

The study results, reported by Cynthia Robinson of NIOSH at the Society of Occupational and Environmental Health Conference December 5, revealed that leading causes of deaths among the workers were malignant neoplasms, diseases of the heart, nonmalignant respiratory diseases, and suicides.

Robinson also reported seventeen cases of mesothelioma, another form of cancer associated with asbestos but much less common.

The NIOSH researcher told the conference, which continued through December 7, that 906 deaths were observed among the white male population where 718.6 were expected. For females, the figures were 128 observed deaths and 87.4 expected.

Robinson told the conference audience that the asbestos involved in the study, except that used for a short time during World War II, was 99 percent chrysotile. She said that for female workers there was a five fold increase in risk of lung cancer and a slight increase for men of lymphoma and lymphosarcoma.

Irving Selikoff, who received an SOEH award at a banquet during the conference for pioneering research on asbestos effects, said he believed that animal studies can and must be used to identify carcinogenic substances in the absence of data from human experience. At a news briefing for reporters, Selikoff stressed that the best possible format for animal studies must be devised to insure maximum reliability.

"We can't solve the problems with human data alone" Selikoff said, suggesting that, with so many untested substances in the work environment and the length of time needed for epidemiological studies, animal data would have to be relied on. Selikoff added that epidemiologists like himself "have got to put themselves out of business" in dealing with human mortality statistics.

M. J. G. Davis, Institute of Occupational Medicine, Edinburgh, Scotland, echoed Selikoff's sentiments about using animal data, saying "we can extrapolate in a qualitative sense" about what would happen to people from the experience with laboratory animals.

But Davis, who delivered a paper on asbestos fiber pathogenicity, warned against relying on evidence which resulted from "unrealistic doses given to study animals." He cited the controversy in which test animals developed tumors after receiving immense doses of saccharin. Davis said experiments should use doses which were "something a human being could come into contact with."

Joseph Wagoner, who is current president of SOEH and a special assistant at the Occupational Safety and Health Administration, noted that with the exception of arsenic, all agents known to be carcinogenic in humans also have been shown to cause cancer in animals in laboratory tests. With regard to data based on human experience, Wagoner said that even when cancer is found in worker populations there is rarely consensus within the government and industry as to the nature of the workers' exposure.

Worker's Families

A study done by Henry A. Anderson, Mount Sinai School of Medicine, focused on the effects to families of workers employed in the asbestos industries.

Anderson said that the wives of asbestos workers had a higher percentage of abnormal chest X-rays than children in the homes, presumably because they have had longer contact with asbestos dust brought home on the clothes of their husbands and because they have closer contact with the substance while washing work clothes, dusting, and cleaning the homes.

Of 626 household contacts with asbestos in the homes of asbestos workers, 35.9 percent showed abnormal chest X-rays, Anderson reported. There were also 37 mesothelioma deaths among the family members studied.

Most of the exposure in the study, which began in 1973, was to amosite asbestos.

Selikoff, director of the Environmental Science Laboratory at Mount Sinai, said that medical followup of workers has suffered from "inattention" in the past. The AFL-CIO has made medical surveillance of workers at high risk a high priority, Selikoff reported.

The U.S. Navy and shipyard owners whose employees are exposed to asbestos also are taking steps to keep track of the medical experiences of their workers, he added. Chemical companies as well have decided to keep under observation employees with past exposure to such agents as benzedine and beta-Naphthylamine.

In the Mount Sinai studies of asbestos workers, Selikoff told the reporters that while high numbers of asbestos fibers were found in the livers of workers, there had not been an increase in liver cancer. However, he noted, the workers did exhibit a higher than normal rate of kidney cancer.

Asbestos

EXCESS OF LUNG CANCER, DEATHS FOUND IN NIOSH STUDY OF TALC WORKERS

A researcher for the National Institute for Occupational Safety and Health reported findings December 6 of excesses of lung cancer and deaths from non-malignant respiratory diseases among miners and millers of nonasbestiform talc in Vermont mines.

The results were presented by NIOSH epidemiologist Sherry Selevan at the Society of Occupational and Environmental Health conference on Fibrous and Particulate Dust, held December 6-7 in Washington, D.C.

Millers in the study showed an excess of nonmalignant respiratory disease, while miners had an excess of lung cancer, Selevan told the conference. Five deaths from lung cancer were observed where 1.5 were expected among the 90 workers in the study who had died.

Overall, the 90 deaths of workers at four companies in three locations in Vermont compared to an expected 77 deaths, according to the NIOSH researcher.

Of the nonmalignant respiratory disease cases, excluding influenza and pneumonia, seven deaths were found among the millers where 0.89 were expected.

Selevan said that with respect to the excessive lung cancer among the miners, who did not show excessive nonmalignant respiratory disease, other agents besides the talc dust could be responsible.

Selevan said NIOSH was drawing no conclusions about safe exposure levels to the talc dust from the evidence gathered in the mortality study. She said current dust levels are lower than levels of past years when some of the talc workers in the study began their employment.

NIOSH personnel also reported on environmental and medical studies of industrial talc operations where asbestos is present in New York state. Among the presentations was a finding reported by David Brown of a threefold increase in lung cancer among workers at the Gouverneur Talc Company Mine in New York (Current Report, December 1, p. 918).

In an environmental study on the Vermont talc operations performed for NIOSH and presented by Maryanne Boudry, Harvard School of Public Health, researchers found that the

talc had only trace amounts of quartz in 15 percent of the samples. No asbestos could be detected by electron microscopy, X-ray diffraction, or other methods.

Bourdy noted that scanning electron microscopy should be considered as an addition to the method currently used by NIOSH to count fibers in dusty environments.

Smoking and Talc

In a paper prepared for delivery by David H. Wegman, also of Harvard, it was concluded that there was an interaction between smoking and talc exposure. Wegman reported that the cross-sectional measurement of lung function in the talc workers was different from the normal population in FEV₁, but not FVC testing.

A final conclusion by Wegman in his report on the respiratory morbidity among workers exposed to non-asbestiform talc was that the current threshold limit value "does not protect smokers exposed to nonfibrous talc."

Steve Blum, University of North Carolina, reported an 80 percent excess mortality from stomach cancer among workers in a rubber manufacturing plant. Blum said that calculations indicate the excess was caused by talc exposure containing asbestos in the rubber facility.

The talc was used as a detackifier or antisticking agent, Blum said. There was a significantly smaller excess of stomach cancer in the second rubber company study, he added, but other factors such as the talc composition and characteristics and differences in work practices and safety controls could help explain the different results from studies of the two companies.

William E. Smith, Fairleigh Dickinson University, described to the conference tests on hamsters aimed at discovering the carcinogenic and fibrinogenic potential of minerals. Smith said that his researchers were able to produce tumors by injection of chrysotile asbestos fibers, provided the doses were large enough.

Tremolite such as that found in industrial talc produced no tumors, however, Smith reported. He added that samples which induced no tumors showed a lack of long thin particles evident in other samples which did cause tumors.

Smith noted that the fibrinogenicity of samples paralleled their carcinogenicity.

Tungsten

NIOSH RECOMMENDS STANDARD TO LIMIT WORKPLACE EXPOSURE

The National Institute for Occupational Safety and Health recommended that workplace exposure to tungsten and cemented tungsten carbide be reduced according to limits set forth by the agency in a criteria document on the substance.

Occupational exposure to insoluble tungsten should be controlled so that no employee is exposed at a concentration greater than five milligrams, measured as tungsten, per cubic meter of air as for a time-weighted concentration for up to a 10-hour workday in a 40-hour workweek.

The institute also said workplace exposure to soluble tungsten should be limited to no greater than one milligram per cubic meter of air for the time-weighted average.

The four-part recommendation suggested limiting exposure to dust of cemented tungsten carbide which contains more than 2 percent cobalt to a concentration no greater than 0.1 milligram, measured as cobalt, per cubic meter of air.

Workplace exposure to the dust of cemented tungsten carbide which contains more than 0.3 percent nickel should be

controlled so that no employee is exposed at a concentration greater than 15 micrograms of nickel per cubic meter of air, as outlined in NIOSH's criteria document concerning exposure to inorganic nickel.

The recommended standard, which offers suggested medical surveillance, recordkeeping, and labeling requirements, appears in the Full Text section of this Current Report.

Lead

RATE RETENTION CLAUSE WOULD NOT CREATE DESTRUCTIVE COSTS, ECONOMIC STUDY SAYS

Inclusion of a medical removal protection clause in a proposed workplace lead standard would result in substantial but not "infeasible" or "destructive" costs to the lead industry, according to an economic impact study submitted to the Occupational Safety and Health Administration on December 1.

The study, prepared by Nicholas A. Ashford, Robert D. Gecht, Dale B. Hattis, and Judith I. Katz, all of the Center for Policy Alternatives, Massachusetts Institute of Technology, followed two weeks of public hearings on whether OSHA should include a medical removal protection provision in its proposed lead standard (Current Report, November 17, p. 845). Such a provision would require employers to provide economic protection to workers transferred or removed from their jobs because of lead exposure.

OSHA's public hearing did not address the issue of economic impact. However, OSHA committee management officer Clarence Page told OSHA that Ashford will be available on December 12 to answer questions about the study. The session is scheduled to begin at 9 a.m. in Room N5437, Department of Labor, Third St. and Constitution Ave., N.W., Washington, D.C.

According to the study, compliance with a rate retention provision would result in costs greater than 4 percent of the net cash flow in the secondary lead smelting, lead pigment, storage battery, and primary lead smelting industries. These costs would result, the study noted, if new employees were hired to fill vacancies created by the temporary removal of lead exposed workers.

However, tax deductions for such costs, and the use of workers' compensation and unemployment insurance to help offset costs to the employer, would "go a long way" in reducing costs to the net cash flow, the report maintained. Also, it added, lower costs would result in the first place if worker rotation rather than the hiring of new employees were used to fill temporarily vacant lead exposed jobs.

The lead standard might be modified to reduce the "expected economic impact" further, the study commented. For example, OSHA might "delay somewhat" the date by which employers would have to remove from lead exposure workers with blood lead levels of 60 micrograms of lead per 100 grams of blood. Also, the blood lead level used to determine when a worker could be returned to his job might be changed from 40 micrograms to 45 micrograms, the study suggested.

Annual Costs

During the first year of compliance with the proposed lead standard, the cost of meeting a rate retention provision through rotation would range from "a low" of 99 cents per exposed employee in shipbuilding to "a high" of \$179.70 per exposed employee in the inorganic pigments industry. These costs are "so low on an absolute scale" that "it is unlikely" that the provision would have a significant impact on any of