

# *REPORT OF STRATEGIC GOAL 1*

And Innovative Project Grant

ACS National Meeting, Philadelphia, August 2016

- Summary and timeline
  - Survey questions in draft
- IPG Funding
- Focus Groups
  - Recruitment Handout
  - Paper handout with Demographic Questions
  - Scenario Questions
  - Focus Group Facilitation

# Chemical Safety Risk Assessment Education, Training & Information Survey Instrument

Sponsors: ACS CHAS/CINF/CHED/CCS

## Survey Team:

Ellen Sweet, Leah McEwen, Ralph Stuart, Sherry Xian

Acknowledgements: ACS CCS SAP, Robin Izzo, Cornell SRI, Sherry Xian, Stephanie Slate, Jodi Wesemann

## Mission/ Goals

Preamble:

"Goal is to facilitate your graduation, teaching, research, and promotion, marketability and life-long skills for improving science."

Our goals:

- Identify gaps in chemical and lab safety knowledge and information
  - use for education and training development
  - where /how to find resources, information
- Characterize baseline lab work and information practices
  - target opportunities for integrating safety awareness
- Inform ACS programs on chemical safety (technical divisions, committees, ACS offices)
  - What information and how to deliver to audiences (external and internal)
- Future use of survey instrument, to monitor trends, by other interested groups
  - Flexibility to pick and choose different topic areas and types of questions

## Audience

Teaching roles in academia

- K-12 teachers (may need a separate survey, may need to separate 9-12 from K-8)
- Undergrad teachers
- Grad TAs
- PI's
- Lab group safety reps

## Timeline/Logistics

May 2016

- ACS Safety Advisory Panel brainstorm

## August 2016

- Focus groups recruitment in Philly at CHAS/CCS booth. Undergrad students, student teachers (CHED - booth?). Need 14-16 total to be divided into 2 groups.
- Dave Finster- give us specific contacts from BCCE Organizing Committee about recruiting participants in focus groups in the case that we do not get enough to commit at Philly.
- NSTA
- AACT

## September

- Focus groups
- Finalize questions

## October 2016

- Survey open

## January 2017

- Preliminary report/presentation

## March 2017

- Final Report - ACS Spring 2017 in San Fran
- Follow up
- SAP meeting
- ACS Fall 2017 in DC - follow up programming

## User contacts:

- CPT list
- CHED member (~400)

## Topics

What do we want to learn from the survey?

- What do they think are the gaps in your learning experience with regards to chemical safety?
- How do you incorporate chemical safety into their own teaching/mentoring?
- How important do you consider the emergency equipment?
- What tools do/would you use for conducting a risk assessment?
- How do you search, evaluate and use information in research planning?
- How do you search, evaluate and use information for risk assessment?
- What is their comfort level in reading SDS'?
- What is their awareness of hazards?
- What is their awareness of risk management?
- What is their personal experience with their own safety?

Use scenarios to frame/group questions

- Different audiences
- Different levels of complexity of the hazard and scenario
- More clearly dig into safety factors in specific contexts
- Present unfamiliar but plausible situations
- Avoid assumptions about what is considered hazardous and risky

## Questions

### 1- Demographics

- a. Institutional type and size, types of degrees, research dollars, special professional school. Are they a member of the Assoc. of Academic Health Centers (AACT)?
- b. How many hours during the week they spend in the lab?
- c. Status: teachers, faculty, student, researcher, TA
- d. Do you supervise people? Responsible for the safety of others in the lab? How many people?
- e. Gender?

### 2- Science & safety background

- a. Science background
- b. Safety training or specialized procedure training
- c. Current type of science, lab work, equipment
- d. Have you personally been injured in the lab (Y/N, 1+)
- e. How often do they do risk assessment? (may be a regional question, may be difficult for research/teaching lab)
- f. Are you being supervised for safety? Does the lab supervisor check on this?
- g. Do they work alone in the lab?
- h. Are they aware of:
  - i. Engineering controls?
  - ii. Institutional expectation around safety?
  - iii. Stakeholder roles?
- i. Do you think your lab is a safe place?
- j. What is your role in your organization viz. safety?
- k. Do you make decisions about using chemicals in various lab procedures? (e.g. students)

### 3- Information practices

- a. What is general information research process for their lab related work? [see Leah's info brainstorm]
  - i. Needs - what info
  - ii. Searching - where (for which types- synthesis, procedures, property data)
    1. How do you evaluate the validity and relevance of the data you find to your work, including safety information?
  - iii. Research planning
    1. Do you develop your procedures generally from one reference or several sources?
    2. How closely do you follow previously published procedures when you develop your experimental plan?
  - iv. Own data management
    1. Electronic lab notebooks?
  - v. Publication, presentation
- b. What is their comfort level in reading SDS's?
  - i. Have they had training?
  - ii. Do they use them on a regular basis?
  - iii. Do they have a preference for manufacturer?

- iv. Have they had challenges working SDS or GHS?
  - v. Do they know what the acronym "GHS" stands for?
  - c. **When searching for information on hazardous chemicals? On hazardous procedures?**
    - i. what information do you think you need?
    - ii. what types of chemical related information do you look for?
    - iii. Where do you think it would be?
    - iv. Do you look in the literature on how to use a chemical?
  - d. What kind of resources/help do you ask for from the safety officer or other EHS rep
- 4- Hazard recognition**
- a. Explain your understanding of chemical hazards
  - b. What are the chemical safety basics? [multiple choice]
  - c. Are you aware of:
    - i. combination of conditions (factors for) a fire? (Fire triangle, storage incompatibility)
    - ii. Materials have hazards that are physical, health, environmental?
  - d. When you are working with chemicals and you see a hazard symbol on the label, such as corrosivity, what do you need to do?
  - e. [scenarios from non-ideal setups, what hazards would you identify?]
- 5- Risk assessment**
- a. When using an SDS, what specific information do you need?
    - i. Why are you using an SDS to find this information, as opposed to another type of resource?
    - ii. What kind of information or data are you specifically looking for?
    - iii. If the SDS does not contain the information you need, what do you do? Do you refer to another resource and, if so, what is that resource?
  - b. What tools do/would you use for conducting a risk assessment? What would the ideal tools look like?
  - c. Do you use an data gathering template or tool to help you organize chemical, physical and health hazard information
  - d. scenario question- you're planning on using a chemical they've never worked with before, doing a process you've never done.
    - i. What resources would you use (web, books, people)?
    - ii. You don't have the necessary safety equipment to conduct this experiment, what do you do?
    - iii. You've been told there isn't enough funding to purchase the equipment, what do you do?
    - iv. Describe a spill, what do they do?
    - v. They see someone working unsafely, what do they do?...  
This person is your supervisor, now answer the previous question.
- 6- Control measures** [may vary some by location, regional regulations, local policies, etc.]
- a. What is your understanding of controlling exposure?
    - i. Dermal
    - ii. Inhalation
  - b. After hazard identification and researching information, what do you do next for:
    - i. Controlling risk during work?
    - ii. Controlling risk during transport and transfer of hazardous materials?

- c. How do you define transport of chemicals during lab work?
  - i. Moving from storage
  - ii. Bench to bench
  - iii. Opening and pouring/pipetting
- d. How do you protect yourself from exposure, based on X scenario?
- e. Who chooses what types of gloves you use and what is the rationale given?
- f. Select all the engineering controls from below...
  - i. Fume hood
  - ii. Biosafety cabinet
  - iii. Respirator
  - iv. SOP
  - v. All of the above
- g. Consider an SOP you use in your lab, does it mention (if you don't use a lab SOP, think about lab class procedures):
  - i. The hazards associated with the chemicals that will be used
  - ii. Cleaning apparatus
  - iii. How to handle experimental waste products
  - iv. Where in the lab to conduct the experiment

#### 7- Emergency response

- a. How important do you consider the emergency equipment? (ranking scale?)
  - i. Do you know where it is in your lab?
  - ii. Have you had training
  - iii. Do you have experience with responding to an emergency in your lab?
- b. How comfortable are you in X emergency situation?
- c. Have you had or known of any experiences with research equipment failure? (multiple choice types of equipment - hotplates, centrifuges, gas cylinders)

#### 8- Safety training needs

- a. What do you think are the gaps in your learning experience with regards to chemical safety?
- b. How do you incorporate chemical safety into your own teaching/mentoring?
- c. How do you teach procedures in the lab that incorporate safety information?
- d. How do you speak to the hazards of substances and processes to learners?



Ellen Sweet  
 Laboratory Ventilation Specialist  
 Department of Environmental Health and Safety  
 Cornell University  
 315-730-8896

August 15, 2016

Dear Ellen:

Below please find a summary of our cost estimates for your proposed survey of American Chemistry Society. In preparing these estimates we have had to make a number of assumptions that are summarized below:

**Scope of work:** We will facilitate **two** focus groups at Cornell with less than 10 participants at each focus group and the focus groups will last no more than 1.5 hours each. We will be responsible for facilitating the focus groups and transcribing the recordings.

We will have responsibility for working with you to develop and test a questionnaire to be administered based on these focus group sessions. We will then program your instrument for web administration. We will send an invitation email to the targeted sample that will include a password embedded URL link to the survey and up to three reminder emails to non-respondents. At the end of each data collection phase we will deliver a clean data file and codebook as well as a summary of the survey responses. We have also included an estimate to provide a final summary of the results over the data collection points.

**The sample:** We will assume that you will provide us with the list that include respondents' name and email address.

**Survey instrument:** We will assume that we will work with you to develop a questionnaire that will be used for data collection. We will assume the questionnaire will average no more than 20 minutes or have no more than 120 items (or data points) with minimal routing and/or validation requirements.

**Timing of research:** We will work with you on the timing of this study.

**Breakdown of costs by task:** Below is a breakdown of the costs by task:

Baseline & 3 follow-up surveys	Charge /hour	Estimated Hours	Cost Estimate
Overall project administration	\$80	2	\$160
Two focus groups	\$80	6	\$480
Transcription of focus groups	\$28	18	\$504
Questionnaire development/testing	\$80	20	\$1,600
Programming/testing instrument for web	\$80	28	\$2,240
Sample setup/invitation and reminder emails	\$80	3	\$240
Deliveries of data file and codebook	\$80	6	\$480
Statistical analysis and report	\$80	46	\$3680
<b>Total</b>		<b>129</b>	<b>\$9,384</b>

This estimate is valid for 6 months from the date of this letter or until the end of the fiscal year (whichever comes first). We have tried to break the costs down for you as best as we can. These figures may need to be revised as more information about the project becomes available. Should unexpected problems and/or changes cause costs to be higher than anticipated, we will work with you to develop solutions. Similarly, should costs be lower than estimated, you will be billed only for that work completed. We will, of course, keep you informed as to the status of our budget as the project progresses and adjust the scope of work as needed.

If you have any questions, please feel free to call me (607/255-0148). We hope we may have the opportunity to work for you.

Sincerely,

A handwritten signature in black ink, appearing to read "Sherry Xian". The signature is fluid and cursive, with the first name "Sherry" and the last name "Xian" clearly distinguishable.

Sherry Xian



Division of Chemical Health and Safety

## ***Opportunity to participate! Receive a \$10 e-gift card for Starbucks!***

Divisions of Chemical Health & Safety (CHAS) and Chemical Information (CINF) are conducting 2 focus groups to discuss **chemical safety** in the laboratory. These will occur in September 2016 via webinar and will take less than 2 hours of your time.

Our goal is to identify gaps in your understanding of how to find and assess chemical hazards and how what we need to do to fill these gaps. This helps to facilitate your safe graduation, safe teaching and research, advancement in your career, marketability and life-long skills for improving science. This study is intended for undergraduate and graduate students.

**Facilitator:** We are working with The Cornell Survey Research Institute (SRI) to study our understanding on current practices and challenges in chemical and lab safety and information use for lab instructors and students.

**Facilitator Background:** The Survey Research Institute (SRI) is a full-service survey research facility at [Cornell University](#). SRI began its operations in August, 1996 as a result of a need for state-of-the-art survey services for Cornell researchers. The primary mission of SRI is to conduct surveys and provide survey research services to Cornell University faculty, students, and administration, federal, state, and local government agencies, other nonprofit organizations, and other organizations in need of survey research work. SRI is committed to offering state-of-the-art technology to its clientele, striving for the highest possible quality in performance while maintaining the highest possible ethical standards of conduct.

Webinar Dates: TBD

Instructors: [Sept, TBD]

Please let us know if you are interested!

ACS Division Contacts: Ellen Sweet, [ems325@Cornell.edu](mailto:ems325@Cornell.edu)  
Leah McEwen, [lm1@Cornell.edu](mailto:lm1@Cornell.edu)



**Cornell University**  
Survey Research Institute



Division of Chemical Health and Safety

Sponsored by the American Chemical Society Committee on Chemical Safety Advisory Panel and the Divisions of Chemical Health & Safety and Chemical Information  
*Conducted by the Cornell Survey Research Institute*

Name: \_\_\_\_\_

1. What is the type of institution where you are employed/in school?  
a. High School                      b. Small College                      c. Research University
2. What is your status  
a. Faculty  
b. HS/UG student  
c. Graduate TA  
d. Research staff  
e. Other (please indicate) \_\_\_\_\_
3. How many hours do you spend each week working in a lab? \_\_\_\_\_ (# hours)
4. Do you work unsupervised in a lab at any time? **Y / N**
5. Do you teach or supervise people in a lab? **Y / N**
6. How many people's safety are you responsible for in a lab setting? \_\_\_\_\_ (# people)
7. On a scale of 1-5, where 1 is not at all familiar and 5 is extremely familiar, how familiar would you say you are with the following lab safety measures?  
\_\_\_\_\_ Institutional expectations around safety  
\_\_\_\_\_ Laboratory ventilation  
\_\_\_\_\_ Hazardous waste handling  
\_\_\_\_\_ Emergency contacts
8. Consider a standard protocol or procedure you use in your lab now. Does it include hazards associated with the following processes? (*Circle all that apply*)  
a. Cleaning apparatus  
b. How to handle experimental waste products

- c. Where in the lab to conduct the experiment
9. Select what engineering controls are available in your lab from the list below. (*Circle all that apply*)
- a. Fume hood
  - b. Biosafety cabinet
  - c. Respirator
  - d. SOP (Standard Operating Procedure)
  - e. All of the above
10. Have you had or known of any experiences with failure of the following research equipment? (*Circle all that apply*)
- a. Hotplates
  - b. Centrifuges
  - c. Gas cylinders
  - d. Other (write-in)

# **Chemical Safety Survey Project (ACS CHAS/CINF/CHED)**

Focus Group Facilitation Guide

[Plan for 90 minute session, 6-8 participants]

**General Goal:** to facilitate your graduation, teaching, research, promotion, marketability and life-long skills for improving science.

## **Supplies:**

1. List of participants attending (sign in sheet)
2. Digital recorders
3. Pre-focus group paper surveys (or emails)
4. Focus group guide

## **Introduction (5-10 minutes)**

Welcome. We would like to thank you for taking the time to participate in today's discussion. We are conducting this survey on behalf of the American Chemical Society Divisions of Chemical Health & Safety and Chemical Information. The purpose is to improve our understanding on current chemical and lab safety practices and information use.

Before we start the discussion, there are a few things I need to cover:

This session is being tape recorded. We are recording the session because we want to make certain that we get all of your comments. All of your comments will be confidential. No names of individuals will be revealed in the summary of the information collected during the session or in any reports developed for the study.

**Turn on tape recorder now.**

This focus group will take about an hour and a half. Your participation in the discussion is voluntary, meaning that you are free to choose not to participate or to leave at any time. **Mention** incentive if one is being offered...

Before we begin, let's take just a few minutes to introduce ourselves to one another.

*[Moderator should introduce him/herself]*

**Please tell us your first name and what your role is in your institution as well as if you have a specific safety role. If you are willing to share, please also tell us if you have personally been injured or witnessed a safety incident in a lab.**

## **Ground Rules (3 minutes)**

Just a few ground rules before we start:

- We would like to hear from each of you throughout the discussion. However, each person does not have to answer every question.
- There are several topic areas we need to cover today. So, we must keep the discussion moving and may need to interrupt someone who is talking. Please don't be offended by this. We want to be sure that we have time for each topic.

- Remember, there are no right or wrong answers. We are interested in each of your thoughts and opinions. It is okay that your opinions may be different from others in the group.
- Please speak one at a time, speak slowly and loudly, and just give us your first name before you speak. (This is because we will be transcribing this session.)

If there are no questions, let's get started.

### **Focus Group Discussion (80 minutes)**

**“I'm going to read you a scenario and I want you to think about this scenario when you answer the rest of the questions throughout the focus group.”**

#### **Scenario (2 minutes):**

You are about to conduct a chemical experiment that involves chemicals you have never worked with before. You will need to write up a standard protocol for these lab procedures. You may need to share this procedure with others in the lab who may also not be familiar with them.

Did everyone understand the scenario? Does everyone know what a 'standard protocol' is?

#### **Questions:**

1. For research planning, do you follow formal procedures or methods when you develop your experimental plan, and/or do you develop your own procedures based on published research?
  - a. Probe: Where do you search for information and what types of information do you search for - (for example, where do you look for synthesis information, procedures, property data, safety and health information)
  - b. Probe: How do you evaluate the validity and relevance of the data that you find, including safety information?
2. When searching for information specifically on hazardous chemicals and hazardous procedures, what types of information do you think you need?
  - a. Probe: Where do you go for this information?
  - b. Probe: If you use an SDS (safety data sheet from the company, formerly MSDS) and it does not contain the information you need, what do you? Do you refer to another resource and, if so, what is that resource?
3. What kind of chemical hazards would you look for in designing your procedure?
  - a. Probe: what are potential conditions (factors) for a fire? (for example, are you aware of the fire triangle, storage incompatibilities, chemical incompatibilities, concentrations, experimental parameters)

- b. Probe: what is your awareness of the types of physical, health, environmental hazards? (are you aware of the GHS classifications)
- 4. How do you determine the risk of the chemicals and procedures you are working with?
  - a. Probe: When you write up your standard protocols and assess risk, do you use a template to help you organize chemical, physical and health hazard information
  - b. Probe: What planning tool would you use to help with risk assessment? What would the ideal tool look like?
- 5. When you have identified hazards associated with the chemicals you are using, how do you reduce the risk of exposure?
  - a. Probe: What is your understanding of how to control inhalation exposure?
  - b. Probe: What do you do to control risk while moving and transferring chemicals?
- 6. What emergency equipment would be needed to respond to the hazards associated with the chemicals you are using that should be included in the protocol?
  - a. Probe: If you are working with students, how do you prepare them to respond to emergencies?
  - b. Probe: Have you ever had to use emergency equipment in a lab?
- 7. What do you think are the gaps in your learning experience with regards to chemical safety?
  - a. Probe (lab audience): How do you teach procedures in the lab that incorporate safety information?
  - b. Probe (K-12 teachers): How do you speak to the hazards of substances and processes to young learners (K-12)?
  - c.