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RIGHTS AND REALITIES: A CRITICAL REVIEW OF THE ACCESSIBILITY OF INFORMATION ON HAZARDOUS CHEMICALS

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INTRODUCTION

Every day the public is confronted by reminders of the potential and real threats posed by hazardous chemicals. People are bombarded with news stories on asbestos, lead, radon, pesticides, and other chemical threats in their homes and in their places of work. In the last few years, major steps have been taken in an effort to address workers' and communities' concerns regarding hazardous chemical exposures. Worker and community right-to-know laws were passed in the 1980s and are part of the mandates regarding access to information about hazardous chemicals. Both the worker and the community right-to-know laws have provided a basic framework for information transfer, but we have a long way to go before all workers and community members will truly have good-quality information. Successfully implementing right-to-know programs will be the challenge for the 1990s.

It is estimated that one in four workers in the United States experiences a potentially hazardous chemical exposure during the course of daily work. More than 60,000 chemicals are included in the *Registry for Toxic Effects of Chemicals*, a compendium of information on chemicals found in the workplace.⁴ In view of the broad scope of potential problems related to chemical exposures, policies and practices have been developed for primary and secondary prevention of exposure-related diseases. Many of those policies include providing information to

employers and workers so that they can make informed decisions about their business and work practices. A basic assumption implicit in the worker-access policies is that workers who receive adequate information will be able to take action when necessary.

The right-to-know laws are intended to fulfill a primary preventive function. In recent years, there has been much discussion about "high-risk notification," a process by which workers are formally notified about potential health risks associated with specific hazardous workplace exposures. Often the information is about a past exposure about which new information from a recent epidemiologic or toxicological study has emerged.

The goal of high-risk notification is **secondary prevention**. Once a worker has been notified, it is hoped that he or she will change any work practices that might cause continued exposure and will participate in appropriate medical screening and surveillance programs. Although attempts to legislate worker notification at the national level have failed so far, many state health departments, companies, and federal agencies, such as the National Institute for Occupational Safety and Health (NIOSH), have nevertheless already instituted worker-notification programs.

NIOSH will publish a special compendium of papers on high-risk notification, highlighting the important issues as they were presented at a national conference last year.⁵ Major issues that we continue to wrestle with include: how best to provide risk communication; what is the best medium (written communications, community meetings, the mass media); how we can evaluate the effectiveness of our notification programs; and whether the physicians in the community will be capable of providing the surveillance and medical monitoring necessary for the early warning and detection that is recommended in the notification.

This last issue raises two related questions. Are most physicians adequately educated and trained about occupational and environmental chemical exposures? Much has been written about the question the last few years; the findings of a committee of the Institute of Medicine (IOM), an institute of the National Academy of Sciences, resoundingly answer no.⁶ The IOM's report suggests that occupational and environmental health should be part of the core curricula in medical schools as well as continuing education for primary-care physicians.

The second issue related to medical surveillance and monitoring has to do with workers' financial access to these programs. For many workers, problems of access to medical care, particularly preventive care, are serious. Only in exceptional cases (like the lead standard) is responsibility for providing medical surveillance and monitoring placed squarely on employers. A related difficulty is ensuring that workers are enabled to complete the loop of activities necessary for secondary prevention. Those activities include entering medical surveillance programs and following up on the necessary medical protocols. The difficulties can be a function of finances or access to appropriate medical care. Some workers are not insured and many are under-insured, such that their policies will not cover a medical surveillance program. In many communities there may not be a physician or health care provider who will establish a medical surveillance program. This problem, inherent in notification programs, also pervades programs that teach workers about the hazardous chemicals with which they may work.

Although the regulatory requirements will briefly be reviewed here, the emphasis will be on describing the current state of implementation of these regulations and some of the barriers that impair workers from receiving information and from being able to act.

Before elaborating on the various standards as they are expressed in the letter of the law, attention must be given to the reality of workers' ability to exercise their rights under these laws. Unfortunately, in difficult economic times, job security will sometimes take precedence over job safety. Employees are less likely to raise or even to support controversial issues, which might consist of actions as basic as requesting information about chemicals they work with or requesting proper protective equipment. This hesitancy to acting on their own behalf might cause continued unprotected exposure to dangerous chemicals. Currently, a legislative initiative is under consideration to expand significantly workers' rights and to protect workers as they exercise their rights.⁹ The major components to this proposal for OSHA reform include the following: (1) a requirement for joint labor-management health and safety committees in all workplaces with 11 or more employees; (2) training for those committee members; (3) strengthening the anti-discrimination protection for workers who exercise their rights under health and safety laws (this includes reinstatement, back pay, compensatory damages, and attorney's fees); (4) expansion of coverage to all public employees (public employees are not currently covered by OSHA in about half the states, those states covered by federal OSHA); and (5) expedited standard setting procedures and modified enforcement activities to include worker participation.¹ Until workers are sure of their job security, they will be reluctant participants in health and safety activities and reluctant to exercise their rights under the health and safety laws.

RIGHT-TO-KNOW LEGISLATION

Several legal processes are available to workers who want to receive information about hazardous chemical exposures. In the 1986 reauthorization of Superfund (Superfund Amendments and Reauthorization Act, often referred to simply as SARA), citizens were given the right to obtain information about hazardous chemicals in worksites located in their communities.¹² In addition to this "community right to know" component, SARA established a mandatory reporting system for use of industrial chemicals. The system generated information for a precedent-setting data base on the locations and quantities of toxic chemicals in U.S. industries. The data base, called the Toxic Release Inventory, is maintained by the Environmental Protection Agency (EPA) and is accessible to the public.

Also established by the original Superfund legislation is a federal agency under the Public Health Service, the Agency for Toxic Substances and Disease Registry (ATSDR). Its mission is to prevent or mitigate adverse health effects and diminished quality of life resulting from exposure to hazardous substances in the environment from waste sites and other facilities, or from emergency releases such as spills or leaks. ATSDR is working to increase scientific knowledge in environmental public health; to promote the development and use of data bases to assess the link between hazardous substances and human health effects; to increase awareness and educational programs about hazardous substances; and to increase environmental public health services at the federal, state, and local levels.

To carry out these goals, ATSDR has established programs to conduct public health assessments of hazardous waste sites and facilities, sponsors or conducts health studies of persons exposed to hazardous substances, and offers consultations on the emergency release of hazardous substances. ATSDR contributes to research and epidemiologic studies by creating health surveillance and exposure registries, by publishing toxicological profiles on hazardous substances, and by

providing educational materials and activities to public and private health care providers and allied health professionals.

Training activities were also part of SARA. Substantial training about hazardous chemicals is now required of all hazardous waste operation workers and for emergency response personnel. EPA funded many projects to develop and deliver curricula for those categories of workers. A clearinghouse has been established at the Workplace Health Fund in Washington, D.C. for the publicly accessible curricula.¹⁷ Many of these curricula have been developed in modular format for easy reformulation.

Another group of workers exposed to a hazardous chemical now required to receive training is lead abatement workers. Thanks to the renewed interest in this age-old hazardous chemical, a result of the heightened public awareness of the risks to children, we can anticipate increased activities to abate homes and public facilities where lead-based paint is a problem. Although there has been a federal OSHA standard for lead for many years, it is limited to protecting workers in "industry." Some states have passed laws providing that workers exposed to lead in the building and construction trades must also receive training. For abatement workers, training will lead to protecting workers as well as to implementation of proper abatement and clean-up techniques that will prevent lead poisoning in residents of the abated homes.

In the mid-1970s, under the 1970 Occupational Safety and Health Act, workers' rights were expanded to include access to information on industrial hygiene monitoring in the workplace (such as air monitoring for chemicals) and access to medical records for any medical monitoring that might be done at work. However, not until the 1980s did workers gain the right to obtain information on chemicals they work with, by means of state and federal initiatives.

Hazard Communication Standard

Promulgated in 1983, a federal law, the Hazard Communication Standard (HCS), commonly known as the "worker right to know" law, mandates that workers receive training and information on all potentially hazardous chemicals with which they work¹⁴ (see Table 1 for the basic components of the standard). Unfortunately, an alarmingly high number of employees in this country still do not know about the potential chemical hazards of their own work.

According to a senior scientist at OSHA, Jennifer Silk, in approximately half of the states (specifically those states in which *federal* OSHA is responsible for regulating occupational health and safety), more than 2,000 citations a month are issued for violation of the HCS.⁸

Even more disconcerting statistics were generated by a recent study done by the General Accounting Office of Congress (GAO) (1991).¹³ Of 2,000 U.S. workplaces assessed (representing small, medium, and large employers), 58% were out of compliance with the HCS, and 30% of the employers had never heard of the standard. Yet among this same population, 80% of the employers claimed to have hazardous chemicals in their workplaces. It is often the case, especially in small and medium-size companies, that the *employers do not know* the potential physical and health hazards posed by chemicals in their workplaces.

Neither OSHA nor the EPA has what is needed: a comprehensive system for announcing new regulations that effectively reaches all of the affected parties. In a survey recently done at the National Center for Hazard Communication (NCHC), we discovered that most employers received information about new

TABLE 1. Basic Components of the Hazard Communication Standard

(OSHA: Hazard Communication Standard: Revised Final Rule. Federal Register August 24, 1987; 52:31852-31886)

1. Manufacturers must produce a Material Safety Data Sheet (MSDS) for all hazardous chemicals that they produce and sell.
2. MSDSs must be shipped to all downstream users of the hazardous chemicals.
3. In all workplaces in which there are hazardous chemicals, the employer is responsible for the following:
 - Labeling all hazardous chemicals in the workplace
 - A written hazardous chemicals program that is accessible to employees who ask for it
 - A system for managing MSDSs that gives workers access to them
 - A training program for all employees who may experience an exposure to a potentially hazardous chemical.

This training program must include information on the following:^{*}

- Location and identity of hazardous chemicals
- Physical hazards
- Health effects (acute and long-term)
- Proper work practices and personal protection
- First aid
- Emergency response (including fire, leak, and spill)
- Workers' rights under the HCS
- Labeling systems
- MSDS systems

^{*} This training program must be provided before a worker begins to work with a hazardous chemical and whenever a new chemical is introduced to the workplace; when new information is released regarding the chemical; and whenever a worker is transferred to an area where he/she may be exposed to new chemicals.

regulations from a vast array of sources, including their trade associations, their corporate headquarters, mailings, and subscriptions. Some employers cited no regular source for this information. Without a systematic approach to informing the public about regulations, it will be difficult to achieve universal compliance.

In most workplaces, the major emphasis is on collecting and managing Materials Safety Data Sheets (MSDSs)—the information sheets required by the HCS for all hazardous chemicals—and on having a written HCS program. Those requirements that create a paper trail for companies' compliance activities are often requested for review by OSHA inspectors. Usually, companies are not nearly so assiduous when it comes to training programs and the actual delivery of information to workers. Many employers consider compliance complete if they have obtained and filed all of the MSDSs for their hazardous chemicals. However, this pro forma paper collection will be of no assistance to the workers unless they have access to the information through training and access to the MSDSs. The HCS is really a proactive standard, and is explicit about employers' responsibility to train workers, not merely to respond to requests for information when workers ask for it. That aspect of the HCS is possibly the most misunderstood part, particularly among small and medium-sized employers.

Even in workplaces making substantial, good-faith efforts to comply with the HCS, workers may still be receiving inaccurate information for reasons discussed below.

The HCS is a "performance" standard. In contrast to most OSHA standards, which are highly specified, compliance with the HCS is judged on the basis of achieving certain goals without specifications from OSHA for the precise manner of doing so. Therefore, great variability prevails in compliance activities. One

company might provide a full day of workshops on hazardous chemicals, protective equipment, and basic toxicology, whereas another employer might simply order employees to watch a 20-minute video on "hazardous chemicals." Both approaches could conceivably satisfy OSHA as being in "compliance" with the training required by the HCS.

No credential nor educational background is required of the person in charge of writing a MSDS or implementing the HCS. Nor is any credential required for the person delivering the training mandated by the standard. Lack of a credentialed work force is a generic problem with respect to regulations on occupational and environmental health and safety. Many workplaces have no one adequately trained and educated to develop and implement programs for occupational or environmental health and safety. Our research indicates that the person most likely to be responsible for health and safety in a plant is a managerial-level employee who is also responsible for other areas of management (such as production, quality assurance, personnel issues, and marketing).⁷ The combination of the numerous other activities that a manager is responsible for with the manager's lack of formal training in occupational and environmental health and safety may result in health and safety being given a low priority, unless the company has had a recent OSHA or EPA inspection or a serious injury or fatality.

An inadequately trained manager developing compliance activities is likely to make decisions that endanger both the workers and the environment. A total lack of qualified health and safety staff is the rule rather than the exception in any given plant. The lack of qualified personnel pervades all occupational and environmental safety and health programs, not just those affected by HCS. After evaluating the preparation of the "environmental workforce," the U.S. Public Health Service has proposed developing a national strategy to train and educate the people who will be responsible for occupational and environmental health and safety.^{8,11} Even when health and safety professionals are present in workplaces, their own professional training is often of a technical nature, and they may not have taken courses to prepare them to train other people. Some of the professional societies have become aware of that lack and are taking steps to rectify the situation. Many of the recent standards promulgated by OSHA and also the EPA include requirements for training employees. It is imperative for managers of health and safety programs to be specifically trained in developing and delivering effective programs for training workers.

Material Safety Data Sheets

The lack of specification in the HCS standard is of particular concern, because it leads to inconsistent benchmarks being used on MSDSs. The primary function of the MSDS is to provide workers with enough information about a specific chemical substance to understand the following: potential acute and chronic health effects; recommended personal protective equipment; proper work practices; first-aid remedies; spill, leak, and fire precautions and responses; and any other information necessary to work safely with that potentially hazardous substance. Again, because the HCS is performance-based, there is no standardized format or content for MSDSs. A simple example: no standard unit of measure has been established for exposure or toxicological data. Without a consistent unit of measure, only the most highly trained professional health and safety expert can comprehend MSDSs.

Another problem is the lack of a mandated reading level for writing MSDSs. According to recommendations from the National Institutes of Health, health messages written for general public consumption should be written at the eighth grade reading level.¹⁰ Of 100 MSDSs randomly selected and analyzed for readability, the average readability was found to be slightly higher than a twelfth grade reading level.¹⁵ Projections for the workforce in the near future predict continued problems with functional literacy, as well as growing numbers of workers who will not speak English as their first language. A two-pronged approach will ensure that the information on chemicals is communicated to those populations: (1) use of materials that use symbols rather than the written word (particularly for labeling), and (2) foreign language translation of any necessarily written materials coupled with training provided in languages accessible to our workers.

Further obscuring the information on MSDSs is the use of technical and medical vocabulary incomprehensible to most workers. Included in the health effects section of an MSDS for parathion are such symptoms as "lacrimation" and "cholinesterase inhibition." Most workers and employers will not have any idea what such medical terms actually mean.

Several other factors make comprehending MSDSs difficult. One is the variability in the location of information on the sheets; on one sheet the first aid and emergency response information might be found on page one and on another it might be found on page three. Another problem is the varying lengths—there is no stipulation for length of an MSDS. Some are a single page, whereas others may be 10 or even 30 pages long. A third and more grave difficulty is the use of inconsistent nomenclature to describe categories of information. For example, although the word "cancer" appears to be readily understood by most workers, "carcinogen" is not.

The comprehensibility of MSDSs was recently studied to determine how well workers could actually understand the information presented.¹⁵ Workers were given a series of MSDSs and asked to perform an open-book test, answering questions on the most important information. The MSDSs were found to be approximately 40% *incomprehensible*.

A companion study to the comprehensibility study evaluated the accuracy of MSDSs.¹⁶ A randomly selected group of 150 MSDSs was evaluated by a panel of experts for accuracy in reporting health effects and toxicological information. Of four major health categories, only 11% of the MSDSs were found to be accurate in all. The remaining 89% of the MSDSs had at least one of the categories that included misinformation or failed to mention important information.

Much of the training provided under the HCS as well as information on chemicals provided on the "shop floor" is based on information from MSDSs. MSDSs that are incomprehensible and inaccurate are a questionable basis for any information, let alone an entire training program. At the University of Wisconsin, a project is underway to evaluate the best way in which to integrate the use of MSDSs into workers' training. In preparation for this project, the investigators have reviewed the research and concerns about MSDSs, which they outline in "Small Group Worker Training in the Use of Material Safety Data Sheets."² The University of Wisconsin is one of three organizations to be sponsored by OSHA to study this issue. The preliminary results of these studies are expected in 1992.

It must be acknowledged that the chemical industry is well aware of the inherent problems with MSDSs. The Chemical Manufacturers Association has

sponsored several initiatives to improve the format, accuracy, and general comprehensibility of MSDSs. Those initiatives include the proposal for the development of a voluntary ANSI standard. However, so far OSHA has not reported any plans to reform the HCS.

The problems of MSDSs are complex. Since workers and employers depend on them for essential information, it is urgent to develop and enact policies to establish standards for accuracy and comprehensibility.

The importance of workers' right-to-know about the current hazards and the importance of notification about risks associated with past exposures is self-evident. Some of the methods for achieving the goal of an informed work force can be found in the existing right-to-know laws and notification programs. But those standards and practices should be viewed as works in progress; much more work remains to be done on the fundamentals and the basic tools of the trade, such as the MSDSs, as well as on policies to ensure that workers are not only not penalized but receive full support in exercising their rights.

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