RESEARCH SAFETY SURVEY RESULTS

FALL 2015

Research Safety Survey

In 2014, Provost Mary Ann Rankin, Vice President and Chief Research Officer Patrick O'Shea, and Vice President for Administration and Finance Carlo Colella established the University of Maryland's Expectations for Conducting Safe Research and invited the research community to participate in the Research Safety Survey.

The survey was aimed at better understanding current safety practices, perceptions, and attitudes within the research community, with the goal of identifying ways that the University can best support a culture of safety in research activities. The survey results were evaluated against the Expectations for Conducting Safe Research.

Also in 2014, the National Academy of Sciences (NAS) released a report authored by a committee of experts in chemistry, laboratory safety management and university administration, *titled "Safe Science: Promoting a Culture of Safety in Academic Chemical Research*." The Expectations for Conducting Safe Research and the questions in the Research Safety Survey closely correlate with areas of focus and recommendations in the NAS report. This allows us to gauge our strengths and areas for improvement against a broader picture of academic research safety culture.

Expectations for Conducting Safe Research

1. **Demonstrate a Commitment to Safety** Lead by example, adhere to the rules and be willing to speak up if you see unsafe practices. Faculty and other supervisors are expected to put safety on the agenda and build it into the way their group works and thinks.
2. **Assess and Plan for Hazards and Risks** Take the time to systematically assess risks and plan for the hazards identified. Incorporate safety into laboratory standard operating procedures.
3. **Implement Controls** Take action to control your risks. Make sure you have the right protective equipment and that engineering controls are working correctly. Principal investigators must enforce the established rules in their lab.
4. **Complete Safety Training** Ensure that new researchers have the knowledge and skill to safely perform their research activities. It is the responsibility of the principal investigator to ensure that researchers receive research specific safety training.
5. **Strive for Continuous Improvement** Research is not a static endeavor. Managing safety requires ongoing reassessment, feedback and reinforcement. Encourage reporting and resolve safety concerns. Involve all lab members when identifying and reviewing lessons learned after incidents and near misses.

Survey Description

The Research Safety Survey was approved by the Institutional Review Board (IRB) and all responses were anonymous. The Office of Research Safety, part of Environmental Safety, Sustainability and Risk (ESSR), administered the survey.

The survey branched into two paths, one for respondents answering "yes" to the question "Are you a principal investigator?" and one for respondents answering "no." A principal investigator is the person who assumes full responsibility for a research project, including the supervision of co-investigators, research assistants, staff, and students. The survey consisted of 40 multiple choice questions covering demographics, frequency of hazardous materials use, laboratory safety perceptions and practices, and resources that would help improve safety in the lab. Respondents were asked to answer based on their work at the University of Maryland over the past two years.

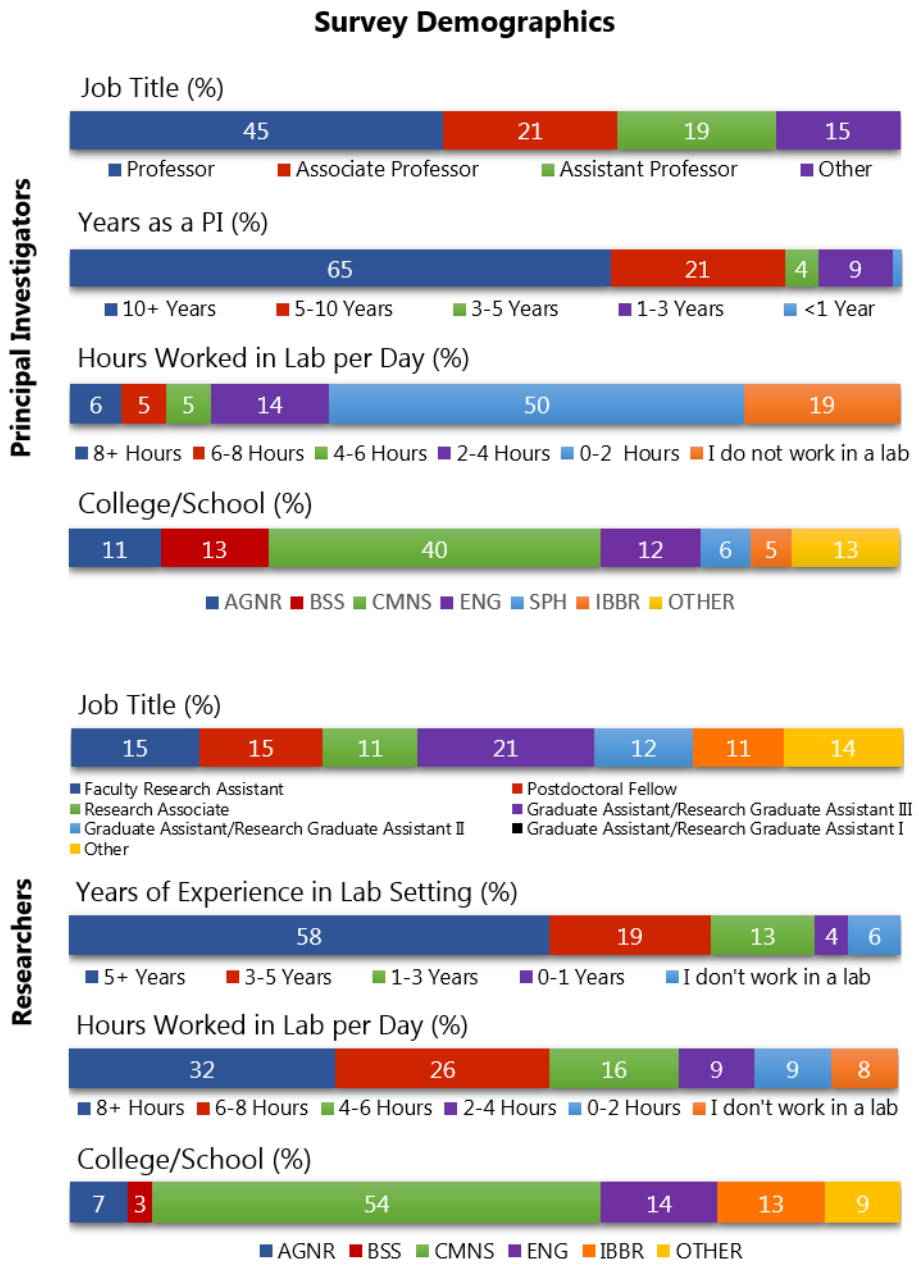
Survey Demographics

A total of 81 principal investigators and 143 graduate students, postdoctoral fellows, faculty research assistants, and other researchers completed the survey. It is estimated that these numbers represent 15-20% of principal investigators and 4-7% of researchers working in laboratories at the University of Maryland and the Institute for Bioscience and Biotechnology Research (IBBR).

One survey question asked the frequency of use of hazardous materials or operations. 84% of all survey participants indicated that they work with at least one of the listed materials or operations, and 75% indicated that they work with at least one high hazard material or operation (pyrophorics, acute toxins, pathogenic microorganisms or electrical hazards).

Evaluating the Data

The questions about laboratory safety practices and perceptions used five point Likert and Likert-type scales (strongly agree to strongly disagree, and always to never). The percentage of positive responses to each question was calculated for principal investigator (PI) responses, researcher responses, and all responses combined. Positive responses were identified as the sum of the two positive scale options, for example "strongly agree" and "agree." The data was then evaluated to look at the difference between positive responses from principal investigators and positive responses from researchers when the question appeared on both survey paths. A larger difference between principal investigator and researcher responses (Δ) indicates a gap in perceptions, and a smaller Δ indicates a consistency in perceptions.



Responses from those working with high hazard material or operations were compared to the responses from all participants and were found to be similar.

The overall margin of error for the survey was 7% with a 95% confidence level.

Summary of Survey Results

Demonstrate a Commitment to Safety and Strive for Continuous Improvement (Expectations 1 & 5)

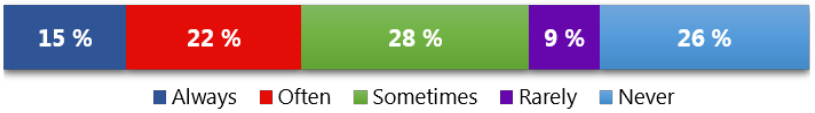
Three areas emphasized by these expectations were addressed in this survey:

1. *Making safety a priority, being willing to speak up if a colleague is working unsafely and encouraging the reporting of safety concerns.* The NAS report lists these as key actions for principal investigators and researchers and the results of this survey show that these are areas of strength in our research labs. The responses to these questions were positive and the Δ was small, less than 10%.

Question	Positive Responses (%) PI	Researcher	Δ
Members of my lab/I can report or address unsafe conditions without fear of reprisal.	96	87	9
I encourage/I feel comfortable reporting safety issues even if it costs money or delays research.	93	84	9
I am comfortable approaching a colleague working unsafely	86	83	7
PI has established clear rules/restrictions for working alone in the lab.	81	50	31
I/my PI provides feedback about lab members/my safety performance.	75	45	30
PI enforces safety rules established for the lab.	91	69	22
Safety mistakes are an opportunity to learn rather than find fault or blame.	89	78	11

2. *Establishing, communicating and enforcing safety rules in the laboratory.* The results indicate that these are areas for improvement. Overall, responses from researchers were less positive than responses from PIs when answering questions focused on these areas. The differences between PI and researcher responses to questions about safety rules and feedback highlight the challenges of communication in an environment in which principal investigators have limited time to spend in their labs. The demographic data shows that 50% of PIs who participated in this survey spend less than two hours per day in the lab compared with 58% of researcher respondents who spend six or more hours per day in the lab. Survey results indicated a range of practices with regards to delegation of safety responsibilities, with a majority (65%) of PIs at least partially utilizing this strategy. Delegation of responsibilities can be an effective tool for managing safety provided the responsibilities delegated are clearly communicated, the person delegated is given the guidance and support to accomplish the task and there is ongoing recognition of the importance of the role within the lab. Given time constraints and the challenge of turnover in academic research labs, we would expect delegation to continue. This suggests that developing and providing support to faculty and departments on establishing delegated safety roles should be an area of focus for future research safety efforts.

Do you delegate responsibility for safety compliance to a member of your lab?
(PIs who work 0-2 hours/day in lab)



3. *Learning from incidents and near misses.* The NAS report concluded that incident and near miss reports are important learning tools for laboratory safety and recommended that organizations incorporate non-punitive incident and near miss reporting as part of their safety cultures. In this survey, 82% of all participants responded positively when asked if safety mistakes are an opportunity to learn rather than find fault or blame, while only 64% responded positively when asked if lessons learned from lab accidents and/or near misses are discussed in the lab. This suggests the need for increased reporting of incidents and near misses and the dissemination of lessons learned to the research community.

Assess and Plan for Hazards and Risks (Expectation 2)

This expectation emphasizes *assessing risks, planning for hazards, and incorporating safety into laboratory procedures*. The NAS report found that hazard analysis is not routinely incorporated into experimental designs and procedures in academic research labs. The report states that routine hazard analysis is a critical component in research planning and execution, and is an element of a strong, positive safety culture. The results of the survey indicate that this is an area for improvement in our research labs. Overall, the percentage of positive responses was lower and the Δ was larger for questions focused on these areas. The results suggest the need for additional education and resources for identifying and assessing hazards and risks and including this information in laboratory procedures.

Question	Positive Responses (%) PI	Researcher	Δ
Prior approval is required for new hazardous materials or experimental procedures in my lab.	92	68	24
Written procedures that include safety are available for the experiments performed in my lab.	83	68	15
Documented hazard identification and hazard assessments are performed for all new experimental procedures and when hazards change.	79	65	14

Implement Controls and Complete All Safety Training (Expectations 3 & 4)

Hazard controls and safety training are traditional areas of focus for research safety, and the survey results indicate that they are areas of strength in our research labs. Two areas emphasized by the university's expectations were addressed in the survey:

Question	Positive Responses (%)		
	PI	Researcher	Δ
I/PI ensures all researchers in lab receive training necessary to work safely before beginning work with hazardous materials/equipment.	93	82	11
Training on handling specific hazardous materials is provided in my lab.	85	78	7
Training on proper and safe use of lab equipment is provided before lab members are allowed to use it.	90	86	4
I wear the required protective equipment when I am working in the lab.	92	89	3

1. *Selecting and using appropriate controls to minimize exposure to hazards in the lab.* The questions in the survey that addressed controls focused on the availability and use of personal protective equipment. The responses to these questions from all survey participants were positive and the responses from principal investigators and researchers were consistent.

2. *Ensuring lab members have the training necessary to conduct their research in a safe manner, including laboratory specific training.* The NAS report found that classroom and online training is necessary but not sufficient to ensure knowledge, skills, qualifications, and abilities to perform safely in a laboratory environment and to establish a strong, positive safety culture. Two questions in the survey addressed laboratory specific training, one focused on equipment and the other on hazardous materials. A difference was observed in the positive responses to these two questions. 88% of all participants responded positively to training on the proper and safe use of equipment, while 79% of all participants responded positively to training on handling specific hazardous materials. Laboratory safety training provided by health and safety departments has traditionally focused on the safe use of hazardous materials. The survey results showing a lower percentage of positive responses to this question may reflect the common notion that this is sufficiently covered by the classroom or online health and safety training.

Resources and Actions to Improve Laboratory Safety

One survey question asked participants to identify what they think would improve safety conditions in their lab. Participants were asked to select up to five choices from a list of resources and actions. This table summarizes the top five choices of principal investigators and researchers. The resources and actions selected align with the areas for improvement identified by the survey results.

Principal Investigators		Researchers	
Resource or Action	%	Resource or Action	%
Laboratory self-inspections.	45	Laboratory self-inspections.	34
Safety discussions during lab meetings.	41	Safety discussions during lab meetings.	28
Increased guidance/support from DES.	23	Increased guidance/support from DES.	28
Improved written safety procedures and guidelines.	20	Formal risk assessment tools and training.	25
Additional training by DES.	19	Additional emergency planning tools and training.	25

Next Steps

During the past year, we have used the results of this survey to direct the Office of Research Safety efforts. Moving forward, we will continue to develop, expand and strengthen our resources to help the research community better address the challenges of managing safety in the laboratory. We plan to perform a follow-up survey to assess the effectiveness of our efforts.

For additional information about the survey and results, please contact Karen Kelley, Manager, Research Safety at 301-405-3960 or labsafety@umd.edu.