

---

The  
Health Consequences  
of SMOKING

1968 SUPPLEMENT TO THE  
1967 Public Health Service Review

---



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
Public Health Service

1968 Supplement to  
Public Health Service Publication No. 1696

Library of Congress Catalog No. 68-60025

---

For sale by the Superintendent of Documents, U.S. Government Printing Office  
Washington, D.C. 20402 - Price 55 cents

## Foreword

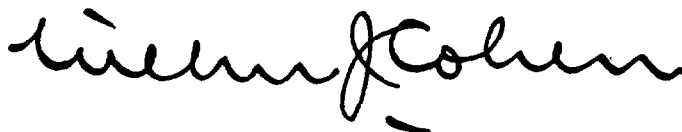
Section 5(d)(1) of Public Law 89-92, the Federal Cigarette Labeling and Advertising Act, requires the Secretary of Health, Education, and Welfare to submit an annual report to the Congress "concerning (A) current information on the health consequences of smoking and (B) such recommendations for legislation as he may deem appropriate." This 1968 Supplement to the 1967 Public Health Service review, "The Health Consequences of Smoking", was prepared for the Secretary pursuant to this section. The Secretary's report was delivered to the Congress on July 1, 1968. It is printed below.

The information presented in the accompanying report, "The Health Consequences of Smoking, 1968 Supplement," confirms or strengthens the conclusions of two previous studies published by this Department—the 1964 Report of the Surgeon General's Advisory Committee on Smoking and Health, and the 1967 Report on the Health Consequences of Smoking.

These conclusions are that smoking is a serious health hazard in this country, one which is bringing about much unnecessary disease and death within our population. In the words of the 1964 Report, adequate remedial action is required. In my opinion, the remedial action taken until now has not been adequate.

I therefore recommend:

1. The warning statement required by the Federal Cigarette Labeling and Advertising Act should be strengthened. This Department would support the wording recommended last year by the Federal Trade Commission, or a suitable paraphrase of the wording.\*
2. This warning should be required to be placed not only on the cigarette package but on cigarette vending machines and in all advertisements.
3. Levels of "tar" and nicotine in cigarette smoke should be published on cigarette packages, on cigarette vending machines, and in all advertisements. Authorization is also needed to make it possible to add other harmful agents to this listing.
4. Appropriations should be made to the Federal Trade Commission to permit the Commission to test all cigarette brands on a quarterly basis for "tar" and nicotine and other harmful agents in cigarette smoke.



Secretary.

---

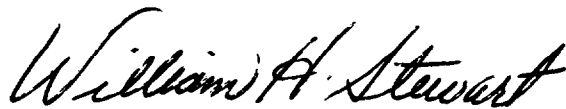
\* The wording recommended by the Federal Trade Commission (Report to Congress, June 30, 1967) was "Warning: Cigarette Smoking is Dangerous to Health and May Cause Death from Cancer and Other Diseases."

## Preface

The following pages provide a review of current information on the health consequences of smoking. As will be seen, the evidence attesting to the harmful effect of smoking on health has continued to mount during the past year, with new research findings confirming the clinical, experimental, and epidemiological relationships between tobacco smoking and many forms of illness related to it. The convergence of research findings continues without substantial negative scientific evidence. New considerations are presented concerning some bio-mechanism involved in the pathogenesis of cardiovascular and bronchopulmonary diseases.

This 1968 Supplemental Report reviews the recent research literature on cardiovascular disease, chronic bronchopulmonary disease and cancer that has become available since *The Health Consequences of Smoking, A Public Health Service Review: 1967* was published. This publication in turn was a review of the research literature which had appeared in the 3½ years since the Surgeon General's Advisory Committee issued its monumental report in 1964. The current research findings should be considered in the perspective of the research evidence previously presented in the 1964 and 1967 reports.

Problems created by cigarette smoking have made this a difficult health issue. Effective preventive programs must be created if we are to meet smoking's grave challenge to human health successfully and reduce the burden of suffering and economic loss involved.

A handwritten signature in black ink, reading "William A. Stewart". The signature is written in a cursive, flowing style with a large initial "W".

*Surgeon General.*

## Acknowledgments

The National Clearinghouse for Smoking and Health, Daniel Horn, Ph. D., Director, was responsible for the preparation of this report; Albert C. Kolbye, Jr., M.D., M.P.H., LL.B., was senior editor and David G. Wember, M.D., was staff director.

The professional staff of the National Clearinghouse for Smoking and Health owes a debt of gratitude to the many experts in the scientific and technical fields, both in and outside of the government who have provided much advice and assistance. Their contributions are gratefully acknowledged.

Special thanks are due the following:

- AUERBACH, OSCAR, M.D.—Senior medical investigator, Veterans Administration Hospital, East Orange, N. J.
- AYRES, STEPHEN M., M.D.—Director, Cardiopulmonary Laboratory, Saint Vincent's Hospital and Medical Center of New York, New York, N.Y.
- BELLET, SAMUEL, M.D.—Director, Division of Cardiology, Philadelphia General Hospital, Philadelphia, Pa.
- BING, RICHARD J., M.D.—Professor and chairman, Department of Medicine, Wayne State University, Detroit, Mich.
- BOCK, FRED G., Ph. D.—Director, Orchard Park Laboratories, Roswell Park Memorial Institute, Orchard Park, N. Y.
- BOERTH, ROBERT, Ph. D., M.D.—National Heart Institute, National Institutes of Health, Bethesda, Md.
- BOREN, HOLLIS, M.D.—Clinical investigator, Veterans Administration Hospital, Denver, Colo.
- BRAUNWALD, EUGENE, M.D.—Department of Medicine, University of California at San Diego, San Diego, Calif.
- BUGNETTI, IDA L.—Health educator, Adult Heart-Preventive Programs Section, Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.
- CHADWICK, DONALD R., M.D.—Director, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.
- CHANCE, BRITTON, Ph. D., Sc. D.—Director, Johnson Research Foundation, Chairman, Department of Biophysics and Physical Biochemistry, School of Medicine, University of Pennsylvania, Philadelphia, Pa.
- COOPER, THEODORE, M.D.—Director, National Heart Institute, National Institutes of Health, Bethesda, Md.
- DOYLE, JOSEPH T., M.D.—Professor of medicine, Albany Medical College, Albany, N.Y.
- EDERER, FRED—Statistician, Biometric Research Branch, National Heart Institute, National Institutes of Health, Bethesda, Md.
- ELIOT, ROBERT S., M.D.—Associate professor of medicine, Department of Medicine, Division of Cardiology, College of Medicine, University of Florida, Gainesville, Fla.

- ENDICOTT, KENNETH M., M.D.—Director, National Cancer Institute, National Institutes of Health, Bethesda, Md.
- EPSTEIN, FREDERICK H., M.D.—Professor of epidemiology, Department of Epidemiology, University of Michigan, School of Public Health, Ann Arbor, Mich.
- FALK, HANS L., Ph. D.—Associate scientific director for carcinogenesis etiology, National Cancer Institute, National Institutes of Health, Bethesda Md.
- FABER, EMMANUEL, M.D., Ph. D.—Professor and chairman, Department of Pathology, University of Pittsburgh, Pittsburgh, Pa.
- FERRIS, BENJAMIN G., Jr., M.D.—Professor, Department of Physiology, Harvard School of Public Health, Harvard University, Boston, Mass.
- FOX, SAMUEL M., III, M.D.—Chief, Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.
- FREDERICKSON, DONALD S., M.D.—Chief, Laboratory of Molecular Disease, National Heart Institute, National Institutes of Health, Bethesda, Md.
- FROM, ARTHUR H., M.D.—Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Applied Physiology Laboratory, Georgetown University, Washington, D.C.
- GELLER, HARVEY—Chief, Operational Studies Section, Cancer Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.
- GITLESOHN, ALLAN, Ph. D.—Johns Hopkins University, School of Public Health, Baltimore, Md.
- GUDBJARNASON, SIGMUNDUR, Ph. D.—Department of Medicine, Wayne State University, Detroit, Mich.
- HAMMOND, E. CUYLER, Sc. D.—Vice president, epidemiology and statistical research, American Cancer Society, New York, N.Y.
- HESS, CATHERINE B., M.D.—Assistant to the chief, Cancer Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.
- HIGGINS, I.T.T., M.D., M.R.C.P.—Professor, Department of Epidemiology, University of Michigan, School of Public Health, Ann Arbor, Mich.
- HOFFMANN, DIETRICH, Ph. D.—Associate member, Environmental Carcinogenesis, Sloan-Kettering Institute for Cancer Research, New York, N.Y.
- IMBODEN, CLARENCE A., Jr., M.D.—Division of Regional Medical Programs, National Institutes of Health, Bethesda, Md.
- ISHII, KANE0, M.D.—Chief, Serology Division, National Cancer Center, Research Institute, Tokyo, Japan.
- KANNEL, WILLIAM B., M.D.—Medical director, Heart Disease Epidemiology Study, National Heart Institute, National Institutes of Health, Framingham, Mass.
- KELLER, ANDREW Z., D.M.D., M.P.H.—Chief, Research in Geographic Epidemiology Research Service, Veterans Administration Central Office, Department of Medicine and Surgery, Washington, D.C.
- KENNER, HARRIS M., M.D.—Medical consultant, Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.
- KERSHBUAM, ALFRED, M.D.—Assistant chief, Division of Cardiology, Philadelphia General Hospital, Philadelphia, Pa.
- KOTIN, PAUL, M.D.—Director, Division of Environmental Health Sciences, U.S. P.H.S., Research Triangle Park, N.C.
- KRUMHOLZ, RICHARD A., M.D.—Director, Medical Chest Department and Pulmonary Function Laboratory, Charles F. Kettering Memorial Hospital, Kettering, Ohio.
- LILJENFELD, ABRAHAM, M.D.—Professor and chairman, Department of Chronic Diseases, Johns Hopkins School of Hygiene and Public Health, Baltimore, Md.

MCLEAN, ROSS, M.D.—Professor of medicine (pulmonary disease), Emory University, School of Medicine, Atlanta, Ga.

McMILLAN, GARDNER C., M.D.—National Heart Institute, National Institutes of Health, Bethesda, Md.

MEYER, JOHN S., M.D.—Professor and Chairman, Department of Neurology, College of Medicine, Wayne State University, Detroit, Mich.

MOORE, GEORGE E., M.D.—Director, Roswell Park Memorial Institute, Buffalo, N.Y.

MOUNT, FRANK W., M.D.—Acting chief, Chronic Respiratory Disease Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.

MURPHY, EDMOND A., M.D., Sc. D.—Associate professor, University of Colorado Medical Center, Medicine and Biostatistics, Denver, Colo.

NABEL, JAY A., M.D.—Cardiovascular Research Institute, University of California Medical Center, San Francisco, Calif.

PAYNE, GERALD H., M.D.—Chief, Adult Heart-Preventive Programs Section, Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.

PETERSON, WILLIAM F., M.D.—Chief, Obstetrics and Gynecology Service, USAF Hospital, Andrews Air Force Base, Washington, D.C.

PETTY, THOMAS L., M.D.—Assistant professor of medicine, University of Colorado Medical Center, Denver, Colo.

PURI, PRITPAL S., M.D.—Department of Medicine, Wayne State University Medical School, Detroit, Mich.

QUINLAN, CARROL B., M.D.—Deputy chief, Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.

ROBINS, MORTON—Chief, Program Statistics and Analysis Section, Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.

ROSS, WILLIAM L., M.D.—Chief, Cancer Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.

SCHACHTER, JOSEPH—Statistician, Adult Heart Activities, Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.

SCHUMAN, LEONARD M., M.D.—Professor of epidemiology, University of Minnesota, School of Public Health, Minneapolis, Minn.

STAMLER, JEREMIAH, M.D.—Chicago Board of Health, Health Research Foundation, Chicago, Ill.

THOM, THOMAS J.—Statistician, Program Statistics and Analysis Section, Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Arlington, Va.

WESTURA, EDWIN E., M.D.—Heart Disease and Stroke Control Program, National Center for Chronic Disease Control, U.S.P.H.S., Chief, Applied Physiology Laboratory, Georgetown University, Washington, D.C.

WYNDER, ERNEST L., M.D.—Associate member, Sloan-Kettering Institute for Cancer Research, New York, N.Y.

ZUKEL, WILLIAM J., M.D.—Assistant Director for Collaborative Studies, National Heart Institute, National Institutes of Health, Bethesda, Md.

The following professional staff of the National Clearinghouse for Smoking and Health contributed to the preparation of this report: Selwyn M. Waingrow, Dorothy E. Green, Ph. D., Robert S. Hutchings, Richard W. White, Emil Corwin, and Robert F. Clarke, Ph. D. Special thanks are due Jennie M. Jennings and Donald R. Shopland.

## Contents

	Page
Foreword.....	iii
Preface.....	v
Acknowledgments.....	vi
Part I. Current Information on the Health Consequences of Smoking.....	1
Highlights of the Report.....	3
Smoking and Overall Mortality.....	5
Part II. Technical Reports on the Relationship of Smoking to Specific Disease Categories.....	11
Chapter 1. Smoking and Cardiovascular Diseases..	13
Chapter 2. Smoking and Chronic Bronchopul- monary Diseases (Non-neoplastic)..	63
Chapter 3. Smoking and Cancer.....	87