Health Aspects of Occupational Safety and Health

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It may come as a surprise to some that my talk emphasizes health aspects of the Occupational Safety and Health Act when health and safety activities have been so firmly wedded under the Act. The distinction is made in name only and not in spirit, and is intended to add balance to the Safety Conference. The distinction between health and safety is also made to permit a disciplinary approach to health and safety problems. There are numerous examples in which the distinction between health problems and safety problems is difficult, or impossible, to make, but by and large, a different type of professional is still used for each type of problem. Thus, we call on an industrial hygienist to control dusts, fumes, and vapors in the workroom air, and we consult with safety engineers when we have a mechanical safety problem. However, in the future both the Departments of Labor and Health, Education, and Welfare will be giving increased recognition to an in-between discipline, that is, a generalist who can recognize, evaluate, and control health problems as well as safety problems. The development of this kind of professional has just begun under the National Institute for Occupational Safety and Health's training grants program, and it will be several years before there is sufficient output to evaluate.

Soon after the Act was passed there were predictions that the health aspects would soon overshadow the safety aspects. Congressman Steiger himself was one of those prognosticators. These predictions have been borne out by experience in both Departments. Approximately 60 percent of the complaints received by the Department of Labor have to do with health problems, and most of the dissatisfaction with HEW's activities are related to our output of recommended health standards.

In discussing health aspects, I will cover three activities in the Department of HEW; that is, research, development of criteria for standards, and hazard evaluations; and one activity in the Department of Labor — the Target Health Hazards Program.

Research

HEW's main responsibility is research. In general, this is applied, rather than basic research, and is usually planned to fill missing gaps needed to develop criteria for standards.

These are primarily dose-effect studies and include a wide range of toxicologic, clinical, and epidemiologic studies. For example, our current industry-wide epidemiologic studies include printing pressmen, foundry workers, construction machinery operators, woodworkers, dentists, machinists, uranium miners and mill workers, cotton textile workers, potash miners, steel workers, cosmetologists, fibrous glass workers, beryllium production workers, asbestos workers, cotton ginners, granite workers, and operating room personnel.

To complement our intramural research activities, NIOSH sponsors a research grants program at universities, state and local agencies, and other public and non-profit institutions. Currently there are sixty-five active research grants, which are funded at a total cost of $2.5 million. For an expert technical review of grant applications, we operate the Safety and Occupational Health Study Section, which is one of the study sections used by Division of Research Grants at the National Institute of Health for referral and review of grant applications. Currently, research activities and criteria documentation account for about 3/4 of our budget of some $30 million.

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Criteria for Standards

The problem we face in HEW of developing criteria for health standards is staggering. According to an estimate of the National Academy of Sciences, 500,000-600,000 chemicals are produced and used in this country. There are about 100,000 organic chemicals listed in Beilstein's *Handbuch der Organischen Chemie,* and one large chemical company lists about 50,000 chemicals in their sales catalog. Three thousand new chemicals are synthesized each year and about 500 of these find some use in industry. In searching for the universe for which we should be recommending standards, some have called attention to NIOSH's own List of Toxic Substances in which approximately 12,000 items are referenced. Health standards are available for only 400 substances and were promulgated as either recognized federal standards or national consensus standards by the Department of Labor in their start-up standards under the Occupational Safety and Health Act. Our planned for activity was a level of 20-30 criteria documents per year to be achieved in about two years, and our output during the first year was five — although these five covered many thousands of workers exposed to asbestos, beryllium, carbon monoxide, noise, and heat stress. Thus, we seem to have a backlog of many thousands of chemicals for which no health standards are available, and this backlog is increasing faster than our ability to develop criteria for standards. The problem of our criteria document output has been the subject of extensive reviews in and outside of HEW, and I think several conclusions are obvious, at least to us:

1. The protection afforded by the 400 health standards promulgated by the Department of Labor represents a considerable baseline of protection, which is equivalent to the protection given workers in most industrial countries of the world. Most of the 400 start-up health standards were derived from the Threshold Limit Value of the American Conference of Governmental Industrial Hygienists, which have an official or semi-official status in Canada, Mexico, most of the South American and Western European countries, the United Kingdom, South Africa, Australia, and Japan. In developing these TLV's, the ACGIH screened many thousand substances, so that the current TLV list represents practically all those substances which professionals in occupational health have identified as being widespread and potentially toxic. ACGIH estimates "that less than 10 percent of the workforce is exposed to toxic materials for which no TLV has been developed."
2. The practical universe of toxic chemical substances towards which we should be striving is more like 1,000-2,000 rather than 12,000. The excess in our list of 12,000 toxic substances represent materials which have toxicity by a non-industrial route, such as oral, intravenous, or subcutaneous, or else they have a very limited use or application.
3. The unusual toxic exposures can be evaluated through hazard evaluations, which will be described shortly.
4. There is now some consensus that the present rate of criteria production should be at least double, and this is the level of activity we are now planning for. In this connection, we have devised a proposal for multi-awards contracts, which should increase our output as well as facilitate bidding by potential contractors. We also have plans for making better use of the National Academy of Sciences, and consensus standards setting organizations.

At this point, I think it appropriate that we review how NIOSH produces criteria documents. Since our resources are limited in terms of dollars and especially in personnel, everything we do is done by priorities. The parameters of the NIOSH priority system involve five indices (population exposed, production/sales, trend-in-use, severity, and incidence) and we utilize inputs from our National Occupational Hazard Survey, National Surveillance Network, and Industry-wide Studies; OSHA and the Bureau of Labor Statistics; National Center for Health Statistics; state agencies; the private sector; and foreign research and reports. Essentially, the technique is to determine the number of workers exposed to a hazard and the hazard's potential for causing injury or disease; then from these components, the expected loss from injury or disease is determined.

From this initial priority list, analyses will be made to determine the current level of information available to develop a criteria document. These analyses will also determine the hazards for which there is not enough information to develop a criteria document. Once it is determined what resources are required, cost and time estimates to fill these research gaps will be developed. This, then, generates a list of NIOSH research needs to be conducted in-house or by contract which will far exceed the current resources available to the Institute.

Finally, from this list of research needs, an evaluation will be made of each item based on the parameters of health benefit (reduction of occupational disease and accident risks), cost and time for completion. The analysis will result in a program decision for the conduct of research which ensures that NIOSH research attains maximum safety and health impact upon the working population within resource constraints.

Having established the priority of hazards based on their health impact, the Institute makes a program decision on the allocation of resources to the compilation of criteria documents and to the research directed toward future criteria development. In accomplishing this work, a great deal of emphasis has been placed, by necessity, on contracting for both the short-term research and development, as well as the drafting of criteria documents.

The review of the initial draft of the criteria document goes through several stages, but in all of them the *professional* nature of the review is stressed. NIOSH consultants, who are health professionals selected from

labor, management, and university sectors, and state agencies, play a very important role in this review. Review by professional organizations such as the AMA Committee on Occupational Toxicology, Industrial Medical Association, American Industrial Hygiene Association, American Conference of Governmental Industrial Hygienists, and Society of Toxicologists, constitutes another very important part of the review. There has been some criticism of NIOSH in that we have not sought review by non-health professionals in industry and the unions and that we have not published our recommendations in the *Federal Register* for all to comment on. Please keep in mind that it is the Department of Labor's responsibility to appoint the ad hoc committees and to conduct the public hearings. Our job as consultant to the Department of Labor is to develop the basic criteria documents and get a multidisciplinary *professional* review in preparation for further review by the Department of Labor. Admittedly, we seldom have enough feasibility data, and this is one of the areas given special attention in the DOL review.

There is a problem which we must consider from time to time in developing criteria documents. This is the collective or cumulative impact of our recommendations on the physician, the worker, and the employer. An example affecting the employer would be the additional impact of record keeping. The employer is already struggling under the burden of keeping records for varying periods of time under a great number of federal, state and local requirements. Perhaps we can standardize on categories of short-range and long-range retention, rather than require one year for this record, five years for that, and so on. As an example of cumulative impact on the worker, consider the requirement for periodic x-ray examinations. It is conceivable that a worker could be overexposed to ionizing radiation if he were covered by various standards, each with its own x-ray requirement. We also have to be realistic when it comes to physician's time and health services. Early drafts of the carbon monoxide document would have made mandatory a medical program of preplacement and periodic examinations, but the final version recommends "should" rather than "shall." A mandatory requirement would be a great boon to occupational medicine, but there simply are not enough physicians at this time to mount such an ambitious program. In all of our criteria documents, NIOSH will attempt to be practical as well as idealistic. Adherence to both concepts is difficult for some to comprehend, but without this our recommendations are identified as feasible only in another world or else we are accused for settling for the lowest common denominator.

Hazard Evaluation

Another of NIOSH's major responsibilities is responding to requests for hazard evaluations, which can originate from either employer or an employee sources. Thus far, the number of requests has been small, slightly over 100, but this activity is increasing rapidly. A request form (HSM 598) to assist employers and employees in registering requests is now available and has been widely distributed. Requests are sent to NIOSH's Division of Technical Services in Cincinnati where sampling recommendations and trade names information will be added before the forms are referred to NIOSH's regional operations offices. An industrial hygienist from one of our ten Regional Offices will make an investigation, and this will usually entail air sampling and analysis. Some of the requests will require medical examinations, and a small number will result in animal toxicity studies. An analysis of the requests during the first year of operations indicates that on the average about two substances are involved with each request and that about half of them have no established standards. The end point of a hazard evaluation is a determination as to whether the substance in question is toxic in the concentrations used or found in the workplace. Whenever NIOSH makes a toxicity determination, an attempt will be made to recommend an environmental limit to control the exposure. This recommendation will be sent to the Department of Labor for consideration in setting standards.

Target Health Hazards Program

The Target Health Hazards Program is the health program counterpart to the injury-oriented Target Industry Program. Both were conceived, planned, and initiated by the Department of Labor, but HEW had considerable input in the Target Health Hazards Program and certainly a discussion of health aspects would be incomplete without it. Under the Target Health Hazards Program, the Occupational Safety and Health Administration is concentrating on five major toxic substances — asbestos, cotton dust, silica, lead and carbon monoxide. Among the criteria for selection were the number and severity of employee exposures, the existence of standards, and the ability to adequately measure the level of exposure involved. OSHA has held a series of meetings with affected employer and employee representatives to explain the purposes of the program and to solicit their cooperation. OSHA industrial hygienists are making inspections of workplaces with the Target Health Hazards, and eventually OSHA will have agreements with a number of states under which state industrial hygienists will receive training in Federal standards and procedures, and make additional inspections for OSHA. NIOSH is cooperating in the implementation of the Target Health Hazards Program by providing analytical services for OSHA's industrial hygienist in our Salt Lake City field station and by calibrating and repairing OSHA industrial hygiene equipment in our Cincinnati laboratory. Having launched the Target Health Hazards Program in a very effective manner, OSHA is maintaining interest in the program through a series of timely articles on each of the Target Health Hazards in their *Safety Standards* publication.