

American Chemical Society



ACS SAFETY INITIATIVES: IMPACT ON THE GLOBAL CHEMISTRY ENTERPRISE

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Chemical Safety within ACS



- MISSION:
 - Advance the broader chemistry enterprise and its practitioners for the benefit of Earth and its people.
- Goal 3:
 - Foster the development of the most innovative, relevant, and effective chemistry education in the world.
- ***ACS will support reforms and initiatives that result in safer laboratory practices*** and a pipeline of competent, ethical, and competitive U.S. chemists ready to address global challenges.

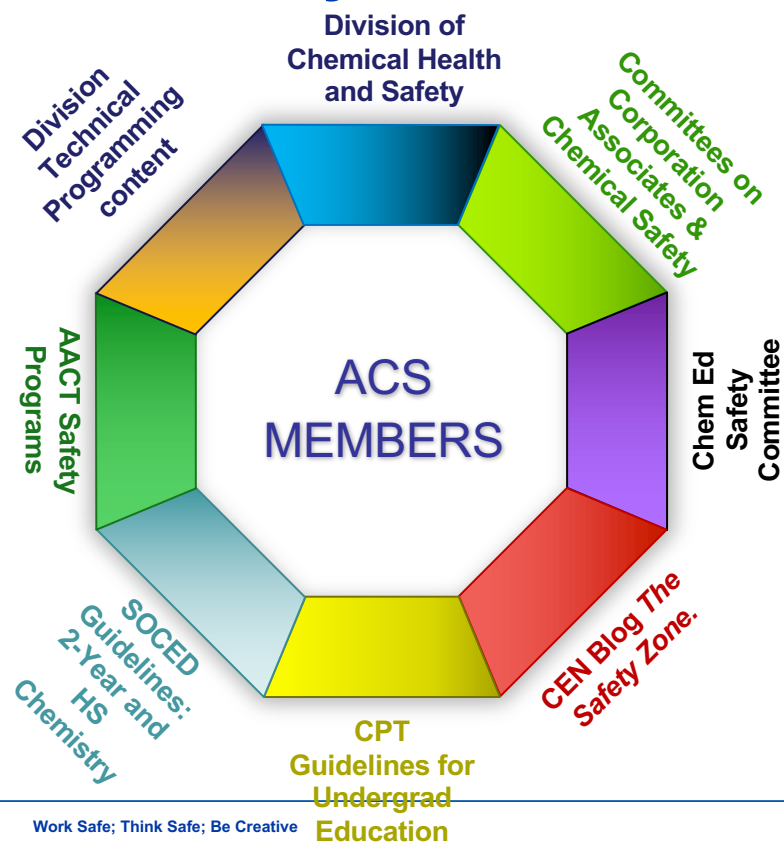
Chemical Safety within ACS



ACS CORE VALUES

- Passion for chemistry and the global chemistry enterprise in the broadest sense
- Focus on members
- Professionalism
- Diversity and inclusion
- **Safety and Ethics**

Chemical Safety within ACS



Chemical Safety within ACS



- **How did this evolve?**
 - In 1976 Howard Fawcett and Ernest Becker petitioned the ACS Council for CHAS to be formed as a Division
 - Howard Fawcett was Chairman of the ACS Committee on Chemical Safety
 - Ernest Becker was an ACS member and an exemplar in the practice of chemical safety
 - In 1979, the Division Activities Committee prepared a recommendation AGAINST forming a full Division of Chemical Health & Safety

Chemical Safety within ACS



- **How did this evolve?**
 - **Glen Seaborg, Gardner Stacy**, President of the ACS, **Warren Falconer**, Chairman of the Science Commission intervened.
 - ACS Council overrode DAC recommendation and overwhelmingly approved full division status for CHAS
 - **CHAS** grew to about 2000 members. The toxicology group split off in 1996, reducing the CHAS membership to about 1400
 - Little interest within ACS on changing the status quo until 2008-2009.

Chemical Safety within ACS



- **Recent actions within ACS**

- *A Guide to Implementing a SAFETY CULTURE in our Universities* [published in 2016]
 - American Public Landgrant Universities w/ ACS and others
- ACS Board includes SAFETY as a Core ACS Value[Completed in 2016]
- Inclusion by authors in ACS publications of safety data re: links,etc .
- ACS implements safety performance as part of ACS Fellows nominations (2016)

Chemical Safety within ACS



- Impact on the Chemistry Enterprise
 - Resources
 - www.acs.org/safety
 - *Guidelines for Chemical Laboratory Safety in Academic Institutions*
 - Safety Culture Task Force of the ACS Committee on Chemical Safety
 - www.dchas.org
 - [Journal of Chemical Health and Safety](#)
 - **For more information: secretary@dchas.org**



Chemical Safety within ACS



- Impact on the Chemistry Enterprise
- Short Term
 - Safety has same value as data integrity
 - Ethics has not addressed safety
 - Mandatory inclusion of safety information in ACS publications, as appropriate
 - Details still not developed
 - All ACS members expected to recognize all Mission-Vision-Values of the Society
 - Messaging under-developed

Chemical Safety within ACS



- **Impact on the Chemistry Enterprise**
 - **Technical Divisions**
 - Organize a division safety committee
 - Include safety as appropriate in technical presentations
 - Co-sponsor sessions with CHAS & CCS
 - Organize programming to help meet ACS publications mandate
 - **Society Committees**
 - Committee on Corporation Associates
 - Safety Subcommittee
 - Committees must develop safety subcommittees as appropriate

Chemical Safety within ACS



- **Impact on the Chemistry Enterprise**
 - **Chemical & Engineering News**
 - Expand news coverage of safety activity within ACS
 - Encourage wider participation with *The Safety Zone*
 - Continue evaluating photographs for safety violations
 - Molecule of the week & Safety (GHS)



Chemical Safety within ACS



- Molecule of the Week

- (-)- α -Santonin**

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| GHS classification: acute toxicity, oral, category 4 |
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| H302—Harmful if swallowed |
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| GHS classification: acute toxicity, dermal and inhalation, category 2 |
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| H310/H330—Fatal in contact with skin or if inhaled |
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|---|
| GHS classification: skin irritation, category 2 |
|---|

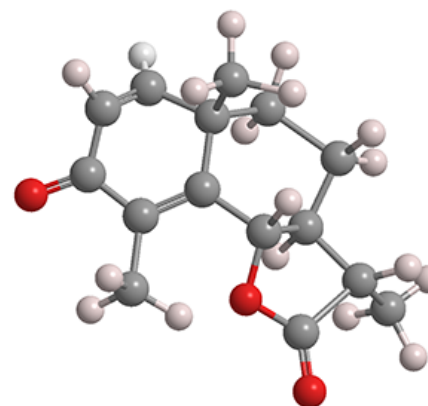
| |
|-----------------------------|
| H315—Causes skin irritation |
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| GHS classification: eye irritation, category 2A |
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| H319—Causes serious eye irritation |
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| GHS classification: specific target organ toxicity—single exposure, category 3, respiratory system |
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| H335—May cause respiratory irritation |
|---------------------------------------|



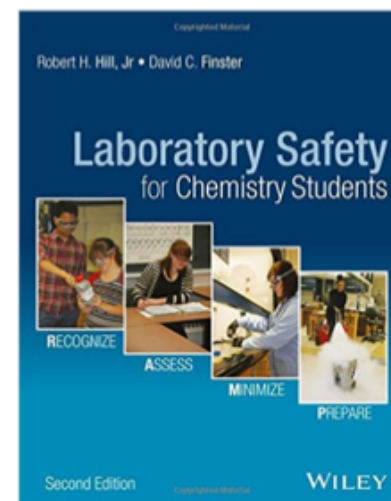
Chemical Safety within ACS



- **Impact on the Chemistry Enterprise**
 - **Undergraduate Education**
 - Include chemical safety in the curriculum

Four Principles of Safety

- **Recognize** hazards
- **Assess** the risks of hazards
- **Minimize** the risks of hazards
- **Prepare** for emergencies
 - **Adopt ACS Course in Chemical Safety**



Chemical Safety within ACS



- **Impact on the Chemistry Enterprise**
 - **Graduate Education**
 - Safety focus in every research group
 - Include risk assessments in experimental protocol development
 - Department safety focus
 - Safety moment in all seminars
 - **Emphasize safety as integral to research and productivity**

Chemical Safety within ACS



- Impact on the Chemistry Enterprise
 - 2-Year and High School Chemistry
 - Increase awareness of “safe teaching methods” among science teachers
 - “Large fireball' injures students in chemistry experiment gone wrong
 - Four students were sent to the hospital. There were no hazardous materials involved.”
 - 22 November 2017, NY



Chemical Safety within ACS



- **Impact on the Chemistry Enterprise**
 - **American Association of Chemistry Teachers AACT**
 - Increase membership
 - Increase outreach and support to teachers aimed at “safe teaching methods”



Chemical Safety within ACS



- **Canadian Society for Chemistry**
 - **Strategic Plan 2016 No mention of safety**
- **European Chemical Sciences**
 - **Safety related statements; no mention of safety in high-level policy**
- **Sociedade Brasileira de Quimica**
 - **No mention of safety in high-level policy**
- **Sociedad Quimica de Mexico, A.C.**
 - **No mention of safety in high-level policy**

Chemical Safety within ACS



- Data from CHAS Incident Database

| ABCChem Member | Entries | Lab Incidents |
|----------------|---------|---------------|
| Brazil | 12 | 1 |
| Canada | 415 | 51 |
| Europe | 16 | 0 |
| Mexico | 16 | 0 |
| USA | 9939 | 1069 |

Data for individual EU countries not included
Brazil & Mexico known to be under-reported

Chemical Safety within ACS



- **Few Reported Incidents**

- Fire crews were forced to evacuate Western University's Spencer Engineering Building after a small fire broke out in a laboratory classroom.
- A worker and supervisor at Canada's world-renowned disease lab in Winnipeg had virtually no safety training before the employee was infected with one of the diseases he handled, says a damning investigation into the incident.
- The Goiânia accident was a radioactive contamination accident that occurred on September 13, 1987, at Goiânia, in the Brazilian state of Goiás, after an old radiotherapy source was stolen from an abandoned hospital site in the city. It was subsequently handled by many people, resulting in four deaths.

Chemical Safety within ACS



- **Few Reported Incidents**
 - Italian researchers are trying to unravel a frightening mystery: How did a **European laboratory** worker become infected with human immunodeficiency virus (HIV) from a non-infectious strain? ... Adding to the mystery, the **laboratory** worker also said that no **laboratory accidents** had occurred.
 - France had Lab Entries with 2 fatalities. Upon examination:
 - From the New York Times Magazine this week, a terrific piece about Curie lab technician Marguerite Perey and sacrifice in the name of science: [My great-great-aunt discovered Francium. And It Killed Her.](#)

Chemical Safety within ACS



- **Impact on the Chemistry Enterprise**
 - **ABCChem Member Societies**
 - Raise safety to the level established by ACS
 - Create a formal home for safety within the society
 - Partner with ACS/safety and CHAS
 - **ABCChem Society Members**
 - Integrate safety into chemistry practice
 - Include a “safety moment” in meetings and seminars

Chemical Safety within ACS



- **Workshop on Chemical Safety within ACS**
- 1. Formulate future ACS strategy to demonstrate the Society's leadership in advancing a culture of safety.
- 2. Engage ACS stakeholders and external experts in the chemical safety conversation to promote an ethos of safety.
- 3. Identify, connect, and coordinate current ACS efforts and expertise in the area of chemical safety, particularly as it applies to safety culture in academic laboratories.
- 4. Identify tools, opportunities, and partnerships that ACS can leverage to support safety cultures.

Chemical Safety within ACS



- Conclusion
 - Chemists have professional duties to ensure maximum possible risk reduction
 - Our professional societies must provide leadership
 - Work safe, think safe, be safe
- And finally ...