Occupational Disease Reporting

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

Occupational Disease Reporting

A REVIEW OF CURRENT PRACTICES TOGETHER WITH A COLLECTION OF INCIDENCE STATISTICS

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FOREWORD

Numerous investigations by the Public Health Service, as well as efforts of other agencies, have substantiated the menace of occupational diseases to the health and life of America's 62,000,000 workers. However, despite the vast fund of knowledge accumulated on the causes, prevention, and control of these illnesses, which have their origin in thousands of different occupations, information is generally lacking on the incidence and severity of specific occupational diseases.

Since adequate statistics are the directional beam of any health program, this lack has impeded efforts to plot a course aimed at conquering occupational diseases. The problem has been further complicated by the absence of full awareness of the chaotic state of current reporting practices.

Continuing demands for information on the occurrence of occupational diseases led the Public Health Service to undertake a study to review the entire situation and to determine specifically the responsible factors. It is hoped that the findings of this study may contribute to a greater appreciation of the situation and that they will motivate interest and action in its improvement on the part of persons and groups concerned with the broad problem.

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November 9, 1953.

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Other State industrial health agencies not participating in the pilot study rendered assistance by contributing valuable information. Special mention is made of the Bureau of Adult Health, California Department of Public Health, with its invaluable background of experience in handling large volumes of occupational disease reports.

Appreciation is also expressed to the State workmen's compensation agencies that consented to the use of reports referred to the industrial health agencies, as well as to those State compensation authorities that furnished copies of their reports or other data used in this publication.

Acknowledgment is made to Dr. W. M. Gafafer and Mrs. Tula Brocard for their contribution to the report; to Rosedith Sitgreaves, Elizabeth S. Frasier, and Irene M. Lima, who assisted with the coding and tabulating of the pilot study data; and to various other members of the Division of Occupational Health for their helpful advice. Appreciation is also expressed to the National Office of Vital Statistics of the Department of Health, Education, and Welfare, and the Bureau of Labor Statistics of the U. S. Department of Labor, which were consulted in the early development of the study.

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INTRODUCTION

The study and control of occupational diseases in the United States has progressed markedly in the past four decades. A vast body of information, both clinical and toxicological, has been developed on the occupational diseases, particularly such diseases as silicosis, dermatoses, and poisoning due to lead, benzol, beryllium, and hundreds of other toxic substances. Our scientific knowledge concerning the environmental control of these diseases is likewise well developed, although its application is yet far from universal. Gradually, too, the prevention and control of occupational diseases has achieved recognition as a specialized activity requiring the teamwork of various professional competencies, as well as official agencies, industry, and other organized groups. An exception to these notable gains has been the ineffectual attempt to obtain adequate morbidity data on occupational diseases. Because of the woeful lack of such data, the industrial hygienist has been seriously impeded from doing as complete a job of elimination and control as possible.

The value of universal morbidity statistics on diseases, whether they be communicable, chronic, or occupational, is unquestioned in public health planning, in developing control programs, and in aiding the passage of pertinent legislation. The gravity of the occupational disease problem in the first part of this century and the low level of the worker's health have been pointed out in the early pioneering studies of occupational diseases and general sickness. Incomplete as the statistics were on the prevalence of specific occupational diseases, they were sufficiently impressive to interest governmental agencies and other groups in the improvement of working conditions and in raising the health level of workers. In fact, the recognized prevalence of silicosis and its association with tuberculosis was one of the main reasons for the establishment by the Public Health Service of the Office of Industrial Hygiene and Sanitation in 1914.

Limited basic statistics also influenced the adoption of legal measures to outlaw or control the use of toxic substances known to cause illness among exposed workers, and to regulate general working conditions. For example, the discovery of numerous cases of serious phosphorus poisoning in factories of the United States led to the passage in 1912 of the Esch law, which placed a prohibitive tax on white phosphorus matches (*1*). The high prevalence of mercurialism reported in early articles (*2*), later substantiated by studies of the Public Health Service (*3*), resulted in the passage of laws and regulations by State governments prohibiting the use of mercury in the carroting of felt fur. Likewise, the large numbers of workers with lead poisoning, especially painters and storage battery workers (*4*), caused some State legislatures to pass the *lead laws* requiring periodic physical examinations of workers exposed to lead. In the early years, reports of cases of industrial illness were obtained through search of plant records, interviews with

physicians, physical examinations of workers, and, in some instances, through compulsory reports of physicians.

The meager available statistics thus did serve a purpose in initiating a program of occupational disease study and control. Beyond that, however, the absence of reliable data on the prevalence of occupational diseases has made impossible a definition of the overall industrial disease problem and a reasonable determination of where toxicologic and clinical research is needed.

SCOPE AND METHOD OF STUDY

The purpose of this study is to bring together existing fundamental information on universal reporting and on the incidence of occupational diseases in this country. It has origin in the recognized need for the improvement of reporting practices and the possible initiation of a national reporting system such as exists for work accidents and communicable diseases. The increasing demands from official and nonofficial groups for information on incidence of occupational diseases also spurred the undertaking.

Material in this publication is presented in three parts. The first reviews the current status of occupational disease reporting practices in this country, including compulsory reporting by practicing physicians and reporting for compensation purposes. Technical difficulties and problems characteristic of both types of reporting are illustrated wherever possible.

The second part deals with an experimental project in the uniform transmittal of reports of occupational diseases to the Division of Occupational Health, Public Health Service, by 11 States through their divisions of industrial health. The project is referred to in the text as the pilot study and was undertaken for several reasons, one of them being to explore the feasibility of a national reporting system for occupational diseases. It was also undertaken to afford an opportunity to study the quality of reports being made. A detailed analysis of the reports is contained in the appendix.

The third part presents all available statistics which might throw some light on the universal incidence of occupational diseases. By utilizing the pilot study data, published reports of workmen's compensation agencies, and unpublished material offered by both industrial health and compensation authorities, it has been possible to obtain information covering essentially a year's period from 28 States and for Federal employees. Although these data are subject to many limitations and variations, it is believed that they represent all readily available material on occupational diseases reported routinely to central agencies.

Before this project was carried out, personal discussions were held with representatives of State and local industrial hygiene units, medical directors of private industries, representatives of insurance companies, and others. Opinions and information were sought on all aspects of occupational disease reporting and statistics. Out of the multitude of problems uncovered, two facts emerged on which there was unanimous agreement. First, the need for improving occupational disease reporting practices was unquestionable and, second, the prospects of obtaining reliable incidence data were hopeless. Those consulted urged the undertaking, however, and gave assurance of their cooperation, provided that the demands on them were reasonable and within the capacity of their organizations.

In September 1949, the Division of Occupational Health presented the subject at a meeting of the Advisory Committee to the Public Health Service on

Occupational Health. The Committee promptly recommended that the Division conduct "a program of study and field work with a view to correcting the situation responsible for inadequate occupational disease reporting practices."

To avoid possible duplication of effort, the project was also discussed with other groups concerned with the collection of industrial accident or sickness statistics. Among these were the Bureau of Labor Statistics of the U. S. Department of Labor, which is charged by law with the responsibility of collecting and publishing work-injury statistics. While occupational diseases are included in the definition of injuries reportable to the Bureau by industry, it was learned that the summary method of collecting the data precludes the segregation of occupational disease data.

Much of the information contained in this publication is derived from materials obtained from State industrial health agencies through personal contacts or through correspondence. Statistical data are based on individual reports of occupational diseases submitted by the 11 State industrial health agencies participating in the pilot study; tabulated material obtained from other State industrial health units; and tabulations from published periodic reports and unpublished data of State workmen's compensation agencies. Information is not included on medical and toxicological aspects of occupational diseases, on health programs in industry, or on the administration of State workmen's compensation laws.

DEFINITIONS OF AN OCCUPATIONAL DISEASE

Lack of agreement among medical and legal authorities as to what specifically constitutes an occupational disease is one of the problems contributing to the chaotic state which characterizes occupational disease statistics. In general, however, it is accepted that an occupational disease is an affliction or an abnormal physiological condition attributable to a specific industrial health hazard, or to conditions associated with the working environment. Interpretations of this broad definition vary with the point of view and the purpose.

Medical definitions.—Medical, sometimes called *industrial,* definitions commonly quoted are summarized by Sappington as follows (*5*):

Hayhurst, for example, has defined an occupational disease as "an affliction which is the result of exposure to an industrial health hazard. There may be exposures to more than one hazard with corresponding complicated afflictions." An industrial health hazard is stated to be any condition or manner of work which may be unnatural to the physiology of the human being involved.

McCord has interpreted the term occupational disease as meaning "abnormal bodily and mental states resulting directly from extended exposure to the harmful substances and diseases directly related to work." It is further explained that these conditions are unlike occupational accidents or injuries, because prolonged exposure is necessary to cause them.

Weyl (quoted by Goldberg) believes that "the term occupational disease should be applied not only to diseases gradually brought about by the activities of the worker, but to any frequent morbid condition in a certain class of occupations."

In studies and reports of the International Labour Office it is stated that "occupational diseases are the outcome of long exposures to noxious influences during work and occur either exclusively or with particular frequency among the workers in a specific industry."

. . . The following definition by the author, therefore, is derived from these conceptions: "An occupational disease is one which occurs with characteristic frequency and regularity in occupations where there is a specific hazard as the cause which operates to produce effects in the human body recognized clinically by the medical profession as pathologic changes and effects produced by the specific occupational hazard involved."

Legal definitions.—Workmen's compensation laws define occupational diseases either by naming those diseases considered compensable or by including all occupational diseases, provided that they meet the conditions as set forth by the acts. An occupational disease is generally held to be an *injury* of gradual or slow development by comparison with the sudden effect of an accident. The usual legal requirement applying to injuries as well as to occupational diseases specifies that they must *arise out of and in the course of employment.* Another common viewpoint also brings within the

legal interpretation any disease contracted by a worker which arises out of an incident of the employment. Thus, tuberculosis may be ruled a compensable occupational disease when contracted by hospital nurses and attendants; mumps or scarlet fever, when contracted by teachers from contact with pupils; and pneumonia when acquired by road construction workers. Legal qualifications imposed upon a compensable occupational disease are exemplified by the Indiana Act (*6*):

. . . Ordinary diseases of life to which the general public is exposed outside of the employment shall not be compensable, except where such diseases follow as an incident of an occupational disease as defined in this section.

A disease shall be deemed to arise out of the employment, only if there is apparent to the rational mind, upon consideration of all of the circumstances, a direct causal connection between the conditions under which the work is performed and the occupational disease, and which can be seen to have followed as a natural incident of the work as a result of the exposure occasioned by the nature of the employment and which can be fairly traced to the employment as the proximate cause, and which does not come from a hazard to which workmen would have been equally exposed outside of the employment. The disease must be incidental to the character of the business and not independent of the relation of employer and employee. The disease need not have been foreseen or expected but after its contraction it must appear to have had its origin in a risk connected with the employment and to have flowed from that source as a rational consequence.

Definitions in reporting laws.—Definitions of an occupational disease in reporting laws do not differ materially from those of workmen's compensation laws. The New York law, for instance, specifies that reportable diseases must be *contracted as the result of the nature of such person's employment.* The Michigan and Minnesota reporting laws define an occupational disease as follows:

An occupational disease, for the purpose of this statute, is an illness of the body which has the following characteristics:

1. It arises out of and in the course of the patient's occupation.

2. It is caused by a frequently repeated or a continuous exposure to a substance or to a specific industrial practice which is hazardous and which has continued over an extended period of time.

3. It presents symptoms characteristic of an occupational disease which is known to have resulted in other cases from the same type of specific exposure.

4. It is not the result of ordinary wear and tear of industrial occupation or the general effect of employment or the kind of illness that results from contacts or activities in life outside of the patient's occupational pursuits.

Pilot study definition.—For the purpose of the pilot study on occupational disease reports, the following definition was developed:

For reporting purposes, an occupational disease is any abnormal physiological condition due to a specific industrial hazard or hazards, other than traumatic injury. It is a disease entity, or a group of symptoms and signs, which in most circumstances will fit into the following categories. (It is recognized that differential diagnosis as to the occupation as a cause of the disease is sometimes very difficult.)

1. Occupational Dermatoses:

Examples: Contact dermatitis caused by primary irritants and sensitizers; oil acne; chrome ulcers; and epitheliomatous cancer.

2. Occupational Diseases Due to Dusts, Fumes, Gases, Vapors, or Mists:

Examples: Silicosis, asbestosis or other pneumoconioses; poisoning by lead, mercury, cadmium, arsenic, or other metals; poisoning by carbon monoxide, chlorine, nitric oxides or other gases; poisoning by benzol, carbon tetrachloride, carbon disulfide, or other organic solvents; and poisoning by insecticide sprays such as parathion and lead arsenate.

3. Occupational Diseases Due to Physical Agents (Nontraumatic):

Examples: Disease due to radiation, welder's conjunctivitis, or glass blower's cataract; caisson disease; heat exhaustion; impaired hearing due to noise; and tenosynovitis (nontraumatic).

4. Occupational Diseases Due to Infectious Agents (Excluding Secondary Infections Subsequent to Trauma):

Examples: Anthrax, brucellosis, Q fever, Newcastle's disease, byssinosis, and fungous diseases such as sporotrichosis and blastomycosis.

PART I—CURRENT REPORTING PRACTICES

Two broad types of occupational disease reporting schemes which are productive of data on a continuous basis are discussed in this section. The first concerns compulsory reporting of occupational diseases by practicing physicians and institutions to State and local health or, at times, labor authorities. The second involves reporting for compensation purposes through the filing with workmen's compensation authorities of employers' reports of work-injuries and of claims for disability due to accidents and diseases. The filing of claims may be considered reporting in that information on the nature and cause of the accident is reported by the employer or physician, or both, to a central agency according to prescribed requirements. The term *reporting* is thus used in a liberal sense. The discussions are limited to the continental United States.

Most of the States have laws requiring employers to keep records of work-injuries and to report injuries causing disability lasting longer than a specified period to the labor department, or to the workmen's compensation authority, or sometimes to both. The period specified usually varies from one shift to one or more days. Some laws apply to all employers, and others are limited to employers covered by workmen's compensation laws. Several States utilize reportable work-injury reports for tabulating causes of injuries in connection with their accident prevention programs, but the availability of these reports on a country-wide basis is limited, and hence they are not covered by this study. Reportable work-injuries may be limited to accidental injuries or may include occupational diseases, depending upon legal wording of the law and interpretation of "accident" and "injury."

To illustrate types of required reporting of occupational diseases and of injuries, requirements as they are written into laws are cited for two States, Connecticut and Minnesota.

Connecticut

General Statutes of Connecticut, 1949, Section 3867. This section requires "each physician having knowledge of any person whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, brass, wood alcohol or mercury or their compounds, or from anthrax or from compressed-air illness or any other disease, contracted as a result of the nature of the employment" to make a report within 48 hours to the State Department of Health. Reports made pursuant to the provisions of this section are not admissible as evidence in any action at law or in any action under the Workmen's Compensation Act.

Section 3754. This section requires "the person in active charge of any

manufacturing or mercantile establishment" to report within 15 days after occurrence, accidents resulting in death or causing absence from work for at least one week, to the Commissioner of Labor.

Section 7441. This section requires employers accepting provisions of the Workmen's Compensation Act to keep a record of injuries to employees resulting in incapacity for one day or more; and each week, or oftener, if directed, to send to the Commissioner in duplicate "such report of such injuries as the rules prescribed by the Board of Commissioners shall determine, with such notices of claims for compensation as have been served upon him within one week." The section further stipulates that no other report of injuries to employees shall be required by a department or office of the State from such employers. Duplicates of reports shall be transmitted to the Commissioner of Labor. (Personal injury, by definition, includes occupational diseases. The Workmen's Compensation Commission is composed of five Commissioners, each of whom has sole jurisdiction over his respective congressional district.)

Minnesota

Minnesota Statutes Annotated, Section 144.34. This section requires "any physician having under his professional care any person whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, brass, silica dust, carbon monoxide gas, wood alcohol or mercury, or their compounds, or from anthrax, or from compressed-air illness or any other disease contracted as a result of the nature of the employment of such person" to make a report within five days to the State Department of Health. Reports made pursuant to this section are not admissible as evidence in any action of law or in any action under the Workmen's Compensation Act.

Sections 175.28 to 175.32. These sections require every employer of labor to report any accident to an employee causing death or serious injury within 48 hours of occurrence, and of all other accidents incapacitating the person for more than the remainder of the day, shift or turn of which the employer or foreman has knowledge, within 14 days after occurrence, to the Industrial Commission. Reports so made are not admissible as evidence at trial of any action or in any judicial proceedings, except for prosecutions for violations of these sections.

Section 175.33. This section requires "every physician attending on or called in to visit a patient whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, or mercury, or their compounds, or from anthrax, or from compressed-air illness contracted as the result of the nature of the patient's employment," to make a report to the Industrial Commission. It is the duty of the Industrial Commission to enforce this section and it may call upon State and local boards of health for assistance.

Section 176.32. This section requires employers subject to the workmen's compensation law to report within 48 hours to the Industrial Com-

mission any accident which causes death or serious injury, and all other accidents within 7 days of occurrence, causing absence for more than the remainder of the day or shift on which injury was sustained. The section also requires every physician or surgeon examining, treating or having special knowledge of any compensable injury to an employee, within 10 days after receipt of requests in writing made by the Industrial Commission, to report all facts within his knowledge relative to the nature and extent of the injury. The law also stipulates that reports so made may be used for hearings, investigations and statistics.

Not covered in this study are also State reporting requirements for communicable diseases such as anthrax, brucellosis and Q fever which are frequently of occupational origin.

Compulsory Reporting of Occupational Diseases by Practicing Physicians

Extent of Reporting Laws

A potential source for information on occupational diseases is provided in legislation requiring physicians to report to State or local authorities attendance on or visits to patients suffering from occupational diseases. As of July 1953, 28 States are known to have such legislation. Ten States have adopted regulations through their health departments, and 18 States have statutory provisions making the reporting of occupational diseases mandatory. Several other States, including Arizona, California, Pennsylvania, Wyoming, and Illinois, enacted similar laws in the past, but these either have been written off the books or have simply passed into oblivion because of their ineffectiveness. A summary of current State legal provisions requiring physicians to report occupational diseases is shown in table 1.

Compulsory reporting of occupational diseases is not a new concept. It is often difficult to establish dates of present laws but, according to available information, several States, including New York, Michigan, and Wisconsin, passed their first laws as early as 1911. The Maryland law was first enacted in 1912; the New Hampshire law, in 1913; and the Rhode Island law, in 1915. The Ohio law requiring reports to be made to the State Department of Health dates back to 1913 and to the Industrial Commission, to 1921. While many earlier laws have been revised and broadened, a few are still in force in their original form. About one-half of the 28 States that now have laws or regulations passed them after 1936, when enactment of the Social Security Act made funds available for the establishment of public health programs, including industrial hygiene. One of the fundamental problems of the State industrial hygiene agencies was securing reports of occupational diseases for investigative purposes, and laws were passed with the hope of attaining this objective.

TABLE 1.—*Summary of legal provisions requiring physicians to report occupational diseases, by State*

State	Legal basis and date [1]	Occupational diseases currently reportable	To whom reported	Type of report form	Number of cases reported in 1950 or 1951
Alabama	Code of Alabama, Title 22, par. 7 (1092) (716)—1935.	Group B. Occupational diseases and injuries, viz., arsenic poisoning, brass poisoning, carbon monoxide poisoning, lead poisoning, mercury poisoning, natural gas poisoning, phosphorous poisoning, wood alcohol poisoning, naphtha poisoning, bisulfide of carbon poisoning, dinitrobenzine poisoning, caisson disease (compressed air illness), any other disease or disability of the nature of the person's employment.	State and county health officers.	Same as for other notifiable diseases.	None.
Arkansas	Regulation of State board of health—1947.	(1) Poisoning by arsenic, benzol or its homologues and derivatives, cadmium, carbon monoxide, chlorine, cyanide, formaldehyde, halogenated hydrocarbons, hydrochloric acid, hydrofluoric acid, hydrogen sulfide, lead, manganese, mercury, methanol (wood alcohol) methanol chloride, nitrous fumes, nitric acid, petroleum or petroleum products, phosphorus, sulfuric acid, carbon bisulfide, sulfur dioxide, zinc. (2) Synovitis, tenosynovitis, or bursitis due to an occupation involving continual or repeated pressure on the parts affected. (3) Chrome ulceration. (4) Compressed air illness. (5) Dermatitis, this is, inflammation of the skin due to oils, cutting compounds or lubricants, dust, liquids, fumes, gases or vapors. (6) Diseased condition caused by exposure to X-rays or radioactive substances. (7) Diseased condition of the eyes due to electric arc and welding, and cataract in glass workers. (8) Epitheliomatous cancer or ulceration of the skin or of the corneal surface of the eye caused by tar, pitch, bitumen, mineral oil or paraffin or any compound, product or residue of any of these substances. (9) Miners' nystagmus incurred in underground work. (10) Asbestosis. (11) Silicosis.	State health officer	Separate card form	Very few.

[1] Date refers to passage of original law or regulation when this information was available.

TABLE 1.—*Summary of legal provisions requiring physicians to report occupational diseases, by State*—Continued

State	Legal basis and date	Occupational diseases currently reportable	To whom reported	Type of report form	Number of cases reported in 1950 or 1951
Colorado	Regulation of State board of health—1941.	Anthrax; poisoning by aniline, benzine (petroleum ether), benzol (benzene), cadmium, carbon disulphide (bisulfide), lead, manganese, mercury, naphtha, tetra ethyl lead, toluene, turpentine; carbon monoxide asphyxiation; metal fume fever (brass); silicosis; silico-tuberculosis.	Local health officer	By telephone, in person, or writing.	3 cases reported in 1951.
Connecticut	General Statutes, sec. 872e—1935.	Poisoning from lead, phosphorus, arsenic, brass, wood alcohol or mercury or their compounds or from anthrax, or from compressed air illness or any other disease, contracted as a result of the nature of the employment.	State department of health	Occupational disease report form.	An average of 300 cases per year are received, chiefly dermatoses. In 1951, however, 749 reports were received.
Georgia	Regulation of State board of health—1941.	Any occupational disease	Board of health		None.
Iowa	Regulation of department of health—1938.	Silicosis; silicatosis; poisoning by phosphorus or its compounds, cyanide or any of its compounds, carbon monoxide, chlorine, ammonia, sulphur dioxide or any irritating gas, hydrogen sulphide or any other sulphide, benzol or nitro-, hydro-, hydroxyl-, and amido-derivatives of benzene, formaldehyde or its preparations, methyl chloride, carbon tetrachloride or any organic halide or solvent, volatile petroleum products (gasoline, benzine, naphtha, etc.), wood alcohol, sulphuric, hydrochloric or any other acid, nitrous fumes, chrome ulceration (nasal and skin); epithelioma (skin or eye) due to pitch, tar, bitumen, mineral oil, or paraffin, or any compound, product, or residue of any of these substances; poisoning from lead, zinc or brass, cadmium, mercury, arsenic, manganese or any of their compounds; radium poisoning or disability due to radioactive properties of substances or Roentgen rays (X-rays); metal fume fever (zinc fume fever, brass founder's ague, brass chills); conjunctivitis and retinitis due to electro- and oxy-acetylene welding or other radiant	Local health officer	Same as for all notifiable diseases.	Do

		energy; tenosynovitis or bursitis; dermatitis (infection or inflammation of the skin on contact surfaces due to oils, cutting compounds or lubricants, dusts, liquids, solids, gases, vapors, or fumes).			
Kansas	Regulation of State board of health—1943.	Poisoning by arsenic, brass, carbon monoxide, lead, mercury, natural gas, phosphorus, wood alcohol, naphtha, bisulphide of carbon, dinitro-benzine; caisson disease (compressed-air illness); any other disease or disability contracted as a result of the nature of the person's employment.	State board of health	do	Do.
Kentucky	Regulation of State board of health—1942.	Same as for Connecticut	City or county health officer.	Special report form (abbreviated).	11 cases of silicosis and 2 of lead intoxication reported in 1951.
Louisiana	Sanitary Code, Ch. 1, par. 1.02—1943.	Diseases resulting from occupation	Local board of health	Same as for all reportable diseases.	None.
Maine	Revised Statutes, 1944, Ch. 22, par. 71—1930.	Same as for Connecticut	State department of health.	Special report form (abbreviated.)	Do.
Maryland	Annotated Code of Maryland, art. 43, sec. 11—1912.	do	State board of health. Also to Baltimore City Health Department.	Same as for all reportable diseases.	None in 1951.
Massachusetts	General Laws, ch. 149, sec. 11—1932.	Any ailment or disease contracted as a result of the patient's employment.	Department of Labor and Industries (copies on request to State department of health).	Occupational disease report form.	*Too few reported to keep statistics.*
Michigan	Act 210, Public Act, 1937—1911.	Any occupational disease (since 1937)	State department of health	do	464 cases reported in 1951.
Minnesota	Minnesota Statutes annotated, sec. 144.34—1939.	Same as for Connecticut plus silica dust and carbon monoxide.	do	Occupational disease report blank.	*Very poor reporting* (letter). 1951—lead poisoning, 35; mercury poisoning, 3; dermatitis, 1; brucellosis, 1.
	Sec. 175.33—1913	Similar to Connecticut law with exception of brass, wood alcohol and clause "any other disease."	Industrial Commission (State and local boards of health may assist in enforcement).		Not ascertained.
Mississippi	Regulation of State board of health—1944.	Any occupational disease	County health officer	Same as for other reportable diseases.	None.
Missouri	Regulation of State board of health—1939.	(1) Occupational dermatitis (dermatoses). (2) Pneumoconiosis—silicosis, anthracosilicosis, asbestosis. (3) Poisonings—carbon monoxide, natural gas, lead, benzene (benzol), carbon tetrachloride, carbon disulfide, chlorinated naphthalene diphenyl, fluorine, hydrogen sulfide, nitrobenzine, ethyl dichloride, chloride, sulfur dioxide, methyl alcohol, ammonia, phenol, cyanide, zinc (metal fume fever), mercury, cadmium, arsenic, manganese, chromium, selenium, vanadium.	Deputy State commissioner of health.		Do.

TABLE 1.—*Summary of legal provisions requiring physicians to report occupational diseases, by State*—Continued

State	Legal basis and date	Occupational diseases currently reportable	To whom reported	Type of report form	Number of cases reported in 1950 or 1951
Missouri	Revised Statutes, 1939, sec. 10216—1929.	Physicians examining (monthly) employees exposed to antimony, arsenic, brass, copper, lead, mercury, etc., or other substances.	State board of health (copies to Commissioner of Labor).		
Montana	Laws of 1939 in special act—1939.	Any occupational disease	Division of Industrial Hygiene may request that report be made to it.	Special form	10 cases reported in 1950 and 1951.
New Hampshire	Public Laws, ch. 132, sec. 1—1913.	Same as for Connecticut	State board of health (copy to Commissioner of Labor).	Occupational disease report form.	Very few reports received.
New Jersey	New Jersey Statutes, sec. 34:6-54—1925.	"Every physician making an examination under sec. 34:6-53 and finding what he believes to be symptoms of lead poisoning * * * ."	State department of health and department of labor.		1 or 2 a year are reported to State department of health.
New Mexico	Regulation of State department of public health—1935.	Anthrax; asbestosis; caisson disease; glanders; infection or inflammation of the skin on contact surfaces due to oils, cutting compounds, or lubricants, dust, liquids, fumes, gases or vapors; silicosis; tenosynovitis and prepatellar bursitis; poisoning by arsenic, bisulfide of carbon, brass or zinc, carbon monoxide, carbon dioxide, dinitrobenzene, hydrogen sulfide, lead, manganese dioxide, mercury, naphtha, natural gas, phosphorus, benzol or by nitre and amide derivatives of benzol (dinitrobenzol, aniline and others), gasoline, benzine, or other volatile products, petroleum and its compounds and derivatives, potassium cyanide, radium, sulfur dioxide, wood alcohol; chrome ulceration. Any other disease, disability or injury contracted as a result of the nature of the person's employment.	Local health officer	Same as for other notifiable diseases.	None.
New York	Labor Law, sec. 206—1911	Same as for Connecticut with exception of "any other disease" clause.	Commissioner of labor	Occupational disease report form.	*Inadequate reporting.* Some reports received.
Ohio	General Code of Ohio, sec. 1243.1—1913.	Same as for Connecticut	State commissioner of health (copy to factory inspector).	do	482 cases, of which 304 were dermatoses, reported in 1950. "Many occur which are never reported." (Letter.)
	Sec. 6330-7—1913	Lead poisoning (uncovered through medical examinations of employees exposed to lead and its compounds).	State department of factory inspection and State board of health.		

	Workmen's Compensation Law, sec. 1465-99a—1921.	Occupational diseases covered by the act (full coverage).	Industrial Commission of Ohio.	----------	All information relative to occupational diseases comes from claims that are filed with the industrial commission for the payment of compensation, medical costs, etc. (Letter.)
Oklahoma	New Laws, 1953, Senate bill No. 60.	Law authorizes State board of health to designate reportable diseases. Accordingly, "any occupational disease" was designated.	State board of health	Special occupational disease reporting form.	New law.
Pennsylvania	Public Law 1363, act of 1913, sec. 478.	Lead poisoning (uncovered through medical examinations of employees working with lead and its compounds).	State department of labor and State department of health.	----------	Probably none.
Rhode Island	General Laws, 1938, ch. 255, sec. 18—1915.	Same as for Connecticut	Department of public health.	Occupational disease report form.	Probably none.
South Carolina	1932 Code No. 4—1937	Any occupational disease	State board of health	Weekly morbidity card	None.
Utah	Regulation of State department of health—1941.	do	State department of health	----------	Do.
Wisconsin	Wisconsin Statutes, sec. 6953—1911.	Poisoning from lead, phosphorus, arsenic, mercury, or from compressed air illness.	State board of health	----------	Do.

Despite the relatively long reporting experience in this country and the fact that compulsory reporting exists in over one-half of the States, reporting of occupational diseases by practicing physicians has never been considered successful or satisfactory. Among the many reasons attributed, lack of standardization and other shortcomings in the laws themselves are cited particularly.

Reportable Diseases

For one thing, there is no standardization in the type of laws or regulations governing reporting and in the number or kind of occupational diseases to be reported. Any or all occupational diseases, with or without definitions and qualifications, are reportable in nine States (Georgia, Louisiana, Massachusetts, Michigan, Mississippi, Montana, Oklahoma, South Carolina, and Utah). In six States (Alabama, Arkansas, Colorado, Iowa, Missouri, and New Mexico) the reportable diseases are named. In Arkansas, the list corresponds to the schedule of compensable diseases; in the other five States, the lists bear little if any resemblance to the schedule laws, since most reporting laws were passed before occupational diseases were made compensable. New Jersey and Pennsylvania limit the reporting to lead poisoning only.

Reporting laws in the remaining 11 States appear to be patterned after the British Factory and Workshop Act of 1895, which required every medical practitioner attending on or called in to visit a patient suffering from poisoning by lead, phosphorus, arsenic, or from anthrax to make a report to the chief factory inspector (*7*). Other diseases, such as poisoning by mercury, brass, and wood alcohol and compressed air illness, were added to this list from time to time. The reporting laws of New York and Wisconsin and one of the Minnesota laws confine the reportable diseases to these few. The laws in the other nine States (Connecticut, Kansas, Kentucky, Maine, Maryland, Minnesota, New Hampshire, Ohio, and Rhode Island) contain, in addition to these diseases and a few others, the terminating clause *any other ailment or disease, contracted as a result of the nature of the patient's employment,* which automatically brings all occupational diseases under the reporting law.

In general, occupational disease reporting laws are in the form of separate statutes or regulations, with some features, such as manner of reporting, patterned after communicable disease reporting laws. In a few States, however, namely, Alabama, Louisiana, and Missouri, occupational diseases are listed or mentioned as reportable along with other notifiable diseases.

The more comprehensive statutes are exemplified by the special laws enacted in Connecticut and Michigan, requiring that reports be made to the State department of health on specially prepared forms and providing for the investigation of reported and suspected diseases. Although the Connecticut law further stipulates that physicians be paid for making reports, reporting is believed to be far from complete. A similar payment provision contained in the Massachusetts law was eliminated in 1950 since it did not provide sufficient inducement for making reports.

The law is unique in Montana in that the Division of Industrial Hygiene of that State may request "a physician, hospital or clinical superintendent, and the State coal and quartz mine inspector, having knowledge of occupational diseases . . ." to make the report. In other words, reporting is not compulsory but is subject to request by the Montana Division of Industrial Hygiene.

Another interesting reporting device used by the States of Ohio, Pennsylvania, Missouri, and New Jersey is a law which requires that physical examinations be made periodically of workers exposed to certain toxic substances, and that all cases of poisoning thus found be reported both to the State health and the State labor authorities. In Ohio, Pennsylvania, and New Jersey, the law applies to exposure only to lead and its compounds; in Missouri, the law is more inclusive and covers exposures encountered in the manufacturing or processing of antimony, arsenic, brass, copper, lead, and other substances. Insofar as it can be ascertained, these laws are not enforced.

Mention should also be made of the reporting requirements in codes and statutes regulating work in compressed air. Most of these laws require medical officers in charge of medical locks to keep records of illness sustained by employees. Some laws further specify that cases of compressed-air illness are to be reported to the agency enforcing the law. Requirements of this type are found in the laws of New York, New Jersey, and Maine, where the enforcing agencies are the State departments of labor.

To Whom Reports Are Made

Another shortcoming which possibly bears on the limited success of current reporting is the lack of uniformity as to whom the reports are to be made. Legal provisions in 16 States require that reports be made to the State health officer; in two of these States, the local health officer is also mentioned (see table 1). In six States, the local health officer is named as the exclusive recipient. Experience has shown that, unless the local health department has its own occupational health program, there is less chance that reports of occupational diseases will be made since the incentive to encourage reports is lacking. Moreover, what few reports might be made directly to local health departments usually reach the State industrial health agency responsible for their investigation either late or not at all, or in a summary form along with other notifiable diseases.

In Minnesota and Ohio, physicians are required to report occupational diseases both to the State department of health and to the State industrial commission in accordance with separate laws. In actual practice, the Ohio Industrial Commission receives from physicians only those reports which involve claims. In two other States, Massachusetts and New York, physicians are required to report to the State department of labor. In New Jersey, Pennsylvania, and Ohio, separate statutes make lead poisoning reportable to both the State health and the labor authorities.

Several of the State laws provide for an exchange of reports. According

to the Massachusetts law, copies of reports of occupational diseases made to the Department of Labor may be referred to the State Department of Health on request; in three States, Missouri, New Hampshire, and Ohio, copies of reports made to the State health department must be transmitted to the State labor authorities. In nine States (Connecticut, Georgia, Minnesota, Montana, New Hampshire, Ohio, Oklahoma, Rhode Island, South Carolina) laws contain clauses to the effect that reports made in this manner are not admissible as evidence in any action at law or in any action under the Workmen's Compensation Act.

Reporting Forms

It is generally recognized that, for good reports of any kind, suitable reporting forms or blanks are essential. Four States—Connecticut, Michigan, Minnesota, and Ohio—that currently receive some reports from physicians provide special reporting forms. These are based on the so-called standard report form originally drawn up by the American Association for Labor Legislation and adopted in 1913 by the Ohio department of health (*8*). The form is divided into three sections, one section for personal data, another for occupational history, and the third for the medical report. The reporting law is usually printed on the back of the form along with a few instructions. Insofar as it was possible to learn, the States that now have or previously had forms similar to this type, in addition to the four mentioned, are Massachusetts, Montana, New Hampshire, New York, and Rhode Island. Three other States—Arkansas, Kentucky, and Maine—have an abbreviated card form with space for name, age, sex, address, diagnosis, and name and address of the employing company.

In the remaining States, occupational diseases are presumably reportable in the same manner as other notifiable communicable diseases. Since the communicable disease reporting card usually gives a bare minimum of information on the illness, this manner of reporting is inadequate for an occupational disease.

One of the main objectives of occupational disease reporting is to offer clues on the occurrence of occupational diseases so that investigative measures can be taken for the prevention of further cases. Statement of the name and address of the plant where the occupational disease was contracted is therefore particularly important. While some laws may specify that such information be reported, this item is likely to be overlooked unless provision is made for it on the report form.

Extent of Present Day Reporting

There is considerable justification in the belief that compulsory reporting of occupational diseases by physicians to health and labor authorities, as required by reporting laws, is notoriously ineffective. A canvass of the situation in the country showed that slightly less than 1,800 cases were reported to health departments in this country during 1950 or 1951. More-

over, 1,695 or 94 percent were reported by three States, Connecticut (749 cases), Michigan (464 cases), and Ohio (482 cases), the rest being reported by four States—Colorado, Kentucky, Minnesota, and Montana. When queried about their number of cases, the New York and Massachusetts industrial health agencies commented that the reports which they received were too few to be statistically important. The other 18 States with reporting laws received an occasional report or none at all; in fact, some of these States have never received any reports despite efforts to solicit the cooperation of physicians. Oklahoma passed its law in June 1953 and is therefore excluded from this canvass.

A crude index of under-reporting by physicians in the past as well as at present is furnished by a few States that have kept continuous records of reports received as contrasted with the number of occupational disease claims filed or awarded by compensation authorities. For example, in 1942, the Ohio Department of Health received 1,637 reports of occupational diseases from physicians (*9*). This figure may be considered fairly representative for the State, since it closely approximates the average number of reports that had been received annually by the Department in the 10-year period 1928 to 1937, when 12,931 cases were reported (*10*). In contrast, the Ohio Industrial Commission in 1942 received 5,597 occupational disease claims for compensation. The contrast was further borne out in 1950, when the Ohio Department of Health received 482 reports from physicians and the Industrial Commission, 4,574 claims for compensation.

The experience in Minnesota shows similar discrepancies; 61 reports were made to the State health department in 1950, as contrasted with 1,931 cases of occupational diseases closed by the Industrial Commission. Michigan has had a comparable experience. The State's present occupational disease reporting law was passed in 1937, also the date of the enactment of its occupational disease compensation legislation. Under this reporting law, according to the records of the Division of Industrial Hygiene of the Michigan Department of Health, physicians made the following reports:

Year	*Number of cases*	*Year*	*Number of cases*
1939	1,110	1945	793
1940	1,034	1946	553
1941	1,482	1947	775
1942	933	1948	613
1943	2,742	1949	513
1944	1,358		

During the 2 years, 1950 and 1951, covered by the pilot study, 1,074 reports were received, including cases uncovered during field studies and not otherwise reported, as well as cases of silicosis reported as a result of general X-ray surveys. According to the biennial report for the fiscal years 1948–50, the Michigan Workmen's Compensation Commission received reports of 1,993 compensable industrial diseases. Although the 2-year periods are not the same, these figures likewise indicate a large degree of under-reporting by physicians.

In Connecticut, figures for the 1937 fiscal period showed that physicians reported 127 cases of occupational diseases; during the same year, compensation claims were paid for 286 cases which were not among those reported (*11*). Comparable data for more recent years are not available. However, as a result of checking physicians' reports against compensation reports, the Connecticut industrial health agency has found that many of the later occupational diseases, too, have not been reported as required by law. It should be pointed out that the experience in Connecticut is unique because the number of cases reported in 1951 increased instead of decreasing or remaining at the same level. The number of reports generally received from physicians averages 300 per year. However, as a result of more contact with physicians during the 2 years that the Connecticut Bureau of Industrial Hygiene participated in the pilot study, the number of cases reported went up to 749 in 1951. This development certainly suggests the possibility that compulsory reporting of occupational diseases might have some merit, if encouraged actively.

Reporting of occupational diseases to the State Department of Public Health is not required by law in California, but this State's experience is cited to show the difficulty of drawing valid conclusions from State statistics on occupational diseases. According to the interpretation of the State Workmen's Compensation Act, all illnesses arising out of conditions of employment are defined as injuries. As such, they are compensable and legally reportable to the California Department of Industrial Relations by both employers and physicians. Of special interest here are reports made by physicians of all injuries they treat which result in a disability of 1 day or longer or require medical treatment other than first aid. The Department of Industrial Relations has been referring all occupational disease reports of this type to the Bureau of Adult Health of the California State Department of Health for over 15 years. The volume of reports of occupational diseases made and referred surpasses that of any other State in the country. Annual tabulations of the Bureau show that for the 1939 fiscal year, 4,231 reports of occupational diseases were tabulated; during the calendar year 1944, the number was 11,893; during 1949, it was 12,536; in 1950, 12,245; in 1951, 14,777; and in 1952, 20,482. Between 50 and 55 percent of the cases referred were dermatoses.

To what extent this continuing rise in the number of cases reported represents a real increase in the occupational disease problem is difficult to say. No doubt, increased compensation benefits, improved methods in handling reports, and selectivity of cases falling into occupational disease categories are factors reflecting improved figures. On the other hand, California has experienced a tremendous upswing in industrialization and, as a consequence, an increase in the labor force. This growth undoubtedly has contributed to a potentially greater problem with respect to some occupational health conditions.

Ineffectiveness of Compulsory Reporting

During the early field work when plans were being developed for the pilot study, opinions were sought from State industrial health staffs and others as to reasons for the ineffectiveness of compulsory reporting. First in importance was the difficulty in diagnosing occupational diseases by practicing physicians and the consequent failure to recognize them. This problem is pointed up by Dr. Mayers in a recent article (*12*):

> To the medical profession, the occupational diseases are always somewhat baffling because they have their origins in environmental conditions which are unfamiliar. Unlike the community environment, where the medical problems have always been largely epidemiological in character, the industrial environment—being manmade—presents problems in fields somewhat further removed from the physician's conventional training and experience; fields such as industrial toxicology or radiation, for example.
>
> Very few people realize that we have no reliable data at the present time as to the statistical incidence of any of the occupational diseases, principally because physicians fail to recognize them. With the best intentions in the world, a physician will not report a case of *Aplastic anemia* if it does not occur to him that it is occupational in origin. . . .

Other problems mentioned were the need for a standard definition of an occupational disease and delineation of categories of conditions to be included within it; criteria for differentiating between a disease and a traumatic injury, especially with respect to such conditions as conjunctivitis, tenosynovitis, bursitis and related afflictions, and chemical burns; and criteria for determining a reportable occupational disease. For instance, to what degree does the element of time and absence of disabling symptoms enter into determining a reportable disease? Does there have to be disability, or loss of time from work, or both? Usually silicosis is not disabling in the early stages; when is it a reportable disease? How can reports of the same case be controlled so that duplicate reporting will not inflate the actual number of cases prevalent? Likewise, a worker with a severe case of industrial dermatitis may remain at work, but at a different job. Is this a reportable disease? These are but a few of the specific points raised which need clarification.

Apart from shortcomings of the laws themselves, another reason is the failure to enforce them. Although penalty clauses are attached to a number of the laws, enforcement does not appear to be practical. Understaffing and the cost prevent State agencies from resorting to this measure, especially when they are faced with more serious violations in other fields.

Another reason is that physicians frequently are not familiar with the laws in their States. Many of the laws are old, and physicians can hardly be expected to know of their existence unless called to their attention. It is generally admitted that a fair degree of success can be anticipated only when close contact is maintained between the reporting physician or the industry and the agency to which occupational disease reports are sent. Maintenance of such close contact obviously has not been practical because of the financial

and staff limitations of the industrial health agencies which, in the final analysis, are responsible for stimulating reporting. However, Hayhurst, even as far back as 1925, commented (13):

In spite of the publicity given to occupational diseases in the state (Ohio) for over 12 years and in spite of circularization of physicians, who are the essential reporting agents, with literature and report blanks, the situation is still practically one of ignorance of the law on the part of nearly all of the physicians concerned. This is shown by the fact that physicians frequently send in a number of reports of cases in addition to one (or so) particularly called to their attention by the director of health, in the present checking back.

It is claimed also that physicians are loath to make occupational disease reports because they do not always know the facts. Their knowledge of occupational diseases, industry itself, materials handled, and the manufacturing processes involved is limited. They have neither the time nor the incentive to inquire further. Moreover, few physicians heed the age-old advice of Ramazzini to ask the patient not only how he is feeling but also *of what trade are you?*

Resistance to a compulsory reporting system on the part of physicians or any professional group is recognized as a factor. No doubt, many of the physicians are of the opinion that reporting occupational diseases violates the confidence of the physician-patient-employer relationship. On the other hand, that physicians will report is attested to by the huge volume of physicians' first reports of work-injury received by the Department of Industrial Relations in California. Such reports are not only required by law, but a further incentive is also provided. To be eligible for payment by the insurance carrier, physicians are required to furnish reports on all cases treated. Moreover, such reports are essential in the event that the worker may wish to file future claims for compensation, should his disability last beyond the legal waiting period. Otherwise, both physician and worker are likely to be penalized.

California's experience also seems to substantiate the claim that compulsory reporting will never be successful unless it is associated with reasons other than that of collecting statistics. Dorn, in a recent article on morbidity reporting, made the following statements (*14*):

As a source of morbidity data, universal reporting by physicians rarely has been satisfactory. Even when the information to be reported has been reduced to the barest essentials, in many instances to nothing more than the number of cases of disease, reporting has been seriously incomplete. . . .

Universal reporting, wherever it has been even partially successful, has been required for administrative or legal purposes. This is true for the registration of births, deaths, marriages, divorces, infectious diseases, and occupational diseases. The statistical data resulting from this registration arise as byproducts of the system and are not the primary reason for its existence.

A similar thought was expressed almost 20 years ago by the International Labour Office (*15*):

It must, however, be frankly admitted that for a long time back authorities on industrial medicine have been unanimous in their opinion that compulsory notification of occupational diseases does not provide accurate information as to the occupational risk to which the workers are exposed unless it is carried out by all doctors and with all possible care. Unfortunately, the long-existent practice in certain countries (in the Netherlands, for instance, where a doctor's fee is paid for every case notified) does not confirm this hope, and notification can only be effective where it forms one element in a system of insurance.

And finally, another factor which may have some bearing on ineffective compulsory reporting practices concerns educational campaigns aimed at their improvement. While there has been much talk about stimulating reporting of occupational diseases, little, if anything, of a practical nature has been done to assist practicing physicians in becoming familiar with a difficult subject, or with the circumstances in industry that give rise to diseases of occupation.

Reporting for Compensation Purposes

The utilization of compensation statistics as a source for securing general statistics on occupational diseases is an exploratory effort confined primarily to published reports of workmen's compensation authorities. In many States workmen's compensation authorities are required by law to publish annual or biennial reports which, as a rule, are available to the public. That these reports are not used extensively by industrial health personnel is suggested by the fact that relatively few references to them are found in literature on occupational disease prevalence. Moreover, such references are confined to one State or to one phase of compensation statistics.

Reasons cited for the failure to utilize these data are that State workmen's compensation reports are not comparable and are especially difficult to interpret. These criticisms are well founded, as will be pointed out later. Despite their shortcomings, however, compensation statistics appear to offer considerable information on the occurrence of occupational diseases and, hence, are being scrutinized as to their potential usefulness.

Moreover, State industrial health agencies, whose functions concern prevention and control of occupational diseases, are finding that information filed with or reported to the workmen's compensation agency offers good clues to where occupational diseases are occurring. At least 16 industrial health agencies in State departments of health have arrangements with compensation authorities for referral of occupational disease claims, used in connection with their investigations. These will be discussed later in the part on the pilot study, the present discussion being limited to published or unpublished data on compensation statistics.

Extent of Laws Providing for Compensation for Occupational Diseases

A factor in favor of reporting for compensation purposes is the comparative extensiveness of coverage by laws providing for compensation for occupational diseases. As of July 1953, 46 States, the District of Columbia, Alaska, Hawaii, and Puerto Rico compensate for one or more occupational diseases (*16*). In 30 of these jurisdictions, laws provide for full coverage; and in 20 jurisdictions, for schedule or limited coverage of occupational diseases. The Alabama law, which went into effect in July 1952, limits coverage to the *disease of pneumonoconiosis.* Louisiana and Vermont both passed schedule laws in 1952, and Kansas and Oklahoma in 1953. Montana has a separate welfare act which allows for monthly benefits for permanent disability from silicosis, provided that the person has resided in the State for 10 years. The other laws with schedule coverage list from 9 to 46 diseases. The two States which do not compensate for any occupational diseases at present are Mississippi and Wyoming.

Compensation Reports as a Source of Data

Workmen's compensation authorities in States compensating for occupational diseases were canvassed for copies of their most recent annual or other periodic report for use in this study. It was found that while the published reports contained a vast amount of information on location of injuries, nature and cause of injuries, the extent of disability, and costs, occupational diseases were not always mentioned and that, when considered separately, the data were not always uniform or understandable.

Thirteen of the published reports [1] which were received contain data on at least the nature or cause of specific occupational diseases. Reports published by New York, Pennsylvania, New Jersey, Illinois, Wisconsin, Minnesota, and Washington were found to be among the more comprehensive and detailed ones. In 8 reports,[2] occupational diseases are treated as one group. Reports for 11 other jurisdictions [3] do not mention occupational diseases either separately or as a group but, it is assumed, combine them with injuries. Since the laws in four States are of recent passage, it would be too soon to expect any information from them. Three States—Arizona, Massachusetts, and Ohio—and the Federal Bureau of Employees' Compensation provided some unpublished information on occupational disease claims.

[1] California (in monthly reports only), Illinois, Maryland, Minnesota, Nebraska, New Jersey, New York, North Carolina, Pennsylvania, Virginia, Washington, West Virginia, and Wisconsin.

[2] Arkansas, Florida, Indiana, Michigan, Missouri, New Hampshire, New Mexico, and Oregon.

[3] Alabama, District of Columbia, Georgia, Idaho, Kentucky, Nevada, North Dakota, Rhode Island, South Dakota, Tennessee, Vermont.

The remaining 10 States[4] either published no reports or did not reply to requests for such reports. Thus, by depending solely on published reports or, in the absence of these, on unpublished tabulations offered by some agencies, statistical information on occupational diseases from workmen's compensation agencies was found to be available from only 24 of the 46 States which compensate for one or more occupational diseases and from the Federal Bureau of Employees' Compensation. Availability of even a minimum amount of information on the number and kind of occupational disease claims filed or closed in the other States processing compensation data would indeed add to the presently limited reservoir of statistics.

Basis for Compiling Compensation Statistics

Most of the compensation agencies pattern their statistical tabulations after the recommendations in the *Manual on Industrial Injury Statistics* of the Bureau of Labor Statistics (*17*). This bulletin describes the administrative details involved in processing compensation and work-injury reports and offers suggestions for standard forms, codes, classifications, and presentation of the statistics in tabular form. It urges uniformity and clarity of language in describing the data. Published reports reveal that this plea has not always been heeded. Although the manual does not suggest an occupational disease classification, it recommends that *industrial or occupational diseases* be treated as one of 11 categories on nature of injury. The following reason is offered for this recommendation:

> No industrial disease classification is suggested here. Instead, it is recommended that any analysis of such diseases be based on the tabulation of the substances which gave rise to the various diseases. A list of industrial diseases, if compiled at all comprehensively, might name as many types of poisonings as there are harmful chemicals. The list of such chemicals is constantly expanding as the science of chemistry grows and develops. Many of the chemicals recognized as poisonous today were not in use, and probably not even known, 5 years ago.

Since 1940, the date of the publication of the Manual, the number of States compensating for occupational diseases has increased to 46, with corresponding liberalization of coverage and benefits. The fact that 13 of the recently published reports contain separate statistics on occupational diseases points to a growing tendency to consider occupational diseases in more detail and to the consequent need for suggesting standardized procedures in handling them.

Variations in Presentation of Compensation Statistics

Further analysis of the State compensation reports revealed that no two States compiled their compensation statistics on occupational diseases in

[4] Colorado, Connecticut, Delaware, Iowa, Louisiana (new law), Maine, Montana, South Carolina, Texas, Utah.

tional diseases in 5 [5] out of 16 schedule laws examined.[6] They are reported among occupational diseases by 7 of the 28 States for which incidence data were collected for this study. As to whether they should be classed as injuries or as occupational diseases, opinions differ widely. In this study, they are classified under miscellaneous conditions since no agreement could be reached for their inclusion among skin diseases, or even in the tabulations.

Chemical burns, as well as burns from cement, lime and similar alkaline substances, are usually included among work-injuries. However, if they result from long and slow exposure, they are considered occupational diseases. In view of the character of the reports of claims filed with compensation agencies, it seems that the fact of repeated or accidental exposure would be difficult to establish.

Tenosynovitis, synovitis, and related conditions.—These conditions are regarded as injuries in some States and as occupational diseases in others, or disregarded altogether. Seven [7] of the sixteen schedule laws examined list them among occupational diseases. They are classed as occupational diseases by 18 of the 28 States for which data on incidence were collected. They are compensated as occupational diseases in States with full coverage, such as New York, Illinois, Oregon, Wisconsin, and Ohio. Physicians seldom report these ailments to health or labor authorities.

In one State visited, it was learned that the clerk codes all such conditions as injuries if the word *accidental* appears in the claim report; if not, they are coded as occupational diseases. The impression is that distinctions made are artificial rather than real and, as a result, contribute to a confused idea of their extent in industry.

Conjunctivitis.—This condition, particularly *flash burns* or welder's conjunctivitis, likewise is listed as a compensable occupational disease in 5 [8] of the 16 schedule laws examined. Conjunctivitis was considered, or compensated as, an occupational disease in 9 of the 28 States for which incidence data were collected. In most States where eye conditions are compensable, they are classed as injuries.

Hernia.—Most of the States consider and compensate for this abnormality as an accidental injury. The report of the New York Workmen's Compensation Board on compensated cases closed in 1949 showed 318 cases under occupational diseases and 9,022 under accidental injuries (*19*). In Michigan, hernia was reported by physicians to the health department along with other occupational diseases. For the purposes of this study, hernia was excluded from all tabulations except those showing relationship of occupational diseases to all injuries.

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[5] Arizona, Arkansas, Maryland, North Carolina, and Texas.

[6] Arizona, Arkansas, Colorado, Georgia, Idaho, Iowa, Maine, Maryland (full in 1951), New Hampshire, New Mexico, North Carolina, Pennsylvania, South Dakota, Tennessee, Texas, and Virginia (full in 1952).

[7] Arizona, Arkansas, Iowa, Maryland, New Mexico, North Carolina, and Texas.

[8] Arizona, Arkansas, Iowa, Texas, and Virginia.

Duration of exposure.—As has been previously intimated, duration of exposure is sometimes a determining factor in distinguishing between an accidental injury and an occupational disease. For example, the New York and Illinois compensation reports use this distinction in the statistical treatment of compensable cases closed. According to the New York report (*19*), "Accidental injuries result from unexpected mishaps, sometimes from single contacts with injurious substances. Occupational diseases, however, are the result of occupational activity or exposure to injurious substances, usually over a period of time." In other words, the same substance or hazard may give rise to an accidental injury or to an occupational disease entity, depending upon the manner of occurrence. The following figures, excerpted from table 50 of the New York report on compensated cases closed in 1949, illustrate this point. The table classified 3,904 closed cases due to *chemicals, explosives, dusts, and other harmful substances,* according to substance, with a breakdown for both accidental injuries and occupational diseases.

Substance	All diseases and injuries	Occupational diseases	Accidental injuries
Gases	118	18	100
Organic solvents	158	121	37
Soaps, cleansing powders	306	288	18
Cyanides (plating solution)	48	26	22
Poison ivy	172	160	12
Bacteria and parasites	313	288	25
Radiations and radiating substances	7	4	3
All other chemicals and similar substances	632	445	187

By the same token, the report elsewhere shows 10 cases of loss of hearing under occupational diseases and 185 cases under accidental injuries. Similar differences appearing for hernia cases were mentioned previously.

The Illinois annual report on compensation cases closed in 1950 (*20*) states, "Occupational diseases differ from accidental injuries in that they are the result of continuous or repeated injurious exposure in the course of employment rather than from isolated mishaps or occurrences."

In one of the tables classifying work-injury cases closed by agency group and accident type (table 27), the following classification and number of cases are shown:

Chemicals—inhalation, absorption, swallowing	989
Dusts and biological agents—inhalation, absorption, and swallowing	148

Some of these are no doubt classed as accidental injuries, for the report shows for *occupational diseases* a total of 796 cases closed during 1950. Of this number, 64 were classified as *industrial poisoning,* and 121 cases were attributed to dusts and biological agents.

To what extent this same viewpoint prevails in other State reports is hard to tell since similar explanations and details are generally lacking.

Value of Compensation Statistics on Occupational Diseases

Judgment varies on the value of compensation data as a source of general statistics on occupational diseases, leaning more to the questionable side. It is contended that the inherent difficult nature of occupational diseases, coupled with the principle of compensation as it applies to occupational diseases and is practiced in the different States, precludes comparable and conclusive results. There is no denying this fact, but it is hardly justification for not at least attempting to improve the data that do stem from this source.

One specific objection is that compensation is concerned primarily with the provision of medical care and prompt payment of benefits to the injured worker. Most compensation authorities are not actively concerned with the prevention of diseases, and hence are indifferent to securing usable good reports of occupational diseases.

Another criticism centers on the reliability of reports made for compensation purposes. Johnstone, discussing the role of the physician in workmen's compensation, reflects on the accuracy of such reports in the following summation (*21*):

1. Claims for an illness due to occupational environment run the gamut from Bell's palsy to athlete's foot.[9] Any disease man is heir to is apt to be alleged as arising from occupation.

2. Since this is so, there is frequently a failure to discriminate between a nonoccupational disease and an occupational one.

3. There exists frequently a failure to differentiate mere exposure from an environment constituting an actual hazard.

4. The more accurate diagnoses come from those physicians engaged entirely in industrial medicine. The inaccurate are more apt to come from physicians engaged part time, or only rarely, in this phase of medicine.

5. A large percentage of the errors in diagnosis can be traced to irresponsibility or disinterest on the part of the physician. He has failed to visualize the philosophy of compensation. Many feel it is easier to accept or deny a case automatically than to ferret out the actual cause of illness.

It is further contended that because of the difficulties of determining industrial causes, many diseases of nonoccupational origin are treated and compensated as occupational ailments. Likewise, controversies over the eligibility of cases for compensation often result in disallowing payment for legitimate occupational diseases. Relatively few claims are investigated or confirmed by compensaton or health authorities. The huge volume of claims for accidents and diseases handled by compensation authorities makes such undertakings difficult. Many, too, are so trivial in nature that their investigation would not be economically practical. These factors, no doubt, contribute to the unreliability of data. Insofar as it is known, however, the extent to which this situation prevails has not been ascertained scientifically.

Also disputable is the use of compensation data on closed cases for incidence statistics. Closed cases, as reported in compensation reports, do not

[9] One of the pilot study States reported a case of *athlete's foot, on the hands, in an operator in a slenderizing salon.* (Author's footnote.)

necessarily connote occurrence in the period under consideration. Sometimes several years may elapse before a case is closed by final payment or death and before it finds its way into statistics. For example, the 1950 Annual Report on Industrial Accidents in Illinois (*20*) shows that of the 46,308 work-injury cases closed for the first time during 1950, only 52 percent occurred during that year; 39 percent were sustained in 1949 and 7.5 percent, in 1948; the rest dated back to other years. Time lapses of this type may prove a disadvantage in the use of such statistics for incidence purposes.

The method of filing claims and reporting work-injuries by employers and physicians also elicits some criticism. With but few exceptions, the same forms and procedures used for accidental injuries are also used for occupational diseases. Moreover, it is maintained that *first reports* required of physicians usually cover preliminary findings which do not necessarily reflect the final diagnosis. While in accidental or traumatic injury there is seldom any doubt as to the cause and nature of the injury, in the case of an occupational disease the entire set of circumstances is subtle and difficult. As a result, accident reporting forms and procedures are not considered satisfactory for many occupational diseases.

In making these observations, and pointing out limitations of compensation statistics, it should be emphasized that there is no intention of being critical, except in a constructive sense. Specific references to material contained in State compensation reports are made merely to illustrate the many areas of variations discussed. The shortcomings described are frequently due to the laws themselves and are typical of data on work-injuries in general. Furthermore, it is realized that the basic objectives of compensation do not concern the singling out of occupational diseases any more than of other categorical types of work-injuries. It so happens that in this country the prevention and control of occupational diseases is recognized as a specialized activity, centered for most part in health departments. Although responsible for such programs, too frequently industrial health units are not the ones that receive reports on where and how occupational diseases are occurring and, therefore, must look to other agencies for such information.

Discussion

Occupational disease reporting by physicians is not yielding a satisfactory contribution to national statistics. It has not done so for 40 years. Even in the few States that do receive some reports, under-reporting is pronounced as contrasted with claims filed with workmen's compensation authorities.

There is no single solution of the problem, just as failure cannot be ascribed to any one cause. However, the evidence presented here would seem to indicate the need for re-evaluating the principle as well as the procedure of compulsory reporting of occupational diseases in this country. Certainly, a system of some character is necessary, for without reporting we can have no knowledge of where and how new illnesses are occurring. It is not within

the scope of this study to propose what form such a system should take. Recommendations should be developed through the group thinking of agencies accountable for enforcing reporting laws, of those responsible for the prevention and control of occupational diseases and, obviously, of the medical profession since the obligation for reporting falls on the physician. Any practical scheme which may be advanced should define clearly the diseases to be reported and the system of reporting in relation to present-day problems. Also, prime consideration should be given the many current demands on physicians for various records and reports.

In contrast with compulsory reporting by physicians, reporting for compensation purposes holds promise as a source for securing general statistics on occupational diseases. There is a great deal of information on occupational diseases in reports published by compensation authorities, and more is implied in the processing of the information reported. Objections to utilizing this source for prevalence statistics are numerous but, in the total absence of data, it is believed that the potentialities of compensation statistics should not be disregarded. Problems concerning the recognition and diagnosing of occupational diseases and lack of uniformity in laws are characteristic not only of compensation statistics, but also of compulsory medical reporting. These are not easy to solve. On the other hand, many of the difficulties which now contribute to the incomparability and difficulty of using the State compensation data on occupational diseases are technical in nature and are amenable to solution.

Inclusion of occupational diseases within the compensation acts is the result of a gradual evolution in this country and comparatively little constructive guidance has been given the compensation authorities in the processing of discrete information on occupational diseases. Difficulties have been recognized; but they have been accepted with more or less apathy. Any and every constructive measure adopted for improvement of compensation statistics would be of benefit to all groups concerned.

PART II—THE PILOT STUDY

Background of the Study

The pilot study was originally undertaken to test the feasibility of developing a national reporting system for occupational diseases. As such, it represents the only known effort at uniform collection of occupational disease reports over a period of time involving a group of States with various methods of obtaining reports. The pilot study was carried out in cooperation with the divisions of industrial health in 11 State departments of health. States covered were Connecticut, Florida, Georgia, Indiana, Michigan, Missouri, New Hampshire, Oregon, South Carolina, Tennessee, and Wisconsin. They were selected in order to obtain average representation of different reporting practices. They also represented States that were willing to participate in such a project. Calendar years 1950 and 1951 were covered during which time the participating States transmitted to the Division of Occupational Health, Public Health Service, individual reports of occupational diseases coming routinely to their attention.

During the preliminary planning of the study, each participating State was visited and agreed on the type of report form and the definition of occupational disease to be used for this purpose. Problems of reporting were also discussed. The form developed, known as the Transmittal Form of Occupational Disease, was kept simple and 5 x 8 inches in size. Each State was supplied with a quantity sufficient for its use. The information sought was restricted to age, sex, and occupation of the employee, the name of the employing firm and type of industry, diagnosis, date of onset of the illness, and the cause of the disease. The form contains no item on length of disability, although this information is highly desirable, because the States seldom, if ever, receive it.

The definition of a reportable disease developed for the pilot study has already been mentioned. It was printed on the reverse side of the transmittal form as a reminder and an educational aid.

When soliciting the participation of the States, the Division of Occupational Health agreed at the outset not to press for any lacking data or to request better information on diagnosis and cause. It was accepted that the information appearing on the form would be the best obtainable under the circumstances. Moreover, the transcribing of the information onto the transmittal form required an additional effort of already understaffed agencies. In some instances, supplementary information was provided on the number of employees in the plant where the illness occurred, whether the case was investigated, or whether the diagnosis was confirmed by laboratory tests or other means. However, not enough information of this type was received to warrant any reliable analyses.

Sources of Reports Transmitted

The idea of developing a national reporting system based on compulsory reports of physicians alone was soon abandoned when it was learned how relatively few reports were being made in this manner. It became clear, even during the early field work, that a national reporting scheme would have to consider other sources of reports as well if it were to succeed. This was realized by State industrial health agencies which, long discouraged with results of compulsory reporting by physicians, were depending on workmen's compensation agencies for reports of cases occurring in industry. In their capacity as impartial fact-finding bodies these agencies often assist the compensation authorities in making studies of the working environment where the disease has allegedly been contracted.

To reflect actual reporting practices in the States, the base of the pilot study was consequently broadened to include reports referred from workmen's compensation authorities. During the 2-year period covered by the study, 9,058 reports of occupational diseases were submitted by the 11 States. Of this total, 77 percent consisted of reports referred to the health departments by compensation agencies. Reports to health departments by physicians accounted for only about 20 percent; the remaining 3 percent comprised reports of cases encountered or reported unofficially during investigations of occupational health hazards, reports of pneumoconiosis uncovered through mass X-ray surveys, and some reports of cases taken from death certificates.

Although reporting by physicians of occupational diseases to the health department is mandatory in 6 of the 11 participating States (Connecticut, Michigan, New Hampshire, Georgia, South Carolina, and Wisconsin), Michigan is the only State which submitted reports received almost entirely from this source. About three-fourths of the reports submitted by Connecticut were made by physicians; the rest were referred from the Industrial Commission or obtained from death certificates. Some of New Hampshire's reports were made by physicians to the State health department, but the majority were referred claims.

Ten of the State industrial health agencies participating in the pilot study together with at least six other State agencies depend entirely or partially on reports from workmen's compensation agencies. These are referred to them under informal agreements, except in Georgia, where the referral is required by law.

Information obtained on each case is usually brief but sufficient for investigative purposes in locating plants in which occupational diseases are occurring. It consists at least of the name of the employee, the name and address of the employer, the nature and cause of illness, and the date of onset. The type of cases referred comprise employers' reports of injury filed in connection with claims in Florida, Oregon, South Carolina, Tennessee, and Georgia, and employers' morbidity reports of disabling work-injuries in Indiana and Wisconsin.

In Florida, for instance, the reports consist entirely of claims for disability from occupational diseases referred to the State board of health by the State industrial commission. Both the employer's first report of injury and the surgeon's first report rendered after initial treatment of the patient are used. When the surgeon's report is late, the coding clerk copies off information on cause and diagnosis from the employer's report. According to the Industrial Commission, very few cases sent in this manner are denied compensation, since the employer presumably would report only those cases of whose occupational origin he is certain.

A detailed analysis of the reports submitted for the pilot study is contained in the appendix.

Quality of Reports

In assessing the quality of reports submitted in the pilot study, several facts should be kept in mind in addition to the problems previously discussed. First, the information was used in the form in which it had been submitted, for it represented the best that could be obtained without further inquiry or investigation. As such it may be considered typical of the kind of reports of occupational disease being made today. Second, a large proportion of the reports had their source in occupational disease claims for compensation. This circumstance raises several questions also affecting the validity of the information. For the purposes of the industrial health agency, the reports serve adequately as clues as to where occupational diseases might be occurring. As a basis for determining the prevalence of occupational diseases in an area, the reports have possibilities but also limitations, many of which are difficult to resolve under the present concepts of reporting occupational diseases.

Reports varied in quality from State to State as well as within individual areas, depending on how the report originated. Differences cannot be ascribed to any one cause; they are due to many factors inherent in the recognition and reporting of occupational diseases. In general, physicians' reports were likely to be weak on etiology; employers' reports, on the nature of the disease. It was noted that, in many instances, better reports resulted when the information was abstracted from both employers' and physicians' reports. Omissions, inaccuracies, and incompleted items were characteristic of all types of reports.

Most unsatisfactory were probably statements on the cause or substance responsible for the occupational disease. While many of the statements relevant to the occupation and the specific work carried on seemed reasonable, some appeared to be questionable. For many of the occupational diseases, information of this kind is difficult to obtain even under the best of circumstances. A basic difficulty is that, under the present reporting schemes, whether the report be made by a physician or the employer, the weight of the explanation of how the injury or occupational disease occurred generally falls on the worker. While an average worker can tell how he broke his arm, he can hardly be expected to know what caused the rash or

the chemical intoxication, or even whether the illness was associated with his work or was nonoccupational in origin. Yet, it is usually the worker's interpretation that is recorded and eventually tabulated.

As has been previously mentioned, one of the basic uses of occupational disease reports by the industrial health agency is for the investigation of health hazards known or alleged to cause illness, in order to prevent the occurrence of additional cases. Such investigations, however, are usually confined to reports of systemic intoxications, outbreaks of dermatitis, and other serious conditions. Isolated cases of dermatitis, tenosynovitis, conjunctivitis, and other less serious conditions are not followed up routinely, for they are too numerous and agency staffs are not large enough to make all the necessary visists. Moreover, because of the time allowed for filing claims, some reports are received too late to be of real investigative value. For this reason, the proportion of the reported cases investigated in the pilot study probably did not exceed 15 or 20 percent.

The following statements of cause and diagnosis, selected more or less at random from the reports transmitted, illustrate not only the quality of information contained in reports, but also the difficulty in scientifically coding such data:

Rash on fingers from vegetable acid. Allergic eczema of hands. Working with oyster shells in water.

Poison on arms and face, allergic dermatitis. Working in muck.

Acute eczematous dermatitis with secondary infection. Allergy to chlordane used in insecticides.

Cement poisoning on hands, arms, and forearms.

Muck poisoning. Infected with muck itch.

Industrial dermatitis of both hands and arms. Allergy to some kind of product. Handling vegetables.

Allergy and dermatitis; hands sore from citrus.

Citrus acid poisoning on both hands. Infected paronychia.

Dermatitis, alkali. Handling cement.

Infection at base of thumbnails. Peeling grapefruit.

Chemical dermatitis on arms. Handling okra and cucumbers which had a preservative on them.

Fungus infection of left hand, handling fish.

Folliculitis, furunculosis and impetigo, both forearms. Contact with oil.

Purulent dermatitis with crusting over entire face. Not given (cause) except poison from citrus trees.

Dermatitis, generalized. Infection due to paint spray.

Infection. Handling fresh meat.

Allergy to paint remover, itching of skin. Cleaning paint from jalousies with fluid.

Infection of leg. By fungus. (Worked for rural electrification company.)

Infection of right palm. Aluminum poisoning, working in shop.

Fungus dermatitis. Caused from climbing poles.

Contact dermatitis, left thigh. From crawling under house.

Dermatitis, both hands. Cause is fish poisoning.

Dermatitis fungus. From handling lettuce and other vegetables.

Exfoliative dermatitis—allergic to asbestos and lime, apparently.

Infested with creeping worms over entire lower limbs. Working with sand.

Skin allergy caused by lye in soap which had accumulated on washing machine being repaired.

Chrome poisoning. Generalized excoriated papular dermatitis. Splashed with tanning solution containing salts.

Dermatitis of both hands. Caused by cowpox infection from milking.

Dermatitis finger tips (frostbite). Due to handling ice constantly.

Chrome poisoning on feet.

Occupational dermatitis, allergic rash. Working in the woods.

Cellulitis legs, bilateral. Scratched legs on debris under a house and contracted dermatitis.

Dermatitis. Insect bite. (Employee was a bus operator.)

Corn poisoning on arms and hands.

Fungus infection between fingers of each hand. From scratches on turkey bone.

Oil folliculitis, erythematous. Papular eruption with pustules about hair follicles and occasional comedones, right forearm. Oil (grease).

Dermatitis venenata. Erythematous patches, vesicular eruption hands and wrists. Oil.

Dry, burning on hands. Red, scaling eruption. Solvent.

Contact dermatitis. Itchy rash, eyes, face, hands and arms. Formaldehyde.

Allergic dermatitis, urticarial. Welts and itching. Synthetic resins and chemicals.

Allergic dermatitis of hands and forearms, probably caused by some external irritant at work. Rash of hands and arms. Chromium and compounds. (Physician's report.) Workmen's compensation report stated "Dermatitis on hands and arms."

Overexposure to soldering fumes. Dizzy spells, nosebleeds, headaches, generalized nervous condition. Gases. (Worker was a solderer.)

Chronic bronchitis. Dust-free silica (compensated).

Bronchitis. Wheeze, nocturnal cough. Formaldehyde.

Industrial chemical intoxication. Semicoma, cyanosis, disorientation. Ketones.

Chemical toxicosis, occupational. Painting walls.

Swollen glands and hives, pain and itching. Fertilizer or allergy.

Tenosynovitis, right hand. Inflammation of tendons. Cleaning out newly installed sprinklers in irrigation system.

Paint poison—lungs ideopathic, anemia severe. Painting cars.

Acute bronchitis. Working with castor meal, it irritated his eyes and throat.

Bronchial irritation. From inhalation of irritating gas (welding and machine shop).

Bronchitis, was cleaning out No. 4 agitator and started to cough and spit blood. Chemical irritation (phosphorus works).

Right wrist swollen just above wrist, very painful. Happened during course of plastering.

Pain and tenderness of flexor muscles of left forearm. From continuously piling lumber.

Lungs congested, throat inflamed, sinus congested. Fumes from spray gun.

Pain and stiffness, left shoulder and arm. From hanging turkeys.

Ganglion cyst, right wrist flexor surface. Constant lifting or twisting of arm while picking berries.

Headache, faintness. Inhaled exhaust fumes from gas-driven roller employee was operating.

Infected lungs from dust. Irritation of respiratory system from dust. (Occupation—logger.)

Cough, nausea. Checking trees for thinning, spray poisoning.

Respiratory poisoning due to dimethylsulphate.

As can be seen from the above illustrations, some of the diagnoses are satisfactory; others are vaguely worded, questionable, or incomplete. The indiscriminate use of such terms as *allergy* and *poisoning* adds to the confusion of identifying the true nature of diseases, and, hence, of classifying them.

It was also noted that certain diagnostic lay terms are used in association with the trade or occupation, often suggesting apparent frequency of such illnesses. Some of those reported in the pilot study are: cement poisoning, clay poisoning (in potteries, referring to a dermatitis), muck poisoning, hemlock poisoning, wood poisoning, lumber poisoning, timber poisoning, salad maker's disease, turkey poisoning, corn poisoning, bean poisoning, food handler's disease, fruit poisoning (pears), citrus poisoning, grain itch, hop poison, packer's wrist, and dust fever.

On the whole, the quality of reports of occupational diseases may well be considered as contributing to the poor information available. However, in view of the difficulties involved, the reports should not be condemned as useless or totally unreliable, but their limitations understood and interpretations made accordingly. The reports do furnish material for an approximate estimation of the situation which is the best that can be expected from our present reporting schemes. However, any future plans aimed at better reporting, whether on a State or National level, should consider the quality of reports as one of the important areas needing improvement.

Frequency of Occurrence of Occupational Diseases in Same Companies

The 2 years covered by the pilot study afforded a good opportunity to observe the frequency with which cases are reported from the same plants over such a period. Since one State did not furnish the names of employing firms, observations were based on 7,590 cases in 10 of the 11 pilot study States. The incidence of repeat attacks in the same person, insofar as could be determined from the reports, appeared to be negligible; so almost all of the cases reported here must have occurred among different persons. The distribution of employer companies according to the number of cases occurring per company is shown in table 2.

TABLE 2.—*Distribution of companies according to the number of cases of alleged or suspected occupational diseases occurring per company, as reported in the pilot study*

Number of cases occurring per company	Companies		Cases	
	Number	Percent	Number	Percent
Total	3,654	100.0	7,590	100.0
1 case	2,733	74.8	2,733	36.0
2 cases	461	12.6	922	12.1
3 cases	159	4.3	477	6.3
4 cases	79	2.2	316	4.2
5 cases	55	1.5	275	3.6
6 to 9 cases	86	2.4	611	8.1
10 cases and over	81	2.2	2,256	29.7

The 7,590 cases occurred in 3,654 companies. One case per company was reported by almost three-fourths of the companies and accounted for 36 percent of all the cases reported. At the other extreme, 10 or more cases per company were reported for 81, or 2.2 percent of the companies, and accounted for 29.7 percent of all the cases reported. Reports of multiple cases represented discrete outbreaks in some instances, but for the most part they were spread out over the 2-year period. Further study of these data showed that three States—Michigan, Connecticut, and Florida—were responsible for most of the multiple reports.

In Michigan, where physicians' reports made up the bulk, 18 companies were responsible for 703 cases. It is assumed that the same person or persons in these companies made the reports, although there may have been exceptions. Data on employment were not furnished for all 18 companies, but most of them employ several thousand workers each and have their own medical departments. The reporting experience of 13 of these companies, all manufacturing automotive transportation equipment, was studied further and revealed the following:

Company	Employment	All cases	Dermatitis	Hernia	Pneumoconiosis	Tenosynovitis
A	(?)	10	2	1	7	
B	21,500	199	199			
C	7,000	8			8	
D	(?)	40	37	2	1	
E	41,000	68	1	67		
F	12,000	22	21		1	
G	(?)	28	28			
H	7,500	11	2		9	
I	(?)	45	21		24	
J	20,000	20	2		18	
K	10,000	38	37		1	
L	75,000	83	7	1	75	
M	6,000	43	12	19		12

It is obvious from this table that there is a distinct tendency for some physicians to report only one kind of an occupational disease and other physicians another kind. Moreover, there is little relation between the number of workers employed and the number of cases reported, regardless

of the type of case. Company B with an employment of 21,500 workers reported 199 cases, all of which were dermatitis. Company E with 41,000 employees reported only 1 case of dermatitis and 67 cases of hernia. Company L with 75,000 workers reported 75 cases of pneumoconiosis, 7 of dermatitis, and 1 of hernia. Company M with 6,000 workers reported 12 cases of dermatitis, 19 of hernia, and 12 of tenosynovitis.

The suspected incompleteness and spottiness of compulsory reporting of occupational diseases is substantiated by these figures. Since all 13 companies are engaged in the manufacturing of transportation equipment, it would reasonably be expected that more or less the same type of occupational hazards would prevail, giving rise to similar types of occupational illnesses. Even if it were assumed that all operations were adequately controlled, dermatitis, hernia, and tenosynovitis would probably occur fairly universally among these industries. With respect to pneumoconiosis, however, the situation may be different since it is not known how many of the cases might have been reported by physicians in the plant and how many were picked up through mass X-ray surveys.

The analysis of the reports submitted for Connecticut showed that 14 companies were responsible for 723 cases, chiefly cutting oil dermatitis occurring in metal-manufacturing industries. One-half of this number was reported by one company with 7,000 workers. In Florida, the reports of dermatitis consisted of claims for compensation, and the 16 companies that accounted for 365 cases were mostly large citrus canneries and packinghouses.

Discussion

As a test of the feasibility of developing a national reporting system for occupational diseases, the pilot study showed that the cooperation of State industrial health agencies is possible and practicable, provided that not too many demands are placed on them. In other respects, however, a national reporting system does not seem timely until the resolution of some of the obvious difficulties in obtaining adequate and reliable reports of occupational diseases and sources of data to be used. As has been demonstrated, such a scheme has little chance of succeeding if based solely on compulsory reports of physicians, as was originally supposed might be done.

Although the reports of occupational diseases for the pilot study were transmitted uniformly by State industrial health agencies, 77 percent of them were referred from workmen's compensation authorities. To take these reports into consideration in developing a national reporting scheme would, in essence, be duplicating the efforts of workmen's compensation agencies, most of which customarily make annual tabulations. Likewise, to consider the transmittal of individual reports to a central agency by the workmen's compensation authorities is not practical in view of the tremen-

dous load of work already imposed on them in the handling of claims. A more practical approach would be to suggest standards and procedures applicable to occupational diseases which the workmen's compensation agencies and others could use as a guide and which would make more usable existing statistics on occupational diseases. It is quite possible that these might eventually be incorporated more definitely into the standard procedures for compiling work-injury statistics which have been developed under the auspices of the American Standards Association. Under the very best of circumstances, the inherent difficulties of occupational disease recognition and reporting, as well as the unsatisfactory quality of reports, preclude other than general statistics. However, by making the most of a difficult situation, it is possible that our present fragmentary statistical knowledge of the occurrence of occupational diseases can be improved.

PART III—INCIDENCE OF OCCUPATIONAL DISEASES

The incidence of occupational diseases in this country has been extremely difficult to estimate. Statistical evidence of their occurrence has been regarded as both incomplete and incomparable, and this concept has discouraged such estimations. In actual practice, however, there appears to be a great deal of information on occupational diseases in workmen's compensation reports, the greatest problem being to piece it together so as to convey some meaningful picture. With full realization of the shortcomings, the incompleteness, and inaccuracies of such data, an experimental attempt was therefore made to gather whatever usable information could be readily collected, covering as large an area of the United States as possible. As contrasted with the pilot study, which was an experiment in uniform reporting and covered 2 years, this effort encompassed the collection, from all sources, of all available published and unpublished data already tabulated, covering essentially 1 year's experience. Information was obtained in this manner for 28 States, as well as the Federal employees, and is presented in tables 3 and 4. The type and source of data used in each State is shown in table 5.

The most recently published report or information available at the time of this study were used. However, since the years for which data were provided were not always identical, the periods varied, covering the calendar year 1949 for 3 States, the calendar year 1950 for 7 States, the 1951 fiscal or calendar year for 16 States, and for the Federal employees, and the biennials ending June 1950 and June 1951 for 2 States.

Data Collected

To lend some vestige of uniformity to the statistics collected, the States in table 3 are grouped according to the predominant type of data used, with individual States listed in table 4. The first group in table 3 consists of the 11 States participating in the pilot study. Although the pilot study itself covered 2 years, only reports received for 1951 were used for these tabulations. The data presented in these two tables also extend beyond the information provided by the pilot study itself. Specifically, the Florida figures include 226 cases of poison ivy claims filed with the Florida Industrial Commission for 1951, which were not included in the pilot study data. By agreement, poison ivy cases are not referred to the State Board of Health because such reports are numerous and are of little investigative value. The Wisconsin figures were supplemented by 542 cases of heat prostration, freezing, inflammation of the joints and muscles, and poison ivy taken from the 1951 statistical report on occupational diseases of the Wisconsin Industrial Commission; these cases had not been referred to the Wisconsin Industrial Hygiene Division. The Missouri figures were supplemented by 37 reports of dust diseases and chemical poisonings taken from death certificates.

The second group of three States is comparable to the pilot study States in that the individual reports were referred to the State divisions of industrial health by the compensation authorities. The cases cited represent unpublished data tabulated and supplied by the respective divisions of industrial health. California, which provided information based on the doctor's first report of work-injury, accounts for 14,777 of the 15,350 reports classed in this group. Reports for Colorado and New Mexico consist of claims submitted for compensation purposes.

The third group is a relatively important group, for it comprises five large industrial States for which published figures on compensated occupational diseases are used. Cases of shorter duration than the legal waiting period shown in the table are not included in these figures.

The last group consists of 9 States as well as the Federal employees, for which published and unpublished data were accumulated on claims closed or reported in connection with compensation administration. As contrasted with the third group, it includes both compensable and noncompensable cases. The figures for Federal employees are incomplete, but the best available.

Summary of Number and Kind of Diseases

A total of 43,307 cases of alleged or suspected occupational diseases was reported from 28 States and for Federal employees. A veritable hodgepodge of types of reports is reflected, namely physicians' reports to health departments, claims filed with or reported to compensation commissions, claims closed, compensable cases closed or awarded, and employer's and physicians' first reports of work-injuries made to compensation commissions or related agencies. A few fatal cases are included, but these are in the minority. The only criterion followed in collecting the statistics was that the figures apply to alleged or suspected occupational diseases. It should also be mentioned that because of State differences in compiling statistics, certain liberties had to be taken with the published data when grouping diseases according to a diagnostic pattern.

An analysis of table 3 shows that systemic effects due to chemical agents accounted for 2,252 cases, representing 5.2 percent of the total (see table 4). These occurred in 26 of the States and among the Federal employees, as shown by the last column in table 3. Individual diseases listed under this broad heading show that poisonings allegedly due to lead and its compounds accounted for 491 cases, reported by 23 States. On the basis of these data, lead poisoning, an early major occupational disease, can still be considered a leading occupational poisoning today. Next in numerical importance are 323 cases of poisoning due to insecticides which were reported by only three of the States. In view of the widespread use of agricultural chemicals, especially organic phosphates, this figure doubtless reflects an incomplete notification of their occurrence. Carbon monoxide or dioxide poisoning accounted for 233 cases in 18 States and for Federal employees.

TABLE 3.—*Incidence of alleged or suspected occupational diseases as reported in 28 States and for Federal employees during a year's period, by nature of disease, and by States grouped according to source of data*

Nature of disease	Total	Pilot study [1]	Reports referred by compensation authorities to industrial health agencies	Compensable cases closed, or awarded—published data	Total cases closed, filed, or reported—published and unpublished data	Number of the 28 States reporting listed diseases
Number of States in each group	[2] 28	11	3	5	[2] 9	
All diseases	43,307	5,838	15,350	6,330	15,789	[2] 28
1. SYSTEMIC EFFECTS DUE TO CHEMICAL AGENTS [3]	2,252	322	529	583	818	[2] 26
Ammonia	24		8	1	15	6
Anilin	23			22	1	2
Arsenic	16	1		1	14	3
Benzol or its derivatives	16	1		8	7	6
Beryllium	9				9	1
Carbon bisulfide	6			6		3
Carbon monoxide or dioxide	233	39	46	22	[4] 126	[2] 18
Carbon tetrachloride	32	4	8	6	14	8
Chlorine	29	3	12	5	9	9
Chrome	154	[5]		54	100	6
Cyanide	15	1	5	1	8	6
Halogenated hydrocarbons	14		3	4	7	5
Insecticides	323	146	177			3
Lead	491	48	88	191	164	23
Mercury	14		1	6	7	6
Petroleum products	23		5	7	11	7
Phosphorus	5			4	1	2
Sulfur dioxide	14	2	10		2	5
Zinc, brass	84	2	5	2	75	[2] 7
Gases not specified	202	8	49	2	143	8
Paint solvents	33	1	12		20	4
Miscellaneous and not known	492	66	100	241	85	21
2. DUST DISEASES OF THE LUNGS	1,999	321	51	613	1,014	[2] 22
Asbestosis	21	1		12	8	5
Anthraco-silicosis	233			233		1
Silicosis [6]	1,615	279	42	350	944	[2] 20
Pneumoconiosis, other, and not specified	130	41	9	18	62	9

3. RESPIRATORY DISORDERS	667	81	380	133	73	17
Bronchitis, influenza, pneumonia	79	40			39	8
Respiratory irritations and not specified	588	41	380	133	34	15
4. DISORDERS DUE TO PHYSICAL CONDITIONS	4,127	694	1,783	796	854	20
Pressure abnormalities	58		19	32	7	3
Effects of repeated motion, pressure or shock	3,748	605	1,572	754	817	18
Effects of heat, cold	304	88	188		28	10
All other [7]	17	1	4	10	2	5
5. INFECTIVE AND PARASITIC DISEASES	1,148	67	100	298	683	[2] 16
Anthrax	69	7	1	53	8	7
Brucellosis	50	16	8	24	2	9
Tuberculosis	811	14	32	133	[8] 632	[2] 10
Communicable and not specified	218	30	59	88	41	11
6. DISEASES OF THE SKIN	23,502	4,251	8,412	3,517	7,322	[2] 27
7. MISCELLANEOUS CONDITIONS	9,612	102	4,095	390	5,025	[2] 24
Allergies (other than skin)	211	17	179		15	9
Cancer	7		2	3	2	4
Conjunctivitis	2,034	54	1,869	15	96	9
Blisters, abrasions	567			167	400	7
Effects of bites, stings	1,635		1,635			1
Heart disease	10				10	3
Neuritis, arthritis	144	3	32	54	55	4
All other, indefinite, not specified	5,004	28	378	151	[9] 4,447	[2] 17

[1] Includes supplementary data for a few States obtained from other sources. See text.
[2] And Federal employees.
[3] May include some skin manifestations other than dermatitis venenata.
[4] Includes 61 cases of poisoning reported as due to CO or smoke for Federal employees.
[5] Chrome dermatitis included under dermatitis for pilot States.
[6] Includes 134 cases reported as silico-tuberculosis.
[7] Includes 14 cases of loss of hearing; 3 due to radiation.
[8] Includes 439 cases reported for Federal employees.
[9] Includes 2,403 cases reported by causative agent only for which nature of disease could not be tabulated.

This figure includes an undetermined number of cases of smoke asphyxiation reported in combination with carbon monoxide poisoning for Federal employees. Poisoning from carbon tetrachloride was reported from 8 States in 32 cases. Twenty-one States contributed to the *miscellaneous and not known* group, which contains 480 cases of alleged poisonings. It also includes poisonings reported by some States as a group or in combination with other conditions.

From this tabulation it can be deduced that the classic diseases, such as poisonings due to arsenic, benzol, carbon bisulphide, mercury, and phosphorus, are still occurring but are playing a diminishing role. Most of these diseases are of relatively low incidence, however, because the risk is small.

The 9 cases of poisoning due to beryllium were reported in a class of *chemical poison* from 1 State. Six States reported 154 cases of chrome *ulceration or poisoning*. None is shown for the pilot study group, since chromic acid dermatitis was classified under skin diseases.

Alleged dust diseases of the lungs, the second major group of diseases, accounted for 1,999 cases, or 4.6 percent; 22 States and the Federal employees contributed to these reports. This subtotal includes 21 cases of asbestosis reported by 5 States, 233 cases of anthracosilicosis reported by 1 State, 1,615 cases of silicosis reported by 20 of the States and for Federal employees, and 130 cases of unspecified pneumoconiosis or all other types. *All other* includes 1 case of berylliosis and 1 of siderosis. Tuberculosis was reported as a complication in 134 of the cases; the actual number is probably much higher since all States did not uniformly report the complication.

Respiratory disorders, the third diagnostic group, is a relatively small one, with 17 States reporting 667 cases, or 1.5 percent of all the cases. Although 79 cases of bronchitis, influenza, and pneumonia are shown in the table, additional cases are hidden in the catch-all group, *respiratory irritations, and not specified*. Such conditions are not uniformly reported, nor are they uniformly compensated under present laws. It is also suspected that, if accurate information were available, some of the conditions classified under the systemic effects would properly be classified under respiratory effects, and vice versa.

Disorders due to physical conditions, the fourth diagnostic group shown, accounted for 4,127 cases, or 9.5 percent of the total number of diseases. Practically all of these were effects of repeated motion, pressure, or shock, such as synovitis, tenosynovitis, and bursitis. Eighteen of the States reported these conditions. Effects of pressure abnormalities, chiefly compressed air, accounted for only 58 reports; and effects of heat and cold, for 304 cases. Only 10 States reported the latter conditions as occupational diseases; in some States, they are not compensable and in others they are considered as accidental injuries. *All other* includes 14 cases of loss of hearing and 3 disabilities due to radiation.

Infective diseases with 1,148 cases, or 2.7 percent, reported by 16 States and the Federal employees comprised the fifth group. This includes 69 cases

of anthrax reported in 7 of the 28 States, 50 cases of brucellosis reported in 9 States, and 811 cases of tuberculosis reported in 10 States and for the Federal employees, with the latter group accounting for over one-half of this number. The 218 cases of *communicable and not specified* include diseases such as mumps, scarlet fever, a few cases of typhoid fever, typhus fever, and dysentery.

Skin diseases, the sixth group, is by far the largest group of diseases reported, with 23,502 cases, or 54.3 percent of the total. Actually, all 28 States contributed to these reports, although only 27 States and the Federal employees are credited in the last column of the table. This is because West Virginia, in which claims for dermatitis were undoubtedly filed, reported only two totals, one for silicosis and one for all other diseases.

Miscellaneous conditions, the last and comparatively large group, has 9,612 cases, or 22.2 percent. It includes 211 cases of bronchial allergies; 7 cases of cancer; 2,034 cases of conjunctivitis due to chemicals, dusts, and welding flash reported by 9 States; 567 cases of blisters and callouses reported by 7 States; 1,635 cases of effects of bites and stings reported by 1 State; 10 cases of heart disease; and 144 of neuritis and arthritis. The *all other, indefinite, and not specified* group contains over one-half, or 5,004 cases, of the miscellaneous conditions. About 2,400 of these cases were reported by causative agent only and could not be distributed according to diagnostic groups. This item also contains reports made in combination, such as *lead, paint, paint thinners,* which could not be separated.

The 43,307 cases of occupational diseases summed up for these jurisdictions represent at the very most only a rough indication of the probable extent of their occurrence. There is no doubt that an undetermined portion of this number may be inaccurately attributed to the occupation. On the other hand, it is likewise apparent that many cases probably occurred that were not included because of legal variations in compensation, difficulties of recognizing occupational diseases, and technical differences in compiling their statistics. Because of the many variables, it would be impossible to project these data in order to obtain a nationwide incidence rate. Nor can the data be related to the past, for no comparable data exist, or to the industrial population because suitable data on workers exposed to the numerous substances in industry are lacking. However, the information available does suggest the potentialities of utilizing compensation data as a basis for general statistics, heretofore lacking, on occupational diseases.

Differences From State to State

The data so collected serve another purpose for this study, that is, to point up the circumstances responsible for differences in number and kind of diseases reported from State to State. To begin with, there are many variations imposed by the laws and in their administration. By referring again to table 4, it can be seen that, in the group of 28 States under consideration, coverage for occupational diseases at the time of the study was full in

TABLE 4.—*Incidence of alleged or suspected occupational diseases as reported in 28 States and for Federal employees during a year's period; percentage distribution of cases according to broad diagnostic groups and State*

State, by source of data	Year covered	Compensation coverage for occupational diseases [1]	Waiting period [1]	All diseases		Diseases of the skin	Systemic effects due to chemical agents	Dust diseases of the lungs	Disorders due to physical conditions [2]	All other [3]
				Number	Percent					
All States				43,307	100.0	54.3	5.2	4.6	9.5	26.4
Pilot study:										
Connecticut	1951	Full	7	900	100.0	93.3	.6	4.7	.2	1.2
Florida	1951	do	4	1,506	100.0	82.1	10.4		1.7	5.8
Georgia	1951	Schedule	7	82	100.0	61.0	18.3	1.2	14.6	4.9
Indiana	1951	Full	7	216	100.0	79.6	8.8	6.5	2.3	2.8
Michigan	1951	do	7	464	100.0	44.8	5.2	47.2	1.5	1.3
Missouri	1951	do	3	434	100.0	90.6	2.0	7.4		
New Hampshire	1951	Schedule	7	76	100.0	90.8				9.2
Oregon	1951	Full	None	677	100.0	59.8	4.0		30.6	5.6
South Carolina	1951	do	3	124	100.0	88.7	2.4			8.9
Tennessee	1951	Schedule	7	113	100.0	87.6	7.1	5.3		
Wisconsin	1951	Full	3	1,246	100.0	53.6	4.5	.6	34.9	6.4
Total				5,838	100.0	72.8	5.5	5.5	11.9	4.3
Reports referred by compensation authorities to industrial health agencies:										
California	1951	do	7	14,777	100.0	56.0	2.9	.1	11.9	29.1
Colorado	1951	Schedule	7 (30 for o. d.)	118	100.0	32.2	41.5	24.6	1.7	
New Mexico	1951	do	7	455	100.0	22.0	11.0	.2	4.8	62.0
Total				15,350	100.0	54.8	3.5	.3	11.6	29.8
Compensable cases closed or awarded—published data:										
Illinois	1950	Full	6	796	100.0	57.8	8.0	11.3	18.7	4.2
Maryland	1950	Schedule [4]	3	426	100.0	41.8	5.6	2.3	18.6	31.7
New Jersey	1951	Full	7	1,240	100.0	70.9	21.3	2.4	1.6	3.8
New York	1949	do	7	3,251	100.0	58.3	3.3	4.3	16.9	17.2
Pennsylvania	1950	Schedule	7	617	100.0	16.9	19.9	55.6		7.6
Total				6,330	100.0	55.5	9.2	9.7	12.6	13.0

Total cases closed, filed or reported—published and unpublished data:										
Arizona	1950	do	7	404	100.0	49.0	1.2	3.0	15.6	31.2
Massachusetts	1949	Full	7	1,703	100.0	76.5	10.5			13.0
Minnesota	1948–50	do	7	1,925	100.0	50.4	6.4	1.7	7.5	[5] 34.0
Nebraska	1951	do	7	651	100.0	71.6	5.7	.8		21.9
North Carolina	1950	do	7	725	100.0	76.9	7.2	2.9	3.6	9.4
Ohio	1950	do	7	4,574	100.0	58.5	5.1	9.9	11.9	14.6
Virginia	1950	Schedule [4]	7	581	100.0	17.7	1.6	.3	1.2	[6] 79.2
Washington	1949	Full	3	590	100.0	54.4	9.8	4.9	11.7	19.2
West Virginia	1949–51	do	7	1,260	100.0	(7)	(7)	35.8	(7)	64.2
Federal Employees	1951	do	7	3,376	100.0	21.7	3.6	.2		74.5
Total				15,789	100.0	46.4	5.2	6.4	5.4	36.6

[1] Source: State Workmen's Compensation Laws. Bulletin No. 125, U. S. Department of Labor. See this bulletin for further qualifications in laws.

[2] Includes chiefly effects of repeated motion, pressure, or shock, and effects of heat and cold, when reported.

[3] Includes respiratory disorders, infective diseases, and miscellaneous diseases, when reported.

[4] Amended to full coverage in 1952.

[5] Includes cases reported by causative agent only for which nature of disease was not specified.

[6] Includes noncompensable cases reported as one total.

[7] Probably reported under the *all other* group. No breakdown given.

19 States and for Federal employees, and of the schedule type in 9 States; the waiting period varies from none in Oregon to 30 days in Colorado (7 for accidents), with 7 days being common to 20 States and the Federal employees. Some variations in type of report used and in source of data have already been described. Further information may be obtained by referring to table 5.

To facilitate illustration of the differences in diseases reported in the States, the diseases listed in table 3 were condensed into five broad diagnostic groups in table 4. In Connecticut, for instance, where reports consist of those made by physicians and of referred compensated cases, 93.3 percent of all cases were dermatoses, and 4.7 percent were dust diseases. The proportions of other diseases were low, despite the fact that Connecticut's industries are largely mechanized. In Michigan, where sole dependence is on physicians' reports, which also included cases picked up in mass X-ray surveys, dust diseases of the lungs outnumbered skin diseases for this particular year, the percentages being 47.2 and 44.8, respectively. On the other hand, in California, where the data are derived from doctors' first reports of work injury, the distribution of occupational diseases is varied. Skin diseases made up 56.0 percent, and disorders due to physical conditions, 11.9 percent; the *all other* group, with 29.1 percent, contained reports of conjunctivitis, insect bites and stings, and various conditions not ordinarily reported by other States. Relatively few cases of systemic poisonings and dust diseases were reported from California.

In the group of States with data on compensable cases only, skin diseases accounted for 57.8 percent of all the compensated cases in Illinois; dust diseases, for 11.3 percent; and disorders due to physical conditions, for 18.7 percent. In Pennsylvania, which has schedule coverage law, 55.6 percent of all the cases compensated were dust diseases; 19.9 percent, systemic poisonings; and 16.9 percent, skin diseases.

In Ohio, which provided a tabulation on a large number of claims filed, skin diseases made up 58.5 percent; disorders due to physical conditions, 11.9 percent; dust diseases, 9.9 percent; and systemic poisonings, 5.1 percent.

These examples are cited to illustrate the wide differences in diseases reported from State to State, due in part to prevalence, but in larger part to variations in legal provisions and to technicalities in processing the data. Even allowing for discrepancies in the data, industrial diversification, and size of labor force in each State, it would still be difficult to explain the differences satisfactorily.

One fact remains indisputable, that is, with few exceptions, skin diseases are more widely prevalent than any other occupational disease reported. Due to circumstances of reporting, they happen to be outnumbered by dust diseases in Michigan, dust diseases and systemic poisonings in Pennsylvania, systemic poisonings in Colorado, and by the *all other* group, comprising mainly conjunctivitis, in New Mexico. Skin diseases probably predom-

TABLE 5.—*Type and source of reports of alleged or suspected occupational diseases used as basis of data shown in tables 3 and 4, by State*

PILOT STUDY	
Connecticut	Physician's reports to State department of health; compensable cases referred by workmen's compensation board.
Florida	Claims filed with industrial commission and referred to industrial hygiene division, State board of health. Figures in text tables 4 and 5 from Sixteenth Annual Report of the Florida Industrial Commission, 1951. Published report.
Georgia	Claims filed with State board of workmen's compensation and reported to division of industrial hygiene, State department of public health.
Indiana	*Employer's report of disablement* reported to industrial commission and referred to division of industrial hygiene, State board of health.
Michigan	Physician's reports to State department of health.
Missouri	Claims filed with division of workmen's compensation and referred to bureau of industrial hygiene, Division of Health of Missouri.
New Hampshire	Claims filed with bureau of labor and referred to bureau of occupational health, State department of health; few physicians' reports to State department of health.
Oregon	Closed medical and compensation cases filed with industrial accident commission and referred to industrial hygiene section, State board of health.
South Carolina	Claims filed with industrial commission and referred to division of industrial health, State board of health.
Tennessee	Closed claims filed with division of workmen's compensation and referred to industrial hygiene service, State department of public health.
Wisconsin	*Employer's first report of injury* reported to industrial commission and referred to industrial hygiene division, State board of health. Figures in text tables 4, 5, 6, and 7 from mimeographed releases of the industrial commission for 1950.
REPORTS REFERRED BY COMPENSATION AUTHORITIES TO INDUSTRIAL HEALTH AGENCIES	
California	*Doctor's first report of work injury* reported to department of industrial relations and referred to bureau of adult health, State department of public health.
Colorado	Claims filed with industrial commission and referred to occupational health section, State board of public health.
New Mexico	Claims filed with State labor and industrial commission and referred to industrial hygiene service, State department of public health.
COMPENSABLE CASES CLOSED OR AWARDED	
Illinois	Compensation cases closed. Annual Report on Industrial Accidents in Illinois, Part II, Compensation Cases Closed in 1950. Illinois Industrial Commission. Published report.
Maryland	Claims awarded. Thirty-Sixth Annual Report of the State Industrial Accident Commission, January 1, 1950, to December 31, 1950. Published report.
New Jersey	Compensable cases closed. Compensable Cases Closed During Year Ending December 31, 1951, Division of Workmen's Compensation, Department of Labor and Industry. Published report.
New York	Compensated cases closed. Compensated Cases Closed in 1949. Workmen's Compensation Board, State of New York. Published report.
Pennsylvania	Compensable injuries. 1950 Annual Accident Report. Part II, Compensable Injuries in Pennsylvania Industries. Department of Labor and Industry. Published report.
CLAIMS CLOSED, FILED, OR REPORTED	
Arizona	Claims accepted. Correspondence with industrial commission.
Massachusetts	Claims filed. Correspondence with department of industrial accidents.
Minnesota	Cases closed. Thirty-Second Biennial Report of the Department of Labor and Industry, 1948–1950. Published report.
Nebraska	Accidents reported. Ninth Annual Report, July 1, 1950, to June 30, 1951, inclusive, Nebraska Workmen's Compensation Court. Published report.
North Carolina	Reports received. Eleventh Biennial Report, 1948–1949, 1949–1950. North Carolina Industrial Commission. Published report.
Ohio	Claims filed. Correspondence with industrial commission.
Virginia	Cases closed. Biennial Report of the Industrial Commission of Virginia, 1949–1950. Published report.
Washington	Cases closed. Twelfth Report of the Department of Labor and Industries, calendar years 1948 and 1949. Published report.
West Virginia	Cases closed and reported. Thirty-Eighth Annual Report of State Compensation Commissioner. Published report.
Federal employees	Cases reported. Correspondence with Bureau of Employees' Compensation, U. S. Department of Labor.

inated in Virginia, West Virginia, and among Federal employees, but because of restriction in classifying the diseases for these jurisdictions, their prevalence is not evident.

Proportion of Skin Diseases Reported

The proportion that skin diseases are to all occupational diseases is a matter of conjecture. The general supposition, based on the experiences cited in a few individual States, is that they make up from 50 to 65 percent of all occupational diseases reported. As borne out by the figures in table 4, these proportions are as good as any that can be computed or estimated under the present methods of reporting occupational diseases.

The proportion of skin diseases to all diseases reported for the 28 States and for Federal employees is 54.3 percent. The individual State proportions fluctuate widely, from a high of 93.3 percent in Connecticut to a low of 16.9 percent in Pennsylvania. The proportions for the States grouped according to type of data collected also show a divergence, though not as wide as that for the individual States. The 11 pilot study States combined produced the highest percentage, with 72.8 percent. One reason may be the selectivity of cases on the part of the referring agencies, although it is impossible to hold any single factor responsible. The proportion for the next group of three States is 54.8 percent. California's reports, which covered a wide variety of disease categories, influenced the proportion of skin diseases for this group. In the group of States with data on compensated cases the proportion is 55.5 percent. The proportion for the last group is 46.4 percent and is admittedly low because of unsatisfactory figures for several of the States in this group.

Relation of Occupational Diseases to All Injuries

Of considerable interest, but difficult of accurate estimation, is the magnitude of the occupational disease problem in relation to all industrial injuries. Published reports of compensation authorities were again used, for they are unique in providing data of this type. Available statistics on claim load, compensation costs, and time loss collected for 8 States are presented in tables 6, 7, and 9. Figures are shown for compensable cases and for noncompensable cases whenever the information was presented in this manner. Data are probably comparable within the State; but because of differences in administration, and in handling and processing claims, comparisons between States are pointless. However, certain broad inferences can be made as to the relative magnitude of the occupational disease problem.

Claim Load

On the basis of the evidence presented in table 6, occupational diseases constitute statistically a relatively small proportion of all cases compensated in each of the eight States. This is apparent despite State differences in compensation coverage and inconsistencies in classifying certain conditions as occupational diseases and traumatic injuries. The ratios ranged from 1.2 percent in Pennsylvania to 4.3 percent in Wisconsin. Pennsylvania has a schedule law with a 7-day waiting period; Wisconsin provides for full coverage of occupational diseases with a 3-day waiting period, pointing to the obvious influence in coverage of compensation laws. The experience in Wisconsin has been that occupational diseases average annually between 4 and 5 percent of all compensable cases settled. In Illinois, on the other hand, the proportion of occupational diseases to all regularly closed cases is 1.7 percent and has averaged between 1 and 2 percent since 1935, when the occupational disease law went into effect. Although Illinois has a full coverage law, its proportion is about the same as that for Pennsylvania, which has a schedule law. This would indicate that factors other than coverage in compensation laws influence the ratio of occupational diseases to all injuries. In New York, occupational diseases constituted 3.2 percent of all compensated cases closed in 1949. This figure includes cases of hernia which are classed as accidental injuries in the other States.

TABLE 6.—*Relation of alleged or suspected occupational diseases to all injuries with respect to claim load in 8 States*

State	Year covered	Compensation coverage for occupational diseases	Waiting period	Number of compensable cases		Percent occupational diseases are of all injuries	Number of noncompensable cases		Percent occupational diseases are of all injuries
				All injuries	Occupational diseases		All injuries	Occupational diseases	
Illinois	1950	Full	6 days	[1] 46,308	796	1.7	[2]	[2]	[2]
New Jersey	1951	do	7 days	[1] 47,145	1,238	2.6	[2]	[2]	[2]
New York	1949	do	do	112,159	[3] 3,569	3.2	52,036	[2]	[2]
Pennsylvania	1950	Schedule	do	50,511	617	1.2	[2]	[2]	[2]
North Carolina	1950	do	do	12,413	174	1.4	65,397	549	0.8
Virginia	1950	do	do	12,995	172	1.3	94,892	411	.4
Florida	1951	Full	4 days	20,539	508	2.5	83,502	1,736	2.1
Wisconsin	1950	do	3 days	25,150	1,087	4.3	[2]	[2]	[2]

Source of data: Periodic published reports of workmen's compensation agencies. See table 5.

[1] Excludes reopened cases which are not tabulated.
[2] No data available.
[3] Includes cases of hernia.

Corresponding figures for noncompensable cases are available for only three States, since these cases are not always reported to the compensation authority or, if reported, are not always tabulated in detail. The ratio shown for North Carolina is 0.8 percent; for Virginia, 0.4 percent; and for Florida, 2.1 percent. The waiting period in North Carolina and Virginia is 7 days, but coverage for compensation for occupational diseases is of the schedule type. The waiting period in Florida is 4 days, but coverage is full.

Compensation Costs

Cost ratios appear to be slightly higher, but still low, ranging from 0.8 percent in Virginia to 8.4 percent in Pennsylvania, as can be seen from table 7. Both States have schedule coverage laws, but in Pennsylvania the high cost of compensation for pneumoconiosis accounted for the relatively high ratio for costs. In States with full coverage, the ratios ranged from 2.0 percent in Illinois to 5.9 percent in New York. Medical costs were not available consistently for all States; when available, they were incompletely reported as in Illinois, New Jersey, and Pennsylvania.

TABLE 7.—*Relation of alleged or suspected occupational diseases to all injuries with respect to cost in 8 States*

State	Compensation costs			Medical costs		
	All injuries	Occupational diseases	Percent occupational diseases are of all injuries	All injuries	Occupational diseases	Percent occupational diseases are of all injuries
Illinois	$18,083,348	$361,399	2.0	[1] $1,121,203	[2]	[2]
New Jersey	23,138,233	551,989	2.4	[1] 1,357,454	[1] $36,334	2.7
New York	76,897,856	4,557,607	5.9	[2]	[2]	[2]
Pennsylvania	16,810,062	1,419,168	8.4	[1] 2,541,710	[1] 14,142	.6
North Carolina	3,426,083	118,790	3.5	1,853,464	19,635	1.1
Virginia	2,509,446	19,083	.8	1,672,964	12,055	.7
Florida	3,792,979	41,215	1.1	3,546,702	66,818	1.9
Wisconsin	7,126,369	281,422	3.9	2,174,341	66,418	3.1

Source of data: Periodic published reports of workmen's compensation agencies. See table 5.

[1] Incomplete. Data are usually only for those temporary disability cases for which medical costs were reported.
[2] No data.

Although compensation costs paid out for occupational diseases were relatively low in relation to all other injuries, average cost per case for certain occupational diseases tended to be comparatively high. Average compensation costs gathered or computed from annual reports for six States are presented in table 8. The average cost per compensated case for accidents and diseases combined ranged from $333 in Pennsylvania to $686 in New York. The average cost for occupational diseases ranged from $320 in Wisconsin to $2,300 in Pennsylvania. The average cost for injuries, excluding occupational diseases, approximated the averages for injuries and diseases combined.

Inconsistencies in classifying occupational diseases are further illustrated in table 8. Because of the absence of a standard for classifying industrial diseases, it was difficult to obtain cost figures for certain single diseases. For example, determining compensation costs of silicosis is complicated by the fact that it is reported in combination with other pneumoconioses or complications. The Illinois figures give an average cost of $3,313 for silicosis with tuberculosis and $1,887 for silicosis without tuberculosis. The average cost per case of *other pneumoconiosis* is $2,093. The New York figures give an average compensation cost of $14,442 for silicosis and $11,674 for *asbes-*

TABLE 8.—*Average compensation costs per case of selected occupational diseases in 6 States*

Occupational Diseases	Illinois		New Jersey		New York		North Carolina		Pennsylvania		Wisconsin	
	Number of cases	Average cost per case	Number of cases	Average cost per case	Number of cases	Average cost per case	Number of cases	Average cost per case [1]	Number of cases	Average cost per case [1]	Number of cases	Average cost per case [1]
All compensated cases	46,308	$391	47,145	$491	112,159	$686	12,413	$371	50,511	$333	25,150	$370
Injuries	45,512	389	45,907	492	108,590	666	12,239	366	49,894	308	24,063	372
Occupational diseases	796	454	1,238	446	3,569	1,277	174	753	617	2,300	1,087	320
Dermatitis	460	147	544	227	1,823	306					453	174
Poison ivy or plant poisoning			38	120							93	102
Silicosis					135	14,442	15	4,825	103	3,745	12	7,355
Silicosis with tuberculosis	12	3,313										
Silicosis without tuberculosis	60	1,887										
Silicosis and asbestosis			30	3,574								
Asbestosis							5	4,367	7	3,361		
Asbestosis and other pneumoconiosis					5	11,674						
Other pneumoconiosis	18	2,093										
Anthracosilicosis									233	4,023		
Lead poisoning			31	632	53	1,668	6	151	67	334	12	411
Chrome ulceration and poisoning			42	420	4	332						
Carbon monoxide poisoning			3	2,318	9	7,015					13	1,287
Carbon monoxide and dioxide poisoning			8	3,178								
Benzol poisoning			4	3,468	2	8,616						
Industrial poisoning	64	735									14	409
Anthrax			6	931	26	171			20	75		
Brucellosis	24	320									10	378
Bursitis, synovitis, and related disorders	122	252			280	462	8	211			328	132
Compressed air illness	27	403			5	12,853						
Tuberculosis					131	4,236					10	4,486

Source of data: Periodic published reports of workmen's compensation agencies. See table 5.

[1] Includes reported medical costs of compensated cases.

tosis and other pneumoconiosis. The average cost for *silicosis and asbestosis* in New Jersey is $3,574. In Pennsylvania, silicosis cases averaged $3,745; asbestosis, $3,361; and anthracosilicosis, $4,023. Finally, in North Carolina the average cost for a case of silicosis was $4,825; and for asbestosis, $4,367, which also included medical costs.

The average cost per case for lead poisoning ranged from $151 in North Carolina to $1,668 in New York; benzol poisoning averaged $8,616 in New York and $3,468 in New Jersey. Dermatitis costs averaged from $147 in Illinois to $306 in New York. The averages for other selected diseases, as shown in the table, ranged widely from State to State.

Time Loss

On the whole, the ratio for time lost due to occupational diseases was higher than for occurrence and compensation costs. Time loss and charges are usually computed according to the American Standards Association time charges (*17*) which include the actual calendar days lost because of disability, with allowance for future disability as in death and permanent injury. Some States do not state clearly the method of computation used, and others do not attempt to compute time-lost figures. For the six States for which these figures are shown (see table 9) the ratios ranged from 1.5 percent in North Carolina to 8.2 percent in Pennsylvania. It will be noted that, although Pennsylvania ranked lowest in proportion of number of cases of occupational diseases in relation to all compensable injuries, it ranked highest in corresponding proportions for compensation costs and time loss, due chiefly to the large number of cases of silicosis compensation awards that year.

TABLE 9.—*Relation of alleged or suspected occupational diseases to all injuries with respect to time loss in 8 States*

State	Unit used in stating time loss	Time lost from—		Percent occupational diseases are of all injuries
		All injuries	Occupational diseases	
Illinois	Days—ASA time charges [1]	13,691,095	408,400	3.0
New Jersey	Days lost (weighted)	9,333,094	379,041	4.1
New York	Weeks awarded [2]	3,941,028	284,695	7.2
Pennsylvania	Days lost [3]	2,533,934	208,188	8.2
North Carolina	Days lost	489,802	7,303	1.5
Virginia [4]				
Florida [4]				
Wisconsin	Days—ASA time charges [5]	2,409,316	116,788	4.8

Source of data: Periodic published reports of workmen's compensation agencies. See table 5.

[1] According to American Standards Association Scale of Time Charges (1945).
[2] Includes actual lost time which the worker incurred, schedule weeks in permanent partial disability cases, and the standard weighting of 1,000 weeks per case used to estimate permanent total disability and death cases.
[3] For temporary disability compensable cases only. 7-day noncompensable waiting period is included in the time loss.
[4] No data.
[5] According to American Standard Method of Compiling Industrial Injury Rates (Apr. 19, 1937), except that temporary disability cases are charged with 6 rather than 7 days' time loss per week of disability.

Discussion

As an experiment in determining the total incidence of occupational diseases in the country, this study has shown that at present such an estimation can be extended to only a partial number of the States. Moreover, because of the lack of homogeneity of the data, satisfactory interpretations cannot be made beyond calling attention to the gross number of cases. Many variables also preclude the projection of the data to obtain a nationwide incidence picture. The experiment has proved more successful in pointing out the many shortcomings and differences that make State statistics on occupational diseases incomparable than in indicating the real extent of the occupational disease problem in this country.

CONCLUSION

It is realized that there is no single solution to improving reporting practices and statistics on occupational diseases. The resolution of the technical or controversial differences mentioned in this report is a difficult task. Furthermore, it will not solve the apparently insurmountable problems of recognizing and diagnosing occupational diseases, or the variations in the State laws and in their administration. Nor does it fall within the scope of any single agency alone to undertake the needed steps towards improving currently available statistics on occupational diseases. For this reason, it is imperative that the various groups concerned with collecting and using statistics on occupational diseases, such as the industrial medical profession, industry, State compensation authorities, industrial health agencies, both Federal and State, work together through representative committees in re-evaluating the situation and developing any necessary standards and procedures to improve existing statistics. Considerable groundwork has already been laid by such organizations as the International Association of Industrial Accident Boards and Commissions, the American Standards Association, the World Health Organization, and the American Conference of Governmental Industrial Hygienists. The outlook for bringing about some improvement in our statistical knowledge of occupational diseases is not discouraging, though complex; nor is it impossible, provided that a constructive and sympathetic attitude is taken.

In conclusion, it is evident that circumstances surrounding occupational disease reporting and statistics in this country are complex and involved, but they can conceivably be remedied. Some of the difficulties which contribute to poor reporting of occupational diseases and to inadequate statistical knowledge of the occupational disease problem may be summarized as follows:

1. Need for a standard categorical classification of occupational diseases which would form a foundation for codes for statistical purposes. A minimum of the major categories would be helpful.

2. Need for the development of standard criteria for determining reportable occupational diseases and for differentiating them from traumatic injuries, which would increase the reliability of statistics on those conditions.

3. Need for the development of standard statistical methods for presenting occupational disease statistics, especially a specific classification code for diagnosis and cause, which would contribute to the comparability of existing data now being tabulated by the different State agencies. The diagnosis code should be based on the World Health Organization International Statistical Classification of Diseases, Injuries and Causes of Death insofar as it is practicable for occupational diseases; the cause code should consider the American Recommended Practice for Compiling Industrial Accident Causes of the American Standards Association.

In addition to these technical difficulties, problems broader in scope and application require group attention and action:

1. Recommendation of a standard generally acceptable definition of an occupational disease.

2. Reevaluation of the practices of reporting of occupational diseases in the light of past experience and modern needs.

3. Assistance to physicians in general practice to better acquaint them with diseases of occupation and the circumstances giving rise to them.

4. Improvement of the quality of reports of all types.

5. Possible establishment of a national reporting system for occupational diseases.

SUMMARY

This study has its origin in the recognized need for improving the reporting of occupational diseases, and in the possible initiation of a national reporting system for occupational diseases. A discussion of the current situation is presented with the hope that, once the problems of reporting and inadequate statistics are recognized and understood, the groups concerned may take proper measures for their solution.

Current Reporting Practices

The first part of the study reviews reporting practices of occupational diseases. Two types of schemes are discussed which are potentially productive of data on a continuous basis: compulsory reporting of occupational diseases by physicians to State and local authorities, and reporting for compensation purposes.

Compulsory Reporting of Occupational Diseases

Compulsory reporting practices in this country are inadequate from the standpoint of coverage and content of laws. Twenty-eight States have statutes or regulations requiring practicing physicians to report to State or local authorities attendance on or visits to patients suffering from occupational diseases. About one-half of these State laws were passed prior to 1936, with a few dating as far back as 1911. The remaining State laws were passed after 1936 to facilitate the efforts of newly established State industrial health agencies in securing occupational disease reports for investigative purposes. The laws are not uniform regarding the kind and number of diseases to be reported, nor as to whom the reports are to be made. Specially designed reporting forms and specific procedures necessary to good reports of occupational diseases are the exception rather than the rule.

Compulsory reporting is likewise grossly inadequate from the standpoint of the number of reports made in this manner. A canvass of the situation revealed that slightly less than 1,800 cases of occupational diseases were reported by physicians to health departments during 1950 or 1951. Moreover, 94 percent of this number were reported in 3 States and 6 percent in 4 States. In the other 21 States with reporting laws, either few or no reports were made in compliance with laws and regulations. Even in the few States that do receive a fair number of reports, it was shown that there is pronounced under-reporting as contrasted with the number of occupational disease claims filed with or paid by compensation authorities.

There are many reasons attributed to the ineffectiveness of compulsory notification of occupational diseases. Among these are difficulties of recognizing and diagnosing occupational diseases, the lack of standardization and shortcomings in the laws themselves, and nonenforcement of laws. Resistance by physicians or any professional group to a compulsory reporting sys-

tem is recognized as a factor. Physicians are loath to make reports because of their limited knowledge of occupational diseases, of industry itself, and of materials handled and manufacturing processes involved. Moreover, it is probable that many physicians are of the opinion that reporting occupational diseases violates the confidence of the physician-patient-employer relationship. The claim that compulsory reporting will never be successful unless it is associated with reasons other than that of collecting statistics would therefore appear to have some merit. In this country, such an incentive is implied in the administration of workmen's compensation laws.

Reporting for Compensation Purposes

Reporting for compensation purposes is discussed as a possible source of reports on occupational diseases in that essential information concerning the cause and nature of accidents and diseases is required of the physician, the employer, and the worker before disability benefits can be paid. Moreover, State industrial health agencies are relying upon workmen's compensation authorities for information on the occurrence of occupational diseases.

As compared with compulsory medical reporting, reporting for compensation purposes may be considered as being more successful, at least quantitatively. A factor in its favor is the comparative extensiveness of coverage by laws providing for compensation for occupational diseases. At present, all but two of the States compensate for one or more, or all occupational diseases. Twenty jurisdictions still have schedule laws, but the trend is obviously towards full coverage with liberalization of benefits. Still another potential factor is that most compensation agencies tabulate their statistics annually or biennially and usually publish their reports.

A review of the extent to which published reports are available and usable indicates that, through reliance on published reports or, in their absence, on unpublished tabulations offered by some State agencies, statistics on occupational diseases can be gathered from 24 States at the present time. It is likely that this number can be increased if sufficient incentive and guidance in handling occupational disease statistics are provided.

On the other side of the ledger, however, it is contended that the principle of compensation as it applies to occupational diseases and as it is practiced in the States, coupled with the difficulties of recognizing diseases as of occupational origin, preclude complete and reliable statistics on their occurrence. Variations and shortcomings of the data make the State reports difficult to interpret and to compare. Inconsistencies were found not only in the methods of compiling and presenting statistics but also in terminology, in type of report being tabulated, and in the classification of some conditions both as occupational diseases and traumatic injuries. In addition to these technical difficulties, variations inherent in the laws themselves and arising out of their administration reflect incompleteness of resulting statistics.

On the basis of the evidence presented, compulsory reporting gives little promise of yielding national statistics on occupational diseases. In view of

the long experience with compulsory notification of occupational diseases, and the continuous inadequacy of resultant reports, the need is indicated for a reevaluation of the principle as well as procedures of compulsory medical reporting. On the other hand, reporting for compensation purposes offers some hope of securing general statistics on occupational diseases, provided that some of the obvious technical difficulties can be resolved.

The Pilot Study

The second part of this publication deals with the pilot study, which represents the only known effort at uniform collection of occupational disease data in this country. It was originally undertaken as an experiment to test the feasibility of developing a national reporting system for occupational diseases and to study the quality of reports. The study was carried out in cooperation with the divisions of industrial hygiene in 11 State departments of health, which transmitted to the Division of Occupational Health, Public Health Service, individual reports of occupational diseases coming to their attention from various sources during the 2 years 1950 and 1951. Of the 9,058 reports received, 77 percent consisted of reports referred to the health departments by compensation agencies. Reports made by physicians directly to health departments accounted for 20 percent; and the remaining 3 percent comprised other sources, such as reports of cases encountered or reported unofficially during investigations of occupational health hazards, cases of pneumoconiosis detected in mass X-ray surveys, and some reports taken from death certificates. A detailed analysis of the reports submitted is contained in the appendix.

The reports received may be considered typical of the kind of reports of occupational diseases being made today. The quality varied from State to State as well as within individual areas, depending on how the report originated. In general, physicians' reports were likely to be weak on etiology; employers' reports, on the nature of the disease. Omissions, inaccuracies, and incompleted items were characteristic of all types of reports. Most unsatisfactory were probably statements on the cause or substance responsible for the occupational disease.

A distribution of companies according to the number of cases per company revealed that three-fourths of the companies reported one case, their total accounting for 36 percent of all the reports. At the other extreme, 10 or more cases were reported by 2.2 percent of the companies and accounted for 29.7 percent of all the alleged diseases reported. Despite the fact that the industries were similar, there was a tendency on the part of some industrial physicians to report only certain diseases.

The pilot study proved that cooperation of State industrial health agencies is possible and practicable, provided that no excessive demands are placed on them at the expense of their routine duties. In other respects, however, a national reporting system does not appear feasible at present. Such a scheme has little chance of succeeding if based solely on compulsory reports of physicians, as it was originally supposed might be done. To base a uniform report-

ing system on workmen's compensation reports would in essence be duplicating the efforts of compensation agencies, which customarily tabulate their statistics. A more practical approach would be to suggest standard statistical procedures applicable to occupational diseases which would make existing data usable. The quality of reports received is another area that can be improved.

Incidence of Occupational Diseases

The third part of this publication is concerned with an experiment at estimating the total incidence of occupational diseases in the United States. With full realization of the shortcomings, incompleteness, and alleged inaccuracies of current statistics, an attempt is made to summarize all types of data that could furnish a comprehensive picture of the occupational disease problem. In contrast with the pilot study, this effort encompassed the collection of all available data on occupational diseases, covering a year's period. The pilot study data for 11 States for the year 1951 were used and supplemented by both published and unpublished compensation data, already tabulated for 17 other States and for Federal employees. It was determined that, in the 28 States and for Federal employees, there were 43,307 alleged or suspected cases of occupational diseases reported during essentially a 12-month period.

State differences in compiling statistics on occupational diseases made the summarization of this material difficult, and certain liberties had to be taken when classifying cases according to a diagnostic pattern. The data were tabulated roughly according to diagnosis and predominant type of report used, and show a somewhat different distribution than that obtained in the pilot study. For instance, diseases of the skin accounted for 75.3 percent of all cases in the pilot study, whereas in the summary for the 28 States and for Federal employees, they made up 54.3 percent of all occupational diseases. The proportions of other diseases in the summary are as follows: systemic effects due to chemical agents, 5.2 percent; dust diseases of the lungs, 4.6 percent; respiratory disorders, 1.5 percent; disorders due to physical conditions, 9.5 percent; infective diseases, 2.7 percent; and miscellaneous conditions, 22.2 percent. Wide differences occurring in number and kind of diseases reported from State to State are probably due in part to prevalence but in larger part to variations in legal provisions on compensation of occupational diseases and to technicalities in processing the data.

Information on the magnitude of the occupational disease problem in relation to all industrial injuries was gathered for eight States from published compensation reports. Although the data are not comparable between States, it can be inferred that the occupational disease problem in relation to all industrial injuries is statistically relatively minor. From the standpoint of case load, it was shown that the ratios for occupational diseases ranged from 1.2 percent to 4.3 percent of all cases compensated in each of

the eight States. Ratios for compensation costs appeared to be slightly higher, ranging from 0.8 percent to 8.4 percent. The average cost per case for certain occupational diseases was found to vary considerably among the States and tended to be comparatively high, especially for the pneumoconioses. The ratios for time loss due to occupational diseases, although the range was from 1.5 percent to 8.2 percent, tended to be higher on the whole than the ratios for claim load and compensation costs.

Despite numerous shortcomings, it appears that State workmen's compensation reports might offer a possible solution to the problem of collecting national occupational morbidity data. However, at the present time, the data cannot be interpreted in terms of national needs and problems. This experiment proved more useful in pointing out the many variations that make State statistics on occupational diseases incomparable, than in indicating the real extent of the occupational disease problem.

Since the problem of adequate occupational disease reporting does not lend itself to a single solution, the need is stressed for joint action by all groups concerned to bring about some improvement in existing statistics.

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TABLE A.—*Number and kind of alleged or suspected occupational diseases reported during 1950 and 1951 and transmitted to the Public Health Service by each of the 11 States participating in the pilot study*

Nature and cause of disease	Total	Florida	Oregon	Wisconsin	Connecticut	Michigan	Missouri	Georgia	Indiana	Tennessee	South Carolina	New Hampshire
All diseases	9,058	1,945	1,468	1,396	1,394	1,074	660	277	364	205	181	94
SYSTEMIC EFFECTS DUE TO CHEMICAL AGENTS	621	183	51	112	14	158	7	41	30	14	9	2
Agricultural chemicals	174	161	3	5	2			3				
Solvents	50	5	8	20	7	1		4	3			2
Carbon tetrachloride	18		1	9	3	1		2	1			1
Paint solvents	13	3	6	4								
Halogenated hydrocarbons	10			4	3			1	1			1
Other and not specified	9	2	1	3	1			1	1			
Metals and their compounds	116	6	14	20	4	27	6	21	9	9		
Lead	94	5	10	18	3	25	4	13	9	7		
Arsenic	1									1		
Cadmium	2	1			1							
Metal fumes	8		2	1		1	1	3				
Other and not specified	11		2	1		1	1	5		1		
Gases	235	3	20	53	1	129	1	12	13	3		
Carbon monoxide	190	2	12	33		124		8	10	1		
Methyl chloride	13			8		5						
Chlorine	3	1		2								
Sulfur dioxide	4		1						3			
Other and not specified	25		7	10	1		1	4		2		
Chemical agents, all other and not specified	28	4	3	4		1		1	5	2	8	
Fumes not specified	18	4	3	10							1	
DUST DISEASES OF THE LUNGS	574	1	2	21	69	426		1	24	30		
Silicosis	396			6	36	329			19	6		
Silico-tuberculosis	86		1	11	29	34			5	6		
Asbestosis	1							1				
Pneumoconiosis, other and not specified	91	1	1	4	4	63				18		

RESPIRATORY DISORDERS	137	43	24	51	10	2		3	2	1	1	
Pneumonia	10	8		1	1							
Bronchitis	49	26	10	3	8			1			1	
Other respiratory irritations	78	9	14	47	1	2		2	2	1		
DISORDERS DUE TO PHYSICAL CONDITIONS	601	35	473		3	23		61	5	1		
Pressure abnormalities	11	1				10						
Effects of repeated motion, vibration, pressure	455	31	408		2	13				1		
Effects of reduced temperature	42	2	40									
Effects of heat and insolation	93	1	25		1			61	5			
INFECTIVE AND PARASITIC DISEASES [1]	80	15	18	17	8				8		1	13
Anthrax	14				1							13
Brucellosis	38	7	5	15	4				7			
Pulmonary tuberculosis	14	5	5	1	3							
Mumps	7		6	1								
Typhus fever	5	3	2									
Malaria, trichinosis	2								1		1	
DISEASES OF THE SKIN	6,817	1,568	867	1,122	1,289	460	653	167	294	158	160	79
Petroleum products	1,302	111	38	87	663	286	42	8	43	11	5	8
Gasoline, kerosene	85	28	6	9	22	15	3	1	1			
Oils and greases	1,005	48	15	69	586	185	36	3	41	9	5	8
Other petroleum products	212	35	17	9	55	86	3	4	1	2		
Solvents	283	44	26	38	87	26	22	12	13	2	10	3
Paint thinners	47	9	9	7	8	3	6	3	2			
Cleaning solvents	44	12		10		11	5	2		2	2	
Halogenated hydrocarbons	10			1	3	3		1	1			1
All other solvents	182	23	17	20	76	9	11	6	10		8	2
Metals and their compounds	189	35	8	44	42	10	26	7	9	3	4	1
Chromium	63	10		21	22	5			4	1		
Lead	14	3	1	2	2		1	2		1	2	
Aluminum	19	11		1		2	5					
Copper, brass	19	2		3	1		7	3		1	1	1
Plating compounds	37	2		13	11	1	6	1	2		1	
Other metals and not specified	37	7	7	4	6	2	7	1	3			

[1] Excludes 263 cases of skin diseases due to infectious and parasitic agents classified under *diseases of the skin*.

TABLE A.—*Number and kind of alleged or suspected occupational diseases reported during 1950 and 1951 and transmitted to the Public Health Service by each of the 11 States participating in the pilot study*—Continued

Nature and cause of disease	Total	Florida	Oregon	Wisconsin	Connecticut	Michigan	Missouri	Georgia	Indiana	Tennessee	South Carolina	New Hampshire
Agricultural chemicals	103	60	27	2	2	----------	2	2	----------	4	4	----------
Fertilizer	21	18	3	----------	----------	----------	----------	----------	----------	----------	----------	----------
Insecticides	82	42	24	2	2	----------	2	2	----------	4	4	----------
Infectious and parasitic agents	263	192	2	7	11	----------	1	4	46	----------	----------	----------
Larva migrans	155	153	----------	----------	----------	----------	----------	2	----------	----------	----------	----------
Fungus and all other	108	39	2	7	11	----------	1	2	46	----------	----------	----------
Dusts	447	145	76	87	26	9	27	14	13	32	10	8
Cement	326	132	59	63	4	----------	21	14	1	28	3	1
Organic	47	5	8	8	17	----------	4	----------	----------	----------	5	----------
Inorganic	41	1	2	5	5	4	1	----------	12	3	1	7
Dust not specified	33	7	7	11	----------	5	1	----------	----------	1	1	----------
Other chemical agents	969	220	147	200	133	24	74	50	24	58	35	4
Acids	68	7	3	16	17	7	4	7	1	3	3	----------
Alkalis	125	31	16	18	40	2	2	10	1	2	3	----------
Coal tar products	53	14	13	10	3	----------	4	----------	1	4	4	----------
Dyes	96	12	3	8	15	2	17	4	3	15	16	1
Soaps, detergents and related compounds	350	102	89	90	22	2	20	8	1	13	----------	3
Other chemicals and not specified	277	54	23	58	36	11	27	21	17	21	9	----------
Physical conditions	164	91	24	18	12	----------	6	6	1	3	3	----------
Moisture	126	83	7	18	4	----------	4	3	1	3	3	----------
Pressure and other	38	8	17	----------	8	----------	2	3	----------	----------	----------	----------
Plants	305	56	16	4	32	----------	186	2	2	4	2	1
Poison ivy and oak	206	[1] 3	2	[1] 1	15	----------	179	2	2	1	1	----------
Other plants	99	53	14	3	17	----------	7	----------	----------	3	1	1

RESPIRATORY DISORDERS	137	43	24	51	10	2		3	2	1	1	
Pneumonia	10	8		1	1							
Bronchitis	49	26	10	3	8			1			1	
Other respiratory irritations	78	9	14	47	1	2		2	2	1		
DISORDERS DUE TO PHYSICAL CONDITIONS	601	35	473		3	23		61	5	1		
Pressure abnormalities	11	1				10						
Effects of repeated motion, vibration, pressure	455	31	408		2	13				1		
Effects of reduced temperature	42	2	40									
Effects of heat and insolation	93	1	25		1			61	5			
INFECTIVE AND PARASITIC DISEASES [1]	80	15	18	17	8				8		1	13
Anthrax	14				1							13
Brucellosis	38	7	5	15	4				7			
Pulmonary tuberculosis	14	5	5	1	3							
Mumps	7		6	1								
Typhus fever	5	3	2									
Malaria, trichinosis	2								1		1	
DISEASES OF THE SKIN	6,817	1,568	867	1,122	1,289	460	653	167	294	158	160	79
Petroleum products	1,302	111	38	87	663	286	42	8	43	11	5	8
Gasoline, kerosene	85	28	6	9	22	15	3	1	1			
Oils and greases	1,005	48	15	69	586	185	36	3	41	9	5	8
Other petroleum products	212	35	17	9	55	86	3	4	1	2		
Solvents	283	44	26	38	87	26	22	12	13	2	10	3
Paint thinners	47	9	9	7	8	3	6	3	2			
Cleaning solvents	44	12		10		11	5	2		2	2	
Halogenated hydrocarbons	10			1	3	3		1	1			1
All other solvents	182	23	17	20	76	9	11	6	10		8	2
Metals and their compounds	189	35	8	44	42	10	26	7	9	3	4	1
Chromium	63	10		21	22	5			4	1		
Lead	14	3	1	2	2		1	2		1	2	
Aluminum	19	11		1		2	5					
Copper, brass	19	2		3	1		7	3		1	1	1
Plating compounds	37	2		13	11	1	6	1	2		1	
Other metals and not specified	37	7	7	4	6	2	7	1	3			

[1] Excludes 263 cases of skin diseases due to infectious and parasitic agents classified under *diseases of the skin*.

most of which an exposure to silica was mentioned. Connecticut reported one case of berylliosis of the lungs in an unemployed molder and a compensated case of siderosis in a welder-mechanic. One case of asbestosis reported occurred in an employee of an asbestos fabric plant in Georgia.

The majority of the cases reported by Tennessee and Michigan were uncovered through mass X-ray case-finding surveys. A number of compensated cases and claims for silicosis were also reported in this group. Death certificates were the basis for about 40 reports of silicosis, usually associated with other causes of death, such as cancer of the lungs, pneumonia, heart failure, and tuberculosis.

It should be pointed out that the reports of alleged dust diseases of the lungs are not an indication of the number of new cases actually developing. As will be shown later, many of the workers with pneumoconiosis had experienced their dust exposure in earlier years and in industries other than those in which they were currently working.

Respiratory disorders.—One hundred and thirty-seven cases, or 1.5 percent of all cases reported.

This group likewise accounted for a relatively small proportion of all cases reported. The principal disorders were 10 cases of pneumonia attributed to exposure while at work, reported in three States—Florida, Wisconsin, and Connecticut; and 49 cases of bronchitis, with Florida, Oregon, and Connecticut accounting for all but 5 of the reports. Connecticut reported 8 cases diagnosed as bronchitis caused by exposure to formaldehyde in a synthetic resin plant. *Other respiratory irritations* accounted for 78 cases attributed to exposures to creosote, oil fumes, acids, and other chemical agents and dusts. Wisconsin reported 47 respiratory disorders; and Oregon, 14. Six States reported from 1 to 9 cases, and 3 States did not report any conditions in this group.

Disorders due to physical conditions.—Six hundred and one cases, or 6.6 percent of all cases reported.

The largest item in this category was effects of repeated motion, vibration, and pressure such as tenosynovitis, synovitis, and bursitis, accounting for 455 cases. Oregon reported 408, representing most of the cases, and Florida, 31. Three States—Connecticut, Michigan, and Tennessee—reported the remaining cases; six States did not report any of these disorders. No reports are shown for Wisconsin because such disorders were not referred by the Industrial Commission to the industrial health agency along with the others. Tenosynovitis and related conditions were reported frequently among canners and packers in the fruit and vegetable industries of Florida, and among canners, walnut pickers, shingle packers, loggers, turkey dressers, and folders of bags in Oregon.

Ten of eleven cases due to pressure abnormalities were compressed air illness among tunnel workers in Michigan; the other case occurred in Florida and involved an actor who breathed too much compressed air preparatory to practice for underwater moving pictures.

Effects of reduced temperature, such as frost bite, were reported by Oregon (40 cases) and Florida (2 cases). The latter occurred among workers in connection with refrigeration in food shops.

Oregon was also responsible for 25 cases of effects of heat and insolation, such as heat cramps and heat exhaustion; and Georgia, 61. These conditions were found common among workers in the construction industry and other outdoor operations, although some were reported among workers at inside jobs.

Infective and parasitic diseases.—Eighty cases, or 0.9 percent of all cases reported.

This group does not include 263 cases of diseases of the skin due to infectious and parasitic agents classified under the group *Diseases of the Skin.* Four States—Missouri, Georgia, Michigan, and Tennessee—did not report any cases falling into this group, and South Carolina reported only 1 case. The 80 reports were distributed fairly uniformly among the six other States. Diseases included were 14 cases of anthrax, with New Hampshire accounting for 13 of them in the woolen textile industry; 38 cases of brucellosis, with Wisconsin reporting 15 chiefly in the meat industry; and 14 cases of pulmonary tuberculosis, of which all but one occurred among institutional employees. The other case was a worker in the laboratory of a chemical factory who was exposed to tuberculous monkeys. Six cases of mumps were reported by Oregon among teachers and truant officers; and one case by Wisconsin in a gas appliance adjuster. Five cases of typhus fever were reported by Florida and Oregon; one case of malaria in a forestry worker and of trichinosis in a meat store clerk who ate uncooked meat were also reported. Infectious and communicable diseases are not subject uniformly to compensation. Consequently, since most of these reports have their source in compensation data, large numbers of such diseases would not be reported even if they occurred.

Diseases of the skin.—Six thousand eight hundred and seventeen, or 75.3 percent of all reports received.

Included in this group are conditions specified as contact dermatitis, occupational dermatitis, eczema, rash, chemical burns, and cellulitis. The last two conditions comprised less than one percent of all the diseases of the skin. Creeping eruption or larva migrans, fungus infections, most of which were not further qualified, straw mite dermatitis, and grain itch were arbitrarily classified in this category since they were reported specifically as skin conditions.

Each of the 11 States, without exception, reported more diseases of the skin than any other disease category. Materials allegedly causing dermatitis were classified into 12 groups, with specific substances listed under each as determined by the frequency with which the material was named (see table A). Exact classification of the substances was difficult because descriptions were incomplete, vague, or suspiciously inaccurate in many of the reports. Four States—Florida, Oregon, Wisconsin, and Connecticut—re-

ported not only the largest number of skin diseases but also the most varied list of substances associated with the conditions.

Excluding the group of miscellaneous substances, the material group responsible for the largest number of skin diseases was petroleum products, with 1,302 cases. Previous analyses of large numbers of dermatoses by the Public Health Service also had showed that petroleum products hold a high place as a cause.* Other chemical agents as a group ranked next with 969 cases, and food products followed with 804 cases. Plants accounted for 305 cases; solvents, for 283; and infectious and parasitic agents, for 263.

The most important single material exposure from the standpoint of numbers was to oils and greases, with 1,005 cases. Oils and greases were stated three times as frequently as any other cause of skin diseases. Cutting oils were the specific offenders, chiefly in the manufacturing of machinery and various metal products. Soaps, detergents, and related compounds followed next with 350 cases and were important in those States that compensated for such cases. An equal number was ascribed to fruits; 326 to cement; 212 to other petroleum products; and 155, specifically to larva migrans.

Individual consideration of each State reveals that in Florida citrus fruits, larva migrans, cement, soaps, detergents and related compounds, and moisture were responsible for over one-half of the 1,568 cases reported during the 2-year study period. Since the citrus fruit industry employs more workers than any other single industry in the State, a preponderance of skin diseases in canneries, packinghouses and groves is not unusual. Whether the juice, the oil in the skin, or the insecticide on the fruit caused the dermatoses could not be decided from the reports; for this reason, all such cases were coded to the citrus fruit itself.

Florida is the only State reporting appreciably large numbers of skin conditions due to parasitic agents. The most common parasitic infection specified was *creeping eruption*, caused by the larva migrans which thrives in damp soil and sand. It occurred among plumbers, electricians, and other public utility workers engaged in installing water pipes or wires. When working under cars, garage employees, too, were affected at times. Fungus, usually unspecified and unqualified, and other skin infections were reported among lifeguards, water skiers, and other persons in the various recreation areas of the State.

Cement was responsible for dermatitis among construction workers; and soaps, detergents and related compounds, among service workers in eating and drinking establishments and in hotels. The exposure group *moisture* contains vaguely specified skin conditions associated with working in the Florida muck, repairing pasture fences, or irrigating groves. Poison ivy cases were not referred by the Florida Industrial Commission to the State Board of Health in accordance with an earlier agreement, since they are of limited value for investigative purposes. However, they constitute an im-

*Brinton, H. P.: Dermatitis cases reported among employed males and females in seven States. *Indust. Med.* 13: 514 (June) 1944.

portant cause of claim for compensation in Florida, Missouri, and other States among workers in public utilities, construction and lumber industries. Other types of plants, such as philodendron, flowers, and shrubs, were reported as causes of dermatitis among nursery workers, florists, and gardeners more frequently in Florida than in any of the other 11 States.

In Oregon, the principal substances causing dermatitis were food products, such as vegetables, fruits, poultry; also lumber, wood and trees; soaps, detergents and related compounds; and cement. Together, these materials were responsible for 62 percent of the 867 cases of dermatitis reported in this State, reflecting the importance of food processing and lumber industries. Vegetables and fruits allegedly causing dermatitis varied from prunes to pears and strawberries, from beans and corn to mushrooms. Oregon reported more cases of skin conditions due to handling turkeys and chickens than any of the other participating States. Its big lumbering industry produced a relatively large number of cases of skin conditions, especially in the felling of green lumber and in planing mills. As in other States, soaps, detergents, and related compounds were the materials causing dermatitis among restaurant and service workers; and cement, among construction workers.

In Wisconsin, oils and greases, soaps, detergents, and related compounds, and cement were mentioned in connection with one-fifth of the 1,122 skin diseases reported. The substance was not specified for over one-third of the cases and was vaguely stated in many others, making difficult the determination of the relative importance of specific substances. However, the distribution points to a large variety.

In Connecticut, where the manufacturing of machinery and parts, tools, and dies, and many nonferrous products predominates, cutting oils and greases were responsible for almost one-half of the 1,289 dermatitis cases reported. Next in numerical importance were the various *other chemical agents,* chiefly acids and alkalies, associated with metal industries of the State. Exposures to chromium and plating compounds, plastics, and resins were relatively important. Plants and soaps, detergents and related compounds were mentioned as causative agents, but not in the large numbers found in the other States. The two cases of skin cancer reported in the pilot study were in Connecticut. One case involved a roofer who experienced repeated burns from asphalt and tar and who had undergone operations for the condition. The second, a compensated case, was claimed to be due to *halowax plugs in pores of the skin;* it occurred in an employee in an asbestos goods manufacturing plant.

In Michigan, oils and greases and other petroleum products, chiefly in the automotive and metal industries, were responsible for almost 60 percent of the 460 cases of skin diseases reported. Apart from 30 cases of dermatitis due to streptomycin in a hospital sanatorium, which are included in the *all other, and not specified group* under *miscellaneous substances,* no other material or substance was reported with sufficient frequency to single it out as being numerically important.

In Missouri, plant poisoning made up almost one-third of the 653 skin conditions reported. Other important substances were oils and greases, cement, soaps, detergents and related compounds, and leather.

In Indiana, the most important substances were oils and greases, plastics and resins, and rubber goods, which accounted for almost one-third of the 290 cases. Indiana also reported 15 cases of grain itch among flour mill workers and 30 cases of straw mite dermatitis in a plant manufacturing straw board.

In South Carolina, primarily a textile manufacturing State, substances mentioned were dyes, oils and chemicals used in textile finishing, and plastic materials in the manufacturing of seat covers. In Tennessee, cement, soaps, and dyes were mentioned more frequently. Of interest are eight cases of tetryl dermatitis in a munitions plant and several cases of *clay poisoning* in potteries. In New Hampshire, glues and pastes seem to be important. The number of cases reported by these three States and Georgia is relatively small so that it is difficult to determine which materials are important offenders.

Miscellaneous conditions.—Two hundred and twenty-eight cases, or 2.5 percent of all cases reported.

This group contains 119 cases of conjunctivitis, of which one-third were due to welding and reported mainly by Florida, Oregon, and Wisconsin. Of the 58 bronchial allergic disorders reported, 34 cases occurred among workers loading sacks of castor bean meal for a stevedoring company in Florida; some of the cases were severe enough to require hospitalization. A textile finishing agent in South Carolina was responsible for 8 cases. Because of the incompleteness of some of the information, it is quite possible that other cases of true allergy may have been classified under diseases of the skin in this report. Ill-defined causes totaled 39. This figure is probably low since an attempt was made to classify the reports into the groups listed. When reports with incomplete or inaccurate information on diagnosis and cause were received, these were discarded from the study.

Industry and Occupation

Some idea of the diversification of industries and occupations associated with specific occupational diseases has already been given. Further data on all occupational diseases by major industry groups are presented for the 11 States in table B. Since skin diseases accounted for three-fourths of all the cases reported, they are shown separately, all the other diseases being combined.

Although cases were reported in all industries, the largest proportion occurred in the manufacturing group. For all diseases, this percentage was 61.3; for skin diseases, it was 64.5; and for the group *all other diseases*, which contains the systemic effects due to chemical poisoning, dust diseases of the lungs, and others, it was 51.3 percent. The last proportion is lower

than would be expected normally, probably because almost 10 percent of the diseases in this group occurred in agriculture where citrus groves were classified and where most of the poisonings due to insecticides were reported. The group *miscellaneous industries and industry not reported* also contained almost 10 percent of these diseases, as contrasted with 4.4 percent of all diseases reported and 2.8 percent of the skin diseases.

TABLE B.—*Distribution of alleged or suspected occupational diseases reported during 1950 and 1951 in the 11 States participating in the pilot study, by industry group*

Industry group	Number			Percent		
	Total	Diseases of the skin	All other diseases	Total	Diseases of the skin	All other diseases
All industries	9,058	6,817	2,241	100.0	100.0	100.0
Agriculture	547	341	206	6.0	5.0	9.2
Mining	66	32	34	.7	.5	1.5
Construction	728	558	170	8.0	8.2	7.6
Manufacturing	5,543	4,398	1,145	61.3	64.5	51.3
Lumber, furniture, wood products	563	386	177	6.2	5.7	7.9
Stone, clay, and glass products	204	160	44	2.3	2.3	2.0
Metal industries	716	511	205	7.9	7.5	9.2
Machinery, including electrical	994	912	82	11.0	13.4	3.7
Transportation equipment	767	532	235	8.5	7.8	10.5
Food and kindred products	945	775	170	10.4	11.4	7.6
Textile mill and fabricated textile products	354	303	51	3.9	4.4	2.3
Paper, printing, and allied industries	151	109	42	1.7	1.6	1.9
Chemicals and allied products	269	170	99	3.0	2.5	4.4
Petroleum, coal, and rubber products	113	101	12	1.3	1.5	.5
Leather and leather products	174	166	8	1.9	2.4	.4
All other manufacturing industries	293	273	20	3.2	4.0	.9
Transportation, communication, and other public utilities	296	199	97	3.3	3.0	4.2
Transportation	127	59	68	1.4	.9	3.0
Telecommunications	33	32	1	.4	.5	----------
Utilities and sanitary services	136	108	28	1.5	1.6	1.2
Wholesale and retail trade	714	588	126	7.9	8.6	5.6
Business and repair services	252	122	130	2.8	1.8	5.8
Personal services	210	172	38	2.3	2.5	1.7
Professional services; public administration	300	212	88	3.3	3.1	3.9
Miscellaneous and industry not reported	402	195	207	4.4	2.8	9.2

Of the specific industry groups listed, manufacturing of machinery, including electrical machinery and appliances, was associated with 11 percent of all the diseases and 13.4 percent of the skin diseases. The corresponding percentages for transportation equipment were 8.5 and 7.8, and for the group *metal industries*, 7.9 and 7.5. The three groups combined yielded 27.4 percent for all diseases and 28.7 percent for skin diseases.

The other major industry group implicated in a large number of reports of all diseases and skin diseases was *food and kindred products*, accounting for 10.4 percent of all diseases and 11.4 percent of all the dermatoses. Of the other industry groups, construction was responsible for 8.0 percent of all diseases; agriculture, for 6.0 percent; and wholesale and retail trade, for 7.9 percent. The proportions for skin diseases paralleled these closely.

With respect to *all other diseases*, the manufacturing of transportation equipment was associated with 10.5 percent of the 2,241 cases; the metal in-

dustries and agriculture each accounted for another 9.2 percent. As explained earlier, the large number of poisonings in citrus groves due to insecticides, reported by Florida, contributed to the relatively high proportion for agriculture. The distribution of cases in the lumber, construction, and food products industries was about the same, each group accounting for approximately 8 percent of the cases.

Occupations of workers, like the data for industries, were classified according to the U. S. Bureau of the Census Index of Industries and Occupations. However, because many of the descriptions were poor or incomplete, it was felt that the material was not suitable for detailed analyses. A percentage distribution of the cases reported in the pilot study according to major occupation group is:

Major occupation group	*Percentage of cases*
Professional, technical, and kindred workers	2
Managers, officials, clerical, and kindred workers	1
Sales workers	1
Craftsmen and kindred workers	18
Operatives and kindred workers	44
Service workers	7
Farm laborers (including grove workers)	4
Laborers, except farm	15
Occupation not reported	8
Total	100

The most commonly affected occupation group was composed of operatives and kindred workers, such as canners, packers, assemblers, laundry workers, welders, garage workers, and truck drivers. Almost one-half, or 44 percent, of the 9,058 cases of occupational diseases occurred among them. Another 18 percent occurred among craftsmen, such as tool and die workers, mechanics, machinists, carpenters, plumbers, stonemasons, and painters. Fifteen percent of the cases were among general laborers; and another 4 percent, among laborers on farms and groves. Professional and technical workers, officials, and clerical and sales workers were also affected with some kind of occupational disease, though not in as great numbers as other groups. Seven percent of the cases occurred among service workers connected with hotels, restaurants, and maintenance of factories and buildings.

Occupations of Workers with Alleged Pneumoconiosis

In the course of processing the individual reports, it was observed that present occupations of workers with pneumoconiosis did not always suggest an exposure to silica or other pneumoconiosis-producing dusts. As a matter of general interest, these cases were tabulated according to present occupation and to previous dusty experience when mentioned. The results for 533 cases are presented in table C.

From a review of this brief tabulation, it is obvious that potential dust hazards are definitely associated with only 3 occupational groups, foundry workers, stone, brick, and pottery workers, and miners. These occupa-

tions gave rise to 199 of the 533 cases of alleged pneumoconiosis. The remainder of the cases involved workers currently engaged in occupations with which dust hazards are associated to a greater or lesser degree, such as the grinders, machinists, and other metal workers, or in occupations with no toxic dust hazard. To illustrate further, 27 of the cases falling in the last group involved inspectors and stock clerks. Twelve of these affected employees had worked at some time in mines; 3 in foundries; and 2 in the stone industries. It is assumed that the other 10 workers shown in the *present occupation* column also had some previous dusty experience which was not ascertained, otherwise the diagnosis would be incorrect.

TABLE C.—*Occupations of 533 workers with an alleged or suspected pneumoconiosis, as reported in the pilot study*

Occupation	Total number of cases	Present occupation [1]	Previous dusty experience mentioned		
			Mines	Foundries	Stone industries
Metal manufacturing:					
Foundry workers	154	143	11	----------	----------
Grinders	21	16	5	----------	----------
Machinists, assemblers, finishers, etc	80	28	44	6	2
Inspectors, stock clerks	27	10	12	3	2
Watchmen, janitors, other service	39	14	14	10	1
Miscellaneous	60	27	28	5	----------
Stone, brick, pottery workers	20	17	2	1	----------
Miners	25	25	----------	----------	----------
Trade, service, repair workers	37	9	24	4	----------
Workers in restaurants; food processing	28	5	16	7	----------
Retired, unemployed	13	----------	9	3	1
All other	29	7	18	2	2
Total	533	301	183	41	8

[1] Includes cases for which only present occupation was known.

Another 39 were watchmen, janitors, or other service workers in factories; of these, 14 mentioned previous mining experience; 10 had foundry experience; and 1, experience in the stone industry. Other occupation groups with no apparent dust exposure to pneumoconiosis-producing dusts comprised the 37 trade, service (other than manufacturing plants) and repair workers, and 28 workers in hotels, restaurants, or in food processing plants, such as meat packing and breweries. All but 9 of the first group and 5 of the second mentioned previous dusty experience.

It has often been said that one should not look for silicotics in dusty industries. The tendency of workers with disabling pneumoconiosis to leave heavy jobs and seek lighter work elsewhere is borne out in this tabulation, assuming, of course, that the diagnoses are made correctly. As the disease progresses and the worker finally is completely disabled and applies for compensation, or dies, he is often found employed at light work in nondusty trades as a janitor, clerk, watchman, or at other sedentary jobs. The data gave no indication as to the number of cases that might represent claims for compensation or that might have been compensated. Since a large pro-

portion of this group were uncovered in mass X-rays, the number would probably be small.

A further analysis of the reports showed that approximately two-thirds of the 183 workers reporting previous mining experience had worked 10 years or longer in coal, iron, copper, or gold mines, either in the United States or in other countries. An equal proportion of workers with previous foundry experience had spent 10 years or longer on such jobs. About 10 workers had both mining and foundry experience or had worked in granite industries at one time. The occupations most commonly reported for foundry workers were molder, coremaker, chipper, and sandblaster.

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