Occupational Safety and Health: Progress Toward the 1990 Objectives for the Nation

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SYNOPSIS

Occupational safety and health is 1 of 15 areas addressed in the Public Health Service's Objectives for the Nation. This area represents 104 million working men and women and the deaths, diseases, and injuries that result from exposures to hazards in their work environment.

Characteristics of public health practice are compared with characteristics of occupational safety and health practice. The National Institute for Occupational Safety and Health (NIOSH), created by the Occupational Safety and Health Act, is discussed. NIOSH has developed a list of 10 leading work-related diseases and injuries. The list is headed by occupational lung diseases.

Twenty Objectives for the Nation in the area of occupational safety and health are reviewed, and the status of NIOSH efforts toward their attainment is discussed. Five categories of objectives are covered: (a) improved health status, (b) reduced risk factors, (c) improved public and professional awareness, (d) improved service and protection, and (e) improved surveillance and evaluation.

The potential for achieving these objectives is discussed, with special attention given to the lack of a data base for monitoring progress. A major conclusion is that surveillance in occupational safety and health needs to be strengthened.

In a recent article in Fortune, Thomas Hines wrote: "The National Safety Council estimates that in 1980 . . . deaths and injuries on the job cost business around 30 billion dollars. Whatever the actual total may be, reducing those costs is a job that calls for better management—and better public policy as well" (*1*). Occupational injuries and diseases exact a large, and largely preventable, toll in human suffering and grief as well as in loss of dollars.

"Healthy People—The Surgeon General's Report on Health Promotion and Disease Prevention" (*2*), in its section on "Actions for Health," lists occupational safety and health as an "action" of major importance in protecting the health of Americans. In a subsequent publication, "Promoting Health/Preventing Disease—Objectives for the Nation," the U.S. Public Health Service established 20 objectives specifically in occupational safety and health for achievement by 1990 or sooner (*3a*).

The Centers for Disease Control (CDC) is the Federal agency given the lead responsibility for responding to many of the Objectives for the Nation. The CDC's National Institute for Occupational Safety and Health (NIOSH) is responsible for leading the response to the objectives established for occupational safety and health. These objectives relate primarily to the health of the young adults and adults who constitute the nation's active and retired workers. They also address the health of a group indirectly related to work: the offspring of workers exposed to agents that affect reproductive function. The purpose of this paper is to review and summarize recent efforts toward meeting these objectives.

Nature and Extent of Work-Related Hazards

Hazards associated with work, like other environmental hazards, are of two general types: trauma and

exposures to toxic agents. An important characteristic of the occupational setting is the possibility of interaction between an environmental factor and an unhealthy personal behavior of the worker. For example, exposure to asbestos and smoking cigarettes are each associated with an increased risk of cancer. However, a worker who is exposed to asbestos and also smokes cigarettes is at greatly increased risk. As regards trauma, there is a clear interaction between the use of alcohol by a machine operator and the inherent hazards of the machine he or she operates.

Because so many Americans are exposed to hazards in the workplace, the national burden of work-related injury and disease is immense. But because of the lack of comprehensive reporting of work-related health problems (and the interaction between workplace hazards and other health risks), it is very difficult to specify the contribution of work-related injury and illness to overall rates of disease, disability, and death.

In an attempt to focus professional attention on the most pressing health problems related to work, the senior scientific staff of NIOSH in 1982 developed the following suggested list of 10 leading work-related diseases and injuries in the United States (*4*):

1. Occupational lung diseases
2. Musculoskeletal injuries
3. Occupational cancers
4. Amputations, fractures, eye loss, lacerations, and traumatic deaths
5. Cardiovascular diseases
6. Disorders of reproduction
7. Neurotoxic disorders
8. Noise-induced loss of hearing
9. Dermatologic conditions
10. Psychologic disorders

The frequency of each condition, its severity in the individual case, and its amenability to prevention were the factors considered in ranking the conditions. Staff of the Institute are analyzing available data and seeking new information to confirm, reject, or amend the suggested ranking.

Government and Public Health Practice

To deal with such health problems, governments may take several forms of action that constitute the practice of public health. In describing the nature of governmental action on behalf of the public health, Stebbins (*5*) noted that in the early days "efforts were made to prevent the spread of infectious disease . . . through the utilization of the police power of the state." Other than an abiding concern for the health of all the people, nothing seems more fundamental in the historical development of public health practice than the use, when necessary, of legally required measures by government to protect vulnerable citizens. In this century the tools of public health practice have become more varied and sophisticated as well as more prominently associated with the delivery of preventive services to the public. However, the authority and the need legally to protect the public remain fundamentals of public health practice. Concerning contemporary local health departments, Stebbins wrote that "[the health officer] is given wide authority and at his discretion may perform acts which are possible to no other agent of government." While health officers use these broad powers infrequently, their authority to use them is none the less real.

In an unpublished paper, "CDC Prevention Strategy," Dennis Tolsma and associates at CDC listed a series of optional modes of governmental action (by localities, States, or nations) to protect the public from risks to health. These actions vary in the degree to which they demand compliance by citizens or organizations and are listed in ascending order of coerciveness. To protect the public health the government may:

1. Provide information on which citizens may act voluntarily to reduce their individual risks.
2. Offer services which, if accepted by citizens, will protect them or the community.
3. Enunciate policies that officially endorse or encourage actions (the use of technologies, products, or behaviors) viewed by the government as protective.
4. Establish economic or other incentives inducing citizens to take actions viewed as protective.
5. Compel citizens (for example, by establishing and enforcing environmental standards) to take actions that are viewed as protective.

These categories, in general, describe the armamentarium available to practitioners of public health (including occupational safety and health) to prevent death, disease, and disability. The relative "mix" of the various types of actions in any strategy to prevent or control a health problem obviously will vary according to the problem and its setting. However, mandatory measures, such as regulation, may prove essential to success.

Of course, taking any action to protect the public health implies the existence of a risk sufficient to warrant the action. The strength of the evidence on which governments act to protect the public also varies. As CDC Director Dr. William H. Foege has observed (personal communication to J.D.M.), there are three general categories of "evidence" on which actions may be taken: (*a*) incontrovertible scientific fact, (*b*) prudence, and (*c*) intuition. He assumes that actions taken on intuition alone are rare even by the most adventurous health officers. If uncertainty exists, he encourages health officers to risk error on behalf of protecting the public health. His advice, given incomplete evidence, is "Risk money, not lives!"

Acting to protect the public requires repeated judgments by officials, based on information that is almost always incomplete. To insist that mandatory public health actions be withheld until the evidence for risk is "incontrovertible" would severely compromise the preventive efficacy of actions. On the other hand, to act on intuition alone is to court loss of the credibility necessary for responsible leadership by public health officials. Therefore, as a general rule, it would seem that actions to protect the public health—especially those that are mandatory—should be based on scientific evidence sufficiently strong, at a minimum, to suggest that the action is "prudent."

Occupational Safety and Health Practice

To achieve the Objectives for the Nation in occupational safety and health will no doubt require the efforts of the entire confederation of talents known as the "public health system," including the specialized agencies established to regulate the workplace. In addition to relevant Federal agencies, the "public health system" includes State and local health and labor departments, schools of public health and medicine, safety and health departments in industry and organized labor, State regulatory agencies, private medical practitioners, and voluntary agencies.

The National Institute for Occupational Safety and Health, in the Department of Health and Human Services, is the Federal preventive health organization responsible for research on the health and safety of America's workers. NIOSH was established by the Occupational Safety and Health Act of 1970 (Public Law 91–596). This act, the Federal Mine Safety and Health Act (Public Law 95–164), and several other laws charge the Institute to identify occupational safety and health hazards, to develop means of preventing these hazards, and to conduct educational programs and training for prevention. In contrast to other national health institutes, NIOSH is specifically authorized to recommend standards to regulatory agencies for the protection of workers.

The Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA), in the U.S. Department of Labor, are the principal Federal agencies responsible for promulgating and enforcing the standards that regulate health aspects of the workplace. The assignment of responsibilities for scientific inquiry and for regulation to different Federal departments (the Department of Health and Human Services and the Department of Labor) is an important feature resulting from specific congressional actions. This separation is often duplicated in the State governments that are active in regulating the workplace; responsibilities for scientific investigation and consultation are vested in the State health department, while standard-setting and enforcement are carried out by the State labor department.

While occupational safety and health is, and has been, an integral part of American public health practice, there are distinct differences between occupational safety and health and other public health activities. For example:

1. To secure mandatory protective measures in the workplace, it is necessary that public health officials intervene *indirectly,* that is, by convincing regulatory officials of the need to promulgate and enforce environmental standards. The regulators at both the Federal and the State levels are often in agencies whose primary interests are the economic and social aspects of work, rather than its effects on health. Hence, in occupational safety and health, the ability of most health officers to act decisively to protect the worker is distinctly circumscribed; skills of persuasion are frequently crucial to the outcome.

2. The strong and centralized Federal role in regulating the workplace differs markedly from the administrative situation in other aspects of public health practice, where State and local health departments are clearly responsible for organized preventive actions, including regulatory measures. In occupational safety and health, the central bodies that regulate the workplace are the Federal agencies OSHA and MSHA. Consequently, State and local health departments, which are the constituted authorities for other public health activities, are much

less prominently associated with occupational safety and health. Indeed, their involvement in the field at present is largely a matter of (*a*) the personal interest of health officers, (*b*) vestiges of the once numerous industrial health units that antedated OSHA, and (*c*) existing arrangements to provide services to the State departments of labor serving as direct agents of OSHA.

3. Preventive measures in the workplace, in contrast to preventive measures elsewhere in the community, over the years have become subjects of collective bargaining between management and organized labor. To a greater extent than is true for the rest of public health practice, preventive measures in occupational safety and health are subject to intense and often adversarial debate. At the national level, the Federal Government is often inescapably cast as referee between the strong and frequently opposing forces of labor and management. Hence, Federal efforts in occupational safety and health, including the work of NIOSH, are subjected to more partisan political interest than many other aspects of public health practice.

These differences result from the social and political history of the United States over many decades. Improving the health of workers requires an understanding of these differences and a willingness to work within the existing administrative realities without compromising the fundamental principles of sound public health practice. It is within the existing professional, social, and political milieu, with its unique complexities, that the Objectives for the Nation in occupational safety and health must be achieved.

Progress Toward the Objectives

Pointing ahead through the current decade, the Objectives for the Nation provide a beacon to guide the practice of occupational safety and health. In many instances NIOSH and other Federal agencies had work relevant to the objectives in occupational safety and health underway before the objectives were developed. The Institute has also initiated other efforts related to the objectives. Progress toward achieving each objective is briefly summarized here according to the format in which the objectives were published (*3a*).

'The assignment of responsibilities for scientific inquiry and for regulation to different Federal departments . . . is an important feature resulting from specific congressional actions.'

Improved health status. Objectives in this area detail hoped-for reductions in the toll of injuries and disease caused by workers' exposure to hazards in the workplace.

In responding to these objectives, NIOSH in 1982 developed the list of leading work-related diseases and injuries presented earlier in this paper. The list, which ranks work-related diseases and injuries according to their importance as perceived by the scientific leadership of NIOSH, provides useful guidance in planning activities by which to achieve the objectives.

Because the nation lacks a unified and comprehensive system for surveillance of work-related death, disease, and disability, it has been and continues to be difficult to quantify the problem and to measure progress toward the attainment of specific objectives. Nonetheless, we have attempted to estimate the present status, using available data. A discussion of the specific objectives follows.

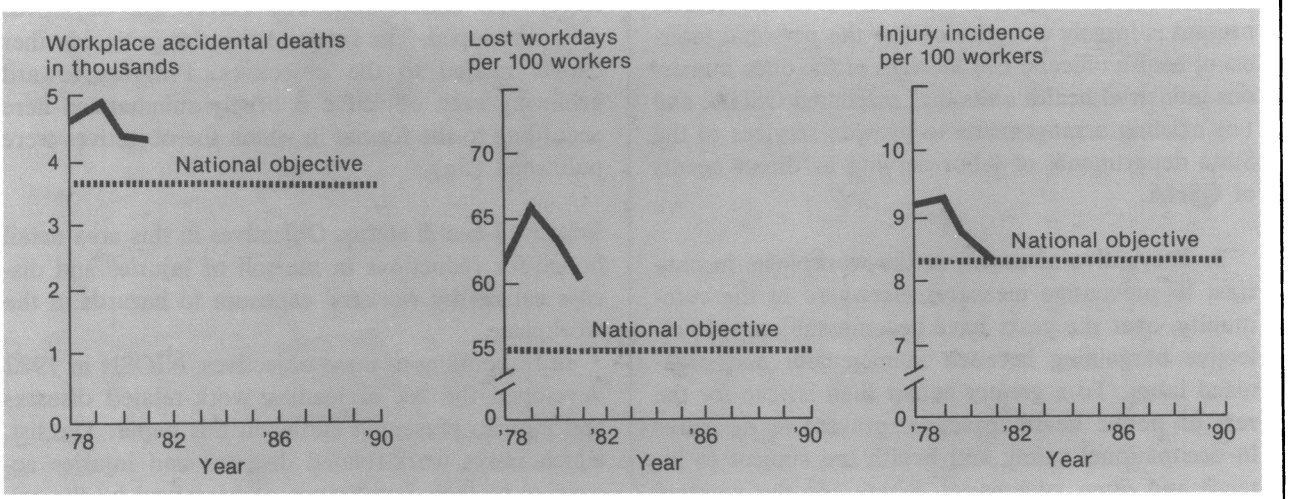
1. By 1990, workplace accident deaths for firms or employers with 11 or more employees should be reduced to less than 3,750 per year.

2. By 1990, the rate of work-related injuries should be reduced to 8.3 cases per 100 full-time workers.

The long-term trends in the incidence and prevalence of both accidental deaths and injuries are downward (see figure). Indeed, from preliminary findings it would appear that objective 2 has already been achieved.

In cooperation with the Consumer Product Safety Commission, NIOSH has augmented the National Electronic Injury Surveillance System to provide current (within 10 days) national estimates of occupational injuries treated in hospital emergency rooms. This system will help in defining more precisely the incidence of workplace injuries. The Institute has also published documents containing recommended standards for the prevention of certain traumatic deaths and injuries. Subjects of these documents include hot environments (*6*); emergency egress (*7*); benzoyl peroxide, an explosive (*8*); coal

Progress in meeting 3 of the Objectives for the Nation in occupational safety and health



SOURCE: Bureau of Labor Statistics

gasification (*9*); and confined spaces (*10*). In addition, the Institute convened the Symposium on Occupational Safety and Research and Education in 1980. In 1982, amputations, fractures, eye loss, lacerations, and traumatic deaths were designated as a category in NIOSH's suggested list of leading work-related diseases and injuries.

3. By 1990, lost workdays due to injuries should be reduced to 55 per 100 workers annually.

The long-term trend for lost workdays due to injuries turned downward in 1980. Injuries to the back produced the greatest number of lost workdays. In 1981, NIOSH published a "Work Practices Guide for Manual Lifting" (*11*) and produced and distributed two videotapes oriented to the prevention of such injuries. Research continues on the epidemiology and prevention of back injuries occurring during complex lifting procedures.

NIOSH also has a program that addresses musculoskeletal injuries to the wrist, leg, ankle, and foot. In 1982, staff of the Institute met regularly with officials of the insurance industry and OSHA to develop collaborative efforts for the prevention of musculoskeletal injuries. Also in 1982, the category of musculoskeletal injuries was designated among the leading work-related diseases and injuries.

4. By 1990, the incidence of compensable occupational dermatitis should be reduced to about 60,000 cases.

In 1976, there were an estimated 70,000 cases of dermatitis involving compensation in the United States (*3b*). In 1981, there were 51,200, according to data from the Department of Labor's Bureau of Labor Statistics (*12*). Thus it appears that objective 4 has already been achieved.

In 1973, NIOSH recommended a standard for occupational exposure to ultraviolet radiation (*13*) because of problems with skin cancer, dermatitis, and burns. In 1977, NIOSH published four documents—on methyl parathion (*14*), refined petroleum solvents (*15*), fibrous glass (*16*), and inorganic nickel (*17*)—recommending standards for occupational exposure to chemical agents that cause dermatitis. In 1978, the Institute recommended a standard for asphalt fumes (*18*) and coal tar products (*19*). As yet, standards for these agents have not been promulgated by OSHA.

In 1980, NIOSH issued a request for applications for research grants relating to occupational dermatological problems, and the Institute is currently funding 10 research projects investigating these problems. NIOSH staff have conducted research on cutaneous hazards and have evaluated protective clothing and skin creams for their protective efficacy. In 1982, dermatological conditions were included on the list of leading work-related diseases and injuries. In 1983, NIOSH will host the first conference to be held on hazards of mechanical trauma to the skin.

5. By 1990, among workers newly exposed after 1985, there should be virtually no new cases of four preventable occupational diseases—asbestosis, byssinosis, silicosis, and coal worker's pneumoconiosis.

In 1982, occupational lung disease was designated the leading work-related disease problem. A working

group comprising the Institute's foremost experts in this field is developing a detailed strategy for the control of this important health problem. The four lung diseases for which specific national objectives have been set account for a major proportion of the national burden of occupational lung disease.

Asbestosis. In 1979, there were an estimated 5,000 cases of asbestosis in the United States (*3b*). NIOSH has played a leading role in efforts to recognize and control asbestos-related diseases. Since the Institute's inception in 1971, NIOSH staff have conducted more than 90 health hazard evaluations related to asbestos. Moreover, NIOSH can claim a major role in developing experts on this problem through training and research.

In 1972, the Institute published a recommended standard for occupational exposure to asbestos (*20*), and in 1977 (*21*) and 1980 (*22*) published revisions. OSHA promulgated a standard for exposure to asbestos in 1972 (*23*).

Concern about asbestos in schools resulted from studies by NIOSH. The Institute has worked with the Environmental Protection Agency to develop educational materials about this community environmental problem. In 1979, NIOSH evaluated asbestos emissions from hair dryers for the Consumer Product Safety Commission. In 1981, NIOSH and OSHA jointly issued a guide for the control of exposures to asbestos. In 1982, NIOSH and the College of American Pathologists of the American Medical Association established standards for the pathological diagnosis of asbestos-associated diseases (*24*). In conjunction with the National Cancer Institute and the American College of Radiology, the Institute has developed a widely accepted teaching module relating to the radiology of asbestos-associated conditions.

The Objective for the Nation concerning asbestosis may be achieved as a result of the interaction of enforcement of environmental standards in the workplace and widespread desire in the industry to prevent further health risks to employees.

Byssinosis. In 1977, there were an estimated 84,000 cases of byssinosis in the United States (*3b*). Unfortunately, reporting of this condition is incomplete, and figures on current incidence generated by various systems are widely discrepant.

In 1975, NIOSH published a recommended standard for occupational exposure to cotton dust (*25*). OSHA promulgated two standards on cotton dust in 1978—one specifically for cotton ginning (*23*). In cooperation with the U.S. Department of Agriculture, NIOSH is now conducting investigations of various methods of washing cotton to reduce its ability to generate dust. The Institute is also working with the University of South Carolina on evaluating allergenic properties of different cotton braques.

In 1978, NIOSH published a document assessing technology for the control of cotton dust (*26*). The Institute certifies respirators required by OSHA standards for respiratory protection of workers and certifies training programs for persons engaged in the testing of pulmonary function. In 1982, 36 such programs were certified.

Silicosis. In 1979, there were an estimated 60,000 cases of silicosis among active workers in mines; foundries; operations producing stone, clay, and glass products; and abrasive blasting (*3b*). In 1981, NIOSH issued a special warning about the silica flour industry (*27*). Investigations by Institute staff had revealed extremely hazardous levels of silica flour dust, resulting in progressive massive fibrosis in several workers with 6 or less years of exposure.

One approach to preventing silicosis is to replace materials that contain silica with less hazardous materials. NIOSH has a program that evaluates the toxic properties of proposed substitute materials used in abrasive blasting operations. Institute staff have completed tests on sampling and analytical methods for silica, and the Institute is funding the development, by the National Bureau of Standards, of a crystalline silica Standard Reference Material for use by industrial hygienists.

In 1975, NIOSH published a recommended standard for occupational exposure to crystalline silica (*28*). To date, this recommendation has not been adopted by OSHA or MSHA. These agencies currently use several different formulas to control exposures to crystalline silica.

Coal worker's pneumoconiosis (CWP). In 1974, there were an estimated 19,400 cases of coal worker's pneumoconiosis (*3b*). The Federal Mine Safety and Health Act uses a dust standard for coal mines that was established in 1969. NIOSH is required to monitor the efficacy of that standard in preventing CWP. Epidemiologic studies are in progress that by 1985 will determine whether the current standard is adequate to prevent new cases.

NIOSH tests and certifies respirators and coal dust samplers, both devices that contribute to the control of CWP. The Institute also provides radiographic examinations to coal miners for detection of simple CWP and prevention of a more disabling form (pro-

gressive massive fibrosis), and provides postmortem examinations of miners to determine qualifications for black lung compensation benefits.

Standards for the pathologic diagnosis of CWP were established by NIOSH and the College of American Pathologists of the American Medical Association in 1979 (*29*). The Institute, in conjunction with the American College of Radiology, has worked with the International Labor Organization in developing radiographic standards used worldwide for classifying pneumoconiosis (*30*).

Changes in the technology of mining, from room and pillar methods to long wall methods, are increasing the potential for high levels of dust in coal mines. NIOSH consults with the Bureau of Mines about measures to control these increased dust levels.

6. By 1990, the prevalence of occupational noise-induced hearing loss should be reduced to 415,000 cases.

In 1975, there were an estimated 462,000 cases of work-related loss of hearing (*3c*). MSHA set noise standards for underground mines in 1971 and for surface mines in 1972 (*31*). In 1973, NIOSH published a recommended standard for occupational exposure to noise (*32*). The Institute tested hearing protectors in 1976 and issued a compendium that describes the noise attenuation properties of commercially available hearing protectors (*33*). This compendium will be updated in 1983.

In 1982, NIOSH completed a survey of the effectiveness of earplugs worn by workers at the worksite. Tests of 420 workers at 15 individual plants indicated that 50 percent of the workers received less than half the potential protection demonstrated in laboratory testing of earplugs. Also in 1982, noise-induced loss of hearing was placed on the list of leading work-related diseases and injuries.

7. By 1990, occupational heavy metal poisoning (lead, arsenic, zinc) should be virtually eliminated.

NIOSH has produced a number of documents recommending standards for occupational exposure to heavy metals: inorganic lead (*34,35*), inorganic arsenic (*36,37*), mercury (*38*), chromium (*39*), tungsten (*40*), vanadium (*41*), cadmium (*42*), antimony (*43*), and cobalt (*44*). OSHA has promulgated standards for lead and inorganic arsenic (*23*). The lead standard was upheld by the Supreme Court in 1980.

Available data (*45*) suggest that undue exposure of workers to lead continues despite the existence of appropriate standards. MSHA has unique problems in regulating exposures to metals because of the different species of lead and vanadium found in mines and mills. NIOSH is developing techniques for measuring these species. The Institute also has demonstrations of control technology underway in secondary lead smelting and foundry casting cleaning. These demonstrations show potential for reducing workers' exposure to airborne lead.

Reduced risk factors. At the heart of prevention lies the need for a thorough understanding of the risks that produce injury and disease. In most instances, the most efficient means of reducing an occupational risk is through engineering changes in the raw materials, the equipment, or the manufacturing processes that generate the risk. In most cases, protective improvements are less expensive and more effective when installed as a part of new facilities, processes, and equipment, rather than as "retrofits" (attempts to improve an already existing system). In many cases, the same improvements in industrial plants that enhance productivity also reduce hazards. A good example is the experience with vinyl chloride in which engineering changes, intended to protect workers, also resulted in a more efficient use of raw materials.

Objectives 8 and 9 concern attempts to reduce risks through effective planning by industries:

8. By 1985, 50 percent of all firms with more than 500 employees should have an approved plan of hazard control for all new processes, new equipment, and new installations.

9. By 1990, all firms with more than 500 employees should have an approved plan of hazard control for all new processes, new equipment, and new installations.

The role of NIOSH in this area is to define potential hazards (through its National Occupational Exposure Survey, for example) and to encourage managers to take advantage of every opportunity to improve the environment of the workplace so as to reduce hazards. Studies have been conducted of the potential hazards in several new industries, including electronics, biotechnology, and the production of synthetic fuels. NIOSH staff have also participated in committees, representing management, labor, and government, working to revitalize major American industries, notably iron and steel. As part of a proposed national program for economic revitalization, NIOSH staff enumerated a series of health problems in various industries that might be solved by technological innovation in the process of reindustrializa-

tion. Selected examples of these opportunities are shown in the box that accompanies this paper.

With respect to vibration-induced vascular and neurological abnormalities (vibration syndrome), NIOSH undertook an integrated scientific effort to identify and alleviate these problems through epidemiologic studies, industrial hygiene, and engineering. In response to complaints from workers using vibrating hand tools, NIOSH conducted a multidisciplinary investigation that defined the prevalence and pathophysiology of the condition and proposed specific changes in the design and use of vibrating equipment—changes that, if implemented, will prevent development of the syndrome. In 1982, the Institute concluded its investigations of vibration syndrome and presented its findings to the public health community (*46*). The Institute has also produced videotapes and instructional guides that describe how to prevent the hazard.

Improved public and professional awareness. Since its inception, NIOSH has widely disseminated information regarding health hazards in the workplace. For the most part, this information has focused on environmental risks; however, since the Objectives for the Nation in occupational safety and health were established, NIOSH has taken an increased interest in health promotion in the workplace as well as in health protection. The Institute has been especially concerned with so-called lifestyle factors—the interaction between environmental exposures and unhealthy personal behaviors.

10. By 1990, at least 25 percent of workers should be able, prior to employment, to state the nature of their occupational health and safety risks and their potential consequences, as well as be informed of changes in these risks while employed.

In 1979, the proportion of workers considered fully informed about health and safety risks was estimated at no more than 5 percent (*3c*). In 1975, NIOSH proposed a labeling standard for trade-name products used in the workplace (*47*). In several instances, State and local governments are establishing their own labeling standards. The Institute has developed a file of data on ingredients of trade-name products for use in responding to requests for information about the contents of chemical products whose ingredients are not displayed on the label.

NIOSH has provided training in safety and health for nearly 100,000 high school teachers of science and vocational arts. Interest is building in expanded training of this sort that would help teachers give their students a broader awareness of potential occupational hazards before entry into the work force.

11. By 1985, workers should be routinely informed of lifestyle behaviors and health factors that interact with factors in the work environment to increase risks of emotional illness and injury.

In 1982, NIOSH established a working group on "health motivation" to plan a program that would address behavioral factors and the interaction of these factors with toxic agents found in the workplace. The Department of Health and Human Services established a health promotion task force to consider the utility of the worksite as a place in which to dispense health information. NIOSH has begun to develop the capability of providing individual health risk appraisals to workers, incorporating job-specific information on risks. This effort is expected to extend the benefits of individual health risk appraisal to blue-collar and service workers who, to date, have not been included in most health promotion programs.

12. By 1985, all workers should receive routine notification, in a timely manner, of all health examinations or personal exposure measurements taken on work environments directly related to them.

Some examples of health problems in industries that might be solved by technological innovation during reindustrialization

IRON AND STEEL

Problem: Coal tar pitch volatiles are associated with lung cancer in coke oven workers. **Probable solution:** Design new continuous coking systems or improve coke oven doors.

Problem: Poorly designed flow of materials leads to worker injuries. **Probable solution:** Design plant layout to avoid complex and dangerous routes.

Problem: Heat and carbon monoxide contribute to heart disease among steel workers. **Probable solution:** Enclose sources of exposure and supply cool, clean air to work stations.

AUTOMOBILE MANUFACTURING

Problem: Noise causes hearing loss. **Probable solution:** Redesign and rebuild forging and stamping operations.

Problem: Paint solvents, when inhaled or absorbed through the skin, cause liver disease and diminished reflexes. **Probable solution:** Seek and substitute the safest possible solvent. Ventilate work areas adequately.

Problem: Heavy metal fumes cause nerve damage. **Probable solution:** Ventilate lead-laden dust from work environments and control the release of lead fumes from vessels containing molten lead. Scandinavian models are available.

In 1980, OSHA issued a standard, "Access to Employee Exposure and Medical Records" (*23*), that establishes workers' rights of access to their medical records. An estimated 23 million workers have access to their records as a result of this standard, which also mandates that employee medical records be preserved by the employer for 30 years.

13. By 1990, all managers of industrial firms should be fully informed about the importance of, and methods for controlling, human exposure to the important toxic agents in their work environments.

Efforts by NIOSH to disseminate information take many forms, varying in sophistication from contacts with the public media to exhaustive scientific treatises on various subjects. In preparing scientific documents, attempts are made to seek out persons managing and working in businesses potentially affected by the information, so that their input may be sought in advance.

In addition, NIOSH collaborates with OSHA, the National Safety Management Society, and representatives of schools of business in a project (called "Minerva" for the goddess of wisdom in Roman mythology) to encourage the inclusion of occupational safety and health in the curriculums of schools of business. Staff of NIOSH are developing case studies for use by students of business administration. The Institute also works with loss control engineers from the insurance industry to disseminate information on the control of hazards to managers of industrial firms.

14. By 1990, at least 70 percent of the primary health care providers should routinely elicit occupational health exposure as part of patient history, and should know how to interpret the information to patients in an understandable manner.

The Consumer Product Safety Commission's National Electronic Injury Surveillance System, supported in part by NIOSH, involves hospital personnel who are asked to collect a brief occupational history from patients in emergency rooms. Information developed by NIOSH about occupational hazards is published in the Morbidity and Mortality Weekly Report of the Centers for Disease Control in order to reach health care providers. The Institute also assists grantees of the SEER program of the National Cancer Institute in collecting occupational histories. The Health Resources and Services Administration is emphasizing occupational histories as part of routine preventive health services at all National Health Service Corps field stations.

The network of 15 NIOSH-supported Educational Resource Centers at universities across the country has become the nation's main focus for training occupational physicians and nurses.

15. By 1990, at least 70 percent of all graduate engineers should be skilled in the design of plants and processes that incorporate occupational safety and health control technologies.

NIOSH has specific relationships with five schools of engineering (Georgia Institute of Technology, Purdue University, Ohio State University, the University of North Carolina, and the University of Delaware) to encourage the inclusion of occupational health issues in the training of students of engineering. For the past 3 years, staff of NIOSH and faculty from the schools have conducted workshops that have developed curriculums for occupational safety and health training of engineering students, with special emphasis on control technology.

Improved services and protection. Of the principal functions of NIOSH, several would seem to fit best the category of "services and protection." These include (*a*) recommendations to regulatory agencies for standard-setting, (*b*) health hazard evaluations (field investigation of hazards in the workplace), (*c*) surveillance of underground miners for evidence of coal worker's pneumoconiosis, and (*d*) testing and certification of personal protective equipment. In addition, staff of the Institute provide consultation and technical assistance to employers and organizations of employees regarding industrial health problems.

A particularly important service is the health hazard evaluation. On request by employers, employees, or agencies, NIOSH will investigate health problems or hazards the requesters perceive. To ensure that these investigations proceed efficiently, NIOSH has a legislatively guaranteed "right of entry" into workplaces to conduct the necessary investigations. While these investigations produce information useful in research, their principal function is to respond to reports of health problems that may be occupational in origin, so that these problems can be understood and prevented.

16. By 1990, generic standards and other forms of technology transfer should be established, where possible, for standardized employer attention to such major common problems as: chronic lung hazards, neurological hazards, carcinogenic hazards, mutagenic hazards, teratogenic hazards, and medical monitoring requirements.

As noted earlier, the responsibility for promulgating and enforcing standards regulating health aspects of the workplace rests with OSHA for general industry and MSHA for mining. NIOSH is responsible for recommending standards to OSHA and MSHA. Since 1970, NIOSH has published 112 documents that recommend standards. Most of these documents have concerned specific agents to which workers were exposed. More recently, interest has grown in broader ("generic") standards for categories of agents or manufacturing processes.

In light of the life-threatening nature of carcinogens found in the workplace, NIOSH has supported OSHA's policy of expediting standard-setting for carcinogens. With the Institute's active support, OSHA developed and promulgated a generic carcinogen standard (*23*) in 1981.

By 1990, assuming the development of appropriate scientific information, NIOSH may well be able to recommend generic standards addressing causes of neurological disorders, chronic lung disorders, reproductive disorders, and other health problems. For each of the 10 leading work-related diseases and injuries, a comprehensive control strategy will be developed that will include attention to the need for establishing or amending standards.

17. By 1990, the number of health hazard evaluations being performed annually should increase tenfold; the number of industry-wide studies being performed annually should increase threefold.

This objective deserves serious reevaluation for revision. Our experience indicates that the need for health hazard evaluations does not justify quite so ambitious an objective. NIOSH completed 179 health hazard evaluations in 1979, 233 in 1980, 413 in 1981, and 496 in 1982 (nearly a threefold increase over the number for 1979). Increased participation by State and local health departments in carrying out health hazard evaluations would be advantageous but is unlikely without major Federal support to the States for this purpose. NIOSH is now utilizing Epidemic Intelligence Service officers of CDC, assigned to State health departments, for assistance in certain health hazard evaluations.

A threefold increase in the number of industry-wide studies performed annually similarly seems unnecessarily ambitious because these studies tend to be elaborate epidemiologic analyses of large amounts of data collected over a considerable period of time.

Improving surveillance and evaluation. Perhaps the greatest need in occupational safety and health today is for comprehensive systems of surveillance of occupational diseases and injuries. Many systems are operating, each providing overlapping and often noncomparable fragments of the epidemiologic situation. A seminar on "Implementing the 1990 Prevention Objectives" was convened at the Centers for Disease Control in September 1982. Representatives from State health departments, associations of health officers, and schools of public health were invited. The need for greater surveillance was a principal topic. Until it is possible to depict accurately the status of work-related diseases and injuries, it will be impossible to determine with assurance that the Objectives for the Nation in this area are being achieved.

18. By 1985, an ongoing occupational health hazard/illness/injury coding system, survey and surveillance capability should be developed, including identification of workplace hazards and related health effects, including cancer, coronary heart disease, and reproductive effects. This system should include adequate measurements of the severity of work-related disabling injuries.

NIOSH is attempting to develop the capabilities of State health agencies as the means of achieving comprehensive surveillance of occupational safety and health problems as is now done for other diseases. NIOSH has begun to stimulate this capability through the State Cooperative Agreement Network System (SCANS). The Institute has agreements with health departments in four States (New York, Maine, Rhode Island, and Utah) to test various potential approaches to surveillance at the State level.

19. By 1985, at least one question about lifetime work history and known exposures to hazardous substances should be added to all appropriate existing health data reporting systems, e.g., cancer registries, hospital discharge abstracts, and death certificates.

Most of these systems are beyond the direct influence of NIOSH. Those systems within the Institute's control (for example, its own registries) conform with the objective. NIOSH is participating in the CDC Consolidated Surveillance and Communications Activity's revision of the Manual of Procedures for National Morbidity Reporting and Public Health Surveillance Activities.

20. By 1985, a program should be developed to: (1) follow up individual findings from health hazard and health evaluations, reports from unions and management and other existing surveillance sources of clinical and epidemiological data; and (2) use the findings to

determine the etiology, natural history, and mechanisms of suspected occupational disease and injury.

NIOSH systematically reviews the results of its field investigations and research and uses them to help establish priorities for new research and policy.

Conclusions

This review summarizes both what has been done and what remains to be accomplished to achieve the Objectives for the Nation in occupational safety and health. The very existence of the objectives is a considerable help to government officials responsible for effective use of resources to protect the public health. While some of the objectives may have been set too low and others unrealistically high, the framework is sound and the concept is utilitarian. Every effort should be made to strengthen the objectives through periodic review (as has already been initiated) and appropriate amendment. The objectives should continue to prod progress toward ever improved health status through prevention.

Any factor that facilitates or obstructs prevention obviously will influence the achievement of the objectives. Two such factors warrant consideration as part of this review: (*a*) the lack of adequate disease surveillance, and (*b*) the nation's attitude toward the role of regulation.

To progress efficiently toward achievement of the objectives requires the ability to know the status of health and disease with some precision. Otherwise, it is impossible to know "where we are," "where we're going," and "when we've gotten there." Present surveillance efforts are inadequate to provide this comprehensive view of occupational health status. Existing systems are particularly inadequate as regards specification of the role of the workplace in current national patterns of morbidity and mortality. Surveillance must be given a higher priority. Those objectives that address surveillance operations should be given greater consideration in the distribution of available resources.

Another important influence on prospects for achievement of the objectives will be the nation's attitude toward regulation of the workplace. While regulation is certainly not the *only* (nor perhaps even the most important) preventive action in occupational safety and health, it has played a distinctly effective role in the protection of workers. Proposed deregulatory changes that appear attractive for economic or other reasons should be systematically evaluated by health officials for their predictable consequences for the health of workers. While the Department of Health and Human Services and NIOSH do not have responsibility for regulating the health aspects of the workplace, it is clearly in the public health interest that NIOSH help shape legally required standards. The Objectives for the Nation provide a specific opportunity and responsibility to synthesize a national understanding of the role of regulation in the prevention of death, disease, and disability.

The Objectives for the Nation provide a helpful framework for directing public health actions in occupational safety and health. Periodic review and amendment of the objectives will strengthen their utility and stimulate desired improvements in health. A significant finding of this review is the lack of sufficient data on the status of health to assess progress confidently. Surveillance efforts should be strengthened; those objectives addressing surveillance should be assigned a higher priority in the future.

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The Secretary's Conference for Youth on Drinking and Driving: Special Report

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SYNOPSIS

Part of a Department of Health and Human Services initiative against teenage alcohol abuse, a national Conference for Youth on Drinking and Driving—held March 26–28, 1983 in Chevy Chase, Md.—brought together more than 300 high school student delegates and school superintendents from every State and Territory.

The conference spotlighted successful programs that students around the country have undertaken to promote sober driving—programs that incorporate these key principles: (a) they rely almost solely on peer leadership "by students for students"; (b) they employ a "holistic" approach to health promotion, emphasizing self-esteem and alternatives to alcohol and drug abuse; and (c) they use the resources of the whole community. Working with student leaders of these model programs, conference delegates devised ways to launch similar programs in their own schools and communities and to enlist help from parents, teachers, lawmakers, the media, and business and civic groups.

The Department of Health and Human Services plans to hold similar conferences annually, to mobilize future generations of students against drunk driving.

THE ONLY AGE GROUP in the United States whose death rate has climbed rather than fallen in the last decade is Americans 15 to 24 years (*1*). The leading cause of death among these young Americans is alcohol-related traffic accidents. In 1981, such accidents involving young drivers resulted in the deaths of nearly 10,000 persons (*2*).

Alarmed by these data, former Department of Health and Human Services Secretary Richard Schweiker decided in October 1982 that a major thrust of a new departmental initiative against teenage alcohol abuse would be a conference for youth on drinking and driving. The conference would spotlight the work of students around the country who promote sober driving in their communities.

Five months later, Schweiker joined his successor, HHS Secretary Margaret Heckler, Transportation Secretary Elizabeth Dole, Education Secretary Terrel Bell, and Representative Michael Barnes (Md.) in welcoming 324 U.S. teenagers to the Secretary's