RESEARCH ARTICLE

Implementing the Hazard Communication Standard final rule: Lessons learned

Changes to the Hazard Communication Standards (HCS) are bringing the United States into alignment with the Global Harmonization System (GHS). The new standard covers 43 million workers who handle hazardous chemicals in more than five million workplaces across the country. Forecasts predict that the implementation of these modifications to the HCS will prevent over 500 workplace injuries and illnesses, and 43 fatalities annually. This study, compiled through a collection and analysis of data provided by trainees who participated in the 2012 OSHA Susan Harwood training at the Rutgers School of Public Health, seeks to identify challenges and the effectiveness of this initiative. Survey data was obtained from a 21 question online survey 6–18 months post-training. In general, participants experienced several reoccurring challenges, including logistical difficulties of initiating a new and comprehensive training for all workers to the GHS changes, implementing GHS changes into their respective workplaces and receiving adequate management support and resources to initiate GHS efforts.

By Koshy Koshy, Michael Presutti, Mitchel A. Rosen

BACKGROUND/LITERATURE REVIEW

The sustained production and use of chemicals is vital to economic growth. Globally, the chemical industry accounts for more than $1.7 trillion per year business and affects many other related and ancillary industries. In the US, the chemical industry accounts for more than $450 billion in business, with exports surpassing $80 billion annually.[1]

Promulgated in 1983, the Hazard Communication Standard (HCS) has required employers to establish hazard communication programs for employees by means of labels on containers, material safety data sheets, and training programs. The implementation of a hazard communication program was then expected to ensure that all workers had a "right to know" the identities and hazards associated with of the chemicals they worked with, thereby inevitably reducing the likelihood of exposures.[2]

Occupational regulations require that workers, including public employees and emergency responders, be made aware of the hazards associated with various chemicals that they may handle or become exposed. An employer and or host employer must effectively train and communicate the physical and health – hazards associated with respective chemicals in the workplace. Through the regulatory "right to know" training obligations, an employer must "effectively" organize and communicate essential information on the hazardous chemicals and provide appropriate control measures. This "right to know" has evolved further to a "right to understand," where the *Understanding* of the nature and degree of chemical hazards inside of a worker's working environment leads to more effective and practical control measures, which deter and lessen the likelihood of exposure.

The United Nations Organization for Economic Cooperation and Development sponsored an initiative to establish a global system for hazard communication in 1992. The goal was to have a workable system in place, which included safety data sheets and easily understandable symbols, by 2000. The Occupational Safety and Health Administration (OSHA) issued final rule to revise the HCS (29CFR1910.1200) in March 2012. The HCS will now be aligned with the GHS of classification and labeling of chemicals. This update to the HCS will provide a common and coherent approach to classifying chemicals and communicating hazard information on labels and safety data sheets. When completely implemented, the revised standard will improve the quality and consistency of hazard information in the workplace,[3,4] making it safer for workers providing more understandable and consistent information on appropriate handling and safe use of hazardous chemicals. Three elements of the new GHS include (1) signal words (2) pictograms and (3) safety data sheets

Koshy Koshy *is a faculty member at the Rutgers School of Public Health, Department of Environmental and Occupational Health, 683 Hoes Lane West, Piscataway, New Jersey 08854, United States (Tel.: 732 235 9459; e-mail: koshyko@rutgers.edu).*

Michael Presutti *is an adjunct instructor at the School of Public Health, Office of Public Health Practice, 683 Hoes Lane West, Suite 110, Piscataway, New Jersey 08854, United States (e-mail: michaelpresutti@aol.com).*

Mitchel A. Rosen *is the director of the Office of Public Health Practice, Rutgers School of Public Health, 683 Hoes Lane West, Piscataway, New Jersey, United States (e-mail: mrosen@rutgers.edu).*

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- Signal words of either WARNING or DANGER must appear on primary container labels. These terms are not interchangeable. DANGER identifies chemicals that present a relatively greater or more immediate hazard to the worker as opposed to WARNING which identifies a lesser degree of hazard.
- The Hazard Communication Standard (HCS) requires pictograms. The pictogram is determined by the chemical hazard classification.
- Workers are required to have access to the Safety Data Sheet (SDS) for the hazardous materials they work with at their site. Prior to the enactment of the GHS, there was no standard format for presenting information on the SDS. Common formats included an eight section document or the sixteen section ANSI format.[5] The information required for the new 16-section format is presented in Table 1. Additionally, the word *material* is removed from its name and all hazard sheets are referred to as Safety Data Sheets (SDS).

OSHA awarded a Susan Harwood Grant to the Rutgers School of Public Health (October 1, 2012–December 31, 2013) to disseminate knowledge and promote awareness of the changes to the Hazard Communication Standard related to GHS to the workers of Region II (New York and New Jersey). *The 7.5-hour Nature of Chemical Hazards & Implications of GHS Applied to Industry* course was developed as part of this program. This course was developed to assist business owners, managers, and others responsible for worker safety in understanding employer responsibility under the revised Hazard Communication Standard and to assist those with training responsibilities.

Table 1. Sixteen-required sections of the revised safety data sheets (SDS).

1.	Identification
2.	Hazard(s) identification
3.	Composition/information on ingredients
4.	First-aid measures
5.	Fire-fighting measures
6.	Accidental release measures
7.	Handling and storage
8.	Exposure control/personal protection
9.	Physical and chemical properties
10.	Stability and reactivity
11.	Toxicological information
12.	Ecological information
13.	Disposal considerations
14.	Transport information
15.	Regulatory information
16.	Other information

Among the students recruited to participate in the training included OSHA Outreach Trainers authorized by Rutgers. Rutgers School of Public Health is one of 27 United States Department of Labor (USDOL) Occupational Safety and Health Administration (OSHA) Training Institute Education Centers (OTIEC). Trainees who successfully complete the Outreach Trainer courses at the OTIEC are authorized to offer the OSHA Outreach training. Health hazards, including Hazard Communication, is a required topic for all OSHA Outreach Training.[6,7]

Ten sessions of the 7.5-hour *The Nature of Chemical Hazards & Implications of GHS Applied to Industry* training were conducted for 220 participants. Users can access the training materials developed for this program at http://ophp.sph.rutgers.edu/ghs.zip

METHOD

Study Design

The Rutgers SPH administered an online survey to the 220 participants who completed the 7.5-hour *The Nature of Chemical Hazards & Implications of GHS Applied to Industry* training to identify the benefits as well as the challenges of implementing the GHS program. Researchers developed the survey at the Rutgers School of Public Health. The survey was approved by the Rutgers Institutional Review Board (IRB) and contained 21 questions (see attachments for a list of questions).

Rutgers SPH implemented the survey using Surveymonkey.com, an online survey instrument, equipped with Skip Logic. Skip Logic provides the ability for the survey to be dynamic in the sense that only relevant questions are asked, based on previous response. If a question response is 'no,' then a follow-up question related to a 'yes' answer is skipped.

The survey identifies how the training prepared participants to transition to GHS. They were queried on their efforts to train workers and the progress and experience of bringing their worksites into compliance with GHS. Data analysis yielded descriptive statistics about the survey participants, including state of employment, worker training experience and years of occupational safety and health experience.

RESULTS

Participant Demographics

Surveys were distributed to all 220 participants who attended the 7.5-hour *The Nature of Chemical Hazards & Implications of GHS Applied to Industry* training, between February 18, 2013 and October 11, 2013 (8–16 months after completing the training). Ten e-mail addresses were not valid, leaving a total of 210 participants in the study. A total of 110 completed the survey for a response rate of 52.4%.

Of these respondents, 77 were employed in New Jersey, 27 in New York, one in Pennsylvania, three reported that they were employed in multiple states, and two skipped the question. Health and safety was the full time responsibility for 86 (78.2%), part-time for 21 (19.1%) and three reported that health and safety was not part of their responsibility.

Consistent with changes to the Hazard Communication Standard that required vertical integration to all industry, the Rutgers Harwood program trained workers across all sectors. Of those who responded to the survey, 66 reported that they worked in general industry, 55 in construction, and three in maritime. Respondents were allowed to select more than one industry as some had cross functional responsibilities. The number of years the participants worked in safety and health is represented in Table 2.

Disseminating GHS to the Workforce

Participants responded to a series of questions related to their efforts to provide GHS training after completing the Rutgers Harwood Program. The