The Health Consequences of SMOKING

A REPORT OF THE SURGEON GENERAL: 1972

The Health Consequences of Smoking

A Report of the Surgeon General: 1972

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Health Services and Mental Health Administration

Honorable Carl Albert Speaker of the House of Representatives Washington, D.C. 20515

Dear Mr. Speaker:

Enclosed is the 1972 report on the health consequences of smoking, as called for by Section 8(a) of the Public Health Cigarette Smoking Act of 1969. As you will see, it continues and strengthens the findings of previous Public Health Service reports that cigarette smoking is a hazard to the health of the American people.

Under this Act, I am also required to submit to you such recommendations for legislation as I deem appropriate.

As you know, it has long been the position of this Department that an adequate health warning should appear in cigarette advertisements along with listings of "tar" and nicotine. We are in support of the current efforts of the Federal Trade Commission to bring this about through the exercise of its regulatory powers. Should these efforts fail, however, we would return to our previous recommendations that this should be accomplished through legislative action.

With kindest regards,

Sincerely,

Elliot L. Richardson Secretary

Preface

Six times since 1964, the Public Health Service has issued formal reviews of the scientific evidence which links cigarette smoking to disease and premature death. Each successive review, including this one, has served to confirm and strengthen the conclusion of the 1964 Report, that cigarettes are a major cause of death and disease.

In the first three chapters of this report, the relationships between cigarette smoking and cancer, cardiovascular disease, and non-neoplastic bronchopulmonary disease are reviewed and evidence is presented which helps develop our understanding of the mechanisms which are involved in these relationships. In the final three chapters, information is presented on public exposure to air pollution from tobacco, on the relationship between tobacco and allergy, and on the harmful constituents which are found in cigarette smoke.

In the past few years, millions of Americans have stopped smoking because they have persuaded themselves that it is in their own self-interest to do so; we must continue to encourage cessation as the only certain way to protect both the individual and society from the harmful effects of smoking. We must also, however, work towards reducing the dangers of smoking for those who have not quit by developing less hazardous cigarettes and encouraging less hazardous ways of smoking. The chapter which discusses the harmful constituents of smoke is a useful statement of our current knowledge in this field; it should interest not only research scientists but those who are concerned with public education and public policy.

Research in smoking and health continues, as this report shows, both in this country and abroad and under both public and private auspices; furthermore, the range of this research is widening as the significance of cigarette smoking as a public health problem becomes more apparent. In establishing the present series of reports, first under Public Law 89–92 and now under Public Law 91–222, the Congress has given us a means of encouraging the research we need and of building a better understanding of the problem.

JESSE L. STEINFELD, M.D.
Surgeon General

v

Table of Contents

		Page
Letter of Tr	ansmittal	iii
PREFACE		v
	TION OF THE REPORT AND VLEDGMENTS	ix
		1
Chapter 1.	Introduction and Summary	1
Chapter 2.	Cardiovascular Diseases	11
Chapter 3.	Non-neoplastic Bronchopulmonary Diseases	35
Chapter 4.	Cancer	57
Chapter 5.	Pregnancy	81
Chapter 6.	Gastrointestinal Disorders	95
Chapter 7.	Allergy	101
Chapter 8.	Public Exposure to Air Pollution from	
aproc or	Tobacco Smoke	119
Chapter 9.	Harmful Constituents of Cigarette Smoke	139
Index	• • • • • • • • • • • • • • • • • • • •	151

Preparation of the Report and Acknowledgments

"Smoking and Health. Report of the Advisory Committee to the Surgeon General of the Public Health Service" was published in 1964. The following documents were subsequently published as reviews of the medical literature as called for by Public Law 89–92.

- 1. "The Health Consequences of Smoking, A Public Health Service Review: 1967"**
- 2. "The Health Consequences of Smoking, 1968 Supplement to the 1967 PHS Review"**
- "The Health Consequences of Smoking, 1969 Supplement to the 1967 PHS Review"**

These documents reviewed the medical literature which had been published since the original Surgeon General's Report. The format of publishing a supplement to a supplement became unwieldy, particularly in the light of the lack of availability of previous reviews to the general public. Therefore, when P.L. 91–222 was signed into law on April 1, 1970, calling for an 18-month interval between the previous report and the new report, the entire field was reviewed with an emphasis on the most recent additions to the literature. The product of this review was: "The Health Consequences of Smoking, A Report of the Surgeon General: 1971."**

The present document, "The Health Consequences of Smoking, A Report of the Surgeon General: 1972," includes a review of the literature which has been published since the 1971 Report was completed. It also includes an evaluation of the state of knowledge in three areas which have not been previously reviewed in these reports: allergy and tobacco, public exposure to air pollution from tobacco smoke, and harmful constituents of cigarette smoke.

The National Clearinghouse for Smoking and Health has the responsibility for the continuous monitoring and compilation of the medical literature on the health consequences of smoking and for the preparation of this document. This is accomplished through several mechanisms:

^{*} Referred to in this manuscript as the Surgeon General's Report.

^{**} Referred to in this manuscript as "The Health Consequences of Smoking."

- 1. An information science corporation is on contract to extract articles on smoking and health from the medical literature of the world. This organization provides a semi-monthly accessions list with abstracts and copies of the various articles. Translations are called for as needed. Articles are classified according to subject and filed by a series of code words and phrases.
- 2. The National Library of Medicine, through the Medlars system, sends the National Clearinghouse for Smoking and Health a monthly listing of articles in the smoking and health area. These are reviewed, and articles not identified by the information science corporation are ordered.
- 3. Staff members review current medical literature and identify pertinent articles.

Initial drafts of the present review were prepared by the staff director, assistant staff director, and consulting editors. The first drafts of the individual chapters were sent to experts for review, criticism, and comment with respect to the articles reviewed, articles not included, and conclusions. The drafts were then revised until they met with the general approval of the reviewers. The final drafts were reviewed as a whole by the Director of the National Clearinghouse for Smoking and Health, the Director of the National Cancer Institute, the Director of the National Heart and Lung Institute, the Director of the National Institute of Environmental Health Sciences, and by six additional experts both within and outside of the Public Health Service.

Acknowledgments

The National Clearinghouse for Smoking and Health, Daniel / Horn, Ph. D., Director, was responsible for the preparation of this report. Staff Director for the report was John H. Holbrook, M.D., and Assistant Staff Director was Elvin E. Adams, M.D. Daniel P. Asnes, M.D., and David G. Cook, M.D., were Consulting Editors.

The professional staff has had the assistance and advice of a number of experts in the scientific and technical fields, both in and outside of the Government. Their contributions are gratefully acknowledged. Special thanks are due the following:

Anderson, William H., M.D.—Chief, Pulmonary Section, School of Medicine, University of Louisville, Louisville, Kentucky.

Anthonisen, Nicholas R., M.D., Ph. D.—Associate Professor, Department of Experimental Medicine, McGill University, Montreal, Quebec, Canada.

X

- AUERBACH, OSCAR, M.D.—Senior Medical Investigator, Veterans Administration Hospital, East Orange, New Jersey.
- AYRES, STEPHEN M., M.D.—Director, Cardiopulmonary Laboratory, Saint Vincent's Hospital and Medical Center of New York, New York, New York.
- Baker, Carl G., M.D.—Director, National Cancer Institute, National Institutes of Health, Bethesda, Maryland.
- BING, RICHARD J., M.D.—Professor of Medicine, University of Southern California, Huntington Memorial Hospital, Pasadena, California.
- BOCK, FRED G., Ph. D.—Director, Orchard Park Laboratories, Roswell Park Memorial Institute, Orchard Park, New York.
- BOREN, HOLLIS G., M.D.—Chief, Pulmonary Disease Section, The Medical College of Wisconsin, Wood Veterans Administration Hospital, Milwaukee, Wisconsin.
- BOUTWELL, ROSWELL K., M.D.—Professor of Oncology, McArdle Laboratory for Cancer Research, University of Wisconsin, Madison, Wisconsin.
- COOPER, THEODORE, M.D.—Director, National Heart and Lung Institute, National Institutes of Health, Bethesda, Maryland.
- CORNFIELD, JEROME—Research Professor of Biostatistics, Graduate School of Public Health, University of Pittsburgh, Biostatistics Project, Bethesda, Maryland.
- EPSTEIN, FREDERICK H., M.D.—Director and Professor of Epidemiology, School of Public Health, University of Michigan, Ann Arbor, Michigan.
- Falk, Hans L., Ph. D.—Associate Director for Program, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina.
- FARR, RICHARD, M.D.—Head, Department of Allergy and Clinical Immunology, National Jewish Hospital and Research Center, Denver, Colorado.
- FERRIS, BENJAMIN G., JR., M.D.—Professor of Environmental Health and Safety, School of Public Health, Harvard University, Boston, Massachusetts.
- FINKLEA, JOHN F., M.D.—Acting Director, Division of Effects Research, National Environmental Research Center, Research Triangle Park, North Carolina.
- FITZPATRICK, MARK J., M.D.—Obstetrician, Perinatal Biology and Infant Mortality Branch, National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Maryland.
- Frazier, Todd M.—Assistant Director, Harvard Center for Community Health and Medical Care, School of Public Health, Harvard University, Boston, Massachusetts.
- FRESTON, JAMES, M.D.—Associate Professor of Medicine, Head, Division of Gastroenterology, University of Utah Medical School, Salt Lake City, Utah.
- GOLDSMITH, JOHN R., M.D.—Head, Environmental Epidemiology Unit, Bureau of Occupational Health and Environmental Epidemiology, California State Department of Public Health, Berkeley, California.
- HANNA, MICHAEL G., JR., Ph. D.—Director, Immunology of Carcinogenesis Program, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
- HARKAVY, JOSEPH, M.D.—Clinical Professor of Medicine (Emeritus), The Mount Sinai Medical School of the University of New York, New York, New York.
- HIGGINS, IAN T. T., M.D.—Professor of Epidemiology, School of Public Health, University of Michigan, Ann Arbor, Michigan.
- HOFFMANN, DIETRICH, Ph. D.—Chief, Division of Environmental Carcinogenesis, American Health Foundation, New York, New York.
- Keller, Andrew Z., D.M.D.—Chief, Research in Geographic Epidemiology, Veterans Administration Central Office, Washington, D.C.

- KIRSNER, JOSEPH B., M.D., Ph. D.—Chief of Staff and Deputy Dean for Medical Affairs, The Pritzker School of Medicine, University of Chicago Hospitals and Clinics, Chicago, Illinois.
- KOLBYE, ALBERT C., JR., M.D., J.D.—Deputy Director, Bureau of Foods, Food and Drug Administration, U.S. Department of Health, Education, and Welfare, Washington, D.C.
- KRUMHOLZ, RICHARD A., M.D.—Medical Director, Institute of Respiratory Diseases, Kettering Medical Center, Kettering, Ohio.
- LENFANT, CLAUDE J. M., M.D.—Associate Director for Lung Programs, National Heart and Lung Institute, National Institutes of Health, Bethesda, Maryland.
- LIEBOW, AVERILL A., M.D.—Professor and Chairman, Department of Pathology, University of California (San Diego), La Jolla, California.
- LILIENFELD, ABRAHAM, M.D.—Professor and Chairman, Department of Epidemiology, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Maryland.
- Lowell, Francis C., M.D.—Chief, Allergy Unit, Massachusetts General Hospital, Boston, Massachusetts.
- McLean, Ross, M.D.—Professor of Medicine, Bowman Gray School of Medicine, Wake Forest University, Winston Salem, North Carolina.
- McMillan, Gardner C., M.D.—Chief, Arteriosclerotic Disease Branch, National Heart and Lung Institute, National Institutes of Health, Bethesda, Maryland.
- MacMahon, Brian, M.D.—Professor of Epidemiology, School of Public Health, Harvard University, Boston, Massachusetts.
- MEYER, MARY B., MRS.—Assistant Professor of Epidemiology, The Johns Hopkins University, Baltimore, Maryland.
- MITCHELL, ROGER S., M.D.—Chief of Staff, Veterans Administration Hospital, Denver, Colorado.
- MURPHY, EDMOND A., M.D., Sc. D.—Associate Professor of Medicine and Biostatistics, The Johns Hopkins Hospital, Baltimore, Maryland.
- NEWILL, VAUN A., M.D.—Chief, Health Effects Branch, Environmental Protection Agency, Washington, D.C.
- PAFFENBARGER, RALPH S., Jr., M.D.—Chief, Epidemiology Section, Bureau of Adult Health and Chronic Diseases, California State Department of Public Health, Berkeley, California.
- PARKER, CHARLES W., M.D.—Professor of Internal Medicine, Division of Immunology, Washington University Medical School, St. Louis, Missouri.
- Peters, John M., M.D.—Associate Professor of Occupational Medicine, School of Public Health, Harvard University, Boston, Massachusetts.
- PETERSON, WILLIAM F., M.D.—Chairman, Department of Obstetrics and Gynecology, Washington Hospital Center, Washington, D.C.
- PETTY, THOMAS L., M.D.—Associate Professor of Medicine and Head, Division of Pulmonary Diseases, University of Colorado Medical Center, Denver, Colorado.
- RALL, DAVID P., M.D.—Director, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina.
- RENZETTI, ATTILIO D., JR., M.D.—Professor of Medicine, Pulmonary Disease Division, University of Utah Medical Center, Salt Lake City, Utah.
- ROBINS, MORTON—Chief of Study, Design, and Analysis Staff, Regional Medical Programs Service, Health Services and Mental Health Administration, Rockville, Maryland.
- SAFFIOTTI, UMBERTO, M.D.—Associate Scientific Director for Carcinogenesis, Etiology, National Cancer Institute, National Institutes of Health, Bethesda, Maryland.

- Schuman, Leonard M., M.D.—Professor and Head, Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis, Minnesota.
- SHIMKIN, MICHAEL B., M.D.—Coordinator and Professor of Community Medicine and Oncology, Regional Medical Program, University of California (San Diego), La Jolla, California.
- STAMLER, JEREMIAH, M.D.—Executive Director, Chicago Health Research Foundation, Chicago, Illinois
- VAN DUUREN, BENJAMIN L., M.D.—Professor of Environmental Medicine, Institute of Environmental Medicine, New York University Medical Center, New York, New York.
- WYNDER, ERNEST L., M.D., President, American Health Foundation, New York, New York.

The chapter on Harmful Constituents of Cigarette Smoke was prepared somewhat differently from the rest of the report, being the culmination of a one-day conference held in June 1970 to review this area of knowledge and to discuss a draft report prepared in advance by staff of the National Institute of Environmental Health Sciences and the National Clearinghouse for Smoking and Health. Earlier in this section, some of these participants are acknowledged as contributors to other parts of the report, namely, Dr. Daniel Horn, who served as Chairman of the meeting, Drs. Daniel P. Asnes, Fred G. Bock, Dietrich Hoffmann, Albert C. Kolbye, Gardner C. McMillan, Umberto Saffiotti, Leonard Schuman, Benjamin L. Van Duuren, and Ernest L. Wynder.

In addition, acknowledgments should be made to the following who were also participants in the conference:

- GORI, GIO BATTA, M.D.—Associate Scientific Director for Program, Etiology, National Cancer Institute, National Institutes of Health, Bethesda, Maryland.
- GRIFFITH, ROBERT, Ph. D.—Director, Tobacco and Health Research Institute, University of Kentucky, Lexington, Kentucky.
- GUERIN, MICHAEL, Ph. D.—Senior Chemist, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
- JARVIK, MURRAY, M.D.—Professor of Psychiatry and Pharmacology, Albert Einstein College of Medicine of Yeshiva University, Bronx, New York.
- Kensler, Charles, M.D.—Senior Vice President, Life Sciences Division, Arthur D. Little, Inc., Cambridge, Massachusetts.
- KOTIN, PAUL, M.D.—Vice President for Health Sciences, Health Sciences Center, Temple University, Philadelphia, Pennsylvania.
- LIPTON, MORRIS, M.D., Ph. D.—Professor and Chairman, Department of Psychiatry, University of North Carolina, Chapel Hill, North Carolina.
- REMINGTON, RICHARD, M.D.—Associate Dean for Research, School of Public Health, University of Texas, Houston, Texas.
- Schmeltz, Erwin, Ph. D.—Head, Lubricants Investigations, Eastern Utilization Research and Development Division, U.S. Department of Agriculture, Philadelphia, Pennsylvania.
- STANTON, MEARL F., M.D.—Medical Officer, National Cancer Institute, National Institutes of Health, Bethesda, Maryland.
- Tso, Tien C., M.D.—Plant Physiologist and Leader, Tobacco Quality Investigations, Plant Science Research Division, ARS, U.S. Department of Agriculture, Beltsville, Maryland.

The following professional staff of the National Clearinghouse for Smoking and Health contributed to the preparation of this report: Robert S. Hutchings, Emil Corwin, Elaine Bratic, Annabel W. Hecht, Lillian Davis, Richard W. White, Richard H. Amacher, Donald R. Shopland, Jennie M. Jennings, Dan Nemzer, Nancy S. Johnston, and Gertrude Herrin.

Special thanks are due Theresa Klotz, Rosalie Levine, and Mildred Ritchie.