Tobacco Use Among U.S. Racial/Ethnic Minority Groups

African Americans
American Indians and Alaska Natives
Asian Americans and Pacific Islanders
Hispanics

A Report of the Surgeon General

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion
Office on Smoking and Health

Suggested Citation

U.S. Department of Health and Human Services. *Tobacco Use Among U.S. Racial/Ethnic Minority Groups—African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics: A Report of the Surgeon General.* Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1998.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402, S/N 017-001-00527-4.

THE SECRETARY OF HEALTH AND HUMAN SERVICES
WASHINGTON, D.C. 20201

The Honorable Newt Gingrich
Speaker of the House of Representatives
Washington, D.C. 20515

Dear Mr. Speaker:

I am pleased to transmit to the Congress the Surgeon General's report on the health consequences of smoking, entitled *Tobacco Use Among U.S. Racial/Ethnic Minority Groups*. This report is mandated by Section 8(a) of the Public Health Cigarette Smoking Act of 1969 (Public Law 91-222) and includes the health effects of smokeless tobacco products, as mandated by Section 8(a) of the Comprehensive Smokeless Tobacco Health Education Act of 1986 (Public Law 99-252). The report was prepared by the Centers for Disease Control and Prevention.

This is the first Surgeon General's report to focus on tobacco use among four U.S. racial/ethnic minority groups: African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics. It provides a single, comprehensive source of data on each racial/ethnic group's patterns of tobacco use, physical effects related to tobacco smoking and chewing, societal and psychosocial factors associated with tobacco use, and a selection of specific tobacco control programs. Armed with accurate data, health professionals can plan appropriate programs to address more effectively the health needs of these groups.

Smoking is the leading cause of preventable death in the United States. Certain racial/ethnic minority populations remain at high risk for using tobacco and often bear a disproportionate share of the human and economic cost of tobacco use. For instance, African Americans suffer the highest death rates from several diseases caused by smoking. Although some recent declines in lung cancer trends are encouraging, we have reason for great concern about recently reported increases in rates of smoking among African-American and Hispanic high school students.

According to estimates from the U.S. Bureau of the Census, over the next 50 years, the size of these four racial/ethnic minority groups is expected to increase dramatically, becoming almost half of the U.S. population by the year 2050. This projection clearly indicates the need to develop effective strategies to prevent tobacco-related disease and death in these four minority population groups.

Sincerely,

Donna E. Shalala

Enclosure

THE SECRETARY OF HEALTH AND HUMAN SERVICES
WASHINGTON, D.C. 20201

The Honorable Albert Gore, Jr.
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

I am pleased to transmit to the Congress the Surgeon General's report on the health consequences of smoking, entitled *Tobacco Use Among U.S. Racial/Ethnic Minority Groups*. This report is mandated by Section 8(a) of the Public Health Cigarette Smoking Act of 1969 (Public Law 91-222) and includes the health effects of smokeless tobacco products, as mandated by Section 8(a) of the Comprehensive Smokeless Tobacco Health Education Act of 1986 (Public Law 99-252). The report was prepared by the Centers for Disease Control and Prevention.

This is the first Surgeon General's report to focus on tobacco use among four U.S. racial/ethnic minority groups: African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics. It provides a single, comprehensive source of data on each racial/ethnic group's patterns of tobacco use, physical effects related to tobacco smoking and chewing, societal and psychosocial factors associated with tobacco use, and a selection of specific tobacco control programs. Armed with accurate data, health professionals can plan appropriate programs to address more effectively the health needs of these groups.

Smoking is the leading cause of preventable death in the United States. Certain racial/ethnic minority populations remain at high risk for using tobacco and often bear a disproportionate share of the human and economic cost of tobacco use. For instance, African Americans suffer the highest death rates from several diseases caused by smoking. Although some recent declines in lung cancer trends are encouraging, we have reason for great concern about recently reported increases in rates of smoking among African-American and Hispanic high school students.

According to estimates from the U.S. Bureau of the Census, over the next 50 years, the size of these four racial/ethnic minority groups is expected to increase dramatically, becoming almost half of the U.S. population by the year 2050. This projection clearly indicates the need to develop effective strategies to prevent tobacco-related disease and death in these four minority population groups.

Sincerely,

Donna E. Shalala

Enclosure

Foreword

The United States of America is a rich blend of cultures. This diversity demands close attention from the agencies and individuals responsible for protecting the public's health. For too long in tobacco control, attention to diversity has been less consistent than is necessary for planning and developing effective health programs. As a result, we sometimes lack sufficient information on which to base tobacco control interventions. With this report, we begin to address such problems and point the way to filling these gaps in knowledge.

Tobacco use causes devastating disease and premature death in every population in the United States. For four major U.S. racial/ethnic minority groups—African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics—patterns of tobacco use, adverse health effects, and the effectiveness of interventions need to be understood in terms of tobacco's cultural and socioeconomic effects on the members of these groups. This report describes the complex factors that play a part in the growing epidemic of diseases caused by tobacco use in these four groups.

Since 1964 when the first Surgeon General's report on smoking and health was released, this report is the first to focus exclusively on tobacco use among members of these four racial/ethnic groups. Together these groups constitute about 25 percent of the U.S. population, and that proportion is growing rapidly. Public health programs must effectively address the health needs of this significant proportion of people. Such action is of paramount importance to reducing tobacco use in the United States and meeting national health objectives for the year 2000. We hope that this report will provide the basis for renewing our commitment to develop more effective tobacco control programs and policies for people of every racial and ethnic background. In addition, the report can be used by parents and communities as a tool to develop their own solutions. With continued diligence, we shall strive to reach and exceed whenever possible our stated health goals by the year 2000 and reduce the enormous health burden caused by tobacco products.

Claire V. Broome, M.D.
Acting Director
Centers for Disease Control and Prevention
and
Acting Administrator
Agency for Toxic Substances and Disease Registry

Preface

from the Surgeon General,
U.S. Department of Health and Human Services

Effective strategies are needed to reduce tobacco use among members of U.S. racial/ethnic groups and thus diminish their burden of tobacco-related diseases and deaths. Cigarette smoking is the leading cause of preventable disease and death in the United States. There is enormous potential to reduce heart disease, cancer, stroke, and respiratory disease among members of racial and ethnic groups, who make up the most rapidly growing segment of the U.S. population.

This Surgeon General's report is the first to address the diverse tobacco control needs of the four major U.S. racial/ethnic minority groups—African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics. This report is also the only single, comprehensive source of data on each group's patterns of tobacco use, physical effects related to tobacco smoking and chewing, and societal and psychosocial factors associated with tobacco use.

The findings detailed in this report indicate that if tobacco use is not reduced among members of these four racial/ethnic groups, they will experience increasing morbidity and mortality from tobacco use. The toll is currently highest for African American adults. Findings also suggest that some close, long-term relationships between tobacco companies and various racial/ethnic communities could hamper U.S. efforts to lower rates of tobacco use by the year 2000. Also notable is the support that members of racial/ethnic groups have shown for legislative efforts to control tobacco use, sales, advertising, and promotion.

As this report goes to press, discouraging news comes from a report published by the Centers for Disease Control and Prevention on the Youth Risk Behavior Survey about tobacco use among African American and Hispanic high school students. Past-month smoking increased among African American students by 80 percent and among Hispanic students by 34 percent from 1991 through 1997. The consistent decline once seen among young African Americans has sharply reversed in recent years. Past-month smoking prevalence increased from 13 percent to 23 percent among African Americans and from 25 percent to 34 percent among Hispanics.

Although cancer remains common in Americans of all racial and ethnic groups, the pattern of increasing lung cancer deaths in the 1970s and 1980s among African American, Hispanic, and some American Indian and Alaska Native subgroups has been halted or reversed for some groups from 1990 through 1995. Some encouraging news from *Cancer Incidence and Mortality, 1973–1995: A Report Card for the U.S.* was just published by the American Cancer Society, the National Cancer Institute, and the Centers for Disease Control and Prevention. The report described lung cancer trend data from 1990 through 1995 for African Americans, Asian Americans and Pacific Islanders, and Hispanics. Lung cancer death rates declined significantly for African American men and for Hispanic men and women from

1990 through 1995; death rates did not change significantly for African American women or for Asian American and Pacific Islander men or women. Although lung cancer trends may continue to decline among some racial/ethnic groups for several more years, recent increases in smoking prevalence among adolescent African Americans and Hispanics and among Asian American and Pacific Islander adolescent males, coupled with the lack of decline among American Indian and Alaska Native adults, do not bode well for long-term trends in lung cancer.

One purpose of this report is to guide researchers in their future efforts to garner more information needed to develop effective prevention and control programs. Several significant research questions need to be addressed. For example, why are African American youths smoking cigarettes in lower proportions than youths in other racial/ethnic groups? How does acculturation affect patterns of tobacco use among immigrants to the United States? What are the differential effects of gender on tobacco use among members of certain racial/ethnic groups? What racial- and ethnic-specific protective factors and risk factors will promote the development of culturally appropriate interventions to prevent and control tobacco use? And to what extent are culturally specific tobacco control programs necessary to curb tobacco use among racial/ethnic populations? While researchers are redirecting their focus, federal, state, and private tobacco control partners need to address program issues, such as how to develop and evaluate culturally appropriate prevention and cessation interventions.

This report includes examples of numerous racial- and ethnic-specific tobacco control programs used in communities across the country. These and other racial/ethnic group-specific programs must be disseminated to all areas of the country, where program planners can develop their own strategies, taking into consideration the cultural attitudes, norms, expectations, and values of the targeted cultural groups.

In each of these endeavors, we will succeed only if we are sensitive to our cultural differences and similarities. I challenge federal and state agencies as well as researchers and practitioners in the social, behavioral, public health, clinical, and biomedical sciences to join me in the pursuit of effective strategies to prevent and control tobacco use among racial/ethnic groups. By meeting this challenge, we will progress toward achieving the nation's year 2000 tobacco-related health objectives and will help to prevent the unnecessary disability, disease, and deaths that result from tobacco use.

David Satcher, M.D., Ph.D.
Surgeon General
and
Assistant Secretary for Health

Acknowledgments

This report was prepared by the U.S. Department of Health and Human Services under the general direction of the Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

Claire V. Broome, M.D., Acting Director, Centers for Disease Control and Prevention, Atlanta, Georgia.

James S. Marks, M.D., M.P.H., Director, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Virginia S. Bales, M.P.H., Deputy Director, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Michael P. Eriksen, Sc.D., Director, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

The editors of the report were

Gerardo Marín, Ph.D., Senior Scientific Editor, Professor, Department of Psychology, University of San Francisco, San Francisco, California.

Gayle Lloyd, M.A., Managing Editor, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Valerie R. Johnson, Senior Editor, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Anne M. Pritchett, Technical Editor, Cygnus Corporation, Rockville, Maryland.

Contributing authors were

Neal L. Benowitz, M.D., Professor and Chief, Division of Clinical Pharmacology, Departments of Medicine, Pharmacy, and Psychiatry, School of Medicine, University of California, San Francisco, California.

Alan Blum, M.D., Associate Professor, Baylor College of Medicine, Houston, Texas.

Ronald L. Braithwaite, Ph.D., Associate Professor, Division of Behavioral Sciences and Health Education, Emory University School of Public Health, Atlanta, Georgia.

Felipe G. Castro, M.S.W., Ph.D., Director, Hispanic Research Center, and Associate Professor, Department of Psychology, Arizona State University, Tempe, Arizona.

Moon S. Chen, Jr., Ph.D., M.P.H., Professor, Department of Preventive Medicine, Ohio State University, Columbus, Ohio.

David B. Coultas, M.D., Associate Professor of Medicine, School of Medicine, University of New Mexico, Albuquerque, New Mexico.

Luis G. Escobedo, M.D., M.P.H., Medical Epidemiologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Dorothy L. Faulkner, Ph.D., M.P.H., Epidemiologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Larri L. Fredericks, Ph.D., M.P.H., Associate Scientist, American Indian Cancer Control Project, Medical Research Institute, Berkeley, California.

Gary A. Giovino, Ph.D., Chief, Epidemiology Branch, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Sandra W. Headen, Ph.D., Assistant Professor, Department of Health Behavior and Health Education, School of Public Health, University of North Carolina, Chapel Hill, North Carolina.

Felicia Schanche Hodge, Dr.P.H., Principal Investigator and Director, Center for American Indian Research and Education, Berkeley, California.

Nancy J. Kaufman, R.N., M.S., Vice President, Robert Wood Johnson Foundation, Princeton, New Jersey.

Juliette S. Kendrick, M.D., Medical Epidemiologist, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Gary King, Ph.D., Assistant Professor and Coordinator, Urban Health Research Program, School of Medicine, University of Connecticut Health Center, Farmington, Connecticut.

Beverly S. Kingsley, Ph.D., M.P.H., Epidemiologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Rod Lew, M.P.H., Health Education Director, Asian Health Services, Oakland, California.

Ann M. Malarcher, Ph.D., Epidemiologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Robert K. Merritt, M.A., Health Scientist, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Michael D. Newcomb, Ph.D., Professor, Department of Psychology, University of California, Los Angeles, California.

John P. Peddicord, M.S., Computer Scientist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Richard Pollay, Ph.D., Professor of Marketing, and Curator, History of Advertising Archives, University of British Columbia, Vancouver, British Columbia, Canada.

Amelie G. Ramirez, Dr.P.H., Associate Professor, Department of Family Practice, University of Texas, and Director, South Texas Health Research Center, San Antonio, Texas.

Patricia A. Richter, Ph.D., M.P.H., Toxicologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Robert G. Robinson, Dr.P.H., Associate Director for Program Development, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Richard B. Rothenberg, M.D., M.P.H., Professor, Department of Family and Preventive Medicine, Emory University School of Medicine, Atlanta, Georgia.

Jonathan M. Samet, M.D., Chairman, Department of Epidemiology, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Maryland.

Michael W. Schooley, M.P.H., Epidemiologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Dana Shelton, M.P.H., Epidemiologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Michael B. Siegel, M.D., M.P.H., Assistant Professor, Boston University School of Public Health, Boston, Massachusetts.

Charyn D. Sutton, President, The Onyx Group, Bala Cynwyd, Pennsylvania.

Scott L. Tomar, D.M.D., Dr.P.H., Assistant Professor, Department of Dental Public Health and Hygiene, School of Dentistry, University of California, San Francisco, California.

Bao-Ping Zhu, M.S., M.B.B.S., Ph.D., Visiting Scientist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Reviewers were

Jasjit S. Ahluwalia, M.D., M.P.H., M.S., Assistant Professor of Medicine, Emory University School of Medicine, Atlanta, Georgia.

David G. Altman, Ph.D., Associate Professor, Department of Public Health Sciences, Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, North Carolina.

Glen Bennett, M.P.H., Coordinator, Office of Prevention, Education, and Control, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, Maryland.

Gilbert J. Botvin, Ph.D., Director, Institute for Prevention Research, Department of Public Health, Cornell University Medical College, New York, New York.

L. Jackson Brown, Director, Epidemiology and Oral Disease Prevention Program, National Institute of Dental Research, National Institutes of Health, Bethesda, Maryland.

Linda Burhansstipanov, Dr.P.H., Director, Native American Cancer Research Program, American Medical Center Cancer Research Center, Denver, Colorado.

David Burns, M.D., Professor of Medicine, University of California at San Diego Medical Center, San Diego, California.

W. Michael Byrd, M.D., M.P.H., Visiting Research Fellow, Department of Health Policy and Management, Harvard School of Public Health, Boston, Massachusetts.

Portia S. Choi, M.D., M.P.H., District Health Officer, Dr. Ruth Temple Health Center, Los Angeles, California.

Nathaniel Cobb, M.D., Director, Cancer Prevention and Control Program, Indian Health Service Headquarters West, Albuquerque, New Mexico.

Janet L. Collins, Ph.D., Director, Division of Nutrition and Physical Activity, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Robert J. Collins, D.M.D., Chief Dental Officer, U.S. Public Health Service, Rockville, Maryland.

Linda S. Crossett, R.D.H., Research Scientist, Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

K. Michael Cummings, Ph.D., Director, Smoking Control Program, Roswell Park Cancer Institute, New York State Department of Health, Buffalo, New York.

Dorynne J. Czechowicz, M.D., Associate Director for Medical and Professional Affairs, Division of Clinical Research, National Institute on Drug Abuse, National Institutes of Health, Rockville, Maryland.

Ronald M. Davis, M.D., Director, Center for Health Promotion and Disease Prevention, Henry Ford Health System, Detroit, Michigan.

Richard A. Daynard, Ph.D., J.D., Chairman, Tobacco Products Liability Project, Northeastern University School of Law, Boston, Massachusetts.

Jane L. Delgado, Ph.D., President and Chief Executive Officer, National Coalition of Hispanic Health and Human Services Organization, Washington, D.C.

John Elder, Ph.D., M.P.H., Professor, Graduate School of Public Health, San Diego State University, San Diego, California.

Harmon Eyre, M.D., Deputy Executive Vice President for Medical Affairs and Research, American Cancer Society, Atlanta, Georgia.

Michael C. Fiore, M.D., M.P.H., Director, Center for Tobacco Research and Intervention, University of Wisconsin Medical School, Madison, Wisconsin.

Adele M. Franks, M.D., Assistant Director for Science, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Harold P. Freeman, M.D., Director of Surgery, Harlem Hospital Center, New York, New York.

Thomas J. Glynn, Ph.D., Chief, Prevention Control Extramural Research Branch, National Cancer Institute, National Institutes of Health, Rockville, Maryland.

Michael G. Goldstein, M.D., Associate Professor of Psychiatry and Human Behavior, Brown University School of Medicine, Providence, Rhode Island.

Robert A. Hahn, Ph.D., M.P.H., Epidemiologist, Epidemiology Program Office, Centers for Disease Control and Prevention, Atlanta, Georgia.

Betty Lee Hawks, M.A., Special Assistant to the Director, Office of Minority Health, U.S. Department of Health and Human Services, Rockville, Maryland.

Clark W. Heath, Jr., M.D., Vice President for Epidemiology and Surveillance Research, American Cancer Society, Atlanta, Georgia.

Jack E. Henningfield, Ph.D., Vice President, Pinney Associates, Bethesda, Maryland.

John H. Holbrook, M.D., Director of Internal Medicine, University of Utah Hospital, Salt Lake City, Utah.

Thomas Houston, M.D., Director, Department of Preventive Medicine and Public Health, American Medical Association, Chicago, Illinois.

Rudolph S. Jackson, Dr.P.H., Professor, Department of Health Education, North Carolina Central University, Durham, North Carolina.

Elaine M. Johnson, Ph.D., Director, Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, Rockville, Maryland.

Nora L. Keenan, Ph.D., Epidemiologist, Office of Surveillance and Analysis, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Monina Klevens, D.D.S., M.P.H., Medical Officer, Division of HIV/AIDS, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia.

Norman A. Krasnegor, Ph.D., Chief, Human Learning and Behavior Branch, Center for Research for Mothers and Children, National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Maryland.

Leonard E. Lawrence, M.D., President, National Medical Association, University of Texas Health Sciences Center at San Antonio, San Antonio, Texas.

Edward Lichtenstein, Ph.D., Research Scientist, Oregon Research Institute, Eugene, Oregon.

Douglas S. Lloyd, M.D., M.P.H., Associate Administrator for Public Health Practice, Health Resources and Services Administration, U.S. Department of Health and Human Services, Rockville, Maryland.

Judith Mackay, M.B.E., J.P., F.R.C.P., Director, Asian Consultancy on Tobacco Control, Kowloon, Hong Kong.

Audrey F. Manley, M.D., M.P.H., President, Spelman College, Atlanta, Georgia.

Alfred McAlister, Ph.D., Associate Professor and Associate Director, Center for Health Promotion Research and Development, The University of Texas at Austin, Austin, Texas.

J. Michael McGinnis, M.D., Scholar-in-Residence, National Academy of Sciences, Washington, D.C.

Bertha Mo, Ph.D., M.P.H., Senior Program Officer, International Development Research Centre, Ottawa, Ontario, Canada.

C. Tracy Orleans, Ph.D., Senior Program Officer, The Robert Wood Johnson Foundation, Princeton, New Jersey.

Terry F. Pechacek, Ph.D., Visiting Scientist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Cheryl L. Perry, Ph.D., Professor, Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis, Minnesota.

John P. Pierce, Ph.D., Sam M. Walton Professor for Cancer Research, Department of Family and Preventive Medicine, University of California, San Diego, California.

Donald H. Reece, Tobacco Control Coordinator, Indian Health Service, Albuquerque, New Mexico.

Patrick Remington, M.D., M.P.H., Chief Medical Officer, Wisconsin Division of Health, Madison, Wisconsin.

Irene Reveles-Chase, M.P.H., Health Education Consultant, Tobacco Control Section, California Department of Public Health, Sacramento, California.

Nancy A. Rigotti, M.D., Director, Quit Smoking Service, General Internal Medicine Unit, Massachusetts General Hospital, Boston, Massachusetts.

Donald J. Sharp, M.D., Medical Epidemiologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Donald R. Shopland, Coordinator, Smoking and Tobacco Control Program, National Cancer Institute, National Institutes of Health, Bethesda, Maryland.

Beverly R. Singer, M.A., Research Staff Associate, School of Social Work, Columbia University, New York, New York.

Jesse L. Steinfeld, M.D., Surgeon General, U.S. Public Health Service, 1969–1973, San Diego, California.

Jonathan R. Sugarman, M.D., M.P.H., Medical Epidemiologist, Portland Area Indian Health Service, Seattle, Washington.

Michael J. Thun, M.D., Director, Analytic Epidemiology, American Cancer Society, Atlanta, Georgia.

Michael H. Trujillo, M.D., M.P.H., Director, Indian Health Service, Rockville, Maryland.

Kenneth E. Warner, Ph.D., Richard D. Remington Collegiate Professor of Public Health, Department of Health Management and Policy, School of Public Health, University of Michigan, Ann Arbor, Michigan.

Raymond Weston, Ph.D., Postdoctoral Fellow, Memorial Sloan-Kettering Cancer Center, Division of Psychiatry, New York, New York.

Judith Wilkenfeld, J.D., Assistant Director, Division of Advertising Practices, Federal Trade Commission, Washington, D.C.

Jerome Williams, Ph.D., Professor of Marketing, Pennsylvania State University, University Park, Pennsylvania.

Ernst L. Wynder, M.D., President, American Health Foundation, New York, New York.

Other contributors were

Marco Andujar, Telecommunications Specialist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Ruth Atchison, Proofreader, Cygnus Corporation, Rockville, Maryland.

Cheryl Baldwin, Graphic Artist/Desktop Publishing Specialist, High 5 Design, Gaithersburg, Maryland.

Mary Bedford, Proofreader, Cygnus Corporation, Rockville, Maryland.

Christine V. Bellantoni, Graduate Student, University of Connecticut Health Center, Farmington, Connecticut.

Maureen Berg, Desktop Publishing Specialist, Market Experts, Silver Spring, Maryland.

Marissa Bernstein, Indexer, Cygnus Corporation, Rockville, Maryland.

Nowell D. Berreth, Writer-Editor, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Joyce Buchanan, Administrative Assistant, Institute for Social Research, Survey Research Center, University of Michigan, Ann Arbor, Michigan.

Janine E. Bullard, Proofreader, Cygnus Corporation, Rockville, Maryland.

Ralph S. Carabello, Ph.D., Epidemiologist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Jeffrey H. Chrismon, Systems Analyst, TRW Inc., Atlanta, Georgia.

Paulette Clark McGee, Proofreader, Cygnus Corporation, Rockville, Maryland.

Coreen A. Colovos, Copy Editor, Cygnus Corporation, Rockville, Maryland.

David F. Coole, M.S., Statistical Programmer, TRW Inc., Atlanta, Georgia.

Karen M. Deasy, Associate Director, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Washington, D.C.

Susan R. Derrick, Program Analyst, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Ellen C. Dreyer, R.N., M.S., Project Director, Cygnus Corporation, Rockville, Maryland.

Rita Elliott, M.A., Editorial Consultant, University of New Mexico, School of Medicine, Albuquerque, New Mexico.

Raymond J. Gamba, M.S., Graduate Student, The Claremont Graduate School, Claremont, California.

Maritta Perry Grau, M.A., Copy Editor, The Write Touch: Editorial Services, Frederick, Maryland.

Sarah Gregory, Acting Managing Editor, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Lillian E. Hatch, M.S.L.S., Information Specialist, Cygnus Corporation, Rockville, Maryland.

Elizabeth L. Hess, Copy Editor, Cygnus Corporation, Rockville, Maryland.

Thomya Hogan, Proofreader, Cygnus Corporation, Rockville, Maryland.

Reta N. Horton, M.A., Secretary, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Frederick L. Hull, Ph.D., Writer-Editor, Technical Information and Editorial Services Branch, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Mescal J. Knighton, Writer-Editor, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Anh Lé, Project Coordinator, Vietnamese Community Health Promotion Project, University of California, San Francisco, California.

Yun Chen W. Lin, M.P.H., Technical Information Specialist, TRW Inc., Atlanta, Georgia.

William T. Marx, M.L.I.S., Technical Information Specialist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Maribet McCarty, R.N., M.P.H., Technical Information Specialist, The Orkand Corporation, Atlanta, Georgia.

Margie McDonald, Word Processing Specialist, Cygnus Corporation, Rockville, Maryland.

Linda A. McLaughlin, Word Processing Specialist, Cygnus Corporation, Rockville, Maryland.

Jennifer A. Michaels, M.L.S., Technical Information Specialist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Barbara A. Mills, Secretary, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Paul D. Mowery, M.S., Senior Research Scientist, Battelle Memorial Institute, Atlanta, Georgia.

Leslie A. Norman, Public Affairs Specialist, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Ward C. Nyholm, Desktop Publishing Specialist, Cygnus Corporation, Rockville, Maryland.

Patrick O'Malley, Ph.D., Research Scientist, Institute for Social Research, Survey Research Center, University of Michigan, Ann Arbor, Michigan.

Anniette Ponce de León, Student, University of San Francisco, San Francisco, California.

Felicia A. Powell, M.S., Statistical Programmer, TRW Inc., Atlanta, Georgia.

Christopher Rigaux, Project Director, Cygnus Corporation, Rockville, Maryland.

Patricia L. Schwartz, Graphic Artist/Desktop Publishing Specialist, Cygnus Corporation, Rockville, Maryland.

Matthew B. Spangler, Proofreader, Cygnus Corporation, Rockville, Maryland.

Catherine T. Timmerman, Chief Operating Officer, Cygnus Corporation, Rockville, Maryland.

Peggy E. Williams, M.S., Proofreader, Marietta, Georgia.

Eve J. Wilson, Ph.D., Project Manager, Cygnus Corporation, Rockville, Maryland.

Beatrice K. Wolman, M.S., Project Manager, Cygnus Corporation, Rockville, Maryland.

Tobacco Use Among U.S. Racial/Ethnic Minority Groups

Chapter 1
Introduction and Summary of Conclusions

Introduction

This Surgeon General's report on tobacco use summarizes current information on risk factors and patterns related to tobacco use among members of four major racial and ethnic minority groups in the United States: African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics. In addition, this report presents information on national and regional efforts to curtail consumption of tobacco products among members of these four groups. Previous Surgeon General's reports on smoking and health have briefly summarized findings related to one or more of the racial/ethnic groups covered in this report, but this is the first Surgeon General's report to concentrate specifically on the four major racial/ethnic groups in the United States.

Several factors prompted the development of this report. First, the information in this report has never before been compiled in one source. Consequently, policymakers, community leaders, researchers, and public health workers have had difficulty determining the extent of the problem, identifying gaps in information regarding tobacco use among members of the four groups, or being aware of existing tobacco control programs that have demonstrated effectiveness. Thus, incorporating such information into the design and implementation of culturally appropriate services has been difficult.

Second, the four racial/ethnic groups currently constitute about one-fourth of the population of this country, and the Bureau of the Census projects that by 2050 the non-Hispanic white population in the United States will total only 53 percent (Day 1996). Preventing health problems related to tobacco use among the individuals in racial and ethnic groups will be integral to achieving U.S. public health objectives, such as those proposed in *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* (U.S. Department of Health and Human Services [USDHHS] 1991, 1995; National Center for Health Statistics [NCHS] 1994).

This report contributes essential knowledge that must be incorporated into efforts to accomplish the *Healthy People 2000* objectives, particularly these six goals:

- *Objective 3.1.* Reduce coronary heart disease deaths to no more than 100 per 100,000 people. (Age-adjusted baseline: 135 deaths per 100,000 people in 1987.) Among African Americans, reduce the number from 168 to 115 deaths per 100,000 people between 1987 and the year 2000 (Objective 3.1a).

- *Objective 3.2.* Slow the rise in lung cancer deaths to achieve a rate of no more than 42 per 100,000 people. (Age-adjusted baseline: 38.5 deaths per 100,000 people in 1987.) Among African American males, slow the rise from 86.1 to 91 deaths per 100,000 people between 1990 and the year 2000 (Objective 3.2b).

- *Objective 3.4.* Reduce the prevalence of cigarette smoking to no more than 15 percent among people aged 18 years and older. (Baseline: 29 percent in 1987 [31 percent for men and 27 percent for women].) Particular year 2000 objectives include lowering the prevalence of smoking to 18 percent among African Americans (Objective 3.4d), 15 percent among Hispanics (Objective 3.4e), and 20 percent among American Indians and Alaska Natives (Objective 3.4f) and Southeast Asian men (Objective 3.4g).

- *Objective 3.5.* Reduce the initiation of cigarette smoking by children and youths so that no more than 15 percent have become regular cigarette smokers by the age of 20 years. (Baseline: 30 percent of youths had become regular cigarette smokers by the ages of 20–24 years in 1987.)

- *Objective 3.9.* Reduce the prevalence of smokeless tobacco use among males aged 12–24 years to no more than 4 percent. (Baseline: 6.6 percent among males aged 12–17 years in 1988; 8.9 percent among males aged 18–24 years in 1987.) A specific objective is to lower the prevalence of smokeless tobacco use among American Indian and Alaska Native young adults to 10 percent by the year 2000 (Objective 3.9a).

- *Objective 3.18.* Reduce stroke deaths to no more than 20 per 100,000 people. (Age-adjusted baseline: 30.4 deaths per 100,000 people in 1987.) Among African Americans, reduce the number from 52.5 to 27.0 deaths per 100,000 people between 1987 and the year 2000 (Objective 3.18a).

This report of the Surgeon General also responds to the need to thoroughly analyze the smoking-related health status of racial/ethnic groups and to determine if there is a differential risk for tobacco addiction (Chen 1993). High risk might derive from personal characteristics but also from social factors, such as migratory patterns, acculturation, and the tobacco industry's historical involvement in the racial/ethnic communities and targeted advertising and promotion of tobacco products (see Chapter 4).

In addition, this report is needed to document how patterns of health, disease, and illness among people in the various racial/ethnic minority groups differ from patterns in the rest of the U.S. population. These differences reflect the groups' exposure to tobacco products, as well as the heterogeneity of the groups' lifestyles, cultural beliefs and practices, genetic backgrounds, and environmental exposures. This report illustrates how patterns of tobacco use differ among and within the four racial/ethnic groups (Chapter 2). It compares the groups in terms of the incidence and the prevalence of death rates for diseases commonly associated with tobacco use and presents data from case-control and cohort studies whenever possible (Chapter 3).

The health status of members of racial and ethnic groups in this country has also been the focus of previous federal reports, such as the *Health Status of Minorities and Low-Income Groups* (Health Resources and Services Administration [HRSA] 1985), the *Report of the Secretary's Task Force on Black and Minority Health* (USDHHS 1985), and *Chronic Disease in Minority Populations* (Centers for Disease Control and Prevention [CDC] 1994). This Surgeon General's report supports initiatives such as the Hispanic Health and Nutrition Examination Survey in the early 1980s; the Surgeon General's National Hispanic/Latino Health Initiative (Novello and Soto-Torres 1993); special funding initiatives from federal agencies such as the CDC, the National Cancer Institute, the National Institute on Alcohol Abuse and Alcoholism, the National Institute on Drug Abuse, the National Heart, Lung, and Blood Institute (1994), and the National Institute of Mental Health (National Institutes of Health 1993); the Department of Health and Human Services's 1996 *Hispanic Agenda for Action: Improving Services to Hispanic Americans*, and the 1998 President's Race Initiative, which includes special funding initiatives for the CDC, the Indian Health Service, and the Health Resources and Services Administration.

Major Conclusions

1. Cigarette smoking is a major cause of disease and death in each of the four population groups studied in this report. African Americans currently bear the greatest health burden. Differences in the magnitude of disease risk are directly related to differences in patterns of smoking.

2. Tobacco use varies within and among racial/ethnic minority groups; among adults, American Indians and Alaska Natives have the highest prevalence of tobacco use, and African American and Southeast Asian men also have a high prevalence of smoking. Asian American and Hispanic women have the lowest prevalence.

3. Among adolescents, cigarette smoking prevalence increased in the 1990s among African Americans and Hispanics after several years of substantial decline among adolescents of all four racial/ethnic minority groups. This increase is particularly striking among African American youths, who had the greatest decline of the four groups during the 1970s and 1980s.

4. No single factor determines patterns of tobacco use among racial/ethnic minority groups; these patterns are the result of complex interactions of multiple factors, such as socioeconomic status, cultural characteristics, acculturation, stress, biological elements, targeted advertising, price of tobacco products, and varying capacities of communities to mount effective tobacco control initiatives.

5. Rigorous surveillance and prevention research are needed on the changing cultural, psychosocial, and environmental factors that influence tobacco use to improve our understanding of racial/ethnic smoking patterns and identify strategic tobacco control opportunities. The capacity of tobacco control efforts to keep pace with patterns of tobacco use and cessation depends on timely recognition of emerging prevalence and cessation patterns and the resulting development of appropriate community-based programs to address the factors involved.

Preparation of This Report

This report of the Surgeon General was prepared by the Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, as part of the Department's mandate, under Public Laws 91–222 and 99–252, to report to the U.S. Congress current information about the health effects of tobacco use.

The report was produced with the assistance of experts in the behavioral, epidemiological, medical, and public health fields. Initial background papers were produced by more than 25 scientists who were selected because of their expertise and familiarity with the topics covered in this report. Their various contributions were summarized into five major chapters that were reviewed by 28 peer reviewers. The entire manuscript was then sent to 43 scientists and experts, who reviewed it for its scientific integrity. Subsequently, the report was reviewed by various institutes and agencies within the Department of Health and Human Services.

Terms Related to Race and Ethnicity

Race and ethnicity are classifications currently used for various purposes, such as tracking morbidity and mortality statistics, defining group characteristics (as is done in many studies and by most federal and state agencies, including the U.S. Bureau of the Census), and exploring the health characteristics of individuals and groups. Most extant data consider four *racial* groups in the United States (African American or black, American Indian and Alaska Native, Asian American and Pacific Islander, and white) as well as two *ethnic* categories (Hispanic and non-Hispanic).

Specific choices have been made in selecting the labels used to identify individuals who share a given race, tradition, culture, or ethnicity. These labels differ somewhat from those published in the Race and Ethnic Standards for Federal Statistics and Administrative Reporting, more commonly known as Directive 15 (U.S. Department of Commerce 1978). This directive presents rules for classifying persons into four racial groups (American Indian or Alaskan Native, Asian or Pacific Islander, black, and white) and two ethnic categories (Hispanic origin and not of Hispanic origin). The labels in this report were chosen to reflect current preferred use by many members of each group and researchers as well as to more clearly identify members of a given group. Nevertheless, because of differences in the way in which ethnicity has been ascertained in the various studies, some overlap and misclassification may exist, particularly with regard to Hispanic origin (for example, Hispanics of African background may be classified as African Americans, or Hispanics may be classified as non-Hispanic whites). In addition, the terms used in this report do not always precisely depict the racial/ethnic group studied (for instance, this report consistently uses the term *American Indian and Alaska Native*, even when describing studies of *Native Americans*—a category that in some cases excludes Alaska Natives). Moreover, the terms used here do not reflect the fact that some studies were conducted in the 48 contiguous states and may exclude a substantial number of Alaska Natives and Native Hawaiians. Throughout this report, the following labels and definitions are used, with the referents basically agreeing with those of Directive 15:

- *African American.* Individuals who trace their ancestry of origin to Sub-Saharan Africa.
- *American Indian and Alaska Native.* Persons who have origins in any of the original peoples of North America and who maintain that cultural identification through self-identification, tribal affiliation, or community recognition.
- *Asian American and Pacific Islander.* Individuals who trace their background to the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.
- *Hispanic.* Persons who trace their background to one of the Spanish-speaking countries in the Americas or to other Spanish cultures or origins.
- *White.* Persons who have origins in any of the original peoples of Europe, North Africa, or the Middle East. Throughout most of this report, white refers to non-Hispanic whites.

Finally, this report avoids using such labels as *people of color, special populations, multicultural populations,* or *diverse populations* because some people consider them inaccurate, improper, or pejorative. Without question, not everyone will agree with the terms used in this report because no universally accepted labels exist. These terms will continue to evolve with time.

Terms Related to Tobacco Use

Throughout this report, *prevalence of smoking cessation* is used to describe the proportion of persons who had ever smoked and who were former smokers at the time of survey (this term is used instead of *quit ratio* or *quit rate*). Definitions related to smoking status—ever smokers, never smokers, current smokers, and former smokers—are presented later in this report (see Chapter 2).

Demographic Characteristics of the Four Racial/Ethnic Minority Groups

In the 1990 U.S. Census, the four racial and ethnic groups that are the focus of this report accounted for 24 percent of the population, or more than 60 million people (Table 1). African Americans were the largest group, followed by Hispanics, Asian Americans and Pacific Islanders, and American Indians and Alaska Natives. Although these groups constitute a minority of the total population, their overall growth of 32 percent between 1980 and 1990 far exceeds the 4-percent increase among whites (Table 1). Asian Americans and Pacific Islanders had the largest growth during that period, followed by Hispanics, American Indians and Alaska Natives, and African Americans. Because of this rapid growth, racial and ethnic populations tend to be younger than the white majority.

Demographic characteristics vary significantly when the four racial and ethnic groups are compared with whites, according to 1990 census data (Table 2; within-group variability is masked because all subgroups that make up a given racial or ethnic group are considered together) (U.S. Bureau of the Census 1993c). The median ages of Hispanics (25.6 years), as well as American Indians and Alaska Natives (26.9 years), are lower than those of the other racial/ethnic group members. Hispanics have the lowest proportion of high school graduates (49.8 percent) of all groups and the highest proportion of people who speak a language other than English (77.8 percent). Asian Americans and Pacific Islanders (38.4 percent) as well as Hispanics (39.4 percent) have the largest proportions of individuals who feel they do not speak English "very well." They also have the highest proportions of foreign-born persons. American Indians and Alaska Natives, African Americans, and Hispanics have significantly higher levels of unemployment and poverty as well as substantially lower household incomes than Asian Americans, Pacific Islanders, or whites. In all four groups, a majority of members live in urban environments; however, American Indians and Alaska Natives have the lowest proportion of urban residents.

Differences in the demographic characteristics of each of the various racial and ethnic groups are related to variations in national background and immigration history. Asian Americans and Pacific Islanders, for example, include approximately 32 different ethnic and

Table 1. U.S. population distribution, by race/ethnicity and Hispanic origin and percentage change, 1980–1990

	1980 (in millions)	1990 (in millions)	% Change
White*	180.26	188.42	4
African American*	26.10	29.28	12
Hispanic	14.61	21.90†	50
Asian American and Pacific Islander	3.50	7.23	107
American Indian and Alaska Native‡	1.42	2.02	42

*Excludes persons of Hispanic origin.
†Excludes 3.5 million Hispanics in Puerto Rico.
‡Includes Eskimos and Aleuts.
Source: U.S. Bureau of the Census 1983, 1993c.

Table 2. Selected demographic characteristics for the U.S. population, by race/ethnicity, 1990

Characteristic	African Americans	American Indians/ Alaska Natives	Asian Americans/ Pacific Islanders	Hispanics	Whites*
Population	29,930,524	2,015,143	7,226,986	21,900,089	188,424,773
Women (percentage)	52.8	50.4	51.2	49.2	51.3
Median age (years)	28.2	26.9	30.1	25.6	34.9
Foreign born (percentage)	4.9	2.3	63.1	35.8	3.3
Education (percentage of persons aged ≥25 years)					
High school education	63.1	65.5	77.5	49.8	79.1
Bachelor's degree or higher	11.4	9.3	36.6	9.2	22.1
English-language ability (percentage of persons aged ≥5 years)					
Speak a language other than English	6.3	23.8	73.3	77.8	5.7
Do not speak English "very well"	2.4	9.2	38.4	39.4	1.8
Number of persons per family	3.5	3.6	3.7	3.8	3.0
Percentage of families with own children aged <18 years	56.5	60.7	59.5	64.5	45.2
Employment status† (percentage of persons aged ≥16 years)					
Employed	62.7	62.1	67.5	67.5	65.3
Unemployed	12.9	14.4	5.3	10.4	5.0
Percentage of employed persons aged ≥16 years in a managerial/professional occupation	18.1	18.3	30.6	14.1	28.5
Household income in 1989 ($)					
Median	19,758	20,025	36,784	24,156	31,672
Mean	25,872	26,602	46,695	30,301	40,646
Per capita income in 1989 ($)	8,859	8,328	13,638	8,400	16,074
Poverty rate (percentage)					
Families	26.3	27.0	11.6	22.3	7.0
Persons	29.5	30.9	14.1	25.3	9.2
Urban residents (percentage)	87.2	56.0	95.4	91.4	70.9

*Excludes persons of Hispanic origin. The population figures for African Americans in Tables 1 and 2 are different because the population cited in Table 2 includes African Americans of Hispanic origin, while the African American population cited in Table 1 excludes persons of Hispanic origin.

†These figures do not include several categories of people who were not in the civilian labor force for various reasons, such as students, housewives, retired workers, seasonal workers in an off season who were not looking for work, institutionalized persons, and persons doing only incidental unpaid family work (less than 15 hours during the reference week).

Source: U.S. Bureau of the Census 1993a,c.

national groups and speak nearly 500 languages and dialects (Chen 1993). They trace their background to areas as diverse as Mongolia to the north, Indonesia and the South Pacific Islands to the south, India to the west, and Japan to the east. Hispanics include individuals who trace their background to the original settlers of large areas in what is now the Southwest United States as well as recent immigrants from any of the 18 Spanish-speaking countries in Latin America. The American Indian and Alaska Native population in the United States is likewise composed of a richly diverse group of indigenous cultures of indigenous cultures, over half of whom do not live on a reservation (U.S. Bureau of the Census 1993c). More than 500 federally recognized tribes and an additional 100 nonfederally recognized tribes are concentrated primarily in 25 reservation states (U.S. Bureau of the Census 1992a). American Indians and Alaska Natives continue to speak more than 150 languages. (For additional information, see U.S. Bureau of the Census reports on Asian Americans and Pacific Islanders [1993a], Hispanics [1993b], and American Indians and Alaska Natives [1993c].) Most African Americans in the United States can trace their ancestry to territories that include the modern states of Benin, Burkina Faso (formerly Upper Volta), Cameroon, the Congo Republic, Côte d'Ivoire (Ivory Coast), the Democratic Republic of the Congo (formerly Zaire), Gabon, Gambia, Ghana, Guinea, Liberia, Nigeria, Senegal, Sierra Leone, and Togo (Ploski and Williams 1989). The mode of entry for practically all Africans who entered the United States in the seventeenth, eighteenth, and nineteenth centuries (until 1865) was as slaves (see Chapter 4 for further historical discussion). Many recent immigrants came from the Caribbean islands and Sub-Saharan Africa. This report excludes data on the 3.5 million residents of Puerto Rico as well as data on residents of other territories and associated states of the United States; however, many of the issues discussed in this report are relevant to these individuals because they have been influenced by the events taking place in the 50 states.

Over the next 50 years, the population of the four groups is expected to increase dramatically, reaching close to one-half of the country's population by the year 2050 (Table 3), according to estimates from the U.S. Bureau of the Census (1992b). These estimates underscore the need to develop appropriate interventions to avert disturbing tobacco addiction patterns in this large segment of the population.

Table 3. Estimated percentage distribution of the U.S. population, by race/ethnicity and Hispanic origin, 1990–2050

	Non-Hispanic				
Year	African American	Asian American/ Pacific Islander	American Indian*	White	Hispanic
1990	11.8	2.8	0.7	75.7	9.0
1995	12.1	3.5	0.7	73.6	10.1
2000	12.3	4.2	0.8	71.6	11.1
2005	12.6	4.9	0.8	69.6	12.2
2010	12.8	5.5	0.8	67.6	13.2
2020	13.3	6.8	0.9	63.9	15.2
2050	15.0	10.1	1.1	52.7	21.1

*Includes Eskimos and Aleuts.
Source: U.S. Bureau of the Census 1992b.

Effects of Racial/Ethnic Background on Health

Extensive research has been conducted on the relationship between health and race/ethnicity (see, for example, Harwood 1981; Polednak 1989; Braithwaite and Taylor 1992; Young 1994). Published reports of these studies tend to show different rates of illness across racial/ethnic groups. Some of these differences may be explained by variations in each group's beliefs and attitudes, traditional health-related practices, normative behaviors, social conditions, levels of access to high-quality health care, experiences with discrimination and racism, living environments, competing causes of death, and genetic backgrounds. Genetic factors may contribute to certain differences among groups of people; however, culture, degree of acculturation, and socioeconomic factors are probably far more significant determinants of health status in the United States (Freeman 1993; Adler et al. 1994).

Culture is a broad concept (Kroeber and Kluckhohn 1963)—its influence encompasses all aspects of daily life, including beliefs and practices about health and illness as well as norms that dictate behaviors. Most contemporary societies include many different cultures, which may be defined by historical, geographic, economic, social, and political elements (Helman 1985). The United States has always been a nation of immigrants and coexisting cultures.

Acculturation—the process of learning the values, beliefs, norms, and traditions of a new culture (Marín 1992)—allows individuals to make choices and to learn of new worldviews, while keeping their original views (biculturalism) or modifying their initial perspectives to be more consonant with those of the new culture (assimilation). In multicultural societies such as the United States, acculturation occurs among immigrants (as they learn the host culture) as well as among individuals born in the United States (as they learn the culture of immigrants). Despite the significance of acculturation's link with human behavior, few studies have focused on how acculturation might affect the health status and behavior of ethnic groups in the United States. Part of the problem has been the difficulty in designing appropriate measuring instruments (Marín 1992), although recent research has begun to assess the role that acculturation plays in determining the health status of members of U.S. racial/ethnic groups (Pérez-Stable 1994; Vega and Amaro 1994; Williams and Collins 1995).

Socioeconomic characteristics, which are powerful determinants of health and disease (USDHHS 1985, 1991; Liberatos et al. 1988; HRSA 1991; Williams and Collins 1995), differ markedly among the racial and ethnic groups of the United States (Table 2). Levels of income and education may directly and indirectly affect the health status of individuals (Council on Ethical and Judicial Affairs 1990; Weissman et al. 1991). Income, for example, often is a determinant of access to health care as well as of the quantity and quality of health care available. Persons with low incomes, regardless of race or ethnicity, are more likely to be uninsured (American College of Physicians 1990), to encounter delays in seeking or receiving care or to be denied care (Tallon 1989), to rely on hospital clinics and emergency rooms for health services (NCHS 1985), and to receive substandard care (Burstin et al. 1992). Level of education may influence health beliefs and behaviors, which determine whether and how individuals seek health care, make treatment choices, and comply with treatment suggestions. Because the literature reviewed in this report has often failed to consider the role of socioeconomic factors in the health status of members of racial/ethnic groups, understanding the significance of the results is difficult. Nevertheless, these published reports indicate that access to health care and the type of care received are partly determined by the race and ethnicity of the patient and that members of minority groups are less likely than whites to receive adequate care (e.g., Blendon et al. 1989; CDC 1989; Todd et al. 1993; Williams and Collins 1995).

The information summarized in this report reflects the role of race, ethnicity, and culture in shaping tobacco use among members of the four population groups. Unfortunately, currently available methods do not help delineate the role of acculturation, socioeconomic conditions, and societal problems such as racism, prejudice, and discrimination (e.g., Osborne and Feit 1992; Freeman 1993; Pappas 1994). Nevertheless, efforts were made here to discern the possible role of these variables in explaining tobacco use among racial/ethnic minority group members.

Chapter Conclusions

Following are the specific conclusions for each chapter in this report.

Chapter 2. Patterns of Tobacco Use Among Four Racial/Ethnic Minority Groups

1. In 1978–1995, the prevalence of cigarette smoking declined among African American, Asian American and Pacific Islander, and Hispanic adults. However, among American Indians and Alaska Natives, current smoking prevalence did not change for men from 1983 to 1995 or for women from 1978 to 1995.
2. Tobacco use varies within and among racial/ethnic groups; among adults, American Indians and Alaska Natives have the highest prevalence of tobacco use; African American and Southeast Asian men also have a high prevalence of smoking. Asian American and Hispanic women have the lowest prevalence.
3. In all racial/ethnic groups discussed in this report except American Indians and Alaska Natives, men have a higher prevalence of cigarette smoking than women.
4. In all racial/ethnic groups except African Americans, men are more likely than women to use smokeless tobacco.
5. Cigarette smoking prevalence increased in the 1990s among African American and Hispanic adolescents after several years of substantial decline among adolescents of all four racial/ethnic minority groups. This increase is particularly striking among African American youths, who had the greatest decline of the four groups during the 1970s and 1980s.
6. Since 1978, the prevalence of cigarette smoking has remained strikingly high among American Indian and Alaska Native women of reproductive age and has not declined as it has among African American, Asian American and Pacific Islander, and Hispanic women of reproductive age.
7. Declines in smoking prevalence were greater among African American, Hispanic, and white men who were high school graduates than they were among those with less formal education. Among women in these three groups, education-related declines in cigarette smoking were less pronounced.
8. Educational attainment accounts for only some of the differences in smoking behaviors (current smoking, heavy smoking, ever smoking, and smoking cessation) between whites and the racial/ethnic minority groups discussed in this report. Other biological, social, and cultural factors are likely to further account for these differences.
9. Compared with whites who smoke, smokers in each of the four racial/ethnic minority groups smoke fewer cigarettes each day. Among smokers, African Americans, Asian Americans and Pacific Islanders, and Hispanics are more likely than whites to smoke occasionally (less than daily).
10. The data in general suggest that acculturation influences smoking patterns in that individuals tend to adopt the smoking behavior of the current broader community; however, the exact effects of acculturation on smoking behavior are difficult to quantify because of limitations on most available measures of this cultural learning process.

Chapter 3. Health Consequences of Tobacco Use Among Four Racial/Ethnic Minority Groups

1. Cigarette smoking is a major cause of disease and death in each of the four racial/ethnic groups studied in this report. African Americans currently bear the greatest health burden. Differences in the magnitude of disease risk are directly related to differences in patterns of smoking.
2. Although lung cancer incidence and death rates vary widely among the nation's racial/ethnic groups, lung cancer is the leading cause of cancer death for each of the racial/ethnic groups studied in this report. Before 1990, death rates from malignant neoplasms of the respiratory system increased among African American, Hispanic, and American Indian and Alaska Native men and women. From

1990 through 1995 death rates from respiratory cancers decreased substantially among African American men, leveled off among African American women, decreased slightly among Hispanic men and women, and increased among American Indian and Alaska Native men and women.

3. Rates of tobacco-related cancers (other than lung cancer) vary widely among members of racial/ethnic groups, and they are particularly high among African American men.

4. The effect of cigarette smoking (as reflected by biomarkers of tobacco exposure) on infant birth weight appears to be the same in African American and white women. As reported in previous Surgeon General's reports, cigarette smoking increases the risk of delivering a low-birth-weight infant.

5. No significant racial/ethnic group differences have been consistently demonstrated in the relationship between smoking and infant mortality or sudden infant death syndrome (SIDS); cigarette smoking has been associated with increased risk of SIDS and remains a probable cause of infant mortality.

6. Future research is needed and should focus on how tobacco use affects coronary heart disease, stroke, cancer, chronic obstructive pulmonary disease, and other respiratory diseases among members of racial/ethnic groups. Studies also are needed to determine how the health effects of smokeless tobacco use and exposure to environmental tobacco smoke vary across racial/ethnic minority groups.

7. Persons of all racial/ethnic backgrounds are vulnerable to becoming addicted to nicotine, and no consistent differences exist in the overall severity of addiction or symptoms of addiction across racial/ethnic groups.

8. Levels of serum cotinine (a biomarker of tobacco exposure) are higher in African American smokers than in white smokers for similar levels of daily cigarette consumption. Further research is needed to clarify the relationship between smoking practices and serum cotinine levels in U.S. racial/ethnic groups. Variables such as group-specific patterns of smoking behavior (e.g., number of puffs per cigarette, retention time of tobacco smoke in the lungs), rates of nicotine metabolism, and brand mentholation could be explored.

Chapter 4. Factors That Influence Tobacco Use Among Four Racial/Ethnic Minority Groups

1. The close association of tobacco with significant events and rituals in the history of many racial/ethnic communities and the tobacco industry's long history of providing economic support to some racial/ethnic groups—including employment opportunities and contributions to community groups and leaders—may undermine prevention and control efforts.

2. The tobacco industry's targeted advertising and promotion of tobacco products among members of these four U.S. racial/ethnic groups may undermine prevention and control efforts and thus lead to serious health consequences.

3. The high level of tobacco product advertising in racial/ethnic publications is problematic because the editors and publishers of these publications may omit stories dealing with the damaging effects of tobacco or limit the level of tobacco-use prevention and health promotion information included in their publications.

4. Although much of the original research on psychosocial factors that influence tobacco use reflects general processes that may apply to racial/ethnic populations, documenting such generalizability requires further research.

5. The initiation of tobacco use and early tobacco use among members of the various racial/ethnic minority groups seem to be related to numerous categories of variables—such as sociodemographic, environmental, historical, behavioral, personal, and psychological—although the predictive power of these categories or of specific risk factors is not known with certainty because of the paucity of research.

6. Cigarette smoking among members of the four racial/ethnic groups is associated with depression, psychological stress, and environmental factors such as advertising and promotion and peers who smoke, as is also the case in the general population. The role of these factors in tobacco use among members of these racial/ethnic groups deserves attention by researchers and persons who develop smoking prevention and cessation programs.

Chapter 5. Tobacco Control and Education Efforts Among Members of Four Racial/ Ethnic Minority Groups

1. More research is needed on the effect of culturally appropriate programs to reduce tobacco use among racial/ethnic minority groups. Interventions should be language appropriate; addressing psychosocial characteristics such as depression, stress, and acculturation may increase the acceptance of programs by members of racial/ethnic groups.

2. To be culturally appropriate, tobacco control programs must reflect the targeted racial/ethnic group's cultural values, consider the group's psychosocial correlates of tobacco use, and use strategies that are acceptable and credible to members of the group. Culturally competent program staff must be aware and accepting of cultural differences, be able to assess their own cultural values, be conscious of intercultural dynamics when persons of different cultures interact, be aware of a racial/ethnic group's relevant cultural characteristics, and have the skills to adapt to cultural diversity.

3. Numerous strategies are needed to control tobacco use among racial/ethnic youths: restricting minors' access to tobacco products, establishing culturally appropriate school-based programs, and designing mass media efforts geared to young people's interests, attitudes, expectations, and norms. Recent provisions of the Synar Amendment, designed to prevent minors' access to tobacco products, and the FDA regulations aimed at reducing the access to and appeal of tobacco products to young people are intended to reduce tobacco use among all youth, including members of racial/ethnic minority groups.

4. Members of racial/ethnic groups are less likely than the general population to participate in smoking cessation groups and to receive cessation advice from health care providers. Barriers to ethnic group participation include limited cultural competence of health care providers and a lack of transportation, money, and access to health care.

5. Available data indicate that racial/ethnic groups support smoking restrictions, such as increasing cigarette excise taxes, banning cigarette advertisements, restricting access to cigarette vending machines, raising the legal age of purchase, prohibiting sponsorship of events by tobacco companies, and establishing clean indoor air regulations. Additional research is needed to evaluate how best to build on this base of public opinion support to strengthen existing tobacco prevention and control programs within racial/ethnic communities.

6. Prevention and cessation efforts in racial/ethnic communities are limited by underdeveloped tobacco control infrastructures and low levels of resources for research, program development, and program dissemination. Greater resources are needed in racial/ethnic minority communities to build tobacco control infrastructures and to develop initiatives.

References

Adler NE, Boyce T, Chesney MA, Cohen S, Folkman S, Kahn RL, et al. Socioeconomic status and health: the challenge of the gradient. *American Psychologist* 1994;49(1):15–24.

American College of Physicians. Access to health care [position paper]. *Annals of Internal Medicine* 1990;112(9):641–61.

Blendon RJ, Aiken LH, Freeman HE, Corey CR. Access to medical care for black and white Americans: a matter of continuing concern. *Journal of the American Medical Association* 1989;261(2):278–81.

Braithwaite RL, Taylor SE, editors. *Health Issues in the Black Community.* San Francisco: Jossey-Bass Publishers, 1992.

Burstin HR, Lipsitz SR, Brennan TA. Socioeconomic status and risk for substandard medical care. *Journal of the American Medical Association* 1992;268(17): 2383–7.

Centers for Disease Control. Pap smear screening—Behavioral Risk Factor Surveillance System, 1988. *Morbidity and Mortality Weekly Report* 1989;38(45): 777–9.

Centers for Disease Control and Prevention. *Chronic Disease in Minority Populations.* Atlanta: Centers for Disease Control and Prevention, 1994.

Chen VW. Smoking and the health gap in minorities. *Annals of Epidemiology* 1993;3(2):159–64.

Council on Ethical and Judicial Affairs. Black-white disparities in health care. *Journal of the American Medical Association* 1990;263(17):2344–6.

Day JC. *Population Projections of the United States by Age, Sex, Race, and Hispanic Origin: 1995 to 2050.* U.S. Bureau of the Census, Current Population Reports. Washington (DC): US Government Printing Office. P25-1130, 1996.

Freeman HP. Poverty, race, racism, and survival. *Annals of Epidemiology* 1993;3(2):145–9.

Harwood A, editor. *Ethnicity and Medical Care.* Cambridge (MA): Harvard University Press, 1981.

Health Resources and Services Administration. *Health Status of Minorities and Low-Income Groups.* Washington (DC): US Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Division of Disadvantaged Assistance. DHHS Publication No. (HRSA) HRS-P-DV 85-1, 1985.

Health Resources and Services Administration. *Health Status of Minorities and Low-Income Groups:* Third Edition. Washington (DC): US Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Division of Disadvantaged Assistance. GPO Publication No. 507-J-1, 1991.

Helman C. *Culture, Health and Illness: An Introduction for Health Professionals.* Bristol (England): John Wright & Sons, 1985.

Kroeber AL, Kluckhohn C. *Culture: A Critical Review of Concepts and Definitions.* New York: Vintage Books, 1963.

Liberatos P, Link BG, Kelsey JL. The measurement of social class in epidemiology. *Epidemiologic Reviews* 1988;10:87–121.

Marín G. Issues in the measurement of acculturation among Hispanics. In: Geisinger KF, editor. *Psychological Testing of Hispanics.* Washington (DC): American Psychological Association, 1992:235–51.

National Center for Health Statistics. Persons With and Without a Regular Source of Medical Care: United States. Data from the National Health Survey. *Vital and Health Statistics.* Series 10, No. 151. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, National Center for Health Statistics. DHHS Publication No. (PHS) 85-1579, 1985.

National Center for Health Statistics. *Healthy People 2000 Review, 1993.* Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics. DHHS Publication No. (PHS) 94-1232-1, 1994.

National Heart, Lung, and Blood Institute. *Minority Programs of the National Heart, Lung, and Blood Institute: Fiscal Year 1993.* Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Heart, Lung, and Blood Institute. NIH Publication No. 94-3037, 1994.

National Institutes of Health. *Minorities in NIH Extramural Grant Programs: Fiscal Year 1982–1991.* Bethesda (MD): National Institutes of Health, Division of Research Grants. GPO Publication No. 351-597, 1993.

Novello AC, Soto-Torres LE. One voice, one vision—uniting to improve Hispanic-Latino health. *Public Health Reports* 1993;108(5):529–33.

Osborne NG, Feit MD. The use of race in medical research [commentary]. *Journal of the American Medical Association* 1992;267(2):275–9.

Pappas G. Elucidating the relationships between race, socioeconomic status, and health [editorial]. *American Journal of Public Health* 1994;84(6):892–3.

Pérez-Stable EJ. Cardiovascular disease. In: Molina CW, Aguirre-Molina M. *Latino Health in the US: A Growing Challenge.* Washington (DC): American Public Health Association, 1994:247–78.

Ploski HA, Williams J, editors. *The Negro Almanac: A Reference Work on the African American.* Detroit: Gale Research Inc, 1989.

Polednak AP. *Racial and Ethnic Differences in Disease.* New York: Oxford University Press, 1989.

Tallon JR Jr. A health policy agenda proposal for including the poor. *Journal of the American Medical Association* 1989;261(7):1044.

Todd KH, Samaroo N, Hoffman JR. Ethnicity as a risk factor for inadequate emergency department analgesia. *Journal of the American Medical Association* 1993;269(12):1537–9.

US Bureau of the Census. Chapter C, General Social and Economic Characteristics. Part 1, United States Summary. *1980 Census of Population, Volume 1, Characteristics of the Population.* Washington (DC): US Government Printing Office. Publication No. PC80-1-C1, 1983.

US Bureau of the Census. *1990 Census of Population, General Population Characteristics, United States.* Washington (DC): US Department of Commerce, Economics and Statistics Administration, Bureau of the Census, 1992a.

US Bureau of the Census. Population Projections of the United States, by Age, Sex, Race, and Hispanic Origin: 1992 to 2050. U.S. Bureau of the Census, *Current Population Reports.* Washington (DC): US Government Printing Office. P25-1092, 1992b.

US Bureau of the Census. *1990 Census of Population: Asians and Pacific Islanders in the United States.* Washington (DC): US Department of Commerce, Economics and Statistics Administration, Bureau of the Census. Publication No. CP-3-5, 1993a.

US Bureau of the Census. *1990 Census of Population: Persons of Hispanic Origin in the United States.* Washington (DC): US Department of Commerce, Economics and Statistics Administration, Bureau of the Census. Publication No. CP-3-3, 1993b.

US Bureau of the Census. *1990 Census of Population: Social and Economic Characteristics, United States.* Washington (DC): US Department of Commerce, Economics and Statistics Administration, Bureau of the Census. Publication No. CP-2-1, 1993c.

US Department of Commerce. Directive No. 15. Race and ethnic standards for federal statistics and administrative reporting. In: *Statistical Policy Handbook.* Washington (DC): US Department of Commerce, Office of Federal Statistical Policy and Standards, 1978:37–8.

US Department of Health and Human Services. *Report of the Secretary's Task Force on Black & Minority Health. Volume 1: Executive Summary.* Washington (DC): US Department of Health and Human Services, 1985.

US Department of Health and Human Services. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* Washington (DC): US Department of Health and Human Services, Public Health Service. DHHS Publication No. (PHS) 91-50212, 1991.

US Department of Health and Human Services. *Healthy People 2000: Midcourse Review and 1995 Revisions.* Washington (DC): US Department of Health and Human Services, Public Health Service, 1995.

Vega WA, Amaro H. Latino outlook: good health, uncertain prognosis. *Annual Review of Public Health* 1994;15:39–67.

Weissman JS, Stern R, Fielding SL, Epstein AM. Delayed access to health care: risk factors, reasons, and consequences. *Annals of Internal Medicine* 1991;114 (4):325–31.

Williams DR, Collins C. US socioeconomic and racial differences in health: patterns and explanations. *Annual Review of Sociology* 1995;21:349–86.

Young TK. *The Health of Native Americans: Toward a Bicultural Epidemiology.* New York: Oxford University Press, 1994.

Chapter 2
Patterns of Tobacco Use Among Four Racial/Ethnic Minority Groups

Introduction

Over the past 15 years, the prevalence of cigarette smoking has generally declined among adult African Americans, Asian Americans and Pacific Islanders, and Hispanics. Nevertheless, rates of cigarette smoking and other tobacco use are still high among certain racial/ethnic minority groups compared with among the overall population, particularly American Indians and Alaska Natives. Designing more successful public health efforts to reduce tobacco-related diseases and deaths in racial/ethnic populations requires greater understanding of these racial/ethnic patterns of tobacco use. This chapter summarizes how smoking behaviors such as current tobacco use, cigarette consumption, and quitting behavior among adults vary within and among racial/ethnic groups. In addition, for all racial/ethnic groups, the prevalence of cigarette smoking is examined for two groups of special interest, women of reproductive age and adolescents.

The purpose of this chapter is to summarize in one source the reported trends and patterns of tobacco use among members of the four racial/ethnic minority groups, by gender, age, and level of education. In addition, newly compiled information is presented on smoking patterns by birth cohort (based on year of birth) for African Americans and Hispanics. The relationship between racial/ethnic group and education as predictors of cigarette smoking is explored, and data on cigarette brand preference and exposure to environmental tobacco smoke are presented. The influence of acculturation on smoking behavior is examined among the two fastest growing immigrant groups to the United States—Asian Americans and Pacific Islanders and Hispanics. Although reports of the effects of acculturation vary widely in the literature, it is an important correlate of behavior despite limitations in conceptualization, operationalization, and measurement.

The analyses presented in this chapter incorporate data from national and state-specific population-based surveys of adults, national population-based surveys of adolescents, and local and international surveys of various adult and adolescent populations. The national studies cited in this chapter include the National Health Interview Survey (NHIS) (1978–1995), which garners yearly data on cigarette smoking; the Behavioral Risk Factor Surveillance System (BRFSS) (1987–1992), which collects information on behavioral risks among adults in the United States; the Adult Use of Tobacco Survey, which has been conducted periodically since 1964; the Hispanic Health and Nutrition Examination Survey (HHANES), which gathered demographic and cigarette-smoking information from Hispanics between 1982 and 1984; the Monitoring the Future (MTF) surveys, which have been conducted in high schools annually since 1975; and the Teenage Attitudes and Practices Survey (TAPS), conducted in 1989 and 1993. Appendix 1 describes these major data sources, and Appendix 2 details the various measures of tobacco use. Appendix 3 presents data on patterns of cigarette use among whites that can be compared with the racial/ethnic group data presented in the chapter. Appendix 4 presents supplementary data on patterns of tobacco use among African Americans, and Appendix 5 describes how the authors validated one of the analytic techniques used to retrospectively estimate smoking prevalence.

The analyses in this chapter update and expand on previous Surgeon General's reports that describe tobacco use among racial/ethnic groups; most of these previous reports have focused on cigarette smoking only among African Americans (U.S. Department of Health, Education, and Welfare [USDHEW] 1979; U.S. Department of Health and Human Services [USDHHS] 1983, 1988, 1989, 1990a). For some analyses reported here, small sample sizes limit the precision of the estimates. The patterns described in the text generally use point estimates, but confidence intervals presented in most tables can be referred to when the precision of the estimates needs to be defined.

Long-Term Tobacco-Use Trends and Behavior Among Racial/Ethnic Minority Groups

African Americans

Prevalence of Cigarette Smoking

The overall prevalence of cigarette smoking among African Americans declined from 37.3 percent in 1978–1980 to 26.5 percent in 1994–1995, according to data from the NHIS (Table 1) (National Center for Health Statistics [NCHS], public use data tapes, 1978–1995). Between 1978 and 1995, the prevalence of current smoking among African American men fell from 45.0 to 31.4 percent, whereas the prevalence among African American women fell from 31.4 to 22.7 percent. Although the prevalence of smoking among African American men remained consistently higher than that among African American women, the gender differential in smoking prevalence narrowed over the 18-year period. Similar patterns have been observed since 1965 among both African Americans and whites (Figure 1) (Centers for Disease Control and Prevention [CDC] 1994c).

Magnitudes of decline in smoking prevalence also differed by age (Table 1). Between 1978 and 1995,

Table 1. Percentage of adult African Americans who reported being current cigarette smokers,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

Characteristic	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	37.3	1.7	35.3	1.4	32.3	1.1	27.9	1.1	27.0	1.5	26.5	1.7
Gender												
Men	45.0	2.5	40.2	2.2	37.6	1.8	34.1	1.8	32.4	2.5	31.4	2.7
Women	31.4	1.8	31.4	1.7	28.0	1.4	22.9	1.3	22.6	1.6	22.7	1.9
Age (years)												
18–34	38.7	2.8	34.7	2.1	32.0	1.7	26.0	1.7	22.1	2.2	21.0	2.4
35–54	43.9	2.4	42.2	2.7	37.2	1.9	35.6	1.9	35.9	2.7	34.2	3.0
≥55	26.5	2.4	27.8	2.4	26.1	2.0	20.0	2.0	22.3	2.8	23.5	2.8
Education§												
Less than high school	36.4	2.5	38.7	2.1	36.3	2.0	33.1	2.2	34.2	3.4	34.8	3.3
High school	42.1	2.6	39.4	2.8	38.8	2.1	33.5	1.9	31.9	2.7	31.3	3.1
Some college	36.7	5.5	34.8	3.4	33.0	2.7	28.9	2.8	27.5	3.2	26.4	3.7
College	34.6	6.7	28.4	4.3	19.7	3.2	17.8	2.9	18.2	4.2	16.7	3.8

*Excludes African Americans who reported they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.
†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.
‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

African Americans 18–34 years of age experienced the largest decline in smoking prevalence, from 38.7 to 21.0 percent, whereas African Americans aged 55 years and older experienced the smallest decline, from 26.5 to 23.5 percent. In the years 1978–1980, persons 18–34 years of age were nearly 1.5 times more likely to smoke than those 55 years of age or older. By 1994 and 1995, however, because of the differential decline in smoking prevalence, the prevalence of smoking among younger adults was as low as that among their older counterparts.

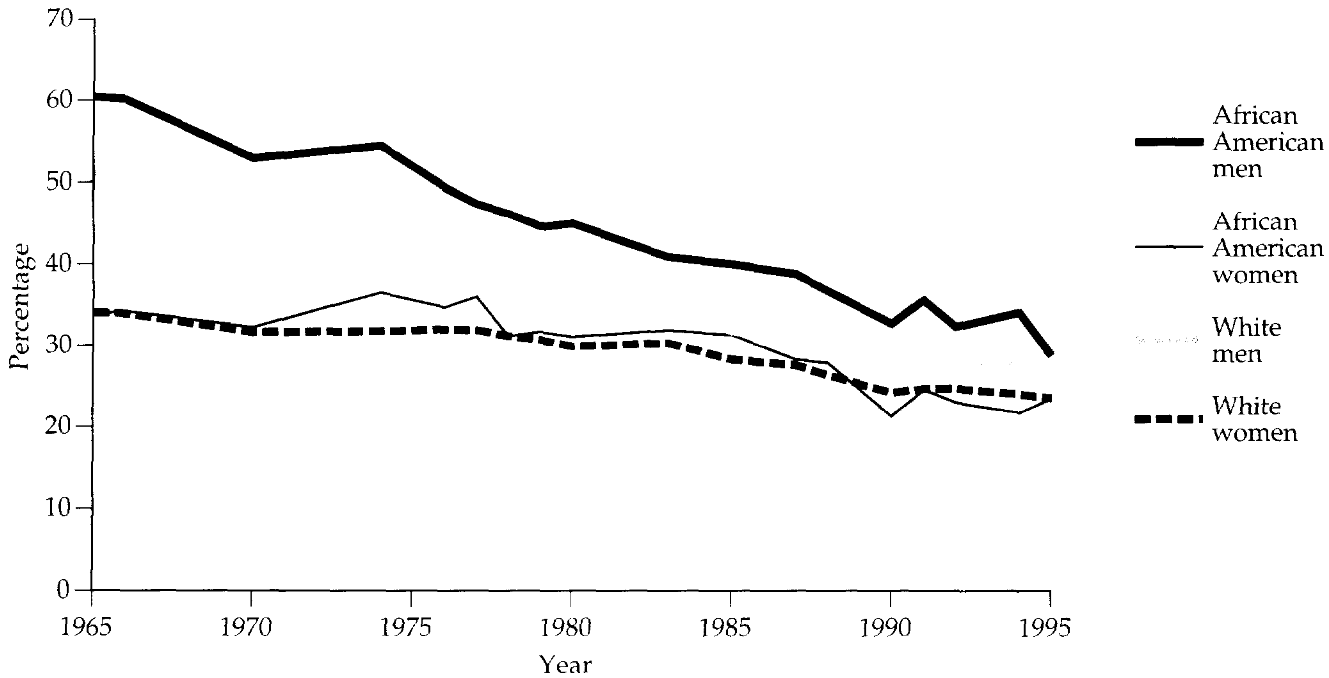
The prevalence of cigarette smoking among African Americans decreased most among college graduates (Table 1)—a pattern that has been found in the nation as a whole (Pierce et al. 1989). Among African American college graduates, the smoking prevalence fell from 34.6 percent in 1978–1980 to 16.7 percent in 1994–1995. In comparison, smoking prevalence among African Americans with less than 12 years of education was 36.4 percent in 1978–1980 and 34.8 percent in 1994–1995. In the years 1978–1980, the prevalence of smoking varied little by level of education. However, by 1994 and 1995, an inverse relationship had emerged. As the level of education increased, the prevalence of cigarette smoking decreased.

Number of Cigarettes Smoked Daily

The percentage of African American smokers who reported that they were light smokers (smoking fewer than 15 cigarettes per day) increased from 56.0 percent in 1978–1980 to 63.9 percent in 1994–1995, according to the NHIS data (Table 2) (NCHS, public use data tapes, 1978–1993). This upward trend was found across all sociodemographic groups, with men, persons less than 55 years of age, and college graduates experiencing the largest increases in light smoking.

Throughout the 18-year period, African American women who smoked were consistently more likely than their male counterparts to smoke fewer than 15 cigarettes per day (Table 2). African American smokers 18–34 years of age were slightly more likely than

Figure 1. Trends in the prevalence of cigarette smoking among African American and white men and women, National Health Interview Surveys, United States, 1965–1995



Source: National Center for Health Statistics, public use data tapes, 1965, 1966, 1970, 1974, 1976, 1977, 1978, 1979, 1980, 1983, 1985, 1987, 1988, 1990, 1991, 1992, 1993, 1994, and 1995.

Table 2. **Percentage of adult African American smokers* who reported smoking <15, 15–24, or ≥25 cigarettes per day, overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data**

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total												
<15 cigarettes	56.0	2.2	55.4	2.5	58.8	2.0	60.6	2.2	63.3	3.0	63.9	3.5
15–24 cigarettes	33.6	2.2	35.2	2.4	32.8	1.9	31.9	2.1	31.1	2.8	28.4	3.2
≥25 cigarettes	10.4	1.7	9.4	1.6	8.4	1.2	7.5	1.2	5.6	1.3	7.6	2.1
Gender												
Men												
<15 cigarettes	50.4	3.2	52.3	3.8	53.2	3.1	55.2	3.1	59.3	4.5	61.1	5.1
15–24 cigarettes	37.1	3.6	36.3	3.4	37.0	3.1	35.6	3.1	34.4	4.2	28.6	4.7
≥25 cigarettes	12.5	2.3	11.4	2.6	9.8	1.7	9.2	1.9	6.3	2.0	10.3	3.7
Women												
<15 cigarettes	62.2	3.2	58.6	3.1	65.0	2.7	67.1	2.6	67.9	3.8	67.1	4.2
15–24 cigarettes	29.8	2.8	34.1	2.8	28.2	2.4	27.5	2.5	27.4	3.6	28.3	4.0
≥25 cigarettes	8.1	2.3	7.3	1.5	6.8	1.3	5.4	1.3	4.7	1.5	4.6	1.7
Age (years)												
18–34												
<15 cigarettes	59.8	3.6	56.9	3.7	64.1	2.9	67.2	3.4	69.5	5.1	70.0	5.5
15–24 cigarettes	31.7	3.3	34.4	3.3	28.5	2.7	26.6	3.2	25.5	4.8	23.3	5.3
≥25 cigarettes	8.5	2.3	8.7	2.3	7.4	1.7	6.2	1.8	5.1	2.1	6.7	2.7
35–54												
<15 cigarettes	51.2	3.4	51.0	4.1	52.1	3.1	54.6	3.4	60.4	4.3	58.9	5.2
15–24 cigarettes	35.6	3.7	37.7	3.9	37.7	3.1	36.9	3.2	33.2	4.1	32.2	4.8
≥25 cigarettes	13.2	2.7	11.3	2.5	10.2	1.7	8.5	1.9	6.3	2.1	8.9	3.6
≥ 55												
<15 cigarettes	55.3	5.4	60.4	5.6	59.1	5.2	60.4	4.8	59.0	6.5	66.7	6.6
15–24 cigarettes	34.8	5.6	32.3	5.9	33.6	5.0	31.9	4.7	36.3	6.4	27.3	6.0
≥25 cigarettes	9.9	4.8	7.4	3.1	7.3	2.5	7.7	2.7	4.7	2.7	6.0	3.8

*Excludes African Americans who reported they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

their older counterparts to be light smokers (except for the years 1983–1985). An association between education and light smoking became apparent in 1990–1991. In 1990 and beyond, among smokers, education was directly related to the proportion of smokers who smoked fewer than 15 cigarettes per day. As the level of education increased, the proportion smoking lightly also increased.

Throughout the 18-year period, the prevalence of heavy smoking (smoking 25 or more cigarettes per

Table 2. Continued

Characteristic	1978–1980† %	±CI‡	1983–1985† %	±CI	1987–1988† %	±CI	1990–1991† %	±CI	1992–1993† %	±CI	1994–1995† %	±CI
Education§												
Less than high school												
<15 cigarettes	53.1	4.0	56.0	4.1	57.3	3.1	57.3	3.4	57.7	5.5	56.1	6.0
15–24 cigarettes	33.5	3.6	32.7	4.0	32.7	3.3	33.5	3.3	33.9	5.4	32.5	5.6
≥25 cigarettes	13.4	3.1	11.4	3.1	10.0	2.2	9.2	2.3	8.4	3.0	11.5	4.5
High school												
<15 cigarettes	53.9	4.7	52.4	4.4	58.3	3.6	59.0	3.7	62.7	4.6	64.0	5.7
15–24 cigarettes	34.9	4.8	40.6	4.1	33.2	3.5	34.8	3.6	33.4	4.4	29.2	4.9
≥25 cigarettes	11.2	3.6	6.9	2.1	8.5	1.9	6.2	1.6	3.9	1.8	6.8	3.9
Some college												
<15 cigarettes	49.7	7.5	48.6	6.6	56.3	4.7	60.9	5.6	63.4	7.0	63.0	8.4
15–24 cigarettes	37.6	6.1	37.4	6.8	34.7	4.7	32.2	5.5	31.0	6.8	32.2	8.2
≥25 cigarettes	12.7	5.9	14.1	5.1	9.0	3.1	6.9	2.9	5.6	3.1	4.9	2.5
College												
<15 cigarettes	57.1	10.2	50.9	9.7	55.2	9.6	65.0	9.3	74.7	10.0	79.0	9.9
15–24 cigarettes	34.1	9.0	35.6	10.9	38.2	9.6	24.9	7.9	20.6	9.5	18.1	9.5
≥25 cigarettes	8.8	5.5	13.5	9.4	6.7	3.4	10.1	6.7	4.7	4.0	2.9	3.5

§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

day) was higher among African American men than among women, and it was higher among respondents 35–54 years of age than among their younger and older counterparts (Table 2). No clear patterns emerged in the relationship between education and the prevalence of heavy smoking.

Quitting Behavior

Between 1978 and 1995, the overall prevalence of smoking cessation (the percentage of persons who have ever smoked 100 cigarettes and who have quit smoking) among African Americans increased from 26.8 to 35.4 percent, according to data from the NHIS (Table 3) (NCHS, public use data tapes, 1978–1995). The prevalence of cessation generally increased over time across all gender, age, and education categories. The largest increases were among persons 55 years of age or older and college graduates.

Throughout the 18-year period, the prevalence of smoking cessation remained higher among persons 55 years of age or older than among their younger counterparts (Table 3). Since 1983, college graduates have been generally more likely to quit smoking than persons with less than 16 years of education.

Attempts to quit smoking during the previous year and short-term success at quitting were measured in a multivariate analysis of the 1991 NHIS data (CDC 1993). After statistical control was made for gender, age, education, and poverty status, African Americans were more likely than whites to stop smoking for at least one day during the previous year. However, African Americans who had stopped smoking for at least one day were less likely than whites to have quit for at least one month.

Data from the National Cancer Institute (NCI) Supplement of the 1992–1993 Current Population Survey (CPS) indicate that among adults who were daily smokers one year before being surveyed, African Americans who had tried to quit for at least one day were slightly more likely than whites to have relapsed to daily smoking. African Americans were also slightly more likely than whites to have become occasional smokers (i.e., to be smoking on only some days) and slightly less likely to have quit smoking (Table 4) (U.S. Bureau of the Census, public use data tapes,

Table 3. Percentage of adult African American ever smokers who have quit,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	26.8	1.7	30.0	1.8	31.8	1.6	36.1	1.8	37.0	2.4	35.4	2.6
Gender												
Men	28.7	2.0	33.5	2.6	33.9	2.3	36.8	2.5	39.1	3.5	34.9	3.7
Women	24.5	2.5	26.2	2.5	29.4	2.1	35.2	2.4	34.5	3.1	35.9	3.4
Age (years)												
18–34	17.9	2.8	20.2	2.8	18.8	2.3	21.0	2.6	23.7	4.6	19.6	4.1
35–54	27.7	2.6	29.5	2.9	33.1	2.6	35.2	2.6	33.2	3.4	33.1	4.0
≥55	42.3	4.0	47.0	3.6	49.2	3.0	57.3	3.6	56.8	4.4	54.7	4.4
Education§												
Less than high school	32.6	2.7	32.7	2.5	35.0	2.5	38.0	3.3	40.0	4.2	36.8	4.0
High school	24.4	3.4	28.8	3.6	27.3	2.7	32.4	2.6	33.4	3.8	31.6	4.3
Some college	32.4	5.9	35.0	4.7	36.6	4.0	38.1	4.4	39.0	5.3	37.3	6.3
College	29.8	8.6	37.0	6.9	50.2	6.1	51.3	6.1	48.7	8.7	51.1	8.5

*Excludes African Americans who reported they were of Hispanic origin. The prevalence of cessation is the percentage of ever smokers who are former smokers. Former smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not smoking, and ever smokers include current and former smokers.
†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.
‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

1992–1993). Some data suggest that African Americans may be more likely than whites to be dependent on nicotine (see Chapter 3, Table 18, in the section Racial/Ethnic Differences in Self-Reported Nicotine Dependence; Royce et al. 1993), although a report by Andreski and Breslau (1993) suggests the opposite. African Americans appear to have comparatively limited access to preventive health services, including smoking cessation services (USDHHS 1988; Hymowitz et al. 1991).

Women of Reproductive Age

Between 1978 and 1995, the prevalence of current smoking among African American women of reproductive age (18–44 years) declined from 35.4 to 23.4 percent, according to data from the NHIS (Table 5) (NCHS, public use data tapes, 1978–1995). Women who were college graduates experienced an overwhelming decline in smoking prevalence, from 37.0 to 10.8 percent, whereas women with less than a high school education (<12 years) experienced a slight increase in the prevalence of current smoking, from 41.1 to 46.3 percent.

In the years 1978–1980, the prevalence of smoking varied little by level of education. However, by 1994 and 1995, a marked inverse relationship between smoking and educational level had emerged. As the level of education increased, the prevalence of smoking decreased. This inverse relationship has also been found in other studies of women of reproductive age (CDC 1991a, 1994b).

National data on tobacco use and pregnancy are available from the 1967 and 1980 National Natality

Table 4. Current cigarette smoking status among persons* who reported that they were daily smokers 1 year before being surveyed, Current Population Survey National Cancer Institute Supplement, 1992–1993

Currrent smoking status	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites		Total	
	%	±CI[†]	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Smoke every day; did not try to quit for at least one day during the previous year	59.8	1.5	62.8	5.5	57.8	4.4	59.8	2.3	63.1	0.5	62.5	0.5
Smoke every day; did try to quit for at least one day during the previous year	29.7	1.4	28.9	5.1	32.0	4.2	28.5	2.1	26.0	0.5	26.6	0.4
Smoke on some days	5.6	0.7	3.7	2.1	4.8	1.9	5.6	1.1	3.7	0.2	4.0	0.2
Do not smoke cigarettes; abstinent for 1–90 days	2.2	0.5	1.8	1.5	2.5	1.4	2.5	0.7	3.4	0.2	3.2	0.2
Do not smoke cigarettes; abstinent for 91–364 days	2.7	0.5	2.8	1.9	2.9	1.5	3.6	0.9	3.8	0.2	3.7	0.2

*Aged 18 years and older; N = 44,272.
†95% confidence interval.
Source: U.S. Bureau of the Census, public use data tapes, 1992–1993.

Surveys, the 1982 and 1988 National Surveys of Family Growth, the 1985 and 1990 NHISs, the 1988 National Maternal and Infant Health Survey (NMIHS), and the 1992–1993 National Pregnancy and Health Survey. Furthermore, since 1989, national trend data on smoking and pregnancy have become readily available from information collected on the revised U.S. Standard Certificate of Live Birth, which is included as part of U.S. final natality statistics compiled each calendar year (NCHS 1992, 1993, 1994; Ventura et al. 1994).

Among the earliest sources of national trend data on smoking during pregnancy were the National Natality Surveys, which were administered to a national sample of married mothers of live infants born in 1967 and 1980 (Kleinman and Kopstein 1987; USDHHS 1989). Among African American mothers <20 years of age, smoking rates remained virtually constant over time at about 27 percent. The smoking prevalence among African American mothers aged ≥20 years declined from 33 percent in 1967 to 23 percent in 1980. The National Survey of Family Growth collected data in 1982 and 1988 on the smoking behavior of females 15–44 years of age during their most recent pregnancy. In 1982, 29.2 percent of African American women reported smoking during their most recent pregnancy, compared with 23.4 percent in 1988 (Pamuk and Mosher 1992; Chandra 1995). More recent data from U.S. final natality statistics indicate that smoking rates for African Americans during pregnancy declined from 17.1 percent in 1989 to 10.6 percent in 1995 (Table 6). Smoking rates declined for African American teenaged mothers from 1989 through 1995 but remained virtually unchanged for African American adult mothers aged 20–49 years during those years (NCHS 1992, 1993, 1994; Ventura et al. 1994, 1995, 1996). In general, African American adolescent mothers were less likely to have smoked than mothers 20–49 years

Table 5. Percentage of African American women of reproductive age who reported being current cigarette smokers,* overall and by education, National Health Interview Surveys, United States, 1978–1995 aggregate data

Characteristic	1978–1980† %	±CI‡	1983–1985† %	±CI	1987–1988† %	±CI	1990–1991† %	±CI	1992–1993† %	±CI	1994–1995† %	±CI
Total	35.4	2.3	34.1	2.0	30.6	1.8	25.4	1.6	23.8	2.1	23.4	2.4
Education§												
Less than high school	41.1	5.6	52.4	5.7	48.2	4.2	44.5	4.7	45.7	6.9	46.3	7.8
High school	36.3	4.0	36.8	3.8	34.5	3.0	31.6	3.0	30.0	3.8	28.4	4.3
Some college	37.1	6.8	32.3	5.0	30.6	3.8	26.4	3.4	26.2	4.7	26.1	5.6
College	37.0	10.2	21.8	6.5	20.0	4.3	17.3	4.3	13.1	5.0	10.8	4.9

*Excludes African American women who reported they were of Hispanic origin. For 1978–1991, current cigarette smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

old—a finding that is consistent with previously published data (USDHHS 1994).

Data from the 1988 NMIHS indicate that 27 percent of African American mothers sampled reported smoking cigarettes in the 12 months before delivery (Sugarman et al. 1994). The National Pregnancy and Health Survey, conducted between October 1992 and August 1993 and sponsored by the National Institute on Drug Abuse (NIDA), provides nationally representative data on the prevalence of prenatal drug use among females of reproductive age (15–44 years). According to the National Pregnancy and Health Survey, 19.8 percent of African American women reported using cigarettes during their pregnancies (NIDA 1994). In the 1985 and 1990 NHISs, questions related to smoking were asked of women aged 18–44 years who had given birth within the past five years. In 1985, 27.5 percent of African American women smoked during the 12 months before the birth and 22.6 percent smoked after learning of their pregnancy; in 1990, 19 percent smoked during the year before the birth and 14.1 percent after learning of their pregnancy (Floyd et al. 1993).

Young People

Cigarette Smoking

In the 1970s and 1980s, the prevalence of cigarette smoking declined among both male and female African American high school seniors, according to data from the MTF surveys (Figure 2) (Bachman et al. 1991b). The prevalence of daily cigarette smoking, based on two-year rolling averages (percentages calculated by averaging the data for the specified year and the previous year to increase racial subgroup sample sizes and stabilize estimates), among African American high school seniors was 24.9 percent in 1977, 4.1 percent in 1993, and 7.0 percent in 1996 (Figure 3) (Johnston et al. 1996; Institute for Social Research, University of Michigan, unpublished data from the 1996 MTF surveys). Between 1974 and 1991, significant declines in the prevalence of cigarette smoking also were observed among African American adolescents participating in the National Household Surveys on Drug Abuse (NHSDAs) as well as among African Americans 18 and 19 years of age who participated in the NHISs (Nelson et al. 1995).

Table 6. Percentage of live-born infants' mothers who reported smoking during pregnancy, by year and race/ethnicity, U.S. final natality statistics, 1989–1995

	1989	1990	1991	1992	1993	1994	1995
Race of mother*							
African American	17.1	15.9	14.6	13.8	12.7	11.4	10.6
American Indian and Alaska Native	23.0	22.4	22.6	22.5	21.6	21.0	20.9
Asian American and Pacific Islander†	5.7	5.5	5.2	4.8	4.3	3.6	3.4
Chinese	2.7	2.0	1.9	1.7	1.1	0.9	0.8
Filipino	5.1	5.3	5.3	4.8	4.3	3.7	3.4
Hawaiian and part Hawaiian	19.3	21.0	19.4	18.5	17.2	16.0	15.9
Japanese	8.2	8.0	7.5	6.6	6.7	5.4	5.2
Other Asian American or Pacific Islander	4.2	3.8	3.8	3.6	3.2	2.9	2.9
White	20.4	19.4	18.8	17.9	16.8	15.6	15.0
Hispanic origin of mother‡							
Hispanic origin	8.0	6.7	6.3	5.8	5.0	4.6	4.3
Cuban	6.9	6.4	6.2	5.9	5.0	4.8	4.1
Central and South American	3.6	3.0	2.8	2.6	2.3	1.8	1.8
Mexican American	6.3	5.3	4.8	4.3	3.7	3.4	3.1
Other and unknown Hispanic	12.1	10.8	10.7	10.1	9.3	8.1	8.2
Puerto Rican	14.5	13.6	13.2	12.7	11.2	10.9	10.4
African American, non-Hispanic	17.2	15.9	14.6	13.8	12.7	11.5	10.6
White, non-Hispanic	21.7	21.0	20.5	19.7	18.6	17.7	17.1
Total	19.5	18.4	17.8	16.9	15.8	14.6	13.9

*Includes data for 43 states and the District of Columbia (DC) in 1989, 45 states and DC in 1990, and 46 states and DC in 1991–1995. Excludes data for California, Indiana, New York (but includes New York City), and South Dakota in 1994 and 1995; Oklahoma in 1989–1990; and Louisiana and Nebraska in 1989, which did not require the reporting of mother's tobacco use during pregnancy on the birth certificate. White and African American racial groups include persons of Hispanic and non-Hispanic origin.

†Maternal tobacco use during pregnancy was not reported on the birth certificates in California and New York, which together accounted for 43–66 percent of the births in each Asian subgroup (except Hawaiian) during 1989–1991.

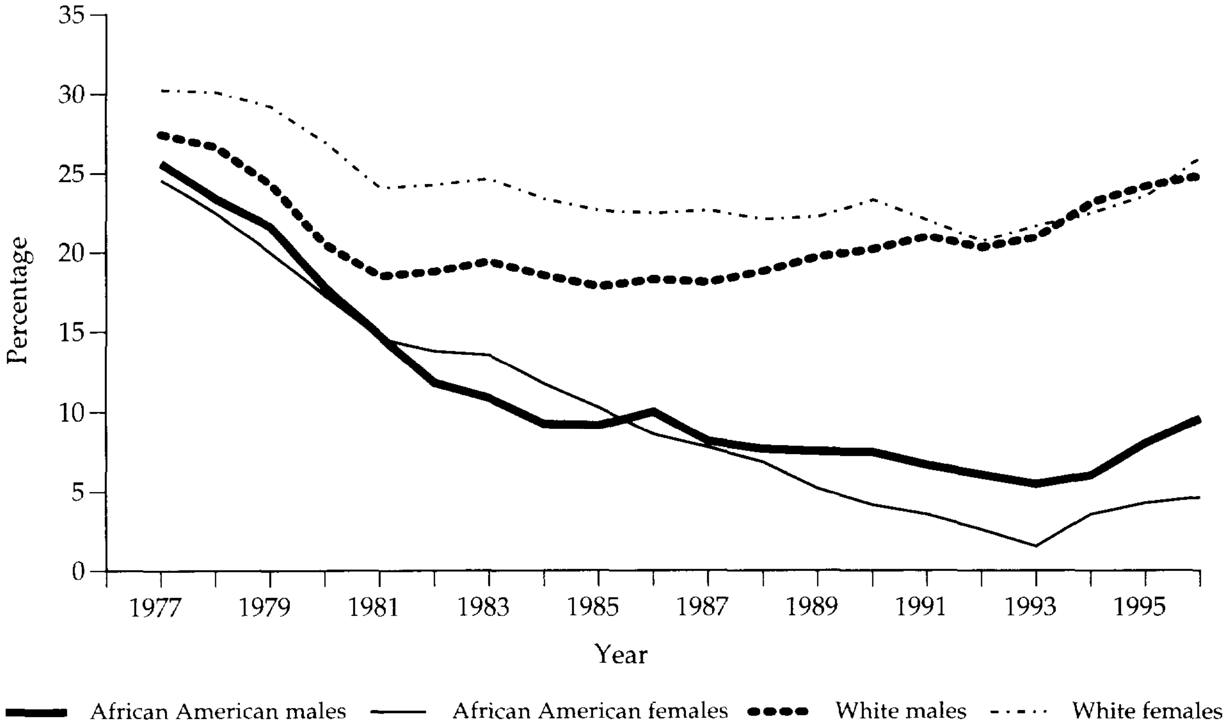
‡Includes data for 42 states and DC in 1989, 44 states and DC in 1990, 45 states and DC in 1991–1992, and 46 states and DC in 1993–1995. Excludes data for California, Indiana, New York (but includes New York City), and South Dakota in 1994 and 1995; Oklahoma in 1989–1990; and Louisiana and Nebraska in 1989, which did not require the reporting of either Hispanic origin of mother or tobacco use during pregnancy on the birth certificate. Persons of Hispanic origin may be of any race.

Sources: National Center for Health Statistics 1996; Ventura et al. 1996, 1997.

The prevalence of cigarette smoking among African American adolescents has been substantially lower than the prevalence among white and Hispanic adolescents (Figures 2 and 3) (Bachman et al. 1991b; USDHHS 1994; CDC 1996; Johnston et al. 1996). Local, more limited surveys have also shown similar differences in cigarette smoking prevalence between African American and white youths (for example, Sheridan et al. 1993; Greenlund et al. 1996).

In addition to the slight increases in the 1990s in smoking prevalence among African American high school seniors (Figures 2 and 3), CDC's Youth Risk Behavior Survey (YRBS) detected an increase in the prevalence of cigarette smoking from 1991 to 1995

Figure 2. Trends in daily smoking* among African American and white high school seniors, by gender, United States, 1977–1996



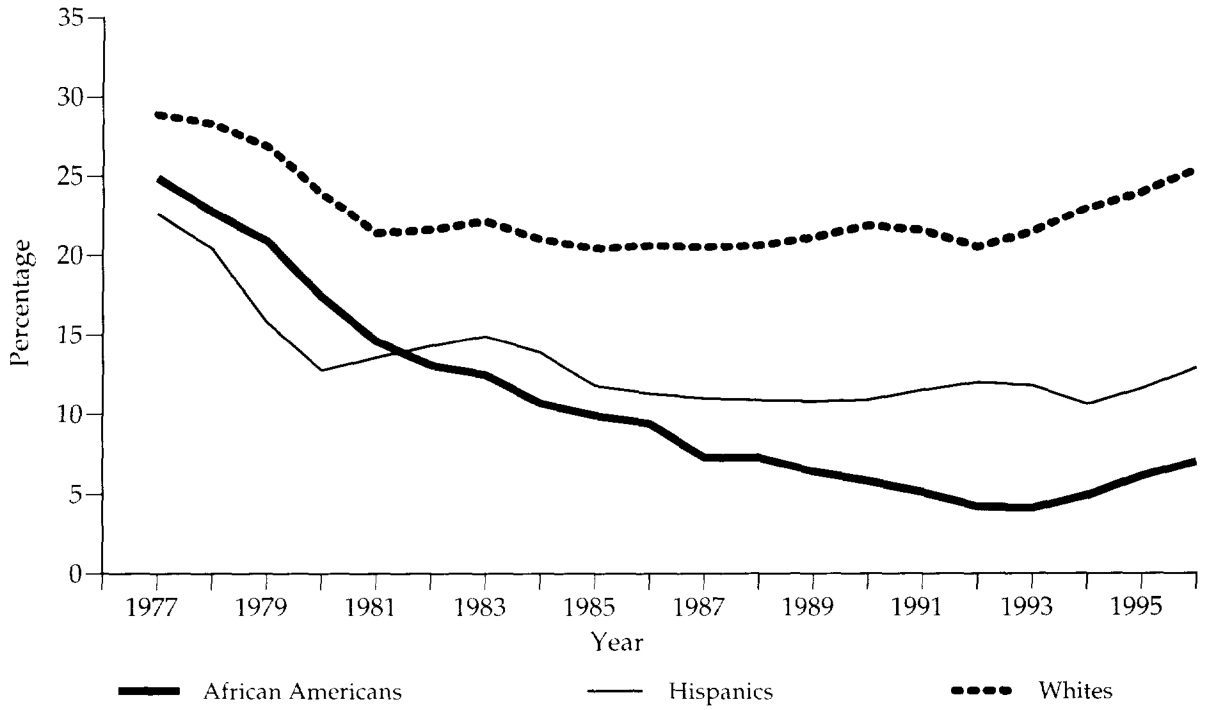
Note: To increase racial subgroup sample sizes and stabilize estimates, the percentages were calculated by averaging the data for the specified year and the previous year.
*Daily smoking is defined as smoking one or more cigarettes per day during the previous 30 days.
Source: Institute for Social Research, University of Michigan, unpublished data from the Monitoring the Future surveys, 1976–1996.

among male African American high school students (CDC 1996). The prevalence of previous-month smoking among African American male high school students increased from 14.1 percent in 1991 to 27.8 percent in 1995. Among female African American high school students, prevalence was 11.3 percent in 1991 and 12.2 percent in 1995 (CDC 1996). Data from the MTF surveys indicate that the prevalence of daily smoking increased more rapidly from 1993 to 1996 for male than for female African American high school seniors (Figure 2) (Institute for Social Research, University of Michigan, unpublished data from the MTF surveys, 1976–1996). Yet even with this increase, the prevalence of smoking among African American high school seniors was still lower than that for members of other racial/ethnic groups during 1990–1994 (Table 7).

The trend of lower smoking prevalences among African American adolescents observed in recent years has continued as these individuals age and become young adults, according to the NHIS data. From 1978 through 1995, the prevalence of current smoking declined more among African Americans aged 20–24 years than among whites of the same ages, regardless of gender (Table 8) or level of formal education (Table 9) (NCHS, public use data tapes, 1978–1995). In addition, among persons 25–29 and 30–34 years of age, recent declines in smoking prevalence were greater for African Americans than for whites (Table 8) (Figure 4).

In addition to the recent increases seen among African American high school seniors (Figures 2 and 3), the MTF surveys indicate that previous-month smoking prevalence (based on two-year rolling averages) among eighth-grade African American students

Figure 3. Trends in daily smoking* among African American, Hispanic, and white high school seniors, United States, 1977–1996



Note: To increase racial subgroup sample sizes and stabilize estimates, the percentages were calculated by averaging the data for the specified year and the previous year.
*Daily smoking is defined as smoking one or more cigarettes per day during the previous 30 days.
Sources: Johnston et al. 1996; Institute for Social Research, University of Michigan, unpublished data, 1996.

increased from 5.3 percent in 1992 to 9.6 percent in 1996; among ninth-grade African American students, the prevalence increased from 6.6 percent in 1992 to 12.2 percent in 1996 (Johnston et al. 1996; Institute for Social Research, University of Michigan, unpublished data from the 1996 MTF surveys). These recent patterns among African American adolescents suggest that the progress seen among young adults (Table 8) may reverse itself in the future.

Possible biases. The accuracy of the finding that African American youths have been smoking less than white youths has been called into question. For example, trends observed may have resulted from artifactual phenomena such as differential dropout rates or misclassification bias.

Differential dropout rates. Some investigators have hypothesized that the data may be biased for two reasons. First, the data from school-based surveys exclude youths who are school dropouts. Second, because African American youths have a higher dropout rate than do white youths, the smoking prevalence rates may be more biased for African American youths than for white youths. However, this bias should only be apparent in the school surveys. The proportion of young adults (aged 25–29 years) who have completed at least four years of high school increased from 74 percent in 1976 to 83 percent in 1993 for African Americans; for whites, this proportion was 86 percent in 1976 and 87 percent in 1993 (Kominski and Adams 1994). The increasing rate of completing at least four years of high school among African American young adults, relative to whites, is not consistent with the hypothesis that the trend in smoking prevalence observed in school surveys is related to the dropout rate. Furthermore, in household surveys, the trends in smoking prevalence among African Americans have also

Table 7. Trends in the percentage of high school seniors who were previous-month smokers, by race/ethnicity and gender, Monitoring the Future surveys, United States, 1976–1979, 1980–1984, 1985–1989, 1990–1994

	1976–1979	1980–1984	1985–1989	1990–1994
Males				
African American	33.1	19.4	15.6	11.6
American Indian and Alaska Native	50.3	39.6	36.8	41.1
Asian American and Pacific Islander	20.7	21.5	16.8	20.6
Hispanic	30.3	23.8	23.3	28.5
White	35.0	27.5	29.8	33.4
Females				
African American	33.6	22.8	13.3	8.6
American Indian and Alaska Native	55.3	50.0	43.6	39.4
Asian American and Pacific Islander	24.4	16.0	14.3	13.8
Hispanic	31.4	25.1	20.6	19.2
White	39.1	34.2	34.0	33.1

Note: The Institute for Social Research usually reports the N (weighted), which is approximately equal to the sample size. Cases are weighted to account for differential probability of selection and then normalized to average 1.0. For males, the ranges of the N (weighted) for each of the cells in this table are 2,916–4,393 for African Americans, 342–587 for American Indians and Alaska Natives, 242–1,166 for Asian Americans and Pacific Islanders, 893–2,808 for Hispanics, and 24,931–31,954 for whites. For females, the ranges of the N (weighted) for each of the cells in this table are 3,982–5,716 for African Americans, 299–586 for American Indians and Alaska Natives, 223–1,143 for Asian Americans and Pacific Islanders, 940–2,723 for Hispanics, and 25,627–31,933 for whites.
Sources: Bachman et al. 1991a; Institute for Social Research, University of Michigan, unpublished data.

become lower than those for whites (Nelson et al. 1995). Finally, data from the 1989 TAPS have shown that African American youths—both active students and dropouts—are significantly less likely than white youths to have smoked recently. Among students 17 and 18 years of age who remained in school, African Americans (5.7 percent) were less likely than whites (19.3 percent) to have smoked in the previous week (CDC 1991b). Among youths who left school, 17.1 percent of African Americans and 46.1 percent of whites had smoked in the previous week. Similarly, 1991 NHSDA data show that among youths 16–18 years old, 7.2 percent of African American high school seniors and 27.7 percent of white high school seniors had smoked in the previous month, compared with 30.4 percent of African American dropouts and 72.2 percent of white dropouts (Kopstein and Roth 1993). Thus, dropout status does not account for the lower smoking prevalence among African American youths.

Differential misclassification bias. Other researchers have proposed that in recent years, African American youths may have been more likely to misclassify their smoking status when questioned. No trend data are available on differences in misclassification of smoking status over time between African Americans and whites. However, data from the 1976–1992 MTF surveys have been used to compare the trends of high school seniors' reports of smoking by their friends—a measure for which they would have little reason to underreport (Johnston et al. 1993b; USDHHS 1994). Until 1993, the percentage of African American seniors who reported that most or all of their friends smoke declined substantially more than that of white seniors. Since 1993, an increase in this measure has been observed for African Americans, but not for whites (Bachman et al. 1980a, 1980b, 1981, 1984, 1985, 1987, 1991a, 1993a, 1993b, 1997; Johnston et al. 1980a, 1980b, 1982, 1984, 1986, 1991, 1992, 1993a, 1995b, 1997). This observation may be limited by the fact that African American and white youths have friends from several ethnic groups.

Bauman and Ennett (1994) recently assessed misclassification bias in a household survey of adolescents 12–14 years of age, using carbon monoxide and salivary cotinine (a nicotine metabolite) as biological

Table 8. Percentage of African Americans and whites 20–34 years of age who reported being current cigarette smokers,* by age group and gender, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Aged 20–24 years												
African Americans												
Total	37.3	4.3	32.0	3.6	24.7	2.9	16.8	2.7	15.0	4.1	13.7	3.9
Men	44.8	6.8	31.6	6.2	25.4	5.0	21.3	4.8	20.3	7.6	19.6	7.3
Women	31.8	4.4	32.3	3.8	24.1	3.3	13.1	2.5	10.7	3.4	8.9	3.3
Whites												
Total	35.6	1.6	35.5	1.6	30.4	1.5	28.4	1.5	32.0	2.3	33.3	2.5
Men	37.2	2.2	34.1	2.3	30.5	2.3	28.0	2.3	32.2	3.1	34.9	3.6
Women	34.0	2.0	36.8	2.2	30.3	1.8	28.8	2.0	32.4	3.1	31.6	3.3
Aged 25–29 years												
African Americans												
Total	41.5	3.9	39.0	3.9	38.3	3.4	30.5	3.3	21.7	3.6	21.0	4.3
Men	47.6	4.9	41.6	6.2	43.1	5.5	35.9	5.7	21.3	5.9	22.6	7.6
Women	36.5	5.8	36.8	4.6	34.3	3.7	26.1	3.6	22.1	4.5	19.6	5.3
Whites												
Total	38.4	1.4	36.2	1.5	34.7	1.3	30.8	1.3	31.2	1.9	32.2	2.1
Men	42.3	2.0	38.3	2.2	34.5	1.8	31.2	1.9	31.9	2.7	32.6	3.1
Women	34.7	2.0	34.1	1.9	35.0	1.7	30.5	1.7	30.6	2.5	31.9	2.8
Aged 30–34 years												
African Americans												
Total	43.0	5.1	40.8	4.5	41.0	3.1	36.5	3.0	34.2	4.2	31.9	4.3
Men	50.2	8.2	45.5	7.1	43.6	5.1	38.9	4.8	38.3	6.9	31.2	6.8
Women	37.5	6.0	37.1	4.6	38.9	3.6	34.5	3.6	30.8	4.9	32.5	5.7
Whites												
Total	38.6	1.8	34.4	1.5	33.1	1.3	31.1	1.2	32.9	1.7	30.7	1.8
Men	43.1	2.5	37.3	2.2	35.9	1.8	32.7	1.7	33.1	2.4	31.3	2.6
Women	34.2	2.3	31.5	1.9	30.4	1.6	29.6	1.5	32.7	2.2	30.2	2.6

*For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

markers for tobacco use. Among adolescents who reported that they did not smoke, African Americans were more likely than whites to test positive for carbon monoxide and for cotinine. Overall, however, white adolescents were three times more likely than African American adolescents to test positive for carbon monoxide, suggesting that whites in this study were substantially more likely to smoke, regardless of

Table 9. Percentage of African Americans and whites 20–24 years of age who reported being current cigarette smokers,* by education and gender, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
≥12 years' education												
African Americans												
Total	41.9	5.2	38.6	4.5	30.4	3.7	22.8	3.9	18.5	5.4	16.7	5.4
Men	49.1	7.9	38.2	7.7	29.6	6.3	28.9	6.9	21.9	9.4	22.2	10.1
Women	35.9	6.3	38.9	4.9	31.0	4.5	17.8	3.5	15.2	5.1	12.5	5.0
Whites												
Total	45.2	1.8	48.3	2.3	44.2	2.1	40.5	2.4	46.9	3.2	45.4	4.2
Men	47.8	2.8	47.8	3.5	46.2	3.2	40.5	3.4	47.5	4.8	47.1	5.8
Women	42.7	2.6	48.7	2.9	42.3	2.8	40.5	3.1	46.4	4.5	43.6	5.6
≥13 years' education												
African Americans												
Total	26.4	6.4	17.3	4.4	12.4	3.7	7.2	2.9	9.0	5.3	9.3	5.6
Men	32.0	11.3	15.6	7.9	13.3	7.0	9.2	5.3	16.6	12.4	15.9	10.6
Women	23.5	6.7	18.5	6.6	11.9	4.0	5.5	3.0	4.6	4.0	3.1	3.0
Whites												
Total	21.6	2.0	18.2	1.8	15.4	1.5	16.0	1.5	19.0	2.6	23.6	2.8
Men	22.0	2.5	15.8	2.4	14.0	2.0	14.5	2.4	17.6	3.5	24.6	4.2
Women	21.2	2.5	20.5	2.6	16.7	2.1	17.3	2.1	20.3	3.5	22.7	3.8

*For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

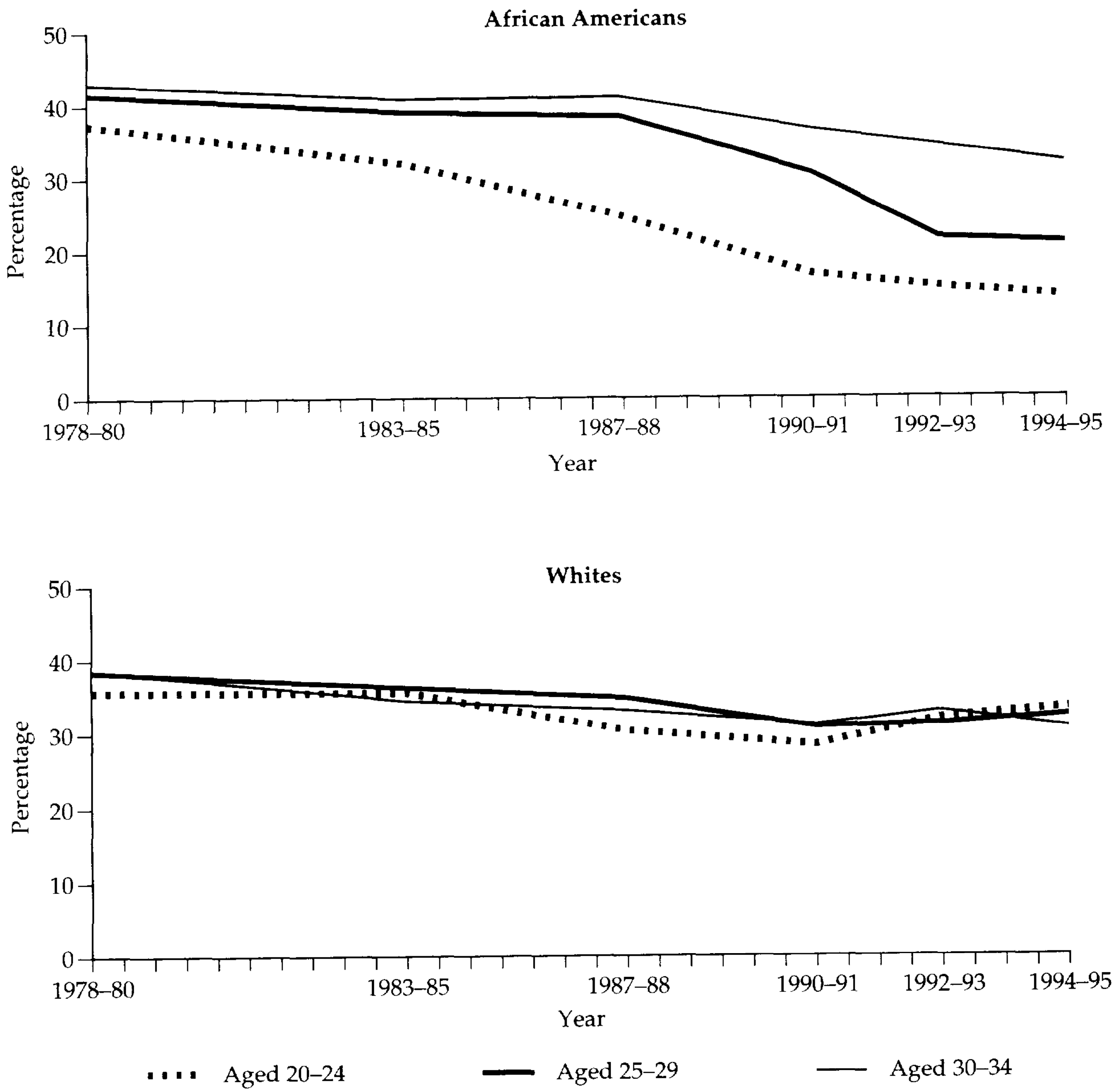
†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

differential misclassification. In a study of young adults 18–30 years old, Wagenknecht and colleagues (1992) also found differential misclassification, with African Americans (5.7 percent) more likely than whites (2.8 percent) to misclassify themselves as nonsmokers. However, these researchers suggested that their results may have been influenced by differential exposure to environmental tobacco smoke and by differences in nicotine metabolism. Using a sample of seventh- through tenth-grade New York State public school students, Wills and Cleary (1997) compared self-reports of cigarette smoking with measured carbon monoxide from expired air. The investigators found that the sensitivity for self-reports was slightly lower for African Americans than for whites, but the magnitude of the effect was small. When self-reported smoking rates were adjusted for carbon monoxide values, at every grade level African American students had significantly lower smoking prevalences than whites. Although the phenomenon of differential misclassification may need further investigation, no evidence indicates that misclassification bias explains the

Figure 4. Trends in smoking* among African Americans and whites aged 20–34 years, United States, 1978–1995



*For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.
Source: National Health Interview Surveys, National Center for Health Statistics, public use data tapes, 1978–1995; see Table 8 for corresponding data.

substantial decline in smoking prevalence reported by African American youths.

Possible behavioral, sociodemographic, and attitudinal explanations. Exploring possible interactions between the use of alcohol or other drugs and changes in cigarette smoking among African American and white adolescents may yield important scientific data. Understanding the trends of smoking behavior in the context of factors such as the age when youths start smoking, background and lifestyle factors, and attitudes about smoking may help program developers design better smoking prevention and control interventions for these and other population subgroups.

Differential use of other drugs. MTF data were analyzed to explore possible interactions between the use of alcohol or other drugs and changes in cigarette smoking among African American and white adolescents (Table 10) (Figures 5 and 6) (Institute for Social Research, University of Michigan, public use data tapes, 1976–1994). Between 1976 and 1994, the percentage of African American adolescents who were abstinent from (i.e., did not use in the previous month) both cigarettes and other substances (Table 10) was higher than for whites and tended to increase more rapidly for African Americans than for whites in every category of drug use. For example, 41.7 percent of African American high school seniors surveyed in 1976–1979 were abstinent from cigarettes and alcohol, compared with 64.1 percent in 1990–1994. Among white seniors, 22.4 percent were abstinent from both cigarettes and alcohol in 1976–1979, compared with 37.1 percent in 1990–1994. Concurrent use (i.e., use of both substances in the past month) was lower and tended to decrease more rapidly among African American seniors than among white seniors between 1976 and 1994. In addition, trends in the use of cigarettes, alcohol, and other substances among high school seniors indicate that among both smokers and nonsmokers, African Americans were generally less likely than whites to use substances other than tobacco (Table 10).

Age of smoking initiation. African American smokers initiate smoking at slightly later ages than white smokers, according to the findings of two national studies (Escobedo et al. 1990; CDC 1991c). In addition, data from the 1994–1995 (combined) NHSDAs indicate that among U.S. adults aged 30–39 years who had ever smoked daily, the average ages for first trying a cigarette and for becoming a daily smoker were about one year higher for African American males than for white males and about two years higher for African American females than for white females (Table 11) (USDHHS, Substance Abuse and Mental Health Services Administration, public use data tapes, 1994–1995).

These differences in the age of smoking initiation are not large enough to suggest that the differences in smoking prevalence currently observed among African American and white adolescents will disappear as these populations age (CDC 1991c). The data presented in Table 11 and by Escobedo and colleagues (1990) indicate that although African Americans are more likely than whites to begin smoking in their early 20s, virtually all smokers in both groups have begun by age 25. Furthermore, the prevalence of cigarette smoking has decreased more rapidly for African Americans than for whites among those persons aged 20–24 years, 25–29 years, and 30–34 years (Table 8), suggesting that a birth cohort effect has occurred.

Background and lifestyle factors. Investigations of background and lifestyle factors have not identified characteristics that might account for the greater decline in smoking among African American youths. Wallace and Bachman (1991) analyzed the MTF data and found that the difference was not explained by factors such as parents' education, presence of two parents in the household, location of residence, college plans, academic performance, employment status, religiousness, or political views. To assess the incidence of cigarette smoking among African American and white adolescents, Faulkner and colleagues (1996) analyzed longitudinal data from the 1989–1993 TAPS. The analyses were restricted to 3,531 African Americans and whites aged 11–17 years who reported in 1989 that they had never tried cigarettes. After controlling statistically for variables that were sociodemographic (sex, age, and parental education), environmental (household smoking and number of same-sex friends who smoke), personal (beliefs about the perceived benefits of smoking), and behavioral (intention to smoke, participation in organized physical activity, and academic performance), the study found that African Americans were significantly less likely than whites to have tried cigarette smoking four years later.

Lowry and colleagues (1996) analyzed cross-sectional data on 6,321 adolescents (aged 12–17 years) from the YRBS supplement to the 1992 NHIS. African Americans were significantly less likely than whites to have smoked in the previous 30 days. This analysis controlled statistically for the educational level of the responsible adult, for family income, for the age and sex of the adolescent, and for whether the adolescent was in or out of school.

Furthermore, the major declines in smoking reported for African American high school seniors have occurred regardless of parents' education; the

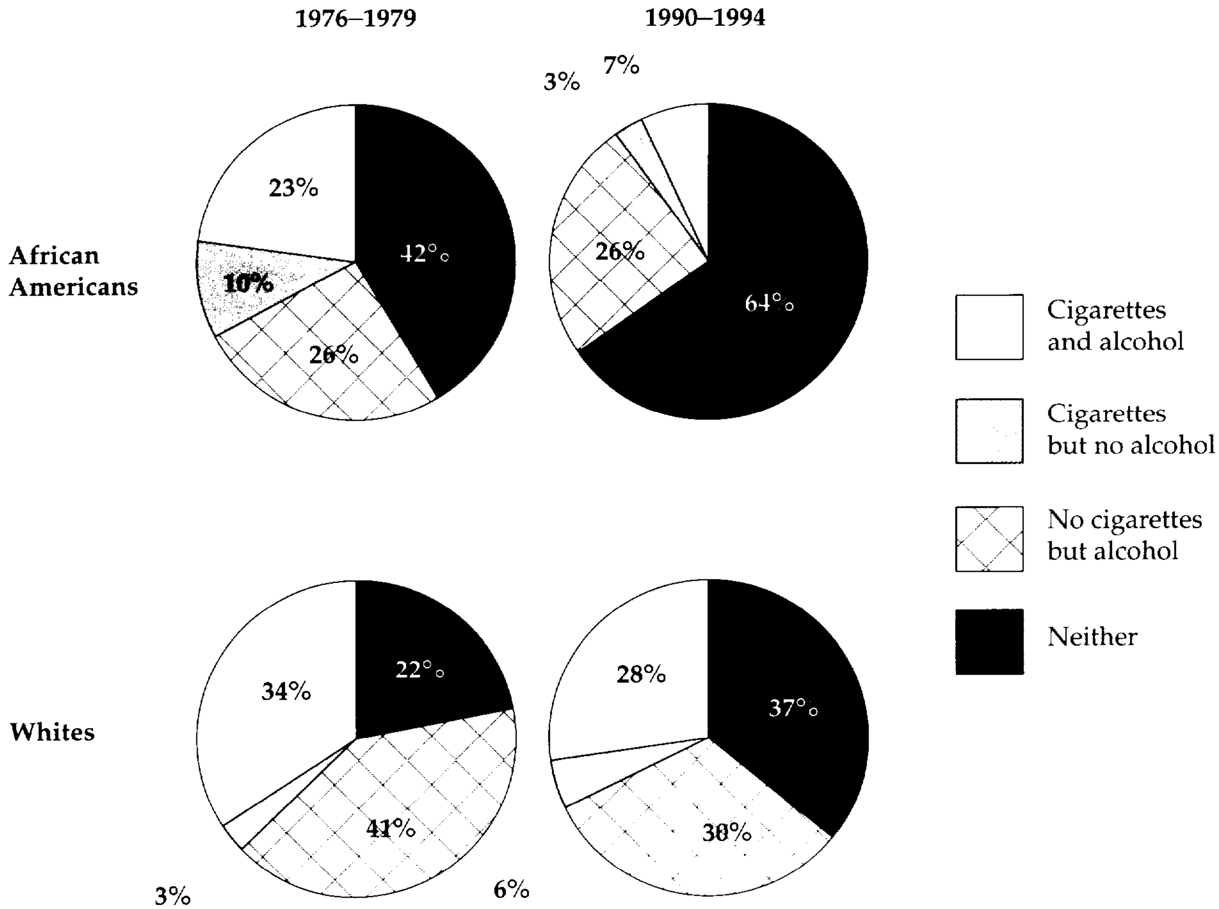
Table 10. Percentage of African American and white high school seniors who reported recently using or not using cigarettes and other selected substances,* Monitoring the Future surveys, United States, 1976–1994 aggregate data

	Cigarette use among African Americans†							
	1976–1979		1980–1984		1985–1989		1990–1994	
Characteristic	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Alcohol use								
Yes	22.7	25.9	15.2	31.2	11.0	29.5	7.2	26.2
No	9.7	41.7	5.3	48.4	3.1	56.4	2.6	64.1
Marijuana use								
Yes	17.2	11.9	11.2	14.2	6.4	7.8	3.1	5.8
No	15.0	55.9	9.3	65.3	7.6	78.2	6.6	84.5
Cocaine use								
Yes	1.4	0.6	1.4	1.3	1.0	1.0	0.3	0.2
No	31.7	66.3	19.7	77.6	13.3	84.8	9.6	89.8
Any illicit drug use‡								
Yes	17.6	12.9	11.4	15.2	6.6	9.3	3.3	6.8
No	14.0	55.5	8.8	64.6	7.0	77.1	6.2	83.7

	Cigarette use among whites§							
	1976–1979		1980–1984		1985–1989		1990–1994	
Characteristic	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Alcohol use								
Yes	33.7	40.5	28.2	46.0	28.6	40.9	27.5	29.7
No	3.3	22.4	2.7	23.1	3.6	26.8	5.7	37.1
Marijuana use								
Yes	22.4	13.7	16.9	12.8	14.4	8.1	11.8	4.4
No	14.3	49.6	13.8	56.5	17.5	60.0	21.3	62.5
Cocaine use								
Yes	2.6	1.1	3.5	2.0	3.4	1.4	1.2	0.2
No	34.3	62.0	27.3	67.2	28.5	66.6	31.9	66.7
Any illicit drug use‡								
Yes	23.3	14.8	18.9	15.5	16.1	10.0	13.3	5.9
No	13.3	48.6	11.7	53.9	15.7	58.3	19.6	61.2

*Refers to use of these substances in the last 30 days.
†Entries are percentages of the entire African American high school senior population.
‡Any illicit drug use includes any use of marijuana, hallucinogens, cocaine, or heroin or any use of other opiates, stimulants, barbiturates, methaqualone, or tranquilizers not under a physician's orders. Methaqualone is excluded from the definition of illicit drugs for the 1990–1994 survey data.
§Entries are percentages of the entire white high school senior population.
Source: Survey Research Center, Institute for Social Research, University of Michigan, public use data tapes, 1976–1994.

Figure 5. Use of cigarettes and alcohol* among African American and white high school seniors, United States, 1976–1979 and 1990–1994



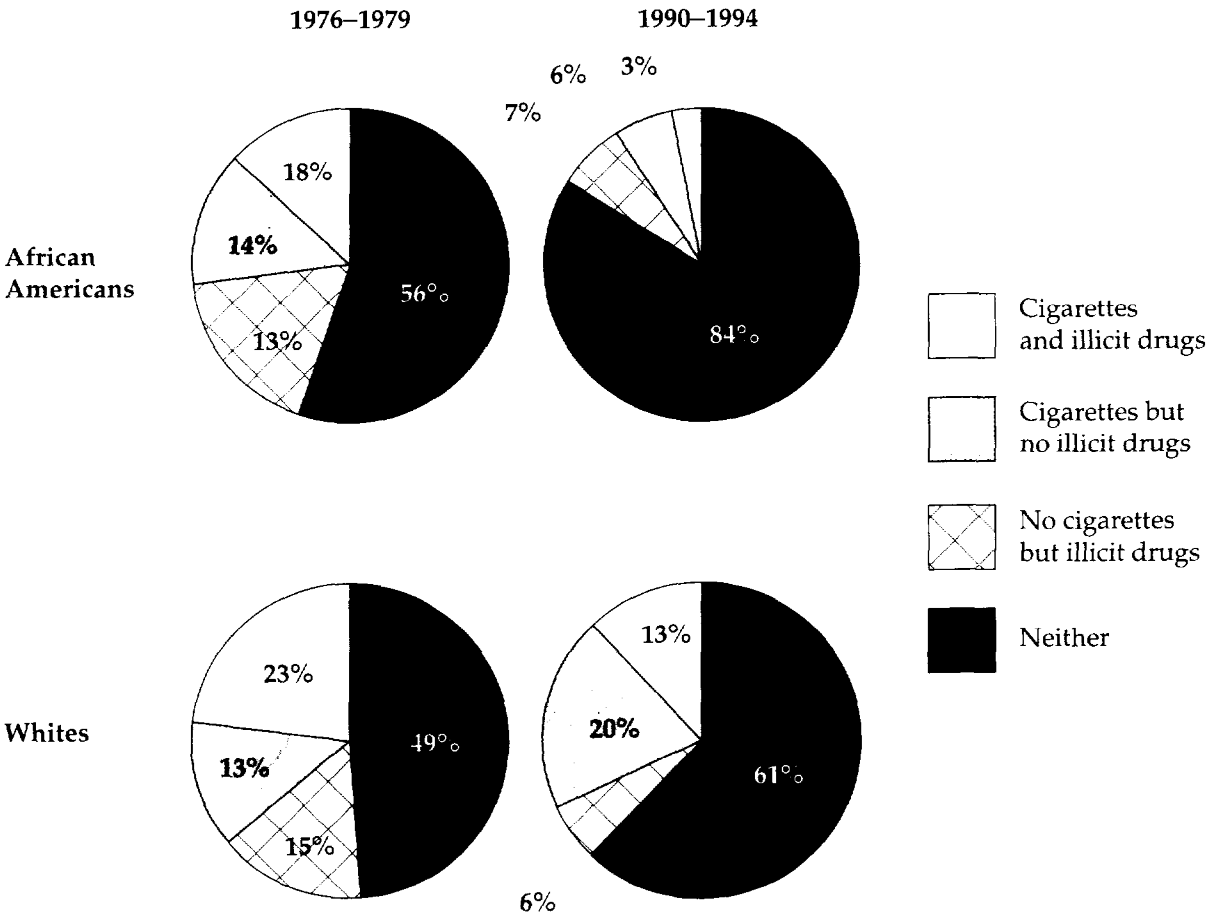
*In the previous month.
Source: Survey Research Center, Institute for Social Research, University of Michigan, public use data tapes, 1976–1994; see Table 10 for corresponding data.

respondent's personal income; school performance; the importance of religion to the respondent; geographic region of residence; and, except for those who were raised on a farm, the locale in which the respondent grew up (Table 12) (Institute for Social Research, University of Michigan, public use data tapes, 1976–1994).

Attitudes about smoking. One possible explanation is that the attractiveness (or *functional value*) of cigarette smoking has decreased more rapidly among African American high school seniors than among white seniors. For example, African American seniors have, over time, become increasingly more likely than white seniors to acknowledge the health risks of cigarette smoking, to claim that smoking is a dirty habit, and to claim that they prefer to date nonsmokers. From 1976 through 1989, African Americans were more likely than whites to disagree with the statement, "I personally don't mind being around people who are smoking" (USDHHS 1994).

African American youths also have been less likely than white youths to believe that cigarette smoking helps control weight. In anonymous surveys of 659 students (with an average age of 16 years) from two racially integrated high schools in the area

Figure 6. Use of cigarettes and illicit drugs* among African American and white high school seniors, United States, 1976–1979 and 1990–1994



*In the previous month.
Source: Survey Research Center, Institute for Social Research, University of Michigan, public use data tapes, 1976–1994; see Table 10 for corresponding data.

of Memphis, Tennessee, 46 percent of white females, 30 percent of white males, 10 percent of African American females, and 14 percent of African American males endorsed the statement, "Smoking cigarettes can help you control your weight/appetite" (Camp et al. 1993). When respondents who smoked at least once a week were asked whether they had smoked to control their weight, 61 percent of the white girls and 16 percent of the white boys said that they had smoked to control their weight, whereas none of the African American smokers reported that they smoked to control their weight. Further research is needed to delineate the role of weight control concerns in patterns of cigarette smoking initiation among adolescents of ethnic groups. One recent study suggests that African American adolescent females prefer a significantly heavier ideal body size than white adolescent females (Parnell et al. 1996), a finding consistent with the notion that the potential weight-controlling effects of cigarettes have less functional utility among young African American females than among white females.

A previous Surgeon General's report indicated that parental concern about whether an adolescent smoked appeared to decrease the risk of that

Table 11. Cumulative percentages of recalled age at which a respondent first tried a cigarette and began smoking daily, among African American, Hispanic, and white men and women aged 30–39, National Household Surveys on Drug Abuse, United States, 1994–1995

	All men*					
	First tried a cigarette			Began smoking daily		
Age (years)	African American	Hispanic	White	African American	Hispanic	White
<12	7.0	9.2	14.9	1.4	1.4	1.3
<14	17.1	20.6	32.2	3.7	4.6	4.6
<16	34.8	39.0	51.0	10.9	11.2	11.8
<18	55.1	54.7	68.7	20.3	19.6	26.4
<19	59.9	62.7	74.0	25.5	26.3	34.3
<20	64.6	65.5	76.1	28.6	28.4	38.5
<25	71.5	72.9	80.9	40.5	37.2	47.4
<30	74.3	76.4	81.7	44.6	42.5	48.8
≤39	75.1	76.7	82.5	45.1	43.4	49.9
Mean age	NA	NA	NA	NA	NA	NA

	All women†					
	First tried a cigarette			Began smoking daily		
Age (years)	African American	Hispanic	White	African American	Hispanic	White
<12	4.6	3.5	7.8	0.6	0.2	0.8
<14	13.3	11.3	27.7	2.5	2.0	5.3
<16	25.7	22.5	49.4	5.9	5.6	15.8
<18	43.9	33.9	67.5	15.9	9.5	30.0
<19	52.3	40.7	73.2	21.7	14.3	38.6
<20	55.8	43.0	75.7	24.0	15.5	41.6
<25	66.1	51.4	80.3	33.7	21.8	49.2
<30	68.3	55.8	81.4	37.0	25.7	51.0
≤39	69.3	57.4	82.0	38.1	26.7	51.4
Mean age	NA	NA	NA	NA	NA	NA

*N = 3,536
†N = 5,143
NA = data not available.

adolescent becoming a cigarette smoker (USDHHS 1994). In a study conducted in Los Angeles and San Diego in 1986, African American parents placed a higher value than white parents on becoming involved in preventing their children from beginning to smoke (Flay et al. 1988; Koepke et al. 1990). Data from two surveys conducted in eight U.S. communities in 1988 and 1989 indicate that African American adults were more likely than white adults to perceive cigarette smoking as a very serious health problem in their community, to favor eliminating vending machines from places where teenagers gather, and to prohibit smoking in their car (Royce et al. 1993).

More recent findings from focus groups conducted at several U.S. sites suggest that African American parents may be more likely than white parents to express clear antismoking messages (McIntosh 1995; Mermelstein et al. 1996). Findings from these focus

Men who had ever smoked daily					
First tried a cigarette			Began smoking daily		
African American	Hispanic	White	African American	Hispanic	White
8.9	13.6	15.7	3.0	3.2	2.7
22.7	29.7	36.7	8.3	10.6	9.2
45.7	55.4	61.0	24.2	25.7	23.7
73.7	74.1	83.9	45.0	45.1	52.9
81.1	83.4	90.5	56.4	60.7	68.8
87.0	86.9	93.0	63.5	65.4	77.1
96.1	97.0	98.4	89.7	85.7	95.1
99.9	99.6	98.9	98.9	97.9	97.7
100.0	100.0	100.0	100.0	100.0	100.0
15.9	15.3	14.6	18.4	18.6	17.6

Women who had ever smoked daily					
First tried a cigarette			Began smoking daily		
African American	Hispanic	White	African American	Hispanic	White
5.9	6.9	8.9	1.6	0.7	1.6
20.1	25.4	37.8	6.7	7.6	10.3
38.6	48.7	66.1	15.5	21.1	30.7
66.8	68.6	85.9	41.8	35.4	58.3
77.2	78.2	92.0	57.0	53.4	75.0
81.4	80.8	94.4	62.9	58.0	80.8
96.0	94.5	99.2	88.4	81.8	95.6
99.6	99.2	99.9	97.2	96.4	99.2
100.0	100.0	100.0	100.0	100.0	100.0
16.6	16.2	14.6	18.9	19.5	17.1

Source: Substance Abuse and Mental Health Services Administration, public use data tapes, 1994–1995.

groups also suggest that smoking by African American adolescents may be a sign of disrespect toward parents (USDHHS 1994). Additionally, African American adolescent females appear to perceive that abstinence from smoking enhances their image, whereas white girls are more likely to perceive that smoking empowers them (perhaps because of themes expressed in cigarette advertising) (Mermelstein et al. 1996). The responses of African American community leaders, including that of former USDHHS Secretary Louis Sullivan, against cigarette marketing campaigns that appear to target African Americans may have influenced young people's attitudes and behaviors about smoking (McIntosh 1995).

Further research is needed to better understand the large decreases in smoking prevalence that occurred among African American youth in the 1970s and 1980s. Research is also needed to better

Table 12. Percentage of African American and white high school seniors who reported previous-month and heavy* smoking, by selected variables, Monitoring the Future surveys, United States, 1976–1994

	Previous-month smoking (%)							
	1976–1979		1980–1984		1985–1989		1990–1994	
Characteristic	African Americans	Whites	African Americans	Whites	African Americans	Whites	African Americans	Whites
Parental education								
Less than high school	34.0	42.0	23.2	36.8	13.9	37.6	11.8	37.6
High school	35.3	39.5	21.2	34.1	14.1	34.8	10.7	34.8
Some college	30.9	35.0	20.7	29.2	16.0	31.3	9.4	32.5
College	29.4	32.4	18.3	26.7	13.3	29.1	9.3	32.4
Some postgraduate study	30.1	31.2	21.9	23.7	14.7	28.3	9.8	31.7
Personal income†								
Low	NA	NA	16.4	24.5	12.6	24.6	7.5	24.6
Medium	NA	NA	19.4	30.5	14.9	28.8	9.4	29.7
High	NA	NA	22.8	33.3	14.1	34.5	9.8	35.5
Very high	NA	NA	23.4	37.8	16.5	39.8	12.4	41.3
School performance								
Far above average	25.9	25.8	16.2	21.0	11.4	23.0	8.0	24.6
Slightly above average	31.2	35.8	20.2	29.6	12.7	30.7	8.4	32.2
Average	34.4	45.3	22.5	38.5	15.3	38.9	10.6	39.4
Below average	40.0	52.4	28.0	44.1	20.5	46.7	17.6	48.3
Importance of religion								
Very important	29.3	25.0	19.1	21.9	11.4	21.9	8.2	22.1
Important	34.1	38.9	23.4	32.4	16.7	32.0	11.5	33.7
Not/somewhat important	40.0	43.0	23.5	35.2	18.3	36.8	12.4	38.5
Region								
Northeast	37.1	40.4	25.7	33.5	18.1	34.9	10.9	34.9
North Central	34.8	38.9	20.3	32.8	16.0	34.6	10.1	35.5
South	32.6	37.7	20.6	31.7	12.7	31.1	10.1	33.6
West	29.1	25.8	20.2	21.3	17.8	26.0	8.0	26.6
Locale in which respondent grew up								
Farm	33.6	37.9	24.9	31.6	26.7	33.0	22.3	31.9
Country	35.5	38.3	23.3	30.7	14.6	33.1	12.2	32.2
Small city	28.5	37.4	20.0	30.1	14.1	31.1	12.1	32.6
Medium-sized city	31.5	37.4	20.1	31.2	14.5	32.3	8.7	34.7
Suburb of medium-sized city	34.5	36.9	18.5	32.0	16.5	32.0	6.8	34.7
Large or very large city	36.2	38.5	22.3	32.0	13.9	33.4	8.5	33.6
Suburb of large or very large city	34.1	32.7	20.0	29.1	14.0	30.2	9.0	33.8

*Heavy cigarette smoking is 10 or more cigarettes smoked per day reported at time of survey.
†Personal income is the sum of income from employment, allowance, and other sources. Trend data are available for 1982–1994 only.
NA = data not available.

Heavy cigarette smoking (%)							
1976–1979		1980–1984		1985–1989		1990–1994	
African Americans	Whites	African Americans	Whites	African Americans	Whites	African Americans	Whites
9.3	24.0	6.2	21.5	3.0	21.3	2.7	19.1
10.8	21.6	4.6	17.4	2.4	15.7	1.6	15.9
9.1	17.4	4.8	13.1	3.3	12.3	1.4	12.6
7.2	14.9	3.5	10.3	2.4	9.5	1.6	11.6
9.1	14.8	5.3	9.0	4.1	8.3	1.2	9.8
NA	NA	3.1	10.1	2.2	8.7	1.1	8.0
NA	NA	3.4	12.5	3.0	9.2	1.7	9.1
NA	NA	6.1	16.3	2.4	14.2	1.2	13.5
NA	NA	6.9	20.7	3.3	19.8	2.3	20.1
7.6	10.6	3.7	8.1	3.0	7.1	1.5	7.1
8.4	17.7	4.1	12.8	2.0	11.2	1.2	11.3
10.2	25.9	5.2	20.2	2.7	17.5	1.5	17.3
11.7	33.5	7.2	26.1	5.1	25.4	4.4	26.0
8.5	10.4	4.0	8.7	2.1	7.3	1.2	7.5
9.4	19.1	5.7	14.5	3.1	12.0	1.9	11.9
12.8	25.0	6.0	18.6	3.9	16.3	2.4	16.5
12.2	23.2	6.3	17.4	4.7	16.6	2.1	14.4
11.1	19.3	5.3	16.0	3.0	13.8	1.9	13.9
9.2	19.5	4.7	14.8	2.1	12.4	1.6	13.8
7.4	12.5	4.2	7.9	3.3	8.4	1.1	8.8
9.9	16.4	5.4	12.3	8.1	12.2	5.1	12.2
10.0	20.2	5.1	14.9	2.9	13.7	1.5	13.1
8.7	19.0	4.5	13.7	2.7	12.2	2.8	12.5
9.4	20.2	4.9	15.4	2.2	13.1	1.3	13.4
9.0	20.6	4.0	15.2	2.8	12.6	1.1	12.7
10.8	22.9	5.4	16.5	2.3	14.9	1.2	14.0
9.3	16.4	3.8	14.0	3.7	11.0	1.2	12.2

Source: Institute for Social Research, University of Michigan, public use data tapes, 1976–1994.

understand the reasons for the increase in prevalence that occurred in the early 1990s (Figures 2 and 3) (CDC 1996).

Other risk behaviors. The Surgeon General's report *Preventing Tobacco Use Among Young People* (USDHHS 1994) has concluded that "Tobacco use in adolescence is associated with a range of health-compromising behaviors, including being involved in fights, carrying weapons, engaging in higher-risk sexual behavior, and using alcohol and other drugs" (p. 9). Escobedo and colleagues (1997) have observed these associations for African American adolescent males and females. Using data from the YRBS supplement of the 1992 NHIS, the researchers found that after their analysis controlled statistically for age, ethnicity, sex, parental educational level, region of the country, and other risk behaviors, marijuana use, binge drinking, and physical fighting were significantly associated with cigarette smoking among African American adolescent males and females. Focus group data suggest that African American youths are more likely than white youths to pair cigarette smoking with marijuana use as a way to maintain and enhance the drug effects of each (Mermelstein et al. 1996).

Smokeless Tobacco Use

The prevalence of smokeless tobacco use among African American adolescents has remained fairly constant in recent years. According to the MTF surveys, previous-month smokeless tobacco use (based on two-year rolling averages) was reported by 1.8 percent of eighth-grade African American students in 1992 and 2.2 percent in 1996; among tenth-grade students, the prevalence was 2.9 percent in 1992 and 2.5 percent in 1996; and among high school seniors, the prevalence was 2.1 percent in 1987 and 2.7 percent in 1996 (Johnston et al. 1996; Institute for Social Research, University of Michigan, unpublished data from the 1996 MTF surveys). Similarly, the YRBS data indicate that 2.1 percent of African American high school students were current smokeless tobacco users in 1991 (USDHHS 1994), and 2.2 percent were so in 1995 (CDC 1996).

African American adolescent males are substantially less likely than white adolescent males to use smokeless tobacco. Among male high school students participating in the 1995 YRBS, for example, 3.5 percent of African Americans and 25.1 percent of whites reported that they had used smokeless tobacco in the previous month (CDC 1996). Among females, 1.1 percent of African Americans and 2.5 percent of whites reported they had used smokeless tobacco in the previous month.

American Indians and Alaska Natives

Data assessing long-term trends in tobacco use among American Indians and Alaska Natives have been unavailable, for the most part, because national surveys and databases have only recently begun to identify persons of American Indian or Alaska Native ancestry. Studies using data from regional surveys or data on specific American Indian tribes have, however, provided useful information about tobacco use among members of these groups. Because the geographic location of American Indian and Alaska Native people reflects unique cultural and historical experiences, researchers should consider these differences when interpreting region-specific data about smoking prevalence. Data from regional studies also may provide information that is useful in developing culturally appropriate tobacco control efforts.

National surveys provide limited capability to assess the level of tobacco use and the effectiveness of tobacco control efforts among American Indians and Alaska Natives. The NHIS, for example, did not begin identifying American Indian and Alaska Native respondents until 1978. Because American Indians and Alaska Natives make up a small proportion of the U.S. population, data must be aggregated from several years to provide meaningful estimates.

Also noteworthy is that the data on tobacco use among American Indians and Alaska Natives include some ceremonial use (e.g., in pipes) in addition to daily addictive behavior (see Chapter 4). Anecdotal information also suggests that standard definitions and classifications of smoking may not accurately reflect smoking habits among American Indians, some of whom may smoke no more than one or two cigarettes per day (Nathaniel Cobb, personal communication, 1994; Roscoe et al. 1995). Yet American Indians who smoke a few cigarettes every day are classified in the <15-cigarettes-per-day category, which may imply a higher overall consumption than actually exists. Such differences in amounts of daily smoking may have important implications for the design of culturally appropriate smoking cessation interventions targeting American Indians.

Prevalence of Cigarette Smoking

Among American Indian and Alaska Native men and women, rates of smoking have been substantially higher than smoking rates in any other U.S. subgroup. In the 1987 Survey of American Indians and Alaska Natives (SAIAN) of the National Medical Expenditure Survey, 32.8 percent of respondents reported being current smokers (Lefkowitz and Underwood 1991). This survey—the only nationally representative sample designed to assess the health practices of people of American Indian and Alaska Native ancestry—targets people who live on or near reservations and who are eligible for services provided by the Indian Health Service (IHS). The NHIS rate of smoking among American Indians and Alaska Natives for 1987 and 1988 (39.2 percent) was greater than the SAIAN estimate, perhaps because of different modes of administration and sampling (tribally enrolled beneficiaries in the SAIAN and the general population of American Indians and Alaska Natives in the NHIS).

In a more recent survey—conducted on reservations between 1989 and 1992 and involving 4,549 American Indians 45–74 years old in 13 tribes in Arizona, North Dakota, South Dakota, and southeastern Oklahoma—the prevalence of cigarette smoking was higher in nearly all American Indian groups (40.5 percent for men and 29.3 percent for women) than in the general U.S. population, but wide variation was notable (Welty et al. 1995). In this study, known as the Strong Heart Study, the smoking prevalence was highest in North Dakota and South Dakota (53.1 percent for men and 45.3 percent for women) and lowest in Arizona (29.7 percent for men and 12.9 percent for women).

According to the NHIS data, the overall prevalence of cigarette smoking among American Indians and Alaska Natives was 48.2 percent in 1978–1980 and 39.2 percent in 1994–1995. Although the data are imprecise, they suggest a substantial drop in prevalence for men from 1978–1980 to 1983–1985 (Table 13) (NCHS, public use data tapes, 1978–1995). However, no progress for men was observed from 1983–1985 to 1994–1995 and, for women, no progress was observed from 1978–1980 to 1994–1995.

Another major source of data on smoking patterns among American Indians and Alaska Natives is the BRFSS, which, for these analyses, included data collected in 47 states and the District of Columbia (CDC 1992a). The BRFSS data for 1987–1991 show that among American Indians and Alaska Natives, 33.4 percent of men and 26.6 percent of women reported that they were current smokers. The 95 percent confidence intervals associated with smoking rates overlap between American Indian and Alaska Native women and men in both surveys. Even though data were aggregated for several years, the small sample sizes of American Indians and Alaska Natives in both surveys produced imprecise estimates that make it impossible to determine whether the prevalence of smoking actually differed between men and women.

The prevalence of smoking among American Indian and Alaska Native women in the NHIS (35.2 percent in 1987–1988 and 37.2 percent in 1990–1991) differed substantially from the prevalence found in the 1987–1991 BRFSS (26.6 percent). Similarly, the prevalence of smoking among American Indian and Alaska Native men in the NHIS (43.5 percent in 1987–1988 and 32.9 percent in 1990–1991) differed appreciably from the prevalence found for men in the 1987–1991 BRFSS (33.4 percent). Methodological differences between the surveys may explain these differences. Household, face-to-face interviews were conducted for the NHIS, whereas telephone interviews were performed for the BRFSS (Goldberg et al. 1991; Sugarman et al. 1992; Leonard et al. 1993). Because telephone coverage in the areas where American Indians and Alaska Natives live tends to be lower than in areas where other ethnic groups live (Goldberg et al. 1991; Sugarman et al. 1992), sometimes as low as 60.4 percent of households (U.S. Bureau of the Census 1994), American Indians and Alaska Natives probably were less likely than others to have been included in the BRFSS surveys. Moreover, because telephone service requires financial ability to pay, persons of higher socioeconomic status may have been more likely than other persons to be included in the BRFSS surveys (Thornberry and Massey 1988). Thus, the BRFSS may have yielded lower smoking rates than the NHIS because the BRFSS surveys selected more affluent respondents, who were less likely than others to smoke.

Estimated rates and trends in cigarette smoking were not significantly related to educational attainment, according to NHIS (Table 13) and SAIAN data. However, both surveys suffered from imprecision because of small sample sizes.

Number of Cigarettes Smoked Daily

NHIS data for 1978–1995 show few variations over time in the number of cigarettes smoked per day among American Indian and Alaska Native smokers (Table 14) (NCHS, public use data tapes, 1978–1995). In the years 1978–1980, 39.9 percent of American Indian and Alaska Native smokers reported smoking fewer than 15 cigarettes per day, and 25.2 percent reported smoking 25 or more cigarettes per day. By 1994–1995, the proportion of American Indian and Alaska Native smokers who smoked fewer than 15 cigarettes per day was 49.9 percent, whereas the proportion who smoked 25 or more cigarettes per day was 17.0 percent. Data from the Strong Heart Study showed that American Indian smokers reported smoking fewer cigarettes per day (range of 6.1 among women in Arizona to 15.0 among men in North Dakota and South Dakota) than the national average (Welty et al. 1995).

Table 13. Percentage of American Indian and Alaska Native adults who reported being current cigarette smokers,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	48.2	5.8	35.6	8.0	39.2	5.9	35.0	6.9	39.1	5.1	39.2	7.3
Gender												
Men	63.0	11.0	41.4	12.9	43.5	9.3	32.9	7.1	37.5	9.3	45.4	13.1
Women	34.1	10.1	32.3	8.8	35.2	6.2	37.2	9.1	40.3	8.6	34.2	8.7
Age (years)												
18–34	53.3	9.2	39.9	13.6	38.1	7.1	36.1	9.3	41.3	8.7	48.0	11.1
35–54	53.5	11.0	36.7	12.1	47.4	8.0	40.2	7.0	45.1	8.4	42.9	11.3
≥55	33.4	15.1	24.7	11.3	29.2	10.7	23.4	14.9	22.3	9.3	10.5	8.9
Education§												
Less than high school	49.9	8.8	28.7	11.3	42.5	8.3	33.4	8.9	42.6	12.3	44.1	14.2
High school graduate/ any college	35.0	11.5	36.7	10.2	35.7	6.7	35.4	7.9	37.9	7.4	33.5	7.8

*Excludes American Indians and Alaska Natives who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.
†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.
‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

In the years 1978–1980, American Indian and Alaska Native men were more likely than women to smoke 25 or more cigarettes per day (Table 14). Since 1980, however, the proportion of men smoking 25 or more cigarettes per day has declined.

Cigarette consumption data from the BRFSS and the NHIS cannot be compared directly because the BRFSS data are for the mean number of cigarettes smoked daily (CDC 1992a). However, both sources of data indicate that the number of cigarettes smoked is slightly greater among older than among younger American Indians and Alaska Natives.

Quitting Behavior

State and regional surveys also indicate that the prevalence of smoking cessation remains relatively low among American Indian and Alaska Native smokers compared with smokers in other racial/ethnic groups (Goldberg et al. 1991; Lando et al. 1992). In the past 17 years, the percentage of American Indians and Alaska Natives who have ever smoked 100 cigarettes and have quit smoking has changed only slightly overall; NHIS data indicate that the prevalence of cessation was 31.6 percent in 1978–1980 and 32.9 percent in 1994–1995 (Table 15) (NCHS, public use data tapes, 1978–1993). During this period, the prevalence of smoking cessation fluctuated substantially for both genders, with similar estimates reported for 1978–1980 and 1994–1995. The prevalence of smoking cessation among American Indians and Alaska Natives has increased with increasing age: those aged 18–34 years have had the lowest prevalence of cessation, those aged 35–54 years have had intermediate proportions, and those aged 55 years and older have had the highest prevalence of cessation. The prevalence of cessation increased among older American Indians and Alaska Natives; however, no progress occurred among those

Table 14. Percentage of adult American Indian and Alaska Native smokers* who reported smoking <15, 15–24, or ≥25 cigarettes per day, overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total												
<15 cigarettes	39.9	10.2	38.2	12.5	33.7	7.5	46.3	7.3	50.0	11.9	49.9	14.6
15–24 cigarettes	34.9	9.5	48.5	12.5	45.8	7.6	34.7	8.2	32.6	9.3	33.0	12.7
≥25 cigarettes	25.2	9.2	13.3	9.6	20.6	5.3	19.1	6.7	17.4	8.8	17.0	8.3
Gender												
Men												
<15 cigarettes	35.8	12.7	22.7	15.2	20.9	10.4	35.5	10.2	38.7	15.9	36.2	28.1
15–24 cigarettes	31.8	12.7	63.6	17.8	53.8	11.6	44.9	14.9	39.8	15.6	42.1	23.1
≥25 cigarettes	32.3	14.8	13.7	12.1	25.4	8.7	19.7	10.6	21.5	12.0	21.7	15.7
Women												
<15 cigarettes	47.1	16.9	48.9	14.6	48.3	11.2	56.2	9.5	58.9	14.7	64.9	12.3
15–24 cigarettes	40.3	17.4	38.1	12.7	36.6	12.2	25.3	7.3	27.0	11.0	23.1	11.2
≥25 cigarettes	12.7	11.2	13.0	12.2	15.1	5.6	18.5	7.8	14.1	11.8	12.0	6.4
Age (years)												
18–34												
<15 cigarettes	42.0	15.7	45.0	18.7	51.8	15.1	59.5	12.7	49.9	16.7	57.6	18.9
15–24 cigarettes	41.0	11.7	49.1	18.1	40.8	13.3	29.7	11.7	35.0	14.3	29.7	17.0
≥25 cigarettes	17.0	11.2	5.9	7.1	7.4	5.7	10.8	5.3	15.1	14.4	12.6	10.4
35–54												
<15 cigarettes	26.9	15.7	26.6	17.2	21.3	9.9	37.3	10.2	46.1	19.1	43.3	17.2
15–24 cigarettes	34.3	15.2	52.1	21.2	40.4	12.9	39.6	10.8	31.1	15.7	32.3	16.1
≥25 cigarettes	38.8	19.5	21.3	19.1	38.3	14.9	23.2	10.9	22.9	12.4	24.3	14.6
≥55												
<15 cigarettes	60.5	23.6	41.3	29.4	20.9	19.3	30.8	12.9	66.1	24.3	14.6	22.4
15–24 cigarettes	19.7	19.6	38.3	31.2	70.0	22.8	35.7	22.9	29.4	24.0	75.5	30.2
≥25 cigarettes	19.8	19.9	20.4	33.3	9.2	9.8	33.5	30.2	4.4	6.3	9.9	19.8
Education§												
Less than high school												
<15 cigarettes	38.0	13.7	30.2	18.1	19.8	12.7	33.2	14.8	45.0	23.9	37.4	21.7
15–24 cigarettes	38.6	13.9	52.7	20.6	51.1	14.1	39.4	18.6	30.9	17.5	40.1	21.1
≥25 cigarettes	23.4	13.1	17.1	20.3	29.1	10.5	27.4	14.1	24.1	22.0	22.5	17.2
High school/any college												
<15 cigarettes	37.8	17.7	36.9	16.4	31.3	11.6	45.6	9.1	47.5	13.5	57.0	16.3
15–24 cigarettes	27.8	18.9	48.5	17.4	47.9	11.7	33.4	9.7	33.7	12.2	25.8	13.4
≥25 cigarettes	34.4	19.1	14.6	13.4	20.8	8.8	21.0	8.7	18.8	9.7	17.2	11.9

*Excludes American Indians and Alaska Natives who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Table 15. Percentage of adult American Indian and Alaska Native ever smokers who have quit,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

Characteristic	1978–1980† %	±CI‡	1983–1985† %	±CI	1987–1988† %	±CI	1990–1991† %	±CI	1992–1993† %	±CI	1994–1995† %	±CI
Total	31.6	7.9	37.7	9.3	36.1	7.5	38.2	8.2	34.6	9.1	32.9	9.6
Gender												
Men	28.5	11.8	38.2	12.9	37.5	9.5	44.0	9.7	43.8	15.3	28.3	13.9
Women	36.5	11.8	37.4	12.8	34.3	8.4	31.7	9.8	25.2	7.7	37.2	13.0
Age (years)												
18–34	29.5	12.0	30.2	15.1	28.0	8.2	28.3	10.1	20.7	13.4	16.3	13.3
35–54	25.4	12.1	38.0	15.2	34.7	9.5	33.0	8.6	34.8	10.5	29.1	13.4
≥55	44.8	18.4	54.1	17.5	50.9	17.3	63.5	19.5	61.7	15.4	81.7	14.8
Education§												
Less than high school	28.4	11.3	43.8	15.7	29.8	12.4	49.4	11.7	37.4	13.1	39.3	15.1
High school/any college	47.3	15.6	39.1	13.3	43.1	9.1	36.0	10.3	36.2	12.3	36.5	11.0

*Excludes American Indians and Alaska Natives who indicated they were of Hispanic origin. The prevalence of cessation is the percentage of ever smokers who are former smokers. Former smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not smoking, and ever smokers include current and former smokers.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

aged 18–54 years. Interviews with patients at urban IHS clinics in Milwaukee, Minneapolis, Seattle, and Spokane also showed a low prevalence of cessation (29.7 percent) (Lando et al. 1992), compared with 45 percent reported for the total U.S. population during the same time.

Data from the NCI Supplement of the 1992–1993 CPS indicate that among American Indians and Alaska Natives aged 18 years and older who were daily smokers one year before being surveyed, 62.8 percent reported that they were still smoking daily and that they had not tried quitting for at least one day during the previous year (Table 4). Another 28.9 percent had tried quitting for at least one day, 3.7 percent were occasional smokers (i.e., smoked only on some days), 1.8 percent had not smoked for the past 1–90 days, and 2.8 percent had not smoked for the past 91–364 days. This distribution was similar to that among whites.

Women of Reproductive Age

Since 1978, rates of smoking have remained strikingly high among American Indian and Alaska Native women of reproductive age (18–44 years) participating in the NHIS (Table 16) (NCHS, public use data tapes, 1978–1995). Between 1978 and 1995, the prevalence of cigarette smoking among reproductive-aged American Indian and Alaska Native women changed little overall, and the data are not precise enough to allow meaningful comparisons according to educational attainment.

A recent study by Davis and colleagues (1992) confirms that the prevalence of smoking is higher among American Indian women of reproductive age than among their counterparts in other racial/ethnic groups. The investigators analyzed birth certificates issued in Washington state between January 1,

Table 16. Percentage of American Indian and Alaska Native women of reproductive age who reported being current cigarette smokers,* overall and by education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	40.2	12.8	35.9	11.3	39.2	8.9	43.3	11.1	39.7	9.4	44.3	12.0
Education§												
Less than high school	60.4	23.7	47.6	24.9	53.1	18.9	61.3	14.5	82.1	18.6	62.4	30.0
High school/any college	17.2	13.1	27.6	11.7	30.5	9.3	42.9	14.4	32.7	11.2	45.6	14.4

*Excludes American Indians and Alaska Natives who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.
†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.
‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

1984, and December 31, 1988, and found that the prevalence of smoking among American Indian mothers, adjusted for maternal age and marital status, was 1.3 times higher than the prevalence among white mothers.

Data from the 1988 NMIHS indicate that 35 percent of American Indian mothers sampled reported smoking cigarettes in the 12 months before delivery (Sugarman et al. 1994). Recent birth certificate data from U.S. final natality statistics show that 20.9 percent of American Indian and Alaska Native mothers smoked during pregnancy (Ventura et al. 1997), a slight decline from 23.0 percent in 1989 (Table 6). The prevalence of smoking among American Indian mothers was higher than all groups in 1989–1995 (Table 6).

Young People

Cigarette Smoking

One of the few studies focusing on tobacco use among American Indian and Alaska Native youths is the MTF, which includes a series of surveys of high school seniors. Between 1976 and 1994, American Indian and Alaska Native high school seniors had higher rates of cigarette smoking than all of their counterparts, although the rate of decline was more rapid than for whites (Table 7). The prevalence of previous-month cigarette smoking during 1990–1994 was 39.4 percent among American Indian and Alaska Native females and 41.1 percent among males. During 1985–1989, rates of daily smoking and of smoking one-half pack or more per day were higher among American Indian and Alaska Native youths than among youths of other racial/ethnic groups (Bachman et al. 1991a).

Data from a revised version of the Adolescent Health Survey showed that for every grade level after the seventh, American Indian and Alaska Native females were somewhat more likely to be daily cigarette smokers than were American Indian males. The prevalence of daily cigarette smoking among females increased from 8.9 percent in junior high school to 17.8 percent in high school, whereas among males the prevalence of daily cigarette smoking increased from 8.1 percent in junior high school to 15.0 percent in high school (Blum et al. 1992).

Smokeless Tobacco Use

The use of smokeless tobacco is also high among American Indian and Alaska Native youths. Bruerd (1990) reviewed nine studies of schoolchildren's use of smokeless tobacco in South Dakota, Montana, Nebraska, Washington, Arizona, New Mexico, and Alaska and found that the prevalence of regular smokeless tobacco use ranged from 18 percent among students in kindergarten through the sixth grade to 55.9 percent among students in the ninth and tenth grades. The percentage of schoolchildren who reported ever using or experimenting with smokeless tobacco ranged from 29 to 82 percent. In general, the findings suggested a young age at onset of smokeless tobacco use, similar prevalence of use among adolescent boys and girls, and higher overall prevalence of use among American Indian and Alaska Native schoolchildren than among students in other populations. A 1987–1988 survey of 650 American Indian and Alaska Native youths at three IHS sites (Alaska; the Billings region, which encompasses Montana and Wyoming; and the Navajo region, which encompasses portions of Arizona, Colorado, New Mexico, and Utah) indicated that these youths were experimenting with and regularly using smokeless tobacco at higher rates than white youths (Backinger et al. 1993).

Regional and Tribal Tobacco Use

Cigarette Smoking

Although a high rate of smoking has been estimated nationally for American Indians and Alaska Natives, regional and state differences in tobacco-use patterns are evident when 1988–1992 aggregate data from the BRFSS are considered. High smoking prevalences were found in Alaska (45.1 percent), the Northern Plains (Montana, Nebraska, North Dakota, and South Dakota) (44.2 percent), and the Northern Woodlands (Iowa, Michigan, Minnesota, and Wisconsin) (35.6 percent), whereas much lower overall smoking prevalences were found in California (25.4 percent) and the Southwest (Arizona, Colorado, New Mexico, and Utah) (17.0 percent) (Table 17) (CDC, public use data tapes, 1988–1992). The prevalence of current cigarette smoking varied by geographic region more than twofold for men and nearly threefold for women. For example, 21.3 percent of men and 13.5 percent of women in the Southwest reported that they currently

Table 17. Percentage of American Indian and Alaska Native adults who reported being current cigarette smokers,* overall and by region/state, gender, age, and education, Behavioral Risk Factor Surveillance System, 1988–1992 aggregate data

	Alaska		California		Northern Plains†		Northern Woodlands†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI
Total	45.1	5.9	25.4	7.0	44.2	7.8	35.6	4.8
Gender								
Men	48.4	8.7	27.9	10.5	49.1	11.3	33.0	7.6
Women	41.7	8.0	22.7	8.9	38.4	9.9	37.6	6.2
Age (years)								
18–34	48.5	9.0	20.9	8.7	51.2	12.4	33.4	6.7
35–54	41.5	8.6	34.4	13.4	47.2	12.4	45.4	9.0
≥55	41.3	14.6	24.0	20.6	27.3	15.1	27.0	9.1
Education§								
Less than high school	43.1	11.2	25.8	15.3	44.5	14.8	40.6	11.0
High school/any college	44.9	7.3	32.5	9.7	40.1	9.8	35.3	5.7

*Current cigarette smokers are persons aged 18 years and older who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked.
†The Northern Plains region includes Montana, Nebraska, North Dakota, and South Dakota; the Northern Woodlands region includes Iowa, Michigan, Minnesota, and Wisconsin; the Pacific Northwest region includes Idaho, Oregon, and Washington; the Southwest region includes Arizona, Colorado, New Mexico, and Utah; and "other" includes all remaining states not specified above that participated in the Behavioral Risk Factor Surveillance System during this period.

smoked, compared with 49.1 percent of men and 38.4 percent of women in the Northern Plains (Table 17).

The majority of American Indians and Alaska Natives (83.3 percent) responding to the BRFSS smoked 15 or fewer cigarettes per day; this finding was consistent across all states and regions (Table 18) (CDC, public use data tapes, 1988–1992). Overall, female American Indians and Alaska Natives smoked fewer cigarettes than their male counterparts—a finding that was consistent across all states and regions. American Indian smokers in the Northern Plains (13.5 percent) were the most likely to smoke 25 or more cigarettes per day. American Indian smokers in the Southwest (51.2 percent) and the Pacific Northwest (46.8 percent) had the highest prevalence of cessation, whereas American Indians in the Northern Plains (31.8 percent) and Alaska Natives (37.0 percent) had the lowest prevalence of cessation (Table 19) (CDC, public use data tapes, 1988–1992).

In similar analyses of the BRFSS data aggregated for 1985–1988, the prevalence of smoking varied markedly by gender and geographic region (Sugarman et al. 1992). For American Indian men, the prevalence of smoking was highest among those living in the Plains region (Iowa, Minnesota, Montana, Nebraska, North Dakota, South Dakota, and Wisconsin) (48.4 percent), followed by those in the West Coast region (California, Idaho, and Washington) (25.2 percent) and the Southwest (Arizona, New Mexico, and Utah) (18.1 percent). Similarly, for American Indian women, the prevalence of smoking was highest among those living in the Plains region (57.3 percent), followed by those in the West Coast region (31.6 percent) and the Southwest (14.7 percent).

Regional and tribal data on cigarette smoking are also available from a probability sample of American Indians living on or near the northern Montana Blackfeet Reservation and those served by the Native American Center in Great Falls, Montana, in 1987 (Goldberg et al. 1991). Among Blackfeet Indians, 34 percent of men and 50 percent of women reported that they smoked cigarettes. Among American Indians in

Oklahoma		Pacific Northwest†		Southwest†		Other†		Total	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
30.4	7.3	33.1	6.0	17.0	4.6	28.9	4.2	29.2	2.5
36.2	12.7	35.4	9.2	21.3	8.2	36.5	6.4	34.4	4.0
26.0	8.9	31.2	7.9	13.5	5.0	21.3	5.2	24.2	3.1
33.5	12.6	37.6	9.6	13.3	5.6	30.2	6.8	28.9	3.8
35.0	12.8	30.3	8.4	18.9	8.8	33.6	7.1	33.8	4.4
21.7	10.6	26.2	14.7	29.8	14.2	18.6	6.6	22.5	5.3
25.1	14.4	42.5	15.4	29.7	12.3	34.0	9.4	33.4	5.6
31.2	8.7	33.9	7.3	15.1	5.9	29.4	5.0	30.5	3.2

‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: Centers for Disease Control, public use data tapes, 1988–1992.

Table 18. Percentage of adult American Indian and Alaska Native smokers* who reported smoking <15, 15–24, or ≥25 cigarettes per day, overall and by region/state, gender, age, and education, Behavioral Risk Factor Surveillance System, 1988–1992 aggregate data

	Alaska		California		Northern Plains†		Northern Woodlands†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI
Total								
<15 cigarettes	83.7	4.1	88.0	5.0	70.9	7.5	84.6	3.6
15–24 cigarettes	12.2	3.7	8.5	4.4	15.7	5.5	12.3	3.3
≥25 cigarettes	4.1	2.2	3.5	2.7	13.5	6.5	3.1	1.6
Gender								
Men								
<15 cigarettes	79.3	7.0	87.7	7.4	66.8	11.4	83.9	5.5
15–24 cigarettes	15.2	6.1	8.3	6.4	14.3	7.8	11.7	5.0
≥25 cigarettes	5.5	4.0	4.0	4.1	19.0	10.4	4.4	2.6
Women								
<15 cigarettes	88.2	4.2	88.2	6.8	75.8	8.8	85.2	4.6
15–24 cigarettes	9.0	3.9	8.8	5.9	17.3	7.7	12.7	4.3
≥25 cigarettes	2.7	1.9	3.0	3.5	6.9	5.4	2.1	2.0
Age (years)								
18–34								
<15 cigarettes	87.7	5.1	90.8	5.8	68.1	12.4	87.4	4.5
15–24 cigarettes	8.7	3.8	5.4	4.4	18.8	9.5	10.9	4.2
≥25 cigarettes	3.6	3.7	3.8	4.0	13.0	10.6	1.7	1.6
35–54								
<15 cigarettes	78.5	7.4	82.1	11.0	65.6	12.0	79.5	7.4
15–24 cigarettes	15.6	6.9	16.2	10.8	16.3	8.7	14.9	6.7
≥25 cigarettes	6.0	3.5	1.7	2.5	18.1	10.6	5.6	4.0
≥55								
<15 cigarettes	80.7	12.3	89.1	12.8	83.5	13.7	84.9	7.4
15–24 cigarettes	16.8	12.2	5.1	9.9	8.9	9.8	12.1	6.8
≥25 cigarettes	2.6	2.1	5.8	8.4	7.6	10.9	3.0	3.1
Education§								
Less than high school								
<15 cigarettes	85.0	7.7	90.6	9.9	66.3	14.8	81.7	7.3
15–24 cigarettes	12.0	7.6	5.1	5.8	13.3	10.5	14.9	6.7
≥25 cigarettes	3.0	2.0	4.4	8.3	20.4	13.5	3.4	3.1
High school/any college								
<15 cigarettes	78.2	6.2	83.1	7.7	74.1	8.9	84.2	4.6
15–24 cigarettes	15.8	5.3	13.2	7.2	16.3	7.4	12.0	4.1
≥25 cigarettes	6.1	4.0	3.7	3.2	9.6	6.3	3.9	2.4

*Current cigarette smokers are persons aged 18 years and older who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked.

†The Northern Plains region includes Montana, Nebraska, North Dakota, and South Dakota; the Northern Woodlands region includes Iowa, Michigan, Minnesota, and Wisconsin; the Pacific Northwest region includes Idaho, Oregon, and Washington; the Southwest region includes Arizona, Colorado, New Mexico, and Utah; and "other" includes all remaining states not specified above that participated in the Behavioral Risk Factor Surveillance System during this period.

Oklahoma		Pacific Northwest†		Southwest†		Other†		Total	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
83.4	6.2	83.0	4.6	92.3	3.7	81.1	3.6	83.3	2.1
9.7	4.6	10.8	3.8	4.5	2.3	11.5	3.1	10.4	1.7
6.9	4.3	6.2	3.0	3.2	3.1	7.4	2.2	6.4	1.3
83.3	9.1	80.2	7.1	87.3	7.3	74.7	5.9	79.3	3.4
8.2	6.7	12.0	5.4	7.2	4.2	14.1	5.0	11.6	2.7
8.5	6.5	7.8	5.0	5.6	6.4	11.1	4.0	9.1	2.3
83.5	8.4	85.3	6.2	96.4	2.7	87.5	3.9	87.1	2.4
10.9	6.2	9.8	5.3	2.3	2.3	8.8	3.6	9.2	2.1
5.6	5.9	4.9	3.6	1.2	1.4	3.6	1.8	3.7	1.3
84.0	10.0	83.5	7.2	98.1	2.1	83.5	5.6	85.9	2.9
9.2	7.1	9.2	5.5	1.8	2.1	11.9	5.2	9.3	2.5
6.8	7.7	7.4	5.2	0.1	0.2	4.6	2.6	4.8	1.8
74.6	11.9	81.1	7.1	84.8	8.7	74.0	6.6	76.8	3.9
16.0	10.9	12.8	6.2	7.0	4.4	13.3	5.0	13.7	3.3
9.3	6.7	6.1	4.1	8.2	8.2	12.7	5.0	9.4	2.6
90.2	8.4	86.0	11.1	87.8	11.4	87.1	6.1	87.2	4.1
4.9	5.5	10.9	9.9	9.9	11.2	7.6	4.6	7.5	3.1
4.8	6.8	3.1	5.6	2.3	2.7	5.3	4.3	5.3	2.8
86.0	12.5	69.7	14.5	80.3	10.9	75.1	8.6	78.6	4.9
9.2	10.8	22.0	13.3	16.4	10.6	11.3	6.7	11.2	3.6
4.8	7.3	8.3	8.2	3.3	4.0	13.6	6.6	10.2	3.8
82.2	7.0	84.7	5.1	92.0	5.4	80.3	4.5	82.1	2.7
10.5	5.6	9.5	4.1	3.6	2.5	12.9	4.0	11.9	2.4
7.3	4.7	5.8	3.3	4.5	5.0	6.7	2.7	6.0	1.5

‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: Centers for Disease Control, public use data tapes, 1988–1992.

Table 19. Percentage of adult American Indian and Alaska Native smokers who reported they quit smoking,* overall and by region/state, gender, age, and education, Behavioral Risk Factor Surveillance System, 1988–1992 aggregate data

	Alaska		California		Northern Plains†		Northern Woodlands†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI
Total	37.0	6.6	44.8	11.9	31.8	8.3	44.3	6.3
Gender								
Men	37.1	9.3	44.8	16.2	32.8	11.4	49.5	9.8
Women	36.9	9.3	44.8	16.9	30.3	11.7	40.0	8.2
Age (years)								
18–34	31.2	10.0	29.8	15.8	15.9	9.4	41.8	9.3
35–54	43.8	9.8	49.2	17.3	32.2	13.4	35.5	9.7
≥55	42.2	16.1	61.0	28.9	58.2	19.7	62.2	12.6
Education§								
Less than high school	38.5	12.6	53.6	22.7	35.1	15.8	48.3	13.0
High school/any college	38.1	7.7	41.8	14.2	37.5	11.6	46.2	7.5

*The prevalence of cessation is the percentage of ever smokers who are former smokers. Former smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not smoking.

†The Northern Plains region includes Montana, Nebraska, North Dakota, and South Dakota; the Northern Woodlands region includes Iowa, Michigan, Minnesota, and Wisconsin; the Pacific Northwest region includes Idaho, Oregon, and Washington; the Southwest region includes Arizona, Colorado, New Mexico, and Utah; and "other" includes all remaining states not specified above that participated in the Behavioral Risk Factor Surveillance System during this period.

Great Falls, 63 percent of men and 62 percent of women reported that they smoked. In both areas, rates of smoking were higher among persons aged 25 years and older than among their younger counterparts. For American Indians in Great Falls, those who had a high school education and did not go to college had lower rates of smoking than those with less than a high school education or those with some college education. Gender differences in smoking cessation were also observed. Among American Indians in Great Falls, 16 percent of men and 19 percent of women had quit smoking; among the Blackfeet American Indians, 34 percent of men and 22 percent of women had quit smoking (Goldberg et al. 1991).

In a 1990 study of members of the Oneida Indian Nation of New York, 71.6 percent of the men and 64.6 percent of the women reported having ever smoked cigarettes (CDC 1990). The prevalence of ever smoking cigarettes was lower among men (65.3 percent) and women (58.2 percent) with 12 or more years of education than among men (81.3 percent) and women (74.5 percent) with less than 12 years of education. Rates of current smoking among the Oneida Indian Nation followed similar patterns in terms of educational status: men (34.7 percent) and women (29.1 percent) with 12 or more years of education had a lower prevalence of cigarette smoking than men (59.4 percent) and women (56.9 percent) with less than 12 years of formal education. Overall, a greater proportion of men (44.4 percent) than women (40.0 percent) smoked. The prevalence of cessation, on the other hand, was fairly similar for men (37.9 percent) and women (38.1 percent).

Similar findings were observed in a survey of people on the Warm Springs Reservation (Warm Springs Confederated Tribes 1993) and in the Western Washington Native American Behavior Risk Factor Survey of the Chehalis, Hoh, Quinault, and Shoalwater

Oklahoma		Pacific Northwest[†]		Southwest[†]		Other[†]		Total	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
40.7	10.2	46.8	8.0	51.2	10.3	39.8	7.0	41.5	4.0
33.1	15.1	44.8	11.8	51.8	15.0	35.4	9.4	39.2	5.5
47.1	13.8	48.5	11.1	50.3	13.8	46.1	10.5	44.4	5.6
27.8	16.1	38.7	12.3	52.7	15.9	28.5	10.0	30.6	5.4
36.9	18.0	52.7	11.7	54.1	16.7	42.2	11.9	44.0	6.6
61.0	16.7	57.4	20.6	38.0	21.2	58.7	12.2	58.2	8.3
45.0	23.5	40.4	18.1	40.9	19.5	39.7	15.3	42.6	8.3
43.5	11.7	47.8	9.5	53.2	13.6	41.4	8.1	42.7	4.8

[‡]95% confidence interval.
[§]Includes persons aged 25 years and older.
Source: Centers for Disease Control, public use data tapes, 1988–1992.

Tribes (Kimball et al. 1990). In a survey of 1,318 adult American Indian and Alaska Native users of Indian clinics in northern California, 40 percent of the respondents reported smoking cigarettes (47 percent of the men and 37 percent of the women) (Hodge et al. 1995).

Aggregated data from the BRFSS indicate that among American Indian and Alaska Native women of reproductive age, smoking rates were highest among women in Alaska (43.9 percent), the Northern Plains (39.5 percent), and the Northern Woodlands (38.8 percent) and lowest among women in the Southwest (11.5 percent) and California (15.3 percent) (Table 20) (CDC, public use data tapes, 1988–1992).

Smokeless Tobacco Use

The use of smokeless tobacco (chewing tobacco and snuff) among American Indians and Alaska Natives also has varied by state and region. According to the BRFSS data for 1988–1992, the prevalences among men were 24.6 percent in the Northern Plains, 16.8 percent in the Northern Woodlands, 14.3 percent in Oklahoma, 11.6 percent in Alaska, 6.5 percent in the Southwest, and 1.8 percent in the Pacific Northwest (CDC, public use data tapes, 1988–1992). In the Oneida Indian Nation survey, none of the women reported using smokeless tobacco, whereas 17.3 percent of the men reported using it (CDC 1990).

More recently, investigators have reported extremely high rates of smokeless tobacco use among Lumbee women in North Carolina (CDC 1995). In 1991, the prevalence of smokeless tobacco use was greatest among Lumbee women 65 years of age and older (51 percent) and lowest among those 25–34 years of age (6 percent). The prevalence was also high among women with less than 12 years of education (42 percent).

Table 20. **Percentage of American Indian and Alaska Native women of reproductive age who reported being current cigarette smokers,* overall and by region/state, Behavioral Risk Factor Surveillance System, 1988–1992 aggregate data**

Alaska		California		Northern Plains†		Northern Woodlands†	
%	±CI‡	%	±CI	%	±CI	%	±CI
43.9	9.3	15.3	9.1	39.5	12.3	38.8	7.1

Oklahoma		Pacific Northwest†		Southwest†		Other†		Total	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
30.4	12.5	32.6	9.7	11.5	5.4	26.7	7.1	24.9	3.9

*Current cigarette smokers are women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked.
†The Northern Plains region includes Montana, Nebraska, North Dakota, and South Dakota; the Northern Woodlands region includes Iowa, Michigan, Minnesota, and Wisconsin; the Pacific Northwest region includes Idaho, Oregon, and Washington; the Southwest region includes Arizona, Colorado, New Mexico, and Utah; and "other" includes all remaining states not specified above that participated in the Behavioral Risk Factor Surveillance System during this period.
‡95% confidence interval.
Source: Centers for Disease Control, public use data tapes, 1988–1992.

Asian Americans and Pacific Islanders

Data needed to assess long-term trends in cigarette smoking among Asian Americans and Pacific Islanders have been unavailable because U.S. surveys, census data, and other national databases have not always included detailed descriptions of race/ethnicity. Although data from specific Asian American and Pacific Islander groups and state surveys have provided information about cigarette smoking for certain racial/ethnic subgroups, these data have been limited in quantity and quality. The NHIS first included information about Asian Americans and Pacific Islanders in the 1978 survey. However, because the proportion of Asian Americans and Pacific Islanders in the United States is small, data from several years must be aggregated to increase the precision of estimates. Because of small sample sizes and aggregation of data, racial/ethnic subgroup differences in smoking behavior are masked. These differences are important because the category *Asian American and Pacific Islander* is heterogeneous in both culture and health behaviors. For example, this category includes about 32 different national and racial/ethnic subgroups (Austin et al. 1989; Hawks 1989) and nearly 500 languages and dialects (Chen 1993), and smoking patterns among these subgroups vary.

Prevalence of Cigarette Smoking

Between 1978 and 1995, the prevalence of smoking declined among Asian Americans and Pacific Islanders, according to NHIS data (Table 21) (NCHS, public use data tapes, 1978–1995). However, patterns between men and women differed. The cigarette smoking prevalence among Asian American and Pacific Islander men declined slightly, from 32.5 to 25.1 percent, whereas the prevalence of smoking among Asian American and Pacific Islander women declined approximately 60 percent, from 14.7 to 5.8 percent. Throughout this period, the prevalence of smoking among men remained more than twice that among women; in 1994–1995, men were 4.3 times more likely than women to report current smoking.

Number of Cigarettes Smoked Daily

From 1978 through 1995, the percentage of Asian American and Pacific Islander smokers who smoked fewer than 15 cigarettes per day increased significantly, according to the NHIS data (Table 22) (NCHS, public use data tapes, 1978–1995). Although large declines from 1978–1980 to 1992–1993 were observed in the prevalence

Table 21. Percentage of adult Asian Americans and Pacific Islanders who reported being current cigarette smokers,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	23.8	4.0	21.4	3.4	15.8	2.4	16.1	2.5	16.7	2.7	15.3	3.0
Gender												
Men	32.5	4.5	33.0	6.2	22.5	3.8	24.5	4.0	26.8	4.7	25.1	5.2
Women	14.7	6.6	9.6	3.5	9.2	2.8	6.6	2.0	6.8	2.7	5.8	2.3
Age (years)												
18–34	22.5	5.8	21.6	4.6	16.3	3.5	15.5	3.2	15.7	4.2	17.6	5.3
35–54	28.7	8.5	20.8	4.8	16.1	3.6	17.1	4.6	21.0	4.7	15.5	4.3
≥55	17.4	4.7	22.0	8.6	12.7	5.9	15.7	5.4	8.3	5.4	9.2	5.1
Education§												
Less than high school	23.1	8.9	23.8	10.2	17.9	6.5	24.9	7.4	13.4	6.2	13.3	7.9
High school/any college	23.7	3.9	22.6	4.5	16.7	2.8	15.6	2.9	17.6	3.5	14.4	3.2

*Excludes Asian Americans and Pacific Islanders who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

of smoking 25 or more cigarettes per day, recent estimates are imprecise and should be interpreted with caution.

Quitting Behavior

Between 1978 and 1995, the percentage of Asian Americans and Pacific Islanders who have ever smoked 100 cigarettes and have quit smoking increased somewhat, NHIS data indicate (Table 23) (NCHS, public use data tapes, 1978–1995). The prevalence of cessation among women increased from 1987–1988 to 1994–1995, but no consistent pattern was observed among men. During each survey period, the prevalence of cessation was higher among Asian Americans and Pacific Islanders 55 years of age and older than it was among their younger counterparts (Table 23).

Data from the NCI Supplement of the 1992–1993 CPS indicate that among Asian Americans and Pacific Islanders aged 18 years and older who were daily smokers one year before the survey, 57.8 percent reported that they were still smoking daily and that they had not tried quitting for at least one day during the previous year (Table 4). Another 32.0 percent had tried quitting for at least one day, 4.8 percent were occasional smokers (i.e., smoked only on some days), 2.5 percent had not smoked for the past 1–90 days, and 2.9 percent had not smoked for the past 91–364 days. Among current smokers, Asian Americans and Pacific Islanders were slightly more likely than whites to report trying to quit for at least a day during the previous year.

Women of Reproductive Age

The prevalence of current smoking among Asian American and Pacific Islander women of reproductive age (18–44 years) has decreased substantially over

Table 22. Percentage of adult Asian American and Pacific Islander smokers* who reported smoking <15, 15–24, or ≥25 cigarettes per day, overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total												
<15 cigarettes	43.3	11.7	53.7	8.1	55.6	7.8	60.4	8.1	61.8	9.4	70.6	9.8
15–24 cigarettes	37.0	9.7	35.3	8.5	37.4	7.4	33.8	7.6	37.1	9.4	21.4	8.2
≥25 cigarettes	19.7	6.5	11.0	6.5	7.0	3.3	5.8	3.9	1.0	1.3	8.0	6.5
Gender												
Men												
<15 cigarettes	40.1	14.6	54.4	9.4	51.8	9.6	59.2	9.2	58.4	11.2	69.1	11.5
15–24 cigarettes	35.8	11.1	36.2	9.3	41.2	9.2	35.4	8.6	40.9	11.2	23.6	10.0
≥25 cigarettes	24.1	8.2	9.4	6.6	7.0	4.2	5.5	4.4	0.7	1.4	7.3	7.4
Women												
<15 cigarettes	50.4	13.7	51.1	14.9	64.4	11.3	65.8	16.8	75.4	11.6	77.3	13.9
15–24 cigarettes	39.6	12.8	32.0	15.2	28.5	9.8	26.8	16.5	22.2	11.5	11.5	11.0
≥25 cigarettes	10.0	7.7	16.8	10.1	7.1	5.1	7.4	8.3	2.3	3.3	11.2	11.1
Age (years)												
18–34												
<15 cigarettes	42.2	12.2	48.2	10.4	59.0	11.0	60.3	10.7	61.3	13.7	73.2	13.6
15–24 cigarettes	37.3	11.5	40.5	11.5	35.1	10.5	35.2	10.5	38.2	13.7	24.3	13.2
≥25 cigarettes	20.5	8.2	11.3	8.3	5.9	4.4	4.5	3.8	0.6	1.1	2.5	3.9
35–54												
<15 cigarettes	45.0	17.1	54.9	13.5	54.5	10.9	62.9	13.5	63.6	13.0	65.0	15.2
15–24 cigarettes	35.5	15.0	32.2	13.1	40.4	11.0	26.9	10.5	34.9	12.9	22.3	11.8
≥25 cigarettes	19.5	9.0	12.9	8.1	5.1	4.6	10.1	9.2	1.6	2.3	12.8	14.0
≥55												
<15 cigarettes	41.3	18.5	67.9	20.3	41.5	23.2	55.8	18.5	52.7	39.1	78.0	23.9
15–24 cigarettes	40.9	13.1	26.4	18.4	39.4	25.0	43.3	18.5	47.3	39.1	4.7	9.3
≥25 cigarettes	17.9	14.4	5.7	8.2	19.1	16.5	0.9	1.8	0.0	0.0	17.3	23.4
Education§												
Less than high school												
<15 cigarettes	59.6	21.3	66.0	15.2	48.7	19.6	72.9	13.9	80.2	17.3	73.8	32.2
15–24 cigarettes	28.6	18.0	23.3	14.2	42.4	19.8	22.2	13.3	19.8	17.3	6.2	9.5
≥25 cigarettes	11.8	13.2	10.7	9.8	8.9	9.5	4.8	6.0	0.0	0.0	20.0	32.8
High school/any college												
<15 cigarettes	40.4	12.4	47.6	9.6	53.0	8.4	58.1	9.8	62.2	11.4	64.8	12.0
15–24 cigarettes	39.4	11.8	39.3	10.2	39.4	8.2	34.7	9.3	36.7	11.4	26.5	10.7
≥25 cigarettes	20.2	7.4	13.0	8.1	7.6	4.2	7.2	5.5	1.1	1.6	8.7	7.5

*Excludes Asian Americans and Pacific Islanders who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers included persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers included persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Table 23. Percentage of adult Asian American and Pacific Islander ever smokers who have quit,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	39.9	6.5	38.4	6.5	41.2	5.7	49.0	5.3	45.5	6.5	48.3	7.2
Gender												
Men	41.2	6.1	34.2	7.8	42.7	6.9	47.2	6.4	42.2	7.4	43.3	8.7
Women	36.9	14.0	49.6	10.2	37.2	9.6	55.4	10.1	55.0	13.9	62.2	12.8
Age (years)												
18–34	34.5	9.4	25.8	7.5	31.3	7.7	34.1	7.6	30.7	9.6	28.5	10.9
35–54	35.7	13.5	45.5	8.8	46.3	8.0	55.3	9.5	44.1	9.2	55.5	10.1
≥55	59.4	10.6	48.9	16.5	58.1	14.9	60.5	11.0	76.9	13.2	70.2	14.9
Education§												
Less than high school	37.0	18.7	46.1	17.1	30.1	15.3	37.7	13.3	50.4	18.1	50.3	21.9
High school/any college	45.2	7.2	39.2	7.3	46.7	6.4	54.8	6.5	48.2	7.3	53.7	8.2

*Excludes Asian Americans and Pacific Islanders who indicated they were of Hispanic origin. The prevalence of cessation is the percentage of ever smokers who are former smokers. Former smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not smoking, and ever smokers include current and former smokers.
†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.
‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

time, from 16.0 percent in 1978–1980 to 5.7 percent in 1994–1995, NHIS data indicate (Table 24) (NCHS, public use data tapes, 1978–1995). Overall, the greatest change occurred between 1978 and 1985, when the prevalence of current smoking declined by approximately 50 percent. Since 1985, declines in smoking prevalence have slowed.

Recent birth certificate data from U.S. final natality statistics indicate that 3.4 percent of Asian American and Pacific Islander mothers smoked during pregnancy (Table 6). Smoking rates for pregnant Asian American and Pacific Islander women are generally low—between 0.8 and 5.2 percent for Chinese, Japanese, Filipino, and "other" Asian Americans or Pacific Islanders. Hawaiian mothers, however, have a relatively high smoking rate (15.9 percent). Ventura and colleagues (1995) reported that 3 percent of foreign-born Asian American and Pacific Islander mothers were reported as smokers, compared with 13 percent of their United States-born counterparts. Data on tobacco use among these mothers (except Hawaiians) may be skewed because California and New York do not report this information, and together these states account for nearly half of births in each Asian American and Pacific Islander subgroup (Ventura et al. 1996).

Young People

Cigarette Smoking

Data from MTF surveys—one of the few studies with data on smoking prevalence among Asian American and Pacific Islander youths—show that these youths have a lower prevalence of smoking than their counterparts in all other racial/ethnic groups except African Americans (Table 7). According to the 1990–1994 MTF data on male high school seniors, the prevalence of smoking was 11.6 percent among African Americans, 20.6 percent among Asian Americans and Pacific Islanders, 28.5 percent among Hispanics, 33.4 percent among whites, and 41.1 percent among

Table 24. Percentage of adult Asian American and Pacific Islander women of reproductive age who reported being current cigarette smokers,* overall and by education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	16.0	6.7	8.2	3.3	8.8	2.7	6.0	2.4	6.6	2.8	5.7	3.0
Education§												
Less than high school	15.0	26.4	7.0	7.3	9.8	8.0	14.1	9.1	3.5	4.0	2.3	4.6
High school/any college	15.4	6.9	8.6	3.4	9.6	3.4	6.1	3.1	5.7	3.1	5.8	3.5

*Excludes Asian Americans and Pacific Islanders who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.
†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.
‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

American Indians and Alaska Natives. Data on female high school seniors show that the prevalence of smoking was 8.6 percent among African Americans, 13.8 percent among Asian Americans and Pacific Islanders, 19.2 percent among Hispanics, 33.1 percent among whites, and 39.4 percent among American Indians and Alaska Natives. As reported by Bachman and colleagues (1991a), during 1985–1989, patterns of daily smoking were similar, with prevalence estimates being lowest among African Americans and Asian Americans and Pacific Islanders. Among Asian American and Pacific Islander high school seniors, 4.4 percent of males and 4.5 percent of females reported smoking one-half pack or more per day.

In 1993, Wiecha (1996) surveyed public school students from two middle schools and two high schools in Worcester, Massachusetts. The self-administered questionnaire used items from CDC's YRBS; every question was written in English, Vietnamese, and Spanish. Vietnamese males were as likely to report cigarette smoking (27.9 percent) as were white males (28.3 percent). The prevalence of cigarette smoking among Vietnamese females (3.7 percent) was lower than among African American (15.1 percent), Hispanic (29.7 percent), and white (30.6 percent) females. Length of time in the United States was related to smoking prevalence for males aged 17 years and older: cigarette smoking prevalence was 7.7 percent among those who had been in the United States for at least six years and 45.2 percent for those who had been in the United States for less than six years.

Smokeless Tobacco Use

Wiecha (1996) also queried Worcester students about their use of smokeless tobacco products. The prevalence of previous-month use among males was 12.0 percent for Vietnamese, 10.3 percent for African Americans, 10.8 percent for Hispanics, and 20.5 percent for whites. Previous-month use among females was 3.6 percent for Vietnamese, 3.2 percent for African Americans, 1.9 percent for Hispanics, and 2.7 percent for whites. Small sample sizes limit the precision of some of these estimates.

State and Local Smoking Estimates

Among the diverse subgroups of Asian Americans and Pacific Islanders, wide variations in lifestyles, health behaviors, and health practices are evident. State and local survey data illustrate the distinct variations in cigarette smoking patterns and behaviors among these ethnic subgroups (Klatsky and

Armstrong 1991; CDC 1992c; Blaisdell 1993; McPhee et al. 1993; McPhee et al. 1995; Wewers et al. 1995; Jenkins et al. 1997b). Although prevalence estimates from national surveys indicate that the smoking prevalence among Asian Americans and Pacific Islanders is lower than the prevalence of smoking in all other racial/ethnic groups and in the overall U.S. population, state and local surveys show that these estimates vary dramatically between racial/ethnic subgroups of Asian Americans and Pacific Islanders. Racial/ethnic subgroup-specific information on smoking behaviors is needed because broad groupings of these many distinct racial/ethnic groups mask important differences.

To characterize smoking and other risk behaviors more fully for program planning efforts at the local level, the California State Department of Health Services and two California agencies—Asian Health Services and the University of California, San Francisco, Vietnamese Health Promotion Project—adapted versions of the CDC's Behavioral Risk Factor Surveys for use with Chinese and Vietnamese residents. The questionnaires were modified for cultural appropriateness and translated into Chinese or Vietnamese. The Chinese-language survey included face-to-face interviews with 296 Chinese adults in Oakland, California, between June 1989 and February 1990. In the Vietnamese-language survey, telephone interviews were conducted with 1,011 Vietnamese adults during February and March 1991 (CDC 1992b). Among both Chinese and Vietnamese respondents, men were more likely than women to be current smokers. The highest smoking prevalence was among men aged 25–44 years, and the prevalence of smoking was lower among men with higher levels of education (Table 25) (CDC 1992b). The mean number of cigarettes smoked per day by smokers was 15.9 among Chinese men, 11.0 among Vietnamese women, and 10.1 among Vietnamese men. This number declined with older age and increasing levels of education and income. (Data on Chinese women are unavailable because the number of Chinese women who smoked was too small for analysis.)

These surveys also measured acculturation by using several proxy variables, including the percentage of lifetime spent in the United States, fluency in English, and date of immigration. Among Chinese men, the average number of cigarettes smoked per day increased as the percentage of their lifetime spent in the United States increased (Table 25). Among Vietnamese respondents, the prevalence of smoking was higher among men who immigrated in 1981 or later and who were not fluent in English.

In a more recent statewide telephone survey of 32,125 California households, Burns and Pierce (1992) found that overall, the prevalence of smoking was lower among Asian Americans and Pacific Islanders than among whites, African Americans, and Hispanics. This trend was evident among both men and women. Because the survey was conducted only in English or Spanish, Asian Americans and Pacific Islanders with limited English fluency were unable to participate. This exclusion of recent immigrants and those with the lowest levels of acculturation may have produced a biased estimate of the prevalence of cigarette smoking among California's Asian Americans and Pacific Islanders. In assessing the smoking prevalence for several racial/ethnic subgroups, Burns and Pierce (1992) found that Chinese reported the lowest prevalence of smoking (11.7 percent), whereas Koreans reported the highest prevalence (23.5 percent) (Table 26). Men in all racial/ethnic subgroups were substantially more likely than women to smoke cigarettes. For men, the prevalence of smoking was highest among Koreans (35.8 percent) and lowest among Chinese (19.1 percent). The prevalence of smoking was highest among men aged 25–44 years. Smoking prevalence declined substantially with increasing education across all racial/ethnic subgroups of men except Japanese men. For women, the prevalence of smoking was highest among Japanese (14.9 percent) and Koreans (13.6 percent) and lowest among Chinese (4.7 percent). Smoking prevalence declined with increasing level of education across all racial/ethnic subgroups of women except Chinese.

In a 1978–1985 survey of 13,031 persons of Asian ancestry enrolled in the Oakland, California, Kaiser Permanente Medical Care Program, the prevalence of cigarette smoking varied significantly by Asian subgroup for both men and women (Klatsky and Armstrong 1991). Among men, the prevalence of cigarette smoking was highest among Filipinos (32.9 percent) and lowest among Chinese (16.2 percent) (Table 27). Among women, the prevalence of smoking was highest among Japanese (18.6 percent) and lowest among Chinese (7.3 percent). Japanese men and women were more likely to smoke one or more packs of cigarettes per day than were their counterparts in other racial/ethnic groups.

During 1989, newly arrived Southeast Asian immigrants were surveyed by the Health Department in King County, Washington, regarding health problems and health risk behaviors (CDC 1992c). Investigators analyzed medical interview records for 274 Vietnamese, 147 Laotian, and 112 Cambodian immigrants and found that the smoking prevalence was substantially

Table 25. Percentage of Chinese and Vietnamese men who reported they smoke* and the number of cigarettes they smoke per day, by age, education, annual household income, and level of acculturation, Behavioral Risk Factor Surveillance System, California, 1990 and 1991 aggregate data

	Chinese				Vietnamese			
Characteristic	%	±CI[†]	Mean no. cigarettes	±CI	%	±CI	Mean no. cigarettes	±CI
Age (years)								
1–24	‡	‡	‡	‡	12.3	8.5	10.0	6.5
25–44	38.5	15.3	12.6	9.1	42.4	5.3	10.3	1.3
45–64	28.1	15.6	22.6	12.4	27.4	7.5	9.9	1.7
≥65	24.4	12.6	15.4	7.5	23.3	15.2	7.3	3.0
Education								
Eighth grade or less	30.2	12.4	15.7	5.5	36.6	11.2	11.9	2.9
Some high school	45.5	20.9	11.2	4.5	39.6	8.3	10.6	1.7
High school graduate	28.6	19.4	28.0	28.4	40.4	12.8	8.8	2.4
Some college	0.0	‡	0.0	‡	32.9	7.3	9.9	2.1
College or more	20.0	17.5	10.0	‡	26.8	7.7	9.1	2.7
Annual household income								
<$10,000	25.5	12.0	9.5	3.9	38.7	11.1	10.3	2.1
$10,000–$24,999	32.1	12.6	14.7	2.7	29.9	7.2	10.1	2.0
$25,000–$50,000	20.0	22.4	55.0	‡	36.9	7.8	10.1	1.9
>$50,000	‡	‡	‡	‡	29.5	10.1	8.3	3.3
Acculturation								
<25% of lifetime in United States	29.8	9.8	13.0	3.7	NA	NA	NA	NA
≥25% of lifetime in United States	26.2	13.3	22.3	15.9	NA	NA	NA	NA
Fluent in English[§]	‡	‡	‡	‡	29.7	7.6	10.7	2.6
Not fluent in English[§]	31.8	8.8	13.3	3.1	36.6	4.6	10.0	1.1
Immigration before 1981	NA	NA	NA	NA	32.2	5.3	10.5	1.5
Immigration in 1981 or later	NA	NA	NA	NA	37.7	6.0	9.8	1.5

*Current cigarette smokers are men who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. Because the number of current smokers who were women was too small for analysis, data for age, education, annual income, and acculturation are provided for men only.
†95% confidence interval.
‡Numbers too small for analysis.
§Self-report of ability to speak English well or fluently.
NA = data not available.
Source: Centers for Disease Control 1992b.

higher among men (42.5 percent) than among women (5.7 percent) (Table 27). Southeast Asian men were 1.6 times as likely to smoke as were other men in Washington, whereas Southeast Asian women were one-fourth as likely to smoke as were other women in the state (CDC 1992c).

In a recent review of Hawaii's health surveillance data for 1975–1980, Blaisdell (1993) found that the smoking prevalence was higher among Native Hawaiians than among persons in other racial/ethnic groups; 61.1 percent of pure Native Hawaiian men and 56.3 percent of part Native Hawaiian men were current smokers (Table 27). According to the 1985 BRFSS data, 42 percent of Native Hawaiian men and 34 percent of Native Hawaiian women were current smokers. Data from the 1989 BRFSS in Hawaii indicate that the prevalence was 28.2 percent among Native Hawaiians (Table 27), which was higher than that among Filipinos, Japanese, and whites (Blaisdell 1993).

Table 26. Percentage of adult Asian Americans and Pacific Islanders who reported being current smokers,* overall and by gender, age, and education, Screener Survey, California, 1990 and 1991 aggregate data†

Characteristic	Chinese (%)	Filipinos (%)	Japanese (%)	Koreans (%)	All Asians (%)
Total	11.7	15.9	17.4	23.5	15.9
Age (years)					
18–24	9.7	12.2	19.7	26.9	14.6
25–44	12.4	21.0	20.3	26.1	18.1
45–64	11.4	14.4	16.8	16.2	15.3
≥65	11.4	6.6	9.9	23.2	8.9
Education					
Less than high school	17.6	19.2	23.4	38.1	21.4
High school	16.7	20.3	21.5	21.3	19.4
Some college	11.2	15.2	16.2	25.3	15.2
College	6.6	11.2	12.3	19.1	10.5
Men					
Total	19.1	24.0	20.1	35.8	23.5
Age (years)					
18–24	13.0	19.1	17.2	34.3	19.0
25–44	20.9	29.2	24.7	44.1	27.1
45–64	19.9	25.8	22.1	22.6	24.0
≥65	19.8	10.6	11.1	60.6	14.0
Education					
Less than high school	35.4	32.1	18.4	70.6	36.9
High school	26.3	27.6	28.7	35.3	28.3
Some college	18.1	21.5	19.2	32.4	20.9
College	9.8	18.9	16.5	31.0	15.6
Women					
Total	4.7	8.9	14.9	13.6	8.9
Age (years)					
18–24	5.8	4.0	22.9	19.9	9.5
25–44	5.5	14.6	16.3	13.9	10.4
45–64	2.5	5.1	13.4	9.9	7.4
≥65	2.6	3.4	8.3	NA	3.8
Education					
Less than high school	1.7	11.6	28.8	20.9	9.4
High school	9.8	12.7	17.5	14.4	12.6
Some college	4.8	8.7	13.4	19.4	9.5
College	3.2	4.9	7.0	5.2	4.9

*Current cigarette smokers are persons aged 18 years and older who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. Only English-speaking persons were interviewed.

†The variables needed to compute confidence intervals were not available.

NA = data not available.

Source: Burns and Pierce 1992.

Table 27. Summary of selected findings on the percentage of Asian American and Pacific Islander adults who smoke, overall and by gender, 1975–1995

Sources	Location/Year	Study Population Characteristics	Adults Total	Adults Men	Adults Women
Klatsky and Armstrong 1991	California, 1978–1985	Current smokers			
		Chinese	NA	16.2	7.3
		Filipino	NA	32.9	11.4
		Japanese	NA	22.7	18.6
		Other Asians	NA	30.9	12.6
		Persons who smoke ≥1 pack/day			
		Chinese	NA	4.1	1.3
		Filipino	NA	7.1	1.7
		Japanese	NA	8.2	4.6
		Other Asians	NA	6.7	1.6
CDC 1992c	Washington State, 1989	Southeast Asians, by age (years)			
		18–29	17.6	29.5	3.0
		30–39	26.3	53.7	5.6
		40–59	26.6	54.5	8.3
		≥60	28.9	55.9	7.1
		Total	23.1	42.5	5.7
Blaisdell 1993	Hawaii, 1975–1980	Pure Native Hawaiians	NA	61.1	NA
	Hawaii, 1975–1980	Part Native Hawaiians	NA	56.3	NA
	Hawaii, 1985	Native Hawaiians	NA	42	34
	Hawaii, 1989	Native Hawaiians	28.2	NA	NA
McPhee et al. 1993	San Francisco and Alameda Counties, California, 1987, 1989	Vietnamese adults			
		1987	NA	56	9
		1989	NA	45	2
McPhee et al. 1995	Santa Clara County, California, 1990	Vietnamese men	NA	36	NA
Wewers et al. 1995	Franklin County, Ohio, 1992	Cambodians	20.6* (30.3)†	34.0 (38.8)	6.6 (21.5)
		Laotians	27.8 (32.9)	45.6 (48.2)	4.2 (10.8)
		Vietnamese	27.6 (29.0)	43.3 (43.3)	6.0 (9.3)
CDC 1997a	Alameda County, California, 1994–1995	Korean adults	21	39	6
Jenkins et al. 1997b	San Francisco and Alameda Counties, California, 1990	Vietnamese men	NA	36.1	NA
Jenkins et al. 1997b	Houston, Texas 1990, 1992	Vietnamese men			
		1990	NA	39.6	NA
		1992	NA	40.9	NA

*Figures not in parentheses are from self-report.
†Figures in parentheses represent cotinine-adjusted prevalences. Persons whose saliva cotinine levels were ≥14 ng/mL were considered to be smokers.
NA = data not available.

Data collected from several surveys (conducted in 1987, 1989, 1990, and 1992) of Vietnamese men and women living in California, Texas, and Ohio showed that the prevalence of cigarette smoking was substantially higher among Vietnamese men than among all U.S. men (Jenkins et al. 1990; McPhee et al. 1993; McPhee et al. 1995; Wewers et al. 1995; Jenkins et al. 1997b). Vietnamese women, however, were significantly less likely to smoke than were Vietnamese men or other U.S. women (Table 27).

Several surveys have been conducted in San Francisco and Alameda Counties, California. In the 1987 survey, which included data from 215 randomly sampled Vietnamese, 56 percent of Vietnamese men reported smoking cigarettes, compared with 9 percent of Vietnamese women (Jenkins et al. 1990). Vietnamese men had twice the smoking prevalence of men in the United States. On average, however, the number of cigarettes smoked per day was smaller among Vietnamese men (13.4) than among men in the general U.S. population (23.0). In the 1989 survey of 151 Vietnamese adults, 45 percent of Vietnamese men and 2 percent of Vietnamese women reported being cigarette smokers (Table 27) (McPhee et al. 1993). The precision of the estimates of smoking prevalence from the 1987 and 1989 surveys is limited by small sample sizes. In the 1990 survey of 1,133 Vietnamese men, which served as the baseline measure in an evaluation of a community-based smoking cessation intervention, 36.1 percent were current smokers. These men smoked an average of 11.1 cigarettes per day (Jenkins et al. 1997b).

Another survey of Vietnamese men (n = 1,322), which also served as the 1990 baseline measure in an evaluation of a similar smoking cessation intervention, was conducted in Santa Clara County, California. In this population, 37.9 percent were current smokers; the smokers consumed an average of 9.9 cigarettes per day (McPhee et al. 1995). The comparison data for the two evaluation studies conducted by McPhee and colleagues were obtained from surveys of Vietnamese men living in Houston, Texas (McPhee et al. 1995; Jenkins et al. 1997b). In the 1990 survey (n = 1,581), 39.6 percent of the men were current smokers; in the 1992 survey (n = 1,209), 40.9 percent were current smokers. The mean number of cigarettes smoked daily was significantly lower in 1992 (11.9) than in 1990 (13.2).

The 1990 and 1992 survey data showed an association between cigarette smoking prevalence and acculturation. In multivariate analyses that included statistical control for education, employment, and poverty status, the prevalence of cigarette smoking was elevated among persons with limited English-language proficiency and persons who had more recently immigrated to the United States (McPhee et al. 1995; Jenkins et al. 1997b). Data collected from 1,403 Southeast Asian immigrant men and women through a household interview indicate that self-reported cigarette smoking prevalence is underreported, especially among women (Wewers et al. 1995). Cigarette smoking status among Cambodian, Laotian, and Vietnamese adults in Franklin County, Ohio, was verified by saliva cotinine assay; a cutoff of 14 ng/mL was used to indicate active smoking. Self-reported smoking prevalence was 40.9 percent for men and 5.6 percent for women. However, results from biochemical verification indicated that 43.7 percent of men and 14.8 percent of women were current smokers. Misclassification as a result of exposure to environmental tobacco smoke is unlikely, given how high the cotinine levels were among self-reported former and never smokers (range 17–331 ng/mL). As other studies have found, current smoking was substantially higher among men than women for all racial/ethnic groups in the study (Table 27) and was higher among respondents with less education.

From August 1994 to February 1995, a telephone survey of 676 Korean Americans (aged 18 years and older) was conducted in Alameda County, California (Table 27) (CDC 1997a) . Overall, 39 percent reported that they had smoked at least 100 cigarettes in their lifetimes. Men (70 percent) were more likely than women (13 percent) to have smoked at least 100 lifetime cigarettes. Current smoking prevalence was 39 percent for Korean American men in Alameda County—an estimate that was substantially higher than the 19 percent prevalence estimate (from the 1995 California Behavioral Risk Factor Survey) for all men in the state. Conversely, only 6 percent of Korean American women from Alameda County reported current smoking—less than the statewide estimate for women of 14 percent.

Cigarette Smoking in Asian Countries

Because so many Asian Americans have recently immigrated to the United States, understanding how smoking practices in Asian countries may affect smoking practices among Asian Americans here is important. Currently, however, data are scarce on smoking trends in the countries from which Asian Americans and Pacific Islanders have emigrated. The information that is available suggests that the prevalence of smoking among men in Asia is much higher than among Asian American men.

Various studies from Asian countries indicate a very high cigarette smoking prevalence among men and a relatively low prevalence among women (Weng et al. 1987; Li et al. 1988; Hawks 1989; Koong et al. 1990; Gong et al. 1995; Jenkins et al. 1997a; World Health Organization, unpublished data). In many of these countries, the estimated prevalence of smoking among men exceeds 50 percent. However, the prevalence of smoking among women is generally below 20 percent. Some of these studies indicate that the prevalence of smoking among women increases with age (Weng et al. 1987; Koong et al. 1990). In Pacific Island nations, the prevalence of smoking among men is also very high, with estimates generally exceeding 50 percent, similar to those in Asian countries. Women in the Pacific Island nations are less likely to smoke than men, but they are more likely to smoke than women in Asian countries, with prevalence estimates generally exceeding 20 percent (World Health Organization, unpublished data).

Studies also show that smoking prevalences are much higher among Chinese male adolescents than among female adolescents. In a 1988 survey of 8,437 junior high school students and 3,823 senior high school students in Beijing, the self-reported prevalence of ever smoking was 34.4 percent among male junior high school students and 3.9 percent among their female counterparts (Zhu et al. 1992). Among senior high school students, the prevalence of ever smoking was 46.0 percent among males and 5.5 percent among females (Wang et al. 1994).

Hispanics

No data are available on long-term trends in the prevalence of cigarette smoking among Hispanics in the United States. Before 1978, major U.S. government databases, surveys, and publications limited their classifications of race and ethnicity to "white" and "black," and no information was available about persons of Hispanic ancestry. When questions about Hispanic ancestry were added to the NHIS in 1978, direct estimates of smoking prevalence among Hispanics were possible for the first time. Because Hispanics made up a small proportion of the U.S. population at the time of the initial surveys, survey data must be aggregated from several years to provide meaningful estimates. As with previous sections, data in this section are from the NHISs, which included Hispanic data aggregated as follows: (1) 1978, 1979, and 1980; (2) 1983 and 1985; (3) 1987 and 1988; (4) 1990 and 1991; (5) 1992 and 1993; and (6) 1994 and 1995. Not until the HHANES was administered from 1982 through 1984 was a large enough sample of Hispanics available to assess long-term reconstructed trends in smoking through retrospective analysis of smoking prevalence among successive birth cohorts of Hispanics (Escobedo and Remington 1989; Escobedo et al. 1989a).

Prevalence of Cigarette Smoking

NHIS data indicate that the prevalence of smoking declined among Hispanics from 1978 through 1995 (Table 28) (NCHS, public use data tapes, 1978–1995). Birth cohort data from the HHANES also reflect recent declines in the prevalence of smoking among the three subgroups of Hispanics surveyed: Cuban Americans, Mexican Americans, and Puerto Ricans (Escobedo and Remington 1989).

Between 1978 and 1995, the prevalence of smoking among Hispanic men and women decreased, although smoking prevalence was consistently greater among men than among women, according to the NHIS data (Table 28). Previous analysis of the HHANES birth cohort data showed that after 1970, the prevalence of smoking declined sharply among Mexican American men and less dramatically among Puerto Rican and Cuban American men (Escobedo et al. 1989a). In contrast, the prevalence of smoking changed little or increased among most age groups of Cuban American, Mexican American, and Puerto Rican women. For men participating in the 1982–1984 HHANES, the smoking prevalence ranged from 41.3 percent (among Puerto Ricans) to 43.6 percent (among Mexican Americans) (Escobedo and Remington 1989), compared with 31.6 percent of Hispanic men in the 1983–1985 NHIS. For women participating in HHANES, the smoking prevalence ranged from 23.1 percent (among Cuban Americans) to 32.6 percent (among Puerto Ricans) (Escobedo and Remington 1989), compared with 20.4 percent of Hispanic women in the 1983–1985 NHIS.

Several factors help explain why the HHANES estimates for men are at least 10 percentage points higher than the NHIS estimates for men for a comparable period and why the HHANES estimates for women also show a higher prevalence than the NHIS estimates for women. Most importantly, the HHANES was more likely to select an immigrant population than the NHIS because HHANES offered respondents the choice of English or Spanish questionnaires. In addition, the HHANES sampled Cuban Americans from Dade County, Florida; Mexican Americans from Arizona, California, Colorado, New Mexico, and Texas; and Puerto Ricans from New York, New Jersey, and Connecticut. On the other hand, the NHIS, administered only in English, is a national sample of the general population, which includes a wider range of racial/ethnic

Table 28. Percentage of adult Hispanics who reported being current cigarette smokers,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	30.1	1.9	25.6	1.6	23.6	1.4	21.5	1.4	20.5	1.6	18.9	0.7
Gender												
Men	37.6	3.0	31.6	2.9	29.6	2.3	27.8	2.3	25.9	2.6	22.9	2.4
Women	23.3	2.0	20.4	1.9	18.4	1.5	15.9	1.6	15.5	1.9	15.1	1.7
Age (years)												
18–34	32.3	2.7	25.8	2.2	23.6	1.9	21.1	1.9	21.0	2.4	19.8	2.2
35–54	30.4	2.7	28.4	3.2	26.3	2.3	25.7	2.2	23.4	2.7	19.8	2.5
≥55	22.9	2.8	19.9	4.2	18.2	2.8	13.7	2.6	12.4	3.7	14.3	3.5
Education§												
Less than high school	33.4	3.5	28.0	2.6	26.1	2.3	22.9	2.4	21.6	2.7	20.2	2.4
High school	25.2	3.9	28.1	3.8	27.8	3.0	27.6	2.7	24.2	3.3	21.6	3.4
Some college	32.7	6.5	26.4	4.0	20.3	3.2	19.9	3.1	19.5	4.2	21.0	4.1
College	17.1	6.6	20.4	6.1	13.9	3.0	16.1	3.4	13.1	3.8	8.7	3.1

*For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

groups and subgroups, including persons who identified themselves as Puerto Rican, Cuban, Mexican, Mexicano, Mexican American, Chicano, Spanish, or of other Latin American origin. Because Hispanics with higher levels of education are less likely to smoke than other groups of Hispanics (Haynes et al. 1990), the slightly different target populations in the HHANES and in the NHIS—which probably differ in educational attainment—may help explain differences in smoking prevalence between the two surveys.

Hispanics aged 55 years and older consistently had the lowest rates of cigarette smoking in the NHIS (Table 28), a finding similar to that from the HHANES (Haynes et al. 1990). Rates of cigarette smoking generally have been highest among Hispanics with a high school education or less and lowest among those who have graduated from college (Table 28). This pattern also was observed in a smaller survey of Hispanic adults in a semirural city near Albuquerque, New Mexico (Samet et al. 1992).

In the 1982–1984 HHANES, having 12 or more years of education was associated with lower rates of cigarette smoking among Cuban American, Mexican American, and Puerto Rican men (Haynes et al. 1990). Among Hispanic women, those with 7–11 years of education had the highest rates of cigarette smoking.

The 1982–1984 HHANES used an eight-item scale to measure level of acculturation in Mexican Americans (Delgado et al. 1990). The variables used to construct the scale were language ability, self-identification, parents' racial/ethnic identification, and generation in the United States. Among Mexican American women, there was a dose-response relationship between the level of acculturation and

Table 29. Percentage of adult Hispanic smokers* who reported smoking <15, 15–24, or ≥25 cigarettes per day, overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

Characteristic	1978–1980† %	±CI‡	1983–1985† %	±CI	1987–1988† %	±CI	1990–1991† %	±CI	1992–1993† %	±CI	1994–1995† %	±CI
Total												
<15 cigarettes	56.0	4.5	55.6	4.1	58.3	3.2	64.5	3.3	72.7	3.8	65.0	4.1
15–24 cigarettes	30.7	4.3	31.3	3.0	30.9	3.1	29.3	3.2	21.2	3.5	27.3	3.9
≥25 cigarettes	13.3	2.4	13.2	3.0	10.9	2.1	6.2	1.4	6.2	2.0	7.7	2.0
Gender												
Men												
<15 cigarettes	52.4	5.9	52.5	5.5	54.9	4.6	62.5	4.4	71.8	5.2	62.4	5.1
15–24 cigarettes	32.6	5.0	33.0	4.2	32.1	4.6	29.8	4.2	20.7	4.5	29.9	4.7
≥25 cigarettes	15.0	3.6	14.4	3.9	13.0	2.9	7.7	2.1	7.6	3.0	7.6	3.7
Women												
<15 cigarettes	61.4	5.2	59.8	4.9	63.0	4.2	67.6	4.7	74.1	5.3	68.8	5.6
15–24 cigarettes	27.8	5.3	28.8	5.1	29.1	4.2	28.6	4.5	22.0	5.1	23.5	5.1
≥25 cigarettes	10.7	3.6	11.5	3.9	7.9	2.3	3.8	1.5	3.9	2.0	7.7	3.1
Age (years)												
18–34												
<15 cigarettes	61.7	6.2	61.4	5.3	61.6	4.8	69.8	4.3	78.1	4.7	70.2	6.3
15–24 cigarettes	28.5	5.5	29.2	4.5	29.3	4.8	27.8	4.1	17.3	4.2	25.1	6.1
≥25 cigarettes	9.9	2.6	9.4	3.7	9.1	2.7	2.4	1.1	4.6	2.4	4.7	2.5
35–54												
<15 cigarettes	49.0	6.3	44.5	6.5	56.0	5.0	59.7	4.9	66.5	6.7	60.4	6.2
15–24 cigarettes	33.4	6.7	35.1	5.0	31.7	4.7	29.6	4.6	25.2	6.1	28.6	5.9
≥25 cigarettes	17.7	4.5	20.4	4.9	12.3	3.5	10.6	2.9	8.2	3.9	11.0	3.8
≥55												
<15 cigarettes	49.6	8.6	61.2	9.7	50.8	7.7	55.2	9.7	69.8	13.5	56.2	11.5
15–24 cigarettes	33.3	8.3	29.2	8.7	34.8	7.5	36.0	10.2	24.6	13.1	32.9	10.5
≥25 cigarettes	17.1	7.6	9.6	5.8	14.4	5.9	8.5	5.5	5.6	4.5	10.9	7.0

*For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

age-adjusted (to the 1980 U.S. population) cigarette smoking prevalence; 19 percent of Mexican-oriented women and 28 percent of U.S.-oriented women were current cigarette smokers (Haynes et al. 1990). The unadjusted prevalence of cigarette smoking among U.S. women aged 18 years and older in 1983 was 29.5 percent (CDC 1994c). No clear relationship was observed among Mexican American men (Haynes et al. 1990).

Navarro (1996) used data from the 1990 California Tobacco Survey to study level of acculturation in Hispanics (most of whom were of Mexican origin). Level of acculturation was defined based on the language spoken in the home: persons from English-speaking homes were classified as having a high level of acculturation, and persons from Spanish-speaking homes were classified as having a low level of

Table 29. Continued

Characteristic	1978–1980† %	±CI‡	1983–1985† %	±CI	1987–1988† %	±CI	1990–1991† %	±CI	1992–1993† %	±CI	1994–1995† %	±CI
Education§												
Less than high school												
<15 cigarettes	55.4	5.0	54.1	5.3	59.2	5.1	66.2	5.2	71.1	6.6	63.5	7.2
15–24 cigarettes	29.9	5.6	33.7	5.9	30.3	4.7	27.6	5.1	23.1	6.1	30.0	7.2
≥25 cigarettes	14.7	4.3	12.3	4.7	10.5	3.3	6.2	2.3	5.8	3.6	6.5	3.4
High school												
<15 cigarettes	53.4	9.9	53.9	7.5	53.9	6.6	60.9	6.0	70.5	7.2	61.3	7.3
15–24 cigarettes	34.7	9.4	33.2	7.1	32.5	6.6	32.6	5.7	25.4	7.0	28.7	6.6
≥25 cigarettes	11.9	5.9	12.9	4.4	13.6	4.5	6.5	2.6	4.2	3.0	10.1	4.4
Some college												
<15 cigarettes	50.6	10.3	50.5	11.8	54.1	9.2	55.1	8.6	70.8	9.7	55.5	9.9
15–24 cigarettes	37.3	10.8	24.1	9.6	31.9	8.2	35.1	8.4	21.0	8.9	36.1	10.1
≥25 cigarettes	12.2	7.5	25.5	9.9	14.0	6.4	9.8	5.3	8.2	5.1	8.4	5.1
College												
<15 cigarettes	55.6	22.1	50.0	17.1	55.3	11.7	64.4	11.3	75.8	11.7	71.6	15.7
15–24 cigarettes	17.8	15.2	36.4	13.5	29.6	10.6	27.1	10.3	16.7	10.3	17.9	12.8
≥25 cigarettes	26.7	21.7	13.6	10.1	15.0	9.3	8.5	5.9	7.5	6.3	10.5	10.7

§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

acculturation. The data were analyzed by gender and for three levels of educational attainment (<12, 12, and >12 years). Among men, smoking prevalence varied for those with <12 and 12 years of education; smoking prevalence was highest among whites, intermediate among Hispanics of high acculturation, and lowest among Hispanics of low acculturation. This pattern also existed for women, but in all three of the education categories. Additionally, in a multivariate analysis that controlled for age, gender, educational attainment, and Mexican origin, Hispanics with a low acculturation level were significantly less likely to smoke than those with a high acculturation level. Navarro suggested that level of acculturation may be related to the degree of urbanization of the person's or family's residence in the country of origin. For example, persons living in rural areas of Latin America appear to be less likely to smoke than those living in urban areas (USDHHS 1992). The relationship between cigarette smoking and level of acculturation among Hispanics living in the United States may be confounded by adaptation to industrial and urban societies (Navarro 1996), especially if persons or families from rural areas acculturate more slowly than those from urban areas. Future research into this topic might ideally include information on the person's or family's residence in the country of origin.

Number of Cigarettes Smoked Daily

Between 1978 and 1985, trends in the number of cigarettes smoked per day by Hispanic smokers remained stable (Table 29) (NCHS, public use data tapes, 1978–1995). More recently, however, an increasing proportion of Hispanic smokers have been smoking fewer than 15 cigarettes per day, and a declining proportion of them have been smoking 25 or more cigarettes per day. For example, in 1978–1980, 13.3 percent of Hispanic smokers smoked 25 or more cigarettes per day. By 1994–1995, this proportion was 7.7 percent.

From 1978 to 1993, Hispanic men were more likely than Hispanic women to smoke 25 or more cigarettes per day, although these differences were not statistically significant (Table 29). Consumption patterns in 1994–1995 were similar across genders. Between 1978 and 1995, the prevalence of smoking 25 or more cigarettes per day declined among Hispanics at all levels of education (Table 29), although only the decline among persons with less than a high school education was statistically significant.

Quitting Behavior

In the NHIS, the prevalence of smoking cessation among Hispanic smokers increased moderately between 1978 and 1995 (Table 30) (NCHS, public use data tapes, 1978–1995). No notable differences in smoking cessation between Hispanic men and women were observed. The prevalence of cessation was higher among persons in the older age groups and among college graduates (Table 30).

Data from a recent multivariate analysis of the 1991 NHIS (CDC 1993) indicate that after the analysis controlled for gender, age, education, and poverty status, Hispanics were more likely than whites to stop smoking for at least one day during the previous year. Hispanics who had stopped smoking for at least one day were about as likely as whites to have stopped for at least one month. Overall, Hispanic smokers were slightly more likely than whites to have quit smoking for at least one month.

Data from the NCI Supplement of the 1992–1993 CPS indicate that among Hispanics aged 18 years and older who were daily smokers one year before the survey, 59.8 percent reported that they were still smoking daily and that they had not tried quitting for at least one day during the previous year (Table 4). Another 28.5 percent had tried quitting for at least one day, 5.6 percent were occasional smokers (i.e., smoked only on some days), 2.5 percent had not smoked for the past 1–90 days, and 3.6 percent had not smoked for the past 91–364 days. This distribution was similar to that among whites, with the exception that slightly more Hispanics had become occasional smokers.

Table 30. Percentage of adult Hispanic ever smokers who have quit,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	35.0	2.8	39.3	2.8	42.8	2.4	44.1	2.6	44.2	3.1	46.2	3.2
Gender												
Men	35.5	3.4	40.5	4.1	43.0	3.3	43.0	3.6	45.8	4.1	48.2	4.3
Women	34.2	4.3	37.6	4.3	42.5	3.4	45.6	3.5	41.6	4.5	43.1	4.5
Age (years)												
18–34	27.9	4.2	32.6	3.2	33.7	3.6	34.3	3.5	31.4	4.3	32.5	4.9
35–54	37.2	3.9	39.2	5.2	44.9	3.7	45.3	3.6	46.4	4.7	49.6	4.9
≥55	51.0	5.5	57.2	7.6	60.4	5.0	67.1	5.6	70.3	6.9	68.1	6.4
Education§												
Less than high school	30.5	3.6	37.7	4.0	43.3	3.6	45.5	4.4	42.8	5.0	47.6	5.1
High school	45.7	7.1	40.0	6.0	41.2	4.6	41.9	4.4	44.2	6.0	44.5	6.2
Some college	38.5	9.8	47.8	6.9	55.0	6.3	52.6	6.1	52.8	8.8	49.1	7.6
College	59.4	14.2	52.2	10.3	59.2	7.2	56.6	7.3	64.0	8.9	71.1	9.1

*The prevalence of cessation is the percentage of ever smokers who are former smokers. Former smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not smoking, and ever smokers include current and former smokers.
†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.
‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Women of Reproductive Age

From 1978 to 1995, a large proportion of Hispanic women of reproductive age (18–44 years) have smoked cigarettes, although this proportion has been declining over time (Table 31) (NCHS, public use data tapes, 1978–1995). Some evidence suggests that the prevalence of smoking among women of reproductive age varies according to the country of origin, with Cuban American women (22.6 percent) and Mexican American women (23.2 percent) reporting cigarette smoking in lower proportions than Puerto Rican women (33.5 percent) (Pletsch 1991). In a comparison of data from the HHANES and the National Health and Nutrition Examination Survey (NHANES), Guendelman and Abrams (1994) found that Mexican American women of reproductive age were less likely than their white counterparts to smoke cigarettes at each of the reproductive stages (interconception, pregnancy, lactation, and postpartum).

The National Survey of Family Growth collected data in 1982 and 1988 on the smoking behavior of females 15–44 years of age during their most recent pregnancy. In 1982, 17.2 percent of Hispanic women reported smoking during their most recent pregnancy, compared with 13.7 percent in 1988 (Pamuk and Mosher 1992; Chandra 1995). More recent data from U.S. final natality statistics indicate that smoking rates for Hispanics during pregnancy declined from 8 percent in 1989 to 4.3 percent in 1995 (Table 6). Hispanic adolescent mothers were about as likely as older Hispanic mothers to have smoked (USDHHS 1994).

Hispanic mothers report generally low rates of tobacco use, ranging from 1.8 to 4.1 percent for Mexican, Cuban, Central American, and South American mothers to 8.2 to 10.4 percent for Puerto Rican and "other" Hispanic mothers and those of unknown Hispanic origin (Table 6). Ventura and colleagues (1995) reported that 3 percent of foreign-born or Puerto

Table 31. Percentage of Hispanic women of reproductive age who reported being current cigarette smokers,* overall and by education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	25.5	2.7	22.2	2.2	19.8	1.7	16.7	1.8	17.3	2.3	16.4	2.0
Education§												
Less than high school	29.2	4.3	24.4	4.4	23.5	4.0	17.6	3.7	17.0	4.4	17.0	3.7
High school	21.3	5.6	27.6	5.3	24.1	3.7	21.4	3.6	25.1	5.3	21.4	4.7
Some college	12.9	7.5	21.5	6.7	15.9	4.6	19.5	4.2	17.0	6.1	16.5	5.3
College	17.3	12.0	16.7	8.3	12.7	4.7	15.2	5.0	12.9	5.8	5.1	4.1

*For 1978–1991, current cigarette smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Rican-born Hispanic mothers smoked, compared with 9 percent of their United States-born counterparts (Ventura et al. 1995). Data on tobacco use among these mothers may be skewed because California and New York do not report this information, and together these states account for almost half of all Hispanic births (Ventura et al. 1996).

The National Pregnancy and Health Survey, conducted between October 1992 and August 1993 and sponsored by NIDA, provides nationally representative data on the prevalence of prenatal drug use among Hispanic females of reproductive age (15–44 years). According to National Pregnancy and Health Survey data, 5.8 percent of Hispanic women reported using cigarettes during their pregnancies (NIDA 1994). In the 1985 and 1990 NHISs, questions related to smoking were asked of women aged 18–44 years who had given birth within the past five years. In 1985, 16.8 percent of Hispanic women smoked during the 12 months before the birth and 10.3 percent smoked after learning of their pregnancy; in 1990, 12.1 percent smoked during the year before birth and 8 percent after learning of their pregnancy (Floyd et al. 1993).

Young People

Cigarette Smoking

Despite the dearth of information on tobacco use among Hispanic youths, several studies have been able to identify trends in smoking initiation and patterns of tobacco use by analyzing data from the HHANES, the MTF surveys of high school seniors (Figure 3), and small local surveys (for example, Smith et al. 1991; Dusenbury et al. 1992; Vega et al. 1993).

HHANES data have shown that smoking initiation increased rapidly among Cuban Americans, Mexican Americans, and Puerto Ricans between ages 11 and 15 years, peaked between ages 15 and 19 years, and declined after the age of 20 years (Escobedo et al. 1990). In all age groups, smoking initiation rates were higher among males than among females.

Slight variations in smoking initiation by level of education were found when the HHANES data were combined for all three Hispanic subgroups (although these were three separate surveys, it was necessary to combine three groups to estimate trends for all three groups). Hispanics with less than a high school education had the highest rates of smoking initiation, with an earlier age of onset and a more accelerated rate of smoking initiation during young adolescence, than Hispanics with more years of schooling. Hispanics with a high school education had intermediate rates of smoking initiation, whereas those with more than a high school education had slightly lower smoking initiation rates. Because educational attainment is a reliable (Liberatos et al. 1988) although limited (Montgomery and Carter-Pokras 1993) indicator of socioeconomic status, these data suggest that an association between smoking initiation and socioeconomic status may exist among Hispanics, as it does for the general U.S. population. However, these differences in smoking initiation by educational attainment were not as large as those found among whites.

In addition, data from the 1994–1995 (combined) NHSDAs indicate that among persons aged 30–39 years, Hispanic men and women were less likely to become daily smokers than whites (Table 11) (USDHHS, Substance Abuse and Mental Health Services Administration, public use data tapes, 1994–1995). Among persons in this age group who had ever smoked daily, the initiation patterns among Hispanics were more like those of African Americans than those of whites. The average ages for first trying a cigarette and for becoming a daily smoker were about one year higher for Hispanic men than for white men and about two years higher for Hispanic women than for white women (Table 11).

Among high school seniors who participated in the MTF in 1985–1989, 23.8 percent of Mexican American males, 22.0 percent of Puerto Rican and Latino males, 18.7 percent of Mexican American females, and 24.7 percent of Puerto Rican and Latina females smoked cigarettes in the previous month (Bachman et al. 1991b). In addition, 11.6 percent of Mexican American males, 13.3 percent of Puerto Rican and Latino males, 8.1 percent of Mexican American females, and 13.3 percent of Puerto Rican and Latina females smoked cigarettes daily in the previous month. The prevalence of smoking one-half pack of cigarettes or more per day was somewhat higher among males (5 to 6 percent) than among females (2 to 4 percent).

Between 1976 and 1989, the prevalence of daily smoking declined among Mexican American high school seniors of both genders and among Puerto Rican and Latina females, according to the MTF data (Bachman et al. 1991b). Decreases occurred between 1976 and 1984 among Mexican American males and between 1980 and 1989 among Puerto Rican and Latina females. Among Mexican American females, decreases in the prevalence of daily smoking occurred between 1976 and 1984, and no decline was observed in more recent years. In contrast, little change in the prevalence of daily smoking was observed among Puerto Rican and Latino males over the entire survey period (Bachman et al. 1991b).

Recent data indicate that rates of smoking are generally lower among Hispanic youths than among white youths. The 1989 TAPS showed that 11.8 percent of Hispanics reported some level of cigarette smoking, compared with 17.7 percent of whites and 6.2 percent of African Americans (Moss et al. 1992). However, patterns may differ for migrant and resident youths. In a recent study of 214 migrant Hispanic adolescents enrolled in school in San Diego, the prevalence of cigarette smoking within the 30 days preceding the survey increased by school grade, from a low of 10 percent of 9th graders to 14 percent of 10th graders, 21 percent of 11th graders, and 18 percent of 12th graders (Lovato et al. 1994). Also, acculturation may influence smoking behavior. In a study of sixth and seventh graders in Dade County, Florida, Vega and colleagues (1993) found that cigarette smoking was more frequent among United States-born Cuban American children (23.8 percent) than among foreign-born Cuban Americans (15.1 percent).

According to the 1995 YRBS, 34.0 percent of Hispanic high school students and 38.3 percent of white high school students smoked on one or more days during the previous month (CDC 1996). Hispanic students were significantly more likely than African American students (19.2 percent) to have smoked during the previous month. Regarding more frequent smoking, Hispanic youths (10.0 percent) and African American youths (4.5 percent) were less likely than white youths (19.5 percent) to have smoked on at least 20 days during the previous month.

Lowry and colleagues (1996) analyzed cross-sectional data on 6,321 adolescents (aged 12–17 years) from the YRBS supplement to the 1992 NHIS. Hispanics were significantly less likely than whites to have smoked in the previous 30 days. This analysis controlled statistically for the educational level of the responsible adult, for family income, for the age and gender of the adolescent, and for whether the adolescent was in or out of school. In an analysis comparing measured carbon monoxide from expired air with self-reported smoking among a sample of seventh- through tenth-grade New York State public school students, Wills and Cleary (1997) found that the self-report sensitivity was slightly lower for Hispanics than for whites but that the magnitude of the effect was small. When self-reported smoking rates were adjusted for carbon monoxide values, ninth- and tenth-grade Hispanic students had significantly lower smoking prevalences than whites.

Recent findings from focus groups conducted at several U.S. sites suggest that Hispanic parents may be more likely than white parents to express clear antismoking messages and that smoking by Hispanic adolescents may be a sign of disrespect toward parents (Mermelstein et al. 1996).

According to the 1996 MTF surveys, the prevalence of previous-month smoking (estimated by combining 1995 and 1996 data) among Hispanic high school seniors (25.4 percent) was intermediate to that among African American seniors (14.2 percent) and white seniors (38.1 percent) (Institute for Social Research, University of Michigan, unpublished data from the 1996 MTF surveys). A similar pattern was observed for tenth-grade students: previous-month smoking prevalences were 23.7 percent for Hispanics, 32.9 percent for whites, and 12.2 percent for African Americans. However, among eighth-grade students, the Hispanic-white difference was attenuated: 19.6 percent of Hispanics, 22.7 percent of whites, and 9.6 percent of African Americans were previous-month smokers. Trends in daily smoking among high school seniors show that rates for Hispanics have been consistently lower than for whites since 1977 and higher than for African Americans since the early 1980s (Figure 3).

The MTF surveys suggest that rates of smoking among Hispanics have increased in the 1990s. The prevalence of previous-month smoking (based on two-year rolling averages) among eighth-grade students was 16.7 percent in 1992 and 19.6 percent in 1996; among tenth-grade students, the prevalence was 18.3 percent in 1992 and 23.7 percent in 1996; and among high school seniors, the prevalence was 21.7 percent in 1990 and 25.4 percent in 1996 (Johnston et al. 1996; Institute for Social Research, University of Michigan, unpublished data from the 1996 MTF surveys). Similarly, YRBS data indicate that the prevalence of previous-month smoking among Hispanic high school students was 25.3 percent in 1991 (USDHHS 1994) and 34.0 percent in 1995 (CDC 1996).

Other Risk Behaviors

Using data from the YRBS supplement to the 1992 NHIS, Escobedo and colleagues (1997) observed associations (USDHHS 1994) between cigarette smoking among Hispanic adolescents and specific behaviors compromising to health. Marijuana use, binge drinking, and weapon carrying were significantly associated with cigarette smoking among Hispanic adolescent males; marijuana use, binge drinking, multiple sexual partners, and physical fighting were associated with cigarette use among Hispanic adolescent females. The analysis controlled statistically for age, ethnicity, gender, parental educational level, region of the country, and other risk behaviors.

Smokeless Tobacco Use

Recent trends in smokeless tobacco use among Hispanic adolescents have changed little. According to the MTF surveys, previous-month smokeless tobacco use (based on two-year rolling averages) was reported by 4.2 percent of eighth-grade Hispanic students in 1992 and 5.2 percent in 1996; among tenth-grade students, the prevalence was 6.2 percent in 1992 and 4.0 percent in 1996; and among high school seniors, the prevalence was 4.4 percent in 1987 and 8.1 percent in 1996 (Johnston et al. 1996; Institute for Social Research, University of Michigan, unpublished data from the 1996 MTF surveys). YRBS data indicate that the prevalence of previous-month use among Hispanic high school students was 5.5 percent in 1991 (USDHHS 1994) and 4.4 percent in 1995 (CDC 1996).

Hispanic adolescent males are much less likely than white adolescent males to use smokeless tobacco. Among male high school students participating in the 1995 YRBS, for example, 5.8 percent of Hispanics and 25.1 percent of whites had used smokeless tobacco during the previous month (CDC 1996). Prevalence among females was 3.1 percent for Hispanics and 2.5 percent for whites.

Retrospective Analyses of Smoking Prevalence Among African Americans and Hispanics

Because of the lack of long-term national survey data on smoking behavior among racial/ethnic groups, retrospective analysis is the only way to reconstruct smoking prevalences for African Americans before 1965 and for Hispanics before 1978. The retrospective method of constructing smoking prevalences for successive birth cohorts of men and women in the U.S. population was first reported by Harris (USDHEW 1979; Harris 1983). Harris's methodology later served as the basis for a report in which smoking prevalences were presented for Cuban American, Mexican American, and Puerto Rican men and women (Escobedo and Remington 1989). Most recently, the NCI (1991) published some results of an analysis of birth cohorts of whites and African Americans. Another type of retrospective analysis has also been used to estimate long-term trends in cigarette smoking. This approach has been the basis of two published reports, one that presented smoking trends among Hispanics in various age groups (Escobedo et al. 1989a) and another that presented smoking trends among Hispanic young adults (Escobedo et al. 1989b). For this section of the report, both types of retrospective analysis were used to generate information not previously available.

Prevalence of Cigarette Smoking Among Successive Birth Cohorts

The following detailed analysis of smoking trends over time—according to gender and educational attainment of defined birth cohorts (based on the year of birth)—uses data from the 1987 NHIS (for African Americans) and the 1982–1984 HHANES (for Hispanics). The smoking histories of respondents were constructed according to the ages they reported cigarette smoking initiation and cessation. Information about these two smoking-related events was then used to classify each respondent as a nonsmoker, current smoker, or former smoker from birth to interview and to calculate the proportion of people smoking each year in each birth cohort. (See Appendix 5 for a discussion of the validation of this methodology.) The resulting birth cohort curves (Figures 7–10) represent smoking prevalences of each cohort for each year from birth to interview (throughout childhood, adolescence, and adulthood) (NCHS, public use data tapes, 1978, 1979, 1980, 1982–1984, and 1987 and 1988 combined). By comparing the curves among successive birth cohorts, one can examine smoking trends over time for those cohorts.

African Americans

The prevalence of smoking among successive birth cohorts of African American men with at least a high school education has declined gradually, with the peak and age-specific smoking prevalences for the most recent cohort (1958–1967) being lower than the prevalences for previous cohorts' curves (Figure 4).

In contrast, little progress has been made in reducing the prevalence of cigarette smoking among successive birth cohorts of African American men with less than a high school education (Figure 7). Although smoking prevalences declined slightly for successive cohorts, the peak prevalence for the most recent cohort continues to be nearly as high as that for previous cohorts. In addition, smoking prevalences during adolescence among African Americans with less than a high school education did not decrease between successive birth cohorts.

Despite initial increases in smoking prevalence among successive birth cohorts of African American women with at least a high school education, prevalences have declined in recent years (Figure 8). The declines in prevalence among African American women with at least a high school education are not as marked as the declines observed among successive birth cohorts of African American men of a similar educational background. Smoking prevalences among African American women with less than a high school education have increased markedly, with the most recent cohort (1958–1967) showing the highest peak (Figure 8).

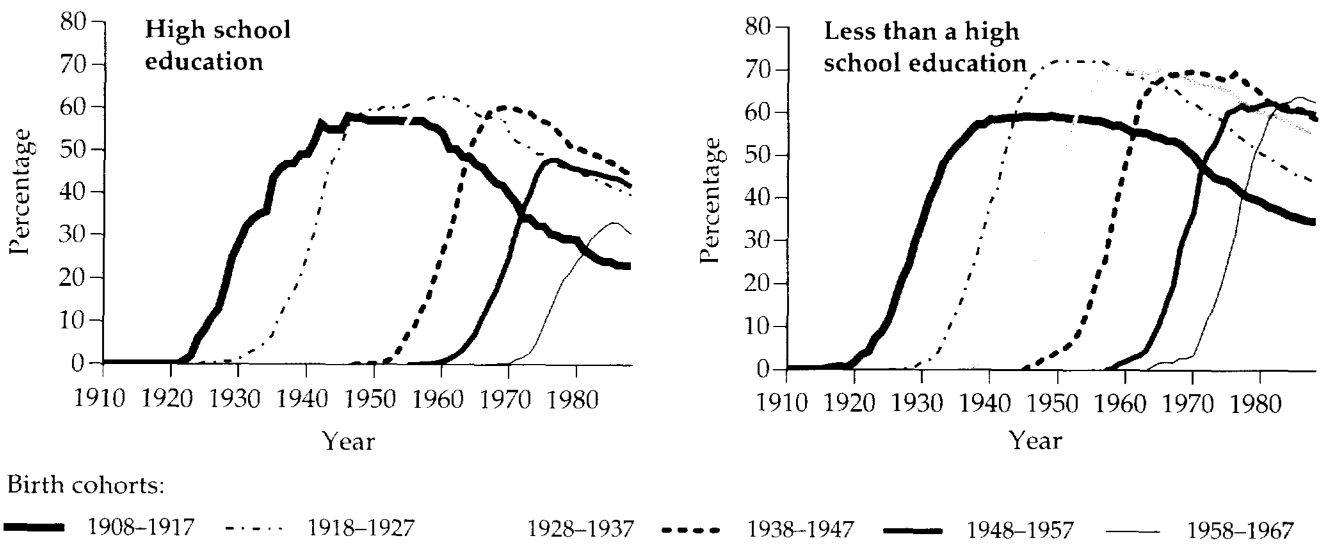
Hispanics

Among six successive birth cohorts of Hispanic men with at least a high school education covering the years 1908–1967, the peak prevalence of smoking increased gradually for the first three cohorts but declined beginning with the 1938–1947 cohort (Figure 9). In addition, the rate of increase in smoking prevalence during adolescence slowed markedly for the most recent cohort compared with rates for previous cohorts.

The smoking prevalence pattern among successive birth cohorts of Hispanic men with less than a high school education (Figure 9) is similar to the pattern among African American men with a similar educational background. Smoking prevalences have declined slightly since the early 1950s, when the highest prevalence was observed for the 1918–1927 cohort.

The slight decline in smoking prevalence among successive birth cohorts of Hispanic women with at least a high school education is similar to the decline among African American women with a similar educational background (Figure 10). However, the decline

Figure 7. Cigarette smoking prevalence among successive birth cohorts of African American men, by education, National Health Interview Surveys, United States, 1978–1980, 1987, and 1988*



*Because these birth cohort curves are the result of calculations of smoking prevalence for each year from birth to interview, they provide information about the smoking prevalence of each cohort during childhood, adolescence, and adulthood.

Sources: National Center for Health Statistics, public use data tapes, 1978–1980, 1987 (Cancer Control Supplement and Epidemiology Supplement), and 1988; Escobedo and Peddicord 1996.

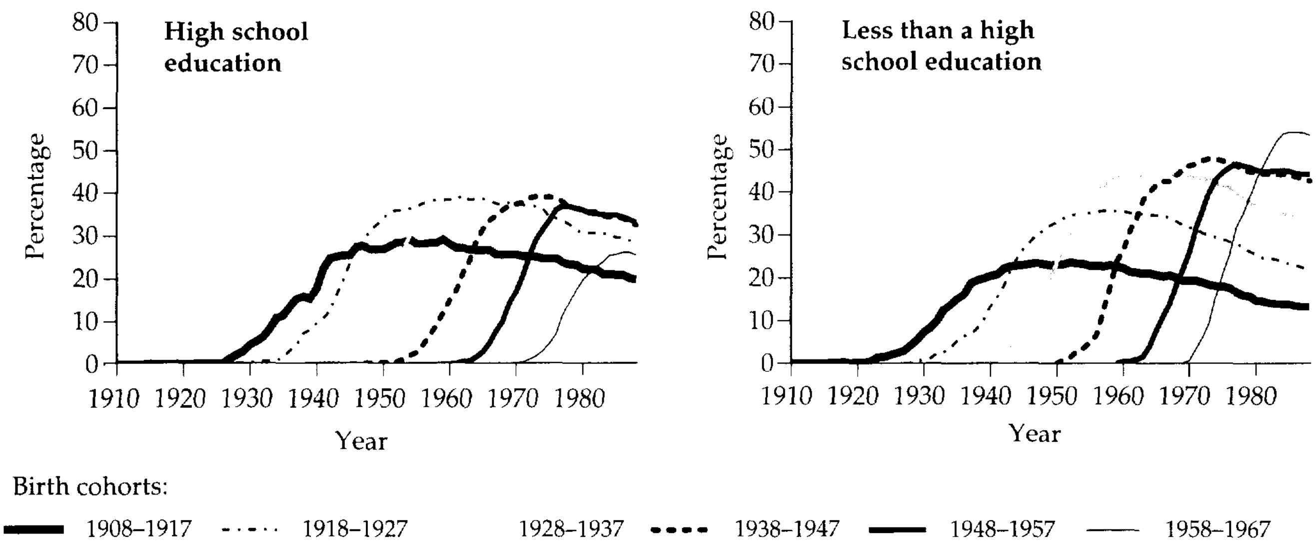
among Hispanic women began more recently, with the 1938–1947 cohort. The peak prevalence for the most recent cohort of Hispanic females with at least a high school education was similar to the peak prevalence for African American women of the same educational level (25 percent).

The smoking prevalences among successive birth cohorts of Hispanic women with less than a high school education increased slightly over time and then leveled off (Figure 10). In addition, the prevalence of smoking during adolescence increased much more rapidly in the most recent birth cohort than in previous cohorts. However, the overall pattern of smoking prevalence in this subgroup of Hispanic women does not show the dramatic increases observed in successive birth cohorts of African American women with a similar educational background. The peak prevalence for the most recent birth cohort of Hispanic women with less than a high school education (34 percent) was substantially lower than the peak prevalence for the corresponding cohort of African American women (54 percent).

The slight changes in smoking prevalences among successive birth cohorts of Hispanic women, regardless of educational background, may be the result of the larger proportion of Mexican American women who compose these subgroups. Although few changes have been observed in the prevalence of smoking among successive birth cohorts of Mexican American women, in recent birth cohorts of Cuban American and Puerto Rican women, more women have smoked cigarettes than those in previous cohorts (Escobedo and Remington 1989). Had more Cuban American and Puerto Rican women been included in the HHANES, the pattern may well have been different.

The results of these birth cohort analyses show that educational attainment is the most powerful predictor of temporal trends in smoking prevalence. In both racial/ethnic groups, men, and to a lesser extent women, with at least a high school education have made progress in reducing cigarette smoking. However, men with less than a high school education, regardless of race/ethnicity, are as likely to smoke now as they were in previous decades. Recent cohorts of African American women with less than a high school education are now substantially more likely to smoke than their counterparts in previous decades.

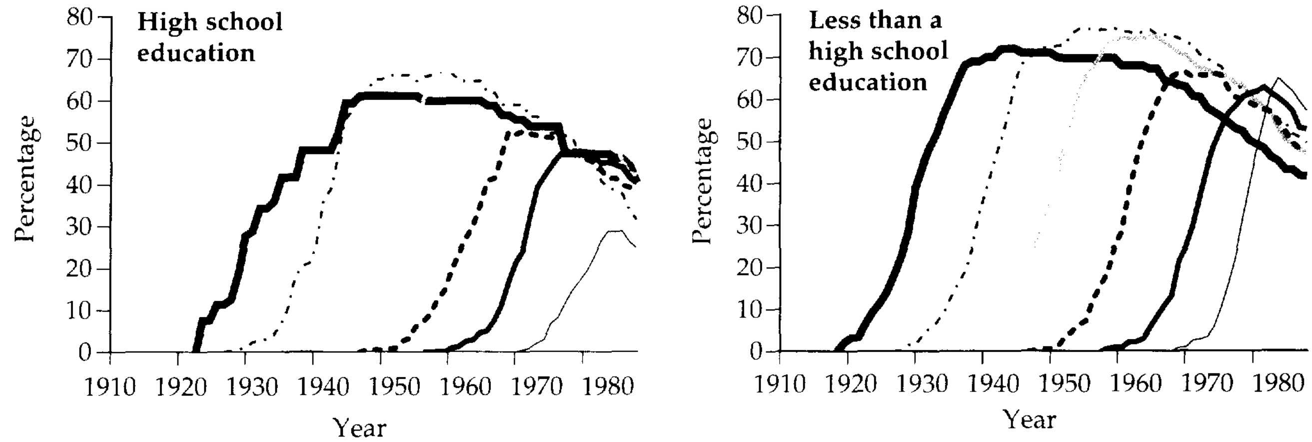
Figure 8. Cigarette smoking prevalence among successive birth cohorts of African American women, by education, National Health Interview Surveys, United States, 1978–1980, 1987, and 1988*



*Because these birth cohort curves are the result of calculations of smoking prevalence for each year from birth to interview, they provide information about the smoking prevalence of each cohort during childhood, adolescence, and adulthood.

Sources: National Center for Health Statistics, public use data tapes, 1978–1980, 1987 (Cancer Control Supplement and Epidemiology Supplement), and 1988; Escobedo and Peddicord 1996.

Figure 9. Cigarette smoking prevalence among successive birth cohorts of Hispanic men, by education, Hispanic Health and Nutrition Examination Survey, 1982–1984*

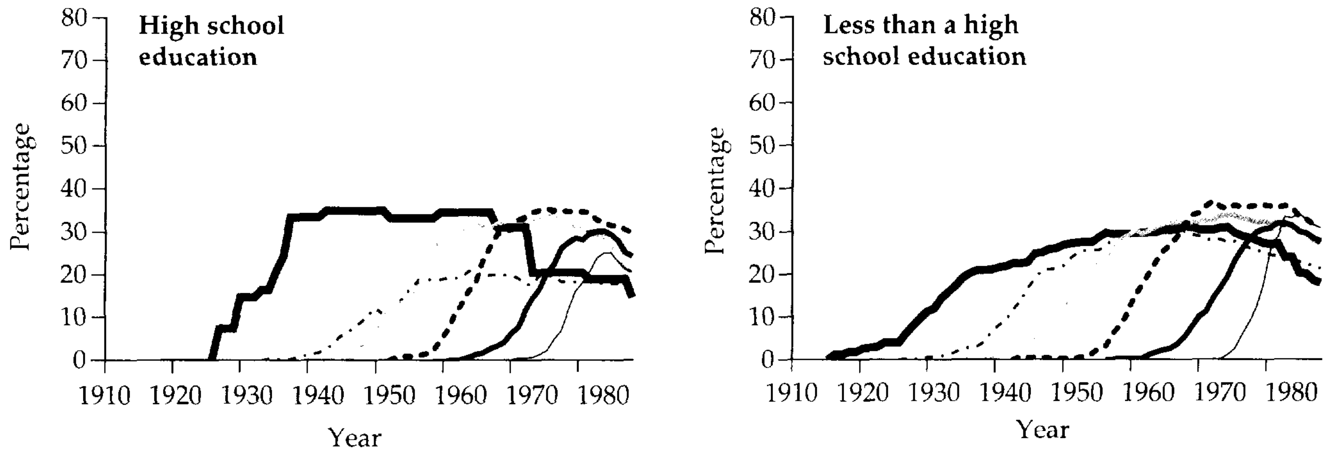


Birth cohorts:
1908–1917 1918–1927 1928–1937 1938–1947 1948–1957 1958–1967

*Because these birth cohort curves are the result of calculations of smoking prevalence for each year from birth to interview, they provide information about the smoking prevalence of each cohort during childhood, adolescence, and adulthood.

Sources: National Center for Health Statistics, public use data tapes, 1982–1984; Escobedo and Peddicord 1996.

Figure 10. Cigarette smoking prevalence among successive birth cohorts of Hispanic women, by education, Hispanic Health and Nutrition Examination Survey, 1982–1984*



Birth cohorts:
1908–1917 1918–1927 1928–1937 1938–1947 1948–1957 1958–1967

*Because these birth cohort curves are the result of calculations of smoking prevalence for each year from birth to interview, they provide information about the smoking prevalence of each cohort during childhood, adolescence, and adulthood.

Sources: National Center for Health Statistics, public use data tapes, 1982–1984; Escobedo and Peddicord 1996.

Long-Term Trends in Cigarette-Smoking Initiation

Another type of birth cohort analysis was conducted to determine long-term trends in smoking among young adults (20–29 years of age) by gender and educational attainment. Information on smoking history was determined during the years that each person was 20–29 years of age. For each year, the prevalence of smoking was determined by dividing the number of smokers aged 20–29 years by the total number of persons aged 20–29 years in that year. Unlike the birth cohort analysis described in the preceding section of this chapter, in this analysis the group for which prevalences are computed changes from year to year because new respondents enter the group when they are 20 years old and leave it when they become 30 years old.

The information for African Americans was obtained from NHIS data collected in 1978, 1979, 1980, 1987, and 1988, whereas the information for Hispanics was obtained from HHANES data collected in 1982–1984.

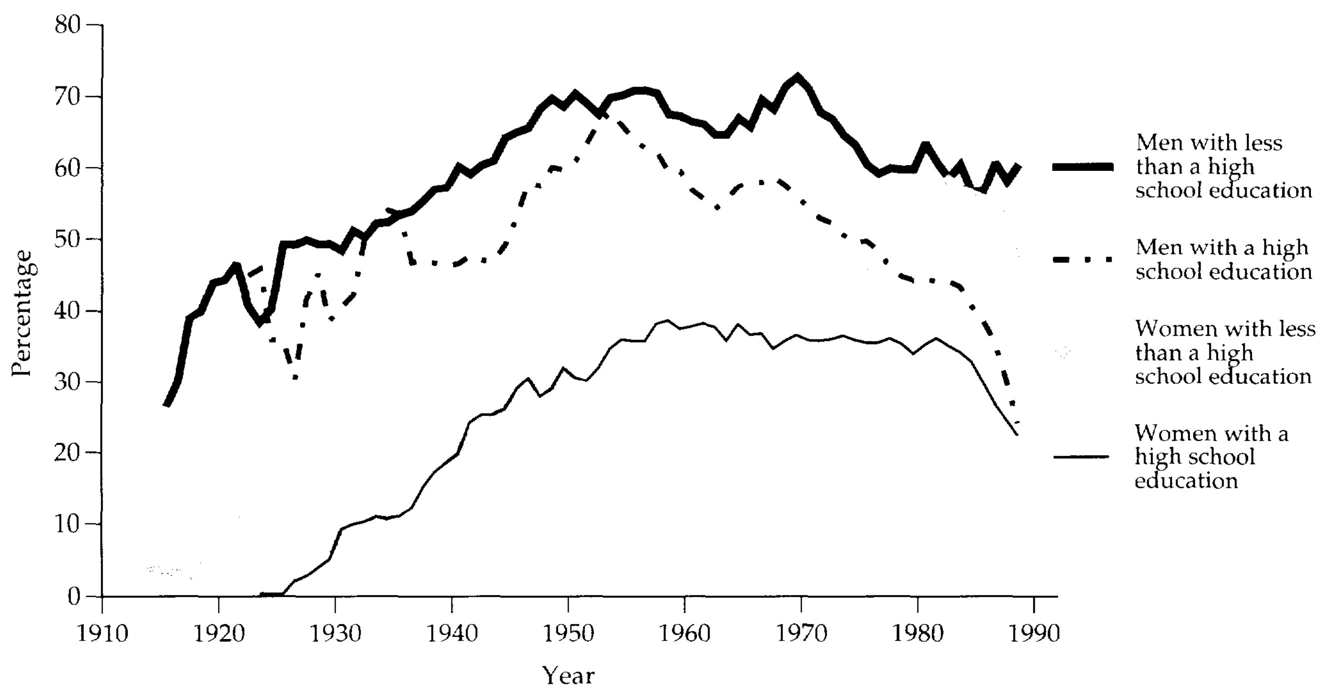
African Americans

Up until the early 1970s, African American men had substantially higher rates of smoking initiation than African American women (Figure 11). Within each gender group, significant education-related differences were not observed until the 1950s, when rates of smoking initiation among male high school graduates began to decline sharply and rates among females with less than a high school education began to increase. Rates among less educated females surged dramatically between 1970 and 1980. After 1980, rates of smoking have consistently declined among each of these subgroups of African Americans except males with less than a high school education.

Hispanics

Significant education-related differences in rates of smoking initiation have been evident only among Hispanic males. Around 1940, Hispanic males who graduated from high school began showing

Figure 11. Reconstructed prevalence of smoking among African American adults aged 20–29 years, by gender and education, National Health Interview Surveys, United States, 1910–1988



Source: National Center for Health Statistics, public use data tapes, 1978, 1979, 1980, 1987, and 1988 combined.

appreciably lower smoking rates than Hispanic males with less than a high school education (Figure 12). These differences increased in the 1960s and even more rapidly in the mid-1970s. No consistent differences in smoking rates by education were observed among Hispanic females.

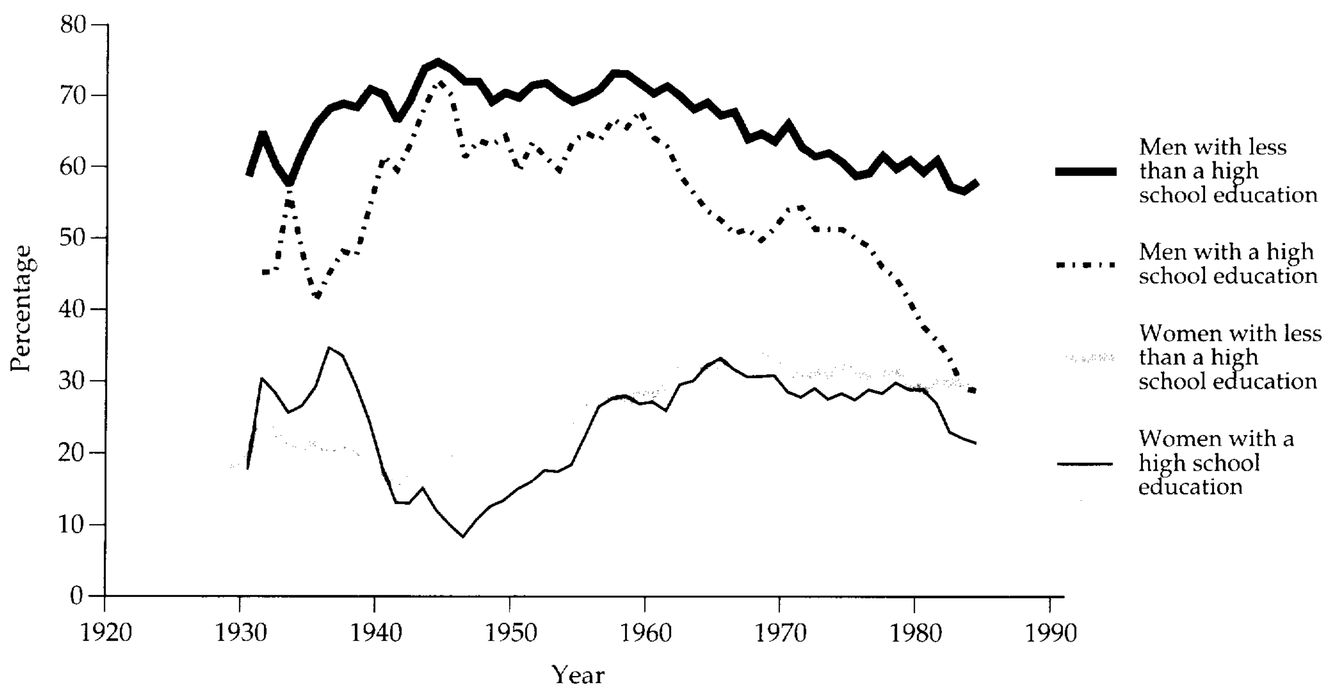
Cigarette Brand Preferences

Knowing what influences cigarette brand preference among smokers is believed to be important because this information can be used to develop counteradvertising strategies. In the late 1970s and the 1980s, the 12 most commonly used brands of cigarettes—Marlboro, Winston, Salem, Kool, Pall Mall, Kent, Benson & Hedges, Camel, Merit, Vantage, Virginia Slims, and Newport—were used by at least 76 percent of all current U.S. smokers, according to data from the 1986 Adult Use of Tobacco Survey (AUTS) and the 1978–1980 and 1987 NHISs (Table 32). Brand use varied somewhat by race/ethnicity. For example, the top brands preferred by African Americans were Kool, Newport, Salem, and Winston, whereas whites preferred Marlboro, Winston, Salem, and Benson & Hedges.

These differences in part reflect the greater use of mentholated cigarettes by African Americans (Cummings et al. 1987; USDHHS 1989). Fifty-five percent of all African American smokers reported using one of three brands that were available only in mentholated form (Newport, Kool, and Salem). Similar patterns and percentages of brand preferences were observed in the 1987 NHIS (Table 32).

Hymowitz and colleagues (1995) recently studied menthol cigarette smoking among adults who participated in a stop-smoking study. Among African Americans who smoked menthol cigarettes (n = 174), the top reasons given for smoking menthols were as follows: 83 percent said that menthol cigarettes tasted better than nonmenthol cigarettes, 63 percent said that they had always smoked menthol cigarettes, 52 percent said that menthol cigarettes were less harsh to the throat than nonmenthol cigarettes, 48 percent found inhalation to be easier with menthol cigarettes, and 33

Figure 12. Reconstructed prevalence of smoking among Hispanic adults aged 20–29 years, by gender and education, Hispanic Health and Nutrition Examination Surveys, 1920–1984



Source: National Center for Health Statistics, public use data tapes, 1982–1984.

Table 32. Percentage of self-reported cigarette brand use among adult current cigarette smokers, overall and by race/ethnicity and gender, National Health Interview Surveys (NHIS) 1978–1980 combined, Adult Use of Tobacco Survey (AUTS) 1986, and NHIS 1987

Survey	Sample Size*	Benson & Hedges		Camel		Kent		Kool		Marlboro	
		%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI
NHIS 1978–1980											
African Americans											
Total	1,540	6.0	1.6	1.3	0.7	1.6	0.6	28.0	4.0	3.8	1.3
Men	750	4.0	1.7	2.3	1.2	1.1	0.8	31.3	4.7	4.2	1.7
Women	790	8.1	2.4	0.3	0.4	2.2	0.8	24.4	4.5	3.3	1.6
Whites											
Total	13,228	4.2	0.6	4.4	0.5	4.8	0.5	6.3	0.6	17.5	1.1
Men	6,675	2.7	0.5	6.9	0.7	4.0	0.6	6.8	0.8	20.3	1.5
Women	6,553	5.8	0.8	1.7	0.4	5.7	0.6	5.8	0.7	14.4	1.2
AUTS 1986											
African Americans											
Total	388	9.2	3.5	0.9	1.2	0.6	0.6	19.9	4.9	6.7	3.1
Men	176	4.6	3.8	1.2	2.0	0.5	0.5	19.6	7.2	10.2	5.5
Women	212	13.8	5.7	0.5	1.2	0.7	0.7	20.3	6.7	3.2	2.9
Whites											
Total	3,693	4.1	0.8	4.9	0.9	2.7	2.7	4.2	0.8	28.3	1.8
Men	1,883	2.9	0.9	7.9	1.5	2.3	2.3	4.7	1.2	32.4	2.6
Women	1,810	5.5	1.3	1.5	0.7	3.2	3.2	3.5	1.0	23.7	2.4
NHIS 1987											
African Americans											
Total	428	6.3	2.7	2.6	2.0	2.5	2.3	24.8	5.4	2.7	1.5
Men	174	2.2	1.8	3.4	3.3	2.1	2.8	30.3	8.6	3.1	2.2
Women	254	11.2	5.1	1.7	2.2	3.0	3.7	18.4	5.5	2.3	1.9
Whites											
Total	1,860	5.8	1.2	3.8	1.1	3.1	0.9	3.7	1.0	31.1	2.6
Men	934	3.8	1.4	5.7	1.6	2.1	1.0	3.6	1.3	38.8	3.5
Women	926	8.1	2.1	1.6	1.7	4.3	1.6	3.7	1.4	22.0	3.1

*Unweighted sample size.

†In the NHIS, "other" includes other brands, no particular brand, and roll-your-own cigarettes; in the AUTS, "other" includes other brands.

percent said that they could inhale menthol cigarettes more deeply. Among a small sample (n = 39) of whites who smoked menthol cigarettes, 74 percent said that menthol cigarettes tasted better than nonmenthol cigarettes, 51 percent said that menthol cigarettes were more soothing to the throat, 39 percent said that they had always smoked menthol cigarettes, and 21 percent found inhalation to be easier with menthol cigarettes.

Evaluating changes in young smokers' brand preferences is especially important because it can help identify factors that influence their choices and may suggest ways to discourage them from starting

Merit		Newport		Pall Mall		Salem		Vantage		Virginia Slims		Winston		Other[†]	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
1.4	0.6	5.2	2.3	6.9	1.5	15.9	2.0	0.9	0.5	2.6	0.9	11.9	2.1	14.5	2.0
1.3	0.9	5.6	2.7	9.6	2.5	12.7	2.8	0.7	0.2	0.2	0.3	13.4	3.3	13.6	2.5
1.4	0.9	4.7	2.8	4.0	1.3	19.4	2.7	1.1	0.8	5.2	1.9	10.3	2.1	15.6	3.2
4.3	0.4	1.2	0.4	5.4	0.4	9.0	0.7	3.5	0.4	2.2	0.3	13.3	0.9	23.9	1.1
4.0	0.6	1.2	0.4	6.4	0.6	7.9	0.8	3.5	0.6	0.2	0.1	15.5	1.2	20.6	1.4
4.7	0.6	1.2	0.4	4.2	0.5	10.3	1.0	3.5	0.5	4.4	0.5	10.8	1.0	27.5	1.4
0.1	0.4	23.4	5.2	2.3	1.8	17.4	4.6	0.4	0.8	3.4	2.2	6.5	3.0	9.4	3.6
0.0	0.0	26.2	8.0	2.8	3.0	15.2	6.5	0.5	1.3	0.3	1.0	8.8	5.1	10.2	5.5
0.1	0.5	20.5	6.7	1.8	2.2	19.7	6.6	0.4	1.0	6.4	4.0	4.2	3.3	8.5	4.6
4.9	0.9	2.4	0.6	3.5	0.7	8.2	1.1	3.6	0.7	3.0	0.7	11.0	1.2	19.2	1.6
4.6	1.2	2.7	0.9	3.9	1.1	6.4	1.4	3.5	1.0	0.4	0.4	13.0	1.9	15.4	2.0
5.3	1.3	2.1	0.8	2.9	0.9	10.4	1.7	3.8	1.1	6.0	1.3	8.8	1.6	23.6	2.4
1.3	1.1	19.6	5.7	2.2	1.2	12.7	3.8	0.5	0.5	1.9	1.2	11.7	4.0	11.2	3.5
0.8	1.2	21.9	9.1	2.1	1.6	11.9	5.4	0.0	0.0	0.5	0.8	12.9	6.3	8.8	4.4
1.9	2.0	16.9	5.3	2.3	1.7	13.5	4.7	1.0	1.2	3.4	2.4	10.3	4.8	14.1	5.0
4.5	1.0	2.8	0.9	2.5	0.8	7.0	1.4	2.6	0.8	3.8	0.9	12.3	1.9	17.0	1.9
4.1	1.4	2.5	1.2	3.2	1.2	5.4	1.9	2.8	1.0	0.1	0.2	13.6	2.7	14.3	2.5
4.9	1.3	3.2	1.3	1.5	0.8	8.9	2.1	2.4	1.1	8.2	2.0	10.7	2.6	20.5	2.8

[‡]95% confidence interval.

Sources: National Center for Health Statistics, public use data tapes, 1978–1980 and 1987; Centers for Disease Control, public use data tapes, 1986.

to smoke (Hunter et al. 1986; Pierce et al. 1991a). Data from the 1989 TAPS show that among adolescents who usually bought their own cigarettes (61.9 percent), Marlboro was the most popular brand among whites (71.4 percent) and Hispanics (60.9 percent), and the mentholated brands of Newport (61.3 percent), Kool (10.9 percent), and Salem (9.7 percent) were preferred by African Americans (Table 33) (CDC 1992d). In the 1993 TAPS, the most popular brands were still Marlboro among whites (63.5 percent) and Hispanics (45.4 percent) and Newport among African Americans (70.4 percent) (Table 33).

Table 33. Percentage of self-reported cigarette brand use among adolescent current cigarette smokers,* by race/ethnicity, Teenage Attitudes and Practices Surveys (TAPSs), 1989 and 1993

Survey	Sample Size†	Benson & Hedges		Camel		Kool		Marlboro		Merit		Newport	
		%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
TAPS 1989													
Race													
African American	41	3.3	6.4	3.1	6.2	10.9	9.1	8.7	9.7	0.0	0.0	61.3	15.7
White	807	1.3	1.2	8.4	2.2	0.6	0.5	71.4	3.4	0.5	0.5	5.6	1.6
Ethnicity													
Hispanic	46	3.7	4.9	7.6	8.6	5.8	6.1	60.9	15.0	0.0	0.0	12.8	9.5
Non-Hispanic	817	1.3	1.2	8.1	2.1	0.8	0.6	69.1	3.5	0.5	0.5	8.0	1.9
TAPS-II 1993													
Race													
African American	41	1.7	3.3	0.0	0.0	11.9	10.9	8.5	8.5	§	§	70.4	14.1
White	646	0.2	0.4	14.4	3.1	0.5	0.8	63.5	4.3	NA	NA	8.7	2.4
Ethnicity													
Hispanic	50	0.0	0.0	10.1	7.7	4.5	8.6	45.4	14.9	NA	NA	34.0	15.1
Non-Hispanic	647	0.3	0.4	13.6	3.1	0.9	0.8	60.9	4.3	NA	NA	11.0	2.5

Survey	Sample Size†	Salem		Vantage		Virginia Slims		Winston		Other	
		%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
TAPS 1989											
Race											
African American	41	9.7	7.2	0.0	0.0	NA	NA	0.0	0.0	2.9	5.8
White	807	1.0	0.7	0.1	0.2	NA	NA	3.4	1.3	7.6	2.0
Ethnicity											
Hispanic	46	2.8	5.4	0.0	0.0	NA	NA	0.0	0.0	6.5	7.6
Non-Hispanic	817	1.5	0.8	0.1	0.2	NA	NA	3.3	1.3	7.3	1.9
TAPS-II 1993											
Race											
African American	41	1.4	2.7	NA	NA	0.5	1.0	0.0	0.0	5.5	6.0
White	646	1.0	0.8	NA	NA	1.0	1.0	1.2	0.1	9.4	2.8
Ethnicity											
Hispanic	50	0.0	0.0	NA	NA	0.0	0.0	6.0	8.1	0.0	0.0
Non-Hispanic	647	1.1	0.8	NA	NA	1.1	1.0	0.8	0.7	10.4	2.9

*Current smokers are adolescents aged 12–18 years who reported smoking cigarettes on 1 or more of the 30 days preceding the survey.
†Unweighted sample size.
‡95% confidence interval.
§Numbers are too small for meaningful analysis; this brand is included in the "other" category.
NA = data not available.
Sources: National Center for Health Statistics, public use data tapes, 1989; Centers for Disease Control and Prevention, public use data tapes, 1993.

A notable change in brand preferences occurred between 1989 and 1993, however. The percentage of adolescents purchasing Marlboro cigarettes decreased 13 percent, whereas the percentage of those purchasing Camel cigarettes increased 64 percent and the percentage of those purchasing Newport cigarettes increased 55 percent (CDC 1994a). The declining preference for Marlboro cigarettes was greatest among Hispanics (CDC 1992d). Increases in brand preference were greatest among white adolescents who preferred Camel cigarettes and among Hispanic adolescents who preferred Newport cigarettes. In 1993, the brands of cigarettes most commonly smoked among a small sample of Vietnamese middle and high school students in Worcester, Massachusetts, were Marlboro (71.0 percent) and Camel (9.7 percent) (Wiecha 1996).

Data from the 1989 and 1993 TAPSs indicate that brand preference is more concentrated among adolescents than among adults. In both surveys, the three most popular brands for each racial/ethnic group were purchased by at least 80 percent of adolescent smokers. Both surveys identified very small numbers of smokers among African American adolescents (41 in 1989 and 45 in 1993) and Hispanic adolescents (46 in 1989 and 50 in 1993); thus, brand preference estimates for these groups are imprecise.

Effects of Education and Race/Ethnicity on Cigarette-Smoking Behavior

In this chapter, smoking prevalence has been shown to vary by racial/ethnic minority group and by educational attainment. Because educational attainment varies among racial/ethnic groups and is related to smoking prevalence, the question arises as to whether racial/ethnic differences in smoking can be explained by differences in educational attainment.

A previous analysis of the 1985 NHIS data showed that controlling for selected measures of socioeconomic status, such as employment status and poverty level, reduced differences in the smoking prevalence between African Americans and whites (Novotny et al. 1988).

Although education, together with such variables as income and occupation, is often used to create a composite measure of socioeconomic status, many researchers have used education as a single proxy indicator of socioeconomic status because education is often associated with many lifestyle characteristics (Liberatos et al. 1988). In addition, education data are usually more accurate and easier to collect than income and occupation data (Liberatos et al. 1988).

Findings in this report indicate that the prevalences of cigarette smoking, smoking cessation, and heavy smoking are all associated with race/ethnicity and educational attainment. Because racial/ethnic group and educational attainment are often interrelated, multivariable models were used in this analysis to distinguish how each variable influences smoking behavior. Data were derived from the NHISs for 1987, 1988, 1990, and 1991 (Table 34) (NCHS, public use data tapes, 1987, 1988, 1990, and 1991). The multivariable logistic regression technique was used to assess the odds ratios of smoking behaviors for African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics compared with whites, before and after adjusting for the effects of educational attainment.[1] Four separate logistic regression models were constructed for different measures of smoking behavior: current smoking, ever smoking, heavy smoking (among current smokers), and smoking cessation (among ever smokers). Four design variables were created to represent the racial/ethnic groups (African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics), with whites serving as the reference group. Similarly, two design

[1] Let β_{i0} = logistic regression coefficient for the *i*th ethnicity group *before* education was included, and β_{i1} = logistic regression coefficient for the *i*th ethnicity group *after* education was included. Then $\beta_{i0} - \beta_{i1}$ measures education's confounding effect on the relationship between smoking and ethnicity. The variance of $\beta_{i0} - \beta_{i1}$ can be approximated as $var(\beta_{i0}) + var(\beta_{i1})$; and the standard error, $SE(\beta_{i0} - \beta_{i1})$, is the square root of the variance. In terms of the more commonly used measure, odds ratio (OR), the following relationship exists: $OR_{i0}/OR_{i1} = exp(\beta_{i0} - \beta_{i1})$. The 95 percent confidence interval for OR_{i0}/OR_{i1} can then be computed as $exp[(\beta_{i0} - \beta_{i1}) \pm 1.96 \times SE(\beta_{i0} - \beta_{i1})]$. Education's confounding effect on the relationship between smoking and ethnicity is determined to be statistically significant if the 95 percent confidence interval for OR_{i0}/OR_{i1} does not include 1.0.

Table 34. Relationship between smoking status and race/ethnicity among adults,* before and after controlling for education,† National Health Interview Surveys, United States, 1987, 1988, 1990, and 1991 aggregate data

		Not controlling for education		Controlling for education		Effect of education‡	
Smoking status	**Race/ethnicity**	**OR_0‡**	**CI§**	**OR_1**	**CI**	**OR_0/OR_1**	**CI**
Current$^{\Delta}$	African Americans	1.11	1.06, 1.16	0.96	0.91, 1.00	1.16	1.08, 1.24
	Hispanics	0.74	0.70, 0.79	0.58	0.54, 0.62	1.29	1.18, 1.42
	Asian Americans and Pacific Islanders	0.51	0.45, 0.58	0.54	0.47, 0.62	0.94	0.78, 1.14
	American Indians and Alaska Natives	1.46	1.16, 1.85	1.20	0.95, 1.51	1.22	0.88, 1.70
	Whites	1.0	referent	1.0	referent	1.0	referent
Former¶	African Americans	0.65	0.61, 0.70	0.74	0.69, 0.78	0.89	0.81, 0.97
	Hispanics	0.97	0.90, 1.05	1.16	1.07, 1.26	0.84	0.75, 0.94
	Asian Americans and Pacific Islanders	0.95	0.80, 1.13	0.88	0.74, 1.05	1.08	0.85, 1.38
	American Indians and Alaska Natives	0.66	0.47, 0.92	0.74	0.53, 1.02	0.89	0.56, 1.41
	Whites	1.0	referent	1.0	referent	1.0	referent
Heavy**	African Americans	0.19	0.16, 0.21	0.18	0.16, 0.20	1.04	0.87, 1.25
	Hispanics	0.25	0.21, 0.30	0.23	0.20, 0.28	1.08	0.84, 1.38
	Asian Americans and Pacific Islanders	0.17	0.11, 0.26	0.17	0.11, 0.27	0.97	0.52, 1.83
	American Indians and Alaska Natives	0.74	0.58, 0.95	0.70	0.55, 0.90	1.05	0.74, 1.49
	Whites	1.0	referent	1.0	referent	1.0	referent
Ever††	African Americans	0.82	0.79, 0.86	0.76	0.72, 0.79	1.09	1.02, 1.16
	Hispanics	0.63	0.60, 0.67	0.55	0.52, 0.58	1.15	1.06, 1.24
	Asian Americans and Pacific Islanders	0.39	0.35, 0.43	0.40	0.36, 0.44	0.97	0.83, 1.13
	American Indians and Alaska Natives	1.21	1.05, 1.40	1.09	0.93, 1.27	1.11	0.90, 1.38
	Whites	1.0	referent	1.0	referent	1.0	referent

*Includes persons aged 25 years and older.

†Education was evaluated at three levels: less than high school education, high school education, and at least some college.

‡OR_0 = odds ratio not controlling for education; OR_1 = odds ratio controlling for education. Odds ratios were calculated as follows: $OR_{i0}/OR_{i1} = \exp(\beta_{i0} - \beta_{i1})$, where β_{i0} is the logistic regression coefficient for the *i*th ethnic group before controlling for education, and β_{i1} is the coefficient after controlling for education. Other variables in the logistic models include age, gender, marital status, geographic region, and year of survey.

§95% confidence interval.

$^{\Delta}$Current cigarette smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. The association presented is for current smoking compared with former and never smoking.

¶Former smokers are those who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not smoking cigarettes. The association presented is for former smoking compared with current smoking.

**Heavy smokers include current smokers who reported at the time of survey that they were smoking 25 or more cigarettes per day. The association presented is for heavy smoking compared with current smoking of 1–24 cigarettes per day.

††Ever smokers are those who reported at the time of survey that they had smoked at least 100 cigarettes in their lives, regardless of their current smoking status. The association presented is for ever smoking compared with never smoking.

Sources: National Center for Health Statistics, public use data tapes, 1987, 1988, 1990, and 1991; Escobedo et al. 1995.

variables were created to represent persons with and without a high school education, with persons having at least some college education serving as the reference group. In addition to including race/ethnicity and education, the logistic regression models included the year of the survey, age, gender, marital status, and geographic region.

Education was first omitted from and then entered in these models. The difference in estimated coefficients before and after the inclusion of education was computed for each of the four design variables representing the different racial/ethnic groups. The variance of this difference was estimated to be the sum of the variances of the two coefficients. The 95 percent confidence interval of the difference was computed by using this variance estimate. The difference in coefficients was translated into the ratio of the odds ratios before and after adjusting for education (Table 34) (Escobedo et al. 1995).

Current Smoking

Before adjustment for education, the data indicated that African Americans as well as American Indians and Alaska Natives were more likely than whites to be current smokers (Table 34). Hispanics as well as Asian Americans and Pacific Islanders were substantially less likely than whites to be current smokers. After adjustment for the confounding effects of education, the odds ratios for current smoking among African Americans and Hispanics decreased significantly (Table 34).

Thus, when the data were adjusted for education, current smoking among African Americans did not differ from whites—an indication that the differences in the unadjusted rates were probably attributable to factors related to differences in educational attainment. For Hispanics, current smoking was lower than for whites, and adjustment for the confounding effects of education further accentuated these differences.

Smoking Cessation

African Americans as well as American Indians and Alaska Natives who had ever smoked were substantially less likely than whites to have quit smoking (Table 34). When education was included in these models, the odds ratio for smoking cessation increased, suggesting that lack of education accounts for some but not all of the low rates of quitting in these two groups. Before adjustment for education, the data showed that Hispanics were as likely as whites to quit smoking. However, after adjustment for education, the data showed that Hispanics were more likely than whites to quit smoking. Thus, the unadjusted smoking cessation rate was lower among both African Americans and Hispanics than among whites partially because of confounding by educational attainment. A similar magnitude of change was observed among American Indians and Alaska Natives, but this difference was not statistically significant. Educational attainment does not explain why African Americans are less likely than whites to quit smoking.

Heavy Smoking

Members of all four racial/ethnic groups were less likely than whites to be heavy smokers, before and after the data were adjusted for the effects of education (Table 34). These differences were greatest between whites and Asian Americans and Pacific Islanders and were smallest between whites and American Indians and Alaska Natives. Because the odds ratio of heavy smoking changed little after adjustment for education, the differences in heavy smoking between racial/ethnic groups appear to be independent of factors associated with educational attainment.

Ever Smoking

Before the data were adjusted for the effects of education, all racial/ethnic groups except American Indians and Alaska Natives were substantially less likely than whites to have ever smoked (Table 34). After adjustment for education, the odds ratios for ever smoking among African Americans and Hispanics declined even further, and these declines were statistically significant. This finding suggests that if African Americans and Hispanics had socioeconomic status more comparable with that of whites, they would be even less likely ever to smoke than whites.

Differences in current smoking, quitting, and ever smoking between whites and Asian Americans and Pacific Islanders also were found. Asian Americans and Pacific Islanders were less likely than whites to be current smokers, substantially less likely to be ever smokers, but also slightly less likely to have quit smoking. After adjustment for education, the odds ratios associated with these smoking behaviors changed little (Table 34). Thus, the lower smoking prevalences among Asian Americans and Pacific Islanders may be related to factors other than education—presumably cultural factors associated with being an Asian American or a Pacific Islander in the United States.

Occasional Smoking

In addition to smoking more cigarettes each day, whites who currently smoke are generally more likely than members of other racial/ethnic groups to smoke on a daily basis. According to the 1993, 1994, and 1995 combined NHISs, 15.2 percent of whites who smoked were occasional (i.e., nondaily) smokers, compared with 26.0 percent of African Americans, 22.2 percent of American Indians and Alaska Natives, 33.1 percent of Asian Americans and Pacific Islanders, and 35.5 percent of Hispanics. Only the estimate for American Indians and Alaska Natives did not differ significantly from that for whites (data not shown) (NCHS, public use data tapes, 1993, 1994, 1995). Husten and colleagues (1998) used data from the 1991 NHIS to study persons who had ever smoked 100 lifetime cigarettes but who had never smoked on a daily basis. Among the ever smokers, African Americans (12.0 percent), American Indians and Alaska Natives (15.0 percent), Asian Americans and Pacific Islanders (12.1 percent), and Hispanics (16.8 percent) were all significantly more likely than whites (6.2 percent) never to have smoked daily. In gender-specific multivariate analyses that controlled for income, age, and education, African Americans, Hispanics, and others (American Indians and Alaska Natives combined with Asian Americans and Pacific Islanders) were significantly more likely never to have smoked daily.

Exposure to Environmental Tobacco Smoke

Data on exposure to environmental tobacco smoke (ETS) among members of U.S. racial/ethnic minority groups are extremely limited. In the 1991–1993 NHIS, nearly one-third of all respondents indicated exposure to ETS at home three or more days per week (Table 35) (NCHS, public use data tapes, 1991–1993). African Americans (37.6 percent) and American Indians and Alaska Natives (36.9 percent) were more likely than other groups to report such levels of exposure to ETS at home. These findings are consistent with smoking prevalence data presented earlier in this chapter. Similar patterns exist among nonsmokers, although the occurrence of higher levels of exposure (three or more days) is reduced by 40 to 60 percent among nonsmokers compared with the total population. Among Asian American, Pacific Islander, American Indian, and Alaska Native nonsmokers, women had substantially more prolonged exposure than men.

Using 1988–1991 NHANES III data on persons aged 17 years and older who did not use tobacco, Pirkle and colleagues (1996) found that 36.9 percent of African Americans, 35.1 percent of Mexican Americans, and 37.4 percent of whites reported that they were exposed to ETS either at home or at work. Wagenknecht and colleagues (1993) analyzed data collected in 1985 and 1986 from 3,300 persons aged 18–30 years who were recruited in four urban centers (Birmingham, Chicago, Minneapolis, and Oakland). African Americans were more likely than whites to report home exposure to ETS and to report that they spent time mostly with smokers. Using 1988 NHIS data on the number of smokers in the home, Overpeck and Moss (1991) estimated that 42.4 percent of U.S. children aged five years and younger were living in a household with a smoker. In 1988, African American children were more likely to be living with a smoker (51.3 percent) than were white children (41.6 percent), and non-Hispanic children (43.2 percent) were more likely to be doing so than were Hispanic children (35.8 percent).

In recent years, small-scale studies have reported on potential exposure to ETS among young people in U.S. racial/ethnic groups. For example, in two rural Alaska villages, an analysis of saliva samples from children in the Alaska Native Head Start program showed that 44 percent of the children (3–6 years of age) had cotinine concentrations indicative of exposure to ETS (Etzel et al. 1992). Recent research has compared levels of cotinine (a metabolite of nicotine) in biological fluids and hair of children, young adults, and adults (Pattishall et al. 1985; Wagenknecht et al. 1993; Crawford et al. 1994; Knight et al. 1996; Pirkle et al. 1996). Most of these investigations (Pattishall et al. 1985; Crawford et al. 1994; Knight et al. 1996; Pirkle et al. 1996) reported that African Americans who did not use tobacco had higher cotinine levels than whites, even after ETS exposure and other factors were taken into account. Further factors, including possible racial differences in nicotine absorption and metabolism (Pattishall et al. 1985; Benowitz et al. 1995; Clark et al. 1996; Knight et al. 1996) and measurement issues, need to be considered (see Racial/Ethnic Differences in Nicotine Metabolites in Chapter 3 for further discussion of this topic).

Table 35. Percentage of all adults and nonsmokers who reported levels of exposure to environmental tobacco smoke in the home, by race/ethnicity and gender, National Health Interview Surveys, United States, 1991–1993 aggregate data

Home exposure*	African Americans %	African Americans ±CI†	Asian Americans/ Pacific Islanders %	Asian Americans/ Pacific Islanders ±CI	American Indians/ Alaska Natives %	American Indians/ Alaska Natives ±CI	Hispanics %	Hispanics ±CI	Whites %	Whites ±CI	Total (%)‡
All adults											
0–2 days											
Total	60.8	1.3	78.5	2.8	60.9	4.5	74.4	1.7	66.9	0.6	67.1
Men	57.3	2.0	76.7	3.7	67.3	6.4	72.6	2.3	66.1	0.7	66.1
Women	63.5	1.5	80.4	3.9	54.9	5.6	76.0	2.1	67.5	0.7	68.0
>3 days											
Total	37.6	0.7	20.5	2.9	36.9	4.4	24.5	1.6	31.9	0.6	31.7
Men	41.1	2.0	21.9	3.7	30.8	6.1	26.3	2.2	32.7	0.7	32.7
Women	34.8	1.5	19.0	3.8	42.7	5.9	22.7	2.1	31.3	0.7	30.8
Nonsmokers											
0–2 days											
Total	80.4	1.3	87.6	2.5	84.6	4.5	86.6	1.4	85.7	0.5	85.3
Men	80.1	2.1	92.0	2.8	90.0	4.9	87.2	2.0	85.2	0.7	85.1
Women	80.6	1.5	84.0	3.7	78.8	7.0	86.1	1.9	86.2	0.6	85.4
>3 days											
Total	18.3	1.2	11.7	2.5	13.5	4.3	12.6	1.4	13.5	0.5	13.9
Men	18.6	2.0	7.0	2.7	9.5	4.8	12.0	1.9	14.0	0.7	14.0
Women	15.1	1.5	15.5	3.6	17.8	6.4	13.0	2.0	13.1	0.6	13.8

*Home exposure was the average number of days per week that anyone was inside the home, as reported by respondents answering "yes" to the question, "Does anyone smoke cigarettes, cigars, or pipes anywhere inside this home?" However, these percentages include persons who indicated no exposure. Percentages exclude "don't know" and "not ascertained" responses regarding the number of days; therefore, the sum may not total 100%.

†95% confidence interval.

‡Total includes persons of other, unknown, or multiple ethnicities and unknown Hispanic origin.

Source: National Center for Health Statistics, public use data tapes, 1991–1993.

Comparisons Between Racial/Ethnic Minority Groups in Current Tobacco Use

Cigarette Smoking

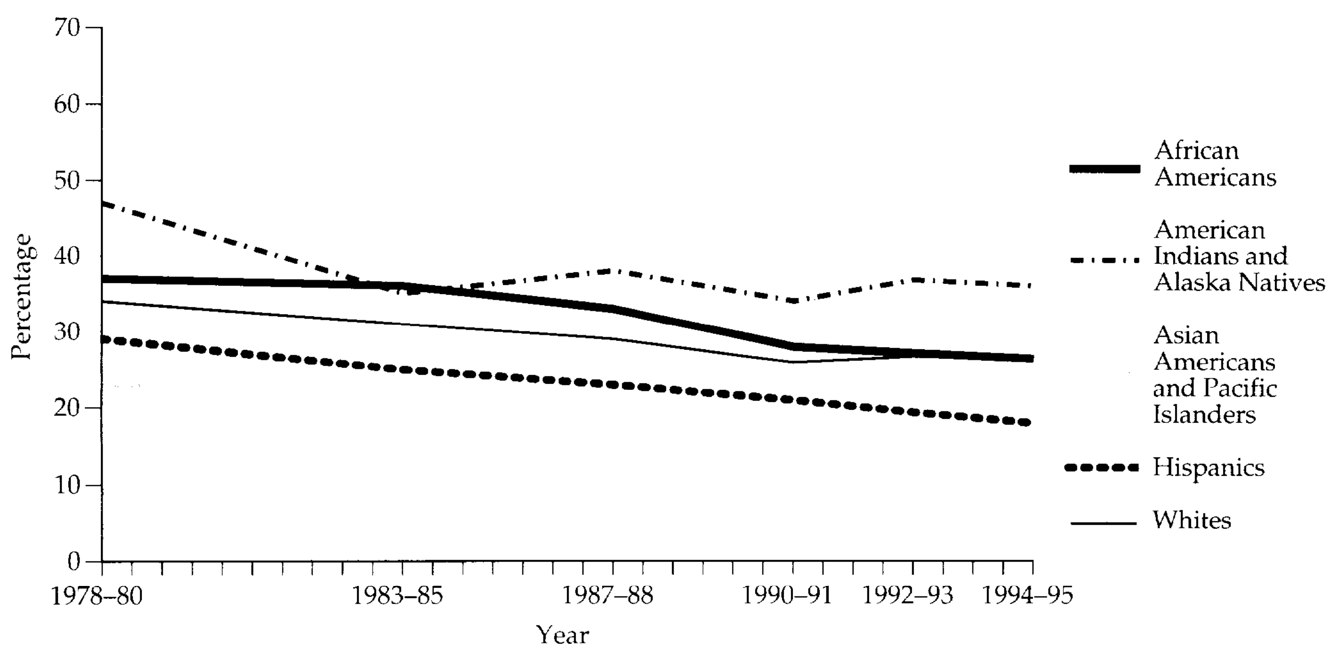
The most recent data from the 1994 and 1995 combined NHISs show that the age-adjusted prevalence of current cigarette smoking was highest among American Indians and Alaska Natives (36.0 percent), intermediate among African Americans (26.5 percent) and whites (26.4 percent), and lowest among Hispanics (18.0 percent) and Asian Americans and Pacific Islanders (14.2 percent) (Table 36) (NCHS, public use data tapes, 1994–1995). Among all racial/ethnic groups except American Indians and Alaska Natives, men had significantly higher rates of cigarette smoking than women. Using data from the NCI Supplement of the 1992–1993 CPS, Shopland and colleagues (1996) reported patterns similar to those seen in the NHIS for African Americans, Asian Americans and Pacific Islanders, Hispanics, and whites (data on American Indians and Alaska Natives were not included in their report). From 1978 through 1995, the age-adjusted prevalence of smoking declined for African Americans, Asian Americans and Pacific Islanders, and Hispanics—overall and for both men and women (Figures 13–15) (NCHS, public use data tapes, 1978–1995). A different picture emerges for American Indians and Alaska Natives. Although a fairly substantial decline in prevalence was observed, particularly among men, for American Indians and Alaska Natives from 1978–1980 to 1983–1985, prevalence did not change overall or for men from 1983–1985 to 1994–1995 or for women from 1978–1980 to 1994–1995.

Table 36. Age-adjusted prevalence of current cigarette smoking* among adults, overall and by race/ethnicity and gender, National Health Interview Surveys, United States, 1994 and 1995 aggregate data

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	%	±CI†	%	±CI	%	±CI	%	±CI	%	±CI
Total	26.5	1.7	36.0	6.0	14.2	2.7	18.0	1.5	26.4	0.7
Men	31.4	2.6	39.3	9.5	23.8	5.1	21.7	2.3	28.1	1.0
Women	22.2	1.8	32.9	8.0	5.4	2.1	14.6	1.8	25.0	0.9

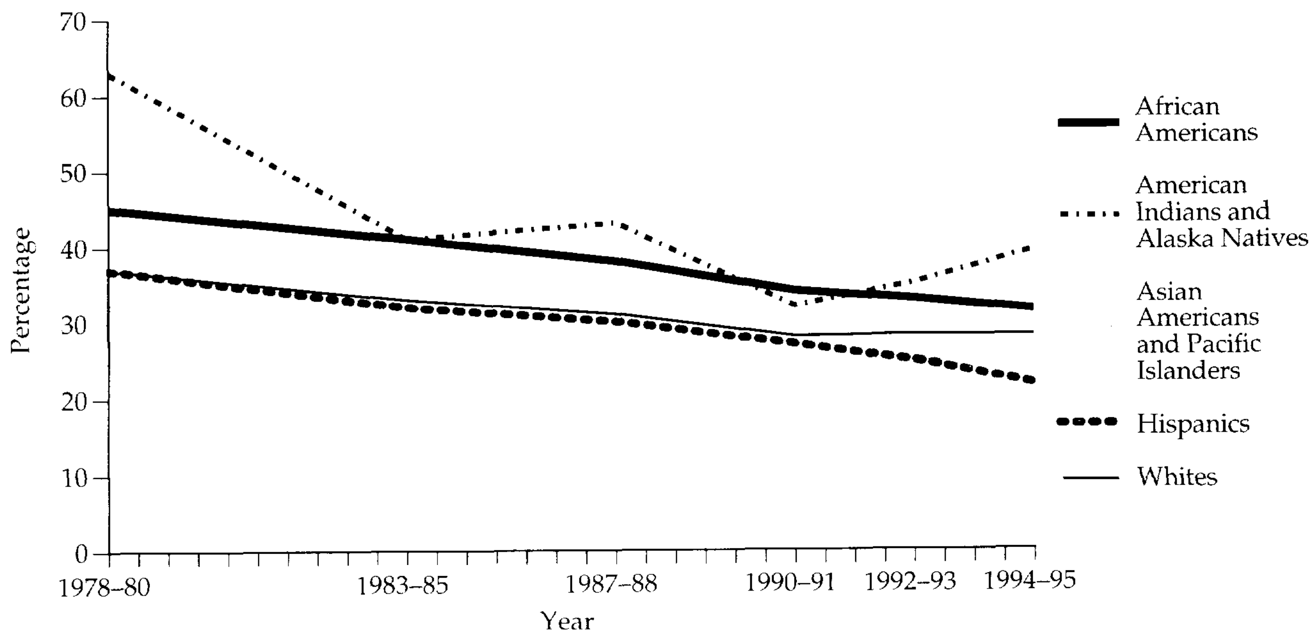
*Current cigarette smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days. Data were age-adjusted to the 1990 U.S. census population.
†95% confidence interval.
Source: National Center for Health Statistics, public use data tapes, 1994–1995.

Figure 13. Trends in the age-adjusted prevalence of current cigarette smoking among African American, American Indian and Alaska Native, Asian American and Pacific Islander, Hispanic, and white adults, National Health Interview Surveys, United States, 1978–1995 aggregate data



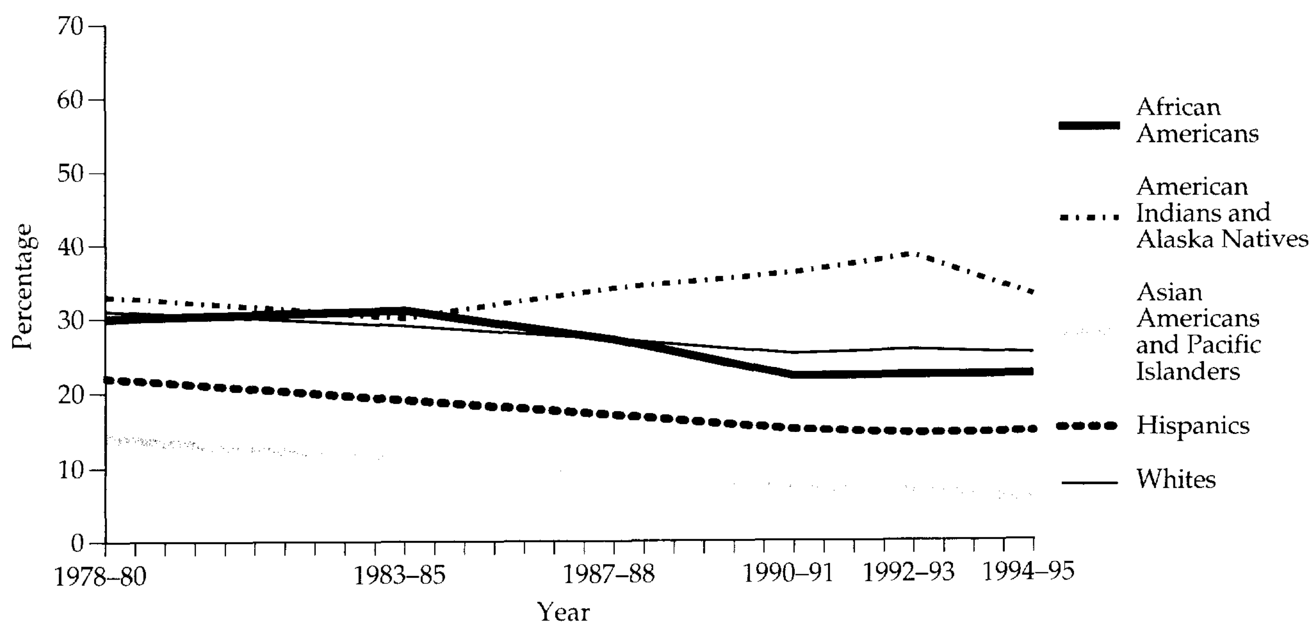
Note: Data were age-adjusted to the 1990 U.S. census population.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Figure 14. Trends in the age-adjusted prevalence of current cigarette smoking among African American, American Indian and Alaska Native, Asian American and Pacific Islander, Hispanic, and white men, National Health Interview Surveys, United States, 1978–1995 aggregate data



Note: Data were age-adjusted to the 1990 U.S. census population.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Figure 15. Trends in the age-adjusted prevalence of current cigarette smoking among African American, American Indian and Alaska Native, Asian American and Pacific Islander, Hispanic, and white women, National Health Interview Surveys, United States, 1978–1995 aggregate data



Note: Data were age-adjusted to the 1990 U.S. census population.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Table 37. Cigarette smoking status*† and number of cigarettes smoked per day‡ among adults, overall and by race/ethnicity and gender, National Health Interview Surveys, United States, 1987, 1988, 1990, and 1991 aggregate data

Characteristic	African Americans	American Indians/ Alaska Natives	Asian Americans/ Pacific Islanders
Total			
Never smokers	54.6	41.1	70.6
Former smokers	15.4	21.9	13.4
Current smokers	30.1	37.1	16.0
Cigarettes smoked per day			
<15 cigarettes	59.6	39.7	58.1
15–24 cigarettes	32.4	40.4	35.3
≥25 cigarettes	8.0	19.9	6.5
Men			
Never smokers	44.6	36.1	56.8
Former smokers	19.6	26.0	19.6
Current smokers	35.9	38.0	23.6
Cigarettes smoked per day			
<15 cigarettes	54.1	27.5	56.1
15–24 cigarettes	36.3	49.7	37.8
≥25 cigarettes	9.6	22.8	6.1
Women			
Never smokers	62.6	46.0	85.3
Former smokers	12.0	17.9	6.9
Current smokers	25.4	36.2	7.8
Cigarettes smoked per day			
<15 cigarettes	65.8	52.3	64.6
15–24 cigarettes	27.9	30.9	27.6
≥25 cigarettes	6.3	16.8	7.9

Note: For racial/ethnic-specific data on cigars, pipes, chewing tobacco, snuff, or any form of tobacco, see Table 38.
*Never smokers are those who reported that they had never smoked at least 100 cigarettes; former smokers are those who reported smoking at least 100 cigarettes in their lives but who reported at the time of survey that they did not currently smoke; and current smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked.
†95% confidence intervals for cigarette smoking status do not exceed ±0.6% for whites, ±1.4% for African Americans, ±3.1% for Asian Americans and Pacific Islanders, ±6.6% for American Indians and Alaska Natives, ±0.5% for all non-Hispanics, ±1.7% for all Hispanics, ±2.3% for Mexican Americans, ±5.2% for Puerto Ricans, ±6.5% for Cuban Americans, ±3.3% for other Hispanics, and ±0.5% for the total population.

Analyses of aggregated NHIS data from the 1987, 1988, 1990, and 1991 surveys indicate differing patterns in the prevalence of current smoking, never smoking, former smoking, and cigarette consumption among members of the four racial/ethnic groups (Table 37) (NCHS, public use data tapes, 1987, 1988, 1990, and 1991). The prevalence of current cigarette smoking was highest among American Indians and Alaska Natives (37.1 percent) and lowest among Asian Americans and Pacific Islanders (16.0 percent). The prevalence of never smoking cigarettes was highest among Asian Americans and Pacific Islanders (70.6 percent) and lowest among American Indians and Alaska Natives (41.1 percent). Rates of former cigarette smoking were highest among whites (26.0 percent) and lowest among Asian Americans and Pacific Islanders (13.4 percent). Overall, men were more likely than women to be current or former smokers, whereas women were more

Hispanics						
All Hispanics	Cuban Americans	Puerto Ricans	Mexican Americans	Other Hispanics	Whites	Total§
60.3	61.9	58.7	61.0	59.3	46.7	49.2
17.2	17.5	16.3	16.8	18.4	26.0	23.8
22.5	20.7	25.0	22.2	22.4	27.3	27.0
61.4	43.3	52.2	68.4	57.9	26.8	33.4
30.0	40.1	36.7	25.7	44.8	32.0	42.3
8.6	16.6	11.1	5.9	10.1	28.3	24.3
49.8	49.6	52.4	48.9	50.6	38.9	40.7
21.6	24.1	19.4	22.1	20.8	32.1	29.6
28.6	26.3	28.3	29.0	28.6	29.1	29.6
58.8	38.5	52.1	65.9	52.4	21.7	29.1
30.9	39.9	31.7	27.2	35.7	42.9	41.2
10.3	21.6	16.2	6.9	11.9	35.4	29.7
69.5	71.1	63.3	72.7	66.5	53.9	56.8
13.4	12.5	14.0	11.7	16.3	20.4	18.6
17.0	16.4	22.7	15.5	17.2	21.7	24.6
65.2	49.2	52.3	72.8	65.9	32.1	38.1
28.8	40.4	41.1	23.2	26.6	46.9	43.5
6.0	10.5	6.6	4.0	17.5	21.1	18.4

‡95% confidence intervals for the number of cigarettes smoked daily do not exceed ±0.8% for whites, ±2.2% for African Americans, ±9.7% for Asian Americans and Pacific Islanders, ±10.4% for American Indians and Alaska Natives, ±0.9% for all non-Hispanics, ±3.4% for all Hispanics, ±4.7% for Mexican Americans, ±8.6% for Puerto Ricans, ±12.4% for Cuban Americans, ±6.8% for other Hispanics, and ±0.8% for the total population.
§Includes persons of other, unknown, or multiple ethnicities and of unknown Hispanic origin.
Source: Centers for Disease Control and Prevention 1994c.

likely than men never to have smoked. Among African Americans, Asian Americans and Pacific Islanders, and all Hispanics except Cuban Americans, the majority of current smokers reported smoking fewer than 15 cigarettes per day, whereas whites, American Indians and Alaska Natives, and Cuban Americans were more likely than others to report smoking 25 or more cigarettes per day. For all groups except Puerto Ricans, women were much more likely than men to report smoking fewer than 15 cigarettes per day.

Pipe and Cigar Use

The prevalence of current pipe or cigar use has been higher among American Indians and Alaska Natives than among other racial/ethnic groups, according to aggregated data from the 1987 and 1991 NHISs (Table 38) (NCHS, public use data tapes, 1987 and 1991). Current pipe or cigar use occurred primarily among men; use was negligible among women of all racial/ethnic groups. The prevalence of cigar or pipe

Table 38. Percentage of adults who reported using cigars, pipes, chewing tobacco, snuff, or any form of tobacco, overall and by race/ethnicity and gender, National Health Interview Surveys, United States, 1987 and 1991 aggregate data*

Characteristic	African Americans	American Indians/ Alaska Natives	Asian Americans/ Pacific Islanders
Cigar smoking†			
Total	1.8	2.7	1.1
Men	3.9	5.3	2.2
Women	0.1	0.2	0.1
Pipe smoking‡			
Total	1.1	3.5	1.2
Men	2.4	6.9	2.3
Women	0.0	0.0	0.0
Cigar or pipe smoking†‡			
Total	2.5	4.9	1.7
Men	5.6	9.8	3.3
Women	0.1	0.2	0.1
Any tobacco smokingΔ			
Total	32.6	36.4	16.0
Men	40.2	37.3	24.0
Women	26.5	35.6	7.8
Use of chewing tobacco¶			
Total	2.0	3.1	0.2
Men	2.7	5.3	0.4
Women	1.5	0.8	0.0
Use of snuff**			
Total	1.4	1.8	0.5
Men	0.9	3.2	0.9
Women	1.9	0.4	0.0
Use of chewing tobacco or snuff¶**			
Total	3.0	4.5	0.6
Men	3.1	7.8	1.2
Women	2.9	1.2	0.0
Use of any tobacco product††			
Total	35.2	40.2	16.8
Men	42.4	43.9	25.6
Women	29.3	36.6	7.9

Note: For racial/ethnic-specific data on cigarette smoking, see Table 37.

*95% confidence intervals do not exceed ±0.7% for whites, ±2.1% for African Americans, ±4.0% for Asian Americans and Pacific Islanders, ±9.6% for American Indians and Alaska Natives, ±0.7% for all non-Hispanics, ±2.2% for all Hispanics, ±2.9% for Mexican Americans, ±7.0% for Puerto Ricans, ±8.0% for Cuban Americans, ±3.9% for other Hispanics, and ±0.7% for the total population.

†Includes persons who reported they had smoked at least 50 cigars in their lives and who reported at the time of survey that they currently smoked a cigar.

‡Includes persons who reported they had smoked a pipe at least 50 times in their lives and who reported at the time of survey that they currently smoked a pipe.

§Indicates a value of >0 and <0.05.

smoking among men was highest among American Indians and Alaska Natives (9.8 percent) and lowest among Puerto Ricans (1.5 percent). Unfortunately, the 1987 and 1991 NHISs did not distinguish between ceremonial and addictive daily pipe smoking, and this factor may partially account for the high prevalence of pipe smoking among American Indian and Alaska Native men.

Hispanics						
All Hispanics	Cuban Americans	Puerto Ricans	Mexican Americans	Other Hispanics	Whites	Total
1.1	1.0	0.7	0.6	1.9	2.3	2.1
2.1	2.5	1.3	1.5	3.8	4.8	4.4
0.1	0.0	0.1	0.0	0.2	0.1	0.1
0.5	1.1	0.1	0.7	0.8	1.4	1.3
1.0	2.6	0.2	1.5	1.7	2.9	2.7
0.0	0.0	0.0	0.0	0.0	0.1	0.0[§]
1.3	2.1	0.8	1.2	2.1	3.3	3.0
2.7	5.1	1.5	2.7	4.3	6.7	6.2
0.1	0.0	0.1	0.0	0.2	0.1	0.1
22.7	22.5	22.1	26.8	21.7	29.6	29.1
29.3	30.8	29.4	31.9	27.2	33.2	33.4
16.8	16.9	14.8	23.1	16.9	26.3	25.2
0.4	0.0	0.4	0.1	0.5	2.0	1.8
0.7	0.0	0.8	0.3	1.1	4.1	3.5
0.1	0.0	0.1	0.0	0.1	0.1	0.3
0.5	0.1	0.6	0.3	0.8	1.9	1.7
1.0	0.3	1.0	0.6	1.6	3.8	3.2
0.1	0.0	0.2	0.0	0.0	0.3	0.4
0.8	0.1	0.9	0.3	1.1	3.4	3.1
1.5	0.3	1.5	0.6	2.3	6.8	5.9
0.1	0.0	0.3	0.0	0.1	0.3	0.6
23.4	22.7	22.9	27.4	22.4	32.2	31.5
30.4	31.2	30.7	32.8	28.4	38.0	37.6
17.0	17.0	15.1	23.3	17.1	26.8	26.0

[Δ]Includes current users of cigarettes, cigars, or pipes.
[¶]Includes persons who reported they had used chewing tobacco at least 20 times in their lives and who reported at the time of survey that they currently chewed tobacco.
[**]Includes persons who reported they had used snuff at least 20 times in their lives and who reported at the time of survey that they currently used snuff.
[††]Includes users of cigarettes, cigars, pipes, chewing tobacco, or snuff.
Source: Centers for Disease Control and Prevention 1994c.

A 1996 survey of U.S. students aged 14–19 years found that white (28.9 percent) and Hispanic (26.2 percent) students were slightly more likely than African American students (19.3 percent) to report having smoked at least one cigar during the previous year. In each racial/ethnic group, males were significantly more likely than females to have smoked at least one cigar during the previous year. Use among females ranged from 13.4 percent in African Americans to 20.0 percent among Hispanics. The prevalence of more frequent cigar use did not differ by race/ethnicity; 3.6 percent of African Americans, 2.5 percent of Hispanics, and 2.3 percent of whites reported that they had smoked at least 50 cigars during the previous year (CDC 1997b).

Use of Smokeless Tobacco

American Indians and Alaska Natives were the most likely (4.5 percent) to use chewing tobacco or snuff, according to aggregated data from the 1987 and 1991 NHISs, whereas Asian Americans and Pacific Islanders (0.6 percent) as well as Hispanics (0.8 percent) were the least likely to use smokeless tobacco (Table 38). Among all racial/ethnic groups except African Americans, men were much more likely than women to use chewing tobacco or snuff. Among African American women, the use of smokeless tobacco has been highest among those aged 65 years and older (CDC 1994c). These findings are consistent with those in published studies (Bauman et al. 1989; Novotny et al. 1989; Rouse 1989), although they differ somewhat from the 1985 CPS estimates for males aged 16 years and older; these estimates showed rates of reported snuff use among African Americans (0.7 percent) and whites (2.2 percent) that were significantly lower than the NHIS-based rates reported here (Marcus et al. 1989).

Conclusions

1. In 1978–1995, the prevalence of cigarette smoking declined among African American, Asian American and Pacific Islander, and Hispanic adults. However, among American Indians and Alaska Natives, current smoking prevalence did not change for men from 1983 to 1995 or for women from 1978 to 1995.
2. Tobacco use varies within and among racial/ethnic groups; among adults, American Indians and Alaska Natives have the highest prevalence of tobacco use; African American and Southeast Asian men also have a high prevalence of smoking. Asian American and Hispanic women have the lowest prevalence.
3. In all racial/ethnic groups discussed in this report except American Indians and Alaska Natives, men have a higher prevalence of cigarette smoking than women.
4. In all racial/ethnic groups except African Americans, men are more likely than women to use smokeless tobacco.
5. Cigarette smoking prevalence increased in the 1990s among African American and Hispanic adolescents after several years of substantial decline among adolescents of all four racial/ethnic minority groups. This increase is particularly striking among African American youths, who had the greatest decline of the four groups during the 1970s and 1980s.
6. Since 1978, the prevalence of cigarette smoking has remained strikingly high among American Indian and Alaska Native women of reproductive age and has not declined as it has among African American, Asian American and Pacific Islander, and Hispanic women of reproductive age.
7. Declines in smoking prevalence were greater among African American, Hispanic, and white men who were high school graduates than they were among those with less formal education. Among women in these three groups, education-related declines in cigarette smoking were less pronounced.
8. Educational attainment accounts for only some of the differences in smoking behaviors (current smoking, heavy smoking, ever smoking, and smoking cessation) between whites and the racial/ethnic minority groups discussed in this report. Other biological, social, and cultural factors are likely to further account for these differences.
9. Compared with whites who smoke, smokers in each of the four racial/ethnic minority groups smoke fewer cigarettes each day. Among smokers, African Americans, Asian Americans and Pacific Islanders, and Hispanics are more likely than whites to smoke occasionally (less than daily).
10. The data in general suggest that acculturation influences smoking patterns in that individuals tend to adopt the smoking behavior of the current broader community; however, the exact effects of acculturation on smoking behavior are difficult to quantify because of limitations on most available measures of this cultural learning process.

Appendix 1. Sources of Data

Most of the data reported in this chapter were collected through a number of large-scale surveys conducted by the federal government or private researchers. When data from one period were insufficient (e.g., because of small sample size) for estimating the prevalence of a risk factor or a behavior, they were combined with similar data for several periods, provided the prevalence under consideration had not changed rapidly over the periods being aggregated. This process, used in some of the NHIS and BRFSS analyses, increased the reliability and stability of prevalence estimates (CDC 1992e).

The data reported in this chapter are limited in several ways. For example, because some racial/ethnic groups were underrepresented in the data sources, the small number of responses may not be representative of the group as a whole. Moreover, most surveys have been conducted in English only, thus limiting the validity of the responses of individuals with limited proficiency in English, particularly among Asian Americans, Pacific Islanders, and Hispanics. In addition, some surveys have used telephone surveys (excluding persons who lack telephone service) or school surveys (excluding youths who dropped out of school or who were frequently absent from class); these surveys have thus excluded a number of respondents who may be at increased risk for cigarette smoking. Despite these limitations, the patterns described in this chapter are the first and largest effort to present a comprehensive perspective on cigarette use among members of racial/ethnic minority groups in the United States.

National Health Interview Survey (NHIS)

Since 1965, the CDC's NCHS has collected data on tobacco use through the NHIS, which uses a probability sample of noninstitutionalized adult civilians in the United States (NCHS 1975, 1985a, 1989). Some NHISs have excluded adults 18 and 19 years of age; however, this report uses data from surveys that have included respondents who were aged 18 years and older (i.e., 1978, 1979, 1980, 1983, 1985, 1987, 1988, 1990, 1991, 1992, 1993, 1994, and 1995). Most interviews were conducted in the home; when respondents could not be interviewed in person, telephone interviews were conducted. The overall NHIS response rate for surveys on smoking has remained at least 85 percent (NCHS 1985a). Overall, sample sizes have ranged from 10,342 in 1980 to 86,332 in 1966. In this report, data have been adjusted for nonresponse and have been weighted to provide national estimates. Confidence intervals have been calculated by using standard errors generated by the Professional Software for Survey Data Analysis (SUDAAN) (Shah et al. 1991). Responses from various administrations of the NHIS have been aggregated to produce more stable results for Hispanics, Asian Americans and Pacific Islanders, and American Indians and Alaska Natives.

Hispanic Health and Nutrition Examination Survey (HHANES)

The NCHS conducted the HHANES from 1982 through 1984 to assess the health and nutritional status and needs of Cuban Americans, Mexican Americans, and mainland Puerto Ricans. No other equivalent source of recent data is available for Hispanics. This survey sampled Mexican Americans from Arizona, California, Colorado, New Mexico, and Texas; Cuban Americans from Dade County, Florida (Miami); and Puerto Ricans from New York, New Jersey, and Connecticut. Demographic and cigarette smoking information were collected from Hispanics aged 20–74 years. All interviews were conducted in the home or in a mobile examination center. NCHS estimates that the HHANES data represent approximately 76 percent of the 1980 Hispanic-origin population. All data in this report have been adjusted and weighted for the complex sample design, nonresponse bias, potential noncoverage bias, and regional nature of the sample (NCHS 1985b).

Behavioral Risk Factor Surveillance System (BRFSS)

The CDC's National Center for Chronic Disease Prevention and Health Promotion coordinates the state surveillance of behavioral risk factors through the BRFSS, initiated in 1981 (Gentry et al. 1985; Remington et al. 1988). Each state that participates in the BRFSS provides estimates of numerous risk behaviors for the state's population of persons aged 18 years and older.

States collect data through random digit-dialed telephone interviews. BRFSS sample sizes have ranged from 476 in Indiana in 1984 to 3,988 in California in 1992. Since 1991, at least 1,178 persons have been sampled in each state. In this report, the data have been weighted to reflect the age, race/ethnicity, and gender distribution of each participating state. Ninety-five percent confidence intervals have been calculated by using the Standard Errors Program for Computing of Standardized Rates from Sample Survey Data (SESUDAAN) (Shah 1981).

Adult Use of Tobacco Survey (AUTS)

Since 1964, the AUTS has been conducted periodically to determine rates of tobacco use as well as descriptive information on smoking patterns among representative samples of the U.S. population. Information gathered has included a history of individual use of any tobacco product as well as attitudes and beliefs about smoking-related issues. The AUTS was conducted in 1964, 1966, 1970, and 1975 by the USDHEW's National Clearinghouse for Smoking and Health, and the most recent survey was conducted in 1986 by the CDC's Office on Smoking and Health. In the 1986 AUTS, a computer-assisted telephone interview protocol (random-digit dialing) was used to survey 13,031 noninstitutionalized civilian U.S. adults ($\geq$17 years of age). Population estimates were obtained by weighting the sample according to smoking status, age, race/ethnicity, gender, education, and geographic region (USDHHS 1990b).

Monitoring the Future (MTF) Surveys

Each spring since 1975, the University of Michigan's Institute for Social Research, with grants from NIDA, has surveyed nationally representative samples of high school seniors as part of the MTF. Sample sizes have ranged from 15,850 to 18,448. The data in this report have been weighted to provide national estimates. Analyses were conducted on data collected for 1976–1994. Data from subsequent years were obtained from published reports (e.g., Johnston et al. 1996) and from the University of Michigan's Institute for Social Research. Since 1991, data have been collected for eighth- and tenth-grade students. Some data from these surveys are cited in this report (Johnston et al. 1993b, 1995a, 1996).

Youth Risk Behavior Survey (YRBS)

The CDC developed the Youth Risk Behavior Surveillance System to measure six categories of priority health-risk behaviors, including tobacco use, among adolescents. Data were collected through national, state, and local school-based surveys of high school students, conducted during the spring of odd-numbered years, and a national household-based survey of youths aged 12–21 years, conducted during 1992 (Kolbe 1990; Kolbe et al. 1993; CDC 1996). Data from the 1991 and 1995 national school-based surveys and the 1992 national household survey are cited in this report (USDHHS 1994; CDC 1996; Lowry et al. 1996).

The national school-based YRBSs each used a three-stage cluster sample design to draw a nationally representative sample of ninth- to twelfth-grade students in public and private schools in all 50 states and the District of Columbia. Schools having a substantial proportion of African American and Hispanic students were oversampled. The questionnaire was administered in the classroom by trained data collectors. The data were weighted to provide national estimates.

The 1992 YRBS was a follow-back survey to the 1992 NHIS. The sample of young people aged 12–21 years was drawn from families who were interviewed for the 1992 NHIS. Participants responded in person. Respondents listened through a headset to an audiocassette containing previously recorded questions. Respondents recorded their responses on answer sheets, which were returned to the interviewers in sealed envelopes. The data were weighted to provide national estimates.

Teenage Attitudes and Practices Survey (TAPS)

In 1989 and 1993, the U.S. Public Health Service conducted the TAPS to collect data on knowledge, attitudes, and practices regarding tobacco use from a national household sample of adolescents (aged 12–18 years) through telephone interviews. The 1993 TAPS included a longitudinal component (TAPS-II) in which 7,960 (87.1 percent) of the 9,135 respondents to the 1989 TAPS were reinterviewed; these respondents were 15–22 years of age during TAPS-II. TAPS-II also included 4,992 persons from a new probability sample. In this report, data on 9,135 TAPS respondents and 7,311 TAPS-II respondents have been analyzed. Data have been weighted to provide national estimates, and confidence intervals have been calculated by using the standard errors generated by the SUDAAN (Shah et al. 1991).

Appendix 2. Measures of Tobacco Use

Several measures of tobacco use among members of racial/ethnic groups can be derived from state and national surveys and other data sources. The most common measures include cigarette smoking and cessation; the number of cigarettes smoked daily; and the use of cigars, pipes, and smokeless tobacco.

Cigarette Smoking and Cessation

The NHIS gathers information on a range of cigarette smoking behaviors, using some of the following terms and measurements:

- For 1978–1991, *current smokers* are defined as those who have smoked 100 or more cigarettes in their lifetime and who report at the time of survey that they currently smoke. For 1992–1995, current smokers are defined as those who have smoked at least 100 cigarettes in their lives and who report at the time of survey that they currently smoke every day or on some days.
- *Former smokers* are those who have smoked 100 or more cigarettes in their lifetime and who do not currently smoke.
- *Never smokers* are those who have smoked fewer than 100 cigarettes in their lifetime.
- *Ever smokers* consist of current smokers and former smokers.
- The *prevalence of cessation* (or quit ratio) is defined as the percentage of ever smokers who are former smokers (Fiore et al. 1989; USDHHS 1989, 1990a).

NHIS data on age at initiation of regular smoking and on duration of abstinence for former smokers have been used to reconstruct the prevalence of cigarette smoking for the decades in this century before systematic surveillance of cigarette smoking was conducted (NCI 1991). Information such as the respondent's date of birth, age at initiation of smoking, and age at cessation for former smokers can be used to assess the smoking status of a respondent for any given year. Similar analyses have been reported in previous Surgeon General's reports (USDHHS 1980, 1985) and in the literature (Harris 1983; Escobedo and Remington 1989; Pierce et al. 1991b).

The BRFSS has routinely reported estimates of "regular" cigarette smoking. Current regular smokers are defined as those (1) who report that they have smoked ≥100 cigarettes and that they currently smoke and (2) who do not respond that they are occasional smokers when asked to report the average number of cigarettes they smoke daily. The use of a measure of current regular smoking generally results in median prevalence estimates that are about 0.7 to 1.0 percentage points lower than those estimates that include current occasional smokers (CDC 1994c). The BRFSS defines and calculates the prevalence of smoking cessation in the same manner as is done in the NHIS.

In the MTF surveys, current cigarette use patterns are defined as any use of cigarettes within the 30 days preceding the survey. This same definition was used for current alcohol, marijuana, cocaine, and any other illicit drug use.

Number of Cigarettes Smoked Daily

Cigarette consumption traditionally has been reported in three categories: (1) smoking fewer than 15 cigarettes per day, (2) smoking between 15 and 24 cigarettes per day, and (3) smoking 25 or more cigarettes per day. In the NHISs and the BRFSS surveys, respondents were asked to report the actual number of cigarettes smoked per day.

In the 1978–1991 NHISs, cigarette consumption was defined as the average number of cigarettes that current smokers reported smoking each day. Starting in 1992, however, current smokers who reported that they smoked only on some days were asked to report the number of days out of the past 30 days that they smoked any cigarettes and the average number of cigarettes they smoked on the days that they smoked.

The MTF survey asks respondents how frequently they have smoked during the previous 30 days. Possible responses are "not at all," "less than one cigarette per day," "one to five cigarettes per day," "about one-half pack per day," "about one pack per day," "about one and one-half packs per day," and "two packs or more per day."

Use of Cigars, Pipes, and Smokeless Tobacco

The 1987 and 1991 NHISs defined current cigar smokers as those who had smoked 50 or more cigars in their lifetime and who were current cigar smokers, and they defined current pipe smokers as those who had smoked 50 or more pipes full of tobacco and who were current pipe smokers. Current snuff users were defined as those who had used snuff 20 or more times and were currently snuff users. The same logic was used to classify chewing tobacco users.

In the BRFSS surveys, smokeless tobacco users were defined as those who said that they had ever used smokeless tobacco (such as chewing tobacco or snuff) and who were current users of any smokeless tobacco products.

Appendix 3. Patterns of Cigarette Use Among Whites

Table 39. Percentage of white adults who reported being current cigarette smokers,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1965–1995

	1965		1966		1970		1974	
Characteristic	%	±CI[‡]	%	±CI	%	±CI	%	±CI
Total	42.1	0.6	42.4	0.5	37.0	0.7	36.4	0.8
Gender								
Men	51.1	0.8	51.8	0.8	43.2	0.8	41.9	1.0
Women	34.0	0.7	33.9	0.7	31.6	1.0	31.7	1.1
Age (years)								
18–34	48.6	1.0	48.3	0.9	41.3	1.0	40.7	1.6
35–54	48.5	0.9	48.7	0.9	42.8	0.9	41.9	1.1
≥55	26.3	0.9	27.4	0.9	25.1	0.9	24.9	1.1
Education[§]								
Less than high school	NA	NA	41.3	0.9	37.1	1.0	36.9	1.3
High school	41.9[Δ]	0.7	44.3	1.0	39.0	0.9	38.1	1.3
Some college	NA	NA	44.4	1.8	38.5	1.4	37.9	2.0
College	40.4[Δ]	1.3	35.2	1.8	28.6	1.5	28.2	1.7

	1985		1987		1988		1990	
Characteristic	%	±CI	%	±CI	%	±CI	%	±CI
Total	29.9	0.7	29.0	0.7	28.2	0.6	25.9	0.6
Gender								
Men	31.8	1.0	30.6	0.9	30.3	0.9	27.8	0.9
Women	28.2	0.9	27.5	0.8	26.3	0.7	24.1	0.8
Age (years)								
18–34	33.6	1.2	32.2	1.1	31.9	1.1	29.7	1.0
35–54	33.7	1.2	33.7	1.0	32.1	1.0	29.9	1.0
≥55	21.5	1.0	20.2	0.9	19.7	0.8	16.8	0.8
Education[§]								
Less than high school	33.7	1.6	34.8	1.6	33.7	1.3	32.0	1.5
High school	33.1	1.2	32.6	1.1	32.6	1.0	30.0	1.0
Some college	30.3	1.6	28.5	1.3	27.8	1.3	24.9	1.2
College	18.3	1.2	16.9	1.0	16.2	1.0	13.7	0.9

*Data collected before 1978 do not distinguish between whites of Hispanic origin and non-Hispanic whites; these data exclude those whites who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

1976[†]		1977[†]		1978		1979		1980		1983	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
35.9	0.7	35.0	0.7	34.0	1.2	33.4	0.8	33.0	1.1	32.3	0.7
40.7	1.1	39.0	1.0	37.3	1.9	36.6	1.0	36.5	1.6	34.6	1.1
31.9	1.0	31.8	1.1	31.1	1.3	30.6	1.0	29.8	1.5	30.2	0.9
40.0	1.2	38.9	1.5	37.0	1.8	37.3	1.3	35.2	1.8	36.0	1.2
41.2	1.4	41.1	1.1	40.5	2.0	38.4	1.3	38.8	2.0	37.4	1.3
25.0	1.1	25.1	1.1	23.6	1.7	23.6	0.9	24.3	1.6	22.5	1.1
36.6	1.5	35.7	1.3	35.6	2.2	35.1	1.5	35.5	2.0	35.3	1.6
37.6	1.4	37.8	1.4	37.0	1.9	35.3	1.3	34.9	2.0	34.8	1.3
37.6	2.1	37.0	1.8	34.1	3.1	35.7	1.8	33.9	3.1	32.8	1.9
27.2	1.7	25.9	1.7	23.8	2.6	23.2	1.6	24.4	2.3	20.1	1.5

1991		1992		1993		1994		1995	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
26.0	0.6	27.2	0.8	25.4	0.8	25.5	0.7	25.6	1.0
27.5	0.9	28.6	1.2	27.0	1.2	28.2	1.1	27.1	1.5
24.6	0.7	25.9	1.1	24.0	1.0	23.1	0.9	24.1	1.3
29.8	1.0	32.8	1.5	30.1	1.4	29.3	1.4	29.7	1.8
30.0	1.0	30.1	1.3	29.3	1.4	28.9	1.2	28.3	1.6
17.3	0.8	17.5	1.2	15.8	1.1	16.2	1.1	17.8	1.3
33.3	1.5	32.0	2.0	31.8	2.6	31.9	1.8	33.3	2.6
30.6	0.9	31.9	1.4	29.1	1.3	29.8	1.3	30.2	1.7
24.9	1.2	25.9	1.7	24.9	1.7	25.7	1.7	24.1	1.9
13.8	0.9	14.8	1.3	13.5	1.3	12.3	1.1	14.0	1.6

[†]The 1976 and 1977 surveys collected data only for persons aged 20 years and older. The data for 1976 and 1977 were statistically adjusted to produce estimates for the total population, males, and females that approximate those for whites aged 18 years and older. Estimates for persons in the 18–34 year old age category were statistically adjusted to produce estimates that approximate those for whites aged 18–34 years.

[‡]95% confidence interval.

[§]Includes persons aged 25 years and older.

[Δ]Levels presented for 1965 are for persons who had a high school education or less and persons who attended some college or were college graduates.

NA = data not available.

Source: National Center for Health Statistics, public use data tapes, 1965–1995.

Table 40. Percentage of adult white smokers* who reported smoking <15, 15–24, and ≥25 cigarettes per day, overall and by gender, age, and education, National Health Interview Surveys, United States, 1965–1995

	1965		1966		1970		1974	
Characteristic	%	±CI[‡]	%	±CI	%	±CI	%	±CI
Total								
<15 cigarettes	33.1	1.1	31.7	0.8	29.7	0.9	27.7	1.2
15–24 cigarettes	45.3	0.8	45.9	0.9	45.0	0.9	44.7	1.2
≥25 cigarettes	21.6	0.7	22.4	0.7	25.4	0.9	27.6	1.1
Gender								
Men								
<15 cigarettes	26.6	1.0	25.8	1.0	24.4	1.2	21.5	1.6
15–24 cigarettes	46.7	1.1	47.2	1.2	45.2	1.2	44.5	1.9
≥25 cigarettes	26.7	0.9	27.0	1.0	30.4	1.2	34.1	1.7
Women								
<15 cigarettes	41.8	1.3	39.5	1.2	35.9	1.1	34.5	1.7
15–24 cigarettes	43.4	1.3	44.3	1.3	44.7	1.1	45.0	1.6
≥25 cigarettes	14.8	0.9	16.2	1.0	19.4	0.9	20.5	1.2
Age (years)								
18–34								
<15 cigarettes	34.7	1.4	33.9	1.3	31.6	1.2	30.9	1.8
15–24 cigarettes	47.4	1.5	48.2	1.3	46.9	1.2	46.3	1.8
≥25 cigarettes	17.9	1.1	17.9	1.0	21.6	1.2	22.8	1.6
35–54								
<15 cigarettes	29.0	1.1	26.7	1.1	24.7	1.1	21.4	1.6
15–24 cigarettes	45.1	1.2	45.5	1.3	44.2	1.2	42.9	1.8
≥25 cigarettes	28.0	1.2	27.8	1.1	31.1	1.1	35.7	1.7
≥55								
<15 cigarettes	40.1	1.9	38.8	1.9	36.3	1.6	32.7	2.4
15–24 cigarettes	41.5	1.9	42.2	1.9	42.7	1.4	44.7	2.4
≥25 cigarettes	18.4	1.5	18.8	1.5	21.1	1.5	22.7	2.3
Education[§]								
Less than high school								
<15 cigarettes	NA	NA	30.7	1.3	28.6	1.5	25.7	2.0
15–24 cigarettes	NA	NA	45.8	1.3	44.3	1.2	45.1	2.1
≥25 cigarettes	NA	NA	23.5	1.2	27.0	1.4	29.2	1.8
High school								
<15 cigarettes	31.1[Δ]	1.0	28.5	1.4	26.2	1.4	25.7	2.0
15–24 cigarettes	45.9[Δ]	1.1	46.9	1.7	47.3	1.4	44.7	2.3
≥25 cigarettes	23.0[Δ]	0.9	24.6	1.4	26.5	1.3	29.6	1.9
Some college								
<15 cigarettes	NA	NA	29.4	2.7	27.1	2.4	23.1	3.1
15–24 cigarettes	NA	NA	44.6	3.0	43.1	2.8	42.7	3.3
≥25 cigarettes	NA	NA	26.0	2.6	29.8	2.2	34.2	2.6
College								
<15 cigarettes	33.2[Δ]	2.0	35.0	3.1	31.7	2.1	27.9	3.9
15–24 cigarettes	42.3[Δ]	2.2	39.2	3.2	40.2	2.8	43.0	3.8
≥25 cigarettes	24.5[Δ]	2.0	25.9	2.8	28.1	3.1	29.1	3.4

*Data collected before 1978 do not distinguish between whites of Hispanic origin and non-Hispanic whites; these data exclude those whites who indicated they were of Hispanic origin. For 1965–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.
NA = data not available.
Source: National Center for Health Statistics, public use data tapes, 1965–1995.

1976†		1977†		1978		1979		1980		1983	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
27.8	1.2	26.9	1.2	23.7	1.5	24.4	1.0	23.2	1.6	23.8	1.2
45.2	1.3	43.6	1.4	44.7	1.7	44.7	1.3	44.6	1.9	46.8	1.4
27.0	1.2	27.5	1.4	31.6	1.6	30.9	1.2	32.2	1.9	29.4	1.3
22.0	1.6	20.5	1.3	17.8	1.9	20.0	1.2	17.7	2.2	17.8	1.5
45.2	1.6	41.6	1.7	43.6	2.5	43.1	1.7	44.3	2.7	45.1	2.0
32.8	1.7	33.5	1.8	38.6	2.3	36.9	1.7	38.0	2.7	37.1	1.6
34.0	1.7	33.7	1.6	30.1	2.4	29.2	1.6	29.3	2.1	30.1	1.7
45.1	1.8	45.8	1.9	45.8	2.3	46.5	1.9	44.8	2.6	48.4	1.9
21.0	1.5	21.0	1.6	24.1	2.3	24.4	1.5	25.9	2.3	21.5	1.6
30.0	1.8	29.9	1.7	25.2	2.2	26.5	1.7	25.2	2.7	27.5	1.9
47.3	1.9	45.9	1.9	47.8	2.6	47.4	1.8	48.0	2.9	49.9	2.0
22.6	1.9	21.9	2.1	27.0	2.7	26.1	1.5	26.9	2.6	22.7	1.7
22.7	1.7	21.2	1.8	19.0	2.3	19.2	1.5	17.6	2.6	18.0	1.7
43.3	2.0	42.6	2.0	41.5	2.7	41.8	2.2	40.5	2.9	42.6	2.2
34.0	1.8	36.3	2.0	39.5	2.4	39.0	2.2	41.9	3.4	39.4	2.2
32.0	2.5	31.6	2.6	28.9	3.6	28.8	2.6	28.7	3.2	26.0	2.5
43.8	2.7	42.9	2.9	43.9	4.1	44.1	3.0	44.7	3.7	47.3	2.9
24.2	2.3	25.6	2.5	27.2	3.7	27.2	2.5	26.6	3.3	26.7	2.5
26.7	1.9	26.2	2.1	23.3	2.9	23.1	2.0	21.2	3.0	20.4	2.2
44.5	2.2	43.3	2.7	44.1	3.3	44.0	2.6	44.9	3.7	45.4	2.9
28.8	2.2	30.5	2.3	32.7	2.4	32.9	2.2	33.9	3.6	34.3	2.7
24.2	1.8	22.7	1.7	22.4	2.5	20.5	1.7	21.0	2.7	21.3	1.8
46.3	2.3	45.6	2.1	43.8	2.7	46.0	2.3	44.6	3.5	46.0	2.3
29.5	2.2	31.7	2.1	33.8	2.9	33.5	2.1	34.4	3.4	32.7	2.2
26.2	3.6	27.8	3.2	18.9	3.2	22.0	3.0	18.0	4.2	21.2	2.9
41.8	3.4	41.4	3.6	44.2	5.7	42.1	3.2	45.9	5.5	46.3	3.6
32.0	3.4	30.8	3.1	37.0	5.5	35.9	3.0	36.0	4.7	32.5	3.4
30.4	3.7	30.4	3.1	25.8	5.2	29.6	3.7	27.7	5.0	28.4	3.8
41.2	4.4	40.2	3.8	41.1	5.9	37.2	3.9	35.2	5.4	40.9	4.2
28.4	3.3	29.4	3.7	33.2	4.7	33.2	3.6	37.1	5.7	30.7	4.2

†The 1976 and 1977 surveys collected data only for persons aged 20 years and older. The data for 1976 and 1977 were statistically adjusted to produce estimates for the total population, males, and females that approximate those for whites aged 18 years and older. Estimates for persons in the 18–34 year old age category were statistically adjusted to produce estimates that approximate those for whites aged 18–34 years.
‡95% confidence interval.
§Includes persons aged 25 years and older.
ΔLevels presented for 1965 are for persons who had a high school education or less and persons who attended some college or were college graduates.

Table 40. Continued

Characteristic	1985 %	1985 ±CI[‡]	1987 %	1987 ±CI	1988 %	1988 ±CI	1990 %	1990 ±CI
Total								
<15 cigarettes	26.1	1.1	25.4	1.0	24.7	1.0	27.9	1.1
15–24 cigarettes	43.6	1.3	43.7	1.1	45.7	1.1	45.2	1.2
≥25 cigarettes	30.3	1.2	30.9	1.1	29.6	1.0	26.9	1.2
Gender								
Men								
<15 cigarettes	20.1	1.6	20.6	1.4	20.4	1.3	21.7	1.4
15–24 cigarettes	42.6	1.9	40.6	1.6	43.9	1.6	43.9	1.8
≥25 cigarettes	37.3	1.8	38.8	1.6	35.7	1.6	34.5	1.9
Women								
<15 cigarettes	32.1	1.6	30.3	1.5	29.3	1.5	34.5	1.6
15–24 cigarettes	44.7	1.7	46.9	1.6	47.5	1.6	46.6	1.6
≥25 cigarettes	23.2	1.4	22.8	1.4	23.3	1.2	19.0	1.4
Age (years)								
18–34								
<15 cigarettes	31.1	1.9	29.8	1.7	29.3	1.7	34.9	1.9
15–24 cigarettes	45.2	2.0	45.6	1.8	47.7	1.8	47.3	1.9
≥25 cigarettes	23.8	1.7	24.6	1.5	22.9	1.5	17.8	1.6
35–54								
<15 cigarettes	19.0	1.7	20.1	1.6	18.1	1.5	20.4	1.6
15–24 cigarettes	41.1	2.1	41.3	1.8	43.7	1.8	43.4	2.0
≥25 cigarettes	39.9	2.1	38.6	1.5	38.3	1.8	36.2	2.0
≥55								
<15 cigarettes	27.7	2.4	26.3	1.6	27.7	2.0	29.1	2.5
15–24 cigarettes	44.7	2.6	44.6	1.8	45.0	2.2	44.5	2.5
≥25 cigarettes	27.6	2.3	29.2	1.9	27.2	2.1	26.4	2.3
Education[§]								
Less than high school								
<15 cigarettes	19.5	2.2	19.9	2.1	19.1	1.8	19.5	2.2
15–24 cigarettes	44.3	2.7	44.2	2.4	44.5	2.4	48.6	2.9
≥25 cigarettes	36.2	2.7	35.8	2.4	36.5	2.4	31.9	2.7
High school								
<15 cigarettes	23.1	1.8	22.8	1.5	20.5	1.4	24.5	1.7
15–24 cigarettes	44.5	2.1	43.4	1.8	47.7	1.8	45.8	1.9
≥25 cigarettes	32.4	1.9	33.8	1.8	31.8	1.6	29.6	1.8
Some college								
<15 cigarettes	26.3	2.8	24.9	2.3	25.6	2.3	27.8	2.6
15–24 cigarettes	42.0	3.1	43.0	2.8	43.2	2.7	43.5	3.1
≥25 cigarettes	31.7	2.9	32.2	2.7	32.2	2.4	28.7	2.8
College								
<15 cigarettes	30.5	3.4	31.0	3.1	32.4	2.9	35.1	3.3
15–24 cigarettes	37.9	3.7	39.9	3.4	39.5	3.2	39.6	3.4
≥25 cigarettes	31.6	3.6	29.2	3.0	28.1	2.9	25.3	3.3

[‡]95% confidence interval.
[§]Includes persons aged 25 years and older.

1991		1992		1993		1994		1995	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
29.8	1.2	31.7	1.5	32.5	1.7	35.6	1.8	35.0	2.0
45.0	1.3	43.3	1.6	44.9	1.7	44.4	1.9	41.8	2.1
25.2	1.2	25.0	1.4	22.6	1.4	20.0	1.4	23.2	1.8
24.6	1.6	25.8	1.9	27.5	2.4	30.5	2.5	28.0	2.6
43.4	1.7	41.8	2.4	43.0	2.5	44.3	2.7	41.6	3.0
31.9	1.8	32.4	2.2	29.5	2.3	25.1	2.2	30.4	2.8
35.0	1.6	37.7	2.3	37.6	2.3	40.8	2.5	42.3	2.8
46.6	1.7	44.9	2.2	46.8	2.4	44.5	2.4	41.9	2.8
18.4	1.3	17.4	1.6	15.6	1.8	14.6	1.9	15.8	2.0
36.5	2.0	37.4	2.6	39.5	3.0	42.5	3.0	44.3	3.4
46.1	2.1	43.9	2.5	45.6	2.8	45.4	3.1	41.1	3.4
17.5	1.7	18.6	2.2	15.0	2.0	12.1	1.7	14.6	2.9
23.9	1.6	26.8	2.3	27.6	2.6	29.6	2.6	31.0	3.0
43.4	1.9	42.3	2.8	44.1	2.5	42.9	2.6	41.6	3.0
32.7	1.9	30.9	2.4	28.3	2.4	27.6	2.5	27.4	2.6
29.1	2.1	29.9	3.2	30.0	3.4	34.6	3.6	27.0	3.4
46.2	2.4	44.2	3.6	45.2	4.1	45.9	4.1	43.2	4.2
24.7	2.2	25.9	2.9	24.8	3.1	19.5	3.2	29.8	4.2
21.4	2.2	24.6	3.2	25.3	3.5	25.6	3.5	19.9	3.7
43.8	2.6	41.5	3.7	45.9	4.0	44.5	4.5	45.4	4.8
34.8	2.7	33.9	3.7	28.8	3.7	29.9	4.1	34.7	4.6
25.7	1.6	26.7	2.3	28.2	2.5	30.5	2.7	29.2	2.8
47.7	1.9	46.3	2.8	46.2	2.7	46.8	2.9	45.0	3.1
26.6	1.9	27.0	2.4	25.6	2.4	22.7	2.3	25.8	3.0
33.0	2.7	33.7	3.7	34.0	3.7	36.8	4.4	40.2	4.6
43.6	2.9	42.0	3.6	44.3	4.3	44.0	4.0	39.2	4.6
23.4	2.4	24.3	3.5	21.8	3.4	19.2	3.3	20.6	3.8
35.3	3.4	43.2	4.5	42.1	5.4	48.7	5.4	50.6	5.6
42.9	3.4	37.6	4.6	37.7	5.0	36.9	5.3	34.0	5.5
21.8	2.9	19.2	4.1	20.2	3.8	14.4	3.7	15.4	3.8

Table 41. Percentage of adult white ever smokers who have quit,[*] overall and by gender, age, and education, National Health Interview Surveys, United States, 1965–1995

	1965		1966		1970		1974	
Characteristic	%	±CI[‡]	%	±CI	%	±CI	%	±CI
Total	25.2	0.6	25.3	0.6	34.3	0.8	36.1	0.9
Gender								
Men	28.9	0.8	28.9	0.8	39.0	1.0	41.0	1.1
Women	19.6	0.9	19.6	0.9	27.8	0.9	29.6	1.4
Age (years)								
18–34	17.6	0.9	16.9	0.9	25.9	1.1	26.2	1.7
35–54	24.5	1.0	25.0	0.9	33.5	1.1	35.2	1.2
≥55	38.3	1.6	38.2	1.5	47.5	1.3	51.0	1.8
Education[§]								
Less than high school	NA	NA	26.4	1.0	34.6	1.2	36.2	1.6
High school	25.4[Δ]	0.8	25.1	1.2	34.5	1.0	36.3	1.5
Some college	NA	NA	28.4	2.2	37.1	1.6	39.5	2.5
College	33.2[†]	1.6	38.5	2.3	49.7	2.3	50.6	2.4

	1985		1987		1988		1990	
Characteristic	%	±CI	%	±CI	%	±CI	%	±CI
Total	46.6	1.0	46.2	0.9	47.7	0.9	50.9	1.0
Gender								
Men	51.0	1.3	50.5	1.2	51.1	1.2	54.2	1.3
Women	41.0	1.3	40.9	1.3	43.5	1.1	47.0	1.2
Age (years)								
18–34	32.4	1.5	31.4	1.4	32.3	1.5	35.1	1.6
35–54	46.2	1.6	44.6	1.5	45.9	1.4	48.6	1.5
≥55	62.2	1.6	63.1	1.5	65.0	1.3	68.9	1.3
Education[§]								
Less than high school	46.5	2.1	44.3	1.9	45.7	1.7	47.8	2.0
High school	44.5	1.6	44.8	1.4	45.0	1.4	48.2	1.5
Some college	48.7	2.3	48.9	1.9	50.7	1.9	54.0	1.9
College	63.7	2.2	63.0	2.1	64.6	1.8	68.7	1.9

[*]Data collected before 1978 do not distinguish between whites of Hispanic origin and non-Hispanic whites; these data exclude those whites who indicated they were of Hispanic origin. The prevalence of cessation is the percentage of ever smokers who are former smokers. Former smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not smoking, and ever smokers include current and former smokers.

[†]The 1976 and 1977 surveys collected data only for persons aged 20 years and older. The data for 1976 and 1977 were statistically adjusted to produce estimates for the total population, males, and females that approximate those for whites aged 18 years and older. Estimates for persons in the 18-34 year old age category were statistically adjusted to produce estimates that approximate those for whites aged 18-34 years.

1976†		1977†		1978		1979		1980		1983	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
36.5	1.0	36.3	1.0	39.5	1.7	40.5	1.2	40.8	1.7	42.0	1.0
41.3	1.3	41.4	1.1	44.7	2.1	45.3	1.3	45.2	2.1	46.6	1.4
30.4	1.5	30.0	1.5	32.8	2.0	34.3	1.7	35.0	2.4	36.2	1.4
25.3	1.3	26.8	1.8	29.1	2.3	29.4	1.5	30.5	2.3	29.1	1.5
36.5	1.7	35.2	1.5	36.7	2.6	39.7	1.8	39.8	2.6	40.3	1.7
51.6	1.9	50.7	1.9	56.0	2.7	55.5	1.6	54.5	2.9	59.0	1.8
37.1	1.9	36.8	1.7	39.1	2.7	41.2	1.9	39.7	3.0	41.5	2.1
36.6	1.7	36.1	1.9	39.0	2.3	40.2	1.8	40.7	2.7	41.9	1.7
39.7	2.8	39.4	2.2	44.9	3.9	41.7	2.4	43.5	4.3	44.6	2.6
49.4	2.7	50.2	2.8	54.5	3.9	55.6	2.7	54.2	3.9	57.9	2.7

1991		1992		1993		1994		1995	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
50.5	0.9	48.5	1.3	51.6	1.3	51.0	1.3	50.5	1.6
54.2	1.2	52.0	1.7	54.6	1.7	53.7	1.7	52.9	2.2
46.2	1.3	44.4	1.8	48.1	1.7	47.8	1.9	47.6	2.1
31.9	1.5	27.4	2.0	31.4	2.0	29.0	2.2	31.5	2.6
48.7	1.4	48.0	1.9	48.6	2.0	49.3	1.9	48.6	2.4
68.8	1.3	68.1	2.0	71.8	1.8	72.1	1.8	68.0	2.2
46.0	2.0	49.1	2.7	49.2	3.4	47.1	2.8	46.5	3.3
48.0	1.4	45.6	2.0	49.8	1.9	48.5	2.1	47.2	2.4
54.9	1.9	53.6	2.7	55.1	2.6	54.7	2.8	55.7	3.0
67.8	1.8	64.2	2.6	68.1	2.6	70.8	2.6	66.1	3.4

‡95% confidence interval.
§Includes persons aged 25 years and older.
ΔLevels presented for 1965 are for persons who had a high school education or less and persons who attended some college or were college graduates.
NA = data not available.
Source: National Center for Health Statistics, public use data tapes, 1965–1995.

Table 42. Percentage of white women of reproductive age who reported being current cigarette smokers,* overall and by education, National Health Interview Surveys, United States, 1965–1995

Characteristic	1965 %	1965 ±CI‡	1966 %	1966 ±CI	1970 %	1970 ±CI	1974 %	1974 ±CI	1976† %	1976† ±CI
Total	42.2	1.1	41.5	1.1	36.8	1.2	37.3	1.7	36.4	1.5
Education§										
Less than high school	NA	NA	48.0	2.2	46.7	2.0	50.5	3.1	49.4	4.4
High school	44.2	1.4	41.3	1.8	36.6	1.8	38.2	2.5	38.0	2.5
Some college	NA	NA	43.8	3.8	37.5	3.2	35.2	4.3	34.8	4.4
College	41.3	2.9	34.6	4.4	27.2	2.6	25.5	3.3	25.0	3.4

Characteristic	1977† %	1977† ±CI	1978 %	1978 ±CI	1979 %	1979 ±CI	1980 %	1980 ±CI	1983 %	1983 ±CI
Total	36.8	1.5	35.6	2.1	36.0	1.4	33.2	1.9	35.5	1.3
Education§										
Less than high school	47.6	3.9	56.1	5.9	52.0	3.9	53.9	7.0	53.6	4.6
High school	37.3	2.5	38.4	3.2	37.3	2.4	33.4	3.6	39.4	2.4
Some college	35.3	3.6	31.8	5.8	36.3	4.3	32.2	5.3	30.8	3.2
College	24.7	3.6	20.1	4.3	21.9	2.7	22.8	4.4	17.8	2.5

Characteristic	1985 %	1985 ±CI	1987 %	1987 ±CI	1988 %	1988 ±CI	1990 %	1990 ±CI	1991 %	1991 ±CI
Total	32.5	1.3	31.1	1.1	30.3	1.0	27.9	1.1	28.7	1.1
Education§										
Less than high school	55.1	4.4	60.6	3.7	57.9	3.9	58.4	4.3	59.6	3.8
High school	37.1	2.1	36.5	1.8	35.7	1.8	34.4	1.8	36.5	2.0
Some college	28.8	2.7	29.2	2.2	29.2	2.3	24.5	2.1	25.1	2.0
College	14.9	2.2	15.1	1.7	14.2	1.6	10.9	1.5	11.8	1.5

Characteristic	1992 %	1992 ±CI	1993 %	1993 ±CI	1994 %	1994 ±CI	1995 %	1995 ±CI
Total	30.7	1.6	29.1	1.4	30.6	1.6	28.2	1.8
Education§								
Less than high school	55.5	6.0	60.1	6.2	56.1	7.2	51.7	7.8
High school	38.3	2.8	38.6	2.7	40.2	2.9	37.0	3.4
Some college	28.3	2.9	23.4	2.8	27.2	3.2	26.0	3.6
College	14.3	2.2	11.5	2.0	11.6	2.3	15.3	2.9

*Data collected before 1978 do not distinguish between whites of Hispanic origin and non-Hispanic whites; these data exclude those whites who indicated they were of Hispanic origin. For 1965–1991, current cigarette smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.
†The 1976 and 1977 surveys collected data only for persons aged 20 years and older. The data for 1976 and 1977 were statistically adjusted to produce estimates that approximate those for white women aged 18–44 years.
‡95% confidence interval.
§Includes persons aged 25 years and older.
NA = data not available.
Source: National Center for Health Statistics, public use data tapes, 1965–1995.

Table 43. Percentage of white adults who reported being current cigarette smokers,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	33.5	0.7	30.9	0.6	28.6	0.5	25.9	0.5	26.4	0.6	25.9	0.7
Gender												
Men	36.8	1.0	32.9	0.8	30.5	0.7	27.6	0.7	27.8	0.8	27.6	0.9
Women	30.5	0.8	29.0	0.7	26.9	0.6	24.4	0.6	25.0	0.8	24.4	0.8
Age (years)												
18–34	36.7	1.1	34.6	0.9	32.0	0.8	29.8	0.8	31.6	1.1	31.3	1.2
35–54	39.0	1.0	35.1	1.0	32.9	0.7	30.0	0.7	29.7	1.0	28.7	1.1
$\geq$55	23.7	0.8	21.9	0.7	19.9	0.7	17.1	0.6	16.7	0.8	16.8	0.9
Education§												
Less than high school	35.3	1.2	34.4	1.3	34.2	1.1	32.6	1.1	31.9	1.6	33.8	1.7
High school	35.6	1.1	33.8	0.9	32.6	0.8	30.3	0.7	30.6	1.0	30.3	1.1
Some college	34.8	1.3	31.2	1.3	28.2	1.0	24.9	0.9	25.4	1.2	24.7	1.3
College	23.6	1.2	19.0	1.0	16.5	0.7	13.8	0.7	14.2	0.9	13.3	1.0

*These data exclude whites who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Table 44. Percentage of adult white smokers* who reported smoking <15, 15–24, or ≥25 cigarettes per day, overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total												
<15 cigarettes	24.0	0.7	25.1	0.8	25.0	0.7	28.9	0.8	32.1	1.1	35.3	1.3
15–24 cigarettes	44.7	0.9	44.9	0.9	44.7	0.8	45.1	0.9	44.0	1.2	43.1	1.4
≥25 cigarettes	31.4	0.9	30.0	0.9	30.3	0.8	26.1	0.9	23.9	1.1	21.6	1.1
Gender												
Men												
<15 cigarettes	18.9	0.9	19.1	1.2	20.5	1.0	23.2	1.1	26.6	1.6	29.3	1.8
15–24 cigarettes	43.5	1.3	43.7	1.3	42.3	1.1	43.6	1.3	42.3	1.8	43.0	2.0
≥25 cigarettes	37.6	1.3	37.2	1.4	37.3	1.2	33.2	1.3	31.1	1.6	27.7	1.8
Women												
<15 cigarettes	29.4	1.1	31.3	1.2	29.8	1.0	34.7	1.2	37.7	1.6	41.6	1.9
15–24 cigarettes	45.9	1.3	46.2	1.3	47.2	1.1	46.6	1.2	45.7	1.6	43.2	1.8
≥25 cigarettes	24.7	1.1	22.5	1.1	23.0	0.9	18.7	1.0	16.6	1.2	15.2	1.4
Age (years)												
18–34												
<15 cigarettes	25.9	1.3	29.6	1.3	29.6	1.2	35.7	1.4	38.3	2.0	43.3	2.2
15–24 cigarettes	47.6	1.2	47.1	1.4	46.7	1.3	46.7	1.5	44.6	1.9	43.4	2.3
≥25 cigarettes	26.5	1.3	23.3	1.2	23.8	1.1	17.6	1.2	17.1	1.5	13.3	1.6
35–54												
<15 cigarettes	18.8	1.0	18.6	1.4	19.1	1.1	22.2	1.1	27.2	1.7	30.3	2.0
15–24 cigarettes	41.4	1.6	41.7	1.7	42.5	1.3	43.4	1.5	43.1	1.8	42.2	2.0
≥25 cigarettes	39.8	1.5	39.7	1.7	38.4	1.3	34.4	1.5	29.7	1.6	27.5	1.8
≥55												
<15 cigarettes	28.8	1.7	27.0	1.7	27.0	1.4	29.1	1.6	29.9	2.5	30.5	2.5
15–24 cigarettes	44.2	2.0	45.8	1.8	44.8	1.6	45.4	1.7	44.7	2.7	44.4	2.9
≥25 cigarettes	27.1	1.7	27.2	1.7	28.2	1.5	25.5	1.6	25.4	2.2	25.0	2.7

*These data exclude those whites who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

Table 44. Continued

Characteristic	1978–1980† %	±CI‡	1983–1985† %	±CI	1987–1988† %	±CI	1990–1991† %	±CI	1992–1993† %	±CI	1994–1995† %	±CI
Education§												
Less than high school												
<15 cigarettes	22.7	1.4	19.9	1.6	19.5	1.4	20.5	1.6	24.9	2.3	22.8	2.6
15–24 cigarettes	44.2	1.9	44.8	2.0	44.3	1.7	46.1	1.9	43.5	2.8	45.0	3.3
≥25 cigarettes	33.1	1.6	35.4	1.9	36.1	1.7	33.4	1.9	31.6	2.7	32.2	3.1
High school												
<15 cigarettes	21.1	1.2	22.4	1.3	21.6	1.0	25.1	1.2	27.4	1.6	29.9	2.0
15–24 cigarettes	45.1	1.9	45.1	1.5	45.6	1.3	46.8	1.4	46.2	1.9	45.9	2.1
≥25 cigarettes	33.8	1.7	32.5	1.5	32.8	1.2	28.1	1.4	26.4	1.7	24.2	1.9
Some college												
<15 cigarettes	20.4	1.9	24.3	2.3	25.3	1.6	30.5	1.9	33.8	2.7	38.5	3.2
15–24 cigarettes	43.5	2.1	43.7	2.5	43.1	2.0	43.5	2.2	43.1	2.8	41.7	3.1
≥25 cigarettes	36.2	2.4	32.0	2.4	31.7	1.7	26.0	1.8	23.1	2.3	19.9	2.5
College												
<15 cigarettes	28.2	2.8	29.6	2.7	31.7	2.3	35.2	2.4	42.7	3.4	49.7	3.9
15–24 cigarettes	37.6	2.9	39.2	2.7	39.7	2.3	41.3	2.3	37.6	3.3	35.3	3.8
≥25 cigarettes	34.2	2.5	31.2	2.6	28.6	2.1	23.5	2.2	19.6	2.7	15.0	2.6

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.
‡95% confidence interval.
§Includes persons aged 25 years and older.
Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Table 45. Percentage of adult white ever smokers who have quit,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	40.3	1.1	44.7	0.8	46.9	0.7	50.7	0.7	50.0	0.9	50.7	1.0
Gender												
Men	45.1	1.2	49.3	1.0	50.8	0.9	54.2	0.9	53.2	1.2	53.3	1.4
Women	34.1	1.4	39.1	1.0	42.2	0.9	46.6	0.9	46.1	1.3	47.7	1.4
Age (years)												
18–34	29.6	1.3	31.1	1.1	31.8	1.1	33.5	1.1	29.2	1.5	30.2	1.7
35–54	39.0	1.3	43.9	1.3	45.3	1.1	48.6	1.1	48.3	1.3	49.0	1.5
≥55	55.4	1.4	60.9	1.2	64.1	1.0	68.9	0.9	69.9	1.3	70.1	1.4
Education§												
Less than high school	40.3	1.4	44.5	1.8	45.0	1.4	46.9	1.5	49.1	2.1	46.8	2.2
High school	40.0	1.5	43.5	1.1	44.9	1.1	48.1	1.0	47.6	1.5	47.9	1.6
Some college	42.9	1.8	47.1	1.8	49.8	1.4	54.5	1.3	54.3	1.8	55.2	2.0
College	55.0	2.2	61.6	1.7	63.8	1.4	68.2	1.4	66.1	1.9	68.4	2.2

*These data exclude those whites who indicated they were of Hispanic origin. The prevalence of cessation is the percentage of ever smokers who are former smokers. Former smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not current smokers, and ever smokers include current and former smokers.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

§Includes persons aged 25 years and older.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Table 46. Percentage of white women of reproductive age who reported being current cigarette smokers,* overall and by education, National Health Interview Surveys, United States, 1978–1995 aggregate data

	1978–1980†		1983–1985†		1987–1988†		1990–1991†		1992–1993†		1994–1995†	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Total	35.3	1.2	33.7	1.0	30.7	0.8	28.3	0.8	30.0	1.2	29.4	1.2
Education												
Less than high school	53.4	3.0	54.5	3.4	59.2	2.7	59.0	3.0	57.5	4.2	53.9	5.2
High school	36.6	1.8	38.0	1.7	36.1	1.4	35.5	1.3	38.5	2.1	38.6	2.3
Some college	34.2	2.8	29.6	2.1	29.2	1.7	24.8	1.5	26.0	2.1	26.6	2.4
College	21.7	1.9	16.0	1.6	14.6	1.2	11.4	1.0	13.0	1.4	13.5	1.8

*These data exclude whites who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†1978, 1979, and 1980 data were combined; 1983 and 1985 data were combined; 1987 and 1988 data were combined; 1990 and 1991 data were combined; 1992 and 1993 data were combined; and 1994 and 1995 data were combined.

‡95% confidence interval.

Source: National Center for Health Statistics, public use data tapes, 1978–1995.

Appendix 4. Patterns of Cigarette Use Among Among African Americans

Table 47. Percentage of adult African Americans who reported being current cigarette smokers,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1965–1995

Characteristic	1965 %	1965 ±CI‡	1966 %	1966 ±CI	1970 %	1970 ±CI	1974 %	1974 ±CI
Total	45.8	1.5	45.9	1.7	41.4	1.8	44.0	2.2
Gender								
Men	60.4	2.8	60.1	2.5	52.9	2.0	54.4	3.9
Women	33.7	2.3	34.2	2.3	32.2	2.5	36.4	2.6
Age (years)								
18–34	53.2	2.8	52.4	2.9	46.0	2.8	46.2	3.5
35–54	50.3	3.0	52.6	2.9	47.0	2.2	53.3	3.8
≥55	27.0	3.2	24.8	3.1	25.1	2.3	28.0	3.8
Education§								
Less than high school			44.6	2.4	41.0	2.1	43.3	3.2
High school	44.6Δ	2.0	51.9	4.6	45.4	3.8	49.1	4.3
Some college			52.9	7.8	43.0	6.0	37.3	8.6
College	47.5Δ	5.8	39.6	8.5	34.2	6.4	44.9	9.1

Characteristic	1985 %	1985 ±CI‡	1987 %	1987 ±CI	1988 %	1988 ±CI	1990 %	1990 ±CI
Total	35.0	1.8	32.9	1.6	31.7	1.6	26.2	1.5
Gender								
Men	39.9	3.0	38.7	2.8	36.6	2.5	32.6	2.4
Women	31.2	2.2	28.2	1.8	27.8	1.9	21.2	1.6
Age (years)								
18–34	34.0	2.8	32.6	2.4	31.5	2.4	25.0	2.2
35–54	42.3	3.4	38.6	2.8	36.0	2.6	32.6	2.7
≥55	27.7	3.0	25.9	2.9	26.4	2.7	19.2	2.4
Education§								
Less than high school	39.6	3.0	37.7	2.9	35.0	2.5	30.6	2.8
High school	39.1	3.4	38.7	2.9	38.8	2.9	31.9	2.5
Some college	35.0	4.9	34.2	4.0	31.9	3.7	25.7	3.8
College	28.4	6.1	18.3	3.9	20.9	4.6	17.5	3.8

*Data collected before 1978 do not distinguish between blacks of Hispanic origin and non-Hispanic blacks; these data exclude those African Americans who indicated they were of Hispanic origin. For 1978–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†The 1976 and 1977 surveys collected data only for persons aged 20 years and older. The data for 1976 and 1977 were statistically adjusted to produce estimates for the total population, males, and females that approximate those for African Americans aged 18 years and older. Estimates for persons in the 18–34 year old age category were statistically adjusted to produce estimates that approximate those for African Americans aged 18–34 years old.

1976†		1977†		1978		1979		1980		1983	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
40.8	2.1	40.7	2.5	37.5	3.7	37.3	2.4	37.1	3.3	35.8	2.2
49.3	3.3	47.3	4.0	46.1	5.5	44.5	3.7	44.9	4.4	40.8	3.5
34.6	3.1	35.9	3.1	31.1	4.5	31.6	2.5	31.0	4.3	31.8	2.6
44.2	3.1	44.4	3.9	39.1	5.8	38.0	3.2	39.9	4.5	35.8	3.2
46.9	3.7	46.9	4.2	46.0	6.1	44.4	3.9	40.5	6.9	42.1	4.1
27.5	3.3	29.9	4.3	24.4	5.2	27.0	4.0	27.5	6.6	27.9	4.2
38.9	2.8	40.2	3.9	36.7	4.8	37.3	3.6	33.7	6.5	37.4	3.9
44.5	4.7	48.2	4.9	40.6	5.1	40.5	4.8	47.6	7.2	39.4	4.3
49.4	7.5	41.8	7.4	46.0	9.9	35.5	6.4	30.8	8.7	34.4	6.3
36.3	10.3	37.1	8.4	37.3	13.5	36.3	7.5	29.4	8.8	28.4	7.3

1991		1992		1993		1994		1995	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
29.4	1.6	27.8	2.0	26.0	2.0	27.2	2.3	25.8	2.6
35.5	2.7	32.3	3.5	32.4	3.4	33.9	4.0	28.8	3.7
24.5	1.9	24.1	2.2	21.0	2.2	21.8	2.2	23.5	3.1
27.0	2.4	22.4	3.0	21.6	3.3	22.0	3.4	19.9	3.4
38.3	2.7	38.0	3.7	33.6	3.6	34.7	3.9	33.6	4.6
20.7	2.7	22.4	3.5	22.3	4.1	24.0	4.0	23.0	3.8
35.4	3.0	34.4	4.5	33.9	4.5	35.3	4.5	34.1	5.0
34.9	2.6	32.3	3.7	31.4	3.8	31.6	4.5	31.0	5.0
31.8	3.8	28.4	4.8	26.6	4.4	27.6	5.4	25.2	5.1
18.0	4.2	22.4	6.6	13.9	4.6	15.7	5.2	17.6	5.4

‡95% confidence interval.

§Includes persons aged 25 years and older.

$^{\Delta}$Levels presented for 1965 are for persons who had a high school education or less and persons who attended some college or were college graduates.

Source: National Center for Health Statistics, public use data tapes, 1965–1995.

Table 48. Percentage of adult African American smokers* who reported smoking <15, 15–24, or ≥25 cigarettes per day, overall and by gender, age, and education, National Health Interview Surveys, United States, 1965–1995

	1965		1966		1970		1974	
Characteristic	%	±CI[‡]	%	±CI	%	±CI	%	±CI
Total								
<15 cigarettes	56.9	2.7	55.8	2.5	55.5	2.5	58.3	3.2
15–24 cigarettes	35.5	2.5	36.2	2.5	36.0	2.4	33.0	3.1
≥25 cigarettes	7.6	1.4	8.0	1.3	8.6	1.4	8.7	1.8
Gender								
Men								
<15 cigarettes	49.1	3.3	48.3	3.2	49.6	3.2	52.9	5.0
15–24 cigarettes	42.0	3.3	41.8	3.1	40.7	3.1	36.5	4.9
≥25 cigarettes	9.0	1.9	9.9	1.9	9.7	1.7	10.6	2.9
Women								
<15 cigarettes	68.0	3.7	66.1	3.8	62.8	2.8	64.3	4.0
15–24 cigarettes	26.3	3.5	28.5	3.5	30.0	2.5	29.1	3.8
≥25 cigarettes	5.7	1.9	5.5	1.7	7.2	1.7	6.6	2.3
Age (years)								
18–34								
<15 cigarettes	59.7	4.0	57.3	3.9	58.5	3.2	64.0	3.9
15–24 cigarettes	33.0	3.7	35.0	4.0	34.0	3.2	27.8	4.0
≥25 cigarettes	7.4	2.1	7.7	2.1	7.4	2.0	8.2	2.4
35–54								
<15 cigarettes	51.4	3.9	52.0	3.9	50.7	3.2	49.3	6.2
15–24 cigarettes	39.9	3.8	39.1	3.7	38.7	3.6	39.4	5.7
≥25 cigarettes	8.7	2.2	8.9	2.3	10.6	2.0	11.3	3.5
≥55								
<15 cigarettes	65.2	6.4	63.3	6.9	59.3	5.9	65.3	7.5
15–24 cigarettes	29.8	6.4	30.6	7.2	34.3	5.6	31.4	8.2
≥25 cigarettes	5.1	3.0	6.1	3.5	6.5	2.1	3.4	2.6
Education[§]								
Less than high school								
<15 cigarettes	NA	NA	55.3	3.5	52.5	3.9	55.8	5.5
15–24 cigarettes	NA	NA	36.0	3.3	38.0	3.7	35.8	5.3
≥25 cigarettes	NA	NA	8.7	2.0	9.5	2.1	8.4	2.6
High school								
<15 cigarettes	55.8[Δ]	3.1	50.6	5.7	52.7	4.3	52.9	8.0
15–24 cigarettes	35.9[Δ]	3.0	40.4	7.9	37.9	4.4	37.4	6.6
≥25 cigarettes	8.3[Δ]	1.8	9.1	3.2	9.4	2.8	9.8	4.1
Some college								
<15 cigarettes	NA	NA	59.0	10.4	49.9	10.1	56.4	12.5
15–24 cigarettes	NA	NA	32.1	9.4	37.1	8.9	29.5	11.0
≥25 cigarettes	NA	NA	9.0	5.8	13.0	6.5	14.1	10.5
College								
<15 cigarettes	54.6[Δ]	9.1	60.9	10.1	69.0	11.1	64.8	15.1
15–24 cigarettes	36.1[Δ]	8.5	32.3	10.1	23.4	9.7	30.2	14.3
≥25 cigarettes	9.3[Δ]	5.3	6.8	5.3	7.6	7.3	5.1	7.1

*Data collected before 1978 do not distinguish between African Americans of Hispanic origin and non-Hispanic African Americans; these data exclude those African Americans who indicated they were of Hispanic origin. For 1965–1991, current cigarette smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

†The 1976 and 1977 surveys collected data only for persons aged 20 years and older. The data for 1976 and 1977 were statistically adjusted to produce estimates for the total population, males, and females that approximate those for African Americans aged 18 years and older. Estimates for persons in the 18–34 year old age category were statistically adjusted to produce estimates that approximate those for African Americans aged 18–34 years old.

1976†		**1977†**		**1978**		**1979**		**1980**		**1983**	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
52.4	3.9	54.7	4.8	57.0	5.1	55.9	3.2	55.2	5.7	54.9	3.9
39.0	3.7	35.7	4.4	34.0	4.6	33.3	3.1	33.8	4.8	35.6	3.7
8.6	2.1	9.8	2.1	9.1	2.8	10.8	1.6	11.0	3.3	9.5	2.4
44.7	4.7	48.4	5.9	49.5	7.3	51.5	4.9	48.8	9.2	51.4	5.7
44.2	4.4	35.3	5.2	37.3	6.3	36.3	4.7	38.7	6.8	36.5	5.3
11.2	3.0	12.6	3.9	13.2	5.1	12.2	2.6	12.5	5.5	12.1	4.1
60.3	5.8	61.2	6.2	65.0	7.0	60.8	4.4	62.1	6.8	58.5	5.1
33.8	5.9	36.1	5.6	30.4	6.4	30.0	3.8	28.5	6.3	34.6	5.0
6.0	2.2	6.9	2.3	4.6	3.0	9.2	2.6	9.4	3.2	6.9	2.5
56.5	5.5	59.4	5.8	60.3	7.9	60.5	5.2	57.8	6.0	57.7	5.7
35.9	5.3	34.8	6.3	31.5	7.0	31.1	4.3	33.1	6.3	33.0	5.2
7.6	2.6	8.0	3.4	8.2	4.2	8.4	2.5	9.1	3.8	9.4	3.7
44.8	6.5	51.6	7.3	53.0	8.4	48.4	5.1	56.1	10.5	47.6	6.4
44.0	6.9	35.4	6.2	37.2	7.5	36.2	4.5	32.1	9.2	40.6	6.1
11.3	3.4	13.0	3.6	9.8	4.8	15.4	4.3	11.8	7.1	11.9	4.4
57.4	6.4	51.1	8.6	56.1	12.6	59.1	8.7	46.5	11.9	61.7	8.8
36.9	6.8	40.2	7.5	33.9	12.5	33.3	8.6	38.9	10.6	32.9	8.6
5.8	3.7	8.7	4.5	10.0	7.2	7.6	4.1	14.7	10.4	5.4	4.0
50.4	5.8	54.1	7.0	53.4	9.2	52.8	5.7	53.9	9.4	52.8	6.6
41.2	5.1	35.2	5.6	35.4	8.3	32.9	5.2	32.6	9.1	34.0	6.3
8.3	3.3	10.7	3.2	11.3	5.4	14.3	4.2	13.6	7.3	13.2	5.1
48.4	6.9	53.9	7.9	60.4	9.5	53.5	5.6	48.9	9.1	52.6	7.0
44.3	6.2	34.0	7.4	31.1	9.1	36.1	6.3	35.8	8.1	42.1	6.9
7.3	3.1	12.1	4.8	8.5	5.5	10.4	4.4	15.3	5.6	5.4	3.1
54.7	11.7	49.5	12.0	41.5	17.6	57.0	11.5	44.7	18.2	50.2	12.1
29.2	9.9	42.8	12.7	46.1	16.8	30.1	9.2	42.7	18.5	37.1	11.7
16.1	7.9	7.7	6.0	12.5	9.0	13.0	6.8	12.5	11.0	12.7	7.9
44.9	14.9	48.1	15.6	71.9	17.1	47.5	13.2	65.7	18.7	51.6	15.3
38.8	13.9	37.9	15.6	22.6	12.5	40.1	11.5	31.1	18.3	36.7	14.8
16.3	13.0	14.0	9.6	5.5	9.8	12.5	9.2	3.3	6.4	11.7	10.9

‡95% confidence interval.
§Includes persons aged 25 years and older.
ΔLevels presented for 1965 are for persons who had a high school education or less and persons who attended some college or were college graduates.
NA = data not available.
Source: National Center for Health Statistics, public use data tapes, 1965–1995.

Table 48. Continued

	1985		1987		1988		1990	
Characteristic	%	±CI[‡]	%	±CI	%	±CI	%	±CI
Total								
<15 cigarettes	55.8	3.2	61.2	2.9	56.4	2.7	59.9	3.2
15–24 cigarettes	35.0	2.9	31.0	2.8	34.6	2.5	34.2	3.2
≥25 cigarettes	9.3	1.9	7.8	1.6	9.0	1.6	6.0	1.5
Gender								
Men								
<15 cigarettes	52.8	5.2	55.3	4.2	51.0	4.1	52.6	4.7
15–24 cigarettes	36.2	4.3	35.8	4.4	38.2	3.8	40.1	4.7
≥25 cigarettes	11.0	3.2	8.9	2.4	10.8	2.5	7.3	2.3
Women								
<15 cigarettes	58.7	3.9	67.9	3.5	62.2	3.9	68.8	3.6
15–24 cigarettes	33.7	3.8	25.7	3.2	30.7	3.6	26.9	3.4
≥25 cigarettes	7.6	2.0	6.5	1.8	7.2	2.0	4.3	1.7
Age (years)								
18–34								
<15 cigarettes	56.4	5.4	66.2	4.5	62.1	4.0	67.5	4.9
15–24 cigarettes	35.4	4.8	27.6	4.0	29.4	3.7	25.8	4.6
≥25 cigarettes	8.2	3.0	6.2	2.3	8.5	2.4	6.7	2.5
35–54								
<15 cigarettes	53.1	4.8	54.9	4.6	49.2	4.3	51.9	4.9
15–24 cigarettes	35.9	4.6	34.9	4.6	40.5	4.4	42.2	4.7
≥25 cigarettes	11.0	3.0	10.1	2.4	10.3	2.5	5.9	2.2
≥55								
<15 cigarettes	59.6	6.5	61.5	7.1	56.8	7.3	60.8	6.9
15–24 cigarettes	31.8	6.6	31.8	6.9	35.3	6.7	34.9	6.8
≥25 cigarettes	8.6	4.1	6.7	3.8	7.9	3.4	4.3	2.7
Education[§]								
Less than high school								
<15 cigarettes	57.9	5.0	62.8	4.3	51.4	4.5	54.1	5.8
15–24 cigarettes	31.8	4.8	27.7	4.5	38.0	4.5	39.2	5.7
≥25 cigarettes	10.3	3.2	9.5	2.9	10.6	3.0	6.7	2.6
High school								
<15 cigarettes	52.4	5.5	57.6	5.2	58.9	4.7	60.6	5.1
15–24 cigarettes	39.8	5.4	34.2	4.9	32.3	4.6	34.0	5.0
≥25 cigarettes	7.9	2.8	8.2	2.9	8.9	2.5	5.4	2.1
Some college								
<15 cigarettes	47.6	8.9	57.7	7.0	55.0	7.2	57.1	7.8
15–24 cigarettes	37.6	8.3	35.3	6.7	34.0	6.8	37.6	7.8
≥25 cigarettes	14.8	6.6	7.0	3.9	11.0	4.9	5.4	3.7
College								
<15 cigarettes	50.5	12.6	56.8	12.1	54.0	13.5	67.9	11.6
15–24 cigarettes	35.0	11.6	34.7	11.7	40.8	13.5	28.1	11.1
≥25 cigarettes	14.5	12.8	8.5	5.8	5.2	4.0	4.0	4.0

[‡]95% confidence interval.
[§]Includes persons aged 25 years and older.

1991		1992		1993		1994		1995	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
61.2	3.0	61.4	4.3	65.6	4.2	65.3	4.8	62.5	5.2
30.0	2.8	33.3	3.9	28.5	4.1	27.2	4.3	29.7	4.8
8.7	1.8	5.3	1.7	6.0	2.1	7.5	3.2	7.8	2.7
57.5	4.4	55.7	6.8	63.3	6.2	64.1	7.0	57.6	7.4
31.7	4.0	39.0	6.3	29.2	5.9	25.2	5.8	32.5	7.2
10.8	2.8	5.3	2.4	7.4	3.4	10.7	5.6	9.9	4.5
65.7	3.5	67.5	4.9	68.4	5.8	66.7	5.5	69.7	9.7
28.0	3.4	27.3	4.5	27.5	5.7	29.8	5.5	22.1	8.2
6.2	1.9	5.2	2.0	4.1	2.2	3.5	1.7	8.2	6.0
66.9	4.6	68.5	6.6	70.6	7.9	71.5	7.3	68.3	8.5
27.3	4.4	27.7	6.5	22.8	7.0	22.3	7.0	24.4	8.1
5.7	2.5	3.8	2.1	6.6	3.8	6.2	3.1	7.2	4.4
56.7	4.4	59.0	6.0	62.2	6.0	60.6	7.3	57.2	7.3
32.7	4.0	34.9	5.7	31.2	6.1	31.1	6.4	33.5	7.0
10.7	2.8	6.1	2.7	6.6	3.2	8.4	5.8	9.4	4.2
60.0	6.8	54.3	8.8	64.6	10.3	66.2	9.6	67.1	9.1
29.3	6.5	39.8	8.5	32.0	10.4	26.2	8.4	28.4	8.5
10.7	4.3	5.9	3.9	3.4	3.6	7.6	6.6	4.5	3.7
60.0	5.2	56.2	8.2	59.4	8.1	59.3	8.7	52.3	8.6
28.7	4.8	36.6	8.0	30.9	8.2	32.0	7.9	33.0	8.4
11.3	3.5	7.2	3.4	9.7	5.0	8.6	6.1	14.8	6.8
57.6	4.9	61.3	6.1	64.6	6.9	63.9	8.3	64.1	7.9
35.5	4.8	34.4	5.8	32.1	6.7	28.8	7.2	29.5	7.2
6.9	2.2	4.3	2.4	3.3	2.7	7.2	6.6	6.4	4.1
63.8	7.7	62.5	9.2	64.4	10.3	66.9	11.6	58.8	11.7
28.2	7.4	32.1	9.1	29.8	9.8	27.1	11.3	37.6	11.5
8.1	4.2	5.4	4.0	5.9	4.8	6.0	4.1	3.6	2.8
62.4	13.2	72.5	12.6	78.3	17.4	73.3	17.8	83.0	11.1
22.1	10.8	21.3	11.2	19.4	17.3	26.7	17.8	12.1	9.7
15.6	11.7	6.1	6.8	2.3	3.6	0.0	0.0	4.9	6.0

Table 49. Percentage of adult African American ever smokers who have quit,* overall and by gender, age, and education, National Health Interview Surveys, United States, 1965–1995

Characteristic	1965 %	1965 ±CI‡	1966 %	1966 ±CI	1970 %	1970 ±CI	1974 %	1974 ±CI
Total	15.5	1.7	14.2	1.7	20.6	1.5	19.7	2.4
Gender								
Men	16.1	2.2	15.5	2.2	22.2	2.0	21.7	3.6
Women	14.5	2.7	12.3	2.4	18.4	2.1	17.4	2.9
Age (years)								
18–34	8.3	2.0	7.2	1.8	12.8	1.8	13.0	3.9
35–54	16.7	2.6	14.0	2.4	21.1	2.0	16.9	3.3
≥55	29.3	5.2	32.4	5.4	37.4	3.6	38.1	5.8
Education§								
Less than high school	NA	NA	17.5	2.3	23.2	2.1	23.3	3.5
High school	18.2Δ	2.1	11.2	3.5	19.4	3.7	17.4	4.7
Some college	NA	NA	12.8	6.5	24.2	6.8	33.2	11.8
College	13.2Δ	5.7	19.9	8.6	33.9	9.9	20.4	9.9

Characteristic	1985 %	1985 ±CI	1987 %	1987 ±CI	1988 %	1988 ±CI	1990 %	1990 ±CI
Total	31.3	2.4	31.1	2.4	32.5	2.1	39.0	2.6
Gender								
Men	34.4	3.6	32.9	3.6	34.9	3.1	39.5	3.4
Women	27.9	3.3	29.0	2.7	29.7	3.0	38.4	3.5
Age (years)								
18–34	21.1	3.5	18.3	3.1	19.2	3.1	24.8	3.9
35–54	30.6	3.7	31.2	3.7	34.9	3.7	39.1	3.8
≥55	48.5	4.6	50.1	4.5	48.3	4.1	58.3	4.6
Education§								
Less than high school	32.8	3.6	34.2	3.7	35.8	3.4	40.4	4.4
High school	30.8	4.4	27.0	3.7	27.6	3.5	35.7	3.9
Some college	36.6	6.6	35.8	5.5	37.3	5.8	43.8	6.5
College	37.4	8.7	49.9	8.2	50.4	8.3	51.4	8.2

*Data collected before 1978 do not distinguish between African Americans of Hispanic origin and non-Hispanic African Americans; these data exclude those African Americans who indicated they were of Hispanic origin. The prevalence of cessation is the percentage of ever smokers who are former smokers. Former smokers are those who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they were not smoking.

†The 1976 and 1977 surveys collected data only for persons aged 20 years and older. The data for 1976 and 1977 were statistically adjusted to produce estimates for the total population, males, and females that approximate those for African Americans aged 18 years and older. Estimates for persons in the 18–34 year old age category were statistically adjusted to produce estimates that approximate those for African Americans aged 18–34 years old.

1976[†]		1977[†]		1978		1979		1980		1983	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
24.3	2.5	22.7	2.5	26.2	4.1	26.7	2.7	27.5	3.4	28.0	2.9
26.7	3.4	26.4	4.4	28.5	6.4	28.7	3.8	29.2	4.9	32.0	4.3
21.6	3.7	18.7	3.0	23.6	4.8	24.4	3.7	25.5	4.9	23.4	3.7
13.8	3.1	14.3	3.1	17.9	5.6	18.4	4.0	16.9	4.7	18.8	3.9
24.0	4.7	23.0	4.2	27.3	6.0	26.5	4.9	31.1	7.2	27.7	4.8
43.4	6.1	37.4	6.2	41.6	10.8	42.8	6.1	41.7	10.0	44.6	6.4
30.0	3.5	26.9	4.4	29.7	6.1	33.1	4.8	34.7	7.3	32.4	5.1
23.2	4.9	20.9	4.9	25.4	5.9	25.4	4.2	21.3	9.3	25.4	5.3
23.7	9.5	26.7	8.3	27.9	13.2	32.7	10.6	37.2	12.9	32.3	9.0
23.9	13.5	25.3	10.9	20.0	16.2	26.8	9.5	41.9	12.7	36.4	11.8

1991		1992		1993		1994		1995	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
33.4	2.6	36.4	3.3	37.8	3.4	34.7	3.5	36.1	3.9
34.2	3.6	40.1	5.2	37.9	4.8	34.1	5.3	35.9	5.3
32.4	3.2	31.9	4.0	37.6	4.8	35.3	4.3	36.4	5.3
17.2	3.6	23.9	7.2	23.3	5.8	16.7	5.6	22.7	6.2
31.8	3.5	31.3	4.5	35.5	5.1	34.1	5.3	32.1	5.9
56.4	5.2	57.4	5.4	56.0	6.7	53.8	6.2	55.6	6.1
35.8	4.5	38.9	5.6	41.2	6.1	34.5	5.6	39.3	5.9
29.4	3.4	33.5	5.8	33.3	5.4	32.3	6.2	30.8	6.3
33.0	5.5	37.7	7.6	40.3	7.7	37.6	8.7	37.0	9.2
51.2	9.1	43.9	11.8	55.1	12.2	50.3	13.0	51.7	11.3

[‡]95% confidence interval.
[§]Includes persons aged 25 years and older.
[Δ]Levels presented for 1965 are for persons who had a high school education or less and persons who attended some college or were college graduates.
NA = data not available.
Source: National Center for Health Statistics, public use data tapes, 1965–1995.

Table 50. Percentage of African American women of reproductive age who reported being current cigarette smokers,* overall and by education, National Health Interview Surveys, United States, 1965–1995

	1965		1966		1970		1974	
Characteristic	%	±CI‡	%	±CI	%	±CI	%	±CI
Total	42.9	2.9	42.6	2.9	38.6	3.1	41.1	3.5
Education§								
Less than high school	NA	NA	48.1	4.7	45.4	4.6	47.1	7.7
High school	45.0Δ	4.0	45.9	6.7	38.9	5.4	45.6	6.4
Some college	NA	NA	49.6	11.7	36.6	10.4	25.6	12.6
College	44.7Δ	9.6	42.9	10.9	41.2	9.2	52.7	13.3

	1985		1987		1988		1990	
Characteristic	%	±CI	%	±CI	%	±CI	%	±CI
Total	34.0	2.8	31.4	2.5	29.8	2.4	22.7	2.1
Education§								
Less than high school	54.3	6.8	49.1	6.0	47.2	6.1	38.2	6.8
High school	36.9	4.9	35.8	4.3	33.2	4.1	30.7	4.3
Some college	34.0	7.1	32.4	5.6	28.9	5.0	21.2	4.1
College	21.3	7.3	19.7	6.5	20.2	6.0	14.9	5.8

*Data collected before 1978 do not distinguish between African Americans of Hispanic origin and non-Hispanic African Americans; these data exclude those African Americans who indicated they were of Hispanic origin. For 1965–1991, current cigarette smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked. For 1992–1995, current smokers include women aged 18–44 years who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked every day or on some days.

1976[†]		1977[†]		1978		1979		1980		1983	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
38.8	4.2	41.7	4.0	36.4	6.3	35.2	3.0	34.6	5.4	34.3	3.4
45.3	7.1	44.0	9.0	41.5	10.3	43.2	8.9	35.7	12.9	49.6	8.9
39.1	7.3	49.3	7.6	36.4	7.7	34.5	6.8	40.0	10.0	36.5	6.2
46.0	9.6	41.4	10.5	53.0	15.3	33.2	9.7	30.5	11.8	29.3	8.4
35.5	15.4	36.6	15.1	45.9	19.2	36.2	10.3	31.0	17.4	22.5	9.2

1991		1992		1993		1994		1995	
%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
28.1	2.4	24.5	2.9	23.1	2.9	22.9	1.8	23.8	3.9
50.4	6.1	45.9	10.0	45.6	9.4	43.6	9.4	49.6	12.3
32.4	4.0	29.8	5.2	30.2	5.5	26.1	5.2	30.6	6.9
31.5	5.6	26.1	6.7	26.3	6.5	27.4	8.2	24.9	7.6
19.8	6.6	18.5	8.2	8.2	6.0	8.0	5.7	13.6	7.9

[†]The 1976 and 1977 surveys collected data only for persons aged 20 years and older. The data for 1976 and 1977 were statistically adjusted to produce estimates that approximate those for African American women aged 18–44 years.

[‡]95% confidence interval.

[§]Includes persons aged 25 years and older.

[Δ]Levels presented for 1965 are for persons who had a high school education or less and persons who attended some college or were college graduates.

NA = data not available.

Source: National Center for Health Statistics, public use data tapes, 1965–1995.

Appendix 5. Validation of the Retrospective Assessment of Smoking Prevalence

Because the method of computing smoking prevalences retrospectively is inherent in the birth cohort analyses described in this chapter, comparability of these estimates with accepted cross-sectional estimates was examined. At least two factors contribute to the observed difference between retrospective and cross-sectional estimates of smoking prevalence: how a former smoker is defined and differences in mortality between smokers and nonsmokers (differential mortality). Retrospective estimates will be greater than cross-sectional ones because they are based on the age at which a smoker *quits once and for all*. However, cross-sectional estimates, using the accepted definition of a former smoker (a person who has ever smoked 100 cigarettes but does not smoke *now*), classify ever smokers who are not currently smoking as quitters, even though many will relapse several times before finally quitting. Differential mortality results in retrospective estimates smaller than cross-sectional ones because smokers are less likely than others to survive and report their smoking history. This factor affects only the older birth cohorts (Harris 1983).

Retrospective estimates of smoking prevalence were assessed by comparing them with smoking prevalence estimates from the NHISs from 1965 through 1988 and from Gallup surveys from 1944 through 1988. The NHIS and Gallup surveys both sample adults only; thus, for the comparison, retrospective prevalences computed for each year included only respondents aged 18 years and older in that calendar year. Sample sizes for the birth cohorts included in this analysis varied widely (Table 51) (NCHS, public use data tapes, 1978, 1979, 1980, 1982–1984 [HHANES], and 1987 and 1988 combined).

When this methodology was used to estimate smoking prevalences retrospectively for the national

Table 51. Sample sizes for birth cohorts, by gender, race/ethnicity, and education,[*] National Health Interview Surveys, 1978–1980, 1987 and 1988 combined, and Hispanic Health and Nutrition Examination Survey, 1982–1984

	Men				Women			
	African American		Hispanic		African American		Hispanic	
Birth Cohort	<HS	≥HS	<HS	≥HS	<HS	≥HS	<HS	≥HS
1908–1917	401	96	142	33	601	185	229	30
1918–1927	494	222	267	111	683	444	376	113
1928–1937	370	387	387	178	531	638	508	233
1938–1947	292	622	266	226	457	1,013	392	277
1948–1957	277	1,066	322	375	555	2,006	417	462
1958–1967[†]	175	755	180	255	415	1,510	224	319

[*]Education was identified as either <12 years of school completed (<HS [high school]) or ≥12 years of school completed (≥HS).

[†]The smoking experience of this cohort is still incomplete.

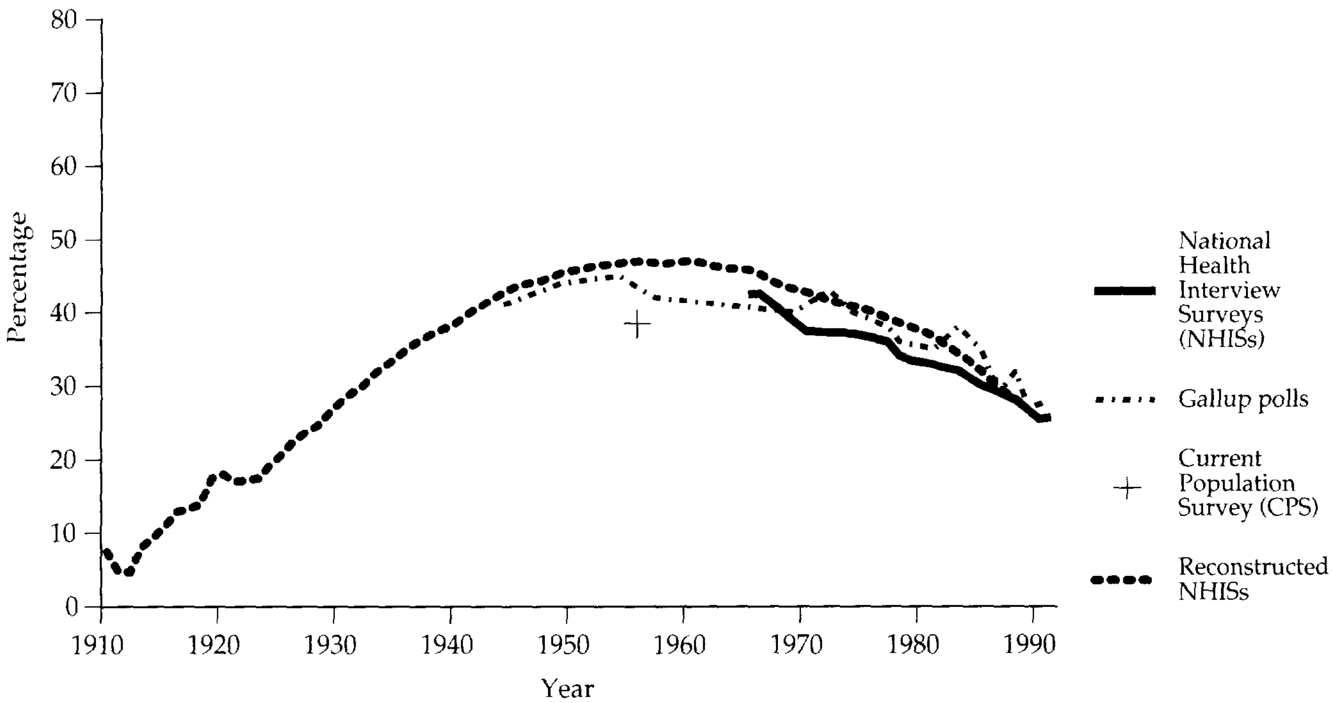
Source: National Center for Health Statistics, public use data tapes, 1978, 1979, 1980, 1982–1984 (Cancer Control Supplement and Epidemiology Supplement), and 1987 and 1988 combined.

samples of the combined 1978, 1979, 1980, 1987, and 1988 NHISs, the prevalence of smoking in the U.S. population was estimated at approximately 10 percent in 1910, and it gradually increased before peaking in 1960 at approximately 50 percent (Figure 16). The prevalence then declined gradually to 28 percent in 1988.

Data from successive Gallup polls administered since 1944 show a somewhat lower smoking prevalence than do retrospective estimates, especially between 1956 and 1970. Both the NHIS and the Gallup poll estimates follow a similar trend. For most years, retrospective estimates are slightly higher than those estimated from cross-sectional surveys (Table 52) (NCHS, public use data tapes, 1978, 1979, 1980, 1982–1984 [HHANES], and 1987 and 1988 combined). In addition, the estimate for the 1955 CPS (37.6 percent) is slightly lower than that estimated from the retrospective NHIS estimates (Figure 16). These findings are probably accounted for by the surveys' differing definitions of former smoker.

The overall agreement of the retrospective prevalences with cross-sectional NHIS and Gallup poll data supports the validity of the prevalence estimates among successive birth cohorts for the population subgroups presented in this chapter.

Figure 16. Comparison of smoking prevalence estimates from selected U.S. surveys, 1910–1991



Sources: Reconstructed estimates for 1910–1988 from the 1987–1988 combined NHISs (National Center for Health Statistics [NCHS], public use data tapes, 1987–1988); 1944–1991 Gallup polls (Thomas and Larsen 1993); 1955 CPS (USDHHS 1988); and 1965–1991 NHISs (NCHS, public use data tapes, 1965–1991).

Table 52. Comparison of current smoking prevalence* (%) between reconstructed estimates from National Health Interview Surveys (NHISs), 1987 and 1988 combined, NHIS cross-sectional survey estimates, and Gallup poll estimates

	Reconstructed NHISs	Cross-sectional NHISs		Gallup Polls	
Year	Estimate	Estimate	Difference†	Estimate	Difference†
1944	42.7	NA	NA	41	–1.7
1949	45.4	NA	NA	44	–1.4
1954	46.7	NA	NA	45	–1.7
1957	46.7	NA	NA	42	–4.7
1965	45.8	42.4	–3.4	NA	NA
1966	45.3	42.6	–2.7	NA	NA
1969	43.2	NA	NA	40	–3.2
1970	42.7	37.4	–5.3	NA	NA
1971	42.3	NA	NA	42	–0.3
1972	41.5	NA	NA	43	+1.5
1974	40.8	37.1	–3.7	40	–0.8
1976	39.9	36.4	–3.5	NA	NA
1977	39.2	36.0	–3.2	38	–1.2
1978	38.5	34.1	–4.4	36	–2.5
1979	38.0	33.5	–4.5	NA	NA
1980	37.4	33.2	–4.2	NA	NA
1981	36.7	NA	NA	35	–1.7
1983	34.4	32.1	–2.3	38	+3.6
1985	32.1	30.1	–2.0	35	+2.9
1986	30.5	NA	NA	31	+0.5
1987	29.2	28.8	–0.4	30	+0.8
1988	28.2	28.1	–0.1	32	+3.8

*In the NHIS, current smokers are persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked; in the Gallup poll, current smokers are persons who reported at the time of poll that they had smoked any cigarettes in the past week.

†Difference between the survey estimate and the reconstructed prevalence estimate.

NA = data not available.

Sources: National Center for Health Statistics, public use data tapes, 1965, 1966, 1970, 1974, 1976, 1977, 1978, 1979, 1980, 1983, 1985, and 1987 and 1988 combined; Gallup and Newport 1990.

References

Andreski P, Breslau N. Smoking and nicotine dependence in young adults: differences between blacks and whites. *Drug and Alcohol Dependence* 1993; 32(2):11–925.

Austin GA, Prendergast ML, Lee H. *Substance Abuse Among Asian American Youth: Prevention Research Update* 1989;5(Winter):1–29.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1976.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1980a.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1978.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1980b.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1980.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1981.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1982.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1984.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1984.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1985.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1986.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1987.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1988.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1991a.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1990.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1993a.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1992.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1993b.

Bachman JG, Johnston LD, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1994.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1997.

Bachman JG, Wallace JM Jr, O'Malley PM, Johnston LD, Kurth CL, Neighbors HW. Racial/ethnic differences in smoking, drinking, and illicit drug use among American high school seniors, 1976–89. *American Journal of Public Health* 1991b;81(3):372–7.

Backinger CL, Bruerd B, Kinney MB, Szpunar SM. Knowledge, intent to use, and use of smokeless tobacco among sixth grade schoolchildren in six selected U.S. sites. *Public Health Reports* 1993;108(5):637–42.

Bauman KE, Ennett SE. Tobacco use by black and white adolescents: the validity of self-reports. *American Journal of Public Health* 1994;84(3):394–8.

Bauman KE, Koch GG, Fisher LA, Bryan ES. Use of smokeless tobacco by age, race, and gender in ten standard metropolitan statistical areas of the Southeast United States. In: National Cancer Institute. *Smokeless Tobacco Use in the United States.* National Cancer Institute Monograph No. 8. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Division of Cancer Prevention and Control, Smoking, Tobacco, and Cancer Program. NIH Publication No. 89-3055, 1989:35–7.

Benowitz NL, Pérez-Stable E, Herrera B, Jacob P. African American-Caucasian differences in nicotine and cotinine metabolism [abstract]. *Clinical Pharmacology and Therapeutics* 1995;57(2):159.

Blaisdell RK. The health status of the Kanaka Maoli. *Asian American and Pacific Islander Journal of Health* 1993;1(2):116–60.

Blum RW, Harmon B, Harris L, Bergeisen L, Resnick MD. American Indian-Alaska Native youth health. *Journal of the American Medical Association* 1992;267 (12):1637–44.

Bruerd B. Smokeless tobacco use among Native American children. *Public Health Reports* 1990;105 (2):196–201.

Burns D, Pierce JP. *Tobacco Use in California, 1990–1991.* Sacramento (CA): California Department of Health Services, 1992.

Camp DE, Klesges RC, Relyea G. The relationship between body weight concerns and adolescent smoking. *Health Psychology* 1993;12(1):24–32.

Centers for Disease Control. *Oneida Indian Nation of New York Health Needs Assessment 1990.* Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, 1990.

Centers for Disease Control. Cigarette smoking among reproductive-aged women—Behavioral Risk Factor Surveillance System, 1989. *Morbidity and Mortality Weekly Report* 1991a;40(42):719–23.

Centers for Disease Control. Cigarette smoking among youth—United States, 1989. *Morbidity and Mortality Weekly Report* 1991b;40(41):712–5.

Centers for Disease Control. Differences in the age of smoking initiation between blacks and whites—United States. *Morbidity and Mortality Weekly Report* 1991c;40(44):754–7.

Centers for Disease Control. Cigarette smoking among American Indians and Alaskan Natives—Behavioral Risk Factor Surveillance System, 1987–1991. *Morbidity and Mortality Weekly Report* 1992a;41(45):861–3.

Centers for Disease Control. Cigarette smoking among Chinese, Vietnamese, and Hispanics—California, 1989–1991. *Morbidity and Mortality Weekly Report* 1992b;41(20):362–7.

Centers for Disease Control. Cigarette smoking among Southeast Asian immigrants—Washington State, 1989. *Morbidity and Mortality Weekly Report* 1992c;41(45): 854–61.

Centers for Disease Control. Comparison of the cigarette brand preferences of adult and teenaged smokers—United States, 1989, and 10 U.S. communities, 1988 and 1990. *Morbidity and Mortality Weekly Report* 1992d;41(10):169–73, 179–81.

Centers for Disease Control. *Using Chronic Disease Data: A Handbook for Public Health Practitioners.* Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Office of Surveillance and Analysis, 1992e.

Centers for Disease Control and Prevention. Smoking cessation during previous year among adults—United States, 1990 and 1991. *Morbidity and Mortality Weekly Report* 1993:42(26):504–7.

Centers for Disease Control and Prevention. Changes in the cigarette brand preferences of adolescent smokers—United States, 1989–1993. *Morbidity and Mortality Weekly Report* 1994a;43(32):577–81.

Centers for Disease Control and Prevention. Cigarette smoking among women of reproductive age—United States, 1987–1992. *Morbidity and Mortality Weekly Report* 1994b;43(43):789–91, 797.

Centers for Disease Control and Prevention. Surveillance for selected tobacco-use behaviors—United States, 1900–1994. *Morbidity and Mortality Weekly Report* 1994c;43(SS-3):1–43.

Centers for Disease Control and Prevention. Smokeless tobacco use among American Indian women—Southeastern North Carolina, 1991. *Morbidity and Mortality Weekly Report* 1995;44(6):113–7.

Centers for Disease Control and Prevention. Tobacco use and usual source of cigarettes among high school students—United States, 1995. *Morbidity and Mortality Weekly Report* 1996;45(20):413–8.

Centers for Disease Control and Prevention. Behavioral Risk Factor Survey of Korean Americans—Alameda County, California, 1994. *Morbidity and Mortality Weekly Report* 1997a;46(33):774–7.

Centers for Disease Control and Prevention. Cigar smoking among teenagers—United States, Massachusetts, and New York, 1996. *Morbidity and Mortality Weekly Report* 1997b;46(20):433–40.

Chandra A. Health Aspects of Pregnancy and Childbirth: United States, 1982–88. *Vital and Health Statistics*. Series 23, No. 18. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics. DHHS Publication No. (PHS) 95-1994, 1995.

Chen VW. Smoking and the health gap in minorities. *Annals of Epidemiology* 1993;3(2):159–64.

Clark PI, Gautam S, Gerson LW. Effect of menthol cigarettes on biochemical markers of smoke exposure among black and white smokers. *Chest* 1996;110(5):1194–8.

Crawford FG, Mayer J, Santella RM, Cooper TB, Ottman R, Tsai WY, et al. Biomarkers of environmental tobacco smoke in preschool children and their mothers. *Journal of the National Cancer Institute* 1994;86(18):1398–402.

Cummings KM, Giovino G, Mendicino AJ. Cigarette advertising and black-white differences in brand preferences. *Public Health Reports* 1987;102(6):698–701.

Davis RL, Helgerson SD, Waller P. Smoking during pregnancy among Northwest Native Americans. *Public Health Reports* 1992;107(1):66-9.

Delgado JL, Johnson CL, Roy I, Treviño FM. Hispanic Health and Nutrition Examination Survey: Methodological Considerations. *American Journal of Public Health* 1990;80(Suppl):6–10.

Dusenbury L, Kerner JF, Baker E, Botvin G, James-Ortiz S, Zauber A. Predictors of smoking prevalence among New York Latino youth. *American Journal of Public Health* 1992;82(1):55–8.

Escobedo LG, Anda RF, Smith PF, Remington PL, Mast EE. Sociodemographic characteristics of cigarette smoking initiation in the United States: implications for smoking prevention policy. *Journal of the American Medical Association* 1990;264(12):1550–5.

Escobedo LG, Peddicord JP. Smoking prevalence in US birth cohorts: the influence of gender and education. *American Journal of Public Health* 1996;86(2):231–6.

Escobedo LG, Reddy M, DuRant RH. Relationship between cigarette smoking and health risk and problem behaviors among US adolescents. *Archives of Pediatrics and Adolescent Medicine* 1997;151(1):66–71.

Escobedo LG, Remington PL. Birth cohort analysis of prevalence of cigarette smoking among Hispanics in the United States. *Journal of the American Medical Association* 1989;261(1):66–9.

Escobedo LG, Remington PL, Anda RF. Long-term age-specific prevalence of cigarette smoking among Hispanics in the United States. *Journal of Psychoactive Drugs* 1989a;21(3):307–18.

Escobedo LG, Remington PL, Anda RF. Long-term secular trends in initiation of cigarette smoking among Hispanics in the United States. *Public Health Reports* 1989b;104(6):583–7.

Escobedo LG, Zhu BP, Giovino GA, Eriksen MP. Educational attainment and racial differences in cigarette smoking. *Journal of the National Cancer Institute* 1995;87(20):1552–3.

Etzel RA, Jones DB, Schlife CM, Lyke JR, Spierto FW, Middaugh JP. Passive smoking and tobacco chewing among Alaskan children: measuring saliva cotinine. *Journal of Smoking-Related Diseases* 1992;3(2):161–5.

Faulkner DL, Escobedo LG, Zhu BP, Chrismon JH, Merritt RK. Race and the incidence of cigarette smoking among adolescents in the United States. *Journal of the National Cancer Institute* 1996;88(16):1158–60.

Fiore MC, Novotny TE, Pierce JP, Hatziandreu EJ, Patel KM, Davis RM. Trends in cigarette smoking in the United States: the changing influence of gender and race. *Journal of the American Medical Association* 1989;261(1):49–55.

Flay BR, Brannon BR, Johnson CA, Hansen WB, Ulene AL, Whitney-Saltiel DA, et al. The Television School and Family Smoking Prevention and Cessation Project. *Preventive Medicine* 1988;17(5):585–607.

Floyd RL, Rimer BK, Giovino GA, Mullen PD, Sullivan SE. A review of smoking in pregnancy: effects on pregnancy outcomes and cessation efforts. *Annual Review of Public Health* 1993;14:379–411.

Gallup G Jr, Newport F. Many Americans favor restrictions on smoking in public places. *The Gallup Poll Monthly* 1990;298(July):19–27.

Gentry EM, Kalsbeek WD, Hogelin GC, Jones JT, Gaines KL, Forman MR, et al. The Behavioral Risk Factor Surveys: II. Design, methods, and estimates from combined state data. *American Journal of Preventive Medicine* 1985;1(6):9–14.

Goldberg HI, Warren CW, Oge LL, Friedman JS, Helgerson SD, Pepion DD, et al. Prevalence of behavioral risk factors in two American Indian populations in Montana. *American Journal of Preventive Medicine* 1991;7(3):155–60.

Gong YL, Koplan JP, Feng W, Chen CHC, Zheng P, Harris JR. Cigarette Smoking in China: prevalence, characteristics, and attitudes in Minhang district. *Journal of the American Medical Association* 1995; 274(15):1232–4.

Greenlund KJ, Johnson C, Wattigney W, Bao W, Webber LS, Berenson GS, et al. Trends in cigarette smoking among children in a southern community, 1976–1994: the Bogalusa Heart Study. *Annals of Epidemiology* 1996;6(6):476–482.

Guendelman S, Abrams B. Dietary, alcohol, and tobacco intake among Mexican-American women of childbearing age: results from HANES data. *American Journal of Health Promotion* 1994;8(5):363–72.

Harris JE. Cigarette smoking among successive birth cohorts of men and women in the United States during 1900-80. *Journal of the National Cancer Institute* 1983; 71(3):473–9.

Hawks BL. Smoking and smoking-related cancers among Asian and Pacific Islander Americans. In: Jones LA, editor. *Minorities and Cancer.* New York: Springer-Verlag, 1989:137–51.

Haynes SG, Harvey C, Montes H, Nickens H, Cohen BH. VIII. Patterns of cigarette smoking among Hispanics in the United States: results from HHANES 1982–84. *American Journal of Public Health* 1990;80 (Suppl):47–54.

Hodge FS, Cummings S, Fredericks L, Kipnis P, Williams M, Teehee K. Prevalence of smoking among adult American Indian clinic users in northern California. *Preventive Medicine* 1995;24(5):441–6.

Hunter SM, Croft JB, Burke GL, Parker FC, Webber LS, Berenson GS. Longitudinal patterns of cigarette smoking and smokeless tobacco use in youth: the Bogalusa Heart Study. *American Journal of Public Health* 1986;76(2):193–5.

Husten CG, McCarty MC, Giovino GA, Chrismon JH, Zhu B-P. Intermittent smokers: a descriptive analysis of persons who have never smoked daily. *American Journal of Public Health* 1998;88(1):86–9.

Hymowitz N, Sexton M, Ockene J, Grandits G. Baseline factors associated with smoking cessation and relapse. *Preventive Medicine* 1991;20(5):590–601.

Hymowitz N, Mouton C, Edkholdt H. Menthol cigarette smoking in African Americans and whites [letter]. *Tobacco Control* 1995;4(2):194–5.

Jenkins CNH, McPhee SJ, Bird JA, Bonilla N-TH. Cancer risks and prevention practices among Vietnamese refugees. *Western Journal of Medicine* 1990;153(1):34–9.

Jenkins CNH, Dai PX, Ngoc DH, Kinh HV, Hoang TT, Bales S, et al. Tobacco use in Vietnam: prevalence, predictors, and the role of the transnational tobacco corporations. *Journal of the American Medical Association* 1997a;277(21):1726–31.

Jenkins CNH, McPhee SJ, Le A, Pham GQ, Ha N-T, Stewart S. The effectiveness of a media-led intervention to reduce smoking among Vietnamese-American men. *American Journal of Public Health* 1997b;87(6): 1031–4.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1977.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1980a.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1979.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1980b.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1981.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1982.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1983.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1984.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1985.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1986.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1987.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1991.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1989.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1992.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1991.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1993a.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1993.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1995a.

Johnston LD, Bachman JG, O'Malley PM. *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1995.* Ann Arbor (MI): Survey Research Center, Institute for Social Research, University of Michigan, 1997.

Johnston LD, O'Malley PM, Bachman JG. *National Survey Results on Drug Use from Monitoring the Future Study, 1975–1992: Volume 1, Secondary School Students.* Rockville (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse. NIH Publication No. 93-3597, 1993b.

Johnston LD, O'Malley PM, Bachman JG. *National Survey Results on Drug Use from Monitoring the Future Study, 1975–1994: Volume 1, Secondary School Students.* Rockville (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse. NIH Publication No. 95-4026, 1995b.

Johnston LD, O'Malley PM, Bachman JG. *National Survey Results on Drug Use from the Monitoring the Future Study, 1975–1995: Volume 1, Secondary School Students.* Rockville (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse. NIH Publication No. 96-4139, 1996.

Kimball EH, Goldberg HI, Oberle MW. *Western Washington Native American Behavioral Risk Factor Survey, 1989, Final Report.* Washington (DC): Chehalis, Hoh, Quinault, and Shoalwater Bay Indian Tribes, Indian Health Service, Centers for Disease Control, University of Washington School of Public Health and Community Medicine, reprinted by the US Department of Health and Human Services, Public Health Service, 1990.

Klatsky AL, Armstrong MA. Cardiovascular risk factors among Asian Americans living in northern California. *American Journal of Public Health* 1991;81(11): 1423–8.

Kleinman JC, Kopstein A. Smoking during pregnancy, 1967–80. *American Journal of Public Health* 1987; 77(7):823–5.

Knight JM, Eliopoulos C, Klein J, Greenwald M, Koren G. Passive smoking in children: racial differences in systemic exposure to cotinine by hair and urine analysis. *Chest* 1996;109(2):446–50.

Koepke D, Flay BR, Johnson CA. Health behaviors in minority families: the case of cigarette smoking. *Family and Community Health* 1990;13(1):35–43.

Kolbe LJ. An epidemiological surveillance system to monitor the prevalence of youth behaviors that most affect health. *Health Education* 1990;21(6):44–8.

Kolbe LJ, Kann L, Collins JL. Overview of the Youth Risk Behavior Surveillance System. *Public Health Reports* 1993;108(1 Suppl):2–10.

Kominski R, Adams A. *Educational Attainment in the United States: March 1993 and 1992*. Washington (DC): US Government Printing Office. Current Population Reports, P20–476, 1994.

Koong SL, Malison MD, Nakashima AK. A prevalence survey of behavioural risk factors in Taipei City, Taiwan. *International Journal of Epidemiology* 1990;19 (1):154–9.

Kopstein AN, Roth PT. *Drug Abuse Among Racial/Ethnic Groups*. Rockville (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse, 1993.

Lando HA, Johnson KM, Graham-Tomasi RP, McGovern PG, Solberg L. Urban Indians' smoking patterns and interest in quitting. *Public Health Reports* 1992;107(3):340–4.

Lefkowitz D, Underwood C. *Personal Health Practices: Findings from the Survey of American Indians and Alaska Natives*. National Medical Expenditure Survey Research Findings 10. Rockville (MD): US Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research. AHCPR Publication No. 91-0034, 1991.

Leonard B, Paisano R, Smith EM, Kileen MJ, Cobb N. IHS Tobacco Project. *The IHS Primary Care Provider* 1993;18(6):107–16.

Li VC, Hu J-H, Zhou M, Zheng J. Behavioral aspects of cigarette smoking among industrial college men of Shanghai, China. *American Journal of Public Health* 1988;78(12):1550–3.

Liberatos P, Link BG, Kelsey JL. The measurement of social class in epidemiology. *Epidemiologic Reviews*. Vol. 10. Baltimore (MD): The Johns Hopkins University School of Hygiene and Public Health, 1988:87–121.

Lovato CY, Litrownik AJ, Elder J, Nuñez-Liriano A, Suarez D, Talavera GA. Cigarette and alcohol use among migrant Hispanic adolescents. *Family & Community Health* 1994;16(4):23–36.

Lowry R, Kann L, Collins JL, Kolbe LJ. The effect of socioeconomic status on chronic disease risk behaviors among US adolescents. *Journal of the American Medical Association* 1996;276(10):792–7.

Marcus AC, Crane LA, Shopland DR, Lynn WR. Use of smokeless tobacco in the United States: recent estimates from the Current Population Survey. In: National Cancer Institute. *Smokeless Tobacco Use in the United States*. National Cancer Institute Monograph No. 8. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Division of Cancer Prevention and Control, Smoking, Tobacco, and Cancer Program. NIH Publication No. 89-3055, 1989:17–23.

McIntosh H. Black teens not smoking in great numbers. *Journal of the National Cancer Institute* 1995; 87(8):564.

McPhee SJ, Jenkins CNH, Anh L. *Smoking Prevention and Cessation Among Vietnamese in Northern California: Final Report*. Sacramento (CA): Report submitted to the Tobacco Control Section, Department of Health Services, State of California, 1993.

McPhee SJ, Jenkins CNH, Wong C, Fordham D, Lai KQ, Bird JA, Moskowitz JM. Smoking cessation intervention among Vietnamese Americans: a controlled trial. *Tobacco Control* 1995;4(Suppl 1):16S–24S.

Mermelstein R, Robinson R, Ericksen M, Crosset L, Feldman S. Explanations of race and gender differences in teen tobacco use. Paper presented at the 124th annual meeting of the American Public Health Association, New York City, November 19, 1996.

Montgomery LE, Carter-Pokras O. Health status by social class and/or minority status: implications for environmental equity research. *Toxicology and Industrial Health* 1993;9(5):729–73.

Moss AJ, Allen KF, Giovino GA, Mills SL. Recent Trends in Adolescent Smoking, Smoking-Uptake Correlates, and Expectations About the Future. *Advance Data*. No. 221. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics. DHHS Publication No. (PHS) 93-1250, 1992.

National Cancer Institute. *Strategies to Control Tobacco Use in the United States: A Blueprint for Public Health Action in the 1990's*. Smoking and Tobacco Control Monograph No. 1. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 92-3316, 1991.

National Center for Health Statistics. Health Interview Survey Procedure, 1957–1974. *Vital and Health Statistics.* Series 1, No. 11. Rockville (MD): US Department of Health, Education, and Welfare, Public Health Service, Health Resources Administration, National Center for Health Statistics. DHEW Publication No. (HRA) 75-1311, 1975.

National Center for Health Statistics. The National Health Interview Survey Design, 1973–84, and Procedures, 1975–83. *Vital and Health Statistics.* Series 1, No. 18. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, National Center for Health Statistics. DHHS Publication No. (PHS) 85-1320, 1985a.

National Center for Health Statistics. Plan and Operation of the Hispanic Health and Nutrition Examination Survey, 1982–84. *Vital and Health Statistics.* Series 1, No. 19. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, National Center for Health Statistics. DHHS Publication No. (PHS) 85-1321, 1985b.

National Center for Health Statistics. Design and Estimation for the National Health Interview Survey, 1985–94. *Vital and Health Statistics.* Series 2, No. 110. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, National Center for Health Statistics. DHHS Publication No. (PHS) 89-1384, 1989.

National Center for Health Statistics. Advance Report on New Data from the 1989 Birth Certificate. *Monthly Vital Statistics Report* 1992;40(12 Suppl).

National Center for Health Statistics. Advance Report of Maternal and Infant Health Data from the Birth Certificate, 1990. *Monthly Vital Statistics Report* 1993;42(2 Suppl).

National Center for Health Statistics. Advance Report of Maternal and Infant Health Data from the Birth Certificate, 1991. *Monthly Vital Statistics Report* 1994;42(11 Suppl).

National Center for Health Statistics. *Health, United States,* 1995. Hyattsville (MD): Public Health Service. DHHS Publication No. (PHS) 96-1232, 1996.

National Institute on Drug Abuse. *Summary Tables: Annualized Estimates from the National Pregnancy and Health Survey.* Rockville (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse, 1994.

Navarro AM. Cigarette smoking among adult Latinos: the California Tobacco Baseline Survey. *Annals of Behavioral Medicine* 1996;18(4)238–45.

Nelson DE, Giovino GA, Shopland DR, Mowery PD, Mills SL, Eriksen MP. Trends in cigarette smoking among US adolescents, 1974 through 1991. *American Journal of Public Health* 1995;85(1):34–40.

Novotny TE, Pierce JP, Fiore MC, Davis RM. Smokeless tobacco use in the United States: the Adult Use of Tobacco Surveys. In: National Cancer Institute. *Smokeless Tobacco Use in the United States.* National Cancer Institute Monograph No. 8. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Division of Cancer Prevention and Control, Smoking, Tobacco, and Cancer Program. NIH Publication No. 89-3055, 1989:25–8.

Novotny TE, Warner KE, Kendrick JS, Remington PL. Smoking by blacks and whites: socioeconomic and demographic differences. *American Journal of Public Health* 1988;78(9):1187–9.

Overpeck MD, Moss AJ. Children's Exposure to Environmental Cigarette Smoke Before and After Birth: Health of Our Nation's Children, United States, 1988. *Advance Data.* No. 202. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Health Statistics. DHHS Publication No. (PHS) 91-1250, 1991.

Pamuk ER, Mosher WD. Health Aspects of Pregnancy and Childbirth: United States, 1982. *Vital and Health Statistics.* Series 23, No. 16. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Health Statistics. DHHS Publication No. (PHS) 89-1992, 1992.

Parnell K, Sargent R, Thompson SH, Duhe SF, Valois RF, Kemper RC. Black and white adolescent females' perceptions of ideal body size. *Journal of School Health* 1996;66(3):112–8.

Pattishall EN, Strope GL, Etzel RA, Helms RW, Haley NJ, Denny FW. Serum cotinine as a measure of tobacco smoke exposure in children. *American Journal of Diseases of Children* 1985;139(11):1101–4.

Pierce JP, Fiore MC, Novotny TE, Hatziandreu EJ, Davis RM. Trends in cigarette smoking in the United States: educational differences are increasing. *Journal of the American Medical Association* 1989;261(1):56–60.

Pierce JP, Gilpin E, Burns DM, Whalen E, Rosbrook B, Shopland D, et al. Does tobacco advertising target young people to start smoking? evidence from California. *Journal of the American Medical Association* 1991a; 266(22):3154–8.

Pierce JP, Naquin M, Gilpin E, Giovino G, Mills S, Marcus S. Smoking initiation in the United States: a role for worksite and college smoking bans. *Journal of the National Cancer Institute* 1991b;83(14):1009–13.

Pirkle JL, Flegal KM, Bernert JT, Brody DJ, Etzel RA, Maurer KR. Exposure of the U.S. population to environmental tobacco smoke: the third National Health and Nutrition Examination Survey, 1988–1991. *Journal of the American Medical Association* 1996;275(16): 1233–40.

Pletsch PK. Prevalence of cigarette smoking in Hispanic women of childbearing age. *Nursing Research* 1991;40(2):103–6.

Remington PL, Smith MY, Williamson DF, Anda RF, Gentry EM, Hogelin GC. Design, characteristics, and usefulness of state-based behavioral risk factor surveillance: 1981–87. *Public Health Reports* 1988;103(4): 366–75.

Roscoe RJ, Deddens JA, Salvan A, Schnorr TM. Mortality among Navajo uranium miners. *American Journal of Public Health* 1995;85(4):535–40.

Rouse BA. Epidemiology of smokeless tobacco use: a national study. In: National Cancer Institute. *Smokeless Tobacco Use in the United States.* National Cancer Institute Monograph No. 8. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Cancer Institute, Division of Cancer Prevention and Control, Smoking, Tobacco, and Cancer Program. NIH Publication No. 89-3055, 1989: 29–33.

Royce JM, Hymowitz N, Corbett K, Hartwell TD, Orlandi MA, for the COMMIT Research Group. Smoking cessation factors among African Americans and whites. *American Journal of Public Health* 1993;83(2): 220–6.

Samet JM, Howard CA, Coultas DB, Skipper BJ. Acculturation, education, and income as determinants of cigarette smoking in New Mexico Hispanics. *Cancer Epidemiology, Biomarkers & Prevention* 1992;1(3): 235–40.

Shah BV. *SESUDAAN: Standard Errors Program for Computing of Standardized Rates from Sample Survey Data.* Research Triangle Park (NC): Research Triangle Institute, 1981.

Shah BV, Barnwell BG, Hunt PN, LaVange LM. *SUDAAN: Professional Software for Survey Data Analysis (SUDAAN User's Manual, Release 5.50).* Research Triangle Park (NC): Research Triangle Institute, 1991.

Sheridan DP, Hornung CA, McCutcheon EP, Wheeler FC. Demographic and educational differences in smoking in a tobacco-growing state. *American Journal of Preventive Medicine* 1993;9(3):155–9.

Shopland DR, Hartman AM, Gibson JT, Mueller MD, Kessler LG, Lynn WR. Cigarette smoking among U.S. adults by state and region: estimates from the Current Population Survey. *Journal of the National Cancer Institute* 1996;88(23):1748–58.

Smith KW, McGraw SA, Carrillo JE. Factors affecting cigarette smoking and intention to smoke among Puerto Rican-American high school students. *Hispanic Journal of Behavioral Sciences* 1991;13(4):401–11.

Sugarman JR, Brenneman G, LaRoque W, Warren CW, Goldberg HI. The urban American Indian oversample in the 1988 National Maternal and Infant Health Survey. *Public Health Reports* 1994;109(2):243–50.

Sugarman JR, Warren CW, Oge L, Helgerson SD. Using the Behavioral Risk Factor Surveillance System to monitor year 2000 objectives among American Indians. *Public Health Reports* 1992;107(4):449–56.

Thomas RM, Larsen MD. Smoking prevalence, beliefs, and activities: by gender and other demographic indicators. Paper presented at the 1993 AAPOR Annual Convention, St. Charles, Illinois, May 1993.

Thornberry OT Jr, Massey JT. Trends in United States telephone coverage across time and subgroups. In: Groves RM, Biemer PP, Lyberg LE, Massey JT, Nicholls WL II, Waksberg J, editors. *Telephone Survey Methodology*. New York: John Wiley & Sons, 1988:25–49.

US Bureau of the Census. *Statistical Brief: Phoneless in America*. Washington (DC): US Department of Commerce, Economics and Statistics Administration, Bureau of the Census. SB/94-16, 1994.

US Department of Health and Human Services. *The Health Consequences of Smoking for Women. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health, 1980.

US Department of Health and Human Services. *The Health Consequences of Smoking: Cardiovascular Disease. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Office on Smoking and Health. DHHS Publication No. (PHS) 84-50204, 1983.

US Department of Health and Human Services. *The Health Consequences of Smoking: Cancer and Chronic Lung Disease in the Workplace. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Office on Smoking and Health. DHHS Publication No. (PHS) 85-50207, 1985.

US Department of Health and Human Services. *The Health Consequences of Smoking: Nicotine Addiction. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Health Promotion and Education, Office on Smoking and Health. DHHS Publication No. (CDC) 88-8406, 1988.

US Department of Health and Human Services. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 89-8411, 1989.

US Department of Health and Human Services. *The Health Benefits of Smoking Cessation. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8416, 1990a.

US Department of Health and Human Services. *Tobacco Use in 1986: Methods and Basic Tabulations from Adult Use of Tobacco Survey*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (OM) 90-2004, 1990b.

US Department of Health and Human Services. *Smoking and Health in the Americas. A 1992 Report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Centers for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 92-8419, 1992.

US Department of Health and Human Services. *Preventing Tobacco Use Among Young People. A Report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1994.

US Department of Health, Education, and Welfare. *Smoking and Health. A Report of the Surgeon General*. Washington (DC): US Department of Health, Education, and Welfare, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health. DHEW Publication No. (PHS) 79-50066, 1979.

Vega WA, Gil AG, Zimmerman RS. Patterns of drug use among Cuban-American, African-American, and white non-Hispanic boys. *American Journal of Public Health* 1993;83(2):257–9.

Ventura SJ, Martin JA, Taffel SM, Mathews TJ, Clarke SC. Advance Report of Final Natality Statistics, 1992. *Monthly Vital Statistics Report* 1994;43(5 Suppl).

Ventura SJ, Martin JA, Taffel SM, Mathews TJ, Clarke SC. Advance Report of Final Natality Statistics, 1993. *Monthly Vital Statistics Report* 1995;44(3 Suppl).

Ventura SJ, Martin JA, Mathews TJ, Clarke SC. Advance Report of Final Natality Statistics, 1994. *Monthly Vital Statistics Report* 1996;44(11 Suppl).

Ventura SJ, Martin JA, Curtin SC, Mathews TJ. Report of Final Natality Statistics, 1995. *Monthly Vital Statistics Report* 1997;45(11 Suppl).

Wagenknecht LE, Burke GL, Perkins LL, Haley NJ, Friedman GD. Misclassification of smoking status in the CARDIA study: a comparison of self-report with serum cotinine levels. *American Journal of Public Health* 1992;82(1):33–6.

Wagenknecht LE, Manolio TA, Sidney S, Burke GL, Haley NJ. Environmental tobacco smoke exposure as determined by cotinine in black and white young adults: the CARDIA study. *Environmental Research* 1993;63(1):39–46.

Wallace JM Jr, Bachman JG. Explaining racial/ethnic differences in adolescent drug use: the impact of background and lifestyle. *Social Problems* 1991;38(3):333–57.

Wang S-Q, Yu J-J, Zhu B-P, Liu M, He G-Q. Cigarette smoking and its risk factors among senior high school students in Beijing, China, 1988. *Tobacco Control* 1994;(3):107–14.

Warm Springs Confederated Tribes. *Warm Springs Confederated Tribes Behavioral Risk Factor Survey, 1990.* Warm Springs (OR): Warm Springs Confederated Tribes, Community Health Promotion Department, Human Services Branch, 1993.

Welty TK, Lee ET, Yeh J, Cowan LD, Go O, Fabsitz RR, et al. Cardiovascular disease risk factors among American Indians: the Strong Heart Study. *American Journal of Epidemiology* 1995;142(3):269–87.

Weng X-Z, Hong Z-G, Chen D-Y. Smoking prevalence in Chinese aged 15 and above. *Chinese Medical Journal* 1987;100(11):886–92.

Wewers ME, Dhatt RK, Moeschberger ML, Guthrie RM, Kuun P, Chen MS. Misclassification of smoking status among Southeast Asian adult immigrants. *American Journal of Respiratory and Critical Care Medicine* 1995;152(6 Pt1):1917–21.

Wiecha JM. Differences in patterns of tobacco use in Vietnamese, African-American, Hispanic, and Caucasian adolescents in Worcester, Massachusetts. *American Journal of Preventive Medicine* 1996;12(1):29–37.

Wills TA, Cleary SD. The validity of self-reports of smoking: analyses by race/ethnicity in a school sample of urban adolescents. *American Journal of Public Health* 1997;87(1):56–61.

Zhu B-P, Liu M, Wang S-Q, He G-Q, Chen D-H, Shi JH, et al. Cigarette smoking among junior high school students in Beijing, China, 1988. *International Journal of Epidemiology* 1992;21(5):854–61.

Chapter 3
Health Consequences of Tobacco Use Among Four Racial/Ethnic Minority Groups

Introduction

The fact that cigarette smoking causes cancer, respiratory and cardiovascular diseases, and adverse pregnancy outcomes is well established (U.S. Department of Health and Human Services [USDHHS] 1989b). Evidence of the relationship between smoking and lung cancer began to accumulate as early as the late 1930s (Ochsner and DeBakey 1939; U.S. Department of Health, Education, and Welfare [USDHEW] 1964). In 1964, the first Surgeon General's report linking smoking to disease concluded that cigarette smoking was a cause of lung and laryngeal cancers in men and a probable cause of lung cancer in women. In more recent reports, the Surgeon General has concluded that cigarette smoking causes 87 percent of lung cancer deaths, 30 percent of all cancer deaths, 82 percent of chronic obstructive pulmonary disease (COPD) deaths, 21 percent of coronary heart disease (CHD) deaths, and 18 percent of deaths from stroke (USDHHS 1989b) as well as 21–39 percent of low-birth-weight births and 14 percent of preterm deliveries (USDHHS 1980, 1989b). In addition, passive or involuntary smoking causes lung cancer in healthy nonsmokers and respiratory problems in young children (USDHHS 1986a; U.S. Environmental Protection Agency 1992).

Despite this wealth of knowledge about the health consequences of smoking, few studies have examined the relationship between tobacco use and known health effects among racial/ethnic groups in the United States. Moreover, few databases include information on sufficient numbers of persons from racial/ethnic groups to allow such analyses.

Although sufficient data are often not available for these population subgroups, the objectives of this chapter are to assess the burden of smoking-related diseases among U.S. racial/ethnic groups, to examine racial/ethnic differences in tobacco-related morbidity and mortality when possible, and to review studies that have examined how the relationship between tobacco use and selected health outcomes may differ among racial/ethnic groups. For many of the adverse health outcomes and diseases presented in this chapter, smoking is one of many contributing factors. The focus in this chapter is on the disease burden related to smoking among four U.S. racial/ethnic minority groups (African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics); data on the contribution of cigarette smoking to any differences between groups are highlighted whenever available. A discussion of some relevant methodological issues is provided in the chapter appendix.

Lung Cancer

The 1964 Surgeon General's report on smoking and health concluded that "Cigarette smoking is causally related to lung cancer in men; the magnitude of the effect far outweighs all other factors. The data for women, though less extensive, point in the same direction" (USDHEW 1964). That conclusion was based on strong epidemiological evidence from case-control and cohort studies and supporting toxicological evidence. When reviewed against criteria for causality, the evidence was initially judged to be sufficient for men and a similar conclusion was subsequently reached for women (USDHHS 1980).

Since the 1964 Surgeon General's report, voluminous evidence has accumulated about the relationship between smoking and lung cancer (USDHHS 1989b; Wu-Williams and Samet 1994). The epidemiological studies consistently indicate that the risk of lung cancer increases with the number of cigarettes smoked and with the length of time a person smokes. Furthermore, evidence shows that in comparison with smokers of non-filtered cigarettes, smokers of filtered cigarettes have only slightly less risk of lung cancer (Wu-Williams and Samet 1994). Although a family history of lung cancer is associated with increased risk, the genetic basis for this association has not yet been determined (Economou et al. 1994). Environmental agents other than cigarette smoke, including certain occupational agents (Coultas and Samet

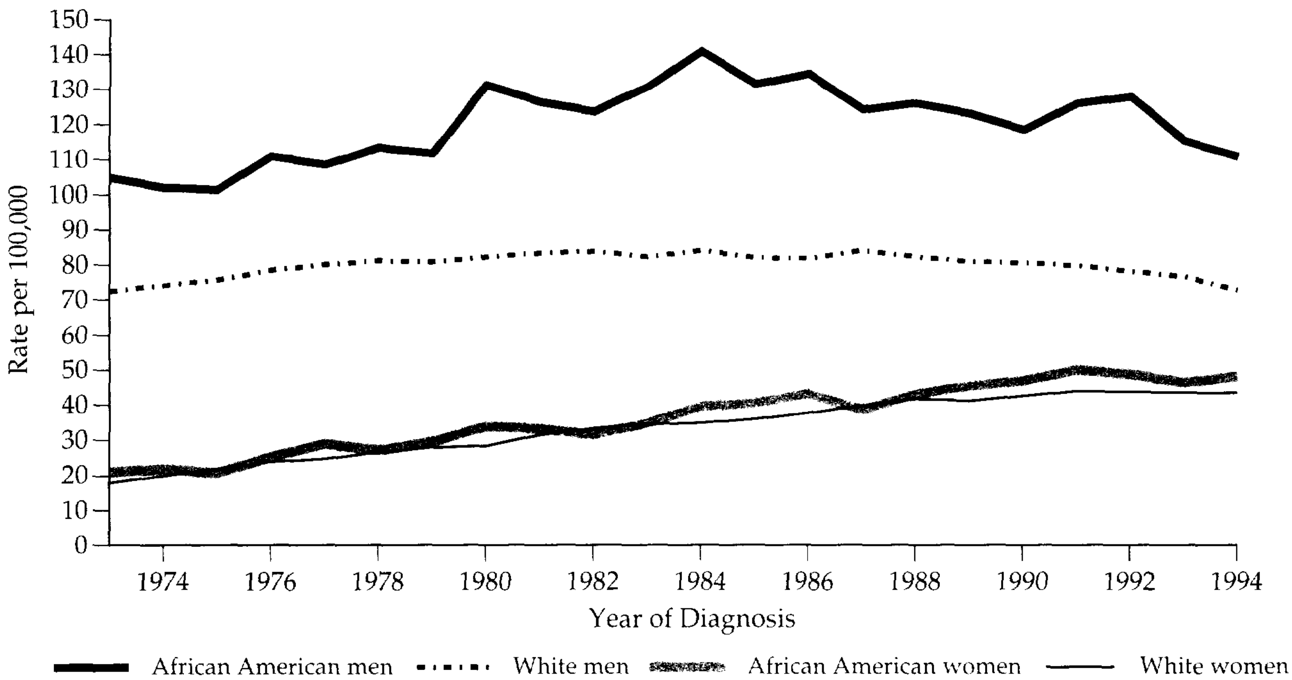
1992; Coultas 1994) and indoor and outdoor air pollutants (Samet 1993), also cause lung cancer. For example, synergism between smoking and radon and asbestos has been demonstrated in studies of worker groups (Saracci and Boffetta 1994).

Because nearly all cases of lung cancer are attributable to cigarette smoking, variations in lung cancer patterns between racial/ethnic groups most likely reflect differences in smoking patterns. Whenever more detailed information is available, it is included in the appropriate sections that follow.

African Americans

The population-based cancer registries operated by the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) Program provide cancer incidence data for several locations throughout the United States, including Connecticut, Hawaii, Iowa, New Mexico, and Utah and the metropolitan areas of Detroit, Atlanta, San Francisco/Oakland, and Seattle/Puget Sound. SEER data show that African American men have had consistently higher lung cancer incidence rates than white men since the 1970s (Figure 1) (Kosary et al. 1995). (SEER data cover about 10 percent of the U.S. population and are used frequently to estimate national cancer rates and trends.) Between 1950 and 1960, age-adjusted death rates for malignant neoplasms of the respiratory system (composed primarily of deaths from lung cancer) among African American men surpassed those among white men and have since remained higher, whereas death rates for African American women have remained fairly similar to those among white women, according to data from the National Vital Statistics System (Table 1) (National Center for Health Statistics [NCHS] 1997). Since 1990, respiratory cancer death rates declined substantially for African American men; among African American women, rates increased through 1990 and then leveled off. From 1992–1994, the age-adjusted death rate for cancer of the trachea, bronchus, and lung (generally referred to as lung

Figure 1. Incidence of cancer of the lung and bronchus, by race/ethnicity and gender, National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program, 1973–1994



Note: Age-adjusted to the 1970 standard U.S. population.
Sources: Adapted from Kosary et al. 1995; Ries et al. 1997.

Table 1. Death rates per 100,000 U.S. residents for malignant diseases of the respiratory system, by race/ethnicity and gender, United States, 1950–1995,* selected years

Race/ethnicity and gender	1950†	1960†	1970	1980	1985	1990	1992	1993	1994	1995
African American men										
All ages, age-adjusted	16.9	36.6	60.8	82.0	87.7	91.0	86.7	86.0	82.8	80.5
All ages, crude	14.3	31.1	51.2	70.8	75.5	77.8	74.7	74.7	72.5	71.2
American Indian or Alaska Native men‡										
All ages, age-adjusted	NA	NA	NA	23.2	28.4	29.7	31.7	31.0	31.1	32.7
All ages, crude	NA	NA	NA	15.7	19.6	21.1	23.1	23.1	23.0	25.1
Asian American or Pacific Islander men§										
All ages, age-adjusted	NA	NA	NA	27.6	26.9	26.8	27.4	28.4	28.0	25.8
All ages, crude	NA	NA	NA	22.9	21.3	21.7	23.0	23.8	23.9	22.4
Hispanic men∆										
All ages, age-adjusted	NA	NA	NA	NA	24.0	27.7	24.4	25.1	24.8	25.2
All ages, crude	NA	NA	NA	NA	13.9	17.4	15.9	16.5	16.5	16.9
White men										
All ages, age-adjusted	21.6	34.6	49.9	58.0	58.7	59.0	56.7	56.3	54.8	53.7
All ages, crude	24.1	39.6	58.3	73.4	77.6	81.0	79.5	79.7	78.5	77.8
African American women										
All ages, age-adjusted	4.1	5.5	10.9	19.5	22.8	27.5	28.5	27.3	27.7	27.8
All ages, crude	3.4	4.9	10.1	19.3	23.5	29.2	30.9	30.2	30.8	31.3
American Indian or Alaska Native women‡										
All ages, age-adjusted	NA	NA	NA	8.1	11.1	13.5	15.5	16.1	17.7	16.4
All ages, crude	NA	NA	NA	6.4	9.2	11.3	13.4	14.6	16.5	15.5
Asian American or Pacific Islander women§										
All ages, age-adjusted	NA	NA	NA	9.5	9.2	11.3	11.1	11.7	11.2	13.0
All ages, crude	NA	NA	NA	8.4	8.2	10.6	11.1	11.7	11.4	13.6
Hispanic women∆										
All ages, age-adjusted	NA	NA	NA	NA	6.7	8.7	8.4	8.2	8.5	8.2
All ages, crude	NA	NA	NA	NA	5.2	7.5	7.5	7.3	7.7	7.5
White women										
All ages, age-adjusted	4.6	5.1	10.1	18.2	22.7	26.5	27.4	27.6	27.7	27.9
All ages, crude	5.4	6.4	13.1	26.5	34.8	43.4	46.2	47.3	47.9	48.9

Note: Data in the table on African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and whites include persons of Hispanic and non-Hispanic origin. Conversely, in this table, the data on Hispanic origin may include persons of any race.

*Age-adjusted to the 1940 U.S. standard population. Cause-of-death data are based on classifications from the then-current *International Classification of Diseases* (e.g., cause-of-death codes 160–165 for the Ninth Revision). Data for the 1980s are based on intercensal population estimates.

†Includes deaths of nonresidents of the United States.

‡Interpretation of trends should consider that population estimates for American Indians and Alaska Natives increased by 45 percent between 1980 and 1990 (because of better enumeration techniques in 1990 and an increased tendency for people to denote themselves as American Indian in 1990).

§Interpretation of trends should consider that the Asian population in the United States more than doubled between 1980 and 1990, primarily because of immigration.

∆Because of incomplete data, the National Center for Health Statistics (NCHS) reports 1985 death certificate data on decedents of Hispanic origin for only 17 states and the District of Columbia. By 1990, data for 47 states and the District of Columbia were reported. NCHS estimates that the 1990 reporting area encompassed 99.6 percent of the U.S. Hispanic population. After 1992, only Oklahoma did not provide information on Hispanic origin.

NA = data not available.

Source: Adapted from National Center for Health Statistics 1997.

cancer) was highest for African American men (81.6 per 100,000 population) (Table 2); the lung cancer death rate for African American women (27.2 per 100,000) was similar to that for white women (27.9 per 100,000) and higher than that for any other racial/ethnic group. Among African Americans in 1993, the four leading causes of cancer death were lung cancer (26.1 percent of all cancer deaths), cancer of the colon and rectum (10.4 percent), prostate cancer (9.4 percent), and cancer of the female breast (8.3 percent) (Parker et al. 1997).

The higher lung cancer incidence and death rates among African American men have not been fully explained. Two ecological analyses of population-based incidence data for metropolitan areas have shown that the African American-white gradient in lung cancer occurrence among men was consistent with gradients in socioeconomic indicators (Devesa and Diamond 1983; Baquet et al. 1991) and that the difference in lung cancer disappeared when the data were adjusted for socioeconomic status. The authors of one paper (Baquet et al. 1991) surmised that the differences in smoking patterns associated with socioeconomic status accounted for the differences in lung cancer between white and African American men, whereas the authors of the other paper (Devesa and Diamond 1983) proposed that cigarette smoking and other environmental correlates of socioeconomic status, such as dietary habits or occupational exposure, may have accounted for their findings.

Data from several National Health Interview Surveys (NHISs) were used to conduct birth cohort analyses of cigarette smoking prevalence in the 1900s for African Americans and whites of both genders (Tolley et al. 1991; Shopland 1995). Older white men (those born before 1915) experienced higher peak smoking rates and slightly earlier ages of initiation than older African American men. For persons born after 1915, peak smoking rates and duration of smoking for African American men were slightly higher than those for white men. In addition, white male smokers were more likely than African American male smokers to quit smoking in the 1950s (when the early scientific studies on smoking and lung cancer were reported); African American male cohorts born after 1915 thus experienced a greater cumulative exposure to cigarette smoke. Reflecting these trends in smoking behavior, lung cancer mortality rates were initially higher for white men. The combination of less cessation, higher peak prevalence, and longer duration of smoking in African American men after the 1940s likely explains the observation that mortality rates for African American men began to exceed those for white men later in the century (Shopland 1995).

Lung cancer death rates have been much lower for women than for men (reflecting historically lower smoking prevalences) and have risen more slowly with age in the older birth cohorts. As rates for men began to decline in cohorts born after 1930, rates continued to rise among women, reflecting their slower adoption and increasing prevalence of cigarette smoking. African American and white women indicated similar patterns of smoking initiation, maintenance, and quitting; lung cancer death rates for African American and white women also have been similar (Tolley et al. 1991; Shopland 1995). These data are consistent with the interpretation that trends in smoking behavior are largely responsible for 20th century lung cancer mortality patterns for African Americans and whites. Tolley and colleagues (1991) further suggested that lung cancer rates among African American men and women may be slightly higher than those for white men and women, even after considering differences in their smoking behaviors.

One study (Harris et al. 1993) showed a higher lung cancer risk among African Americans compared with whites who had the same level of cumulative exposure to cigarette smoking. In this 20-year case-control study, 2,678 cases of lung cancer were identified among white men, 238 cases among African American men, 1,394 cases among white women, and 113 among African American women; after adjusting the data for cumulative tar consumption and education, the researchers found that African Americans had a significantly higher risk of lung cancer. One limitation of this study is that it uses the Federal Trade Commission's (FTC's) estimates of tar yield to calculate cumulative tar consumption. The FTC's machines are set to parameters that have not changed for decades. Because humans smoke cigarettes differently than the machines used by the FTC, the validity of these measures has been called into question (NCI 1996a). In the Kaiser Permanente cohort study, the relative risks of lung cancer were approximately the same for African Americans and whites (Friedman et al. 1997). Dorgan and colleagues (1993) conducted a case-control study to assess race and gender differences in lung cancer, categorizing participants according to consumption of fruits and vegetables. Lung cancer risk was significantly increased for African Americans who currently smoked (compared with never smokers and former light smokers), regardless of the amount of vegetables consumed. These analyses were statistically adjusted for gender, age, education, occupation, passive smoking, and study phase.

In a recent population-based case-control study to compare the risks of lung cancer for African

Table 2. Age-adjusted death rates* for selected smoking-related causes of death, by race/ethnicity and gender, United States, 1992–1994

Disease Category (*ICD-9 code*)†	African American		American Indian/ Alaska Native		Asian American/ Pacific Islander		White		Hispanic	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Cancer										
Lip, oral cavity, pharynx (140–149)	7.7	1.8	2.6	1.0	3.3	1.0	3.0	1.2	2.4	0.5
Esophagus (150)	11.4	3.0	3.2	0.5	2.7	0.5	4.4	0.9	2.8	0.4
Stomach (151)	9.5	4.1	4.9	2.6	8.9	5.1	3.9	1.7	6.2	3.1
Pancreas (157)	11.1	8.1	3.4	3.0	5.5	3.9	7.3	5.2	5.1	3.8
Larynx (161)	4.6	0.8	0.9	0.3	0.6	0.1	1.7	0.4	1.3	0.2
Trachea, bronchus, lung (162)	81.6	27.2	33.5	18.4	27.9	11.4	54.9	27.9	23.1	7.7
Cervix uteri (180)	NA	5.7	NA	3.0	NA	2.5	NA	2.2	NA	3.2
Bladder (188)	3.2	1.6	1.2	0.5	1.5	0.6	3.9	1.1	1.8	0.6
Kidney, other, unspecified urinary organs (189)	4.3	2.0	4.4	2.3	1.8	0.8	4.1	1.9	3.1	1.3
Cardiovascular diseases										
Coronary heart disease (410–414)	138.3	85.0	100.4	45.9	71.7	36.2	132.5	62.9	82.7	43.9
Cerebrovascular disease (430–438)	53.1	40.6	23.9	21.1	29.3	22.4	26.3	22.6	22.7	16.3
Respiratory diseases										
Bronchitis, emphysema (491–492)	4.7	1.6	2.8	1.9	2.9	0.9	6.2	3.8	2.4	0.9
Chronic airway obstruction, not elsewhere classified (496)	17.6	6.6	14.2	9.0	7.9	2.6	20.4	12.2	8.2	3.7

*Per 100,000, age-adjusted to the 1940 U.S. standard population. Estimates for Hispanics exclude data from New Hampshire for 1992 and from Oklahoma for 1992–1994.
†*International Classification of Diseases, Ninth Revision*, World Health Organization 1977.
NA = data not available.
Sources: National Center for Health Statistics, public use data tapes, 1992–1994; U.S. Bureau of the Census 1997.

Americans and whites across categories of cigarette smoking status, Schwartz and Swanson (1997) examined incident cases from the Occupational Cancer Incidence Surveillance Study. This study operates in conjunction with the Metropolitan Detroit Cancer Surveillance System, a participant in the NCI's SEER Program. The analyses were stratified by gender and statistically adjusted for age, education, and cigarette smoking behaviors. The overall risks of lung cancer (of all histological types) were similar for African

Americans and whites. Thus, race did not appear to be an independent predictor of lung cancer in the population as a whole. However, African Americans were more likely than whites to have developed squamous cell carcinoma. Additionally, African American men aged 40–54 years were 2–4 times more likely than white men of the same ages to have developed lung cancer (of several histological types). The authors concluded that the increased risks among younger African Americans may suggest a greater degree of susceptibility to lung carcinogens or greater exposure to other unidentified carcinogens and they called for further research on the topic.

Investigators have postulated that the more frequent smoking of menthol cigarettes by African Americans, compared with whites, contributes to their increased rate of lung cancer (Harris et al. 1993). In a recent experimental study of 12 persons after the amount of menthol injected into experimental cigarettes was increased, the amount of carbon monoxide exhaled by African American smokers also increased (Miller et al. 1994). In a comparison of smoking behavior associated with mentholated cigarettes and regular cigarettes among 29 subjects, McCarthy and colleagues (1995) found higher mean puff volume and higher puff frequency after participants smoked regular cigarettes than after they smoked mentholated cigarettes; however, no differences in mean expired carbon monoxide levels were found. Available data suggest that mentholated cigarettes are not smoked more intensely than regular cigarettes (Jarvik et al. 1994; Miller et al. 1994; McCarthy et al. 1995; Ahijevych et al. 1996). Thus, mentholated cigarettes may promote lung permeability and diffusibility of smoke constituents (Jarvik et al. 1994; McCarthy et al. 1995; Clark et al. 1996a).

Recent studies have examined the possible role of genetics in determining the risk of lung cancer among African Americans. Crofts and colleagues (1993) identified a restriction fragment length polymorphism (RFLP) in the gene (*CYP1A1*) that encodes the enzyme responsible for initiating metabolism of polyaromatic hydrocarbon compounds found in cigarette smoke (Guengerich 1992, 1993). In one study of African Americans, the risk of adenocarcinoma of the lung was higher for smokers with the *CYP1A1 RFLP* than for smokers who did not have this RFLP (Taioli et al. 1995). Two other studies, however, did not find an association between the presence of the variant allele in African Americans and increased lung cancer risk (Kelsey et al. 1994; London et al. 1995). Taioli and colleagues (1995) also found that persons who had adenocarcinoma with the African American *CYP1A1 RFLP* had lower lifetime cigarette consumption, as measured by pack-years, compared with those who had adenocarcinoma without the polymorphism. However, using a cutoff point of 35 pack-years, London and colleagues (1995) found no association between the variant *CYP1A1* variant allele and lung cancer risk based on smoking history. Additionally, a homozygous rare *CYP1A1* allele associated with the risk of lung cancer among persons from Japan (Kawajiri et al. 1990) was found more often in African Americans than in whites (Shields et al. 1993). However, in a small case-control study, no association was observed between the presence of this polymorphism and lung cancer risk (Shields et al. 1993).

Despite strong research interest in this area, scientists have been unable to consistently associate variant alleles with lung cancer susceptibility. The frequencies of the polymorphisms of interest appear to be low in United States populations studied thus far. Low frequencies of the alleles of interest suggest that future investigations must allow for an adequate sample size of the group under study and adjustment for factors such as smoking history and age. In addition, low frequency allelic affects may be negated or obscured by high tobacco exposure levels.

Two phenotypes were identified in African American and white persons representing poor and extensive extremes of glucuronidation (Richie et al. 1997). Glucuronidation is considered a detoxification pathway because it increases the water solubility of a chemical substrate and facilitates excretion (Goldstein and Faletto 1993). The ratio of conjugated metabolite to free metabolite of a tobacco-specific nitrosamine was 30 percent higher in the urine of white smokers than in African American smokers. This finding suggests that African Americans are at higher risk from nitrosamine exposure during smoking because of a decreased capacity to detoxify carcinogenic tobacco-specific nitrosamines. Hence, variability in glucuronosyltransferase activity, or in clearance of glucuronide conjugates, may represent another determinant of cancer risk.

The genetically determined poor, intermediate, or enhanced debrisoquine metabolizer phenotype has been investigated as a risk factor for lung cancer. Homozygous dominant (extensive metabolizer) individuals were found more frequently among white lung cancer patients who smoked cigarettes than white control patients with COPD who smoked cigarettes (Ayesh et al. 1984). Caporaso and colleagues confirmed the association between the extensive debrisoquine metabolizer phenotype and lung cancer risk. In this study, almost equivalent numbers of extensive metabolizers were found among African Americans (74 percent) and whites (73 percent) (Caporaso et al. 1990).

Another approach in assessing the possible role of genetics is using chromosome breaks to measure cancer susceptibility. One research group has developed an in vitro cytogenic assay that measures mutagen-induced chromosome breaks in short-term lymphocyte cultures. This approach has shown a relationship between mutagen sensitivity and elevated lung cancer. However, attempts to use this method as a predictive marker of racial/ethnic differences in cancer risk in African and Mexican Americans produced inconsistent results (Spitz et al. 1995; Strom et al. 1995; Wu et al. 1996).

Carcinogenesis can involve genotoxic mechanisms whereby chemical interactions at critical cellular sites go unrepaired. Alterations in certain genes, known as proto-oncogenes and tumor suppressor genes, are linked with cancer risk (Land et al. 1983; Marshall et al. 1984; Slamon et al. 1984; Klein and Klein 1985; Denissenko et al. 1996). Some gene alleles that are evaluated as markers of lung cancer risk vary in their distributions among African Americans and whites. For example, in a study of lung cancer cases and trauma victim controls, Weston and colleagues (1991) found rare Ha-ras-1 alleles more often in the lung tissue of African Americans (17 percent) than in whites (5 percent). For both groups, the prevalence of rare alleles among lung cancer patients was higher than among controls (23 percent for African American lung cancer cases, 15 percent for African American trauma victim controls, 6 percent for white lung cancer cases, and 2 percent for white trauma victim controls). These findings were confirmed in a second study (Weston et al. 1992). African American and white differences in distribution of alleles at the L-myc locus and p53 genotype have also been reported. The authors concluded that L-myc genotypes and p53 variants do not predict lung cancer risk (Weston et al. 1992).

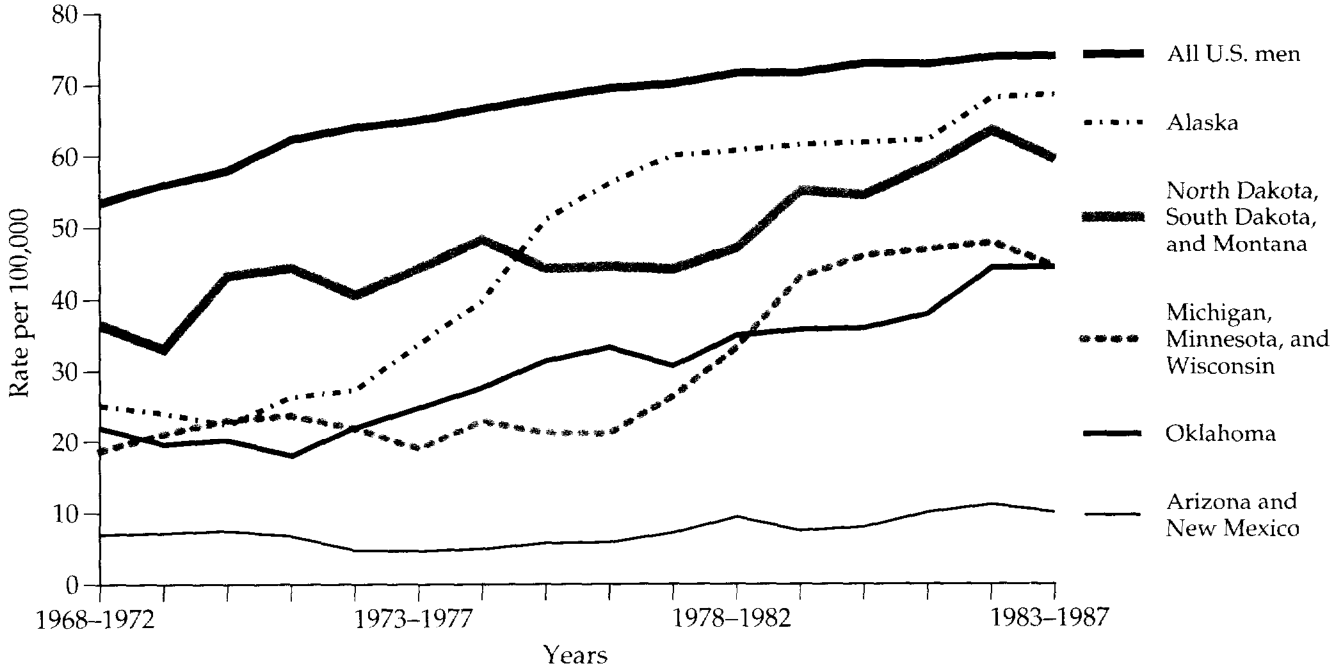
In summary, the higher rates of lung cancer observed among African American men are consistent with historical patterns of cigarette smoking in this century (Shopland 1995). In addition, African American men aged 40–54 years may be especially susceptible to lung carcinogens (Schwartz and Swanson 1997), perhaps because they detoxify them differently (Richie et al. 1997). A genetic role in racial and ethnic-specific risk for lung cancer cannot be ruled out, because some studies have shown that African American populations have increased frequencies of rare alleles associated with greater risks for developing lung cancer than whites. However, because of the low frequency of these alleles in the populations under study and the possibility of misclassification bias, studies have been inconclusive (Shields et al. 1993; Taioli et al. 1995). Further, African American smokers prefer mentholated cigarettes, and menthol may promote the absorption and diffusion of tobacco smoke constituents (Jarvik et al. 1994; McCarthy et al. 1995; Clark et al. 1996a). This hypothesis has received inconsistent support in the epidemiological literature. Kabat and Herbert (1991) found no relationship between menthol use and lung cancer risk; however, Sidney and colleagues (1995) suggested that smoking mentholated cigarettes increased the risk of lung cancer only in male smokers. Further research could clarify the nature of individual susceptibility and the possible role of mentholation. Reduction in cigarette smoking will undoubtedly lead to reduction in the risk of lung cancer for African Americans.

American Indians and Alaska Natives

Since the early 1900s, many studies have documented the low overall occurrence of cancer among American Indians compared with whites (Hoffman 1928; Smith et al. 1956; Smith 1957; Salsbury et al. 1959; Sievers and Cohen 1961; Kravetz 1964; Reichenbach 1967; Creagan and Fraumeni 1972; Dunham et al. 1973; Blot et al. 1975; Lanier et al. 1976; Samet et al. 1980, 1988b; Sorem 1985; Mahoney and Michalek 1991; Nutting et al. 1993). Investigations of lung cancer incidence and deaths have confirmed that lung cancer is less frequent among American Indians overall than among whites (Coultas et al. 1994). Between 1992 and 1994, age-adjusted death rates for lung cancer per 100,000 among American Indian and Alaska Native men (33.5) and women (18.4) were slightly higher than those among Asian American and Pacific Islanders as well as Hispanics, whereas they were lower than rates among African Americans and whites (Table 2) (NCHS, public use data tapes, 1992–1994; U.S. Bureau of the Census 1997). Mortality rates for malignant diseases of the respiratory system increased from 1980 through 1995 among American Indians and Alaska Natives (Table 1) (NCHS 1997).

Nationally, lung cancer is the leading cause of cancer death among American Indians and Alaska Natives. Among those who died of cancer in 1993, the four leading causes of death were lung cancer (26.8 percent), cancer of the colon and rectum (8.9 percent), cancer of the female breast (6.3 percent), and prostate cancer (6.0 percent) (Parker et al. 1997). Additionally, lung cancer was the leading cause of cancer death among both men and women in 10 of the 12 Indian

Figure 2. Age-adjusted lung cancer death rates among American Indian and Alaska Native men in selected states compared with rates among all U.S. men, 1968–1987*

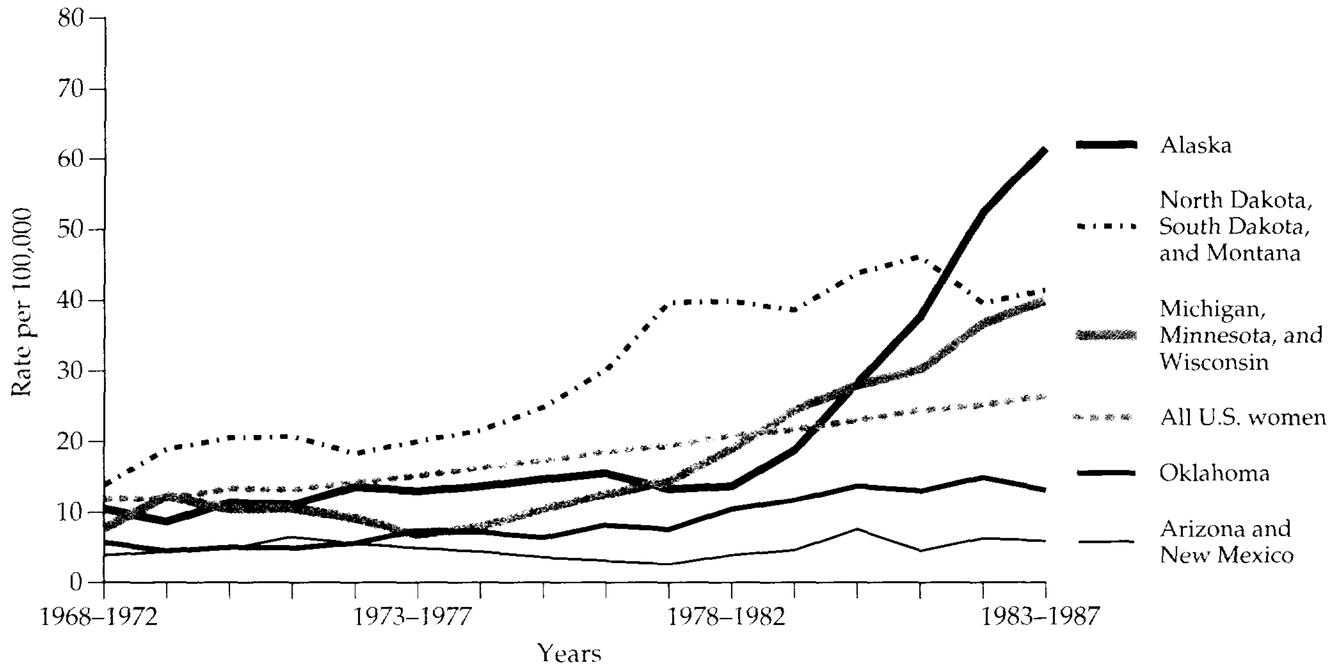


*Rates presented here were determined using midpoint population estimates for each 5-year time interval and were adjusted to the 1970 U.S. standard population.
Source: Valway 1992.

Health Service (IHS) areas (Arizona and New Mexico had low rates of lung cancer deaths) (Valway 1992). Lung cancer death rates among American Indians and Alaska Natives have been rising in most IHS areas (Figures 2 and 3) (Valway 1992); national death rates from malignant diseases of the respiratory system have also been increasing (Table 1).

Lung cancer death rates vary by IHS area. Specifically, American Indians in the Southwest have had the lowest lung cancer death rates, whereas American Indians in Alaska, North Dakota, South Dakota, and Montana have had rates nearly as high as those in the general U.S. population (Table 3, Figures 2 and 3) (Valway 1992). These differences are associated with variations in smoking among American Indians and Alaska Natives (Centers for Disease Control [CDC] 1987; Welty et al. 1993). In an analysis of data from the 1985–1988 Behavioral Risk Factor Surveillance System (BRFSS) on 1,055 American Indians, Sugarman and colleagues (1992) determined smoking prevalence for three groups of states that contained three specific IHS areas. In this study, the Plains states (Iowa, Minnesota, Montana, Nebraska, North Dakota, South Dakota, and Wisconsin) contained the Aberdeen, Bemidji, and Billings IHS areas; the West Coast states (California, Idaho, and Washington) contained the Portland and California IHS areas; and the Southwest states (Arizona, New Mexico, and Utah) contained the Albuquerque, Navajo, Tucson, and Phoenix IHS areas. Cigarette smoking prevalence rates were highest in the Plains states (48.4 percent for men and 57.3 percent for women), intermediate in the West Coast states (25.2 percent for men and 31.6 percent for women), and lowest in the Southwestern states (18.1 percent for men and 14.7 percent for women). These general geographic patterns of smoking prevalence paralleled patterns of lung cancer mortality (Table 3) (Valway 1992). The smoking prevalence estimates from the 1985–1988 BRFSS analyses may be imprecise because of relatively small samples. However, other analyses (American Indians and Alaska Natives, in Chapter 2; Welty et al. 1995) show similar patterns. Another

Figure 3. Age-adjusted lung cancer death rates among American Indian and Alaska Native women in selected states compared with rates among all U.S. women, 1968–1987*



*Rates presented here were determined using midpoint population estimates for each 5-year time interval and were adjusted to the 1970 U.S. standard population.
Source: Valway 1992.

potential limitation is that American Indians living in the California and Portland IHS areas may be more likely than American Indians from other IHS areas to be misclassified on death certificates as being of other racial/ethnic categories (Valway 1992), suggesting that death rates for American Indians may be underestimated in these areas (Sorlie et al. 1992).

Lanier and colleagues (1996) recently reported on lung cancer incidence rates for Alaska Native men and women. Lung cancer incidence was higher for Alaska Natives than it was for the general U.S. population. In addition, lung cancer was the most common incident cancer among men and the third most common incident cancer among women (after breast cancer and cancer of the colon/rectum). Lung cancer incidence increased substantially among Alaska Native men (by 93 percent) and women (by 241 percent) between 1969–1973 and 1989–1993. The authors concluded, "Reduction in tobacco use would result in the greatest decreases in cancer rates in this population" (p. 751).

Asian Americans and Pacific Islanders

Two issues should always be kept in mind when interpreting data about the health consequences of cigarette smoking among Asian Americans and Pacific Islanders: the diversity of this group and the paucity of data. The Asian American and Pacific Islander population of the United States includes approximately 32 national and racial/ethnic groups and nearly 500 languages and dialects. Although many of these persons were born in the United States, many others are recent immigrants (see Chapters 1 and 2); yet the national data do not indicate these distinctions. Environmental exposures experienced in Asia, such as women's exposure to smoke from cooking fuels, may influence lung cancer occurrence among recent immigrants (Coultas et al. 1994).

From 1980 through 1995, age-adjusted death rate for malignant neoplasms of the respiratory system (primarily deaths from lung cancer) among Asian

Table 3. Death rates for lung cancer among American Indians and Alaska Natives, by Indian Health Service (IHS) area, 1984–1988

	Men		Women	
Areas	**N**	**Rate***	**N**	**Rate***
U.S., all ethnicities		74.2		27.3
Nine IHS areas*†	307	38.5‡	203	27.2
All 12 IHS areas	562	40.1‡	296	21.4‡
Aberdeen	63	68.7	41	45.0‡
Alaska	80	75.5	62	68.5‡
Albuquerque	12	18.8‡	5	7.8‡
Bemidji	41	63.4‡	24	40.7‡
Billings	36	65.3	33	65.7‡
California†	33	33.2‡	8	6.6‡
Nashville	24	41.8‡	15	25.1
Navajo	25	11.4‡	7	4.0‡
Oklahoma†	167	46.0‡	55	14.0‡
Phoenix	20	17.2‡	13	11.5‡
Portland†	55	40.5‡	30	23.4
Tucson	6	25.9‡	3	13.5‡

*Per 100,000, age-adjusted to the 1970 U.S. standard population. Rates based on a small number of deaths should be interpreted with caution.
†The California, Oklahoma, and Portland IHS areas appear to have a problem with underreporting Indian ethnicity on death certificates; therefore, a separate total is presented for the nine other IHS areas, excluding these three areas.
‡Denotes a rate significantly different from the rate for the overall U.S. population.
Source: Valway 1992.

American and Pacific Islander men remained fairly constant; this death rate for Asian American and Pacific Islander women increased slightly between 1980 and 1995 but was substantially lower than for men (Table 1) (NCHS 1997). Trends should be interpreted with caution because the large numbers of immigrants from Asia and the Pacific Islands that came to the United States during that time may have influenced both disease prevalence in and the age structure of this group. During 1992–1994, the age-adjusted death rate for lung cancer was 27.9 per 100,000 for Asian American and Pacific Islander men and 11.4 per 100,000 for women (Table 2). These rates were slightly higher than those for Hispanics and slightly lower than those for American Indians and Alaska Natives. In 1993, the four leading causes of cancer death among Asian Americans and Pacific Islanders were lung cancer (22.3 percent of all cancer deaths), cancer of the colon and rectum (10.4 percent), cancer of the liver and intrahepatic bile duct (8.6 percent), and stomach cancer (7.7 percent) (Parker et al. 1997).

Data on lung cancer for more specific subgroups have been published in several reports (Baquet et al. 1986; Ross et al. 1991; Zane et al. 1994; NCI 1996b). The most recent data are from NCI's SEER program and provide information for 1988–1992. This report includes incidence data from the nine areas included in the annual SEER reports (e.g., Kosary et al. 1995) and from Los Angeles, San Jose/Monterey, and the Alaska Area Native Health Service. Data on Hispanics are predominantly from Los Angeles, New Mexico, San Francisco, and San Jose/Monterey. Most Hispanics represented in SEER are Mexican Americans. Data on Asian Americans and Pacific Islanders are mainly from Los Angeles, Hawaii, San Francisco/Oakland, San Jose/Monterey, and Seattle/Puget Sound. Data on American Indians are from New Mexico; data from the Alaska Native Area Health Service provide information on Alaska Natives (NCI 1996b).

During 1988–1992, the age-adjusted (to the 1970 U.S. standard population) incidence per 100,000 population of lung cancer for men was 89.0 for Hawaiians, 70.9 for Vietnamese, 53.2 for Koreans, 52.6 for Filipinos, 52.1 for Chinese, and 43.0 for Japanese. For comparison purposes, the lung cancer incidence rates were 117.0 for African American men, 76.0 for white men, and 41.8 for Hispanic men. For women, the lung cancer incidence rates were 43.1 for Hawaiians, 31.2 for Vietnamese, 25.3 for Chinese, 17.5 for Filipinos, 16.0 for Koreans, and 15.2 for Japanese. In comparison, the lung cancer incidence rates were 44.2 for African American women, 41.5 for white women, and 19.5 for Hispanic women.

Age-adjusted lung cancer death rates during 1988–1992 were, per 100,000 men, 88.9 for Hawaiians, 40.1 for Chinese, 32.4 for Japanese, and 29.8 for Filipinos; mortality estimates were not available for Koreans and Vietnamese of either gender. In comparison, the lung cancer death rates were 105.6 for African American men, 72.6 for white men, and 32.4 for Hispanic men. For women, the lung cancer death rates were 44.1 for Hawaiians, 18.5 for Chinese, 12.9 for Japanese, and 10.0 for Filipinos. In comparison, the lung cancer death rates were 31.9 for white women, 31.5 for African American women, and 10.8 for Hispanic women (NCI 1996b). The lung cancer rates reflect gender differences in smoking rates among Asian American and Pacific Islander populations, as indicated by 1978–1995 data from the NHISs (see Chapter 2).

Several studies have identified high rates of lung cancer among Native Hawaiians. Data on lung cancer among Pacific Islanders from the Hawaii Tumor Registry indicate that Native Hawaiians have the highest lung cancer incidence rates among the islands' other racial/ethnic groups, including Japanese, Filipinos, and Chinese (Kolonel 1980; Hinds et al. 1981). Using medical records of lung cancer patients and data from a population-based survey, Hinds and colleagues (1981) assessed the risk of developing lung cancer associated with smoking among women in Hawaii. The risk for developing lung cancer among women who had ever smoked compared with those who had never smoked was substantially greater among Native Hawaiian women (tenfold higher) than among Japanese women (fivefold higher) and Chinese women (twofold higher). In a comparison of the risks of smoking among Native Hawaiians, Filipinos, Japanese, and Chinese in Hawaii, Le Marchand and colleagues (1992) found that Native Hawaiian men had the highest risk and that white and Filipino women had higher risks than Native Hawaiian women. The pattern of variation of smoking's effect on lung cancer was statistically significant for men. These differences persisted after variables for beta-carotene and cholesterol intake were included in the statistical model. The observation that the risk of lung cancer related to smoking may vary among subgroups requires further elucidation. In a cohort study of 7,961 Japanese American men who were living in Hawaii, the incidence of lung cancer was 11.4 times higher in current smokers than in persons who had never smoked; the risk for former smokers was 3.1 times higher than for never smokers (Chyou et al. 1993).

Hispanics

According to NCHS data from 1985 through 1995, the age-adjusted death rate for malignant neoplasms of the respiratory system (primarily deaths from lung cancer) among Hispanic men was about three times higher than that for Hispanic women (Table 1) (NCHS 1997). Trends should be interpreted with caution, because only 17 states and the District of Columbia contributed death certificate data on Hispanics for 1985; by 1990, however, 47 states and the District of Columbia, covering 99.6 percent of the U.S. Hispanic population, contributed relevant data (Table 1) (NCHS 1997). From 1992 through 1994, the age-adjusted death rate for cancer of the trachea, bronchus, and lung (generally referred to as lung cancer) was 23.1 per 100,000 for Hispanic men and 7.7 per 100,000 for Hispanic women (Table 2). Overall, lung cancer is the leading cause of cancer death among Hispanics. Among those who died of cancer in 1993, the four leading causes of death were lung cancer (17.9 percent), cancer of the colon and rectum (9.6 percent), cancer of the female breast (8.2 percent), and cancer of the liver and other biliary organs (6.0 percent) (Parker et al. 1997). Among Hispanic women, however, breast cancer mortality exceeds that of lung cancer (NCI 1996b).

National mortality data for 1992–1994 (Table 4) also indicate that rates of lung cancer per 100,000 were higher among Cuban men (33.7) than among Mexican American (28.3) and Puerto Rican men (21.9). Among women, little variation is evident across Hispanic subgroups (Table 4). An earlier nationwide analysis limited to foreign-born Cubans, Mexicans, and Puerto Ricans provided similar results for 1979–1981 (Rosenwaike 1987).

Some regional data suggest that rates of lung cancer among Hispanics increased rapidly. For example, New Mexico mortality data for 1958–1982 indicate that lung cancer death rates increased for successive birth cohorts of Hispanics (Samet et al. 1988b). Between 1958–1962 and 1978–1982, lung cancer death rates per 100,000 increased from 10.1 to 28.8 among Hispanic men and from 4.8 to 11.2 among Hispanic women (Samet et al. 1988b). However, lung cancer death rates among Hispanics remained below those of the general U.S. population. Moreover, between 1969–1971 and 1979–1981, lung cancer incidence rates doubled for persons with Spanish surnames (not necessarily all persons were Hispanic) residing in the Denver, Colorado, area (Savitz 1986).

National and regional vital statistics have shown that patterns of lung cancer incidence differ among Hispanics and whites throughout the United States (NCHS 1994). Much of the information available on lung cancer incidence has relied on the SEER Program, which for many years included only one subgroup of Hispanics—those residing in New Mexico.

Since the 1950s, descriptive studies of death have documented differing patterns of lung cancer among Hispanics and whites in the western and southwestern United States. In California, during the 1950s and 1960s, age-specific death rates from lung cancer among older Mexican-born women were two to three times the rates among California women of all ages (Buechley et al. 1957; Buell et al. 1968). Lung cancer death rates for women in Texas and New Mexico during the 1960s and 1970s showed a similar pattern of age-specific rates (Lee et al. 1976; Samet et al. 1980, 1988b), although Hispanic women in the West and Southwest have had lower overall lung cancer death rates than white women (Savitz 1986; Martin and Suarez 1987; Samet et al. 1988b; Bernstein and Ross 1991).

Table 4. Age-adjusted death rates* for selected smoking-related causes of death among Mexican Americans, Puerto Rican Americans, and Cuban Americans, United States, 1992–1994

Disease category (*ICD-9* code)†	Mexican		Puerto Rican		Cuban	
	Men	Women	Men	Women	Men	Women
Cancer						
Lip, oral cavity, pharynx (140–149)	2.0	0.4	5.5	0.9	3.3	0.7
Esophagus (150)	2.7	0.3	6.1	1.1	2.7	0.4
Stomach (151)	6.8	3.5	7.7	3.9	3.1	1.3
Pancreas (157)	5.4	4.3	5.0	3.6	5.0	4.1
Larynx (161)	1.1	0.1	2.6	0.3	2.2	0.1
Trachea, bronchus, lung (162)	21.9	8.0	28.3	9.6	33.7	8.9
Cervix uteri (180)	NA	3.7	NA	3.7	NA	1.6
Bladder (188)	1.4	0.5	2.1	1.0	3.5	0.5
Kidney, other, unspecified urinary organs (189)	3.7	1.6	1.9	1.0	2.7	1.0
Cardiovascular diseases						
Coronary heart disease (410–414)	82.3	44.2	118.6	67.3	95.2	42.4
Cerebrovascular disease (430–438)	25.5	18.9	27.3	16.5	17.1	11.5
Respiratory diseases						
Bronchitis, emphysema (491–492)	2.2	0.9	3.2	1.3	3.3	1.0
Chronic airway obstruction, not elsewhere classified (496)	7.6	3.7	10.5	5.3	9.1	3.1

*Per 100,000, age-adjusted to the 1940 U.S. standard population. Death rates are not available from New Hampshire for 1992 and from Oklahoma for 1992–1994. Due to limitations in the data, the population estimates for Oklahoma and New Hampshire were not subtracted from the denominator. Based on the 1990 Census, the number of persons of Hispanic origin from New Hampshire and Oklahoma represented about 0.04 percent of the U.S. Hispanic population.
†*International Classification of Diseases, Ninth Revision*, World Health Organization 1977.
NA = data not available.
Sources: National Center for Health Statistics, public use data tapes, 1992–1994; U.S. Bureau of the Census 1997.

In 1982 and 1983, lung cancer rates among Hispanic men and women in Florida also were lower than the rates among whites (Trapido et al. 1990a,b). More recent data (1981–1989) from Dade County, Florida, again show the incidence of lung cancer to be lower among Hispanic men than among white men and lower among Hispanic women than white women (Trapido et al. 1994a,b). Similarly, Mexican and Puerto Rican immigrants in Illinois have had lower standardized lung cancer death rates than whites (Mallin and Anderson 1988). In addition, lung cancer incidence and death rates have been much lower among Hispanic men than among white men in New Mexico (Samet et al. 1980), Texas (Lee et al. 1976), California (Menck et al. 1975; Bernstein and Ross 1991), Connecticut (Polednak 1993), and Colorado (Savitz 1986). Mortality data indicate that Puerto Ricans living on Long Island, New York, had slightly lower death rates for lung cancer than Puerto Ricans living elsewhere in the United States (except Puerto Rico) (Polednak 1991). However, Puerto Rican men and women residing on Long Island had lung cancer death rates that were three to four times the rates among Puerto Rico residents.

These lower rates of lung cancer among Hispanics appear to reflect differences in smoking between Hispanics and whites. The results of a 1980–1982 case-control study of lung cancer cases among Hispanics and whites residing in New Mexico indicate that the risks (adjusted for gender and age) across categories of smoking consumption among both groups were comparable (Table 5) (Humble et al. 1985). This finding suggests that the reduced rates of lung cancer deaths among Hispanics are attributable to their lower cigarette consumption (number of cigarettes smoked daily) and not to some other correlate of Hispanic race/ethnicity. In a mortality study conducted in Texas between 1970 and 1979 using age-standardized death rates, Holck and colleagues (1982) found that Mexican American women had stable lung cancer death rates (approximately 30 per 100,000), whereas white women had increasing rates of death from lung cancer. The lower lung cancer rates for Mexican American women were consistent with their lower prevalence of smoking (18.5 percent of Mexican American women vs. 31.6 percent of white women).

The elevated rates of lung cancer death among older Hispanic women in the West and Southwest have been attributed to a possible pattern of early initiation of smoking among women born in Mexico before 1900 as well as the custom of cooking indoors with an open fire (Buell et al. 1968; Lee et al. 1976). The findings of a 1980–1982 case-control study in New Mexico indicate that older Hispanic women smoked hand-rolled cigarettes, which may have contributed to the high lung cancer death rate among older Mexican American women (Humble et al. 1985).

Table 5. Odds ratios for the risk of lung cancer, by gender, race/ethnicity, and smoking status, case-control study, New Mexico,* 1980–1982

	Men	
Smoking status	**Hispanic**	**White**
Former smokers	8.0† (1.9–42.2)‡	7.2 (3.0–17.6)
Current smokers <20 cigarettes per day	11.6 (2.7–61.5)	9.2 (3.3–25.8)
≥20 cigarettes per day	26.1 (5.6–146.6)	24.7 (10.0–59.9)
	Women	
	Hispanic	**White**
Former smokers	6.3† (1.5–27.8)	6.5 (2.8–15.4)
Current smokers <20 cigarettes per day	18.5 (4.9–72.4)	19.2 (6.5–60.8)
≥20 cigarettes per day	36.9 (7.6–217.1)	16.0 (6.7–36.3)

*Mantel-Haenszel estimates of exposure odds ratios were calculated for two age strata: <65 years of age and ≥65 years of age. Odds ratios are relative to persons who never smoked.
†$p < 0.01$.
‡95% Cornfield confidence limits; unless otherwise indicated, $p < 0.0001$.
Source: Adapted from Humble et al. 1985.

Other Cancers

Cigarette smoking causes cancers of the lung, larynx, mouth, esophagus, and bladder; is a contributing factor for cancers of the pancreas, kidney, and cervix; and is associated with cancer of the stomach (USDHHS 1989b, 1990). Cigarette smoking is also suspected of contributing to colon cancer (Giovanucci et al. 1994), liver cancer (Doll et al. 1994), and acute myeloid leukemia (Siegel 1993). Little information is available on cigarette smoking as a risk factor for these cancers among members of racial/ethnic minority groups. In the annual Cancer Statistics Review of the SEER Program, cancer incidence and death rates are reported for African Americans and whites (Kosary et al. 1995). A special 1986 report provides more detailed information on African Americans and other ethnic groups for 1978–1981 (Baquet et al. 1986). A more recent report provides detailed information on several ethnic groups for 1988–1992 (NCI 1996b). Other population-based cancer registries are also beginning to contribute relevant information.

Several recently published sources of information on cancer among American Indians include an IHS report, which describes regional differences in cancer deaths among American Indians in the United States for 1984–1988 and time trends for 1968–1987 (Valway 1992); two reports from the Alaska Area Native Health Service (Lanier et al. 1993, 1996), which describe cancer incidence in the state's Eskimo, Aleut, and Indian populations; and an NCI monograph that documents the status of the evidence on cancer and the need for additional research regarding cancer among American Indians and Alaska Natives (Burhansstipanov and Dresser 1993).

Table 6. Age-adjusted incidence and death rates* for selected smoking-related cancers, by race/ethnicity and gender, National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program, 1988–1992

Primary cancer site (*ICD-9* code)[†]	African American	Alaska Native	American Indian (New Mexico)	Chinese	Filipino
All sites					
Incidence rate,[§] men	560[‡]	372	196	282	274
Incidence rate, women	326	348	180	213	224
Death rate,[¶] men	319	225	123	139	105
Death rate, women	168	179	99	86	63
Cervix uteri (180)					
Incidence rate, women	13.2	15.8	9.9	7.3	9.6
Death rate, women	6.7	–[**]	–	2.6	2.4
Esophagus (150)					
Incidence rate, men	15.0	–	–	5.3	2.9
Incidence rate, women	4.4	–	–	–	–
Death rate, men	14.8	–	–	4.2	2.2
Death rate, women	3.7	–	–	–	–
Kidney and renal pelvis (189.0–189.1)					
Incidence rate, men	12.8	–	15.6	4.6	5.8
Incidence rate, women	6.0	–	–	2.3	2.8
Death rate, men	5.1	–	–	1.3	1.9
Death rate, women	2.2	–	–	0.9	–
Larynx (161)					
Incidence rate, men	12.7	–	–	2.8	2.4
Incidence rate, women	2.5	–	–	–	–
Death rate, men	5.6	–	–	0.9	–
Death rate, women	0.9	–	–	–	–
Lung and bronchus (162.2–162.9)					
Incidence rate, men	117.0	81.1	14.4	52.1	52.6
Incidence rate, women	44.2	50.6	–	25.3	17.5
Death rate, men	105.6	69.4	–	40.1	29.8
Death rate, women	31.5	45.3	–	18.5	10.0

*Rates per 100,000, age-adjusted to the 1970 U.S. standard population.

†U.S. Department of Health and Human Services 1989a.

‡Includes persons of other ethnic groups who designated themselves as of Hispanic origin.

§All incidence data are from five states: Connecticut, Hawaii, Iowa, New Mexico, and Utah; from six metropolitan areas: Atlanta (including 10 rural counties), Detroit, Los Angeles, San Francisco/Oakland, San Jose/Monterey, and Seattle/Puget Sound; and from the Alaska Area Native Health Service.

Death and incidence data both indicate marked heterogeneity of cancer occurrence among racial/ethnic groups in the United States, and this heterogeneity extends to the cancer sites associated with cigarette smoking. For example, SEER data indicate that African Americans have higher incidence and death rates than whites for a number of smoking-related cancer sites, including the oral cavity and pharynx, esophagus, cervix uteri, larynx, stomach, pancreas, and lung (Table 6; Figure 4) (Kosary et al. 1995; NCI 1996b). When the ratios of African American to white incidence and death rates exceed 1.0 in Figure 4, then African Americans

Hawaiian	Japanese	Korean	Vietnamese	White	Hispanic†
340	322	266	326	469	319
321	241	180	273	346	243
239	133	NA	NA	213	129
168	88	NA	NA	140	85
9.3	5.8	15.2	43.0	8.7	16.2
–	1.5	NA	NA	2.5	3.4
9.4	5.6	–	–	5.4	4.4
–	–	–	–	1.7	0.9
–	4.8	NA	NA	5.3	3.4
–	0.9	NA	NA	1.2	0.7
9.8	7.3	6.3	–	11.9	10.0
–	2.3	–	–	5.9	5.5
–	2.4	NA	NA	5.0	3.7
–	0.8	NA	NA	2.3	1.7
–	2.5	–	–	7.5	5.1
–	–	–	–	1.5	0.7
–	–	NA	NA	2.3	1.9
–	–	NA	NA	0.5	0.2
89.0	43.0	53.2	70.9	76.0	41.8
43.1	15.2	16.0	31.2	41.5	19.5
88.9	32.4	NA	NA	72.6	32.4
44.1	12.9	NA	NA	31.9	10.8

ΔEstimates for all cancer sites are rounded to the nearest integer.
¶National Center for Health Statistics, public use data tapes, 1988–1992, is the source for all death rates in this table. Death rates are U.S. mortality rates.
**A dash means that the rate was not calculated for fewer than 25 cases.
NA = data not available.
Source: National Cancer Institute 1996b; National Center for Health Statistics, public use data tapes, 1988–1992.

Table 6. Continued

Primary cancer site (*ICD-9* code)[†]	African American	Alaska Native	American Indian (New Mexico)	Chinese	Filipino
Oral cavity excluding nasopharynx (140.0–146.9; 148.0–149.9)					
Incidence rate,[§] men	20.4[Δ]	–**	–	5.3	5.4
Incidence rate, women	5.8	–	–	2.3	5.3
Death rate, men	8.7	–	–	1.6	1.2
Death rate, women	2.1	–	–	0.7	1.3
Pancreas (157)					
Incidence rate, men	14.0	–	–	8.0	6.5
Incidence rate, women	11.5	–	–	4.9	6.0
Death rate,[Δ] men	14.4	–	–	6.7	4.5
Death rate, women	10.4	–	–	5.1	3.5
Stomach (151)					
Incidence rate, men	17.9	27.2	–	15.7	8.5
Incidence rate, women	7.6	–	–	8.3	5.3
Death rate, men	13.6	–	–	10.5	3.6
Death rate, women	5.6	–	–	4.8	2.5
Urinary bladder (188)					
Incidence rate, men	15.2	–	–	13.0	8.3
Incidence rate, women	5.8	–	–	3.7	2.1
Death rate, men	4.8	–	–	2.0	1.2
Death rate, women	2.4	–	–	1.0	–

*Rates per 100,000, age-adjusted to the 1970 U.S. standard population.
[†]U.S. Department of Health and Human Services 1989a.
[‡]Includes persons of other ethnic groups who designated themselves as of Hispanic origin.
[§]All incidence data are from five states: Connecticut, Hawaii, Iowa, New Mexico, and Utah; from six metropolitan areas: Atlanta (including 10 rural counties), Detroit, Los Angeles, San Francisco/Oakland, San Jose/Monterey, and Seattle/Puget Sound; and from the Alaska Area Native Health Service.

experience excess morbidity and mortality from the cancers shown. Also, SEER data for 1988–1992 show that whites have higher rates of some cancers than Hispanics, Asian Americans, Pacific Islanders, American Indians, and Alaska Natives (Table 6) (NCI 1996b). U.S. mortality data for 1984–1988 show that American Indians have a lower mortality rate from lung cancer than the general U.S. population but a higher mortality rate from cervical cancer (Table 7) (Valway 1992).

Cervical Cancer

In a case-control Los Angeles County study of invasive cervical cancer that included 98 English-speaking case-control pairs and 102 Spanish-speaking pairs, Peters and colleagues (1986) found that the overall risk of such cancer was increased by cigarette smoking. The cervical cancer risk related to smoking was comparable in the two groups. In a more recent study of the risk factors for cervical dysplasia among Hispanic and white women in New Mexico (Becker et al. 1994a,b), cigarette smoking was significantly associated with high-grade cervical dysplasia among white women but not among Hispanic women; however, this difference in risk was not statistically significant. In addition, in a recent pilot study of American Indian women in the Albuquerque IHS area, Becker and colleagues (1993) found that cigarette smoking was associated with cervical dysplasia; however, the results were not statistically significant.

Hawaiian	Japanese	Korean	Vietnamese	White	Hispanic‡
11.7	7.0	–	11.6	14.6	8.9
–	3.3	–	–	5.8	2.7
–	2.1	NA	NA	3.8	2.7
–	0.8	NA	NA	1.5	0.7
10.9	8.7	–	–	9.8	8.0
8.7	7.3	7.6	–	7.4	6.9
12.8	8.5	NA	NA	9.7	7.1
9.1	6.7	NA	NA	6.9	5.2
20.5	30.5	48.9	25.8	10.2	15.3
13.0	15.3	19.1	25.8	4.4	8.0
14.4	17.4	NA	NA	6.1	8.4
12.8	9.3	NA	NA	2.8	4.2
–	13.7	10.4	–	31.7	15.8
–	4.1	–	–	7.8	4.3
–	2.0	NA	NA	5.8	2.8
–	1.2	NA	NA	1.7	0.9

§Estimates for all cancer sites are rounded to the nearest integer.
¶National Center for Health Statistics, public use data tapes, 1988–1992, is the source for all death rates in this table. Death rates are U.S. mortality rates.
**A dash means that the rate was not calculated for fewer than 25 cases.
NA = data not available.
Source: National Cancer Institute 1996b; National Center for Health Statistics, public use data tapes, 1988–1992.

Esophageal Cancer

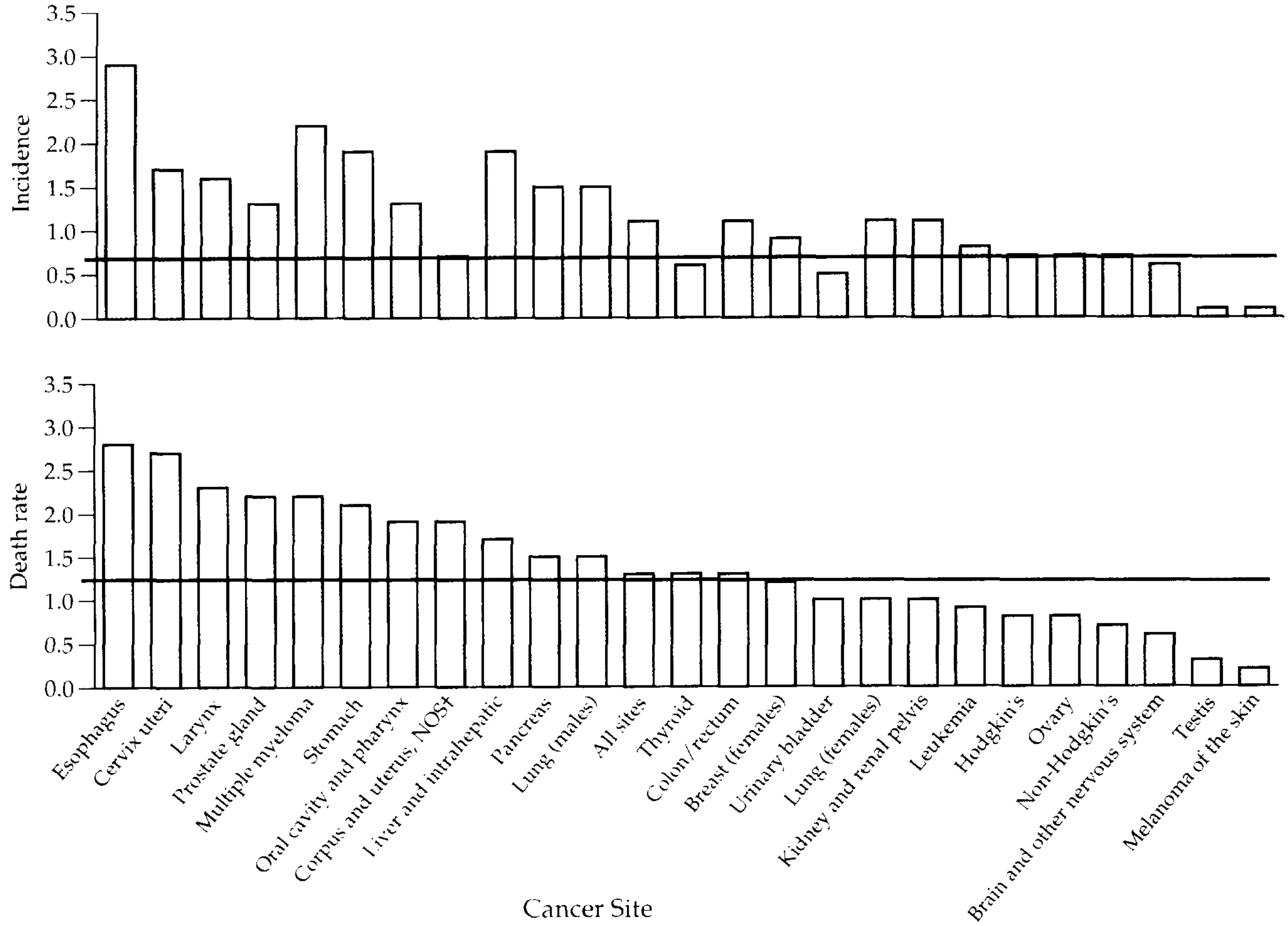
Esophageal cancer incidence and death rates in the United States are highest among African Americans (Tables 2 and 6) (NCI 1996b). To assess potential causes of the high rates of death from esophageal cancer found among African American men, Pottern and colleagues (1981) conducted a case-control study in Washington, D.C. After adjusting the data for alcohol consumption, they found that the relative risk of esophageal cancer among smokers was only marginally higher than among nonsmokers. In a more recent study, the risk for African American men of developing squamous cell carcinoma of the esophagus was significantly elevated for smokers, even after adjusting statistically for age, geographic area, alcohol consumption, and income (Brown et al. 1994).

Smoking mentholated cigarettes may also be a cause of the high and rising esophageal cancer rates among African Americans. In a case-control study of data from the American Health Foundation's ongoing tobacco study, Hebert and Kabat (1989) failed to show a consistent effect of smoking mentholated cigarettes on the risk of esophageal cancer among African Americans. Better designed studies are needed to adequately address this hypothesis.

Oral Cancer

Tobacco use and alcohol use are the predominant risk factors for cancers of the oral cavity and pharynx (commonly referred to as oral cancer) (USDHHS 1989b). African Americans have the highest oral

Figure 4. SEER* cancer incidence and U.S. death rates, 1988–1992, ratio of African American rate to white rate for all ages, by cancer site



*National Cancer Institute's Surveillance, Epidemiology, and End Results Program; rates are age-adjusted to the 1970 U.S. standard population.
†Not otherwise specified.
Source: Kosary et al. 1995.

cancer incidence and death rates in the United States (Tables 2 and 6) (NCI 1996b). Using underlying cause-of-death data compiled by NCHS and U.S. census population enumerations and intercensal population estimates, investigators found that from 1950 to 1990, the death rate for cancers of the oral cavity and pharynx (age-adjusted to the 1970 age distribution of the U.S. population) decreased for white men from 6.6 to 4.2 per 100,000 population. However, for African American men, the death rate increased from 4.8 in 1950 to 11.0 in 1980 and subsequently decreased slightly, to 9.8 in 1990. From 1980 through 1990, the rate for African American men was approximately twice as high as that for white men. The death rate for cancers of the oral cavity and pharynx for African American women exceeded the rate for white women for nearly all of the 41-year period. The death rate increased slightly for white women, from 1.5 to 1.6,

Table 8. Odds ratios (ORs) and 95% confidence intervals (CIs) for the risk of oral cancer associated with cigarette smoking, by race/ethnicity and smoking status, 1984–1985*

	African American		White	
Smoking status	**OR†**	**±CI**	**OR†**	**±CI**
Never smoked	1.0		1.0	
No. of cigarettes per day‡				
1–19	1.2	0.5–2.6	1.2	0.8–1.7
20–39	2.1	1.0–4.4	2.2	1.6–2.9
≥40	2.8	1.0–7.7	2.8	2.0–4.0
Years of cigarette smoking				
1–19	0.9	0.3–2.4	0.6	0.4–1.0
20–39	1.6	0.7–3.3	1.9	1.3–2.5
≥40	2.9	1.2–7.2	3.3	2.3–4.6
Age at smoking initiation (years)				
<17	1.8	0.8–3.9	2.0	1.4–2.7
17–24	1.7	0.8–3.8	1.9	1.4–2.6
≥25	1.2	0.4–3.6	2.2	1.4–3.5
Years since stopped smoking				
0 (never quit)	2.3	1.1–4.7	3.6	2.6–4.8
1–9	1.1	0.4–3.1	1.1	0.7–1.6
10–19	0.1	0.0–1.3	1.1	0.7–1.6
≥20	0.3	0.1–1.7	0.6	0.3–0.9

*Data from four population-based cancer registries in Los Angeles County and Santa Clara and San Mateo Counties near San Francisco-Oakland, metropolitan Atlanta, and the state of New Jersey.

†ORs are adjusted for alcohol consumption, gender, age, study location, and respondent status and are relative to persons who never smoked.

‡Usual number of cigarettes smoked daily when the persons smoked.

Source: Day et al. 1993.

Urinary Bladder Cancer

The incidence of urinary bladder cancer in the United States is highest for whites (Table 6) (NCI 1996b). Among men, mortality is highest for whites; among women, mortality is highest for African Americans (Tables 2 and 6) (NCI 1996b). Differences in bladder cancer risk associated with cigarette smoking for African Americans and whites have been examined in several case-control studies (Table 9), including the ongoing study conducted by the American Health Foundation (Harris et al. 1990), a population-based study conducted in the Detroit metropolitan area (Burns and Swanson 1991), and a population-based study carried out through SEER registries in 1978 (Hartge et al. 1993). In the American Health Foundation study, investigators found that although cigarette smoking was a significant risk factor for bladder cancer among both whites and African Americans, the data suggested a steeper exposure-response relationship among whites (with significant increased risk beginning at exposures of 20 pack-years) than among African American men (with increased risk beginning only after 60 pack-years). However, in a multivariate analysis of the data for men, the risk of bladder cancer did not differ by race. The other two studies showed similar findings for both whites and African Americans in the association between cigarette smoking and bladder cancer. In a smaller case-control study in Orange County, California, no significant interactions were found between smoking and race/ethnicity among whites, Hispanics, Asian Americans, or Pacific Islanders (Anton-Culver et al. 1993). Thus, information currently available suggests that smoking increases the risk of bladder cancer in a similar fashion among both whites and African Americans. In a cohort study of 7,995 Japanese American men who were living in Hawaii, the risk of bladder cancer was 2.9 times higher in current smokers than in nonsmokers (Chyou et al. 1993).

Aromatic amines, such as 4-aminobiphenyl, are considered causative chemical agents in cigarette smoke-induced bladder cancer (Bartsch et al. 1993). As with other potential carcinogens in tobacco smoke, aromatic amines require metabolic activation before interacting with DNA (Miller and Miller 1981). A competing chemical pathway (i.e., acetylation) exists and serves as a detoxification mechanism. Genotyping studies have characterized several variant alleles of the N-acetyltransferase gene, which can result in different rates of chemical acetylation. People who are slow acetylators have increased risk for bladder cancer (Hein 1988). Bell and colleagues (1993) determined

Table 9. Odds ratios for the risk of urinary bladder cancer associated with smoking, by gender, race/ethnicity, and smoking status

		Men		Women	
Reference, study type, and year	**Smoking status**	**African American**	**White**	**African American**	**White**
Harris et al. 1990	Never	1.0	1.0	1.0	1.0
Multicenter, hospital-based,	Former	1.6	2.1		1.3
1973–1985	Current	2.0	3.2	3.9*	3.2
Burns and Swanson 1991	Never	1.0	1.0	1.0	1.0
Detroit, population-based	Ever	3.0	2.3	3.8	2.4
	Pack-years				
	< 30	1.9	1.5	3.1	1.7
	30–59.9	4.0	2.6	3.8	2.9
	60–89.9	4.7	2.7	5.0	3.5
	> 90	4.8	3.0	5.2	2.7
Hartge et al. 1993	Never	1.0	1.0	1.0	1.0
SEER† registries,	Former				
population-based, 1978	Cigarettes smoked				
	< 20 per day	1.6	1.3	3.6	2.0
	≥ 20 per day	1.8	1.9	5.0	1.3
	Current				
	Cigarettes smoked				
	< 20 per day	2.2	2.1	1.7	2.0
	≥ 20 per day	4.5	3.0	2.1	3.1

*Ever smokers.
†National Cancer Institute's Surveillance, Epidemiology, and End Results Program.

that 41 percent of African Americans and 55 percent of whites were slow acetylators. A phenotyping study also found the highest percentage of slow acetylators among whites (54 percent), compared with African Americans (34 percent) and Asians (14 percent) (Yu et al. 1994).

In the 1994 study by Yu and colleagues, slow acetylators had higher levels of 3- and 4-aminobiphenyl-hemoglobin adducts, regardless of race and level of smoking (Yu et al. 1994). For African Americans, Asians, and whites, however, the levels of 3- and 4-aminobiphenyl-hemoglobin adducts increased proportionately more for cigarette smokers compared with nonsmokers than for slow acetylators compared to rapid acetylators. In a subsequent study by Yu and colleagues (1995), the slow acetylation phenotype combined with the null genotype of the gene *(GSTM1)* for a phase II detoxification enzyme (glutathione S-transferase) resulted in higher levels of 3- and 4-aminobiphenyl-hemoglobin adducts than did lower risk profiles (i.e., rapid acetylator and/or at least one functional *GSTM1* gene allele). The highest risk profile was seen in 27 percent of whites, 15 percent of African Americans, and 3 percent of Asians.

Several studies show that the highest levels of risk are experienced by smokers, because high levels of exposure to tobacco smoke overwhelm the various phenotypic traits. The differences in risks for various detoxification and activation pathways appear to be most significant among persons who did not smoke or who smoked at very low levels (Yu et al. 1994, 1995; Landi et al. 1996).

Chronic Obstructive Pulmonary Disease

In addition to causing lung cancer, tobacco smoking also causes several non-malignant diseases of the lung and increases the frequency of respiratory symptoms and illnesses (USDHHS 1989b, 1990). Chronic obstructive pulmonary disease (COPD) is a clinical term applied to persons with a permanent airflow obstruction associated with significant impairment (Samet 1989; USDHHS 1989b). Cigarette smokers with COPD have impaired breathing as a result of emphysema (air space enlargement and destruction) and damage to the airways (USDHHS 1984). These smokers also may have chronic bronchitis, which is the term used by epidemiologists and clinicians for chronic sputum production.

Longitudinal studies show that the development of COPD follows sustained excessive loss of ventilatory function of the lung caused by cigarette smoking (USDHHS 1984, 1990). The rate at which ventilatory function declines tends to increase with the amount smoked and to revert to the rate associated with aging after smoking cessation (USDHHS 1990). The frequency of chronic bronchitis is similarly related to smoking pattern.

African Americans

Data from several national surveys have been used to compare the prevalence of COPD among African Americans and whites. McWhorter and colleagues (1989) used data from the 1971–1975 National Health and Nutrition Examination Survey (NHANES I) and the 1982–1984 NHANES I Epidemiologic Follow-up Study (NHEFS) to determine the prevalence of COPD among 14,404 adults aged 25–74 years. African American race/ethnicity was associated with a lower risk for having COPD; 6.2 percent of whites and 3.2 percent of African Americans had COPD.

In the 1990 NHIS, the prevalence of self-reported chronic bronchitis was 55.2 per 1,000 African Americans aged 45–64 years and 42.7 per 1,000 African Americans aged 65 years and older (USDHHS 1991). The prevalence of self-reported emphysema was 3.6 per 1,000 middle-aged African Americans and 41.5 per 1,000 older African Americans. Compared with African Americans, whites in both age groups reported higher prevalences of chronic bronchitis (59.7 for those aged 45–64 years and 73.8 for those aged 65 years and older) and emphysema (13.8 for those aged 45–64 years and 46.1 for those aged 65 years and older). However, self-reports of chronic bronchitis and emphysema, without further validation, are probably subject to substantial misclassification.

African Americans are also less likely than whites to die of COPD (Evans et al. 1987; NCHS 1991). Evans and colleagues (1987) found that in 1982, the age-adjusted COPD death rate was 16.6 per 100,000 whites and 12.8 per 100,000 African Americans. Data for 1986–1988 also show lower death rates from COPD among African Americans than among whites (Desenclos and Hahn 1992). More recent data (Table 2) show that African American men have higher death rates (17.6) for chronic airway obstruction than men in the other three racial/ethnic minority groups, although their rates are lower than rates among white men (20.4). The same pattern is also evident for deaths due to bronchitis and emphysema. The rate of COPD mortality is unexpectedly low among African Americans, given their high prevalence of smoking and related high lung cancer rates. The reasons for this discrepancy remain to be explored. However, whites are more likely than African Americans to have ever smoked and to be former smokers (see Table 37 in Chapter 2). Mannino and colleagues (1997) have observed that death rates from obstructive lung disease relate to rates of ever smoking. These authors suggest that the differences in the race- and gender-specific relative rankings for obstructive lung disease and lung cancer may be because long-term former smokers are more likely to develop obstructive lung disease than lung cancer.

American Indians and Alaska Natives

Little information is available on the occurrence of COPD among American Indians and Alaska Natives. In a 1987 survey of approximately 6,500 American Indians and Alaska Natives aged 19 years and older, 2.4 percent of men and 1.4 percent of women reported having emphysema, compared with 2.7 percent of men and 2.3 percent of women in the general U.S. population (Johnson and Taylor 1991). Rhoades (1990) studied hospitalization and death rates for COPD in American Indians and Alaska Natives. Although the death rates for COPD were lower than from other competing causes, such as chronic liver disease, diabetes, and injuries, the hospitalization rates for COPD exceeded those for cancer and tuberculosis.

Additionally, hospitalization rates and death rates for COPD varied widely between geographic regions. The contribution of COPD to hospitalization rates ranged from 1.6 percent in the Navajo IHS area to 5.1 percent in the Bemidji area; COPD death rates per 100,000 ranged from 1.7 in the Albuquerque area to 10.3 in the Billings area (Rhoades 1990).

Between 1992 and 1994, COPD death rates among American Indian men were approximately two-thirds the rates among whites (Table 2). Data from the Alaska area indicate that from 1979 through 1986, COPD death rates per 100,000 were 31.6 for Alaska Native men, compared with 40.3 for white men in Alaska and 38.3 for men in the United States as a whole (Coultas et al. 1994). The COPD death rates per 100,000 were 22.3 for Alaska Native women, compared with 34.8 for white women in Alaska and 18.6 for women in the United States as a whole. Similarly, death rates for COPD in New Mexico (Samet et al. 1988b) reflect the nationwide pattern of lower rates of death among American Indians compared with whites and are consistent with the lower smoking prevalence among tribes in the southwestern United States (Sugarman et al. 1992). The high rates of COPD among Alaska Natives are probably related to the fact that rates of smoking among Alaska Natives are higher than rates among American Indians elsewhere, particularly in the Southwest.

Asian Americans and Pacific Islanders

Information on COPD morbidity and death among Asian Americans and Pacific Islanders is sparse. National mortality data indicate that the prevalence of deaths from bronchitis and emphysema is lower in this group than among African Americans and whites (Table 2); the death rate from chronic airways obstruction is lowest for Asian Americans and Pacific Islanders. Data from California show that from 1986 through 1987, the overall prevalence of COPD deaths among "Asian and other" persons was lower than among whites but varied widely for specific Asian American and Pacific Islander subgroups (Asian American Health Forum, Inc. 1990).

One of the oldest studies of Asian Americans—the Honolulu Heart Study, conducted in 1965—provides valuable age-related information on smoking and lung function among Japanese Americans. Of the 6,346 Japanese American men aged 46–68 years who underwent spirometric testing, 48 percent were current cigarette smokers, 25 percent were former smokers, and 27 percent had never smoked (Marcus et al. 1988). Airflow obstruction was found in 11.7 percent of the participants. The prevalence of airflow obstruction increased with age and with the amount smoked. For most age and smoking categories, the prevalence of airflow obstruction was lower among Japanese American men than among white men from Connecticut participating in the same study (Beck et al. 1981).

In another recent analysis of data from the Honolulu Heart Program, Japanese American men who continued to smoke showed steeper rates of decline in forced expiratory volume after one second (FEV_1), a measure of pulmonary function, compared with never smokers. Among continuing smokers, FEV_1 decline was significantly associated with duration of smoking. Additionally, the rate of decline in FEV_1 among former smokers became more like that of persons who had never smoked (Burchfiel et al. 1995), consistent with previous reports on the benefits of quitting smoking (USDHHS 1990). In another analysis of data from the same study, Sharp and colleagues (1994) found that a diet composed of large amounts of fish may protect the lungs against damage from cigarette smoking. However, fish consumption was not associated with pulmonary function at higher levels of cigarette smoking (>30 cigarettes/day).

Hispanics

In the 1982–1984 Hispanic Health and Nutrition Examination Survey (HHANES), Puerto Ricans (2.9 percent) had a higher prevalence of reported chronic bronchitis than Mexican Americans (1.7 percent) or Cuban Americans (1.7 percent) (Bang et al. 1990). Chronic airflow obstruction (assessed using spirometry) was present in less than 1 percent of Hispanic adults surveyed in a New Mexico community (Samet et al. 1988a). Similarly, investigators who surveyed Mexican Americans in Tucson, Arizona, found a relatively low prevalence of physician-diagnosed COPD or related diagnoses (Di Pede et al. 1991).

COPD has been reported to occur less frequently among Hispanics than among whites. Surveys in New Mexico have shown, for example, that physician-diagnosed chronic bronchitis or emphysema is less common among Hispanics than among whites (Samet et al. 1982, 1988a). Death rates from chronic obstructive lung diseases and allied conditions are also lower among Hispanics than among whites (Tables 2 and 4). Mortality data for New Mexico indicate that between 1958 and 1982, Hispanic men had a lower death rate from COPD than white men; however, from 1958 through 1982, the death rate from COPD rose steeply among Hispanic men—from 5.0 per 100,000 in 1958–1962 to 30.1 per 100,000 in 1978–1982 (Samet et al. 1988b). During this same time, COPD death rates increased among Hispanic women but remained comparable to rates among white women (Samet et al. 1988b).

Little information is available on the risk of COPD among Hispanic smokers. In a 1979 respiratory disease survey of Hispanic and white residents of New Mexico's Bernalillo County, Samet and colleagues (1982) found that race/ethnicity was not a significant predictor of current or previous physician-diagnosed chronic bronchitis and emphysema and that no significant interaction existed between race/ethnicity and cigarette smoking. Hispanic ethnicity also was not a significant predictor of the symptoms of chronic cough, chronic phlegm, or persistent wheeze. Similarly, the results of a survey of Hispanics and whites in Tucson indicated that race/ethnicity was not a significant determinant of respiratory symptoms, after survey data were adjusted for cigarette smoking (Di Pede et al. 1991). However, a recent cross-sectional study of urban pregnant women indicated that the prevalence of either doctor-diagnosed asthma or persistent wheeze without asthma was lower among a heterogenous Hispanic population than among white women of similar socioeconomic background (these data were adjusted for cigarette smoking status, family history of asthma, educational level, household exposure to pets, and level of lung function). The authors did not conclude that their data provided evidence of biological protection from wheeze syndromes. An almost fivefold excess risk of persistent wheeze was detected in the total population of urban women who are current smokers (David et al. 1996).

Coronary Heart Disease

In 1994, cardiovascular diseases, comprising a diverse group of disorders including coronary heart disease (CHD), hypertension, stroke, and rheumatic heart disease, caused approximately 940,000 deaths in the United States (NCHS 1996a). The occurrence of specific cardiovascular diseases and their risk factors varies widely among the different racial/ethnic minority groups. Of the cardiovascular diseases, CHD is the single largest cause of death; it results in approximately 480,000 deaths annually in the United States. This section of the report focuses on CHD, which is also termed coronary artery disease or ischemic heart disease (IHD).

Coronary artery disease results from atherosclerosis of coronary arteries. Anatomical lesions become evident in young adults and are usually clinically manifest in the fifth through seventh decades as angina pectoris, myocardial infarction, and sudden cardiac death (Enos et al. 1986; Strong 1986). In this chapter, these clinical manifestations of coronary artery disease are collectively termed CHD.

Numerous non-modifiable and modifiable risk factors contribute to the development of CHD. The non-modifiable factors include aging, gender (men have greater risk), and family history of CHD. The major risk factors that are potentially modifiable include hypertension, cigarette smoking, obesity, hypercholesterolemia, diabetes mellitus, and physical inactivity (Smith and Pratt 1993). The 1983 Surgeon General's report on smoking and health concluded that "Cigarette smoking should be considered the most important of the known modifiable risk factors for coronary heart disease in the United States" (USDHHS 1983, p. iv).

African Americans

The first population-based epidemiological investigations of cardiovascular diseases in the United States that included substantial numbers of African American and white participants began in 1960 in Evans County, Georgia, and Charleston, South Carolina (Saunders 1991). Since 1960, follow-up data for these cohorts and a number of other epidemiological studies have provided information on the combined effects of race/ethnicity and various risk factors for cardiovascular disease. Consistent with findings for the general population, cigarette smoking increased risk of death from CHD among African Americans (Hames et al. 1993; Keil et al. 1995).

Tyroler and colleagues (1984) examined deaths from CHD among the Evans County men, who were followed from 1960 through 1980, and found that the overall rate of death from CHD was lower among African Americans than among whites, with a ratio of 0.86. For current and former smokers, the probability of dying from all causes and from CHD was higher among whites with a low-socioeconomic status (on the basis of occupation, education, and source of income of the head of household) than among their African American counterparts. However, the analysis did not control for the number of cigarettes smoked, and the data were limited because of the small number of CHD deaths (31) among African Americans.

In the Charleston Heart Study of CHD death rates between 1960 and 1990, Keil and colleagues (1993) found that the age-adjusted, African American-to-white death rate ratios were 0.90 for men and 1.2 for women. After controlling for age and other cardiac risk factors, the researchers found that smoking was associated with a slightly higher risk of dying of CHD among African American men than among white men. White women had a slightly higher risk of dying of CHD than did African American women. These racial/ethnic group differences were not tested for statistical significance, however.

Other investigations that provide information on the risks for CHD and the modification of the effects of smoking, by race/ethnicity, include the Cancer Prevention Study I (CPS-I) (Garfinkel 1984), the NHEFS (Cooper and Ford 1992), the National Mortality Followback Survey (NMFS) (DeStefano and Newman 1993), and the ongoing study of Kaiser Permanente enrollees (Friedman et al. 1997). As part of the CPS-I, death patterns in the original cohort of one million people were described for 1959–1972. The observed-to-expected death rate ratios from CHD among African Americans and whites followed the same pattern as nationwide vital statistics described previously. Overall, the African American-to-white ratios of CHD deaths were 0.78 for men and 1.07 for women. Stratified analyses, by gender, of any effects that the amount of cigarettes smoked might have on CHD deaths showed little difference between African Americans and whites.

Participants in the NHANES I, conducted between 1971 and 1975, were reexamined between 1982 and 1984 as part of the NHEFS (Cooper and Ford 1992). Of the 12,599 participants in the follow-up survey, 10,741 were white and 1,858 were African American. The study showed that cumulative incidence rates of fatal CHD were higher among African Americans (6.2 percent of men and 3.7 percent of women) than among whites (5.6 percent of men and 2.6 percent of women). In contrast, cumulative incidence rates of nonfatal CHD were higher among whites (7.0 percent of men and 4.7 percent of women) than among African Americans (5.0 percent of men and 3.9 percent of women). The risk of new CHD events associated with cigarette smoking was similar among whites and African Americans. These results, however, are limited by the small number of new CHD events among African Americans and the low proportion (approximately 50 percent) of respondents for whom smoking information was collected at baseline.

In a case-control study of CHD deaths among African Americans and whites, DeStefano and Newman (1993) used data from the 1986 NMFS to identify case subjects (n = 803) and 1988 data from the BRFSS to identify control subjects (n = 25,398). When they compared the risk of death among smokers vs. persons who have never smoked (men aged 25–44 years and women aged 25–54 years), the investigators found that among persons without diabetes, African American smokers had a lower relative risk for CHD death than white smokers. However, the 95 percent confidence intervals associated with these odds ratios overlapped each other—an indication that the difference in risk was not statistically significant. In the Kaiser study, the risk of death from CHD has varied among African Americans and whites, but small numbers limit interpretation of these findings (Friedman et al. 1997).

American Indians and Alaska Natives

Most of the available data on CHD among American Indians and Alaska Natives have originated from studies of selected tribes, as reviewed by Young (1994). Investigations of heart disease in southwestern American Indians and Alaska Natives conducted several decades ago showed a low prevalence of CHD relative to the U.S. population and other racial/ethnic groups (Welty and Coulehan 1993). In a descriptive study of CHD deaths occurring from 1948 through 1952 among the Navajos, Smith (1957) found that the standardized death rate ratios for CHD among the Navajos compared with whites were 0.10 for men and 0.12 for women. Since then, numerous other regional investigations of CHD deaths and the incidence of CHD in other tribes of the United States and Canada have been reported. Overall, for studies conducted in the 1950s and 1960s, the ratios of CHD death rates among American Indians and Alaska Natives compared with nationwide rates have ranged from 0.1 to 0.5. An analysis of death statistics from the NCHS showed that crude CHD death rates for individuals classified as American Indians, Eskimos, or Aleuts declined from 100 per 100,000 in 1969–1971 to 67 per 100,000 for the years 1979–1981 (Gillum 1988). A review of New Mexico's vital statistics for 1958–1982 indicates that for American Indian men, CHD death rates peaked at 101.7 per 100,000 between 1968 and 1972 and fell to 76.6 per 100,000 between 1978 and 1982 (Becker et al. 1988). For American Indian women, the CHD death rate peaked at 63.0 per 100,000 between 1963 and 1967 and declined to a low of 28.3 per 100,000 between 1978 and 1982.

In a recent analysis of mortality data for 1992–1994 (Table 2), the rate of death due to CHD was lower among American Indian and Alaska Native men (100.4) and women (45.9) than among white men (132.5) and women (62.9). The ratio of CHD death rates among American Indians and Alaska Natives compared with whites was .76 for men and .73 for women. The fact that these ratios are higher than ratios from earlier studies suggests that CHD deaths among American Indians and Alaska Natives may be increasing (Welty and Coulehan 1993; Young 1994).

Risk factors for cardiovascular disease were investigated recently in a large multi-tribal study of American Indians. The results showed that mean levels of total, low density lipoprotein, and high density lipoprotein cholesterol were lower in American Indians than in the U.S. general population. Prevalence of hypertension, non-insulin dependent diabetes mellitus, and obesity were very high, but varied considerably among tribes and geographic regions (Welty et al. 1995). A second study found that levels of serum cholesterol were lower in American Indian smokers who attended a stop smoking clinic than in African American and white smokers from population-based samples (Folsom et al. 1993). However, fibrinogen levels and the prevalence of abdominal obesity were higher in American Indian smokers than in African Americans and whites.

The IHS is another source of nationwide and regional health statistics on CHD deaths. Because the mortality data in IHS reports combine all cardiovascular diseases under "diseases of the heart" (IHS 1994b), this information cannot be compared directly with CHD data from other sources. Between 1989 and 1991, diseases of the heart accounted for 21.9 percent of deaths in all IHS areas, with a crude death rate of 115.1 per 100,000 (IHS 1994b). These data indicate cardiovascular diseases were the leading cause of death among American Indians. However, because Indian race/ethnicity was underreported on death certificates in several IHS areas, including California and Oklahoma as well as Portland, Oregon, this death rate may be incorrect.

Death rates from heart diseases vary widely among people in the 12 IHS areas. From 1989 through 1991, the rate of death from heart diseases per 100,000 was lowest in the Albuquerque area (88.0) and highest in the Aberdeen area (249.0) (IHS 1994a). These wide variations in deaths from diseases of the heart parallel the wide variations in the prevalence of cigarette smoking among the various tribes (Sugarman et al. 1992; Coultas et al. 1994) (see also Chapter 2). For example, in a 1985–1988 survey of adult American Indians in the southwestern United States, 18.1 percent of men and 14.7 percent of women reported current smoking, compared with 48.4 percent of men and 57.3 percent of women in the Plains states (Sugarman et al. 1992).

Data to assess the influence of tobacco use on the risk of cardiovascular disease among American Indians are extremely limited. One study has shown that cigarette smoking increases the risk for CHD among American Indians, after adjustment for other risk factors (Howard et al. 1995). In fact, most studies presented in this section describe cardiovascular disease morbidity and mortality without ever assessing the influence of tobacco use. Nevertheless, cardiovascular disease is the leading cause of death among American Indians and Alaska Natives (NCHS 1996b), and tobacco use is an important risk factor for this disease. More studies are needed to evaluate the independent effect of tobacco use on the risk of cardiovascular disease among American Indians and Alaska Natives.

Asian Americans and Pacific Islanders

Limited data are available on risk factors and CHD among Asian Americans and Pacific Islanders in the United States (Yu 1991). A recent study of nationwide mortality indicated that Asian Americans and Pacific Islanders have lower rates of death from CHD than whites (Table 2).

In an analysis of 1980 death rates in Los Angeles County, Frerichs and colleagues (1984) found that the age- and gender-adjusted death rates for cardiovascular diseases varied widely among Asian Americans and Pacific Islanders. Koreans had the lowest rate per 100,000 (82), and Japanese had the highest rate (162). These rates were substantially lower than the overall rate for the county population, with rate ratios of 0.26 for Koreans and 0.52 for Japanese. Specific data on CHD deaths and cigarette smoking prevalence were not available.

In another study, Reed and colleagues (1983) used death records from Hawaii to describe age-adjusted, gender-specific, and racial- and ethnic-specific rates of CHD deaths occurring from 1940 through 1978. For all racial/ethnic minority groups, CHD death rates were higher among men than among women. Death rates and the temporal trends in deaths varied widely between the different groups, with the highest death rates among Native Hawaiians and the lowest among Japanese. Filipino men had the greatest increase in CHD death rates, surpassing the rates for whites in 1978. Although most of the other groups had declines in CHD death rates between 1960 and 1970, CHD death rates for Native Hawaiian men remained level.

In 1965, three cohorts of Japanese men were assembled in Japan, Honolulu, and San Francisco to investigate the differences in CHD deaths observed among Japanese men living in the three locales (Worth et al. 1975; Yano et al. 1988). From 1965 through 1972, Worth and colleagues (1975) found that age-specific death rates were highest among the San Francisco men, intermediate among those living in Honolulu, and lowest among those living in Japan. For example, among men 60–64 years of age, the annual CHD death rates per 1,000 were 4.9 in San Francisco, 3.9 in Honolulu, and 2.1 in Japan. Mortality data for 1965–1980 indicate that the age-adjusted CHD death rate ratio for men in Honolulu compared with men in Japan was 1.4 (Yano et al. 1988). The age-adjusted mean levels of most CHD risk factors, including cigarette smoking (measured in cigarette-years), were also higher among Honolulu men. After adjusting for these risk factors, the rate ratio for CHD declined to 1.17, indicating that more than half of the elevated CHD death rate was due to the higher mean levels of CHD risk factors among Honolulu men.

In the Honolulu Heart Program cohort, composed of 7,705 Japanese men 45–68 years of age living in Hawaii who had no evidence of CHD at enrollment between 1965 and 1968, numerous analyses were conducted to further examine predictors of CHD incidence and death (Reed et al. 1982, 1987; Yano et al. 1984; Benfante et al. 1991). A higher level of acculturation was found to be associated with CHD risk factors and incidence during the 1971–1979 follow-up (Reed et al. 1982). Men who were primarily Japanese in culture smoked an average of seven cigarettes per day, whereas men who were more acculturated smoked an average of 11 cigarettes per day. A similar pattern was seen for total CHD incidence, which was highest among the men who were more acculturated (62 per 1,000) and lowest among the men who were primarily Japanese in culture (35 per 1,000).

Yano and coworkers (1984) conducted detailed analyses of the relationship between risk factors and the incidence of CHD during a 10-year period, beginning after the enrollment period (1965–1968). Systolic blood pressure, number of cigarettes smoked, and cholesterol level were all independently associated with the occurrence of all CHD events. Alcohol consumption was found to be a protective factor. Subsequent analyses of 20-year follow-up data from the same study showed that cigarette smoking was independently associated, in a dose-response manner, with increased risk of CHD (fatal or nonfatal) and aortic aneurysm (Goldberg et al. 1995). The risk for angina was elevated in persons who smoked more than 20 cigarettes per day. Another analysis suggested that high levels of fish intake might limit the increased risk among heavy smokers, although these findings should be considered preliminary (Rodriguez et al. 1996). In addition, cigarette smoking was found to be independently associated with increased prevalence of myocardial lesions in Japanese men with minimal evidence of coronary atherosclerosis at autopsy (Burchfiel et al. 1996).

Hispanics

Because of incomplete data, the NCHS reported data from 1985 death certificates on decedents of Hispanic origin for only 17 states and the District of Columbia (NCHS 1996b). By 1990, data for 47 states and the District of Columbia were reported. The NCHS estimated that the 1990 reporting area encompassed 99.6 percent of the U.S. Hispanic population (NCHS 1996b). In 1993 and 1994, only Oklahoma did not provide information on Hispanic origin (NCHS 1996a,b).

Between 1992 and 1994, the overall rate of death from CHD in the United States was lower among Hispanics than among whites (Table 2). Among the various Hispanic subgroups, Puerto Rican men had the highest death rates per 100,000 (118.6); similarly, CHD death rates among Puerto Rican women (67.3) were higher than among Mexican (44.2) and Hispanic (42.4) women.

Nationwide death rates among Hispanics and whites have been estimated by using data collected by the U.S. Bureau of the Census as part of the Current Population Survey (CPS) (Sorlie et al. 1993). Baseline interview data were obtained between 1973 and 1985 from approximately 40,000 Hispanics and 660,000 non-Hispanics aged 25 years and older. Death rates for these two groups were ascertained up to nine years after the initial interview through the National Death Index. Age-adjusted death rate ratios for CHD were lower among Hispanics than among non-Hispanics (0.60 for men and 0.75 for women). Further details for the different Hispanic subgroups were not provided.

In addition to nationwide data on the occurrence of CHD among Hispanics, regional studies have been conducted in California (Schoen and Nelson 1981;

Frerichs et al. 1984), Colorado (Rewers et al. 1993), New Mexico (Buechley et al. 1979; Becker et al. 1988), and Texas (Stern and Gaskill 1978; Stern et al. 1987; Mitchell et al. 1991; Goff et al. 1993). In general, these investigations have consistently shown that Hispanic men have lower CHD death rates than white men, although the Colorado study found little evidence for lower CHD death rates among Hispanics without diabetes (Rewers et al. 1993).

The prevalence of angina was also found to be lower among Hispanics than among whites in a review of data from a sample of Mexican Americans participating in the 1982–1984 HHANES and of whites surveyed in the 1976–1980 NHANES II (LaCroix et al. 1989). Prevalence rates based on self-reports were 2.8 percent among Mexican American men and 3.9 percent among white men, and they were 5.4 percent among Mexican American women and 6.3 percent among white women. As with African Americans, no significant differences were observed in the distribution of cardiovascular disease risk factors among Mexican Americans with and without self-reported angina. The results of this survey were limited by the lack of smoking-specific analyses for Mexican Americans.

Several investigators also have examined the cardiovascular disease risk factor profiles of Hispanics (Mitchell et al. 1991; Shea et al. 1991; Winkleby et al. 1993). Shea and colleagues (1991) analyzed 1989 BRFSS data on 636 Hispanics, most of whom were Puerto Ricans, Dominicans, and Cubans living in New York City. Although the overall risk factor profile was high among these Hispanic subgroups, the prevalence of current cigarette smoking varied by level of education. Mitchell and colleagues (1991) obtained information on cardiovascular disease risk factors from 5,148 subjects, including 3,281 Mexican Americans, who participated in the San Antonio Heart Study from 1979 through 1988. The overall risk profiles were higher among Mexican Americans. For men of all ages, the prevalence of current smoking was higher among Mexican American men (36.7 percent) than among white men (30.4 percent). For women of all ages, however, the prevalence of current smoking was lower among Mexican American women (21.0 percent) than among white women (26.8 percent). For both men and women, the number of cigarettes smoked per day was consistently lower among Mexican Americans than among whites. More recently, Winkleby and colleagues (1993) examined the cardiovascular disease risk profiles of 756 Hispanics and 756 whites participating in California surveys from 1979 through 1990. Hispanics and whites were matched by age, gender, educational level, city of residence, and time of survey. Whites had a higher prevalence of smoking (34.2 percent) than Hispanics (24.0 percent), and they smoked more cigarettes per day (19.7) than Hispanics (11.4).

Few investigators have compared the risk of smoking-related CHD between Hispanics and members of other racial/ethnic groups. Mitchell and coworkers (1991) determined the 1979–1988 prevalence of myocardial infarction among 3,281 Mexican Americans and 1,867 whites who participated in the San Antonio Heart Study. On the basis of either electrocardiograms or self-reports, the risk of myocardial infarction among Mexican Americans compared with whites was 24 percent lower for men but 40 percent higher for women. Race/ethnicity did not appear to modify the risk for myocardial infarction.

Cerebrovascular Disease

Cerebrovascular disease is a major cause of mortality and morbidity in the United States every year. In 1994, a total of 153,306 deaths in the United States were caused by cerebrovascular disease (NCHS 1996a).

Stroke, the major form of cerebrovascular disease, results from an interruption of the arterial blood supply to the central nervous system, primarily the brain. Most commonly, the interruption of the arterial blood supply results from an occlusion of an artery in the brain by a thrombus, which may have resulted from atherosclerosis or blood clots from a diseased heart. A less common mechanism for development of stroke is rupture of a blood vessel in the brain. Other diagnoses under the general rubric of cerebrovascular disease include transient cerebral ischemia and cerebral arteriosclerosis.

As for CHD, risk factors for stroke may be divided into non-modifiable and modifiable characteristics. The non-modifiable factors include aging, gender, and family history of stroke. The major risk factors that are potentially modifiable include hypertension, hypercholesterolemia, diabetes mellitus, cigarette smoking, and heart disease (USDHHS 1989b).

African Americans

The rate of death from cerebrovascular disease in the United States is higher among African Americans than other racial/ethnic groups and whites (Table 2). For 1992–1994, the rate of death (per 100,000 population) from cerebrovascular disease was twice as high among African American men (53.1) as among white men (26.3) and almost twice as high among African American women (40.6) as among white women (22.6).

Similar patterns have been observed in studies of persons belonging to health plans. Klatsky and colleagues (1991) determined the incidence of hospitalization for cerebrovascular disease among 74,096 whites and 33,041 African Americans who were members of a prepaid health plan in northern California from 1978 through 1984. The relative risks for hospitalization for hemorrhagic cerebrovascular disease, cerebral thrombosis, and nonspecific cerebrovascular disease were higher among African Americans than among whites. Because hypertension is the strongest risk factor for stroke, the high prevalence of hypertension among African Americans partially explains this pattern (Braithwaite and Taylor 1992). Despite limited data on the link between smoking and stroke among African Americans, the high rate of cigarette smoking among African Americans (see Chapter 2) clearly appears to have played a significant role in elevating the risks of stroke in this population (USDHHS 1983).

American Indians and Alaska Natives

In recent years, age-adjusted death rates for cerebrovascular disease were slightly lower among American Indian and Alaska Native men and women than among white men and women (Table 2). For example, from 1992–1994, the age-adjusted death rate per 100,000 population for cerebrovascular disease was 23.9 for American Indian and Alaska Native men, 26.3 for white men, 21.1 for American Indian and Alaska Native women, and 22.6 for white women.

Young's (1994) recent review of the literature indicates that few investigations have focused on cerebrovascular disease among American Indians or Alaska Natives. Middaugh (1990) found little difference between the death rate from cerebrovascular disease among Alaska Natives and persons of other race/ethnicities, with death rate ratios of 1.13 for men and 1.03 for women. In a review of 1958–1987 vital statistics data from New Mexico, Kattapong and Becker (1993) observed lower rates of death from cerebrovascular disease among American Indians than among Hispanics and whites. For American Indian men, cerebrovascular disease death rates per 100,000 peaked at 70.1 between 1968 and 1972 and fell to 31.3 between 1983 and 1987. Cerebrovascular disease death rates for American Indian women also peaked at 55.7 between 1968 and 1972 and declined to a low of 19.3 between 1983 and 1987.

Asian Americans and Pacific Islanders

From 1992 through 1994, the age-adjusted death rate per 100,000 population for cerebrovascular disease was 29.3 for Asian American and Pacific Islander men, 26.3 for white men, 22.4 for Asian American and Pacific Islander women, and 22.6 for white women (Table 2).

In a study of stroke deaths occurring between 1965 and 1972 among Japanese men living in Japan, Honolulu, and San Francisco, age-specific stroke death rates were highest among men living in Japan (Worth et al. 1975). Among men 60–64 years of age, annual death rates per 1,000 men were 5.4 in Japan, compared with 2.5 in San Francisco and 1.1 in Honolulu. For CHD, however, the death rates in Japan were lower than rates in Honolulu and San Francisco. Data from the Honolulu Heart Program suggest that other risk or protective factors associated with a Japanese diet, such as high alcohol intake and low intake of food from animal sources, may play important roles in the development of stroke and CHD in Honolulu and Japan, along with smoking, older age, high systolic blood pressure, and high serum cholesterol and glucose levels (Reed 1990).

In a study of 1980 death rates among Asian Americans in Los Angeles, Frerichs and colleagues (1984) found that Koreans had the lowest age- and gender-adjusted death rate for cerebrovascular disease (48 per 100,000) and that Japanese had the highest rate (80 per 100,000). When the investigators compared the average age- and gender-adjusted death rates for these Asian Americans with rates for the entire county, the mortality ratio was 1.07 for Japanese and 0.65 for Koreans.

Cigarette smoking was found to be an independent risk factor for stroke among men of Japanese ancestry who participated in the Honolulu Heart Program (Abbott et al. 1986). For all types of stroke, the estimated relative risk of smoking, adjusted for age and other major risk factors, was 2.5. This risk decreased to 1.5 among men who quit smoking during the six-year follow-up period and increased to 3.5 among men who continued to smoke, indicating that cigarette smoking is a cause of stroke in Japanese men.

A subsequent analysis of participants in the Honolulu Heart Program indicated that cigarette smoking significantly increased the risk for thromboembolic stroke (Goldberg et al. 1995).

Hispanics

Studies about stroke among Hispanics have focused on the magnitude of this outcome in relation to other racial/ethnic groups. Between 1986 and 1988, the overall rate of death from cerebrovascular disease was lower among Hispanics than among whites in the United States (Desenclos and Hahn 1992). When cerebrovascular disease death rates for Hispanics and whites were compared, the mortality ratio for Hispanic men was 0.89, and the ratio for Hispanic women was 0.84. Of the different Hispanic subgroups, Mexican Americans had the highest death rates from cerebrovascular disease. Sorlie and colleagues (1993) had similar observations when they estimated death rates using census data collected between 1973 and 1985. Age-adjusted death rate ratios for cerebrovascular disease were lower among Hispanics than among whites (0.60 for men and 0.76 for women). No details were provided for the different Hispanic subgroups. In more recent years, age-adjusted death rates for cerebrovascular disease were slightly lower among Hispanic men and women than among white men and women. For example, from 1992–1994, the age-adjusted death rate per 100,000 population for cerebrovascular disease was 22.7 for Hispanic men, 26.3 for white men, 16.7 for Hispanic women, and 22.6 for white women (Table 2).

Regional studies in California (Frerichs et al. 1984), New Mexico (Kattapong and Becker 1993), and Texas (Stern and Gaskill 1978) provide further evidence that Hispanics have a lower risk of death from cerebrovascular disease than do whites and African Americans. Frerichs and colleagues (1984) compared 1980 death rates among the different racial/ethnic groups in Los Angeles County. The age- and gender-adjusted cerebrovascular disease death rates per 100,000 were 64 for Hispanics compared with 76 for whites (death rate ratio, 0.84) and 94 for African Americans (death rate ratio, 0.68).

After reviewing New Mexico vital statistics data for 1958–1987, Kattapong and Becker (1993) described time trends in deaths from cerebrovascular disease among Hispanics, whites, and American Indians. Except for the period 1983–1987, Hispanic men had lower death rates than white men. From 1983 to 1987, the ratio of death rates among Hispanic men (45.8 per 100,000) compared with the rate among white men (36.1 per 100,000) was 1.27. For women, the pattern of death rates was less consistent. From 1958 through 1972, Hispanic women had higher death rates than white women; between 1973 and 1982, they had lower rates; and from 1983 through 1987, Hispanic women had slightly higher death rates (43.1 per 100,000) than white women (39.3 per 100,000).

Stern and Gaskill (1978) examined temporal trends in stroke deaths from 1970 through 1976 among Hispanics and whites living in Bexar County, Texas, which includes San Antonio. Stroke deaths were generally lower among Hispanic women, but no significant difference was observed between the rates among men of either racial/ethnic group. Furthermore, no temporal trends in stroke deaths were evident for either gender or racial/ethnic group.

Cigarette smoking probably explains some of the risk of stroke among Hispanics. However, data to assess the strength of this relationship are not available. Because the data presented here suggest that stroke is a leading cause of morbidity and death among Hispanics (NCHS 1993), future studies should examine the specific role that cigarette smoking plays.

Smoking and Pregnancy

Smoking has long been known to be associated with poor outcomes for the infants of mothers who smoke. Mean infant birth weight and low birth weight (LBW) (<2,500 grams or <5.5 pounds) are often studied as measures of fetal morbidity because birth weight is easy to measure. LBW can result either from preterm delivery (<37 weeks' gestation) or from intrauterine growth retardation, but the distinction may be difficult to make. Smoking has been associated with an average decrease in birth weight of about 200 grams as well as LBW, preterm birth, perinatal mortality, and infant mortality (USDHHS 1980, 1989b; Malloy et al. 1988; English and Eskenazi 1992).

Evidence that the relationship between smoking and poor infant outcomes is causal has been strengthened by recent studies that used biomarkers of tobacco exposure, such as saliva and serum cotinine (Bardy et al. 1993; Li et al. 1993; English et al. 1994). Bardy and colleagues (1993) demonstrated a dose-response relationship between serum cotinine and decreased gestational age, decreased birth weight, and decreased crown-heel length.

The exact mechanisms whereby smoke exposure affects the fetus are poorly understood. Carbon monoxide, which impairs oxygen delivery to the fetus, and nicotine, which impairs placental blood flow, have been implicated as the causative substances in tobacco smoke (USDHHS 1980).

The infant outcomes most often studied have been LBW and infant mortality. Sudden infant death syndrome (SIDS) is an important component of infant mortality because it is the most common cause of death among infants older than one month of age. Available data show that LBW, infant mortality, and SIDS occur differentially in different racial/ethnic groups in the United States (Table 10) (Kleinman 1990; NCHS 1994). In general, whites have lower rates of these conditions and other racial/ethnic groups tend to have higher rates, but considerable variation exists.

Several studies have reported different effects of smoking on LBW, infant mortality, and SIDS across racial/ethnic minority groups. This section focuses only on those studies that have investigated potential racial/ethnic group differences in the relationship between smoking and infant outcomes.

Studies of Low Birth Weight

Nearly 25 years ago, the possibility was raised that smoking might have a differential effect on reproductive outcomes in different racial/ethnic groups (Lubs 1973). In a study of all singleton live births at Yale-New Haven Hospital in 1972, Lubs reported a difference in the effect of maternal smoking on LBW among 783 African American and 3,415 white women. A strong dose-response relationship was observed between the number of cigarettes smoked during pregnancy and infant LBW (defined as ≤2,500 grams for whites and ≤2,350 grams for African Americans). Among African American women, smoking 20 or more cigarettes per day was associated with a threefold increase in LBW, compared with only a twofold increase among white women. These racial/ethnic group differences were not explained by differences in age, prepregnancy weight, education, or marital status.

Several more recent studies also provide evidence for the possibility of a differential effect of smoking on LBW among white and African American women. English and colleagues (1994) used interview data from the Child Health and Development Studies, conducted from 1959 through 1966 in California. Stored serum samples were analyzed for cotinine, and the levels were compared with self-reported cigarette consumption and infant birth weight for 374 African American and 829 white pregnant smokers separately. African American pregnant smokers were found to have higher serum cotinine levels than white pregnant smokers after the data were controlled for smoking dose and demographic confounders. No racial/ethnic minority group difference was found in the rate of decrease in mean birth weight per given amount of cotinine in the serum of women who smoked. These data suggest that cigarette smoking may have a greater effect on birth weight among African Americans than among whites because higher cotinine levels are present in African American women than in white women who smoke the same amount; the higher cotinine levels may result from a greater intake of tobacco smoke per cigarette by African American women than by white women.

Li and colleagues (1993) found a differential effect of smoking reduction during pregnancy on infant birth weights among African American and white women. Study subjects were 803 participants in an experimental trial of smoking cessation for pregnant women in Alabama; self-reported smoking was validated with saliva cotinine. Reduction was defined as a minimum drop in saliva cotinine values between the baseline (early pregnancy) visit and the late pregnancy visit. Smoking reduction increased the birth weight of infants of both African American and white women, but racial/ethnic group differences were present. Among white women, a reduction in smoking increased infant birth weight regardless of the baseline cotinine value. However, among African American women with high baseline cotinine values, a reduction in smoking had no effect on infant birth weights. The authors suggested that high levels of cigarette smoking (as detected by high cotinine levels) early in pregnancy may have irreversible effects on African American infants.

Another recent study reported a differential effect of smoking on LBW (<2,500 grams) among multiparous African American and white women, but in the opposite direction (Neggers et al. 1994). Among African American women, the investigators found no significant difference in birth weight between smokers

Table 10. Rates of selected infant outcomes, by mother's race/ethnicity,* United States

Reference	Outcome/years	African American	American Indian and Alaska Native	Asian American and Pacific Islander				
				Total	Chinese	Japanese	Filipino	Other
NCHS, public use data tapes, 1992§	Low-birth-weight (<2,500 grams) rate per 100 live births, 1992	13.4	6.2	6.6	5.2	7.5	7.4	6.9
NCHS 1994§	Infant mortality rate per 1,000 live births, 1987	17.8	13.0	7.3	6.2	6.6	6.6	7.9
Kleinman 1990	Sudden infant death syndrome rate per 1,000 live births, 1983–1984	2.41	3.44	0.95	NA	NA	NA	NA

*The categories African American and white include persons of Hispanic and non-Hispanic origin. Conversely, persons of Hispanic origin may be included in other categories as well.

†Reported for selected states only; reporting areas for Hispanic origin vary by year.

and nonsmokers, whereas among white women, the infants of smokers weighed significantly less than those of nonsmokers. However, no information was available on the number or type of cigarettes smoked or the biomarker of exposure; these results were adjusted only for the mother's parity, age, height, and alcohol consumption as well as the infant's gender and gestational age at birth. In addition, the study was not designed to study the relationship between smoking and LBW but to determine whether the relationship between maternal triceps skinfold thickness and infant birth weight was modified by smoking and race/ethnicity.

Two studies have reported that smoking is related to an elevated risk of LBW among both African American and white women, but neither study found significant racial/ethnic group differences. In a population-based, case-control study of African American and white women delivering singleton infants without congenital anomalies in a large urban county of California, the Alameda County Low Birth Weight Study Group (1990) found that the risk of LBW associated with regular smoking throughout pregnancy was 3.0 (95 percent confidence interval [CI], 1.7–5.3) for white women and 3.6 (95 percent CI, 2.4–5.6) for African American women (adjusted for age, parity, prepregnancy weight, socioeconomic status, alcohol use, prior LBW birth, and prenatal care). Unfortunately, the authors were unable to adjust the data for the number of cigarettes smoked.

Castro and colleagues (1993) reported a study of maternal smoking and substance abuse during pregnancy and found similar associations between smoking during pregnancy and small size for gestational age (birth weight of less than the 10th percentile for gestational age) for African American and white women (odds ratio [OR] for African American women, 2.0 [95 percent CI, 1.3–3.1]; OR for white women, 2.4 [95 percent CI, 1.7–3.0]). These results were adjusted for maternal age, parity, marital status, insurance status, alcohol use, marijuana use, and other drug use; however, no information was available on the number of cigarettes smoked or the biomarker of exposure.

Few studies have examined the relationship between smoking and LBW among Hispanic populations. Cohen and colleagues (1993) analyzed birth weight data on 19,571 Hispanic infants and 206,973 white infants (those whose mothers did not indicate they were of Hispanic origin) born in Massachusetts

Hispanic[†]						
Total	Mexican American	Puerto Rican	Cuban	Central and South American	Other[‡]	White
6.4	6.0	8.8	6.0	5.6	7.5	5.9
8.2	8.0	9.9	7.1	7.8	8.7	8.2
NA	0.84	1.38	0.83	0.53	1.52	1.21

[‡]Includes persons of unknown Hispanic origin.
[§]Data calculated to one significant digit.
NA = data not available.

between 1987 and 1989 and found that the incidence of LBW ranged from a high of 73 per 1,000 Puerto Rican infants to a low of 32.2 per 1,000 Cuban infants. The crude percentage of LBW was higher for smokers than for nonsmokers in each racial/ethnic group; however, multivariate adjusted risks were not presented for racial/ethnic groups separately.

Several studies have demonstrated associations between smoking and LBW in specific racial/ethnic minority groups, including Puerto Ricans (Becerra and Smith 1988), Mexican Americans (Wolff et al. 1993), North American Indians (Godel et al. 1992), and African Americans (Jacobson et al. 1994; Johnson et al. 1994). In each instance, smoking was shown to be related to lower birth weight; however, these studies did not provide data on other racial/ethnic groups, which might have allowed comparisons.

The percentage of LBW (<2,500 grams) in the United States in 1993 was higher overall for smokers (11.8 percent) than for nonsmokers (6.6 percent) (NCHS 1996b). Although a higher percentage of white mothers (16.8) smoked during pregnancy than did African American mothers (12.7), African American women had a higher percentage (13.3) of LBW live births than white women (6.0) did in 1993. Age- and racial/ethnic-specific analyses of population data may be more revealing. Land and Stockbauer (1993), for example, found that the teenage-specific LBW rate for African Americans in Missouri dropped by 13.6 percent from 1978–1990, concomitant with a drop in cigarette smoking prevalence among young African American mothers. Analyses of individual data statistically controlled for confounding factors such as preterm deliveries and maternal parity, weight, and access to health care (USDHHS 1989a) would be preferable. The studies of individuals that are reported in this section provide more useful data than do population-based ecological comparisons on the relationship between cigarette smoking and the increased occurrence of LBW in various racial/ethnic groups.

Studies of Infant Mortality and Sudden Infant Death Syndrome

Only one study has examined the risks of smoking associated with overall fetal and infant mortality in specific racial/ethnic groups (Kleinman et al. 1988). The authors used data from Missouri live birth, fetal death, and infant death certificates for births during

Table 11. Risk of sudden infant death syndrome associated with smoking, by race/ethnicity, selected studies, United States

		African American		American Indian and Alaska Native		Asian American and Pacific Islander	
Reference	Exposure/years	OR*	CI†	OR	CI	OR	CI
Li and Daling 1991‡	Active smoking 1984–1989	3.1	1.7–5.9	1.4	0.9–2.4	2.7	1.1–6.6
Schoendorf and Kiely 1992§	Passive exposure 1988	1.8	1.0–3.0	NA	NA	NA	NA
	Combined exposure 1988	3.1	2.3–4.2	NA	NA	NA	NA
Klonoff-Cohen et al.[Δ] 1995	Passive exposure 1989–1992	5.0	1.1–22.8	NA	NA	NA	NA

*OR = odds ratio.

†CI = 95% confidence interval.

‡Li and Daling assessed the risk, by mother's ethnicity, associated with active maternal smoking during pregnancy; ORs are adjusted for maternal age, marital status, prenatal care, parity, and birth weight.

§Schoendorf and Kiely assessed the risk, by mother's ethnicity, associated with (1) passive smoking (maternal smoking after birth but not during pregnancy) and (2) combined exposure (maternal smoking during pregnancy and after birth); ORs are adjusted for maternal age, education, and marital status.

ΔKlonoff-Cohen et al. assessed the risk, by infant's ethnicity, associated with total passive smoke exposure from all adults (mother, father, live-in adults, and day-care providers); ORs are adjusted for birth weight, routine sleep position, medical conditions at birth, breast-feeding, prenatal care, and maternal smoking during pregnancy.

NA = data not available.

1979–1983 to examine the risk of mortality associated with smoking during pregnancy. They found no significant variation in the effects of smoking on African American and white women, with adjusted ORs ranging from 1.3 to 1.6, depending on parity and the amount smoked.

Three studies have examined the effects of smoking on SIDS in specific racial/ethnic minority groups (Table 11) (Li and Daling 1991; Schoendorf and Kiely 1992; Klonoff-Cohen et al. 1995). Li and Daling (1991) used data from Washington State birth records from 1984 through 1989, linked with infant death records. After adjusting the data for maternal age, marital status, prenatal care, parity, and birth weight, they found a statistically significant increased risk of SIDS associated with maternal smoking during pregnancy in all racial/ethnic groups except American Indians (Table 11). The ORs were not significantly different between groups, except between African Americans and American Indians. No information was available on the number of cigarettes smoked or the biomarker of exposure.

Schoendorf and Kiely (1992) used data from the 1988 National Maternal and Infant Health Survey to study the association between SIDS and maternal smoking (either passive [only after birth] or combined [during pregnancy and after birth]) among infants of normal birth weight. They found similar increased risks of SIDS among African American and white infants exposed to maternal smoking (Table 11), after adjusting the data for maternal age, education, and marital status. Although white mothers reported heavier smoking than African American mothers, the authors did not adjust their findings for the number of cigarettes smoked.

Hispanic		White	
OR	CI	OR	CI
5.5	1.4–22.0	2.2	1.8–2.6
NA	NA	3.1	2.3–4.2
NA	NA	1.8	1.0–3.0
2.6	0.9–7.3	3.4	1.6–7.2

Klonoff-Cohen and colleagues (1995) conducted a 1989–1992 case-control study of passive smoking and SIDS in five counties in southern California. The OR for SIDS associated with all types of passive smoke exposure combined was 3.50 (95 percent CI, 1.81–6.75), after adjustment for birth weight, routine sleep position, medical conditions at birth, breast-feeding, prenatal care, and maternal smoking during pregnancy. The evidence suggested a dose-response relationship, with an increased risk of SIDS associated with increased passive exposure to smoke. The authors also stratified the data by racial/ethnic group and found similar effects across groups (Table 11), although the results were not adjusted for the number of cigarettes smoked.

Health Problems Affecting Pregnant Women

Smoking is related to a variety of health problems affecting pregnant women, ranging from ectopic pregnancy to abruptio placentae (USDHHS 1980; Rosenberg 1987), but race- and ethnic-specific data are not generally available. In addition to exploring smoking's effects on fetuses and infants, future research should focus on the race- and ethnic-specific effects of smoking on the pregnant woman herself.

Implications

The question of whether race- and ethnic-specific differences exist in the relationship between smoking and infant outcomes has not been satisfactorily resolved. Many intriguing questions have been raised, but investigators have not yet determined the exact nature of such differences or what factors mediate them.

Comparative studies have been hampered by inconsistent and inadequate measurement of exposure. For example, few investigators have fully explored issues of dose of smoking such as the number of cigarettes smoked or the levels of biomarkers, although the amount of smoking during pregnancy does differ among racial/ethnic minority groups (see Chapter 2). Moreover, even though the timing of smoking during pregnancy may play a critical role in the development of LBW (Lieberman et al. 1994), few studies of LBW have separately assessed the effects of smoking during each trimester of pregnancy. Patterns of quitting and reducing smoking during pregnancy may in fact differ by race/ethnicity.

Racial/ethnic group differences in nicotine metabolism may also be important (Wagenknecht et al. 1990; English et al. 1994). African American pregnant smokers appear to have higher serum cotinine levels than white pregnant smokers when the data are controlled for nicotine dose (English et al. 1994). Thus, fetal exposure may be higher among African Americans than among whites for a given number of cigarettes smoked.

Racial/ethnic group differences in oxygen-carrying capacity may also play a role in mediating the effects of smoking. In 1973, Lubs suggested that the increased effects of smoking on birth weight among African American women might in part be explained by higher rates of sickle cell trait or glucose-6-phosphate dehydrogenase (G6PD) deficiency, which impair oxygen-carrying capacity (Lubs 1973). No published reports have examined Lubs's hypothesis. In addition, anemia, which is more prevalent among African American women, may be a risk factor for preterm delivery (Hogue and Yip 1989).

Future studies of smoking and pregnancy outcomes should consider racial/ethnic group differences in the timing of smoking during pregnancy, nicotine metabolism, and factors that affect oxygen-carrying capacity, such as sickle cell trait, G6PD deficiency, and anemia.

Summary of Health Consequences from Active Cigarette Smoking

Attempts to predict racial- and ethnic-specific rates of disease incidence and mortality from racial- and ethnic-specific cigarette smoking prevalences are of limited value, because other factors can also influence disease rates. When studies of individuals are conducted, the data lead to the conclusion that cigarette smoking is a major cause of disease and death in each of the four U.S. racial/ethnic minority groups studied in this report. These studies reveal few major differences in the risk ratios for various diseases. Limited epidemiological and biological data suggest that African Americans may be at an especially high level of risk for lung cancer. Although further research could clarify the nature of the interrelationships between cigarette smoking, other risk factors, potential modifying factors, racial/ethnic group membership, and various disease outcomes, it is clear that reducing tobacco use in each of the nation's racial/ethnic groups will reduce the incidence and mortality from several of the nation's leading causes of death and is a major public health goal to pursue.

Effects of Exposure to Environmental Tobacco Smoke

Environmental tobacco smoke (ETS) is the mixture of sidestream smoke and exhaled mainstream smoke that is produced by active smokers and then involuntarily inhaled by nonsmokers. Over the past decade, the adverse effects of ETS have been reported in the literature. The 1986 Surgeon General's report on smoking and health (USDHHS 1986a) concluded that the inhalation of ETS (labeled "involuntary smoking" in that report) is a cause of diseases, including lung cancer, in healthy nonsmokers and that the children of parents who smoke are more likely than the children of nonsmoking parents to have respiratory infections, respiratory symptoms, and abnormal maturation of lung function. Similar conclusions were also reached in 1986 by a committee of the National Research Council (1986). More recently, the U.S. Environmental Protection Agency (1992) assessed the risks associated with ETS, and the results reaffirmed that ETS is carcinogenic and that it exacerbates and may even cause childhood asthma. To date, racial/ethnic group differences in the adverse effects of ETS have not been investigated, although a number of studies have investigated racial/ethnic group differences in the level of exposure to ETS and in people's reactions to ETS.

Overpeck and Moss (1991) examined patterns of exposure to ETS among children five years of age and younger included in the 1988 NHIS and found that exposure varied by race/ethnicity and socioeconomic status (Table 12). African American children were the most likely to be exposed to ETS, whereas Hispanic children were the least likely to be exposed to ETS. Moreover, in the CARDIA (Coronary Artery Risk Development in [Young] Adults) study, the prevalence of exposure to ETS was significantly higher among African Americans (32 percent) than among whites (24 percent) (Wagenknecht et al. 1993). Overall, 28 percent of individuals 18–30 years of age were exposed to ETS, as detected by a serum cotinine level of 2–13 ng/mL. Adult survey data from the 1992 California Tobacco Survey show that Hispanics (21.3 percent) were most likely to report working around a cigarette smoker within the two weeks before the survey (Pierce et al. 1994). Asian Americans (13.2 percent) and African Americans (12.8 percent) reported being exposed to ETS at work in lower proportions than whites (17.9 percent). Data from the 1988 NHIS (CDC 1992) show that 40.3 percent of employed adults reported that cigarette smoking was allowed in their place of employment. The percentages of persons who reported experiencing discomfort caused by ETS exposure at work did not differ significantly by racial/ethnic group. In a 1992–1993 study of U.S. adults who worked indoors, Asian Americans and Pacific Islanders (51.4 percent) were the most likely and African Americans (43.3 percent) were the least likely to work under a completely smoke-free ETS policy (Gerlach et al. 1997). Since most studies suggest that differences exist in the ETS exposure of various racial/ethnic groups, studies to monitor the health effects of this exposure are needed.

Table 12. Exposure to household smoke among children 5 years of age and younger and percentage distribution, by level of exposure since birth and selected characteristics, United States, 1988

		Percentage distribution*				
				Exposed since birth		
Characteristic	**Number of children (in thousands)†**	**Total**	**Not exposed since birth**	**Total‡**	**Current smoker in household**	**Former smoker in household**
All children§	19,019	100.0	51.1 (0.9)	48.9 (0.9)	42.4 (0.9)	6.1 (0.4)
Ethnicity						
African American	2,759	100.0	41.5 (2.4)	58.5 (2.4)	51.3 (2.4)	6.7 (1.2)
White	15,575	100.0	51.9 (1.0)	48.1 (1.0)	41.6 (1.0)	6.1 (0.4)
Hispanic origin						
Non-Hispanic	16,923	100.0	50.4 (1.0)	49.6 (1.0)	43.2 (1.0)	6.0 (0.4)
Hispanic	2,096	100.0	56.4 (2.6)	43.6 (2.6)	35.8 (2.5)	6.9 (1.2)
Mexican American	1,006	100.0	60.7 (4.1)	39.3 (4.1)	31.8 (3.8)	6.5 (1.5)
Annual household income						
<\$10,000	2,685	100.0	33.4 (2.1)	66.6 (2.1)	57.7 (2.3)	8.7 (1.1)
\$10,000–\$24,999	5,436	100.0	44.3 (1.5)	55.7 (1.5)	48.8 (1.6)	6.3 (0.7)
\$25,000–\$39,999	4,871	100.0	55.9 (1.7)	44.1 (1.7)	38.3 (1.6)	5.4 (0.7)
≥\$40,000	4,149	100.0	65.7 (1.8)	34.3 (1.8)	29.5 (1.5)	4.6 (0.9)
Poverty status△						
In poverty	3,376	100.0	36.4 (2.1)	63.6 (2.1)	55.7 (2.3)	7.6 (1.0)
Not in poverty	14,582	100.0	54.8 (1.0)	45.2 (1.0)	39.2 (1.0)	5.6 (0.4)
Mother's education						
<12 years	3,279	100.0	33.3 (2.2)	66.7 (2.2)	61.2 (2.1)	5.1 (0.8)
12 years	8,014	100.0	44.5 (1.4)	55.5 (1.4)	47.9 (1.4)	7.3 (0.6)
>12 years	7,505	100.0	66.3 (1.2)	33.7 (1.2)	27.6 (1.1)	5.4 (0.6)
Place of residence						
Metropolitan statistical area	14,550	100.0	51.5 (1.0)	48.5 (1.0)	42.2 (1.1)	5.9 (0.4)
Central city	5,994	100.0	49.4 (1.4)	50.6 (1.4)	43.6 (1.5)	6.3 (0.6)
Not central city	8,556	100.0	52.9 (1.4)	47.1 (1.4)	41.1 (1.4)	5.6 (0.6)
Not metropolitan statistical area	4,469	100.0	49.7 (1.9)	50.3 (1.9)	43.1 (1.7)	6.8 (0.8)

*Figures in parentheses are standard errors of estimates.
†Excludes children whose exposure status is unknown.
‡Includes children exposed since birth whose period of exposure is unknown.
§Includes all other ethnicities, unknown household income, unknown poverty status, unknown education of mother, and unknown assessed health status.
△Poverty status determined in the National Health Interview Survey by family size, number of children, and household income by using 1987 poverty levels defined by the U.S. Bureau of the Census.
Source: Adapted from Overpeck and Moss 1991.

Effects of Smokeless Tobacco Use

Smokeless tobacco refers to moist oral snuff, dry oral and nasal snuff, and chewing tobacco. Smokeless tobacco is commonly used by youths, particularly those in rural areas, and it is highly addictive (USDHHS 1986b; Boyd and Glover 1989). Among the adverse health effects of smokeless tobacco use are oral cancer, oral leukoplakia (white mouth lesions that may be precancerous), gingival recession, periodontal diseases, elevated blood pressure, and increased risk for cardiovascular disease (NCI 1992; USDHHS 1994; Bolinder et al. 1994).

Few studies have examined the adverse health effects of smokeless tobacco use in racial/ethnic minority populations, and the research that has been conducted has been limited in several ways: (1) population-based, case-control studies rarely have sufficient numbers of racial/ethnic group members to allow group-specific analyses for groups other than African Americans (Blot et al. 1988; Day et al. 1993); (2) because the use of smokeless tobacco and associated health effects are relatively rare in most racial/ethnic groups, the feasibility of conducting prospective investigations is limited; and (3) smokeless tobacco users often report current or past use of other substances, such as cigarettes and alcohol, that are risk factors for health effects also associated with smokeless tobacco use, such as oral cancer (Blot et al. 1988; Mattson and Winn 1989). These multiple risk factors complicate or preclude analysis of the independent effects of smokeless tobacco use.

The valid data that are available, however, indicate that for men, the prevalence of smokeless tobacco use is highest among American Indians, Alaska Natives, and whites; for women, the prevalence is highest among American Indians, Alaska Natives, and African Americans (CDC 1993c). Data for 1989–1991 show that rates of death from cancers of the lip, oral cavity, and pharynx have been higher among African American men (7.8 per 100,000) than among Puerto Rican men (3.9 per 100,000), Asian American and Pacific Islander men (3.4 per 100,000), and white men (3.2 per 100,000) (Table 2) (NCHS, public use data tapes, 1989–1991; U.S. Bureau of the Census 1993).

In a case-control study, Winn and colleagues (1981) examined the estimated relative risk of oral and pharyngeal cancer associated with snuff-dipping among African American and white women in the southern United States. Although the relative risk was higher among white women (4.2) than among African American women (1.5), white women had dipped snuff for significantly longer periods and had consumed more snuff per week than African American women had. The relative risk for cancers of the gum and buccal mucosa increased with longer duration of snuff use, but this analysis was not conducted separately for African Americans and for whites.

A few studies of the health effects associated with smokeless tobacco use have been conducted among American Indian and Alaska Native populations. In a study of Navajo youths aged 14–19 years in New Mexico (Wolfe and Carlos 1987), 64 percent of the teenagers used smokeless tobacco products. Oral leukoplakia was found in 26 percent of smokeless tobacco users, representing a ninefold increase in risk when these youths were compared with those who did not use smokeless tobacco. The estimated relative risk of leukoplakia increased with duration and frequency of smokeless tobacco use. The investigators observed no apparent differences between users and nonusers of smokeless tobacco regarding gingival bleeding, calculus accumulation, or the extent or severity of gingival recession or loss of periodontal attachment.

In a survey of students in grades 7–12 attending schools on the Rosebud Sioux Reservation in South Dakota, more than one-third of the students reported regularly using smokeless tobacco (CDC 1988). Of these regular users, 37 percent had oral lesions (i.e., any white or red wrinkled area in the mouth or buccal mucosa). The students with oral lesions had used smokeless tobacco for a mean of 3.4 years, 6.6 times per day, and they had held each dip or chew for an average of 40 minutes. Students who used smokeless tobacco but did not have lesions had used the product for a mean of 2.5 years, 2.9 times per day, and they had held each dip or chew for an average of 30 minutes. This suggests a possible relationship between duration and intensity of smokeless tobacco use and the occurrence of oral lesions. The prevalence of oral lesions among nonusers of smokeless tobacco was not reported.

The 1986–1987 National Survey of Oral Health in U.S. School Children conducted oral clinical examinations on 17,027 children aged 12–17 years who provided information on their use of various tobacco products (Tomar et al. 1997). Smokeless tobacco lesions (defined by the authors as slight to heavy wrinkling of the oral mucosa) were more common among white (2.0 percent) than among African American (0.2 percent) or Hispanic (0.8 percent) school children. In white males, the strongest correlates of lesions were, in order, current snuff use and current chewing tobacco use. Lesions were more common with increasing duration and frequency of smokeless tobacco use. Because of small sample sizes, analyses were not conducted on data for other racial/ethnic groups.

Nicotine Addiction and Racial/Ethnic Differences

Most smokers have difficulty quitting because they are addicted to nicotine (USDHHS 1988). An understanding of the role of nicotine addiction in determining smoking behavior could help clarify racial/ethnic differences in tobacco use and facilitate smoking cessation treatment. Nicotine addiction was reviewed extensively in the 1988 Surgeon General's report on smoking and health (USDHHS 1988). Concepts of addiction also have been reviewed in subsequent Surgeon General's reports (USDHHS 1989b, 1994). However, relatively little research has been conducted on racial/ethnic minority differences in nicotine addiction. This section provides a brief review of nicotine addiction and discusses the limited data on racial/ethnic differences and nicotine addiction.

Nature of Addiction

In the broadest sense, addiction (often used interchangeably with dependence) indicates a loss of control over drug-taking behavior. The World Health Organization describes drug dependence as "a behavioral pattern in which the use of a given psychoactive drug is given a sharply higher priority over other behaviors which once had a significantly higher value" (Edwards et al. 1982). In other words, drug use controls one's behavior to an extent considered detrimental to the individual or to society.

The criteria for drug dependence, described in the 1988 Surgeon General's report on smoking and health (Table 13) (USDHHS 1988), include highly controlled or compulsive use of a drug, the use of a drug that produces psychoactive effects, and evidence that drug-taking behavior is reinforced by the effects of the drug. Other criteria for drug dependence have been developed by the American Psychiatric Association [APA] (1994) for the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV™)* (Table 14). These criteria are quite specific and useful in diagnosing drug dependence in individual patients.

Pharmacologic Factors in Nicotine Addiction

Nicotine addiction, like all drug addictions, is a complex process involving the interplay of pharmacology, learned or conditioned factors, personality, social setting, and genetics (USDHHS 1988, 1994; Benowitz 1992a). The pharmacologic reasons for drug use include an enhancement of one's mood or functioning. Drugs produce such effects either directly or by relieving withdrawal symptoms. The pharmacologic factors involved in nicotine addiction work in several ways. For example, positive effects reported after smoking tobacco include pleasure, arousal, and relaxation as well as improved attention, reaction time, and performance of certain tasks. In addition, cigarette smoking has been cited as effective in relieving aversive emotional states, including reducing anxiety or stress, relieving hunger and preventing weight gain, and relieving nicotine withdrawal symptoms (Table 15) (Benowitz 1992a).

The pharmacology of nicotine addiction can be discussed in relation to several processes: (1) absorption, distribution, and elimination of nicotine in the body (pharmacokinetics); (2) pharmacologic effects of nicotine on target organs (pharmacodynamics); and (3) translation of pharmacologic effects into behavior. These processes are reviewed in the following sections, and racial/ethnic differences are discussed when information is available.

Absorption, Distribution, and Elimination of Nicotine in the Body

Nicotine from tobacco smoke is absorbed rapidly across the lungs' alveolar membranes and into the systemic circulation (Benowitz 1990). Following absorption from the lung, concentrations of nicotine in the blood rise quickly and peak at the completion of smoking. Concentrations of nicotine in arterial blood leaving the lungs and heart are several times higher than those measured in venous blood (Henningfield

Table 13. Criteria for drug dependence

Primary criteria	
Highly controlled or compulsive use	
Psychoactive effects	
Drug-reinforced behavior	
Additional criteria	
Addictive behavior often involves—	
	stereotypic patterns of use
	use despite harmful effects
	relapse following abstinence
	recurrent drug cravings
Dependence-producing drugs often produce—	
	tolerance
	physical dependence
	pleasant (euphoric) effects

Source: Adapted from U.S. Department of Health and Human Services 1988.

et al. 1993). Within 10 to 19 seconds after the start of a puff, nicotine is delivered to the brain. Rapid delivery of high concentrations of nicotine to the brain provides the possibility for rapid behavioral reinforcement from smoking and allows the smoker to control the concentration of nicotine in the brain and, hence, to modulate the pharmacologic effects of nicotine.

In contrast, the absorption of nicotine from smokeless tobacco is gradual, with blood levels peaking at the end of chewing tobacco or using snuff (Benowitz et al. 1988). Buccal-oral absorption results in a gradual increase in concentrations of nicotine in the brain, with relatively little arterial-venous disequilibrium. This pattern of absorption may provide a less intense pharmacologic reinforcement than that produced by smoke inhalation but is sufficient to produce addiction.

The level of nicotine in the body is determined by the balance of nicotine intake from tobacco and the rate of nicotine elimination from the body. Nicotine is eliminated primarily by hepatic metabolism, with a small amount (5–10 percent) excreted unchanged in the urine. The primary metabolite of nicotine is cotinine, which has been used as a measure of nicotine exposure (Benowitz 1996). Keenan and colleagues (1994, 1995) recently published preliminary data consistent with the hypothesis that cotinine has some psychoactive properties. These effects do not appear to be mediated by nicotine receptor agonism, but could play some role in nicotine addiction. The rate of metabolizing nicotine varies considerably from person to person (Benowitz et al. 1982). A person who metabolizes nicotine slowly would not need to take in as much nicotine to achieve a particular level of nicotine in the body as a person who metabolizes nicotine more rapidly. The level of nicotine in the body appears to be positively correlated with the degree of nicotine dependence and negatively correlated with the likelihood of successful cessation therapy (USDHHS 1988; Pomerleau et al. 1990; Sutherland et al. 1992).

Theoretically, racial/ethnic differences in the absorption, distribution, or elimination of nicotine could influence the likelihood of developing nicotine dependence (see Racial/Ethnic Differences in Nicotine Metabolites later in this chapter for further discussion of this topic).

Pharmacodynamics of Nicotine

Nicotine acts on nicotinic cholinergic receptors in the brain and other organs of the body, enhancing the release of neurotransmitters such as acetylcholine, norepinephrine, dopamine, beta-endorphin, and serotonin (USDHHS 1988). The physiologic consequences of nicotine intake include behavioral arousal and sympathetic neural activation (Table 15) (Benowitz 1992a). The release of specific neurotransmitters has been speculatively linked to the various reinforcing effects of nicotine (Pomerleau and Pomerleau 1984). For example, the enhanced release of dopamine and norepinephrine may be associated with pleasure as well as appetite suppression, the latter of which may contribute to lower body weight. The release of acetylcholine may be associated with improved performance of behavioral tasks and improved memory, whereas the release of beta-endorphin may be associated with reduced anxiety and tension.

Although smokers give different explanations for smoking, most agree that smoking produces arousal, particularly with the first few cigarettes of the day, and paradoxically, smoking can also be calming or relaxing, especially in stressful situations (Pomerleau and Pomerleau 1984; Benowitz 1992a). Consistent with reports of arousal, the smoking of cigarettes or the administration of nicotine is followed by electroencephalographic desynchronization, with an upward shift in the brain's dominant alpha frequency and decreased total alpha and theta power (Pickworth et al. 1989).

Table 14. American Psychiatric Association diagnostic criteria for substance dependence

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three or more of the following consequences, occurring at any time in the same 12-month period:

Tolerance, as defined by either—

need for markedly increased amounts of the substance to achieve intoxication or desired effect or
markedly diminished effect with continued use of the same amount of the substance.

Withdrawal, as manifested by either—

the characteristic withdrawal syndrome* for the substance or
the same (or a closely related) substance being taken to relieve or avoid withdrawal symptoms.

Consumption of the substance in larger amounts or over a longer period than was intended.

Having a persistent desire to cut down or control substance use or unsuccessfully trying to do so.

Spending a great deal of time in activities necessary to obtain the substance (e.g., visiting multiple doctors or driving long distances), use the substance (e.g., chain-smoking), or recover from its effects.

Giving up or reducing important social, occupational, or recreational activities because of substance use.

Continuing to use the substance, despite the knowledge that one has a persistent or recurrent physical or psychological problem likely caused or exacerbated by the substance (e.g., current cocaine use despite recognition of cocaine-induced depression or continued drinking despite recognition that an ulcer was worsened by alcohol consumption).

*The characteristic withdrawal syndrome for nicotine refers to the daily use of nicotine for at least several weeks and abrupt cessation of nicotine use, or reduction in the amount of nicotine used, followed within 24 hours by four or more of the following signs: dysphoric or depressed mood; insomnia; irritability, frustration, or anger; anxiety; difficulty concentrating; restlessness; decreased heart rate; increased appetite or weight gain.
Source: Adapted from American Psychiatric Association 1994.

Several researchers have studied the effects of cigarette smoking and nicotine administration on the behavior of smokers who have abstained from tobacco use (abstinent smokers) (USDHHS 1988; Hughes et al. 1990; Warburton 1990; Le Houezec and Benowitz 1991; Heishman et al. 1994). Many of these studies have shown that nicotine restores tobacco-abstinence-related deficits in attention and short-term memory and decreases reaction time (Peeke and Peeke 1984; USDHHS 1988; Snyder et al. 1989; Snyder and Henningfield 1989; Warburton 1990; Levin 1992; Pritchard et al. 1992). Nicotine also may increase a person's vigilance in performing repetitive tasks and increase selective attention in abstinent smokers. The effects of nicotine on the cognitive functioning of nonsmokers have not been clearly identified (USDHHS 1988; Heishman et al. 1994). Smokers commonly report pleasure, mental stimulation, and reduction of stress after smoking a cigarette (McKennell 1970; Russell et al. 1974).

Cigarette smoking and nicotine also have sympathomimetic action, producing brief increases in blood pressure, heart rate, and cardiac output with cutaneous vasoconstriction (Benowitz 1988). Nicotine causes muscle relaxation by stimulating discharge of the Renshaw cells and pulmonary afferent nerves, which inhibit motor neuron activity and relax certain muscles. However, not all muscles are relaxed; increased electromyographic activity and tonicity of the large upper-back muscles (trapezius) have been observed after smoking (Fagerström and Götestam 1977).

Table 15. Human pharmacology of nicotine

Primary effects*	Withdrawal symptoms
Pleasure	Irritability, restlessness
Arousal, enhanced vigilance	Drowsiness
Improved task performance	Difficulty concentrating, impaired task performance
Relief of anxiety	Anxiety
Reduced hunger	Hunger
Body weight reduction	Weight gain
	Sleep disturbance
	Cravings or strong urges for nicotine
Electroencephalogram desynchronization	
Increased circulating levels of catecholamines, vasopressin, growth hormone, adrenocorticotropic hormone (ACTH), cortisol, prolactin, beta-endorphin	Decreased catecholamine excretion†
Increased metabolic rate	
Lipolysis, increased free fatty acids	
Heart rate acceleration	Heart rate slowing†
Cutaneous and coronary vasoconstriction	
Increased cardiac output	
Increased blood pressure	
Skeletal muscle relaxation	

*Some of these effects are related in part to relief of withdrawal symptoms.
†May represent a return to baseline rather than true withdrawal.
Source: Benowitz 1992a.

Genetic differences in the number of nicotinic receptors and pharmacologic responses to nicotine have been well demonstrated in animals (Marks et al. 1991). Genetic differences in pharmacologic responses to nicotine could underlie different susceptibilities to nicotine addiction, as appears to be the case for certain types of alcohol addiction (Hughes 1986; Cloninger 1987; Carmelli et al. 1992). Genetic susceptibility may vary by ancestry of origin (for example, sickle cell disease and African American ancestry). Genetic differences in nicotine responsiveness associated with ancestry of origin remain to be explored.

Tolerance, Withdrawal, and Addictive Tobacco Use

With prolonged or repeated exposure to nicotine, neurologic changes (neuroadaptation) occur. In animals, chronic nicotine exposure results in an increased number of nicotinic receptors in the brain (Marks et al. 1985). During the course of these changes, the smoker develops more brain nicotinic receptors and an increased tolerance to the various effects of nicotine. For example, previous studies have shown that at autopsy, the number of nicotinic receptors was greater in the brains of cigarette smokers than in those of nonsmokers (Benwell et al. 1988). Smokers develop substantial tolerance to the behavioral arousal and cardiovascular effects of nicotine in the course of a single day (Benowitz et al. 1989b). They can regain sensitivity to the effects of nicotine, at least in part, after overnight abstinence from smoking.

As a consequence of these neurologic changes, nicotine withdrawal symptoms appear when nicotine use is abruptly stopped (Table 16) (Hughes and Hatsukami 1992). Withdrawal symptoms include restlessness, irritability, anxiety, drowsiness, impatience, confusion, impaired concentration, and depression (Hughes et al. 1990). Some abstaining smokers gain weight, and others have impaired performance measures, such as reaction time. Many abstaining

Table 16. Incidence* of nicotine withdrawal symptoms, United States

Symptom	Clinic attendees (%)	Self-quitters (%)
Anxiety	87	49
Irritability	80	38
Difficulty concentrating	73	43
Restlessness	71	46
Hunger	67	53
Craving	62	37
Nocturnal awakenings	24	39
Depression	NA	31

*Percentage of subjects with postcessation ratings greater than precessation ratings 2 days after they quit smoking.
NA = data not available.
Sources: Hughes 1992; Hughes and Hatsukami 1992. Adapted from Hughes and Hatsukami 1992.

smokers have a strong craving to smoke a cigarette. Most of the withdrawal symptoms reach maximal intensity 24 to 48 hours after cessation and gradually diminish in intensity within three to four weeks (Gross and Stitzer 1989; Hughes et al. 1990), although some individuals experience longer lasting symptoms (USDHHS 1988). These symptoms, which also appear after quitting the use of smokeless tobacco (CDC 1994) or nicotine gum, are relieved following the administration of nicotine—a strong indication that the withdrawal symptoms are related to the effects of nicotine.

The degree of nicotine dependence is determined in part by the level of nicotine that accumulates in smokers. In general, the level of accumulated nicotine is proportional to the number of cigarettes smoked per day. Consistent with the concept of a daily tolerance-withdrawal cycle, a short duration of time between awakening and smoking the first cigarette is associated with a high degree of nicotine dependence (Heatherton et al. 1989). This presumably reflects an effort to relieve nicotine withdrawal symptoms. These two factors—the number of cigarettes smoked per day and the amount of time from awakening to smoking the first cigarette—are commonly used to assess the severity of nicotine dependence (Fagerström and Schneider 1989).

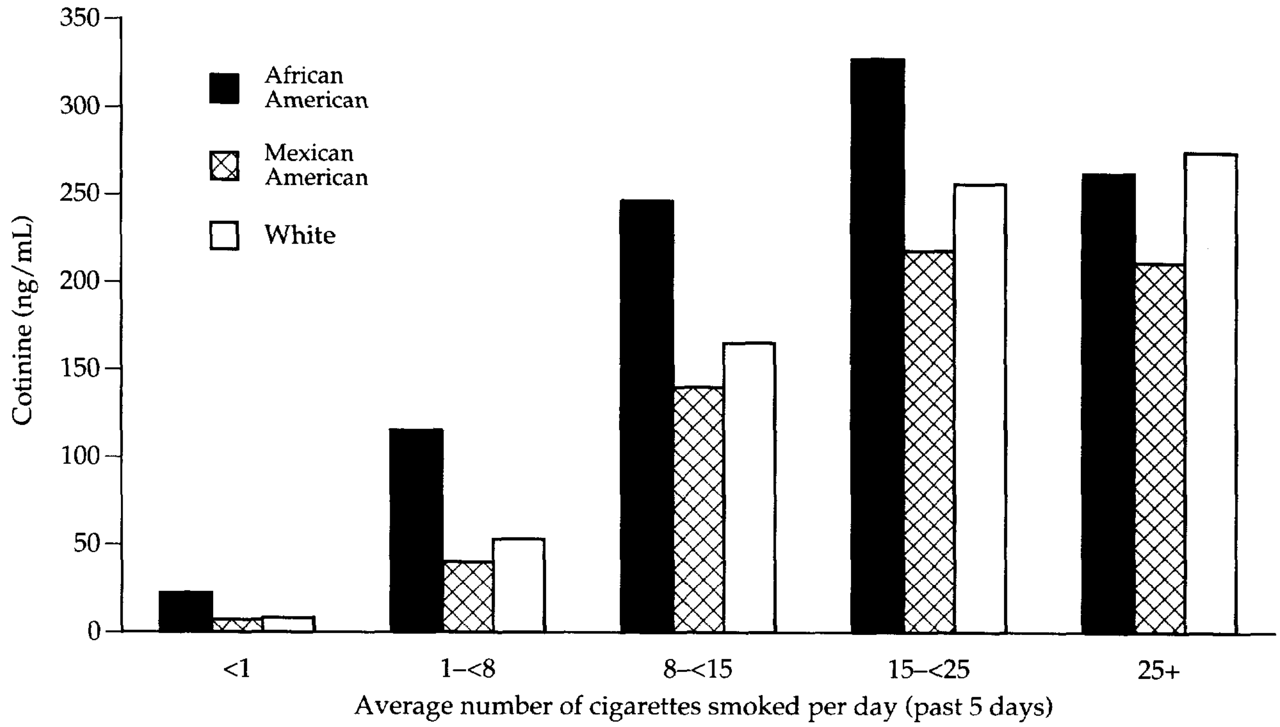
Level of Addiction

Assessments of the level of nicotine addiction help predict responses to nicotine and serve as a potential guideline for therapeutic approaches to smoking cessation. The professionals who design strategies to prevent tobacco use and treat persons with nicotine addiction need to understand the high level of addiction among cigarette smokers and to appreciate the group-specific cultural characteristics of the behavior and smokers' individual reasons for initiating, continuing, and quitting tobacco use (Krasnegor 1979; Grunberg and Acri 1991). The most widely used indexes of addiction levels are the number of cigarettes smoked per day, the serum nicotine or cotinine level, the Fagerström dependence questionnaire (Fagerström and Schneider 1989), and the diagnostic criteria of the *DSM-IV*™ (APA 1994). The Fagerström dependence questionnaire incorporates questions about the number of cigarettes smoked per day, the time between awakening and smoking the first cigarette of the day, as well as episodes in which the smoker lost control of smoking behavior (such as smoking at inappropriate times or in inappropriate places). The prevalence of smoking cessation—and conversely, the number of unsuccessful quit attempts—also reflects the level of addiction, at least in part. The brand of cigarette smoked might be expected to correlate with a person's level of dependence because high-yield cigarettes nominally deliver more nicotine per cigarette. However, in large surveys of smokers, only a modest relationship was found between yield (measured by a smoking machine) and levels of nicotine or cotinine in the body (Benowitz et al. 1986; Coultas et al. 1993). This is because people smoke differently than machines that are set to a standardized testing protocol—that is, they are able to take more frequent or deeper puffs, to smoke each cigarette more completely, to smoke more cigarettes per day, and to block ventilation holes in the cigarettes (Henningfield et al. 1994; NCI 1996a).

Racial/Ethnic Differences in Nicotine Metabolites

Evidence suggests that African Americans have higher cotinine levels per reported number of cigarettes smoked per day than whites (Wagenknecht et al. 1990; English et al. 1994; Clark et al. 1996a) (Figure 5). In Figure 5, the racial/ethnic minority group comparisons among those who smoked 25 or more cigarettes per day may be somewhat biased, because the average daily consumption for whites was substantially higher than that for African Americans and Mexican

Figure 5. Serum cotinine levels by number of cigarettes smoked daily for African Americans, Mexican Americans, and whites, National Health and Nutrition Examination Survey, United States, 1988–1991



Note: N = 2,136.
Source: National Center for Health Statistics, public use data tape, 1997.

Americans. Clark and colleagues (1996b) found no evidence that underreporting of daily cigarette consumption occurred more often in African American than in white smokers.

One possible explanation for the higher cotinine level among African Americans is that African Americans may absorb more nicotine from their cigarettes than whites (Benowitz et al. 1995). Greater absorption could result from several factors, including group-specific patterns of smoking behavior (i.e., more and deeper puffs per cigarette or longer retention of tobacco smoke in the lungs) (Benowitz et al. 1995). Additionally, menthol in cigarettes may facilitate absorption of cigarette smoke constituents (Jarvik et al. 1994; McCarthy et al. 1995; Clark et al. 1996a). However, the fact that African Americans smoke menthol cigarettes more commonly than whites do explains only a small percentage of their higher levels of cigarette smoke constituents (Wagenknecht et al. 1992; Ahijevych et al. 1996; Clark et al. 1996a).

Racial/ethnic differences in nicotine metabolism could influence the development of nicotine addiction. Several researchers have suggested that African Americans might metabolize cotinine differently than whites (Pattishall et al. 1985; Wagenknecht et al. 1990; English et al. 1994; Benowitz et al. 1995). Results of studies of nonsmokers support this hypothesis (Pattishall et al. 1985; Wagenknecht et al. 1993; Crawford et al. 1994; Knight et al. 1996; Pirkle et al. 1996). Most of these investigations (Pattishall et al. 1985; Crawford et al. 1994; Knight et al. 1996; Pirkle et al. 1996) reported that African Americans had higher cotinine levels than whites, even after ETS exposure and other factors were taken into account. These findings may be limited by the fact that no measures of tobacco smoke or nicotine concentrations in the air were obtained.

Based on a preliminary report of data for 40 African Americans and 39 white controls matched for age, gender, and cigarette consumption, Benowitz and colleagues (1995) reported that the disposition kinetics of nicotine were similar for both groups. For example, the percentage conversion of nicotine to cotinine was similar across groups. However, the clearance of cotinine was significantly lower for African Americans than for whites. Additionally, the average estimated intake of nicotine per cigarette smoked was 1.41 mg in African Americans and 1.09 mg in whites. This difference is of borderline statistical significance ($p = 0.07$) (Benowitz et al. 1995). African Americans took in 28 percent more nicotine per cigarette than would have been expected based on FTC yields; whites took in 9 percent more nicotine per cigarette than would have been expected based on FTC yields (Pérez-Stable et al., unpublished data).

Investigators have also found cotinine levels in African Americans that were higher than expected for the number of cigarettes smoked. Ahijevych and Wewers (1993) found an average salivary cotinine level of 402 ng/mL in African American women who smoked an average of 15 cigarettes per day. This level is much higher than the expected level found in other persons who smoked the same number of cigarettes. Clark and colleagues (1996b) reported that African American smokers smoked longer cigarettes and more of each cigarette than white smokers. However, because they smoked fewer cigarettes each day, African Americans smoked fewer total daily millimeters of cigarettes. Among young adults in the CARDIA study, African Americans (48 percent) were more likely than whites (36 percent) to report that a substantial amount of their cigarette burned without their smoking it (Wagenknecht et al. 1992). Also, in a study of 33 African American and white women, Ahijevych and colleagues (1996) did not find a racial/ethnic difference in total puff volume (per cigarette).

Pérez-Stable and colleagues (1990) reported that among Mexican Americans who were part of the 1982–1984 HHANES, cotinine levels were unexpectedly high in smokers reporting low levels of cigarette consumption. Higher-than-expected cotinine levels may reflect underreporting of smoking by Hispanics, but the possibility also exists that Hispanics absorb or metabolize nicotine differently than whites (Henningfield et al. 1990). However, recent data from NHANES III (Figure 5) indicate that, among persons who smoked at least one cigarette daily, Mexican American smokers had lower serum cotinine levels in each consumption category than African American and white smokers.

Racial/Ethnic Differences in Self-Reported Nicotine Dependence

The use of questionnaires to systematically investigate racial/ethnic differences in nicotine dependence has been limited. Data from the 1987 NHIS (Table 17) show that African Americans were more likely than whites and Hispanics to report smoking their first cigarette of the day within 10 minutes of awakening, although these differences tended to disappear among those who reported smoking 25 or more cigarettes per day (NCHS, public use data tapes, 1987). Telephone survey data on smoking, collected as part of the Community Intervention Trial (COMMIT) for Smoking Cessation, also indicate that African Americans were more likely than whites to smoke within 10 minutes of awakening (an indicator of nicotine dependence [USDHHS 1988]), even after the researchers controlled for the number of cigarettes smoked per day (Royce et al. 1993). Conversely, Andreski and Breslau (1993) conducted a study that used the dependence criteria of the *DSM-III*™ and found that, compared with African Americans, greater proportions of whites had symptoms of nicotine dependence. The researchers randomly selected 1,200 adults aged 21–30 years from the members of a health maintenance organization in southeast Michigan. Overall, 22.6 percent of the whites who smoked met the criteria for nicotine dependence, compared with 9.3 percent of the African Americans who smoked. Nicotine dependence was found to have a significant association with psychological distress, as measured by the Brief Symptom Inventory for smokers in both groups. Poor physical health was also associated with nicotine dependence, and this relationship was stronger among African Americans than among whites.

Kandel and colleagues (1997) used questions from the 1991, 1992, and 1993 (combined) National Household Surveys on Drug Abuse (NHSDAs) to develop a proxy measure of *DSM-IV*™ (APA 1994) dependence on various substances (including nicotine). Respondents were asked, for example, if they felt unable to reduce their use when they tried to cut down, experienced withdrawal symptoms (described in this survey as feeling sick because they stopped or cut down), felt that they needed or were dependent on the substance, and felt the need for larger amounts to obtain the same effect. This study used responses from 87,915 persons aged 12 years and older. Among persons who smoked during the previous year, whites were more likely than African Americans, Hispanics, and other racial/ethnic minority group members to be rated as dependent on nicotine. The authors

Table 17. Percentage of adult smokers* who reported that they smoked their first cigarette within 10 minutes and within 30 minutes of awakening, by race/ethnicity and number of cigarettes smoked per day, National Health Interview Survey, United States, 1987

	African Americans		Hispanics		Whites	
Characteristic	%	±CI†	%	±CI	%	±CI
1–14 cigarettes						
≤10 minutes	21.9	4.9	11.3	5.3	11.1	2.1
≤30 minutes	39.2	5.5	26.2	7.3	27.1	3.0
15–24 cigarettes						
≤10 minutes	51.7	8.4	32.7	10.3	36.9	2.4
≤30 minutes	77.6	5.9	61.3	10.3	68.4	2.5
≥25 cigarettes						
≤10 minutes	69.0	18.0	63.3	17.2	61.9	3.0
≤30 minutes	95.6	3.6	93.4	8.2	88.8	1.8

*Persons who reported smoking at least 100 cigarettes in their lives and who reported at the time of survey that they currently smoked.
†95% confidence interval.
Source: National Center for Health Statistics, public use data tapes, 1987.

acknowledged that their study was limited somewhat because the NHSDA indicators of dependence were not based on diagnostic interviews designed specifically to assess *DSM-IV*™ criteria. Nevertheless, the finding that whites were more likely to exhibit indicators of dependence than African Americans was consistent with that of Andreski and Breslau (1993). Further research is needed to resolve the apparent discrepancy for African Americans between studies that are based on the number of minutes to the first cigarette of the day and those that are based on *DSM-III*™ or *DSM-IV*™ criteria for dependence.

Navarro (1996) used population-based data from the 1990 California Tobacco Survey on white (n = 70,997) and Hispanic (n = 28,000) adults. Her analyses indicated that whites were significantly more likely than Hispanics to smoke on a daily basis and to smoke at least 15 cigarettes each day. Furthermore, among the daily smokers, whites were more likely than Hispanics to smoke a cigarette within 30 minutes of awakening. Among Hispanics, those who were less acculturated (i.e., who came from households where the language spoken in the household was not English) were significantly less likely than those who were more acculturated (i.e., who came from households where English was the language spoken) to be daily smokers and to smoke at least 15 cigarettes each day. Among Hispanics who were daily smokers, the percentage who smoked within 30 minutes of awakening did not differ significantly by level of acculturation.

Smoking to maintain a lower body weight is believed to contribute to tobacco dependence. In a survey of high school students in Memphis, Tennessee, Camp and colleagues (1993) found that more whites than African Americans believed that cigarette smoking could help them control their body weight. Among the high school students who smoked, 39 percent of white females and 12 percent of white males reported smoking to control their body weight, compared with none of the African American students.

A few studies have analyzed the perceptions that members of racial/ethnic groups have regarding the addictive nature of tobacco. In a San Francisco area study of 2,835 primary care patients who smoked, Vander Martin and colleagues (1990) found that whites smoked more cigarettes per day and were more likely to consider themselves addicted to cigarettes than African American, Asian American, and Hispanic smokers. Smoking within 15 minutes of awakening was least likely among Hispanic smokers but equally common among smokers in the other groups. In addition, African Americans and Hispanics were less likely than the others to believe that quitting smoking would lead to weight gain.

Most Americans of all races and ethnicities realize that cigarette smoking is addictive. In a survey of 2,092 adults in St. Louis and Kansas City, Missouri, Brownson and colleagues (1992) found that a similar number of whites (90.3 percent) and African Americans (88.5 percent) believed cigarette smoking was addictive. Results from the 1992–1993 CPS (see Chapter 5, Research and Development Limitations) showed that most members of the four racial/ethnic groups as well as whites agreed with the statements that cigarette smoking was an addiction or both a habit and an addiction (Table 18) (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993). Minor differences across gender were observed, although smokers were somewhat less likely to agree with the statements. Approximately 5 percent of the Asian American and Hispanic smokers indicated that cigarette smoking was neither a habit nor an addiction, compared with 1.9 percent of white smokers.

Racial/Ethnic Differences in Quitting Smoking

Because nicotine is addictive, highly addicted smokers have great difficulty in quitting. Differences in quitting can be used as another measure of the level of dependence. Some studies have found that although a similar percentage of whites and African Americans have ever been smokers, the percentage of former smokers has been greater among whites (26.4 percent) than among African Americans (17.2 percent) (Novotny et al. 1988) (see also Chapter 2). Data for 1989 from the BRFSS indicate that the standardized prevalence of smoking cessation was 47 percent among whites vs. 39.1 percent among African Americans (prevalence of cessation was defined as the percentage of ever smokers who were former smokers) (CDC 1990). Similar findings were reported by Kabat and Wynder (1987), Hahn and colleagues (1990), and Geronimus and colleagues (1993). The 1991 NHIS Health Promotion and Disease Prevention supplement collected data on smokers who had quit for at least one day at the time of survey and for at least one month in the previous year (CDC 1993b). Hispanics (52.1 percent) and African Americans (48.7 percent) were more likely than whites (40.3 percent) to have quit smoking for one day. However, data on abstinence from smoking in the previous year showed that Hispanics (16.3 percent) and whites (14.0 percent) were more likely than African Americans (7.9 percent) to have quit smoking for one month or longer. Thus, African Americans were less likely than whites to maintain abstinence. This effect remained after the findings were controlled for socioeconomic status. In an unadjusted analysis of data from the Current Population Survey NCI Supplement, a similar pattern was observed, although the differences between African Americans and whites were slight (see Table 2 and African Americans, Quitting Behavior in Chapter 2).

The lower smoking cessation rates among African Americans do not appear to result from a lack of desire to quit (Royce et al. 1993). In the COMMIT telephone survey, 46.0 percent of African American women and 44.4 percent of African American men stated that they wanted to quit smoking "a lot," compared with 35.0 percent of white women and 33.3 percent of white men. Thus, the lower prevalence of cessation among African Americans may be related to factors other than the desire to quit, such as the absence of culturally appropriate smoking cessation interventions, difficulties in accessing community resources for quitting smoking, and possibly a higher level of nicotine dependence as indicated by comparatively higher levels of cotinine when the data are controlled for the number of cigarettes smoked.

Addiction to Smokeless Tobacco

Considerable nicotine is absorbed from smokeless tobacco. An average systemic dose of nicotine is 3.6 mg for snuff, 4.6 mg for chewing tobacco, and 1.8 mg for cigarettes (Benowitz et al. 1988). Blood nicotine concentrations throughout the day are similar among smokers and those who use smokeless tobacco (Benowitz et al. 1989a). Plasma cotinine levels in regular smokeless tobacco users are often similar to the levels in cigarette smokers (Holm et al. 1992). Abstinence from smokeless tobacco use results in signs and symptoms of nicotine deprivation that are similar to those seen in smokers after they stop smoking (Hatsukami et al. 1987; CDC 1994). These symptoms are reversed by the use of tobacco or administration of nicotine gum. In a study of Swedish oral snuff users, many of the participants considered themselves addicted to snuff, and they reported having as much difficulty giving up smokeless tobacco use as was reported by cigarette smokers trying to quit smoking (Holm et al. 1992). Evidence also suggests that when regular snuff users are deprived of snuff, they will smoke cigarettes to satisfy their need for nicotine (Benowitz 1992b). However, no data are available on racial or ethnic differences in the level of addiction to smokeless tobacco.

Table 18. Percentage of men and women who considered smoking a habit or addiction,* overall and by smoking status, Current Population Survey, United States, 1992–1993

Characteristic	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
	%†	±CI‡	%	±CI	%	±CI	%	±CI	%	±CI
Overall										
Habit	31.7	0.7	19.6	2.6	23.9	1.4	25.1	0.8	17.8	0.2
Addiction	19.8	0.6	19.6	2.6	17.8	1.2	26.3	0.8	21.9	0.2
Both	41.3	0.7	54.6	3.3	46.4	1.6	38.4	0.9	57.0	0.3
Men										
Habit	32.3	1.1	19.5	3.9	25.5	2.0	26.4	1.2	19.3	0.3
Addiction	20.4	0.9	21.4	4.0	18.4	1.8	26.7	1.2	22.0	0.3
Both	39.5	1.1	52.6	4.9	45.8	2.3	36.7	1.3	55.2	0.4
Women										
Habit	31.3	0.9	19.6	3.5	22.5	1.9	24.0	1.0	16.5	0.3
Addiction	19.5	0.8	18.1	3.4	17.2	1.7	25.9	1.1	21.9	0.3
Both	42.5	0.9	56.2	4.4	46.9	2.2	39.8	1.2	58.6	0.4
Nonsmokers										
Habit	29.8	0.8	18.3	3.3	21.7	1.4	23.5	0.8	16.4	0.2
Addiction	20.4	0.7	21.1	3.5	18.9	1.4	27.1	0.9	23.0	0.3
Both	42.9	0.8	54.6	4.2	47.5	1.8	39.4	1.0	57.7	0.3
Men										
Habit	30.3	1.3	19.8	5.3	22.2	2.2	24.6	1.3	18.0	0.4
Addiction	20.5	1.1	22.4	5.5	20.2	2.1	27.9	1.4	22.8	0.4
Both	41.6	1.4	51.4	6.6	48.1	2.6	38.0	1.5	56.1	0.5
Women										
Habit	29.6	1.0	17.3	4.2	21.3	1.9	22.7	1.1	15.0	0.3
Addiction	20.3	0.9	20.2	4.5	17.8	1.8	26.5	1.1	23.1	0.4
Both	43.7	1.1	56.8	5.5	47.0	2.4	40.4	1.3	59.0	0.4
Smokers										
Habit	36.6	1.4	21.5	4.4	36.0	3.9	32.7	2.0	22.1	0.5
Addiction	18.6	1.1	17.5	4.0	12.3	2.7	22.6	1.7	18.9	0.4
Both	37.2	1.4	54.4	5.3	40.9	4.0	34.1	2.0	55.2	0.6
Men										
Habit	36.4	2.0	19.4	5.9	36.6	4.7	32.3	2.5	22.9	0.7
Addiction	20.2	1.7	20.5	6.1	12.6	3.2	23.3	2.3	19.7	0.6
Both	35.1	2.0	53.6	7.5	38.3	4.7	32.8	2.5	53.0	0.8
Women										
Habit	36.7	1.9	23.7	6.4	34.6	7.1	33.2	3.1	21.2	0.7
Addiction	17.2	1.5	14.4	5.3	11.5	4.8	21.4	2.7	18.1	0.6
Both	39.0	1.9	55.2	7.5	47.0	7.5	36.1	3.2	57.3	0.8

*In response to the question, "Do you think smoking is a habit, an addiction, neither, or both?"
†Percentages in this table do not include all categories of responses and thus may not equal 100%.
‡95% confidence interval.
Source: U.S. Bureau of the Census, National Cancer Institute Tobacco Use Supplement, public use data tapes, 1992–1993.

Conclusions

1. Cigarette smoking is a major cause of disease and death in each of the four racial/ethnic groups studied in this report. African Americans currently bear the greatest health burden. Differences in the magnitude of disease risk are directly related to differences in patterns of smoking.
2. Although lung cancer incidence and death rates vary widely among the nation's racial/ethnic groups, lung cancer is the leading cause of cancer death for each of the racial/ethnic groups studied in this report. Before 1990, death rates from malignant neoplasms of the respiratory system increased among African American, Hispanic, and American Indian and Alaska Native men and women. From 1990 through 1995 death rates from respiratory cancers decreased substantially among African American men, leveled off among African American women, decreased slightly among Hispanic men and women, and increased among American Indian and Alaska Native men and women.
3. Rates of tobacco-related cancers (other than lung cancer) vary widely among members of racial/ethnic groups, and they are particularly high among African American men.
4. The effect of cigarette smoking (as reflected by biomarkers of tobacco exposure) on infant birth weight appears to be the same in African American and white women. As reported in previous Surgeon General's reports, cigarette smoking increases the risk of delivering a low-birth-weight infant.
5. No significant racial/ethnic group differences have been consistently demonstrated in the relationship between smoking and infant mortality or sudden infant death syndrome (SIDS); cigarette smoking has been associated with increased risk of SIDS and remains a probable cause of infant mortality.
6. Future research is needed and should focus on how tobacco use affects coronary heart disease, stroke, cancer, chronic obstructive pulmonary disease, and other respiratory diseases among members of racial/ethnic groups. Studies also are needed to determine how the health effects of smokeless tobacco use and exposure to environmental tobacco smoke vary across racial/ethnic minority groups.
7. Persons of all racial/ethnic backgrounds are vulnerable to becoming addicted to nicotine, and no consistent differences exist in the overall severity of addiction or symptoms of addiction across racial/ethnic groups.
8. Levels of serum cotinine (a biomarker of tobacco exposure) are higher in African American smokers than in white smokers for similar levels of daily cigarette consumption. Further research is needed to clarify the relationship between smoking practices and serum cotinine levels in U.S. racial/ethnic groups. Variables such as group-specific patterns of smoking behavior (e.g., number of puffs per cigarette, retention time of tobacco smoke in the lungs), rates of nicotine metabolism, and brand mentholation could be explored.

Appendix. Methodological Issues

It is important to review some methodological issues involved in collecting the data discussed in this chapter. These methodological problems affect the quality of the data and the type of conclusions that can be reached from studies conducted to date. Also, because cigarette smoking tends to be associated with other lifestyle risk factors that impact on health (e.g., Wingard et al. 1982; Vickers et al. 1990; Pérez-Stable et al. 1994), there is a need to control their co-occurrence in order to better understand the health effects of tobacco use.

Classification of Smoking Status

In investigating the health effects of smoking cigarettes and using other tobacco products, researchers typically obtain information from the subjects or surrogate respondents on the use of such products. Questionnaires usually cover cigarette smoking status (i.e., never, former, and current smoker), number of years of smoking and age at initiation of smoking, number of cigarettes smoked per day, and use of other tobacco products (e.g., pipes, cigars, and smokeless tobacco). However, this information may not be fully valid, resulting in misclassification of exposure to cigarette smoking. A previous report of the Surgeon General reviewed the classification of cigarette smoking status and the consequences of misclassification (USDHHS 1990).

Misclassification of smoking information merits consideration in investigating tobacco use among racial/ethnic populations, because of the potential for bias in comparing the effects of smoking across racial/ethnic groups. To date, such bias has not been identified, although several studies show that Hispanics may underreport cigarette smoking. In a population-based survey in New Mexico, Coultas and colleagues (1988) compared self-reports of smoking against salivary cotinine level (a product of nicotine that has been used as a measure of exposure to nicotine) and end-tidal carbon monoxide concentration. Based on the questionnaire results, the age-standardized prevalence rates of current smoking were 30.9 and 27.1 percent for Hispanic men and women, respectively. After adjusting for cotinine and carbon monoxide levels, these percentages were 39.1 and 33.2. The rate of misclassification was greater in self-reported former smokers than in never smokers, but self-reported never smokers also had levels of cotinine and carbon monoxide indicative of active smoking.

Using information from the Hispanic Health and Nutrition Examination Survey (HHANES), Pérez-Stable and colleagues (1992) documented the misclassification of smoking status through comparisons of self-reports with serum cotinine levels. Among 65 Mexican American former smokers participating in the HHANES in 1982 through 1983, 7 (10.8 percent) had a cotinine level indicative of active smoking; among 124 reported never smokers, 5 (4 percent) were probably active smokers based on their cotinine levels. In a number of surveys, Hispanics, particularly Latino groups in the southwestern and western United States, have been found to smoke about one-half pack of cigarettes per day, compared with non-Hispanic whites who typically report smoking one pack per day (Coultas et al. 1994). Pérez-Stable and colleagues (1992) used data from 547 Mexican American participants in the HHANES to examine underreporting of cigarette consumption using the ratio of serum cotinine to self-reports of the number of cigarettes smoked per day as the "gold standard." This study found that among Mexican Americans, 20.4 percent of men and 24.7 percent of women who were self-reported smokers underreported smoking between one and nine cigarettes per day. Self-reported Mexican American smokers who reported smoking greater numbers of cigarettes per day underreported less frequently.

An analysis of the data from the Coronary Artery Risk Development in (Young) Adults Study (CARDIA) showed that there were higher rates of misclassification in terms of self-reported nonsmokers who had serum cotinine levels of at least 14 ng/mL among African Americans (5.7 percent) than among non-Hispanic whites (2.8 percent) (Wagenknecht et al. 1992). Alternative explanations for underreporting, such as more efficient smoking and differences in cotinine metabolism, could not be excluded.

Two additional studies examined the relationship between ancestry of origin and levels of biochemical markers in smokers. In a study of participants in CARDIA, African American smokers demonstrated higher cotinine levels than non-Hispanic white smokers after controlling for several dimensions of cigarette-smoking behavior (Wagenknecht et al. 1990). Lactose intolerance, which elevates breath hydrogen concentration, may increase the apparent level of expired air carbon monoxide, a readily measured marker of active smoking (McNeill et al. 1990). Lactose intolerance is common in a number of racial/ethnic groups, including Asian Americans and African Americans.

Classification of Race/Ethnicity

The data included in this chapter are derived from diverse sources, including vital statistics, cancer registries, and epidemiological studies on smoking. Race/ethnicity has been classified in these studies using various techniques, including designation on death certificate, classification according to cancer registry protocols, self-reports, birthplace, language use, and surname. The validity of each of these approaches is undoubtedly imperfect; moreover, validity varies across regions and over time. However, comprehensive assessments of the validity of racial/ethnic minority classification in various types of health data have not been reported.

The limited information available indicates some potential for misclassification. For example, Frost and colleagues (1992) compared the classification of "Native American," as recorded by the Seattle-Puget Sound registry of the Surveillance, Epidemiology, and End Results (SEER) Program against an Indian Health Service (IHS) registry of patients eligible for services. A substantial portion of patients with invasive cancer in the IHS registry were not similarly classified by the Seattle-Puget Sound cancer registry. Similarly, an injury registry for the state of Oregon undercounted those with injuries (Sugarman et al. 1993). Using data from the National Longitudinal Mortality Study, Sorlie and colleagues (1992) compared demographic characteristics reported on the CPS of the

U.S. Bureau of the Census with those characteristics reported on the death certificates for persons who died (during a seven-year follow-up period). Among 216 persons identified as American Indians or Alaska Natives by the CPS, only 159 (73.6 percent) were so classified on the death certificate. Similarly, the concordance rate for 272 persons classified by the CPS as Asian Americans or Pacific Islanders was 82.4 percent. Such disagreement suggests that current estimates of mortality rates for selected racial/ethnic groups are underestimated. However, in New Mexico, the classification of "American Indian" by the New Mexico Tumor Registry, also a participant in the SEER Program, closely corresponded with the classification by the state's Bureau of Vital Statistics (Eidson et al. 1994).

Another study in New Mexico also showed a high concordance between self-reported Hispanic race/ethnicity and the designation by the Bureau of Vital Statistics (Samet et al. 1988b). In the report by Sorlie and colleagues (1993), 10.3 percent (n = 62) of persons identified as Hispanics by the CPS were not classified as Hispanics on the death certificate. Surnames also have been used to classify Hispanic ethnicity, using either surname lists developed by the U.S. Bureau of the Census or name recognition algorithms (Howard et al. 1983; Wiggins and Samet 1993). Although studies in parts of the southwestern United States have shown a generally high validity for surname-based approaches for identifying Hispanic ethnicity, the sensitivity and specificity of the various Census Bureau lists have varied over time, and data from the Southwest cannot be readily generalized to other locales. In addition, surname lists tend to exclude women who marry non-Hispanic whites and who take their husband's last name and to exclude as well their children when given the father's non-Hispanic last name (Marín and Marín 1991).

These studies suggest that the validity of classification of race/ethnicity is likely to vary across locations and possibly by type of data. In interpreting health data for racial/ethnic populations, consideration should be given to the potential for misclassification of race/ethnicity and the consequences of any resulting bias.

Classification of Health Outcomes

Comparisons of disease occurrence among racial/ethnic groups also may be biased by differential patterns of disease diagnosis and labeling by race and ethnicity. Such differences may have multiple causes that reflect the complex sequence that begins with the development of symptoms and signs and extends to the labeling of an illness by a clinician or the statement of cause-of-death on a death certificate. Health beliefs and knowledge, ability to access and pay for medical care, the quality of care available, and differential patterns of care by race/ethnicity may all affect diagnoses of illnesses. A full review of these topics is beyond the scope of this report, but several examples are offered to illustrate the potential for differential patterns of classification of health outcomes by race/ethnicity.

Becker and colleagues (1990) examined the assignment of underlying cause of death to the category "symptoms, signs, and ill-defined conditions" in the *Manual of the International Classification of Diseases, Injuries and Causes of Death* (ICD). In the nation, the crude death rate for this non-specific category has paralleled the mortality rate in this category for African Americans. Becker and colleagues (1990) analyzed vital statistics data for New Mexico for 1958 through 1982 and calculated mortality rates for "symptoms, signs, and ill-defined conditions" by racial/ethnic group. The state mortality rates for Hispanics, non-Hispanic whites, and American Indians for this category exceeded the nationwide rates. Among the racial/ethnic minority groups in New Mexico, American Indians had particularly high mortality rates; for men, 8.4 percent of American Indian deaths were in this category versus 5.9 percent of Hispanic deaths and 5.0 percent of non-Hispanic white deaths. Similarly, mortality rates for cancers of ill-defined and unknown primary sites tend to be much higher in American Indians in several areas of the country than for all racial/ethnic groups combined (Valway 1992).

Recent comparisons of the evaluation and management of chest pain and coronary artery disease in African Americans and non-Hispanic whites further illustrate the potential for bias by race/ethnicity in diagnostic classification. In a study of patients presenting to an emergency room with chest pain, African Americans were less likely to be admitted and less likely to be sent to a coronary care unit once they were admitted (Johnson et al. 1993). The study also found that African Americans were as likely as non-Hispanic whites to have cardiac catheterization. In contrast, other studies, using Department of Veterans' Affairs, Medicare, and other large data bases, have shown that African Americans are less likely than non-Hispanic whites to have cardiac catheterization and invasive interventions for coronary artery disease (Wenneker and Epstein 1989; Udvarhelyi et al. 1992; Ayanian et al. 1993; Franks et al. 1993; Whittle et al. 1993; Peterson et al. 1994). These differential patterns of evaluation by race/ethnicity could introduce bias in investigations of tobacco smoking and coronary artery disease among African Americans and non-Hispanic whites by underestimating the effects of cigarette smoking on coronary artery disease.

References

Abbott RD, Yin Y, Reed DM, Yano K. Rise of stroke in male cigarette smokers. *New England Journal of Medicine* 1986;315(12):717–20.

Ahijevych K, Wewers ME. Factors associated with nicotine dependence among African American women cigarette smokers. *Research in Nursing and Health* 1993;16(4):283–92.

Ahijevych K, Gillespie J, Demirci M, Jagadeesh J. Menthol and nonmenthol cigarettes and smoke exposure in black and white women. *Pharmacology Biochemistry and Behavior* 1996;53(2):355–60.

Alameda County Low Birth Weight Study Group. Cigarette smoking and the risk of low birth weight: a comparison in black and white women. *Epidemiology* 1990;1(3):201–5.

American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV™)*. Washington (DC): American Psychiatric Association, 1994.

Andreski P, Breslau N. Smoking and nicotine dependence in young adults: differences between blacks and whites. *Drug and Alcohol Dependence* 1993;32(2):119–25.

Anton-Culver H, Lee-Feldstein A, Taylor TH. The association of bladder cancer risk with ethnicity, gender, and smoking. *Annals of Epidemiology* 1993;3(4):429–33.

Asian American Health Forum, Inc. *Asian and Pacific Islander American California Proportionate Mortality Ratios*. Monograph Series 2. San Francisco: Asian American Health Forum, 1990.

Ayanian JZ, Udvarhelyi IS, Gatsonis CA, Pashos CL, Epstein AM. Racial differences in the use of revascularization procedures after coronary angiography. *Journal of the American Medical Association* 1993; 269(20):2642–6.

Ayesh R, Idle JR, Ritchie JC, Crothers MJ, Hetzel MR. Metabolic oxidation phenotypes as markers for susceptibility to lung cancer. *Nature* 1984;312(5990):169–70.

Bang KM, Gergen PJ, Carroll M. Prevalence of chronic bronchitis among U.S. Hispanics from the Hispanic Health and Nutrition Examination Survey, 1982–84. *American Journal of Public Health* 1990;80(12):1495–7.

Baquet CR, Horm JW, Gibbs T, Greenwald P. Socioeconomic factors and cancer incidence among blacks and whites. *Journal of the National Cancer Institute* 1991;83(8):551–7.

Baquet CR, Ringen K, Pollack ES, Young JL, Horm JW, Ries LAG. *Cancer Among Blacks and Other Minorities: Statistical Profiles*. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Division of Cancer Prevention and Control. NIH Publication No. 86-2785, 1986.

Bardy AH, Seppälä T, Lillsunde P, Kataja JM, Koskela P, Pikkarainen J, et al. Objectively measured tobacco exposure during pregnancy: neonatal effects and relation to maternal smoking. *British Journal of Obstetrics and Gynaecology* 1993;100(8):721–6.

Bartsch H, Malaveille C, Friesen M, Kadlubar FF, Vineis P. Black (air-cured) and blond (flue-cured) tobacco cancer risk IV: molecular dosimetry studies implicate aromatic amines as bladder carcinogens. *European Journal of Cancer* 1993;29A(8):1199–1207.

Becerra JE, Smith JC. Maternal smoking and low birthweight in the reproductive history of women in Puerto Rico, 1982. *American Journal of Public Health* 1988;78(3):268–72.

Beck GJ, Doyle CA, Schachter EN. Smoking and lung function. *American Review of Respiratory Disease* 1981;123(2):149–55.

Becker TM, Wheeler CM, McGough NS, Parmenter CA, Jordan SW, Stidley CA, et al. Sexually transmitted diseases and other risk factors for cervical dysplasia among southwestern Hispanic and non-Hispanic white women. *Journal of the American Medical Association* 1994a;271(15):1181–8.

Becker TM, Wheeler CM, McGough NS, Parmenter CA, Stidley CA, Jamison SF, et al. Cigarette smoking and other risk factors for cervical dysplasia in southwestern Hispanic and non-Hispanic white women. *Cancer Epidemiology, Biomarkers & Prevention* 1994b; 3(2):113–9.

Becker TM, Wheeler CM, McPherson RS, Kratochvil A, Parmenter CA, North CQ, et al. Risk factors for cervical dysplasia in southwestern American Indian women: a pilot study. *Alaska Medicine* 1993;35(4): 255–63.

Becker TM, Wiggins C, Key CR, Samet JM. Ischemic heart disease mortality in Hispanics, American Indians, and non-Hispanic whites in New Mexico, 1958–1982. *Circulation* 1988;78(2):302–9.

Becker TM, Wiggins CL, Key CR, Samet JM. Symptoms, signs, and ill-defined conditions: a leading cause of death among minorities. *American Journal of Epidemiology* 1990;131(4):664–8.

Bell DA, Taylor JA, Butler MA, Stephens EA, Wiest J, Brubaker LH, et al. Genotype/phenotype discordance for human arylamine N-acetyltransferase (NAT2) reveals a new slow-acetylator allele common in African-Americans. *Carcinogenesis* 1993;14(8):1689–92.

Benfante R, Reed D, Frank J. Does cigarette smoking have an independent effect on coronary heart disease incidence in the elderly? *American Journal of Public Health* 1991;81(7):897–9.

Benowitz NL. Pharmacologic aspects of cigarette smoking and nicotine addiction. *New England Journal of Medicine* 1988;319(20):1318–30.

Benowitz NL. Clinical pharmacology of inhaled drugs of abuse: implications in understanding nicotine dependence. In: Chiang CN, Hawks RL, editors. *Research Findings on Smoking of Abused Substances*. National Institute on Drug Abuse Research Monograph No. 99. Rockville (MD): US Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse. DHHS Publication No. (ADM) 90-1690, 1990:12–29.

Benowitz NL. Cigarette smoking and nicotine addiction. *Medical Clinics of North America* 1992a;76(2):415–37.

Benowitz NL. Drug therapy—pharmacology of smokeless tobacco use: nicotine addiction and nicotine-related health consequences. In: *Smokeless Tobacco or Health: An International Perspective*. Smoking and Tobacco Control Monograph No. 2. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health. NIH Publication No. 93-3461, 1992b:219–28.

Benowitz NL. Cotinine as a biomarker of environmental tobacco smoke exposure. *Epidemiologic Reviews* 1996;18(2):188–204.

Benowitz NL, Jacob P III, Jones RT, Rosenberg J. Interindividual variability in the metabolism and cardiovascular effects of nicotine in man. *Journal of Pharmacology and Experimental Therapeutics* 1982;221 (2):368–72.

Benowitz NL, Jacob P III, Yu L. Daily use of smokeless tobacco: systemic effects. *Annals of Internal Medicine* 1989a;111(2):112–6.

Benowitz NL, Jacob P III, Yu L, Talcott R, Hall S, Jones RT. Reduced tar, nicotine, and carbon monoxide exposure while smoking ultralow- but not low-yield cigarettes. *Journal of the American Medical Association* 1986; 256(2):241–6.

Benowitz NL, Pérez-Stable E, Herrera B, Jacob P. African American-Caucasian differences in nicotine and cotinine metabolism [abstract]. *Clinical Pharmacology and Therapeutics* 1995;57(2):159.

Benowitz NL, Porchet H, Jacob P III. Nicotine dependence and tolerance in man: pharmacokinetic and pharmacodynamic investigations. In: Nordberg A, Fuxe K, Holmstedt B, Sundwall A, editors. *Progress in Brain Research*. Vol. 79. Amsterdam: Elsevier Science Publishers, 1989b:279–87.

Benowitz NL, Porchet H, Sheiner L, Jacob P III. Nicotine absorption and cardiovascular effects with smokeless tobacco use: comparison with cigarettes and nicotine gum. *Clinical Pharmacology and Therapeutics* 1988;44(1):23–8.

Benwell MEM, Balfour DJK, Anderson JM. Evidence that tobacco smoking increases the density of (–)-[3H] nicotine binding sites in human brain. *Journal of Neurochemistry* 1988;50(4):1243–7.

Bernstein L, Ross RK. *Cancer in Los Angeles County: A Portrait of Incidence and Mortality, 1972–1987*. Los Angeles: University of Southern California, 1991.

Blot WJ, Lanier A, Fraumeni JF Jr, Bender TR. Cancer mortality among Alaskan Natives, 1960–69. *Journal of the National Cancer Institute* 1975;55(3):547–54.

Blot WJ, McLaughlin JK, Winn DM, Austin DF, Greenberg RS, Preston-Martin S, et al. Smoking and drinking in relation to oral and pharyngeal cancer. *Cancer Research* 1988;48(11):3282–7.

Bolinder G, Alfredsson L, Englund A, de Faire U. Smokeless tobacco use and increased cardiovascular mortality among Swedish construction workers. *American Journal of Public Health* 1994;84(3):399–404.

Boyd GM, Glover ED. Smokeless tobacco use by youth in the U.S. *Journal of School Health* 1989;59(5):189–94.

Braithwaite RL, Taylor SE, editors. *Health Issues in the Black Community*. San Francisco: Jossey-Bass, 1992.

Brown LM, Hoover RN, Greenberg RS, Schoenberg JB, Schwartz AG, Swanson GM, et al. Are racial differences in squamous cell esophageal cancer explained by alcohol and tobacco use? *Journal of the National Cancer Institute* 1994;86(17):1340–5.

Brownson RC, Jackson-Thompson J, Wilkerson JC, Davis JR, Owens NW, Fisher EB Jr. Demographic and socioeconomic differences in beliefs about the health effects of smoking. *American Journal of Public Health* 1992;82(1):99–103.

Buechley R, Dunn JE Jr, Linden G, Breslow L. Excess lung-cancer–mortality rates among Mexican women in California. *Cancer* 1957;10(1):63–6.

Buechley RW, Key CR, Morris DL, Morton WE, Morgan MV. Altitude and ischemic heart disease in tricultural New Mexico: an example of confounding. *American Journal of Epidemiology* 1979;109(6):663–6.

Buell PE, Mendez WM, Dunn JE Jr. Cancer of the lung among Mexican immigrant women in California. *Cancer* 1968;22(1):186–92.

Burchfiel CM, Marcus EB, Curb JD, Maclean CJ, Vollmer WM, Johnson LR, et al. Effects of smoking and smoking cessation on longitudinal decline in pulmonary function. *American Journal of Respiratory and Critical Care Medicine* 1995;151(6):1778–85.

Burchfiel CM, Marcus EB, Sharp DS, Enright PL, Rodriguez BL, Masakai KH, et al. Characteristics associated with rapid decline in forced expiratory volume. *Annals of Epidemiology* 1996;6(3):217–27.

Burhansstipanov L, Dresser C. *Documentation of the Cancer Research Needs of American Indians and Alaska Natives*. Native American Monograph No. 1. Bethesda (MD): Cancer Control Science Program, Division of Cancer Prevention and Control, National Cancer Institute. NIH Publication No. 93-3603, 1993.

Burns PB, Swanson GM. Risk of urinary bladder cancer among blacks and whites: the role of cigarette use and occupation. *Cancer Causes and Control* 1991; 2(6):371–9.

Burns PB, Swanson GM. Stomach cancer risk among black and white men and women: the role of occupation and cigarette smoking. *Journal of Occupational and Environmental Medicine* 1995;37(10):1218–23.

Camp DE, Klesges RC, Relyea G. The relationship between body weight concerns and adolescent smoking. *Health Psychology* 1993;12(1):24–32.

Caporaso NE, Tucker MA, Hoover RN, Hayes RB, Pickle LW, Issaq HJ, et al. Lung cancer and the debrisoquine metabolic phenotype. *Journal of the National Cancer Institute* 1990;82(15):1264–72.

Carmelli D, Swan GE, Robinette D, Fabsitz R. Genetic influence on smoking—a study of male twins. *New England Journal of Medicine* 1992;327(12):829–33.

Castro LC, Azen C, Hobel CJ, Platt LD. Maternal tobacco use and substance abuse: reported prevalence rates and associations with the delivery of small for gestational age neonates. *Obstetrics & Gynecology* 1993;81(3):396–401.

Centers for Disease Control. Indian Health Service facilities become smoke-free. *Morbidity and Mortality Weekly Report* 1987;36(22):348–50.

Centers for Disease Control. Prevalence of oral lesions and smokeless tobacco use in Northern Plains Indians. *Morbidity and Mortality Weekly Report* 1988; 37(39):608–11.

Centers for Disease Control. Cessation of cigarette smoking—United States, 1989. *Morbidity and Mortality Weekly Report* 1990;39(38):676–80.

Centers for Disease Control. Discomfort from environmental tobacco smoke among employees at worksites with minimal smoking restrictions—United States, 1988. *Morbidity and Mortality Weekly Report* 1992; 41(20):351–4.

Centers for Disease Control and Prevention. Mortality trends for selected smoking-related cancers and breast cancer—United States, 1950–1990. *Morbidity and Mortality Weekly Report* 1993a;42(44):857, 863–6.

Centers for Disease Control and Prevention. Smoking cessation during previous year among adults—United States, 1990 and 1991. *Morbidity and Mortality Weekly Report* 1993b;42(26):504–7.

Centers for Disease Control and Prevention. Use of smokeless tobacco among adults—United States, 1991. *Morbidity and Mortality Weekly Report* 1993c; 42(14):263–6.

Centers for Disease Control and Prevention. Reasons for tobacco use and symptoms of nicotine withdrawal among adolescent and young adult tobacco users—United States, 1993. *Morbidity and Mortality Weekly Report* 1994;43(41):745–50.

Chyou PH, Nomura AMY, Stemmermann GN, Kato I. Lung cancer: a prospective study of smoking, occupation, and nutrient intake. *Archives of Environmental Health* 1993;48(2):69–72.

Clark PI, Gautam SP, Gerson LW. Effect of menthol cigarettes on biochemical markers of smoke exposure among black and white smokers. *Chest* 1996a; 110(5):1194–8.

Clark PI, Gautam S, Hlaing WM, Gerson LW. Response error in self-reported current smoking frequency by black and white established smokers. *Annals of Epidemiology* 1996b;6(6):483–9.

Cloninger CR. Neurogenetic adaptive mechanisms in alcoholism. *Science* 1987;236(4800):410–6.

Cohen BB, Friedman DJ, Mahan CM, Lederman R, Munoz D. Ethnicity, maternal risk, and birth weight among Hispanics in Massachusetts, 1987–89. *Public Health Reports* 1993;108(3):363–71.

Cooper RS, Ford E. Comparability of risk factors for coronary heart disease among blacks and whites in the NHANES-I Epidemiologic Follow-Up Study. *Annals of Epidemiology* 1992;2(5):637–45.

Correa P, Fontham E, Pickle LW, Chen V, Lin Y, Haenszel W. Dietary determinants of gastric cancer in south Louisiana inhabitants. *Journal of the National Cancer Institute* 1985;75(4):645–54.

Coultas DB. Other occupational carcinogens. In: Samet JM, editor. *Epidemiology of Lung Cancer.* New York: Marcel Dekker, 1994: 299–333.

Coultas DB, Gong H Jr, Grad R, Handler A, McCurdy SA, Player R, et al. Respiratory diseases in minorities of the United States. *American Journal of Respiratory and Critical Care Medicine* 1994;149(2):S93–S131.

Coultas DB, Howard CA, Peake GT, Skipper BJ, Samet JM. Discrepancies between self-reported and validated cigarette smoking in a community survey of New Mexico Hispanics. *American Review of Respiratory Disease* 1988;137(4):810–14.

Coultas DB, Samet JM. Occupational lung cancer. *Clinics in Chest Medicine* 1992;13(2):341–54.

Coultas DB, Stidley CA, Samet JM. Cigarette yields of tar and nicotine and markers of exposure to tobacco smoke. *American Review of Respiratory Disease* 1993; 148(2):435–40.

Crawford FG, Mayer J, Santella RM, Cooper TB, Ottman R, Tsai WY, et al. Biomarkers of environmental tobacco smoke in preschool children and their mothers. *Journal of the National Cancer Institute* 1994; 86(18):1398–402.

Creagan ET, Fraumeni JF Jr. Cancer mortality among American Indians, 1950–67. *Journal of the National Cancer Institute* 1972;49(4):959–67.

Crofts F, Cosma GN, Currie D, Taioli E, Toniolo P, Garte ST. A novel CYP1A1 gene polymorphism in African Americans. *Carcinogenesis* 1993;14(9):1729–31.

David MMA, Hanrahan JP, Carey V, Speizer FE, Tager IB. Respiratory symptoms in urban Hispanic and non-Hispanic white women. *American Journal of Respiratory and Critical Care Medicine* 1996;153(4 Pt 1):1285–91.

Day GL, Blot WJ, Austin DF, Bernstein L, Greenberg RS, Preston-Martin S, et al. Racial differences in risk of oral and pharyngeal cancer: alcohol, tobacco, and other determinants. *Journal of the National Cancer Institute* 1993;85(6):465–73.

Denissenko MF, Pao A, Tang M-s, Pfeifer GP. Preferential formation of benzo[a]pyrene adducts at lung cancer mutational hotspots in P53. *Science* 1996;274(5286):430–2.

Desenclos J-CA, Hahn RA. Years of potential life lost before age 65, by race, Hispanic origin, and sex—United States, 1986–1988. *Morbidity and Mortality Weekly Report* 1992;41(SS-6):13–23.

DeStefano F, Newman J. Comparison of coronary heart disease mortality risk between black and white people with diabetes. *Ethnicity & Disease* 1993;3(2):145–51.

Devesa SS, Diamond EL. Socioeconomic and racial differences in lung cancer incidence. *American Journal of Epidemiology* 1983;118(6):818–31.

Di Pede C, Viegi G, Quackenboss JJ, Boyer-Pfersdorf P, Lebowitz MD. Respiratory symptoms and risk factors in an Arizona population sample of Anglo and Mexican American whites. *Chest* 1991;99(4):916–22.

Doll R, Peto R, Wheatley K, Gray R, Sutherland I. Mortality in relation to smoking: 40 years' observations on male British doctors. *British Medical Journal* 1994;309:901–11.

Dorgan JF, Ziegler RG, Schoenberg JB, Hartge P, McAdams MJ, Falk RT, et al. Race and sex differences in associations of vegetables, fruits, and carotenoids with lung cancer risk in New Jersey (United States). *Cancer Causes and Control* 1993;4(3):273–81.

Dunham LJ, Bailar JC III, Laqueur GL. Histologically diagnosed cancers in 693 Indians of the United States, 1950–65. *Journal of the National Cancer Institute* 1973; 50(5):1119–27.

Economou P, Lechner JF, Samet JM. Familial and genetic factors in the pathogenesis of lung cancer. In: Samet JM, editor. *Epidemiology of Lung Cancer*. New York: Marcel Dekker, 1994:353–96.

Edwards G, Arif A, Hodgson R. Nomenclature and classification of drug- and alcohol-related problems: a shortened version of a WHO memorandum. *British Journal of Addiction* 1982;77(1):3–20.

Eidson M, Becker TM, Wiggins CL, Key CR, Samet JM. Breast cancer among Hispanics, American Indians and non-Hispanic whites in New Mexico. *International Journal of Epidemiology* 1994;23(2):231–7.

English PB, Eskenazi B. Reinterpreting the effects of maternal smoking on infant birthweight and perinatal mortality: a multivariate approach to birthweight standardization. *International Journal of Epidemiology* 1992;21(6):1097–105.

English PB, Eskenazi B, Christianson RE. Black-white differences in serum cotinine levels among pregnant women and subsequent effects on infant birthweight. *American Journal of Public Health* 1994;84(9):1439–43.

Enos WF, Holmes RH, Beyer J. Coronary disease among United States soldiers killed in action in Korea: preliminary report [reprint from 1953]. *Journal of the American Medical Association* 1986;256(20):2859–62.

Evans R, Mullally DI, Wilson RW, Gergen PJ, Rosenberg HM, Grauman JS, et al. National trends in the morbidity and mortality of asthma in the U.S.: prevalence, hospitalization and death from asthma over two decades: 1965–1984. *Chest* 1987;91(6):65S–74S.

Fagerström K-O, Götestam KG. Increase of muscle tonus after tobacco smoking. *Addictive Behaviors* 1977;2(4):203–6.

Fagerström K-O, Schneider NG. Measuring nicotine dependence: a review of the Fagerstrom Tolerance Questionnaire. *Journal of Behavioral Medicine* 1989; 12(2):159–82.

Folsom AR, Johnson KM, Lando HA, McGovern PG, Solberg LI, Ekstrum JK. Plasma fibrinogen and other cardiovascular risk factors in urban American Indian smokers. *Ethnicity & Disease* 1993;3(4):344–50.

Franks AL, May DS, Wenger NK, Blount SB, Eaker ED. Racial differences in the use of invasive coronary procedures after acute myocardial infarction in Medicare beneficiaries. *Ethnicity & Disease* 1993;3(3):213–20.

Frerichs RR, Chapman JM, Maes EF. Mortality due to all causes and to cardiovascular diseases among seven race-ethnic populations in Los Angeles County, 1980. *International Journal of Epidemiology* 1984;13(3):291–8.

Friedman GD, Tekawa I, Sadler M, Sidney S. Smoking and mortality: the Kaiser Foundation experience. In: National Cancer Institute. *Changes in Cigarette-Related Disease Risks and Their Implication for Prevention and Control*. Smoking and Tobacco Control Monograph No. 8. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, 1997.

Frost F, Taylor V, Fries E. Racial misclassification of Native Americans in a surveillance, epidemiology, and end results cancer registry. *Journal of the National Cancer Institute* 1992;84(12):957–62.

Garfinkel L. Cigarette smoking and coronary heart disease in blacks: comparison to whites in a prospective study. *American Heart Journal* 1984;108(3 Pt 2):802–7.

Gerlach KK, Shopland DR, Hartman AM, Gibson JT, Pechacek TF. Workplace smoking policies in the United States: results from a national survey of more than 100,000 workers. *Tobacco Control* 1997;6(3):199–206.

Geronimus AT, Neidert LJ, Bound J. Age patterns of smoking in U.S. black and white women of childbearing age. *American Journal of Public Health* 1993; 83(9):1258–64.

Gillum RF. Ischemic heart disease mortality in American Indians, United States, 1969–1971 and 1979–1981. *American Heart Journal* 1988;115(5):1141–4.

Giovannucci E, Colditz GA, Stampfer MJ, Hunter D, Rosner BA, Willett WC, et al. A prospective study of cigarette smoking and risk of colorectal adenoma and colorectal cancer in U.S. women. *Journal of the National Cancer Institute* 1994;86(3):192–9.

Godel JC, Pabst HF, Hodges PE, Johnson KE, Froese GJ, Joffres MR. Smoking and caffeine and alcohol intake during pregnancy in a northern population: effect on fetal growth. *Canadian Medical Association Journal* 1992;147(2):181–8.

Goff DC Jr, Ramsey DJ, Labarthe DR, Nichaman MZ. Acute myocardial infarction and coronary heart disease mortality among Mexican Americans and non-Hispanic whites in Texas, 1980 through 1989. *Ethnicity & Disease* 1993;3(1):64–9.

Goldberg RJ, Burchfiel CM, Benfante R, Chiu D, Reed DM, Yano K. Lifestyle and biologic factors associated with atherosclerotic disease in middle-aged men. *Archives of Internal Medicine* 1995;155(7):686–94.

Goldstein JA, Faletto MB. Advances in mechanisms of activation and deactivation of environmental chemicals. *Environmental Health Perspectives* 1993;100:169–76.

Gross J, Stitzer ML. Nicotine replacement: ten-week effects on tobacco withdrawal symptoms. *Psychopharmacology* 1989;98(3):334–41.

Grunberg NE, Acri JB. Conceptual and methodological considerations for tobacco addiction research. *British Journal of Addiction* 1991;86(5):637–41.

Guengerich FP. Characterization of human cytochrome P450 enzymes. *FASEB Journal* 1992;6(2):745–8.

Guengerich FP. The 1992 Bernard B. Brodie Award Lecture: bioactivation and detoxification of toxic and carcinogenic chemicals. *Drug Metabolism and Disposition* 1993;21(1):1–6.

Hahn LP, Folsom AR, Sprafka JM, Norsted SW. Cigarette smoking and cessation behaviors among urban blacks and whites. *Public Health Reports* 1990; 105(3):290–5.

Hames CG, Rose K, Knowles M, Davis CE, Tyroler HA. Black-white comparisons of 20-year coronary heart disease mortality in the Evans County Heart Study. *Cardiology* 1993;82(2–3):122–36.

Harris RE, Chen-Backlund J-Y, Wynder EL. Cancer of the urinary bladder in blacks and whites: a case-control study. *Cancer* 1990;66(12):2673–80.

Harris RE, Zang EA, Anderson JI, Wynder EL. Race and sex differences in lung cancer risk associated with cigarette smoking. *International Journal of Epidemiology* 1993;22(4):592–9.

Hartge P, Silverman DT, Schairer C, Hoover RN. Smoking and bladder cancer risk in blacks and whites in the United States. *Cancer Causes and Control* 1993; 4(4):391–4.

Hatsukami DK, Gust SW, Keenan RM. Physiologic and subjective changes from smokeless tobacco withdrawal. *Clinical Pharmacology and Therapeutics* 1987; 41(1):103–7.

Heatherton TF, Kozlowski LT, Frecker RC, Rickert W, Robinson J. Measuring the heaviness of smoking: using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. *British Journal of Addiction* 1989;84(7):791–800.

Hebert JR, Kabat GC. Menthol cigarette smoking and oesophageal cancer. *International Journal of Epidemiology* 1989;18(1):37–44.

Hein DW. Acetylator genotype and arylamine-induced carcinogenesis. *Biochimica et Biophysica Acta* 1988; 948(1):37–66.

Heishman SJ, Taylor RC, Henningfield JE. Nicotine and smoking: a review of effects on human performance. *Experimental and Clinical Psychopharmacology* 1994; 2(3):1–51.

Henningfield JE, Cohen C, Giovino GA. Can genetic constitution affect the "objective" diagnosis of nicotine dependence? [editorial]. *American Journal of Public Health* 1990;80(9):1040–1.

Henningfield JE, Kozlowski LT, Benowitz NL. A proposal to develop meaningful labeling for cigarettes [commentary]. *Journal of the American Medical Association* 1994;272(4):312–4.

Henningfield JE, Stapleton JM, Benowitz NL, Grayson RF, London ED. Higher levels of nicotine in arterial than in venous blood after cigarette smoking. *Drug and Alcohol Dependence* 1993;33(1):23–9.

Hinds MW, Stemmermann GM, Yang H-Y, Kolonel LN, Lee J, Wegner E. Differences in lung cancer risk from smoking among Japanese, Chinese and Hawaiian women in Hawaii. *International Journal of Cancer* 1981;27(3):297–302.

Hoffman FL. *Cancer Among North American Indians. The Health Progress of the North American Indian. The Indian as a Life Insurance Risk.* Newark (NJ): Prudential Press, 1928.

Hogue CJ, Yip R. Preterm delivery: can we lower the black infant's first hurdle? *Journal of the American Medical Association* 1989;262(4):548–50.

Holck SE, Warren CW, Rochat RW, Smith JC. Lung cancer mortality and smoking habits: Mexican American women. *American Journal of Public Health* 1982; 72(1):38–42.

Holm H, Jarvis MJ, Russell MAH, Feyerabend C. Nicotine intake and dependence in Swedish snuff takers. *Psychopharmacology* 1992;108(4):507–11.

Howard BV, Lee ET, Cowan LD, Fabsitz RR, Howard WJ, Oopik AJ, et al. Coronary heart disease prevalence and its relation to risk factors in American Indians: the Strong Heart Study. *American Journal of Epidemiology* 1995;142(3):254–68.

Howard CA, Samet JM, Buechley RW, Schrag SD, Key CR. Survey research in New Mexico Hispanics: some methodological issues. *American Journal of Epidemiology* 1983;117(1):27–34.

Hughes JR. Genetics of smoking: a brief review. *Behavior Therapy* 1986;17(4):335–45.

Hughes JR. Tobacco withdrawal in self-quitters. *Journal of Consulting and Clinical Psychology* 1992;60 (5):689–97.

Hughes JR, Hatsukami DK. The nicotine withdrawal syndrome: a brief review and update. *International Journal of Smoking Cessation* 1992;1(2):21–6.

Hughes JR, Higgins ST, Hatsukami D. Effects of abstinence from tobacco: a critical review. In: Kozlowski LT, Annis HM, Cappell HD, Glaser FB, Goodstadt MS, Israel Y, et al., editors. *Research Advances in Alcohol and Drug Problems*. Vol. 10. New York: Plenum Publishing Corporation, 1990:317–98.

Humble CG, Samet JM, Pathak DR, Skipper BJ. Cigarette smoking and lung cancer in "Hispanic" whites and other whites in New Mexico. *American Journal of Public Health* 1985;75(2):145–8.

Indian Health Service. *Regional Differences in Indian Health—1994*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Indian Health Service, Office of Planning, Evaluation, and Legislation, Division of Program Statistics, 1994a.

Indian Health Service. *Trends in Indian Health—1994*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Indian Health Service, Office of Planning, Evaluation, and Legislation, Division of Program Statistics, 1994b.

Jacobson JL, Jacobson SW, Sokol RJ, Martier SS, Ager JW, Shankaran S. Effects of alcohol use, smoking, and illicit drug use on fetal growth in black infants. *Journal of Pediatrics* 1994;124(5 Pt 1):757–64.

Jarvik ME, Tashkin DP, Caskey NH, McCarthy WJ, Rosenblatt MR. Mentholated cigarettes decrease puff volume of smoke and increase carbon monoxide absorption. *Physiology and Behavior* 1994;56(3):563–70.

Johnson AA, Knight EM, Edwards CH, Oyemade UJ, Cole OJ, Westney OE, et al. Selected lifestyle practices in urban African American women—relationships to pregnancy outcome, dietary intakes and anthropometric measurements. *Journal of Nutrition* 1994; 124(6S):963S–72S.

Johnson A, Taylor A. *National Medical Expenditure Survey. Prevalence of Chronic Diseases: A Summary of Data from the Survey of American Indians and Alaska Natives.* Data Summary 3. Rockville (MD): US Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, Center for General Health Services Intramural Research, 1991.

Johnson PA, Lee TH, Cook EF, Rouan GW, Goldman L. Effect of race on the presentation and management of patients with acute chest pain. *Annals of Internal Medicine* 1993;118(8):593–601.

Kabat GC, Wynder EL. Determinants of quitting smoking. *American Journal of Public Health* 1987; 77(10):1301–5.

Kabat GC, Herbert JR. Use of mentholated cigarettes and lung cancer risk. *Cancer Research* 1991;51(24):6510–3.

Kandel D, Chen K, Warner LA, Kessler RC, Grant B. Prevalence and demographic correlates of symptoms of last year dependence on alcohol, nicotine, marijuana and cocaine in the U.S. population. *Drug and Alcohol Dependence* 1997;44(1):11–29.

Kattapong VJ, Becker TM. Ethnic differences in mortality from cerebrovascular disease among New Mexico's Hispanics, Native Americans, and non-Hispanic whites, 1958 through 1987. *Ethnicity & Disease* 1993;3(1):75–82.

Kawajiri K, Nakachi K, Imai K, Yoshii A, Shinoda N, Watanabe J. Identification of genetically high risk individuals to lung cancer by DNA polymorphisms of the cytochrome P4501A1 gene. *FEBS Letters* 1990; 263(1):131–3.

Keenan RM, Hatsukami DK, Pentel PR, Thompson TN, Grillo MA. Pharmacodynamic effects of cotinine in abstinent cigarette smokers. *Clinical Pharmacology and Therapeutics* 1994;55(5):581–90.

Keenan RM, Hatsukami DK, Pentel PR, Thompson TN, Grillo MA. Evidence that cotinine is psychoactive [reply letter]? *Clinical Pharmacology and Therapeutics* 1995;57(1):95–7.

Keil JE, Sutherland SE, Knapp RG, Lackland DT, Gazes PC, Tyroler HA. Mortality rates and risk factors for coronary disease in black as compared with white men and women. *New England Journal of Medicine* 1993;329(2):73–8.

Keil JE, Sutherland SE, Hames CG, Lackland DT, Gazes PC, Knapp RG, et al. Coronary disease mortality and risk factors in black and white men: results from the combined Charleston, SC, and Evans County, Georgia, heart studies. *Archives of Internal Medicine* 1995;155(14):1521–7.

Kelsey KT, Wiencke JK, Spitz MR. A race-specific genetic polymorphism in the CYP1A1 gene is not associated with lung cancer in African Americans. *Carcinogenesis* 1994;15(6):1121–4.

Klatsky AL, Armstrong MA, Friedman GD. Racial differences in cerebrovascular disease hospitalizations. *Stroke* 1991;22(3):299–304.

Klein G, Klein E. Evolution of tumours and the impact of molecular oncology. *Nature* 1985;315(6016): 190–5.

Kleinman JC. Infant mortality among racial/ethnic minority groups, 1983–1984. *Morbidity and Mortality Weekly Report* 1990;39(SS-3):31–9.

Kleinman JC, Pierre MB Jr, Madans JH, Land GH, Schramm WF. The effects of maternal smoking on fetal and infant mortality. *American Journal of Epidemiology* 1988;127(2):274–82.

Klonoff-Cohen HS, Edelstein SH, Lefkowitz ES, Srinivasan IP, Kaegi D, Chang JC, et al. The effect of passive smoking and tobacco exposure through breast milk on sudden infant death syndrome. *Journal of the American Medical Association* 1995;273(10):795–8.

Knight JM, Eliopoulos C, Klein J, Greenwald M, Koren G. Passive smoking in children: racial differences in systemic exposure to cotinine by hair and urine analysis. *Chest* 1996;109(2):446–50.

Kolonel LN. Cancer patterns of four ethnic groups in Hawaii. *Journal of the National Cancer Institute* 1980; 65(5):1127–39.

Kosary CL, Ries LAG, Miller BA, Hankey BF, Harras A, Edwards BK, editors. *SEER Cancer Statistics Review, 1973–1992: Tables and Graphs.* Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Division of Cancer Prevention and Control. NIH Publication No. 96-2789, 1995.

Krasnegor NA. Implications and directions for future research. In: Krasnegor NA, editor. *Cigarette Smoking as a Dependence Process.* National Institute on Drug Abuse Research Monograph No. 23. Rockville (MD): US Department of Health, Education, and Welfare, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse. DHHS Publication No. (ADM) 79-800, 1979:186–9.

Kravetz RE. Disease distribution in Southwestern American Indians: analysis of 211 autopsies. *Arizona Medicine* 1964;21(9):628–34.

LaCroix AZ, Haynes SG, Savage DD, Havlik RJ. Rose questionnaire angina among United States black, white, and Mexican-American women and men. *American Journal of Epidemiology* 1989;129(4):669–86.

Land H, Parada LF, Weinberg RA. Cellular oncogenes and multistep carcinogenesis. *Science* 1983;222(4625): 771–8.

Land GH, Stockbauer JW. Smoking and pregnancy outcome: trends among black teenage smokers in Missouri. *American Journal of Public Health* 1993;83(8): 1121–4.

Landi MT, Zocchetti C, Bernucci I, Kadlubar FF, Tannenbaum S, Skipper P, et al. Cytochrome P4501A2: enzyme induction and genetic control in determining 4-aminobiphenyl-hemoglobin adduct levels. *Cancer Epidemiology, Biomarkers & Prevention* 1996;5(9):693–8.

Lanier AP, Bender TR, Blot WJ, Fraumeni JF Jr, Hurlburt WB. Cancer incidence in Alaska Natives. *International Journal of Cancer* 1976;18(4):409–12.

Lanier AP, Kelly J, Smith B, Amadon C, Harpster A, Peters H, et al. *Cancer in the Alaska Native Population: Eskimo, Aleut, and Indian Incidence and Trends, 1969–1988.* Anchorage (AK): US Department of Health and Human Services, Public Health Service, Indian Health Service, Alaska Area Native Health Service, 1993.

Lanier AP, Kelly JJ, Smith B, Harpster AP, Tanttila H, Amadon C, et al. Alaska Native cancer update: incidence rates 1989–1993. *Cancer Epidemiology, Biomarkers & Prevention* 1996;5(9):749–51.

Le Houezec J, Benowitz NL. Basic and clinical psychopharmacology of nicotine. *Clinics in Chest Medicine* 1991;12(4):681–99.

Le Marchand L, Wilkens LR, Kolonel LN. Ethnic differences in the lung cancer risk associated with smoking. *Cancer Epidemiology, Biomarkers & Prevention* 1992; 1(2):103–7.

Lee ES, Roberts RE, Labarthe DR. Excess and deficit lung cancer mortality in three ethnic groups in Texas. *Cancer* 1976;38(6):2551–6.

Levin ED. Nicotinic systems and cognitive function. *Psychopharmacology* 1992;108(4):417–31.

Li CQ, Windsor RA, Perkins L, Goldenberg RL, Lowe JB. The impact on infant birth weight and gestational age of cotinine-validated smoking reduction during pregnancy. *Journal of the American Medical Association* 1993;269(12):1519–24.

Li DK, Daling JR. Maternal smoking, low birth weight, and ethnicity in relation to sudden infant death syndrome. *American Journal of Epidemiology* 1991;134 (9):958–64.

Lieberman E, Gremy I, Lang JM, Cohen AP. Low birthweight at term and the timing of fetal exposure to maternal smoking. *American Journal of Public Health* 1994;84(7):1127–31.

London SJ, Daly AK, Fairbrother KS, Holmes C, Carpenter CL, Navidi WC, et al. Lung cancer risk in African-Americans in relation to a race-specific CYP1A1 polymorphism. *Cancer Research* 1995; 55(24):6035–7.

Lubs ML. Racial differences in maternal smoking effects on the newborn infant. *American Journal of Obstetrics and Gynecology* 1973;115(1):66–76.

Mahoney MC, Michalek AM. A meta-analysis of cancer incidence in United States and Canadian Native populations. *International Journal of Epidemiology* 1991;20(2):323–7.

Mallin K, Anderson K. Cancer mortality in Illinois Mexican and Puerto Rican immigrants, 1979–1984. *International Journal of Cancer* 1988;41(5):670–6.

Malloy MH, Kleinman JC, Land GH, Schramm WF. The association of maternal smoking with age and cause of infant death. *American Journal of Epidemiology* 1988;128(1):46–55.

Mannino DM, Brown C, Giovino GA. Obstructive lung disease deaths in the United States from 1979 through 1993: an analysis using multiple-cause mortality data. *American Journal of Respiratory and Critical Care Medicine* 1997;156(3):814–8.

Marcus EB, Buist AS, Curb JD, Maclean CJ, Reed DM, Johnson LR, et al. Correlates of FEV1 and prevalence of pulmonary conditions in Japanese-American men. *American Review of Respiratory Disease* 1988; 138(6):1398–404.

Marín G, Marín BV. *Research with Hispanic Populations.* Applied Social Research Methods Series. Vol. 23. Newbury Park (CA): Sage Publications, 1991.

Marks MJ, Campbell SM, Romm E, Collins AC. Genotype influences the development of tolerance to nicotine in the mouse. *Journal of Pharmacology and Experimental Therapeutics* 1991;259(1):392–402.

Marks MJ, Stitzel JA, Collins AC. Time course study of the effects of chronic nicotine infusion on drug response and brain receptors. *Journal of Pharmacology and Experimental Therapeutics* 1985;235(3):619–28.

Marshall CJ, Vousden KH, Phillips DH. Activation of c-Ha-ras-1 proto-oncogene by in vitro modification with a chemical carcinogen, benzo(a)pyrene diol-epoxide. *Nature* 1984;310(5978):586–9.

Martin J, Suarez L. Cancer mortality among Mexican Americans and other whites in Texas, 1969–80. *American Journal of Public Health* 1987;77(7):851–3.

Mattson ME, Winn DM. Smokeless tobacco: association with increased cancer risk. In: *Smokeless Tobacco Use in the United States.* National Cancer Institute Monographs No. 8. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health. NIH Publication No. 89-3055, 1989:5–16.

McCarthy WJ, Caskey NH, Jarvik ME, Gross TM, Rosenblatt MR, Carpenter C. Menthol vs. nonmenthol cigarettes: effects on smoking behavior. *American Journal of Public Health* 1995;85(1):67–72.

McKennell AC. Smoking motivation factors. *British Journal of Social and Clinical Psychology* 1970;9(1):8–22.

McNeill AD, Owen LA, Belcher M, Sutherland G, Fleming S. Abstinence from smoking and expired-air carbon monoxide levels: lactose intolerance as a possible source of error. *American Journal of Public Health* 1990;80(9):1114–5.

McWhorter WM, Polis MA, Kaslow RA. Occurrence, predictors, and consequences of adult asthma in NHANESI and follow-up survey. *American Review of Respiratory Disease* 1989;139(3):721–4.

Menck HR, Henderson BE, Pike MC, Mack T, Martin SP, SooHoo J. Cancer incidence in the Mexican American. *Journal of the National Cancer Institute* 1975;55 (3):531–6.

Middaugh JP. Cardiovascular deaths among Alaskan Natives, 1980–86. *American Journal of Public Health* 1990;80(3):282–5.

Miller EC, Miller JA. Searches for the ultimate chemical carcinogens and their reactions with cellular macromolecules. *Cancer* 1981;47(10):2327–45.

Miller GE, Jarvik ME, Caskey NH, Segerstrom SC, Rosenblatt MR, McCarthy WJ. Cigarette mentholation increases smokers' exhaled carbon monoxide levels. *Experimental and Clinical Psychopharmacology* 1994; 2(2):154–60.

Mitchell BD, Hazuda HP, Haffner SM, Patterson JK, Stern MP. Myocardial infarction in Mexican Americans and non-Hispanic whites: the San Antonio Heart Study. *Circulation* 1991;83(1):45–51.

National Cancer Institute. *Tobacco Effects in the Mouth.* Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute and National Institute of Dental Research. NIH Publication No. 92-3330, 1992.

National Cancer Institute. *The FTC Cigarette Test Method for Determining Tar, Nicotine, and Carbon Monoxide Yields of US Cigarettes. Report of the NCI Expert Committee.* Smoking and Tobacco Control Monograph No. 7. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 96-4028, 1996a.

National Cancer Institute. *Racial/Ethnic Patterns of Cancer in the United States, 1988–1992.* Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Division of Cancer Prevention and Control. NIH Publication No. 96-4104, 1996b.

National Center for Health Statistics. Current Estimates From the National Health Interview Survey, 1990. *Vital and Health Statistics.* Series 10, No. 181. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Health Statistics. DHHS Publication No. (PHS) 92-1509, 1991.

National Center for Health Statistics. Advance Report of Final Mortality Statistics, 1990. *Monthly Vital Statistics Report* 1993;41(7 Suppl).

National Center for Health Statistics. *Health, United States, 1993.* Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics. DHHS Publication No. (PHS) 94-1232, 1994.

National Center for Health Statistics. Advance Report of Final Mortality Statistics, 1994. *Monthly Vital Statistics Report* 1996a;45(3 Suppl).

National Center for Health Statistics. *Health, United States, 1995.* Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics. DHHS Publication No. (PHS) 96-1232, 1996b.

National Center for Health Statistics. *Health, United States, 1996–97 and Injury Chartbook.* Hyattsville (MD): US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics. DHHS Publication No. (PHS) 97-1232, 1997.

National Research Council. *Environmental Tobacco Smoke: Measuring Exposures and Assessing Health Effects.* Washington (DC): National Academy Press, 1986.

Navarro AM. Cigarette smoking among adult Latinos: the California Tobacco Baseline Survey. *Annals of Behavioral Medicine* 1996;18(4):238–45.

Neggers Y, Goldenberg RL, Cliver SP, Hoffman HJ, Copper RI. The relationship between maternal skinfold thickness, smoking and birthweight in black and white women. *Paediatric and Perinatal Epidemiology* 1994; 8(2):216–21.

Nomura AMY, Stemmermann GN, Chyou PH. Gastric cancer among the Japanese in Hawaii. *Japanese Journal of Cancer Research* 1995;86(10):916–23.

Novotny TE, Warner KE, Kendrick JS, Remington PL. Smoking by blacks and whites: socioeconomic and demographic differences. *American Journal of Public Health* 1988;78(9):1187–9.

Nutting PA, Freeman WL, Risser DR, Helgerson SD, Paisano R, Hisnanick J, et al. Cancer incidence among American Indians and Alaska Natives, 1980 through 1987. *American Journal of Public Health* 1993; 83(11):1589–98.

Ochsner A, DeBakey M. Symposium on cancer. Primary pulmonary malignancy. Treatment by total pneumonectomy; analysis of 79 collected cases and presentation of 7 personal cases. *Surgery, Gynecology, and Obstetrics* 1939;68(2):435–51.

Overpeck MD, Moss AJ. Children's Exposure to Environmental Cigarette Smoke Before and After Birth: Health of Our Nation's Children, United States, 1988. *Advance Data.* No. 202. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Health Statistics, 1991.

Parker CL, Tong T, Bolden BA, Wingo PA. Cancer statistics, 1997. *CA: A Cancer Journal for Clinicians* 1997;47(1):5–27.

Pattishall EN, Strope GL, Etzel RA, Helms RW, Haley NJ, Denny FW. Serum cotinine as a measure of tobacco smoke exposure in children. *American Journal of Diseases of Children* 1985;139(11):1101–4.

Peeke SC, Peeke HVS. Attention, memory, and cigarette smoking. *Psychopharmacology* 1984;84(2):205–16.

Pérez-Stable EJ, Marín G, Marín BV, Benowitz NL. Misclassification of smoking status by self-reported cigarette consumption. *American Review of Respiratory Disease* 1992;145(1):53–7.

Pérez-Stable EJ, Marín G, Marín BV. Behavioral risk factors: a comparison of Latinos and non-Latino whites in San Francisco. *American Journal of Public Health* 1994; 84(6):971–6.

Pérez-Stable EJ, Vanoss Marín B, Marín G, Brody DJ, Benowitz NL. Apparent underreporting of cigarette consumption among Mexican American smokers. *American Journal of Public Health* 1990;80(9):1057–61.

Peters RK, Thomas D, Hagan DG, Mack TM, Henderson BE. Risk factors for invasive cervical cancer among Latinas and non-Latinas in Los Angeles County. *Journal of the National Cancer Institute* 1986; 77(5):1063–77.

Peterson ED, Wright SM, Daley J, Thibault GE. Racial variation in cardiac procedure use and survival following acute myocardial infarction in the Department of Veterans Affairs. *Journal of the American Medical Association* 1994;271(15):1175–80.

Pickworth WB, Herning RI, Henningfield JE. Spontaneous EEG changes during tobacco abstinence and nicotine substitution in human volunteers. *Journal of Pharmacology and Experimental Therapeutics* 1989; 251(3):976–82.

Pierce JP, Cavin SW, Macky C, Rosbrook B, Berry CC, Maklan DM, et al. *Technical Report on Analytic Methods and Approaches Used in the 1992 California Tobacco Survey Analysis.* Sacramento (CA): California Department of Health Services, 1994.

Pirkle JL, Flegal KM, Bernert JT, Brody DJ, Etzel RA, Maurer KR. Exposure of the U.S. population to environmental tobacco smoke: the third National Health and Nutrition Examination Survey, 1988–1991. *Journal of the American Medical Association* 1996; 275(16):1233–40.

Polednak AP. Cancer incidence in the Puerto Rican-born population of Long Island, New York. *American Journal of Public Health* 1991;81(11):1405–7.

Polednak AP. Lung cancer rates in the Hispanic population of Connecticut, 1980–88. *Public Health Reports* 1993;108(4):471–6.

Pomerleau OF, Pomerleau CS. Neuroregulators and the reinforcement of smoking: towards a biobehavioral explanation. *Neuroscience and Biobehavioral Reviews* 1984;8(4):503–13.

Pomerleau CS, Pomerleau OF, Majchrzak MJ, Kloska DD, Malakuti R. Relationship between nicotine tolerance questionnaire scores and plasma cotinine. *Addictive Behaviors* 1990;15(1):73–80.

Pottern LM, Morris LE, Blot WJ, Ziegler RG, Fraumeni JF Jr. Esophageal cancer among black men in Washington, D.C. Alcohol, tobacco, and other risk factors. *Journal of the National Cancer Institute* 1981; 67(4):777–83.

Pritchard WS, Robinson JH, Guy TD. Enhancement of continuous performance task reaction time by smoking in non-deprived smokers. *Psychopharmacology* 1992;108(4):437–42.

Reed DM. The paradox of high risk of stroke in populations with low risk of coronary heart disease. *American Journal of Epidemiology* 1990;131(4):579–88.

Reed DM, MacLean CJ, Hayashi T. Predictors of atherosclerosis in the Honolulu Heart Program. I: biologic, dietary, and lifestyle characteristics. *American Journal of Epidemiology* 1987;126(2):214–25.

Reed D, McGee D, Cohen J, Yano K, Syme SL, Feinleib M. Acculturation and coronary heart disease among Japanese men in Hawaii. *American Journal of Epidemiology* 1982;115(6):894–905.

Reed D, McGee D, Yano K. Trends of coronary heart disease among men of Japanese ancestry in Hawaii. *Journal of Community Health* 1983;8(3):149–59.

Reichenbach DD. Autopsy incidence of diseases among Southwestern American Indians. *Archives of Pathology* 1967;84(July):81–6.

Rewers M, Shetterly SM, Hoag S, Baxter J, Marshall J, Hamman RF. Is the risk of coronary heart disease lower in Hispanics than in non-Hispanic whites? The San Luis Valley diabetes study. *Ethnicity & Disease* 1993;3(1):44–54.

Rhoades ER. The major respiratory diseases of American Indians. *American Review of Respiratory Disease* 1990;141(3):595–600.

Richie JP, Carmella SG, Muscat JE, Scott DG, Akerkar SA, Hecht SS. Differences in the urinary metabolites of the tobacco-specific lung carcinogen 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone in black and white smokers. *Cancer Epidemiology, Biomarkers & Prevention* 1997;6(10):783–90.

Ries LAG, Kosary CL, Hankey BF, Miller BA, Harras A, Edwards BK, editors. *SEER Cancer Statistics Review, 1973–1994*. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 97-2789, 1997.

Rodriguez BL, Sharp DS, Abbott RD, Burchfiel CM, Masaki K, Chyou PH, et al. Fish intake may limit the increase in risk of coronary heart disease morbidity and mortality among heavy smokers. *Circulation* 1996;94(5):952–6.

Rosenberg MJ, editor. *Smoking and Reproductive Health*. Littleton (MA): PSG Publishing Company, 1987.

Rosenwaike I. Mortality differentials among persons born in Cuba, Mexico, and Puerto Rico residing in the United States, 1979–81. *American Journal of Public Health* 1987;77(5):603–6.

Ross RK, Bernstein L, Hartnett NM, Boone JR. Cancer patterns among Vietnamese immigrants in Los Angeles County. *British Journal of Cancer* 1991;64(1):185–6.

Royce JM, Hymowitz N, Corbett K, Hartwell TD, Orlandi MA. Smoking cessation factors among African Americans and whites. *American Journal of Public Health* 1993;83(2):220–6.

Russell MAH, Peto J, Patel UA. The classification of smoking by factorial structure of motives. *Journal of the Royal Statistical Society* 1974;137(Pt 3, Series A): 313–46.

Salsbury CG, Howard FH, Bassford PS Jr, Atkinson GR, Green RW. A cancer detection survey of carcinoma of the lung and female pelvis among Navajos on the Navajo Indian reservation. *Surgery, Gynecology and Obstetrics* 1959;108(3):257–66.

Samet JM. Definitions and methodology in COPD research. In: Hensley MJ, Saunders NA, editors. *Clinical Epidemiology of Chronic Obstructive Pulmonary Disease*. New York: Marcel Dekker, 1989:1–22.

Samet JM. The epidemiology of lung cancer. *Chest* 1993;103(1 Suppl):20S–29S.

Samet JM, Coultas DB, Howard CA, Skipper BJ. Respiratory disease and cigarette smoking in a Hispanic population in New Mexico. *American Review of Respiratory Disease* 1988a;137(4):815–9.

Samet JM, Key CR, Kutvirt DM, Wiggins CL. Respiratory disease mortality in New Mexico's American Indians and Hispanics. *American Journal of Public Health* 1980;70(5):492–7.

Samet JM, Schrag SD, Howard CA, Key CR, Pathak DR. Respiratory disease in a New Mexico population sample of Hispanic and non-Hispanic whites. *American Review of Respiratory Disease* 1982;125(2):152–7.

Samet JM, Wiggins CL, Key CR, Becker TM. Mortality from lung cancer and chronic obstructive pulmonary disease in New Mexico, 1958–82. *American Journal of Public Health* 1988b;78(9):1182–6.

Saracci R, Boffetta P. Interactions of tobacco smoking with other causes of lung cancer. In: Samet JM, editor. *Epidemiology of Lung Cancer*. New York: Marcel Dekker, 1994:465–93.

Saunders E, editor. *Cardiovascular Diseases in Blacks*. Philadelphia: F.A. Davis Company, 1991.

Savitz DA. Changes in Spanish surname cancer rates relative to other whites, Denver area, 1969–71 to 1979–81. *American Journal of Public Health* 1986; 76(10):1210–5.

Schoen R, Nelson VE. Mortality by cause among Spanish surnamed Californians, 1969–71. *Social Science Quarterly* 1981;62(2):259–74.

Schoendorf KC, Kiely JL. Relationship of sudden infant death syndrome to maternal smoking during and after pregnancy. *Pediatrics* 1992;90(6):905–8.

Schwartz AG, Swanson GM. Lung carcinoma in African Americans and whites: a population-based study in metropolitan Detroit, Michigan. *Cancer* 1997; 79(1):45–52.

Sharp DS, Rodriguez BL, Shahar E, Hwang LJ, Burchfiel CM. Fish consumption may limit the damage of smoking on the lung. *American Journal of Respiratory and Critical Care Medicine* 1994;150(4):983–7.

Shea S, Stein AD, Basch CE, Lantigua R, Maylahn C, Strogatz DS, et al. Independent associations of educational attainment and ethnicity with behavioral risk factors for cardiovascular disease. *American Journal of Epidemiology* 1991;134(6):567–82.

Shields PG, Caporaso NE, Falk RT, Sugimura H, Trivers GE, Trump BF, et al. Lung cancer, race, and a CYP1A1 genetic polymorphism. *Cancer Epidemiology, Biomarkers & Prevention* 1993;2(5):481–5.

Shopland DR. Tobacco use and its contribution to early cancer mortality with a special emphasis on cigarette smoking. *Environmental Health Perspectives* 1995; 103(Suppl 8):131–41.

Sidney S, Tekawa IS, Friedman GD, Sadler MC, Tashkin DP. Mentholated cigarette use and lung cancer. *Archives of Internal Medicine* 1995;155(7):727–32.

Siegel M. Smoking and leukemia: evaluation of a causal hypothesis. *American Journal of Epidemiology* 1993; 138(1):1–9.

Sievers ML, Cohen SL. Lung cancer among Indians of the Southwestern United States. *Annals of Internal Medicine* 1961;54(5):912–5.

Slamon DJ, deKernion JB, Verma IM, Cline MJ. Expression of cellular oncogenes in human malignancies. *Science* 1984;224(4646):256–62.

Smith RL. Recorded and expected mortality among the Indians of the United States with special reference to cancer. *Journal of the National Cancer Institute* 1957; 18(3):385–96.

Smith CA, Pratt M. Cardiovascular disease. In: Brownson RC, Remington PL, Davis JR, editors. *Chronic Disease Epidemiology and Control*. Washington (DC): American Public Health Association, 1993: 83–107.

Smith RL, Salsbury CG, Gilliam AG. Recorded and expected mortality among the Navajo, with special reference to cancer. *Journal of the National Cancer Institute* 1956;17(1):77–89.

Snyder FR, Davis FC, Henningfield JE. The tobacco withdrawal syndrome: performance decrements assessed on a computerized test battery. *Drug and Alcohol Dependence* 1989;23(3):259–66.

Snyder FR, Henningfield JE. Effects of nicotine administration following 12 h of tobacco deprivation: assessment on computerized performance tasks. *Psychopharmacology* 1989;97(1):17–22.

Sorem KA. Cancer incidence in the Zuni Indians of New Mexico. *Yale Journal of Biology and Medicine* 1985;58(5):489–96.

Sorlie PD, Backlund E, Johnson NJ, Rogot E. Mortality by Hispanic status in the United States. *Journal of the American Medical Association* 1993;270(20):2464–8.

Sorlie PD, Rogot E, Johnson NJ. Validity of demographic characteristics on the death certificate. *Epidemiology* 1992;3(2):181–4.

Spitz MR, Hsu TC, Wu X, Fueger JJ, Amos CI, Roth JA. Mutagen sensitivity as a biological marker of lung cancer risk in African Americans. *Cancer Epidemiology, Biomarkers & Prevention* 1995;4(2):99–103.

Stern MP, Bradshaw BS, Eifler CW, Fong DS, Hazuda HP, Rosenthal M. Secular decline in death rates due to ischemic heart disease in Mexican Americans and non-Hispanic whites in Texas, 1970–1980. *Circulation* 1987;76(6):1245–50.

Stern MP, Gaskill SP. Secular trends in ischemic heart disease and stroke mortality from 1970 to 1976 in Spanish-surnamed and other white individuals in Bexar County, Texas. *Circulation* 1978;58(3):537–43.

Strom SS, Wu X, Sigurdson AJ, Hsu TC, Fueger JJ, Lopez J, et al. Lung cancer, smoking patterns, and mutagen sensitivity in Mexican-Americans. *Journal of the National Cancer Institute Monographs* 1995; 18(18):29–33.

Strong JP. Coronary atherosclorosis in soldiers: a clue to the natural history of atherosclerosis in the young. *Journal of the American Medical Association* 1986; 256(20):2863–6.

Sugarman JR, Soderberg R, Gordon JE, Rivara FP. Racial misclassification of American Indians: its effect on injury rates in Oregon, 1989 through 1990. *American Journal of Public Health* 1993;83(5):681–4.

Sugarman JR, Warren CW, Oge L, Helgerson SD. Using the behavioral risk factor surveillance system to monitor year 2000 objectives among American Indians. *Public Health Reports* 1992;107(4):449–56.

Sutherland G, Stapleton JA, Russell MAH, Jarvis MJ, Hajek P, Belcher M, et al. Randomised controlled trial of nasal nicotine spray in smoking cessation. *Lancet* 1992;340(8815):324–9.

Taioli E, Crofts F, Trachman J, Demopoulos R, Toniolo P, Garte SJ. A specific African-American CYP1A1 polymorphism is associated with adenocarcinoma of the lung. *Cancer Research* 1995;55(3):472–3.

Tolley HD, Crane L, Shipley N. Smoking prevalence and lung cancer death rates. In: *Strategies to Control Tobacco Use in the United States—A Blueprint for Public Health Action in the 1990s*. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. DHHS Publication No. (NIH) 92-3316, 1991.

Tomar SL, Winn DM, Swango PA, Giovino GA, Kleinman DV. Oral mucosal smokeless tobacco lesions among adolescents in the United States. *Journal of Dental Research* 1997;76(6):1277–86.

Trapido EJ, Chen F, Davis K, Lewis N, MacKinnon JA. Cancer among Hispanic males in South Florida: nine years of incidence data. *Archives of Internal Medicine* 1994a;154(2):177–85.

Trapido EJ, Chen F, Davis K, Lewis N, MacKinnon JA, Strait PM. Cancer in South Florida Hispanic women: a 9-year assessment. *Archives of Internal Medicine* 1994b;154(10):1083–8.

Trapido EJ, McCoy CB, Stein NS, Engel S, McCoy HV, Olejniczak S. The epidemiology of cancer among Hispanic women: the experience in Florida. *Cancer* 1990a;66(11):2435–41.

Trapido EJ, McCoy CB, Stein NS, Engel S, Zavertnik JJ, Comerford M. Epidemiology of cancer among Hispanic males: the experience in Florida. *Cancer* 1990b;65(7):1657–62.

Tyroler HA, Knowles MG, Wing SB, Logue EE, Davis CE, Heiss G, et al. Ischemic heart disease risk factors and twenty-year mortality in middle-age Evans County black males. *American Heart Journal* 1984;108(3 Pt 2):738–46.

Udvarhelyi IS, Gatsonis C, Epstein AM, Pashos CL, Newhouse JP, McNeil BJ. Acute myocardial infarction in the Medicare population. *Journal of the American Medical Association* 1992;268(18):2530–6.

US Bureau of the Census. *Current Population Reports: U.S. Population Estimates, by Age, Sex, Race, and Hispanic Origin: 1980 to 1991*. Washington (DC): US Government Printing Office. Publication No. P25-1095, 1993.

US Bureau of the Census. *State Population Estimates by Age, Sex, Race, and Hispanic Origin: 1990–1994*; <http://www/census.gov/population/www/estimates/st_sasrh.html>; (accessed: August 21, 1997).

US Department of Health and Human Services. *The Health Consequences of Smoking for Women. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health, 1980.

US Department of Health and Human Services. *The Health Consequences of Smoking: Cardiovascular Disease. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Office on Smoking and Health. DHHS Publication No. (PHS) 84-50204, 1983.

US Department of Health and Human Services. *The Health Consequences of Smoking: Chronic Obstructive Lung Disease. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Office on Smoking and Health. DHHS Publication No. (PHS) 84-50205, 1984.

US Department of Health and Human Services. *The Health Consequences of Involuntary Smoking. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Health Promotion and Education, Office on Smoking and Health. DHHS Publication No. (CDC) 87-8398, 1986a.

US Department of Health and Human Services. *The Health Consequences of Using Smokeless Tobacco*. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health. NIH Publication No. 86-2874, 1986b.

US Department of Health and Human Services. *The Health Consequences of Smoking: Nicotine Addiction. A Report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Health Promotion and Education, Office on Smoking and Health. DHHS Publication No. (CDC) 88-8406, 1988.

US Department of Health and Human Services. *The International Classification of Diseases, Clinical Modification, Volume 1, 9th Revision*. Rockville (MD): Department of Health and Human Services, Public Health Service, Health Care Financing Administration. DHHS Publication No. 89-1260, 1989a.

US Department of Health and Human Services. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General.* Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 89-8411, 1989b.

US Department of Health and Human Services. *The Health Benefits of Smoking Cessation. A Report of the Surgeon General.* Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8416, 1990.

US Department of Health and Human Services. *Health Status of Minorities and Low-Income Groups.* 3rd ed. Washington (DC): US Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Division of Disadvantaged Assistance, 1991.

US Department of Health and Human Services. *Preventing Tobacco Use Among Young People. A Report of the Surgeon General.* Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1994.

US Department of Health, Education, and Welfare. *Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service.* Washington (DC): US Department of Health, Education, and Welfare, Public Health Service. PHS Publication No. 1103, 1964.

US Environmental Protection Agency. *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders.* Washington (DC): US Environmental Protection Agency, Office of Research and Development, Office of Air and Radiation. EPA/600/5-90/006F, 1992.

Valway S, editor. *Cancer Mortality Among Native Americans in the United States: Regional Differences in Indian Health, 1984–1988 and Trends Over Time, 1986–1987.* Rockville (MD): US Department of Health and Human Services, Public Health Service, Indian Health Service, Office of Health Programs, Division of Clinical and Preventive Services, Cancer Prevention and Control Program, 1992.

Vander Martin RV, Cummings SR, Coates TJ. Ethnicity and smoking: differences in white, black, Hispanic, and Asian medical patients who smoke. *American Journal of Preventive Medicine* 1990;6(4):194–9.

Vickers RR Jr, Conway TL, Hervig LK. Demonstration of replicable dimensions of health behaviors. *Preventive Medicine* 1990;19(4):377–401.

Wagenknecht LE, Cutter GR, Haley NJ, Sidney S, Manolio TA, Hughes GH, et al. Racial differences in serum cotinine levels among smokers in the Coronary Artery Risk Development in (Young) Adults Study. *American Journal of Public Health* 1990;80(9):1053–6.

Wagenknecht LE, Haley NJ, Jacobs DR Jr. Wagenknecht and colleagues respond [letter]. *American Journal of Public Health* 1992;82(8):1173.

Wagenknecht LE, Manolio TA, Sidney S, Burke GL, Haley NJ. Environmental tobacco smoke exposure as determined by cotinine in black and white young adults: the CARDIA study. *Environmental Research* 1993;63(1):39–46.

Warburton DM. Psychopharmacological aspects of nicotine. In: Wonnacott S, Russell MAH, Stolerman IP, editors. *Nicotine Psychopharmacology: Molecular, Cellular, and Behavioural Aspects.* Oxford (England): Oxford University Press, 1990:77–111.

Welty TK, Coulehan JL. Cardiovascular disease among American Indians and Alaska Natives. *Diabetes Care* 1993;16(1 Suppl):277–83.

Welty TK, Lee ET, Yeh J, Cowan LD, Go O, Fabsitz RR, et al. Cardiovascular disease risk factors in American Indians: the Strong Heart Study. *American Journal of Epidemiology* 1995;142(3):269–87.

Welty TK, Zephier N, Schweigman K, Blake B, Leonardson G. Cancer risk factors in three Sioux tribes: use of the Indian-Specific Health Risk Approval for data collection and analysis. *Alaska Medicine* 1993;35(4):265–72.

Wenneker MB, Epstein AM. Racial inequalities in the use of procedures for patients with ischemic heart disease in Massachusetts. *Journal of the American Medical Association* 1989;261(2):253–7.

Weston A, Caporaso NE, Perrin LS, Sugimura H, Tamai S, Krontiris TG, et al. Relationship of H-ras-1, L-myc, and p53 polymorphisms with lung cancer risk and prognosis. *Environmental Health Perspectives* 1992; 98:61–7.

Weston A, Vineis P, Caporaso NE, Krontiris TG, Lonergan JA, Sugimura H. Racial variation in the distribution of Ha-ras-1 alleles. *Molecular Carcinogenesis* 1991;4(4):265–8.

Whittle J, Conigliaro J, Good CB, Lofgren RP. Racial differences in the use of invasive cardiovascular procedures in the Department of Veterans Affairs medical system. *New England Journal of Medicine* 1993; 329(9):621–7.

Wiggins CL, Samet JM. Methods. In: Becker TM, Wiggins CL, Elliott RS, Key CR, Samet JM, editors. *Racial and Ethnic Patterns of Mortality in New Mexico.* 1st ed. Albuquerque (NM): University of New Mexico Press, 1993:1–11.

Wingard DL, Berkman LF, Brand RJ. A multivariate analysis of health-related practices. *American Journal of Epidemiology* 1982;116(5):765–75.

Winkleby MA, Fortmann SP, Rockhill B. Health-related risk factors in a sample of Hispanics and whites matched on sociodemographic characteristics: the Stanford Five-City Project. *American Journal of Epidemiology* 1993;137(12):1365–75.

Winn DM, Blot WJ, Shy CM, Pickle LW, Toledo A, Fraumeni JF Jr. Snuff dipping and oral cancer among women in the southern United States. *New England Journal of Medicine* 1981;304(13):745–9.

Wolfe MD, Carlos JP. Oral health effects of smokeless tobacco use in Navajo Indian adolescents. *Community Dentistry and Oral Epidemiology* 1987;15(4):230–5.

Wolff CB, Portis M, Wolff H. Birth weight and smoking practices during pregnancy among Mexican-American women. *Health Care for Women International* 1993;14(3):271–9.

World Health Organization. *Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death.* Vol. 1. Geneva: World Health Organization, 1977.

Worth RM, Kato H, Rhoads GG, Kagan A, Syme SL. Epidemiologic studies of coronary heart disease and stroke in Japanese men living in Japan, Hawaii and California: mortality. *American Journal of Epidemiology* 1975;102(6):481–90.

Wu X, Hsu TC, Spitz MR. Mutagen sensitivity exhibits a dose-response relationship in case-control studies. *Cancer Epidemiology, Biomarkers & Prevention* 1996;5(7):577–8.

Wu-Williams AH, Samet JM. Lung cancer and cigarette smoking. In: Samet JM, editor. *Epidemiology of Lung Cancer.* New York: Marcel Dekker, 1994:71–108.

Yano K, MacLean CJ, Reed DM, Shimizu Y, Sasaki H, Kodama K, et al. A comparison of the 12-year mortality and predictive factors of coronary heart disease among Japanese men in Japan and Hawaii. *American Journal of Epidemiology* 1988;127(3):476–87.

Yano K, Reed DM, McGee DL. Ten-year incidence of coronary heart disease in the Honolulu Heart Program. *American Journal of Epidemiology* 1984;119(5):653–66.

Young TK. *The Health of Native Americans: Toward a Biocultural Epidemiology.* New York: Oxford University Press, 1994.

Yu ESH. The health risks of Asian Americans [editorial]. *American Journal of Public Health* 1991;81(11): 1391–2.

Yu MC, Ross RK, Chan KK, Henderson BE, Skipper PL, Tannenbaum SR, et al. Glutathione s-transferase M1 genotype affects aminobiphenyl-hemoglobin adduct levels in white, black, and Asian smokers and nonsmokers. *Cancer Epidemiology, Biomarkers & Prevention* 1995;4(8):861–4.

Yu MC, Skipper PL, Taghizadeh K, Tannenbaum SR, Chan KK, Henderson BE, et al. Acetylator phenotype, aminobiphenyl-hemoglobin adduct levels, and bladder cancer risk in white, black, and Asian men in Los Angeles, California. *Journal of the National Cancer Institute* 1994;86(9):712–6.

Zane NWS, Takeuchi DT, Young KNJ. *Confronting Critical Health Issues of Asian and Pacific Islander Americans.* Thousand Oaks (CA): Sage Publications, 1994.

Chapter 4
Factors That Influence Tobacco Use Among Four Racial/Ethnic Minority Groups

Introduction

Tobacco use is determined and influenced by several kinds of factors: (1) individual factors (perceptions, self-image, peers); (2) social factors (societal norms); (3) environmental factors, such as advertising and economics; and (4) cultural factors, such as traditional uses of tobacco, acculturation, and the historical context of the tobacco industry in various communities. Behavior and patterns of tobacco use result from each of these factors and from their complex interplay, which is difficult to study and measure. Although available evidence has demonstrated that these factors contribute to behavior, research has been unable to quantify the distinct effect of each one and the effects of their interaction. The lack of definitive literature points to the need for further research to better quantify the ways in which a person's exposure to various social, environmental, and cultural influences affects tobacco use behavior. Most likely, it is not a single factor but rather the convergence or interaction of some or all of these factors that significantly influences both a person's decision to use tobacco and patterns of tobacco use (U.S. Department of Health and Human Services [USDHHS] 1989; Lynch and Bonnie 1994; USDHHS 1994). This chapter examines the complex factors that influence tobacco use among the four major racial/ethnic minority groups.

Tobacco has a role in all communities through social, economic, and cultural connections. These connections include (1) social customs, such as the sharing and giving of tobacco in Asian communities; (2) employment opportunities and economic growth provided to racial/ethnic groups through tobacco agriculture and manufacturing; (3) tobacco industry support of community leaders and organizations; (4) tobacco industry sponsorship of cultural events; and (5) ceremonial and medicinal uses of tobacco. Indeed, tobacco's history has led to some positive social perceptions of tobacco, perceptions that may also influence use.

Cigarette advertising and promotion may stimulate cigarette consumption by (1) encouraging children and adolescents to experiment with and initiate regular tobacco use, (2) deterring current tobacco users from quitting, (3) prompting former users to begin using again, and (4) increasing daily consumption by serving as an external cue to smoke (Centers for Disease Control [CDC] 1990a). Whether or not they are intended to do so, advertising and promotional activities appear to influence risk factors for adolescent tobacco use (USDHHS 1994). Cigarette advertising appears to affect young people's perceptions of the pervasiveness, image, and function of smoking. Because misperceptions in these areas constitute psychosocial risk factors for the initiation of smoking, cigarette advertising appears to increase young people's risk of smoking. The Food and Drug Administration (FDA) recently concluded that although advertising may not be the most important factor in a child's decision to smoke, studies establish that it is a substantial contributing factor (*Federal Register* 1996).

A different kind of influence is found in psychosocial variables, which help explain why people start using tobacco, why some continue using it, and why some stop using it. Published research findings are scant about individual and interpersonal factors that influence tobacco use among African Americans, American Indians, Alaska Natives, Asian Americans, Pacific Islanders, and Hispanics. This paucity of data, in fact, both inspired and hampered the development of this report. Although research findings based on samples of the majority white population may be applicable to racial/ethnic populations, such generalizability has not been sufficiently studied. Furthermore, cultural differences exist among communities and members of various racial/ethnic groups in values, norms, expectancies, attitudes, and the historical context of tobacco and the tobacco industry. Such differences, in turn, may influence both the prevalence of cigarette smoking in a particular racial/ethnic minority group and the effect of certain associated risk factors (Marín et al. 1990a; Vander Martin et al. 1990; Robinson et al. 1992a).

Another important factor that may influence tobacco use behavior is the actual infrastructure within a community for conducting tobacco control activities that support a non-tobacco-use norm. This capacity of the community for tobacco control activities is also discussed in Chapter 5 of this report because it directly affects such programs, in addition to the influence it may have on the environmental context of tobacco use.

The first part of this chapter summarizes the history of tobacco use among members of the four major racial/ethnic groups in the United States—African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics. The association between the tobacco industry and these communities, including economic influences and the role of targeted advertising and promotion, is also described. The second part of the chapter discusses psychosocial influences associated with initiation of tobacco use, maintenance, and cessation among the four groups. Unfortunately, the limited information available affects the length and comprehensiveness of the presentation. The appendix presents a short history of tobacco advertising targeting African Americans. Because so little information is available on the history of cigarette advertising aimed at American Indians, Alaska Natives, Asian Americans, Pacific Islanders, and Hispanics, these groups are not discussed in the appendix.

Historical Context of Tobacco

African Americans

The first recorded landing of Africans in the United States was in 1619, when a group of indentured servants was brought to Jamestown, Virginia (Foner 1981), and Jamestown quickly became the center for profitable tobacco trade with England and other European nations (USDHHS 1992). Indeed, a significant portion of the early colonies' wealth derived from the exportation of tobacco (Northrup and Ash 1970). Cotton did not become preeminent until the invention of the cotton gin in 1793 (Foner 1981). Tobacco farming was widespread throughout the south, and although tobacco was later supplanted by other crops (including cotton) in many areas, it remains a major crop in six states—Georgia, Kentucky, North Carolina, South Carolina, Tennessee, and Virginia (Gale 1993).

Whites initially were employed in tobacco cultivation, but as tobacco prices fell in Europe, tobacco companies began using less expensive labor (Kulikoff 1986). Among other factors, the need for a larger and less expensive labor force to grow tobacco led the colonies to gradually transform the status of Africans from indentured servants, who earned their freedom after a period of involuntary servitude, to slaves, who were the property of their masters for life. In addition to slaves, many free African Americans worked in tobacco farming during the 18th and 19th centuries. Indeed, more free African Americans were employed in tobacco production than in any other occupational category in the south during that time (Northrup and Ash 1970). Slaves also hired themselves out as tobacco laborers, and some earned enough funds to purchase their freedom.

After emancipation, freed African Americans who had obtained some acreage began farming tobacco because it was a cash crop that did not require much land to be profitable. In particular, freed African Americans farmed tobacco in Georgia, North Carolina, South Carolina, and Virginia. Nevertheless, the number of tobacco farms owned by African Americans has declined dramatically in the 20th century, possibly because so many African Americans, including tobacco farm owners and laborers, were migrating to the north (U.S. Commission on Civil Rights 1982; Gale 1993).

In the colonial period and early years of the United States, African Americans and whites worked side by side in cigarette-manufacturing factories, which tended to be primarily small cottage industries. However, the introduction of the cigarette-making machine in the mid-1880s changed this pattern. Because white women were viewed as the only group that had the manual dexterity needed to operate the machines, and it was socially unacceptable for African American men and women to work alongside white women, African Americans were replaced as factory workers and relegated to less skilled, menial, field jobs (Northrup and Ash 1970; Meyer 1992). During the early 1900s, the dirtiest, unhealthiest, and lowest paying jobs in tobacco factories were carried out by African American women (Jones 1984). Because the jobs held by African Americans in stemming and processing the tobacco leaf were low paying, the tobacco industry made little effort to mechanize such jobs before the early 1930s. Thus, many African Americans remained employed in the tobacco industry, even as tobacco factories began replacing people with labor-saving machines (Northrup and Ash 1970).

The high concentration of African Americans in certain occupations helped them gain a foothold in one of the few areas in which organized labor had achieved success in the south. Initial unionizing efforts by the Tobacco Workers International Union began in the early 20th century (Kaufman 1986). The efforts of the United Tobacco Workers Local 22 to encourage African American members to register for and vote in municipal elections are credited with the election of an African American to the city council of Winston-Salem, North Carolina, in 1947. At the same time, a rival—the Food, Tobacco, Agriculture, and Allied Workers Union—sought to involve African Americans in its unionizing efforts as equals. United Tobacco Workers Local 22, which represented workers at the R.J. Reynolds Tobacco Company in Winston-Salem, remained one of the strongest unions in the south. The union represented equal numbers of African American and white workers. In addition, African American women held significant leadership roles in the union (Lerner 1973; Foner 1981). This early unionization among African Americans in tobacco-producing states was of such historic importance that it is considered one of the first civil rights movements (Korstad and Lichtenstein 1988). Probably as a result of the racial divisions within the union movement and the residual power held by African American workers, R.J. Reynolds was the first company to have African Americans operate cigarette-making machines after World War II and, in 1961, to open a factory with integrated production lines and desegregated facilities (Northrup and Ash 1970).

Nevertheless, tobacco cultivation has not contributed significantly to the economic well-being of African Americans in the southern states. In each of the decennial censuses conducted between 1960 and 1990, about one-third of all counties in the south where tobacco is a major agricultural product have been identified as areas of persistent poverty. These poverty-stricken counties—concentrated in Georgia, North Carolina, and South Carolina—tend to have more farms owned and operated by African Americans than the south in general (Gale 1993). In addition, economies of scale and the increasing mechanization of tobacco growing have accelerated the decrease in tobacco farming, particularly by African Americans (U.S. Commission on Civil Rights 1982; Gale 1993). For example, by 1987, more than 50 percent of the farms operated by African Americans specialized in livestock production, and only 11 percent specialized in tobacco growing (Gale 1993).

In summary, tobacco has been a part of the experience of African Americans since the early 1600s, when Africans were first brought to the Americas. The relationship between African Americans and tobacco growers and manufacturers has changed in the postslavery era but remains strong and complex, particularly since the mid-1940s. The strength derives from the important economic role of tobacco among African Americans, and the complexity comes from the contradictory social and economic forces that affected the African American worker. In addition, changing market forces helped make African Americans significant users of tobacco. As a result, the relationship of African Americans to the tobacco industry was no longer primarily dependent on their role as workers in the tobacco labor force but was now influenced as well by their status as consumers. For example, until the mid-1940s, many African Americans held low-paying jobs in tobacco-related agriculture and industry; around the time of World War II, however, some tobacco companies began to advertise to African Americans. Advertising efforts increased in the 1950s, a decade that saw African American men surpass white men in smoking prevalence. During this same time, the tobacco industry was hiring and promoting African American workers. Other influences affecting African Americans' ties to tobacco were the tobacco industry's increased attention to and positive steps toward civil rights in the 1950s and 1960s, the broadcast ban on tobacco advertising that led the tobacco industry to seek more targeted market segments in the 1970s, and the expansion of African American political power in the 1980s and 1990s, which served to give the tobacco industry additional access to the African American community (Robinson et al. 1992b). The historical patterns underpinning the African American community's relationship to tobacco may affect African Americans' attitudes and behaviors towards tobacco.

American Indians and Alaska Natives

Tobacco has long played an important role in the cultural and spiritual life of North and South American Indians and Alaska Natives. When the Europeans colonized the Americas, tobacco already was being cultivated and used in many parts of the continent. Early European explorers documented the cultivation and farming of tobacco and its extensive use among tribes throughout most of North and South America (Hodge 1910; Linton 1924) and in Alaska's interior (Sherman 1972)—findings that have been supported by archaeological discoveries at a variety of sites (Haberman 1984).

When Europeans first arrived in the Americas, tobacco served various purposes among American Indians and Alaska Natives, including ceremonial, religious, and medicinal functions (McCullen 1967; Seig 1971; Ethridge 1978). In ceremonial and religious rites, tobacco was a significant part of sacramental offerings. For example, tobacco was used to ensure good luck in hunting and to seal peace and friendship agreements. When used for medicinal purposes, tobacco often was mixed with other substances in topical ointments and ingested for internal healing. For example, in the northwest region of North America, tobacco was combined with shell lime powder and then formed into small marble-sized balls that were dissolved in the mouth (Linton 1924). Tobacco smoke often was used during prayers to aid in healing and was prescribed to cleanse people, places, and objects of unwanted spirits. Tobacco smoke also was used at the beginning of meetings as a ritual to cleanse the room and secure the truth from the spoken word.

Early inhabitants of the American continent also inhaled tobacco smoke (Linton 1924). They often placed burning or smoldering tobacco on the bare ground or on a mound and then waved the smoke toward their faces using the palms of their hands. Early inhabitants also smoked rolled sheets of dried tobacco leaves (cigars) and wrappings of cut tobacco, and they smoked tobacco through a flaxen reed. The most common way to smoke tobacco was to place cut tobacco within the bowl of a calumet—either a stone or a hollowed-out bone pipe (Linton 1924).

Tobacco smoking was part of many solemn occasions among American Indians, such as when leaders met (Paper 1988). In some tribes, the pipe became such a powerful object that it was considered sacred. Only certain individuals could use the pipe, and only sacredly gathered tobacco could be burned in a pipe's bowl (Linton 1924). The Hopi Tribe used tobacco religiously, blowing smoke in the four sacred directions to invoke good planting and to encourage rainfall. Other tribes, such as the Delaware, Iroquois, and Sioux, smoked tobacco during prayers, at the opening of the *sacred bundle*—a collection of religious artifacts (Paper 1988). Tobacco also was used between enemies in battle to signify a truce. If one party offered the pipe and the other party accepted it, this signified the end of the battle, and both parties would then put down their weapons. As a result, the smoking of tobacco leaves, often with the peace pipe, became associated with the American Indian as a common symbol that had significant positive social and cultural connotations.

During the 1700s, tobacco became one of the most important commodities traded among American Indians and Alaska Natives. For example, Alaska Natives in the Arctic and sub-Arctic regions depended on trade with tribes from the east and south of the North American continent to obtain tobacco products (Fortuine 1989). Among the items traded were special smoking vessels, such as pipes made of stone quarried in what is now Wisconsin and Minnesota (Linton 1924; Paper 1988).

With the European colonization of the American continent, tobacco became known in Europe, where it was at times expressly forbidden, primarily because of health concerns about the dangers of tobacco spitting. Following tobacco practices in the Americas, early European explorers smoked tobacco the way it was smoked by American Indians (Linton 1924). Indeed, many of the pipes these explorers used were fashioned after tribal pipes. Europeans also adopted many of the tribes' medicinal uses of tobacco. However, the use of tobacco for recreational purposes was widely accepted and soon became primary. Europeans also began to chew tobacco raw rather than in a mixture of powdered shells or roots, as was the custom of North American tribes.

Most early American Indian tobacco harvesting was done with farming technologies that originated in the Southern part of North America (Paper 1988). For example, nonfarming nomadic tribes and light farming tribes scattered tobacco seeds on holy grounds near waterways or marshes and let the plants grow without much cultivation. In fact, the Iroquois prohibited their people from cultivating tobacco plants or coming in contact with them while the plants were growing to maturity. Other tribes, such as the Blackfeet, Crow, and some Northern Plains Indian people, grew tobacco plants instead of food crops in small sacred patches for medicinal and ceremonial uses (Linton 1924).

Over the centuries as American Indians and Alaska Natives experienced vast cultural and political upheaval, their attitudes about tobacco changed significantly. Today, among some contemporary American Indian and Alaska Native groups, tobacco use has lost some of its traditional attributes and no longer is endowed with the same special meaning. However, some American Indians have maintained the traditional practices associated with tobacco. For example, tobacco is given as a gift to traditional healers and dancers at powwows and many other social gatherings, and it is presented to honor persons celebrating important events, such as marriages. Many American Indians consider tobacco to be a medicine that can improve their health and assist in spiritual growth when used in a sacred and respectful manner. It is important to recognize the positive social context in which tobacco is viewed in American Indian communities and to recognize the difficulties these connotations may cause in preventing tobacco use among youth and helping adults to quit. It is possible that tobacco control efforts could be enhanced by emphasizing the distinction between sacred uses of tobacco on ceremonial occasions and addictive tobacco use by individuals. An additional complicating factor for tobacco control efforts among this population is that American Indians have become increasingly reliant on tobacco sales and on the revenues these sales bring to the reservations (see Tobacco Industry Support for Racial/Ethnic Minority Communities later in this chapter).

Asian Americans and Pacific Islanders

Because about 63 percent of the Asian Americans and Pacific Islanders in the United States are immigrants (U.S. Bureau of the Census 1993), their lives have been influenced by the history of tobacco use in Asia and the Asian Pacific. Asia's many countries and cultures have different traditions regarding the use of tobacco. These differences are also reflected in Asian Americans and Pacific Islanders themselves. Tobacco was introduced in Asia in the early 17th century by Europeans (Goodman 1992). Like the introduction of opium in China, the exportation of tobacco to Asia has led to an addiction that has dramatically changed the health behaviors of Asians (Chen and Winder 1990). The Dutch brought tobacco to China, where it was mixed with opium. The Chinese subsequently introduced tobacco in Mongolia, Tibet, and Eastern Siberia (Goodman 1992). Early Portuguese explorers then carried tobacco to India, Japan, and Java in 1605, and the Japanese in turn introduced tobacco in Korea (Laufer 1924). Asians later used tobacco in ways more similar to its medicinal uses in other parts of the world. In China, for example, tobacco was used as a remedy against colds, malaria, and cholera. The beliefs about the usefulness of tobacco as a medicine were so ingrained in China during the 17th century that two imperial edicts (1638 and 1641) prohibiting its use failed to curtail tobacco use.

Currently, tobacco is a crop of great significance in Asia. In 1990, Asian countries produced approximately 60 percent of the world's tobacco crop (Goodman 1992). By 1995, United Nations statistics showed that Asian countries were producing 63.2 percent of tobacco leaves in the world (Food and Agriculture Organization of the United Nations [FAO] 1996). Both China (34.1 percent) and India (9.0 percent) ranked above the United States (6.3 percent) in the percentage of total tobacco leaf production (FAO 1996). In China, the manufacture and sale of tobacco products are part of the economic role that tobacco plays. After foreign investment was legalized in China in 1979, the China National Tobacco Corporation entered into joint ventures with Philip Morris, R.J. Reynolds, and other foreign tobacco companies. The China National Tobacco Corporation has dramatically increased production after implementing western technology, and its 183 cigarette factories, 150 tobacco drying plants, 30 research institutes, and 520,000 workers make up a strong part of the local economy (Frankel and Mufson 1996).

Whereas cigars, pipes, snuff, chewing tobacco, cheroots (cigars), bidis (cigarettes of India), and kreteks (clove cigarettes) initially were more commonly used than regular tobacco cigarettes in Asia, cigarettes now are an integral part of contemporary Asian and Asian Pacific life. As expected, Asians and Pacific Islanders who migrate to the United States bring with them the attitudes and expectancies that have characterized the use of tobacco in their countries of origin. Sharing cigarettes, particularly among adult male guests, is a gesture of hospitality in a number of Asian cultures (Tamir and Cachola 1994). For example, distributing cigarettes, particularly U.S. cigarettes, at Cambodian weddings is a customary way of honoring the bride and groom. In China, foreign visitors are expected to give cartons of cigarettes to their hosts. In this regard, the importance of using tobacco as a form of social exchange is very similar to the reinforcement given to tobacco use among Hispanics.

Cigarette smoking also has acquired utilitarian uses in some Asian countries. In Southeast Asia, for example, cigarette smoking is perceived as a way to keep warm at night and to keep mosquitoes away (Mackay and Bounxouie 1994). In some provinces in China, anecdotal information indicates that babies and toddlers are given puffs of lighted cigarettes to stop them from crying (Mackay et al. 1993).

Cigarette smoking in Asian society has been popularly associated with affluence and sophistication (Frankel and Mufson 1996). Accordingly, the promotion of cigarette smoking in Asian countries follows patterns fairly similar to those found in the United States, where cigarette smoking is glamorized and often associated with affluence. In a recent article, Sesser (1993) recounted how in one week of traveling in Asia he "attended a Virginia Slims fashion show at a Taiwanese disco, watched the finals of the Salem Open tennis tournament in Hong Kong, and followed the progress of the Marlboro Tour '93, a bicycle race in the Philippines" (p.78). Cigarettes made in the United States are not only promoted in those Asian countries where the importation of foreign cigarettes is allowed, but also in China, where U.S. cigarettes are not freely sold (Stebbins 1990). In these cases, brand recognition is an important outcome of promotional campaigns once the market is opened to imported cigarettes.

Before market access trade actions by the United States in the 1980s, advertising was unnecessary in most Asian countries because tobacco production was operated through state-owned tobacco monopolies.

As a result, few brands were available for purchase. The expansion of large transnational corporations (e.g., British American Tobacco Company, Ltd., and Philip Morris Companies Inc.) into Asian markets brought about more brand competition and, thus, more advertising. Advertising techniques have included sponsorship of rock concerts and teen dances and extensive radio and outdoor advertising (Frankel and Mufson 1996). According to a study reported by the National Bureau of Economic Research using data from Japan, Taiwan, South Korea, and Thailand, ". . . in 1991, average per capita cigarette consumption was nearly ten percent higher than it would have been had the markets remained closed to U.S. cigarettes" (Chaloupka and Laixuthai 1996, p. 13).

The paucity of information about tobacco use among Asian Americans and Pacific Islanders hampers the formation of substantive conclusions about the relationship between community attitudes and behaviors and the historical relationship with tobacco and the tobacco industry. Existing information, however, is sufficient to show that factors associated both with the respective native cultures and with acculturation are important. Tobacco prevention and control programs must take these cultural factors into account to positively influence the norms, attitudes, and behaviors of these racial/ethnic communities.

Hispanics

The cultivation and processing of tobacco have played a significant role in the economies of most Latin American countries, including Brazil (Nardi 1985), Colombia (De Montaña 1978), Cuba (Rivero Muñiz 1964), and Mexico (Ros Torres 1984). In 1995, the level of production of tobacco leaf in South America alone reached 9.1 percent of the world total (FAO 1996). In the United States, Hispanics, primarily those of Cuban ancestry, have played a key role in the manufacture of cigars in Florida factories. As is true of all immigrants, Hispanics who migrate from Latin America are influenced by historical conditions in their native countries regarding tobacco and the tobacco industry and bring with them the attitudes and expectancies that characterize tobacco use in their countries of origin. These attitudes and expectancies are often modified as the process of acculturation takes place (Marín et al. 1989a).

The history of tobacco use in Central and South America as well as in the Caribbean predates the arrival of the European explorers and therefore has acquired a rich lore. Tobacco played a prominent role in religious and healing practices of native inhabitants of those regions. It was used by shamans or spiritual leaders to induce trancelike states, ensure fertility, and facilitate spiritual consultations. Many cultural and social norms surrounded tobacco, all of which have contributed to defining the role of tobacco in these societies. Tobacco became a staple crop of the Americas when the predominant means of obtaining food shifted from hunting to agriculture. Tobacco manufacture and trade played a significant role in the economies of the Caribbean, Latin America, and North America. A detailed account of the history of tobacco in the Americas can be found in the Surgeon General's report *Smoking and Health in the Americas* (USDHHS 1992).

Recent surveys also indicate that Hispanic cigarette smokers have group-specific expectancies and attitudes that differentiate them from smokers of other racial/ethnic groups. These expectancies and attitudes are the product of social conditions and norms that have dictated the use of tobacco in Latin American countries for the last few centuries and are also the effects of certain relevant cultural values, such as *simpatía* (a social mandate for positive social relations), *personalismo* (the value placed on personal relationships), and *familialism* (the normative and behavioral influence of relatives) (Marín and Marín 1991). Among many Hispanics in the United States, cigarette smoking is a social activity (Marín et al. 1989a; 1990a,b). Although tobacco use remains a social activity among all communities, given the cultural values of *simpatía* and *personalismo*, sharing cigarettes often serves as a particularly strong form of social affiliation and friendship. This norm must often be considered when tobacco prevention and control programs are initiated within Hispanic communities.

Economic Influences

Tobacco Industry Support for Racial/Ethnic Minority Communities

The tobacco industry's longtime economic support for U.S. racial/ethnic communities may have contributed to the survival of many of these communities' institutions (Robinson et al. 1992b). For example, the tobacco industry supports African American communities in five main ways: (1) direct employment of African Americans, (2) support for social services and civil rights organizations, (3) contributions to politicians and political organizations, (4) support for educational and cultural programs, and (5) contracts with small businesses (Blum 1989; Robinson et al. 1992a,b). More recently, the tobacco industry also has provided economic support to American Indian, Alaska Native, Asian American, Pacific Islander, and Hispanic communities.

As detailed below, the tobacco industry has employed members of racial/ethnic communities primarily in farming and manufacturing, although some have been employed in sales and marketing positions. The industry's support for social services and civil rights organizations and its involvement in educational and cultural activities have been wide-ranging. This support has included contributions to endowments, scholarship funds, and literacy campaigns as well as support for artistic groups, exhibits, and performances. Contributions from tobacco companies and tobacco-related political action committees have underwritten the growth of racial/ethnic political power at the local, state, and national levels. In addition, many tobacco companies use the services of minority-owned businesses either through their own internal programs or through formal alliances with such groups as Operation PUSH (People United to Save Humanity) and the National Association for the Advancement of Colored People (NAACP). In addition, tobacco product sales and promotions have contributed to the economies of racial/ethnic communities. For example, the sale of cigarettes and smokeless tobacco contributes to the economies of small corner convenience stores catering to racial/ethnic minority communities in urban areas. Tobacco is an important income-generating resource also on some Indian reservations. Because reservations are exempt from paying excise and sales taxes on tobacco products, tobacco shops are operated to produce additional income for the community. Although these shops are legally restricted to selling tax-free cigarettes to American Indians, this restriction is rarely monitored. A number of reservations are located a short distance from major cities whose residents often drive to the reservations to purchase tax-free or low-tax cigarettes and other tobacco products.

The interrelationships between the tobacco industry and racial/ethnic group leaders, industries, and community agencies may have served to strengthen bonds between the industry and the four racial/ethnic groups that are the subject of this report. These relationships are based on several factors, one being that the tobacco industry has often been the only source of funds for community initiatives. In addition, the tobacco industry has built personal alliances with members of racial/ethnic groups through employment and personal relationships (Robinson et al. 1992b). Indeed, Philip Morris's record in making financial commitments to community programs as a result of racial/ethnic-related networking has been noted (Stanley 1996). Efforts in African American communities to put tobacco control strategies in place have had to overcome some leaders and organizations who were reticent about such action because the community had a positive relationship with the tobacco industry, partly based on the industry's strong support for local economic, social, and cultural activities (Robinson et al. 1992b). Many leaders and members of these communities have a positive predisposition toward both the industry and cigarette smoking.

Employment Opportunities

Although the tobacco industry initially discriminated against African Americans, excluding them from many types of factory jobs, it eventually began hiring many African Americans in manufacturing positions (Northrup and Ash 1970). By the 1930s, African Americans made up about half of all persons employed in the process of taking tobacco from its leafy state to a finished product (Northrup and Ash 1970; Foner 1981).

African Americans have been concentrated in the tobacco industry for three main reasons: (1) factories were located in the Southern states, where the African American population was largest; (2) more laborers were needed as the demand for cigarettes grew after World War I; and (3) other opportunities opened for whites in an expanding economy, leaving African Americans with few job alternatives because of racial discrimination and other factors (Northrup and Ash 1970).

In the last few decades, the involvement of African Americans in the production and marketing of tobacco has changed significantly. By 1960, African Americans represented less than 25 percent of tobacco workers—a decline from more than 50 percent 30 years earlier. Possible reasons for this dramatic decrease include (1) the migration of African Americans from southern to northern states; (2) the imposition of the minimum wage, which eliminated many of the low-paying jobs in which African Americans were concentrated; (3) the mechanization of tobacco factories, which required fewer people to produce the same number of cigarettes; and (4) the inability of unions to change the poor working conditions of African American workers, leading to their exodus from those companies (Northrup and Ash 1970).

Today, the tobacco industry employs African Americans as well as members of other racial/ethnic minority groups in a variety of factory, marketing, and promotional positions. In the latter two types of positions, members of racial/ethnic groups conduct promotional and marketing activities with owners of local shops and convenience stores serving racial/ethnic neighborhoods in urban areas and racial/ethnic enclaves in metropolitan areas.

The tobacco industry was one of the early leaders among corporations in providing opportunities in management to qualified African Americans. Two African American executives of tobacco companies were honored in 1997 by the Business Policy Review Council at its annual Corporate Pioneers Gala Tribute for their long-term contributions as corporate pioneers in breaking down color barriers in the business world (US Newswire, Inc. 1997).

Members of various racial/ethnic communities also have been employed as models or spokespersons in the advertising and promotion of tobacco products. Advertising and public relations agencies select racial/ethnic minority models and celebrities to promote and advertise tobacco products to targeted racial/ethnic groups in print and outdoor advertisements. These easily recognizable racial/ethnic models and celebrities are essential to targeted advertising, and advertising agencies have relied heavily on members of racial/ethnic communities to fill these modeling jobs. For example, the tobacco industry used African American athletes extensively to advertise tobacco products during the 1950s and 1960s, when racial integration was taking place in sports (see the appendix). In a study of advertising in *Ebony* magazine during the 1950s and 1960s, investigators found that African American athletes were used in cigarette advertisements far more frequently than other African American celebrities and entertainers (Pollay et al. 1992). The use of well-known athletes, entertainers, and public figures in tobacco industry marketing and public relations campaigns has continued into the 1990s.

Advertising Revenues

By placing advertisements in racial/ethnic publications, primarily those with limited circulations, tobacco companies have become important contributors of advertising revenues for these publications (Blum 1986). As a result, many racial/ethnic minority publications—including community-oriented newspapers and national magazines—rely on revenues from tobacco advertising (Cooper and Simmons 1985; Milligan 1987; Blum 1989; Tuckson 1989; Robinson et al. 1992b). Some racial/ethnic publications independently sought closer economic ties with the tobacco industry. For example, after the ban on the broadcast advertising of tobacco products took effect in 1971, a group of African American newspaper publishers approached the tobacco companies and asked them to increase their business with African American media (Williams 1986).

Corporate media leaders are aware of the reliance of African American publications on tobacco advertising (Robinson 1992). The publisher of *Target Market News*, an African American consumer-marketing publication, has suggested that "reducing cigarette ads could deprive the inner city of much-needed revenues" (Johnson 1992b, p. 27). Similarly, the president of an African American advertising agency has predicted that "if they kill off cigarette and alcohol advertising, black papers may as well stop printing" (Johnson 1992b, p. 27). In 1988, the *National Black Monitor*, a monthly insert in about 80 African American newspapers, published a three-part tribute to the tobacco industry. The *National Black Monitor* has defended its relationship with the tobacco industry and has stated that "black newspapers . . . could not have survived without the past and continuing support from the tobacco industry" (1990, p. 4).

National and local publications directed at other racial/ethnic groups also frequently carry tobacco product advertisements and promotions. These include full-page, four-color advertisements in magazines and full-page advertising spreads in community newspapers. In 1989, for example, *Hispanic* magazine ran a short story contest, sponsored by Philip Morris, which offered a $1,000 honorarium and publication of the winning story. The contest was promoted in a special issue celebrating Hispanic Heritage Month, and announcements appeared in a message from the editor on the magazine's first page and in a one-page display.

The relatively high level of tobacco product advertisements in racial/ethnic and general publications is problematic because the editors and publishers may limit stories dealing with the damaging effects of tobacco or limit the level of antitobacco information in their publications for fear of retribution from tobacco companies (Evans 1990; Robinson et al. 1992a; Warner et al. 1992). Their concerns may be valid. For example, when *Newsweek* published an article on the nonsmokers' rights movement, tobacco advertisers removed all tobacco advertisements from that issue and ran them later (Warner 1985). In addition, a study of cancer coverage and tobacco advertising over a six-year period in three African American popular magazines (*Ebony*, *Essence*, and *Jet*) found that these magazines published only nine articles that focused on cancers caused by cigarette smoking (six on lung or bronchus cancer, one on bladder cancer, and two on throat cancer). In the articles on lung cancer, smoking was rarely discussed as a major contributing cause; smoking was not mentioned as a cause of throat cancer (Hoffman-Goetz et al. 1997).

Although magazines and newspapers with large circulations can sustain the sporadic loss of advertising revenues, the livelihood of racial/ethnic publications can be effectively threatened by such losses. Tobacco companies typically place less than 10 percent of their advertising budgets with small African American weeklies (Russ 1993); however, these advertisements may often mean the difference between survival and failure for small publications (Tuckson 1989; Robinson et al. 1992b). Magazine advertisements of tobacco products have decreased recently in all types of publications (Federal Trade Commission [FTC] 1997), indicating that magazines distributed nationally, including those serving racial/ethnic minority communities, may rely somewhat less on tobacco companies for advertising revenues. For example, 6.5 percent of *Ebony*'s full-page advertisements were for tobacco products in 1993, compared with 9.4 percent in 1988, 13.5 percent in 1983, and 11.6 percent in 1978 (Gerardo Marín and Raymond Gamba, unpublished data). Additionally, a comparison of revenues generated from advertising for the first 11 months of 1989 showed that major African American publications such as *Jet*, *Ebony*, and *Essence* received proportionately higher revenues from tobacco companies than did major mainstream publications (Ramirez 1990).

Industries associated with the tobacco industry may also provide public relations support to racial/ethnic publications. In 1992, for instance, an advertisement in *Ebony* paid for by the Nabisco Foods Group (RJR Nabisco, Inc., of which R.J. Reynolds Tobacco Company is a subsidiary) saluted the magazine's publisher and seven other African American entrepreneurs as "role models to our nation's youth and as inspiration to all of us" (Nabisco Foods Group 1992, p. 2).

Eight-sheet billboards are also frequently used to advertise tobacco products in racial/ethnic communities. These billboards are small (5 x 11 feet) and are often placed close to eye level on the sides of buildings and stores. In 1985 alone, tobacco companies spent $5.8 million on eight-sheet billboards in African American communities; this amount accounted for 37 percent of total expenditures for this medium. Tobacco companies spent $1.4 million on such billboards in Hispanic neighborhoods (Davis 1987).

Funding of Community Agencies and Organizations

The tobacco product and alcoholic beverage industries have made significant financial and in-kind contributions to various racial/ethnic community organizations at the local, regional, and national levels. These contributions have at times been described as marriages of convenience in which community organizations and agencies receive much-needed income and tobacco companies gain, at a minimum, name recognition and goodwill (Maxwell and Jacobson 1989). Trade publications suggest that such community relations efforts are "effective . . . devices to augment minority advertising efforts and throw some water on any hot spots" (DiGiacomo 1990, p. 32). Recipients of tobacco industry support include most of the larger national organizations as well as a plethora of smaller local community agencies. In fiscal year 1989, for example, organizations receiving support from tobacco companies included the Congressional Hispanic Caucus, the National Black Caucus of State Legislators, the National Urban League, and the United Negro College Fund (UNCF) (Johnson 1992a,b). Internal tobacco industry documents released by Doctors Ought to Care (DOC) show that Philip Morris gave more than $17 million to racial/ethnic, educational, and arts groups in 1991 (Solberg and Blum 1992).

One large racial/ethnic minority organization that has refused the support of the tobacco industry is the National Coalition of Hispanic Health and Human Services Organizations (COSSMHO), which has adopted a formal policy not to accept money from tobacco companies or their subsidiaries. The diversity of contributions to racial/ethnic community agencies can be illustrated through a review of contributions made to African American organizations. For example, Philip Morris has contributed to such organizations as the Leadership Conference on Civil Rights, the National Association of Black Social Workers, the National Association of Negro Business and Professional Women's Clubs, the National Black Police Association, 100 Black Men of America, Inc., the National Coalition of 100 Black Women, the National Conference of Black Lawyers, the National Minority AIDS Council, and Operation PUSH (Jackson 1992; Rosenblatt 1994). R.J. Reynolds has contributed to the NAACP; UNCF; and Opportunities Industrialization Centers of America, a national network of job training centers (Russ 1993). Other tobacco companies and the Tobacco Institute itself have made similar contributions to African American and Hispanic organizations (Robinson et al. 1992a).

In communities where tobacco companies have offices and factories, additional programs and activities have been funded to the benefit of whites as well as members of racial/ethnic communities. This support has ranged from funding for local sites of the Young Men's Christian Association to sponsorship of Christmas tree-lighting ceremonies (Jackson 1992). The tobacco industry also has participated in special celebrations and has sponsored awards and recognition events for various civic organizations. For example, at each year's conference of the National Urban League, Philip Morris presents the Herbert H. Wright Awards to African American executives of major corporations who have excelled in working on behalf of humanitarian causes. The awards are named in memory of one of the first African American executives at Philip Morris.

Promotional materials further document the tobacco industry's involvement with racial/ethnic communities. Current information is difficult to obtain, but in 1986, RJR Nabisco published the booklet called *A Growing Presence in the Mainstream*, which summarized the company's involvement with racial/ethnic communities amid quotations from Martin Luther King, Jr., John F. Kennedy, Booker T. Washington, Maya Angelou, and the *New Testament*, along with photographs of an African American member of the company's board of directors (RJR Nabisco, Inc. 1986). The booklet reported a number of the company's accomplishments, including RJR Nabisco's record for employing members of racial/ethnic minority groups, the provision of more than 25 percent of RJR Nabisco's total company-paid employee group life insurance by African American-owned insurance firms, the advertising of RJR Nabisco's products in more than 200 racial/ethnic magazines and newspapers each year, and recognition by the UNCF as the largest contributor to the fund's schools since 1983. The booklet also listed 122 different organizations to which the company provided funding, including the National Urban League; the NAACP; the League of United Latin American Citizens; Howard University; Alpha Kappa Alpha Sorority; the Portland Life Center; the Harlem Dowling-West Side Center for Children and Family Services; New Jersey's Special Supplemental Food Program for Women, Infants and Children; the National Council of Negro Women; the National Puerto Rican Coalition; and ASPIRA, Inc., of New Jersey (RJR Nabisco, Inc. 1986).

At the community level, tobacco companies rely on athletic, cultural, and social events to promote their products' images, often in association with small community agencies. In African American and Hispanic communities, tobacco companies frequently sponsor street fairs, jazz festivals, Little League baseball teams, soccer teams, symphony orchestras, auto races, and art exhibits, just as they do in white communities (Blum 1986; Robinson et al. 1992b; Sanchez 1993). These contributions place community agencies in a particular dilemma, because many of the agencies' programs depend directly or indirectly on contributions received from the tobacco industry. At the same time, acceptance of money and services from the tobacco industry may be perceived as an indirect endorsement of tobacco use. Community leaders generally are split in their opinions about the propriety of accepting support from tobacco companies and alcoholic beverage companies (Robinson et al. 1992a). Opponents argue that the costs of compromised integrity, implicit endorsement of tobacco and alcoholic beverages, and current and future increases in disease and death in these communities are far greater than the benefits these funds provide. Proponents argue that these funds—when made available for such purposes as scholarships, conferences, business development, health fairs, and the organizations' survival—benefit the various racial/ethnic communities, particularly when other sources of financial support have been in short supply or unavailable. Strategies and policies that promote funding sources other than tobacco companies are needed to alleviate communities' reliance on tobacco-related support (Satcher and Robinson 1994).

The tobacco industry also supports the operations and activities of racial/ethnic organizations by providing special services, such as the publication of resource guides and other materials (Blum 1986). For example, Philip Morris has biennially published the *Guide to Black Organizations* since 1981 (Philip Morris Companies Inc. 1992). The guide lists national, regional, and local African American nonprofit organizations throughout the United States, as well as African American state and regional caucuses of elected and appointed officials. Philip Morris also publishes and widely distributes two similar publications, the *National Directory of Hispanic Organizations* (Congressional Hispanic Caucus Institute, Inc. 1993) and the *National Directory of Asian Pacific American Organizations 1997–1998* (Organization of Chinese Americans 1997).

Support for Education

For years, the tobacco industry has contributed to programs that aim to enhance the primary and secondary education of children, has funded universities and colleges, and has supported scholarship programs targeting African Americans (the UNCF) and Hispanics (the National Hispanic Scholarship Fund).

Philip Morris has contributed to Teach For America, a not-for-profit group that trains teachers, primarily those in racial/ethnic urban school systems, such as those in Baltimore City and the District of Columbia (Marriott 1992). In addition, both Philip Morris and R.J. Reynolds donate money to public school systems in racial/ethnic minority communities (Milloy 1990).

For more than a century, the tobacco industry has provided financial support to historically and predominantly African American colleges and universities in the United States. This funding tradition can be traced to Richard Joshua Reynolds, who founded R.J. Reynolds about the time that African Americans were emerging from slavery. In 1891, Reynolds gave money to a school that eventually became Winston-Salem State University, a school that educated freed slaves (Russ 1993).

The tobacco companies also have been strong supporters of the UNCF, which was founded in the mid-1940s to provide a central fund-raising arm for a number of small, struggling, predominantly African American private colleges and universities. When questioned in the mid-1980s about the appropriateness of accepting contributions from tobacco companies, a former head of the UNCF gave three reasons for accepting the contributions: (1) the companies had been longtime supporters of higher education for African Americans, even when the cause was not popular; (2) the contributions from the tobacco companies were too large to reject because the colleges needed the money to survive; and (3) the tobacco companies had factories in communities where the African American colleges and universities were located (Blum 1985). In addition to supporting the UNCF, tobacco companies have supported African American higher education in a variety of other ways, such as through other scholarships and internship programs (Robinson et al. 1992b).

In recent years, the tobacco industry has begun supporting adult literacy efforts. In 1990, Philip Morris joined with the Pew Charitable Trusts and the Philadelphia Mayor's Commission on Literacy to launch the Gateway Program, an adult literacy campaign designed to serve as a national model. Philip Morris contributed $1.5 million to the program and an additional $1.5 million for media support (Robinson et al. 1992b). In yet another outreach effort, Philip Morris subsidized the Milwaukee County Youth Initiative, a program designed to help low-income and minority families become more involved in the education of their children (Haile 1991).

Support for Political, Civic, and Community Campaigns

The emergence of racial/ethnic minority political power, mostly at the local level, has provided yet another avenue for the tobacco industry to bolster its support of racial/ethnic communities. Although most of the contributions at the national level have gone to white legislators, two African American legislators were 14th and 16th on a list of tobacco industry-related campaign contributions received from January 1985 through September 1995 (Fisher 1995).

At the state and local levels the tobacco industry has been generous to all, including racial/ethnic legislators, particularly those in a position to vote on increases in tobacco excise taxes and smoking restrictions on the job and in public places. Since Californians passed Proposition 99, which raised the cigarette sales tax by 25 cents per pack, political contributions from tobacco companies in California rose from less than $800,000 in the 1985–1986 elections to more than $7.6 million in the 1991–1992 elections (Begay et al. 1993). These politicians, some of whom are of racial/ethnic origins, once elected, control how the excise tax revenues are spent and what proportion of the revenues is spent on tobacco control and tobacco-education projects.

Other contributions have been made by the tobacco industry to civic leaders through such mechanisms as Brown & Williamson Tobacco Corporation's Kool Achiever Awards, which are designed to recognize a dozen or so urban achievers "working to create long-term benefits for urban communities" (Brown &

Williamson Tobacco Corporation 1993, back cover). Each recipient chooses a nonprofit organization to which Brown & Williamson donates $5,000. In 1993, R.J. Reynolds began a similar campaign entitled Salem Freshside™ Salute, which recognizes African Americans working to improve the conditions usually found in center cities by giving these individuals donations of $5,000. In addition, promotional campaigns directed at the nation as a whole can affect racial/ethnic minority communities. For example, in 1989, Philip Morris sponsored a touring exhibition of the Bill of Rights. Philip Morris placed advertisements celebrating the freedoms guaranteed by the Bill of Rights in dozens of magazines and newspapers, including a large number of African American and Hispanic publications. Photographs of admired celebrity members of racial/ethnic groups appeared in the tobacco company's advertisements. Such efforts engender good will and name recognition among various racial/ethnic groups. Just as some organizations, such as COSSMHO and, more recently, the Tet Festival in San Jose, California, and the Dia De Fiesta Latina Day of the Del Mar Fair in California, have refused to accept tobacco industry dollars (Fernandez 1996; Levin and Perry 1996; *San Diego Union-Tribune* 1996), individuals are also refusing to accept similar tributes. For example, a community activist was awarded but declined to accept the Kool Achiever Award because of the ethical dilemma he perceived related to the high number of African Americans whose diseases or deaths are caused by tobacco use (Rosenberg 1993).

Support for Cultural Activities

Tobacco companies have been creative in their efforts to reach all members of society via cultural events (Johnson 1992b). Tobacco companies sponsor large museum exhibitions, concerts, and performances for the full spectrum of society. Advertisements for cigarettes and, in some cases, for smokeless tobacco are often placed conspicuously at these events, although sometimes the tobacco industry's sponsorship is noted more subtly in catalogs and program notes. Some of the activities, however, are directed at racial/ethnic communities and are designed to support or enhance racial/ethnic pride and culture—such as Mexican rodeos; American Indian powwows; racial/ethnic minority dance companies; racial/ethnic parades and festivals; Tet festivals; Chinese New Year festivities; Cinco de Mayo festivities; and activities related to Black History Month, Asian/Pacific American Heritage Month, and Hispanic Heritage Month (Warner 1986; Maxwell and Jacobson 1989).

In some instances, tobacco products are associated with popular community events through sponsorships and store promotions. In 1989, for example, Skoal Bandit smokeless tobacco was tied to the promotion of Miami's Calle Ocho festival through live radio remotes from several 7-Eleven stores in the Miami area (Gross 1989). During that same year, the promotion of Skoal Bandit was associated with a Hispanic festival in Corpus Christi, Texas, and with the 10th anniversary car and truck show of *Lowrider* magazine (Gross 1989). Recently, the 1994 Little Saigon Tet Festival in Orange County, California, was sponsored by Marlboro and 555 State Express of London brands of cigarettes. Booths at the festival were used to promote the two brands of cigarettes through displays and the distribution of promotional items.

The sponsorship of artistic events has been one of the fastest growing segments of special events marketing, and tobacco companies have taken full advantage of this trend to expand and strengthen their linkages with various racial/ethnic communities (Bergin 1990). The tobacco industry's link with racial/ethnic music and art is not new; for example, in the 1950s, tobacco companies featured African American jazz artists in cigarette advertisements in *Ebony* magazine. However, these links are more complex today (Pollay et al. 1992; Robinson et al. 1992b). For example, in 1994, New York City art institutions that received funds from Philip Morris were placed in a difficult situation when the tobacco company asked them to inform city council members about the role that Philip Morris had played in sponsoring artistic events in New York City. At that time, the city council was considering a ban on cigarette smoking in most restaurants and public places, and Philip Morris was threatening to move the company headquarters away from New York City if such a ban was approved (Goldberger 1994). The headquarters did not move despite the city's passage of a 1995 law that banned smoking in workplaces (except for physically separated, separately ventilated smoking rooms and private offices), restaurants seating more than 35 patrons, day care centers, and playgrounds (Smith 1995).

Musical events have long been a primary outlet for targeting support among racial/ethnic groups. For example, jazz, rap, blues, rhythm and blues, salsa, gospel, and world music concerts are often heavily sponsored by tobacco companies and are identified with specific cigarette brands targeted toward African Americans, Hispanics, and Asian Americans and Pacific Islanders. Tobacco companies heavily promote these concerts on racial/ethnic minority radio stations, in the press, and through magazines that have large circulations (Robinson et al. 1992a,b). At these concerts, companies often promote their cigarette brands by naming events after the brands, by placing promotional signs on and around stages, and by distributing free cigarettes and other promotional items featuring cigarette brand logos. These musical events have included the Parliament World Beat Concert Series, Brown & Williamson's Kool Jazz Festival, Benson & Hedges's blues and jazz concerts, and Philip Morris's Superband Series. The Superband Series was launched in 1985 by Philip Morris to support and publicize jazz as "America's unique contribution to the field of music" (*Jet* 1990, p. 36). The Superband, which featured African American musicians, performed throughout the world and the United States.

Racial/ethnic dance troupes and the visual arts have been strongly supported by tobacco companies. Philip Morris has contributed significantly to African American troupes, including the Alvin Ailey American Dance Theater and the Dance Theatre of Harlem (Blum 1989; Rothstein 1990; Jackson 1992; Johnson 1992b). Philip Morris also has provided substantial funding to the Studio Museum in Harlem, one of the main repositories of African American paintings, sculptures, and crafts. In addition, tobacco companies have underwritten traveling art shows featuring African American and African artists and have displayed the artists' work in corporate settings (Jackson 1992; Robinson et al. 1992b). Traveling exhibits of Hispanic and Asian American artists have received significant support from tobacco companies as well.

One of the longest running cultural events in African American communities is the annual eight-month tour of the *Ebony* Fashion Fair. Founded in 1958 by the publisher of the leading African American magazine, this event is attended by more than 300,000 women in 190 cities. From the late 1970s to the early 1990s, R.J. Reynolds's More cigarettes supported the fair (Assael 1990). Proceeds from the tour have benefited African American churches, sororities, and other charitable and civic organizations whose antidrug campaigns, health fairs, and other projects are cited in the program. When the show was supported by More cigarettes, fashion models lit cigarettes during walks down the runway. In addition to reciting the names of clothing designers, the announcer noted that the models smoked More cigarettes. Free samples of More cigarettes were distributed to members of the audience as they left the performance. At the Chicago performance of the 1984 *Ebony* Fashion Fair, R.J. Reynolds marked the UNCF's 40th anniversary by donating a $250,000 ruby necklace to the fund as part of the tradition of giving rubies on 40th anniversaries (Joyner 1984; Blum 1985, 1986).

Estimating how much money is actually spent by the tobacco industry on the sponsorship of racial/ethnic cultural and social activities is difficult. Detailed financial records of tobacco manufacturers are not public record, and the financial information that is published in annual reports and similar company publications does not separate the amount of money spent on the promotion of cultural and artistic events among racial/ethnic groups from the amount spent on advertising and other forms of product promotion.

Support for Sports Events

Although the negative effect of tobacco on health has made direct links between tobacco companies and sports less tenable today than they were in the 1950s and 1960s, tobacco companies have increased their involvement in sports by sponsoring community-based softball, golf, soccer, and baseball (Blum 1989; Robinson et al. 1992b). One such example is U.S. Tobacco's Skoal Brand sponsorship of the Hispanic championship soccer tournament, Copa Nacional (*Brandweek* 1995). Tobacco companies have maintained a link to sports and racial/ethnic communities through such means as sponsoring the Jackie Robinson Foundation Awards Dinner. In 1995 alone, the six major cigarette-manufacturing companies in the United States spent $83 million to sponsor, advertise, or promote sporting events; to support individual athletes or group teams; to advertise in sports venues; and to promote items connected with sporting events (FTC 1997). Tobacco industry support for sports is consequential, in part, because of the perception among some youth, particularly African Americans, that athletic ability provides an avenue of personal advancement.

Advertising and Promotion

Advertising is an important influence on tobacco use initiation and maintenance, as documented in *Preventing Tobacco Use Among Young People* (USDHHS 1994). Cigarette advertising and promotion may stimulate cigarette consumption by (1) encouraging children and adolescents to experiment with and initiate regular use of cigarettes, (2) deterring current smokers from quitting, (3) prompting former smokers to begin smoking again, and (4) increasing smokers' daily cigarette consumption by serving as an external cue to smoke (CDC 1990a). In addition, cigarette advertising appears to influence the perceptions of youths and adults about the pervasiveness of cigarette smoking and the images they hold of smokers (USDHHS 1989, 1994). Cigarette advertising also may contribute to the perception that smoking is a socially acceptable, safe behavior and may produce new perceptions about the functions of cigarette smoking in social situations. All of these perceptions have been shown to be risk factors for the initiation of cigarette smoking (Lynch and Bonnie 1994; USDHHS 1994; *Federal Register* 1996).

Unfortunately, the specific effect of advertising on youth in racial/ethnic minority communities is not well understood, to some extent because research is scarce on youth in racial/ethnic communities. Available data indicate that young people smoke the brands that are most heavily advertised. In 1993, the three most heavily advertised brands of cigarettes, Marlboro, Camel, and Newport, were the three most commonly purchased brands among adolescent smokers. More than 45 percent of Hispanic and 63 percent of white teenagers reported purchasing Marlboro. African American teenagers most often chose Newport, one of the mentholated cigarettes heavily marketed to the African American community (Cummings et al. 1987; CDC 1994a). Although combined sales of these three brands represented only 35 percent of the adult market share, they represented 86 percent of the adolescent market share. These data suggest that tobacco advertising influences brand preference among youths and that there are differences in preference among racial/ethnic groups (CDC 1994a).

Another reason that research to date has been unable to quantify the specific effect of tobacco advertising on racial/ethnic groups is that advertising for tobacco products is ubiquitous and uses images, such as glamour, independence, and attractiveness, that appeal to all segments of society. Overall, tobacco products are among the most heavily advertised products in the United States. However, studies have documented that some tobacco products are advertised disproportionately to members of racial/ethnic groups, such as mentholated products to African Americans and brands named "Rio" and the earlier "Dorado" to Hispanics (Gloede 1985; Leviten 1985; Walters 1985).

In a study of adolescents who had never tried smoking, Evans and colleagues (1995) reported an association between a measure they constructed on receptivity to tobacco marketing and a measure of susceptibility to begin smoking. Higher scores on the receptivity index were associated with increasing likelihood of being susceptible to start smoking. The association persisted, even after statistical control for exposure to other smokers, race/ethnicity, and other socioeconomic status variables. Racial/ethnic minority-group specific analyses were not conducted. The findings in this study, though suggestive, require further validation.

Market segmentation is a well-developed strategy for crafting advertising campaigns that present particularly persuasive appeals to targeted audiences (Murphy 1984). It has been suggested that the tobacco industry strategically targets new consumer groups (e.g., women, racial/ethnic groups, and youths) by developing advertisements that exploit the psychological interests and needs of those targeted populations (e.g., Basil et al. 1991). A large and increasing portion of advertising and marketing is targeted to racial/ethnic groups, especially youth (Moore et al. 1996; Zbar 1996). The challenge for the audience is to distinguish the advertising that represents consumer goods with benefit or satisfaction from advertising that represents products that may harm the target community (Moore et al. 1996). Targeted tobacco advertising presents images of success, wealth, happiness, and sophistication, all of which are attractive to racial/ethnic groups, perhaps particularly in contrast with other, less flattering images of those communities presented by the news media. A recent article on the health of African American women discussed the attractive images used to target the African American community. "We have grown almost numb to negative images of ourselves in the media—Black teen girls surrounded by screaming babies or men in handcuffs. Except in cigarette or liquor advertisements. In these we are beautiful, confident, well-dressed, happy, wealthy, in love. . . " (Villarosa 1994, p. 13).

Concern about targeted tobacco advertising has been the subject of various congressional hearings (e.g., U.S. Congress 1987, 1990). Efforts have been made by communities to counteract such advertising. Indeed, tobacco companies' targeting of racial/ethnic communities appears in some cases to have created a reverse marketing effect, such as that seen with the African American community's negative and forceful response to Uptown and X brand cigarettes (see Targeted Products later in this chapter). Recent data show that African Americans' spending on tobacco decreased 5 percent between 1994 and 1995 (Schmeltzer 1996), perhaps due in part to an adverse reaction to the targeted marketing of a harmful product (McIntosh 1995). Counteradvertising has also been used; one poster distributed by Harlem Hospital in 1991 depicted the Marlboro man lighting a cigarette for an African American child. The caption read, "They used to make us pick it. Now they want us to smoke it." A television spot, "Rappers/Pick It," produced by the California Department of Health Services, conveys a similar theme (Kizer et al. 1990, p. 76).

Although many companies are sensitive about disclosing targeted marketing strategies, particularly efforts focused on racial/ethnic minority markets, recent analyses of marketing trends document tobacco companies' efforts to sell their products to racial/ethnic groups and to youths (Davis 1987; Altman et al. 1991; Johnson 1992a; Moore et al. 1996; Stoddard et al. 1997). At least one major tobacco company, Philip Morris, has argued that it does not exclusively target any particular group (Nelson and Lukas 1990). Questions also have been raised about the appropriateness of using targeted advertising and promotional techniques when the quantity and intensity of these efforts are well beyond the proportional purchasing power of the targeted group or when particular promotional techniques such as billboard placements are used in quantities that are out of proportion to the population size of the targeted groups. Examples of targeted advertising and promotion that may be inappropriate include the overly frequent placement of billboards that advertise tobacco products in racial/ethnic enclaves, the use of cultural values and symbols valued by members of racial/ethnic groups to promote tobacco products, and the use of certain promotional practices (e.g., coupons, discounts, tie-ins, and free gifts).

Magazine Advertisements

Certain tobacco products are advertised disproportionately to members of racial/ethnic groups. For example, menthol cigarettes are more frequently advertised in magazines targeting African Americans than in magazines directed at the general public (Cummings et al. 1987). An analysis of one year of issues (June 1984 through May 1985) of three magazines primarily directed at African Americans—*Jet, Ebony,* and *Essence*—and of four magazines directed at the general population—*Newsweek, Time, People,* and *Mademoiselle*—found that 12 percent more advertisements for cigarettes appeared in the African American magazines. In addition, 65.9 percent of the cigarette advertisements in the African American magazines were for menthol cigarettes, compared with 15.4 percent of those in the general population magazines (Cummings et al. 1987). Indeed, Newport, a menthol brand, is the number one preferred cigarette among African American adults and youth (CDC 1990b, 1994a).

Outdoor Advertisements

Early research showed that marketing approaches such as billboards and point-of-sale displays have been particularly effective in reaching African Americans. In one early study, Bullock (1961) sampled 1,106 African Americans and 537 whites from Atlanta, Birmingham, Houston, Memphis, and New Orleans to assess a variety of consumer behaviors. Bullock found that billboards and point-of-sale materials were particularly effective in reaching a high proportion of African American consumers and that African American consumers were more likely than whites to trust advertising. In addition, a disproportionately high number of billboards and other outdoor advertisements promoting cigarettes and other tobacco products have been placed in racial/ethnic minority communities. A recent study in Los Angeles found that the density of cigarette advertisements on billboards was 4.6 times greater in the city proper than in the suburbs (Ewert and Alleyne 1992). In a study conducted in San Diego, Elder and colleagues (1993) found that the highest proportion of billboards featuring tobacco products was in Asian American (13.0 percent) neighborhoods, followed by African American (9.6 percent), Hispanic (4.7 percent), and white (1.1 percent) neighborhoods. The volume of outdoor advertising in Asian American neighborhoods was relatively low, although the proportion of that space devoted to tobacco products was high (Elder et al. 1993). In an earlier study, Mitchell and Greenberg (1991) found that most billboards in racial/ethnic communities in four New Jersey cities were predominantly dedicated to advertised alcoholic beverages and tobacco products. In several urban centers, the proportion of billboard tobacco advertising has been found to be higher in African American neighborhoods than in white areas (Tuckson 1989; Mitchell and Greenberg 1991; Mayberry and Price 1993). Stoddard and colleagues (1997) documented tobacco billboard advertising in four neighborhoods (African American, Asian American and Pacific Islander, Hispanic, and white) in Los Angeles during 1993 and 1994. Tobacco billboard density (the number of billboards per mile) was highest in African American communities, intermediate in Hispanic and Asian communities, and lowest in white communities. The models in billboards in African American neighborhoods were more likely to appear younger than in the other neighborhoods. In addition, 91 percent of the billboards in African American neighborhoods featured an African American as the central character; in the other three neighborhoods, whites portrayed the central characters.

In-Store Promotions

In-store and over-the-counter promotions for tobacco products also seem to disproportionately target racial/ethnic communities. For example, in racial/ethnic neighborhoods in San Diego, Asian American retail outlets had the highest average number of tobacco promotion displays (6.4), compared with Hispanic (4.6) and African American (3.7) stores (Elder et al. 1993). In addition, low-cost or generic cigarettes that have begun to capture increasing market shares may be particularly effective as part of a targeted campaign directed at members of racial/ethnic groups with low-socioeconomic status and for whom price may be an important consideration in the purchase of cigarettes (Assael 1990).

Convenience store owners often are eager to promote tobacco products, which account for about 26.5 percent of their total sales (National Association of Convenience Stores 1993). In such stores, tobacco companies frequently promote their products through special displays and point-of-sale promotions that provide monetary or product allowances for the store owners (Cummings et al. 1991; Wildey et al. 1992; Davis 1993; USDHHS 1994). In a study of 23 supermarkets and convenience stores in San Diego, Wildey and colleagues (1992) found that 52 percent of store owners reported receiving payments from tobacco companies for displaying advertisements in their stores and that 69 percent of the stores displayed tobacco advertisements on the outside walls, windows, or parking lot signs. The researchers also found that stores in Asian American neighborhoods were more likely than stores in white communities to have outside advertisements for tobacco products. A San Francisco study found that a large number of small stores in racial/ethnic minority neighborhoods display outside placards and small billboards for tobacco products (Gerardo Marín and colleagues, unpublished data). About 57.6 percent of small stores in predominantly African American neighborhoods displayed at least one advertisement for tobacco products, compared with 37.7 percent in predominantly Hispanic neighborhoods and 28.6 percent in predominantly Asian American and Pacific Islander neighborhoods.

Racial/Ethnic Symbols, Names, and Events

Another area of concern about targeted advertising and promotion is the use of clearly identifiable racial/ethnic models; group-specific messages, such as salutes to Latino community organizations during Hispanic Heritage Month, and group-relevant placements. Examples of group-relevant placements are cigarette advertisements appearing during Black History Month and featuring pictures or quotations of African American leaders and Philip Morris's salute to its Bill of Rights campaign during news coverage of Nelson Mandela's release from prison. These advertisements target racial/ethnic communities by making use of symbols and events that are held in high esteem by community members.

Individuals' psychosocial characteristics are commonly used in the design of targeted advertising and marketing campaigns (Basil et al. 1991). Consumers, particularly those who identify with an racial/ethnic group's culture, tend to prefer buying goods that are specifically advertised to their cultural group. Deshpande and colleagues (1986) found that Hispanics who strongly identified with their racial/ethnic culture preferred Spanish language advertising, were more likely than those with less cultural identification to maintain brand loyalty, and were more likely than those with less cultural identification to buy prestige brand goods and those advertised specifically to their racial/ethnic minority group. In addition, Lee and Barnes (1989–1990) found that advertisements targeting African Americans differ from those directed at the general population in that they feature certain bright colors.

Tobacco product promotions also feature symbols and names that have special meaning for racial/ethnic groups. Certain names have special significance for particular groups (Uptown among African Americans), the use of non-English names may appeal to certain linguistic groups (Rio and Dorado among Hispanics), and the use of certain words can conjure symbols that are meaningful to a particular group (American Spirit among American Indians). The use of racial/ethnic events and symbols to market tobacco can present a complex issue that is difficult for communities to resolve. For instance, the American Spirit cigarette package portrays an American Indian smoking a pipe, and the product's literature features American Indian cultural themes, stating that the American Indian custom was to smoke tobacco leaves the "natural way" and that American Spirit cigarettes are "natural" cigarettes. In early 1997, the American Indian Tobacco Education Network criticized the Sante Fe Tobacco Company for exploiting sacred Indian traditions and imagery to sell its tobacco products. The Sante Fe Tobacco Company countered that it honors Indian traditions in its use of community symbols and even donates tobacco to tribes for ceremonial purposes (Guthrie 1997). The fact remains that American Spirit cigarettes contain tobacco with amounts of tar and nicotine similar to those of commercial brands and are thus dangerous to health, despite their lack of additives. Although targeted marketing of products may bring economic benefits to racial/ethnic communities, when such marketing is for a harmful product such as cigarettes, the target community is challenged to choose between potential economic gain and social recognition versus the inevitable long-term adverse health outcomes from use of the product (Moore et al. 1996).

Cigarette advertisements also have been accused of trivializing social causes and cultural values. For example, a Virginia Slims advertisement that appeared in the July 1994 issue of *Life* uses the concept of racial/ethnic equality to promote use of the product. In addition, certain tobacco product advertisements have used visual images, such as American Indians as warriors, that demean the culture and insult some individuals (Green 1993).

Another significant concern is the effect that targeted tobacco advertising may have on recent immigrants. For many immigrants, the advertising of cigarettes in their country of origin has helped mold their attitudes and perceptions of tobacco use. These perceptions in turn create expectations about the social effects of cigarette smoking as portrayed in advertisements, as well as brand recognition and brand loyalties toward the most frequently advertised brands. Targeted promotional and marketing practices also can affect the decisions of consumers who have recently migrated to the United States and who, in general, have not been exposed to marketing techniques and promotional approaches common in the United States. Immigrants not exposed to lifelong learning from the commercial practices of a market economy may be less critical and overly trusting of the messages and implied promises presented in advertisements. Webster (1990–1991) found that highly acculturated Hispanics rated certain consumer products as defective and overpriced and claimed that advertising was problematic, whereas less acculturated Hispanics were more accepting of such defective products and saw advertising not only as informative but also as enjoyable. Immigrants also respond differently to promotional techniques with which they are unfamiliar. For example, Hispanics who have a low level of acculturation may not respond to certain novel promotional techniques such as the use of coupons (Donthu and Cherian 1992) but are more influenced by radio and billboard advertisements and point-of-sale displays (Webster 1992). Other studies have also found that promotional techniques have differential effects on various sectors of the Hispanic population. The more acculturated Hispanics report being primarily influenced by magazine advertisements, brochures, product labels, and consumer guides, such as *Consumer Reports* and the *Yellow Pages* (Webster 1992).

Targeted Products

Although a few cigarette brands have names that imply specific racial/ethnic minority targeting (e.g., Rio and Dorado for Hispanics), their promotion has been limited to a few states. The recent introduction of American Spirit seems to be directed at American Indians as well as youths and individuals preferring natural products. In addition, Japan Tobacco Inc. has begun to market its top-selling brand, Mild Seven, in the United States (Stebbins 1990; Sesser 1993). The brand is being promoted as a cigarette manufactured by Asians for Asians, and full-page advertisements appear in magazines primarily targeting Asian Americans (Koeppel 1990b). Mild Seven billboards also have appeared in Koreatown and Little Tokyo in Los Angeles as well as in other U.S. cities with large Asian American populations.

One of the best examples of product targeting was the cigarette Uptown, designed by R.J. Reynolds in the 1980s to reach African American smokers (Dagnoli 1989; Simmons 1989; Koeppel 1990a; Robinson and Sutton, in press). The attempted introduction of this cigarette is a case study in racial/ethnic product targeting. The characteristics, packaging, and planned promotion of Uptown cigarettes allegedly were designed specifically for African Americans. The menthol formulation of this new brand was designed to compete directly with Lorillard's Newport cigarette, which was one of only three full-price cigarettes to gain market shares in 1989 along with Philip Morris's Marlboro and Virginia Slims cigarettes (Dagnoli 1989). In 1986, Newport was the leading brand of cigarettes among African American smokers, ahead of Brown & Williamson's Kool cigarettes and R.J. Reynolds's Salem cigarettes (Simmons 1989; CDC 1990b). The mentholated Uptown cigarettes were to be packed with their filters down in the belief that African American blue-collar workers often open their cigarettes from the bottom to avoid crushing the filters or having to put unwashed hands on the part of the cigarette that goes into their mouth (Ramirez 1990). Furthermore, in its statement announcing Uptown cigarettes, the company defined African Americans as the primary market for the new brand. Unlike Newport cigarettes, which were purported to be aimed at all smokers rather than just African Americans, R.J. Reynolds was specific (Dagnoli 1989). "We expect Uptown to appeal most strongly to black smokers," said Lynn Beasley, vice president of strategic marketing for the company. "Our research led us to believe that Uptown's blend . . . will be an appealing alternative to smokers currently choosing a competitive brand. We have developed a product based on research that shows that a significant percentage of black smokers are currently choosing a brand that offers a lighter menthol flavor than our major menthol brand, Salem" (*Philadelphia News Observer* 1990, p. 7).

Uptown cigarettes were to yield 19 milligrams of tar per cigarette, which was the highest level of tar in all of R.J. Reynolds's cigarette brands, with the exception of unfiltered Camel cigarettes. The planned advertisements were to depict African American couples enjoying cigarettes in a sophisticated urban environment with the slogan "Uptown. The Place. The Taste" (Koeppel 1990a). The marketing plan for Uptown cigarettes was designed to take advantage of media that were particularly effective in reaching African Americans, including billboards, transit advertising, bus shelters, point-of-purchase signs, and advertisements in racial/ethnic newspapers and magazines.

The introduction of Uptown cigarettes was planned for the first week in February 1990 to coincide with Black History Month activities, including receptions, exhibits, festivals, award ceremonies, and other events highlighting the African American experience. Promoting Uptown cigarettes during this high level of activity—through the distribution of free samples and the underwriting of events—would afford R.J. Reynolds a prime opportunity to promote the new brand (Simmons 1989).

R.J. Reynolds selected Philadelphia as the test market site because of its demographics. In 1990, the city's population was approximately 40 percent African American and was served by several African American newspapers. In addition, African Americans tended to live in distinct neighborhoods that could be reached effectively through billboards and transit advertising. Furthermore, unlike some communities that had mobilized against excessive billboard advertising of alcoholic beverages and tobacco products, Philadelphia's African American community had been quiet in this respect.

In the wake of a firestorm of negative national publicity (see Chapter 5), R.J. Reynolds withdrew its plans to test-market Uptown cigarettes in Philadelphia. The protest against this targeted product involved community members, civic and religious leaders, health professionals, and then-Secretary of Health and Human Services Dr. Louis W. Sullivan. Ultimately, R.J. Reynolds decided to withdraw Uptown cigarettes from the market permanently.

The same leadership and strategy were used again in Boston in early 1995 and similarly resulted in the withdrawal of a new brand of cigarettes called "X," thought to be targeted to African Americans because of its red, green, and black packaging and the suggestion of the name of noted leader Malcolm X. In this instance, however, both the manufacturer and the distributor denied that the brand was targeted to African Americans or any other racial/ethnic market (Jackson 1995) (see Efforts to Control Tobacco Advertising and Promotion in Chapter 5).

In January 1997, R.J. Reynolds released a mentholated version of Camel cigarettes. R.J. Reynolds had last marketed a mentholated brand of Camels in 1966 (Tobacco Merchants Association of the United States 1978). Approximately three-fourths of African American smokers smoke mentholated cigarettes (USDHHS 1990) and Camel cigarettes are popular, so the African American community has been concerned that a new menthol brand may escalate smoking among African Americans. In an event similar to that precipitating the withdrawal of Uptown cigarettes, key religious leaders, led by the National Association of African Americans for Positive Imagery, launched a national crusade against the new brand extension of Camel Menthols (Rotzoll 1997).

Psychosocial Determinants

Psychosocial variables help explain why people start using tobacco (initiation), why some continue using it (maintenance), and why some stop using tobacco products (cessation). This section of the chapter provides a summary of research to date on the factors associated with initiation, maintenance, and cessation of tobacco use among ethnic groups. Unfortunately, the literature is sparse on individual and interpersonal factors that influence tobacco use among African Americans, American Indians, Alaska Natives, Asian Americans, Pacific Islanders, and Hispanics.

Research and etiologic theory on smoking and smokeless tobacco use have largely excluded members of racial/ethnic groups. In fact, few researchers have included persons other than whites as part of their studies. Although research findings based on samples of the majority white population may be applicable to racial/ethnic minority populations, such generalizability has not been sufficiently studied. Racial/ethnic groups may have different exposure levels and different reactions to risk factors or protective conditions than do whites. Furthermore, cultural differences in values, norms, expectancies, and attitudes may differ among members of various racial/ethnic groups. These differences, in turn, may influence the prevalence of cigarette smoking in a particular racial/ethnic group and the relationship between smoking behavior and associated risk factors (Marín et al. 1990a; Vander Martin et al. 1990). Certain experiences and values associated with tobacco use thus may be unique to some racial/ethnic groups and may not be relevant to others. Understanding group-specific and community-based factors is necessary to help shape the development of culturally appropriate interventions. (Interventions are detailed in Chapter 5. For a detailed discussion of the range of variables that prompt youths to start smoking and to use smokeless tobacco, see *Preventing Tobacco Use Among Young People*, USDHHS 1994.)

Initiation and Early Use of Tobacco

Much of the research on tobacco use among racial/ethnic minority groups has focused primarily on a constellation of risk factors that affect people's behaviors (Bry et al. 1982; Newcomb et al. 1986, 1987; Moncher et al. 1990; Scheier and Newcomb 1991; Felix-Ortiz and Newcomb 1992; Newcomb and Felix-Ortiz 1992; Vega et al. 1993). These studies have assessed environmental, behavioral, psychological, and societal attributes proposed by the various theories of tobacco use initiation (Ajzen and Fishbein 1970; Jessor and Jessor 1977; Kandel 1980; Yamaguchi and Kandel 1985; Elder and Stern 1986; Newcomb and Bentler 1988; Chassin et al. 1990, 1992), considering these attributes as individual risk factors or as a set of variables that affect an individual's behavior (Hawkins et al. 1992). Some studies have proposed that the particular factors that increase an individual's vulnerability are not as important as the accumulation of such factors in a person's life and that tobacco use is but one of many responses people use to cope. Investigators have focused on some environmental and behavioral factors (such as parental and peer smoking or the availability of cigarettes) that may be useful in developing prevention strategies, but they have paid less attention to other equally important environmental conditions (such as price, access, exposure to advertising, economic history, customs and practices associated with tobacco in the native country, and tobacco industry influence on community organizations and leaders) that are differentially related to tobacco use and initiation.

Some investigators have studied the onset of adolescent smoking as a phenomenon of gradual passage through various cognitive and behavioral stages of change—for example, from abstaining to using tobacco regularly (Conrad et al. 1992). Following Prochaska and DiClemente's (1983) paradigm for studying smoking cessation, Stern and colleagues (1987) found that a predominantly white sixth-grade population progressed through stages, such as *precontemplation* (when the youth would not even consider smoking), to *decision making* (thinking about taking up the behavior and experimenting with cigarettes), to *maintenance* (regular smoking). Similar results were found in a study of California high school students, about one-third of whom were Hispanic (Elder et al. 1990), but potential differences between white and Hispanic students were not fully explained.

More recently, Pierce and colleagues (1996) found that baseline susceptibility to smoking (defined as the absence of a firm decision not to smoke) was a stronger independent predictor of experimentation than the presence of smokers among either family or best friends. In this study, African American, Asian American, and Pacific Islander adolescents were significantly less likely to experiment than whites or Hispanics. However, exposure to smokers was more important than susceptibility to smoking in distinguishing adolescents who progressed to established smoking from those who remained experimenters. African American, Asian American, and Hispanic adolescents appeared less likely than whites to become established smokers (Pierce et al. 1996).

African Americans

A few studies have tried to identify variables that predict cigarette smoking among African Americans. Brunswick and Messeri (1983) examined five domains of variables to assess their effects on the onset and continuation of cigarette smoking among 379 African Americans aged 18–23 years who resided in the Harlem area of New York City. In this eight-year prospective study, multiple regression analyses showed that variables in each of five domains—personal background, school achievement, family and peer orientations, emotional conflict, and health attitudes and behaviors—were significant predictors of smoking initiation, although the patterns of influence differed by gender. In further analyses, Brunswick and Messeri (1984) found that poor school achievement predicted the onset of cigarette smoking among the young men and women. In addition, young women who reported higher cigarette use had low self-efficacy and were worried more about school.

Among white youths, the presence of a best friend who smokes is a significant predictor of smoking, but the data on African American youths are contradictory. Some studies have shown that having peers who smoke is a poor predictor of cigarette smoking among African American youths (Headen et al. 1991), whereas others have found the opposite (Botvin et al. 1992, 1993). Botvin and colleagues (1993) found that the most powerful predictor of cigarette smoking among those students initially sampled was having friends who smoke, together with personal factors such as lack of assertiveness in refusing cigarettes. A study of 757 African American and Hispanic seventh graders in six New York City public schools yielded similar results (Botvin et al. 1994).

A few studies have analyzed retrospectively the predictive power of various sets of variables. Benson and Donahue (1989), for example, studied cigarette use among African Americans and whites by analyzing data from the 1976, 1979, 1982, and 1985 National High School Senior Surveys that were part of the University of Michigan's Monitoring the Future (MTF) Project. The researchers analyzed 10 predictors of cigarette use: personal importance of religion, region of the country where respondents resided, gender, school type, community size, college plans, hours worked, a father present, level of parental education, and maternal employment. For each year examined, the researchers found that the association between these 10 variables and cigarette use was substantially lower for African American high school seniors than for white high school seniors. Among both African Americans and whites, cigarette smoking was associated with the frequency with which the respondents went out at night, low levels of religiousness, and lack of concrete plans for college. In another study, Wallace and Bachman (1991) analyzed data from the MTF surveys for the years 1985–1989. They found that among African American high school seniors, four variables were significantly associated with cigarette smoking in the 30 days preceding the survey: living in a nonurban area, being truant, frequently attending rock concerts, and having peers who used cigarettes. Among white high school seniors, 10 variables were significantly associated with cigarette use: being female, living in a single-parent family, having low attachment to school, being truant, going to parties, going to rock concerts, doing poorly in school, not being committed to future education, spending evenings out for fun and recreation, and having peers who used cigarettes (these last 4 variables were also associated with cigarette use among African Americans, but the association was stronger among whites).

Weinrich and colleagues (1996) examined the relationship among three factors—adolescent smoking under stress, psychological distress, and social support—among 1,168 sophomore and junior high school students. They found that race was strongly associated with smoking to cope with stress, as measured by indices of anger/anger control, depression, somatization (expression of anxiety in physical symptoms), anxiety, obsessive/compulsive behavior, and social support. In each case, white students were more likely than African American students to engage in stress-related smoking.

Also using a risk factor approach, Farrell and colleagues (1992) found that among 1,352 African American adolescents from the Southeastern United States, the following risk factors were associated with cigarette use: being home alone after school, having friends who approved of and used drugs, knowing adults who used drugs, feeling pressured to use drugs, expecting to use drugs in the future, being highly involved in delinquent behavior, having a history of trouble with the police, and having used cigarettes and alcohol previously. As noted, comparison of these studies is hampered by the noncomparability of the variables assessed.

American Indians and Alaska Natives

Among American Indians and Alaska Natives, tobacco use has a long and unique history that includes its use in rituals and spiritual ceremonies (Weibel-Orlando 1985; Siegel 1989). Despite this important history, little is known about current predictors of the initiation of cigarette smoking and smokeless tobacco use among young American Indians and Alaska Natives. Schinke and colleagues (1989) have reviewed the scant literature and theories regarding tobacco use and believe that because of the historical association of tobacco with spiritual rites (Weibel-Orlando 1985), its contemporary daily use is also imbued with positive cultural attributes. But more behavioral explanations for tobacco use among American Indian and Alaska Native youths include peer pressure and expected pharmacologic effects (Schinke et al. 1990).

In a study of cigarette smoking initiation among North American Indians, Pickering and colleagues (1989) surveyed a sample of 689 Cree schoolchildren aged 9–18 years in Canada's James Bay Region. Factors associated with being a smoker included being older, being female, having a mother who smoked, and having a best friend who smoked. In a larger study, conducted in the northwestern United States, Moncher and colleagues (1990) examined tobacco use in a cross-sectional sample of 1,147 fourth and fifth graders of American Indian and Alaska Native descent. The researchers assessed 16 possible risk factors related to peer and family use of various drugs, school adjustment, intentions to use various drugs, quality of family relationships, nondrug-related deviant behavior, cultural identity, and religiousness. All of the 16 risk factors correlated with the prevalence of any current or ever use of cigarettes or smokeless tobacco by these children.

In an earlier study, also in the northwestern United States, Hall and Dexter (1988) studied smokeless tobacco use in a sample of 1,180 adolescents that included 257 American Indians. Multiple regression analyses revealed that among male adolescents, smokeless tobacco use was significantly associated with having friends who used smokeless tobacco; with cigarette smoking; and with tobacco use by the youths' siblings, father, and other relatives. Among female adolescents, a similar pattern was observed, except that age also was positively associated with more smokeless tobacco use. Other explanations of tobacco use may include the relatively weak tobacco control infrastructure within American Indian communities and the presence of other environmental factors, such as advertising, that promote the use of tobacco products (Hodge 1995; Robinson et al. 1995).

Asian Americans and Pacific Islanders

Research on the factors that influence initiation of tobacco use among Asian Americans is sparse, and there is no such information about Pacific Islanders. Zane and Sasao (1992) reviewed the literature to identify possible explanations for the use of substances (including tobacco) among Asian Americans and Pacific Islanders. They mention several influences observed in other populations that may be relevant for Asian Americans and Pacific Islanders: (1) multiple stressful life events related to cultural adjustment; (2) culture-specific social skills needed in the United States, particularly direct self-expression, assertiveness, and individualism, which are often the opposite of traditional Asian and Pacific Island values and role expectations; and (3) family cohesion, which may reduce the role of peer influences that are central among members of other racial/ethnic groups.

Wiecha (1996) studied 226 Vietnamese adolescents in two public middle schools and two public high schools in Worcester, Massachusetts, to examine the correlates and patterns of tobacco use. Four factors were independently and significantly associated with smoking among Vietnamese adolescents: male gender, older age, smoking by friends, and reporting carrying a weapon in the last month. Other factors that suggested associations but did not reach statistical significance included performing poorly in school, ever using marijuana, and fighting. Acculturation was inversely associated with current cigarette smoking, i.e., study participants who were more acculturated, as indicated by longer time in the United States, better spoken English, or no use of Vietnamese translation on the survey, were less likely to be current smokers. Findings also suggest that the adolescents in this study knew less about the health consequences of cigarette smoking and might share a lower-than-average perceived susceptibility to cancer (Wiecha 1996).

Data from adults may be of use in identifying factors related to initiation among youths. Chen (1993), for example, found that the influence of friends or peers was the most frequent reason for smoking initiation reported by 13 adult Cambodian immigrant men. Data collected in 1991 indicate that among 296 adult Chinese Americans in Oakland, California, 40 percent of those who smoked reported that they began smoking "to be sociable" (Rod Lew and Art Chen, unpublished data). Other factors mentioned frequently were peer pressure (25 percent) and boredom (16 percent).

Hispanics

Research on why Hispanics begin to smoke often is narrowly focused on subgroups, such as those from a specific city or with a particular national background. Smith and colleagues (1991), using a cross-sectional design, examined numerous potential factors affecting cigarette smoking and intentions to smoke among Puerto Rican teenagers in Boston, Massachusetts, and Hartford, Connecticut. Few statistically significant associations were found. Among Puerto Rican male adolescents, current cigarette smoking was associated with greater acculturation, more close friends who smoked, older age, and greater exposure to smoking at recreational activities. Among female Puerto Rican teenagers, the only factor associated with smoking was having close friends who smoked. In this study, the smoking status of parents had no effect on teenagers' smoking behavior.

Three studies have analyzed possible factors associated with tobacco use among Hispanic youths in the New York City area. Among Puerto Rican and Dominican seventh graders (Bettes et al. 1990), the researchers found that tobacco use was unrelated to language use (a possible proxy variable for acculturation) but was significantly associated with negative self-esteem, lower psychological well-being, higher psychological distress, and risk-taking. In a subsequent study, Dusenbury and colleagues (1992) examined possible factors associated with smoking experimentation and current cigarette use among New York City Hispanic youths aged 10–18 years. The researchers found an almost identical set of significant factors for both experimental and current use of cigarettes. These predictors included being older; having poor academic performance; having friends, parents, and siblings who smoked; believing that smoking was highly normative; and having parents with neutral or favorable attitudes toward cigarette smoking. More recently, Dusenbury and colleagues (1994) found that among Hispanic sixth- and seventh-grade students in New York City, those who smoked cigarettes tended to be older and to have a greater proportion of friends and relatives who smoked. They also found that speaking both English and Spanish at home and with friends (a behavior related to biculturalism) increased these students' probability of smoking cigarettes. Separate analyses for boys and for girls showed that boys from bilingual homes were more likely to smoke; however, this was not true among girls. Data from two Southwestern cities indicate that a low level of maternal education and low grades obtained in school were associated with cigarette smoking among Hispanic youths (Schinke et al. 1992).

Cowdery and colleagues (1997) analyzed cohort data collected in the 1989 and 1993 Teenage Attitudes and Practices Survey (TAPS) from a nationally representative sample of Hispanic adolescents aged 15–22 years in 1993. They found that among Hispanic adolescents, the most strongly associated risk factor for smoking initiation was peer smoking. Additionally, not reporting a dislike for being around smokers and believing that smoking helps people relax and reduces stress were associated with an increased risk of smoking among males and females. The belief that smoking helps keep weight down was significantly associated with smoking among females. Among males, believing that there was no harm in an occasional cigarette, that smoking reduces boredom, and that smoking helps ease nervousness at social events were all associated with an increased risk of smoking.

School participation may be an important predictor of tobacco use among Hispanics because they have the highest high school dropout rates of the major racial/ethnic groups in the United States (Kaufman and Frase 1990; Tomás Rivera Center 1993). Among white youths, dropping out of high school is a distinct correlate of cigarette use (Weng et al. 1988), but the results are not as clear for Hispanics. Chavez and colleagues (1989) studied three groups of Mexican American respondents—a group of youths who had dropped out of school, a group of youths at serious academic risk of dropping out of school, and a control group—from three Southwestern U.S. locations that varied in population size. Among Mexican American male youths, those at risk of dropping out of school and those who had dropped out of school had a higher prevalence of cigarette use but a lower prevalence of smokeless tobacco use than the control group. No significant differences in tobacco use were found among the three groups of Mexican American female youths. Watts and Wright (1990) compared Mexican American adolescents in Texas who were incarcerated with those who were attending high school and found that both minor delinquency and violent delinquency were significantly associated with tobacco use.

The results from a recent study by Felix-Ortiz and Newcomb (1992) provide additional insights into the variables related to smoking among Hispanic adolescents. The researchers assessed risk factors and protective factors as predictors of both the frequency of cigarette smoking and the quantity of cigarettes smoked. Multiple regression analyses showed that among Hispanic boys (but not among girls), risk factors such as low academic achievement, low law abidance, low religiousness, and high level of depression significantly predicted both the quantity of cigarettes smoked and the frequency of smoking. In a more recent study, Felix-Ortiz and Newcomb (1995) found that neither familiarity with Hispanic culture nor familiarity with the larger U.S. culture was directly associated with tobacco use among boys and girls. Among Hispanic boys, cigarette use was associated with less *respeto*—a cultural value that grants prerogatives to adults and others with social power and that refers to a sense of personal self-worth. Among Hispanic girls, cigarette use was related to more involvement in Hispanic groups and political activities. A significant interaction was found between English- and Spanish-language proficiency (usually considered a proxy measure of acculturation) and frequency of cigarette smoking among both boys and girls. For example, Hispanic youths with poor English- and Spanish-language skills had the highest frequency of cigarette use, whereas those with poor English-language skills but strong Spanish-language skills reported the lowest frequency of cigarette use. Hispanic youths with strong English-language skills had moderate levels of cigarette smoking frequency, regardless of their degree of Spanish-language proficiency.

Another study of 1,411 females of Latino origin (Latinas) found differences in knowledge and perceptions about cigarette smoking between Spanish-language and English-language/bilingual young women (Campbell and Kaplan 1997). In this study, Latinas who either spoke English or were bilingual were less likely than their counterparts who spoke only Spanish to acknowledge the danger associated with smoking an occasional cigarette or to recognize the difficulty in quitting smoking, were more likely to identify beneficial aspects of smoking, and were more likely to consider smoking socially.

For many Hispanic youths, adaptation to life in the United States may produce psychological stress and anxiety. Whether these factors are directly associated with smoking among Hispanic youth is not known. In a recent study of migrant adolescents in the San Diego, California, area, Lovato and colleagues (1994) reported that respondents' level of acculturation was not related to cigarette smoking or alcohol use, even though the more acculturated adolescents were more likely to engage in binge drinking. Acculturation remains a strong theoretical consideration in smoking initiation, but current findings are limited by the methodological issues previously cited. In addition, a variety of acculturation measures have been used, and these have intrinsic limitations for assessing the cultural learning process (Marín 1992). Interpretation is particularly problematic when researchers use proxy measures such as language proficiency to measure complex psychosocial processes like acculturation. The existence of multiple cultures within Hispanic communities adds to the complexity of this issue, as is also the case in Asian American communities.

Multiple Group Studies

Several studies have examined initiation and early use of tobacco among more than one racial/ethnic group and have compared data within and among these groups. Some of these studies have concentrated on analyzing the prevalence of perceived risk factors commonly associated with tobacco use, and other studies have addressed the question of what differentiates smokers from nonsmokers.

CDC and 13 universities conducted research in a collaborative partnership that involved a series of focus groups and in-depth interviews among African American, American Indian, Asian American and Pacific Islander, Hispanic, and white teenagers. The purpose of the research was to assess differences in the functional value of smoking, the images associated with and social norms that surround smoking, and the messages that youths report receiving about smoking. The universities used common methodologies, protocols, definitions, and coding schemes for transcripts of focus groups and interviews. Preliminary findings of this research are that (1) young smokers know about the addictive nature of nicotine; (2) smoking is viewed as "cool" and "grown up"; (3) smoking derives functional value from group belonging and stress management; (4) among girls, notions of "respect" and "reputation" are influential for nonsmoking in some groups; and (5) parental messages about smoking vary by race/ethnicity, but African American and Hispanic parents give clearer messages about not smoking than parents in other groups. Other emerging issues noted in this analysis are that (1) smoking is not seen as image enhancing among African American girls; (2) African Americans were more likely to pair cigarette smoking with marijuana to maintain a "high"; (3) parental smoking is a negative influence, particularly among American Indian families; and (4) variation exists among the racial/ethnic groups with regard to the media channels through which messages are received (Mermelstein et al. 1996).

Prevalence of Risk Factors for Cigarette Use

Several studies have analyzed how possible risk factors for tobacco use differ among youths in various racial/ethnic groups. For instance, in a study of Los Angeles County students in grades seven through nine, Maddahian and colleagues (1986) found that African American adolescents reported having the highest number of friends who provided cigarettes, followed by white, Hispanic, and Asian American adolescents. Perceived ease in acquiring cigarettes was highest among white adolescents and lowest among Asian American adolescents; Hispanic and African American adolescents reported moderate ease in acquiring cigarettes. In assessing how earned income vs. allowance income related to cigarette use, the researchers found that Asian American and white adolescents reported having a higher earned income than adolescents in the other two racial/ethnic groups; in comparison, Hispanic and African American adolescents reported receiving more allowance income than Asian American or white adolescents. Maddahian and colleagues (1988) subsequently found that African American and Hispanic youths reported greater intention to use cigarettes than white and Asian American youths. In a more recent study, involving northeastern U.S. youths in grades six through eight, Vanderschmidt and colleagues (1993) found that physical violence and sexual activity were the risk behaviors most highly associated with smoking among African American, Hispanic, and white students.

Smoking-related perceptions and risk factors also differ among older youths of different racial/ethnic backgrounds. In a study of high school seniors

Table 1. High school seniors' perceptions about the risks associated with cigarette smoking, Monitoring the Future surveys, United States, 1980–1989

		African Americans		American Indians	
Perceived risks	**Gender**	**%**	**N***	**%**	**N***
Percentage who believe that people take a great risk of harming themselves if they smoke one or more packs of cigarettes per day	Male	68.4	1,586	52.5	221
	Female	71.0	1,901	63.5	181
Percentage who believe that people disapprove or strongly disapprove of people aged 18 years and older smoking one or more packs of cigarettes per day	Male	77.6	1,717	64.1	220
	Female	80.4	2,076	63.1	210
Percentage who think their close friends disapprove or strongly disapprove of their smoking one or more packs of cigarettes per day	Male	75.4	1,193	65.2	179
	Female	80.5	1,610	69.1	155
Percentage who report that none vs. most or all of their friends smoke cigarettes					
None	Male	17.1	1,340	12.8	200
	Female	19.9	1,807	11.0	184
Most or all	Male	19.0	1,340	30.0	200
	Female	18.7	1,807	36.8	184

*The number of respondents (N) varied for each question. Each of the numbers (N) reported represents the total number of students who were asked a particular question, not the number of students who responded affirmatively.

participating in the MTF between 1980 and 1989, Wallace and Bachman (1993) found that American Indians, both males and females, were less likely than students in other racial/ethnic groups to perceive that smoking one or more packs of cigarettes per day posed a great risk to their health (Table 1). The perception that friends and people in general disapproved of smoking one or more packs of cigarettes per day was least prevalent among male and female American Indian high school seniors and most prevalent among female Asian American seniors. Finally, the percentage of students who reported that most or all of their friends smoked cigarettes was highest among American Indian seniors and lowest among Asian American seniors.

Factors Associated with Initiation of Cigarette Use

Numerous researchers have assessed patterns of cigarette use initiation among young people of various races/ethnicities. For example, Botvin and colleagues (1994) studied potential predictors of cigarette smoking onset among seventh graders in six New York schools within low-socioeconomic communities. Approximately 50 percent of the children were African American, and 36 percent were Hispanic. Statistically significant predictors for ever smoking included the absence of one or both parents, low grades in school, high prevalence of smoking among friends, and a sense of hopelessness. The data were not analyzed separately by race/ethnicity.

Asian Americans		Mexican Americans		Puerto Ricans and Latin Americans		Whites	
%	N*	%	N*	%	N*	%	N*
67.6	309	69.7	456	66.2	228	64.0	11,266
71.8	307	67.1	477	64.2	241	66.6	11,764
80.4	350	77.3	486	82.7	280	77.1	11,970
85.6	311	81.2	477	82.2	258	70.0	12,459
77.0	277	76.3	335	77.1	163	73.1	10,346
81.7	270	80.2	414	79.0	165	73.6	11,163
19.1	298	14.3	429	10.9	185	11.6	11,226
29.6	274	17.2	439	12.4	213	9.9	11,760
12.8	298	16.9	429	19.5	185	19.3	11,226
11.4	274	17.4	439	21.9	213	25.4	11,760

Source: Adapted from Wallace and Bachman 1993.

In assessing differences among racial/ethnic groups, Koepke and colleagues (1990) compared 14 potential predictors of cigarette smoking onset among seventh- through ninth-grade African Americans, Asian Americans and Pacific Islanders, Hispanics, and whites from Los Angeles and San Diego, California. The researchers found that most variables were not related to smoking onset among any of the racial/ethnic groups, and no single factor was a statistically significant predictor among all four groups. Greater anger increased the likelihood of smoking onset for African American and Hispanic youths but was unrelated to smoking onset for Asian American, Pacific Islander, and white youths. The number of close friends who had tried cigarettes was a significant predictor of smoking onset for Hispanic, Asian American, and Pacific Islander youths but not for African American or white youths. These studies underscore the variability of predictors among groups.

Peer influences also were identified in a study of sixth and seventh graders in San Diego. Elder and colleagues (1988) found that white girls, African American boys, and Asian American boys who believed that a large number of their peers smoked cigarettes were more likely to experiment with smoking. When actual continued use of cigarettes was considered, the normative belief (that a large proportion of their peers smoked) predicted cigarette smoking for Hispanic boys and for white boys and girls. These normative perceptions were most strongly associated with experimenting with chewing tobacco among white boys and girls and Asian American boys. Other studies also have found that peer smoking had a significant effect on cigarette smoking initiation. Sussman and colleagues (1987), for example, examined predictors of cigarette smoking among Southern California adolescents in Los Angeles and Orange Counties and found that peer pressure to smoke was not a predictor of smoking, although peer cigarette use was a critical predictor for Asian Americans, Hispanics, and whites (but not for African Americans). In this same study, parental pressure to smoke and knowledge of the health consequences of smoking were not associated with smoking for any group. On the other hand, three variables were statistically significant predictors for all four groups—general availability of cigarettes, difficulty in refusing offers to smoke, and intent to start smoking. The strongest predictors of cigarette smoking were different for each racial/ethnic group: for white youths, adult and peer models of smoking were the strongest predictors; for Hispanic youths, self-image as a smoker and adult or peer approval of smoking were the strongest predictors; for African American youths, preference for risk-taking was the strongest predictor; and for Asian American youths, low self-esteem and poor achievement in school were the strongest predictors.

Castro and colleagues (1987) also found that peer smoking behaviors were significantly correlated with cigarette smoking among African American, Asian American, Pacific Islander, Hispanic, and white teenagers in Los Angeles County. Disruptive family events (e.g., number of relocations) were significantly correlated with cigarette smoking among Asian American, Pacific Islander, and white youths but not among African American and Hispanic youths. In addition, law abidance, liberalism, and religiousness were significantly associated with less frequent cigarette smoking among African American, Asian American, Pacific Islander, and white youths but were associated with more frequent cigarette smoking among Hispanics. A more recent study (Landrine et al. 1994) has found that although cigarette smoking among peers is a good predictor of cigarette smoking among white adolescents, it is a less powerful predictor of cigarette smoking among African Americans, Asian Americans, and Hispanics.

The role of personal psychological characteristics in predicting cigarette smoking has also been studied in a multiracial/multiethnic setting. Among seventh graders in New York City, Bettes and colleagues (1990) found that certain psychosocial variables—negative self-esteem, positive self-esteem, psychological distress, psychological well-being, and risk-taking—had no differential effect on tobacco use, except that psychological well-being and high risk-taking were found to be particularly protective for African American seventh graders.

Factors Associated with Initiation of Smokeless Tobacco Use

Riley and colleagues (1991) found that among African Americans, American Indians, and whites, self-reported use of smokeless tobacco was associated with the perceived consequences of use, the use of alcoholic beverages and cigarettes, peers' use of smokeless tobacco, beliefs about the health consequences of smokeless tobacco use, and level of perceived control over one's own health. The strongest predictors for all groups were previous use of alcoholic beverages and tobacco and peers' use of smokeless tobacco. Perceived negative consequences were considered most important among American Indians and whites. For African Americans and American Indians, the strongest predictor of the amount of smokeless tobacco used was previous use of alcoholic beverages and cigarettes. For whites, the strongest predictor of the amount of smokeless tobacco used was peers' use of smokeless tobacco.

Summary, Initiation and Early Use of Tobacco

The limited number of studies renders the results fragmentary, but some general findings emerge. Certain categories of variables—sociodemographic, environmental, behavioral, personal, and psychological—may be related to tobacco use initiation and continued use among youths of various racial/ethnic minority groups. Some of these categories of variables may predict initiation of tobacco use for all people, regardless of their race/ethnicity (USDHHS 1994), but the predictive strength of these variables likely differs across racial/ethnic groups. Because of the methodological problems previously mentioned, the summarized findings are not comparable across racial/ethnic groups; these findings are meant to suggest a pattern rather than to convey a body of evidence. Future research must establish the strength of various predictors by using comparable and culturally appropriate measurements. In addition, several important predictors of tobacco use among racial/ethnic youth and the environmental factors surrounding it have not been thoroughly researched. One such example is the role of tobacco advertising, which has been shown to affect a number of risk factors related to smoking initiation, such as perceptions about the pervasiveness of cigarette smoking, its social acceptability, its danger, and its function in social situations (USDHHS 1994). Finally, the relative strength of a community's tobacco control infrastructure may influence behaviors and policies about tobacco and the tobacco industry. Robinson and colleagues (1995) suggested that this fact should be considered in assessments of initiation and early use of tobacco products.

Tobacco Use Among Adults

The factors associated with tobacco use among adult members of racial/ethnic groups have been studied even less than those among young people. Few studies have analyzed tobacco use among adult American Indians, Alaska Natives, Asian Americans, or Pacific Islanders, and only limited information is available on predictors of continued tobacco use among African Americans and Hispanics.

African Americans

Romano and colleagues (1991) examined the association between cigarette smoking, social support, and stress in a sample of adult African Americans in the San Francisco and Oakland areas of California. African American men and women who reported high levels of stress were more likely to smoke than those reporting fewer stressful conditions. The role of stress in cigarette smoking among adult African Americans also has been supported by the findings of Feigelman and Gorman (1989) and Ahijevych and Wewers (1993). In a national sample of adults interviewed for the 1987 General Social Survey, Feigelman and Gorman (1989) found that the highest proportion of smokers were African Americans who were exposed to high levels of stress and who had a low level of occupational prestige. In comparison, whites with low stress and high occupational prestige had the lowest proportion of smokers. African American women with underdeveloped social networks were also more likely to smoke than those with strong social support. The role of social support was not statistically significant for African American men. In fact, African American men who appeared to have little emotional support from friends or family were less likely to smoke than African American men who had such support.

American Indians and Alaska Natives

Hodge and colleagues (1996) studied adult American Indian patients in Northern California. The sample included members of the Hupa, Maidu, Pit River, Pomo, and Yurok Tribes of California as well as a number of Sioux Indians. The researchers found few differences in the type and amount of social support experienced by American Indian smokers and nonsmokers. In the urban areas of San Francisco and San Jose, American Indians who reported high levels of stress were more likely to be current smokers than those who reported lower levels of stress. American Indians living in urban areas also reported being more motivated to quit than those in rural areas.

In a study of 614 American Indian women (Eastern Band Cherokee) in western North Carolina, Spangler and colleagues (1997) found several correlates with higher prevalence of current smoking, including younger age, alcohol use, no yearly physical examination, marital status of separated or divorced, lack of friends, and lack of church participation. Having a lower level of education and having consulted an Indian healer were correlated with higher smokeless tobacco use.

Asian Americans and Pacific Islanders

In a study of adult male Vietnamese refugees living in the San Francisco area, Jenkins and colleagues (1990) found that cigarette smoking was significantly related to having immigrated to the United States within the previous nine years, not knowing that smoking causes cancer, having an income below the federal poverty level, and having limited proficiency in English. No significant associations were found between men's cigarette smoking and education, alcohol use, marital or employment status, health condition, or age. In another study, conducted between 1989 and 1991 (CDC 1992), cigarette smoking among Chinese, Vietnamese, and Hispanics in California was associated with an annual income of less than $25,000, a high school education or less, recent immigration to the United States, and limited proficiency in English.

In a survey of Southeast Asian men—primarily Cambodian, Laotian, and Vietnamese—Chen and colleagues (1993) found that compared with former smokers and persons who had never smoked, smokers were more likely to have limited proficiency in English, to be more traditional (less acculturated), and to report that almost all of their five best friends were smokers. Only about one-third of the men surveyed had heard that cigarette smoking may cause heart disease. In addition, Chen and colleagues observed no statistically significant differences in the knowledge of smoking danger reported by smokers, former smokers, or persons who had never smoked.

In a survey of 832 Cambodian, Vietnamese, and Laotian men in Ohio, Moeschberger and colleagues (1997) found that the odds of never smoking and of being a former smoker were significantly higher among men who were employed than among those unemployed. In addition, current smokers were more likely than nonsmokers to be traditional or bicultural, whereas men who had assimilated into U.S. culture were four times as likely to have quit.

Hispanics

The literature on correlates of cigarette smoking among Hispanic adults is more substantive than that for the other racial/ethnic minority groups. These studies permit exploration of the interaction of cultural pride and acculturation with other correlates of cigarette smoking (Marín et al. 1989a; Castro et al. 1991) and drug use among Hispanics (see Chapter 2).

The possible relationship between symptoms of depression and cigarette smoking was investigated by Pérez-Stable and colleagues (1990), who examined the association between smoking status (i.e., current smokers, former smokers, and those who had never smoked) and depressive symptoms in a random sample of 551 Hispanics in San Francisco. After controlling for gender, acculturation, age, education, and employment status, significant differences in depression (as measured by the Center for Epidemiological Studies Depression [CES-D] Scale) remained between current smokers and nonsmokers (both former smokers and lifetime abstainers). Current smokers had a 70 percent greater risk for having depressive symptoms than persons who had never smoked. A recent study that used data from the HHANES identified an association between patterns of smoking initiation and depressed mood, a history of major depression, or both (Escobedo et al. 1996). The belief that cigarette smoking reduces tension has been identified as a potent reason for smoking, according to researchers studying Hispanics from South America and the Caribbean who live in the New York City area (Larino et al. 1993), as well as Mexican Americans in San Francisco (Marín et al. 1989a).

To identify additional correlates of tobacco use among adult Hispanics, Lee and Markides (1991) compared three age groups of adults in a sample of Mexican Americans in the Southwestern United States who were interviewed between 1982 and 1984 as part of the HHANES. Among Mexican Americans aged 20–39 years, being a smoker was associated with the increased consumption of alcohol for both men and women, with poorer health for men, and with more depressive symptoms for women. Among Mexican American men aged 40–59 years, those who smoked cigarettes also consumed more alcohol than those who did not smoke. Among Mexican American women aged 40–59 years, those who smoked cigarettes also consumed more alcohol and had lower diastolic blood pressure, lower body mass, and more depressive symptoms than those who did not smoke. Among Mexican Americans aged 60–74 years, men who smoked were more likely to consume alcohol and coffee and to have lower body mass than men who did not smoke; women who smoked were also more likely to consume coffee and alcohol than those who did not smoke. A Mexican American subsample of the HHANES showed that cigarette smoking was associated with the presence of other smokers at home or at the workplace and with the respondent's level of acculturation (Coreil et al. 1991). These data also showed that cigarette smoking status was not related to educational level or to employment status but that age was positively associated with the number of cigarettes smoked per day among younger men and women aged 20–39 years. A study of Hispanic adults in New Mexico (Samet et al. 1992) found a relationship between low levels of formal education and prevalence of cigarette smoking. Low socioeconomic status, often indicated by education, was also related to cigarette smoking in that study.

A number of studies conducted in San Francisco have compared the psychosocial characteristics of Hispanic smokers with those of white smokers. These studies provided an understanding of culture-specific differences in attitudes, norms, and expectancies of smokers and served as the basis for developing a culturally appropriate smoking cessation intervention—Programa Latino Para Dejar de Fumar (Hispanic Program to Quit Smoking) (see Chapter 5). In one such study (Marín et al. 1990a), Hispanic smokers were significantly more concerned than white smokers about harming their children's health. White smokers, on the other hand, were significantly more concerned than Hispanic smokers about burning holes in their clothes and feeling controlled by the need to smoke. White smokers were more likely than Hispanic smokers to view other smokers as friendlier and more sociable, aggressive, attractive, and feminine than nonsmokers (Marín et al. 1989b). More acculturated Hispanics provided responses that more closely resembled the responses of whites than the responses of less acculturated Hispanics (Marín et al. 1989b). Acculturation also was found to affect an individual's willingness to quit smoking on the basis of advice from his or her parents and physicians. Similarly, in a New York City area survey of 88 Hispanics who expressed interest in quitting cigarette smoking, Mahony and colleagues (1993) found that their reasons for smoking differed by their level of acculturation.

Summary, Tobacco Use Among Adults

A few variables have been associated with the continued use of cigarettes among adults from racial/ethnic groups. Cigarette smoking among members of the four racial/ethnic groups seems to be associated with depression, psychological stress, and environmental factors such as tobacco advertising and promotion and the influence of peers who smoke. The high levels of stress among members of the four racial/ethnic groups may be the product of such factors as low-prestige jobs; poverty; difficulties associated with living in a new environment or culture; limited proficiency in English; prejudice and discrimination; pressures to acculturate; limited free time; and multiple demands on time related to jobs, substandard housing, and the care of small children. Smoking cessation programs directed at members of these racial/ethnic groups should address stress reduction in the same way that tobacco prevention and control strategies should consider the historical context of tobacco and the tobacco industry in the community and cultural differences among racial/ethnic minority communities.

These data also indicate that Hispanic smokers have expectations and attitudes related to cigarette smoking that differ from those of white smokers—a finding that supports the need for culturally appropriate cessation interventions. Future studies should determine if similar differences in expectancies and attitudes exist among smokers of the other three racial/ethnic groups considered in this report. The limited data available support the need for more and better designed studies of tobacco use among members of the various racial/ethnic groups.

Smoking Cessation

Little is known about the psychosocial factors that influence cigarette smoking cessation among members of racial/ethnic groups. Although people's level of addiction is an important determinant of whether they will successfully stop smoking, limited information is available on patterns of addiction among members of various racial/ethnic groups. (For more information on patterns of addiction, see Chapter 3. For details about other variables that affect smoking cessation, such as smoking patterns and access to culturally appropriate cessation services, see Chapters 2 and 5.)

African Americans

Knowledge about the damaging effects of smoking can be an important motivator of smoking cessation (Orleans et al. 1989; Jepson et al. 1991; also see Chapter 5). Studies of African Americans' knowledge about the health consequences of tobacco smoking have produced contradictory findings. Klesges and colleagues (1988), for example, interviewed African American and white adults in Fargo, North Dakota, and Memphis, Tennessee, and found that proportionately more whites than African Americans knew that cigarette smoking was related to heart attacks, emphysema, premature births, and skin wrinkles. Similarly, Vander Martin and colleagues (1990) found that African Americans from the San Francisco Bay area who smoked cigarettes were less concerned about the health effects of cigarette smoking than were whites who smoked. African Americans also were less likely to believe that cigarettes were addictive, produced harmful health effects, or caused heart attacks.

Conversely, in a 1990 study in St. Louis and Kansas City, Missouri, Brownson and colleagues (1992) found that about the same percentage of African Americans and whites believed that smoking was harmful to people's health. Although African Americans recognized the harmful effects of environmental tobacco smoke (ETS), they tended to minimize some of the health effects of smoking, particularly its link with heart disease. Similarly, an ABC News/*The Washington Post* survey conducted in February 1993 found that a large proportion of African American and white adults perceived ETS to be a health risk (Roper Center for Public Opinion Research 1993). In that poll, however, a greater proportion of African Americans than whites reported that they worried a great deal about ETS. In studies limited to African Americans, researchers have reported differences based on smoking status. Warnecke and colleagues (1978) interviewed African American women in Buffalo, New York, and found that current smokers were less likely to say they believed that cigarette smoking was related to a variety of conditions, including cancer and heart disease, than were former smokers or persons who had never smoked.

Most African American smokers want to quit, and many have tried. In a 1986 study of African American smokers who were policyholders of the North Carolina Mutual Life Insurance Company, Orleans and colleagues (1989) found that 79.3 percent of respondents had tried to quit smoking at least once in their lifetime. Hoffman and colleagues (1989) found that most of the patients in a general community hospital in Chicago who smoked reported previous attempts to quit on their own, and 65 percent wanted to stop smoking immediately. More than two-thirds of these African American smokers indicated that they would like a formal program to help them quit smoking. In a more recent survey, Ahluwalia and McNagny (1993) found that among all African American patients visiting a county-operated health facility in Atlanta, Georgia during a three-week period, 86 percent of the smokers wished to quit. Ninety-nine percent of those who wanted to quit smoking indicated they would participate in a smoking cessation program even if it involved visits to the hospital. According to data from the 1993 NHIS (CDC 1994b), 71.4 percent of African Americans aged 18 years or older who currently smoked were interested in quitting.

Royce and colleagues (1993) used a sample drawn from metropolitan communities in California, New Jersey, New York, and North Carolina as part of the Community Intervention Trial for Smoking Cessation (COMMIT) project and found that more African Americans than whites reported a strong desire to quit smoking and more attempts to quit in the past year. These researchers also observed that a larger percentage of African Americans than whites reported a need to smoke within 10 minutes of awakening (a behavioral symptom of nicotine dependence), even after the analysis controlled for age, education, and gender. In the San Francisco Bay area study by Vander Martin and colleagues (1990), African American adult smokers were more interested in quitting smoking than were white adult smokers and were also more confident that they could successfully quit.

When smoking cessation trends are compared, a different pattern emerges by gender. Hahn and colleagues (1990) found a slightly higher proportion of white women in Minneapolis and St. Paul (33 percent) than of African American women (29 percent) who reported trying cigarettes with lower levels of tar and nicotine in the previous year, and a higher proportion of white men (63 percent) than African American men (52 percent) reporting that they had tried to quit smoking.

In their study of African American women in Buffalo, New York, Warnecke and colleagues (1978) found that many women who had quit smoking attributed their quitting to the fact that cigarette smoking causes cancer (44 percent) or other diseases (45 percent); to physical side effects such as coughing or headaches (36 percent); or to negative cosmetic effects such as bad breath, stained teeth, or bad smell (34 percent). More recently, in a series of eight focus group discussions with African American women smokers residing in Chicago public housing developments, respondents said that quitting was difficult for them because they lived in a highly stressful environment that made it difficult to manage their personal lives (Lacey et al. 1993). Cigarette smoking was one of the few pleasures available to them in such an environment, and the women had few if any sources of information on how to quit smoking. In addition, these women tended to believe that cigarette smoking posed minimal health risks, that the behavior was quite common among other adults, and that all that was needed to quit was the willingness to do it. In a study of urban pregnant women, O'Campo and colleagues (1992) found that the only predictor of quitting smoking during pregnancy for African American women was intention to breast-feed, whereas among white women, the best predictors were educational level, age, and parity. About 46 percent of African American women who quit smoking during pregnancy relapsed within 6–12 weeks after delivery. Formula feeding of the infant was the best predictor of postpartum smoking relapse for both African American and white mothers.

American Indians and Alaska Natives

Few studies have focused on smoking cessation among American Indians, and no studies have addressed smoking cessation trends among Alaska Natives. In a survey of American Indians in Northern California, respondents were found to have fairly high levels of information regarding the health effects of cigarette smoking (Hodge et al. 1994). For example, a similar proportion of urban (94 percent) and rural (91 percent) American Indian smokers knew that smoking during pregnancy would harm the fetus. Although American Indian smokers were as knowledgeable as nonsmokers regarding the health effects of cigarette smoking, attitudes about smoking differed between the two groups. American Indian smokers were more likely than nonsmokers to think that it is acceptable to smoke and chew tobacco, to permit the advertising of tobacco products, to let visitors smoke in one's home, and to allow smoking in restaurants. In addition, American Indian women who smoked reported a greater number of depressive symptoms (as measured by the CES-D) than nonsmoking women. However, researchers observed no differences in the number of depressive symptoms among men who smoked compared with men who did not smoke. A fairly large number of American Indians reported that they were not interested in quitting (45 percent of residents in urban areas and 55 percent of residents in rural areas). In the 1993 NHIS, however, 65.0 percent of American Indian or Alaska Native smokers aged 18 years or over reported that they wanted to quit smoking cigarettes completely (CDC 1994b). In another study of current smokers who were patients at Indian health clinics, Lando and colleagues (1992) found that the most commonly mentioned reasons for relapse were cravings, stress, nervousness, and the pressure to smoke in social situations.

Asian Americans and Pacific Islanders

Little has been published about smoking cessation among Asian Americans and Pacific Islanders. In one study that addressed this issue, Jenkins and colleagues (1990) found that among adult Vietnamese refugees living in the San Francisco area, 82 percent of smokers wanted to quit, but 71 percent of them felt that quitting would be difficult. About 69 percent of the Vietnamese smokers had been advised by their physicians to reduce or quit smoking. Lack of information about the health consequences of cigarette smoking is a problem among some Asian American groups. In a study of Chinese Americans in Oakland, California, Lew (1992) found that 53 percent of the respondents did not know that heart disease was associated with cigarette smoking, and 26 percent of them said they did not know that lung cancer was related to cigarette smoking. Of current Asian American or Pacific Islander smokers aged 18 years or more in the 1993 NHIS, 60.2 percent reported being interested in quitting smoking completely (CDC 1994b).

Hispanics

Several studies have examined what motivates adult Hispanic smokers to quit. Marín and colleagues (1990b) found that family-related consequences and concerns (e.g., to set a good example for one's children) contributed more to Hispanics' desire to quit smoking than to whites' desire to quit. Hispanic smokers who intended to quit believed that by doing so they would improve family relations, breathe more easily, and have a better taste in their mouths. They also believed that they would gain weight. In an earlier study, Hispanic smokers who subjectively considered themselves to be highly addicted to tobacco had the lowest levels of perceived self-efficacy to avoid cigarette smoking (Sabogal et al. 1989). The level of perceived self-efficacy to avoid smoking also declined as the reported number of cigarettes smoked per day increased. In the 1993 NHIS, 68.7 percent of Hispanic smokers aged 18 years or over said they wanted to quit smoking cigarettes entirely (CDC 1994b). Research with Hispanic adults has shown that their expectancies for quitting and for continued cigarette smoking differ in terms of their level of acculturation so that those Hispanics who have acculturated more tend to resemble whites in their expectations (Marín et al. 1989a, 1990b).

Summary, Smoking Cessation

Although the literature on predictors or correlates of smoking cessation among members of these four racial/ethnic minority groups is limited, an important theme emerges from the studies reviewed in this section. Some studies, primarily those of African Americans (see also Chapter 5), have shown that smokers tend to report having little knowledge of the health effects of smoking or techniques to quit smoking. Smokers' lack of information about cessation techniques available in the community is consistent with underdeveloped tobacco control infrastructures and the low levels of resources for research and program delivery (Robinson et al. 1995; Shelton et al. 1995). Information alone is not enough to produce a behavior change as complex as quitting, but information on the health consequences of smoking is still perceived by some researchers as necessary to develop the motivation to quit. Information on resources and techniques for quitting may also be essential for the success of a smoking cessation program. The lack of information may appear surprising in view of the decades-long smoking education campaigns conducted by federal and state agencies and voluntary associations, but it is consistent with the thesis that resources allocated for tobacco control research and programs have been proportionately lower in racial/ethnic communities than in white communities (Robinson et al. 1995). Equally important, information may not have been presented through appropriate channels, and the motivational messages may not have been culturally appropriate (see Chapter 5).

This literature review has identified several areas for which more appropriate approaches are needed. First, the effects of stress and depression on attempts to quit smoking are particularly important among members of racial/ethnic groups. Culturally appropriate cessation interventions need to identify the sources of stress and then present stress-reduction techniques that are perceived as appropriate and effective by members of racial/ethnic groups. Second, group-specific motivations and attitudes predict a person's interest in and success at quitting smoking. Future research should focus on group-specific attitudes and expectancies as well as those that are shared by racial/ethnic groups. The effects of acculturation and group identification also need to be addressed, particularly because research involving Hispanics has shown that acculturation plays an important role in shaping the attitudes and expectancies held by Hispanic smokers (Marín et al. 1989a; 1990a,b).

In summary, the distinctive psychosocial environment of disparate racial/ethnic minority groups requires that additional tailored intervention materials be designed. Existing smoking cessation programs and strategies currently designed for the general population cannot simply be adapted or translated for use with a particular racial/ethnic group (see Chapter 5 for more discussion of cessation).

Methodological Limitations of the Literature

The content of the literature must be interpreted in light of its methodological limitations. The weaknesses of the studies demand caution, but on a more positive note, they suggest appropriate directions for future research. These limitations fall into four main categories: (1) nongeneralizability, (2) noncomparability, (3) sample size and aggregation problems, and (4) nonreporting.

Nongeneralizability. Most studies of psychosocial factors in racial/ethnic groups have been conducted in big cities such as Chicago, Los Angeles, New York, and San Francisco. Some of the findings may not apply to persons residing in smaller cities or rural areas where the psychosocial environment that influences tobacco use may differ from that in large urban areas or racial/ethnic enclaves in large cities.

Similarly, primary prevention research in this field has relied heavily on urban school populations. Most studies have excluded school dropouts; students attending alternative, parochial, or private schools; those housed in detention facilities; those living and working in rural environments; and other at-risk youths, and therefore may have limited generalizability.

Noncomparability. Many studies have used different variables to measure the same phenomenon, or they have measured the same variables differently. Differential instrumentation (Cook and Campbell 1979) is a problem because a construct may not only differ in meaning from one culture to another, but its appropriate measurement (operationalization) may also differ (Berry 1969; Triandis and Marín 1983; Marín and Marín 1991). For example, if a risk factor survey initially developed for a white population is administered unchanged to African Americans or Hispanics, it may prove to be culturally inappropriate and invalid. Instead, researchers should consider what meanings the survey terms or constructs have for the group members (Brislin et al. 1973). Few researchers have conducted the basic ethnographic and psychosocial research needed to identify these culture-specific constructs. With the exception of some investigators who have studied smoking cessation among Hispanics (discussed earlier in this chapter), most researchers have ignored a central assumption of cross-cultural research—that equivalent and culturally appropriate instrumentation must first be developed and used.

Another difficulty in analyzing and comparing studies of tobacco use among young respondents is that the studies rarely measure comparable behaviors. For example, some researchers attempt to predict the first instance when a person uses a tobacco product. Other researchers, primarily in cross-sectional studies, use their data to predict current reported tobacco use and assume that those variables may help explain initiation of tobacco use.

Aggregation problems. A common problem with some of the studies reviewed in this chapter is that racial/ethnic populations have not been assessed separately from larger populations. For example, some studies of African Americans and whites have failed to separate these groups when reporting the results. Other studies, particularly those with small sample sizes, have not separated subgroups within racial/ethnic minority groups—for example, distinguishing Chinese from Vietnamese—even when such separation is essential to properly understanding the results. Such results would be difficult to reproduce without knowledge of the population mix.

Nonreporting. The data summarized in this chapter are further limited by a bias in the reporting of results. Some researchers report only significant results and fail to indicate the equally important observation that some associations are not significant. This limitation can negatively affect the design of culturally appropriate prevention strategies. In addition, few of the studies reviewed in this chapter adequately describe the procedures followed or the data collected. Properly understanding the meaning and measurement of many of the variables included in these research reports is difficult because of the paucity of detail. Finally, few of these studies have reported on issues of statistical power in their designs, which frequently are characterized by a small sample and a large number of variables.

Despite such limitations in the quality and comparability of data, these studies identify the variables that should be the focus of future research and variables that need to be considered in culturally appropriate prevention programs (see Chapter 5).

Chapter Summary

Tobacco use patterns are influenced by many factors. In addition, the factors themselves and their importance in influencing tobacco use vary among racial and racial/ethnic groups. Some common experiences and themes, however, emerge: the targeted advertising and promotions through racial/ethnic-specific media channels, the influence of peers who smoke on initiation of tobacco use, the association of depression and stress with cigarette smoking and cessation among adults from different racial/ethnic groups, and the influence of acculturation. Psychosocial variables help explain individual tobacco use behavior. Tobacco advertising and promotion are influential because they appear to affect the perceived sense of pervasiveness, function, and image of tobacco use, which in turn affect these psychosocial variables. Another possible influence is the historical relationship between racial/ethnic minority communities and the tobacco industry. Most likely, it is not any one single factor but the interplay or convergence of these factors that significantly influences both a person's decision to use tobacco and the resulting tobacco use patterns. The effects of each factor have so far eluded quantification by researchers based on available evidence; more research is needed to better understand the etiology, exposure, and effects of these factors.

Conclusions

1. The close association of tobacco with significant events and rituals in the history of many racial/ethnic communities and the tobacco industry's long history of providing economic support to some racial/ethnic groups—including employment opportunities and contributions to community groups and leaders—may undermine prevention and control efforts.

2. The tobacco industry's targeted advertising and promotion of tobacco products among members of these four U.S. racial/ethnic groups may undermine prevention and control efforts and thus lead to serious health consequences.

3. The high level of tobacco product advertising in racial/ethnic publications is problematic because the editors and publishers of these publications may omit stories dealing with the damaging effects of tobacco or limit the level of tobacco-use prevention and health promotion information included in their publications.

4. Although much of the original research on psychosocial factors that influence tobacco use reflects general processes that may apply to racial/ethnic populations, documenting such generalizability requires further research.

5. The initiation of tobacco use and early tobacco use among members of the various racial/ethnic minority groups seem to be related to numerous categories of variables—such as sociodemographic, environmental, historical, behavioral, personal, and psychological—although the predictive power of these categories or of specific risk factors is not known with certainty because of the paucity of research.

6. Cigarette smoking among members of the four racial/ethnic groups is associated with depression, psychological stress, and environmental factors such as advertising and promotion and peers who smoke, as is also the case in the general population. The role of these factors in tobacco use among members of these racial/ethnic groups deserves attention by researchers and persons who develop smoking prevention and cessation programs.

Appendix. A Brief History of Tobacco Advertising Targeting African Americans

A previous report of the Surgeon General (USDHHS 1994) presented a brief historical perspective of cigarette advertising in the United States focusing on advertising strategies targeting youths. Because targeted marketing to other racial/ethnic groups is a more recent phenomenon and because information about this practice with African Americans is more available, this appendix focuses on advertising to African Americans. This appendix updates the review in the 1994 Surgeon General's report, particularly as it relates to African Americans.

Early Assumptions

A significant proportion of cigarette advertising targeting African Americans was based on the belief that consumer behavior among African Americans differs from that of whites. In the 1950s, a primary belief of advertising agencies working on cigarette advertising was that status-seeking was a central motivator of African Americans. A survey of *Ebony* readers, published in *Advertising Age* (1950), showed that "prestige and quality—not cost—are the most important factors to stress when appealing to colored buyers. Because of the psychological considerations involved, Negroes are extremely desirous of being identified as customers who recognize and demand quality merchandise" (p. 17).

Another early assumption of advertising agencies targeting African Americans was that advertisements featuring African American models were more effective—or at least more appealing to African

Americans—than advertisements portraying whites. In a 1950 survey of the buying habits and motivations of African Americans, Starch and colleagues found that the majority of *Ebony* readers preferred advertisements featuring African American models, although about one-third of the African American respondents said that it did not matter whether African American models were used (*Advertising Age* 1950). In a later study of consumer reactions to the use of white or African American models, 93 white and 88 African American college freshmen in Houston were asked to react to four cigarette advertisements, indicating whether the models were ugly or beautiful, low class or high class, and friendly or unfriendly (22 bipolar scales were presented) (Barban and Cundiff 1964). In general, the cigarette advertisement with white models and the same advertisement with African American models drew similar reactions from whites and African Americans. In a more recent study, however, African Americans who strongly identified with their culture were more likely to prefer African American models (Whittler 1989). Another recent study has shown that African American college students preferred television commercials for consumer products that included African American models (Pitts et al. 1989). These findings were replicated recently among African American Chicago youths aged 12–14 years who perceived African American models in cigarette advertisements as more appealing (Huang et al. 1992).

A central belief related to targeted advertising and marketing is the assumption that members of racial/ethnic groups, particularly African Americans and Hispanics, are brand-conscious and brand-loyal consumers. This approach to purchasing is believed to motivate consumers to spend extra money to purchase a product with a recognized brand name or a product that has been used by family members and neighbors for a relatively long period of time. Large multinational brand names often are associated with quality in the immigrants' countries of origin, and purchasing of those brands in the United States may serve as an example of having "arrived" or achieved a sought-after economic status. Other researchers hypothesize that previous consumer experiences and an increase in disposable income produce brand consciousness. For example, Dallaire (1955) argued that "the Negro's desire to improve his lot, his increasing income and the fact that he's been burned so badly and so often in the past with shoddy merchandise makes him a highly brand-conscious consumer" (p. 58). Whether brand loyalty is indeed a characteristic of certain racial/ethnic minority groups continues to be debated (Deshpande et al. 1986; Donthu and Cherian 1992); however, this assumption often has been invoked in the design of advertising directed at members of racial/ethnic groups.

Promotional campaigns directed at African Americans and members of other racial/ethnic groups also operate under the assumption that these individuals are more likely than whites to trust advertising, although most of the studies on which this perception is based have been limited by methodological flaws such as nonrandom sampling and a small sample size. In a 1961 study of 1,106 African Americans and 537 whites, about twice as many whites as African Americans had unfavorable attitudes toward all types of advertising (Bullock 1961). In a 1968 study of 1,846 persons, the 77 African Americans interviewed had the highest proportion (53 percent) of favorable responses to the open-ended question "How do you yourself feel about advertising?" compared with 1,707 whites (40 percent) (Bauer and Greyser 1968). Eleven years later, Durand and colleagues (1979) interviewed 80 persons and found that African Americans were consistently more trusting of television and newspapers than whites were, and they relied less on magazine advertisements. Soley and Reid (1983) interviewed a random sample of 185 Atlantans and found that African Americans were more satisfied with the informational value of magazine and television advertising than whites were and that high-income respondents were the least satisfied with advertising.

Early Targeted Advertising Efforts (1940s–1960s)

Turn-of-the-century advertisements for tobacco products tended to include women, to emphasize female sexuality, and to portray women as dangerous and delightful. Conversely, American Indians and African Americans often were pictured as childlike and unattractive (Mitchell 1992). Tobacco companies have depicted African Americans in their advertisements since the first Bull Durham advertisements appeared at the turn of the century, but only since the 1940s have they aggressively targeted African Americans as a distinct consumer market.

In the decades that have followed, tobacco companies have been described as "bold pioneers in both their use of new media and their targeting of other segments even when controversial" (Pollay et al. 1992, p. 49). In 1942, the advertising agency of the Lorillard Tobacco Company, J. Walter Thompson Company, began to monitor cigarette sales in African American neighborhoods as part of an Old Gold cigarette promotion (Pollay 1988). By 1948, Philip Morris was running its "no cigaret hangover" campaign in the African American press and in daily newspapers published in languages other than English (*Tide* 1948, p. 18). By 1955, several cigarette companies, including Philip Morris, were producing advertising materials targeting African Americans and Hispanics (*Printers' Ink* 1955). Soon thereafter, Philip Morris began placing point-of-sale materials in English as well as Spanish for the newly repositioned Marlboro cigarettes (Ullman Gravure, Inc. 1957). A decade after tobacco firms first displayed an interest in African American consumers, the firms were described as "leaders among advertisers gunning for a bigger share of the Negro market" (Dallaire 1955, p. 58).

One of the earliest targeting efforts, conducted on behalf of Liggett & Myers's Chesterfield cigarettes, targeted African Americans via advertisements featuring athletes' testimonials and placed in racial/ethnic newspapers and magazines, such as *Ebony*, *Our World*, and *Tan*. The company also launched an extensive point-of-sale advertising campaign featuring African American sports figures (Dallaire 1955). The campaign included a series of six documentary films that presented African American achievements. Each film was viewed by about 3 million people in 500 primarily African American theaters. These films also were shown at more than 100 African American colleges, where free cigarette samples were distributed, reaching an estimated 900,000 additional people. The success of this effort led to the filming of 13 five-minute films featuring interviews with African American celebrities (Dallaire 1955).

The 1950s also marked the introduction of mentholated cigarettes. Although a greater proportion of African Americans now smoke mentholated cigarettes compared with members of other racial/ethnic groups (Chapter 2), no evidence exists that the menthol market was initially conceived as having any special appeal to African Americans or other racial/ethnic groups. Mentholated cigarettes are relative newcomers to the tobacco market, and they have been well received by smokers. In 1956, Brown & Williamson's mentholated and then unfiltered Kool cigarette enjoyed an increasing market share that attracted its competitors to introduce mentholated cigarettes with filters. These competitors and their entries included R.J. Reynolds's Salem, Philip Morris's Spud, Liggett & Myers's Oasis, and Lorillard's Newport cigarettes. By the end of 1957, 5 percent of all cigarettes consumed were mentholated, representing "a relatively sharp gain for a fledgling cigarette movement exploring a new taste" (Wootten 1957, p. 22).

By 1959, The American Tobacco Company, the only firm without a mentholated cigarette, was preparing to market a cigarette tentatively called Richmond. The campaign concept allegedly argued that the Richmond cigarette "gives you all of smoking's pleasure, with none of its penalties" (*Printers' Ink* 1959a, p. 12). Around the same time, Brown & Williamson was ready to test market a second menthol brand, Belair, and was introducing three other menthol brands into the market—Riviera, Spring, and Alpine (*Printers' Ink* 1959c). Tobacco companies also were beginning to use technical jargon to market their menthol products. For example, in 1959, advertising professionals described R.J. Reynolds's advertisements for Salem as "breathlessly reporting 'an amazing new development' in copy that was both opaque and studded with scientific jargon" to inform consumers about the highly porous paper that "air softens every puff. There are, obviously, just no limits to the company's tender regard for the smoker" (*Printers' Ink* 1959b, p. 8).

In a study of early cigarette advertisements targeting African Americans, investigators compared a complete set of cigarette advertisements from *Ebony* for the years 1950–1965 with a matched set of advertisements from *Life* (Pollay et al. 1992). The results, which follow, are important in promoting a better understanding of the principles followed in advertising targeted to African Americans.

By 1965, all six major U.S. cigarette firms had advertised in the pages of *Ebony* as well as *Life*. While the cigarette advertising in *Life* increased over the years, particularly between 1963 and 1965, the amount of such advertising in *Ebony* more than tripled during the same period. *Ebony* initially had fewer cigarette advertisements (16 in 1950) than *Life* (31 in 1950), but a dramatic increase in efforts targeting African Americans soon led *Ebony* to have more than twice the number of cigarette advertisements (57 in 1962) as *Life* (28 in 1962) (Pollay 1990; Pollay et al. 1992). An analysis of the page costs indicated that this pattern was not related to the relative costs of the two magazines nor was it likely related to cigarette firms' joining other firms to offer their products to African Americans through African American-owned media. Although this was a period of general growth for *Ebony*, "cigarette firms increased their spending and page acquisition even more than the average, keeping themselves out in front of the pack" and making cigarette firms the source of an estimated 6.5 percent of *Ebony*'s total advertising income in 1962 (Pollay et al. 1992, p. 54).

The investigators also found that the manifest race/ethnicity of the models portrayed in cigarette advertisements increased between 1950 and 1965. Out of the 540 cigarette advertisements in *Ebony*, more than 84 percent featured identifiable human models, and more than 90 percent of those used African American models. In the early 1950s, the white endorsers who occasionally appeared in *Ebony* included physicians who claimed "more doctors smoke Camels" and television and movie stars (Pollay et al. 1992). Since 1958, virtually all models in *Ebony*'s cigarette advertisements have been African American. Yet none of the African American cigarette endorsers appearing in *Ebony* advertisements have appeared in *Life* advertisements, not even the widely popular sports stars and musicians.

During the early years of targeted advertising, professional athletes were most often featured in cigarette advertisements. Sports stars were used in advertisements even when the advertising copy was inconsistent with athletics. A Lucky Strike cigarette advertisement in *Ebony*, for example, referenced scientific tests in 1950 but showed a picture of an African American Olympic athlete. These advertisements sometimes differed from advertisements appearing in media targeting the general population. In 1960, Kent cigarettes illustrated its "scientist's choice" campaign in *Ebony* with another Olympic champion, not with a scientist as was done in the advertisement placed in *Life*. Although athletes also appeared in cigarette appeals to the larger public, "cigarette ads aimed at black readers of *Ebony* were significantly more likely to use athletes than those aimed at white readers of *Life*. For 1950–1965, endorsements from athletes were about five times more common in *Ebony* than in *Life*" (Pollay et al. 1992, p. 51).

Although most tobacco-producing companies were targeting the African American market through *Ebony*, these companies advertised significantly fewer cigarette brands in *Ebony* than in *Life* (Pollay et al. 1992). Advertising of new products seems to have lagged in African American publications. Whereas advertisements for filtered tobacco products first appeared in *Life* in 1953 and made up one-half of all cigarette advertising in *Life* by 1955, advertisements for filtered tobacco products did not appear in *Ebony* until 1955 and did not represent one-half of its cigarette advertising until 1958, three years later than for *Life*.

Recent Targeted Advertising Efforts (Late 1960s–1980s)

By the late 1960s, with racial/ethnic pride enhanced by the success of the civil rights movement, the nature and appeal of advertising began to change to better tailor the contents of the advertisements to targeted racial/ethnic groups. In an analysis of advertisements for all consumer products in selected issues of *Ebony* and *Life* in 1960, Berkman (1963) found that in about two-thirds of the advertisements featuring models, African American models were substituted for white models in advertisements placed in *Ebony*, although the content of the advertisements was basically identical. The African American models initially featured were predominantly light skinned, according to Berkman (1963), but subsequent studies of all *Ebony* advertisements between 1952 and 1968 showed that the use of male models with more African American features and hair texture became more common over time, whereas the advertisements continued to use female African American models with Caucasian features (Gitter et al. 1972; Weiss 1972).

Cigarette advertising has changed in similar ways. In the late 1960s, Lorillard's advertisements for Kent cigarettes featured an African American model wearing an Afro hairstyle and saying "that's where it's at" (*Advertising Age* 1968, 1969). By 1971, Liggett & Myers employed an advertising agency that specialized in targeting the African American market. The agency's campaign for L&M cigarettes featured a slogan that called the brand "super bad" (meaning excellent), and research indicated the advertisement had "great appeal among members of the black community" (*Advertising Age* 1971a, p. 20).

Not all cigarette advertisements aimed at African Americans have been successful at employing meaningful role models or at credibly using street or popular language. One African American marketing professional asserted that neither the Marlboro cowboy nor the Viceroy race car driver was meaningful to most African Americans and that Winston's use of the phrase "How good it is!" in a racial/ethnic advertisement was a "white man's cliché that retired with Jackie Gleason." In contrast, Kool's slogan, "Come all the way up to Kool, America's #1 selling menthol," was lauded for astutely positioning the leader as a sign of upward mobility (Wall 1973, p. 71).

In the 1970s, Liggett & Myers began targeting African American women with advertising for its "arty female oriented" Eve cigarettes by running advertisements with African American models in *Black America Magazine*, *Black Enterprise*, *Ebony*, *Essence*, *Jet*, *New Lady*, and *Tuesday Magazine* (*Advertising Age* 1971b, p. 24). The next year, Liggett & Myers began promoting L&M cigarettes to African American men and women via advertisements in African American magazines, including *Contact*, *National Scene*, and *Soul Illustrated*

(*Advertising Age* 1971a). In 1974, Kool cigarette advertisements in African American magazines featuring African American models used the copy "Nobody makes cool like Kool" (*Advertising Age* 1974, p. 76).

During the mid-1970s, products targeted to African Americans began to emerge. For example, R.J. Reynolds created an extra-strong menthol product, Salem Extra, which was advertised as offering "different smokes for different folks." The cigarette was market-tested in Birmingham and New Orleans through outdoor advertisements as well as newspaper and regional magazine advertisements that were supported by sampling. These efforts indicated to the advertising trade that Salem Extra should be targeted to African Americans, along with another extra-strong menthol brand, Super M, which was being tested by The American Tobacco Company in Pittsburgh (O'Connor 1974).

In the late 1970s, tobacco companies began using billboards to advertise cigarettes in racial/ethnic minority communities. Over the past two decades, billboards have appeared more frequently in commercially zoned areas and in older, poorer, and otherwise less desirable residential neighborhoods that border major highways and mass transit systems. In surveys of six cities in the late 1980s, Scenic America, a national organization opposed to billboards, found far more billboards advertising tobacco products in minority neighborhoods than in other neighborhoods (McMahon and Taylor 1990). For example, 76.7 percent of advertising messages on billboards in one impoverished African American community in Philadelphia were for alcoholic beverages and tobacco products. In San Francisco, 62 percent of the billboards in predominantly African American neighborhoods advertised cigarettes, compared with 36 percent of all billboards citywide (McMahon and Taylor 1990). According to the Outdoor Advertising Association of America Marketing Division, tobacco companies are the leading outdoor advertisers, accounting for approximately one-third of all billboards (McMahon and Taylor 1990). Furthermore, data for 1988 show that cigarettes are the most heavily advertised product in outdoor media (CDC 1990a). A study conducted in Columbia, South Carolina, confirmed that African American communities have 2.6 times as many billboards advertising cigarettes as white communities have (Mayberry and Price 1993).

In the late 1970s, cigarette producers and their advertising agencies were becoming very aware of the significance of the African American market, as exemplified by this quotation from a well-known advertising agency: "While Blacks represent only 10.3% of the total U.S. population, they account for 18% of all smokers and 31% of all menthol smokers" (Rosser Reeves Inc. 1979, p. 12). As a result, tobacco companies have heavily advertised and promoted cigarettes to racial/ethnic minorities, particularly African Americans.

References

Advertising Age. "Ebony" survey reveals Negro buying habits. *Advertising Age* 1950;21(35):16–7.

Advertising Age. Use of Negro models in ads won't reduce sales to whites, Johnson advises workshop. *Advertising Age* 1968;39(50):24.

Advertising Age. Black is not only beautiful, it's profitable. *Advertising Age* 1969;40(16):94.

Advertising Age. L&M cigaret[te]s pitched to blacks as "super bad." *Advertising Age* 1971a;42(31):20.

Advertising Age. Print ads push Eve cigaret[te]s to black women. *Advertising Age* 1971b;42(19):24.

Advertising Age. Brown & Williamson Tobacco [Co.]. *Advertising Age* 1974;45(34):76–80.

Ahijevych K, Wewers ME. Factors associated with nicotine dependence among African American women cigarette smokers. *Research in Nursing and Health* 1993;16(4):283–92.

Ahluwalia JS, McNagny SE. Smoking prevalence and desire to quit in inner-city African American walk-in clinic patients. *Clinical Research* 1993;41(4):752A.

Ajzen I, Fishbein M. The prediction of behavior from attitudinal and normative variables. *Journal of Experimental Social Psychology* 1970;6(4):466–87.

Altman DG, Schooler C, Basil MD. Alcohol and cigarette advertising on billboards. *Health Education Research* 1991;6(4):487–90.

Assael S. Why big tobacco woos minorities. *Adweek's Marketing Week* 1990;XXXI(5):21–30.

Barban AM, Cundiff EW. Negro and white response to advertising stimuli. *Journal of Marketing Research* 1964;1(4):536.

Basil MD, Schooler C, Altman DG, Slater M, Albright CL, Maccoby N. How cigarettes are advertised in magazines: special messages for special markets. *Health Communication* 1991;3(2):75–91.

Bauer RA, Greyser SA. *Advertising in America: The Consumer View. A Report and Interpretation of the American Association of Advertising Agencies' Study on the Consumer Judgment of Advertising.* Boston: Harvard University, Graduate School of Business Administration, 1968.

Begay ME, Traynor M, Glantz SA. The tobacco industry, state politics, and tobacco education in California. *American Journal of Public Health* 1993;83(9):1214–21.

Benson PL, Donahue MJ. Ten-year trends in at-risk behaviors: a national study of black adolescents. *Journal of Adolescent Research* 1989;4(2):125–39.

Bergin R. *Sponsorship and the Arts: A Practical Guide to Corporate Sponsorship of the Performing and Visual Arts.* Evanston (IL): Entertainment Resource Group, 1990.

Berkman D. Advertising in "Ebony" and "Life": Negro aspirations vs. reality. *Journalism Quarterly* 1963; 40(1):53–64.

Berry JW. On cross-cultural comparability. *International Journal of Psychology* 1969;4(2):119–28.

Bettes BA, Dusenbury L, Kerner J, James-Ortiz S, Botvin GJ. Ethnicity and psychosocial factors in alcohol and tobacco use in adolescence. *Child Development* 1990;61(2):557–65.

Blum A. Cigarette companies go to college. *New York State Journal of Medicine* 1985;85(7):349.

Blum A. Selling cigarettes: the blue-collar, black target. *The Washington Post* 1986 May 18;Sect F:1 (col 2).

Blum A. The targeting of minority groups by the tobacco industry. In: Jones LA, editor. *Minorities and Cancer.* New York: Springer-Verlag, 1989:153–62.

Botvin GJ, Baker E, Botvin EM, Dusenbury L, Cardwell J, Diaz T. Factors promoting cigarette smoking among black youth: a causal modeling approach. *Addictive Behaviors* 1993;18(4):397–405.

Botvin GJ, Baker E, Goldberg CJ, Dusenbury L, Botvin EM. Correlates and predictors of smoking among black adolescents. *Addictive Behaviors* 1992;17(2):97–103.

Botvin GJ, Epstein JA, Schinke SP, Diaz T. Predictors of cigarette smoking among inner-city minority youth. *Developmental and Behavioral Pediatrics* 1994;15(2):67–73.

Brandweek. UST says "Skoal" to Copa Nacional sponsorship (US Tobacco's Skoal to sponsor Copa Nacional, Hispanic soccer league championship tournament). *Brandweek* 1995;XXXVI(35):14.

Brislin RW, Lonner WJ, Thorndike RM. *Cross-Cultural Research Methods.* New York: John Wiley & Sons, 1973.

Brown & Williamson Tobacco Corporation. Kool Achiever Awards [Milwaukee presentation program]. Louisville (KY): Brown & Williamson Tobacco Corporation, 1993.

Brownson RC, Jackson-Thompson J, Wilkerson JC, Davis JR, Owens NW, Fisher EB Jr. Demographic and socioeconomic differences in beliefs about the health effects of smoking. *American Journal of Public Health* 1992;82(1):99–103.

Brunswick AF, Messeri P. Causal factors in onset of adolescents' cigarette smoking: a prospective study of urban black youth. *Advances in Alcohol and Substance Abuse* 1983;3(1–2):35–52.

Brunswick AF, Messeri PA. Gender differences in the processes leading to cigarette smoking. *Journal of Psychosocial Oncology* 1984;2(1):49–69.

Bry BH, McKeon P, Pandina RJ. Extent of drug use as a function of number of risk factors. *Journal of Abnormal Psychology* 1982;91(4):273–9.

Bullock HA. Consumer motivations in black and white II. *Harvard Business Review* 1961;39(4):110–24.

Campbell KM, Kaplan CP. Relationship between language orientation and cigarette-smoking beliefs of Latinas. *American Journal of Health Behavior* 1997; 21(1):12–20.

Castro FG, Maddahian E, Newcomb MD, Bentler PM. A multivariate model of the determinants of cigarette smoking among adolescents. *Journal of Health and Social Behavior* 1987;28(Sept):273–89.

Castro FG, Sharp EV, Barrington EH, Walton M, Rawson RA. Drug abuse and identity in Mexican Americans: theoretical and empirical considerations. *Hispanic Journal of Behavioral Sciences* 1991;13(2):209–25.

Centers for Disease Control. Cigarette advertising—United States, 1988. *Morbidity and Mortality Weekly Report* 1990a;39(16):261–5.

Centers for Disease Control. Cigarette brand use among adult smokers—United States, 1986. *Morbidity and Mortality Weekly Report* 1990b;39(38):665, 671–3.

Centers for Disease Control. Cigarette smoking among Chinese, Vietnamese, and Hispanics—California, 1989–1991. *Morbidity and Mortality Weekly Report* 1992;41(20):362–7.

Centers for Disease Control and Prevention. Changes in the cigarette brand preferences of adolescent smokers—United States, 1989–1993. *Morbidity and Mortality Weekly Report* 1994a;43(32):577–81.

Centers for Disease Control and Prevention. Cigarette smoking among adults—United States, 1993. *Morbidity and Mortality Weekly Report* 1994b;43(50):925–30.

Chaloupka FJ, Laixuthai A. U.S. trade policy and cigarette smoking in Asia. Working paper no. 5543. Cambridge (MA): National Bureau of Economic Research, 1996.

Chassin L, Presson CC, Sherman SJ. Social psychological contributions to the understanding and prevention of adolescent cigarette smoking. *Personality and Social Psychology Bulletin* 1990;16(1):133–51.

Chassin L, Presson CC, Sherman SJ, Edwards DA. The natural history of cigarette smoking and young adult social roles. *Journal of Health and Social Behavior* 1992;33(Dec):328–47.

Chavez EL, Edwards R, Oetting ER. Mexican American and white American school dropouts' drug use, health status, and involvement in violence. *Public Health Reports* 1989;104(6):594–604.

Chen MS Jr. Cardiovascular health among Asian Americans/Pacific Islanders: an examination of health status and intervention approaches. *American Journal of Health Promotion* 1993;7(3):199–207.

Chen MS Jr, Guthrie R, Moeschberger M, Wewers ME, Anderson J, Kuun P, et al. Lessons learned and baseline data from initiating smoking cessation research with Southeast Asian adults. *Asian American and Pacific Islander Journal of Health* 1993;1(2):194–214.

Chen TTL, Winder AE. The opium wars revisited as U.S. forces tobacco exports in Asia [commentary]. *American Journal of Public Health* 1990;80(6):659–62.

Congressional Hispanic Caucus Institute, Inc. *1993–1994 National Directory of Hispanic Organizations*. Congressional Hispanic Caucus Institute, Inc. and New York: Philip Morris Companies, 1993.

Conrad KM, Flay BR, Hill D. Why children start smoking cigarettes: predictors of onset. *British Journal of Addiction* 1992;87(12):1711–24.

Cook TD, Campbell DT. *Quasi-Experimentation: Design & Analysis Issues for Field Settings*. Chicago: Rand McNally College Publishing Company, 1979.

Cooper R, Simmons BE. Cigarette smoking and ill health among black Americans. *New York State Journal of Medicine* 1985;85(7):344–9.

Coreil J, Ray LA, Markides KS. Predictors of smoking among Mexican-Americans: findings from the Hispanic HANES. *Preventive Medicine* 1991;20(4):508–17.

Cowdery JE, Fitzhugh EC, Wang MQ. Sociobehavioral influences on smoking initiation of Hispanic adolescents. *Journal of Adolescent Health* 1997;20(1):46–50.

Cummings KM, Giovino G, Mendicino AJ. Cigarette advertising and black-white differences in brand preference. *Public Health Reports* 1987;102(6):698–701.

Cummings KM, Sciandra R, Lawrence J. Tobacco advertising in retail stores. *Public Health Reports* 1991;106 (5):570–5.

Dagnoli J. RJR's Uptown targets blacks. *Advertising Age* 1989;60(54):4.

Dallaire VJ. U.S. Negro market growing target for advertisers. *Printers' Ink* 1955;252(11):52–62.

Davis RM. Current trends in cigarette advertising and marketing. *New England Journal of Medicine* 1987; 316(12):725–32.

Davis RM. Does the Marlboro Man drink milk? *Tobacco Control* 1993;2(3):246–7.

De Montaña A. *El Tabaco, Monocultivo y Dependencia, Colombia Siglo XIX*. Bogota DE (Colombia): Universidad Nacional de Colombia, Centro de Investigaciones, 1978.

Deshpande R, Hoyer WD, Donthu N. The intensity of ethnic affiliation: a study of the sociology of Hispanic consumption. *Journal of Consumer Research* 1986; 13(2):214–20.

DiGiacomo F. Doing the right thing. *Marketing and Media Decisions* 1990;25(6):25–32.

Donthu N, Cherian J. Hispanic coupon usage: the impact of strong and weak ethnic identification. *Psychology and Marketing* 1992;9(6):501–10.

Durand RM, Teel JE Jr, Bearden WO. Racial differences in perceptions of media advertising credibility. *Journalism Quarterly* 1979;56(3):562–6.

Dusenbury L, Epstein JA, Botvin GJ, Diaz T. The relationship between language spoken and smoking among Hispanic-Latino youth in New York City. *Public Health Reports* 1994;109(3):421–7.

Dusenbury L, Kerner JF, Baker E, Botvin G, James-Ortiz S, Zauber A. Predictors of smoking prevalence among New York Latino youth. *American Journal of Public Health* 1992;82(1):55–8.

Elder J, de Moor C, Young RL, Wildey MB, Molgaard CA, Golbeck AL, et al. Stages of adolescent tobacco-use acquisition. *Addictive Behaviors* 1990;15(5):449–54.

Elder JP, Edwards C, Conway TL. *Independent Evaluation of Proposition 99-Funded Efforts to Prevent and Control Tobacco Use in California* [annual report]. Submitted to California Department of Health Services, Tobacco Control Section. San Diego (CA): San Diego State University, Graduate School of Public Health, 1993.

Elder JP, Molgaard CA, Gresham L. Predictors of chewing tobacco and cigarette use in a multiethnic public school population. *Adolescence* 1988;23(91):689–702.

Elder JP, Stern RA. The ABCs of adolescent smoking prevention: an environment and skills model. *Health Education Quarterly* 1986;13(2):181–91.

Escobedo LG, Kirch DG, Anda RF. Depression and smoking initiation among US Latinos. *Addiction* 1996;91(1):113–9.

Ethridge RF. Tobacco among the Cherokees. *Journal of Cherokee Studies* 1978;3(2):77–86.

Evans CA Jr. Fighting the pushers in minority America. *Henry Ford Hospital Medical Journal* 1990;38(2–3):164–5.

Evans N, Farkas A, Gilpin E, Berry C, Pierce JP. Influence of tobacco marketing and exposure to smokers on adolescent susceptibility to smoking. *Journal of the National Cancer Institute* 1995;87(20):1538–45.

Ewert D, Alleyne D. Risk of exposure to outdoor advertising of cigarettes and alcohol [letter]. *American Journal of Public Health* 1992;82(6):895–6.

Farrell AD, Danish SJ, Howard CW. Risk factors for drug use in urban adolescents: identification and cross-validation. *American Journal of Community Psychology* 1992;20(3):263–86.

Federal Register. US Department of Health and Human Services, Food and Drug Administration. Regulations restricting the sale and distribution of cigarettes and smokeless tobacco to protect children and adolescents; final rule (21 CFR Parts 801, 803, 804, 807, 820, and 897), 61 *Fed. Reg.* 44396 (1996).

Federal Trade Commission. *Report to Congress: Pursuant to the Federal Cigarette Labeling and Advertising Act.* Washington (DC): Federal Trade Commission, 1997.

Feigelman W, Gorman B. Toward explaining the higher incidence of cigarette smoking among black Americans. *Journal of Psychoactive Drugs* 1989;21(3):299–305.

Felix-Ortiz M, Newcomb MD. Risk and protective factors for drug use among Latino and white adolescents. *Hispanic Journal of Behavioral Sciences* 1992;14(3):291–309.

Felix-Ortiz M, Newcomb MD. Cultural identity and drug use among Latino and Latina adolescents. In: Botvin GJ, Schinke SP, Orlandi MA, editors. *Drug Abuse Prevention With Multiethnic Youth.* Thousand Oaks (CA): Sage Publications, 1995:147–65.

Fernandez E. Butt out, tobacco sponsors told Tet festival officials won't accept ads for smoking, gambling. *San Francisco Examiner* 1996 Feb 18;Sect B:8.

Fisher I. Tobacco funds go to black officials. *New York Times* 1995 Nov 19;Sect 1:21 (col 1).

Foner PS. *Organized Labor and the Black Worker 1619–1981.* New York: International Publishers, 1981.

Food and Agriculture Organization of the United Nations. *FAO Yearbook/Annuaire/Anuario: Production/Production/Producción, Vol. 49, 1995.* FAO Statistics Series No. 130. Rome: Food and Agriculture Organization of the United Nations, 1996.

Fortuine R. *Chills and Fever: Health and Disease in the Early History of Alaska.* Fairbanks (AK): University of Alaska Press, 1989.

Frankel G, Mufson S. Vast China market key to smoking disputes. *The Washington Post* 1996 Nov 20;Sect A:1.

Gale F. Tobacco economies: what's ahead? *Agricultural Outlook* 1993;Sept:27–31.

Gitter AG, O'Connell SM, Mostofsky D. Trends in appearance of models in *Ebony* ads over 17 years. *Journalism Quarterly* 1972;49(3):547–50.

Gloede WF. RJR puts on the Ritz; PM goes to Rio. *Advertising Age* 1985;56(2):1, 78.

Goldberger P. Philip Morris calls in I.O.U.'s in the arts. *The New York Times* 1994 Oct 5;Sect A:1 (col 2).

Goodman J. *Tobacco in History: The Cultures of Dependence.* London: Routledge, 1992.

Green MK. Images of Native Americans in advertising: some moral issues. *Journal of Business Ethics* 1993;12(4):323–30.

Gross AE. Skoal rides tobacco road. *Promote* 1989 Sept:11.

Guthrie P. Some contend that American Spirits violate Indian spirit. *Albuquerque Tribune* 1997 July 12:Sect A:9.

Haberman TW. Evidence for aboriginal tobaccos in eastern North America. *American Antiquity* 1984;49(2):269–87.

Hahn LP, Folsom AR, Sprafka JM, Norsted SW. Cigarette smoking and cessation behaviors among urban blacks and whites. *Public Health Reports* 1990;105(3):290–5.

Haile SW, editor. *National Directory of Corporate Giving.* 2nd ed. New York: The Foundation Center, 1991.

Hall RL, Dexter D. Smokeless tobacco use and attitudes toward smokeless tobacco among Native Americans and other adolescents in the Northwest. *American Journal of Public Health* 1988;78(12):1586–8.

Hawkins JD, Catalano RF, Miller JY. Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychological Bulletin* 1992;112(1):64–105.

Headen SW, Bauman KE, Deane GD, Koch GG. Are the correlates of cigarette smoking initiation different for black and white adolescents? *American Journal of Public Health* 1991;81(7):854–8.

Hodge FS. Tobacco control leadership in American Indian communities. In: Slama K, editor. *Tobacco and Health*. New York: Plenum Press, 1995:375–8.

Hodge FS, Cummings SR, Frederick L, Kipnis P. *Prevalence of Smoking/Smokeless Tobacco Use in 18 Northern California American Indian Health Clinics*. Vol. A. Berkeley (CA): Center for American Indian Research and Education, American Indian Cancer Control Project, May 1994.

Hodge FS, Fredericks L, Kipnis P. Patient and smoking patterns in Northern California American Indian clinics: urban and rural contrasts. *Cancer* (Suppl) 1996;78(7):1623–8.

Hodge FW. *Handbook of American Indians North of Mexico*. Bulletin No. 30. Washington (DC): Smithsonian Institution, Bureau of American Ethnology, 1910.

Hoffman A, Cooper R, Lacey L, Mullner R. Cigarette smoking and attitudes toward quitting among black patients. *Journal of the National Medical Association* 1989;81(4):415–20.

Hoffman-Goetz L, Gerlach KK, Marino C, Mills SL. Cancer coverage and tobacco advertising in African-American women's popular magazines. *Journal of Community Health* 1997;22(4):261–70.

Huang PP, Burton D, Howe HL, Sosin DM. Black-white differences in appeal of cigarette advertisements among adolescents. *Tobacco Control* 1992;1(4):249–55.

Jackson DZ. Cash from the hand that kills them. *Boston Globe* 1992 Sept 23;Sect OP-ED:17 (col 1).

Jackson DZ. Making money by any means necessary. *Boston Globe* 1995 Feb 1;Sect OP-ED:13.

Jenkins CNH, McPhee SJ, Bird JA, Bonilla N-TH. Cancer risks and prevention practices among Vietnamese refugees. *Western Journal of Medicine* 1990;153(1):34–9.

Jepson C, Kessler LG, Portnoy B, Gibbs T. Black-white differences in cancer prevention knowledge and behavior. *American Journal of Public Health* 1991;81(4):501–4.

Jessor R, Jessor SL. *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth*. New York: Academic Press, 1977.

Jet. Ray Charles, B. B. King join Superband's annual world tour to promote jazz music. *Jet* 1990;78(16):36.

Johnson D. Jordan's role. *The Nation* 1992a;255(21):761.

Johnson DR. Tobacco stains: cigarette firms buy into African-American groups. *The Progressive* 1992b;56(12):26–8.

Jones BW. Race, sex, and class: black female tobacco workers in Durham, North Carolina, 1920–1940, and the development of female consciousness. *Feminist Studies* 1984;10(3):441–51.

Joyner T. Reynolds presents jewel of a gift to college fund. *The Charlotte Observer* 1984 Nov 12;Sect B:15 (col 1).

Kandel DB. Drug and drinking behavior among youth. *Annual Review in Sociology* 1980;6:235–85.

Kaufman P, Frase MJ. *Dropout Rates in the United States: 1989*. Washington (DC): US Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics, Information Services. NCES Publication No. 90-659, 1990.

Kaufman SB. *Challenge & Change: The History of the Tobacco Workers International Union*. Kensington (MD): Baker, Confectionery and Tobacco Workers International Union, 1986.

Kizer KW, Honig B, Allenby CL, Deukmejian G. *Toward a Tobacco-Free California: A Status Report to the California Legislature on the First Fifteen Months of California's Tobacco Control Program*. Sacramento (CA): California Department of Health Services and California Department of Education, 1990.

Klesges RC, Somes G, Pascale RW, Klesges LM, Murphy M, Brown K, et al. Knowledge and beliefs regarding the consequences of cigarette smoking and their relationships to smoking status in a biracial sample. *Health Psychology* 1988;7(5):387–401.

Koepke D, Flay BR, Johnson CA. Health behaviors in minority families: the case of cigarette smoking. *Family Community Health* 1990;13(1):35–43.

Koeppel D. In Philadelphia, R.J. Reynolds made all the wrong moves. *Adweek's Marketing Week* 1990a;31(5): 20–2.

Koeppel D. Japan's Mild 7 cigarette targets Asians in the U.S. *Adweek's Marketing Week* 1990b;31(33):4–5.

Korstad R, Lichtenstein N. Opportunities found and lost: labor, radicals, and the early civil rights movement. *Journal of American History* 1988;75(1): 786–811.

Kulikoff A. *Tobacco and Slaves: The Development of Southern Cultures in the Chesapeake, 1680–1800.* Chapel Hill (NC): University of North Carolina Press, 1986.

Lacey LP, Manfredi C, Balch G, Warnecke RB, Allen K, Edwards C. Social support in smoking cessation among black women in Chicago public housing. *Public Health Reports* 1993;108(3):387–94.

Lando HA, Johnson KM, Graham-Tomasi RP, McGovern PG, Solberg L. Urban Indians' smoking patterns and interest in quitting. *Public Health Reports* 1992;107(3):340–4.

Landrine H, Richardson JL, Klonoff EA, Flay B. Cultural diversity in the predictors of adolescent cigarette smoking: the relative influence of peers. *Journal of Behavioral Medicine* 1994;17(3):331–46.

Larino MD, Nevid JS, Javier R. Smoking patterns in Hispanic Americans in relation to region of origin. Paper presented at the meeting of the American Psychological Association, Toronto, August 1993.

Laufer B. *Tobacco and its Use in Asia* [leaflet]. Chicago: Field Museum of Natural History, 1924.

Lee DJ, Markides KS. Health behaviors, risk factors, and health indicators associated with cigarette use in Mexican Americans: results from the Hispanic HANES. *American Journal of Public Health* 1991;81 (7):859–64.

Lee S, Barnes JH Jr. Using color preferences in magazine advertising. *Journal of Advertising Research* 1989–1990;29(6):25–30.

Lerner G, editor. *Black Women in White America: A Documentary History.* New York: Vintage Books, 1973.

Levin M, Perry T. Museum ditches Philip Morris as sponsor. *Los Angeles Times* 1996 May 1;Sect D:2.

Leviten P. Manufacturers send changing smoke signals. *Supermarket Business* 1985;40(12):39–43.

Lew R. Tobacco control in the Asian Pacific Islander community: from research to implementation. Paper presented at the 8th World Conference on Tobacco or Health, Buenos Aires, March 30–April 3, 1992.

Linton R. *Use of Tobacco Among North American Indians* [leaflet]. Chicago: Field Museum of Natural History, 1924.

Lovato CY, Litrownik AJ, Elder J, Nuñez-Liriano A, Suarez D, Talavera GA. Cigarette and alcohol use among migrant Hispanic adolescents. *Family and Community Health* 1994;16(4):23–36.

Lynch BS, Bonnie RJ, editors. *Growing Up Tobacco Free: Preventing Nicotine Addiction in Children and Youths.* Washington (DC): National Academy Press, 1994.

Mackay J, Bounxouie B. Laos—"the land of smiles" (and smokes). *Tobacco Control* 1994;3(1):10–1.

Mackay J, Shiru N, Charlton A, Lam TH, Moyer C. Smoking among Chinese youth: a cure for crying? *Tobacco Control* 1993;2(1):7–8.

Maddahian E, Newcomb MD, Bentler PM. Adolescents' substance use: impact of ethnicity, income, and availability. *Advances in Alcohol and Substance Abuse* 1986;5(3):63–78.

Maddahian E, Newcomb MD, Bentler PM. Adolescent drug use and intention to use drugs: concurrent and longitudinal analyses of four ethnic groups [brief report]. *Addictive Behaviors* 1988;13(2):191–5.

Mahony D, Nevid JS, Javier RA. Acculturation and smoking patterns among Hispanic smokers seeking to quit. Paper presented at the meeting of the American Psychological Association, Toronto, August 1993.

Marín BV, Marín G, Pérez-Stable EJ, Otero-Sabogal R, Sabogal F. Cultural differences in attitudes toward smoking: developing messages using the theory of reasoned action. *Journal of Applied Social Psychology* 1990b;20(6):478–93.

Marín G. Issues in the measurement of acculturation among Hispanics. In: Geisinger KF, editor. *Psychological Testing of Hispanics.* Washington (DC): American Psychological Association, 1992:1235–51.

Marín G, Marín BV. *Research with Hispanic Populations.* Applied Social Research Methods Series, Vol. 23. Newbury Park (CA): Sage Publications, 1991.

Marín G, Marín BV, Otero-Sabogal R, Sabogal F, Pérez-Stable EJ. The role of acculturation in the attitudes, norms, and expectancies of Hispanic smokers. *Journal of Cross-Cultural Psychology* 1989a;20(4):399–415.

Marín G, Marín BV, Pérez-Stable EJ, Sabogal F, Otero-Sabogal R. Cultural differences in attitudes and expectancies between Hispanic and non-Hispanic white smokers. *Hispanic Journal of Behavioral Sciences* 1990a;12(4):422–36.

Marín G, Pérez-Stable EJ, Otero-Sabogal R, Sabogal F, Marín BV. Stereotypes of smokers held by Hispanic and white non-Hispanic smokers. *International Journal of the Addictions* 1989b;24(3):203–13.

Marriott M. Teacher program is given a boost. *The New York Times* 1992 Jan 12;Sect L:13 (col 1).

Maxwell B, Jacobson M. *Marketing Disease to Hispanics: The Selling of Alcohol, Tobacco, and Junk Foods.* Washington: Center for Science in the Public Interest, 1989.

Mayberry RM, Price PA. Targeting blacks in cigarette billboard advertising: results from down South. *Health Values* 1993;17(1):28–35.

McCullen JT Jr. Indian myths concerning the origin of tobacco. *New York Folklore Quarterly* 1967;23(4):264–73.

McIntosh H. Black teens not smoking in great numbers. *Journal of the National Cancer Institute* 1995; 87(8):564.

McMahon ET, Taylor PA. *Citizens' Action Handbook on Alcohol and Tobacco Billboard Advertising.* Washington (DC): Center for Science in the Public Interest and Scenic America, 1990.

Mermelstein R, Robinson R, Ericksen M, Crosset L, Feldman S. Explanations of race and gender differences in teen tobacco use. Paper presented at the 124th annual meeting of the American Public Health Association, New York City, November 19, 1996.

Meyer JA. Cigarette century. *American Heritage* 1992; 43(8):72–80.

Milligan S. Eyes on the lies: how black leaders and cigarette companies have turned indoor smoking into a civil rights issue. *The Washington Monthly* 1987; 19(5):39–42.

Milloy C. Ethics go up in smoke. *The Washington Post* 1990 Apr 1;Sect D:3 (col 4).

Mitchell D. Images of exotic women in turn-of-the-century tobacco art. *Feminist Studies* 1992;18(2):327–50.

Mitchell O, Greenberg M. Outdoor advertising of addictive products. *New Jersey Medicine* 1991;88(5):331–3.

Moeschberger ML, Anderson J, Kuo YF, Chen MS, Wewers ME, Guthrie R. Multivariate profile of smoking in Southeast Asian men: a biochemically verified analysis. *Preventive Medicine* 1997;26(1):53–8.

Moncher MS, Holden GW, Trimble JE. Substance abuse among Native-American youth. *Journal of Consulting and Clinical Psychology* 1990;58(4):408–15.

Moore DJ, Williams JD, Qualls WJ. Target marketing of tobacco and alcohol-related products to ethnic minority groups in the United States. *Ethnicity & Disease* 1996;6(1,2):83–98.

Murphy PE. Analyzing markets. In: Frederiksen LW, Solomon LJ, Brehony KA, editors. *Marketing Health Behavior: Principles, Techniques, and Applications.* New York: Plenum Press, 1984:41–58.

Nabisco Foods Group. Models of success [advertisement]. *Ebony* 1992;47(8):2.

Nardi J-B. *A Historia do Fumo Brasileiro.* Rio de Janeiro: ABIFUMO, 1985.

National Association of Convenience Stores. *State of the Industry: Convenience Store Industry Totals, Trends & Averages.* Alexandria (VA): National Association of Convenience Stores, 1993.

National Black Monitor. The black press and the tobacco industry. *National Black Monitor* 1990;15(7):4.

Nelson JR Jr, Lucas JE. Target: minorities. *Marketing and Media Decisions* 1990;25(10):70–1.

Newcomb MD, Bentler PM. *Consequences of Adolescent Drug Use: Impact on the Lives of Young Adults*. Newbury Park (CA): Sage Publications, 1988.

Newcomb MD, Felix-Ortiz M. Multiple protective and risk factors for drug use and abuse: cross-sectional and prospective findings. *Journal of Personality and Social Psychology* 1992;63(2):280–96.

Newcomb MD, Maddahian E, Bentler PM. Risk factors for drug use among adolescents: concurrent and longitudinal analyses. *American Journal of Public Health* 1986;76(5):525–31.

Newcomb MD, Maddahian E, Skager R, Bentler PM. Substance abuse and psychosocial risk factors among teenagers: associations with sex, age, ethnicity, and type of school. *American Journal of Drug and Alcohol Abuse* 1987;13(4):413–33.

Northrup HR, Ash RI. *The Racial Policies of American Industry: The Negro in the Tobacco Industry. Report No. 13*. Philadelphia (PA): University of Pennsylvania, Wharton School of Finance and Commerce, Department of Industry, Industrial Research Unit, 1970.

O'Campo P, Faden RR, Brown H, Gielen AC. The impact of pregnancy on women's prenatal and postpartum smoking behavior. *American Journal of Preventive Medicine* 1992;8(1):8–13.

O'Connor JJ. Salem Extra menthol to challenge Kool leadership. *Advertising Age* 1974;45(39):2, 94.

Organization of Chinese Americans. *National Directory of Asian Pacific Americans* 1997–1998. New York: Philip Morris Companies Inc., 1997.

Orleans CT, Schoenbach VJ, Salmon MA, Strecher VJ, Kalsbeek W, Quade D, et al. A survey of smoking and quitting patterns among black Americans. *American Journal of Public Health* 1989;79(2):176–81.

Paper J. *Offering Smoke: The Sacred Pipe and Native American Religion*. Moscow (ID): University of Idaho Press, 1988.

Pérez-Stable EJ, Marín G, Marín BV, Katz MH. Depressive symptoms and cigarette smoking among Latinos in San Francisco. *American Journal of Public Health* 1990;80(12):1500–2.

Philadelphia News Observer. R.J. Reynolds to test market new product in Philadelphia. *The Philadelphia News Observer* 1990 Jan 3;7 (col 1).

Philip Morris Companies Inc. *Guide to Black Organizations, 1992–94 Edition*. New York: Philip Morris Companies, 1992.

Pickering J, Lavallee C, Hanley J. Cigarette smoking in Cree Indian school children of the James Bay region. *Arctic Medical Research* 1989;48(1):6–11.

Pierce JP, Choi WS, Gilpin EA, Farkas AJ. Validation of suceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychology* 1996;15(5):355–61.

Pitts RE, Whalen DJ, O'Keefe R, Murray V. Black and white response to culturally targeted television commercials: a values-based approach. *Psychology and Marketing* 1989;6(4):311–28.

Pollay RW. Promotion and policy for a pandemic product: notes on the history of cigarette advertising [working papers and research reprints]. Vancouver (Canada): The History of Advertising Archives, University of British Columbia, 1988.

Pollay RW. Black and white and read all over: cigarette advertising in *Ebony* and *Life* [1950–1965] [working papers and research reprints]. Vancouver (Canada): The History of Advertising Archives, University of British Columbia, 1990.

Pollay RW, Lee JS, Carter-Whitney D. Separate, but not equal: racial segmentation in cigarette advertising. *Journal of Advertising* 1992;21(1):45–57.

Printers' Ink. What's news . . . and why: Philip Morris plans cyclic ad program. *Printers' Ink* 1955;250(13):20.

Printers' Ink. Menthol cigarette competition tightens as more major entries crowd into race. *Printers' Ink* 1959a;267(11):11–2.

Printers' Ink. Porous appeals [editorial]. *Printers' Ink* 1959b;268(4):8.

Printers' Ink. ROP color: do ad men know its power? *Printers' Ink* 1959c;268(13):37–44.

Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. *Journal of Consulting and Clinical Psychology* 1983;51(3):390–5.

Ramirez A. A cigarette campaign under fire. *The New York Times* 1990 Jan 12;Sect D:1 (col 3).

Riley WT, Barenie JT, Mabe PA, Myers DR. The role of race and ethnic status on the psychosocial correlates of smokeless tobacco use in adolescent males. *Journal of Adolescent Health* 1991;12(1):15–21.

Rivero Muñiz J. *Tabaco, su Historia en Cuba*. La Habana (Cuba): Instituto de Historia, Comision Nacional de la Academia de Ciencias de la Republica de Cuba, 1964.

RJR Nabisco, Inc. *A Growing Presence in the Mainstream*. Winston-Salem (NC): RJR Nabisco, Programs for Minorities and Women, 1986.

Robinson RG. The tobacco industry and the African American community: from compromise to empowerment. Paper presented at the 8th World Conference on Tobacco or Health, Buenos Aires, March 30–April 3, 1992.

Robinson RG, Barry M, Bloch M, Glantz S, Jordan J, Murray KB, et al. Report of the tobacco policy research group on marketing and promotions targeted at African Americans, Latinos, and women. *Tobacco Control* 1992a;1(Suppl):S24–S30.

Robinson RG, Pertschuk M, Sutton C. Smoking and African Americans: spotlighting the effects of smoking and tobacco promotion in the African American community. In: Samuels SE, Smith MD, editors. *Improving the Health of the Poor: Strategies for Prevention*. Menlo Park (CA): The Henry J. Kaiser Family Foundation, 1992b:123–81.

Robinson RG, Shelton DM, Hodge F, Lew R, Lopes E, Toy P, et al. Tobacco control capacity index for communities of color in the United States. In: Slama K, editor. *Tobacco and Health*. New York: Plenum Press, 1995:359–65.

Robinson RG, Sutton CD. The Coalition Against Uptown Cigarettes. In: Jernigan D, Wright P, editors. *Making News, Changing Policy*. Washington (DC): US Office of Personnel Management, Center for Substance Abuse Prevention, and The Marin Institute for the Prevention of Alcohol and Other Drug Problems, in press.

Romano PS, Bloom J, Syme SL. Smoking, social support, and hassles in an urban African-American community. *American Journal of Public Health* 1991; 81(11):1415–22.

Roper Center for Public Opinion Research. *Attitudes on Smoking by Race. Telephone Survey Conducted from February 25 to 28, 1993*. Storrs (CT): Roper Center for Public Opinion Research, University of Connecticut, conducted by ABC News/*The Washington Post*, 1993.

Ros Torres MA. *La Producción Cigarrera a Finales de la Colonia: La Fabrica en México*. Mexico (DF): Instituto Nacional de Antropología e Historia, 1984.

Rosenberg ND. Costly talk: activist refuses $5,000 award. *The Milwaukee Journal* 1993 Sept 30;Sect A:1.

Rosenblatt R. How do tobacco executives live with themselves? *The New York Times Magazine* 1994 Mar 20:34.

Rosser Reeves Inc. Arctic Lights: Strategic Brand Conference, Brand Issues/Strategies/Tactics: May 17, 1979, minutes. Madison (WI): M86-426, Box 2, Papers of Rosser Reeves, State Historical Society of Wisconsin, 1979.

Rothstein M. Uneasy partners: arts and Philip Morris. *The New York Times* 1990 Dec 18;Sect C:15 (col 2).

Rotzoll BW. New cigarettes target black kids, foes say. *Chicago Sun-Times* 1997 Feb 2;Sunday News Sect:23.

Royce JM, Hymowitz N, Corbett K, Hartwell TD, Orlandi MA. Smoking cessation factors among African Americans and whites. *American Journal of Public Health* 1993;83(2):220–6.

Russ VM. Is it philanthropy or a smoke screen? cigarette makers give to black causes. *Philadelphia Daily News* 1993 Aug 2;Lifestyle Sect:38, 40.

Sabogal F, Otero-Sabogal R, Pérez-Stable EJ, Marín BV, Marín G. Perceived self-efficacy to avoid cigarette smoking and addiction: differences between Hispanics and non-Hispanic whites. *Hispanic Journal of Behavioral Sciences* 1989;11(2):136–47.

Samet JM, Howard CA, Coultas DB, Skipper BJ. Acculturation, education, and income as determinants of cigarette smoking in New Mexico Hispanics. *Cancer Epidemiology, Biomarkers & Prevention* 1992;1(3):235–40.

San Diego Union-Tribune. Fair board sends Marlboro packing: Marlboro cigarettes promotional contract with Del Mar Fair Board to end. *San Diego Union-Tribune* 1996 Apr 2:Sect A:1.

Sanchez L. Anti-smoking efforts take aim at Latinos. *The San Diego Union-Tribune* 1993 June 25;Sect B:3 (col 1).

Satcher D, Robinson RG. The CDC and the NMA—partnerships to control tobacco in the African-American community. *Journal of the National Medical Association* 1994;86(7):493–6.

Scheier LM, Newcomb MD. Differentiation of early adolescent predictors of drug use versus abuse: a developmental risk-factor model. *Journal of Substance Abuse* 1991;3(3):277–99.

Schinke SP, Moncher MS, Holden GW, Botvin GJ, Orlandi MA. American Indian youth and substance abuse: tobacco use problems, risk factors and preventive interventions. *Health Education Research* 1989; 4(1):137–44.

Schinke SP, Orlandi MA, Schilling RF, Botvin GJ, Gilchrist LD, Landers C. Tobacco use by American Indian and Alaska Native people: risks, psychosocial factors, and preventive intervention. *Journal of Alcohol and Drug Education* 1990;35(2):1–12.

Schinke S, Orlandi M, Vaccaro D, Espinoza R, McAlister A, Botvin G. Substance use among Hispanic and non-Hispanic adolescents. *Addictive Behaviors* 1992;17(2):117–24.

Schmeltzer J. "Mainstream" spending up by minorities; study shows buying of cars and computers surging among African-Americans as upbeat view of economy spreads. *Chicago Tribune* 1996 Aug 28;Business Sect:1.

Seig L. *Tobacco, Peace Pipes, and Indians.* Palmer Lake (CO): The Filter Press, 1971.

Sesser S. Opium war redux. *The New Yorker* 1993; 69(29):78–89.

Shelton DM, Merritt RK, Robinson RG. Tobacco control strategies. In: Slama K, editor. *Tobacco and Health.* New York: Plenum Press, 1995:367–74.

Sherman G. Tobacco pipes of the Western Eskimos. *Beaver* 1972;303(1):49–51.

Siegel RK. *Intoxication: Life in Pursuit of Artificial Paradise.* New York: E. P. Dutton, 1989.

Simmons S. New cig is aimed at black smokers: Uptown to be tested here. *Philadelphia Daily News* 1989 Dec 14;Business Sect:51.

Smith KW, McGraw SA, Carrillo JE. Factors affecting cigarette smoking and intention to smoke among Puerto Rican-American high school students. *Hispanic Journal of Behavioral Sciences* 1991;13(4):401–11.

Smith L. Big apple breathes easy. *Tobacco Control* 1995;4(1):15–7.

Solberg EJ, Blum A. Tobacco money buys minorities' political support. *Tobacco Control* 1992;1(4):245–6.

Soley LC, Reid LN. Satisfaction with the informational value of magazine and television advertising. *Journal of Advertising* 1983;12(3):27–31.

Spangler JG, Dignan MB, Michielutte R. Correlates of tobacco use among Native American women in western North Carolina. *American Journal of Public Health* 1997;87(1):108–11.

Stanley BN. New deal: an increasing number of minority-owned businesses land contracts with Philip Morris. *Richmond Times-Dispatch* 1996 Feb 12;Sect D:14.

Stebbins KR. Transnational tobacco companies and health in underdeveloped countries: recommendations for avoiding a smoking epidemic. *Social Science and Medicine* 1990;30(2):227–35.

Stern RA, Prochaska JO, Velicer WF, Elder JP. Stages of adolescent cigarette smoking acquisition: measurement and sample profiles. *Addictive Behaviors* 1987; 12(4):319–29.

Stoddard JL, Johnson CA, Boley-Cruz T, Sussman S. Targeted tobacco markets: outdoor advertising in Los Angeles minority neighborhoods [letter]. *American Journal of Public Health* 1997;87(7):1232–3.

Sussman S, Dent CW, Flay BR, Hansen WB, Johnson CA. Psychosocial predictors of cigarette smoking onset by white, black, Hispanic, and Asian adolescents in Southern California. *Morbidity and Mortality Weekly Report* 1987;36(4 Suppl):11S–16S.

Tamir A, Cachola S. Hypertension and other cardiovascular risk factors. In: Zane NWS, Takeuchi DT, Young KNJ, editors. *Confronting Critical Health Issues of Asian and Pacific Islander Americans.* Thousand Oaks (CA): Sage Publications, 1994:209–46.

Tide. Philip Morris. *Tide* 1948;22(33):18.

Tobacco Merchants Association of the United States. *The TMA Directory of Cigarette Brand Names 1913–1977*. New York: Tobacco Merchants Association of the United States, 1978.

Tomás Rivera Center. *Resolving a Crisis in Education: Latino Teachers for Tomorrow's Classrooms*. Claremont (CA): Tomás Rivera Center, 1993.

Triandis HC, Marín G. Etic plus emic versus pseudoetic: a test of a basic assumption of contemporary cross-cultural psychology. *Journal of Cross-Cultural Psychology* 1983;14(4):489–500.

Tuckson RV. Race, sex, economics, and tobacco advertising [editorial]. *Journal of the National Medical Association* 1989;81(11):1119–24.

Ullman Gravure, Inc. TransPlastix dynamic plastic displays [advertisement]. *Printers' Ink* 1957;258(13):82.

US Bureau of the Census. *1990 Census of Population: Asians and Pacific Islanders in the United States*. Washington (DC): US Department of Commerce, Economics and Statistics Administration, Bureau of the Census. Publication No. CP-3-5, 1993.

US Commission on Civil Rights. *The Decline of Black Farming in America: A Report of the United States Commission on Civil Rights*. Washington (DC): US Commission on Civil Rights, 1982.

US Congress. Advertising of Tobacco Products. Hearings before the Subcommittee on Health and the Environment of the Committee on Energy and Commerce, House of Representatives, 99th Congress, 2nd Sess. Washington (DC): US Government Printing Office. Serial No. 99-167, 1987.

US Congress. Tobacco Issues (Part 2). Hearings before the Subcommittee on Transportation and Hazardous Materials of the Committee on Energy and Commerce, House of Representatives, 101st Congress. Washington (DC): US Government Printing Office. Serial No. 101-126, 1990.

US Department of Health and Human Services. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 89-8411, 1989.

US Department of Health and Human Services. *Tobacco Use in 1986: Methods and Basic Tabulations from Adult Use of Tobacco Survey*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (OM) 90-2004, 1990.

US Department of Health and Human Services. *Smoking and Health in the Americas. A 1992 Report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Centers for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 92-8419, 1992.

US Department of Health and Human Services. *Preventing Tobacco Use Among Young People. A Report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1994.

US Newswire, Inc. Business Policy Review Council to honor black corporate pioneers. Washington (DC): US Newswire, Inc., February 1, 1997.

Vander Martin R, Cummings SR, Coates TJ. Ethnicity and smoking: differences in white, black, Hispanic, and Asian medical patients who smoke. *American Journal of Preventive Medicine* 1990;6(4):194–9.

Vanderschmidt HF, Lang JM, Knight-Williams V, Vanderschmidt GF. Risks among inner-city young teens: the prevalence of sexual activity, violence, drugs, and smoking. *Journal of Adolescent Health* 1993;14(4): 282–8.

Vega WA, Zimmerman RS, Warheit GJ, Apospori E, Gil AG. Risk factors for early adolescent drug use in four ethnic and racial groups. *American Journal of Public Health* 1993;83(2):185–9.

Villarosa L. Body and soul. *Women's Review of Books* 1994;11(10–11):13–4.

Wall KA. Positioning your brand in the black market. *Advertising Age* 1973;44(25):71–6.

Wallace JM Jr, Bachman JG. Explaining racial/ethnic differences in adolescent drug use: the impact of background and lifestyle. *Social Problems* 1991;38(3):333–57.

Wallace JM Jr, Bachman JG. Validity of self-reports in student-based studies on minority populations: issues and concerns. In: De La Rosa MR, Adrados J-LR, editors. *Drug Abuse Among Minority Youth: Advances in Research and Methodology*. National Institute on Drug Abuse Research Monograph No. 130. Rockville (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse, 1993:167–200, NIH Publication No. 93-3479.

Walters DKH. Cigarettes; makers aim at special niches to boost sales. *Los Angeles Times* 1985 Sept 15;Business Sect:1(col 3).

Warnecke RB, Graham S, Rosenthal S, Manfredi C. Social and psychological correlates of smoking behavior among black women. *Journal of Health and Social Behavior* 1978;19(4):397–410.

Warner KE. Cigarette advertising and media coverage of smoking and health. *New England Journal of Medicine* 1985;312(6):384–8.

Warner KE. *Selling Smoke: Cigarette Advertising and Public Health*. Washington (DC): American Public Health Association, 1986.

Warner KE, Goldenhar LM, McLaughlin CG. Cigarette advertising and magazine coverage of the hazards of smoking—a statistical analysis. *New England Journal of Medicine* 1992;326(5):305–9.

Watts WD, Wright LS. The relationship of alcohol, tobacco, marijuana, and other illegal drug use to delinquency among Mexican-American, black, and white adolescent males. *Adolescence* 1990;25(97):171–81.

Webster C. Attitudes toward marketing practices: the effects of ethnic identification. *Journal of Applied Business Research* 1990–1991;7(2):107–16.

Webster C. The effects of Hispanic subcultural identification on information search behavior. *Journal of Advertising Research* 1992;32(5):54–62.

Weibel-Orlando J. Indians, ethnicity, and alcohol: contrasting perceptions of the ethnic self and alcohol use. In: Bennett LA, Ames GM, editors. *The American Experience With Alcohol: Contrasting Cultural Perspectives*. New York: Plenum Press, 1985:201–26.

Weinrich S, Hardin S, Valois RF, Gleaton J, Weinrich M, Garrison CZ. Psychological correlates of adolescent smoking in response to stress. *American Journal of Health Behavior* 1996;20(1):52–60.

Weiss W. Mass media and social change. In: King BT, McGinnies E, editors. *Attitudes, Conflict, and Social Change*. New York: Academic Press, 1972:137–54.

Weng L-J, Newcomb MD, Bentler PM. Factors influencing noncompletion of high school: a comparison of methodologies. *Educational Research Quarterly* 1988; 12(2):8–22.

Whittler TE. Viewers' processing of actor's race and message claims in advertising stimuli. *Psychology and Marketing* 1989;6(4):287–309.

Wiecha JM. Differences in patterns of tobacco use in Vietnamese, African-American, Hispanic, and Caucasian adolescents in Worcester, Massachusetts. *American Journal of Preventive Medicine* 1996;12(1):29–37.

Wildey MB, Young RL, Elder JP, de Moor C, Wolf KR, Fiske KE, et al. Cigarette point-of-sale advertising in ethnic neighborhoods in San Diego, California. *Health Values* 1992;16(1):23–8.

Williams L. Tobacco companies target blacks with ads, donations and festivals. *Wall Street Journal* 1986 Oct 6;33(col 4).

Wootten HM. Filters push cigarette sales up 4.9%. *Printers' Ink* 1957;261(13):22–7.

Yamaguchi K, Kandel DB. On the resolution of role incompatibility: a life event history analysis of family roles and marijuana use. *American Journal of Sociology* 1985;90(6):1284–1325.

Zane N, Sasao T. Research on drug abuse among Asian Pacific Americans. *Drugs & Society* 1992;6(3–4):181–209.

Zbar JD. Marketing to Hispanics; the Spanish-language magazine is getting crowded with new entries as publishers and advertisers look to reach a growing market of 27 million people who spend $228 billion annually. *Advertising Age* 1996;67(12):27–8.

Chapter 5
Tobacco Control and Education Efforts Among Members of Four Racial/Ethnic Minority Groups

Introduction

Various approaches have been used to prevent and control tobacco use among racial/ethnic minority groups in the United States. This chapter addresses six major approaches to tobacco control: (1) primary prevention efforts, (2) smoking cessation programs, (3) environmental tobacco smoke (ETS) and clean indoor air policies, (4) economic efforts to reduce tobacco use, (5) efforts to control tobacco advertising, and (6) tobacco product regulations (Satcher and Eriksen 1994). Each section presents a selection of interventions and focuses on activities that reflect the specific characteristics of given racial/ethnic groups.

Because most of these efforts are relatively new among racial/ethnic group members and many have been developed or applied in predominantly white communities, little information is available about the ease and feasibility of their implementation or replication in racial/ethnic contexts. Although data exist on the overall effectiveness of programs that do not differentiate racial/ethnic minority groups from whites, data are limited on the effectiveness of racial/ethnic-specific tobacco control efforts, because results of their evaluations are just beginning to appear in the literature. Although an increasing number of tobacco control programs are being implemented among various racial/ethnic groups, many of these programs lack evaluation components. To remedy the lack of information, culturally appropriate research and evaluations need to be conducted in the future, and more professionals need to be trained in culturally appropriate research and evaluation methodologies. Moreover, the types of tobacco control efforts that are most effective, easiest to implement, and most cost-effective among racial/ethnic groups must be identified (Fiore et al. 1996). In some instances, smoking cessation treatments that have been shown to be effective with non-Hispanic whites also have produced positive effects with racial/ethnic populations (Fiore et al. 1996). It is already well known that preventing tobacco use is of paramount importance because cessation is difficult.

Tobacco control infrastructures in white and racial/ethnic minority communities have developed differently, although the reasons are not well understood. This development has been influenced by many factors: immigration; the historical and current role of the tobacco industry in the economic, political, social, and cultural life of the community; and the resources invested in communities for research and the establishment of tobacco control programs (Robinson et al. 1995; Shelton et al. 1995). Robinson and colleagues developed an index to measure the capacity of racial/ethnic communities to engage in, develop, and implement tobacco control initiatives. The researchers then applied the index to racial/ethnic communities on a national level. They defined capacity in the index as being made up of four broad components, each of which is composed of numerous elements: (1) research, (2) infrastructure, (3) diffusion of programs, and (4) internalization of policy initiatives. The index assumes that a logical order exists among these components, that is, that a community's ability to gather data and assess its needs precedes program development and dissemination. During this process, it is likely that a community's capacity grows through the evolution of new leaders, establishment of more communication networks, and emergence of a deeper understanding and acceptance of community needs and interventions to meet those needs. Robinson and colleagues (1995) concluded that racial/ethnic communities have fewer resources and less infrastructure to develop and implement tobacco control initiatives than the white community. In addition, racial/ethnic communities were compared with one another, and findings demonstrated variability among communities. The index can be considered a preliminary but important step in providing a useful framework for evaluating the relative tobacco control capacity of racial/ethnic minority communities. Mature tobacco control infrastructures provide leadership, advocacy for a smoke-free environment, communication systems, established research initiatives, effective tobacco control programs, and environmental norms; these elements enable communities and their residents to counter tobacco industry marketing strategies and the appeal of an addictive substance.

Principles for Developing Culturally Appropriate Tobacco Control Strategies

To be culturally appropriate, interventions must properly reflect the characteristics of the group members; that is, programs must recognize that cultural groups—whether they are based on race/ethnicity, national origin, or other characteristics—are not monolithic entities. Behavior can be affected by not only demographic characteristics, such as gender, employment status, educational level, literacy, income, and age but also such variables as national background (i.e., the place of birth of individuals, their parents, or grandparents); acculturation (with its correlates of generational history, time of migration, and language preference); and large social circumstances such as racism, discrimination, and poverty. In particular, and as discussed in Chapter 4, tobacco prevention and control strategies must respond to the historical context of racial/ethnic communities as well as to their current needs (Ellis et al. 1995). Those attitudes and behaviors that have been shaped by the historical relationship between the community on one hand and tobacco and the tobacco industry on the other need to be considered when tobacco control strategies are developed.

Although few tobacco control programs targeting racial/ethnic groups have been culturally appropriate, they are increasing, and their evaluation will further guide the development of culturally appropriate tobacco control strategies. Such programs would address these racial/ethnic groups' differing psychosocial and large social factors related to tobacco use.

Development of culturally appropriate interventions also must go beyond language translations and adaptations of materials (e.g., Rogler et al. 1987; Marín 1993; Bayer 1994) and should do more than simply include contemporary, group-specific traditions or ancestral symbols and traditions. In addition, planners should not assume that the involvement of community leaders and organizations will automatically guarantee a program's success. Marín (1993, p. 149) has argued that to be culturally appropriate, an intervention must meet these requirements: "(1) it is based on the cultural values of the group, (2) the strategies that make up the intervention reflect the subjective culture (attitudes, expectancies, norms) of the group, and (3) the components that make up these strategies reflect the behavioral preferences and expectations of the group's members."

Recent studies have identified numerous intergroup differences in beliefs, attitudes, expectancies, and norms that are useful in designing effective tobacco control programs by identifying optimal messages or techniques that are culturally appropriate. Racial/ethnic cultural values are often an asset in tobacco control efforts. For example, Marín and colleagues (1990a) found that Hispanic smokers were more likely than white smokers to think that an effective motivator to quit smoking was the knowledge that adults who smoke set a bad example for children and endanger children's health. According to Robinson and colleagues (1992), African Americans responded to the use of prayer during smoking cessation programs, and Hodge and colleagues showed that American Indians were unresponsive to confrontational approaches for curtailing tobacco use (American Indian Cancer Control Project 1991). Materials developed for Chinese Americans have offered the use of martial arts as a behavioral alternative to cigarette smoking (Chinese Community Smoke-Free Project 1992). Another example of a culturally appropriate message is a billboard used by the California Department of Health Services to target Hispanics (Figure 1). The billboard makes use of a basic Hispanic value (*familialism*) within the context of a message that is an important motivator to Hispanics to quit smoking—quitting to protect the health of the family (Marín et al. 1989, 1990a). More recently, in an analysis of a population-based survey of Californians 18 years of age and older, researchers found that African Americans and Hispanics were more likely than whites to plan to quit smoking in the near future and to have tried to quit at least one time (Kaplan et al. 1993). In a comparison of smoking cessation intentions and behaviors among white and African American smokers, white smokers were more likely to set quitting smoking as a goal, whereas African Americans were more likely to focus on a goal of reducing the number of cigarettes they smoked per day or making other changes in smoking behavior (Hahn et al. 1990). Another study found that intentions to breast-feed predicted smoking cessation among African American pregnant women (O'Campo et al. 1992).

Other recent studies of smoking cessation programs indicate that members of most racial/ethnic groups tend to be very interested in quitting smoking. In the 1993 National Health Interview Survey (NHIS), current smokers in all racial/ethnic groups said they were willing to quit smoking (Table 1) (National Center for Health Statistics [NCHS], public use data tape, 1993). African Americans (71.4 percent) reported the desire to quit in greater proportions than members of the other racial/ethnic groups, whereas Asian Americans and Pacific Islanders (60.2 percent) showed the least interest in quitting. In all four racial/ethnic groups, women were more likely than men to want to stop smoking. Moreover, data from the Community Intervention Trial for Smoking Cessation's (COMMIT) initial survey in 10 U.S. communities showed that more African Americans than whites, both men and women, said they wanted "a lot" to quit (Royce et al. 1993). In a San Francisco study, Hispanics considered a high interest in quitting smoking to be more desirable than did whites (Marín et al. 1989).

Despite their interest in smoking cessation, members of these racial/ethnic minority groups have been

Figure 1. Billboard used by the California Department of Health Services in targeting Hispanics to quit smoking*

*Translation: If you smoke, she smokes.
Source: California Department of Health Services, Tobacco Control Media Education Campaign, Sacramento, 1993.

Table 1. Percentage of adult smokers who would like to stop smoking,* by race/ethnicity and gender, National Health Interview Survey, United States, 1993

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	%	±CI†	%	±CI	%	±CI	%	±CI	%	±CI
Total	71.4	4.8	65.0	14.6	60.2	12.2	68.7	5.8	70.4	1.8
Men	68.6	7.3	57.3	23.4	58.3	14.6	63.8	7.8	67.8	2.6
Women	74.9	5.4	70.3	16.1	65.3	22.6	79.3	8.1	72.4	2.1

*In response to the question, "Would you like to completely stop smoking cigarettes?"
†95% confidence interval.
Source: National Center for Health Statistics, public use data tape, 1993.

less likely than whites to actually quit. In a study of 786 adult smokers in the Minneapolis-St. Paul area, Hahn and colleagues (1990) found that 52 percent of African American men had tried to quit smoking in the previous year, compared with 63 percent of white men. They also found that 56 percent of African American women had tried to quit, compared with 58 percent of white women. In a recent survey conducted in California, African Americans, Asian Americans, and Hispanics were more likely than whites to report that they tried to quit smoking in the previous year; however, relapses were more common among African Americans (49.5 percent), Asian Americans (39.8 percent), and Hispanics (37.8 percent) than among whites (35.0 percent) (Burns and Pierce 1992). NHIS data from 1991 that were statistically adjusted for gender, age, education, and poverty status indicate that African Americans and Hispanics were more likely than whites to quit for a day during the previous year but that African Americans who tried to quit were more likely than whites to relapse (Centers for Disease Control and Prevention [CDC] 1993b). In another study—conducted in Milwaukee, Wisconsin; Minneapolis, Minnesota; and Seattle and Spokane, Washington—

American Indians who were patients at Indian Health Service (IHS) clinics reported a moderate desire to quit smoking (mean of 5.97 on a scale of 0 to 10) but a high rate of relapse (70 percent) (Lando et al. 1992). These data suggest the need for culturally appropriate programs that not only help smokers stop smoking but also support them in their efforts to maintain a smoke-free lifestyle and to avoid relapses.

In addition to considering intergroup differences, tobacco control programs targeting members of racial/ethnic groups must involve culturally competent staff—persons with the academic and interpersonal skills needed to understand and appreciate racial/ethnic groups' cultural differences and similarities and to respect these groups' beliefs, attitudes, norms, and behaviors (Cross et al. 1989; Roberts 1990; Orlandi 1992). Such staff must have the skills to understand their own cultural beliefs and values, to understand the dynamics of cultural differences, and to translate that understanding into culturally appropriate behaviors. Cross and colleagues (1989) and Davis and Voegtle (1994) propose that culturally competent health care systems—and by implication culturally competent staff—should (1) be aware and accepting of cultural differences, (2) have the capacity for cultural self-assessment, (3) be conscious of the dynamics inherent when cultures interact, (4) have relevant cultural knowledge of the targeted group, and (5) have skills that promote adaptation to diversity. Other authors, such as Corcoran and Robinson (1994), assert that public health professionals need to actively include the community by establishing planning teams composed of key community leaders and that staff be willing to redefine the project as community needs change.

Furthermore, persons designing and implementing tobacco control programs ideally should determine whether theoretical models and approaches originally developed for certain populations would be relevant to the racial/ethnic groups being targeted. Most current theoretical approaches to health promotion have been developed by white researchers who work primarily with white populations. Some researchers have questioned the overall validity and usefulness of these theoretical approaches because the approaches that are developed do not necessarily reflect the cultural values shared by other racial/ethnic groups and do not consider how variables such as acculturation, racism, and poverty may affect peoples' health behaviors (Prochaska 1992; Robinson and Sutton, in press). This concern can be addressed only through an empirical approach that analyzes the usefulness of theories initially developed for groups other than the ones being targeted by an intervention (Orlandi 1992).

Information Needs

To ensure that prevention and cessation programs will provide members of a racial/ethnic minority group with the information that they need most, program designers must find out three things. (1) Do members of the community need basic information about the harmful health effects of tobacco use? (2) What culture-specific experiences directly influence the role of tobacco and the tobacco industry and how can they be addressed in health promotion messages? (3) Which media and information sources would be most effective in conveying information to the targeted group?

Because information about the dangers of cigarette smoking has been provided to the public for more than 30 years, most U.S. citizens and residents are well aware of these health consequences. American Indians, for example, tend to have a high level of knowledge about the hazards of smoking. In a study of 1,369 northern California American Indians who were patients at IHS clinics, Hodge and colleagues (1995) found that most American Indians knew about the health effects of tobacco use, particularly its relationship with cancer and the dangers of smoking while pregnant.

Conversely, this basic information may not have reached persons who have limited English proficiency, who have recently arrived in the United States, or who may not have been exposed to media and information sources that traditionally have carried messages about the dangers of cigarette smoking. It is possible for example, that Asian Americans, Pacific Islanders, and Hispanics who have recently immigrated to the United States are not familiar with the dangers of cigarette smoking. Less acculturated Asian Americans, Pacific Islanders, and Hispanics who have resided in the United States for several years may not have benefited from large-scale public education campaigns directed at persons who are proficient in English and those who interact frequently with mainstream society. To help address this need, the Agency for Health Care Policy and Research translated the consumer cessation guide "You Can Quit Smoking" into Cambodian, Laotian, Vietnamese, Tagalog, Korean, and Chinese (U.S. Department of Health and Human Services [USDHHS] 1996 and 1997). Chen and colleagues (1993) reported that less than 40 percent of Cambodian, Laotian, and Vietnamese smokers in Columbus, Ohio, had heard that smoking caused heart disease. Earlier, Jenkins and colleagues (1990) reported that only 74 percent of Vietnamese adults surveyed in San Francisco knew that smoking caused cancer. Nevertheless, Campbell and Kaplan (1997) found that both less acculturated and more acculturated Hispanic women (as measured by language orientation) agreed that cigarette smoking is harmful to children's health. However, less acculturated Hispanic women were more likely to agree that it is safe to smoke for a year or two.

Even long-term U.S. residents who have been receiving information on the dangers of tobacco smoke for many years may have limited or incorrect information. For example, in a study of Chicago women living in subsidized housing, 46 percent of African American women agreed that the chances of getting lung cancer were the same for smokers and nonsmokers, compared with 27 percent of white women (Manfredi et al. 1992). In that study, African American women also reported that the causes of lung cancer were unknown or that lung cancer was the result of environmental pollution (Lacey et al. 1993). Conversely, in a multivariate analysis, African Americans compared with whites were found to have higher levels of knowledge about the benefits of not using tobacco and the health consequences of tobacco use, but blue collar status emerged as the most significant predictor of lower levels of knowledge (Robinson et al. 1991). In another study, African American residents of urban Missouri areas recognized the harmful effects of ETS but were less likely than whites to know the health risks associated with active smoking, particularly its link with heart disease (Brownson et al. 1992).

In a 1989 survey of Hispanic and white clients of a San Francisco health maintenance organization (HMO), Hispanics had numerous misconceptions about the causes of cancer, but a similar proportion of Hispanics (97.5 percent) and whites (98.4 percent) knew that cigarette smoking caused cancer (Pérez-Stable et al. 1992). Similarly, Vander Martin and colleagues (1990) surveyed patients of primary care physicians and found that African Americans (87.8 percent) and Asian Americans (86.5 percent) were significantly less likely than whites (92.1 percent) and Hispanics (91.6 percent) to recognize that cigarettes had harmful health effects. They also found that African American (58.9 percent), Asian American (56.3 percent), and Hispanic (60.1 percent) smokers were less likely than white smokers (80.3 percent) to recognize that they were addicted to cigarettes. In the 1992 NHIS, members of racial/ethnic groups were generally less likely than whites to indicate concern over the carcinogenic characteristics of cigarette smoking, although they expressed the same level of agreement as whites regarding the need for pregnant women not to smoke and about the harmfulness of ETS (Table 2) (NCHS, 1992 Cancer Control Supplement, public use data tape). In addition, racial/ethnic group members were less likely than whites to believe that there were health benefits to quitting smoking.

Once program planners decide what information needs to be conveyed, they must consider which media would be most effective in reaching the targeted audience. Many researchers have suggested employing the media most frequently used by the targeted ethnic group. To reach African American smokers, for example, Stotts and colleagues (1991) suggest that smoking cessation programs should use African American broadcast and print media to address this group's information and motivational needs.

Moreover, prevention and cessation programs should use the information channels (e.g., radio, television, and newspapers) and information sources (e.g., physicians, peers, and actors) that members of the targeted racial/ethnic group perceive to be trustworthy and reliable. Unfortunately, little is known about how credible the various media and information sources are perceived to be by members of racial/ethnic groups. In one of the few studies focusing on this issue—research involving African Americans in Columbia, South Carolina; Durham, North Carolina; Hartford, Connecticut; and Springfield, Massachusetts—television was perceived as the most trustworthy information channel (by 70 percent of participants), followed by newspapers (59 percent), radio (53 percent), and magazines (53 percent) (Cernada et al. 1989–1990). A recent study among Hispanics (Marín 1996) showed that the most credible channels for disseminating information about cigarette smoking among Hispanics are (in descending order) books, newspaper articles, pamphlets, magazine articles, and television news shows; the least credible were *fotonovelas* (illustrated comic-book type of booklet targeting adults) and *telenovelas* (Spanish-language soap operas). The same study found that the most credible sources of cigarette smoking information among Hispanics were (in descending order) a physician, a cancer patient, and a peer of the respondent; the least credible sources of information were a politician, a singer, an actor, and a child.

Research and Development Limitations

In a recent analysis of racial/ethnic minority groups' expertise for engaging in tobacco control efforts, Robinson and colleagues (1995) suggested that African American, American Indian, Alaska Native, Asian American, Pacific Islander, and Hispanic groups all have been significantly limited in conducting research and developing program and policy initiatives for tobacco control. According to Robinson and colleagues, these limitations may exist, in part, because racial/ethnic groups tend to have fewer resources for tobacco control activities than whites.

Table 2. Adults' beliefs about the health effects of smoking, by race/ethnicity, gender, and smoking status, National Health Interview Survey, United States, 1992

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	%	±CI*	%	±CI	%	±CI	%	±CI	%	±CI
	So many things cause cancer that it does not really matter if you smoke.									
Overall										
Total	28.6	3.0	25.6	9.6	27.3	7.0	30.7	3.0	16.5	1.0
Men	27.8	4.7	30.7	14.1	25.2	10.5	28.1	4.3	18.0	1.5
Women	29.3	3.6	21.3	11.3	29.3	8.4	33.2	3.9	15.2	1.2
Nonsmokers										
Total	25.2	3.6	18.7	7.8	22.9	6.6	25.4	3.1	10.9	1.0
Men	23.7	6.2	19.9	14.6	15.3	9.2	23.3	4.6	11.8	1.5
Women	26.3	4.1	17.7	11.0	28.1	8.6	27.3	4.1	10.0	1.2
Smokers										
Total	38.2	5.6	39.4	21.9	47.6	18.9	50.5	7.0	32.5	2.3
Men	36.4	7.9	54.1	28.5	45.9	21.0	43.3	9.2	33.7	3.2
Women	40.2	7.3	27.4	24.2	64.9	34.7	58.8	9.9	31.2	3.1
	Smoking by a pregnant woman may harm the baby.									
Overall										
Total	90.7	1.7	90.8	6.1	92.3	3.9	92.0	1.9	92.5	0.7
Men	90.5	2.6	86.0	10.4	91.9	6.3	92.9	2.7	91.4	1.0
Women	90.9	2.0	94.9	6.4	92.6	4.7	91.2	2.4	93.5	0.8
Nonsmokers										
Total	92.6	1.7	94.5	5.2	92.2	4.5	93.2	2.0	94.9	0.6
Men	92.2	2.7	87.8	10.5	91.1	8.8	92.5	3.2	93.7	1.0
Women	92.9	2.2	100.0	0.0	93.0	4.8	93.8	2.4	96.0	0.7
Smokers										
Total	90.1	2.9	89.1	11.6	94.3	6.1	92.1	4.2	89.5	1.5
Men	90.1	4.0	92.7	14.3	95.6	6.1	95.0	4.7	88.5	2.2
Women	90.2	3.8	86.2	17.4	81.2	24.7	88.8	6.9	90.5	1.8
	The smoke from other people's cigarettes is harmful to you.									
Overall										
Total	82.1	2.2	79.8	9.1	80.3	6.2	86.7	2.2	85.2	0.9
Men	81.5	3.4	77.1	16.2	83.8	7.4	85.4	3.4	82.8	1.4
Women	82.7	2.7	82.2	10.9	76.9	9.4	87.9	2.7	87.4	1.1
Nonsmokers										
Total	89.7	2.0	94.9	4.2	81.1	7.1	89.8	2.3	91.6	0.8
Men	90.0	3.2	92.8	6.0	86.1	9.4	88.9	3.5	89.7	1.3
Women	89.4	2.4	96.6	6.5	77.6	9.8	90.6	2.8	93.4	0.9
Smokers										
Total	66.8	5.2	57.6	20.8	78.4	11.7	80.0	5.1	71.0	2.2
Men	67.8	7.0	57.8	29.7	80.6	12.5	76.3	7.9	68.4	3.1
Women	65.7	7.5	57.4	29.5	56.4	36.4	84.3	6.1	73.7	2.9

*95% confidence interval.
Source: National Center for Health Statistics, 1992 Cancer Control Supplement, public use data tape.

Table 2. Continued

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
	Most deaths from lung cancer are caused by cigarette smoking.									
Overall										
Total	73.7	2.9	79.3	10.4	77.1	6.1	77.4	2.8	75.0	1.1
Men	74.9	4.6	75.5	15.6	79.9	8.4	76.7	4.3	73.9	1.7
Women	72.8	3.4	82.6	10.5	74.3	8.7	78.2	3.5	76.1	1.3
Nonsmokers										
Total	80.0	2.9	84.6	9.0	79.1	6.8	79.4	3.2	81.7	1.1
Men	81.6	5.2	71.2	18.0	83.4	10.2	78.5	4.9	80.3	1.7
Women	78.8	3.5	95.6	5.8	76.1	8.8	80.3	3.7	82.9	1.4
Smokers										
Total	61.5	5.6	74.1	18.4	69.4	14.2	73.8	6.2	59.8	2.3
Men	64.6	7.6	91.2	16.8	74.5	14.6	71.8	8.8	60.4	3.5
Women	57.7	7.7	60.3	28.6	19.1	25.3	76.2	7.8	59.3	3.1
	Even if a person has smoked for more than 20 years, there is a health benefit to quitting.									
Overall										
Total	82.6	2.5	81.3	9.1	78.2	6.3	80.9	2.9	91.4	0.4
Men	82.0	3.9	80.7	11.2	78.6	8.7	82.0	4.2	91.1	1.0
Women	83.0	3.0	81.7	14.1	77.8	9.1	79.8	3.5	91.7	0.9
Nonsmokers										
Total	85.5	2.8	79.6	12.3	78.9	7.1	82.1	3.1	93.9	0.7
Men	85.5	4.6	81.8	11.9	80.6	10.8	82.2	4.6	94.0	1.0
Women	85.4	3.3	77.8	19.8	77.7	9.3	82.1	3.9	93.8	1.0
Smokers										
Total	79.0	4.5	88.2	11.0	76.6	13.1	80.3	5.8	88.0	1.7
Men	77.7	6.8	87.8	17.0	76.0	14.6	82.9	8.2	86.9	2.4
Women	80.7	5.9	88.5	14.0	81.9	24.3	77.2	8.0	89.2	2.0

Overcoming these limitations will be imperative in future years because the need for culturally appropriate tobacco control programs will likely grow. Numerous researchers have argued that culturally appropriate health promotion efforts need to be developed for racial/ethnic groups (Rogler et al. 1987; Edwards and MacMillan 1990; Nestle and Cowell 1990; Gonzalez et al. 1991; Robinson et al. 1991; Uba 1992; Vega 1992; Alcalay et al. 1993; Marín 1993). Early outcome data on interventions targeting racial/ethnic groups further indicate the need for such strategies (Chen et al. 1994; Pérez-Stable et al. 1994; Marín and Pérez-Stable 1995). Moreover, in a National Cancer Institute (NCI) analysis of self-guided strategies for smoking cessation, Glynn and colleagues (1990) supported the need for targeted programs and suggested that the availability of self-guided smoking cessation materials tailored to the needs of a racial/ethnic group "enhances their adoption and may positively affect quit rates" (p. 11). Therefore, culturally appropriate interventions may prove to be more acceptable and easier to implement and also may have increased effectiveness (Fiore et al. 1996). Cultural values, in fact, often support the messages given in effective tobacco control programs. In addition, if the development process includes community leaders and researchers who represent the community, the process itself will enhance the existing tobacco control infrastructure (Robinson et al. 1995).

Primary Prevention Efforts

Most of the programs that seek to prevent tobacco use among racial/ethnic minority groups focus on children and adolescents. These interventions include efforts to restrict minors' access to tobacco products, school-based health education programs, and mass media efforts.

Efforts to Restrict Youth Access to Tobacco

A comprehensive national effort to address the problem of minors' access to tobacco was made in 1992 with the passage of the Synar Amendment to the Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act (Public Law 102–321), which amended the Public Health Service Act. The draft regulations were made final in 1996. These regulations require the 50 states, the District of Columbia, and U.S. jurisdictions to enact and enforce legislation restricting the sale and distribution of tobacco products to minors, as a condition of receiving federal block grant funds for substance abuse and treatment. As a result, all states now designate an agency to enforce their minimum-age laws on purchase of tobacco products. Many local governments have attempted over the years to limit access to tobacco among youths under the age of 18 years by enacting or strictly enforcing legislation that limits minors' ability to purchase tobacco over the counter and through vending machines, whereas others have opted to educate retailers and encourage them to voluntarily comply with legislation that limits the sale of tobacco products to minors (Lynch and Bonnie 1994; USDHHS 1994). Studies show that over-the-counter sales of tobacco to adolescents under the age of 18 years are indeed widespread, although all states prohibit such sales (Altman et al. 1989; Jason et al. 1991; NCI 1991; DiFranza and Brown 1992; Forster et al. 1992). Despite laws in every state that prohibit the sale of tobacco products to persons under 18 years of age, underage buyers in 1996 were able to purchase tobacco products from retail outlets a median of 40 percent of the time, according to reports from states, compared with rates ranging from 60 to 90 percent in previous studies (USDHHS 1998).

In addition to requirements of the Synar Amendment, the recent regulations on tobacco products proposed by the Food and Drug Administration (FDA) and made final on August 23, 1996, sought to reduce both minors' access to tobacco products and the appeal those products have to minors (see Efforts to Control Tobacco Advertising and Promotion later in this chapter). Three key provisions address minors' access to tobacco: (1) requiring vendors to check a photograph identification as proof of age and prohibiting sales to those under age 18, (2) prohibiting most vending machines and self-service displays of cigarettes except in facilities totally inaccessible to persons under age 18, and (3) prohibiting free samples of cigarettes and sales of individual cigarettes or packs of fewer than 20 cigarettes (so-called kiddie packs). Both the Synar Amendment and the FDA regulations hold promise for reducing tobacco use by all young people, including those who are members of racial/ethnic groups.

In general, adults in the four racial/ethnic groups perceive that minors have fairly easy access to tobacco products. In the 1992–1993 Current Population Survey,[1] a greater proportion of white respondents (55.6 percent) said that it was very easy for minors to purchase tobacco products, compared with American Indians and Alaska Natives (52.6 percent), Hispanics (49.8 percent), African Americans (49.0 percent), and Asian Americans and Pacific Islanders (44.3 percent) (Table 3) (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993). Men and nonsmokers were more likely than women and smokers to think that minors had easy access to tobacco products. Data from the 1989 Teenage Attitudes and Practices Survey (TAPS) showed that most youths 12–18 years old who reported cigarette smoking bought their cigarettes primarily at small stores or through cigarette vending machines (Allen et al. 1993). For example, 86.9 percent of white adolescents reported often or sometimes buying their cigarettes from small stores, compared with 80.0 percent of African Americans and 90.0

[1] The Current Population Survey (CPS) is a continuous monthly survey conducted by the U.S. Bureau of the Census and focuses primarily on labor force indicators for the civilian noninstitutionalized U.S. population aged 15 years and older. Questions on smoking and tobacco use (NCI Tobacco Use Supplement) were added to the CPS for the September 1992, January 1993, and May 1993 surveys. About 57,000 eligible households are surveyed each month and yield approximately 110,000 interviews; interviews are conducted with a knowledgeable household respondent who responds for all household members aged 15 years and older. The knowledge, attitude, and belief questions described in this report were asked only of self-respondents.

percent of Hispanics. In contrast, 51.4 percent of white smokers reported often or sometimes buying cigarettes from large stores, compared with 56.6 percent of Hispanics and 39.8 percent of African Americans.

Data from a 1993 follow-up survey (TAPS-II) that were statistically adjusted for participant correlation and age showed that African Americans were less likely than whites to have ever been asked to show proof of age when buying or trying to buy cigarettes; Hispanics were less likely than non-Hispanics to ever have been asked to show proof of age (CDC 1996). In 1989, 12- to 17-year-old whites who smoked were

Table 3. Adults' beliefs about minors' ease in purchasing cigarettes and other tobacco products,* by race/ethnicity, smoking status, and gender, Current Population Survey, United States, 1992–1993

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	%	±CI†	%	±CI	%	±CI	%	±CI	%	±CI
Total										
Very easy	49.0	0.7	52.6	3.3	44.3	1.6	49.8	0.9	55.6	0.3
Somewhat easy	15.4	0.5	15.9	2.4	16.6	1.2	15.4	0.6	17.6	0.2
Men										
Very easy	52.5	1.2	55.6	4.9	46.0	2.3	51.9	1.3	57.4	0.4
Somewhat easy	16.1	0.9	14.5	3.5	17.6	1.8	15.7	1.0	18.7	0.3
Women										
Very easy	46.8	0.9	50.1	4.5	42.6	2.2	48.1	1.2	54.0	0.4
Somewhat easy	14.9	0.7	17.0	3.4	15.7	1.6	15.2	0.9	16.7	0.3
All nonsmokers										
Very easy	50.9	0.9	51.4	4.2	44.1	1.7	50.4	1.0	57.2	0.3
Somewhat easy	16.1	0.6	16.2	3.1	17.2	1.3	15.5	0.7	17.9	0.2
All smokers										
Very easy	44.2	1.4	54.2	5.3	45.5	4.1	47.1	2.1	50.9	0.6
Somewhat easy	13.4	1.0	15.4	3.8	13.8	2.8	15.1	1.5	17.0	0.4
Nonsmokers										
Men										
Very easy	54.8	1.4	52.2	6.6	46.4	2.6	53.3	1.5	58.9	0.5
Somewhat easy	16.7	1.0	14.3	4.6	18.5	2.0	15.6	1.1	19.0	0.4
Women										
Very easy	48.6	1.1	50.7	5.6	42.3	2.3	48.3	1.3	55.7	0.4
Somewhat easy	15.7	0.8	17.5	4.2	16.1	1.7	15.5	0.9	16.9	0.3
Smokers										
Men										
Very easy	47.8	2.1	59.3	7.4	45.4	4.9	47.7	2.7	53.6	0.8
Somewhat easy	14.8	1.5	14.9	5.3	14.9	3.5	16.3	2.0	18.0	0.6
Women										
Very easy	41.0	1.9	49.1	7.5	45.8	7.5	46.4	3.3	48.4	0.8
Somewhat easy	12.2	1.3	15.9	5.5	11.3	4.7	13.2	2.3	16.0	0.6

*In response to the question, "In your opinion, how easy is it for minors to buy cigarettes and other tobacco products in your community?" Response categories included "very easy," "somewhat easy," "somewhat difficult," "very difficult," and "don't know."
†95% confidence interval.
Source: U.S. Bureau of the Census, public use data tapes, 1992–1993.

more likely (58.7 percent) than same-aged African Americans who smoked (43.3 percent) to report that they usually bought their own cigarettes. By 1993, however, 62.1 percent of whites who smoked and 64.1 percent of African Americans who smoked reported that they usually bought their own cigarettes. In 1989, 12- to 17-year-old non-Hispanics who smoked were more likely (59.0 percent) than Hispanics of the same age who smoked (41.3 percent) to report that they usually bought their own cigarettes. By 1993, however, 62.4 percent of non-Hispanics who smoked and 59.1 percent of Hispanics who smoked reported that they usually bought their own cigarettes (CDC 1996). In a study in San Bernardino and Riverside Counties, California, Klonoff and colleagues (1994) found that the purchase of single cigarettes by minors was more frequent in ethnic communities (71.2 percent of minors) than in white neighborhoods (34.4 percent of minors).

Klonoff and colleagues (1997) used a factorial design to study the sale of cigarettes to minors in 72 stores in African American, Hispanic, and white communities. Purchase attempts (N = 1,296) were made in 24 stores in each community. There were two participants in each age (ages 10, 14, and 16 years), gender, and race/ethnicity category.

Sales were made most often to 16-year-old African Americans, regardless of gender. A gender effect existed for Hispanics, and more frequent sales occurred to Hispanic girls. Another report based on the same data analyzed purchase attempts by 14- and 16-year-old African American and white participants in African American and white communities (Landrine et al. 1997). Racial- and ethnic-specific sales rates were similar in white communities. In African American communities, however, sales rates were higher for African American youths than for white youths. Of the 41 packs of cigarettes sold to African American youths, only 7 percent were sold by African American vendors. The rest were sold by Asian (67 percent), white (13 percent), and Hispanic (13 percent) vendors, according to participants' reports. Unfortunately, vendor-specific sales rates and comparable sales data by vendor race/ethnicity for the white community were not provided. A limitation of this study is that the apparent age of the minors, an important correlate of sales (DiFranza et al. 1996), was not assessed by independent raters.

A community-based study conducted after passage and enforcement of legislation limiting minors' access to tobacco products showed a reduction in the proportion of merchants who sell cigarettes to minors and the proportion of adolescents who smoke (Jason et al. 1991; Jason et al. 1996). Nevertheless, many merchants—fully aware of legislation prohibiting sales of tobacco to minors—continue to sell these products to underage customers. For example, in a 1991 study of 156 tobacco retailers in central Massachusetts, 80 percent of the merchants who displayed state-mandated warning signs specifying that it was illegal for minors to purchase tobacco products were still willing to illegally sell cigarettes to youths (DiFranza and Brown 1992). Likewise, a 1994 Massachusetts study reported the ineffectiveness of the tobacco industry-sponsored "It's the Law" voluntary compliance program for stores to prevent underage youths from purchasing tobacco (DiFranza et al. 1996). The results of surveys and sting operations conducted by community action groups affiliated with such organizations as Stop Teenage Addiction to Tobacco (STAT) show that before public awareness campaigns, 32 to 87 percent of U.S. adolescents who tried to buy cigarettes in various communities were able to do so. These figures decreased dramatically (by 10 to 93 percent) when merchants were informed of the law, fined for selling tobacco products to minors, or told that their behavior would be monitored by law enforcement agents (Altman et al. 1989; Feighery et al. 1991; Forster et al. 1992).

Some of the campaigns aimed at increasing merchants' awareness of the law's provisions have concentrated on small, urban convenience stores where many youths purchase their own cigarettes (Davis 1991). As a result of a merchant public awareness campaign in San Diego County, tobacco sales to minors declined in Hispanic and Asian American neighborhoods but not in African American communities (Keay et al. 1993). Additional data are needed to determine the reasons that shopkeepers sell tobacco to minors (Landrine et al. 1994) and also the effectiveness of various approaches among youths of different racial/ethnic minority groups and among owners of convenience stores located in racial/ethnic neighborhoods. Information about the tobacco-purchasing patterns among youths of various racial/ethnic groups also is limited; additional research in this area would be particularly useful in designing programs to curtail youths' access to tobacco products.

Cigarette vending machines are another way minors obtain tobacco products, because the machines are rarely supervised by adults. Tobacco control advocates have recommended banning cigarette vending machines, locking them, or moving them to places where adults could check the ages of purchasers. Results from the 1992 California Tobacco Survey showed that a large proportion of Hispanics (93.8 percent), African Americans (91.1 percent), Asian Americans and Pacific Islanders (87.9 percent), and whites (84.2

percent) were willing to ban cigarette vending machines that are accessible to minors (Pierce et al. 1994a).

Strong support for banning cigarette vending machines accessible to youths also was found in the 1994 Robert Wood Johnson Foundation (RWJF) Youth Access Survey, a national household survey to assess public attitudes about policy alternatives for limiting youths' access to tobacco products. This survey of 2,345 adults, including 486 African Americans, 402 Hispanics, and 1,341 whites, showed that there was willingness to ban cigarette vending machines accessible to youths (Table 4) and strong support for banning all cigarette vending machines (Nancy Kaufman et al., unpublished data).

Although most adults believe that it is relatively easy for youths to obtain cigarettes, the RWJF Youth Access Survey found that African Americans (57.5 percent) were somewhat less likely than Hispanics (67.4 percent) and whites (70.0 percent) to believe that tobacco products were very or somewhat easy for youths to buy in their communities. Even so, African Americans and Hispanics were more supportive than whites of increasing retailing restrictions that would limit youths' access to tobacco, with Hispanics being the most supportive. The retail measure with the broadest public support is the proposal to eliminate self-service tobacco displays, requiring retailers to keep tobacco products behind the counter. Hispanics and African Americans differ from whites in their beliefs about the potential results of raising the age at which tobacco products can be legally purchased. Sixty-five percent of Hispanics and 61.4 percent of African Americans, compared with only 44.3 percent of whites, believe that raising the age of legal purchase to 21 would prevent smoking initiation. Similar results were observed when 19 was proposed as the legal age of purchase.

School-Based Health Education Approaches

In the past decade, numerous programs to prevent tobacco use have been developed for use in schools with a substantial number of white students (Lynch and Bonnie 1994). Rather than consider the specific cultural characteristics of targeted students, most of these programs have been theory-driven or intuitively designed and directed toward students at large. Although youths from various racial/ethnic groups have been included in numerous studies, their responses and behaviors have rarely been separately analyzed or reported in the literature. In a review of school-based smoking-prevention programs, an NCI panel of experts concluded that, in general, children from the major racial/ethnic groups and those of low-socioeconomic status were the least likely to have been reached by smoking-prevention programs in schools (Glynn 1989). In 1991, the NCI Advisory Panel on Tobacco-Use Reduction Among High-Risk Youth (Glynn et al. 1991) recommended that entire schools be the target of efforts to identify high-risk youth and that a broader approach (such as identifying a school with a large proportion of economically disadvantaged youth) may be more cost-effective and reach the greatest number of high-risk youth without detrimentally labeling individuals the way a more focused approach might. To support the development of effective school-based interventions, the CDC published a set of guidelines for school health programs to prevent tobacco use and addiction (CDC 1994). These guidelines incorporate findings from a number of studies on tobacco use and addiction, call for school-based tobacco-use prevention programs to be provided for students from all racial/ethnic groups, and indicate that such programs should be "sensitive to, and representative of, a student population that is multicultural, multiethnic, and socio-economically diverse" (p. 4).

One significant challenge is the difficulty of implementing a targeted, culturally appropriate intervention in a typical urban classroom that includes students from many cultural and racial/ethnic groups. Another problem with school-based interventions is that teachers in most school districts are overworked and do not have the time, resources, or training to perform these additional activities as part of their daily lessons (Perry et al. 1990). Teachers often have difficulty making tobacco control a high-priority area for instruction when they must also deal with basic educational issues and serious community problems such as crime, illegal drug use, and substandard housing. In addition, high dropout rates in some racial/ethnic minority communities make it impossible for school-based programs to reach many children. For example, a recent analysis of 1990 census data (U.S. General Accounting Office [GAO] 1994) showed that a large proportion of Hispanic dropouts have abandoned formal schooling within the grades (sixth through ninth) when adolescents are vulnerable to cigarette smoking initiation (USDHHS 1994). The GAO report showed that among all Hispanic dropouts, 14 percent had left formal school by the fourth grade and 56 percent had left by the ninth grade.

To overcome these challenges, new school-based tobacco control programs continue to be developed and implemented. ASSIST, the American Stop Smoking Intervention Study, for example, has a youth component, and at some sites such as North Carolina, the

Table 4. Public support for and beliefs about policies regarding tobacco access and marketing, by selected characteristics, Robert Wood Johnson Foundation Youth Access Survey, 1994

	African American* (N = 486)		Hispanic (N = 402)		White* (N = 1,341)	
Characteristic	**%**	**±CI†**	**%**	**±CI**	**%**	**±CI**
Favor banning the sale of cigarettes in vending machines	74.9	3.5	84.5	3.1	72.5	3.1
Favor banning cigarette vending machines that are accessible to youths	93.7	2.0	93.0	2.2	90.7	2.0
Think retailers should keep tobacco products behind the counter to prevent shoplifting by minors	82.6	3.0	88.9	2.7	75.5	3.0
Favor allowing the sale of cigarettes only in certain stores, just as is done with alcohol	46.9	4.0	72.9	3.9	43.1	3.4
Believe that restricting the sale of cigarettes to persons aged 21 years and older will help reduce the number of kids under 21 who begin smoking	61.4	3.9	65.4	4.2	44.3	3.4
Believe that restricting the sale of cigarettes to persons aged 19 years and older will help reduce the number of kids in high school who begin smoking	56.9	3.9	66.5	4.1	47.1	3.5
Favor banning tobacco product advertising on billboards	61.8	3.9	68.9	4.1	57.3	3.4
Favor banning tobacco product advertising in newspapers or magazines	57.4	3.9	62.3	4.3	49.1	3.5
Think tombstone advertising would make smoking less appealing to youths	72.1	3.6	74.9	3.8	72.8	3.1
Favor requiring plain packaging to make cigarettes less attractive to youths	48.0	4.0	61.8	4.3	44.9	3.5
Favor not allowing coupons in cigarette packs to obtain promotional items appealing to youths	76.5	3.4	82.1	3.4	67.8	3.3
Favor not allowing coupon promotions to obtain free cigarettes by mail	79.5	3.2	89.8	2.7	80.4	2.8
Favor not allowing tobacco companies to sponsor sporting or entertainment events in which their brand names are featured	65.1	3.8	71.7	3.9	51.9	3.5
Think that it is very or somewhat easy for youths to buy cigarettes	57.5	3.9	67.4	4.1	70.0	3.2

*Non-Hispanic.
†95% confidence interval.
Source: Nancy Kaufman et al., unpublished data. Ethnic differences in public attitudes about policy alternatives for limiting youth access to tobacco products: results of a national household survey, 1994.

program teaches students to serve as peer counselors who can provide information on smoking prevention and cessation to other high school students. However, little information is available on the counselors' success in racial/ethnic communities.

Some of the largest experimental school-based programs that have included children from racial/ethnic minority groups are briefly described in this section. This listing is not exhaustive because previous reports have reviewed this type of program (Lynch and Bonnie 1994; USDHHS 1994). These interventions represent the variety of school-based approaches used in racial/ethnic neighborhoods.

Project SMART (Self-Management and Resistance Training)

Project SMART is an in-school program designed to encourage junior high school students to resist pressure to use cigarettes and other drugs by teaching them stress-reduction skills, social-resistance skills, and personal decision-making skills. Implemented in 12 sessions, Project SMART provides the students with role-playing opportunities and offers specific techniques for resisting cigarettes, alcohol, marijuana, and other drugs. In an assessment of this program, Graham and colleagues (1990) interviewed seventh graders in 16 California schools between 1982 and 1986. Approximately 6 percent of the participants were Asian American, 20 percent were African American, 31 percent were Hispanic, and 43 percent were white. The program materials, dissemination channels, and evaluation procedures were not tailored specifically for any of these racial/ethnic groups. Differential effects for cigarette smoking on the basis of participants' gender and racial/ethnic minority background were found. Overall, seventh-grade girls were more positively affected by the program than were seventh-grade boys, and Asian Americans were more likely than other racial/ethnic groups to be affected by the intervention. Hispanics and whites were marginally affected by the program, whereas African Americans did not appear to be affected at all.

Life Skills Training Program

The Life Skills Training (LST) Program is a tobacco-use prevention curriculum that teaches adolescents positive life options and social-resistance skills. The program aims to help students enhance their self-esteem, resist tobacco advertising appeals, cope with anxiety, and develop verbal and nonverbal communication skills as well as social and assertiveness skills, including techniques to resist social pressures to smoke (Botvin et al. 1989a, 1992; Dusenbury and Botvin 1992). Program lessons focus on (1) tobacco information, (2) social skills, (3) personal skills, and (4) self-improvement. Each program includes instruction, behavior modeling and rehearsal, and group feedback. The LST curriculum was initially developed for use with white youths, but the curriculum was later modified for use with Hispanics and African Americans, following consultations with psychologists, educators, reading specialists, and urban adolescents from various racial/ethnic groups. To assess its feasibility, acceptability, and effectiveness in an urban African American population, the LST curriculum was tested in a pilot study involving 608 African American seventh-graders in New Jersey (Botvin et al. 1989a). The study found that the curriculum was acceptable to African American teachers and students and could be implemented with little difficulty in an urban setting. Three months after the intervention, investigators found a 56 percent reduction in the proportion of adolescents who reported that they had smoked in the previous 30 days. In an earlier study, Botvin and colleagues (1989b) found that the use of the LST curriculum was feasible and acceptable among Hispanic seventh-graders attending urban schools in northern New Jersey and in New York City.

More recently, researchers studied the LST curriculum's effectiveness among Hispanic students in the New York City area and found significant changes in knowledge, smoking behavior, and normative expectations concerning peer and adult smoking among students in the schools targeted by the intervention, compared with students in control schools that did not implement the curriculum (Botvin et al. 1992). Consistency in the findings varied, however, because of implementation difficulties across schools. General problems, such as limited resources and stressful conditions in urban schools, may have contributed to these difficulties.

Project SHOUT (Students Helping Others Understand Tobacco)

Project SHOUT was a three-year tobacco-use prevention program that began in 1988 and targeted San Diego students who were in the seventh grade at the beginning of the program (Sallis et al. 1990; Elder et al. 1993b). About 51 percent of the students who participated in the program for all three years were white, and 28 percent were Hispanic. The program consisted of lessons and activities, led by college undergraduate students, on such topics as the consequences of tobacco use, refusal and decision-making skills, and the antecedents and social consequences of tobacco use. Efficacy of the program was measured with preintervention and postintervention questionnaires administered to students at the end of grades seven, eight, and nine. In addition, the efficacy of the program was tested by using a physiological measurement to detect cigarette smoking and an audiotaped skills assessment of the students' ability to refuse offers of cigarettes (Sallis et al. 1990). Follow-up telephone calls and mailings were made during the last year of the intervention to reinforce the program. The proportion of Project SHOUT students who reported smoking in the previous month increased from 8.3 percent at the end of the seventh grade to 13.2 percent at the end of the ninth grade. In comparison, 9.2 percent of control students reported smoking in the previous month at the end of the seventh grade, and 19.8 percent reported smoking in the previous month at the end of the ninth grade. When researchers used logistic regressions to analyze the prevalence of cigarette smoking during the previous month among ninth graders, comparing control and experimental groups, the results were statistically significant for whites but not for Hispanics (Elder et al. 1993b). When researchers considered cigarette smoking during the previous week, they found statistically significant results for both Hispanic and white respondents. When offered a cigarette in a mock situation, students who received refusal skills training provided more appropriate responses than those who did not receive the training (Sallis et al. 1990).

Southwestern Cardiovascular Curriculum Project and Pathways to Health

In 1990, the University of New Mexico began a series of projects designed to educate Navajo and Pueblo youths about cardiovascular health and the prevention of cancer. The Southwestern Cardiovascular Curriculum Project, founded by the National Heart, Lung, and Blood Institute, provides fifth-grade Navajo and Pueblo youths with information on the health effects of tobacco use and helps them develop skills to resist social pressures (Davis et al. 1995b). An evaluation of the program showed that among students who had tried cigarette smoking at baseline, boys who were randomly assigned to the program reported decreasing their cigarette smoking more than those not participating.

The Pathways to Health program, developed with funding from the NCI, involves fifth and seventh graders in nine Navajo and Pueblo schools in rural northwest New Mexico (Davis et al. 1995a). This 16-lesson curriculum is designed to improve Navajo and Pueblo Indian children's decision-making abilities regarding health (Cunningham-Sabo and Davis 1993). The curriculum includes skill acquisition, self-discovery, and class discussion, and it blends traditions of Navajo and Pueblo Indians. Overall, the project promotes a diet low in fat and high in fiber, fruits, and vegetables, and it teaches students to avoid both cigarettes and smokeless tobacco (Cunningham-Sabo and Davis 1993). Results of the baseline testing showed that a large proportion of fifth (30.6 percent) and seventh (60.4 percent) graders had tried cigarette smoking (Davis et al. 1995a). Although 64.5 percent of fifth-grade girls and 41.0 percent of fifth-grade boys expressed intentions to never smoke, by the time they became seventh graders, only 37.8 percent of seventh-grade girls and 24.5 percent of seventh-grade boys reported intentions to never smoke. Tribal differences were also noted. Pueblo students reported higher use of cigarettes, and Navajos reported higher use of chewing tobacco and snuff.

Other Primary Prevention and Intervention Efforts

Other primary prevention and intervention programs have been relatively small in scale and have directly targeted members of a given racial/ethnic minority group. For example, Cella and colleagues (1992) recently designed a smoking-prevention curriculum for 309 mostly African American (57 percent) and Hispanic (19 percent) sixth- and seventh-graders from the Chicago area. The program included two assemblies that were attended by all students. The first assembly featured a rap video developed by African American adolescents in Richmond, California, and a talk by an African American oncologist on the health risks of smoking and social pressures to smoke. The second assembly featured a rap contest in which students performed original rap songs they had written to convey messages about smoking prevention. After the first assembly, students who participated in small follow-up groups were found to have more negative attitudes toward smoking, compared with students attending the larger assembly. There were no differences in attitudes towards smoking between students who decided to participate in the rap contest and those who did not. No data were collected on the intervention's possible effects on rates of smoking initiation or continuation.

Another small-scale tobacco-use prevention effort targeted American Indian children from two Washington State reservations (Schinke et al. 1988). American Indian children participating in the project, who were an average of 11.8 years of age, received training in communication, coping, and cognitive decision-making skills from a bicultural perspective. At a six-month follow-up, children who participated in the program were less likely than children in a control group to report that they had smoked tobacco or used smokeless tobacco within the previous 14 days.

A prevention project now under way in American Indian communities in the northeastern United States involves 260 American Indian adolescents in an after-school cancer education program (Schinke et al. 1996). The intervention merges tribal culture with an educational approach that uses storytellers and role models from the community. The curriculum provides students with information on problem-solving skills, the historical use of tobacco among northeastern Indian tribes, and health and media literacy to show how lifestyle habits are heavily promoted through mass media. Problem-solving skills, the historical use of tobacco among northeastern Indian tribes, and American Indians' heritage are celebrated through such activities as making story bags (bags containing mementos that are reminders of the story) and dance sticks. A preliminary evaluation of the project has shown that American Indian youths who received the tobacco use curricula or the combined tobacco use and dietary curricula had more knowledge and understanding of the health problems associated with tobacco use. In addition, students receiving the tobacco use or the combined curricula were more aware of the role of peers, relatives, and the media in shaping people's dietary and tobacco preferences (Schinke et al. 1996). In another program, involving American Indian children in the northwestern states, Moncher and Schinke (1994) have shown that a culturally appropriate skills-learning curriculum can be more effective when combined with community involvement in the prevention of tobacco use.

Schinke and colleagues (1994) recently developed a program targeting American Indian youths. Based on a legend of the Seneca Nation, the program features an interactive software package entitled *Boy and Woman Bear,* which provides culturally appropriate information on how young people can reduce their risk of cancer via good nutrition and only very limited, nonhabitual use of tobacco. The effectiveness of the software was measured with 368 American Indian youths, aged 10–14 years, in the southeastern United States. As expected, the youths who participated in the program were more knowledgeable about nutrition and tobacco-related facts than were nonparticipants. Further research by these authors (Schinke et al. 1996) has shown the strong effects of multitopic interventions with American Indians.

The Alaska Area Native Health Service of the Public Health Service conducted a pilot study of a school-based intervention targeting 240 Alaska Native children in grades two through six in three Eskimo villages (Bruerd et al. 1994). The curriculum, a modification of previously developed programs, was delivered in 12–15 lessons and involved the children's families in some of the activities. The evaluation of the program showed a decrease in cigarette smoking and in the use of snuff in two of the three villages that participated. The program was most effective when teachers attended training sessions and fully implemented the curriculum. Another program sponsored by the Alaska Area Native Health Service, the Great Alaska Spit-Out, educates Alaska Native schoolchildren and adults about the health risks associated with smokeless tobacco use (Burhansstipanov and Dresser 1993). Schoolchildren in rural Alaska communities prepare essays and public service announcements regarding the health problems associated with tobacco use. All children who submit entries receive certificates. Monetary awards are given for the best essays, and trips to Washington, D.C., are awarded to the first-place winners.

As an adjunct to tobacco control curricula, cigarette smoking bans on school grounds have been imposed in some states (recent federal legislation, Public Law 103–227, Part C, mandates that schools receiving federal monies be tobacco-free). Although some states and school districts have prohibited students from using tobacco on school campuses, they have excluded administrators, teachers, and volunteers from such policies, most likely because some adults are resistant to tobacco-use bans. Data from the 1992 California Tobacco Survey showed that a relatively low proportion of California adults and youths favored banning cigarette smoking on school grounds (Pierce et al. 1994a). Whites (22.3 percent) were the most willing to ban smoking on school grounds, followed by Asian Americans and Pacific Islanders (16.5 percent), African Americans (16.3 percent), and Hispanics (11.1 percent).

Mass Media Efforts to Prevent Tobacco Use

A few programs have developed mass media materials to prevent tobacco use among children in racial/ethnic minority groups. Most of these programs use television commercials and videotapes to present prevention messages in a targeted fashion. *Stop Before You Drop,* a 10-minute videotape developed by African American adolescents in Richmond, California (American Lung Association [ALA] 1990b), presents a preventive message through stories, rap songs, and dancing; this videotape is available through local affiliates of the ALA. *It's No Joke, Don't Smoke!* is a 30-minute videotape that openly discusses tobacco use among children and young adolescents in racial/ethnic minority groups (California Department of Health Services, Tobacco Control Section 1993). Other mass media prevention approaches include theatrical works presented at school assemblies or during community events and the distribution of newsletters and newspapers in schools and through other community outlets.

No data on the effectiveness of these and similar prevention efforts are available because these activities are relatively new. Although these efforts incorporate the musical preferences of young adolescents (for example, as reflected in programming on MTV [Music Television]) and feature actors from the racial/ethnic groups being targeted, rarely do the messages properly reflect the attitudes, expectations, and normative beliefs of the targeted children. Instead, most of these efforts have allowed untrained scriptwriters (often children from the targeted group) to produce the text. Although this approach benefits from the use of words and expressions that are familiar to the targeted children, it fails to incorporate attitudinal change strategies and the results of studies identifying predictors of tobacco use (see Chapter 4).

Also problematic is the lack of information regarding the best media outlet to use in presenting smoking-prevention campaigns to youths in various racial/ethnic groups, both in terms of frequency of use and in their perceived credibility and motivating power. In a study of 349 Chicago youths aged 5–15 years, Blosser (1988) found differences across racial/ethnic groups in the quantity, frequency, and access to various media. For example, 70.8 percent of African Americans in the sample reported watching television during dinner, compared with 64.6 percent of Puerto Ricans, 58.8 percent of whites, and 58.1 percent of Mexican Americans. Racial/ethnic group differences were also found for access to various media; large proportions of youths reported that they owned a television set (100 percent of whites, 99.0 percent of African Americans, and 97.7 percent of Hispanics), but varying proportions of youths reported that they owned an audiocassette player (80.0 percent of whites, 77.1 percent of Mexican Americans, 62.5 percent of African Americans, and 54.8 percent of Puerto Ricans). In a recent survey of Los Angeles children 8–12 years of age, Raymond J. Gamba (unpublished data) found that children perceived some media channels to be more believable than others when information on tobacco was presented. Overall, respondents perceived talks at school (63 percent), books and pamphlets (54 percent), television programs (54 percent), radio commercials (52 percent), and television commercials (52 percent) to be highly credible in presenting information about tobacco use. Students' perceptions varied by ethnic group. For example, a large proportion of African Americans perceived books and pamphlets to be the most credible channels of information, followed by billboards, posters, newspapers, and television programs and commercials. A large proportion of Asian Americans and Hispanics, however, perceived talks at school to be highly credible, followed by television and radio commercials.

Smoking Cessation Programs

Most structured smoking cessation programs directed at members of racial/ethnic minority groups have emphasized a self-help approach with some supportive adjuncts, such as motivational messages in the mass media or the use of peers or relatives as motivators and supporters (Stotts et al. 1991). This emphasis on self-help may be a direct result of the fact that most smokers quit on their own (Fiore et al. 1990). Some programs have successfully used materials developed for whites, with little or no adaptation for the racial/ethnic group being targeted. Though there is currently little research on the development of culturally appropriate smoking cessation programs, culture-specific tailoring or the development of culturally appropriate programs may be necessary in order to enhance effectiveness. At a minimum, programs must be communicated in a language understood by the target audience (Fiore et al. 1996).

In this section, six major intervention approaches are described: (1) self-help programs, (2) group programs, (3) community interventions, (4) programs in health care settings, (5) employer-sponsored programs, and (6) nontraditional provider interventions. When available, the results of outcome evaluations of the projects or strategies are mentioned. Because most of these projects are relatively new, there is a paucity of research measuring the effectiveness of the various strategies and programs. These descriptions provide an overview of the different approaches that have been used; the list is not complete and does not necessarily represent the most effective interventions or model programs. Future research efforts should consider the components of culturally appropriate interventions (Marín 1993) and conduct proper process and outcome evaluations to provide a better understanding of the effectiveness of various targeted intervention approaches.

Self-Help Approaches

In the United States, most people who quit smoking do so without the help of formal programs, therapy, or nicotine replacement (Pierce et al. 1989; Fiore et al. 1990; Stotts et al. 1991). Members of racial/ethnic minority groups, however, generally seem to have less success with self-help approaches than whites. For example, recent analyses of the 1986 Adult Use of Tobacco Survey showed that African Americans tended to be less successful at quitting smoking than whites (Fiore et al. 1990).

A number of self-help cessation materials and programs have been developed for members of racial/ethnic groups who want to quit on their own. Some of these materials and programs are adaptations of materials and programs previously developed for whites, usually by federal agencies such as the NCI or voluntary associations such as the ALA. Other programs and materials have been developed specifically for members of these racial/ethnic groups; however, only a few studies report on the success of these programs in helping members of racial/ethnic groups quit smoking.

Smokers from racial/ethnic minority groups tend to favor relying on willpower alone to quit smoking. In a 12-state survey of 1,163 low- to middle-income African American insurance policyholders aged 21–60 years, Orleans and colleagues (1989) found that 89.3 percent of those who were former smokers reported relying primarily on willpower to quit smoking and 21.7 percent reported relying primarily on prayer and meditation. These former smokers also reported seldom using cessation aids of any type, including smoking cessation groups (0.4 percent) or books and guides (3.2 percent). Likewise, Hispanic smokers surveyed in San Francisco perceived willpower as the most effective technique for quitting smoking (Marín et al. 1990a).

Rompa Con el Vicio: Una Guía Para Dejar de Fumar (Break the Habit: A Guide to Stop Smoking)

The first self-help manual designed specifically for a U.S. racial/ethnic group was developed in 1988 in San Francisco as part of the Programa Latino Para Dejar de Fumar (Hispanic Program to Quit Smoking). The manual was distributed by the NCI under the name *Guía Para Dejar de Fumar* (Sabogal et al. 1988) and was based on a significant number of studies that identified group-specific attitudes, norms, expectancies, and values related to cigarette smoking and smoking cessation among Hispanics and whites (Marín et al. 1990a,b). Initial versions of the manual (hereafter referred to as the *Guía*) were thoroughly pretested to identify optimal formats, designs, photographs, typefaces, and publication format and size. In 1991, a revised version, *El Fumar, Un Juego Peligroso: Guía Para Dejar de Fumar*, was published and distributed in California with funding from Proposition 99 tax revenues earmarked for tobacco control activities (Programa Latino Para Dejar de Fumar de San Francisco 1992). In 1993, the NCI published and distributed nationally the third edition, *Rompa Con el Vicio: Una Guía Para Dejar de Fumar* (Programa Latino Para Dejar de Fumar de San Francisco 1993).

The *Guía* is a 24-page, 8½-by-11-inch, full-color booklet printed on glossy paper and featuring photographs of numerous Hispanic individuals demonstrating various cessation techniques as well as their testimonials about quitting smoking. All text is in broadcast Spanish—that is, conversational Spanish used by television broadcasters and easily understood by all Spanish-speaking Hispanics. The first section of the *Guía* describes the short- and long-term effects of cigarette smoking, including health problems among smokers and their relatives and the negative social effects, such as bad breath and bad-smelling clothes. The second section presents possible methods a smoker can follow to quit, particularly approaches that Hispanic smokers perceive to be effective (Marín et al. 1990a). In addition, this section offers suggestions and verbal scripts for dealing with social pressures to smoke as well as for dealing with stress or depression. The third section presents strategies to follow after a relapse. The final section lists ways relatives and friends can motivate and support smokers who are trying to quit.

The effectiveness of the first edition of the *Guía* was evaluated in a study of 431 Hispanic smokers who volunteered to participate after they picked up the manual at community stores or clinics in San Francisco (Pérez-Stable et al. 1991). More than 21 percent of the participants reported that they had quit smoking 2.5 months after reading the *Guía*; however, this percentage declined to 18.6 percent after more than 8 months and to 13.7 percent after 14 months.

Pathways to Freedom

Pathways to Freedom: Winning the Fight Against Tobacco is a self-help manual targeting African Americans (Robinson et al. 1992). The manual and a companion 12-minute videotape were developed by the Fox Chase Cancer Center in Philadelphia with funding from the NCI and assistance from a number of African American churches and other community groups. The manual was designed to emphasize quitting and community mobilization. In the early stages of the manual's development, focus group participants and community leaders who were interviewed suggested that the manual should include graphics depicting African Americans representing everyday people of all ages, should provide strong visuals illustrating the health consequences of cigarette smoking, and should target smokers and nonsmokers. Persons in the interviews and focus groups also suggested that the manual and videotape include information on targeted advertising and that they identify the tobacco industry as the enemy.

The resulting manual, *Pathways to Freedom*, is a 36-page, 8 ½-by-11-inch, glossy publication with numerous color photographs and line drawings. The first part of the manual discusses the characteristics of cigarette smoking among African Americans; the tobacco industry's influence on the community through advertising and promotional campaigns; and the effects of stressors, such as unemployment and racism, that promote cigarette smoking behavior. The second part provides instructions on how to quit smoking and help smokers quit, and the third part shows how communities can combat tobacco dependence by working together. The manual addresses the tobacco-related concerns of African American smokers as well as other community members. It covers such topics as cigarette-smoking patterns among African Americans, culturally appropriate strategies to quit smoking, messages that nonsmoking friends and relatives can use to help smokers quit, and the role of prayer and faith in helping people quit and avoid a relapse. The manual was distributed nationally as part of the Legends campaign carried out in 1993 and 1994 by CDC and the National Medical Association (NMA). As part of an American Cancer Society Pathways to Freedom Community Demonstration Project launched in 1992, 285 African American smokers who received the manual agreed to participate in postintervention evaluations. About 71 percent of respondents read some or all of the guide, and 56 percent of those who did reported trying to quit smoking. Approximately 75 percent of those who tried to quit reported being able to stay off cigarettes for at least 24 hours. Most respondents reported that the manual was easy to read, that the graphics were appropriate, and that it was useful overall (C. Tracy Orleans et al., unpublished data). For more information on the evaluation project, see the discussion later in this chapter under "Community Approaches."

Làm Thê' Nào Để Bỏ Hút Thuô'c? (How to Quit Smoking)

Làm Thê' Nào Để Bỏ Hút Thuô'c? is a self-help, smoking cessation manual developed in 1990 to help Vietnamese smokers quit (Vietnamese Community Health Promotion Project 1990). The 30-page, 8½-by-11-inch manual was developed as part of the Vietnamese Community Health Promotion Project based at the University of California, San Francisco. The manual's format is similar to that of the *Guía* and covers topics such as reasons for quitting smoking, the health effects of cigarette smoking, approaches to quitting, dietary concerns while quitting, and suggestions for avoiding and coping with relapse. The manual, available through the California Department of Health Services' Tobacco Control Section, features full-color photographs.

It's Your Life—It's Our Future

It's Your Life—It's Our Future is a 28-page smoking cessation, self-help manual targeting American Indian adults (American Indian Cancer Control Project 1991). The manual was developed by the American Indian Cancer Control Project in Berkeley, California, with NCI funding. The two-color, spiral-bound manual is printed on high-quality paper. The first section of the manual provides motivational information on quitting smoking, including the negative effects of smoking and the positive effects of quitting. The second section presents techniques to help smokers reduce the number of cigarettes smoked per day and offers suggestions on what to do before and after quitting and how to deal with withdrawal symptoms. The last section of the manual provides suggestions on how to stay free of cigarettes, such as how to deal with pressure to smoke from family and friends, how to control stress, and how not to gain weight. The contents of the manual, the presentation of the materials, and the approach to quitting that is promoted in this manual reflect the values of American Indians and their emphasis on the family and the community. The manual is formatted for easy reading; for example, the sections have bulleted headings, and the text is printed in large type. American Indian artwork and pictures are featured throughout the manual. A 16-minute videotape was produced to further motivate smokers to quit and to remain smoke-free (American Indian Cancer Control Project 1991).

Victory Over Smoking—A Guide to Smoking Cessation for You and Your Family

The Chinese Community Smoke-Free Project of the Chinese Hospital in San Francisco produced a 46-page smoking cessation manual entitled *Victory Over Smoking* (Chinese Community Smoke-Free Project 1992) with funding from California's Proposition 99 tobacco tax initiative. The 8½-by-11-inch manual is printed on glossy paper and has black-and-white photographs of Chinese Americans and line drawings. The manual is written in Chinese, and it describes a number of suggested attitudes and behaviors that are specific to and consonant with Chinese culture. For example, "living long enough to see one's grandchildren grow" is presented as a possible benefit to quitting, and martial arts is suggested as a possible alternative to smoking. The five-part manual was pretested with focus groups of San Francisco's Chinese American residents. The first section describes cigarette smoking among Chinese Americans, and the second section describes common health effects of cigarette smoking. The third section presents steps smokers can take as they prepare to quit. The next section describes alternatives to smoking as well as techniques and activities for remaining smoke-free. The final section provides suggestions on how to maintain abstinence, such as through physical exercise, deep breathing exercises, and diet.

Smoking: Facts and Quitting Tips Series

In 1992, the NCI produced two small brochures, *Smoking: Facts and Quitting Tips for Black Americans* (NCI 1992b) and *Smoking: Facts and Quitting Tips for Hispanics* (NCI 1992a). Despite the difference in titles, the brochures are basically identical in content. The major difference between the brochures is that the one targeting Hispanics includes text in both English and Spanish. No information is yet available on their effectiveness.

Hot Lines

Hot lines for smokers who want to quit provide callers with short-term counseling over the telephone and self-help materials via the mail. Probably the most prominent of these hot lines is the Cancer Information Service (CIS), funded by the NCI, which provides services and information to persons wishing to quit smoking. The CIS provides services in English as well as in Spanish in states with high concentrations of Hispanics. The CIS also provides Spanish-speaking counselors and callers with Spanish-language materials, including copies of the *Guía*.

Some states have implemented their own smoking cessation hot lines. For example, California recently funded a hot line to help smokers quit by providing short-term telephone counseling. Between August 1992 and December 1993, the California hot line received calls from more than 18,000 smokers (Pierce et al. 1994b). Most of these calls came from whites (56.8 percent), followed by Hispanics (20.6 percent), African Americans (16.1 percent), and Asian Americans (2.4 percent). These figures show that the proportion of African American and Hispanic smokers reached by the California hot line was similar to or higher than the proportion of African American smokers (7.0 percent) and Hispanic smokers (18.6 percent) in the state, whereas the proportion of Asian American smokers reached by the hot line was lower than the proportion of Asian American smokers in California (5.0 percent).

Group Approaches

In general, smoking cessation programs that are group-based have had difficulty attracting participants, and attrition rates are often high. The scant data available for racial/ethnic groups indicate that similar difficulties may exist to an even greater extent. For example, Hispanics and Asian Americans rarely participate in smoking cessation groups (Pérez-Stable et al. 1993). The same is true for African Americans (Hymowitz et al. 1996). The possible reasons are varied (Glynn 1989; Stotts et al. 1991; Lichtenstein and Glasgow 1992):

- They may have difficulty accessing primary health care facilities that offer smoking cessation services (because of eligibility criteria or physical distance).

- They may be unable to afford the high cost of some group interventions.
- They may perceive such efforts to be inconvenient (e.g., requiring transportation and child care) and time consuming.
- They may prefer to deal with personal problems alone or in the family rather than to seek professional or other help outside of the home.
- They may lack access to linguistically appropriate services.
- They may distrust researchers and health care providers who are not members of their racial/ethnic groups or who are unaware of their culture and behavioral expectations and traditions.
- If they have physically demanding jobs or heavy caregiving responsibilities, they may be too exhausted to attend program meetings.

The difficulty in obtaining enough individuals to participate in smoking cessation groups or even to continue their participation after a few initial sessions has been a problem for many ethnic smoking cessation programs, including those targeting Hispanics in San Francisco, California (Pérez-Stable et al. 1993) and Queens, New York (Nevid and Javier 1992), African Americans in Atlanta, Georgia (Ahluwalia and McNagny 1993), and Chinese restaurant workers in Boston, Massachusetts (Betty Lee Hawks, personal communication, 1993). As a result, many programs have stopped using cessation groups as a possible intervention strategy and as a way to deliver information personally.

As an alternative to group approaches, intervenors in San Francisco began offering personal consultation over the telephone and face-to-face (Pérez-Stable et al. 1993). Trained individuals provide information and support to smokers who want more information than is provided in a self-help manual. This approach (labeled *consultas*, or personal consultations), although demanding in terms of time and personnel, is considered culturally appropriate among Hispanics, who traditionally value personal attention. This alternative also allows telephone advisors to tailor the information to each person's needs. Another alternative program, which provides individual counseling to Southeast Asian smokers in their homes rather than in clinics, has been well received in Long Beach, California (Mary Anne Foo, personal communication, 1994).

Community Approaches

Most community smoking cessation programs targeting members of racial/ethnic groups have been conducted in fairly large urban communities and have used self-help materials together with mass media and outreach workers. In a recent overview of community-wide programs targeting cardiovascular disease, Winkleby (1994) noted the need to conduct focused studies with populations that have not been reached successfully in the past with large-scale projects, as is the case with members of the four racial/ethnic minority groups considered in this report.

Because so many racial/ethnic groups place a high value on the family and on the authority of older relatives (Sabogal et al. 1987), some community programs have employed family-centered interventions, working under the assumption that a smoker's children and other relatives can effectively intervene and that parents can be a child's best source of information regarding smoking-prevention programs. In Boston, the South Cove Community Health Center involved more than 350 Chinese elementary school children in a poster contest to depict the hazards of tobacco. Many of these posters depicted the father smoking at home and motivated children to discuss cigarette smoking in their homes (Esther Lee, personal communication, 1993). In a Vietnamese Saturday language school program in Sacramento, California, youths have been mobilized to carry antismoking messages to their families and to encourage them to avoid using tobacco (Debra Oto-Kent, personal communication, 1993). In another project, Asian American and Pacific Islander children were asked to compete in a "letter to my parents" writing contest, asking them not to smoke (Irene Linayao-Putman, personal communication, 1993). Anecdotal information about this and similar programs indicates that the children enjoy these activities and that their parents are seldom discomforted by the letters, particularly when they perceive the programs to be sanctioned by the school system. Nevertheless, the usefulness of such an approach may be limited in families that maintain strict patriarchal or matriarchal structures in which children's interventions may be perceived as a lack of respect toward adults or as a challenge to the parents' authority.

As mentioned previously, large-scale community projects generally have used multiple strategies and channels to disseminate smoking cessation information and to motivate smokers to quit. A sample of programs targeting members of the four racial/ethnic groups is presented below. This listing represents the variety of community approaches developed to help racial/ethnic smokers quit but should not necessarily be perceived as a list of model programs.

Stanford Five-City Multifactor Risk Reduction Project

Researchers at Stanford University developed the Stanford Five-City Multifactor Risk Reduction Project to examine cardiovascular disease and related risk factors over a nine-year period in five small communities in northern California. The project was based on behavior-change models and social-learning theory (Farquhar et al. 1985, 1990) and used television, mass-distributed print media, direct mailings, contests, correspondence courses, and school-based programs for youths. In the communities with very high concentrations of Hispanics, Spanish-language radio and newspaper columns were chosen as the primary methods of disseminating information. The decline of smoking rates was 13 percent greater in the treatment cities than in the control cities (Farquhar et al. 1990). Although researchers observed no differences in the proportion of experimental or control respondents who reported ever receiving advice from physicians on quitting smoking, whites (51.1 percent) were much more likely to report having received this advice than Hispanics (32.6 percent) (Frank et al. 1991).

Researchers found that the project was fairly successful in promoting the use of self-help smoking cessation materials among whites. A greater proportion of smokers in the experimental communities (22.1 percent) than in the control communities (15.0 percent) reported using smoking cessation materials in the 12 months before the interview (Jackson et al. 1991). In the experimental communities, Hispanics and whites did not differ in their reported use of materials to reduce cardiovascular risk. When asked about their use of tobacco control materials, 31.0 percent of Hispanic women and no Hispanic men reported using smoking cessation print materials during the previous 12 months, compared with 21.3 percent of white women and 13.7 percent of white men.

The project was less effective in promoting smoking cessation programs; no Hispanic smokers reported using such programs, compared with 6.3 percent of white smokers. More recent analyses of and comment on risk-reduction data from this and other community-based interventions suggest that such interventions can achieve more positive results by being coupled with policy initiatives, developing more focused studies, and broadening evaluation concepts (Winkleby et al. 1992; Fortmann et al. 1993; Winkleby 1994).

Programa Latino Para Dejar de Fumar (Hispanic Program to Quit Smoking)

The Programa Latino Para Dejar de Fumar was a community-based, culturally appropriate intervention designed specifically for Hispanic smokers in San Francisco (Pérez-Stable et al. 1993; Marín and Pérez-Stable 1995). Funded by the NCI for 1985–1995, the program was operated jointly by the University of California, San Francisco, and the University of San Francisco. To motivate Hispanic smokers to quit and to inform them of strategies to stop smoking, the program used mass media (primarily radio and television public service announcements), outreach efforts, and distribution of the *Guía*. Program planners developed the various versions of the *Guía*, implemented the *consultas* approach to deal with individual needs for counseling, and used a periodic raffle to reward individuals who quit smoking within a given period of time (Pérez-Stable et al. 1993). Intervention messages were based on research that identified the attitudes, norms, expectancies, and values of Hispanic smokers (Marín et al. 1990a,b). The strategies incorporate significant cultural values such as *familialism* (the normative and behavioral influence of relatives) (Sabogal et al. 1987) and *simpatía* (a social mandate for positive social relationships) (Triandis et al. 1984). For example, a key message of the program was that smokers should quit to protect the health of their children and to avoid setting a bad example for children. To incorporate *simpatía* into the program, planners developed intervention materials that emphasized the positive aspects of quitting and avoid confrontational approaches. This latter approach was similar to that used in materials developed for American Indians (American Indian Cancer Control Project 1991).

The Programa Latino Para Dejar de Fumar has been evaluated through a number of cross-sectional and longitudinal surveys as well as through smaller scale studies that have examined the effectiveness of specific strategies (Marín et al. 1990c, 1994; Pérez-Stable et al. 1993; Marín and Pérez-Stable 1995). The program has significantly increased Hispanics' knowledge about the dangers of smoking, awareness of the program, and participation in the program. Most important, the program has decreased the prevalence of smoking among Hispanics in San Francisco (Marín and Pérez-Stable 1995). These changes have been observed primarily among the less acculturated Hispanic smokers who make up the targeted group. For example, during the first year of the program, 24.9 percent of the less acculturated Hispanics in San Francisco reported awareness of the program; two years later, that proportion had increased to 48.5 percent (Marín et al. 1990b; Marín and Pérez-Stable 1995). During the first year in which the *Guía* was available, 23 percent of the less acculturated Hispanic women and 12 percent of the less acculturated Hispanic men in San Francisco reported having a copy. One year later, the proportion of the less acculturated Hispanics who reported having a copy of the *Guía* had increased to 37.7 percent of the women and 34.1 percent of the men.

Sí Puedo (Yes, I Can)

Sí Puedo was an eight-week smoking cessation program designed specifically for Hispanic smokers in a largely Hispanic area of Queens, New York. The program used the *Guía* and other print materials, weekly bilingual group meetings, regular telephone calls to offer support to participants, and videotaped vignettes in which Hispanic actors conveyed smoking cessation messages. Persons were recruited through mass media advertising, direct mailings to Hispanic physicians and clergy, and fliers posted throughout the community. Most participants were from South America (57 percent); the rest were from the Caribbean (25.4 percent) or Central America (9 percent). Some people participated in all aspects of the program, whereas others used only the self-help materials. Preliminary figures show that 55.6 percent of the participants who took part in all components of the Sí Puedo smoking cessation program stopped smoking by the end of the program (Nevid and Javier 1992). In comparison, 21.7 percent of those who used only the self-help materials abstained from smoking.

Pathways to Freedom Community Demonstration Project

The American Cancer Society (ACS) used the *Pathways to Freedom* manual and videotape as part of a demonstration project to lower the prevalence of cigarette smoking among African Americans (Robinson et al. 1992; Robinson and Sutton, in press). During the first phase (1992–1993), the ACS provided funds to eight of its local units in Long Beach and central Los Angeles, California; Philadelphia, Pennsylvania; Delaware; the District of Columbia; Georgia; Kansas; and Texas. The ACS units developed programs to recruit African American smokers to quit smoking using the *Pathways to Freedom* materials and to expand the ACS's outreach into African American communities. Many of them planned their projects to coincide with the Great American Smokeout (GAS).

In the second phase of the project (1993–1994), the ACS provided funding to seven more local units in Contra Costa and San Diego Counties, California; Maryland; Nebraska; Chattanooga and Memphis, Tennessee; and Utah. Cessation activities expanded to include efforts to mobilize African American communities and to identify more individuals and groups willing to become tobacco control advocates.

The process evaluation of the first phase showed that the program was easier to implement in communities with a previous history of community-based outreach efforts (Robert G. Robinson et al., unpublished data). Dissemination of the self-help manual was most difficult in multiethnic communities and areas of a city. Most ACS agencies used a variety of distribution channels, including churches, health care organizations, and recreation centers. The program helped the ACS to approach African Americans and to gain support from African American volunteers. Even though the project emphasized self-help approaches, several ACS units incorporated *Pathways to Freedom* materials into smoking cessation groups conducted in African American communities.

The outcome evaluation of the first phase consisted of telephone interviews with 763 smokers who returned a screening postcard that was attached to each *Pathways to Freedom* manual. Respondents reported a favorable impression of the manual and a 10 percent quit rate at 30 days. In addition, smokers who viewed the *Pathways to Freedom* videotape were significantly more likely than others to accept and use the self-help materials as well as to move from precontemplation to contemplation in the process of changes involved in smoking cessation.

Quit Today!

A two-part study funded by the NCI will evaluate the effectiveness of the *Pathways to Freedom* manual and videotape when incorporated into a community-based campaign targeting adult African American smokers. In the first phase of the project, the *Pathways to Freedom* videotape will be distributed communitywide, and paid radio announcements will be aired, encouraging smokers to call the CIS for help. In the second phase of the project, callers to the CIS will be randomly selected to receive either the *Pathways to Freedom* manual and smoking cessation counseling related to the manual or an NCI manual and standard CIS smoking cessation counseling. Results of this study should produce important information about the effectiveness of targeted self-help smoking cessation materials for African Americans combined with established services such as the CIS.

Chicago Lung Association's Multifaceted Smoking Cessation Intervention

In 1985, Warnecke and colleagues (1991) launched a multifaceted smoking cessation intervention on behalf of the Chicago Lung Association. Like a number of programs, this intervention used materials originally produced for whites to target members of other racial/ethnic minority groups. The program used televised messages on techniques for quitting smoking and avoiding relapse as well as the ALA self-help manual and smoking cessation groups. More than 325,000 smokers in the targeted population viewed televised messages featuring role models who encouraged them to obtain a self-help manual, *Freedom from Smoking in 20 Days*, by mail or at one of three locations—a local hardware store, an HMO, or the Chicago Lung Association. A total of 9,182 smokers (23 percent of whom were African American) registered to participate in the study and were followed for 24 months. The results showed that African American and white smokers responded differently to various smoking cessation strategies. For example, African Americans were more likely than whites to report seeing the televised messages on a daily basis and were more likely to recall the messages. However, African Americans were less likely than whites to attend smoking cessation groups.

As an adjunct to the Chicago Lung Association's program, Jason and colleagues (1988) studied the effects of a television program in the West Garfield Park neighborhood of Chicago, where 86 percent of the residents were African American. Before the television program aired, individuals who reported smoking were randomly assigned to a control group (91 percent were African American) or to an experimental group (96 percent were African American). Members of the control group viewed the program or read the self-help manual at their leisure, whereas members of the experimental group received motivational calls prompting them to view the television program and inviting them to attend smoking cessation meetings at a community health center three times during the 20-day program. Eight percent of the smokers in the experimental group reported quitting at the end of the program, compared with 1 percent of those in the control group. After four months, 20 percent of the smokers in the experimental group had quit, compared with 9 percent of those in the control group.

Chicago Community-Based Interventions for Low-Income African Americans

In conjunction with the smoking cessation television program sponsored by the Chicago Lung Association, Lacey and colleagues (1991) designed community-based interventions for low-income African Americans living in four subsidized housing projects in Chicago. Residents were trained as lay health advisors to deliver smoking cessation messages to their neighbors. They made weekly home visits during the 20 days in which the television program was aired, and they used reminder cards to support the positive behaviors outlined in the program. A subsample of women in the housing projects watched the televised program and participated in six smoking cessation classes, which used a curriculum similar to the one presented in the television program. Health educators gave the women supplemental materials appropriate for them and tips on sources of social support for smoking cessation. Classes were held in the housing projects. Of the 235 residents who preregistered for the smoking cessation intervention, 141 attended at least one class or accepted at least one home visit. Of the 56 women who attended at least one class session, 11 percent quit smoking. About one-half of the 174 residents who registered for the home visitation accepted such a visit, but none quit smoking. Focus groups conducted in conjunction with the intervention indicated that residents of the housing projects perceived that they were not vulnerable to the negative health consequences of smoking, that smoking helped them to cope with stress, and that they had few environmental supports for quitting smoking.

Freedom from Smoking® for You and Your Family on TV/Por Su Salud y Su Familia

Like the Chicago Lung Association's intervention, the Freedom from Smoking® for You and Your Family Project in California featured role models in televised pieces and distributed self-help materials. In 1991, project planners produced special editions of the ALA *Freedom from Smoking® for You and Your Family* self-help manual and the *Guía* and placed them in a newspaper insert that was distributed throughout seven English-language television markets—Eureka, Fresno, Los Angeles, Sacramento, Santa Barbara, San Diego, and the San Francisco Bay area—and four Spanish-language television markets—Fresno, Los Angeles, Sacramento, and the San Francisco Bay area. In addition, locally produced television pieces in both English and Spanish were shown for seven days as part of the daily news. These news pieces included interviews with Hispanic and white experts on tobacco-use control and with four local residents who had volunteered to use the self-help materials to quit smoking. The program reached nearly 1.2 million smokers (C. Anderson Johnson et al., unpublished data). The newspaper insert was most frequently read by white (22 percent), Asian American and Pacific Islander (18 percent), and African American (16 percent) smokers; smaller proportions of English-speaking Hispanics (14 percent) and Spanish-speaking Hispanics (10 percent) read the insert. The television pieces were viewed most frequently by Spanish-speaking Hispanics (25 percent), followed by African Americans (14 percent), Asian Americans and Pacific Islanders (9 percent), whites (9 percent), and English-speaking Hispanics (9 percent). A year after the intervention, 3.1 percent of the people who had read the English-language newspaper insert and had viewed the television piece were former smokers; this was true among all racial/ethnic minority groups except Spanish-speaking Hispanics. In comparison, 1.5 percent of the people who did not participate in the program were former smokers. By itself, neither the English-language television piece nor the newspaper insert was effective in promoting smoking cessation. Viewers of the Spanish-language television program, which used culturally appropriate materials, were more successful; 9 percent of viewers were former smokers at 12 months, compared with 2 percent of smokers who did not view the program.

A Su Salud (To Your Health)

A Su Salud was a mass media health promotion program conducted from 1985 through 1990 to reduce smoking among Mexican Americans residing along the U.S.-Mexico border in Eagle Pass and Del Rio, Texas (Ramirez and McAlister 1988; Amezcua et al. 1990). This mass media campaign used role models, an extensive media campaign, community volunteers, and behavioral modeling techniques grounded in the principles of Bandura's (1977) Social Learning Theory. It was modeled after a similar program implemented in North Karelia, Finland (McAlister et al. 1982; Puska et al. 1987). A Su Salud recruited individuals who wanted to quit smoking, organized focus groups to determine their needs and levels of awareness about tobacco use, and then featured community role models in a series of informational programs that were televised on local Spanish-language stations. The media messages were reinforced through a network of community volunteers who personally contacted the targeted population individually or in small groups. The volunteers delivered calendars with community events and stories about the role models. The program also produced *fotonovelas*—pictorial stories, presented in a comic-book format, which depicted smoking cessation behaviors. The program resulted in a modest but notable increase in smoking cessation rates among community members. Out of the 17 percent of smokers who reported that they had quit smoking, 8 percent were verified (McAlister et al. 1992).

University of North Carolina/North Carolina Mutual *Quit for Life Guide*

The Quit for Life program used lay leaders to promote smoking cessation messages. The *Quit for Life Guide* was based on the ALA's Freedom from Smoking® for You and Your Family Project and targeted policyholders of the predominantly African American North Carolina Mutual Life Insurance Company (Schoenbach et al. 1988). The program was novel in that it was delivered by the company's life insurance sales agents, who discussed the health consequences of smoking with their customers and provided social support for quitting and avoiding relapse (Orleans et al. 1989). The Quit for Life program was moderately effective in promoting smoking cessation among the targeted low- to middle-income smokers. Over a two-year period, 2,042 smokers enrolled in the program. About 14.9 percent of the participants who received self-help materials, telephone counseling, and agent support quit smoking at 12 months, compared with 14.1 percent of the participants who received just self-help materials and agent support, and 12.3 percent of the control subjects, who received agent support only. Verifying these self-reported quit rates was impossible, however, because few respondents agreed to provide saliva samples for a cotinine test, which would have provided biochemical verification (Schoenbach et al. 1988).

In an eight-week follow-up study, the Quit for Life program targeted the insurance company's corporate employees in a large urban center. Preliminary results regarding policyholders in one sales district and lasting eight weeks showed that 8 of the 126 African American smokers enrolled in the program (6 percent) were nonsmokers six months after enrollment (Sandra W. Headen et al., unpublished data).

Legends

Beginning in 1993, the NMA and CDC began co-sponsoring the Legends campaign. Legends is the only national-level, mass media motivational campaign directed at African Americans who want to quit smoking. The campaign consists primarily of public service television and radio announcements that use famous African American leaders and historic figures, such as Martin Luther King, Jr., and Malcolm X, to motivate smokers to quit. Individuals interested in quitting can request the *Pathways to Freedom* cessation guide by calling a toll-free telephone number; the Legends campaign generated more than 7,500 calls for the *Pathways to Freedom* guide within the first 18 months. The NMA has supported the campaign at the local level by promoting media and community outreach activities, including billboard advertisements, in 14 NMA-sponsored "Healthy People 2000" cities across the country.

Great American Smokeout

GAS is an annual ACS-sponsored event that encourages smokers to quit. The results of a 1991 Gallup poll indicated that smokers of various racial/ethnic minority groups may respond favorably to the GAS (CDC 1992). Fewer African Americans and Hispanics than whites reported being aware of the Smokeout. However, 25 percent of African Americans and Hispanics who were aware of the GAS reported participating in the project, and 14 percent of those who participated reported that they were not smoking cigarettes one to three days after the GAS (CDC 1992). The same poll estimated that during the 1991 GAS, approximately one-third of smokers in the United States participated, either by not smoking or by reducing the number of cigarettes they smoked (CDC 1992). Lieberman Research Inc. (1993) found that 26 percent of smokers from racial/ethnic communities (i.e., African Americans, Asian Americans, Hispanics, and others) participated in the 1993 GAS, compared with only 19 percent of white smokers. In interviews conducted 1 to 10 days after the GAS, however, similar proportions of racial/ethnic group members (18 percent) and whites (17 percent) reported that they had quit or that they were smoking less than before the GAS.

Suc Khoe La Vang! (Health is Gold!)

From 1990 to 1992, Suc Khoe La Vang! (Health is Gold!), the Vietnamese Community Health Promotion Project, conducted media-led smoking reduction campaigns targeting Vietnamese men in San Francisco and Alameda Counties and in Santa Clara County, California (McPhee et al. 1993, 1995; Jenkins et al. 1997). Both interventions used materials that were produced in Vietnamese. The programs included antitobacco counteradvertising campaigns that used billboard, print, and television advertisements; published articles in Vietnamese-language newspapers; a videotape that aired on Vietnamese-language television stations; health education materials such as brochures, a quit kit, posters, bumper stickers, and a calendar; a continuing medical education course on smoking cessation counseling methods for Vietnamese physicians; and the distribution of printed "no smoking" signs and ordinances. Unlike the Santa Clara intervention, the San Francisco campaign was preceded by a 15-month pilot antitobacco media program and included a component for students and their families.

The evaluation of the programs showed that the Santa Clara intervention did not influence cigarette smoking prevalence or recent quitting status (quitting during the prior two years) (McPhee et al. 1995). However, a program effect was observed in the San Francisco trial, such that the odds of being a smoker were significantly lower and the odds of quitting recently were significantly higher in San Francisco than in a comparison community (Jenkins et al. 1997). The authors explained the difference in two ways, the longer duration of exposure to the antitobacco campaign in San Francisco (39 months) than in Santa Clara (24 months) and the added school- and family-based component of the San Francisco campaign.

Involvement of Health Care Providers

A number of successful smoking cessation approaches use health care providers, primarily physicians and dentists, to inform patients about the urgency of quitting smoking and to suggest quitting strategies (Health and Public Policy Committee 1986; Flay et al. 1992; Reid et al. 1992; NCI 1994; Fiore et al. 1996). Although this approach may be effective with members of the four racial/ethnic minority groups studied in this report—particularly those groups that exhibit high *power distance* (i.e., the respect for and deference to authority figures such as physicians, teachers, and older people) (Hofstede 1980)—a number of structural characteristics limit the usefulness of this approach. The most important limitation is that a large proportion of members of these racial/ethnic minority groups lack access to primary care providers. This problem has been widely documented among adult members of racial/ethnic groups (Aday et al. 1993) and adolescents (Lieu et al. 1993), such as among African Americans (Hopkins 1993) and Hispanics (Treviño et al. 1991; GAO 1992; Pierce et al. 1994b).

Data from the 1990 California Tobacco Survey showed that 46.9 percent of Hispanic smokers had not visited a physician in the 12 months before the survey, compared with 42.0 percent of Asian Americans and Pacific Islanders, 26.7 percent of African Americans, and 33.4 percent of whites (Burns and Pierce 1992). According to the 1992 NHIS data on cigarette smokers, 37.6 percent of Hispanics, 26.1 percent of African Americans, and 29.2 percent of whites had not visited a physician during the year preceding the survey (Tomar et al. 1996). Data from the 1989 NHIS on the number of annual visits per person to the dentist showed that African American men (1.0 visits) and women (1.4 visits) made fewer visits than Hispanic men (1.5 visits) and women (1.7 visits) and white men (2.1 visits) and women (2.4 visits) (Bloom et al. 1992). Among smokers, national data collected in 1992 showed that 42.6 percent of African Americans, 39.3 percent of Hispanics, and 54.4 percent of whites had visited a dentist during the preceding year (Tomar et al. 1996). In addition, because many health care providers lack linguistic skills and training in cultural sensitivity, they tend to be ineffective advocates of smoking cessation among members of ethnic groups. Equally problematic is the fact that few physicians have the necessary training, feel qualified and supported, or express interest in recommending quitting to smokers (Kottke et al. 1994).

Available data indicate that a large proportion of health care providers, primarily physicians, do not take advantage of office visits to encourage smokers to quit. In general, members of racial/ethnic groups are less likely than whites to receive advice on quitting smoking from their physicians, and they are even less likely to receive such advice from their dentists (e.g., Kogan et al. 1994; Winkleby et al. 1995; Hymowitz et al. 1996). According to data from the 1992–1993 CPS, about 42.4 percent of Hispanics and 45.4 percent of African Americans who had visited a physician during the previous year reported that within that year they had received a physician's advice on quitting smoking, compared with 50.4 percent of whites (Table 5) (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993). In general, women reported receiving a physician's advice in greater proportions than men. When asked if they had ever received a physician's advice on quitting smoking, only 39.8 percent of Hispanics said they had, compared with 47.2 percent of African Americans, 45.7 percent of Asian Americans and Pacific Islanders, 54.5 percent of American Indians and Alaska Natives, and 58.1 percent of whites. Results of the 1991 NHIS show that whereas 38.2 percent of whites reported receiving advice to quit from a physician or other health care professional at any visit during the preceding 12 months (CDC 1993a), a percentage significantly higher than for Hispanics (30.6 percent), such advice was received by 34.4 percent of African Americans, 41.4 percent of American Indians and Alaska Natives, and 34.4 percent of Asian Americans and Pacific Islanders. According to the 1992 NHIS data on cigarette smokers who had visited a physician during the previous year, 55.5 percent of whites, 50.2 percent of African Americans, and 35.1 percent of Hispanics reported that a physician had advised them to quit smoking during the preceding year; among smokers who had visited a dentist during the previous year, 23.4 percent of whites, 26.3 percent of African Americans, and 27.2 percent of Hispanics reported that a dentist had advised them to quit during the preceding year (Tomar et al. 1996). Because questions were worded differently about advice from health care providers on quitting smoking, estimates based on data from the 1991 NHIS and the 1992 NHIS are not directly comparable and cannot be interpreted as indicating a secular trend. Findings from other surveys show that among African Americans, pregnant women are the most likely to receive smoking cessation advice and services in a health care setting (O'Campo et al. 1992; Tiedje et al. 1992).

Results from the 1992 California Tobacco Survey showed that among smokers who visited a physician in the previous year, 60.9 percent of Hispanics did not receive advice on quitting smoking, compared with 56.0 percent of African Americans and 47.8 percent of whites (Pierce et al. 1994b). These figures are comparable to those found in the Stanford Five-City Multifactor Risk Reduction Project, in which 63.4 percent of Hispanic smokers reported never being advised to quit smoking by their physician, compared with 45.9 percent of whites (Frank et al. 1991). These differences seem to be particularly notable among less educated Hispanics (Winkleby et al. 1995).

Despite these limitations, the use of health care providers to promote smoking cessation can have promising results (Royce et al. 1995). The CDC has funded the design of protocols that will prescribe strategies health care providers can use when counseling patients in smoking cessation, using the *Guía* for Hispanics and the *Pathways to Freedom* program for African Americans. In addition, the NCI has produced a number of publications reviewing this approach (NCI 1994) as well as training materials to teach health care personnel how to promote smoking cessation (Glynn and Manley 1992), and a recent publication has evaluated the effectiveness of various smoking cessation approaches available to primary care clinicians (Fiore et al. 1996).

For You and Your Family

The For You and Your Family project provides tobacco-use prevention services to racial/ethnic communities in health care settings. The project, sponsored by California's Department of Health Services, was

Table 5. Percentage of adult smokers who have received advice to quit smoking from either a medical doctor or a dentist, by race/ethnicity and gender, Current Population Survey, United States, 1992–1993

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	**%**	**±CI***	**%**	**±CI**	**%**	**±CI**	**%**	**±CI**	**%**	**±CI**
					Received advice from a medical doctor in past year†					
Total	45.4	1.7	48.3	6.2	49.6	5.3	42.4	2.6	50.4	0.7
Men	42.5	2.6	45.2	9.0	50.1	6.8	39.6	3.6	48.8	1.0
Women	47.3	2.2	51.0	8.5	48.8	8.6	45.5	3.8	51.7	0.9
					Received advice from a medical doctor ever					
Total	47.2	1.4	54.5	5.3	45.7	4.1	39.8	2.0	58.1	0.6
Men	40.5	2.1	50.4	7.5	43.7	4.8	33.2	2.5	53.1	0.8
Women	53.1	2.0	58.6	7.4	50.4	7.5	50.0	3.3	63.1	0.8
					Received advice from a dentist in past year‡					
Total	20.6	1.8	21.1	6.3	30.5	5.0	22.6	2.6	19.6	0.6
Men	22.0	2.8	28.5	10.1	36.3	6.4	23.3	3.6	21.4	0.9
Women	19.6	2.3	14.2	7.5	19.3	7.3	21.7	3.7	18.0	0.8
					Received advice from a dentist ever					
Total	14.7	1.0	18.2	4.1	24.9	3.5	16.7	1.6	18.6	0.4
Men	15.4	1.5	21.2	6.1	26.7	4.3	15.7	2.0	19.4	0.6
Women	14.1	1.4	15.2	5.4	20.8	6.1	18.2	2.6	17.8	0.6

*95% confidence interval.
†Among persons who visited a medical doctor during the past year.
‡Among persons who visited a dentist during the past year.
Source: U.S. Bureau of the Census, National Cancer Institute Tobacco Use Supplement, public use data tapes, 1992–1993.

developed recently by a team of California researchers. This multicultural perinatal project seeks to reduce cigarette smoking among pregnant women and to limit their exposure to ETS. The project includes a trainer's guide, a health care provider's guide, and targeted client education materials for African Americans, American Indians, Hispanics, and Asian Americans (i.e., Cambodians, Chinese, Koreans, and Laotians). Materials for clients differ in their content and format, depending on the racial/ethnic group being targeted; the materials range from a brochure for African Americans entitled *Hey, Girlfriend, Let's Talk About Smoking and You* to a four-color magazine entitled *La Mujer: La Familia y el Cigarrillo,* which motivates Hispanic women to quit and provides suggestions and techniques for quitting and maintaining abstinence (Otero-Sabogal and Sabogal 1991).

The importance of developing smoking cessation programs for pregnant women of various races/ethnicities has been documented recently among American Indians (Bulterys et al. 1990). By using statistical models with information on the health status of American Indians in the Aberdeen IHS area, Bulterys and colleagues found that by quitting smoking, American Indian pregnant women would prevent 2.6 percent of all infant deaths, 3.7 percent of postneonatal deaths, and 1.2 percent of neonatal deaths.

American Indian Cancer Control Project

The American Indian Cancer Control Project in California used self-help techniques, individual counseling, and cultural interventions to help American Indian smokers quit. Access to American Indians over the age of 18 years was facilitated through 18 northern California clinics owned and operated by American Indians. Fourteen rural clinics located on or near reservations and four urban clinics participated in the project. The project has been testing a clinic-based, physician-initiated message enhanced by using American Indian community health representatives who also provide outreach support. Recent data indicate that the clinic-based procedures were an acceptable and accessible means of reaching the American Indian population in northern California (Hodge et al. 1995, 1996). Evidence from this project suggests the need for culturally appropriate smoking cessation programs (Hodge et al. 1995).

Involvement of Employers

Employer-provided smoking cessation programs could help to lower the prevalence of smoking, yet very few individuals report having such programs available to them. Data from the 1992–1993 CPS showed that 23.6 percent (95 percent confidence interval [CI] = ± 0.9 percent) of African Americans reported having such services at work, compared with 22.4 percent (CI ± 0.3 percent) of whites, 21.8 percent (CI ± 1.8 percent) of Asian Americans and Pacific Islanders, 18.8 percent (CI ± 3.6 percent) of American Indians and Alaska Natives, and 15.8 percent (CI ± 0.9 percent) of Hispanics (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993). Among smokers, 25.0 percent (CI ± 1.8 percent) of African Americans, 19.7 percent (CI ± 0.6 percent) of whites, 18.4 percent (CI ± 4.1 percent) of Asian Americans and Pacific Islanders, 17.7 percent (CI ± 5.8 percent) of American Indians and Alaska Natives, and 14.3 percent (CI ± 1.9 percent) of Hispanics reported having access to employer-provided smoking cessation services (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993).

Involvement of Nontraditional Providers

Community members who traditionally have not been perceived as health promoters also have become involved in tobacco control efforts. For example, African American religious leaders have been involved in tobacco control efforts as well as in other health promotion activities, such as the National High Blood Pressure Education Program (1992). These ministers and pastors carry great influence among African Americans and are responsible for dictating social and moral values. In addition, the church often has been central in mobilizing African American communities around issues of social justice. Examples of tobacco control efforts involving community members, including religious leaders, are presented in this section. Unfortunately, little evidence is available about the success or effectiveness of this type of intervenor.

Heart, Body, and Soul is a church-based intervention in east Baltimore, Maryland, a predominantly (88 percent) African American community (Stillman et al. 1993; Voorhees et al. 1996). Focus groups conducted before the intervention revealed that African American smokers were knowledgeable of the health risks of smoking but knew few strategies beyond quitting cold turkey. The smokers perceived little support for quitting from their friends and family, with the exception of their children, who tended to be strong motivators to quit smoking. The smokers participating in the focus groups did not approve of nicotine replacement and viewed it as substituting one addiction for another. The intervention phase of the study emphasized the importance of self-efficacy to promote behavior change and social actions that promote large, systemic, social changes as a strategy for affecting individual behavior. The project was carried out through a partnership with the local ministerial alliance. Of 130 churches in the area, 22 participated in the intervention.

After introductory activities, which included a health fair, churches were randomly assigned to receive either an intensive smoking cessation intervention or the minimal level of activity, which involved distribution of the ALA educational brochure *Don't Let Your Dreams Go Up in Smoke* (ALA 1990a). Churches participating in the intervention received the same brochure but also were involved in the following activities: (1) training of smoking cessation specialists, who conducted weekly support groups with a spiritual overtone; (2) a kickoff service that included an inspirational sermon, distribution of *One Day at a Time* (a Scripture-based book of inspirational messages for smokers), and an inspirational audiocassette on quitting smoking; and (3) reinforcement of successful quitting through recognition during church services and the provision of certificates to volunteers participating in the program. The program is now being extended to churches in 13 cities throughout the country. As a result of this program, a number of African American clergy have formed a coalition, Black Clergy for Substance Abuse Prevention, to implement tobacco control programs and other substance abuse prevention efforts. The coalition is affiliated with the National Association of African Americans for Positive Imagery (NAAAPI). A recent study showed that church-based programs can be effective in moving individuals along the continuum of change toward quitting smoking (Schorling et al. 1997).

Innovative programs are also under way in California. In San Diego, the Union of Pan Asian Communities of San Diego County delivers antismoking messages through fortune cookies (Irene Linayao-Putman, personal communication, 1993). The St. Mary Medical Center and the United Cambodian Community, Inc., in Long Beach, California, developed audiocassettes that feature traditional Laotian and Cambodian music as well as antismoking messages. These audiocassettes are distributed through racial/ethnic shops, health fairs, and other community events. Barbers and beauty parlor operators also have been trained to provide antismoking messages to their clients in small community programs in California and other states.

Although not all of these smoking cessation interventions are culturally appropriate, preliminary figures on the overall effectiveness of these massive interventions show that progress is being made in a number of areas. In California, for example, the overall prevalence of smoking has declined, more smoking cessation services are available, people are more aware of the dangers of cigarette smoking, and increases in adolescent smoking appear to have stopped (Breslow and Johnson 1993; Pierce et al. 1994b; Elder et al. 1996). These results are true for members of racial/ethnic minority groups as well as for whites.

Environmental Tobacco Smoke and Clean Indoor Air Policies

A large number of individuals from racial/ethnic groups work in the service industry (e.g., restaurants) and in blue-collar jobs (e.g., factories and repair shops)—areas of employment where cigarette smoking usually is allowed. Thus, they are probably heavily exposed to ETS.

Although the data are incomplete, a few studies indicate the extent to which nonsmokers, particularly those who are members of racial/ethnic groups, are exposed to ETS. Data from the 1993 California Tobacco Survey showed that 32.0 percent of nonsmoking Hispanics were exposed to ETS at indoor workplaces, compared with 19.1 percent of African Americans and 19.0 percent of whites (Pierce et al. 1994b).

Exposure to ETS at home is also a concern among members of racial/ethnic groups. Data from the 1992–1993 CPS (Table 6) showed that a majority of Asian Americans and Pacific Islanders (60.6 percent) and Hispanics (56.6 percent) did not allow cigarette smoking in their homes (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993). In comparison, smaller proportions of whites (41.3 percent), African Americans (38.9 percent), and American Indians and Alaska Natives (35.6 percent) reported that they prohibited smoking at home. Minor gender differences were observed in the reporting of such restrictions. Other surveys indicate that exposure to tobacco smoke at home is a valid concern.

An analysis of data from the Hispanic Health and Nutrition Examination Survey indicates that 31 to 62 percent of Mexican American nonsmoking women had household exposure to ETS (Pletsch 1994). In addition, 22 to 59 percent of Puerto Rican women and 40 to 53 percent of Cuban American women had such exposure.

In recent years, businesses and governments have adopted policies, laws, and ordinances that limit cigarette smoking in public places and in workplaces (Rigotti and Pashos 1991). The effects of these policies can be expected to benefit all U.S. residents, including members of racial/ethnic minority groups. In addition, systemwide antismoking policies are being promulgated. For example, no-smoking policies have been implemented in a number of federal workplaces, including IHS hospitals and clinics and Department of Defense installations. States have also been restricting smoking at a fairly rapid pace by banning smoking on public transportation vehicles as well as in health care offices and facilities, airports, other public buildings, and elevators (O'Connor 1992). A number of states also restrict smoking in indoor cultural and recreational facilities, including libraries, museums,

Table 6. Percentage of adults who reported that no one is allowed to smoke anywhere inside the home,* by race/ethnicity, smoking status, and gender, Current Population Survey, United States, 1992–1993

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	%	±CI†	%	±CI	%	±CI	%	±CI	%	±CI
Overall										
Total	38.9	0.7	35.6	3.2	60.6	1.6	56.6	0.9	41.3	0.3
Men	37.7	1.1	34.1	4.7	57.9	2.3	54.3	1.3	41.2	0.4
Women	39.6	0.9	36.8	4.3	63.2	2.2	58.5	1.2	41.4	0.4
Nonsmokers										
Total	49.9	0.9	53.4	4.2	67.3	1.6	64.5	1.0	51.7	0.3
Men	50.2	1.4	54.1	6.6	66.7	2.5	63.6	1.5	51.6	0.5
Women	49.8	1.1	52.9	5.5	67.8	2.2	65.2	1.2	51.8	0.4
Smokers										
Total	7.4	0.8	7.9	2.9	25.2	3.5	21.6	1.7	10.1	0.3
Men	9.2	1.2	8.7	4.2	28.5	4.4	26.7	2.4	12.4	0.5
Women	5.9	0.9	7.1	3.9	17.5	5.7	13.9	2.3	7.8	0.4

*Includes persons who reported having a rule that no one is allowed to smoke anywhere inside the home.
†95% confidence interval.
Source: U.S. Bureau of the Census, National Cancer Institute Tobacco Use Supplement, public use data tapes, 1992–1993.

theaters, galleries, shopping malls, sports arenas, and auditoriums. An ever-increasing number of states have restricted smoking in schools and on school grounds for students, school personnel, and other persons with access to the school; 27 states restrict smoking in child day-care centers. As of December 31, 1997, 41 states have some kind of restriction on smoking in government worksites, 21 have restrictions on smoking in private worksites, and 31 restrict smoking in restaurants (CDC, Office on Smoking and Health, State Tobacco Activities Tracking and Evaluation System, unpublished data).

An increasing number of employers are also restricting cigarette smoking. In the 1992–1993 CPS, a substantial proportion of respondents reported that their employers had policies prohibiting cigarette smoking in work areas and in indoor public areas, such as lobbies, rest rooms, and lunch rooms. Gerlach and colleagues (1997) used data from the 1992–1993 NCI Tobacco Use Supplement to the CPS to document the prevalence and restrictiveness of workplace smoking policies reported by African Americans, Asian Americans and Pacific Islanders, Hispanics, and whites who were employed in indoor workplaces. Their data showed that 43.3 percent of African Americans, 51.4 percent of Asian Americans and Pacific Islanders, 45.1 percent of Hispanics, and 46.2 percent of whites worked for employers who provided smoke-free policies. In all four groups, women were more likely than men to be protected by smoke-free policies. Overall, about one-third of employees worked in places that either had no policy on smoking or allowed smoking in private work areas. These minimal policies were reported by 33.9 percent of African Americans, 29.7 percent of Asian Americans and Pacific Islanders, 37.3 percent of Hispanics, and 35.6 percent of whites. This report did not present data on American Indians and Alaska Natives.

Members of the racial/ethnic minority groups considered in this report tend to favor restrictions on tobacco smoking (see Royce et al. 1993 for data on African Americans). In the 1992–1993 CPS, Asian Americans and Pacific Islanders and Hispanics were generally more likely to support the total restriction of cigarette smoking in restaurants, hospitals, indoor workplaces, and indoor shopping malls (Table 7) (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993). Smokers were more likely to agree with partial restrictions of cigarette smoking (limiting smoking to some areas within each enclosed space) than to support the total restriction of cigarette smoking in each of the public places included in the CPS. Results of an ABC News/*The Washington Post* poll conducted in February 1993 showed that larger proportions of African Americans (54.3 percent) and Hispanics (52.9 percent) favored banning smoking in public places, compared with whites (48.3 percent) (Roper Center for Public Opinion Research 1993). The same poll showed that fairly similar proportions of Hispanics (87.9 percent), African Americans (84.3 percent), and whites (84.1 percent) felt that ETS was a health risk. However, Hispanics (50.8 percent) and African Americans (44.2 percent) reported worrying more about ETS than whites (34.4 percent).

Data from the 1992 California Tobacco Survey showed that members of racial/ethnic groups had limited support for the complete ban of cigarette smoking in restaurants and in workplaces (Pierce et al. 1994a). For example, smoking bans in restaurants drew support from 53.5 percent of Hispanics, 41.9 percent of African Americans, 35.0 percent of Asian Americans and Pacific Islanders, and 34.7 percent of whites. The data on smoking bans in the workplace were similar. Hispanics (54.5 percent) were more likely to support banning cigarette smoking in the workplace than were Asian Americans and Pacific Islanders (43.5 percent), African Americans (40.2 percent), and whites (34.4 percent).

More recently, findings from a 1993 survey indicate that residents of eight California cities (Fresno, Hercules, Indio, Los Angeles, Paradise, Sacramento, San Bernardino, and San Diego) significantly supported strong ETS controls (Sherwood et al. 1994). In this 1993 survey, 78 percent of whites supported a complete ban on smoking in restaurants, compared with 91.4 percent of Asian Americans, 89.5 percent of Hispanics, 82.6 percent of American Indians, and 82.5 percent of African Americans. In addition, 84.5 percent of whites strongly supported a complete ban on smoking in the workplace, compared with 93.5 percent of Asian Americans, 92.0 percent of Hispanics, 87.9 percent of African Americans, and 85.6 percent of American Indians.

The degree to which existing no-smoking policies are enforced in racial/ethnic communities is unknown. In a recent survey of 39 American Indian tribes, Glasgow and colleagues (1995) found significant intertribal variations in the types of policies and places covered by clean indoor air policies. For example, 64 percent of the tribes reported having a no-smoking policy that designated tribal schools, council meeting areas, and private offices as nonsmoking areas, but none banned smoking in bingo halls. Those tribes that received a specially developed policy workbook and direct consultation on ways to implement tobacco control policies were found to have adopted stringent policies within two years of having received the intervention materials (Lichtenstein et al. 1995). A recent observational study of American Indian facilities in California, Idaho, New Mexico, New York, Oregon, and Washington found that smoking policies and practices varied considerably across settings (Hall et al. 1995). Tribal schools and Indian health care facilities had the most restrictive policies. Tribal council meeting areas and private offices were less likely to be designated nonsmoking areas. No-smoking signs were observed most frequently in clinics (46 percent) and tribal offices (37 percent); no-smoking posters also were prominent in clinics (49 percent). Evidence of smoking (e.g., persons smoking, cigarette stubs, and ashtrays) was observed most frequently in tribal offices and cultural centers or community buildings (Hall et al. 1995).

A number of programs have tried to promote clean indoor air policies and practices among members of the racial/ethnic minority groups included in this report, but little information is available on their effectiveness. For example, Asian Americans for Community Involvement of Santa Clara County, based in San Jose, California, has targeted 400 Asian American restaurants and businesses to encourage them to have smoke-free areas. However, the researchers had difficulties assuring Asian American merchants that providing smoke-free areas would be good for business (Jung 1993).

Among American Indians, efforts have been made to help various tribes develop comprehensive smoke-free programs. For example, Glasgow and colleagues (1995) worked with 39 tribes in Washington, Oregon, and Idaho to review, modify, and develop tobacco-use policies that would protect tribal members from ETS. Tobacco policy committees were established to advise tribes during the policymaking process. A tobacco policy workbook also was developed to guide the tribes. Although tribal leaders expressed support for more stringent tobacco-use policies, changes in tobacco policies were not produced through the tobacco policy committees as the project had originally planned.

Table 7. Percentage of adults who think that smoking should be allowed in some areas or not allowed at all in selected public locations,* by race/ethnicity and smoking status, Current Population Survey, United States, 1992–1993

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	%	±CI†	%	±CI	%	±CI	%	±CI	%	±CI
	Restaurants (allowed in some areas)									
Total	50.8	0.7	52.4	3.3	42.1	1.6	38.1	0.9	52.9	0.3
Nonsmokers	44.3	0.9	39.1	4.1	37.6	1.7	33.5	0.9	44.4	0.3
Smokers	69.5	1.3	73.4	4.7	66.4	3.9	58.8	2.1	78.6	0.5
	Hospitals (allowed in some areas)									
Total	22.8	0.6	26.6	2.9	12.8	1.1	12.9	0.6	25.8	0.2
Nonsmokers	18.5	0.7	15.6	3.1	11.2	1.1	10.5	0.6	19.0	0.3
Smokers	35.0	1.4	44.3	5.3	21.7	3.4	23.4	1.8	46.3	0.6
	Indoor work areas (allowed in some areas)									
Total	39.3	0.7	43.9	3.3	24.7	1.4	25.8	0.8	40.7	0.3
Nonsmokers	32.6	0.8	30.1	3.9	21.0	1.4	21.6	0.8	32.4	0.3
Smokers	58.5	1.4	65.8	5.0	44.3	4.1	44.1	2.1	65.5	0.5
	Restaurants (not allowed)									
Total	45.3	0.7	42.5	3.3	54.5	1.6	58.8	0.9	43.1	0.3
Nonsmokers	53.0	0.9	58.7	4.2	59.8	1.7	64.2	1.0	52.9	0.3
Smokers	23.5	1.2	16.9	4.0	25.9	3.6	34.9	2.0	13.6	0.4
	Hospitals (not allowed)									
Total	75.3	0.6	71.3	3.0	85.1	1.1	85.7	0.6	72.5	0.3
Nonsmokers	80.0	0.7	83.5	3.2	86.9	1.2	88.3	0.6	79.9	0.3
Smokers	62.0	1.4	51.8	5.3	75.8	3.5	74.2	1.8	50.6	0.6
	Indoor work areas (not allowed)									
Total	57.0	0.7	52.2	3.3	71.8	1.4	70.9	0.8	55.7	0.3
Nonsmokers	64.6	0.8	68.3	4.0	75.8	1.5	75.7	0.9	65.1	0.3
Smokers	35.6	1.4	26.5	4.7	50.5	4.1	50.3	2.1	27.6	0.5

*In response to the question about each place, "Do you think that smoking should be allowed in all areas, in some areas, or not allowed at all?"

†95% confidence interval.

Source: U.S. Bureau of the Census, National Cancer Institute Tobacco Use Supplement, public use data tapes, 1992–1993.

Table 7. Continued

Characteristic	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
	%	±CI	%	±CI	%	±CI	%	±CI	%	±CI
Bars and cocktail lounges (allowed in some areas)										
Total	44.2	0.7	36.6	3.2	45.7	1.6	38.8	0.9	44.0	0.3
Nonsmokers	44.2	0.9	38.5	4.1	46.4	1.8	39.0	1.0	44.9	0.3
Smokers	44.3	1.4	33.3	5.0	42.2	4.0	37.8	2.0	41.3	0.6
Indoor sporting events (allowed in some areas)										
Total	30.3	0.7	25.8	2.9	23.0	1.4	22.4	0.7	28.7	0.3
Nonsmokers	27.1	0.8	17.9	3.3	21.1	1.4	20.2	0.8	23.9	0.3
Smokers	39.2	1.4	38.2	5.2	32.8	3.8	31.9	1.9	43.3	0.6
Indoor shopping malls (allowed in some areas)										
Total	39.9	0.7	40.8	3.3	32.3	1.5	28.2	0.8	41.6	0.3
Nonsmokers	35.7	0.8	31.7	4.0	29.1	1.6	25.2	0.9	35.2	0.3
Smokers	51.7	1.4	54.8	5.3	49.5	4.1	41.3	2.1	61.2	0.6
Bars and cocktail lounges (not allowed)										
Total	25.6	0.6	22.2	2.8	29.8	1.5	31.3	0.8	22.6	0.2
Nonsmokers	31.8	0.8	33.2	4.0	33.5	1.7	35.6	1.0	28.8	0.3
Smokers	8.1	0.8	5.2	2.4	9.6	2.4	12.1	1.4	4.0	0.2
Indoor sporting events (not allowed)										
Total	64.5	0.7	68.2	3.1	72.3	1.4	72.9	0.8	65.9	0.3
Nonsmokers	68.9	0.8	79.3	3.4	74.8	1.5	75.8	0.9	72.3	0.3
Smokers	52.5	1.4	50.5	5.3	59.5	4.0	60.0	2.0	46.5	0.6
Indoor shopping malls (not allowed)										
Total	54.4	0.7	52.3	3.3	62.7	1.6	67.2	0.8	52.6	0.3
Nonsmokers	59.7	0.8	65.2	4.0	66.5	1.7	70.8	0.9	60.6	0.3
Smokers	39.7	1.4	32.3	5.0	42.7	4.0	51.3	2.1	28.6	0.5

Economic Efforts to Reduce Tobacco Use

Numerous efforts have been made to reduce the use of cigarettes through excise and sales taxes. Because these taxes increase the price of cigarettes, higher tax rates generally curb the demand for cigarettes, and ultimately, tobacco consumption (Grossman 1989; Peterson et al. 1992; Keeler et al. 1993; Townsend et al. 1994). Peterson and colleagues (1992) evaluated the effects of state cigarette tax increases on cigarette sales in the 50 states from 1985 through 1988. The researchers found that state cigarette tax increases were associated with an average decline in cigarette consumption of three cigarette packs per capita (a decline of about 2.4 percent). Likewise, larger tax increases were associated with larger declines in consumption. In a recent study in Britain, Townsend and colleagues (1994) found that individuals of low-socioeconomic status were more responsive to changes in the price of cigarettes than those who were more affluent.

As of June 30, 1996, all states, the District of Columbia, and 451 localities currently impose taxes on cigarettes in addition to the federal tax (Tobacco Institute 1997). As of December 31, 1997, state taxes ranged from a low of 2.5 cents in Virginia to a high of $1 in Alaska; the average state tax was 37.76 cents per pack (CDC, Office on Smoking and Health, State Tobacco Activities Tracking and Evaluation System, unpublished data).

Members of some racial/ethnic minority groups have supported increases in taxes for tobacco products. In a 1990 survey of California smokers, 29.1 percent of African American smokers and 34.5 percent of Hispanic smokers reported that they would support a cigarette tax increase (Burns and Pierce 1992). A much smaller proportion of whites who smoke (20.0 percent) supported such an increase. Recently, larger proportions of California adults have supported an increase in cigarette taxes. The 1992 California Tobacco Survey among both smokers and nonsmokers found that cigarette tax increases were supported by 60.2 percent of Asian Americans and Pacific Islanders, 50.4 percent of Hispanics, 49.5 percent of African Americans, and 49.8 percent of whites (Pierce et al. 1994a). Furthermore, a 1993 nationwide survey conducted for the ACS found that Hispanics (71 percent) and African Americans (63 percent) supported an increase of $2 per pack to pay for a national health insurance program (Marttila & Kiley, Inc. 1993). These proportions were fairly similar to those found among whites (66 percent).

Although tobacco taxes are effective in discouraging smoking, some people consider increases in excise taxes to be regressive because the poorer members of society pay a higher proportion of their income in taxes. Wasserman (1992), for example, states:

> With respect to excise tax increases, however, we must be mindful of the distributional consequences of higher taxes. More precisely, because low-income smokers do not appear to be any more responsive to higher cigarette prices than high-income smokers, higher excise taxes will result in disproportionate economic harm, and, in some cases, could lead poorer smokers to forgo food, shelter, and needed health care to fulfill the persistent and pernicious demands of their smoking habits. As a result, higher cigarette taxes should be accompanied by measures to compensate the poor for the larger burden that they will necessarily have to bear. For example, federal and state income tax structures could be modified to facilitate such compensation (p. 20).

A 1990 federal government report supported this argument by presenting data from the 1984–1985 Consumer Expenditure Survey Interview showing that families in the lowest income quintile spent 4 percent of their posttax income on tobacco products, compared with families in the highest quintile, who spent 0.5 percent of their posttax income on tobacco products (U.S. Congressional Budget Office 1990). On the other hand, some argue that the hardship of increased taxes on the poor is outweighed by the fact that smoking-related health costs and suffering decline among persons who smoke fewer cigarettes or stop smoking because of the higher taxes on tobacco. A group of economists meeting in 1995 concluded that additional research on costs is needed before an optimal cigarette excise tax from an economic perspective can be determined (Warner et al. 1995). These economists agreed that the strongest argument currently for increasing cigarette taxes is the protection of children.

The actual effects of excise tax initiatives on members of racial/ethnic minority groups are difficult to ascertain. Nevertheless, reductions in the consumption of tobacco products resulting from increases in excise taxes should ultimately benefit members of U.S. racial/ethnic groups by lowering their prevalence of cigarette smoking and by limiting or lowering their exposure to ETS. California's experience after increasing the tax on cigarettes shows that a number of community-based projects, school-based interventions, and research activities, which directly benefit members of the racial/ethnic groups and could not have been funded from other sources of tax revenue, can be funded through the revenue generated by the increased taxes (Breslow and Johnson 1993). In addition, given the need to help community-based programs and organizations rely less on tobacco industry support (Satcher and Robinson 1994), earmarked tax revenues may prove to be a viable alternative.

Efforts to Control Tobacco Advertising and Promotion

Tobacco products are heavily advertised in racial/ethnic publications and in racial/ethnic communities. Efforts to restrict the effects of advertising and promotion of tobacco products in racial/ethnic communities have been limited by various factors, including the communities' reliance on the tobacco industry (see Chapter 4), difficulties in mobilizing communities that are faced with problems perceived to be in need of more immediate attention (e.g., affordable housing, unemployment, unequal education, and racial/ethnic minority discrimination), the lack of trained community leaders interested in health issues, and possibly the lack of infrastructure for tobacco prevention and control initiatives in racial/ethnic communities (Robinson et al. 1995). As a result, persons residing in racial/ethnic communities are continually exposed to the advertising and promotion of tobacco products. A recent study in Los Angeles County, for example, examined the risk of exposure to outdoor advertising of cigarettes among residents of various communities (Ewert and Alleyne 1992). The results suggest that persons residing in the city of Los Angeles were more likely to be exposed to cigarette and alcohol billboard advertisements than residents of nearby suburbs. Cigarettes were advertised on 59 of the 299 billboards (19.7 percent) surveyed on 46.2 miles of streets. The number of cigarette advertisements was 4.6 times greater in the city of Los Angeles than in its suburbs.

Members of some racial/ethnic minority groups tend to be more likely than whites to support a ban on tobacco product advertisements (Table 8). Data from the 1992–1993 CPS showed that 37.5 percent of whites supported a ban on advertising tobacco products, compared with 44.7 percent of Hispanics, 39.5 percent of Asian Americans and Pacific Islanders, and 38.3 percent of African Americans (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993). In each racial/ethnic group, women and nonsmokers were more supportive of a total ban on tobacco advertising than were men and smokers. The 1992 California Tobacco Survey found that adult Californians supported the banning of such advertising in newspapers and magazines as well as on billboards (Table 9) (Pierce et al. 1994a). The same survey also showed support for banning tobacco companies from sponsoring cultural events. Hispanics tend to show the greatest level of support for these measures, whereas whites support them the least. Data from the 1992–1993 CPS also showed that fairly large percentages of racial/ethnic group members would support a ban on the free distribution of tobacco samples (Table 10) (U.S. Bureau of the Census, NCI Tobacco Use Supplement, public use data tapes, 1992–1993). Hispanics (59.4 percent) and Asian Americans and Pacific Islanders (57.5 percent) were the most likely respondents to state that they supported such a ban. In all groups, women and nonsmokers were more likely than men and smokers to favor the ban.

The 1994 RWJF Youth Access Survey (Table 4) found varying support for restricting or banning different types of tobacco advertising. Hispanics and African Americans were more likely than whites to support such proposals (Nancy Kaufman et al., unpublished data). Hispanics were more supportive of bans on billboard, newspaper, and magazine advertising than were African Americans and whites. Requiring plain packaging of tobacco products (brand name and warning label in black letters on white background) was supported substantially more by Hispanics than by African Americans or whites.

In recent years, the tobacco industry has shifted expenditures for advertising to promotional marketing, with 89 percent of 1995 expenditures devoted to nonadvertising promotions (Federal Trade Commission 1997). The RWJF Youth Access Survey found that broad-based support exists for eliminating coupon

Table 8. Percentage of adults who think that the advertising of tobacco products should be always allowed or not allowed at all,* by race/ethnicity, smoking status, and gender, Current Population Survey, United States, 1992–1993

Characteristic	African Americans %	African Americans ±CI†	American Indians/ Alaska Natives %	American Indians/ Alaska Natives ±CI	Asian Americans/ Pacific Islanders %	Asian Americans/ Pacific Islanders ±CI	Hispanics %	Hispanics ±CI	Whites %	Whites ±CI
Total										
Always	17.3	0.6	21.5	2.7	12.6	1.1	13.7	0.6	21.4	0.2
Not at all	38.3	0.7	36.6	3.2	39.5	1.6	44.7	0.9	37.5	0.3
Men										
Always	19.8	0.9	24.0	4.2	15.6	1.7	16.8	1.0	25.5	0.4
Not at all	35.2	1.1	30.5	4.5	35.9	2.2	39.2	1.3	32.9	0.4
Women										
Always	15.7	0.7	19.4	3.5	9.7	1.3	11.2	0.8	17.9	0.3
Not at all	40.3	0.9	41.6	4.4	43.0	2.2	49.2	1.2	41.5	0.4
Nonsmokers										
Always	13.6	0.6	13.0	2.9	10.5	1.1	11.4	0.6	16.7	0.2
Not at all	42.2	0.8	44.3	4.2	41.8	1.7	47.8	1.0	42.0	0.3
Men										
Always	16.5	1.0	15.6	4.8	13.4	1.8	14.0	1.1	20.7	0.4
Not at all	38.3	1.4	38.1	6.4	38.3	2.5	42.3	1.5	37.0	0.5
Women										
Always	11.8	0.7	11.2	3.5	8.2	1.3	9.6	0.8	13.4	0.3
Not at all	44.5	1.1	48.7	5.6	44.7	2.4	51.6	1.3	46.3	0.4
Smokers										
Always	28.2	1.3	34.7	5.1	23.7	3.5	24.0	1.8	35.6	0.5
Not at all	27.2	1.3	24.3	4.6	27.5	3.6	31.1	1.9	23.9	0.5
Men										
Always	27.5	1.9	34.8	7.1	23.2	4.1	25.4	2.3	38.8	0.8
Not at all	28.1	1.9	20.1	6.0	28.1	4.4	29.9	2.5	21.5	0.7
Women										
Always	28.7	1.8	34.5	7.2	25.0	6.5	21.9	2.8	32.4	0.7
Not at all	26.5	1.7	28.5	6.8	26.1	6.6	32.9	3.1	26.2	0.7

*In response to the question, "Do you think advertising of tobacco products should be always allowed, allowed under some conditions, or not allowed at all?"
†95% confidence interval.
Source: U.S. Bureau of the Census, National Cancer Institute Tobacco Use Supplement, public use data tapes, 1992–1993.

promotions, such as promotional gear or free cigarettes by mail (Nancy Kaufman et al., unpublished data). Hispanics continue to be more supportive of promotional bans than non-Hispanics, with 89.8 percent of Hispanics supporting elimination of coupons for obtaining free cigarettes by mail, compared with 79.5 percent of African Americans and 80.4 percent of whites. In addition, 82.4 percent of Hispanics favor elimination of cigarette pack coupons that can be exchanged for promotional items such as clothing, compared with 76.5 percent of African Americans and 67.8 percent of whites. The public is more ambivalent about not allowing tobacco company sponsorship of sporting or entertainment events in which their cigarette brand names are featured during television broadcasts. Hispanics were more supportive of such a ban than were African Americans and whites (Table 4).

Racial/ethnic minority communities have begun to respond to the tobacco industry's targeted advertising and marketing efforts by mobilizing against the industry. The strong community response in Philadelphia against the planned introduction of Uptown

Table 9. Percentage of Californians* who support curtailment of tobacco advertising and promotion efforts, by race/ethnicity, 1992

Curtailment	African Americans	Asian Americans/ Pacific Islanders	Hispanics	Whites
Ban advertising in newspapers and magazines	60.2	51.2	74.7	47.7
Ban advertising on billboards	64.9	57.6	78.1	54.9
Ban sponsorship of sporting or cultural events	63.7	59.4	70.1	50.7

*Data on American Indians and Alaska Natives are not reported because of small sample size.
Source: Pierce et al. 1994a.

cigarettes, a brand targeting African Americans, resulted in the cancellation of the test marketing of the cigarette by its producers and a renewed interest in tobacco control efforts among African Americans in Philadelphia (see Chapter 4). The Coalition Against Uptown Cigarettes, which led the campaign, succeeded by building on previous efforts by Philadelphia organizations and individuals to control tobacco use among the city's African Americans. These organizations include some African American clergy as well as voluntary associations, particularly the ALA and the ACS, the Fox Chase Cancer Center, the local Committee to Prevent Cancer among Blacks, and the Philadelphia chapter of the National Black Leadership Initiative on Cancer (NBLIC). Indeed, the NBLIC in Philadelphia served as a common meeting ground for leaders from various agencies and provided opportunities for the development of mutual trust needed during the campaign. The NBLIC had been formed several years before under the leadership of Louis W. Sullivan, M.D., then and now president of Morehouse School of Medicine. Subsequently, Dr. Sullivan provided strong support to the coalition's efforts in his role as Secretary of Health and Human Services. The fact that the Uptown coalition was led by African Americans in this historic benchmark in the tobacco control movement was central to its ultimate success. Moreover, the participation of Philadelphia's African American clergy and the participation of an African American minister as a key coalition spokesperson were critical in obtaining community support for the Coalition Against Uptown Cigarettes. This support added to the campaign's credibility and guaranteed its success as a grassroots communications vehicle.

The experience of the Coalition Against Uptown Cigarettes is significant not only for the result it achieved but also because it provides a case study in community mobilization. The coalition focused its efforts primarily on African Americans—both smokers and nonsmokers—with the goal of derailing the introduction of Uptown cigarettes by convincing smokers to refuse to sample the new brand. To accomplish this, the coalition crafted messages that targeted R.J. Reynolds rather than smokers. In addition, the coalition aimed at forming a partnership among African American smokers and nonsmokers around the issue of limiting minors' access to this new tobacco product. Also central to the success of the Coalition Against Uptown Cigarettes was its strategic use of mass media (Robinson and Sutton, in press). Coalition leaders expanded the debate beyond health; identified the tobacco industry's major positions related to economics, civil rights, and self-determination; and developed specific counterarguments. For example, when tobacco industry supporters argued that tobacco control advocates were taking away smokers' right of free choice, coalition spokespersons countered by stating that the community had not asked for Uptown cigarettes, that excessive billboard advertising of cigarettes in African American communities did indeed take away choices, that smokers had the right to choose to reject Uptown cigarettes, and that communities had the right to choose what products entered their neighborhoods.

Another example of community mobilization in tobacco control occurred early in 1995, when a new mentholated cigarette brand named "X" being marketed in Boston was withdrawn by its manufacturer and distributor after protests by the African American community, led by the NAAAPI and Boston-based Churches Organized to Stop Tobacco (COST) (Jackson 1995). X cigarettes were packaged in the Afrocentric colors red, black, and green and featured a prominent

Table 10. Percentage of adults who think that giving away free tobacco samples should be always allowed or not allowed at all,* by race/ethnicity, smoking status, and gender, Current Population Survey, United States, 1992–1993

	African Americans		American Indians/ Alaska Natives		Asian Americans/ Pacific Islanders		Hispanics		Whites	
Characteristic	%	±CI†	%	±CI	%	±CI	%	±CI	%	±CI
Total										
Always	11.4	0.5	12.8	2.2	6.9	0.8	7.7	0.5	12.2	0.2
Not at all	49.9	0.7	49.9	3.3	57.5	1.6	59.4	0.9	54.3	0.3
Men										
Always	13.4	0.8	14.6	3.5	9.1	1.3	9.9	0.8	15.3	0.3
Not at all	46.8	1.2	46.4	4.9	52.2	2.3	53.8	1.3	48.9	0.4
Women										
Always	10.0	0.6	11.2	2.8	4.8	1.0	5.8	0.6	9.4	0.2
Not at all	52.0	0.9	52.9	4.5	62.7	2.2	63.9	1.2	59.1	0.4
Nonsmokers										
Always	7.7	0.5	6.8	2.1	5.3	0.8	5.9	0.5	8.4	0.2
Not at all	55.9	0.9	61.2	4.1	61.0	1.7	63.5	1.0	62.2	0.3
Men										
Always	9.4	0.8	8.1	3.6	7.1	1.3	7.8	0.8	11.2	0.3
Not at all	52.6	1.4	57.8	6.5	55.9	2.6	58.6	1.5	56.3	0.5
Women										
Always	6.8	0.5	5.8	2.6	3.9	0.9	4.6	0.5	6.0	0.2
Not at all	57.9	1.1	63.7	5.3	65.1	2.3	66.9	1.2	67.3	0.4
Smokers										
Always	21.8	1.2	22.1	4.4	15.7	3.0	15.5	1.5	23.6	0.5
Not at all	33.3	1.4	32.1	5.0	38.9	4.1	41.1	2.1	30.6	0.5
Men										
Always	22.5	1.8	22.8	6.3	16.5	3.6	16.4	2.0	26.9	0.7
Not at all	33.9	2.0	31.3	7.0	39.2	4.8	39.1	2.6	28.4	0.7
Women										
Always	21.1	1.6	21.3	6.2	13.8	5.2	14.1	2.3	20.5	0.6
Not at all	32.7	1.9	32.9	7.1	38.4	7.3	44.1	3.3	32.9	0.7

*In response to the question, "Do you think that giving away free samples by tobacco companies should be always allowed, allowed under some conditions, or not allowed at all?"
†95% confidence interval.
Source: U.S. Bureau of the Census, National Cancer Institute Tobacco Use Supplement, public use data tapes, 1992–1993.

"X," a symbol associated with African American leader Malcolm X. Although X cigarettes were manufactured and distributed by two relatively small companies with modest marketing efforts, African American community leaders feared that even a small success could fuel the creation of similar products by major tobacco companies with larger resources for advertising and promotion. Unlike the case of Uptown cigarettes, however, both the manufacturer and the distributor of X cigarettes denied that their product was targeted to an African American market.

NAAAPI demanded in writing that X cigarettes be withdrawn. Extensive media coverage was given to NAAAPI leaders invited to speak, as part of Boston Black History Month events, to large audiences about the need for communities to mobilize against tobacco. As a result of NAAAPI's organizing efforts, the creator and distributor of X cigarettes (Stowecroft Brook Distributors, Charlestown, Massachusetts) and the manufacturer (Star Tobacco Corporation, Petersburg, Virginia) received protests from around the country, including calls from organizations in the African

American Tobacco Control Network of California. This successful strategy demonstrated again the effectiveness of united action against tobacco within the African American community and the ability of NAAAPI and its African American tobacco control network to extend the achievements of the Uptown experience.

In other racial/ethnic communities, some groups have rejected billboards advertising tobacco products. In Detroit, for example, Wayne County Commissioner Alberta Tinsley-Williams founded the Coalition Against Billboard Advertising of Alcohol and Tobacco, which enlisted the support of churches, schools, and civic groups to seek the removal of such billboards. Other communities have gone even further. For example, inspired by the anonymous Chicagoan "Mandrake," who painted over tobacco and alcohol billboards in ethnic neighborhoods, Reverend Calvin Butts led parishioners on walking tours in New York City to document and whitewash billboards advertising tobacco and alcohol (Associated Press 1990). Such acts were emulated by Dallas County, Texas, Commissioner John Wiley Price and Chicago-based Reverend Michael L. Phleger (Collins 1990). These grassroots efforts culminated in a meeting of African American community leaders in Greensboro, North Carolina, in 1991. This meeting led to the founding of a national group to combat tobacco and alcohol advertising in ethnic communities, NAAAPI (*Food & Drink Daily* 1991). Chaired by the Reverend Jesse W. Brown, the NAAAPI aims to increase public awareness of the devastating effects of cigarette and alcohol advertising among African Americans. The NAAAPI has gained affiliates in various communities throughout the United States. In 1994, the association supported efforts to drape covers over cigarette billboards in African American communities and led memorial services for persons who had died because of tobacco use.

Another example of community mobilization against the advertising and promotion of tobacco products is taking place in California. To coordinate racial and ethnic-specific, state-funded activities supported by the increase in the cigarette sales tax, the California Department of Health Services's Tobacco Control Section developed and funded four racial/ethnic minority networks, the first of which was the Hispanic/Latino Tobacco Education Network. This network was hosted by the University of San Francisco through 1996 and has attracted more than 500 members. The other networks include the Asian Pacific Islander Tobacco Education Network (initially hosted by the Asian American Health Forum), which comprises approximately 200 organizations; the African American Tobacco Education Network (initially sponsored by the Bay Area Urban League), which has approximately 300 members; and the American Indian Tobacco Education Network. These networks have been charged with coordinating and mobilizing tobacco control efforts among various communities and helping community agencies to better design and implement their programs. The various networks have different goals, responsibilities, and levels of funding, but one common thread is their commitment to ensuring that racial/ethnic communities take an active role in defining their own tobacco control needs. In general, the networks organize a variety of strategy and training sessions, media and advocacy campaigns, and technical assistance programs. They also help develop and evaluate resources on tobacco control and prevention and promote networking among their members. Although evaluations of these networks have not yet been completed, the networks' role as catalysts is already evident. Thus far, the networks have garnered the support of community agencies funded to carry out tobacco control efforts in California. For example, 70 percent of the funded community agencies in California reported attending meetings of these racial/ethnic minority networks during the summer of 1993 (Elder et al. 1993a).

One emergent network is the International Multicultural Partnership, which grew out of the ASSIST program and provides technical assistance to racial/ethnic communities interested in tobacco prevention and control. It is a consortium that includes members from over 31 states and several countries. Its mission is to develop and implement culturally appropriate health education programs and services that will effectively reach those population groups at highest risk of tobacco-related illness and death.

In addition to efforts to control tobacco advertising in specific racial/ethnic communities, the FDA regulations approved by President Clinton in August 1996 broadly support such activities in racial/ethnic and other communities in the form of the provisions that ban billboards advertising tobacco products within 1,000 feet of schools and playgrounds, limit in-store advertising (except in adult-only facilities) and billboards to black-and-white text, limit advertising to black-and-white text in publications with significant readership under age 18, prohibit brand logos on various promotional items, and prohibit sponsorship of sporting or entertainment events using brand or product identification. The FDA regulations are intended to reduce teenage access and attraction to tobacco products among all racial and racial/ethnic minority groups (*Federal Register* 1996).

Tobacco Product Regulations

An important approach to controlling and preventing tobacco use is the drafting and enacting of product regulations. These large social interventions range from the use of cigarette warning labels to the licensing of tobacco product sales, and they can regulate the product's packaging, its distribution, and even its components. Because most of these regulations affect all people residing in the United States, rather than just members of racial/ethnic communities, they are not described in detail here. The 1994 Youth Access Survey commissioned by RWJF found significant public support among all those surveyed for requiring tobacco companies to list the additives to their products on package labels (African Americans, 88.9 percent; Hispanics, 90.4 percent; and whites, 93.6 percent). Most respondents also supported government regulation of cigarettes, although support was somewhat stronger among Hispanics (81.1 percent) than among African Americans (72.6 percent) and whites (69.5 percent) (Table 11).

Among the few tobacco product regulations to specifically target a racial/ethnic group are Spanish-language warning labels, which appear in cigarette advertisements and promotions in Spanish-language

Table 11. Public beliefs about and support for policies related to nicotine and tobacco product regulation, Robert Wood Johnson Foundation Youth Access Survey, 1994

	African American* (N = 486)		Hispanic (N = 402)		White* (N = 1,341)	
Characteristic	%	±CI†	%	±CI	%	±CI
Think nicotine in cigarettes is addictive	90.9	2.90	86.8	4.16	92.6	1.65
Believe that cigarette companies deliberately adjust nicotine levels to keep smokers addicted to cigarettes	57.5	5.41	56.8	5.62	54.9	3.06
Favor requiring tobacco companies to gradually reduce the amount of nicotine in cigarettes	77.7	4.68	84.8	4.02	79.1	2.43
Favor requiring insurance companies to cover the cost of programs to quit smoking	66.7	5.35	77.0	4.64	63.4	2.96
Favor requiring tobacco companies to list additives on package labels the way food and drug companies are required to list ingredients	88.9	3.64	90.4	3.41	93.6	1.63
Agree that because the government regulates all other products containing nicotine, such as nicotine patches and nicotine gum, the government should also regulate cigarettes	72.6	5.00	81.1	4.19	69.5	2.82

*Non-Hispanic.
†95% confidence interval.
Source: Nancy Kaufman et al., unpublished data. Ethnic differences in public attitudes about policy alternatives for limiting youth access to tobacco products: results of a national household survey, 1994.

publications or on billboards located in Hispanic communities. The use of warning labels is one of the earliest and best known mechanisms that the federal government has employed to inform the public about the health hazards of smoking. Warning labels have been required on cigarette packages and in cigarette advertising since 1966, and four rotating health warnings have been required on cigarette packages and advertisements since October 12, 1984, through Public Law 98–474. Warning labels are not required on cigarettes made for export, cigarettes manufactured abroad by U.S. tobacco companies, or other tobacco products, such as cigars, pipe tobacco, and roll-your-own cigarette tobacco. Warning labels on smokeless tobacco containers have been required since passage in 1986 of Public Law 99–252, which took effect in 1987.

Little is known about the level of awareness or effectiveness of cigarette warning labels among members of racial/ethnic groups or members of the U.S. population at large. A 1991 study of Hispanics in San Francisco has shown that Hispanics are more aware of the presence of warning labels on cigarettes (69.3 percent) than on other products, such as diet soda (27.2 percent), wine (27.6 percent), beer (31.5 percent), and aspirin (36.7 percent) (Marín 1994). The same study also found that the level of awareness of cigarette warning labels was higher among highly acculturated Hispanics (76.5 percent) than among less acculturated Hispanics (65.5 percent). This finding may be attributable to the fact that highly acculturated Hispanics have greater fluency in English—the language used for most product warning labels and cigarette packages.

Support for warning labels does not seem to differ significantly across racial/ethnic minority groups. In a 1992 Louis Harris and Associates poll of 488 smokers, 65 percent of Hispanics, 58 percent of African Americans, and 56 percent of whites favored legislation that required stronger warning labels on cigarette packages than those currently required by law (Louis Harris and Associates, unpublished data).

Conclusions

1. More research is needed on the effect of culturally appropriate programs to reduce tobacco use among racial/ethnic minority groups. Interventions should be language appropriate; addressing psychosocial characteristics such as depression, stress, and acculturation may increase the acceptance of programs by members of racial/ethnic groups.

2. To be culturally appropriate, tobacco control programs must reflect the targeted racial/ethnic group's cultural values, consider the group's psychosocial correlates of tobacco use, and use strategies that are acceptable and credible to members of the group. Culturally competent program staff must be aware and accepting of cultural differences, be able to assess their own cultural values, be conscious of intercultural dynamics when persons of different cultures interact, be aware of a racial/ethnic group's relevant cultural characteristics, and have the skills to adapt to cultural diversity.

3. Numerous strategies are needed to control tobacco use among racial/ethnic youths: restricting minors' access to tobacco products, establishing culturally appropriate school-based programs, and designing mass media efforts geared to young people's interests, attitudes, expectations, and norms. Recent provisions of the Synar Amendment, designed to prevent minors' access to tobacco products, and the FDA regulations aimed at reducing the access to and appeal of tobacco products to young people are intended to reduce tobacco use among all youth, including members of racial/ethnic minority groups.

4. Members of racial/ethnic groups are less likely than the general population to participate in smoking cessation groups and to receive cessation advice from health care providers. Barriers to ethnic group participation include limited cultural competence of health care providers and a lack of transportation, money, and access to health care.

5. Available data indicate that racial/ethnic groups support smoking restrictions, such as increasing cigarette excise taxes, banning cigarette advertisements, restricting access to cigarette vending machines, raising the legal age of purchase, prohibiting sponsorship of events by tobacco companies, and establishing clean indoor air regulations. Additional research is needed to evaluate how best to build on this base of public opinion support to strengthen existing tobacco prevention and control programs within racial/ethnic communities.

6. Prevention and cessation efforts in racial/ethnic communities are limited by underdeveloped tobacco control infrastructures and low levels of resources for research, program development, and program dissemination. Greater resources are needed in racial/ethnic minority communities to build tobacco control infrastructures and to develop initiatives.

References

Aday LA, Lee ES, Spears B, Chung C-W, Youssef A, Bloom B. Health insurance and utilization of medical care for children with special health care needs. *Medical Care* 1993;31(11):1013–26.

Ahluwalia JS, McNagny SE. Smoking prevalence and desire to quit in inner-city African American walk-in clinic patients. *Clinical Research* 1993;41(4):752A.

Alcalay R, Ghee A, Scrimshaw S. Designing prenatal care messages for low-income Mexican women. *Public Health Reports* 1993;108(3):354–62.

Allen KF, Moss AJ, Giovino GA, Shopland DR, Pierce JP. Teenage tobacco use: data estimates from the Teenage Attitudes and Practices Survey, United States, 1989. *Advance Data*. No. 224. Washington (DC): US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics. DHHS Publication No. (PHS) 93-1250, 1993.

Altman DG, Foster V, Rasenick-Douss L, Tye JB. Reducing the illegal sale of cigarettes to minors. *Journal of the American Medical Association* 1989;261(1):80–8.

American Indian Cancer Control Project. *It's Your Life—It's Our Future* [stop smoking guide and video]. Berkeley (CA): American Indian Cancer Control Project, 1991.

American Lung Association. *Don't Let Your Dreams Go Up in Smoke* [brochure]. West Babylon (NY): American Lung Association, 1990a.

American Lung Association. *Stop Before You Drop* [videotape]. Richmond (CA): Richmond Quits Smoking Project, 1990b.

Amezcua C, McAlister A, Ramirez A, Espinoza R. A Su Salud: health promotion in a Mexican-American border community. In: Bracht N, editor. *Health Promotion at the Community Level*. Newbury Park (CA): Sage Publications, 1990:257–77.

Associated Press. Billboard vigilante targets minority area. *The Houston Post* 1990 Jan 26;Sect A:7 (col 1).

Bandura A. *Social Learning Theory*. Englewood Cliffs (NJ): Prentice-Hall, 1977.

Bayer R. AIDS prevention and cultural sensitivity: are they compatible? *American Journal of Public Health* 1994;84(6):895–8.

Bloom B, Gift HC, Jack SS. Dental services and oral health: United States, 1989. *Vital and Health Statistics*. Series 10, No. 183. Hyattsville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics. DHHS Publication No. (PHS) 93-1511, 1992.

Blosser BJ. Ethnic differences in children's media use. *Journal of Broadcasting and Electronic Media* 1988;32 (4):453–70.

Botvin GJ, Batson HW, Witts-Vitale S, Bess V, Baker E, Dusenbury L. A psychosocial approach to smoking prevention for urban black youth. *Public Health Reports* 1989a;104(6):573–82.

Botvin GJ, Dusenbury L, Baker E, James-Ortiz S, Botvin EM, Kerner J. Smoking prevention among urban minority youth: assessing effects on outcome and mediating variables. *Health Psychology* 1992;11(5):290–9.

Botvin GJ, Dusenbury L, Baker E, James-Ortiz S, Kerner J. A skills training approach to smoking prevention among Hispanic youth. *Journal of Behavioral Medicine* 1989b;12(3):279–96.

Breslow L, Johnson M. California's Proposition 99 on tobacco, and its impact. *Annual Review of Public Health* 1993;14:585–604.

Brownson RC, Jackson-Thompson J, Wilkerson JC, Davis JR, Owens NW, Fisher EB Jr. Demographic and socioeconomic differences in beliefs about the health effects of smoking. *American Journal of Public Health* 1992;82(1):99–103.

Bruerd B, Grimm J, Mead S, Schlife C, Jones D, Tucker J, et al. *The Alaska Native Community-Oriented Tobacco Project Evaluation Report*. Anchorage (AK): Prevention Associates, September 1994.

Bulterys M, Morgenstern H, Welty TK, Kraus JF. The expected impact of a smoking cessation program for pregnant women on infant mortality among Native Americans. *American Journal of Preventive Medicine* 1990;6(5):267–73.

Burhansstipanov L, Dresser C. *Documentation of the Cancer Research Needs of American Indians and Alaska Natives.* Native American Monograph No. 1. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Division of Cancer Prevention and Control, Cancer Control Science Program. NIH Publication No. 93-3603, 1993.

Burns D, Pierce JP. *Tobacco Use in California, 1990–1991.* Sacramento (CA): California Department of Health Services, 1992.

California Department of Health Services, Tobacco Control Section. *It's No Joke, Don't Smoke!* [videotape]. Los Angeles: KCET/Educational Enterprises and Sueno Productions, 1993.

Campbell KM, Kaplan CP. Relationship between language orientation and cigarette-smoking beliefs of Latinas. *American Journal of Health Behavior* 1997; 21(1):12–20.

Cella DF, Tulsky DS, Sarafian B, Thomas CR Jr, Thomas CR Sr. Culturally relevant smoking prevention for minority youth. *Journal of School Health* 1992;62 (8):377–80.

Centers for Disease Control and Prevention. The Great American Smokeout—November 19, 1992. *Morbidity and Mortality Weekly Report* 1992;41(45):853.

Centers for Disease Control and Prevention. Physician and other health-care professional counseling of smokers to quit—United States, 1991. *Morbidity and Mortality Weekly Report* 1993a;42(44):854–7.

Centers for Disease Control and Prevention. Smoking cessation during previous year among adults—United States, 1990 and 1991. *Morbidity and Mortality Weekly Report* 1993b;42(26):504–7.

Centers for Disease Control and Prevention. Guidelines for school health programs to prevent tobacco use and addiction. *Morbidity and Mortality Weekly Report* 1994;43(RR-2):1–18.

Centers for Disease Control and Prevention. Accessibility of tobacco products to youths aged 12–17 years—United States, 1989 and 1993. *Morbidity and Mortality Weekly Report* 1996;45(6):125–30.

Cernada GP, Darity WA, Chen TTL, Winder AE, Benn S, Jackson R, et al. Mass media usage among black smokers: a first look. *International Quarterly of Community Health Education* 1989–1990;10(4):347–64.

Chen MS Jr, Guthrie R, Anderson J, Kuun P, Moeschberger M, Zaharlick A. An evaluation of heart health education for Southeast Asians. *American Journal of Preventive Medicine* 1994;10(4):205–8.

Chen MS Jr, Guthrie R, Moeschberger M, Wewers ME, Anderson J, Kuun P, et al. Lessons learned and baseline data from initiating smoking cessation research with Southeast Asian adults. *Asian American and Pacific Islander Journal of Health* 1993;1(2):194–214.

Chinese Community Smoke-Free Project. *Victory Over Smoking: A Guide to Smoking Cessation for You and Your Family.* San Francisco: Chinese Community Smoke-Free Project, 1992.

Collins J. Billboard folks cite rights; foes say ads wrong. *Dallas Times Herald* 1990 Mar 21;Sect A:1 (col 1).

Corcoran RD, Robinson RG. Community demonstration project initiative: technical support for program development at the community level. *Cancer Practice* 1994;2(3):222–8.

Cross TL, Bazron BJ, Dennis KW, Isaacs MR. *Towards a Culturally Competent System of Care,Volume 1.* Washington (DC): Georgetown University Child Development Center, Child and Adolescent Service System Program Technical Assistance Center, 1989.

Cunningham-Sabo L, Davis SM. Pathways to Health: a health promotion and cancer prevention project for American Indian youth. *Alaska Medicine* 1993; 35(4):275–8, 296.

Davis RM. Reducing youth access to tobacco. *Journal of the American Medical Association* 1991;266(22):3186–8.

Davis S, Lambert LC, Cunningham-Sabo L, Skipper BJ. Tobacco use: baseline results from Pathways to Health, a school-based project for southwestern American Indian youth. *Preventive Medicine* 1995a;24(5): 454–60.

Davis SM, Lambert LC, Gomez Y, Skipper BJ. Southwest Cardiovascular Curriculum Project: study findings for American Indian elementary students. *Journal of Health Education* 1995b;26(2):S72–S81.

Davis BJ, Voegtle KH. *Culturally Competent Health Care for Adolescents: A Guide for Primary Care Providers*. Chicago: American Medical Association, Department of Adolescent Health, 1994.

DiFranza JR, Brown LJ. The Tobacco Institute's "It's the Law" campaign: has it halted illegal sales of tobacco to children? *American Journal of Public Health* 1992;82(9):1271–3.

DiFranza JR, Savageau JA, Aisquith BF. Youth access to tobacco: the effects of age, gender, vending machine locks, and "It's the Law" programs. *American Journal of Public Health* 1996;86(2):221–4.

Dusenbury L, Botvin GJ. Substance abuse prevention: competence enhancement and the development of positive life options. *Journal of Addictive Diseases* 1992;11(3):29–45.

Edwards NC, MacMillan K. Tobacco use and ethnicity: the existing data gap. *Canadian Journal of Public Health* 1990;81(Jan-Feb):32–6.

Elder JP, Edwards C, Conway TL. *Independent Evaluation of Proposition 99-Funded Efforts to Prevent and Control Tobacco Use in California* [annual report]. Submitted to California Department of Health Services, Tobacco Control Section. San Diego (CA): San Diego State University, Graduate School of Public Health, 1993a.

Elder JP, Edwards CC, Conway TL, Kenney E, Johnson CA, Bennett ED. Independent evaluation of the California tobacco education program. *Public Health Reports* 1996;111(4):353–8.

Elder JP, Wildey M, de Moor C, Sallis JF, Eckhardt L, Edwards C, et al. The long-term prevention of tobacco use among junior high school students: classroom and telephone interventions. *American Journal of Public Health* 1993b;83(9):1239–44.

Ellis GA, Reed DF, Scheider H. Mobilizing a low-income African American community around tobacco control: a force field analysis. *Health Education Quarterly* 1995;22(4):443–57.

Ewert D, Alleyne D. Risk of exposure to outdoor advertising of cigarettes and alcohol [letter]. *American Journal of Public Health* 1992;82(6):895–6.

Farquhar JW, Fortmann SP, Flora JA, Taylor CB, Haskell WL, Williams PT, et al. Effects of community-wide education on cardiovascular disease risk factors: the Stanford Five-City Project. *Journal of the American Medical Association* 1990;264(3):359–65.

Farquhar JW, Fortmann SP, Maccoby N, Haskell WL, Williams PT, Flora JA, et al. The Stanford Five-City Project: design and methods. *American Journal of Epidemiology* 1985;122(2):323–34.

Federal Register. US Department of Health and Human Services, Food and Drug Administration. Regulations restricting the sale and distribution of cigarettes and smokeless tobacco to protect children and adolescents; final rule (21 CFR Parts 801, 803, 804, 807, 820, and 897), 61 *Federal Register* 44396 (1996).

Federal Trade Commission. *Report to Congress: Pursuant to the Federal Cigarette Labeling and Advertising Act*. Washington (DC): Federal Trade Commission, 1997.

Feighery E, Altman DG, Shaffer G. The effects of combining education and enforcement to reduce tobacco sales to minors: a study of four northern California communities. *Journal of the American Medical Association* 1991;266(22):3168–71.

Fiore MC, Novotny TE, Pierce JP, Giovino GA, Hatziandreu EJ, Newcomb PA, et al. Methods used to quit smoking in the United States: do cessation programs help? *Journal of the American Medical Association* 1990;263(20):2760–5.

Fiore MC, Bailey WC, Cohen SJ, Dorfman SF, Goldstein MG, Gritz ER, et al. *Smoking Cessation. Clinical Practice Guideline No. 18*. Rockville (MD): US Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research. AHCPR Publication No. 96-0692, 1996.

Flay BR, Ockene JK, Tager IB. Smoking: epidemiology, cessation, and prevention. *Chest* 1992;102(3):277S–301S.

Food & Drink Daily. Black-led group targets alcohol and tobacco ads. *Food & Drink Daily* 1991;1(8):3.

Forster JL, Hourigan M, McGovern P. Availability of cigarettes to underage youth in three communities. *Preventive Medicine* 1992;21(3):320–8.

Fortmann SP, Taylor CB, Flora JA, Jatulis DE. Changes in adult cigarette smoking prevalence after 5 years of community health education: the Stanford Five-City Project. *American Journal of Epidemiology* 1993; 137(1):82–96.

Frank E, Winkleby MA, Altman DG, Rockhill B, Fortmann SP. Predictors of physicians' smoking cessation advice. *Journal of the American Medical Association* 1991;266(22):3139–44.

Gerlach KK, Shopland DR, Hartman AM, Gibson JT, Pechacek TF. Workplace smoking policies in the United States: results from a national survey of more than 100,000 workers. *Tobacco Control* 1997;6(3):199–206.

Glasgow RE, Lichtenstein E, Wilder D, Hall R, McRae SG, Liberty B. The Tribal Tobacco Policy Project: working with northwest Indian tribes on smoking policies. *Preventive Medicine* 1995;24(5):434–40.

Glynn TJ. Essential elements of school-based smoking prevention programs. *Journal of School Health* 1989; 59(5):181–8.

Glynn TJ, Anderson DM, Schwarz L. Tobacco-use reduction among high-risk youth: recommendations of a National Cancer Institute Expert Advisory Panel. *Preventive Medicine* 1991;20(2):279–91.

Glynn TJ, Boyd GM, Gruman JC. *Self-Guided Strategies for Smoking Cessation: A Program Planner's Guide.* Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Smoking and Tobacco Control Program. NIH Publication No. 91-3104, 1990.

Glynn TJ, Manley MW. *How To Help Your Patients Stop Smoking: A National Cancer Institute Manual for Physicians.* Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, Division of Cancer Prevention and Control, Smoking and Tobacco Control Program. NIH Publication No. 92-3064, 1992.

Gonzalez VM, Gonzalez JT, Freeman V, Howard-Pitney B. *Health Promotion in Diverse Cultural Communities.* Palo Alto (CA): Health Promotion Resource Center, Stanford Center for Research in Disease Prevention, 1991.

Graham JW, Johnson CA, Hansen WB, Flay BR, Gee M. Drug use prevention programs, gender, and ethnicity: evaluation of three seventh-grade Project SMART cohorts. *Preventive Medicine* 1990;19(3):305–13.

Grossman M. Health benefits of increases in alcohol and cigarette taxes. *British Journal of Addiction* 1989; 84(10):1193–1204.

Hahn LP, Folsom AR, Sprafka JM, Norsted SW. Cigarette smoking and cessation behaviors among urban blacks and whites. *Public Health Reports* 1990;105 (3):290–5.

Hall RA, Lichtenstein E, Burhansstipanov L, Davis SM, Hodge F, Schinke S, et al. Tobacco use policies and practices in diverse Indian settings. *American Indian Culture and Research Journal* 1995;19(3):165–80.

Health and Public Policy Committee, American College of Physicians. Methods for stopping cigarette smoking. *Annals of Internal Medicine* 1986;105(2):281–91.

Hodge FS, Cummings S, Fredericks L, Kipnis P, Williams M, Teehee K. Prevalence of smoking among adult American Indian clinic users in northern California. *Preventive Medicine* 1995;24(5):441–6.

Hodge FS, Fredericks L, Kipnis P. Patient and smoking patterns in northern California American Indian clinics. Urban and rural contrasts. *Cancer* 1996;78(7 Suppl):1623–8.

Hofstede G. *Culture's Consequences: International Differences in Work-Related Values.* Beverly Hills (CA): Sage Publications, 1980.

Hopkins RS. Insurance coverage and usage of preventive health services. *Journal of the Florida Medical Association* 1993;80(8):529–32.

Hymowitz N, Jackson J, Carter R, Eckholdt H. Past quit smoking assistance and doctors' advice for white and African-American smokers. *Journal of the National Medical Association* 1996;88(4):249–52.

Jackson C, Flora JA, Winkleby MA, Fortmann SP. Use of educational resources for cardiovascular risk reduction in the Stanford Five-City Project. *American Journal of Preventive Medicine* 1991;7(2):82–8.

Jackson DZ. Making money by any means necessary. *Boston Globe* 1995 Feb 1;Sect OP-ED:13.

Jason LA, Billows WD, Schnopp-Wyatt DL, King C. Long-term findings from Woodridge in reducing illegal cigarette sales to older minors. *Evaluation and the Health Professions* 1996;19(1):3–13

Jason LA, Ji PY, Anes MD, Birkhead SH. Active enforcement of cigarette control laws in the prevention of cigarette sales to minors. *Journal of the American Medical Association* 1991;266(22):3159–61.

Jason LA, Tait E, Goodman D, Buckenberger L, Gruder CL. Effects of a televised smoking cessation intervention among low-income and minority smokers. *American Journal of Community Psychology* 1988;16(6):863–76.

Jenkins CNH, McPhee SJ, Bird JA, Bonilla N-TH. Cancer risks and prevention practices among Vietnamese refugees. *Western Journal of Medicine* 1990;153(1):34–9.

Jenkins CNH, McPhee SJ, Le A, Pham GQ, Ha N-T, Stewart S. The effectiveness of a media-led intervention to reduce smoking among Vietnamese-American men. *American Journal of Public Health* 1997;87 (6):1031–4.

Jung C. Smoking dies hard in Asian businesses: Santa Clara County cuts tobacco control funding. *San Jose Mercury News* 1993 July 6;Sect B:1.

Kaplan RM, Pierce JP, Gilpin EA, Johnson M, Bal DG. Stages of smoking cessation: the 1990 California Tobacco Survey. *Tobacco Control* 1993;2(2):139–44.

Keay KD, Woodruff SI, Wildey MB, Kenney EM. Effect of a retailer intervention on cigarette sales to minors in San Diego County, California. *Tobacco Control* 1993;2(2):145–51.

Keeler TE, Hu T-W, Barnett PG, Manning WG. Taxation, regulation, and addiction: a demand function for cigarettes based on time-series evidence. *Journal of Health Economics* 1993;12(1):1–18.

Klonoff EA, Fritz JM, Landrine H, Riddle RW, Tully-Payne L. The problem and sociocultural context of single-cigarette sales. *Journal of the American Medical Association* 1994;271(8):618–20.

Klonoff EA, Landrine H, Alcaraz R. An experimental analysis of sociocultural variables in sales of cigarettes to minors. *American Journal of Public Health* 1997; 87(5):823–6.

Kogan MD, Kotelchuck M, Alexander GR, Johnson WE. Racial disparities in reported prenatal care advice from health care providers. *American Journal of Public Health* 1994;84(1):82–8.

Kottke TE, Willms DG, Solberg LI, Brekke ML. Physician-delivered smoking cessation advice: issues identified during ethnographic interviews. *Tobacco Control* 1994;3(1):46–9.

Lacey LP, Manfredi C, Balch G, Warnecke RB, Allen K, Edwards C. Social support in smoking cessation among black women in Chicago public housing. *Public Health Reports* 1993;108(3):387–94.

Lacey L, Tukes S, Manfredi C, Warnecke RB. Use of lay health educators for smoking cessation in a hard-to-reach urban community. *Journal of Community Health* 1991;16(5):269–82.

Lando HA, Johnson KM, Graham-Tomasi RP, McGovern PG, Solberg L. Urban Indians' smoking patterns and interest in quitting. *Public Health Reports* 1992;107(3):340–4.

Landrine H, Klonoff EA, Fritz JM. Preventing cigarette sales to minors: the need for contextual, sociocultural analysis. *Preventive Medicine* 1994;23(3):322–7.

Landrine H, Klonoff EA, Alcaraz R. Racial discrimination in minors' access to tobacco. *Journal of Black Psychology* 1997;23(2):135–47.

Lichtenstein E, Glasgow RE. Smoking cessation: what have we learned over the past decade? *Journal of Consulting and Clinical Psychology* 1992;60(4):518–27.

Lichtenstein E, Glasgow RE, Lopez K, Hall R, McRae SG, Meyers GB. Promoting tobacco control policies in Northwest Indian tribes. *American Journal of Public Health* 1995;85(7):991–4.

Lieberman Research Inc. Non-Whites' Participation in the 1993 Great American Smokeout. New York: Lieberman Research Inc., conducted for the American Cancer Society, 1993.

Lieu TA, Newacheck PW, McManus MA. Race, ethnicity, and access to ambulatory care among US adolescents. *American Journal of Public Health* 1993; 83(7):960–5.

Lynch BS, Bonnie RJ, editors. *Growing Up Tobacco Free: Preventing Nicotine Addiction in Children and Youths.* Washington (DC): National Academy Press, 1994.

Manfredi C, Lacey L, Warnecke R, Buis M. Smoking-related behavior, beliefs, and social environment of young Black women in subsidized public housing in Chicago. *American Journal of Public Health* 1992;82(2): 267–72.

Marín G. Defining culturally appropriate community interventions: Hispanics as a case study. *Journal of Community Psychology* 1993;21(2):149–61.

Marín G. Self-reported awareness of the presence of product warning messages and signs by Hispanics in San Francisco. *Public Health Reports* 1994;109(2):275–83.

Marín G. Perceptions by Hispanics of channels and sources of health messages regarding cigarette smoking. *Tobacco Control* 1996;5(1):30–6.

Marín G, Marín BV, Otero-Sabogal R, Sabogal F, Pérez-Stable EJ. The role of acculturation in the attitudes, norms, and expectancies of Hispanic smokers. *Journal of Cross-Cultural Psychology* 1989;20(4):399–415.

Marín BV, Marín G, Pérez-Stable EJ, Hauck WW. Effects of a community intervention to change smoking behavior among Hispanics. *American Journal of Preventive Medicine* 1994;10(6):340–7.

Marín BV, Marín G, Pérez-Stable EJ, Otero-Sabogal R, Sabogal F. Cultural differences in attitudes toward smoking: developing messages using the theory of reasoned action. *Journal of Applied Social Psychology* 1990a;20(6):478–93.

Marín G, Marín BV, Pérez-Stable EJ, Sabogal F, Otero-Sabogal R. Changes in information as a function of a culturally appropriate smoking cessation community intervention for Hispanics. *American Journal of Community Psychology* 1990b;18(6):847–64.

Marín G, Marín BV, Pérez-Stable EJ, Sabogal F, Otero-Sabogal R. Cultural differences in attitudes and expectancies between Hispanic and non-Hispanic white smokers. *Hispanic Journal of Behavioral Sciences* 1990c;12(4):422–36.

Marín G, Pérez-Stable EJ. Effectiveness of disseminating culturally appropriate smoking-cessation information: Programa Latino Para Dejar de Fumar. *Journal of the National Cancer Institute Monographs* 1995;18:155–63.

Marttila & Kiley, Inc. *Highlights from an American Cancer Society Survey of U.S. Voter Attitudes Toward Cigarette Smoking.* Boston: Marttila & Kiley, Inc., 1993.

McAlister A, Puska P, Salonen JT, Tuomilehto J, Koskela K. Theory and action for health promotion: illustrations from the North Karelia Project. *American Journal of Public Health* 1982;72(1):43–50.

McAlister AL, Ramirez AG, Amezcua C, Pulley L, Stern MP, Mercado S. Smoking cessation in Texas-Mexico border communities: a quasi-experimental panel study. *American Journal of Health Promotion* 1992;6(4):274–9.

McPhee SJ, Jenkins CNH, Anh L. *Smoking Prevention and Cessation Among Vietnamese in Northern California: Final Report.* Sacramento (CA): Report submitted to the Tobacco Control Section, Department of Health Services, State of California, 1993.

McPhee SJ, Jenkins CNH, Wong C, Fordham D, Lai KQ, Bird JA, Moskowitz JM. Smoking cessation intervention among Vietnamese Americans: a controlled trial. *Tobacco Control* 1995;4(1 Suppl):16S–24S.

Moncher M, Schinke S. Group intervention to prevent tobacco use among Native American youth. *Research on Social Work Practice* 1994;4(2):160–71.

National Cancer Institute. *Strategies to Control Tobacco Use in the United States: A Blueprint for Public Health Action in the 1990's.* Smoking and Tobacco Control Monograph No. 1. Bethesda (MD): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 92-3316, 1991.

National Cancer Institute. *Datos Sobre el Hábito de Fumar y Recomendaciones Para Dejar de Fumar (Smoking: Facts and Quitting Tips for Hispanics).* Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 92-3405S, 1992a.

National Cancer Institute. *Smoking: Facts and Quitting Tips for Black Americans.* Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 92-3405, 1992b.

National Cancer Institute. *Tobacco and the Clinician: Interventions for Medical and Dental Practice.* Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 94-3693, 1994.

National High Blood Pressure Education Program. *Churches as an Avenue to High Blood Pressure Control.* Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Heart, Lung, and Blood Institute, National High Blood Pressure Education Program. NIH Publication No. 92-2725, 1992.

Nestle M, Cowell C. Health promotion for low-income minority groups: the challenge for nutrition education. Health Education Research: *Theory & Practice* 1990; 5(4):527–33.

Nevid JS, Javier RA. "Si, puedo" smoking cessation program for Hispanic smokers. Paper presented at the Fourth National Forum on Cardiovascular Health, Pulmonary Disorders, and Blood Resources, Minority Health Issues for an Emerging Majority, Washington, DC, June 1992.

O'Campo P, Faden RR, Brown H, Gielen AC. The impact of pregnancy on women's prenatal and postpartum smoking behavior. *American Journal of Preventive Medicine* 1992;8(1):8–13.

O'Connor C, editor. *State Legislated Actions on Tobacco Issues.* Washington (DC): The Coalition on Smoking OR Health, 1992.

Orlandi MA, editor. *Cultural Competence for Evaluators: A Guide for Alcohol and Other Drug Abuse Prevention Practitioners Working With Ethnic/Racial Communities.* Office for Substance Abuse Prevention Cultural Competence Series 1. Rockville (MD): US Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, Office for Substance Abuse Prevention, Division of Community Prevention and Training. DHHS Publication No. (ADM) 92-1884, 1992.

Orleans CT, Schoenbach VJ, Salmon MA, Strecher VJ, Kalsbeek W, Quade D, et al. A survey of smoking and quitting patterns among black Americans. *American Journal of Public Health* 1989;79(2):176–81.

Otero-Sabogal R, Sabogal F. *La Mujer: La Familia y el Cigarrillo.* San Francisco: American Lung Association of San Francisco, 1991.

Pérez-Stable EJ, Marín BV, Marín G. A comprehensive smoking cessation program for the San Francisco Bay Area Latino Community: Programa Latino Para Dejar de Fumar. *American Journal of Health Promotion* 1993; 7(6):430–42, 475.

Pérez-Stable EJ, Marín G, Marín BV. Behavioral risk factors: a comparison of Latinos and non-Latino whites in San Francisco. *American Journal of Public Health* 1994;84(6):971–6.

Pérez-Stable EJ, Sabogal F, Marín G, Marín BV, Otero-Sabogal R. Evaluation of "Guía Para Dejar de Fumar," a self-help guide in Spanish to quit smoking. *Public Health Reports* 1991;106(5):564–70.

Pérez-Stable EJ, Sabogal F, Otero-Sabogal R, Hiatt RA, McPhee SJ. Misconceptions about cancer among Latinos and Anglos. *Journal of the American Medical Association* 1992;288(22):3219–23.

Perry CL, Murray DM, Griffin G. Evaluating the statewide dissemination of smoking prevention curricula: factors in teacher compliance. *Journal of School Health* 1990;60(10):501–4.

Peterson DE, Zeger SL, Remington PL, Anderson HA. The effect of state cigarette tax increases on cigarette sales, 1955 to 1988. *American Journal of Public Health* 1992;82(1):94–6.

Pierce JP, Cavin SW, Macky C, Rosbrook B, Berry CC, Maklan DM, et al. *Technical Report on Analytic Methods and Approaches Used in the 1992 California Tobacco Survey Analysis.* Sacramento (CA): California Department of Health Services, 1994a.

Pierce JP, Evans N, Farkas AJ, Cavin SW, Berry C, Kramer M, et al. *Tobacco Use in California: An Evaluation of the Tobacco Control Program, 1989–1993.* La Jolla (CA): University of California, San Diego, 1994b.

Pierce JP, Fiore MC, Novotny TE, Hatziandreu EJ, Davis RM. Trends in cigarette smoking in the United States: projections to the year 2000. *Journal of the American Medical Association* 1989;261(1):61–5.

Pletsch PK. Environmental tobacco smoke exposure among Hispanic women of reproductive age. *Public Health Nursing* 1994;11(4):229–35.

Prochaska JO. A transtheoretical model of behavior change: learning from mistakes with majority populations. In: Becker DM, Hill DR, Jackson JS, Levine DM, Stillman FA, Weiss SM, editors. *Health Behavior Research in Minority Populations: Access, Design, and Implementation*. Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health. NIH Publication No. 92-2965, 1992:105.

Programa Latino Para Dejar de Fumar de San Francisco. *El Fumar un Juego Peligroso . . . Guía Para Dejar de Fumar*. San Francisco: Programa Latino Para Dejar de Fumar de San Francisco, 1992.

Programa Latino Para Dejar de Fumar de San Francisco. *Rompa Con el Vicio: Una Guía Para Dejar de Fumar*. Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 94-3001, 1993.

Puska P, McAlister A, Niemensivu H, Piha T, Wiio J, Koskela K. A television format for national health promotion: Finland's "Keys to Health." *Public Health Reports* 1987;102(3):263–9.

Ramirez AG, McAlister AL. Mass media campaign—A Su Salud. *Preventive Medicine* 1988;17(5):608–21.

Reid DJ, Killoran AJ, McNeill AD, Chambers JS. Choosing the most effective health promotion options for reducing a nation's smoking prevalence. *Tobacco Control* 1992;3(1):185–97.

Rigotti NA, Pashos CL. No-smoking laws in the United States. *Journal of the American Medical Association* 1991;266(22):3162–7.

Roberts RN. *Developing Culturally Competent Programs for Families of Children with Special Needs*. 2nd ed. Washington (DC): Georgetown University Child Development Center and the Maternal and Child Health Bureau, 1990.

Robinson RG, Kessler LG, Naughton MD. Cancer awareness among African Americans: a survey assessing race, social status, and occupation. *Journal of the National Medical Association* 1991;83(6):491–7.

Robinson RG, Orleans CT, James DA, Sutton CD. *Pathways to Freedom: Winning the Fight Against Tobacco*. Philadelphia: Fox Chase Cancer Center, 1992. Reprinted with permission by the Centers for Disease Control and Prevention and the National Medical Association.

Robinson RG, Shelton DM, Hodge F, Lew R, Lopez E, Toy P, et al. Tobacco control capacity index for communities of color in the United States. In: Slama K, editor. *Tobacco and Health*. New York: Plenum Press, 1995:359–65.

Robinson RG, Sutton CD. The Coalition Against Uptown Cigarettes. In: Jernigan D, Wright PA, editors. *Making News, Changing Policy*. Washington (DC): US Office of Personnel Management, Center for Substance Abuse Prevention, and The Marin Institute for the Prevention of Alcohol and Other Drug Problems, in press.

Rogler LH, Malgady RG, Costantino G, Blumenthal R. What do culturally sensitive mental health services mean? the case of Hispanics. *American Psychologist* 1987;42(6):565–70.

Roper Center for Public Opinion Research. *Attitudes on Smoking by Race. Telephone Survey Conducted from February 25 to 28, 1993*. Storrs (CT): Roper Center for Public Opinion Research, University of Connecticut, conducted by ABC News/*The Washington Post*, 1993.

Royce JM, Ashford A, Resnicow K, Freeman HP, Caesar AA, Orlandi MA. Physician- and nurse-assisted smoking cessation in Harlem. *Journal of the National Medical Association* 1995;87(4):291–300.

Royce JM, Hymowitz N, Corbett K, Hartwell TD, Orlandi MA. Smoking cessation factors among African Americans and Whites. *American Journal of Public Health* 1993;83(2):220–6.

Sabogal F, Marín B, Marín G, Otero-Sabogal R, Pérez-Stable EJ. *Guía Para Dejar de Fumar: Por Su Salud y Su Familia*. Washington (DC): US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 88-3001, 1988.

Sabogal F, Marín G, Otero-Sabogal R, Marín BV, Pérez-Stable EJ. Hispanic familism and acculturation: what changes and what doesn't? *Hispanic Journal of Behavioral Sciences* 1987;9(4):397–412.

Sallis JF, Elder JP, Wildey MB, de Moor C, Young RL, Shulkin JL, et al. Assessing skills for refusing cigarettes and smokeless tobacco. *Journal of Behavioral Medicine* 1990;13(5):489–503.

Satcher D, Eriksen M. The paradox of tobacco control [editorial]. *Journal of the American Medical Association* 1994;271(8):627–8.

Satcher D, Robinson RG. The CDC and the NMA-partnerships to control tobacco in the African-American community. *Journal of the National Medical Association* 1994;86(7):493–6.

Schinke SP, Moncher MS, Singer BR. Native American youths and cancer risk reduction: effects of software intervention. *Journal of Adolescent Health* 1994; 15(2):105–10.

Schinke SP, Orlandi MA, Botvin GJ, Gilchrist LD, Trimble JE, Locklear VS. Preventing substance abuse among American-Indian adolescents: a bicultural competence skills approach. *Journal of Counseling Psychology* 1988;35(1):87–90.

Schinke SP, Singer B, Cole K, Contento IR. Reducing cancer risk among Native-American adolescents. *Preventive Medicine* 1996;25(2):146–55.

Schoenbach VJ, Orleans CT, Salmon MA, Quade D, Strecher VJ, Kalsbeek WD, et al. A self-help quit smoking program for black Americans. Paper presented at the 116th Annual Meeting of the American Public Health Association, Boston, November 16, 1988.

Schorling JB, Roach J, Siegel M, Buturka N, Hunt DE, Guterbock TM, Stewart HL. A trial of church-based smoking cessation interventions for rural African Americans. *Preventive Medicine* 1997;26(1):92–101.

Shelton DM, Merritt RK, Robinson RG. Tobacco control strategies. In: Slama K, editor. *Tobacco and Health*. New York: Plenum Press, 1995:367–74.

Sherwood D, Maroney N, Stubblebine WC. *Assessing Public Support for No-Smoking Policies: A Survey of California Residents*. Claremont (CA): The Claremont Graduate School, The Claremont Institute for Economic Policy Studies, January 1994.

Stillman FA, Bone LR, Rand C, Levine DM, Becker DM. Heart, body, and soul: a church-based smoking-cessation program for urban African Americans. *Preventive Medicine* 1993;22(3):335–49.

Stotts RC, Glynn TJ, Baquet CR. Smoking cessation among blacks. *Journal of Health Care for the Poor and Underserved* 1991;2(2):307–19.

Tiedje LB, Kingry MJ, Stommel M. Patient attitudes concerning health behaviors during pregnancy: initial development of a questionnaire. *Health Education Quarterly* 1992;19(4):481–93.

Tobacco Institute. *The Tax Burden on Tobacco. Historical Compilation, Volume 31*. Washington (DC): The Tobacco Institute, 1997.

Tomar SL, Husten CG, Manley MW. Do dentists and physicians advise tobacco users to quit? *Journal of the American Dental Association* 1996;127:259–65.

Townsend J, Roderick P, Cooper J. Cigarette smoking by socioeconomic group, sex, and age: effects of price, income, and health publicity. *British Medical Journal* 1994;309(6959):923–7.

Treviño FM, Moyer ME, Valdez RB, Stroup-Benham CA. Health insurance coverage and utilization of health services by Mexican Americans, mainland Puerto Ricans, and Cuban Americans. *Journal of the American Medical Association* 1991;265(2):233–7.

Triandis HC, Marín G, Lisansky J, Betancourt H. Simpatía as a cultural script of Hispanics. *Journal of Personality and Social Psychology* 1984;47(6):1363–75.

Uba L. Cultural barriers to health care for Southeast Asian refugees. *Public Health Reports* 1992;107(5):544–8.

US Congressional Budget Office. *Federal Taxation of Tobacco, Alcoholic Beverages, and Motor Fuels*. Washington (DC): Congress of the United States, US Congressional Budget Office, August 1990.

US Department of Health and Human Services. *Preventing Tobacco Use Among Young People. A Report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1994.

US Department of Health and Human Services. *You Can Quit Smoking: Consumer Guide. Clinical Practice Guideline No. 18.* Rockville (MD): US Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research. AHCPR Publication Nos. 96-0695 and 97-G003–G008, 1996 and 1997.

US Department of Health and Human Services. *Synar Regulation Implementation: FY 97 State Compliance, Section I: Program Summary. Report to Congress.* Rockville (MD): US Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention, 1998.

US General Accounting Office. *Hispanic Access to Health Care: Significant Gaps Exist.* Gaithersburg (MD): US General Accounting Office, Program Evaluation and Methodology Division. GAO/PEMD–92–6, January 1992.

US General Accounting Office. *Hispanics' Schooling: Risk Factors for Dropping Out and Barriers To Resuming Education.* Gaithersburg (MD): US General Accounting Office, Program Evaluation and Methodology Division. GAO/PEMD–94–24, July 1994.

Vander Martin R, Cummings SR, Coates TJ. Ethnicity and smoking: differences in white, black, Hispanic, and Asian medical patients who smoke. *American Journal of Preventive Medicine* 1990;6(4):194–9.

Vega WA. Theoretical and pragmatic implications of cultural diversity for community research. *American Journal of Community Psychology* 1992;20(3):375–91.

Vietnamese Community Health Promotion Project. *Làm Thế Nào Để Bỏ Hút Thuốc? (How to Quit Smoking).* San Francisco: The Vietnamese Community Health Promotion Project, University of California, San Francisco, Division of General Internal Medicine, 1990.

Voorhees CC, Stillman FA, Swank RT, Heagerty PJ, Levine DM, Becker DM. Heart, body, and soul: impact of church-based smoking cessation interventions on readiness to quit. *Preventive Medicine* 1996;25(3):277–85.

Warnecke RB, Flay BR, Kviz FJ, Gruder CL, Langenberg P, Crittenden KS, et al. Characteristics of participants in a televised smoking cessation intervention. *Preventive Medicine* 1991;20(3):389–403.

Warner KE, Chaloupka FJ, Cook PJ, Manning WG, Newhouse JP, Novotny TE, et al. Criteria for determining an optimal cigarette tax: the economist's perspective. *Tobacco Control* 1995;4(4):380–6.

Wasserman J. How effective are excise tax increases in reducing cigarette smoking [editorial]? *American Journal of Public Health* 1992;82(1):19–20.

Winkleby MA. The future of community-based cardiovascular disease intervention studies [editorial]. *American Journal of Public Health* 1994;84(9):1369–72.

Winkleby MA, Fortmann SP, Rockhill B. Trends in cardiovascular disease risk factors by educational level: the Stanford Five-City Project. *Preventive Medicine* 1992;21(5):592–601.

Winkleby MA, Schooler C, Kraemer HC, Lin J, Fortmann SP. Hispanic versus white smoking patterns by sex and level of education. *American Journal of Epidemiology* 1995;142(4):410–8.

List of Tables and Figures

Chapter 1
Introduction and Summary of Conclusions

Chapter 2
Patterns of Tobacco Use Among Four Racial/Ethnic Minority Groups

Chapter 3
Health Consequences of Tobacco Use Among Four Racial/Ethnic Minority Groups

Chapter 4
Factors That Influence Tobacco Use Among Four Racial/Ethnic Minority Groups

Chapter 5
Tobacco Control and Education Efforts Among Members of Four Racial/Ethnic Minority Groups

Glossary

ACS	American Cancer Society
AIDS	acquired immunodeficiency syndrome
ALA	American Lung Association
APA	American Psychiatric Association
ASSIST	American Stop Smoking Intervention Study
AUTS	Adult Use of Tobacco Survey
BRFSS	Behavioral Risk Factor Surveillance System
CARDIA	Coronary Artery Risk Development in (Young) Adults
CDC	Centers for Disease Control and Prevention
CES-D	Center for Epidemiological Studies Depression Scale
CHD	coronary heart disease
CI	confidence interval
CIS	Cancer Information Service
COMMIT	Community Intervention Trial for Smoking Cessation
COPD	chronic obstructive pulmonary disease
COSSMHO	National Coalition of Hispanic Health and Human Services Organizations
COST	Churches Organized to Stop Tobacco
CPS	Current Population Survey
CPS-I	Cancer Prevention Study I
DNA	deoxyribonucleic acid
DOC	Doctors Ought to Care
DSM-III™	*Diagnostic and Statistical Manual of Mental Disorders, Third Edition*
DSM-IV™	*Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*
ETS	environmental tobacco smoke
FAO	Food and Agriculture Organization of the United Nations
FDA	Food and Drug Administration
FEV_1	forced expiratory volume after one second
FTC	Federal Trade Commission
G6PD	glucose-6-phosphate dehydrogenase
GAO	U.S. General Accounting Office
GAS	Great American Smokeout
HHANES	Hispanic Health and Nutrition Examination Survey
HMO	health maintenance organization
HRSA	Health Resources and Services Administration
ICD	*Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death*
ICD-9	*International Classification of Diseases, Ninth Revision*
IHD	ischemic heart disease
IHS	Indian Health Service
LBW	low birth weight
LST	Life Skills Training
MTF	Monitoring the Future surveys
MTV	Music Television
NAAAPI	National Association of African Americans for Positive Imagery
NAACP	National Association for the Advancement of Colored People
NBLIC	National Black Leadership Initiative on Cancer

NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NHANES I	National Health and Nutrition Examination Survey I
NHANES II	National Health and Nutrition Examination Survey II
NHANES III	National Health and Nutrition Examination Survey III
NHEFS	NHANES I Epidemiologic Follow-up Study
NHIS	National Health Interview Survey
NHSDA	National Household Survey on Drug Abuse
NIDA	National Institute on Drug Abuse
NMA	National Medical Association
NMFS	National Mortality Followback Survey
NMIHS	National Maternal and Infant Health Survey
OR	odds ratio
PUSH	People United to Save Humanity
RFLP	restriction fragment length polymorphism
RWJF	The Robert Wood Johnson Foundation
SAIAN	Survey of American Indians and Alaska Natives
SEER	Surveillance, Epidemiology, and End Results Program
SESUDAAN	Standard Errors Program for Computing of Standardized Rates from Sample Survey Data
SHOUT	Students Helping Others Understand Tobacco
SIDS	sudden infant death syndrome
SMART	Self-Management and Resistance Training
STAT	Stop Teenage Addiction to Tobacco
SUDAAN	Professional Software for Survey Data Analysis
TAPS	Teenage Attitudes and Practices Survey
TAPS-II	Teenage Attitudes and Practices Survey II
UNCF	United Negro College Fund
USDHEW	U.S. Department of Health, Education, and Welfare
USDHHS	U.S. Department of Health and Human Services
YRBS	Youth Risk Behavior Survey

Index

A

B

C

D

E

M

N

O

P

Q

R

T

U

V

W

Y