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Occupational Diseases

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IN Ohio the industrial population comprises 2,300,000 workers who are potentially subject to occupational diseases and industrial public health hazards resulting from exposure to toxic substances in their working environment. These diseases may be of a serious nature affecting the various vital organs and systems of the body, depending upon the nature of the toxic dusts, fumes, mists, vapors, or gases and the concentrations involved. In general a broad classification of occupational diseases due to physical and chemical agents may be grouped into the following four categories:

(1) Toxic dusts, mists, fumes, vapors and gases;
(2) Physical states of the environment such as temperature, radiant energy and noise;
(3) Mechanical factors such as pressure, physical strain and movement, and
(4) Infectious agents connected with industrial occupations.

SCOPE OF OCCUPATIONAL DISEASES

Chemicals may be absorbed through the skin, inhaled through the respiratory tract or taken through the digestive tract due to contamination at work from improper work processes or due to lack of adequate cleaning facilities and personal protective measures. Chemicals in general vary in their toxicity; their effects may be acute or chronic and may affect one or more organs at different times. We know, for example, that silica, asbestos and beryllium produce changes in the lungs with physical disability of long or permanent duration.

Benzol, toluene and other solvents produce diseases of the blood and blood-forming organs. Carbon tetrachloride, tetrachlorethane and other halogenated hydrocarbons produce toxic effects on the liver and kidneys. Manganese, mercury and carbon disulphide affect the brain and central nervous system.

Some chemicals may produce specific cancers such as cancer of the bladder due to aromatic amines. Destructive changes in the bone have occurred due to arsenic and phosphorus. Perforations of the nasal septum as well as lesions of the oral cavity result from excessive exposure to chromium, alkalies, and acids. The gastrointestinal tract is affected symptomatically by chemicals capable of acting as systemic poisons.

Gases such as carbon monoxide, phosgene and cyanogens cause asphyxiation, while other gases such as nitrous oxides produce chemical pneumonias. Exposure to x-rays and emanations from radium may produce serious burns and cancer while the blood and blood-forming organs are also profoundly affected by radiation. Infrared rays may produce cataracts and methyl chloride, blindness.

Occupational dermatoses are the most frequent of the industrial diseases and result from exposure to chemicals which act as primary skin irritants or as skin sensitizers. Incidentally, it is characteristic of this dermatitis that the symptoms disappear when the person is taken away from the working environment and usually reappear on re-exposure unless preventive measures have been taken.

OCCUPATIONAL EXPOSURES

The magnitude and complex nature of the occupational disease problem is reflected in the number, variety, and location of industries. There are over 12,500 manufacturing industries utilizing hundreds of varied chemicals and materials which require exposure of individuals to toxic dusts, fumes, vapors, mists and gases and other factors evolved during the manufacturing processes. Ohio leads the nation in the production of steel and glass and in the number of foundries as well as electrical appliances and the ceramic arts. The state is noted for its wide variety of manufactured products and industries in all sections of the state.

The State of Ohio has a rather remarkable distribution of industries both large and small within its various counties and there is hardly an area which does not have some form of industrial employment. In this respect practically every physician has, within the area he lives and practices, an opportunity to study and observe individuals who have been afflicted with occupational diseases. Even agriculture presents important occupational health problems through the wide-spread use of chemicals in the spraying of crops and the various insecticides. Lead, arsenic, nicotine and DDT have been commonly recognized but the recent increasing use of organic phosphates such as "parathion®" and

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"TEPP" (tetraethylpyrophosphate) have been dramatic and deadly in their toxic effects. Occupational diseases then may occur under a variety of conditions and in a tremendous number of different environmental exposures.

We know that 98.6 per cent of all the manufacturing industries in the State of Ohio, exclusive of transportation, agriculture, construction, etc., have 1,000 or less employees. Generally speaking, small industries do not have adequate medical service. This is particularly true of industries with less than 500 employees.

The lack of medical services represents a tremendous need, long recognized, which requires a co-ordinated effort for improvement. Unless there be physicians to take care of the employees and proper arrangements made for satisfactory medical services, occupational diseases can neither be recognized nor controlled. Basically, the foundation for the prevention and control of occupational diseases relates to the provision of adequate medical services to these industries.

RESPONSIBILITY OF PHYSICIAN, PATIENT, EMPLOYER, AND COMMUNITY

The physician has a responsibility to his patient for the correct diagnosis of an occupational disease. The recognition of an occupational disease not only affects the prognosis but also may modify the course of treatment. Under certain conditions further work might prolong the exposure and therefore aggravate the illness whereas removal from work may result in prevention and cure. Similarly certain specific industrial diseases have contraindications or requirements such as alcohol, for example, which will adversely affect an individual who has been exposed to carbon tetrachloride, and atropine which is a necessary emergency treatment for insecticide poisoning due to parathion.®

If the physician recognizes as the etiologic agent certain solvents like carbon tetrachloride, or other chlorinated hydrocarbons, he can estimate the damage to the liver or kidneys as well as the disability, and he can then determine the choice of treatment of the occupational disease. The proper diagnosis and treatment of an occupational disease also helps a patient financially in the sense that all occupational diseases are covered by compensation in Ohio, and the medical cost, treatment, diagnostic tests, hospital bills, etc., are paid by the Industrial Commission when the proper claim application has been filed and approved on a particular worker.

COMPENSATION

An occupational disease according to the industrial compensation board is "a disease peculiar to a particular industrial process, trade, or occupation to which an employee is not ordinarily subjected or exposed outside of or away from his employment."

All claims for occupational disease must be filed within six months after disability begins. In the case of claims filed for silicosis or any other disease of the respiratory tract, the application must be made to the Industrial Commission within one year after total disability began or within six months after death occurred. The payment for medical services is arranged according to a fee schedule established by the Industrial Commission in cooperation with a committee of the State Medical Society. This knowledge by the physician removes the financial barrier from a patient and enables him to remain under treatment with a doctor as long as necessary but morally, no longer for a particular occupational disease.

Unfortunately, few physicians have a personal acquaintance with the working environment of their patients. The symptoms of lead colic and acute appendicitis for example can and have been confused, but a physician with a knowledge of the lead exposure of his patient would be in a better position to evaluate his illness. Again, we find maganese poisoning and multiple sclerosis have twin-like symptoms. How many physicians would look for manganese poisoning in a patient employed in the manufacture of dry batteries? It is necessary for the physician, therefore, to obtain an accurate occupational history from workers who become their patients.

The patient in turn has a responsibility to the physician to provide him with complete and accurate data of his work as well as the reporting of all his symptoms and the factors relating to the illness. In short, every time a working man goes into a doctor's office when he is being treated for an illness, he should provide the doctor with some information about his occupation, the number of years he was employed at that type of work, the materials he handles and the substances to which he is exposed. The doctor then would include this information on the worker's case history card. It is because this information is seldom given to the doctor that difficulties have occurred and occupational diseases pass unrecognized. The patient should bring the work place to the doctor.

The physician has a responsibility to his industrial employer to provide adequate physical examinations on employees referred to him. This is of financial importance to the company in the sense that cursory examinations may pass over the recognition of a physical condition or preexisting disease with the consequence that the individual may be employed and the disease further aggravated by employment. Under such conditions the company is then subject to compensation costs for any disease or illnesses which result from the aggravation of any previous condition.

The most obvious considerations in this regard are diabetes, syphilis, and heart disease. Actual cases have occurred with considerable damage

to the individual as well as considerable financial loss to the company. The loss of a foot or leg nonhealing fractures of a syphilitic are two illustrations which emphasize the necessity of adequate examinations. At the same time in the conduct of these physical examinations, the physician must keep his records confidential on a proper physician-patient relationship and not release information without the consent of the patient he has examined. It is for this reason that physical examinations are usually classified in four broad categories: A, B, C, and D, which relate to the selective placement of the employee according to certain types of work.

The physician must also guide management in the establishment of proper employment policies concerning individuals who are handicapped, those who have had tuberculosis or venereal disease, and problems of maternity and women in industry in regard to their proper placement. Certain basic principles relating to these employment policies have been expressed by national organizations in these fields. It is equally necessary for the physician to keep adequate records of these physical examinations as well as the diseases, injuries, and deaths of workers for current and future reference.

The recognition of an occupational disease the physician is a basic necessity before he can seek to determine the cause and undertake preventive measures in order that other cases may not occur. By isolating or controlling the problem the physician decreases compensation costs and maintains production for the employer. The direct and indirect financial loss due to training of new personnel, interruption of production or loss of experienced employees in small plants has real meaning to the plant owner. Such an effort by the physician also facilitates a favorable public response to the plant in establishing it as a "safe" place to work.

The employer in turn has a responsibility to the physician in designating to him the proper authority and responsibility to insure that there will be no infringement of medical ethics or prerogatives. Also, the employer should provide the physician with authentic information about the toxic substances used in the industry which may affect the employees, their identification, quantities involved, and subsequent changes in manufacturing processes which may occur involving toxic substances. The plant physician should be provided with an opportunity to study the plant processes and the necessary First Aid facilities or personnel, and he should be given remuneration necessary to perform industrial medical services of a higher caliber.

The physician has an important responsibility to the community for the prevention of a disability or illness which may result in an economic loss, whether due to injury or sickness, for this in turn decreases the ultimate financial responsibility of a community to maintain people who are unable to work.

LEGAL REQUIREMENTS

The responsibility of a physician in the prevention and spreading of a communicable disease such as diphtheria or small pox is well recognized. Here, assistance is given to the community by the reporting of the communicable disease to the local health officer with the subsequent identification of the carrier or source of contamination and means of spread. These are dramatic and evident means of prevention through the efforts and cooperation of the general practitioners. We have exactly the same situation in regard to occupational diseases with the exception that only in unusual circumstances will they occur in epidemic fashion. However, the responsibility of the physician is a legal one which was established in 1920 by the General Assembly of the State of Ohio *"that every physician who is called in or attends a patient with an occupational disease is required to report the occupational disease within 48 hours to the State Department of Health on a form set up for that purpose."* (See accompanying form.)

These reports of occupational diseases which are sent to the Ohio Department of Health from all areas of the state form the basis for an epidemiological evaluation of the geographical distribution of diseases, their type, the number, and the industries involved which are plotted as is done in communicable diseases.

An illustration of this point is the large number of occupational dermatoses which were found to be occurring in a particular city in Ohio. The occupational disease reports, however, did not come to our attention from the physicians but from the newspaper releases that an epidemic of dermatitis had occurred which resulted in a threatened strike at a certain plant. We were called in to determine the cause of the dermatitis and found it was due to a change in the glue process used in the manufacture of automobile seat covers. If there had been proper reporting of the occupational diseases in this instance, the problem would have been spotted on an epidemiological basis by the Ohio Department of Health, long before it became a major problem in the community causing a labor-management dispute in addition to the effect on the employees' health.

STATE ASSISTANCE

The physician by fulfilling his responsibility in the reporting of an occupational disease to the official state agency enables, then, the technical resources of the state to be placed at his disposal in the identification and correction of a problem. The State Health Department has a technical staff consisting of medical, engineering, and chemical units which conduct the necessary

FORM

CERTIFICATE OF INDUSTRIAL OR OCCUPATIONAL DISEASE

WRITE PLAINLY WITH INK—THIS IS A PERMANENT RECORD

N. B.—Every item of information should be carefully supplied. The exact statement of OCCUPATION is very important. Physicians should state DIAGNOSIS in plain terms. See instructions on back of certificate.

2-17627

OHIO DEPARTMENT OF HEALTH
COLUMBUS 15, OHIO

CERTIFICATE OF INDUSTRIAL OR OCCUPATIONAL DISEASE

Name of Patient ..... (Last name) (First name) (Second name)

Address: Street and No. ..... City or Village .....

PERSONAL AND STATISTICAL PARTICULARS

Sex	Age	Color	Country of Birth

Single, married, widowed, or divorced (*write* the word) .....

OCCUPATION

(*a*) Trade, occupation, or work (in which disease was acquired) .....

Particular kind of work in such trade, etc. .....

Date of entering this occupation .....

Employer's name .....

Address .....

Employer's business (goods made or work done) .....

(*b*) Previous occupations:

Name of occupations	*Entered (year)*	*Left (year)*

Previous illnesses, if any, due to occupation:

Disease or illness	*Year*

MEDICAL CERTIFICATE OF DISEASE

Diagnosis .....

Chief symptoms and conditions .....

Date first symptoms appeared .....

Complicating diseases (such as alcoholism, syphilis, tuberculosis, etc.) .....

What substance(s) or condition(s) in your opinion caused this affliction? .....

Duration (actual, estimated) ..... (Check which)

Additional facts .....

Date of diagnosis ....., 195....

(Signed) ....., M. D.

....., 195 ... (Address).....

Mail to DIRECTOR OF HEALTH, Departments of State Bldg., Columbus 15, Ohio

For Instructions See Other Side

industrial hygiene studies. These studies comprise the evaluation of the manufacturing materials and processes; atmospheric determination of toxic dusts, fumes, mists, vapors or gases; measurements of illumination and ventilation; analysis of chemical composition of materials and processes to which the workers are exposed; evaluation of medical and nursing services in plants; necessary protective measures; and industrial toxicology.

Each type of industry and individual plant poses specific industrial health problems. In each instance of occupational disease, there are medical and engineering control measures which can prevent the occurrence of additional cases and can control the extent of the toxic exposures. The medical and engineering control measures required are designed for the specific process, operation, or toxic substance involved, in order that the maximum allowable concentrations be within the limits as specified by the regulations adopted by the Public Health Council in 1946.

The key solution to the prevention of occupational dermatitis, for example, is to keep the

contact of the irritants with the skin at a minimum. There are certain basic approaches to accomplish this and these are: (1) total enclosure of the manufacturing process, (2) adequate local and general exhaust ventilation, (3) protective clothing, (4) enforcement of cleanliness, (5) protective ointments, (6) the use of nonirritant industrial cleansers. In effect, then, the general practitioner has through the use of the state facilities a technical arm, so to speak, for use in the identification and control of suspected environmental factors within industry in order to carry out his responsibility to his patient, to his employer, and to his community.

A physician who suspects or recognizes an occupational disease and wishes to have technical assistance may request that help from the State Health Department.

"GROUP ASSOCIATION"

"Association" of factors from observations is manifest daily in the practice of medicine, especially when one correlates symptoms and physical findings in the examination of a patient. The "association" I wish to emphasize is that relating to a *group* rather than to one individual, such as a group of workers or a community at large. Perhaps a few illustrations will help:

Let us begin with an event in a small town where invitations were extended to attend a community supper. The meal was served on a Saturday evening and 4 to 8 hours later the people who attended became ill with nausea, diarrhea and vomiting. The doctor who was called to many of the homes recognized the symptoms of food poisoning. He discovered that all of the individuals had the same symptoms, all ate the same food at the same place and at the same time. The doctor *associated* the cause of the disease with the eating of this particular meal.

RELATING TO INDUSTRY

Now let us take an example of "association" relating to industry. We find workers cleaning out a tank with a solvent called carbon tetrachloride in a room that is not properly ventilated. A number of workers become ill and collapse. Since their work is the one common factor in their history, it is evident their illness is directly *associated* with their work.

These two examples or illustrations of "association" which I have described to you are immediately observed because they relate to an acute incident producing an acute disease, that is, the development of a disease or illness from a few hours to one or two days following exposure.

Let us now consider the chronic type of exposure. Some 200 men worked in a plant which manufactures chromates and about 12 to 15 years later a significant group of the men developed lung cancer and died. In another plant where dyes were manufactured, observations showed that 20 years later deaths from bladder cancer among the employees were far greater than one might expect. In neither case did the workers, their families or their physicians "associate" this particular disease or death with employment because of the so-called latent period, the long time it takes between occupational exposure and the actual development of the disease. This type of exposure then is frequently described as chronic and the development of disease and symptoms may be delayed weeks, months, or years after the occupational exposure occurred. Beryllosis, for example, may occur as long as 12 years after exposure.

There are difficulties too in this matter of "association." We realize there are hundreds of chemicals being used and introduced in various combinations in industry that may cause subsequent serious effects on the human body and that symptoms of disease may often develop months or years after the critical exposure. In addition, the last place of employment is not necessarily the work place where the initial exposure occurred. Individuals move from job to job as you well know, and the recognition of an "association" of such an exposure and the detection of the chronic disease which may devel- requires comprehensive work histories and some knowledge of substances used in various industries.

MEDICAL PROGRESS

In closing, I should like to comment that some of you may have the opportunity of directing the medical services of an industry engaged in the manufacturing or processing of a single product or using a particular chemical in large amounts where a group of employees would be exposed to the same substance. If you would carefully record your observations of the symptoms and findings of these employee patient- whom you examine, you may be able to make correlations of medical importance. This opportunity exists whether the observations relate to a large or small group of employees, or whether to a single department or an entire plant.

Undoubtedly many occupational diseases are classified as nonoccupational in origin and have been unrecognized by the patient, the employer, and the physician as well as the community.

It must be remembered that many contributions made to the progress of medicine were developed from the "initial association" of observations by the practicing physician which ultimately led to further scientific investigations and discovery.