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Improving Workplace Hazard Communication

The information-based system set up to protect workers from chemical exposure is in need of an overhaul.

Workers in many modern industrial settings have long faced a multitude of chemical threats to their health and safety—some of them obvious, many more barely perceptible. As early as 1972, a National Institute for Occupational Safety and Health survey found that "approximately 25 million U.S. workers, or one in four, [were] potentially exposed to one or more of the nearly 8,000 hazards." Stunningly, for 90 percent of the chemicals present in surveyed workplaces, "neither the employer nor the employee knew the identity of the chemicals in the trade-name products." When workers became ill from chemical exposures, such ignorance hampered diagnosis and treatment. According to an article in the journal of the Oil, Chemical, and Atomic Workers Union, a worker who got sick often could say little more than "I work with the 203 stock" to his or her doctor.

The following years saw growing public awareness of the dangers posed by industrial chemicals. As but one example, lung cancers and lung tissue scarring caused by asbestos demonstrated unequivocally that hazardous substances could cause severe harm in insidious, imperceptible ways. Unions and some policymakers seized upon this challenge and advocated for workers' "right to know" about chemical exposures and associated dangers, and in the early 1980s they won workplace right-to-know laws in a number of states.

At the national level, 1983 brought a landmark victory for this movement when the Occupational Safety and Health Administration (OSHA) issued its Hazard Communication Standard (HCS). Promoted by regulators, union leaders, and the chemical industry, the HCS represented a novel approach, based on transparency and disclosure of information to workers, to reducing illnesses and injuries from chemicals. Although the government issues specific standards for many especially noxious chemicals, such as asbestos, benzene, and lead, OSHA could never hope to formulate separate standards for the hundreds of thousands of hazardous chemical products in use. Instead, OSHA chose a "performance-based" approach, as embodied in the HCS.

The standard creates a two-part chain of disclosure: First, chemical manufacturers and importers

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must evaluate the hazardousness of the substances they produce or import and disclose such information to employers who purchase their products; and second, employers must make this information available to all of their workers who handle hazardous substances. In practice, this means that manufacturers and importers must attach to all containers of hazardous chemicals descriptive labels that provide the identity of the substance, a hazard warning, and the company's name and address. The companies also must complement their labels by providing employers with more extensive information about chemical identity, physical and chemical characteristics, physical and health hazards, precautions, emergency measures, and other matters. Finally, in plants that expose workers to hazardous substances, employers must train employees on how to access chemical information, protect themselves from risk, and respond to emergencies.

OSHA initially limited the scope of the HCS to the manufacturing sector, because it accounted for more than 50 percent of illnesses caused by exposure to chemicals. Soon after the standard was adopted, however, the United Steelworkers of America mounted a series of legal challenges that resulted in HCS's scope being extended to all industries where employees were exposed to hazardous chemicals. Today, the HCS is one of OSHA's most pervasive regulations, covering more than 3 million workplaces where, according to the agency, "more than 32 million workers are exposed to 650,000 hazardous chemical products."

Mixed success

The hope that motivated implementation of the HCS was that releasing various kinds of information would increase the ability of workers and others to fend for themselves in the face of complex risk environments. OSHA anticipated that workers would use the information "to protect themselves, and to support and participate in their employer's protective programs." The agency also hoped that employers would be propelled by the accumulation of this type of information to switch to less hazardous chemicals.

Measured against such hopes, however, the HCS's success has been mixed. Two decades of experience demonstrate that simply providing workers with information does not necessarily increase understanding or change behavior. For workers who have suffered injuries and illness, new chemical information has enabled them to establish the chains of exposure and toxicity that hurt them. This knowledge, in turn, has improved treatment and their ability to secure compensation.

But disclosure has been disappointing as a preventative tool for workers to avoid these harms. Complex chemical information, frequently conveyed in confusing ways, has been difficult for many workers to understand and use. Even if workers accurately understood the risks posed by workplace chemical exposures, many of them would have limited abilities to act on this information by, for example, finding safer jobs or demanding more pay to compensate for dangers they face. Finally, manufacturers and employers enjoy great discretion over how they will implement the regulation's requirements for chemical evaluation, hazard communication, and worker training. This latitude has generated wide disparities in compliance and the quality of information.

Now, however, a timely alignment of circumstances provides the nation with an opportunity to improve the HCS's performance. As in the United States, the use of information disclosure to mitigate the dangers of workplace hazards has gained credence internationally. Ten years ago, the United Nations (UN) Conference on Environment and Development launched a mandate to develop a Globally Harmonized System (GHS) for hazard classification and communication. This international set of rules seeks to harmonize the three major hazard communication systems: U.S. regulations, the Canadian system, and European Union standards. The GHS also creates rules to protect workers and consumers in developing countries.

This effort recently reached a milestone. In December 2002, two UN committees were scheduled to formally endorse the harmonized system. The international criteria will then be implemented by national governments. Implementation is likely to be a lengthy process. In the United States, regulators expect it will be fully implemented around 2008. This process will affect a number of agencies, including OSHA, the Consumer Product Safety Commission, the Department of Transportation, and the Environmental Protection Agency. Although individual countries cannot unilaterally modify the GHS, national agencies will enjoy some discretion when implementing the harmonized system.

The GHS thus creates two windows of opportunity in which policymakers might use the lessons of the past to inform improvements to hazard communication. First, the long U.S. experience can inform the activities of policymakers in other countries and in international organizations as they grapple with the complexities of information policy. Second, international standards will compel U.S. lawmakers and policymakers to reopen accepted HCS rules and practices as they seek to conform to the new global requirements.

Unless hazard information is more effectively communicated, the ability of workers to take preventive precautions will remain limited.

Learning from experience

As part of the process of revision in the United States, the limitations of the HCS should be acknowledged and repaired. In this light, there are a number of lessons that should be considered by members of Congress as they harmonize U.S. laws with the GHS, as well as by OSHA regulators who will subsequently revise the implementation of the HCS to avoid the pitfalls of the current system:

Information disclosed under the HCS can be exceedingly complex. The required Material Safety Data Sheets (MSDSs) provided by manufacturers and importers to employers are often quite long, technical, and written in jargon that confounds many workers. Even owners of small businesses that use hazardous chemicals in their activities are often unable to understand MSDSs. A 1990 study by the Printing Industries of America found that workers with 15 or more years of education were able to understand only two-thirds of the information contained in MSDSs. OSHA-sponsored research lead by Paul Kolp of A.T. Kearny Inc. has confirmed that workers understand only about 60 percent of the health and safety information presented in MSDSs. Accuracy poses an additional hurdle. The same researchers found in one study that only 11 percent of MSDSs were accurate in all of the sections that described health effects, first aid, personal protective equipment, and exposure limits.

The chemical industry responded to such criticisms by developing a simplified MSDS format, which was approved by the American National Standards Institute (ANSI). This format, which has been widely but voluntarily adopted, made MSDSs more comprehensible in part by presenting information in uniform and consistent sections. For example, workers seeking first aid measures can refer to a single section (section 4) of the new MSDSs. However, limits to the comparability of information remain even in these standardized MSDSs. Different manufacturers preparing MSDSs for similar chemicals can generate divergent hazard evaluations and descriptions of exposure effects. Because they serve diverse audiences that include employers, health professionals, union representatives, and workers, MSDSs tend to use a vocabulary that is suited to sophisticated users. Each of these obstacles is compounded for workers with low literacy or for international workers with limited English skills. (MSDS information is typically conveyed in English only.)

Even if MSDSs were more user-friendly, individual psychological tendencies to misperceive and misunderstand risk would continue to hamper effective use of hazard information. According to Cass Sunstein of the University of Chicago, individuals are prone to probability neglect—that is, they tend to pay more attention to risks that involve extremely bad outcomes with remote probabilities, such as airplane crashes or tornadoes, while downplaying risks that are more probable but whose outcomes are not perceived as vividly, such as heart attacks or injuries from bicycle accidents. In addition, individuals find it difficult to distinguish among low-probability events. It is cognitively complicated to distinguish between a 1 in 100,000 hazard probability and a 1 in 1,000,000 chance. Beyond a certain threshold, probabilities seem so remote that people discount risks and reduce their precautions.

Individuals frequently rely on past experience to guide their actions. Workers who have never encountered problems in handling some substance may simply incorrectly presume that the material is safe and so fail to take adequate protective measures.

Training programs can help to address these ob-

stacles of understanding and perception. The HCS presciently required employers to provide training to workers in this regard. However, the current standard allows employers wide flexibility to determine the method and content of training. Some excellent training programs are conducted in small groups and include lifelike simulations and interactive sessions where workers can express their doubts and receive feedback. But less-effective programs consist of little more than a video presentation that provides only limited help in educating workers.

Research by one of the authors of this article (Fung) and colleagues on a variety of disclosure regulations shows that third-party organizations can enhance this regulatory approach by performing two important functions. They can make information more accessible to the users—that is, workers, who are the intended beneficiaries of disclosure—and they can improve users' ability to understand data and react appropriately. Third-party organizations can also act as users' representatives and press to strengthen the regulations that provide that information. In the case of the HCS, unions were crucial in its adoption and expansion. However, unions in many industrial sectors lacked the capacity to make this knowledge accessible to workers by systematically analyzing and reinterpreting chemical information. In a few areas, such as the steel, petrochemical, and automobile industries, unions did urge employers to substitute safer chemicals in place of more dangerous ones. However, outside of the 13 percent of U.S. workers who are unionized, there are few third parties organized to help workers use chemical-hazard information to protect themselves.

On the other hand, employers have turned out to be one of the primary users of MSDSs. Perhaps from a desire to limit liability and minimize the costs associated with illnesses and accidents, employers have used MSDS information to substitute less-hazardous chemicals in their processes. A 1992 study by the Government Accounting Office found that 56 percent of employers reported a "great" or "very great" improvement in the availability of information and that one-third of them had switched to less-hazardous chemicals after receiving more detailed information from their suppliers. However, many employers will make such substitutions only when it does not come at too great an expense. Voluntary substitution thus offers an incomplete mechanism to improve safety.

Crafting improved regulations

These lessons suggest several principles for improving not only workplace hazard communication policy but also for crafting effective information-disclosure policies generally:

Information should be simplified and focused. Dumping data on the public is generally not useful, because too many intended beneficiaries lack the capability to understand and make use of the information. Simply increasing the quantity of information often makes it more difficult to identify useful information; information oversupply can lead to cognitive overload. It is not a question of how much information people need to make them aware of hazards, but rather of selecting and conveying salient information that will be processed and utilized. Too often, regulators seem to trade quantity for quality.

Policymakers should consider the perspective of intended users in designing the ways in which policies will generate, present, and disseminate information. Though MSDSs were intended for workers, they speak a language that is accessible mostly to sophisticated users. As a result, MSDSs have become a major source of information on hazardous and nonhazardous chemical products that enables employers to manage their liability and respond to the market's demand for transparency and greener products. Workers, on the other hand, tend to consult MSDSs only after an injury or illness has occurred, limiting the preventative potential of information. The harmonized format for MSDS as proposed in the new international guidelines is not significantly different from the ANSI-approved format currently used in the United States. Labels, on the other hand, convey more significant information. Making use of symbols and pictograms can increase comprehension, especially for non-English-speaking employees working in the United States. After the introduction of the harmonized labels and MSDSs, it would be valuable for OSHA to test their comprehensibility and their impact in changing workers' behavior. Should OSHA find that these are still limited, a stronger emphasis on training could improve workers' protection. Unless hazard information is effectively communicated to workers, the power of

this information to enable workers to take preventative precautions will remain limited.

Information should be presented using concise and crisp language. For example, the term "lacrimation" should be replaced by "tears," and more crude images of the consequences of accidents, shown during training, could elicit a stronger change in behavior. The vocabulary should also be used consistently so that words like "poison" always have a precise meaning that will not change according to the source of the warning. In the nutritional labeling of food, for example, the term "recommended daily allowance" successfully conveys information in a standardized and concise format. Clear metrics and standardized formats enhance the usability of information.

Similarly, information is more easily interpreted when it is comparable. In disclosure systems such as those used for nutritional labeling and automobile safety, for example, consumers can compare the relative features of competing products. Information provided by the HCS, by contrast, does not enable workers to compare the relative risks posed by chemical exposure in different workplaces. Aggregating information upward in this way would certainly pose a formidable challenge, but it would dramatically enhance workers' ability to use this information.

Third-party organizations, including unions and workplace safety groups, are fundamental lubricants in disclosure systems. Beyond the traditional role of representing workers' interest in negotiations with employers, third-party organizations can help users analyze and act on complex data, and they can compel employers to reduce risks. Analysis of other disclosure systems demonstrates that the involvement of third-party organizations has been crucial to the sustainability and improvement of information-based regulation. The HCS would have been much more effective had third-party organizations been more consistently involved not only in introducing the standard but throughout its implementation.

Unions have played a particularly important role in improving the quality of training, making sure that workers are not simply given information, but that they actually understand it and adjust their behavior accordingly. Acting on this experience, institutionalizing the presence of third-party organizations in designing and delivering the training might be extremely beneficial, especially for nonunionized workplaces. Creating continuing roles for third-party organizations to be involved in the generation, interpretation, and use of data could trigger a healthy mechanism to use the information and assure better worker protection.

The involvement of third-party organizations, including unions, is crucial to the improvement of information-based regulation.

Unfortunately, because of the relative paucity of unions, along with the scarcity of other types of workers organizations, it might be more realistic to focus on employers' incentives to elicit the control function that third-party organizations should play. For example, to assure that training is carried out effectively, companies that invest in "good training"—including interactive training, with real life simulations and sessions to evaluate workers' understanding—and that have low injury and illness rates might be rewarded by reducing their required contributions to worker compensation programs. Another measure might be to invest in the existing Committees for Occupational Safety and Health, nonprofit coalitions of unions, health professionals, workers, and activists, to strengthen their monitoring capacity in nonunionized workplaces.

As a bottom line, then, policymakers seeking to design strategies of information disclosure should thoroughly analyze the chains that connect information to understanding and understanding to action. Simply providing information does not necessarily enable workers or other individuals to interpret or utilize it. Policymakers should take into account the opportunities and resources that determine whether, and how, the intended beneficiaries of disclosure can act on information that is provided. How, for example, can workers use information about hazards to protect themselves or to press employers to make their workplaces safer? Which workers will have the bargaining power to demand premiums to compensate

for health risks? Who will be able to secure employment in safer venues?

Effective information-based regulation, like other regulation, seeks to induce changes in actual behavior. In the case of information-based regulation, policymakers are frequently tempted to assume that the release of information will itself be sufficient to generate effective actions and responses. The HCS experience shows that policymakers should resist this temptation. Instead, they should squarely face the intricacies and pitfalls of information provision and craft policies that overcome them.

Recommended reading

Mary Beth Arnett, "Risky Business: OSHA's Hazard Communication Standard, EPA's Toxics Release Inventory, and Environmental Safety", *Environmental Law Reporter*, Vol. 22, No. 7, 1992. Pp. 10440-10491.

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