THE NATIONAL COAL WORKERS' AUTOPSY STUDY

by

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Section 203(d) of the Federal Coal Mine Health and Safety Act of 1969 authorizes the Department of Health, Education, and Welfare to perform research on pneumoconiosis and to undertake an autopsy study. The responsibility for this project was entrusted to the Bureau of Occupational Safety and Health, which has since become the National Institute for Occupational Safety and Health. Initially, the autopsy study was planned as a strict research study, obtaining maximum data from a few medical centers, where special techniques would be performed to detailed standards. Later, following the coal mine disaster in Hyden, Ky., in December 1970, the need for a general autopsy study was realized. The planned research autopsy study became a separate project and a larger national program of autopsies of coal miners done by private pathologists was planned. The program was formulated with consultation of the Social Security Administration, the Armed Forces Institute of Pathology, the College of American Pathologists, the American Society of Clinical Pathologists, and the medical support of the United Mine Workers. The final protocol was published as a regulation in the Federal Register of May 14, 1971.

An explanation of the program, the program protocol, a sample of a personal history form, a reprint of the official autopsy protocol, and a return postcard were mailed to approximately 10,000 pathologists listed by the American Medical Association and to 60 pathologists listed by the American College of Osteopathic Pathologists. The program was also publicized by a presentation at the American Society of Clinical Pathologists' fall meeting on October 27, 1971, by editorials in all leading pathology journals, and by an article submitted to the Archives of Pathology.

The pathology section at the Appalachian Laboratory for Occupational Respiratory Diseases (ALFORD) has a threefold function--that of research in pneumoconiosis and other occupational respiratory diseases, a service program which is the National Coal Workers' Autopsy Study, and a responsibility to insure that miners killed in mine disasters may be autopsied.

The National Coal Workers' Autopsy Study is basically a service program to aid surviving relatives of miners in establishing claims for Black Lung Benefits through the Disability Insurance Program with the Social Security Administration. This program guarantees payment up to $200.00, with an additional $10.00 if a chest X-ray and report are submitted, to the pathologist. Such payment is used to encourage the participation of pathologists and is also especially useful to compensate for professional services when an autopsy is requested for miners who die outside the hospital. Participation requires

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that the survivor fill out a short, simple form listing a history of occupational exposure, the miner's main occupation and last occupation, a smoking history, and the name of the last mine worked in, as well as the number of years worked. The form also includes a statement assuring the person permitting the autopsy that if he or she ever wants the information to be released, the Public Health Service will cooperate. It is also specifically stated in the form that no payment is to be made for the autopsy by the consenting party. The autopsy should be performed by an accepted autopsy procedure, such as that described by the Armed Forces Institute of Pathology Autopsy Manual. The pathology section of ALFORD has a limited number of these manuals which may be borrowed by the pathologists for a brief period. Upon receipt of the forms, the autopsy protocol, tissue blocks, and slides, payment is issued. Thus, the National Coal Workers' Autopsy Study is a general study applicable to all pathologists throughout the country. It is designed to be a straightforward project not requiring any specialized equipment or extended effort which might discourage participation.

There has been increasing participation by pathologists throughout the Nation. In the first year, there were only 68 cases submitted, and in the second year, 203 cases were submitted. Of the cases, 77.3 percent are from the Appalachian bituminous coalfields and 9 percent are from the Western coalfields of Utah, Oklahoma, New Mexico, Colorado, and Wyoming.

The cases submitted comprise a useful range of coal miners. The population has an average age of 64 with a range from 36 to 88 (standard deviation of 11 years). The average time working underground was 30 years with a standard deviation of 14 years but a range of 1 year to 65 years. Nearly all jobs are represented. Sixty percent of the men worked at the face of the mine in jobs such as continuous miner operator and coal loader. Fourteen percent of the men never worked in a mine with modern mining machinery.

The main cause of death was vascular disease such as arteriosclerotic heart disease or a cerebral vascular accident (40 percent), followed by nonmalignant lung diseases (20 percent), and malignant diseases of all types (23 percent). Nine percent died with lung cancer. Accidents and violent deaths accounted for only 2.3 percent. Approximately half of the men (50.1 percent) were either nonsmokers or very light smokers (less than one pack year for their lifetime). Twenty percent (20 percent) of the men were heavy smokers of over 30 pack years for their lifetime.

In general, we have a fairly representative sample of the Nation's coal mining population. The degree of coal dust exposure ranges from men who have worked only 1 or 2 years in the mines to others that have worked over 65 years in the mines. We have smoking histories, job histories, and geographical locations to correlate with autopsy data. We are currently studying new methods to quantitate lung disease.

The research study of the laboratory has many facets. Tissues and information obtained through the National Coal Workers' Autopsy Study are used to study the causes of death of miners as well as a general range of lesions produced by coal workers' pneumoconiosis. The electron microscope and the

molecular probe are used to study the ultrastructure of the lungs and the elemental analysis of dust particles within the lung. Another study is determining the correlation between the extent of the tissue damage due to dust and the appearance of the lungs by X-ray. Post mortem physiological studies are being performed to determine the extent of tissue damage which is detectable by physiologic studies. The research aspects of the pathologic studies will lead to a greater understanding of the structure and function of lungs as well as the reaction of lungs to dust and chemicals.

The third function of the laboratory is to insure that an autopsy service is available to miners killed in disasters. The three pathologists in the section are prepared to assist at any disaster. In the case of mine disasters, the pathology section is notified by the Bureau of Mines by an answering service "hot line." At this time, the pathology section contacts responsible parties at the scene of an accident and determines the extent of the disaster and informs the people of the availability of autopsy services. The team will go to the disaster site prior to the recovery of the bodies to make whatever local arrangements may be needed with pathologists, hospitals, the coroner, and the widows or next-of-kin.

The usual procedure would be to contact the Social Security Administration's local office which, in most cases, has a local representative at the scene of the disaster. The United Mine Workers Welfare and Retirement Fund officers, usually physicians, are also routinely at the scene of the disaster. These people largely have the trust of the miners' families and can advise the families of the desirability of having their relatives autopsied. A call is usually made to the county prosecutor's office or the county coroner to insure that the civil government cooperates in this procedure. However, the success of the disaster autopsy study depends upon the ability to obtain permission for the autopsy from the widow within a reasonable time after death.

The need for carrying out a full autopsy and an analysis on all miners killed or injured as a result of a mine accident cannot be overemphasized. The use of forensic autopsies in investigating aircraft accidents has now become a routine procedure and has contributed to increased aircraft safety. In such cases, the Federal Aviation Agency (FAA) works in cooperation with private pathologists in seeing that autopsies are done on essentially all individuals killed in aircraft accidents. The FAA has the authority to order autopsies if the local authorities will not do so. A similar program would be valuable for investigating mine accidents. Such a program would detail the causes of death in mine accidents and help in the development of means to prevent these deaths.

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