Attachment 11

Report of Strategic Goal 1: Educational Programming Team

March 2016

Submitted by Ellen Sweet

The team worked with Leah McEwen of the CINF division to conduct 2 surveys in the fall of 2015. For the members of CHAS the intent was to gage interest in topics, venues, delivery formats and costs of training and education that CHAS could offer. These surveys went to 2 different audiences; those who develop and deliver training and education about chemical health and safety and those who receive it. These went out via Survey Monkey to the UCLA Lab Safety Center, the chair of the CHED Safety Committee, CCS, the CHAS listserv, Corporate Associates, and AACT for distribution.

See attached summaries

Responses to the trainer/educator survey totaled 116

Responses to the trainee survey totaled 645

The ACS Committee on Professional Training was also asked to assist in distributing these. They provided, for a one time use, the list of email contacts for all of the ACS certified chemistry programs in the country. However, due to the large numbers of responses we had received already the team chose to not distribute to this group at this time.

Due to the large numbers of responses we engaged the services of the Cornell Survey Research Institute, CISER, to do the statistical analysis and create reports.

See attached

Further analysis of these surveys would allow us to focus on specific responses and be more strategic in the educational offerings the Goal 1 team is looking to develop. So, we have submitted an Innovative Project Grant application to pay for additional services from CISER to assist with this. There were 2 support letters sent with the application and can be accessed from the application.

See attached

In addition, the team is working members of CCS to submit a grant application to the UCLA Lab Safety Institute to work with CISER in development of a survey of undergraduate chemistry safety education practices.

Next Steps for the Educational Programming Team:

1-2: Develop an educational course plan

Strategy 1-2:

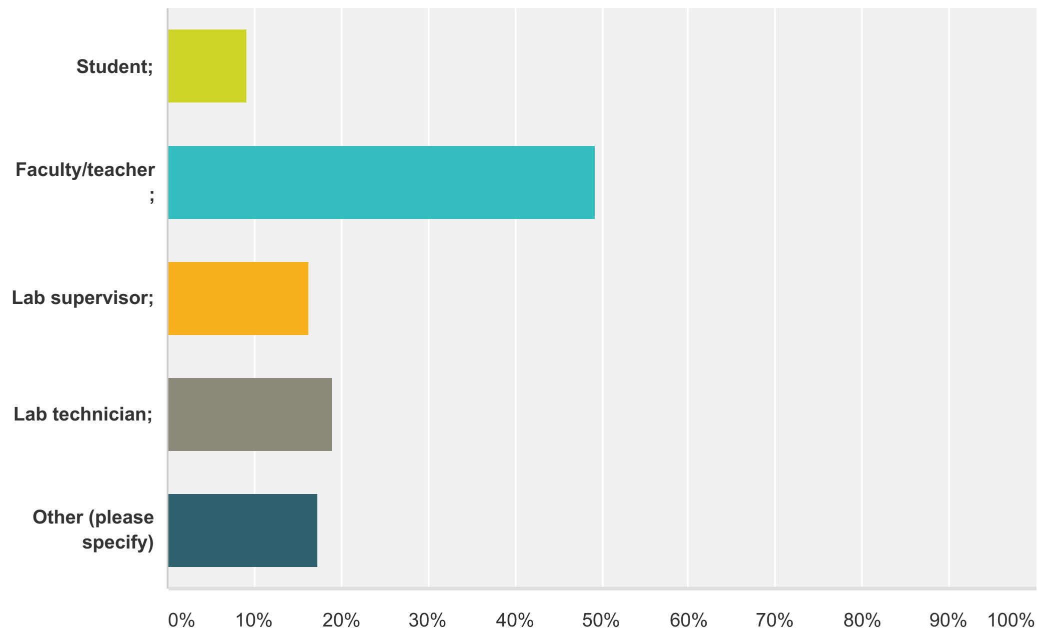
The EPT will develop an educational course plan by May 2016.

[Impact, High; Resources, Medium]

CHAMPION: Kimi Bush

Q1 What role do you play in the laboratory you work in?

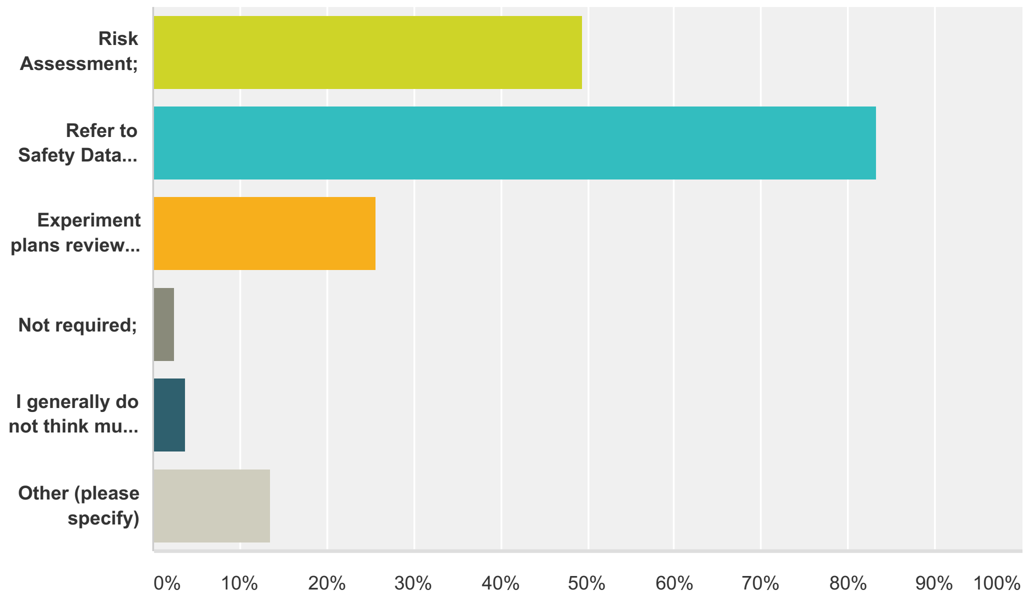
Answered: 582 Skipped: 0



Answer Choices	Responses	
Student;	**9.11%**	53
Faculty/teacher;	**49.31%**	287
Lab supervisor;	**16.32%**	95
Lab technician;	**18.90%**	110
Other (please specify)	**17.35%**	101
Total Respondents: 582		

Q2 When you plan your experiments, how are you considering the health and physical hazards of the compounds you are using or creating?

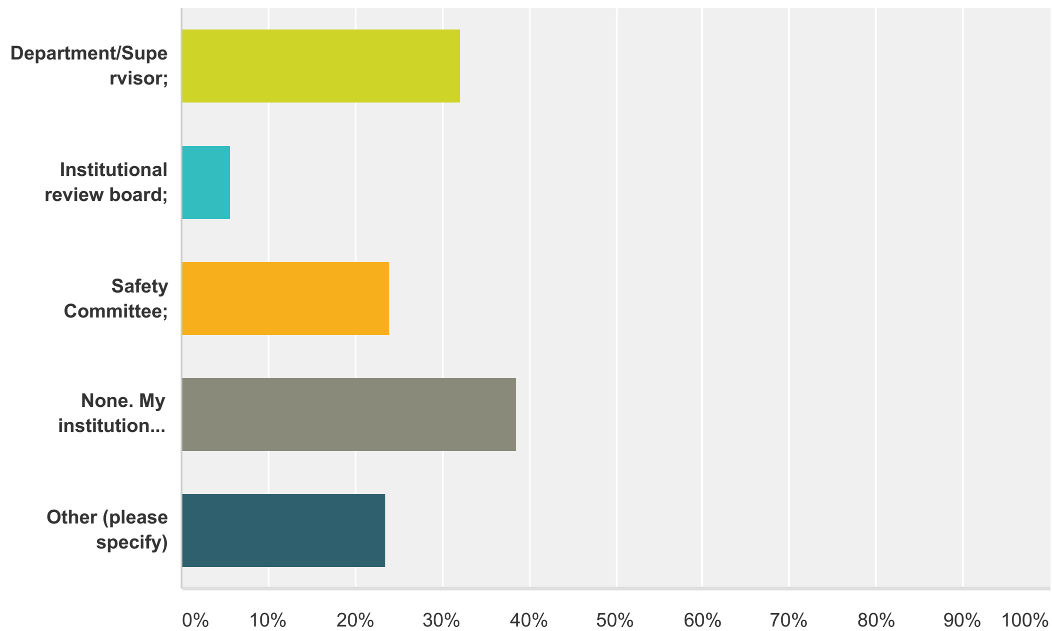
Answered: 579 Skipped: 3



Answer Choices	Responses	
Risk Assessment;	**49.40%**	286
Refer to Safety Data Sheet (SDS) and/or Standard Operating Procedure;	**83.25%**	482
Experiment plans reviewed by Principal Investigator;	**25.73%**	149
Not required;	**2.42%**	14
I generally do not think much about this.	**3.80%**	22
Other (please specify)	**13.47%**	78
Total Respondents: 579		

Q3 What approvals do you have to meet before you use your experimental plan?

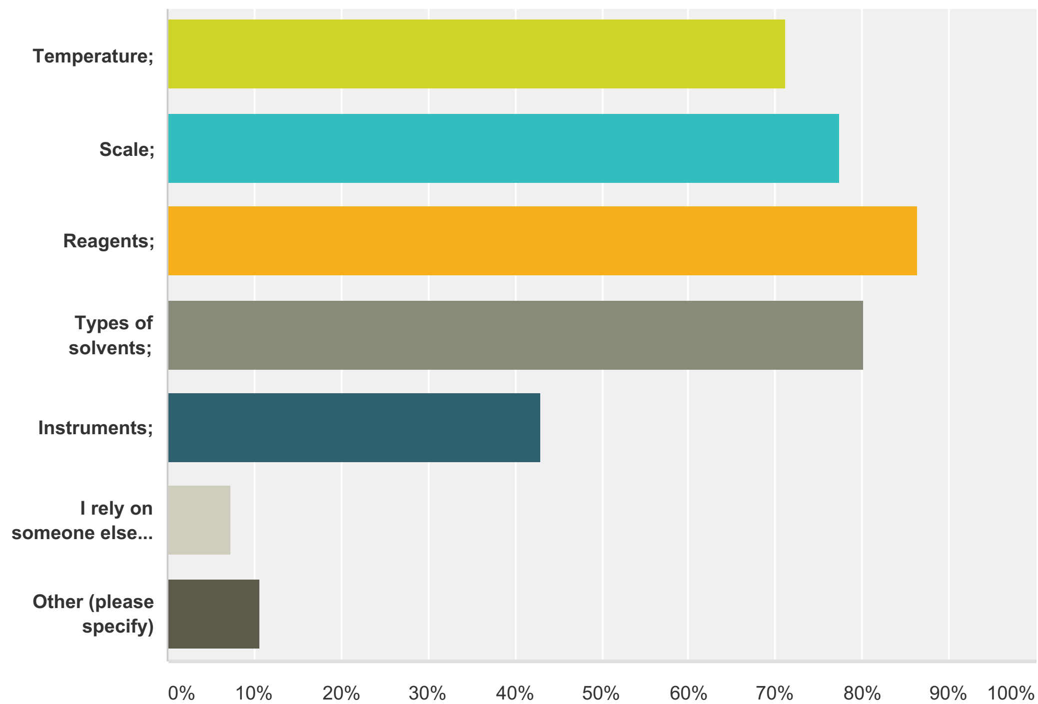
Answered: 577 Skipped: 5



Answer Choices	Responses	
Department/Supervisor;	**32.24%**	186
Institutional review board;	**5.55%**	32
Safety Committee;	**23.92%**	138
None. My institution does not require approvals to work with chemicals.	**38.65%**	223
Other (please specify)	**23.57%**	136
Total Respondents: 577		

Q4 When you are making adjustments to the experimental parameters, which variables do you consider as you contemplate how changes might impact the potential hazards?

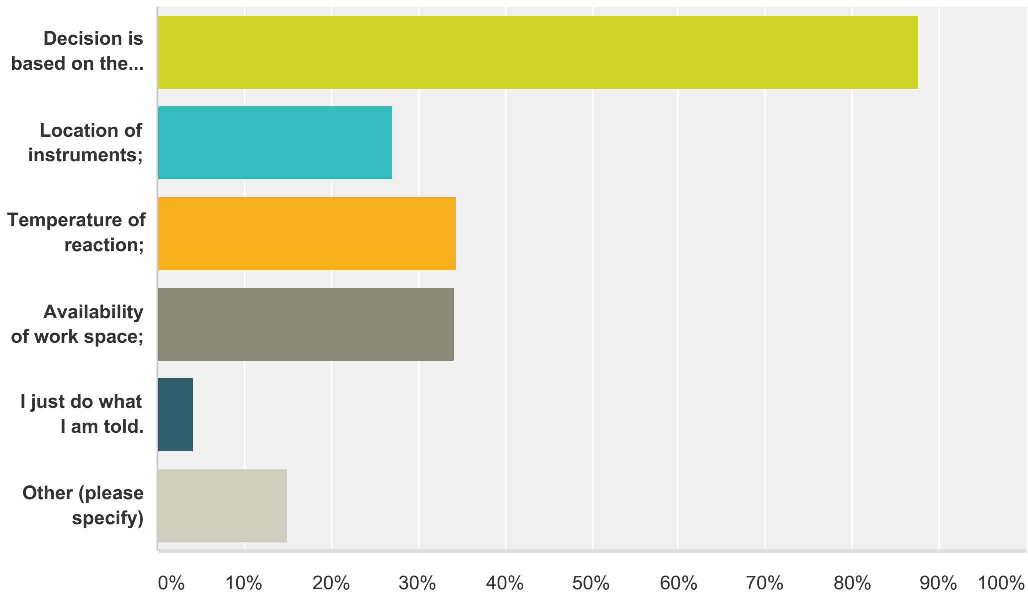
Answered: 577 Skipped: 5



Answer Choices	Responses	
Temperature;	**71.23%**	411
Scale;	**77.47%**	447
Reagents;	**86.48%**	499
Types of solvents;	**80.07%**	462
Instruments;	**42.98%**	248
I rely on someone else to consider the hazards with the chemicals I am working with.	**7.28%**	42
Other (please specify)	**10.57%**	61
Total Respondents: 577		

Q5 How do you decide where to set up an experiment in the lab (i.e. in a fume hood, glove box, or an open the bench)?

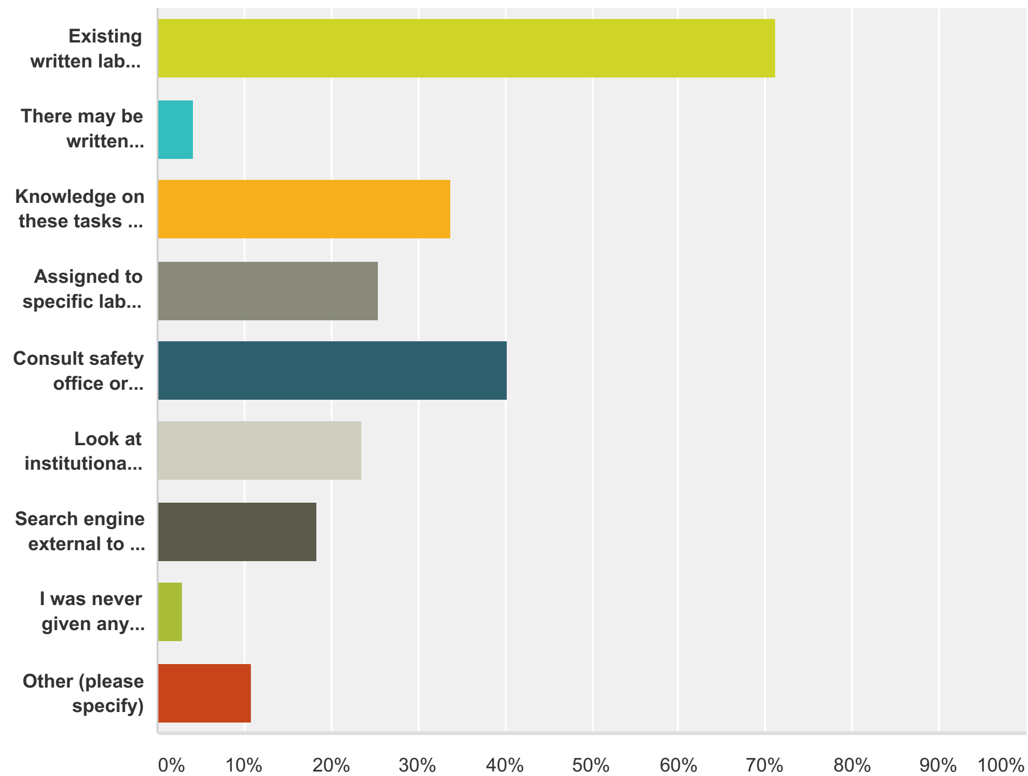
Answered: 581 Skipped: 1



Answer Choices	Responses	
Decision is based on the volatility or toxicity of the chemicals;	**87.78%**	510
Location of instruments;	**27.19%**	158
Temperature of reaction;	**34.42%**	200
Availability of work space;	**34.25%**	199
I just do what I am told.	**4.13%**	24
Other (please specify)	**14.97%**	87
Total Respondents: 581		

Q6 How do you plan for storing chemicals, cleaning apparatus and handling wastes?

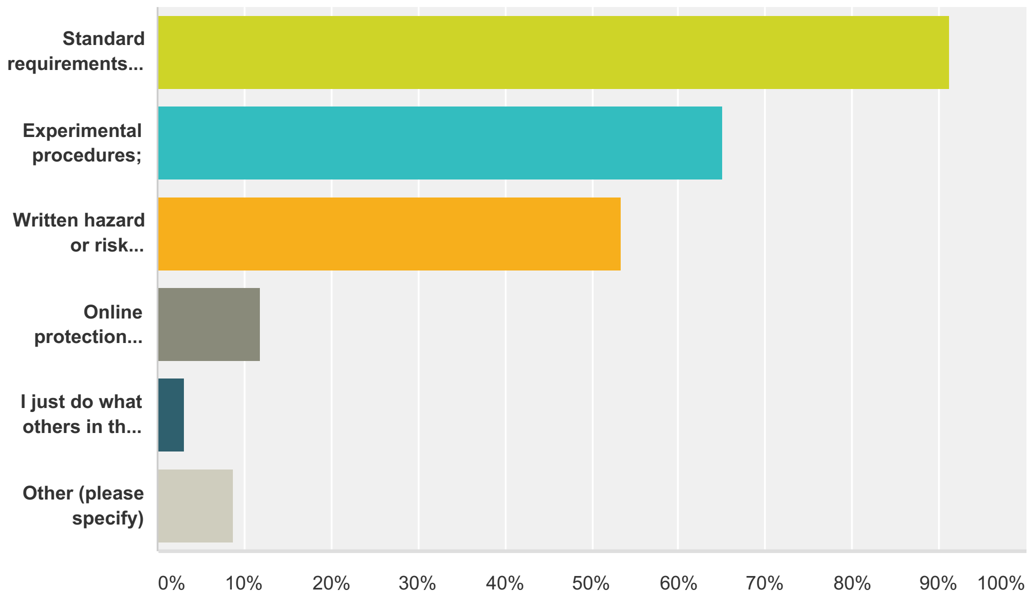
Answered: 577 Skipped: 5



Answer Choices	Responses	
Existing written lab procedures;	**71.23%**	411
There may be written procedures. But, I've never seen them.	**4.16%**	24
Knowledge on these tasks is passed down from person to person (aka- Oral Tradition).	**33.80%**	195
Assigned to specific lab personnel;	**25.48%**	147
Consult safety office or official;	**40.38%**	233
Look at institutional resources online;	**23.57%**	136
Search engine external to the institution;	**18.37%**	106
I was never given any instructions on these tasks.	**2.95%**	17
Other (please specify)	**10.92%**	63
Total Respondents: 577		

Q7 How do you choose what protection to use to prevent exposure to chemicals for yourself and co-workers?

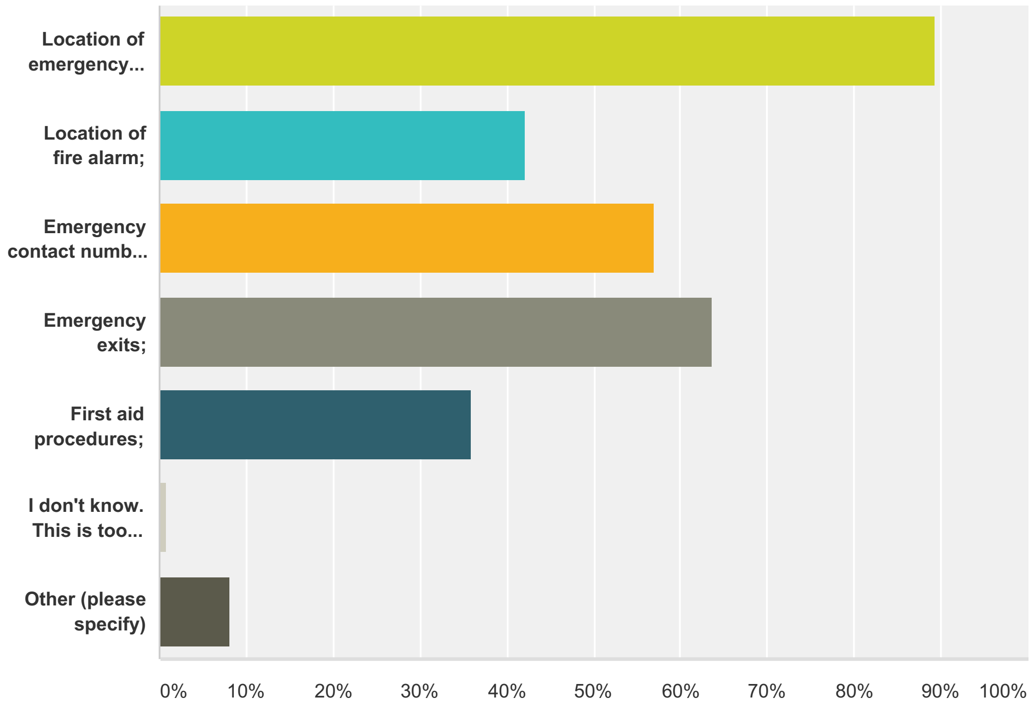
Answered: 576 Skipped: 6



Answer Choices	Responses	
Standard requirements based on training (e.g., goggles);	**91.32%**	526
Experimental procedures;	**65.10%**	375
Written hazard or risk assessment process;	**53.47%**	308
Online protection selection tool;	**11.81%**	68
I just do what others in the lab do;	**3.13%**	18
Other (please specify)	**8.68%**	50
Total Respondents: 576		

Q8 What is most important to know when there is an emergency in the lab?

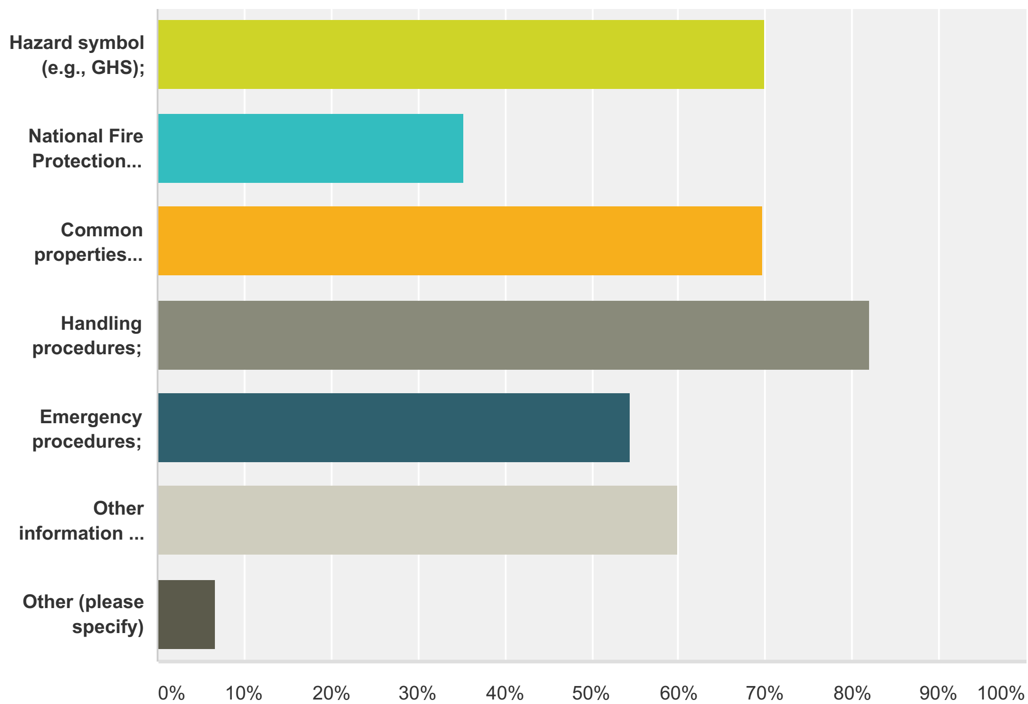
Answered: 578 Skipped: 4



Answer Choices	Responses	
Location of emergency equipment (e.g., fire extinguisher, emergency shower, emergency shut-offs, etc.);	**89.27%**	516
Location of fire alarm;	**42.21%**	244
Emergency contact numbers (whom to call and in what order);	**57.09%**	330
Emergency exits;	**63.67%**	368
First aid procedures;	**35.99%**	208
I don't know. This is too difficult to decide.	**0.87%**	5
Other (please specify)	**8.13%**	47
Total Respondents: 578		

Q9 What chemical hazard information do you need to plan and conduct your experiments safely?

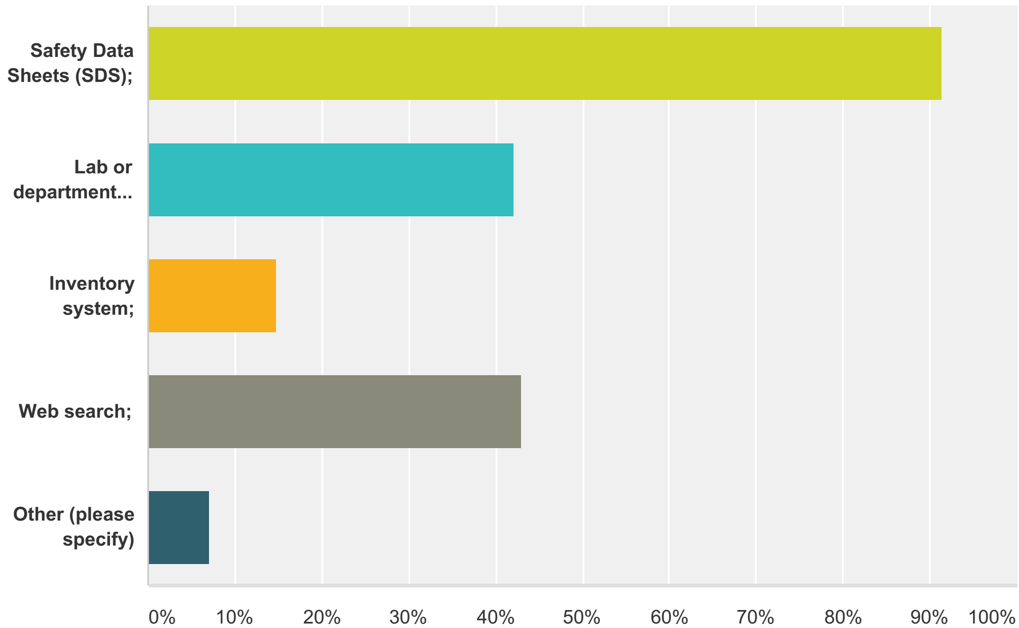
Answered: 577 Skipped: 5



Answer Choices	Responses	
Hazard symbol (e.g., GHS);	**69.84%**	403
National Fire Protection Association (NFPA) ratings;	**35.36%**	204
Common properties (e.g., flash point);	**69.67%**	402
Handling procedures;	**82.15%**	474
Emergency procedures;	**54.42%**	314
Other information on a Safety Data Sheet (SDS);	**59.97%**	346
Other (please specify)	**6.59%**	38
Total Respondents: 577		

Q10 Where do you usually find this information?

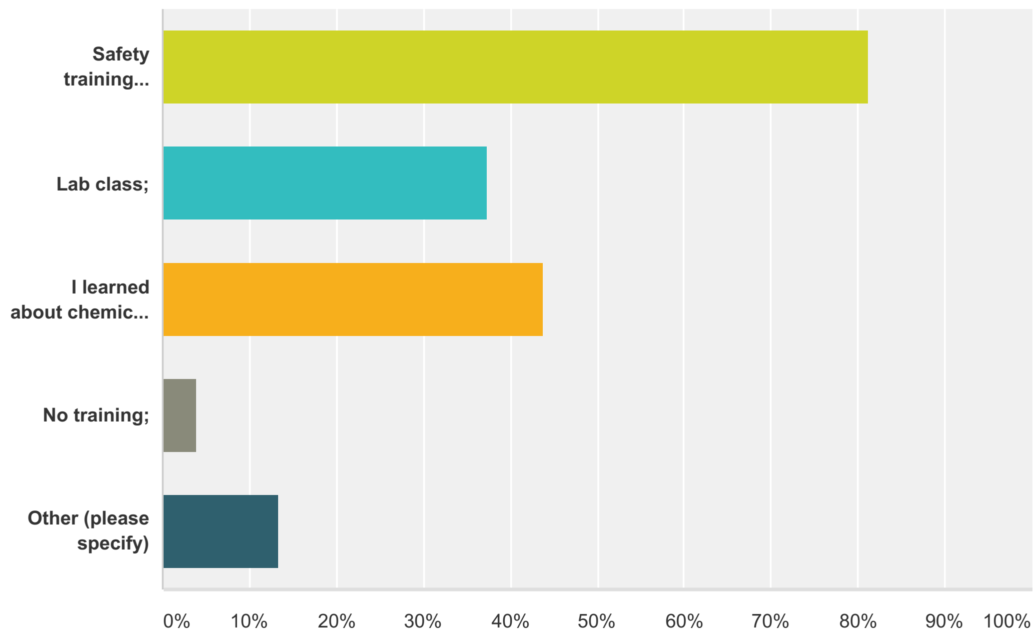
Answered: 578 Skipped: 4



Answer Choices	Responses	
Safety Data Sheets (SDS);	**91.35%**	528
Lab or department procedures;	**42.21%**	244
Inventory system;	**14.88%**	86
Web search;	**42.91%**	248
Other (please specify)	**7.09%**	41
Total Respondents: 578		

Q11 How were you taught about safety information and how to use it in your research?

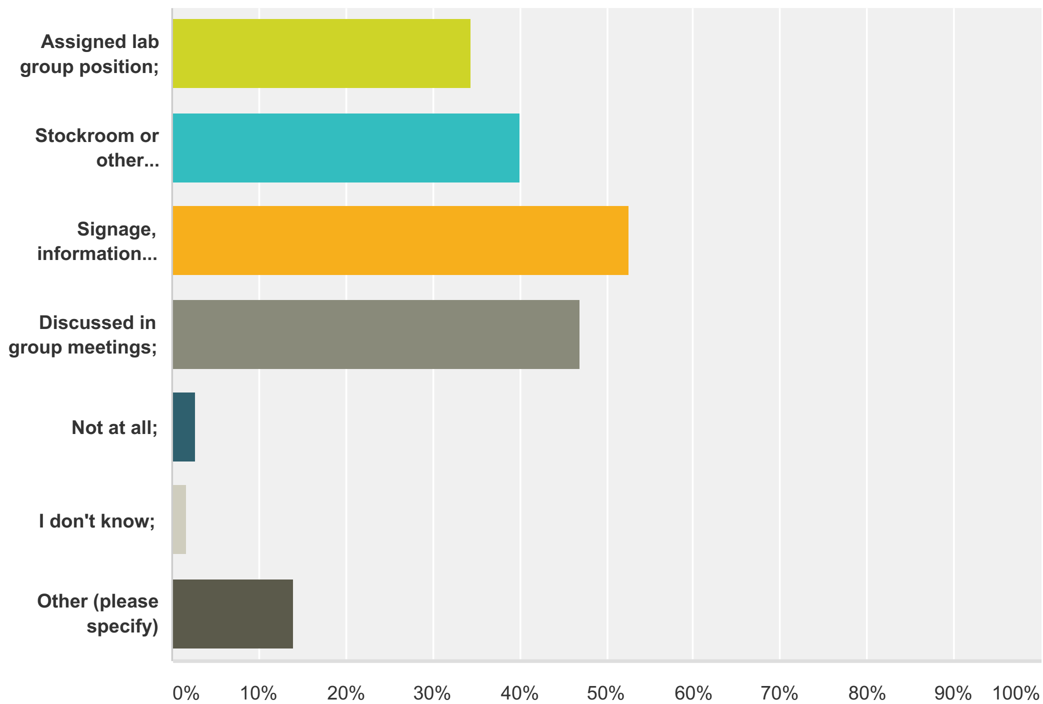
Answered: 578 Skipped: 4



Answer Choices	Responses	
Safety training (separate workshop);	**81.31%**	470
Lab class;	**37.37%**	216
I learned about chemical safety from others in the lab;	**43.94%**	254
No training;	**3.98%**	23
Other (please specify)	**13.32%**	77
Total Respondents: 578		

Q12 How is chemical hygiene and safety managed in your lab?

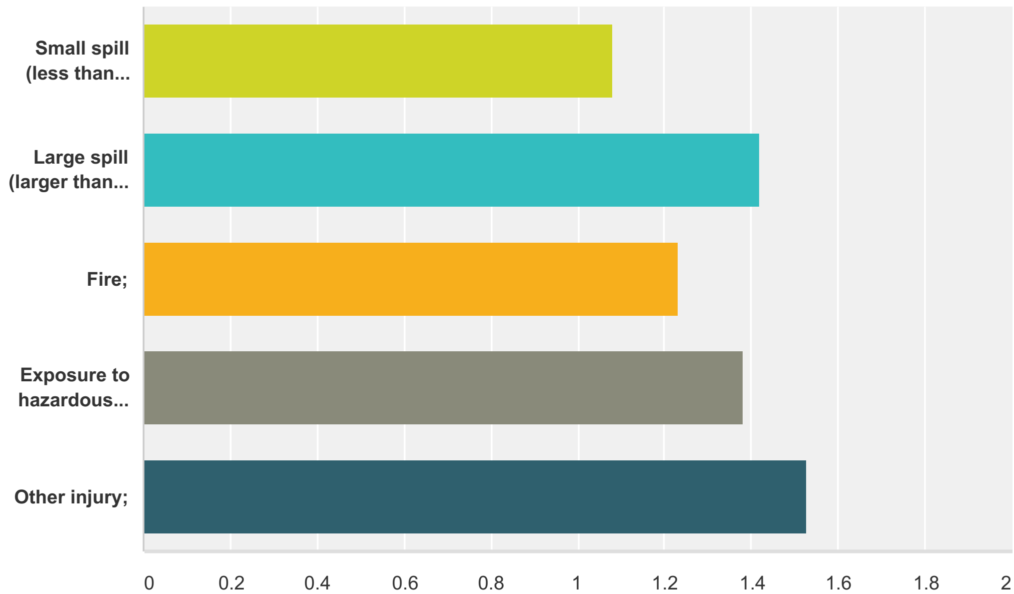
Answered: 578 Skipped: 4



Answer Choices	Responses	
Assigned lab group position;	**34.43%**	199
Stockroom or other Department function;	**40.14%**	232
Signage, information binders or other documentation system;	**52.60%**	304
Discussed in group meetings;	**46.89%**	271
Not at all;	**2.77%**	16
I don't know;	**1.73%**	10
Other (please specify)	**14.01%**	81
Total Respondents: 578		

Q13 Are you comfortable with the knowledge you have now to respond to an emergency? Yes/NoA. Small spill (less than 500ml) Y/NB. Large spill (larger than 500ml) Y/NC. Fire Y/ND. Exposure to hazardous material Y/NE. Other injury Y/N

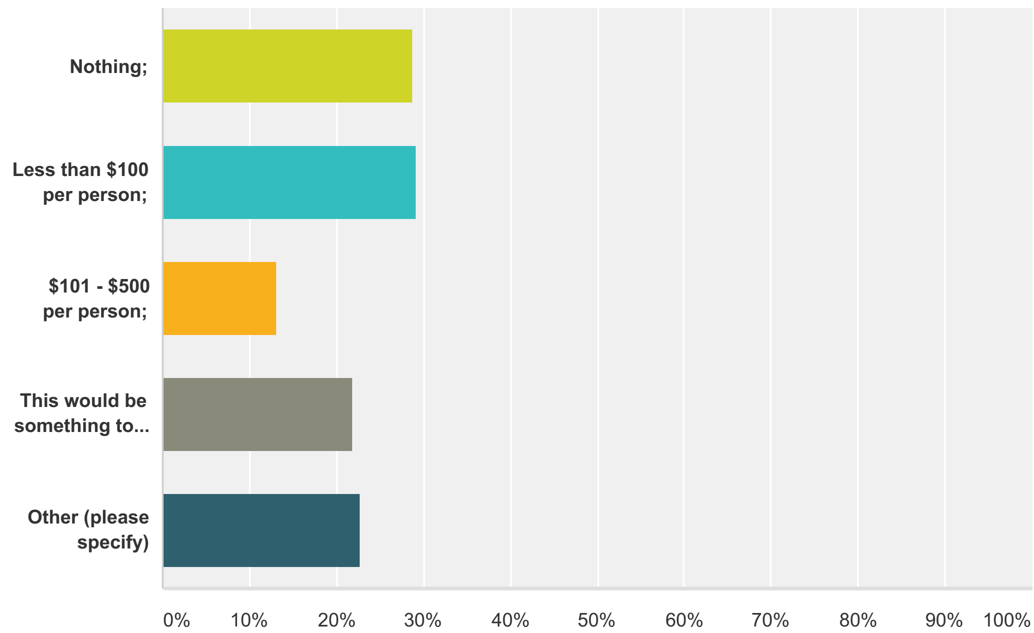
Answered: 576 Skipped: 6



	Yes	Maybe	No	(no label)	(no label)	Total	Weighted Average
Small spill (less than 500ml);	**93.74%** 539	**4.87%** 28	**1.04%** 6	**0.35%** 2	**0.00%** 0	575	1.08
Large spill (larger than 500ml);	**64.46%** 370	**29.44%** 169	**5.75%** 33	**0.35%** 2	**0.00%** 0	574	1.42
Fire;	**80.63%** 458	**16.20%** 92	**3.17%** 18	**0.00%** 0	**0.00%** 0	568	1.23
Exposure to hazardous material (eg. inhalation, skin contact);	**68.29%** 392	**25.26%** 145	**6.27%** 36	**0.17%** 1	**0.00%** 0	574	1.38
Other injury;	**54.91%** 291	**38.30%** 203	**5.85%** 31	**0.94%** 5	**0.00%** 0	530	1.53

Q14 How much are you willing to pay for a chemical health and safety workshop?

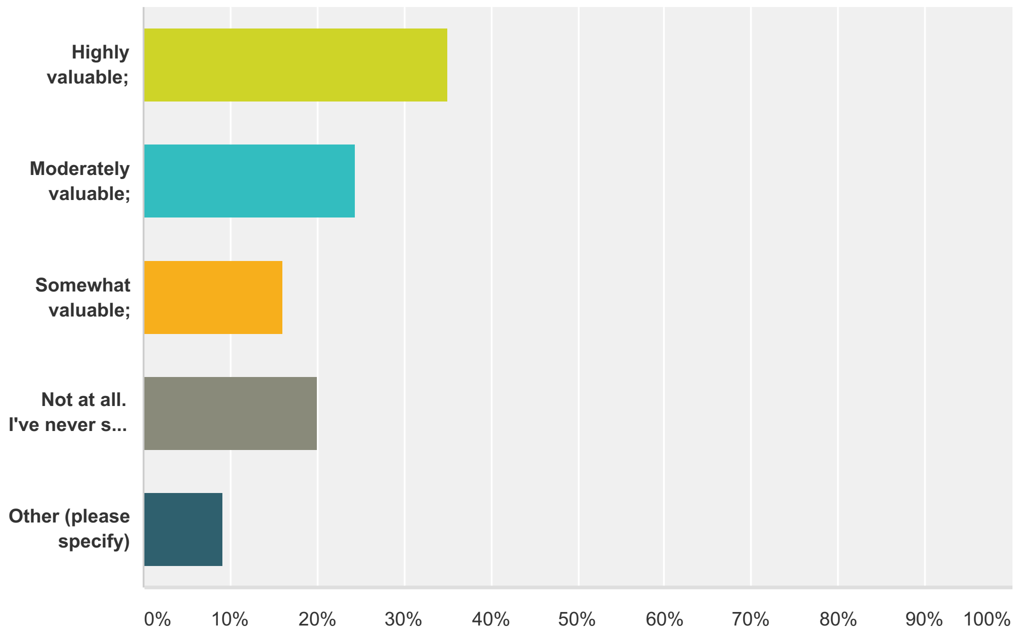
Answered: 566   Skipped: 16



Answer Choices	Responses	
Nothing;	**28.80%**	163
Less than $100 per person;	**29.15%**	165
$101 - $500 per person;	**13.07%**	74
This would be something to consider, so that my institution doesn't have to develop it's own;	**21.91%**	124
Other (please specify)	**22.79%**	129
Total Respondents: 566		

Q15 What is the value of safety/hazard information that comes from the American Chemical Society?

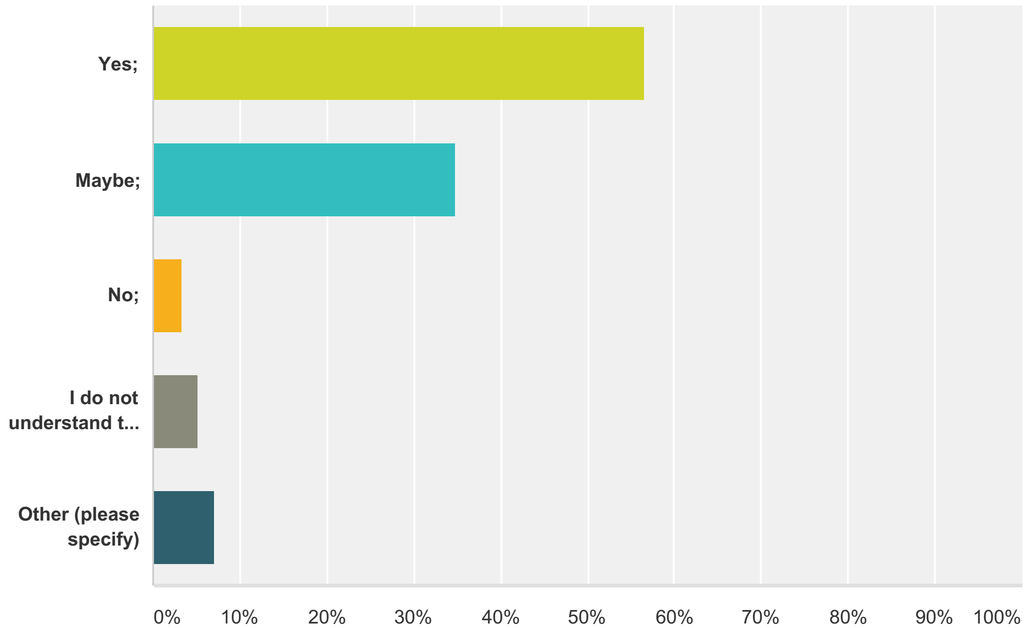
Answered: 574 Skipped: 8



Answer Choices	Responses	
Highly valuable;	**35.02%**	201
Moderately valuable;	**24.39%**	140
Somewhat valuable;	**16.03%**	92
Not at all. I've never seen chemical safety/hazard information comments or statements from the American Chemical Society.	**20.03%**	115
Other (please specify)	**9.23%**	53
Total Respondents: 574		

Q16 Is there need for a searchable "Lessons Learned" database?

Answered: 573 Skipped: 9



Answer Choices	Responses	
Yes;	**56.54%**	324
Maybe;	**34.90%**	200
No;	**3.32%**	19
I do not understand the question.	**5.24%**	30
Other (please specify)	**7.16%**	41
Total Respondents: 573		

Q17 Please provide any additional comments that would assist CHAS in the development of educational/training offerings.

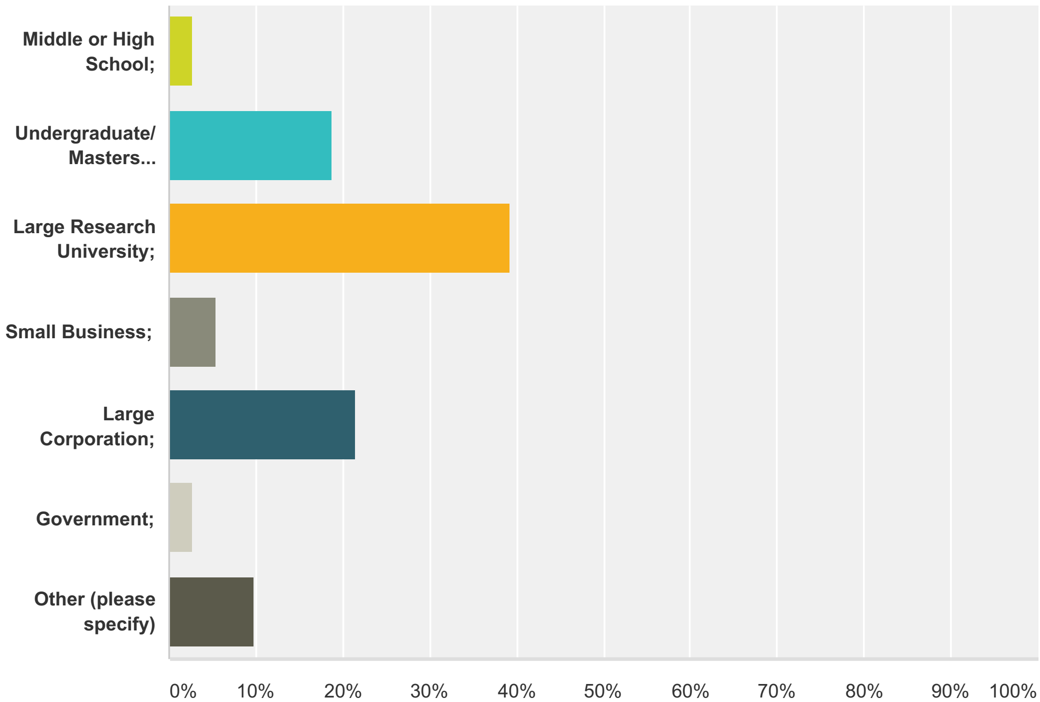
Answered: 112 Skipped: 470

Q18 What chemical health and safety issues do you feel you need more education about?

Answered: 136 Skipped: 446

Q1 What type of organization do you represent?

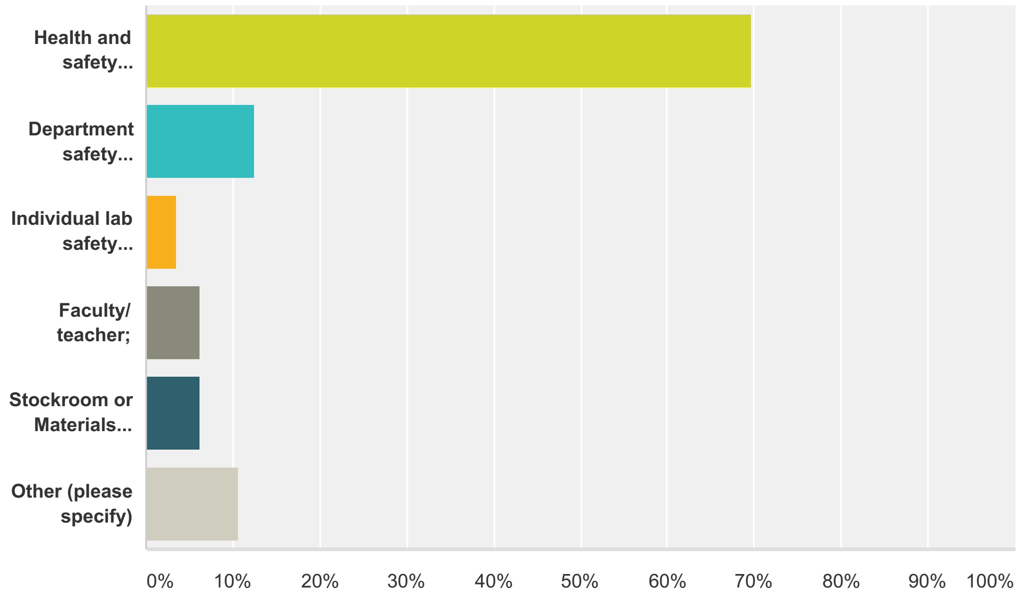
Answered: 112 Skipped: 0



Answer Choices	Responses	
Middle or High School;	**2.68%**	3
Undergraduate/ Masters Institution;	**18.75%**	21
Large Research University;	**39.29%**	44
Small Business;	**5.36%**	6
Large Corporation;	**21.43%**	24
Government;	**2.68%**	3
Other (please specify)	**9.82%**	11
Total		**112**

Q2 Please select the choice below that best describes your role.

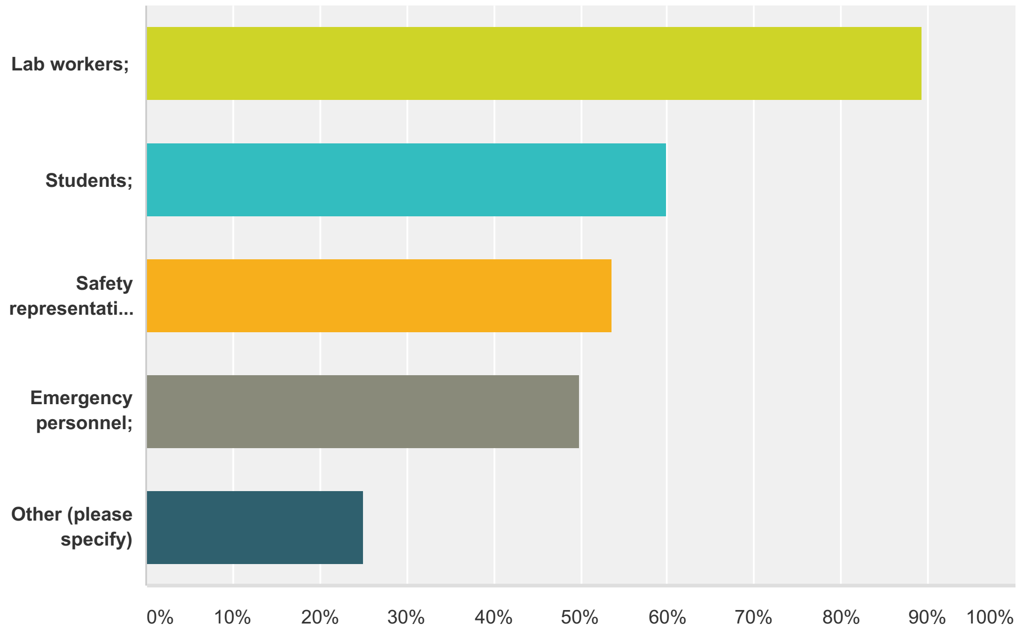
Answered: 112 Skipped: 0



Answer Choices	Responses	
Health and safety professional, EHS;	**69.64%**	78
Department safety coordinator;	**12.50%**	14
Individual lab safety representative;	**3.57%**	4
Faculty/ teacher;	**6.25%**	7
Stockroom or Materials manager;	**6.25%**	7
Other (please specify)	**10.71%**	12
Total Respondents: 112		

Q3 To whom do you communicate chemical hazard information?

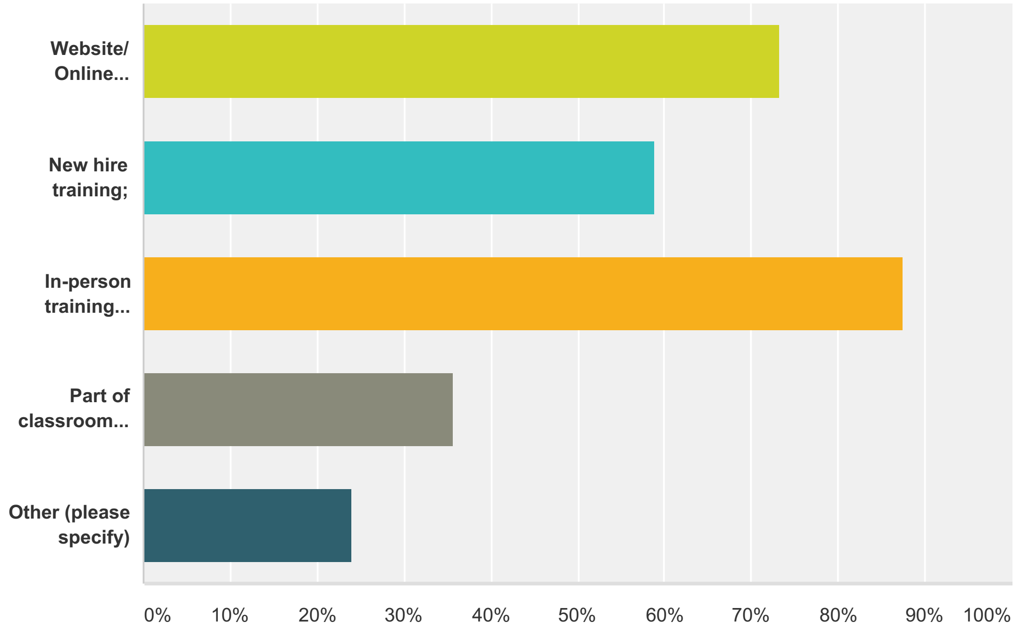
Answered: 112 Skipped: 0



Answer Choices	Responses	
Lab workers;	**89.29%**	100
Students;	**59.82%**	67
Safety representatives;	**53.57%**	60
Emergency personnel;	**50.00%**	56
Other (please specify)	**25.00%**	28
Total Respondents: 112		

Q4 What delivery methods are used to communicate these hazards?

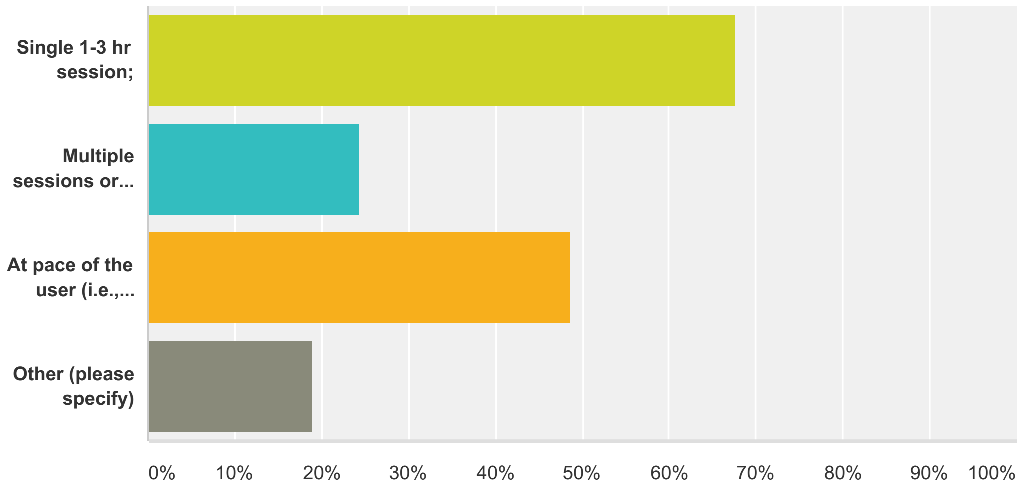
Answered: 112 Skipped: 0



Answer Choices	Responses	
Website/ Online training;	**73.21%**	82
New hire training;	**58.93%**	66
In-person training (instructor or supervisor led training);	**87.50%**	98
Part of classroom curriculum;	**35.71%**	40
Other (please specify)	**24.11%**	27
Total Respondents: 112		

Q5 How long does each communication method take?

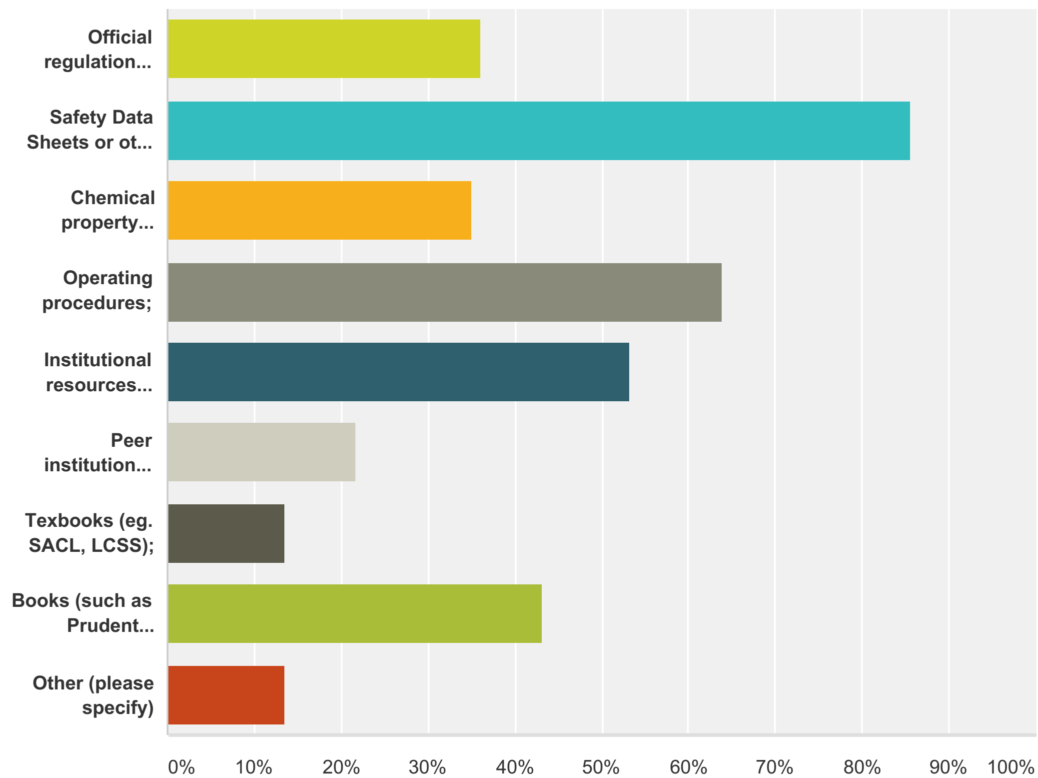
Answered: 111 Skipped: 1



Answer Choices	Responses	
Single 1-3 hr session;	**67.57%**	75
Multiple sessions or full days;	**24.32%**	27
At pace of the user (i.e., online);	**48.65%**	54
Other (please specify)	**18.92%**	21
Total Respondents: 111		

Q6 What types of resources provide the most useful chemical hazard information for those using chemicals?

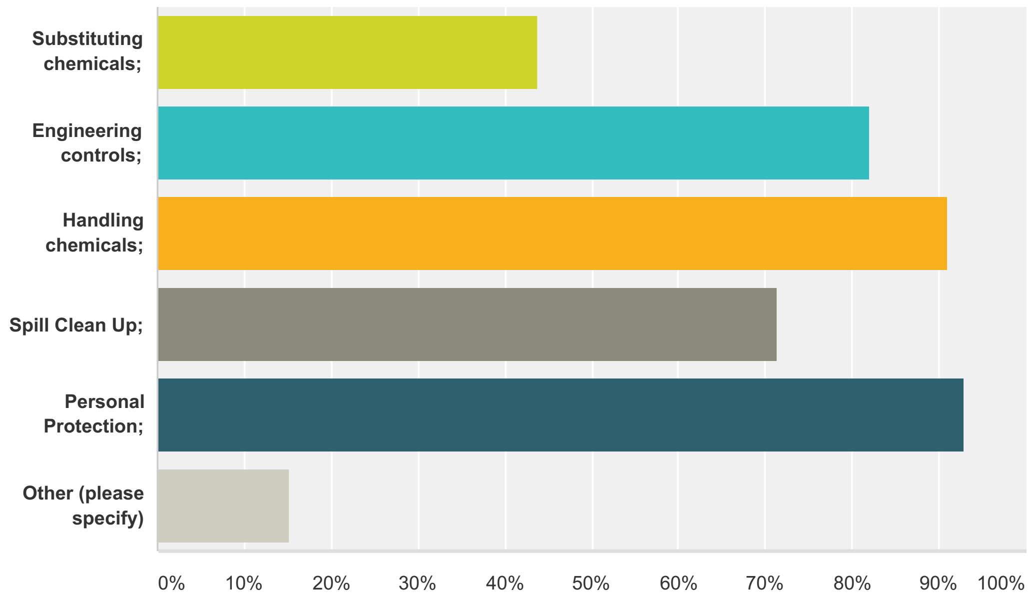
Answered: 111 Skipped: 1



Answer Choices	Responses	
Official regulation (e.g., OSHA);	**36.04%**	40
Safety Data Sheets or other hazard symbols;	**85.59%**	95
Chemical property databases;	**35.14%**	39
Operating procedures;	**63.96%**	71
Institutional resources (including faculty or staff);	**53.15%**	59
Peer institution resources;	**21.62%**	24
Texbooks (eg. SACL, LCSS);	**13.51%**	15
Books (such as Prudent Practices);	**43.24%**	48
Other (please specify)	**13.51%**	15
Total Respondents: 111		

Q7 What information do these resources provide on how to reduce risk associated with the chemicals being used (ie. engineering controls)?

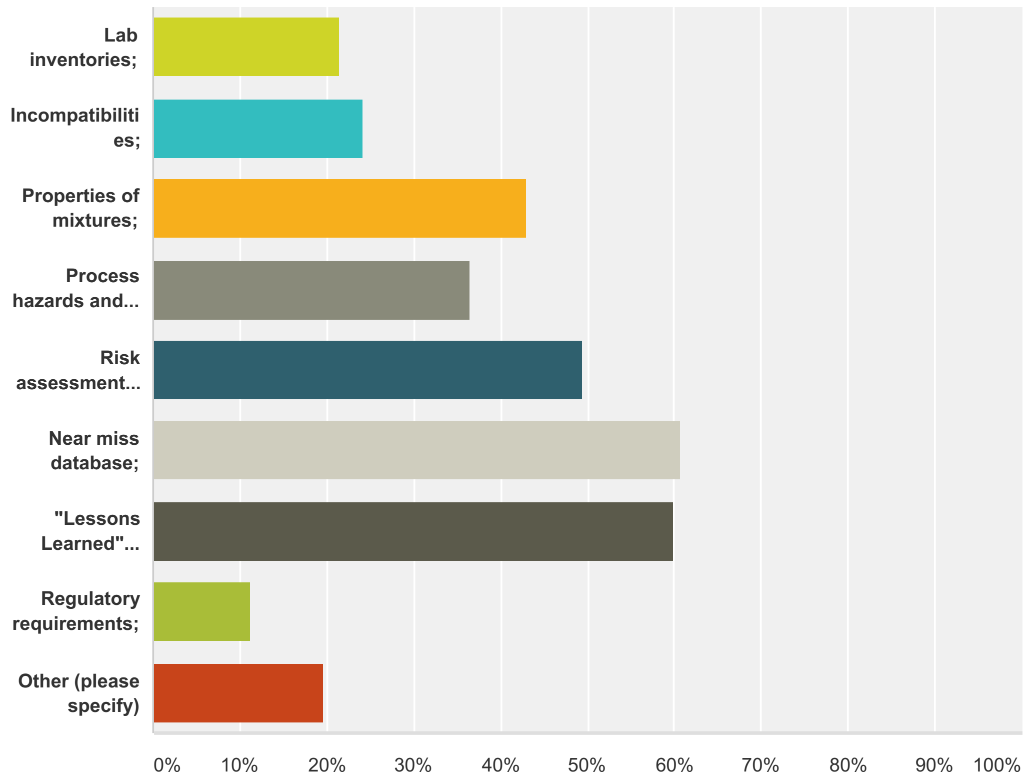
Answered: 112 Skipped: 0



Answer Choices	Responses	
Substituting chemicals;	**43.75%**	49
Engineering controls;	**82.14%**	92
Handling chemicals;	**91.07%**	102
Spill Clean Up;	**71.43%**	80
Personal Protection;	**92.86%**	104
Other (please specify)	**15.18%**	17
Total Respondents: 112		

Q8 What kind of chemical health and safety information is needed that isn't currently readily available to you?

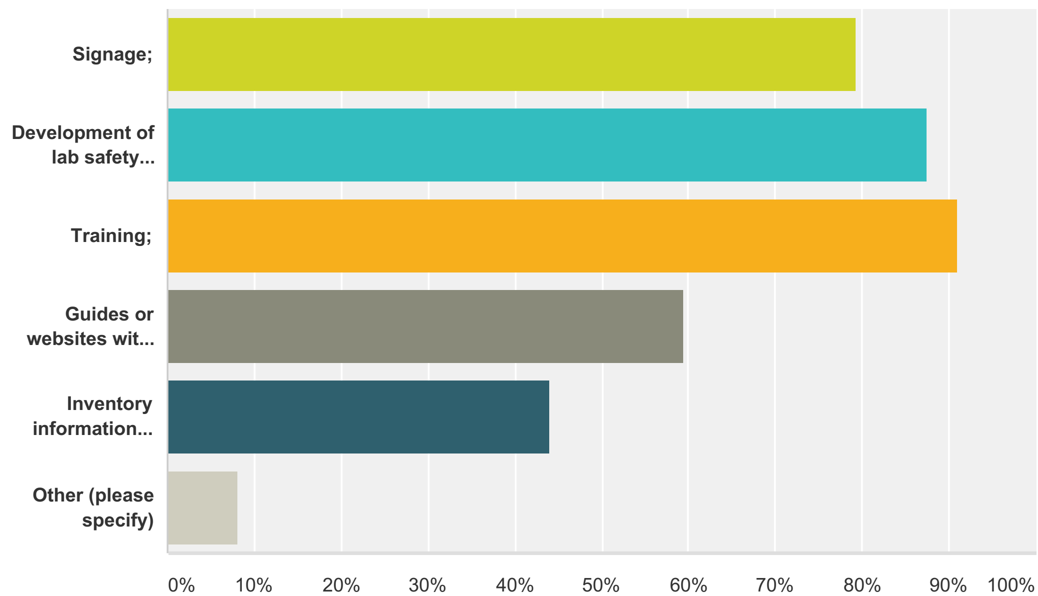
Answered: 107 Skipped: 5



Answer Choices	Responses	
Lab inventories;	**21.50%**	23
Incompatibilities;	**24.30%**	26
Properties of mixtures;	**42.99%**	46
Process hazards and safety;	**36.45%**	39
Risk assessment protocols;	**49.53%**	53
Near miss database;	**60.75%**	65
"Lessons Learned" database;	**59.81%**	64
Regulatory requirements;	**11.21%**	12
Other (please specify)	**19.63%**	21
Total Respondents: 107		

Q9 How do you use chemical hazard information to communicate hazards to those you are working with?

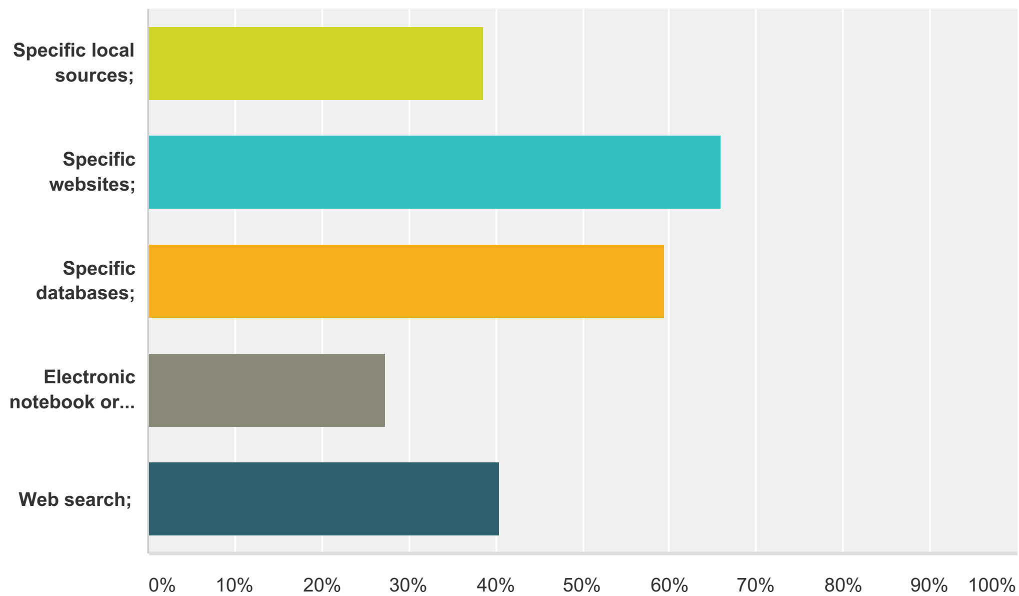
Answered: 111 Skipped: 1



Answer Choices	Responses	
Signage;	**79.28%**	88
Development of lab safety procedures;	**87.39%**	97
Training;	**90.99%**	101
Guides or websites with links, further sources, etc.	**59.46%**	66
Inventory information system;	**44.14%**	49
Other (please specify)	**8.11%**	9
Total Respondents: 111		

Q10 When you are not directly working with your constituencies, how would you prefer they find the chemical hazard information that they need? Please list any examples you have for each type below:

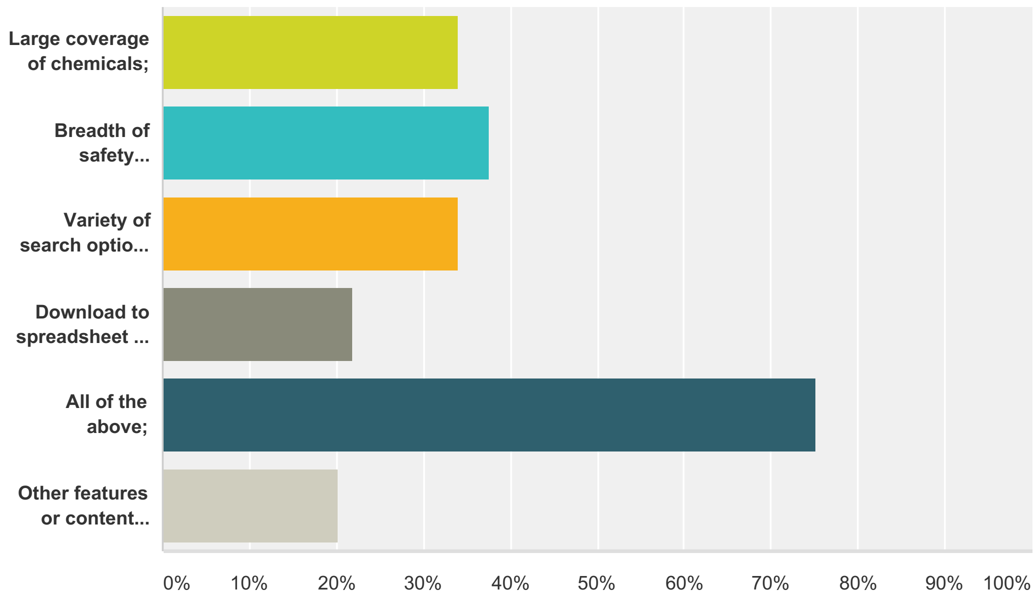
Answered: 106 Skipped: 6



Answer Choices	Responses	
Specific local sources;	**38.68%**	41
Specific websites;	**66.04%**	70
Specific databases;	**59.43%**	63
Electronic notebook or other campus information system;	**27.36%**	29
Web search;	**40.57%**	43
Total Respondents: 106		

Q11 If there was one ideal online database or website for delivering chemical safety information, what features would it have?

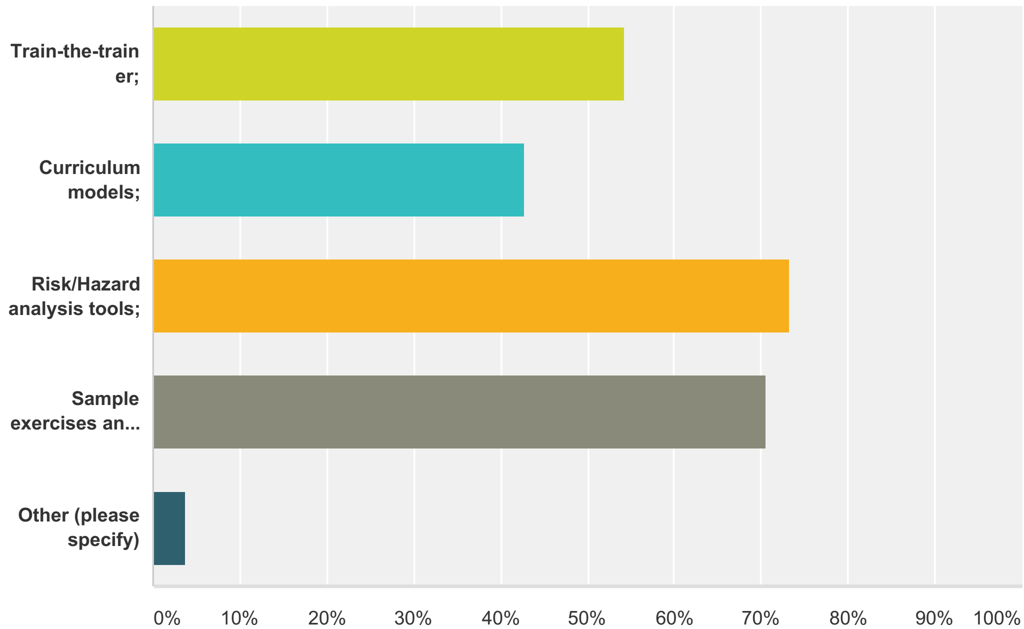
Answered: 109 Skipped: 3



Answer Choices	Responses	
Large coverage of chemicals;	**33.94%**	37
Breadth of safety information (e.g., properties, management controls, first aid, lessons learned, etc.);	**37.61%**	41
Variety of search options (e.g., name, CAS, structure, substructure);	**33.94%**	37
Download to spreadsheet or print or data file;	**22.02%**	24
All of the above;	**75.23%**	82
Other features or content (write-in response)	**20.18%**	22
Total Respondents: 109		

Q12 What delivery methods and materials (via training or incorporated into the curriculum) of chemical hazard information would expand your ability to deliver this knowledge?

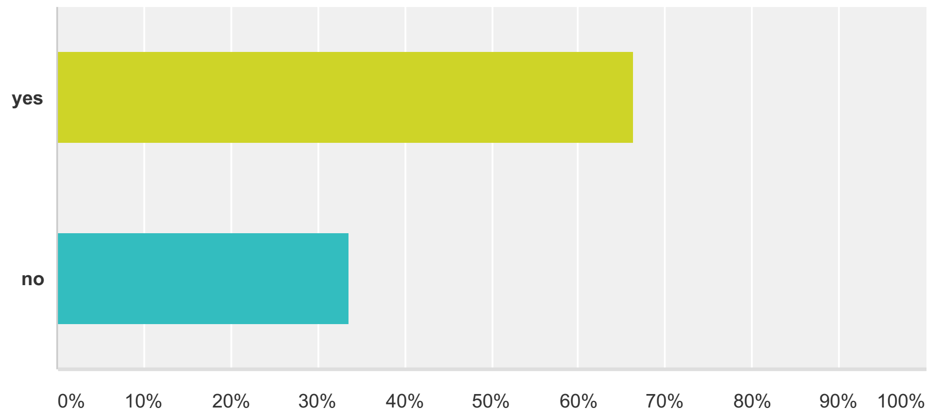
Answered: 105 Skipped: 7



Answer Choices	Responses	
Train-the-trainer;	**54.29%**	57
Curriculum models;	**42.86%**	45
Risk/Hazard analysis tools;	**73.33%**	77
Sample exercises and assessments;	**70.48%**	74
Other (please specify)	**3.81%**	4
Total Respondents: 105		

Q13 Are you aware that the American Chemical Society offers chemical health and safety outreach and training in every region of the United States?

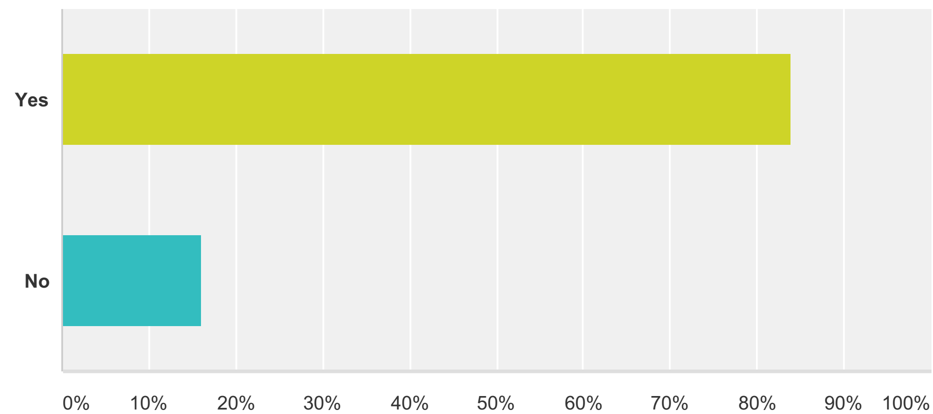
Answered: 107 Skipped: 5



Answer Choices	Responses	
yes	**66.36%**	71
no	**33.64%**	36
Total		**107**

Q14 Are you familiar with the American Chemical Society, Division of Chemical Health and Safety (CHAS)?

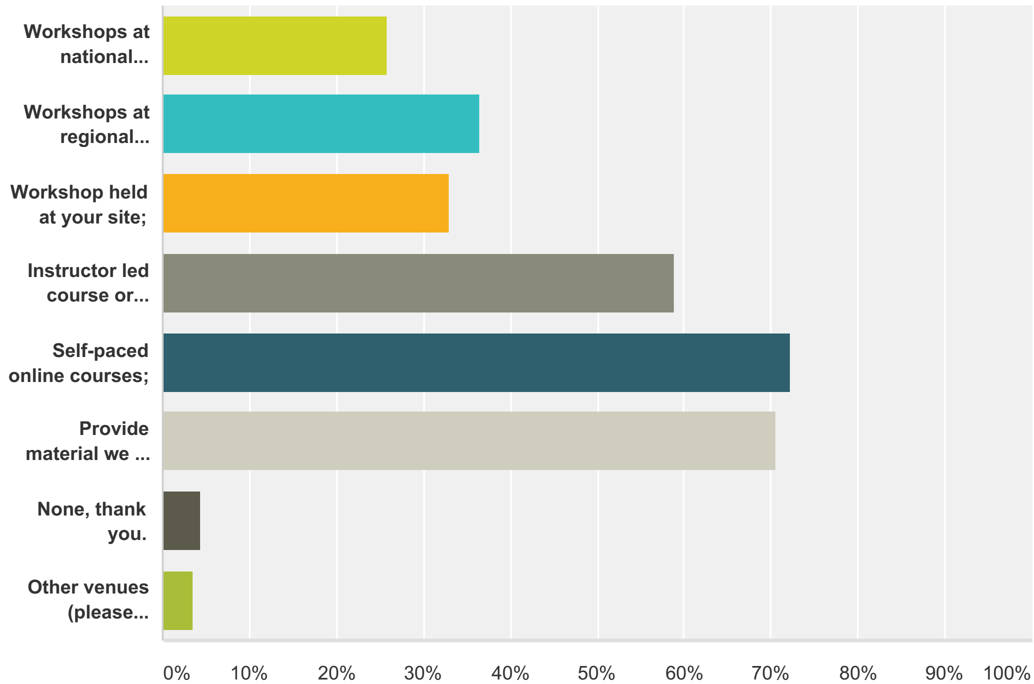
Answered: 106 Skipped: 6



Answer Choices	Responses	
Yes	**83.96%**	89
No	**16.04%**	17
Total		**106**

Q15 How would you prefer to see training material offered from CHAS?

Answered: 112 Skipped: 0



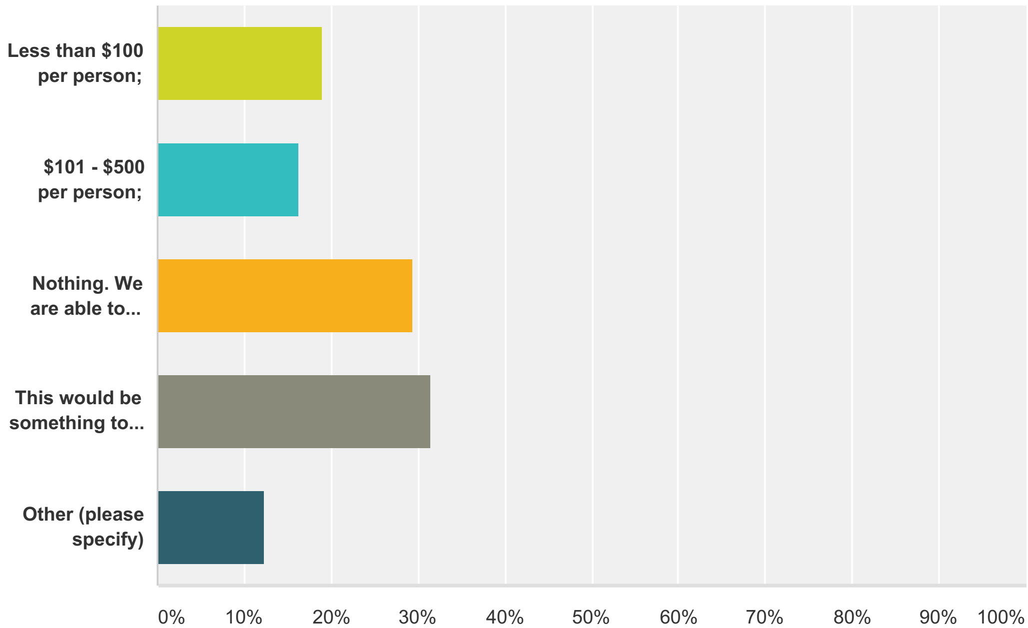
Answer Choices	Responses	
Workshops at national meetings;	**25.89%**	29
Workshops at regional meetings;	**36.61%**	41
Workshop held at your site;	**33.04%**	37
Instructor led course or webinar;	**58.93%**	66
Self-paced online courses;	**72.32%**	81
Provide material we can present in-house;	**70.54%**	79
None, thank you.	**4.46%**	5
Other venues (please specify)	**3.57%**	4
Total Respondents: 112		

Q16 Are there any specific chemical health and safety topics that you would be interested in hearing more about?

Answered: 32 Skipped: 80

Q17 What is your institution willing to pay for a safety training workshop?

Answered: 105 Skipped: 7



Answer Choices	Responses	
Less than $100 per person;	**19.05%**	20
$101 - $500 per person;	**16.19%**	17
Nothing. We are able to provide our own.	**29.52%**	31
This would be something to consider, so that we do not have to develop our own.	**31.43%**	33
Other (please specify)	**12.38%**	13
Total Respondents: 105		

Q18 Please provide any additional comments that would assist CHAS in the development of educational/training offerings.

Answered: 18 Skipped: 94

Lab Worker, Scientist, Student's Awareness and Preferred Delivery Methods of Information on Chemical Hazards Survey
Summary of Results
Prepared by: Survey Research Institute

Purpose

To understand what type of chemical hazard information lab workers, scientists, and students who work with chemicals in laboratories need, and to further understand the differences of what participants need and preferred delivery methods of the information for different types of laboratory settings.

Methodology

Data Collection

The principal investigator oversaw the administration of the Lab Worker, Scientist, Student Survey and collected 645 valid paper surveys. All the results are included in the summary.

There are 18 main questions for the survey, of which 16 use Single/Multiple Choice(s) and 2 use Open-End.

- Single/Multiple Choice(s) (Questions 1-16)
- Open-End (Questions 17-18)

Results

Demographics

Table 1. Roles of respondents in the laboaratory

Roles in the laboratory	Respondents	
	N	%
Faculty/Teacher	312	48.4%
Lab Technician	107	16.6%
Researcher/Scientist	77	11.9%
Lab Supervisor	70	10.9%
Student	62	9.6%
Peer Leader	9	1.4%
Retiree	6	0.9%
Other	2	0.3%

Results from participants who chose option “other” were recoded based on their text input. Job roles were recoded based on respondents’ original checkbox response to create one variable.

Among 645 respondents, less than half of the respondents (48.4%) identified themselves as faculty/teacher. Less than one out of five respondents (16.6%) identified themselves as lab technicians. More than one out of ten respondents identified themselves as researchers/scientists (11.9%). One out of ten respondents identified themselves as lab supervisors (10.9%). The rest of the respondents identified themselves as students (9.6%), peer leaders (1.4%), retirees (0.9%), or other (0.3%).

Result Frequency for Each Question

Table 2. How they consider the health and physical hazards of the compounds they use or create when they plan their experiments

How they consider the health and physical hazards of the compounds they use or create when they plan their experiments	Respondents	
	N	%
Refer to Safety Data (SDS) and/or Standard Operating Procedure	541	83.9%
Risk Assessment	317	49.1%
Experiment plans reviewed by Principal Investigator	171	26.5%
I generally do not think much about this	17	2.6%
Peer Review	17	2.6%
Base on Experiment/Experience	15	2.3%

Not Required	7	1.1%
Other	4	0.6%

In response to the question how they are considering the health and physical hazards of the compounds they are using or creating when they plan their experiments, the vast majority of the respondents (83.9%) referred to Safety Data (SDS) and/or Standard Operating Procedure. The plurality of the respondents (49.1%) did risk assessment. Over a quarter of the respondents (26.5%) had experiment plans reviewed by a Principal Investigator. The rest of the respondents chose not to think much about this (2.6%), or indicated it was not required (1.1%).

When evaluating responses to this question by job role (Table 1), researchers/scientists (7.8%) were more likely to base on their experience/knowledge than students (1.6%), faculty/teachers (1.3%), lab supervisors (1.4%), and lab technicians (0.9%).

Table 3. Approvals they have to meet before experimental plan

Approvals they have to meet before experimental plan	**Respondents**	
	N	%
None. My institution does not require approvals to work with chemicals	273	42.3%
Department/Supervisor	243	37.7%
Safety Committee	187	29.0%
Institutional review board	74	11.5%
Other	21	3.3%

In response to the question about what approvals they have to meet before the experimental plan, the plurality of the respondents (42.3%) required no approval from their institutions to work with chemicals. Over one third of the respondents (37.7%) required approvals from department/supervisor. Over a quarter of the respondents (29.0%) required approvals from a Safety Committee.

When evaluating responses to this question by job role (Table 1), lab supervisors (67.1%), lab technicians (57.9%), and students (53.2%) were more likely to need approvals by department/supervisor than researchers/scientists (46.8%) and faculty/teachers (17.6%). Lab supervisors (27.1%) and researchers/scientists (24.7%) were more likely to need approvals by an institutional review board than lab technicians (14.0%), students (4.8%) and faculty/teachers (4.8%). Lab supervisors (58.6%) and lab technicians (54.2%) were more likely to need approvals by a safety committee than researchers/scientists (48.1%), faculty/teachers (12.2%), and students (11.3%). Faculty/teachers (67.0%) and students (35.5%) were more likely to need no approvals by their institutions than researchers/scientists (19.5%), lab technicians (15%), and lab supervisors (11.4%).

Table 4. Variables to consider when making adjustments to experimental parameters as you contemplate how changes might impact the potential hazards

Variables to consider when making adjustments to experimental parameters as you contemplate how changes might impact the potential hazards	Respondents	
	N	%
Reagents	552	85.6%
Types of Solvents	510	79.1%
Scale	498	77.2%
Temperature	461	71.5%
Instruments	275	42.6%
I rely on someone else to consider the hazards with the chemicals I'm working with	45	7.0%
Other	14	2.2%

When making adjustments to experimental parameters as they contemplated how changes might impact the potential hazards, the vast majority of the respondents (85.6%) would consider reagents as a variable. Four out of five respondents (79.1%) would consider types of solvents. Over three quarters of the respondents (77.2%) would consider scale. Seven out of ten respondents (71.5%) would consider temperature.

When evaluating responses to this question by job role (Table 1), researchers/scientists (94.8%), lab supervisors (81.4%) and lab technicians (73.8%) were more likely to consider temperature as a variable than students (66.1%) and faculty/teachers (64.7%). Researchers/scientists (89.6%), lab supervisors (84.3%) and faculty/teachers (80.1%) were more likely to consider scale as a variable than lab technicians (71.0%) and students (58.1%). Researchers/scientists (66.2%), lab technicians (60.7%), and lab supervisors (57.1%) were more likely to consider instruments as a variable than students (35.5%) and faculty/teachers (28.8%). Students (24.2%) were more likely to rely on someone else than lab technicians (10.3%), faculty/teachers (4.5%), lab supervisors (1.4%), or researchers/scientists (1.3%).

Table 5. Things considered when deciding where to set up an experiment in the lab

Things considered when deciding where to set up an experiment in the lab	Respondents	
	N	%
Decision is based on the volatility or toxicity of the chemicals	566	87.8%
Temperature of reaction	236	36.6%
Availability of work space	227	35.2%
Location of instruments	183	28.4%
Other	37	5.7%
I just do what I am told	13	2.0%

To decide where to set up an experiment in the lab (i.e. in a fume hood, glove box, or an open the bench), the vast majority of the respondents (87.8%) would consider volatility or toxicity of the chemicals. One third of the respondents (36.6%) would consider temperature of reaction. One third of the respondents (35.2%) would consider availability of work space. Over a quarter of the respondents (28.4%) would consider location of instruments.

When evaluating responses to this question by job role (Table 1), lab technicians (52.3%) were more likely to consider location of instruments than students (38.7%), researchers/scientists (37.7%), lab supervisors (25.7%), or faculty/teachers (17.0%); students (11.3%) were more likely to just do what they were told than other job roles.

Table 6. Resources on instructions for storing chemicals, cleaning apparatus and handling wastes

Resources on instructions for storing chemicals, cleaning apparatus and handling wastes	Respondents	
	N	%
Existing written lab procedures	460	71.3%
Consult safety office or official	252	39.1%
Knowledge on these tasks is passed down from person to person (aka- Oral Tradition)	216	33.5%
Assigned to specific lab personnel	163	25.3%
Look at institutional resources online	152	23.6%

Search engine external to the institution	120	18.6%
There may be written procedures. But, I've never seen them.	21	3.3%
Other	12	1.9%
I was never given any instructions on these tasks	5	0.8%

To plan for storing chemicals, cleaning apparatus and handling wastes, the vast majority of the respondents (71.3%) would refer to existing written lab procedures. Two out of five respondents (39.1%) would consult safety office or official. One third of the respondents (33.5%) thought knowledge on these tasks was passed down from person to person (aka-Oral Tradition). A quarter of the respondents (25.3%) thought it would be assigned to specific lab personnel.

When evaluating responses to this question by job role (Table 1), researchers/scientists (97.4%), lab technicians (92.5%), or lab supervisors (85.7%) were more likely to refer to existing written lab procedures than faculty/teachers (58.0%) or students (54.8%). Researchers/scientists (57.1%), lab technicians (54.2%), or lab supervisors (50.0%) were more likely to consult a safety office or official than faculty/teachers (30.8%) or students (22.6%). Researchers/scientists (39.0%), lab supervisors (38.6%), or lab technicians (30.8%) were more likely to look at institutional resources online than students (19.4%) or faculty/teachers (14.7%).

Table 7. Resources on protection to prevent exposure to chemicals

Resources on protection to prevent exposure to chemicals	Respondents	
	N	%
Standard requirements based on training (e.g., goggles)	582	90.2%
Experimental procedures	415	64.3%
Written hazard or risk assessment process	352	54.6%
Online protection selection tool	73	11.3%
Other	5	0.8%
I just do what others in the labs do	4	0.6%

To choose what protection to prevent exposure to chemicals, the vast majority of the respondents (90.2%) would refer to standard requirements based on training (e.g., goggles). The majority of the respondents (64.3%) would refer to experimental procedures. Over half of the respondents (54.6%) would refer to a written hazard or risk assessment process.

When evaluating responses to this question by job role (Table 1), researchers/scientists (81.8%) and lab supervisors (70.0%) were more likely to consider experimental procedures than lab technicians (67.3%), faculty/teachers (63.1%), or students (43.5%). Researchers/scientists (83.1%), lab technicians (71.4%), and lab supervisors (71.4%) were more likely to consider the written hazard or risk assessment process than students (43.5%) or faculty/teachers (37.2%). Lab supervisors (24.3%), lab technicians (23.4%), and lab supervisors (23.4%) were more likely to consider online protection selection tool than students (3.2%) or faculty/teachers (3.2%). Students (6.5%) were more likely to just do what others in the lab do than other job roles.

Table 8. Most important to know when an emergency happens in the lab

Most important to know when an emergency happens in the lab	Respondents	
	N	%
Location of emergency equipment (e.g., fire extinguisher, emergency shower, emergency shut-offs, etc.)	573	88.8%
Emergency exits	412	63.9%
Emergency contact numbers (whom to call and in what order)	366	56.7%
Location of fire alarm	276	42.8%
First aid procedures	230	35.7%
Other	9	1.4%
I don't know. This is too difficult to decide	5	0.8%

In response to the question what they think the most important to know when an emergency happens in the lab, the vast majority of the respondents (88.8%) would consider location of emergency equipment (e.g., fire extinguisher, emergency shower, emergency shut-offs, etc.) to be most essential. Two-third of the respondents (63.9%) would consider emergency exists most important. Over half of the respondents (56.7%) responded with emergency contact numbers (whom to call and in what order). The plurality of the respondents (42.8%) would consider location of fire alarm as the most important to know.

When evaluating responses to this question by job role (Table 1), lab supervisors (61.4%), lab technicians (56.1%) and researchers/scientists (54.5%) were more likely to consider location of fire alarm the most important thing to know as compared to students (37.1%) or faculty/teachers (33.0%). Lab technicians

(72.9%), researchers/scientists (67.5%), and lab supervisors (67.1%) were more likely to consider emergency contact numbers (whom to call and in what order) most important than faculty/teachers (50.6%) or students (35.5%). Lab supervisors (74.3%), researchers/scientists (74.0%) and lab technicians (72.9%) were more likely to consider emergency exists most important than faculty/teacher (58.3%) or student (51.6%).

Table 9. Chemical hazard information needed to plan and conduct experiments safely

Chemical hazard information needed to plan and conduct experiments safely	Respondents	
	N	%
Handling procedures	526	81.6%
Hazard symbol (e.g., GHS)	451	69.9%
Common properties (e.g., flash point)	447	69.3%
Other information on a Safety Data Sheet (SDS)	387	60.0%
Emergency procedures	350	54.3%
National Fire Protection Association (NFPA) ratings	236	36.6%
Other	6	0.9%

In response to the question what chemical hazard information they need to plan and conduct experiments safely, the vast majority of the respondents (81.6%) would need handling procedures. Seven out of ten respondents (69.9%) would need a hazard symbol (e.g., GHS). Seven out of ten respondents (69.3%) would need common properties (e.g. flash point). Three out of five respondents (60%) would need other information on a Safety Data Sheet (SDS).

When evaluating responses to this question by job role (Table 1), researchers/scientists (81.8%), lab technicians (78.5%) and lab supervisors (72.9%) were more likely to need common properties (e.g., flash point) than faculty/teachers (66.0%) or students (58.1%). Researchers/scientists (70.1%) and lab technicians (69.2%) were more likely to need emergency procedures than lab supervisors (55.7%), students (50.0%), or faculty/teachers (45.8%). Lab supervisors (71.4%) and researchers/scientists (70.1%) were more likely to need other information on a Safety Data Sheet (SDS) than lab technicians (66.4%), faculty/teachers (57.1%), or students (40.3%).

Table 20. Resources on chemical hazard information needed to plan and conduct experiments safely

Resources on chemical hazard information needed to plan and conduct experiments safely	Respondents	
	N	%
Safety Data Sheets (SDS)	588	91.2%
Web search	271	42.0%
Laboratory or department procedures	270	41.9%
Inventory system	94	14.6%
Others	7	1.1%

In response to the question of where they usually find the chemical hazard information they need to plan and conduct their experiments safely, the vast majority of the respondents (91.2%) usually found it from Safety Data Sheets (SDS). The plurality of the respondents (42%) usually found it from web searches. The plurality of the respondents (41.9%) usually found it from laboratory or department procedures.

When evaluating responses to this question by job role (Table 1), lab technicians (97.2%), researchers/scientists (96.1%) and lab supervisors (95.7%) were more likely to find it from Safety Data Sheets (SDS) than faculty/teachers (90.1%) or students (82.3%). Lab technicians (97.2%), researchers/scientists (94.8%), and lab supervisors (92.9%) were more likely to find it from safety training (separate workshop) than faculty/teachers (72.8%) or students (64.5%).

Table 31. How they were taught about safety information and its application in research

How they were taught about safety information and its application in research	Respondents	
	N	%
Safety training (separate workshop)	521	80.8%
I learned about chemical safety from others in the lab	281	43.6%
Lab class	244	37.8%
No training	21	3.3%
Other	18	2.8%

In response to the question how they were taught about safety information and how to use it in their research, the vast majority of the respondents (80.8%) thought they were taught about safety information and its application in research from safety training (separate workshop). The plurality of the respondents (43.6%) thought that they learned about chemical safety from others in the lab. One third of the respondents (37.8%) thought they learned from lab class.

When evaluating responses to this question by job role (Table 1), students (77.4%) were more likely to learn it from lab class than faculty/teachers (37.8%), lab supervisors (30.0%), lab technicians (30.8%), or researchers/scientists (27.3%).

Table 42. Chemical hygiene and safety management in your lab

Chemical hygiene and safety management in your lab	Respondents	
	N	%
Signage, information binders or other documentation system	342	53.0%
Discussed in group meetings	313	48.5%
Stockroom or other Department function	248	38.4%
Assigned lab group position	226	35.0%
Other	34	5.3%
Not at all	15	2.3%
I don't know	14	2.2%

In response to the question on how chemical hygiene and safety was managed in their lab, over half of the respondents (53%) found it from signage, information binders or other documentation system. The plurality of them (48.5%) thought it was discussed in group meetings. Two out of five respondents (38.4%) thought it was function of stockroom or other department. Over one third of them (35%) thought it was an assigned lab group position.

When evaluating responses to this question by job role (Table 1), researchers/scientists (64.9%) and lab technicians (54.2%) were more likely to think it managed by assigned to a lab group position than lab supervisors (47.1%), students (30.6%), or faculty/teachers (19.2%). Faculty/teachers (50.3%) were more likely to think it managed by stockroom or other department function than students (32.3%), or researchers/scientists (29.9%), or lab supervisors (28.6%) or lab technicians (21.5%). Lab technicians (72.0%) were more likely to think it managed by signage, information binders or other documentation system. Researchers/scientists (81.8%), lab technicians (72.9%) and lab supervisors (68.6%) were more likely to think it was discussed in group meetings than faculty/teachers (31.1%) or students (29.0%). Students (17.7%) were more likely not to know how it was managed than other job roles.

Table 53. Whether you are comfortable with the knowledge you have now to respond to an emergency

Whether you are comfortable with the knowledge you have now to respond to an emergency	Respondents					
	Yes		Maybe		No	
	N	%	N	%	N	%
Small spill (less than 500ml)	598	92.7%	32	5.0%	6	0.9%
Large spill (larger than 500ml)	415	64.3%	183	28.4%	37	5.7%
Fire	512	79.4%	100	15.5%	19	2.9%
Exposure to hazardous material (e.g. inhalation, skin contact)	440	68.2%	157	24.3%	38	5.9%
Other injury	320	49.6%	232	36.0%	32	5.0%

In response to the question whether they are comfortable with the knowledge they have now to respond to an emergency, when the emergency was a small spill (less than 500 ml), the vast majority of respondents (92.7%) thought they were comfortable. The rest of the respondents thought they maybe were comfortable (5.0%), or were not comfortable (0.9%). When the emergency was a large spill (larger than 500 ml), the majority of the respondents (64.3%) thought they were comfortable. Three out of ten of respondents (28.4%) thought they maybe were comfortable. 5.7% of the respondents thought they were not comfortable. When the emergency was a fire, the vast majority of the respondents (79.4%) thought they were comfortable. The rest of the respondents thought they maybe were comfortable (5.0%), or were not comfortable (0.9%). When the emergency was exposure to hazardous material (e.g. inhalation, skin contact), the majority of the respondents (68.2%) thought they were comfortable. A quarter of the respondents (24.3%) thought they maybe were comfortable. 5.9% of the respondents thought they were not comfortable.

When evaluating responses to this question by job role (Table 1), when the emergency was a small spill (less than 500ml), lab supervisors (98.6%), lab technicians (97.2%), and faculty/teachers (93.6%) were more likely to be comfortable with it than researchers/scientists (90.9%) or students (80.6%). Students (14.5%) were more likely to answer maybe comfortable than other job roles. Students (4.8%) were more likely to feel not comfortable than other job roles. When the emergency was a large spill (larger than 500ml), researchers/scientists (85.7%), lab technicians (82.2%), and lab supervisors (80.0%) were more likely to be comfortable with it than faculty/teachers (55.4%) or students (37.1%). Students (40.3%) and faculty/teachers (38.5%) were more likely to answer maybe comfortable than other job roles. Students (22.6%) were more likely to feel not comfortable than job roles. When the emergency was a fire, lab technicians (94.4%), lab supervisors (90.0%) and researchers/scientists (85.7%) were more likely to be comfortable with it than faculty/teachers (76.3%) or students (53.2%). Students (35.5%) and faculty/teachers (20.8%) were more likely to answer maybe comfortable than other job roles. Students (11.3%) were more likely to feel not comfortable than other job roles.

When the emergency was exposure to hazardous material (e.g. inhalation, skin contact), lab supervisors (88.6%), researchers/scientists (88.3%), and lab technicians (85.0%) were more likely to be comfortable with it than faculty/teachers (56.7%) or students (50.0%). Students (38.7%) and faculty/teachers (34.0%) were more likely to answer maybe comfortable than other job roles. Students (9.7%) and faculty/teachers (9.3%) were more likely to feel not comfortable than other job roles. When the emergency was other injury, researchers/scientists (76.6%), lab supervisors (70.0%), and lab technicians (65.4%) were more likely to be comfortable with it than faculty/teachers (35.9%) or students (32.3%). Faculty/teachers (56.1%) and students (54.8%) were more likely to answer maybe comfortable than other job roles. Students (9.7%) and faculty/teachers (7.4%) were more likely to feel not comfortable than other job roles.

Table 64. The amount you are willing to pay for a chemical health and safety workshop

The amount you are willing to pay for a chemical health and safety workshop	Respondents	
	N	%
Less than $100 per person	178	27.6%
This would be something to consider, so my institution doesn't have to develop its own	166	25.7%
$101-$500 per person	83	12.9%
Other	62	9.6%

In response to the question about how much they are willing to pay for a chemical health and safety workshop, over a quarter of the respondents (27.6%) were willing to pay less than $100 per person. One quarter of the respondents (25.7%) thought this would be something to consider, so their institution would not have to develop its own. More than one out of ten respondents (12.9%) would be willing to pay $101-$500 per person.

When evaluating responses to this question by job role (Table 1), students (58.1%) were more likely not to pay than lab technicians (39.3%), researchers/scientists (28.6%), lab supervisors (24.3%), or faculty/teachers (22.1%). Students (35.5%) and faculty/teachers (34.9%) were more likely to pay less than $100 per person than lab technicians (19.6%), researchers/scientists (19.5%) or lab supervisors (14.3%).

Table 75. The value of safety/hazard information by American Chemical Society

The value of safety/hazard information by American Chemical Society	Respondents	
	N	%
Highly Valuable	217	33.6%
Moderately valuable	158	24.5%
Not at all. I've never seen chemical safety/hazard information comments or statements from the American Chemical Society.	126	19.5%
Somewhat valuable	101	15.7%
Other	35	5.4%

In response to the question what the value of safety/hazard information that comes from the American Chemical Society is, one third of the respondents (33.6%) thought it was highly valuable. A quarter of the respondents (24.5%) thought it was moderately valuable. One out of five respondents (19.5%) responded that they had never seen chemical safety/hazard information comments or statements from the American Chemical Society, and 15.7% of the respondents thought it was somewhat valuable.

Table 86. Whether there is need for a searchable "Lessons Learned" database

Whether there is need for a searchable "Lessons Learned" database	Respondents	
	N	%
Yes	357	55.3%
Maybe	223	34.6%
I do not understand the question	33	5.1%
No	17	2.6%
Other	6	0.9%

In response to the question whether there is need for a searchable "Lessons Learned" database, the majority of the respondents (55.3%) thought there would be need, one third of them (34.6%) thought there might be need, and 2.6% thought there would be no need.

Health and Safety Professional, Department Safety Coordinator, Lab Safety Representative, Educator or Stockroom Worker's Communication Approaches and Delivery Methods of Information on Chemical Hazards Survey

Summary of Results

Prepared by: Survey Research Institute

Purpose

To understand what type of chemical hazard information resources are needed by health and safety professionals, department safety coordinators, lab safety representatives, and educator or stockroom workers, and to understand what communication approaches are in development and what delivery methods are being used.

Methodology

Data Collection

The principal investigator oversaw the administration of Health and Safety Professional, Department Safety Coordinator, Lab Safety Representative or Stockroom Worker Survey and collected 116 valid paper surveys. All the results are included in the summary.

There are main 18 questions for the survey, of which 16 use Single/Multiple Choice(s) and 2 use Open-End.

- Single/Multiple Choice(s) (Questions 1-15, 17)
- Open-End (Questions 16, 18)

Results

Demographics

Table 1. Types of organization

Types of organization	Respondents	
	N	%
Large Research University;	51	44.0%
Large Corporation;	26	22.4%
Undergraduate/ Masters Institution;	24	20.7%
Small Business;	6	5.2%
Middle or High School;	4	3.4%
Government;	3	2.6%
Other (please specify)	2	1.7%

Among 116 respondents, the plurality of the respondents (44.0%) identified their organization as a large research university. Less than a quarter of the respondents (22.4%) identified their organization as a large corporation. One out of five respondents (20.7%) identified their organization as an undergraduate/master's institution. The rest of the respondents identified their organization as small business (5.2%), middle or high school (3.4%), government (2.6%), or other (1.7%).

Table 2. Job roles

Job roles	Respondents	
	N	%
Health and Safety Professional, EHS	85	73%
Department safety coordinator	16	14%
Stockroom or Materials Manager	9	8%
Faculty/teacher	8	7%
Individual Lab Safety representative	4	3%
Others	3	3%

Among 116 respondents, less than three quarter of the respondents (73%) identified themselves as a health and safety professional, EHS. 14% of respondents identified themselves as department safety coordinators. The rest of the respondents identified themselves as a stockroom or materials manager (8%), faculty/teacher (7%), or individual lab safety representative (3%).

Result Frequency for Each Question

Table 3. Whom you communicate chemical hazard information to

Whom you communicate chemical hazard information to	Respondents	
	N	%
Lab Workers	104	90%
Students	70	60%
Safety Representatives	64	55%
Emergency Personnel	58	50%
Faculty/Teacher	16	14%
Others	2	2%

In response to the question "To whom do you communicate chemical hazard information?", nine out of ten respondents (90%) communicated to lab workers. Three out of five respondents (60%) communicated to students. Over half of the respondents (55%) communicated to safety representatives. Half of the respondents (50%) communicated with emergency personnel. 14% of respondents communicated with faculty/teachers.

When evaluating responses to this question by job role (Table 2), individual lab safety representatives (100.0%), stockroom or materials managers (100.0%), health and safety professionals, EHS (93.7%), and department safety coordinators (90.9%) were significantly more likely to communicate to lab workers than to faculty/teachers (37.5%).

Table 4. Delivery methods used to communicate these hazards

Delivery methods used to communicate these hazards	Respondents	
	N	%
In-person training (instructor or supervisor led training)	102	88%
Website/Online training	84	72%
New Hire Training	68	59%
Part of classroom curriculum	41	35%
Others	2	2%

In response to the question, “What delivery methods are used to communicate these hazards?”, the vast majority of the respondents (88%) used in-person training (instructor or supervisor led training). Three quarters of the respondents (72%) used website/online training. Three out of five respondents (59%) used new hire training. One third of the respondents (35%) indicated it was part of classroom curriculum.

When evaluating responses to this question by job role (Table 2), health and safety professionals, EHS (82.3%), individual lab safety representatives (80.0%), and department safety coordinators (72.7%) were more likely to use website/online training than stockroom or materials managers (57.1%) and faculty/teacher (57.1%).

Table 5. Time each communication method takes

Time each communication method	Respondents	
	N	%
Single 1-3 hour session	90	77.6%
at pace of the user (i.e., online)	63	54.3%
Multiple sessions of full days	34	29.3%
Others	3	2.6%

In response to the question, “How long does each communication method take?”, over three quarters of the respondents (77.80%) thought it took single 1-3 hour session. Over half of the respondents (54.30%) thought it would be at the pace of the user (i.e. online). Three out of ten respondents (29.3%) thought it would take multiple sessions of full days.

When evaluating responses to this question by delivery method (Table 4), respondents who chose website/online training as delivery methods (67.9%) were more likely to think the communication method would be at the pace of the user (i.e., online) than other respondents (18.8%).

Table 6. Types of resources that provide the most useful chemical hazard information

Types of resources that provide the most useful chemical hazard information	Respondents	
	N	%
Safety Data Sheets or other hazard symbols	99	85.3%
Operating Procedures	73	62.9%
Institutional resources	61	52.6%

Books	50	43.1%
Chemical property databases	43	37.1%
Official Regulations	42	36.2%
Peer Institutional resources	25	21.6%
Textbooks	16	13.8%
Others	1	0.9%

In response to the question, "What types of resources provide the most useful chemical hazard information for those using chemicals?", the vast majority of respondents (85.3%) thought Safety Data Sheets or other hazard symbols provided the most useful chemical hazard information. Three out of five respondents thought operating procedures provided the most useful information. Over half of the respondents (52.6%) thought institutional resources provided the most useful information. The plurality of the respondents (43.1%) thought books provided the most useful information. Over one third of the respondents (37.1%) thought chemical property databases provided the most useful information. Over one third of respondents (36.2%) thought official regulations provided the most useful information. One out of five respondents (21.6%) thought peer institutional resources provided the most useful information. And 13.8% of the respondents thought textbooks provided the most useful information.

Table 7. Information these resources provide on how to reduce risk associated with the chemicals being used (i.e., engineering controls)

Information these resources provide on how to reduce risk associated with the chemicals being used (i.e., engineering controls)	Respondents	
	N	%
Personal Protection	108	93.1%
Handling Chemicals	105	90.5%
Engineering Controls	93	80.2%
Spill Clean Up	83	71.6%
Substituting Chemicals	**50**	**43.1%**
Others	3	2.6%

In response to the question, "What information do these resources provide on how to reduce risk associated with the chemicals being used (i.e. engineering controls)?", over nine out of ten respondents (93.1%) thought these resources provided information on personal protection. Nine out of respondents (90.5%) thought these resources provided information on handling chemicals. Four out of five respondents (80.2%) thought these resources provided information on engineering controls. Seven out of ten respondents (71.6%) thought these resources provided information on spill cleanup. And the plurality of the respondents (43.1%) think they provided information on substituting chemicals.

When evaluating responses to this question by types of resources (Table 7), respondents who thought peer institution resources provided the most useful chemical hazard information (76.0%) were more likely to think these resources provided information on substituting chemicals than other respondents (34.1%).

Table 8. Chemical health and safety information needed that isn't currently readily available

Chemical health and safety information needed that isn't currently readily available	**Respondents**	
	N	%
Near miss database	72	62.1%
"Lessons Learned" database	72	62.1%
Risk assessment protocols	62	53.4%
Properties of mixtures	54	46.6%
Process hazards and safety	46	39.7%
Incompatibilities	34	29.3%
Lab inventories	**27**	**23.3%**
Regulatory requirements	17	14.7%
Others	7	6.0%

In response to the question, "What kind of chemical health and safety information is needed that isn't currently readily available to you?", three out of five respondents (62.1%) needed information on near miss database. Three out of five respondents (62.1%) needed information on "Lessons Learned" database. Over half of the respondents (53.4%) needed information on risk assessment protocols. The plurality of the respondents (46.6%) needed information on properties of mixtures. Two out of five respondents (39.7%) needed information on process hazards and safety. Three out of ten respondents (29.3%) needed information on incompatibilities. Less than a quarter of the respondents (23.3%) needed information on lab inventories, and three out of ten respondents (14.7%) needed information on regulatory requirements.

Table 9. How to use chemical hazard information to communicate hazards to those they are working with

How to use chemical hazard information to communicate hazards to those they are working with	Respondents	
	N	%
Training	105	91%
Development of lab safety procedures	101	87%
Signage	92	79%
Guides or websites with links, further sources, etc.	68	59%
Inventory information systems	51	44%
Others	2	2%

In response to the question, "How do you use chemical hazard information to communicate hazards to those you are working with?", more than nine out of ten respondents (91%) preferred training. Seventeen out of twenty respondents (87%) preferred development of lab safety procedures. Four out of five respondents (79%) preferred signage. Three out of five respondents (59%) preferred guides or websites with links, further sources, etc., and the plurality of the respondents (44%) preferred inventory information systems.

Table 10. How you prefer your constituencies find the chemical hazard information that they need

How you prefer your constituencies find the chemical hazard information that they need	Respondents	
	N	%
Specific websites	73	63%
Specific databases	65	56%
Specific local sources	42	36%
Web search	39	34%
Electronic notebook or other campus information system	29	25%

In response to the question how you prefer your constituencies find the chemical hazard information that they need, more than three out of five respondents preferred specific websites (63%). Over half of the respondents (56%) preferred specific databases. Over one third of the respondents (36%) preferred specific local resources. One third of the respondents (34%) preferred web search. And a quarter of the respondents (25%) preferred electronic notebook or other campus information system.

Table 11. Features of an ideal online database or website for delivering chemical safety information

Features of one ideal online database or website for delivering chemical safety information	Respondents	
	N	%
All of the above	70	60%
Breadth of safety information (e.g., properties, management controls, first aid, lessons learned, etc.)	42	36%
Large coverage of chemicals	38	33%
Variety of search options (e.g., name, CAS, structure, substructure)	38	33%
Download to spreadsheet or print or data file	24	21%
Other features or content (write-in response)	3	3%

In response to the question what features would one ideal online database or website have for delivering chemical safety information, three out of five of the respondents (60%) thought it would have all of the features listed, including breadth of safety information (e.g., properties, management controls, first aid, lessons learned, etc.), large coverage of chemicals, variety of search options (e.g., name, CAS, structure, substructure), and download to spreadsheet or print or data file. Over one third of the respondents (36%) thought it would have breadth of safety information (e.g., properties, management controls, first aid, lessons learned, etc.). One third of the respondents (33%) thought it would have large coverage of chemicals. One third of the respondents (33%) thought it would have variety of search options (e.g., name, CAS, structure, substructure). One out of five respondents (21%) thought it would have the feature of download to spreadsheet or print or data file.

Table 12. Delivery methods and materials (via training or incorporated into the curriculum) of the chemical hazard information that would expand their ability to deliver this knowledge

Delivery methods and materials (via training or incorporated into the curriculum) of the chemical hazard information that would expand their ability to deliver this knowledge	Respondents	
	N	%
Risk/Hazard analysis tools	81	70%
Sample exercises and assessments	76	66%
Train-the-trainer	60	52%
Curriculum models	48	41%
Other	2	2%

In response to the question, "What delivery methods and materials (via training or incorporated into the curriculum) of chemical hazard information would expand your ability to deliver this knowledge?", seven out of ten respondents (70%) thought risk/hazard analysis tools would expand the ability. Two thirds of the respondents (66%) thought sample exercises and assessments would expand the ability. Over half of the respondents (52%) thought train-the-trainer would expand the ability, and two out of five respondents (41%) thought curriculum models would expand the ability.

Table 13. Aware the American Chemical Society offers chemical health and safety outreach and training in every region of the United States

Aware the American Chemical Society offers chemical health and safety outreach and training in every region of the United States	Respondents	
	N	%
Yes	73	62.9%
No	38	32.8%

In response to the question whether they are aware that the American Chemical Society offers chemical health and safety outreach and training in every region of the United States, the majority of the respondents (62.9%) were aware of it, and one third of the respondents (32.8%) were not aware of it.

Table 14. Familiar with the American Chemical Society, Division of Chemical Health and Safety (CHAS)

Familiar with the American Chemical Society, Division of Chemical Health and Safety (CHAS)	Respondents	
	N	%
Yes	92	79.3%
No	18	15.5%

In response to the question whether they are familiar with the American Chemical Society, Division of Chemical Health and Safety (CHAS), four out of five respondents (79.3%) were familiar with it, and 15.5% of the respondents were not familiar with it.

Table 15. How they prefer to see training material offered from CHAS

How they prefer to see training material offered from CHAS	Respondents	
	N	%
Self-paced online courses	85	73%
Provide materials we can present in-house	82	71%
Instructor led course or webinar	69	59%
Workshops at regional meetings	43	37%
Workshop held at your site	37	32%
Workshops at national meetings	30	26%
None, thank you	5	4%
Other Venues	2	2%

In response to the question of how they would prefer to see training material offered from CHAS, the vast majority of the respondents (73%) preferred self-paced online courses. Seven out of ten respondents (71%) preferred CHAS provide materials they could present in-house. Three out of five respondents (59%) preferred instructor led course or webinar. Less than two out of five respondents (37%) preferred workshops at regional meetings. One third of the respondents (32%) preferred workshop held at your site. A quarter of the respondents (26%) preferred workshops at national meetings.

Reference #: 8742932

Innovative Project Grants for Divisional Enhancement Sponsored by the Council Committee on Divisional Activities (DAC)

Technical Division Innovative Project Grant (IPG) Application Form

Please note that Division IPG funding will not be considered for on-going projects or for projects that will take place at the ACS National Meeting when funding decisions are made. Only proposals describing new projects will be considered for support. The purpose of IPGs is to “seed” new ideas; funding does not support continuation of existing programs or projects. Please refer to the Division IPG webpage for complete programmatic guidelines.

Project Coordinator Information

Name: *
CHAS: Ralph Stuart (primary contact), CINF: Leah McEwen

Email: *
secretary@dchas.org, lrm1@cornell.edu

IPG Information

Sponsoring Technical Division: *
Chemical Health & Safety (CHAS)

Submission Date: *
01/30/2016

Is this an joint (inter-Division) application?Funding for a joint inter-Division proposal is limited to $12,500, split equally between those Divisions (each Division can receive up to $6,250 in funding). *
Yes

Indicate the partnering Division: *
Chemical Information (CINF)

Title of Project: *
Chemical Safety Information and Education Survey of the Academic Laboratory Population

Project Start Date: *
04/01/2016

Project Completion Date: *
04/01/2017

Does the Division currently have an IPG? *
No

If yes, indicate submission date:

Name of Current Division Chair: *
CHAS: John Palmer, PhD, CINF: Rachelle Bienstock, PhD.

Email of Current Division Chair: *
jgppalmer@gmail.com, rachelleb1@gmail.com

Letter of Support from Division attached? (If the Division Chair is the Project Coordinator, a member of the Executive Committee must submit the support letter.) *
Yes

Submitting a letter of support from the active Division Chair is required. If one is not provided through this application, you will need to send it via an email attachment to division@acs.org by the closest submission deadline (February 1 or July 1).

Upload Division's letter of support here (acceptable formats: .pdf, .doc, .docx).
https://fs23.formsite.com/kate1dc/files/f-80-64-8742932_ITGck9i9_IPG_Support_Letters.docx

IPG Co-Sponsors

Are letter(s) of support from your co-sponsors attached? *
Yes

Submitting a letter of support from co-sponsors is required if the Division is partnering with one (or more) on this project. If one is not provided through this application, you will need to send it via an email attachment to division@acs.org by the closest submission deadline (February 1 or July 1).

Upload co-sponsor's letter(s) of support here (acceptable formats: .pdf, .doc, .docx).
https://fs23.formsite.com/kate1dc/files/f-80-61-8742932_11aOOlLb_IPG_Support_Letters.docx

Which groups are co-sponsors? *

- [X] Other ACS Division(s)
- [ ] ACS Local Section(s)
- [X] ACS Committee(s)
- [ ] External (non-ACS) Groups
- [ ] None

Specify partnership(s): *

Two ACS partners have been identified: the Committee on Chemical Safety's Safety Advisory Panel and the DivCHED Safety Committee

Project Description

Project Goal (Please provide a brief description of project goals): *

The goal of this project is to develop and implement survey instruments which ascertain the current laboratory safety information needs and risk assessment practices of the academic chemistry community and how CHAS and CINF, as well as other ACS stakeholders, can better support those needs and practices. The survey findings will be used to:

1) identify limitations of current chemical safety information sources and tools; and

2) inform opportunities for CHAS and CINF to support improved lab risk assessment, management and documentation by providing education and training services to ACS members and other chemists.

This project will be coordinated with similar efforts by the DivCHED Safety Committee and Committee on Chemical Safety. The information developed in this project will be available to all ACS constituencies.

Is this project intended to fund strategic planning for your Division? *

- [ ] Yes
- [x] No

What are the Division’s current challenges? *

What are the Division's strategic goals? *

Highlight the innovative aspects of the proposed project. *

This project will be innovative in many ways:
1) It expands the current CHAS-CINF partnership to include other ACS Divisions and committees.
2) Many ACS efforts to better understand the lab safety challenge have been limited by the resources available on a volunteer basis; this project will provide a professional approach to identifying key safety information needs.

Specifically, the information needs this project will meet include:
1- Data about current chemical safety information practices and challenges from an adequate sample size to inform ACS safety program development;
2- Information from the chemistry community about how they apply risk assessment concepts in the laboratory;
3- Identification of opportunities for ACS divisions who support safety in chemical research and education to improve these efforts; and
4- A re-usable survey that can be used to identify changes that occur as a result of ACS initiatives, variations between localities and communities, and over time;

Project Background: *

Chemical safety in academic research and education laboratories is an issue of increasing national concern. Over the last few years, severe laboratory accidents have led to increased concern about lab safety. For example, in 2015, the NFPA issued a revised fire code that increases requirements for management of chemical hazards in teaching laboratories.

These events highlight the need for chemists to effectively use chemical safety information as they plan their work. ACS is uniquely positioned to provide the necessary leadership to identify and make improvements in this area. CHAS and CINF are responding by collaboratively developing content and chemical safety information tools. A brief survey conducted by the divisions, as well as one in 2013 by the CCS, leave open questions that the focus groups in this proposal will address. This project will provide baseline data on the current use of chemical safety information to support safety programming efforts across the ACS.

Project Outline

Overview: *

Preliminary analysis of informal surveys conducted by a variety of ACS bodies suggests that a formalized survey process would greatly inform the work of those ACS stakeholders to support the chemistry community as well as other lab science communities and nationalities. The project will develop two types of data collection tools:
1- targeted interviews and focus groups of specific communities of interest, such as undergraduate chemistry educators; and
2- a robust survey tool that can be used with a variety of chemistry populations worldwide to identify the needs of chemists as information tools change over time.

Specifically, this project will inform the technical partnership between the Divisions in providing information tools for laboratory chemical safety. The Cornell Institute for Social and Economic Research Survey Research Institute will be hired to define how to best collect information about current chemical safety information education and research efforts in the lab.

Objective(s): *

The driving questions for this project are:

1. What chemical safety literature is currently used in planning and conducting laboratory work, in both the teaching and research lab settings, and what gaps in this literature present challenges in completing risk assessments and implementing safety management plans for laboratory work?

2. What are the most promising opportunities for ACS Divisions and Committees to provide chemical safety education and training to the academic lab population in a way that supports best safety practices and compliance with NFPA 45, OSHA lab requirements, and EPA requirements?

Identify target audience(s) and estimate the number of people to be reached. Estimate the number of members involved in organizing the project. *

The primary audience for this project are support staff who assist chemical educators and principle investigators in conducting a risk assessment when a chemical hazard or process is introduced in the lab. Their work directly impacts chemists throughout academia. Thus, over time, this project will support chemical research and teaching lab workers and the number of people to be reached by the project is quite large.

More specifically, this survey will build on information collected by the CCS in 2013 and the Divisions in a preliminary survey conducted in 2015 that included chemical educators, students, laboratory staff and EHS support staff. We have received permission to use the ACS CPT mailing list to call for participation in a more in-depth survey. This mailing list contains roughly 800 contacts. When CHAS conducted a survey of this group in 2010 on a different topic, we received a 40% response rate, and we expect high participation in this survey as well.

Describe how IPG funding will seed future divisional activities following the completion of this project. *

With the knowledge gained, educational and outreach materials can be strategically developed to meet the needs of ACS stakeholders. For example:
- the current CHAS workshop schedule will be re-evaluated to better meet the needs of the ACS community.
- CINF members will use this information to develop specific chemical safety information services.
- CCS and DivCHED safety committee will prioritize and develop best practice guidance for chemistry teaching and research labs based on the information from this project.

Budget:

Please complete the budget table below (for this form to calculate correctly, enter dollar amounts without commas and without dollar signs). Note the following: Up to $7500 can be requested per proposal. Maximum annual funding per Division is $12,500. Maximum funding for strategic planning is $2,000. Funding for joint applications with two identical proposals is limited to $12,500, split equally between Divisions.

Item:
Initial Analysis of fall 2015 survey results condu

Expense:
1000

Justification:
Estimate provided by CISER-SRI based on hourly rates

Item:
Development of survey questions

Expense:
4500

Justification:
Estimate provided by CISER-SRI based on hourly rates

Item:
Development of focus group questions

Expense:
3500

Justification:
Estimate provided by CISER-SRI based on hourly rates

Item:
Organize focus groups

Expense:
3500

Justification:
Estimate provided by CISER-SRI based on hourly rates

Item:
CCS Safety Advisory Panel project review

Expense:
0000

Justification:
CCS SAP annual meeting budget

Item:

Expense:
0.00

Justification:

Additional funds requested from other sources:
05000

Justification:
Annual meeting budget of CCS Safety Advisory Panel

Project Total:
17500.00

Total Requested from DAC:
12500.00

Assessment Plan:

How do you plan to assess the success of your proposed project? *

The success of the project will assessed by the development of a report on the results. The information developed will be provided to any ACS groups interested in improving their safety programming. Specific examples of such uses are:
- refreshing of the CHAS national meeting workshops
- development of chemical safety information tools by CINF members
- development of guidance documents from DivCHED and CCS

Describe the assessment tools you will use to measure success of the proposed project (i.e., surveys). *

CISER will guide testing of each phase of the survey development and outputs will include a systematic response analysis and summary of findings concerning chemical safety information use, professionally assisted by CISER-SRI.

In addition, over the next three years, we will stay in contact with ACS stakeholders to determine the value of the data collected and information developed in improving their safety programming in order to determine follow up information needs.

If funded, how will the outcomes of this project be used for future divisional planning? *

A strategic goal in the CHAS strategic plan of 2015 (partially funded by a 2014 IPG) is "CHAS will be the preferred and accepted resource for authoritative chemical health and safety information." One of CINF's strategic goals is to "Expand multi-disciplinary collaboration and outreach within ACS... to connect globally and share knowledge." The information to be developed by this project is fundamental to achieving both of these divisional goals as well as informing future strategic planning.

Questions? Contact division@acs.org.