

Executive Summary and Recommendations from the 2022 ACS Presidential Safety Summit

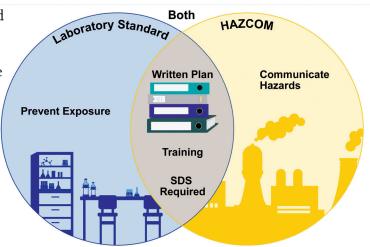
The fourth ACS Presidential Safety Summit was held on October 13–15, 2022, at ACS headquarters in Washington, DC. Co-organized by the ACS Committee on Chemical Safety (CCS) and the ACS Office of Safety Programs, the summit brought together 39 participants from industry, academia, national laboratories, graduate students and postdoctoral scholars, and ACS staff members. Three guiding questions focused discussions on articulating and communicating industry needs and expectations related to laboratory safety for new Ph.D. hires in research and development (R&D).

Question 1: What laboratory safety competencies (knowledge, skills, and attitudes) do new Ph.D. hires need to reduce the time for onboarding in industrial R&D laboratories where chemicals are used?

To prepare to address this question, summit participants reviewed survey responses from a select group of industrial safety professionals. The survey questions were designed to determine what safety expectations industrial employers have for their new Ph.D. hires. The framework of Recognize hazards, Assess risks, Minimize risks, Prepare for emergencies (the RAMP model) was used to organize the survey questions.

The discussion of the survey results during the summit highlighted the specific safety knowledge, skills, and attitudes that were most desired in new Ph.D. hires. These included:

- Awareness and appreciation of regulations from various federal agencies (OSHA, EPA, and FDA) affecting laboratories where chemicals are used.
- Ability to recognize hazards.
- Ability to locate and apply authoritative chemical safety information.



- Ability to implement the RAMP model by
 - ▶ Conducting risk assessments,
 - ▶ Applying the hierarchy of controls,
 - ► Selecting and using personal protective equipment (PPE),
 - ▶ Recognizing when a Management of Change procedure is needed,
 - ▶ Recognizing off-normal conditions,
 - ▶ Learning from near-misses and incidents, and
- ► Applying ionizing and non-ionizing radiation safety practices.

Human factors¹ were also identified as ways to reduce time for onboarding. These included:

- Leadership skills that include prioritizing safety,
- Cultural acknowledgment in the context of safety,
- Safety mindset,
- Communication and listening skills, and
- Willingness to learn and adapt.

¹As used here, "human factors" include those safety categories and items that can affect the performance of an individual, including risk perception, attitude, technical and non-technical skills, and competence.

Question 2: Building on the successes of recent initiatives, what additional opportunities are there for industry and ACS to respond to industry's needs and expectations related to laboratory safety for new Ph.D. hires in R&D?

To inform this discussion, participants were provided with information on the current landscape in chemical safety education, the materials that have been created at ACS, and the grassroots organizations known as Laboratory Safety Teams (LSTs) that graduate students are creating throughout the country. In response to the second question, the summit participants emphasized that ACS has a unique opportunity to build more connections between academia and industry. If chemical safety education is included in collaborative initiatives between ACS and industry, undergraduate and graduate chemistry students will be better prepared to work safely in industrial R&D laboratories.

Suggestions for other collaborative projects between academia and industry that ACS might catalyze included:

- Collaborative development of safety education and training opportunities that meet industry standards and expectations,
- Highlighting industry expectations through ACS webinars, symposia, and other communications,
- Enhancing safety expectations in the ACS Guidelines for Bachelor's Degree Programs, and
- Encouraging and supporting Laboratory Safety Teams (LSTs) in graduate programs to reflect industry expectations.



Question 3: How do we broaden and continue the summit conversations?

During the last part of the summit, potential next steps and partners were considered. Disseminating information through symposia, papers, webinars, and workshops will be a key first step in continuing the conversation and pursuing collaborative initiatives. Participants identified potential actionable strategies in four areas:

- Advancing safety education and training activities,
- Conveying safety expectations,
- Connecting industry and academia, and
- Engaging influential stakeholders in chemical safety.

Strengthening safety education and training of Ph.D. students requires the collective efforts of many

