



Where are we with lab safety education:
Who, what, when, where, and how?

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The “Why?” is covered

- Most people involved in education understand the need for lab safety training.
- Why? To protect students, staff, and property; train chemists; educate the public; avoid fines and litigation; and protect the reputation of the department/school.

What? – more sources available

- *Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards*, National Research Council, 2011.
- *Laboratory Safety for Chemistry Students*, Hill and Finster, Wiley, 2010.
- *Safety in Academic Chemistry Laboratories*, 7th Ed., ACS CCS.
- Other texts, published or customized, including CHPs.
- Safety topic-based training: corrosive, flammable, toxicology, reproductive toxins, radioactivity, high energy equipment, scale up, hazardous waste, PPE, off-the-job examples.

Where should training be done?

- Grades K-12
- Community Colleges; Undergraduate Programs (all tracks, majors and non-majors)
- Graduate Programs and Postdoctoral Fellowships
- Industry and Government Laboratories
- Chemistry demonstrations and science fairs

When? – As often as possible

- Safety education embedded in each course; depends on each instructor having appropriate safety knowledge and a positive attitude toward safety.
- Dedicated courses or programs in lab safety. How many courses and when should they be taken?

Intro to Lab Safety (years 1-2)

- This course begins to develop skills and knowledge at the start of the curriculum.
- Emphasizes that safety is fundamental to the science of chemistry.
- If part of general chemistry, all students will get some safety education (public awareness).
- Limitations: not much chemistry experience; if this is the only course, “we’re done with this.”

Safety for Chem Majors (years 3-4)

- This course builds on knowledge of all areas; leads to a broader application of principles.
- Students can appreciate how pervasive safety is in chemistry.
- Limitations: if this is only course, students miss opportunities to learn safety in other (earlier) courses. Also, students may develop unsafe practices in previous lab work.

Lab Safety Seminar Courses

- Science Lab Management: for high school and middle school science teachers.
- Lab Safety Issues in Chemistry: for community college students, covers general and organic chemistry.
- Special Topics in Lab Safety (Seminar): for undergraduate and graduate students.
- Could be offered at ACS Regional Meetings or as an ACS Education Department offering.

How? – Many Sources

- Can draw from many sources at colleges and universities.
- Include topics covered with curriculum lab work, then consider major topics outside of existing lab courses.
- Explore degree programs with existing major or minor in chemical safety (e.g., West Virginia Wesleyan College – B.S. in Chemical Hygiene & Safety).

Courses in WVWC CHS program

- CHEM 260 and 360 Chemical Hygiene Officer Experiential Learning I and II (1 credit each)
- CHEM 361 Survey of Industrial Hygiene and Hazardous Waste Operations (2 credits)
- CHEM 460 Chemical Hygiene Officer: Preparation for the Profession (4 credits)
- BIOL 305 Principles of Toxicology (3 credits)
- POLS 328 Environmental Law and Politics (3)
- PHED 140 First Aid and Safety (3 credits)

Who? – How it's done now

- Assigned responsibility for chemist or safety professional in addition to regular expectations. Maybe rotated on a regular basis. Example is CHO assignment.
- Safety Champion: faculty or staff member may develop a professional and/or personal interest in chemical safety and volunteer to lead activity in lab safety education.
- Problem: no active research in chemical safety.

Who in the future?

- Professor Safety: Tenure-track position specializing in chemical health & safety.
- Can push the frontiers of knowledge, safety equipment, and development of safe processes.
- Within a large system (state), faculty member could be shared by two or three campuses.
- Independent colleges could share faculty.
- see *Chem. Health Saf.*, **2015**, 22(2), 45.

Conclusions and Recommendations

- Although chemical safety content is growing, more information needs to be published.
- All institutions (academic and industrial) should commit to a specific educational plan.
- Identify staff with technical knowledge and positive attitude toward safety.
- Consider tenure-track position in chemical safety; position can be shared with more than one institution.