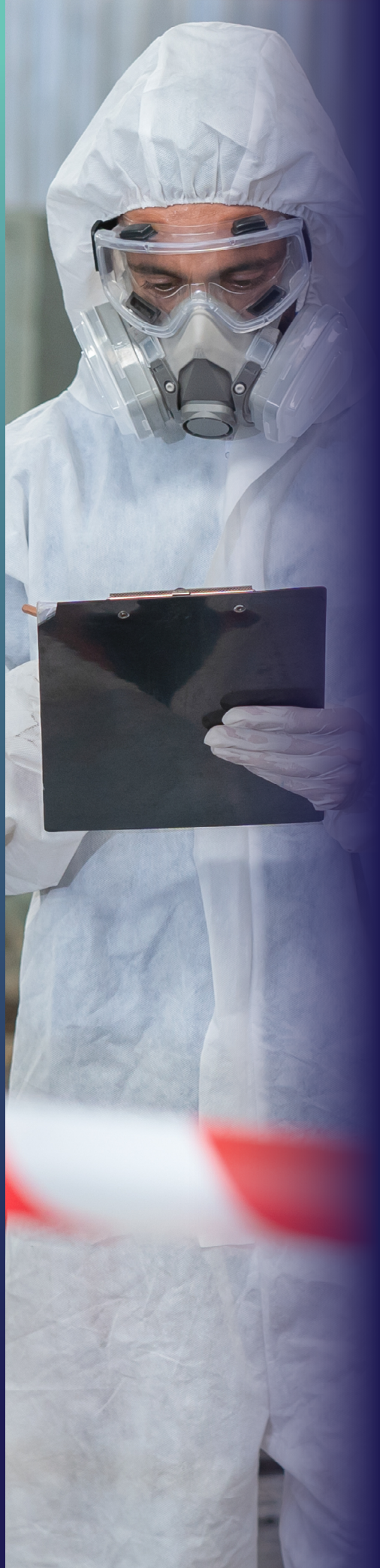

Grand Challenges for Worker Health, Safety, and Well-Being

Improving Exposure Assessment

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Introduction

In 2020, the AIHA Board of Directors approved the Grand Challenges for Worker Health, Safety, and Well-Being. According to the White House Office of Science and Technology Policy under the Obama Administration, Grand Challenges are "ambitious but achievable goals that harness science, technology, and innovation to solve important national or global problems and that have the potential to capture the public's imagination" (n.d., para. 1).

Criteria for the Grand Challenges

The criteria selected by AIHA's Grand Challenges Leadership Team require the goals set by the Improving Exposure Assessment Team to be:

- Big, important, compelling initiatives geared toward solving critical world needs.
- Likely to achieve progress in solving global needs within five to 10 years.
- Capable of generating defined, measurable outcomes.
- Reliant on interdisciplinary collaboration, significant innovations, and long-term sustained commitments to make progress.

Exposure assessment is fundamental to effectively managing and controlling occupational hazards that can adversely affect worker health and well-being. As a part of the Grand Challenges initiative, the Improving Exposure Assessment Team's goal was to support and empower occupational and environmental health and safety (OEHS) professionals to properly assess and manage all chemical, physical, and biological agent exposures for all workers on all workdays. To this end, we have identified five systemic challenges that OEHS professionals may expect to face in conducting comprehensive workplace exposure assessments, presented as the Grand Challenges for Improving Exposure Assessment. This concept paper provides a brief background on exposure assessment, describes progress achieved by AIHA towards improving exposure assessment, and summarizes each of the five challenges, along with benefits and barriers to addressing them.

Background

Through the centuries, scientists and physicians such as Hippocrates, Pliny the Elder, Celsius, Ramazzini, Paracelsus, and Agricola have recognized the effects of chemicals, metals, and other harmful substances on worker health. After the Industrial Revolution began in the 18th century, increased exposure and disease arose in industrial settings, leading to the enactment of occupational health and safety laws and regulations. Early in the 20th century, the science of industrial hygiene began to take shape, thanks to the efforts of physicians such as Alice Hamilton, who recognized the health burden of work.

From these beginnings, industrial hygiene has evolved into a science of anticipation, recognition, evaluation, and control of hazards, with industrial hygienists driving major advancements in worker protection. The 1960s brought pivotal advancements in the ability to monitor the environment, with the development of impingers, electrostatic impingers, and filtration techniques revolutionizing the analysis of chemical and metal exposures in the workplace (Perkins, 2008). The subsequent introduction of battery-powered pumps, which facilitated the movement of air through sampling media, proved transformative and laid the groundwork for further innovative monitoring solutions.

While industrial hygiene has undeniably made workplaces safer over the past century, the emergence of cutting-edge technologies has introduced new potential for exposure and new challenges in exposure measurement. Consequently, a significant hurdle lies in the need to enhance workplace exposure assessment to keep pace with these advancements, which represents a significant hurdle for OEHS professionals.

To continue advancing workers' protection from occupational hazards, OEHS professionals must address various challenges, such as finding alternate systems for exposure assessment when laboratory data are unavailable, improving the use and knowledge of direct-reading instruments, and improving dermal exposure assessment tools and methods. OEHS professionals must also actively engage with the U.S. Environmental Protection Agency's process for establishing chemical exposure limits due to new risk management requirements under the Toxic Substances Control Act (TSCA). Furthermore, AIHA and other organizations have developed risk assessment tools designed to help practitioners better analyze quantitative data derived from similarly exposed groups of workers, even with data sets ranging from as few as one sample to several. However, these tools have not been widely adopted throughout the profession. Encouraging widespread use of risk assessment tools is the aim of AIHA's Improving Exposure Judgments program, as well as the continuous improvement plan for exposure assessment strategies and improving exposure judgments, which was drafted from the results of the State of the Art vs. Practice Survey.

Progress to Date in Improving Exposure Assessment

In 2022, AIHA launched multiple programs under the umbrella of the Advancing OEHS Science and Practice initiative. Collectively, these programs have been designed to further AIHA's mission by improving the practice of OEHS to better protect workers and communities. The process of improving OEHS practice starts with exposure assessment and proceeds through exposure management, activities that are aligned with the scope and objectives of the AIHA Principles of Good Practice program, one of the four programs under the Advancing OEHS Science and Practice initiative.

Principles of good practice are minimum expected standards of practice and performance established for a particular profession or function. They differ from competencies, which pertain to what OEHS professionals know, such as the topics included in certified industrial hygienist (CIH) exam rubrics. Instead, principles of good practice focus on the performance of OEHS—that is, what we do. The AIHA Principles of Good Practice program was established under the AIHA Guideline Foundation to document vital OEHS professional practices that have been determined to protect workers reliably and effectively. This resource documents a concise, easy-to-use summary of recommended practices for the industrial or occupational hygienist that incorporates best risk management practices whenever feasible.

Building on this work, AIHA's 2023 State of the Art Vs. Practice Survey on occupational exposure assessment, another program under the Advancing OEHS Science and Practice umbrella, identified many significant gaps in exposure assessment practices. These findings inform the need for the association to develop a new continuous improvement plan from which this data can serve as a baseline for measuring practice improvements.

The Grand Challenges for Improving Exposure Assessment

Occupational exposure assessment is a broad discipline. Multiple challenges affect our ability as OEHS professionals to assess and manage all exposures to chemical, physical, and biological agents for all workers and on all workdays.

The Grand Challenges for Improving Exposure Assessment were selected based on the project criteria: that Grand Challenges should be important to worker health, safety, and well-being; that progress in achieving the Grand Challenges may be expected in five to 10 years; that the outcomes of the Grand Challenges should be defined and measurable, and that progress towards achieving the Grand Challenges should require collaboration, innovation, and commitment. This concept paper discusses the five Grand Challenges identified by the Improving Exposure Assessment Team: improving decision-making when exposure monitoring data are not available, improving decision-making when exposure monitoring data are available, improving the use of data from real-time detection systems, improving dermal exposure assessment, and embracing and influencing TSCA risk evaluations.

Improving Decision-Making When Exposure Monitoring Data Are Not Available

The Problem

Globally, the availability of qualified industrial or occupational hygienists and proper sampling techniques in the field is often limited. Samantha Connell, MSPH, CIH, the past president of the International Occupational Hygiene Association, wrote for The Synergist (2023) that there are approximately 20,000 occupational hygienists worldwide, only 8% of whom work in the top 10 emerging economies, where the need is greatest. Compounding difficulties include lack of availability of proper sampling equipment or sufficient budget to pay for laboratory analyses. OEHS faces a Grand Challenge to assess occupational exposure risks in the absence of quantitative exposure data.

Therefore, OEHS professionals should consider three approaches:

- Expanding the conventional defense of professional judgment, such as the use of surrogate data and controls verified as effective in peer-reviewed literature.
- Promoting and training OEHS professionals in the use of new and emerging tools, such as artificial intelligence (AI), as well as hazard and control banding.
- Promoting collaborative partnerships with manufacturers of equipment that aids in the implementation of the hierarchy of controls, such as gas monitors, to pursue data collection (Knott et al., 2023).

The Benefit

The promotion of each of the proposed approaches would expand the field's options for leveraging the limited numbers of professional occupational hygienists. It would also expand participation in decision-making to include other worker protection advocates, such as safety practitioners and environmental health and safety generalists. In the scenario envisioned by the Improving Exposure Assessments Team, one would not need to understand the conventional logic of exposure assessment judgments to establish valid and protective controls.

The Barrier

Our profession's challenge in pursuit of better decision-making in the absence of exposure monitoring data is to broaden awareness of the aforementioned strategies to those outside of the core of occupational hygienists. Suggested strategies include initiating closer communication between technical societies and industry—for example, between AIHA and manufacturers of controls for silica—as well as developing new training.

Highlights: Improving Decision-Making When Exposure Monitoring Data Are Not Available

- Expand conventional defense of professional judgment.
- Promote and train professionals in using new and emerging tools.
- Promote collaborative partnerships with manufacturers that aid in the implementation of the hierarchy of controls to pursue data collection.

Improving Decision-Making When Exposure Monitoring Data Are Available

The Problem

In 2023, with the assistance of the market research firm Avenue M Group, AIHA conducted a survey to identify, define, and address gaps between current and state-of-the-art practice in airborne chemical exposure assessment among its membership. The survey was also circulated to members of the American Conference of Governmental Industrial Hygienists (ACGIH), the Australian Institute of Occupational Hygienists, the British Occupational Hygiene Society, and the Southern African Institute for Occupational Hygiene. After reaching close to 5,400 contacts, AIHA received a total of 936 qualified responses: 728 from the email campaign to AIHA's contact list and 208 from the generic links. For the 728 responses to AIHA's email campaign, the completion rate was 76%, the response rate was 14%, and the margin of error was plus or minus 4% at the 95% confidence level.

Key findings indicated that a significant number of practitioners were not following recommended practices aligned with AIHA's strategy, notably:

- Criteria for unacceptable exposures varied widely among OEHS practitioners, reinforcing the importance of the Improving Exposure Judgments and Principles of Good Practice initiatives.
- Statistical tool use and understanding among practitioners was low, also reinforcing the importance of the Improving Exposure Judgments and Principles of Good Practice initiatives.
- Practitioners were highly variable in their selection and use of occupational exposure limits, reinforcing the importance of the Principles of Good Practice initiative, as well as the need to continue promoting occupational exposure banding.
- Only about half of practitioners used a systematic planning process for advancing up the hierarchy of controls, reinforcing the need to promote the importance of a systematic planning approach.

This research enables AIHA to develop a continuous improvement strategy that identifies and reduces barriers to adoption and empowers practitioners to achieve best-in-class practice. AIHA's Improving Exposure Judgments program, a third element of the Advancing OEHS Science and Practice initiative, aims

to overcome practitioners' common objections to using available industrial hygiene statistical tools that would elevate their risk-assessment abilities. AIHA offers free access to education, software, and resources that help practitioners become skilled in using statistical tools and other approaches in their daily practice. The use of these tools leads to practitioners better protecting workers and communities through improved judgments; having increased confidence in their judgments, with verifiable data analysis to inform and validate their assessments; fostering stronger communication with their colleagues and clients; and achieving greater efficiency in assessing risk with less time and money.

The Barrier

Often, practitioners do not think they have collected enough measurements above the limit of detection to use statistical tools to characterize exposure risks. However, statistical tools for assessing risk can analyze data sets of only a single sample, such as by relying on Bayesian statistics.

In late 2024, AIHA launched the multi-year "Culture Shift" communications campaign to create greater awareness of the benefits of using these tools. In this campaign, the association promotes its free suite of resources, including video courses, software tools, real case examples, and more, for data sets of any size. Successful completion of the Improving Exposure Judgments: An Introduction to IH Statistics course also helps prepare practitioners earn their Registered Specialist: Exposure Decision Analysis credential. This credential distinguishes professionals who have acquired the knowledge and skills needed to make informed decisions about worker exposures and uncertainty.

Furthermore, although current OEHS program curricula focus on traditional statistical analysis, statistical treatments of exposure data have been formalized and advanced significantly through tools such as those accessible through AIHA's exposure risk and management apps and tools webpage. OEHS professionals may convey to academic faculty the need to introduce students to these advanced statistical tools, which will likely become important in their careers.

Highlights: Improving Decision-Making when Exposure Monitoring Data Are Available

- Identify and reduce barriers to adoption of best-in-class exposure decision-making tools through AIHA's Culture Shift campaign.
- Influence academic faculty to introduce students to the importance of statistics in their future practice.

Improving the Use of Data from Real-Time Detection Systems

The Problem

Real-time detection instruments provide the means to quickly assess employee safety in the workplace. This allows OEHS professionals to achieve greater flexibility when conducting exposure screening assessments of potentially hazardous work environments. The ability to determine within a few minutes or even seconds what hazards an employee may be exposed to in real time makes this equipment a valuable tool, but how should this information be communicated to non-technical stakeholders? What level of confidence should users place in the accuracy of real-time measurements? Obtaining accurate and reliable data depends on the user's training and skill, proper equipment maintenance, adherence to prescribed storage, use, and calibration information provided by the manufacturers, and other factors. Use of real-time detection technology by individuals who are not trained OEHS professionals or other competent persons may reduce the confidence level that workers are being fully protected from exposure to hazardous substances (Haas & Cauda, 2022).

NIOSH and OSHA provide methods for conducting active or passive sampling with media ordered from labs and returned for analysis. However, most of these methods produce results that OEHS professionals then compare to eight-hour or 15-minute exposure limits. This makes it difficult to identify exposures that periodically rise above the OEL or only occur within a few minutes during the average shift, either due to the nature of the task or a potential failure in a mechanical process or engineering control. For example, tasks such as opening the doors of semi-trucks carrying chemicals that may have spilled in transit or connecting and disconnecting hoses to large vessels only require a few minutes to complete, but these tasks may be conducted multiple times during each eight-hour shift. The OEHS professional has the option to take shorter samples, normally in 15-minute increments, across a specified time period, but then, there are the risks of contaminating or mixing up samples or missing windows to characterize peak exposure events.

Evaluating the current methods that assist exposure assessment and providing additional monitoring support through applied AI software has the potential to improve exposure assessments and confidence in workplace safety and health programs.

The Benefits

New methods and technologies can improve current field exposure assessments.

Development of new methods for using direct-reading instruments. NIOSH's Center for Direct Reading and Sensor Technologies prioritizes developing new methodologies (NIOSH, 2024a). Organizations that develop and publish voluntary technical standards, such as ASTM International, could assist with developing methods for using real-time detection equipment. Standardized methods would allow people without experience in using instruments or knowledge in the industrial hygiene field to understand the procedure for identifying overexposures. By relying on standard methods, industrial hygienists could train employees on site, increasing capabilities for accurate and timely exposure assessment at that location.

Incorporating AI into direct-reading instruments to assist with determining exposures. A direct-reading instrument might record 5,000 data points for a single pollutant over an eight-hour work shift (G. Popov & T. Popov, 2022). Collection of such large amounts of data can present challenges for people tasked with data interpretation and evaluation. Davenport and Kalakota (2019) suggest that, since AI can perform as well as physicians in diagnosing diseases or spotting malignant tumors, incorporating an AI assistant into real-time detection software could enable users to make more informed decisions based on the data collected. The AI assistant could compare the results of real-time monitoring with OSHA and ACGIH exposure limits or obtain study data from sources available in the field.

The Barriers

The benefits of using standardized methods and AI software may only be obtained through collaboration between manufacturers, OEHS professionals, and research groups. By collaborating with industrial hygienists in the field to understand how direct-reading instruments are intended to be used, device manufacturers can become partners in promoting the utility of real-time assessments (Cauda et al., 2022). This would not be the first time a professional group came to understand the value of collaborating with a manufacturer of detection instruments. Members of AIHA's Real-Time Detection Systems Committee have implemented the Standardized Equipment Specification Sheet program to provide a common language through which manufacturers and end users can effectively communicate (Owens, 2017).

Highlights: Improving the Use of Data from Real-Time Detection Systems

- Create NIOSH or OSHA methods or guidelines for using direct reading instruments.
- Incorporate AI into detection software to assist with determining exposures.

Improving Dermal Exposure Assessments

The Problem

It is well known that dermal exposure can contribute significantly to the total exposure dose for some chemicals. Dermal exposure to chemicals can result in direct effects on the skin, such as burns, irritation, dermatitis, or sensitization, as well as systemic effects, such as acute toxicity, target organ toxicity, cancer, or reproductive toxicity. Dermal exposures may also damage the skin and degrade its protective properties, increasing dermal absorption of harmful substances (Anderson & Meade, 2014; NIOSH, 2024b; NIOSH, 2011). Protecting workers from the effects of dermal chemical exposures is necessary to ensure their health and safety.

There are currently several methods for estimating dermal exposure, including hand rinses, dermal wipes, skin patches, whole-body suits, and biomonitoring (OSHA, n.d.). At this time, ACGIH (n.d.) has established Biological Exposure Indices (BEIs) for 55 chemicals and chemical groups. There are 42,293 chemicals in the active EPA TSCA inventory, so the relative number of chemicals with established BEIs is very small. Without guidance values for interpreting the results of biomonitoring, such data are of limited value. In addition, these methods for estimating dermal exposures require careful sample collection and handling, followed by often-expensive analytical evaluation. While the methods mentioned previously are valuable for research and certain high-hazard operations, they may be impractical for use by small and medium-sized enterprises and in developing countries. Even if these methods are available, the lack of guidance values for most chemicals in commerce makes interpreting the data difficult.

Modeling dermal exposure has the potential to expand the use of dermal exposure assessment. The AIHA Exposure Modeling Toolbox has identified eight models that can estimate dermal chemical exposures for workers and consumers (AIHA, n.d.c). EPA's ExpoBox website (2025d), which compiles exposure assessment tools by routes, including dermal, identifies 10 models with some applicability to dermal exposure assessment, but only six that can be used directly for estimating dermal exposures. Current models often require individuals to download software, be well trained in its use, and provide complicated inputs that may be very difficult to obtain. Use of these models for dermal exposure assessments is thus unfeasible for many workplaces.

The Benefit

Improving dermal exposure assessment tools and approaches and making them more widely available will allow governments and employers to better protect their workers in many ways, such as through:

- Identifying dermal hazards for selection of personal protective equipment (PPE).
- Identifying chemicals with significant skin absorption potential.
- Supporting substitution of safer chemicals through comparative exposure assessment.
- Prioritizing processes with higher dermal exposure potential for the installation of engineering controls.

Better identification of dermal contact hazards will allow for more effective use of process controls and PPE, as well as reduce risks of injury and illness for workers. Reducing the potential for dermal absorption will decrease workers' overall chemical exposure doses and, therefore, potential health effects.

The Barrier

Improving dermal exposure assessment tools and approaches will require significant investment of resources. To have the greatest impact, these tools and methods must be free, relatively easy to use, and widely available to governments, non-governmental organizations, businesses, and even workers. It is unrealistic to think that, in the future, all workplaces will have access to trained OEHS professionals to identify these hazards and implement controls. To be effective, we need to empower workers and small employers to protect themselves.

Highlights: Improving Dermal Exposure Assessments

- Develop standardized, simplified methods to set dermal exposure guidelines.
- Develop tools using existing chemical and physical parameters that can identify chemicals with high dermal absorption potential.
- Develop free, easy-to-use, accessible models to estimate dermal exposures.

Embracing and Influencing TSCA Risk Evaluations

Background

EPA is charged with protecting the environment and public from materials, substances, chemicals, mixtures, and other items that may impose unacceptable risks of negative impacts. EPA was granted this duty by the passage of the 1976 Toxic Substance Control Act. To address it, EPA has devised a methodology for conducting risk evaluations (Procedures for Chemical Risk Evaluation Under the Toxic Substances Control Act, 2023).

In 2016, TSCA was amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act. This act changed the risk evaluation process outlined in Section 6 of TSCA. Three key changes were the requirements for EPA to establish deadlines for evaluating existing chemicals, to conduct risk-based chemical assessments, and to provide more transparency into the process for chemical manufacturers and the public (EPA, 2025a; 2025b).

In October 2023, EPA published a proposal amending the 2016 Lautenberg Act in the Federal Register. In the summary paragraph, EPA stated that it had:

> reconsidered the procedural framework rule for conducting such risk evaluations and determined that certain aspects of that framework should be revised to better align with applicable court decisions and the statutory text, to reflect the Agency's experience implementing the risk evaluation program following enactment of the 2016 TSCA amendments, and to allow for consideration of future scientific advances in the risk evaluation process without need to further amend the Agency's procedural rule. (Procedures for Chemical Risk Evaluation Under the Toxic Substances Control Act, 2023, para.1)

The agency sought public comment on the proposed changes in a period that ended on December 14, 2023. On May 3, 2024, the proposed changes were passed and printed in the Federal Register (EPA, 2025a; 2025b; Procedures for Chemical Risk Evaluation Under the Toxic Substances Control Act, 2024).

The final rule incorporated two key changes. First, EPA finalized the proposal that the agency would "assess all exposure routes and pathways relevant to the chemical substance under the conditions of use,

including those that are regulated under other federal statutes" (Procedures for Chemical Substance Risk Evaluations, 2024, para. d[9]). Second, when determining whether unreasonable risk is present, the agency will "take into account reasonably available information," including whether workers have been exposed due to the lack or ineffective use of PPE, and will not "consider exposure reduction based on assumed use of personal protective equipment" (para. f[2]).

Although EPA did not publish any changes to TSCA regarding risk-based occupational exposure values, the agency did provide additional information on their future approach to drafting risk-based occupational exposure values and publishing them for peer review. According to the supplementary information published for the final rule in the Federal Register, EPA will provide "a risk-based occupational exposure value in the draft risk evaluation where unreasonable risk to workers through inhalation is identified," which will include an explanation of how the value was calculated (Procedures for Chemical Risk Evaluation Under the Toxic Substances Control Act, 2024, para. 128). "To avoid confusion," the agency added, "EPA is no longer referring to the risk-based occupational exposure value calculated in the risk evaluation as an Existing Chemical Exposure Limit" (para. 129).

AIHA, industry and trade associations, and individual companies have identified the need for the OEHS profession to be actively involved in the TSCA process for chemical risk evaluations, including the establishment of occupational exposure values. To address some of the issues with TSCA risk evaluations, AIHA formed the TSCA Task Force in 2021. One measure of success established by the task force is its representation of diverse interests, including those of EPA, NIOSH, OSHA, AIHA, and ACGIH, as well as certified industrial hygienists, to understand the differences between occupational exposure values and the methods used to establish them. Due to the aforementioned changes relating to occupational exposure values, the AIHA TSCA Task Force will need to continue to advocate for exposure values published by EPA that are consistent with sound scientific principles.

The Problem

There are inconsistencies in the processes that governments and non-governmental organizations use to determine whether a chemical substance presents an unreasonable risk of injury to human health or the environment. EPA's use of the phrase "unreasonable risk" is significant, as it is not defined within the text of TSCA. When determining unreasonable risk, the potential hazard and route of entry into the body should be considered based on conditions of use.

In the United States, EPA has the authority under TSCA to require a chemical substance be evaluated for health risks when regulatory authorities believe there is reasonable information available to prioritize the substance. TSCA chemical risk evaluations include five components: the scope, hazard assessment, exposure assessment, risk characterization, and risk determination. TSCA does not provide details on the exposure assessment strategies EPA will use in that component of the evaluation. However, the agency has included a document on releases and occupational exposure assessment in the completed chemical risk evaluations, which outline an exposure evaluation process (Lynch et al., 2023).

Methods for establishing exposure limits—represented by the third component of the TSCA risk evaluation process—are not consistent between countries or even between entities within countries, particularly the United States. Lynch et al. (2023) identified challenges with the TSCA approach to exposure estimates and limits and advocated for a "harmonized approach to exposure assessment," which the authors believed would "increase stakeholder confidence in the results of TSCA risk evaluations" (abstract, para. 1).

The Benefit

Creating a consistent and uniform chemical risk evaluation process within EPA, which may also be relied upon by other countries and governments, as well as OEHS professionals, will improve harmony and ensure health and safety protections for workers. One such approach is the United Nations Economic Commission for Europe (UNECE) Globally Harmonized System of Classification and Labelling of Chemicals (GHS). It provides an example of how a unified effort between countries and regulatory authorities can achieve harmony in the interest of worker health and safety. Standardizing the chemical risk evaluation process, particularly the exposure assessment process, among UNECE member states will also improve the GHS process (Scroggins, 2010).

The Barriers

Embracing TSCA and influencing the chemical risk evaluation process is critical to the OEHS profession. Developing a unified process for the exposure assessment component of chemical risk evaluations is a challenge not only within the United States but other countries too. Achieving this goal will require diplomacy, as well as financial and technical resources. Although it took approximately 12 years for the United States to adopt the GHS framework, this feat proves that consensus is possible (Scroggins, 2010).

Regulatory authorities that are responsible, solely or in part, for worker health and safety must solicit OEHS expertise from private and government entities when conducting chemical risk evaluations and establishing occupational exposure limits. AIHA's TSCA Task Force must continue to communicate its efforts and action items with the association's Exposure Assessment Strategies and Exposure and Control Banding committees, as well as the International Occupational Hygiene Association, to aid in creating a unified approach to addressing exposure assessments with EPA and among UNECE member states.

Highlights: Embracing and Influencing TSCA Risk Evaluations

- Advocate for regulatory authorities responsible for risk evaluations to solicit expertise in OEHS from scientific societies, such as AIHA.
- Create a harmonized approach for performing exposure assessments within chemical risk evaluations.
- Communicate the efforts and action items of AIHA's TSCA Task Force to help develop a unified approach to exposure assessments with EPA and among UNECE member states.

Conclusion

Workers, their families, and their communities value safe and healthy environments, within and outside their workplaces. Ensuring that workers' health, safety, and well-being are protected begins with OEHS practitioners being able to conduct thorough and accurate assessments of exposures to potentially harmful chemical, physical, and biological agents. As OEHS professionals, we rely on resources, such as the comprehensive repository of tools maintained by AIHA, to improve the accuracy and efficiency of our exposure assessments. Accordingly, we should advance the proper use of these tools in all workplaces.

The future of OEHS rests not only on the shoulders of professionals and scientists, but on all stakeholders in the field. Together, we must navigate these Grand Challenges to identify, develop, and enhance the field of OEHS. How can we advance exposure assessment in the next decade? What resources can we leverage to surmount the current and future challenges? These questions and others, along with our collective responsibility to find solutions, will shape the futures of workers.

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