FIRST ANNUAL REPORT TO CONGRESS

BY

THE TASK FORCE ON ENVIRONMENTAL CANCER AND HEART AND LUNG DISEASE

ENVIRONMENTAL POLLUTION AND CANCER AND HEART AND LUNG DISEASE

Washington, D.C.

August 7, 1978

U. S. Environmental Protection Agency
National Cancer Institute
National Heart, Lung and Blood Institute
National Institute for Occupational Safety & Health
National Institute of Environmental Health Sciences

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 10 1978

THE ADMINISTRATOR

President of the Senate

Speaker of the House of Representatives

Dear Sirs:

In accordance with Section 402 of Public Law 95-95, The Clean Air Act Amendments of 1977, and on behalf of the participating agencies, as Chairman I herewith submit the first annual report of the Task Force on Environmental Cancer and Heart and Lung Disease. The Report identifies the problem of environmental pollution and its relationship to these disease categories, the current efforts of Federal agencies to characterize and deal with this problem, and areas of research in which early interagency cooperation can be expected to contribute to the resolution of the problem.

The Task Force agencies--Environmental Protection Agency, National Cancer Institute, National Heart, Lung, and Blood Institute, National Institute for Occupational Safety and Health, and National Institute for Environmental Health Sciences--have coordinated their efforts to produce the information contained in this report. The member agencies assure me of their continuing support, and we expect the work and products of the Task Force to grow during the coming year.

Sincerely yours,

Douglas M. Costle

PREFACE

On August 7, 1977, in Section 402 of Public Law 95-95, the Clean Air Act Amendments of 1977, Congress directed the establishment of a Task Force on Environmental Cancer and Heart and Lung Disease, to include representatives of the following agencies:

Environmental Protection Agency
National Cancer Institute
National Heart, Lung and Blood Institute
National Institute for Occupational Safety and Health
National Institute of Environmental Health Sciences.

The potential for addition of other agencies* concerned with problems of environmental cancer, heart and lung disease was implicit in the legislation. The Task Force was directed to:

1. recommend a comprehensive research program to determine and quantify the relationship between environmental pollution and human cancer and heart and lung disease;

2. recommend comprehensive strategies to reduce or eliminate the risks of cancer or such other diseases associated with environmental pollution;

3. recommend research and such other measures as may be appropriate to prevent or reduce the incidence of environmentally related cancer and heart and lung diseases;

4. coordinate research by, and stimulate cooperation between, the Environmental Protection Agency, the Department of Health, Education, and Welfare, and such other agencies as may be appropriate to prevent environmentally related cancer and heart and lung diseases; and

5. report to Congress, not later than one year after the date of enactment of this section and annually thereafter, on the problems and progress in carrying out this section.

The First Annual Report of the Task Force is presented in pages which follow. Chapter 1 of this report is an overview of the problem of environmentally related cancer, heart and lung disease. The scope of the Task Force's efforts is also described in Chapter 1. Chapter 2 summarizes current Federal programs which address the problem. Chapter 3 describes Task Force objectives, actions and plans. Appendices include information on Task Force organization, on member agencies, and on other agencies and interagency groups with associated interests.

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* At the first meeting of the Task Force it was decided to offer observer status, as a prelude to possible full membership at the request of Congress, to the National Center for Health Statistics and the Center for Disease Control at Atlanta. Those agencies accepted.

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EXECUTIVE SUMMARY

This is the First Annual Report to Congress of the Task Force on Environmental Cancer and Heart and Lung Disease, as required by Section 402 of Public Law 95-95.

Cancer, heart and lung disease are dominant factors in our Nation's health. Their contribution to total annual deaths in the United States has increased from 12 percent in 1900 to nearly 60 percent in 1976. This is due in large part to medical advances in controlling death from infection and accident. But there is also evidence of links between the environment and these three diseases.

The problem facing the Nation today in regard to environmental cancer, heart and lung disease can be summarized as follows:

- There is evidence that risk and occurrence of cancer, heart and lung disease increase with environmental pollution, broadly defined to include all environmental factors.
- The extent of illness, death, and costs to society from environmentally related cancer, heart and lung disease is a matter of national concern.
- There is expectation that levels of illness, death, and cost resulting from these environmentally related diseases could be substantially reduced by preventive measures.
- Current preventive measures are believed to be inadequate to obtain desired reductions of risk and occurrence.
- Increased knowledge of pollution-disease relations and improvements in strategies and preventive measures are needed for reduction of risk and occurrence.

- The Federal Government has a central, critical role to take in research and prevention of environmentally related diseases; changes in current Federal efforts may be necessary if desired reductions of risk and occurrence of environmentally related cancer, heart and lung disease are to be obtained.

The problem of environmentally related cancer, heart and lung disease is very complex. The responsibilities assigned by Congress to the Task Force are comprehensive. In order that the problem could be analyzed and acted upon in sufficient depth, the Task Force limited its scope of activities for this first year in two ways. First, only one etiological factor -- chemical pollutants present in the ambient and workplace environment -- was considered. Other factors such as smoking, nutrition, radiation, etc., were deferred for future years. Secondly, with reference to the charges given by Congress, only interagency coordination and research programs to determine and quantify relationships between pollution and diseases were addressed in this first year. Questions of strategies to reduce risk and of measures to reduce incidence of disease will be examined in the coming year.

Information on existing programs relevant to the Task Force's responsibilities, and consistent with the above scope, was collected and is presented in this report. The categories for information classification were designed so that these would cover major aspects of the problem of environmentally related cancer, heart and lung diseases and their control. The amounts of funding for various programs in the five agencies were categorized in a common format. Total expenditures by the agencies for research into relations between cancer, heart and lung disease and chemical pollution were approximately 207 million dollars in FY 1977. In order to see a short-term trend in the efforts, information

on actual and planned funding for FY 1977, 1978, and 1979 was displayed. Projected expenditures characteristically show small increases over each previous year.

The Task Force considered possible approaches for evaluating the effectiveness of various sectors of the overall Federal effort to resolve problems of environmentally related cancer, heart and lung disease. It was evident that much work must be done by the Task Force and others before such evaluations are possible. The Task Force has identified six important areas of research in which early interagency cooperation can be expected to contribute substantially to the resolution of environmentally related cancer, heart and lung disease problems. These areas, listed in no specific order of priority, will receive special Task Force emphasis in the coming months:

- Standardization of Measurements and Tests
- Exposure and Metabolic Mechanisms for Pollutants
- Early Indicators of Disease
- Risk Assessment
- Education of the Public and Health Professionals
- Strategies to Protect Public Health.

The Task Force will also consider the establishment of an interagency information management system on environmentally related cancer, heart and lung disease maximally utilizing existing agency information systems. From analysis of these and other significant problem areas, and from evaluation of priorities

and resource allocations, the Task Force will recommend to Congress -- in interim reports and in its second annual report -- specific new initiatives intended to reduce environmentally related cancer, heart and lung disease.

Chapter 1

THE PROBLEM

INTRODUCTION

The environment we have created may now be a major cause of death in the United States. Cancer, heart and lung disease, accounting for 12 percent of deaths in 1900 and 38 percent in 1940, were the cause of 59 percent of all deaths in 1976. Patterns of illness and death have changed over the years. Medical advances have reduced the impact of infection and accident, and life expectancy has increased. After other causes of illness and death have been brought under control, cancer, heart and lung disease have emerged as dominant factors in the public health. Growing evidence links much of the occurrence of these diseases to the nature of the environment. National levels of illness might be sharply reduced, and life prolonged, if we could better manage our relations with the environment. This is the problem which Congress has asked the Task Force on Environmental Cancer and Heart and Lung Disease to address.

ENVIRONMENT AND DISEASE

What is the "environment" that we must manage to achieve this improvement in life? It is the ambient air around us, the food we eat, the water we drink, the streets and roads and land we build on. During our lifetimes the environment reacts with us and upon us influencing our psychology, our physiology and even our genes. Each factor acts independently or in concert, directly or indirectly.

Cancer, heart and lung diseases, like all other conditions, have multiple causes. Genes and all aspects of the environment interact to produce the individual. Some of the etiological factors for cancer, heart and lung disease include chemicals in the environment, radiation, infectious agents, drugs, smoking, nutritional deficiency and other factors related to diet. There is as yet no scientific consensus on the numerical contributions of many of these factors to the disease process in the population as a whole. The recommendation of research programs to improve quantitative information on the role of environmental factors in the occurrence of cancer, heart and lung disease is one of the major charges given to the Task Force by Congress.

The Task Force has not addressed the full range of environmental factors in its first year of activity. In order to provide a field of action which could be analyzed and acted upon in sufficient depth in a short period of time, the Task Force has centered its initial efforts on one class of causative factors, chemical pollution. A definition of this appears below. In subsequent years, the Task Force will broaden its scope of action so that other aspects of environmentally related cancer, heart and lung diseases may be covered.

Environmental chemical pollution refers to compounds which impact upon the human body through their occurrence in air, water, soil, or other media. This definition implies the possibility of preventing adverse health effects of pollutant exposure by measures which eliminate the pollutant from the environment or reduce its impact. Specifically for this year's report,

the following categories are included in the definition of environmental chemical pollution:

- Airborne gases and particulates
- Toxic substances in water supplies and in contact surfaces such as clothing, foliage, and paint.
- Pesticides and herbicides
- Chemical contaminants in food
- Occupational exposures to hazardous substances
- Passive smoking (i.e., in exposure of nonsmokers to smoking of others).

The following categories are excluded:

- Aspects of normal nutrition and diet, including food additives
- Drugs in medicinal or customary nonmedicinal use (e.g., hormones, alcohol)
- Active smoking
- Ionizing and nonionizing radiation
- Noise
- Biological agents (e.g., viruses)
- Psychological stress
- Heat and cold.

This definition is consistent with the types of public health protective strategies which the presently constituted Task Force might implement through EPA's regulatory initiatives, but it is not necessarily consonant with the broader view of environmental pollution taken by others. It should be

again emphasized that the present definition should be regarded as provisional, establishing a field of action for the Task Force at this time but not necessarily limiting Task Force action at some future period.

A CHEMICAL ERA

Between 30 and 40 years ago this country entered a new chemical era in which the uses of new chemicals -- in industrial processes, fuels, fabrics, building materials, fertilizers, pesticides, food additives, drugs, and many other aspects of life -- began to increase at rates greatly exceeding those of previous years. This is dramatically shown for synthetic organic chemical production (Figure 1). This coincided with a rapid expansion of our use of fuels for electricity generation and for motor vehicles to produce a chemical environment new in human history.

Industry has been able to create and distribute new chemical substances at a rate far faster than the one at which the medical and scientific communities, with all available Federal support, have been able to determine the possible adverse health effects of these chemicals. It is estimated that approximately 2,000 new chemicals enter our environment to a significant degree each year. Present chronic assay methods require three years or more and substantial costs to test one chemical. The adverse effects and persistence of some chemicals have been discovered only after they have been in wide use for a number of years. Unfortunately, this experience will probably be repeated, but action is being taken to minimize such occurrences through a wide range of governmental activities, including research, regulation, and education.

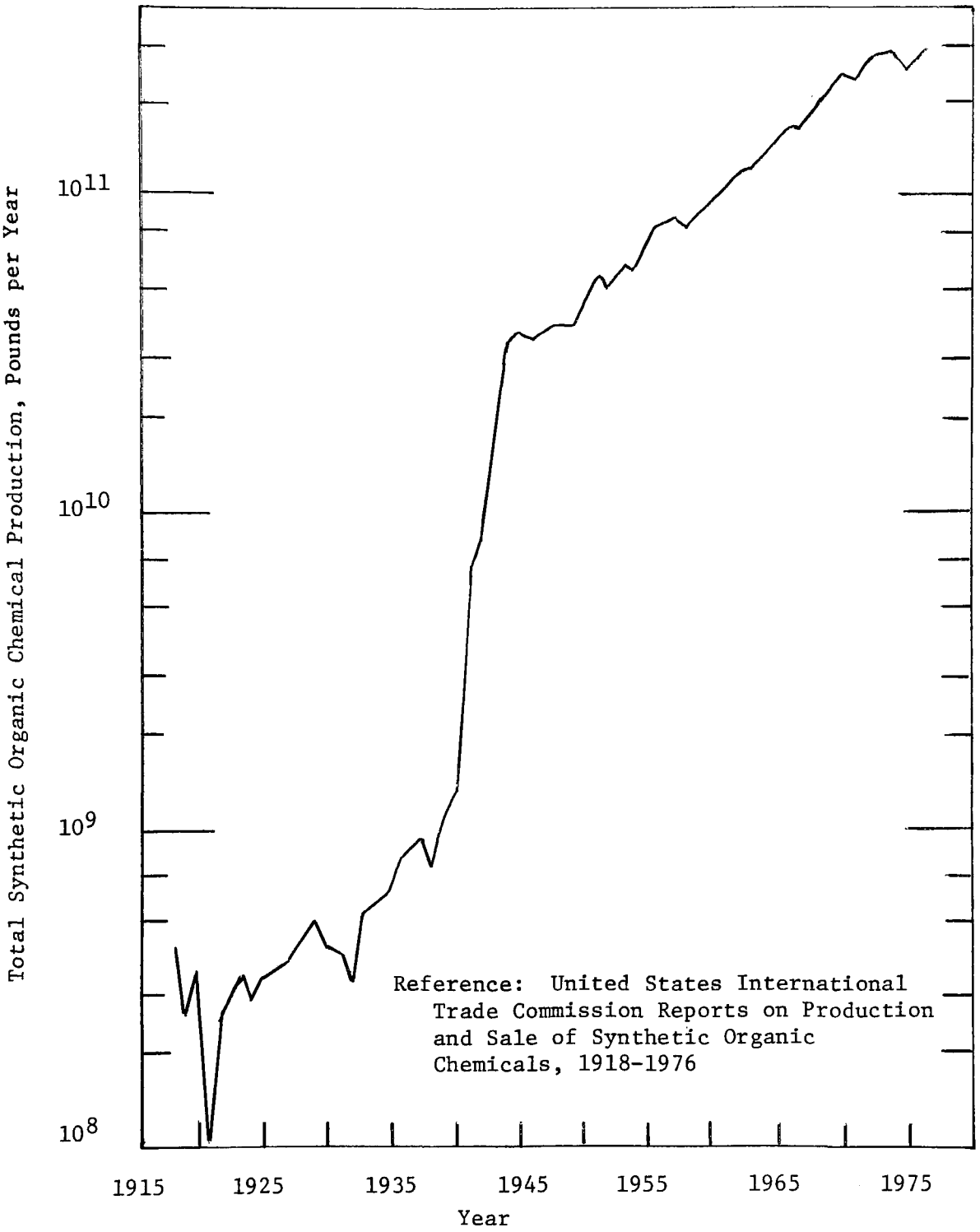

Figure 1. Historical Growth of the Synthetic Organic Chemical Industry

GOVERNMENTAL AND PUBLIC AWARENESS OF THE PROBLEM OF ENVIRONMENTAL DISEASE

Recognition of the problem of environmentally related disease has grown only in a slow and piecemeal fashion. The initial effort was directed toward pollutants which had clearly evident adverse effects and then toward pollutants potentially damaging and relatively simple to measure in air, water and other media. Pollutants with clearly demonstrable health effects, such as carbon monoxide which competes with oxygen in the blood and thus lessens the amount of oxygen which is available for the human system, were examined and regulated. Thus, emissions and air quality standards for carbon monoxide exist. Other pollutants -- sulfur dioxide, particulates, oxidants, and potential contaminants of our water supplies -- were treated in a similar fashion. Table 1 suggests the substantial regulatory effort which has grown with our knowledge of the presence and effects of environmental pollution.

The increasing number of scientific and news reports on potentially adverse effects of various aspects of our new levels of technology indicates a growing government and public awareness of the hazards of environmentally related chronic disease: news reports of asbestos as an occupational hazard, threats from PCB's and Kepone, and suspected links between cancer rates and chemical industry locations are examples. The public has learned, with growing concern, of the direct involvement of the American worker with toxic effects in the workplace environment. Reviews are being undertaken of past environmental hazards to which our industrial workers and Armed Forces personnel have been subjected.

Table 1. Federal Regulation of Levels of Environmental Pollutants

Ambient Air Quality Standards

- Particulates
- Sulfur dioxide
- Carbon monoxide
- Lead (proposed)
- Nitrogen dioxide
- Photochemical oxidants
- Hydrocarbons

Air Emission Standards:

- Acid mist
- Carbon monoxide
- Fluorides
- Hydrocarbons
- Nitrogen dioxide
- Particulates
- Beryllium
- Vinyl chloride
- Sulfur dioxide
- Total reduced sulfur
- Mercury
- Asbestos

Toxic Substances Control:

Several substances have been recommended to EPA by the TSCA Interagency Testing Committee for further testing.

Occupational Standards:

- Permissible exposure limits for approximately 400 toxic and hazardous substances
- Occupational Safety and Health Standards for 20 designated carcinogens

Drinking Water Standards:

- Arsenic
- Barium
- Cadmium
- Chromium
- Cyanide
- Fluoride
- Lead
- Mercury
- Nitrate
- Selected pesticides
- Selenium
- Silver

Others - Regulatory actions to limit environmental damage from:

- Effects of food additives
- Radioactive materials
- Pesticides
- Noise
- Solid waste
- Effects of smoking

THE EVIDENCE FOR AN ENVIRONMENTAL CAUSE OF CANCER, HEART AND LUNG DISEASE

Much work has been done in research into cause, prevention, and therapy of cancer, heart and lung disease. The broad environmental context has not yet been fully assessed, but there is evidence of environmental association. The evidence is diffuse and in many cases inconclusive. Figure 2 displays some known or suspected cause-and-effect relationships. This reflects a small part of the problem; there are several hundred known or suspected carcinogens and other toxic substances which are not included in the list. Available evidence demonstrates that the total problem is a complex of pollutants, exposures, susceptibilities, and effects. When these are coupled with prolonged latency periods -- up to 40 years for cancer -- it is obvious that special steps must be taken to determine the extent of the problem.

Some of the specific evidence relating cancer, heart and lung disease to environmental factors is presented in the pages which follow.

Cancer and the Environment

The two leading causes of death in the United States are heart disease and cancer. While there is evidence to indicate that many cancer rates have stabilized or decreased, cancer incidence for some specific body sites has increased since 1900 at a rate much higher than can be accounted for by population growth and aging of the population. Lung cancer rates have risen exponentially over the past 30 years. Much of this increase has been attributed to smoking but it is postulated that a part of the increase can be attributed to environmental factors other than smoking. Approximately 20 percent of the American people die of cancer. In 1972, 610,000 new cases were diagnosed and 1,000,000 people

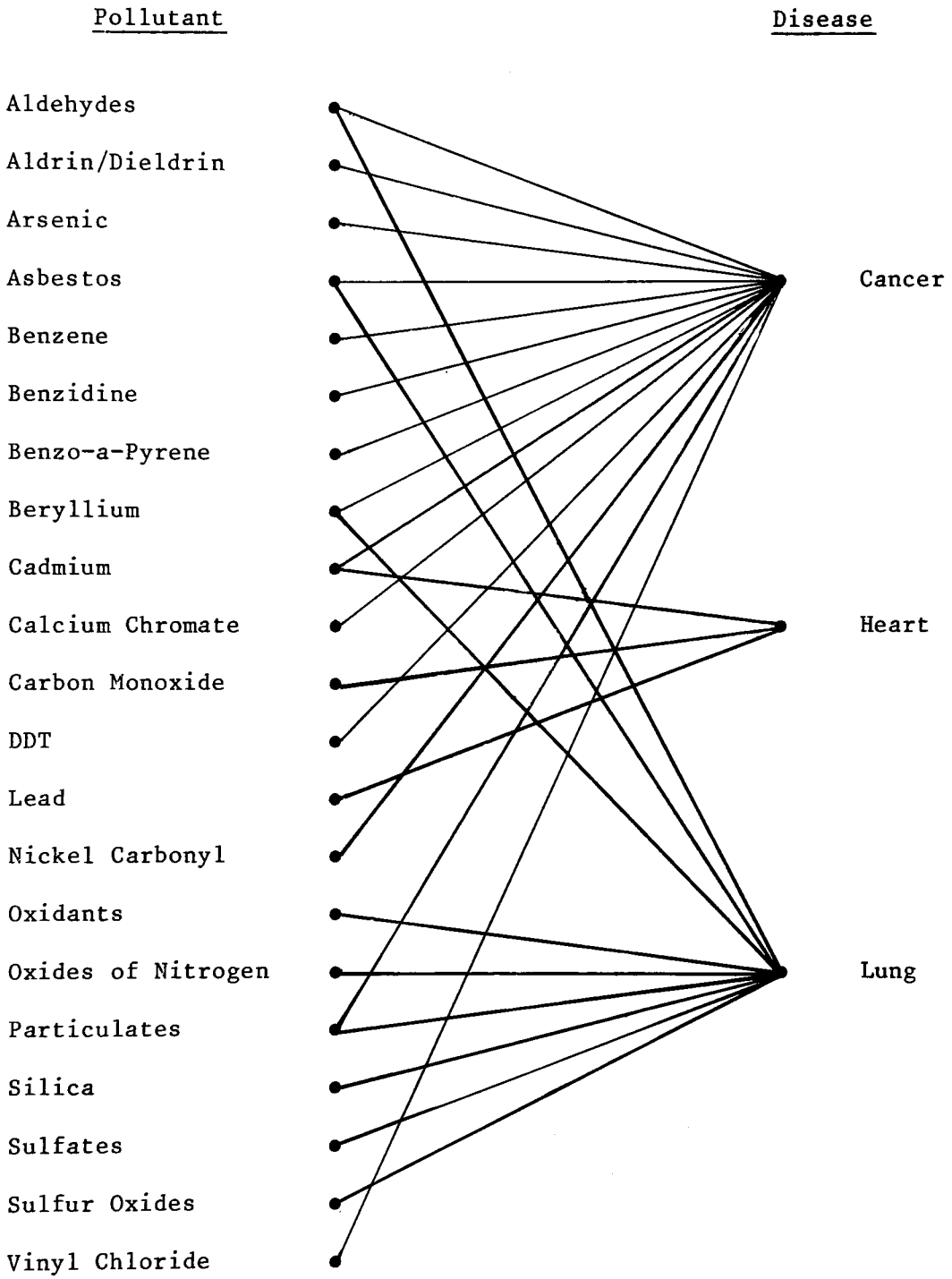

Figure 2. Known or Suspected Links Between Selected Pollutants and Disease

were being treated. An enormous benefit to human health would be achieved by controlling carcinogens responsible for even a small fraction of these cases.

Of the upwards of 100,000 known chemicals of potential toxicity, only approximately 6,000 have been laboratory tested for carcinogenicity. It is estimated that 10 to 16 percent of the chemicals so tested provide some evidence of animal carcinogenicity. To scratch the surface of the complexity which researchers and regulators are faced with, a few inherent problems in cancer research are listed below:

- Cancer in man usually has multifactorial causes.
- The long latent period of cancer has troublesome medical, social and economic implications. Chemicals may appear to be safe for human exposure after being used for 10 to 15 years; this gives a false sense of security.
- Mobility of society poses another problem -- collection of data for epidemiology studies is difficult.
- Tests on animals are expensive and time consuming, and extrapolation of animal data to effects in man is difficult.
- Concentrations of single chemicals in the environment are often low, requiring sensitive methods for detection and analysis.
- Interactions between a given chemical and the rest of the environment must be considered.
- Once a carcinogen is identified, the mechanism of carcinogenesis in the body presents another difficult phase of the problem.

Despite these research difficulties, substantial progress has been made in recognizing environmental-cancer relationships.

A link between cancer and exposure to soot was detected as early as 1775 by Percival Pott in London; he found that chimney sweeps were subject to cancer of the scrotum. In 1895, an association between cancer of the bladder and the dye industry was reported. Later studies have firmly established a cause-and-effect relationship between benzidine, a chemical used in dye manufacture, and cancer of the bladder.

In 1950, occupational exposure to asbestos and increased lung cancer incidence was first noted. Mesothelioma, a rare type of cancer, has subsequently been definitely linked to asbestos. Exposure of the individual has often occurred in the workplace but cases have also been found in persons living close to an asbestos-producing facility or in the same household as an asbestos worker. In the case of vinyl chloride, studies of exposed workers have revealed that these workers have a significant excess of liver angiosarcoma and probably other more common cancers of the respiratory system, brain, and lymphatic system. Studies of human cancer associated with workplace situations, combined with a large body of work with animals and potential carcinogenic agents, have demonstrated clear disease-pollutant associations in many cases. The prestigious International Agency for Research on Cancer (IARC) has identified by international consensus 26 chemicals or industrial processes that cause cancer in the human population.

Heart Disease and the Environment

Morbidity and mortality rates for heart diseases have been found to be higher in areas of high air pollution than in areas of low air pollution. At present there is no evidence that environmental pollution is the direct cause of

heart disease but many scientists believe that it may aggravate or compromise a preexisting cardiovascular condition. Heart disease mortality began a decline in 1970, but it is not known whether there is a parallel decline in heart disease morbidity -- and the relationship of this decline to changing environmental factors, if any, is as yet unknown.

Unlike lungs and other organs, the heart is not a direct target organ of hazardous substances. Thus, quite often, knowledge from bioassay studies of the general cellular toxicity of a substance in itself is not sufficient to identify that substance as a cardiovascular factor. Furthermore, the lack of a closely analogous animal model for human coronary heart disease limits the value of animal toxicological studies. Hence, much of the work in the environmental area has been in the areas of human descriptive epidemiology.

Statistical evidence that carbon monoxide can be responsible for aggravated heart disease problems has been available since 1938. Although it is difficult to sort out the independent effects of sulfur dioxide, nitrogen dioxide, oxidants and other elements of our environment, evidence strongly suggests an increased appearance of symptoms and acute cardiovascular events during periods of high air pollution. Epidemiological studies have indicated a statistical association between soft drinking water and elevated mortality rates from cardiovascular disease. The relationship of smoking to heart disease mortality is well documented. Cadmium concentration has been correlated with death rates from hypertension and arteriosclerotic heart disease in some studies. There is enough evidence of an environmental impact upon heart disease to suggest environmental intervention as a preventive medicine measure.

Lung Disease and the Environment

Respiratory diseases, which include emphysema, chronic bronchitis, allergic and infectious pneumonitis, and asthma, are now the sixth most prevalent cause of death in the U.S. Current evidence shows cigarette smoking to be the greatest environmental causative factor in most cases of lung disease, but other environmental pollution may initiate and certainly exacerbate a variety of respiratory diseases; epidemiological studies done on numerous areas of the country support this. Studies have suggested that air pollution alone accounts for between 2 to 4 percent of excess bronchitis rates.

Epidemiological findings suggest that there is a causal relation between pollutants in the ambient and occupational environment and the following adverse effects on the respiratory system:

- An increase in chronic respiratory disease mortality, particularly during periods of high pollution levels
- Increase in chronic bronchitis morbidity
- Reduced expiratory flow in adults
- Failure of pulmonary function to improve during growth in children
- Pneumoconiosis.

THE COSTS OF ENVIRONMENTAL DISEASE

A recent estimate, 1972, places an approximate value for the total annual costs of cancer, heart and lung disease at about 69 billion dollars annually (Figure 3). These estimates comprise costs of treatment and the value of lost earnings from illness and early death. If even a relatively small percentage of this amount could be saved through reduction of the environmentally

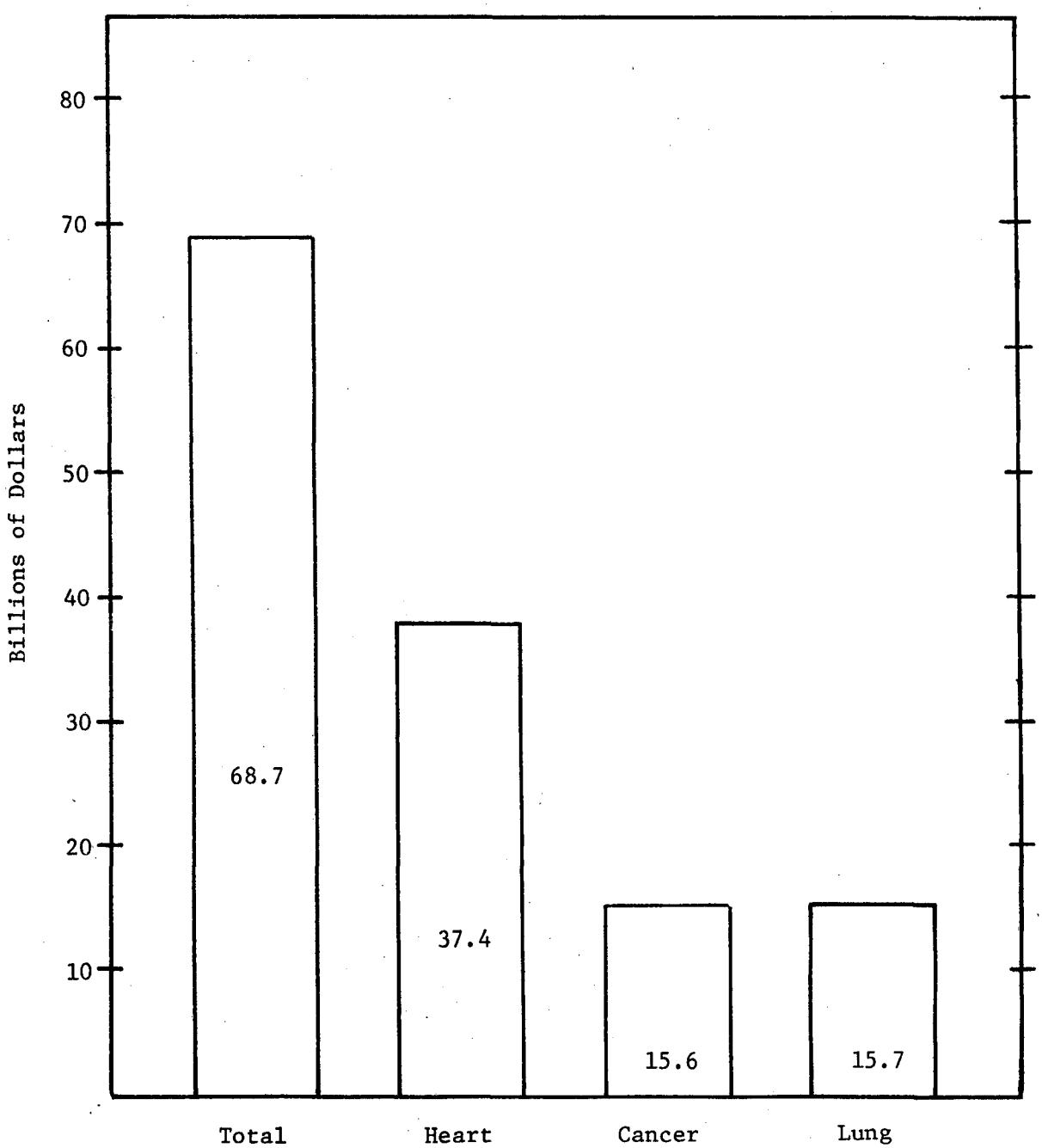

Figure 3. Estimated Health Care Costs for Heart, Cancer and Lung Diseases, 1972*

* National Center for Health Statistics, Department of Health, Education, and Welfare, Health -- United States -- 1976-1977, Publication (HRA) 77-1232, Washington, D.C., 1977.

related components of these three diseases, the savings to the American public would be immense. The present cost of these diseases, in medical expense and taxes, is a burden which is unacceptable and at least partly avoidable.

The cost savings which might result from an effective solution of environmentally related disease problems must be considered in conjunction with the other costs, and social and economic dislocations, which must be incurred if the levels of pollution in our environment are to be reduced. The costs of eliminating some pollutants, through industrial source controls or changing of industrial materials usages, may be small in comparison with potential benefits in health and health cost savings. The costs of other environmental changes, with respect to major shifts in transportation patterns and energy use, for example, may be large. There is a growing realization within the government and medical and scientific communities that preventive strategies are as essential as treatment programs in the effort to improve the public health and to control medical expenditures. The mandate of the Task Force reflects this realization.

SUMMARY

Against this background of the relationships between environment and disease, and the impacts upon American society, the problem faced by the Task Force may be summarized as follows:

- There is evidence that risk and occurrence of cancer, heart and lung diseases increase with environmental pollution, broadly defined to include all environmental factors.
- The extent of illness, death, and costs to society from environmentally related cancer, heart and lung disease is a matter of national concern.

- There is expectation that levels of illness, death, and cost resulting from these environmentally associated diseases could be substantially reduced by preventive measures.

- Current preventive measures are believed to be inadequate to obtain desired reductions of risk and occurrence.

- Increased knowledge of pollution-disease relations, and improvements in strategies and preventive measures, are needed for reduction of risk and occurrence.

- The Federal Government has a central, critical role to direct research and the prevention of environmentally related diseases; changes in current Federal efforts may be necessary if desired reductions of risk and occurrence of environmentally related cancer, heart and lung disease are to be obtained.

The Task Force was created to address this problem.

Chapter 2

CURRENT FEDERAL ACTION

INTRODUCTION

The Federal effort aimed at preventing environmentally related cancer, heart and lung disease consists of a wide variety of research, regulatory and prevention programs. The research programs are aimed at improving the understanding of environmental factors and their relationships with cancer, heart and lung disease. These research activities provide the basis for the development of control programs designed to reduce disease occurrence. Additionally, educational programs which are directed toward reducing public exposure to environmental hazards are included in the Federal effort. This chapter presents a summary of programs, conducted by the member and observer agencies* of the Task Force, which are within the scope of the Task Force's effort for the first year -- namely, relationships of chemical pollution and disease.

Additional information, provided in the appendices, is outlined below:

- An organizational history of the Task Force (Appendix A)
- Descriptions of the objectives and responsibilities of the Task Force agencies as they relate to the problem of environmental pollution and cancer, heart and lung disease. Summaries of the legislative acts which authorize the Task Force agencies to conduct research and establish regulations for environmental pollutants (Appendix B)

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* Member agencies are the Environmental Protection Agency (EPA), National Cancer Institute (NCI), National Heart, Lung and Blood Institute (NHLBI), National Institute for Occupational Safety and Health (NIOSH), and National Institute of Environmental Health Sciences (NIEHS). Observer agencies include National Center for Health Statistics (NCHS) and Center for Disease Control (CDC) at Atlanta

- Descriptions of other Federal agencies and committees with associated interests in Task Force efforts (Appendix C).

OVERVIEW OF CURRENT TASK FORCE AGENCY PROGRAMS

The current research performed by Task Force member and observer agencies which is directed toward discovering and quantifying the relationships between chemical pollutants and cancer, heart and lung disease, and toward preventing or reducing the incidence of such disease, is described below.

Environmental Protection Agency

The Environmental Protection Agency consists of the Office of Research and Development, the Office of Air, Noise, and Radiation, the Office of Toxic Substances, the Office of Water and Waste Management, and the Office of Enforcement, in addition to various other administrative offices. The programs of these offices are described separately below.

Office of Research and Development

The Environmental Protection Agency's research is conducted primarily by the Office of Research and Development (ORD). The main objective of this research is to determine the health risks to humans associated with the discharge of pollutants into the environment, so that national land, air and water quality standards may be established. Those research projects which investigate directly or indirectly the relationship of various pollutants to cancer, heart and lung disease are categorized and summarized below.

Air Programs

- Studies of the relationships of certain pollutants and respiratory function impairment to provide data to calculate and revise the primary ambient air quality standards

- Toxicological investigations, controlled human exposure studies, and epidemiological studies which evaluate the health effects of sulfates, nitrates, oxidants, trace metals and emissions from mobile sources, including diesels

- Assessment of the relationships of known or suspected carcinogens, present in the air, to the incidence of cancer in the general population.

Water Programs

- Epidemiological investigations of the relationships between cancer rates and local public drinking water constituents

- Assessment of cancer risk from chlorination of water

- Epidemiological investigations of the relationships of inorganic water contaminants to cardiovascular disease

- Rapid screening techniques, toxicological and epidemiological studies to determine the health effects of drinking water contaminants. These studies provide data to evaluate present standards and establish new maximum levels for organic, inorganic and microbiological contaminants of drinking water

- Development of criteria for safe treatment and disposal of wastewater and sludge.

Pesticides and Other Toxic Substances

- Studies which evaluate the health effects of pesticides currently in use and other candidate pesticide chemicals

- Studies which assess the toxicity, carcinogenicity, and teratogenicity of metals, inorganic, and organic non-pesticide pollutants that reach humans through different exposure routes.

Energy

- Studies of possible carcinogenic, mutagenic, teratogenic and respiratory effects on humans from existing and emerging energy technologies, particularly the effects of unanticipated pollutants related to fossil fuel combustion.

Interdisciplinary

- Investigations by the National Center for Toxicological Research, jointly funded by the FDA and the EPA, of the long-term mutagenic effects of chronic low doses of chemical toxicants

- Aggregate epidemiological analyses to determine the benefits derived from reducing some contributing factors (such as diet, lack of medical care, pollutants) to major diseases, including cancer, heart and lung disease, in major U.S. urban areas.

Office of Air, Noise, and Radiation

The Office of Air, Noise, and Radiation (OANR) is involved in investigations which estimate the rate of human exposure to known or suspected carcinogens. Two methods of investigation are utilized:

- Data derived from direct sampling and analysis of air conducted by ORD

- Dispersion modeling for compounds which are not easily measured directly in the environment.

These efforts are supported by a major research program with the Office of Research and Development aimed at risk assessment of atmospheric carcinogens. Risk assessments are used for initial regulatory prioritization of both individual compounds and significant source categories which emit multiple carcinogens. OANR is developing population data for significant sources which will provide the basis for estimating risk and predicting incidence.

Office of Toxic Substances

The Toxic Substances Control Act, which became effective January 1, 1977, gives EPA an important new tool for addressing toxic chemical problems. The Act is designed to provide better information about the potential hazards of chemical substances, prevent toxic problems through premarket screening of new chemicals, and limit the manufacture and use of potentially harmful chemicals.

The Office of Toxic Substances is engaged in a number of programs which investigate the relationships between environmental pollutants and disease. Programs related to cancer include the following:

- Short-term mutagenicity testing
- Epidemiological studies to examine possible carcinogenicity associated with arsenic, vinyl chloride, and vinylidine chloride.

Programs related to diseases in general, including cancer, heart and lung diseases, include the following:

- Development of methods (testing schemes, computer searches for similar molecular structures, etc.) for identifying agents and effects in both human health and environmental spheres
- Investigation of toxic residues found in human tissue by means of literature searching and quick turn-around analysis of chemicals associated with certain exposures
- On-call investigations to determine the presence of pollutants in specified areas.

The Office of Toxic Substances also has under its jurisdiction the pesticides program. The EPA is directed by statute to strike the proper

balance between necessary pest control and protection of the public health. To meet this objective various control programs have been implemented (see Appendix B).

Other EPA Offices

The two other major EPA divisions, the Office of Water and Waste Management and the Office of Enforcement, do not conduct research related to the scope of the Task Force's effort. These offices depend primarily on EPA's Office of Research and Development for research support.

National Cancer Institute

The National Cancer Institute (NCI) operates a large number of programs aimed at identifying environmental carcinogens, quantifying the relationships between these carcinogens and cancer incidence, and prevention of cancer incidence through educational and other programs.

NCI has a major epidemiological effort through its Field Studies and Statistics Program, directed at identifying potential environmental factors in populations with unusually high incidence of cancer. These efforts are supported by extensive cancer surveys, including the Third National Cancer Survey and the Surveillance, Epidemiology and End Results (SEER) Program, in addition to mortality and morbidity data provided by the NCHS and a number of specialized surveys. In addition to conducting research which utilizes these data, NCI provides baseline data on cancer incidence and mortality for use by the general research community in identifying environmental carcinogens. These data are key to measuring progress in efforts to prevent cancer incidence.

Major study areas include:

- Susceptibility of the fetus and child to environmental agents. The objective has been to increase the awareness of pediatricians and parents to the potential hazards of environmental pollutants.

- Mapping of cancer mortality across the Nation to pinpoint areas of high incidence of cancer with potential environmental causes. This mapping program is a collaborative effort with the NCHS.

- A series of correlation studies linking county mortality rates with environmental data available at a county level.

- Studies of the relationships between cancer incidence and occupation. NCI provides funding for a major NIOSH-managed program aimed at identifying agents of the work environment responsible for causing cancer, in addition to its own intramural research in this area.

- Special field studies which include the surveying of individuals in communities with high incidence of cancer to determine environmental or other causal factors which might explain the observed incidence.

Other programs within the Field Studies and Statistics Program have been aimed at determining the relationships between reserpine and breast cancer; fluorides and generalized cancer; chlorination of water supplies and increased cancer; industrial hazards and cancer; and a number of environmental contaminants, such as asbestos, TRIS, vinyl chloride, and cancer incidence.

The development of our knowledge on the causative factors of cancer in man can be projected along the following lines: a) epidemiologic studies to correlate specific exposures with incidence of certain types of cancer in man with particular emphasis on occupational exposures;

b) additional bioassays in animal models and in vitro systems which will identify chemicals which are carcinogenic in animals or mutagenic and may therefore be considered as potential carcinogens in man; c) studies of animal-human correlations by comparisons of bioassay results with the results of epidemiologic studies or by bioassays on isolated human tissues by in vitro techniques; and d) by studies of pharmacological and metabolic correlations among species.

The Carcinogenesis Research Program of NCI conducts research to: a) develop better means for the removal of hazardous chemicals from the environment; b) develop means to enhance the ability of the host to detoxify environmental agents; c) determine the extent to which animals act synergistically with viruses or with physical carcinogens; and d) develop more rapid and more sensitive means to detect and bioassay the cancer-inducing effects of chemicals for man.

Studies of the carcinogenesis process include the following activities: a) new emphasis has been given to the study of carcinogen metabolism and toxicology; b) methods for pharmacologic inhibition of the formation of carcinogens have been obtained by blocking nitrosation of amines and other classes of carcinogens (e.g., hydrazines, metals); c) major metabolic steps in the enzymatic activation of several classes of carcinogens are being investigated with special emphasis on polynuclear hydrocarbons; d) micromethods, applicable to determination in small samples of human cells, have been developed measuring carcinogen activation levels; e) inhibitors of carcinogen activation have been identified; and f) the development and use of high-pressure, liquid chromatography in the study of metabolism of polynuclear hydrocarbon carcinogens.

NCI's research in cancer biology includes basic laboratory studies of the process by which cancer-causing agents interact with cell components to cause cell transformation. Related studies are concerned with alteration of the process to prevent cancer.

The office of the Scientific Coordinator for Environmental Cancer serves as a focal point for development of program interests and collaborative efforts in environmental cancer. Achievements in the identification and classification of carcinogens in the environment include the following: a) compilation of reports and publications on mutagens and carcinogens in drinking water; b) preliminary reports on air pollutants that are classified as mutagens and carcinogens; c) acceleration of collaborative efforts with EPA; d) cooperation with trade associations; and e) assistance to the Carcinogenesis Testing Program and Clearinghouse on Environmental Carcinogens.

The Carcinogenesis Testing Program conducts studies of chemicals for their cancer-causing potential. NCI tests approximately 60 new chemicals per year in animals and other laboratory systems for cancer-causing activity. It is estimated that about 1,000 chemicals have been found carcinogenic in animal bioassays out of 6,000 that have been tested.

The Clearinghouse on Environmental Carcinogens was established to advise the Director of NCI on matters concerning the Institute's program to identify and to evaluate environmental carcinogens to which humans might be exposed. Members of the Clearinghouse are drawn from major communities concerned with environmental cause of cancer: academia, industry, organized labor, public interest groups, and state health officials. The Clearinghouse

is responsible for providing expert advice on the selection of chemicals for testing, the experimental designs of the conduct of testing, the evaluation of the results of testing (see reference to the Chemical Selection Working Group in Appendix C), as well as advising on other matters.

At the Frederick Cancer Research Center, NCI carries out tests of the cancer-causing potential of chemicals in laboratory animals. A major program there is the development of a cell culture technique to test chemicals more quickly and at less expense. Other work there concerns safety procedures and equipment used in carcinogenesis testing. In 1974, NCI began to fund a new program of fundamental research at the Center, emphasizing the role of the immune defense system in the prevention, causation and control of cancer in animals. The theme of the program is the Immunobiology of Cancer, featuring major projects on the interactions of an animal with its tumor, spread of cancer within an animal and viral and chemical factors in causation. The research concentrates on finding ways to stimulate the body's natural defenses to fight both established cancers and cancer-causing agents.

Ongoing research in NCI's Division of Cancer Treatment includes studies on the induction of tumors in primates by antitumor agents and other materials, as well as therapy of the tumors induced. Other laboratory studies are concerned with the mechanism of chemically induced hepatomas and ovarian tumors, and studies on the mutagenicity and carcinogenicity of antitumor agents and chemical carcinogens. The long-range emphasis is concentrated on the problem of second tumors arising in patients as a result of therapy.

As part of its Cancer Control Program, NCI is implementing programs specifically aimed at reducing environmentally caused cancer. This includes an occupational cancer information alert program through an interagency agreement with the Occupational Safety and Health Administration. To facilitate dissemination of preventive cancer information, NCI supports outreach activities of its Comprehensive Cancer Centers and is establishing communication networks in the Centers. In addition, the International Cancer Research Data Bank (ICRDB) was established to collect, analyze and disseminate all data useful in the prevention, diagnosis, and treatment of cancer for use by researchers throughout the world.

National Heart, Lung and Blood Institute

The following information briefly describes the focus of two divisions of the National Heart, Lung and Blood Institute (NHLBI) whose efforts are relevant to the Task Force's responsibilities.

Division of Heart and Vascular Disease

Programs which are aimed at identifying and quantifying the relationships between diseases of the heart and environmental contaminants include:

- Epidemiologic studies to identify environmental factors which predispose persons to increased risk of diseases of the heart
- Investigations of environmental factors, such as trace metals and the degree of water hardness which might affect coronary heart disease morbidity and mortality

Division of Lung Diseases

There are numerous programs aimed at determining the relationships between lung diseases and environmental pollutant agents. These are:

- Studies to identify and better determine the relative contribution of environmental risk factors to the incidence and exacerbation of chronic bronchitis and emphysema
- Studies to determine the role of environmental factors in increased risk of hyaline membrane disease
- Studies to identify specific agents responsible for fibrotic lung diseases and hypersensitivity pneumonitis, and establish dose-to-effect relationships between these agents and resulting lung reactions
- Studies to identify agents within the occupational environment, which are responsible for fibrotic lung diseases, and the development of corresponding dose-response relationships
- Investigation of specific agents responsible for hypersensitivity pneumonitis in working and home environments, with special emphasis on measures to reduce or eliminate exposures
- Epidemiologic studies of populations exposed to occupational hazards to the lung such as asbestos and silica to elucidate the natural history of fibrotic lung diseases
- Epidemiologic studies of populations exposed to organic dusts that cause hypersensitivity pneumonitis to elucidate the natural history of the disease
- Investigations relative to the immunologic and biochemical responses to organic and inorganic dusts that lead to fibrotic lung diseases and hypersensitivity pneumonitis
- Investigations are underway into the etiology and pathophysiology of environmentally -- as well as occupationally -- induced asthmas, such as those caused by cotton or coffee bean dust, toluene disocyanate, and phthallic anhydride.

The NHLBI has a major emphasis on the prevention of environmentally caused or aggravated lung disease, including programs aimed at:

- Investigating occupational lung diseases such as silicosis and farmer's lung, emphasizing epidemiology, prevention and control in defined populations. Educational programs have been instituted to alert farmers to the hazards of inhaling dusts that result in farmer's lung and to urge them to take preventive steps to keep from breathing the materials.

- Developing measurement techniques to screen asymptomatic individuals with early interstitial lung diseases. Preliminary studies have shown that the course of such diseases can be altered by removing the slightly impaired worker from the polluted environment.

- Improving prevention and prompt diagnosis of chronic obstructive lung diseases by developing programs to increase the responsiveness of health professionals and the public to the importance of risk factors and early symptoms.

- Promoting the use of pulmonary function tests in routine examinations of individuals at high risk of respiratory disease.

National Institute for Occupational Safety and Health

The primary responsibility of the National Institute for Occupational Safety and Health (NIOSH) is to provide research and standards-setting support to the Occupational Safety and Health Administration under the Occupational Safety and Health Act of 1970 and to the Mine Safety and Health Administration under the 1977 Amendments to the Federal Mine Safety and Health Act.

NIOSH's current programs are divided into four major areas: Criteria Documentation and Standards Development, Research, Technical Assistance and Manpower Development.

Criteria Documentation and Standards Development

NIOSH provides recommended health and safety standards in the form of criteria documents to the Secretary of Labor for promulgation and enforcement. The order of hazards selected for criteria development is determined by a NIOSH priority system based on severity of response, population at risk, carcinogenicity, availability of an existing standard, and advice from Federal agencies and involved industry, organized labor and professional groups. For a selected hazard, available scientific, medical, and engineering research information is systematically gathered and collated. Throughout the preparation of a criteria document, extensive and broadly based review procedures are carried out with reviewers selected not only from labor and industry but also from universities, research organizations, professional groups, and various Federal and state agencies.

Research

The largest effort within NIOSH, both in terms of dollars and personnel, is directed at applied occupational health and safety research. Most of this research addresses the development or modification of criteria for recommended occupational safety and health standards. Other research is directed at assessing interactions between chemical and physical agents, at developing new monitoring techniques and analytical methods, and at methods of diagnosing and preventing specific occupational diseases. Examples of NIOSH's research effort related to the Task Force's mandate include:

- Surveillance, control technology assessment, and laboratory research aimed at identification and prevention of occupational cancer

- Development of sensitive and specific diagnostic tests for occupational diseases
- Identification of dose-response relationships to assure safe working conditions in industries
- Development of personal protective equipment to reduce exposure to industrial chemicals
- Epidemiological and industrial hygiene studies related to conventional and new energy sources.

Technical Services

NIOSH provides a variety of technical services to employers, employees, universities and professionals in the field of occupational safety and health. These include:

- Medical examinations and autopsies of coal miners
- Testing and certification of personal protective equipment and hazard measuring devices (gas detector tubes, noise level meters, etc.)
- Technical information services
- The development of model occupational safety and health programs
- Health hazard evaluations.

Manpower Development

NIOSH currently offers a series of 26 technical training courses for representatives from Federal agencies, state and local governments, private industry and unions. NIOSH also provides training project grants to educational institutions for specific occupational safety and health

training programs. Last year, NIOSH initiated the Educational Resource Center concept. These Centers, funded through training grants, provide for occupational medicine and associated professional occupational health and safety training.

National Institute of Environmental Health Sciences

Work of the National Institute of Environmental Health Sciences (NIEHS) relevant to prevention of environmentally related cancer, heart and lung disease includes research over a spectrum from identification of environmental disease agents to studies of health hazards and epidemiology. There is also an emphasis upon development of environmental health science resources through extramural grants and an Institute and grant training program. Research supported by NIEHS can be divided into three primary program areas:

1. Prediction, Detection and Assessment of Environmentally Caused Diseases and Disorders. Research here provides scientific bases for developing methods for forecasting environmental health problems before they occur. Work in this program area includes:

- Studies aimed at understanding the dynamics of transport and conversions of pollutants in the environment
- Development of new test methods for detecting the effects of environmental agents on biological systems
- Development of methods for assessing and predicting consequences of exposure to environmental agents in the human population.

2. Mechanisms of Environmental Diseases and Disorders. NIEHS research in this program area aims to gain understanding of the biological and biochemical mechanisms involved in environmentally related diseases. Once the disease process is understood, steps can be taken to avoid, alter or possibly correct the adverse biological effects which lead to morbidity and mortality. Research in this area provides information regarding the relative susceptibility of individuals who are at higher risk and contributes to a developing capability to predict long-term chronic effects of environmental contaminants.

3. Environmental Health Research and Manpower Development Resources. NIEHS support in this program area provides long-term stable core support for broadly based multidisciplinary research and training programs focused on a variety of environmental health problems. This support is provided through Environmental Health Science Centers and Marine Freshwater Biomedical Centers. These centers serve as national focal points and resources for research and manpower development in health problems related to air, water and food pollution; occupational and industrial neighborhood health and safety; heavy metal toxicity; agricultural chemical hazards; the relationships of the environment to cancer, birth defects, behavioral anomalies, respiratory and cardiovascular diseases, and diseases of other specific organs; and basic aspects of toxicity mechanisms, body defense mechanisms, and the influence of age, nutrition, and other factors in chemically induced injury and disease.

In the three principal disease areas of interest, the NIEHS programs may be summarized briefly as follows.

Cancer

Extramural research supported by NIEHS extends from studies of biological effects of known and suspected carcinogens, and mutagenicity-carcinogenicity correlations, to epidemiological surveys to assess insult from environmental exposures. Relevant intramural research includes studies in five NIEHS laboratories and several NIEHS branches which are concerned with such areas as:

- Microbial test systems for detection of chemical mutagens
- Environmental factors adversely affecting reproduction and development including effects such as carcinogenesis in offspring exposed to chemicals in utero
- Chemical metabolism in the mediation of carcinogenesis
- Metabolism of pollutants by marine species, including identification of food sources of carcinogens
- Animal studies of hormonal activity of chemically induced pulmonary neoplasms
- Mechanisms of respiratory tract cancer inhibited or accelerated by endogenous and exogenous factors
- Human population risk assessment
- Methodology development and field studies in neoplastic disease epidemiology
- Animal studies on the carcinogenicity of orally administered asbestos.

Cardiovascular Diseases

NIEHS supports an extramural program in which grantees study environmental aspects of cardiovascular diseases, ranging from impacts of pollutant exposures on erythrocyte function to the possible role of environmental mutagenesis in the pathogenesis of arteriosclerosis. Population studies are exploring the association between incidence and severity of cardiovascular sequelae to acute and chronic exposures to high and low levels of environmental agents alone and in multiple combinations. There is also intramural work in hazard assessment for environmentally related cardiovascular disease, as well as a research program in inhalation toxicology which examines interactions of the cardiovascular and pulmonary systems resulting from inhalation of gases, particulates and fibers.

Lung Diseases

The extramural research program explores the environmental characteristics of airborne pollutants, their transformations, their potentiative interactions and their impacts on biological systems. The range of studies is broad, from mechanisms of action at cellular and molecular levels to epidemiological and biometric studies of human populations exposed to environmental stresses. The intramural program includes: a) studies of mechanisms of toxication and detoxication of chemicals such as polycyclic hydrocarbons in lung and lung cells in order to further understand why the lung is often more sensitive to chemical toxicity than other organs, and b) the animal studies of the NIEHS Laboratory of Pulmonary Function and Toxicology addressed to prevention of environmentally related respiratory diseases. The latter includes research into prostaglandins in relation to inhaled gases, the relations

between inhaled toxicants and the acellular lining of lung terminal airways, hormonal activity of neoplastic pulmonary tissue and mechanisms of respiratory tract cancer.

Many NIEHS studies are relevant to the environmental aspects of several diseases, for example, inhalation toxicology studies of interactions among cardiovascular-pulmonary systems, kidneys and the liver. Also of this character is work of the NIEHS Office of Health Hazard Assessment concerned with technology and surveillance to identify unsuspected environmental chemical hazards to all aspects of human health, as well as NIEHS intramural work in environmental biophysics and developmental toxicology which provide technical methods useful for the study of many environmental diseases.

Research Training

NIEHS extramural programs support research training (university-based) programs that produce most of the doctoral level toxicologists. Retraining programs are suppported.

NIEHS also publishes Environmental Health Perspectives. This widely distributed journal provides rapid dissemination of information on new or newly recognized environmental hazards.

OVERVIEW OF OBSERVER AGENCY PROGRAMS

National Center for Health Statistics

The National Center for Health Statistics (NCHS), through its many data systems, routinely produces data on disease incidence, including cancer, heart and lung disease. These valuable data systems frequently provide the basis for research carried out by other Federal agencies, and are aimed at determining and quantifying the relationships between cancer,

heart and lung disease and environmental pollutant agents. Of particular importance to environmental research are:

- The Basic Vital Statistics (including the Current Mortality Sample)
- The Health Interview Survey
- The Health and Nutrition Examination Survey
- The Hospital Discharge Survey.

These and other data systems of NCHS provide a national view of disease incidence and mortality, permitting the isolation of populations with special disease problems, potentially environmentally related. The continuing nature of the data collection effort permits monitoring of the effectiveness of preventive programs in reducing disease incidence.

The NCHS has assisted NCI in the production of cancer atlases. These atlases have been key to NCI's effort to pinpoint counties which represent cancer hot spots requiring further epidemiological investigation to identify possible environmental causes of the disease incidence. NCHS is now producing an atlas which will include all major diseases including cancer, heart and lung disease. NCHS hopes to develop more systematic monitoring of mortality and morbidity, by cause, to more quickly identify unusual time and space patterns for disease which may merit field investigations.

NCHS is currently working with EPA, through an interagency agreement, examining methods to relate NCHS's disease-oriented data systems to environmental systems of EPA. While most past effort of this type has been limited in scope, carried out for a particular study, this effort is

aimed at a general marriage of NCHS and EPA data systems to better determine the relationships between disease incidence and environmental pollutant agents. NCHS estimates its total commitment to environmental aspects of disease incidence, including surveillance, to be $3.7 million for fiscal 1978.

Center for Disease Control at Atlanta

The Center for Disease Control (CDC), through the National Institute for Occupational Safety and Health (NIOSH) is engaged in major efforts toward the understanding and prevention of environmentally related cancer, heart and lung disease in occupational contexts; this work is summarized elsewhere in this report under a separate heading for NIOSH.

CDC at its Atlanta headquarters is also concerned with the occurrence of chronic diseases in the general population and, through several of its branches other than NIOSH, conducts research and preventive activities relevant to the concerns of the Task Force on Environmental Cancer and Heart and Lung Disease.

The Cancer Branch of CDC's Chronic Diseases Division supports epidemiological studies of environmental causes of cancer. Some of this work has been in general population surveillance in cooperation with NCI. Other studies deal with such subjects as vinyl chloride, thorotrast and arsenic as etiologic agents for angiosarcoma; vinyl chloride and lung cancer; and followup of cancer development in persons exposed to radiation from the nuclear test Smokey.

The Special Studies Branch of the Chronic Diseases Division conducts studies of environmental hazards through epidemic investigations. Many of these studies involve populations exposed to lead and result in information on blood lead leavels in relation to environmental exposures. Continuing inter-agency long-term studies of polybrominated biphenyls (PBB), in collaboration with the Michigan Department of Public Health and NCI, NIEHS, and FDA, are providing extensive information on possible dose-response relations between symptomatology and serum PBB levels; the concern is that some of the exposed persons may develop cancer. In other work the Special Studies Branch studies human exposure to potentially carcinogenic pesticides, health hazards of various heavy metals, and provides surveillance on environmental exposure which may be related to cancer, heart and lung disease, among other diseases. An evaluation of lung cancer incidence in U.S. counties containing smelters is among planned CDC research programs.

The major environmental concern of CDC programs -- with respect to Task Force concerns -- is with population studies of cancer (and of suspected carcinogens such as PBB's) and with heavy metals which may be implicated in cancer.

FUNDING OF CURRENT FEDERAL PROGRAMS

Categorization Scheme

Information on funding of programs relevant to the Task Force's responsiblities was collected from the five member agencies. In order to have a common basis for collecting and organizing information, a categorization

scheme which covers the entire spectrum of relevant programs was constructed. This scheme, shown in Table 2, represents the initial base from which a more complete structure can be built as the Task Force activities continue in the future years.

The categorization scheme provides a common format for classification of programs related to understanding and control of environmentally caused cancer, heart and lung diseases. For each agency relevant projects were classified into 15 categories shown in Table 2 for each disease and for each media or pathway combination. In many cases where a project could be included in more than one category, it was included under the category of major emphasis. A project which could be applicable to more than one disease, such as cancer, heart and lung disease, or might not be specific to any of the three, was included under the disease category called "nonspecific."

Some of the terms and phrases given in Table 2 are defined below:

Media/pathway refers to the manner in which the environmental insult reaches the host population. The preliminary designations used in categorization are: air (inhalation), water (ingestion), oral intake, skin contact, and occupational exposure. Occupational exposure may involve other media/pathways but has been considered separately because of its special nature.

Determination of Biological Effects includes studies which identify the range and nature of biological effects associated with pollutants. Studies of this type are often laboratory based, using test animals.

TABLE 2

CATEGORIZATION FOR FEDERAL FUNDING OF PROGRAMS DIRECTED TOWARD DETERMINATION AND QUANTIFICATION OF RELATIONSHIPS AND REDUCTION OF RISK AND INCIDENCE OF ENVIRONMENTAL CANCER AND HEART AND LUNG DISEASE

Agency _____

Disease _____

Media/Pathway _____

	Funds by Category		
	FY 1977	FY 1978	FY 1979
Determination and Quantification of Relationships			
Determination of Biological Effects	$_____	$_____	$_____
Understanding Mechanism or Mode of Biological Effects	_____	_____	_____
Development of Dose-Response Relationships	_____	_____	_____
Identification of Environmental Pollutant Agents	_____	_____	_____
Identification and Analysis of Sources	_____	_____	_____
Environmental Transport and Transformation Analysis	_____	_____	_____
Sampling, Analytic Methods and Monitoring	_____	_____	_____
Human Exposure Estimation	_____	_____	_____
Establishing Cause-and-Effect Association	_____	_____	_____
Population Risk Assessment	_____	_____	_____
Costs of Environmentally Related Illness	_____	_____	_____
Reduction of Risk and Incidence			
Preventive Health	_____	_____	_____
Education of Public and Health Professionals	_____	_____	_____
Surveillance	_____	_____	_____
Source-Control Measures			
Total Funding by Agency	$_____	$_____	$_____

Understanding Mechanism or Mode of Biological Effects focuses on the mechanisms of environmental causes of disease and is often a sequel to the previous category. Programs which evaluate the mode and extent of entry into the human body, body pathways, toxin end points, and residence time in the body are included in this category, as are studies of cellular or sub-cellular interaction with pollutants.

Development of Dose-Response Relationships is concerned with quantitative characterization of the relationship between varying dosages of a physical agent and their effects in humans and animals. This is a key to establishing standards for permissible levels of pollutants in air, water, food and other media. These studies are laboratory or epidemiological in nature.

Identification of Environmental Pollutant Agents includes the screening of chemicals for a preliminary assessment of toxic effects. The objective is the identification of agents which require further research because of potentially harmful health effects. The Ames test is an example of this category.

Identification and Analysis of Sources concerns identification and quantification of sources of environmental pollutants, both for evaluation of health impact and for regulation. These studies are either pollutant-specific or source-specific. The former includes the study of a particular pollutant discharged by different sources and the latter addresses the type, amount, and manner of release of contaminants from a single type of source.

Environmental Transport and Transformation studies predict environmental concentrations of a pollutant based on the understanding of transport processes and physical or chemical changes that occur during such transport.

Primary tools are analytical or physical models of environmental transport and transformation. Included in this category are studies which attribute concentrations of pollutants in the environment to sources.

Sampling, Analytic Methods and Monitoring studies are aimed at developing better environmental sampling techniques and equipment, including improvements in laboratory analysis methods.

Human Exposure Estimation involves studies which estimate the level of exposure of individuals to pollution through various pathways over a defined period of time. Precise estimation of human exposures requires extensive monitoring of ambient, residential, and occupational environments.

Establishment of Cause-and-Effect Association corresponds roughly to epidemiological studies of disease incidence. This category of study seeks to associate variation in environmental exposure with the prevalence of disease while controlling for other factors which may influence the prevalence of disease.

Population Risk Assessment studies are aimed at estimation of risk to the population in terms of excess morbidity or mortality due to a particular pollutant or type of source. These studies assist in the establishment of priorities for research and for regulation of environmental pollutants. Risk assessment requires integration of results of studies on human exposure and cause-effect association. Information on dose-response relationships, if available, forms an important input to risk assessment.

Cost of Environmentally Related Illness includes studies which evaluate direct and indirect economic impact of environmental pollution. An example of a study in this category is an evaluation of human morbidity costs attributable to air pollution.

Preventive Health includes a range of programs aimed at avoidance or minimization of harmful effects of pollutant agent exposure. Programs which are specifically directed toward source-control, education, and surveil lance are excluded. An example of preventive health is the screening of workers with potential cardiovascular problems from a marginally hazardous work environment.

Education of the Public and of Health Professionals consists of programs directed toward improving the capability of the medical professional in recognizing and treating environmental disease, efforts to educate the general public about environmental hazards as a means of prevention of environmentally caused illness, and programs to educate the public in environmental disease awareness. Grant programs to health professional training institutions appear in this category.

Surveillance includes a range of programs aimed at the surveillance of populations to provide early indication of an environmental disease problem. Programs of this type typically involve the routine collection of medical data to provide baseline information and subsequent assessment of the biological impact of pollutants found in the environment. An ancillary but important function of surveillance programs is the accumulation of data for analysis in other program categories.

Source Control Measures include efforts which establish or evaluate measures of control. The most important measure is the setting of legal standards to limit the permissible emissions or environmental concentrations of agents. This category includes programs directed at improving control devices or processes to reduce pollutants released into the environment.

Categorized Funding

Tables 3 through 7 present summaries of each agency's funding which is directed toward the concerns of the Task Force. The funding is presented for each of the agencies, EPA, NCI, NHLBI, NIOSH and NIEHS, for each of the diseases of concern (and for a general "nonspecific" category) by fiscal year and as broken down in 15 categories. Data are available on funding by media/pathway but are not included in this report.

The funding tables reveal the following general findings:

- EPA's programs are directed toward understanding the relationship between disease and pollutants in the ambient environment as well as toward the reduction of disease incidence. Much effort is devoted to the identification of sources, the development methods to control sources, and the development of pollutant sampling and analytic methods. Since many pollutants relate to more than one disease, a large portion of EPA's effort is not disease-specific. There are, however, major research activities specific to cancer and lung and heart disease.

- NCI has major program activity directed toward identifying, understanding, and quantifying the relationship between cancer and environmental pollutants. NCI also has major programs in cancer prevention and in the creation and management of data bases consisting of information on cancer incidence and mortality across the Nation.

- Within the NHLBI, most efforts are aimed at identifying and quantifying the relationships between environmental pollutants and heart and lung disease. Most of this effort has been directed toward lung disease.

- As in the case of EPA, efforts within NIOSH are not generally disease-specific--that is, efforts tend to relate to all diseases of concern. NIOSH efforts tend to be prevention-oriented; the majority of NIOSH funding is included under preventive health. Substantial resources are devoted to education of health professionals and worker population. Another major category

TABLE 3. SUMMARY OF FUNDS (DOLLARS)

ENVIRONMENTAL PROTECTION AGENCY

	Cancer			Heart			Lung			Non Specific (Includes cancer, heart and lung)		
	1977	1978*	1979*	1977	1978*	1979*	1977	1978*	1979*	1977	1978*	1979*
1. Determination of Biological Effects	$ 337,000	$ 357,000	$ 378,400	$ 670,000	$ 710,200	$ 752,800	$2,837,000	$3,007,200	$3,187,600	$1,301,600	$1,010,800	$1,071,400
2. Understanding Mechanism or Mode of Biological Effects	1,450,800	1,500,800	1,183,400	102,200	102,200	42,000	156,000	165,400	175,300	187,000	198,000	210,100
3. Development of Dose-Response Relationships	500,000	600,000	600,000	--	--	--	235,900	250,000	265,000	185,000	196,100	207,900
4. Identification of Environmental Pollutant Agents	1,565,700	1,681,100	1,898,800	--	--	--	--	--	--	1,786,000	2,515,900	1,871,900
5. Identification and Analysis of Sources	437,000	476,700	513,000	75,000	125,000	60,000	125,000	75,000	200,000	5,754,100	6,099,000	6,465,000
6. Environmental Transport and Transformation Analysis	1,016,300	1,085,800	1,188,800	125,000	175,000	100,000	125,000	100,000	300,000	2,551,400	2,704,500	2,866,700
7. Sampling, Analytic Methods and Monitoring	1,602,600	1,743,900	1,832,200	153,000	162,200	171,900	611,500	648,100	687,000	8,755,600	9,435,900	9,388,300
8. Human Exposure Estimation	712,000	967,500	1,202,200	50,000	75,000	40,000	200,000	184,000	293,500	2,114,000	2,341,800	2,206,700
9. Establishing Cause-and-Effect Association	1,353,600	1,598,200	1,109,700	347,400	368,200	390,300	802,600	1,242,300	1,001,800	602,000	638,000	676,400
10. Population Risk Assessment	240,000	265,400	300,000	--	--	--	50,000	53,000	56,200	1,447,900	1,582,500	1,639,600
11. Costs of Environmentally Related Illness	--	--	--	--	--	--	--	--	--	--	--	--
12. Preventive Health	147,600	156,800	166,200	--	--	--	598,900	1,151,800	806,300	--	588,500	--
13. Education of the Public and of Health Professionals	--	--	--	--	--	--	--	--	--	26,700	132,300	30,000
14. Surveillance	2,156,000	2,767,000	3,003,000	--	--	--	--	--	--	2,312,000	2,450,700	2,597,800
15. Source-Control Measures	919,400	1,286,800	1,113,400	--	--	--	79,000	83,700	88,700	13,605,800	14,422,000	15,287,500
Total	$12,438,000	$14,487,000	$14,489,100	$1,522,600	$1,717,800	$1,557,000	$5,820,900	$6,960,500	$7,061,400	$40,629,100	$44,316,000	$44,519,300

* Estimated

The above table includes pass-through funds assigned to NIOSH: 1977, $1,469,000; 1978, $3,846,900; 1979, $1,977,700.

TABLE 4. SUMMARY OF FUNDS (DOLLARS)

NATIONAL CANCER INSTITUTE

	Cancer			Heart			Lung			Non Specific (includes cancer, heart and lung)		
	1977	1978	1979	1977	1978	1979	1977	1978	1979	1977	1978	1979
1. Determination of Biological Effects	$19,588,948	$21,332,500	$22,143,900									
2. Understanding Mechanism or Mode of Biological Effects	42,155,092	43,629,042	45,626,199									
3. Development of Dose-Response Relationships	1,627,684	2,372,841	2,573,200									
4. Identification of Environmental Pollutant Agents	2,474,900	2,817,900	2,673,500									
5. Identification and Analysis of Sources	633,200	907,100	1,002,300									
6. Environmental Transport and Transformation Analysis	38,000	52,000	57,500									
7. Sampling, Analytic Methods and Monitoring	67,900	112,800	96,700									
8. Human Exposure Estimation	821,075	1,921,478	1,527,200									
9. Establishing Cause-and-Effect Association	6,079,105	8,471,094	8,737,200									
10. Population Risk Assessment	1,202,600	1,512,900	1,528,200									
11. Costs of Environmentally Related Illness	--	--	--									
12. Preventive Health	2,080,700	1,615,100	1,828,200									
13. Education of the Public and of Health Professionals	2,168,700	1,885,200	1,882,200									
14. Surveillance	7,349,200	10,311,500	10,936,100									
15. Source-Control Measures	105,000	75,600	52,800									
Total	$86,392,104	$97,017,055	$100,665,199									

The above table includes NCI pass-through funds assigned to NIOSH: 1977, $2,989,200; 1978, $4,093,500; 1979, $4,093,500.

TABLE 5. SUMMARY OF FUNDS (DOLLARS)

NATIONAL HEART, LUNG AND BLOOD INSTITUTE

	Cancer			Heart			Lung			Non Specific (Includes cancer, heart and lung)		
	1977	1978	1979	1977	1978	1979	1977	1978	1979	1977	1978	1979
1. Determination of Biological Effects							$ 140,500	$ 156,500	$ 174,300			
2. Understanding Mechanism or Mode of Biological Effects							1,336,500	1,488,300	1,657,300			
3. Development of Dose-Response Relationships							22,500	25,000	27,800			
4. Identification of Environmental Pollutant Agents							264,200	294,200	327,600			
5. Identification and Analysis of Sources												
6. Environmental Transport and Transformation Analysis												
7. Sampling, Analytic Methods and Monitoring							45,000	50,100	55,800			
8. Human Exposure Estimation				$ 28,420	$ 28,420	$ 28,420	25,600	28,500	31,700			
9. Establishing Cause-and-Effect Association				80,530	80,530	80,530						
10. Population Risk Assessment							853,100	950,000	1,057,900			
11. Costs of Environmentally Related Illness												
12. Preventive Health							114,300	127,300	141,800			
13. Education of the Public and of Health Professionals							615,600	685,500	763,300			
14. Surveillance												
15. Source-Control Measures												
Total				$108,950	$108,950	$108,950	$3,417,300	$3,805,400	$4,237,500			

TABLE 6. SUMMARY OF FUNDS (DOLLARS)

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

	Cancer			Heart			Lung			Non Specific (includes cancer, heart and lung)		
	1977	1978	1979	1977	1978	1979	1977	1978	1979	1977	1978	1979
1. Determination of Biological Effects	$1,433,800	$1,629,300	$1,653,700	$ 37,660	$ 42,800	$ 43,440	$ 862,220	$ 979,800	$ 993,690	$ 464,640	$ 528,000	$ 535,920
2. Understanding Mechanism of Mode of Biological Effects	332,900	378,300	383,900				1,447,250	1,644,600	1,669,270	130,420	148,200	150,420
3. Development of Dose-Response Relationships							39,860	45,300	45,980			
4. Identification of Environmental Pollutant Agents	442,500	502,900	510,400				255,280	256,000	259,840	241,120	274,000	278,110
5. Identification and Analysis of Sources	14,200	16,100	16,300									
6. Environmental Transport and Transformation Analysis												
7. Sampling, Analytic Methods and Monitoring	1,198,100	1,361,500	1,381,900				431,820	490,700	498,060	1,108,180	1,259,300	1,278,190
8. Human Exposure Estimation							16,650	12,100	12,280	311,340	353,800	359,110
9. Establishing Cause-and-Effect Association	580,100	659,200	669,100	2,830	3,220	3,270	1,222,970	1,389,700	1,410,550	790	900	910
10. Population-at-Risk Assessment	318,700	362,100	367,500	8,300	9,430	9,570	142,210	161,600	164,020	102,610	116,600	118,350
11. Costs of Environmentally-Related Illness												
12. Preventive Health	377,700	429,200	435,600	151,700	172,390	174,980	2,497,000	2,837,500	2,880,060	11,044,880	12,551,000	12,739,270
13. Education of Public and of Health Professionals	14,200	16,100	16,300							7,268,270	8,259,400	8,383,290
14. Surveillance	633,700	720,100	730,900				448,710	509,900	517,550	389,050	442,100	448,730
15. Source-Control Measures	337,700	383,800	389,500				442,730	503,100	510,650	163,330	185,600	188,380
Total	$5,683,600	$6,458,600	$6,555,100	$200,490	$227,840	$231,260	$7,806,700	$8,830,300	$8,961,950	$21,224,630	$24,118,900	$24,480,680

TABLE 7. SUMMARY OF FUNDS (DOLLARS)

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

	Cancer			Heart			Lung			Non Specific (includes cancer, heart and lung)		
	1977	1978	1979	1977	1978	1979	1977	1978	1979	1977	1978	1979
1. Determination of Biological Effects	$4,665,861	$ 5,052,941	$ 5,115,941	$1,222,801	$1,266,376	$1,269,376	$2,983,387	$3,374,369	$ 3,390,369			
2. Understanding Mechanism or Mode of Biological Effects	2,802,402	3,283,743	3,305,743	1,817,853	1,823,464	1,824,464	2,541,236	3,363,617	3,421,617	$484,051	$532,457	$532,457
3. Development of Dose-Response Relationships	243,854	256,108	256,108	155,231	155,000	155,000	109,612	33,000	43,000			
4. Identification of Environmental Pollutant Agents	67,991	69,000	69,000	57,865	58,000	58,000	212,123	213,000	214,000			
5. Identification and Analysis of Sources	3,000	3,300	3,300	3,000	3,300	3,300	3,000	3,300	3,300			
6. Environmental Transport and Transformation Analysis	3,000	3,300	3,300	--	--	--	71,445	72,000	72,000			
7. Sampling, Analytic Methods and Monitoring	--	--	--	--	--	--	--	--	--			
8. Human Exposure Estimation	109,988	110,300	112,300	31,107	31,300	31,300	1,051,298	1,053,300	1,057,300			
9. Establishing Cause-and-Effect Association	271,236	272,613	271,613	57,135	60,613	60,613	729,336	736,000	737,000			
10. Population Risk Assessment	446,042	447,148	449,148	209,518	210,000	210,000	493,644	497,300	498,300			
11. Costs of Environmentally Related Illness	--	--	--	--	--	--	--	--	--			
12. Preventive Health	--	--	--	--	--	--	--	--	--			
13. Education of the Public and of Health Professionals	576,654	581,986	581,055	50,481	50,589	50,324	529,125	534,901	533,723			
14. Surveillance	--	--	--	--	--	--	--	--	--			
15. Source-Control Measures	82,000	--	--	--	--	--	60,070	60,000	60,000			
Total	$9,272,028	$10,080,439	$10,167,508	$3,604,991	$3,658,642	$3,662,377	$8,784,276	$9,940,787	$10,030,609	$484,051	$532,457	$532,457

includes sampling and analytical methods. This particular category reflects efforts aimed at identifying the presence of known toxins in the work environment.

- NIEHS efforts are primarily directed toward understanding the relationship between disease occurrence and environmental pollutants. This effort is devoted mostly to cancer and lung disease, with some attention to cardiovascular disease.

Overview of Funding for Task Force Agency Programs

The program and fiscal summaries provided by each agency lend themselves to a variety of interpretations for various purposes. To illustrate, and to provide an overall summary of the preliminary findings, Table 8 has been prepared. This table summarizes the overall level of effort by agency in dollars for each of the three major disease categories.

The Federal Government currently funds approximately $207 million per year on research and strategy programs aimed at understanding relations between chemical pollution and cancer, heart and lung disease and developing programs of prevention. Of the funds that are directed specifically towards a disease, the majority are directed toward cancer. Very little funding is currently directed toward environmentally related heart disease, although a significant portion (approximately 20 percent) is directed toward lung disease.

During the first year of its work the Task Force has focused on research into relations between chemical pollution and cancer, heart and lung disease. Funding levels reported in Table 8 thus refer primarily to research and do not yet represent the full range of concerns -- including control strategies and preventive measures -- which the Task Force will address in the following years.

TABLE 8. 1977 FUNDING BY AGENCY FOR DISEASES OF CONCERN TO THE TASK FORCE

	EPA	NCI	NHLBI	NIOSH	NIEHS	Total
Cancer	$12,438,000	$86,392,104	--	$ 5,683,600	$ 9,272,028	$113,785,732
Heart Disease	1,522,600	--	$ 108,950	200,490	3,604,991	5,437,031
Lung Disease	5,820,900	--	3,417,300	7,806,700	8,784,276	25,829,176
Nonspecific (Cancer, Heart, Lung)	40,629,100	--	--	21,224,630	484,051	62,337,781
Total	$60,410,600	$86,392,104	$3,526,250	$34,915,420	$22,145,346	$207,389,720

Chapter 3

THE TASK FORCE PROGRAM

SCOPE

As directed by Congress in Public Law 95-95, the Task Force on Environmental Cancer and Heart and Lung Disease will:

1. Recommend a comprehensive research program to determine and quantify the relationships between environmental pollution and the occurrence of those three classes of disease in man

2. Recommend comprehensive strategies to reduce or eliminate the risks of those diseases occurring as a result of environmental pollution

3. Recommend research and other appropriate measures to prevent or reduce the incidence of those diseases occurring as a result of environmental pollution

4. Coordinate research by, and stimulate cooperation between, the Environmental Protection Agency, the Department of Health, Education, and Welfare, and such other agencies as may be appropriate, to prevent environmentally related cancer, heart and lung diseases

5. Report to Congress, annually, on problems and progress in carrying out its charge.

This scope is too broad to address all at once. In its first year, the Task Force has concentrated upon research into relationships between environmental chemical pollution and the three classes of disease (Item 1 of the Congressional directive to the Task Force) and upon establishing coordinative and cooperative actions between the agencies (Item 4 of the directive). Items 2 and 3 of the directive, concerning recommendations for strategies, research and other measures to reduce risks and incidence of environmentally

related cancer, heart and lung disease, will be added to the thrust of the Task Force's work in the coming years. In planning effective strategies, the Task Force will, in the future, examine a wider range of environmental factors and will make plans and recommendations in fields extending from basic health research to considerations of control measures for pollutant and related disease.

Earlier in this report, a scheme was introduced for categorizing current Federal expenditures for environmentally related cancer, heart and lung disease research and control (see page 39). That categorization scheme, restated and expanded, is shown in Figure 4 as a flow chart embracing all Federal activities required to accomplish Task Force objectives. In this chart the interrelations of research strategy and control measures are displayed. The structure shown here is not only a means of describing the total Federal program in environmentally related cancer, heart and lung disease, but also will become a means for evaluating it, as will be discussed subsequently.

In Figure 4, the 15 categories of the funding tables of Chapter 2 appear as numbered boxes. They constitute the areas, currently within the Task Force's purview, in which Federal effort is required. Federal activities in several other important areas, not currently under examination by the Task Force, are also essential to the effective control of environmental disease. These -- appearing in unnumbered boxes at the right of the chart -- include considerations of availability and costs of pollutant control technology, and broad considerations of national economy, law, and political acceptability.

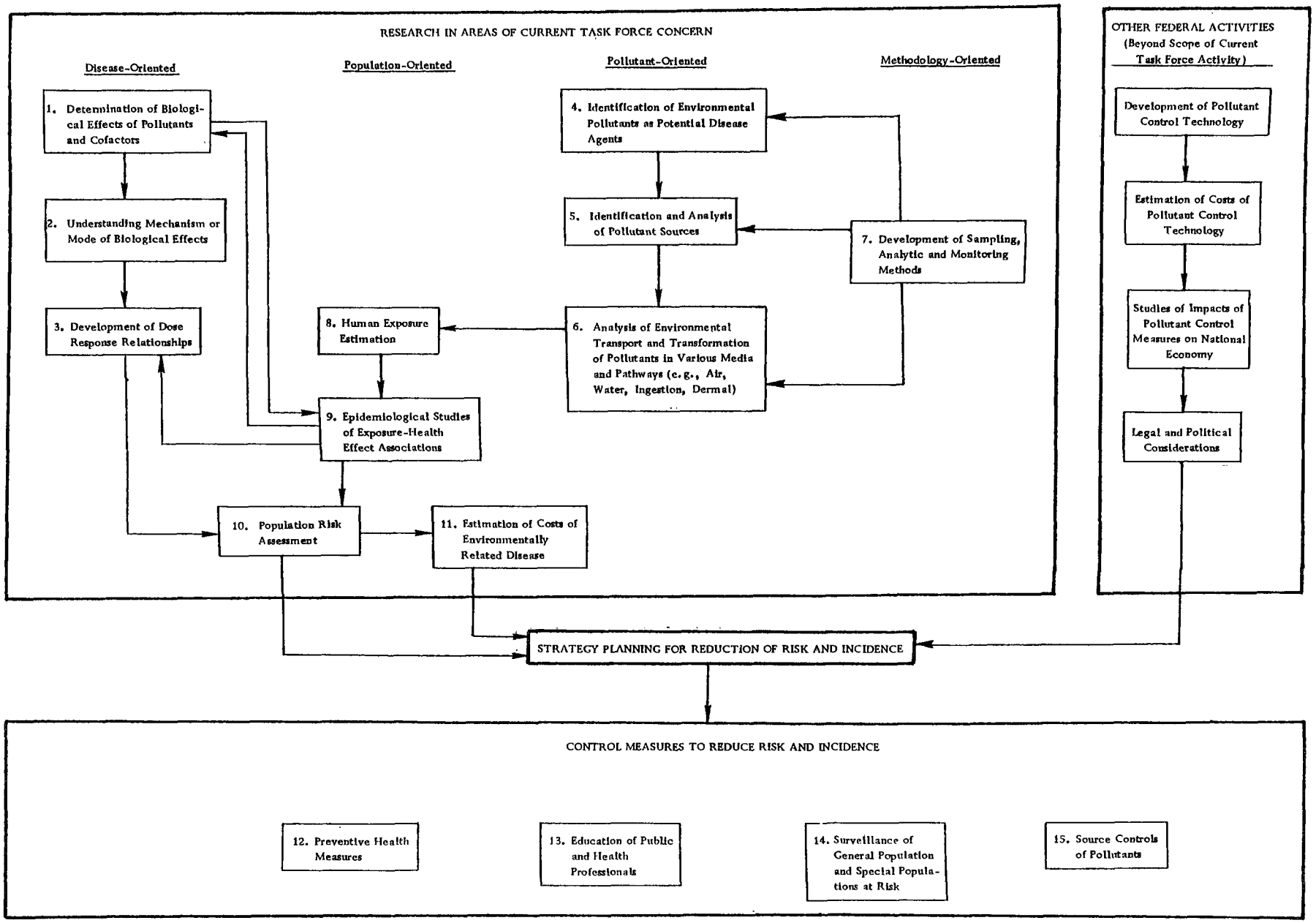

Figure 4. Flow of Research, Strategy and Control--Federal Efforts with Respect to Environmental Cancer and Heart and Lung Disease

Research and other considerations shown in the upper part of this chart enter into the strategy planning -- by EPA and the other agencies represented on the Task Force -- required for the selection of effective control measures to reduce risk and incidence. The flow of effort is not simply one way through the sequence of research-strategy-control but involves a continuous iterative review. The results of research in one area impact upon research objectives and methods in another. The outcome of strategy planning will impact upon research as well as upon control measures. The continued evaluation of the effects of control measures will result in new research directions and in modifications of strategy. The Task Force sees its major long-term function as the identification and management of the linkage activities needed to make this interactive process work.

A categorization scheme of the kind expressed in Figure 4 will in time become a basis for evaluating the effectiveness of the total program, and hence for recommending measures to improve it. Each category of this structure requires action. Each linkage requires information exchange and managed coordination between and within agencies to make the linkage work. There is no simple way of assigning, a priori, relative rankings of importance to the various categories and linkages. All are essential. Some categories of research and control require much greater effort than others, hence greater funding and other resources; or they may require earlier initiation than others. This may be true either because of the role of a category of effort in the overall program, the paucity of existing knowledge, the difficulty of performance or the magnitude of work to be done. The optimal resource levels for expenditures in each category can be determined only

through iterative evaluation of the effectiveness of the research-strategy-control continuum. The development of methods for making that evaluation, and the continuous future performance of that evaluation, will be a major element of Task Force work in the coming months and years. However, the Task Force has recognized through discussion and consensus of its members that there are important action areas upon which it can now move forward.

AREAS FOR TASK FORCE ACTION

An early thrust of the Task Force, as a body created to coordinate research and stimulate cooperation among agencies, has been toward identifying and reinforcing the existing interagency groups already at work on aspects of the environmentally related cancer, heart and lung disease problem. These include:

- Interagency Regulatory Liaison Group
- Interagency Collaborative Group on Environmental Carcinogenesis
- Toxic Substances Strategy Committee
- Toxic Substances Control Act Interagency Testing Committee
- Interagency Toxic Substances Data Committee
- DHEW Committee to Coordinate Toxicology and Related Programs.

A brief description of the work and membership of these groups appears in Appendix C. These existing cooperative bodies will be asked to work with the Task Force toward common objectives.

The Task Force has also identified examples of specific existing interagency cooperation at the project level, such as the fund assigned to NCI by the Office of Management and Budget for use in 24 NCI/EPA-managed studies of environmental carcinogenesis, and current work on carcinogens in the occupational environment being performed by NIOSH with NCI support. Such studies are being examined as prototypes of effective interagency cooperation.

The Task Force has considered the current individual agency disease-oriented and population-oriented programs for the purpose of identifying problem areas in environmentally related cancer, heart and lung disease in which all cooperating agencies of the Task Force have significant concerns. Six such areas have been selected for detailed examination in the coming months:

- Standardization of Measurements and Tests
- Exposure and Metabolic Mechanisms for Pollutants
- Early Indicators of Disease
- Risk Assessment
- Education of the Public and of Health Professionals
- Strategies to Protect Public Health.

A brief description of the subject matter of each of these areas appears subsequently, beginning on page 59. The order of presentation is not intended to suggest a priority ranking.

It is important to note that these areas have not been selected on the basis of a detailed analysis of overall needs in the national effort to reduce risk and incidence of cancer, heart and lung disease. The Task Force is not yet equipped to make such an analysis. The development of methods

for systematic evaluation of overall objectives, programs and achievements is still ahead. The Task Force hopes to have and use such methods in its later work. But concerted interagency action need not wait upon evaluative methodology development, and it should not wait.

In each of the six identified problem areas there are unresolved questions which currently impede progress toward disease reduction. These are problem areas, important to each of the Task Force agencies, in which interagency cooperation can make an effective early contribution. The Task Force has begun an examination of these areas to determine: (1) ways in which interagency cooperation can be made to improve performance and results, (2) the nature and degree of improvement which could be expected, and (3) the likely contribution of the resulting improvements to overall solutions of the environmentally related cancer, heart and lung disease problem. On the basis of these criteria, the Task Force is in the process of deciding what further action it will take in the coming year in each of the six areas. The Task Force expects to establish special Working Groups for further studies of these areas.

The relationship of these areas to the national program to reduce environmentally related cancer, heart and lung disease is as follows:

- <u>Standardization of Measurements and Tests</u>

  All five Task Force agencies perform research involving measurements of chemical, physical and biological factors -- in a wide range of laboratory, clinical and community conditions -- which may ultimately be used to support common conclusions and common positions with respect to control of environmentally related cancer, heart and lung disease. Standardization of measurement and test methods would insure a common understanding

of results. Through inclusion of accepted quality assurance procedures it would insure comparability; such procedures could involve collaborative interchange of "blind" samples for analysis. It would facilitate reproducibility of results when required for related research or regulatory enforcement monitoring. It would also assist in the development of improved methods for areas now inadequately served, such as assays of pollutant chemical forms in tissue.

- Exposure and Metabolic Mechanisms for Pollutants

There are a number of disease agents and disease mechanisms which are of important concern to all Task Force agencies; the role of cadmium in cancer and heart disease is an example. A common, shared approach to the study of exposure and metabolic processes for such agents could improve the effectiveness of all agency programs. Such an approach would examine how the agent appears in various forms (different compounds, different valences) as an exposure hazard in various media (air, water, different types of foods); how it enters the body; how it is metabolized; and its fate and biological effects. The Working Group in this area could inventory the available knowledge for selected pollutants, assemble the documented information on quantified processes and effects, appraise the value of available knowledge and use this information to identify new research required.

- Early Indicators of Disease

The diseases of concern to the Task Force have latent periods of many years between pollutant exposure and occurrence of manifest disease. The course of disease may be irreversible by the time it is discovered. Early indicators of disease (e.g, small bodily changes or signals which would indicate that exposure had occurred and a chain of pathological events set in motion) could be of immense value in identifying a patient-at-risk for cancer, or heart or lung disease. Knowledge and detection of early signals might permit therapy to arrest or reverse disease processes at an early stage. Early indicators of disease would permit agencies to devise screening techniques to assess

various chemicals for chronic disease potential without waiting years for the development of manifest diseases. Existing knowledge is inadequate to permit significant use of these approaches for most diseases of concern to the Task Force. It is a logical area in which to utilize resources for a combined approach to a promising line of preventive medicine.

- Risk Assessment

Resource limitations impose the need for priorities. In determining what forms of pollutions and what environmentally related disease to address on a priority basis it is necessary to have an assessment of the risk to the general population, and to specific populations, of disease incidence and mortality. Such assessments would aid all Task Force agencies in determining their research priorities. The sharing of the iterative work of risk assessment can produce an effective use of resources and can establish a common basis for priority setting in arenas of research, strategy and control. The work already in motion at the National Center for Health Statistics (through the United States National Committee on Vital and Health Statistics), to assess statistics needed for determining the effects of the environment on health, can be valuable in improving interagency capability for risk assessment.

- Education of the Public and of Health Professionals

The education of the public and health professionals -- in awareness, recognition and means of avoidance of environmentally related disease and environmental pollution -- is an effective way of reducing disease. This is particularly the case with respect to nutritionally related diseases, hazards of smoking, drugs and medicines, and occupational hazards; awareness of the need for containment is critical to occupational hazards. Physicians cannot treat or prevent environmentally related diseases with full effectiveness if they are not trained to recognize their nature.

- Strategies to Protect Public Health

The ultimate purpose of most investigations into diseases and pollution is the protection of public

health through prevention of illness. By monitoring trends in mortality or morbidity, it is possible to identify emerging problems and initiate research actions to solve these problems. The Task Force agencies could find it valuable in directing their own internal activities, to constantly consider their plans and programs in the light of common strategies to protect public health.

These six areas do not exhaust the possibilities of early cooperative interagency actions through the Task Force's work. A number of other areas have also been identified in Task Force discussions, but these constitute the core program with which the Task Force enters its second year.

NEXT STEPS

The Task Force will continue the organizational and program actions now underway. The Task Force will meet in plenary sessions at approximately 3-month intervals throughout the coming year, with the next regular plenary session scheduled for September 20, 1978. The agenda for that meeting will include the following:

- Formulation of systematized approaches for development of cooperative interagency projects, with plans for implementing these approaches
- Organization of working groups to address the six problem areas already identified
- Consideration of evaluative methodologies for assessing priorities, program effectiveness and resource allocation in the future overall environmentally related cancer, heart and lung disease program
- Strengthening of working relations between the Task Force and existing relevant Federal interagency bodies

- Addition of the National Center for Health Statistics and the Center for Disease Control at Atlanta as full members of the Task Force, and consideration of member or observer status for other agencies

- Organization of a Task Force information management system, maximally utilizing existing information management systems in the participating agencies, which will provide ready Task Force access to a continuously updated complete file of information about the objectives, scope, results and resource requirements of all federally funded activities relevant to Task Force objectives.

These are large subjects and may be expected to carry forward from the agenda of the September 20, 1978 meeting into the agendas of subsequent meetings. The Task Force will carry on the detailed planning, coordination and implementation of this work -- and of other work as it may enter into Task Force agendas -- through specially delegated working groups. These working groups will meet as frequently as required to perform their work. In general, it is expected that the plenary sessions of the Task Force will determine policy and priorities, will review work performed by working groups, and will reach formal decisions. The active performance of Task Force work on a continuing basis will be carried on through the working groups. The Task Force and its working groups will be assisted in all their activities by the EPA staff for Environmental Preventive Medicine and Health, which will continue to act as its technical secretariat.

The next regularly scheduled Task Force Report to Congress will be submitted on August 7, 1979, and will describe the problems encountered and progress achieved to that date in carrying out the directives of Section 402 of Public Law 95-95. The Task Force need not wait until then, however, to

make formal recommendations for action to Congress. Out of the active examination of problem areas, priorities and resource allocations upon which the Task Force is now embarking, early recommendations will appear for specific new initiatives in the effort to reduce environmentally related cancer, heart and lung disease. As these initiatives are developed, and as their resource requirements, probable benefits, and expected impact upon other Federal activities are determined, the Task Force will make interim reports to Congress, with specific programs and recommendations for action.

Appendix A

TASK FORCE ORGANIZATION

Appendix A

TASK FORCE ORGANIZATION

The Task Force on Environmental Cancer and Heart and Lung Disease was formally established in November 1977, following an exchange of letters between the Administrator of EPA and the Directors of NCI, NHLBI, NIOSH and NIEHS. Task Force members were subsequently designated by each agency, as follows:

EPA	-	Mr. Douglas Costle	- Chairman
		Dr. Stephen Gage	- Alternate
		Dr. Delbert Barth	- Alternate
NCI	-	Dr. Herman Kraybill	
		Dr. John Munn	- Alternate
NHLBI	-	Dr. Manning Feinleib	
		Dr. Claude Lenfant	
		Dr. Richey Sharrett	- Alternate
		Dr. Hugh Stamper	- Alternate
NIOSH	-	Dr. Ralph Yodaiken	
		Dr. Jean French	- Alternate
NIEHS	-	Dr. David Rall	
		Dr. Raymond Shapiro	- Alternate

Observers assigned to the Task Force were Dr. Paul Leaverton for NCHS and Dr. Clark Heath for CDC.

Within EPA, the Administrator has designated a Staff for Environmental Preventive Medicine and Health, reporting to the Administrator through the Assistant Administrator for Research and Development. This staff has as a major responsibility the day-to-day organization and coordination of Task Force activities, serving as a technical secretariat to the Task Force. It

performs this function with regular EPA staff seconded from other parts of EPA and assisted by an external consulting group.

After a period of organization and planning at supporting staff levels, the Task Force convened its first meeting, chaired by Mr. Douglas Costle for EPA, on April 26, 1978 at EPA Headquarters, Washington, D.C. This meeting was attended by Representatives Paul Rogers and George Brown of the U.S. Congress, by the heads of the participating agencies or their special representatives, and by the designated Task Force members and other senior members of agency staffs. Objectives and plans for Task Force work were reviewed and a program of Task Force Working Group activities was developed. The Task Force Working Group met formally on three subsequent occasions -- May 12, June 7 and June 16, 1978 -- discussing plans and concepts, reviewing support work by the Staff for Environmental Preventive Medicine and Health, and developing Task Force recommendations. The results of the Working Group's deliberations were reviewed at the second meeting of the Task Force on June 29, 1978. Behind the formal meetings was a continuing activity in each agency, throughout the period from April through July, developing information for use of the Task Force.

With the preparation and submittal of this First Annual Report to Congress the Task Force passes an important checkpoint. The Task Force has spent its first months organizing, gathering information, and developing initial recommendations. Task Force work will continue with a principal emphasis upon examination of the problem areas described in Chapter 3.

Appendix B

TASK FORCE AGENCIES -- RESPONSIBILITIES AND LEGISLATIVE BACKGROUND

Appendix B

TASK FORCE AGENCIES -- RESPONSIBILITIES AND LEGISLATIVE BACKGROUND

ENVIRONMENTAL PROTECTION AGENCY

Responsibilities

The Environmental Protection Agency (EPA) was established in 1970 by a Presidential order which consolidated 15 Federal environmental programs into a single agency. The mission of this agency is to protect and enhance the quality of the environment through the development of a coordinated and comprehensive attack on environmental problems such as air and water pollution, solid waste management, pesticide usage, radiation, noise, and toxic substances. EPA is primarily responsible for establishing and enforcing standards and regulations which are necessary to protect public health, welfare and property and ecological systems from damage by environmental pollutants. Through various legislative mandates, EPA has been given responsibility in monitoring and analyzing the environment, conducting research and demonstration projects and assisting in the development and implementation of state and local pollution control programs.

Legislative Framework

In 1970, President Nixon signed into law the National Environmental Policy Act (P.L. 91-190) which was created to establish a national policy for the preservation of the environment, to assure that Federal policies would take environmental factors into account in decision making, and to create a Council of Environmental Quality within the Executive Office.

The Council is charged with the following areas of responsibility:

- The analysis of current information regarding conditions and trends in the quality of the environment
- The conduct of research regarding environmental quality and ecological systems
- Documentation and analysis of alterations in the natural environment
- The development of recommendations on national environmental policy
- The appraisal of the effects of Federal programs on environmental quality.

Six months later the President transmitted to Congress a reorganization plan to coordinate the administration of environmental programs through the establishment of an independent agency, the Environmental Protection Agency. This order (Reorganization Plan No. 3 of 1970) combined 15 programs from 5 separate Federal agencies. The primary role of the EPA would be to establish and enforce environmental quality standards, to provide technical assistance to state and local governments in the developoment of environmental programs, and to conduct research, demonstration and monitoring programs.

The Water Pollution Control Advisory Board (from the Department of Interior) and the Air Quality Advisory Board (from the Department of Health, Education, and Welfare) were transferred to EPA thereby giving the agency the authority to control air and water pollution. Additional transfer of authority included:

- All functions of the Federal Radiation Council
- Functions of the Atomic Energy Commission regarding the establishment of radiation hazard standards

- Functions in the Department of Interior regarding studies of the effects of pesticides upon wildlife resources as well as the administration of the Gulf Breeze Biological Laboratory

- Functions of the Department of Agriculture in the Plant Protection Division of the Agricultural Research Service, Federal Insecticide, Fungicide and Rodenticide Act, and Federal Food, Drug and Cosmetic Act

- Functions of the Department of Health, Education and Welfare included in the Federal Food, Drug, and Cosmetic Act regarding pesticide research and standards development and functions exercised by the Bureaus of Solid Waste Management, Water Hygiene and Radiologic Health

- Functions of the Council on Environmental Quality relating to the study of ecological systems.

A synopsis of the major pieces of legislation which authorize EPA activities and programs follows.

AIR POLLUTION

Clean Air Act of 1963 (as amended through 1977)

Purpose: To protect the quality of the Nation's air resources, initiate a research program to achieve control of air pollution, and encourage and assist the development of state, local and regional air pollution control programs.

Mandates:

- Establish national research and development programs for the prevention and control of air pollution.

- Provide grants for the improvement or establishment of air pollution control programs or implementation of national ambient air quality standards.

- Give states the primary responsibility for assuring air quality within the state, and for enforcement of the provisions of this responsiblity through EPA-approved implementation plans.

- Issue air quality criteria for each pollutant which indicate identifiable effects on public health or welfare expected from its presence in the ambient air. Issue information on air pollution control techniques and processes for each pollutant.

- Establish primary air quality standards (to protect public health) and secondary air quality standards (to protect public welfare) for each pollutant for which criteria have been issued including a standard for NO_2 concentrations.

- Establish a scientific review committee to evaluate criteria, appraise standards, and describe necessary future research efforts.

- Publish a list of categories of stationary sources of pollution which may endanger public health or welfare, and establish standards of performance for new sources within each category which reflect the degree of emission limitation "achievable through application of the best technological system of continuous emission reduction."

- Establish emission standards for hazardous air pollutants to which no ambient air quality standard is applicable.

- Provide procedures for Federal enforcement and penalty assessment for violations of the Act and of State Implementation Plans. Require revision of implementation plan by states if emission of air pollutant in the U.S. causes or contributes to air pollution which endangers public health or welfare in a foreign country.

- Provide for establishment of advisory committees to assist in the development of air quality criteria standards and research.

- Authorize EPA or state to issue not more than two orders to permit delay in achievement of emission control standards for primary nonferrous smelters (but not beyond January 1, 1988).

- Require states to notify nearby states of a proposed new source which may affect pollution levels.

- Conduct a study of effect of substances and practices which affect the stratosphere, particularly ozone. This shall include physical, chemical and biomedical research to ascertain effects on public health and welfare.

- Establish an interagency coordinating committee to plan and review such research.

- Regulate the practices, substances or activities which may be anticipated to affect the stratosphere.

- Set maximum allowable increases in concentrations of sulfur dioxide and particulate matter for each class area where air quality is cleaner than ambient air standards.

- Determine procedure for area redesignation.

- Require permit for construction of any major emitting facility; such facility to comply with emission limitations and particulate concentrations allowable.

- Set regulations to "prevent the significant deterioration of air quality" from emissions of hydrocarbons, carbon monoxide, photochemical oxidants and nitrogen oxides.

- Set regulations to assure the prevention of future impairment of visibility in Class I Federal areas (national parks and wilderness areas) resulting from air pollution.

- Implement plans required to provide for attainment of ambient air quality standards by 1982 for any nonattainment areas.

- Establish emission standards for automobiles, heavy duty vehicles (trucks, busses).

- Establish procedure for issuance of certificates of conformity to verify that a vehicle is in compliance with emission standards.

- Establish performance warranty of motor vehicle control devices with replacement costs to be borne by the manufacturer.

- Require registration of fuel additives and testing of such, if necessary, to determine potential public health effects.

- Promulgate regulations with respect to reduction of lead content per gallon of gasoline prior to October 1982.

- Establish interagency Low-Emission Vehicle Certification Board to certify any class or model of motor vehicle as low-emission and to determine suitable substitutions for use by Federal agencies.

- Establish fuel economy improvement standards for new motor vehicles manufactured after 1980.

- Require establishment of emission standards for any air pollutant from aircraft engines.

- Study effects on health and welfare of particulate emissions from motor vehicles; and requirements of measures to mitigate the effects.

- Establish procedure for restraint in the case of any pollutant presenting imminent and substantial endangerment to public health.

- Require preparation of economic and environmental impact assessment concerning any standard or regulation.

- Conduct interagency conference on air quality monitoring.

- Evaluate employment shifts resulting from administration of the Act.

- Establish National Commission of Air Quality to study: alternatives to protect air quality and prevent significant deterioration; economic and environmental consequences of achieving or not achieving purposes of the Act; health effects of nonregulated air pollutants.

- Establish Task Force on Environmental Cancer and Heart and Lung Disease to recommend research to determine effects of environmental pollution on human cancer and heart and lung disease, and recommend strategies to reduce such incidence.

- With National Academy of Sciences, study endangerment to public health presented by suspended particulate matter and odorous emissions.

- With Council of Economic Advisors, study and assess economic measures for air pollution control that may strengthen the Act and serve as incentives for controlling air pollution problems.

WATER POLLUTION

Federal Water Pollution Control Act as Amended (Clean Water Act of 1977)

Purpose: To establish a comprehensive water pollution control program in an effort to reduce and eliminate pollution and to restore and preserve our water resources.

Mandates:

- Develop effluent limitations to limit discharges from industrial and municipal sources.
- Wastewater discharge permit program to be established by EPA or the states.
- Develop water quality standards indicating water use designation and water quality criteria.
- Establish standards of performance for discharge of pollutants from new sources.
- Develop regulations regarding discharge of oil and hazardous substances into navigable waters.
- Establish National Contingency Plan for removal of oil and hazardous substances.
- Establish grant program for construction or modification of wastewater treatment plants.
- Perform areawide planning for waste treatment management.
- Establish statewide planning councils for program for prevention, reduction and elimination of pollution.
- Develop research and demonstration projects relating to causes, effects and preventive elimination of pollution as well as effects on health and welfare of pesticides in water.
- Establish water surveillance system for monitoring water quality.
- Create national clearinghouse for data pertaining to relevant studies.

- Establish manpower development and training programs in water treatment and water quality control.

- Establish Water Pollution Control Advisory Board within EPA to make policy recommendations.

- Establish Effluent Standards and Water Quality Advisory Committee to provide and evaluate scientific data.

- Implement a public education program.

- Establish a National Study Commission to investigate technological aspects and economic, social and environmental effects of effluent limitations and goals of Act.

Marine Protection, Research and Sanctuaries Act of 1972 and Amendments

Purpose: To regulate dumping in ocean waters and to protect the territorial sea.

Mandates:

- Issue permits for transport and dumping of any radiological, chemical or biological warfare agent or radioactive waste into territorial sea (or within 12 miles of territorial sea baseline) based on minimal danger to human health, marine environment, ecological systems and economic potential, need and alternatives.

- Secretary of the Army to issue permits for transport of dredged material to be dumped into the ocean, based on review criteria.

- Secretary of the Department under which the Coast Guard is operating to establish surveillance and enforcement activities to prevent unlawful transportation and dumping responsibilities.

- Initiate program of monitoring and study of: effects of dumping in ocean water; effects of pollution, overfishing and man-induced changes in ocean ecosystems; and the Great Lakes.

- Secretary of Commerce to designate marine sanctuaries for preservation of their conservation, recreational, ecological or esthetic values, and issue regulations to control activities within the sanctuaries.

- Implement the provisions of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, permits issued to include dumping of material from outside the U.S. within the territorial boundaries.

Safe Drinking Water Act (1974) and Amendments (1977)

Purpose: To assure safe drinking water to protect public health.

Mandates:

- Develop primary drinking water standards for pollutants which may have an adverse effect on public health.

- Develop secondary drinking water standards necessary to protect public welfare.

- List contaminants which may have effect on public health and maximum levels which allow for adequate margin of safety.

- Conduct study, in cooperation with the National Academy of Sciences, to assess the maximum level of contaminants to protect public health, determine which population groups are more susceptible to adverse effects, determine exposure to contaminants in other than drinking water, effects of interaction and exposure to two or more contaminants and exposure and body burden levels which alter physiological function and increase risk of illness.

- Give states the primary enforcement responsibilities for public water systems if adequate procedures are implemented. Grants available to assist in the establishment and supervision of public water systems.

- Publish regulations for state underground injection control programs to prevent underground injection which endangers drinking water sources.

- Provide grants for manpower training in occupations involving public health aspects of providing safe drinking water.

- Conduct research relating to:

  - Causes, treatment and prevention of diseases resulting from water contaminants

- Waste disposal and means of controlling waste

- Methods of underground injection which do not degrade underground drinking water sources

- Virus contamination

- Quantity, quality and availability of rural drinking water supplies.

- Authorize demonstration project for improved or new technology for providing safe drinking water and for health implications in reclamation, recycling and reuse of waste waters.

- Establish National Drinking Water Advisory Council of 15 members to advise and make recommendations regarding related EPA activities, functions and policies.

SOLID WASTE

Resource Conservation and Recovery Act of 1976

Purpose: Provides for the regulation and control of hazardous waste, and the development of plans for recovery of energy and other resources from discarded materials.

Mandates:

- Develop guidelines for solid waste management which:

  - Describe levels of performance attainable by various practices

  - Provide protection to public health and welfare, quality of surface and ground waters and ambient air

  - Provide for disease and vector control.

- Establish Office of Solid Waste within EPA to carry out responsibilities of the Act.

- Provide technical assistance to states on solid waste management, resource recovery and resource conservation.

- Require permits be issued to each facility which treats, stores or disposes hazardous waste by October 1978. EPA to publish criteria for identification of hazardous waste and list specific wastes which require permit.

- Establish standards for transporters of hazardous waste to protect health and the environment.

- Provide technical and financial assistance to states in the development of hazardous waste programs and solid waste management plans and authorize such plans if in compliance with EPA regulations.

- Inventory open dump sites in the United States, prohibit establishment of new open dumps and issue regulations to upgrade existing open dump sites to minimize potential health hazards.

- Secretary of Commerce to encourage resource recovery technology by developing specifications for the materials recovered from waste and provide such information to Federal agencies for procurement purposes (each agency "to procure items composed of highest percentage of recovered materials practicable consistent with maintaining a satisfactory level of competition").

- Commence legal suit if solid waste presents imminent danger to health or the environment.

- Investigate personnel requirements to carry out state plans, utilization of existing training programs and obstacles to employment in solid waste disposal and resource recovery field.

- Conduct and promote research relating to:

  - Effects on health and welfare of solid waste material release

  - Solid waste disposal programs

  - Planning and operation of resource recovery systems and marketing recovered resources

  - Development of new and improved methods of processing solid waste

  - Composition of solid waste stream and anticipated future changes

- Resource recovery from glass and plastic waste

- Effects of mining waste on humans, air, water, health, welfare and natural resources.

- Establish interagency Resource Conservation Committee to evaluate consequences of resource conservation.

- Establish library for data regarding solid waste management, resource recovery facilities, research and development projects and develop educational programs to promote understanding.

- Provide grants for demonstration facilities of new technology for solid waste disposal and resource recovery systems.

- Enforce compliance of the Act.

TOXIC SUBSTANCES AND PESTICIDES

Toxic Substances Control Act (1976)

Purpose: To regulate commerce and protect human health and the environment by requiring testing and necessary use restrictions on chemicals.

Mandates:

- Require testing of chemical substances by manufacturers or processors if EPA determines there may be an unreasonable risk to public health or the environment or existing data on environmental and health effects are insufficient.

- Establish eight-member interagency committee to make recommendations to EPA Administrator regarding priority lists of chemicals to be evaluated based on quantities produced, extent of exposure, existence of data regarding health and environmental effects, with specific attention to those substances known to cause or contribute to birth defects.

- Require notification by manufacturers of intent to manufacture new substances or significant new use of existing substance.

- Prohibit sale, manufacture, processing or use of chemical substance if it presents a risk of injury to health or the environment. EPA may require limitation of amount manufactured or limitations on the way the chemicals are used.

- Require labeling of chemicals with instructions on use and adequate warnings.

- Require records of manufacture process, monitoring tests, quality control procedures.

- Require labeling and disposal regulations for polychlorinated biphenyls (PCBs) by July 1977. The Act prohibits manufacture by January 1979 and distribution by July 1979.

- Commence civil action for seizure of imminently hazardous substances.

- Require reporting of adverse health or environmental effects caused by chemical substances or mixtures.

- Conduct research, development and monitoring activities with Department of Health, Education, and Welfare regarding: screening techniques for carcinogenic, mutagenic and ecological effects; feasibility of establishing standard classification system for chemical substances and standard means for storage; development of methods to evaluate health and environmental effects of chemical substances, their toxicity and persistence.

- Provide technical assistance to manufacturers and processors respecting requirements of the Act.

- Make grants to states for establishment of programs to prevent unreasonable risks to health or environment associated with chemical substances.

Federal Insecticide, Fungicide and Rodenticide Act (1972) and Amendments (1975)

Purpose: To establish a comprehensive program to regulate the manufacturing, distribution and use of pesticides.

Mandates:

- Register all pesticides, their labeling and classification by use; approval based on ability to perform as warranted without adverse environmental effects.

- Certify those individuals who use or supervise the use of pesticides classified for restricted use. States may administer certification plan.

- Issue permits for testing of experimental pesticides.
- Register establishments that produce pesticides.
- Enforcement authority to EPA or states to establish civil and criminal penalties for violation of the Act.
- Establish procedures and regulations to be implemented for storage, transportation and disposal of pesticides.
- Conduct research on pesticides, alternatives for pest control and monitoring pesticide use.
- Establish advisory panel of seven members to study the effects of regulations and classifications on health and the environment.
- Provide assistance for the development of state plans for enforcement and state training and certification programs for applicators.

NOISE POLLUTION

Noise Control Act of 1972

Purpose: To control the emission of noise detrimental to the human environment.

Mandates:

- Develop criteria reflecting effects of noise on public health and welfare and specify reduction necessary for protection with an adequate margin of safety.
- Identify and categorize major sources of noise and develop standards for levels of noise emissions.
- Study adequacy of Federal Aviation Administration flight and operational noise controls and measures available to control aircraft noise with recommendations for amending regulations and standards for aircraft noise or sonic boom to protect public health and welfare.
- Require labeling of all products which emit noise capable of affecting public health or welfare or which are sold on the basis of reducing noise.

- Conduct research regarding effects and measurement of noise on public health and welfare and techniques for noise control.

- Provide technical assistance to states to facilitate development and enforcement of ambient noise standards.

- Establish Low-Noise Emission Product Advisory Committee to certify low noise emission products and suggest suitable substitutions for Federal procurement.

- Establish noise emission standards for railroads and motor carriers engaged in interstate commerce which reflect the degree of noise reduction achievable through the application of the best technology available with consideration of cost of compliance.

NATIONAL CANCER INSTITUTE

Responsibilities

The National Cancer Institute (NCI) of the National Institutes of Health coordinates the National Cancer Program with the advice of the National Cancer Advisory Board. The Program encompasses NCI's own efforts in cancer research and cancer research done in other NIH Institutes as well as by other Federal and non-Federal programs.

The National Cancer Institute supports research and demonstration programs aimed at uncovering the causes of, and the best therapeutic approaches to, the cure of cancer. Its primary focus is on the prevention and cure of cancer. Because many of the causes of cancer are now believed to be of environmental origin, NCI devotes considerable effort to the screening and evaluation of chemicals in the environment which might cause cancer. It also conducts research on the geographical distribution of cancer in search of clues to the environmental causes of cancer. Basic research on the metabolism and mechanism of action of various types of

environmental carcinogens, as well as on the interactions of biological, chemical or physical environmental agents such as radiation, is carried on by NCI. The National Cancer Institute participates with EPA and NIOSH in major cooperative research programs aimed at determining and quantifying environmental causes of cancer.

Legislative Framework

NCI was created in 1937 by the National Cancer Institute Act (P.L. 75-244). This Act provided for the first Federal research program established for the study of disease control. In 1944 NCI was made a division of the National Institutes of Health by the Public Health Service Act.

The authorities of NCI and the National Institutes of Health were enlarged by the National Cancer Act of 1971 "in order to advance the national effort against cancer." This Act provided for the development of the National Cancer Program (NCP) to coordinate, expand and intensify research efforts by NCI, related programs of other research institutes, and other Federal and non-Federal programs. In addition to national efforts, the NCP is to support cancer research in foreign countries, collaborative research efforts between American and foreign scientists, and training of foreign scientists in the United States.

The Act provides for the establishment of cancer centers for "clinical research, training, and demonstration of advanced diagnostic and treatment methods relating to cancer." Cancer control programs were to be established in cooperation with state and other hea'th agencies.

The administration of the NCP is the responsibilitiy of the Director of the National Cancer Institute, who shall be appointed by the President.

The Act created the National Cancer Advisory Board (to supersede the previous National Advisory Cancer Council) to advise and assist the NCI Director regarding the program. The Board has the responsibility to investigate all NCP programs and activities and submit an annual report to the President for transmittal to Congress regarding progress toward NCP objectives and a plan for the program for the next five years.

The President's Cancer Panel was established to monitor the development and execution of the NCP. The three-member Panel, appointed by the President, presents periodic progress reports directly to the President.

To provide for a scientific review of all research grants and programs authorized by the NCI Director, peer review groups were to be established within the NIH when deemed necessary by the Advisory Board and the Director of NIH.

In 1974, amendments to the National Cancer Act extended the National Cancer Program appropriations and amended the provisions to expand the scope of the national program. Research in the area of nutrition was encouraged by Congress including investigation of the role of nutrition in the treatment and rehabilitation of individuals with cancer and the role of nutrition in cancer cause. Expansion in the cancer control program was also mandated to include trials of such programs as routine exfoliative cytology tests to diagnose uterine cancer.

Amendments to the National Cancer Act removed the limitation on the number of Comprehensive Cancer Centers. This change allows the Director of NCI to establish the centers he deems appropriate in order to provide

quality cancer care throughout the country by way of effective demonstration and outreach programs. The ceiling on the number of professional or scientific consultants available to the Director was increased from 50 to 100. Personnel needs for the operation of the NCP are to be included in the annual report to Congress in order to assess the estimated manpower needs and available resources.

Additionally, the Director of the NCI was given the responsibility to disseminate new and existing cancer knowledge regarding the cause, prevention, diagnosis and treatment of the disease to practitioners, health professionals, scientists and the general public. Activities of this program are to be included in the President's annual report.

The Amendments established the President's Biomedical Research Panel to monitor the complete range of research activities of the NIH and to identify any obstacles that may threaten the development of an effective biomedical research effort. Composed of seven presidential appointees, including the chairman of the President's Cancer Panel, this panel is to make recommendations regarding the subject, contents, organization and operation of the biomedical and behavioral research conducted and supported by the National Institutes of Health and the National Institute of Mental Health.

New regulations required that all grant applications as well as research and development contract projects in the area of biomedical and behavioral research administered by the National Institutes of Health (including NCI), National Institute of Mental Health, National Institute of Alcohol Abuse and Alcoholism and National Institute on Drug Abuse be reviewed by a scientific peer review group. This review will provide feedback that will assure an effective, coordinated effort to achieve a comprehensive cancer program.

NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

Responsibilities

The National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health was created to advance a national program focusing on the cause, prevention, and cure of diseases affecting the cardiovascular and pulmonary systems of the body. Within its mandate, NHLBI funds and administers studies of environmental factors related to these diseases. These programs focus on risk factors, epidemiologic analysis of the incidence of heart and lung diseases, identification of the cause-effect relationship between environmental conditions and specific diseases and control of the disease process.

Legislative Framework

In 1948, a national program to prevent and treat cardiovascular disease was implemented by the passage of the National Heart Act (P.L. 80-655). This legislation, which amended the Public Health Service Act of 1944, provided for the establishment of the National Heart Institute (NHI) to support research and training relating to the cause, prevention, diagnosis and treatment of heart disease.

The purpose of this Act was to "improve the health of the people of the United States through the conduct of researches, investigations, experiments and demonstrations relating to the cause, prevention, and method of diagnosis and treatment of diseases of the heart and circulation." The NHI was to support and coordinate similar research by public and private agencies, provide manpower training, and assist the states in utilization of the most effective methods of prevention, diagnosis and treatment of heart disease.

In 1948, the Surgeon General established the NHI as one of the Institutes of the National Institutes of Health. All research activities related to heart disease were transferred to the NHI.

With increased attention on the effects of lung and respiratory diseases, the Secretary of Health, Education, and Welfare expanded the role of the Institute by redesignating it the National Heart and Lung Institute in 1969. Additional responsibilities included research and training efforts in the area of lung disorders.

A major legislative thrust occurred in 1972 with the passage of the National Heart, Blood Vessels, Lung and Blood Act which provided the authority to expand the research efforts to combat blood vessel and blood disorders as well as intensify and coordinate efforts in cardiovascular and lung diseases. These enlarged programs included research in diseases of children such as asthma, cystic fibrosis, and hemolytic and hemophilic diseases. Clinical research and demonstration centers were established to provide demonstrations of advanced methods in diagnosis, prevention and treatment of cardiovascular and chronic lung diseases and to provide resources for training scientists and medical personnel. This legislation provided for the development of a Health Information Program to disseminate relevant information to medical professionals and the public regarding the numerous factors, such as diet, stress and cigarette smoking, affecting the prevention of these diseases.

The Act called for the development of a National Program to expand, intensify and coordinate efforts regarding heart, blood vessel, lung and blood diseases. The Director of the Institute, with the advice

of a 23-member advisory council, the National Heart and Lung Advisory Council, was given the responsibility to plan and implement new research programs as well as to coordinate programs and activities of other research institutes of the National Institutes of Health. This Council was required to report to Congress and the President on the activities and accomplishments achieved in the past year.

Increased emphasis on programs in the areas of blood research and blood resource management was the result of the 1976 Amendments to the Act. Testing and evaluation of newly acquired knowledge which may be of value in the control of diseases affecting the heart, lung and blood systems were promoted.

Ten additional research and demonstration centers were authorized for "advanced diagnostic, prevention and treatment methods for blood, blood vessel diseases, research in the use of blood products and research in the management of blood resources."

The Amendments increased the number of consultants available to assist the Council. The Congressional report was to include Council appropriation recommendations and estimates of manpower requirements to carry out the program. The 1976 Act (P.L. 94-278) created the name change of the Institute to the present National Heart, Lung and Blood Institute (NHLBI) with a corresponding change in the name of the advisory council.

In 1977, authorization under the National Heart, Lung and Blood Act was extended by Congress through the fiscal year ending 1978 with no substantive changes.

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

Responsibilities

The National Institute for Occupational Safety and Health (NIOSH), a division of the Center for Disease Control, is involved in the effort to reduce or eliminate workplace hazards for every working person. As such NIOSH has major responsibilities in the areas of research, standards development, technical assistance and manpower development. NIOSH conducts research on chemicals, industrial processes and job hazards which endanger workers' health and safety. NIOSH prepares criteria documents on occupational hazards and recommends occupational health and safety standards to the Occupational Safety and Health Administration and the Mine Safety and Health Administration for promulgation and enforcement of standards. NIOSH also has responsibilities in providing technical assistance to workers, industries and governmental agencies concerned with worker safety and health.

Legislative Framework

Occupational safety and health has been a public concern since the early part of this century. Recent interest in this area has been prompted by the abundance of data regarding the effects of industrial chemicals on employee health. In 1970, Congress passed the Occupational Safety and Health Act (P.L. 91-596) in an effort to eliminate on-the-job deaths, injuries and illnesses, and to assure safe and healthful workplace environments.

Due to the complexity and magnitude of this problem, the Act provided that several agencies be responsible for the specific policies and programs involved. The Occupational Safety and Health Administration (OSHA) within the Department of Labor was designated as the agency responsible for the promulgation

of occupational safety standards to provide for worker protection. Compliance and enforcement of these safety standards is an essential part of OSHA's role. The enforcement of the standards has been realized by physical inspection of the workplace by an OSHA officer. The Act encouraged the states to develop their own occupational health and safety programs with OSHA serving as the agency for evaluation and approval of such plans.

Authorization to develop and recommend occupational safety and health standards was given to the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health, Education, and Welfare. The Director of NIOSH was given the responsibility to conduct any research and experimental programs deemed necessary for the development of criteria for new occupational safety and health standards. These criteria documents, which review the scientific basis for a standard and suggested provisions, are forwarded to OSHA for review. The 1970 legislation provides that these suggested standards then be published in the Federal Register prior to approval by the Secretary of Labor so that objections may be filed and assessed prior to the final draft of the standard.

The 1969 Federal Coal Mine, Safety and Health Act authorized the development of health standards for the protection of life and the prevention of occupational diseases of miners. The Secretary of Health, Education, and Welfare transferred this responsibility to NIOSH with the passage of the 1970 Act. Additional mandates were given to NIOSH for all mines (metal, stone, clay and gravel) under the Mine Safety and Health Amendments Act of 1977.

In addition to standard development, the legislation provides that NIOSH be responsible for applied research, manpower development, and technical assistance and consultation services to Federal, state and private agencies. The Act requires that NIOSH develop educational programs to assure an adequate supply of qualified medical personnel to carry out the requirements of the legislation. Additional training is to be provided to employers and employees regarding the recognition, avoidance and prevention of unsafe working conditions due to both physical and human factors.

The Institute must provide technical assistance and consultative services to Federal, state and local agencies upon request. Support for health hazard evaluations, development of occupational safety and health programs for small businesses and industrial hygiene and engineering assistance is to be made available. The dissemination of occupational safety and health technical information is an additional NIOSH responsibility.

To carry out the adjudicatory functions under the Act, the Occupational Safety and Health Review Commission (OSAHRC) was created. This Commission, an independent adjudicatory agency of the United States, serves as a court system where employees, employers or their representatives may seek relief when there is disagreement with any enforcement action taken by the Secretary of Labor.* Any part may then appeal the decision of the Commission to the appropriate United States Court of Appeals.

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* Those areas in which decisions have been made include penalties, conduct of workplace inspections, abatement requirements, interpretation of safety and health standards, and employment relationship to job safety requirements.

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

Responsibilities

The National Institute of Environmental Health Sciences (NIEHS) was established in 1966 as a biomedical research organization within NIH. It is the principal Federal agency for the support of research and training of manpower to carry out research in the area of effects of chemical, physical, and biological environmental agents on human health. NIEHS's goal is to provide the scientific information base, advanced scientific methodology, and trained scientific manpower to reach an understanding of the total impact of environmental factors on human health.

To meet its objective, NIEHS sets research priorities developed through a program planning process that takes into account the changing nature of environmental health problems, the rapidly evolving state-of-the-art in the field, and the opportunities available to the Institute. This process permits the Institute to take advantage of the best thinking of the academic and scientific communities in addition to that of its own staff. Initially, this process involved planning undertaken to describe the NIEHS mission. Thereafter, concurrent planning, strengthened by two major environmental health task force reports, followed to provide ongoing and future guidelines for NIEHS research programs.

The mission of the Institute takes into account several considerations. First, NIEHS takes a broad view. It does not consider only disease end-points, vehicles by which hazards are transmitted, or particular population groups affected. Its approach is holistic, requiring multidisciplinary research efforts. Such an approach is necessary to identify the consequences

of the interaction of biological systems with chemical, biological, and physical agents in the environment. In this connection, the need is two-fold: a) there must be vigorous and integrated study of the effects of environmental factors on human health and well-being; and b) there is an overriding need to establish the basic information upon which realistic control measures could be based.

Second, NIEHS research objectives determine how environmental agents produce deleterious effects in exposed persons and the circumstances that influence the expression of these effects. This is intended to permit principles to be developed through which the probable toxicity of new as well as existing compounds can be predicted. Individual bioassay of every agent is impossible because of the enormous expense involved in testing the 700 to 1,000 new compounds introduced in commercial quantities every year, as well as the approximately 15,000 synthetic chemicals already in the environment. This meant interest must be focused upon the fundamental nature of the body's response to these agents and the ultimate consequences for health and longevity. In addition, programs are directed to investigate and identify the opportunities that such basic knowledge may offer for preventing environmentally related disease.

Several factors make achieving these objectives difficult. The investigations of NIEHS are not directed only to exposure of overwhelming concentrations of environmental agents producing immediate or short-term responses that are relatively easy to detect and understand. Rather, and more difficult, the Institute must determine the significance of the effect of multiple, or combinations of, agents because additive or synergistic effects interacting at a common site may be important in disease development.

Finally, because of the broad nature of the problems to be addressed, NIEHS is called on to carry out a wide range of coordination efforts, including collaborative programs with other Federal and non-Federal organizations. It also engages in a high degree of cooperation with academic institutions to advance understanding of the relationship of environment to health and to stimulate recruitment and training of research personnel.

NIEHS pursues its mission by supporting training in the areas of environmental toxicology, environmental pathology, environmental mutagenesis, and environmental epidemiology and funding basic and applied research on the consequences of exposure of man and other biological systems to potentially toxic or harmful agents in the environment. In its research, NIEHS attempts to learn: (1) how and where potentially harmful environmental agents are released into the environment; (2) how these agents move, and possibly change as they move, through the environment; (3) how they come to affect man and other biological systems in the environment; (4) the extent of exposure of various population groups, especially sensitive populations, to these agents; (5) what effects these agents cause by themselves and in combination with other factors in the environment; (6) what happens in biological systems after exposure to hazardous agents; and (7) what diseases are caused or aggravated. In rounding out these activities NIEHS supports efforts to identify hazardous environmental agents before they are released into the environment. These efforts include developing, testing and validating biological assay systems that can be used to predict the toxic effects which might occur in humans following exposure to these agents.

The output of NIEHS programs is intended to aid those agencies and organizations, public and private, with responsibilities for developing and instituting regulations, policies, and procedures which will reduce the incidence of environmentally induced diseases.

Legislative Framework

There is no single Congressional Act which provides specific legislative mandates for NIEHS. Even before the NIEHS was created, the need for special program development in environmental health was recognized; and a number of planning activities followed that led to the definition of the NIEHS mission and responsibilities.

The concept of a national research center dealing with the scientific aspects of environmental health was first spelled out in a June 1958 report prepared by a committee headed by Dr. Stanhope Bayne-Jones, entitled, "The Advancement of Medical Research and Education Through the Department of Health, Education, and Welfare." This report indicated the need for a strong Federal public health research program to deal with the emerging health problems related to the increasing number and variety of substances in the environment.

In November 1961, the Surgeon General of the U.S. Public Health Service established a Committee on Environmental Health Problems, headed by Dr. Paul Gross of Duke University, to develop long-range objectives for a PHS environmental health program. The Committee recommended creation of an environmental center and a new Office of Environmental Health Sciences. The Committee's report said:

> "It is the Office of Environmental Health Sciences, in particular, which will make possible an integrated

> national environmental health program while avoiding unnecessary duplication of effort. It offers a new method of attacking those facets of environmental health problems which are common to many of the operational programs. By its integrated approach it can identify and appraise environmental health problems which are not under consideration. At the same time it can develop a protection criteria which are based on all aspects of the environment."

Congress approved funds in September 1964 for the planning of a central environmental health facility with the understanding that it would be limited to research and with the provision that it be located more than 50 miles from the District of Columbia.

At the suggestion of the Office of Science and Technology, staff papers developing the proposal were submitted to a small group drawn from the National Environmental Health Advisory Committee, headed by Detlev W. Bronk, for comment on the mechanism by which such an undertaking would be best activated. In April 1965 this group unanimously recommended that the center be operated by the Public Health Service, that it seek the assistance of qualified scientific organizations in developing its plans, and that it solicit advice from appropriate advisory bodies. Arrangements were made with consultants (in conjunction with a panel of scientists from several national as well as neighboring universities, representing various disciplines relevant to the center's overall purpose) to review staff plans for the center's mission, broad program, scientific components, facility requirements, and staffing needs. This report, delivered on November 1, 1965, includes a statement of objectives and a guide to the development of the NIEHS.

A site for the new institute was selected at Research Triangle Park, North Carolina.

The Division of Environmental Health Sciences was established as part of the National Institutes of Health in 1966. The Division was elevated to an Institute in 1969 by the Secretary of the Department of Health, Education, and Welfare.

A Congressional appropriation of 2.5 million dollars in 1976 was awarded to NIEHS for the construction of permanent facilities. Subsequently, an additional 42 million dollars was allocated allowing completion of the facility in mid-1980.

Appendix C

NON-TASK FORCE AGENCIES AND COMMITTEES WITH ASSOCIATED INTERESTS IN TASK FORCE EFFORTS

Appendix C

NON-TASK FORCE AGENCIES AND COMMITTEES WITH ASSOCIATED INTERESTS IN TASK FORCE EFFORTS

TASK FORCE OBSERVER AGENCIES

The Center for Disease Control at Atlanta (other than NIOSH, which is also part of CDC) and the National Center for Health Statistics have important roles relating to the efforts of the Task Force and have participated in its effort as observers. It is anticipated that these two agencies will join as full Task Force members in the future. Their responsibilities in the area of environmentally related cancer, heart and lung disease are described in the following paragraphs.

The National Center for Health Statistics (NCHS) has, since 1969, been responsible for producing baseline data on births, deaths, injury, disease, illness and medical care in the population. Until 1974 the NCHS statistical output was oriented toward health in the United States in relation to our social environment (urban/rural, income, education, etc.). In 1974 the Secretary of DHEW was authorized by Congress to collect statistics on "other health hazards." NCHS has since worked closely with the various agencies concerned with environmental problems to plan, conduct, and coordinate health information gathering activities related to developing a data base which better illuminates the relationships of health and environment.

The Center for Disease Control (CDC) at Atlanta serves as the Public Health Service's focal point for the control and prevention of infectious, vector-borne, preventable acute and chronic diseases and conditions; occupational health and safety problems; and certain environmentally

induced health problems. CDC is also charged with certain regulatory activities, such as prevention of importation of disease from other countries and the evaluation of occupational health hazards. This latter task is carried out by NIOSH.

NON-TASK FORCE AGENCIES WITH MAJOR REGULATORY RESPONSIBILITIES

Other Federal agencies with primary regulatory or enforcement roles whose activities have bearing on the work of this Task Force include the Consumer Products Safety Commission, the Food and Drug Administration, the Occupational Safety and Health Administration, and the Mine Safety and Health Administration.

Formerly within the Food and Drug Administration, the Consumer Products Safety Commission (CPSC) became an independent agency under Congress in 1973. CPSC acts in a regulatory capacity to protect the public from the use of products containing substances harmful to health. As a regulatory agency, the Commission relies heavily on research done by other Federal agencies to provide it with information on substances which should be eliminated from products because they are toxic, carcinogenic or possibly carcinogenic. In addition, the Commission conducts limited research, including in vivo and in vitro screening of chemicals for mutagenicity and carcinogenicity, animal inhalation studies and toxicological studies. CPSC is of importance to the Task Force because it is responsible for control and regulation of substances which become a part of our environment through the manufacture and use of products which may cause cancer or exacerbate heart and lung disease.

The Food and Drug Administration (FDA) within the Department of Health, Education, and Welfare supports research on a wide variety of chemical and physical environmental agents. It has been given a mandate to regulate and eliminate health hazards in food and harmful emissions from electronic products. FDA's environmental health research is conducted principally through its National Center of Toxicological Research which develops test protocols and conducts toxicological tests for environmental agents in the food chain, the Bureau of Foods which researches hazards in food from micro-organisms and chemicals, and the Bureau of Radiological Health which studies hazards of radiation.

The Occupational Safety and Health Act (1970) designated the Occupational Safety and Health Administration (OSHA) within the Department of Labor as the agency which establishes occupational safety standards to provide for worker protection. Compliance monitoring and enforcement of the safety standards set is an essential part of OSHA's role. NIOSH provides research and standard setting support to OSHA. This requires detailed coordination between the two agencies. Through joint NIOSH/OSHA working groups, technical standards are developed under the Supplemental Occupational Standards Program. The standards cover such areas as: education of employees as to potential hazards, monitoring and engineering control mechanisms, establishment of sampling techniques and sampling intervals and medical surveillance and testing programs.

The Mine Safety and Health Administration (MSHA) is the Federal agency responsible for the enforcement of statutes created to protect the

health and safety of mine workers. This agency was created in 1973 by the Secretary of the Interior as separate from the Bureau of Mines. The Federal Mine Safety and Health Amendments Act of 1977 transferred the authority of this agency from the Department of Interior to the Department of Labor. The primary role of MSHA is the enforcement of the provisions of the 1977 legislation and the promulgation and enforcement of mine health and safety standards.

OTHER AGENCIES CONCERNED WITH ENVIRONMENTAL HEALTH

In addition to the agencies described above, numerous other departments of the U.S. Government support environmental health research as part of their missions and hence share in some part in the overall Federal program addressed to the study and control of environmental cancer, heart and lung disease.

In 1970, the National Environmental Policy Act established the Council on Environmental Quality in the Executive Office of the President. The Council was charged with the task of coordinating all environmental quality programs and with making thorough reviews of all Federal programs related to the environment. Federal agencies are required to file statements with the Council -- detailed statements on environmental implications of all legislative proposals as well as on major activities they administer which have significant environmental impact. The Council transmits yearly reports to Congress on current environmental trends and its suggestions concerning ways of remedying deficiencies in existing programs and activities.

The Department of Energy supports environmental health research aimed at understanding the role of energy-related pollutants as a cause of human health problems in order to design new and expanding energy technologies in ways which will minimize their side effects.

The Department of Agriculture is also involved in environmental health-related research, principally done by its Agricultural Research Service, Cooperative State Research Service and the Forest Service. These services are concerned generally in assuring the safety of water and food for human consumption. Its research includes investigation of the metabolism and fate of pesticides and insecticides in the food chain, studies on methods for reducing bacteria, viruses and molds in our foods and development of methods for soil and vegetation management which will protect the quality of the drinking water.

The Department of Defense allocates funds to environmental health-related research in support of its responsibilities to minimize and prevent adverse health impacts from its facilities. Its attention has been directed to such areas as studies of the effects, hazards, and disposal of toxic industrial wastes, ambient air quality surveys at military air bases, studies of contaminated land areas and land application of waste waters, and development of criteria for direct recycling and reuse of treated waste waters.

The National Bureau of Standards within the Department of Commerce is the principal Federal agency concerned with the development and promotion of advanced measurement methods and evaluation of scientific data to ensure accurate air, water and noise pollution measurements. Its research provides a technical data base which other agencies can use in determining

regulations for pollution sources as well as aiding them in basic research concerning rates of chemical reactions taking place in the environment and measurement of low levels of chemicals in the air, water and food chain.

Other Federal agencies with ancillary concerns aimed at environmental effects on our Nation's health include: The Department of the Interior, principally through the Fish and Wildlife Service, Bureau of Mines and the Office of Water Research and Technology; the Nuclear Regulatory Commission; the Department of Housing and Urban Development; and the Department of Transportation.

INTERAGENCY COMMITTEES AND TASK FORCES

In addition to work done in the field of environmental effects on human health by individual Federal agencies, a number of interagency committees and task forces have been established to coordinate and help direct the Federal effort.

The President's Environmental Message of May 23, 1977 established prevention of harm from toxic substances as a high priority of his administration. The Council on Environmental Quality was instructed to coordinate an interagency program to eliminate overlaps and fill gaps in the collection of data on chemicals and to coordinate Federal research and regulatory activities affecting them. As a result, an interagency Toxic Substances Strategy Committee was formed to carry out the directive. This Committee includes representatives from 11 agencies and the Domestic Council, all with responsibilities relating to the control of potentially hazardous chemicals in our environment. Task Force members participating in this committee are EPA, NCI, NIOSH and NIEHS.

Also in response to the President's Environmental Message of 1977, the CEQ-led Interagency Task Force on Environmental Data and Monitoring was established to review present environmental monitoring and data programs and recommend improvements that would make these programs more effective. Represented on this Task Force are all Federal agencies with significant expertise and interest in environmental data and monitoring. EPA and HEW are represented on this Task Force.

In response to the Toxic Substances Control Act, the TSCA Interagency Testing Committee, was formed to make recommendations to the Administrator of the Environmental Protection Agency respecting the chemical substances and mixtures to which EPA should give priority for requiring testing. Its statutory members are CEQ, DOC, EPA, NSF, NIEHS, NIOSH, NCI and OSHA with DOD, FDA, DOI and CPSC in a liaison role.

The Interagency Toxic Substances Data Committee, also mandated under the Toxic Substances Control Act, is co-chaired by EPA and CEQ with other members from the agencies concerned with toxic substances control. Its purpose is to design and establish a data system for the efficient retrieval of toxicological and other scientific data useful for industry and government in carrying out the Act.

The DHEW Committee to Coordinate Toxicology and Related Programs was established in 1973 by the Assistant Secretary for Health, Department of Health, Education, and Welfare as a multi-agency group to provide a medium to assure exchange of information on toxicology and related programs, to coordinate these programs, to enhance sharing of resources, and to provide advice to the Department to aid in establishing research priorities.

The Committee's advice also guides decisions being made by regulatory agencies, and its members serve as contacts with scientific and industrial communities and state and local governments concerned with toxicology concerns. Members and observers of this Task Force on the Committee include representatives from NCI, NIEHS, CDC Atlanta, and NIOSH. EPA provides liaison representatives on the Steering Subcommittee.

The Interagency Collaborative Group on Environmental Carcinogenesis was established in early 1972 primarily as a mechanism for interfacing of NCI with other Federal agencies that would permit a holistic approach to environmental cancer (air pollutants, water pollutants, drugs, diet contaminants and workplace exposures). It became obvious after initiation of this group that the National Cancer Program was responsive to that section of the National Cancer Act of 1971 which requires collaboration with Federal agencies. The ICGEC also provides an exchange forum for data and information on environmental cancers. It also has as an objective the stimulation of collaboration and implementation of cooperative projects such as those now in existence under the NCI/NIOSH and NCI/EPA collaborative programs on environmental cancer. The ICGEC draws on representation from 28 agencies or subagencies with NCI's representative acting as chairman.

The Chemical Selection Working Group (CSWG) was established to assist the NCI Carcinogenesis Bioassay Program in selecting chemicals for test. Chemicals to be selected for testing are first discussed by the CSWG before review by the Clearinghouse on Environmental Carcinogens (page 25). The CSWG is composed of representatives from the following government agencies: NCI, EPA, NIEHS, NIOSH, CDC, CPSC, FDA, OSHA, DOA, DOE, and DOD.

In the regulatory area, EPA, CPSC, FDA, and OSHA have formed an Interagency Regulatory Liaison Group to examine, assess, and redesign, if necessary, the processes by which they regulate chemicals which impact upon people and the environment and to coordinate their research programs. Currently there are eight active work goups with IRLG. In addition, the Department of Labor and the Office of Management and Budget have announced a joint effort to eliminate duplication and fill gaps in regulating workplace hazards and to propose a system of incentives to supplement regulation.

The establishment of the above-mentioned committees and task forces, all aimed at the coordination of our research in the environmental research field as well as collation of information already collected, should be of great importance to the mission of this Task Force. Combined efforts by these groups may:

- Be instrumental in developing a comprehensive research program to determine and quantify the relationship between environmental toxicants and cancer, heart and lung disease.
- Coordinate information between agencies providing information regarding environmental pollutants thought to aggravate cancer, heart and lung disease and those responsible for strategies designed to eliminate these environmental risks.
- Coordinate control efforts to reduce pollutants affecting heart, lung and blood disease.
- Identify monitoring programs which should be expanded or initiated.
- Advise the Task Force on substances considered to be priority environmental pollutants, especially in relation to cancer, heart, lung and blood disease.
- Advise the Task Force on substances not yet tested or requiring further study to fill gaps in information.

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