PREVENTION STRATEGIES FOR MUSCULOSKELETAL DISORDERS: NIOSH, OSHA AND ANSI IN THE U.S.

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THE CHALLENGE OF DELIVERING ON THE NATION'S PROMISE

As a society, we now accept that occupational illness is a social problem. This recognition is the product of our awareness and conviction that occupational injuries and illness are not random and unavoidable by-products of work. Many of the hazards that we know today were recognized long ago by workers, employers, and the medical and safety community. What is new is the recognition that many workplace hazards can be minimized through controls and preventive efforts. Our commitment as a Nation to the prevention of workplace injuries and illnesses was formalized more than 20 years ago in the enactment of Public Law 91-596, better know as the "Occupational Safety and Health Act of 1970." The Act clearly stated our goals as a society:

"To assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health; and for other purposes."

From this Act, the Occupational Safety and Health Administration (OSHA) was established in the Department of Labor. OSHA's functions include setting mandatory safety and health standards, inspecting workplaces, leveling penalties for violations, and providing education. The National Institute for Occupational Safety and Health (NIOSH) was also created by the Act. NIOSH is a research agency and part of the Centers for Disease Control within the Department of Health and Human Services. NIOSH functions include conducting research to develop criteria, recommending this criteria to OSHA for standard setting, and providing professional education and dissemination of health and safety information.

The challenge today—as it was 20 years ago—is to maintain our commitment to the goals of this Act. The debate centers on the methods by which we bridge the gap between "an awareness of emerging occupational hazards" and the "actions deemed necessary to eliminate them." Moreover, when regulatory activity in the form of standards is contemplated, it becomes clear that work-place hazards not only pose a threat to our nation's health, but also pose significant political and economic challenges for our society. Both OSHA and NIOSH staff are currently striving to meet those challenges in developing a proposed ergonomic standard for reducing work-related musculoskeletal disorders.

Although ergonomics was not explicitly identified in the Act, Section 6(b)(5) provides the following authority:

"The Secretary, in promulgating standards dealing with toxic materials or harmful physical agents ... shall set the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life. Development of standards under this subsection shall be based upon research, demonstrations, experiments, and such other information as may be appropriate.... Whenever practical, the standard promulgated shall be expressed in terms of objective criteria and of the performance desired."

PREVENTING WORK-RELATED MUSCULOSKELETAL DISORDERS.

Standard setting for preventing injury and illness is based on the theory that there is an acceptable level and duration of exposure (threshold) to a hazard above which there is some significant risk of injury or illness. The threshold becomes the design limit or benchmark. Establishing those values and that relationship is the job of the scientist. Establishing what is a significant risk and how risks are to be managed ultimately is a public health problem, requiring input from all sectors of society. In this country, public health issues are often decided in the courts where the opposing views of society become reflected in laws and regulations.

Prevention requires knowledge about the presence of a hazard: what it is, where it is, how much is present, and for how long. Prevention also requires that there is a predictive relationship between the presence of a hazard and the potential for an adverse health outcome. With respect to musculoskeletal disorders experienced by workers, there is sufficient research and clinical evidence to assert that certain types of "work activities" are largely responsible for the growing incidence of disorders affect-

ing the upper extremities and the lower back. Researchers concerned with the development of an ergonomic standard, however, continue to seek further clarification with respect to a number of issues. Three of the more prominent follow:

- Which attributes (risk factors) of the work activities are most responsible for these disorders?
- What are the most reliable early indicators of work-related musculoskeletal disorders?
- What is the nature or quality of the relationship bet ween the exposure factor(s) and adverse health effects?

Recently, these questions have been simplified as "How much [exposure] is too much"? Attempts to answer this question have taken different forms. Three examples from NIOSH, OSHA, and ANSI follow:

PROGRAMS FOR PREVENTING MUSCULOSKELETAL DISORDERS.

In 1985, NIOSH in conjunction with the Association of Schools of Public Health convened a first national conference to develop a Proposed National Strategy for the Prevention of Musculoskeletal Injuries [DHHS (NIOSH) Publication No. 89-129]. The document was organized to identify four key elements: environmental hazards, human biological factors, behavioral factors, and inadequacies in the existing health care systems. For the next five years, this document served primarily as the Institute's blueprint for establishing an ergonomic research agenda for the prevention of musculoskeletal disorders. In 1991, a second conference was convened. NIOSH in collaboration with the Michigan Center for Occupational Health and Safety Engineering, and the National Institute for Arthritis and Musculoskeletal and Skin Disease brought together more than 100 persons with various interests to present their thoughts, and discuss what the nation needed to do to control the rising incidence of "disorders from repeated trauma" in the U.S., which exceeds 50% of all recorded occupational illnesses. The findings from this conference were published in a document entitled: Occupational Musculoskeletal Injuries: Implementation Issues and Research Needs [DHHS (NIOSH) Publication No. 93-101]. This document provided a current assessment of what research questions needed to be addressed to understand the causes and prevention of occupational musculoskeletal injuries. In retrospect, the two NIOSH documents served to clarify the state of knowledge with respect to issues of (1) identification, (2) evaluation, (3) intervention, and (4) education concerning ergonomic issues. The NIOSH documents may also have helped set the stage for OSHA's current ergonomic initiative.

In August 1990, OSHA issued the Ergonomic Program Management Guidelines for Meat Packing Plants (OSHA 3132). While the guidelines refer specifically to meatpacking, these guidelines are largely generic in nature and may be applied to a broad range of industries. OSHA's commitment to ergonomics was clearly stated in an introductory paragraph on page 1 of the Guidelines: "Finding solutions to the problems posed by ergonomic hazards may well be the most significant workplace safety and health issue of the 1990s." This document was unique in specifying a set of positive steps for implementing workplace changes that incorporated a company-wide response to reducing musculoskeletal disorders. Elements of the program are well known and have served as the foundation for more recent efforts by OSHA to develop a standard for ergonomics. Key components of the program included: developing a written program; ensuring management commitment and employee participation; performing worksite surveillance, hazard prevention and follow-ups; and, ensuring proper medical management and training.

In June 1993, the American National Standards Institute (ANSI) Z-365 Committee completed and distributed a first draft of a document entitled: Control of Cumulative Trauma Disorders. ANSI, organized in 1918 primarily as an engineering group, now draws members from all sectors of society, including industry, employees, insurers, and members from technical societies. Standards are developed by agreement or consensus. The Z-365 committee consists of more than 100 members, who as a full committee meet twice each year. A revised ANSI Z-365 document is planned for release in April, 1994. A final document is not expected before 1995. The ANSI draft document proposes a technical standard that specifies general principles and practices for controlling cumulative trauma disorders. The committee stressed that professional judgement was needed to apply the principles to specific work situations. In reviewing the available data for the ANSI-draft document, the committee concluded that (1) it is possible to anticipate situations in which musculoskeletal disorders might occur; (2) it is possible to develop control recommendations for reductions of ergonomic stressors, but (3) it is not possible to specify design parameters for a given level of risk in a given population.

Many investigators question the advisability of establishing a pure design standard for ergonomics because the modern workplace is characterized by continuous change. What we may define as being "acceptable or safe" from a generic viewpoint today may not be appropriate for a given job layout or work process in the future, nor would it necessarily be compatible with the

capabilities of the employed workers. An ergonomic design-based standard also would require periodic updates in design specifications to reflect: (1) changes and improvements in control technology, (2) changes in our understanding of dose-response relationships, (3) changes to reflect different types of workers, and (4) improvements in methods for quantifying hazards. Such new information would require changes in what are acceptable threshold levels for each hazard. By contrast, the advocates of a design-based standard emphasize the importance of having specific design targets that provide technical direction for what is acceptable that would be applicable to different jobs with different workers. Certainly, knowing "what is too much" and "what is acceptable" from a design standpoint can simplify compliance and oversight activities. Of course, the alternative is a establish a performance or health-based standard that reflects the philosophy of the lead sentence of the OSH Act: "assure safe and healthful working conditions for working men and women." With this approach, employers would face the responsibility of developing their own ergonomic program of identification, evaluation, and controls to achieve this goal. Many larger industries have developed such programs. Without some form of assistance, smaller industries may not have the resources for such a program.

TRENDS IN ESTABLISHING A STANDARD.

There are a number of features that are common to the various ergonomic efforts in the U.S. to establish recommendations or strategies for preventing musculoskeletal disorders. The following list, although not exhaustive, represents some of the specific problems that have been widely and vigorously discussed:

- What components are needed for an ergonomic program? Elements of any program are likely to be introduced in stages or tiers to match the need for the program. In general, the advanced program would require evidence of management commitment and employee involvement. Specific steps would include (a) initial surveillance, (b) job analysis, (c) job intervention, (d) medical management, and (e) training.
- What action level or triggers are needed to initiate an ergonomic program? Various proposals for periodic surveillance of injuries/illness and hazard indicators have been suggested as a means for producing a statistical trigger. Current proposal are to use a combination of medical records surveillance with a hazard checklist. In the event that medical records are not maintained, some form of musculoskeletal symptom questionnaire would be used for the initial assessment.
- What benchmarks or design recommendations exist that are available to guide the design or redesign of jobs? Design principles are well established in the field of ergonomics. Validation efforts, however, for many of these principles have not been either undertaken or well documented. As a result, proposals for ergonomic programs have stressed the need for using or finding experienced and qualified individuals to implement workplace design modifications. This raises the issue of who is qualified to provide ergonomic support to industry and where will these experts come from.
- What controls or preventive efforts are most effective in reducing musculoskeletal disorders? Proposals for developing an ergonomic standard embrace the same hierarchy of controls that industrial hygiene has used. These controls focus first and primarily on eliminating the hazards using engineering methods, guided by the principles of ergonomics. If engineering controls are not feasible, administrative controls may be used to reduce exposure. Administrative controls include work scheduling and training procedures. Neither personal protective equipment or worker selection methods have been advocated in any of the recent ergonomic proposals.

In summary, the dilemma facing ergonomic-rule making may seem insurmountable in view of the ubiquitous nature of ergonomic problems in the workplace. Detractors point to the lack of definite data on cause and effects, as well as the apparent lack of suitable studies documenting successful ergonomic interventions. The reality, however, is that public health decisions, unlike the scientific search for certainty is made not on the basis of absolute certainty, but as was noted above "on the basis of the best available evidence," Section 6(b)5 of the OSHA Act. Perhaps the best available evidence to support a standard is found in those workplaces in which ergonomic programs have been successful established, resulting in both economic and human benefits from reductions in lost time and human suffering.

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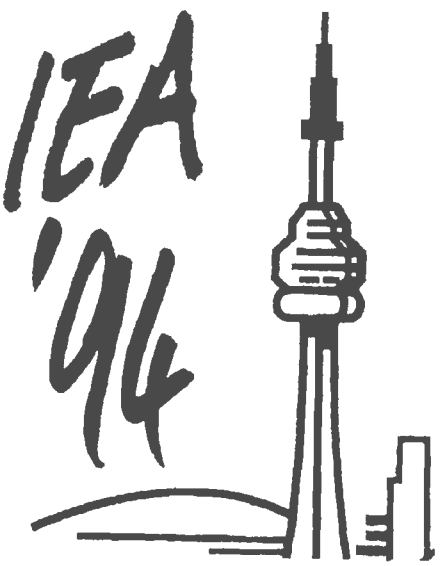

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