FDP Faculty Lunch Forum

Promoting a Culture of Safety in Laboratory Science

Alice Young, Texas Tech University
Robert Nobles, University of Tennessee

September 3, 2015

Who does safety in our labs & studios?

UCLA 2008

Texas Tech 2010

Yale 2011

VA 2012

Can we move forward by

- Framing conversations about lab practices and safety culture as responsible conduct of research?
- Including risk/hazard analysis as explicit component of student work?
- Including safety leadership as component of evaluations for
  - Faculty?
  - Students?
  - Chairs, Deans, Presidents?

http://www.labsafetyinstitute.org/MemorialWall.html
http://www.csb.gov/texas-tech-university-chemistry-lab-explosion/

… safety …

“Yale student dies in chemistry lab accident”
CBS News, Apr 2011

“A Higher Bar for Pathogens, But Adherence Is an Issue”
New York Times, May 2010

“A Pfizer Whistle-Blower Is Awarded $1.4 Million”
New York Times, Apr 2010

“U. of C. researcher dies after exposure to plague bacteria”
Chicago Tribune, Sept 2009

“HIGH-CONTAINMENT LABORATORIES: National Strategy for Oversight Is Needed”
GAO Congressional Testimony Report, Sept 2009

“Microbiology labs linked to nationwide salmonella outbreak”
MSNBC, April 2011

“Danger in School Labs: Accidents Haunt Experimental Science”
Scientific American, Aug 2010

“UW employee infected in lab where unauthorized experiments happened”
Associated Press, May 2010

“Safety Rules Can’t Keep Up With Biotech Industry”
New York Times, May 2010

“Six accidents at Los Alamos National Laboratory since July have revived safety questions about operations”
Associated Press, Feb 2010

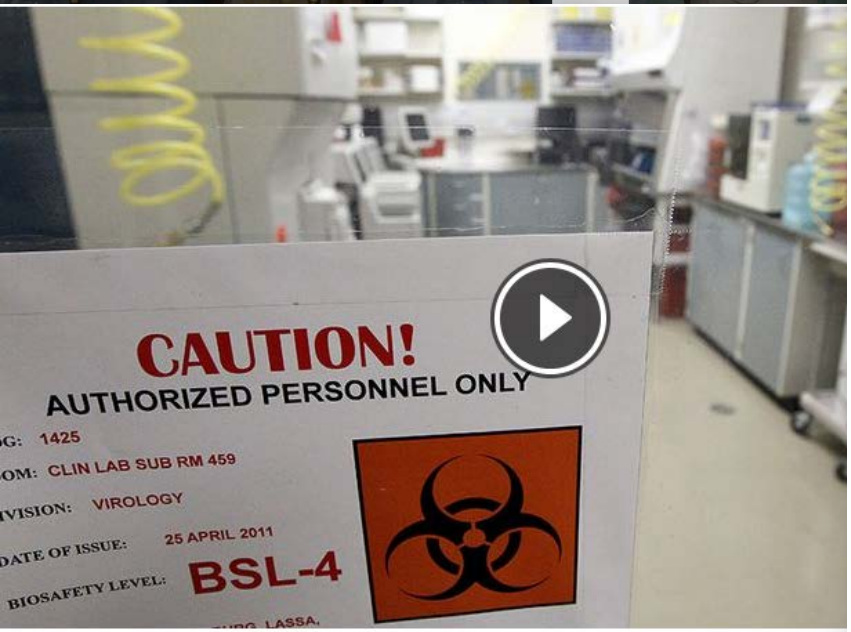
“Texas A&M to pay $1 million fine to end ban on biodefense research”
Dallas Morning Star, Feb 2009

USA TODAY NEWS SPORTS LIFE MONEY TECH TRAVEL OPINION 78° CROSSWORDS YOUR TAKE ELECTIONS 2016 MORE

Inside America's secretive biolabs

INVESTIGATION REVEALS HUNDREDS OF ACCIDENTS, SAFETY VIOLATIONS AND NEAR MISSES PUT PEOPLE AT RISK

Alison Young and Nick Penzenstadler, USA TODAY



A USA TODAY Network investigation identifies more than 200 biosafety level 3 and 4 lab facilities that work with dangerous pathogens -- and reveals safety records that some of them fought to keep secret.

(USA NEWS, USA TODAY)

Limitations of self-policing

SOME RESEARCHERS IGNORE BIOSAFETY RULES

http://www.usatoday.com/story/news/2015/05/28/biolabs-pathogens-location-incidents/26587505/

Universities, feds fight to keep lab failings secret

Alison Young and Nick Penzenstadler, USA TODAY 4:31 p.m. EDT May 28, 2015

(Photo: USDA)

Transparency is an important cornerstone in maintaining public trust in biological research, says the National Institutes of Health, which has issued guidance to laboratories that receive federal funding. While many research organizations answered USA TODAY's questions and provided basic records about their biosafety committees' work, dozens of others were not so forthcoming.

Some ignored information requests or attempted to charge hundreds of dollars in fees for records they are required to make public as a condition of their federal research funding. Others sought to conceal information about the pathogens they experiment with, lab mistakes or disciplinary actions taken by federal regulators. One lab even lobbied its state legislature for a bill to exempt its research records, citing USA TODAY's request for its biosafety records.

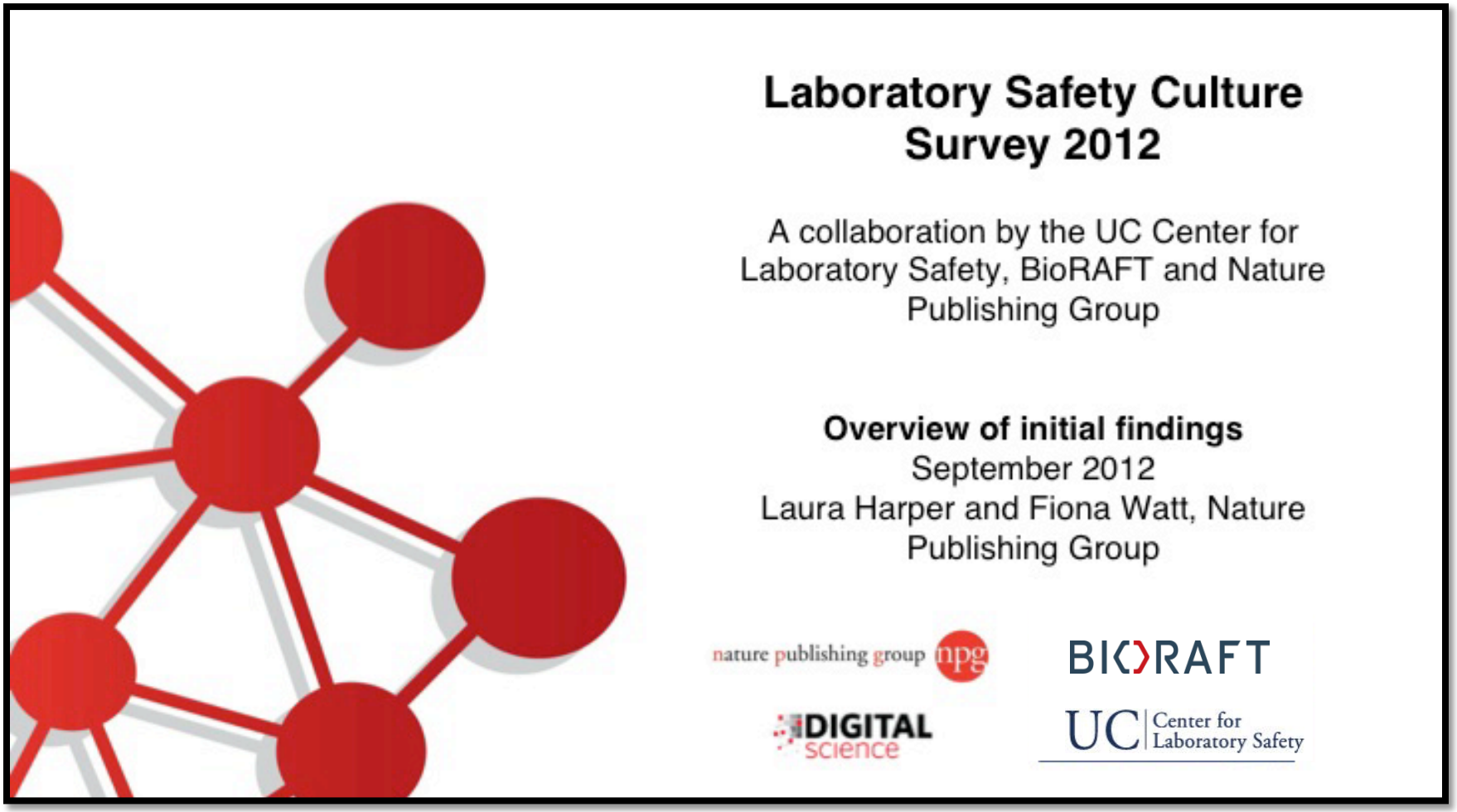
USA TODAY
Inside America's secretive biolabs

Several labs claimed that bioterrorism laws prohibited them from releasing any information about their work with pathogens designated as select agents — the regulatory term for viruses, bacteria and toxins that have the potential to be used as bioterror weapons. And many persisted in these claims even after reporters pointed out the labs' own press releases, websites and research papers touting their work with these same pathogens.

Regulators from the Federal Select Agent Program told USA TODAY there are no rules or laws restricting labs from discussing the type of select agent work they do or the names of the pathogens involved. The only prohibitions involve specific information about security measures — such as locations of keys or security codes.

"With the exception of specific security information (such as IT system passwords, key locations and lock combinations), the select agent regulations place no restrictions on

http://www.usatoday.com/story/news/2015/05/28/labs-fight-for-secrecy/26530719/



View full report

Nature news: http://www.nature.com/news/safety-survey-reveals-lab-risks-1.12121

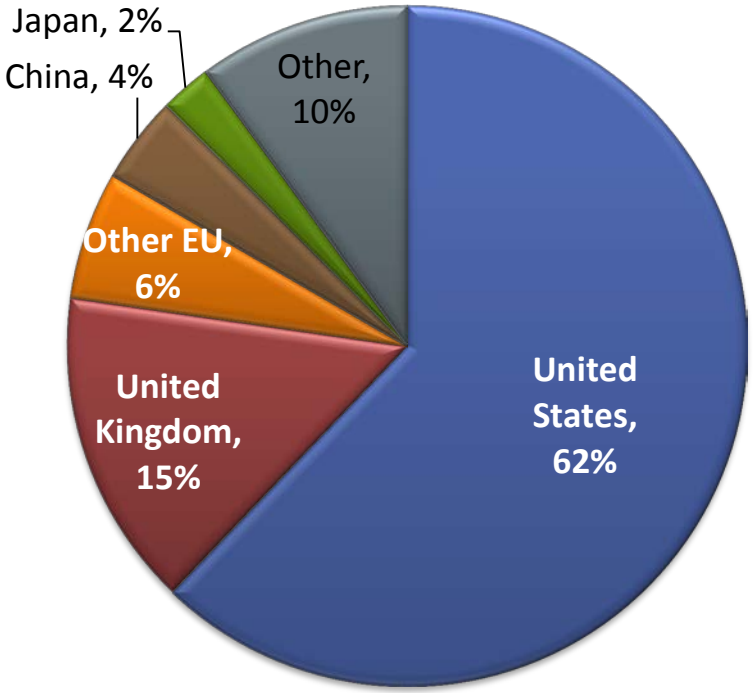
2375 Respondents

Avg. Lab group size: 11

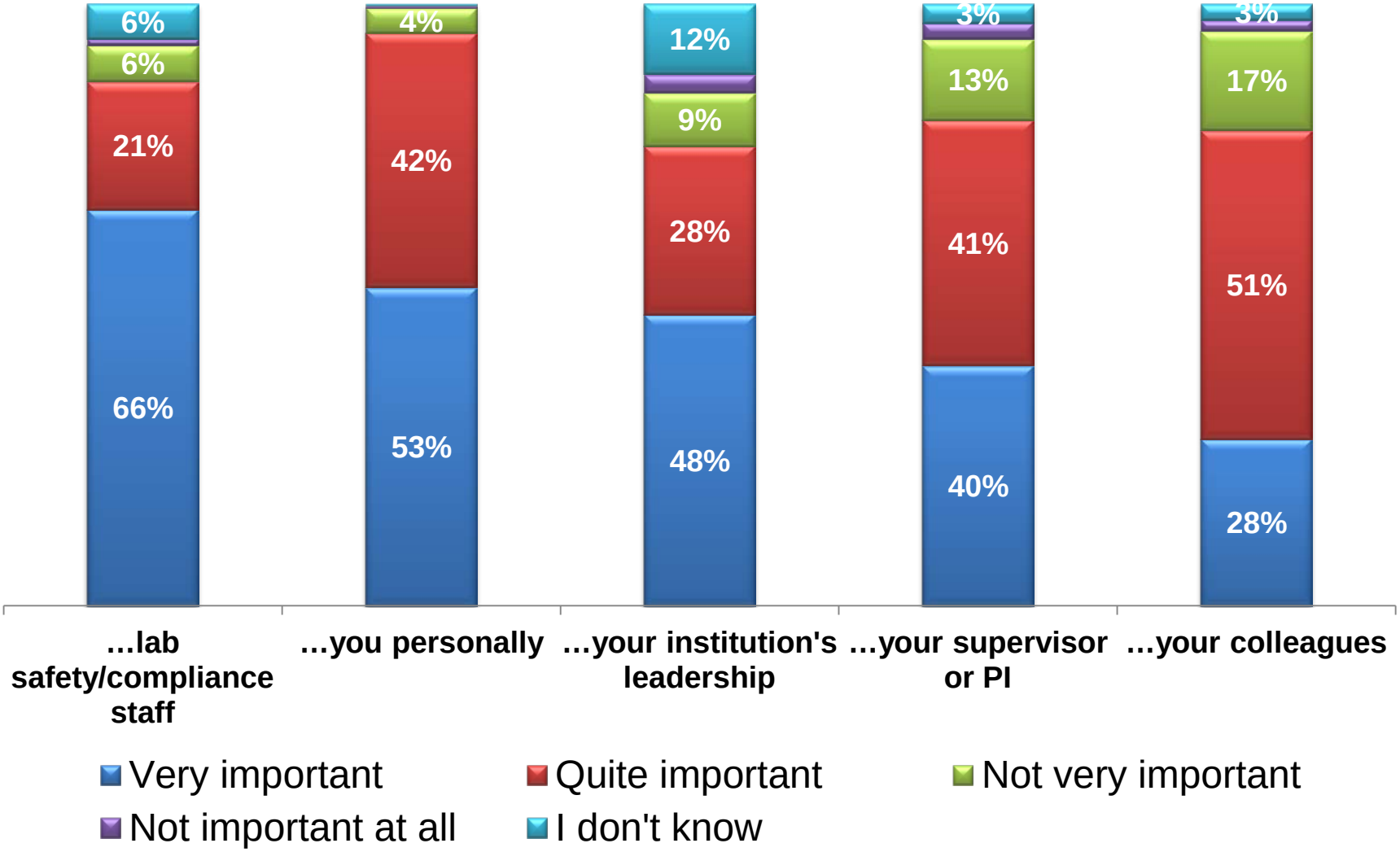
Avg. years in research: 13

Avg. years in current lab: 6

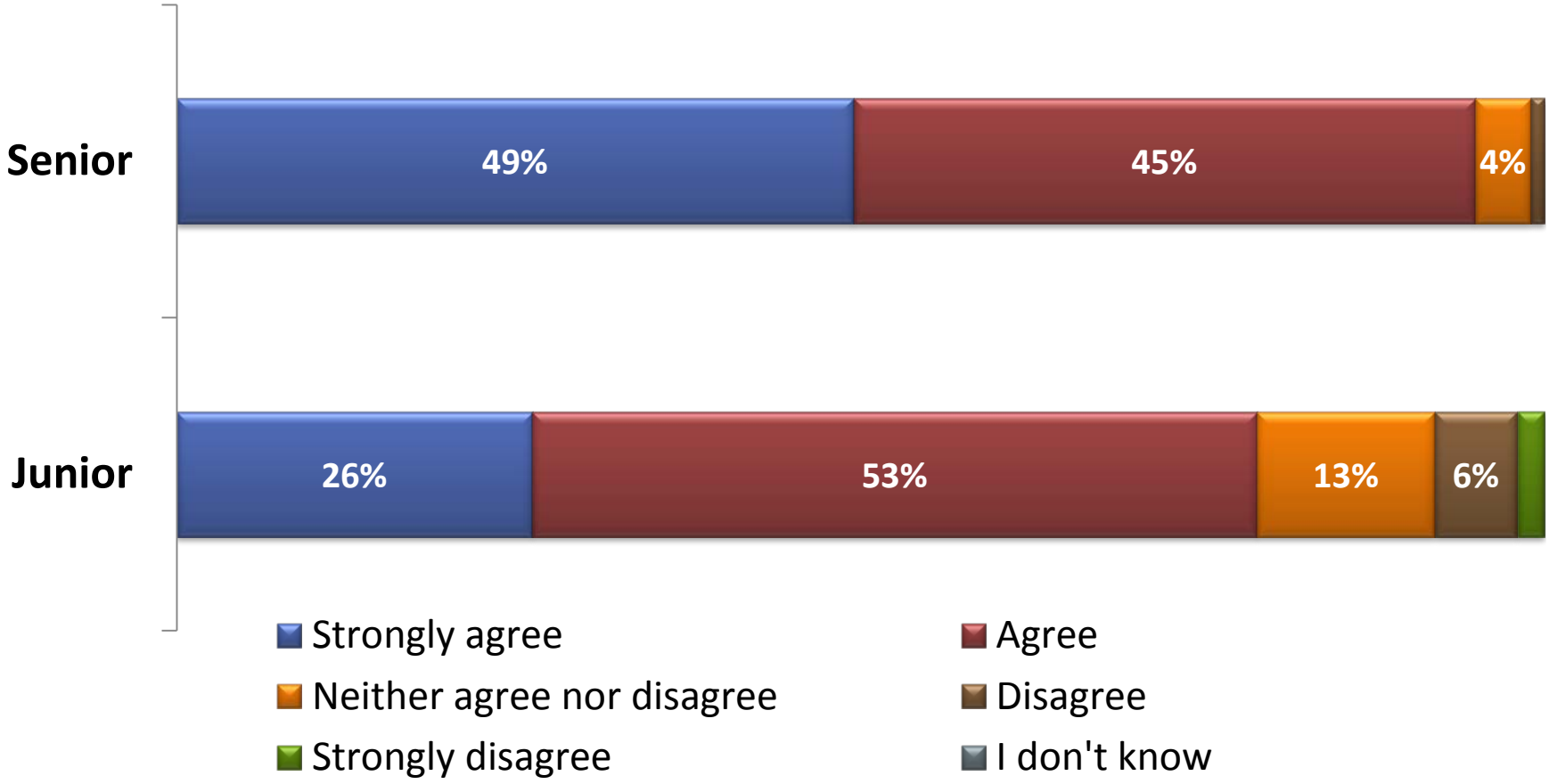
Seniority level	Number	Avg Hours in lab per week
Junior	1091	40
Senior	643	22



Importance placed on safety by…



"Appropriate safety measures in my lab have been taken to protect employees from injury"

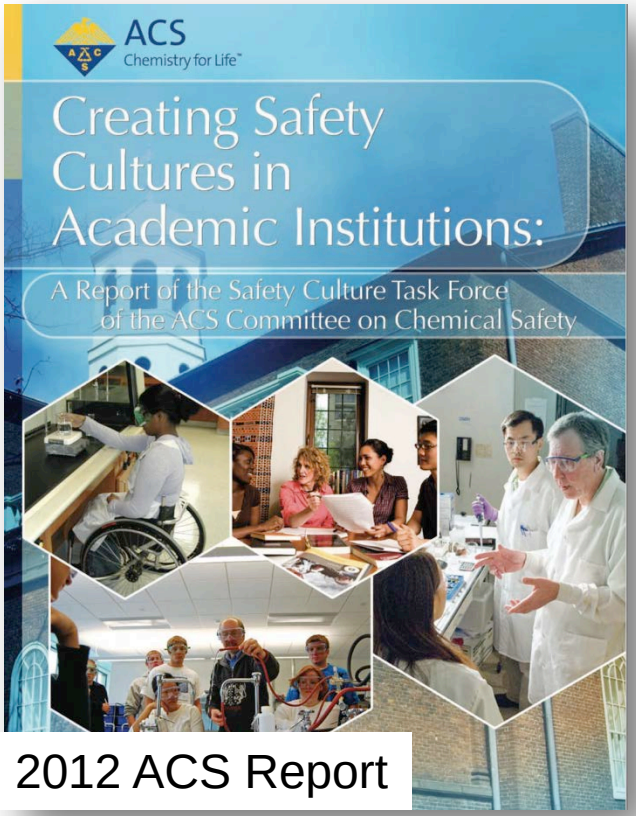


Where ***exactly*** do the laws say we have to do this...?

… but I already took the safety training course…

Show me the data that this will make us safer!

Overviews of challenges



2012 ACS Report

2014 NRC Report

Links:

- http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/academic-safety-culture-report-final-v2.pdf
- http://www.nap.edu/openbook.php?record_id=18706

Key actors

Principal Investigators and Department Chairs

Laboratory Researchers

University Senior Leaders

Deans and Vice Presidents for Research

Environmental Health and Safety Staff

SAFE SCIENCE

Actions for Principal Investigators and Department Chairs

Interest in promoting safety in academic research laboratories has grown in recent years, following high-profile incidents in which researchers were injured or killed. Many colleges and universities want to go beyond complying with regulations to fostering a safety culture: affirming a constant, institution-wide commitment to safety and integrating safety as an essential element in the daily work of researchers.

A report from the National Research Council, *Safe Science: Promoting a Culture of Safety in Academic Chemical Research*, identifies steps that everyone involved in research and other activities using chemicals—from researchers to principal investigators to university leadership—should take to create and promote this approach to safety.

As principal investigators, you have enormous influence over the culture in the laboratories, which you lead. In many ways, you set the tone for the standard of safety that will be implemented. The principal investigator and the entire institution are responsible for promoting safety and providing the resources and training needed to work safely. Day-to-day actions and practices that lead to safe laboratories demand that you, as PIs, encourage participation, commitment, and leadership among your research team (or group), whose safety is at stake.

ELEMENTS OF A STRONG LABORATORY SAFETY CULTURE

An ideal laboratory safety culture ensures that anyone who enters a laboratory, from inexperienced students to senior investigators, understands that they are entering an environment that requires special precautions. They are aware of the hazards posed by the materials they and others in the lab are working with, and they are prepared to take immediate and appropriate measures to protect themselves and their co-workers, especially in the case of unexpected events. At a minimum, laboratory safety includes:

- awareness of the physical and chemical properties and health hazards of laboratory reagents and equipment being used, gained by conducting hazard analysis,
- availability and use of proper apparatus and infrastructure needed to carry out the procedure safely,
- knowledge of and ability to execute any additional special practices necessary to reduce risks,
- use of proper personal protective equipment,
- access to a well-organized workspace that facilitates unrestricted movement about the laboratory and appropriate segregation of materials and processes, and
- familiarity with emergency procedures, including the use of safety showers, fire extinguishers, and eye stations.

A strong, positive safety culture encourages all laboratory workers to place the highest priority on these practices. It is not enough to provide safe equipment, systems, and procedures if the culture of the organization does not encourage and support working safely.

One of the barriers to the development of safety culture in academic laboratories is the attitude that safety practices inhibit research productivity. But the occurrence of a serious incident in a laboratory, in addition to being a tragedy in itself, stops research and is certainly a dramatic impact on research progress, as anyone who has experienced or witnessed such an incident can attest.

It is part of the academic culture for researchers to work long hours, late at night, and often alone. These practices may reflect a pressure to produce results, influenced by power dynamics that are antithetical to the advancement of a strong safety culture. No amount of productivity justifies carrying out hazardous procedures alone and with inadequate sleep.

Safety is a core element of responsible research, not an impediment to it. Good science is safe science, fostering a productive and secure work environment. Like publishing papers and acquiring grants, conducting research safely is key to the success of a research group, and it must be held in high academic esteem.

ACTIONS FOR PRINCIPAL INVESTIGATORS

Academic research faculty play primary roles in laboratory safety and in developing and maintaining an effective safety culture within their research groups. Principal investigators should take the following steps to promote this kind of culture:

Encourage open and ongoing dialog about safety. Graduate students and other research staff are dependent, financially and educationally, upon principal investigators' grants and research projects. This sense of dependence may inhibit them from raising safety concerns because of fear that the principal investigator will feel that they are less focused on

Promoting a Culture of Safety in Academic Chemical Research

Components of positive safety culture: When I enter a lab, I understand

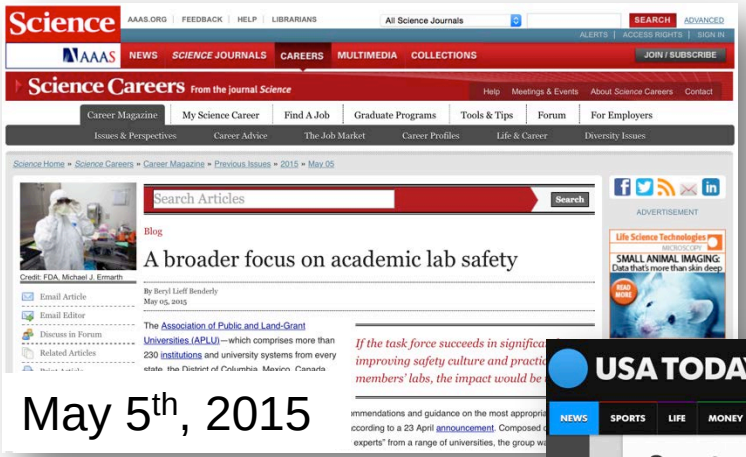
- … I'm entering environment that requires special precautions,
- ... the hazards posed by materials & processes used,
- … and how to take immediate and appropriate measures to protect myself & my co-workers, especially in the case of unexpected events.
- At a minimum, laboratory safety includes:
  - genuine awareness of the properties & hazards of reagents, equipment, & processes being used
  - availability & use of apparatus, PPE, & infrastructure needed to work safely
  - knowledge of & ability to execute any practices necessary to reduce risk

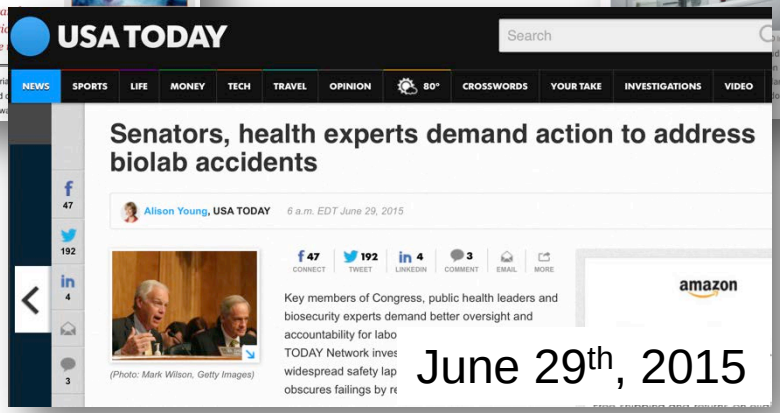
Components of positive safety culture: Focus on culture, not compliance

Do our expectations and practices support …

- hazard analyses as regular, expected part of academic work?
- ‘safe’ spaces to raise safety concerns?
- hands-on skills and robust use of EH&S consultation?
- talking about safety in standard academic venues (lab meetings, seminars, papers, talks, grant proposals, P&T)?
- use of scarce financial resources to support infrastructure and resources needed for safety and regulatory compliance?
- safety leadership as a core element of academic success?

APLU - National 360





- UCLA, TTU, Yale accidents
- NIH Guideline
- OSTP, NIH, other federal agencies forming biosafety task force

- Corporate hiring practices
- Governing Boards and Enterprise Risk Management

APLU Lab Safety Task Force

- Since 2013, APLU Council on Research (CoR) has sought to proactively address the lab accident epidemic on campuses.
- Sense that academic leaders must be proactive change agents
- Concerns about risk management, federal agency action, faculty workload burden
- Formal Task Force established in 2014, involving APLU, AAU, COGR, ACS

APLU Task Force Charter

Key points:

- To highlight common safety risks within academic laboratories.
- To assess and benchmark innovative mechanisms to prevent and manage laboratory safety incidents.
- To confer with laboratory safety experts from governmental or non-governmental organizations focused on enhancing domestic laboratory safety standards.
- To assess regulatory and other national initiatives to enhance the culture of laboratory safety.
- Make recommendation as action items.

Task Force Members

- Taylor Eighmy (Chair), University of Tennessee, Knoxville
- Mark McLellan (Co-chair), Utah State University
- Gene Block (Honorary Chair), UCLA
- Kimberly Espy, University of Arizona
- Mridul Gautam, University of Nevada, Reno
- Kimberly Jeskie, Oak Ridge National Laboratory
- Dawn Mason, Eastman Chemical Company
- Jan Novakofski, University of Illinois at Urbana-Champaign

Task Force Members (continued)

- Patty Olinger, Emory University
- Joanne Polzien, Michigan Technological University
- Lesley Rigg, University of Calgary
- Tim Slone, University of North Carolina at Greensboro
- Ara Tahmassian, Harvard University
- Erik Talley, Cornell University
- William Tolman, University of Minnesota Twin Cities
- Nancy Wayne, University of California Los Angeles
- Alice Young, Texas Tech University

Task Force Staff

- Steve Bilbao, Utah State University
- Robert Nobles, University of Tennessee, Knoxville
- Kacy Redd, APLU

Thanks to Taylor Eighmy, Mark McLellan, Kacy Redd, Howard Gobstein, and Ara Tahmassian for the APLU slides.

Listening Sessions

During 2015, the Task Force met, often online, with a range of stakeholders to hear their perspectives. So far:

- May 6: NRC, ACS, CSHEMA, AAHRP
- June 8: AAALAC
- June 15: COGR, FASEB, FDP, AAU
- June 18: NIH
- June 31: CoR
- August 3: URIMA
- August 14: NACUA
- August 14: NACUBO
- August 17: ACS
- September (date TBD): CUR and NPDA
- November (date TBD): CASS (deans)
- TBD: NACUA

Draft Approach: Framing Vision and Mission of Task Force

- Advocating for a proactive call to all universities to embrace ***a renewed commitment to improve the safety culture*** for all academic research, scholarship, and teaching.

Draft Approach: Suggested Core Institutional Values

- Safety is a component of scholarly excellence and responsible conduct of research.
- Our campus environments must ensure the health and safety of our entire community.
- Improved focus on safety is critical to our students' careers.
- We are determined to create a culture to ensure risk reduction.
- As safety cultures are developed, one size does not fit all. We need diverse and flexible approaches and methods that involve the entire campus community.

Draft Approach: Primary Recommendation

- *APLU and AAU should call upon all academic institutions to renew their commitment to improve the safety culture for all academic research, scholarship, and teaching.*
- *Letter from APLU and AAU leadership to all universities with a copy of the Task Force report*
- *Tool Box that institutions can use to strengthen their culture and practices*

Draft Approach: Letter to Presidents RE

- What we value.
- National reports and recent incidents and accidents (*e.g.*, UCLA, Yale, TTU, Biosafety and federal labs, NIH plan)
- Asking all academic institutions
  - to use APLU Tool Box as they chart a direction.
  - to look beyond the research lab and embrace a commitment to improve safety in labs, studios, teaching classrooms, and field sites.
- Importance of Presidents acting to publicize their commitment and expectations within their institutions.
- APLU plans to recognize exemplary programs and to sponsor an annual safety culture award.

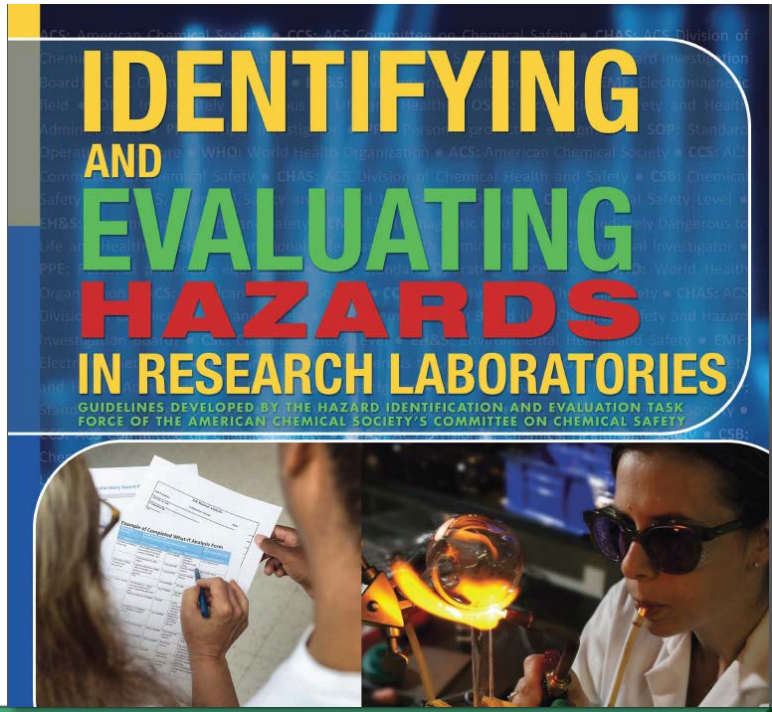
Draft Approach: A Safety Tool Box

- Path and rate of change around cultural adoption is unique to each institution. One size does not fit all.
- Each institutions can best select the tools that best work for them.
- Tools in the Tool Box are expected to evolve.
- The most useful Tools will likely focus on cultural change rather than compliance.
- Accreditation is not a component of the Tool Box.

Draft Approach: Tool Sets to support …

- Institution-wide dynamics and resources
- Data, hazard identification, & hazard analysis
- Training, learning, & application
- Continuous improvement
- Access to key resources

- Tools drawn from
  - Peer academic institutions
  - Industrial partners
  - National labs



http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/identifying-and-evaluating-hazards-in-research-laboratories.pdf

Proposed Remaining Schedule

- Continue obtaining input from stakeholders (Summer & early Fall)
- Finalize report (November)
- Draft letter (November)
- Present Tool Box to CoR (November)
- Formal letter from CoR to APLU, AAU, Chancellor Block (December?)
- Letter and report from APLU, AAU, Chancellor Block to APLU and AAU institutions (January 2016?)

Q&A

- What do you think will work to improve the safety culture in academia?
- Suggestions for Tool Box?
- Are you supportive of separating the safety culture push from compliance requirements?
- What are your thoughts about a lab safety accreditation equivalent to AAALAC or AAHRP?

FDP Faculty Forum

Thank you!

Questions?

Sept. 3, 2015
alice.young@ttu.edu

Additional details about APLU Draft Approach

- [to answer questions]

Draft Approach: Tools to Initiate Cultural Change

We are drawing heavily upon NAS and ACS recommendations. Possibilities include “start-up” tools to support:

- Campus dialogues among stakeholders
- Collegial relationships between faculty and EH&S
- Empowering Graduate & Undergraduate students
- Clarification and transparency of roles of all stakeholders
- A learning culture (celebrating learning from near misses), rather than a punitive culture
- Recognition and reward systems
- Incorporating language about safety expectations in hiring documents, annual performance reviews
- Academic and industrial/government partnerships
- Training for Students, Faculty, Department Heads, Deans

Draft Approach: Tools to Help Maintain Culture

- Tools to Help Win Hearts and Minds
- Training and acting Tools
- Operational Tools
- Assessment Tools
- Personal Accountability Tools

Draft Approach: Tools for Assessment

A. Internal self-assessment of culture and practices for programs. Tools might be used at the institutional level or at the sub-unit level (*e.g.,* departments, colleges, institutes).

B. External peer assessment of culture and practices, again at various levels. Tools might guide peer selection and review based on academic and research profiles and maturation of safety culture. Similar tools are common to the academy, especially around graduate program review.

C. External assessment from professional consulting organizations (e.g., paid review). Such tools are offered by organizations that work closely with industry and national laboratories.

D. CSHEMA model -- comprehensive and extensive campus-wide guided self-assessment. This tool requires a more extensive process than a, b, or c). Typically this is a year long process.

Draft Approach: Roles and Responsibilities

- President/Chancellor
- Provost
- Senior Research Officer
- Designated Lead for Safety
- Department Heads
- Faculty
- Students
- Job descriptions / hiring / personnel reviews / promotion

Draft Approach: Resources (examples)

- NRC report
- ACS reports
- CSB reports
- Lab Safety Institute web site
- UC System approach
- Stanford approach
- CSHEMA
- NIH/Federal Task Forces

Cross Referencing Underway

- Making sure we align our draft approach with relevant recommendations from NRC, ACS, others
- Looking at U.S. CSB recommendations regarding TTU
- Looking at "Laboratory Safety Attitudes and Practices: A Comparison of Academic, Government, and Industry Researchers (J. Chemical Health & Safety, 2015)
- Exploring OSHA "Culture of Safety" recommendations