# Improving Laboratory Safety and the Culture of Safety in Academic Laboratories

***American Society for Engineering Education***
***Engineering Research Council***
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UCLA

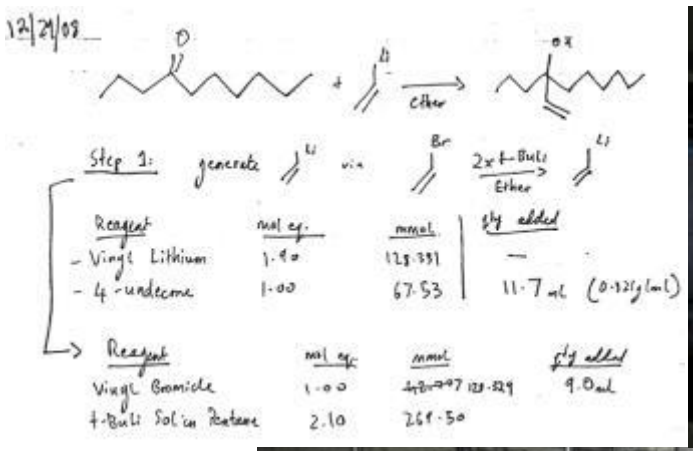
UC | Center for Laboratory Safety

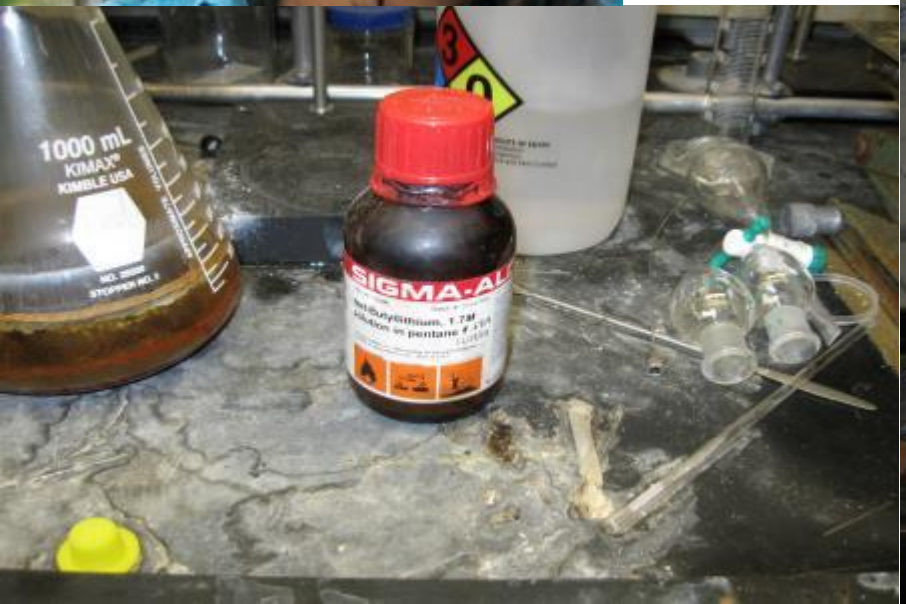
# Early Laboratory Conditions

# Modern Laboratory Conditions

# December 29, 2008

Sheharbano Sangji




# Accident Aftermath

**Repercussions across**

- UCLA campus
- University of California system
- Chemistry departments and universities nationwide
- Federal agencies
- Professional societies

A very tragic accident that truly changed academic safety practices and the academic culture of safety

# UCLA Response

**UCLA initiated a wide array of changes and activities in response to the accident, Cal/OSHA inspections, and legal fillings.**

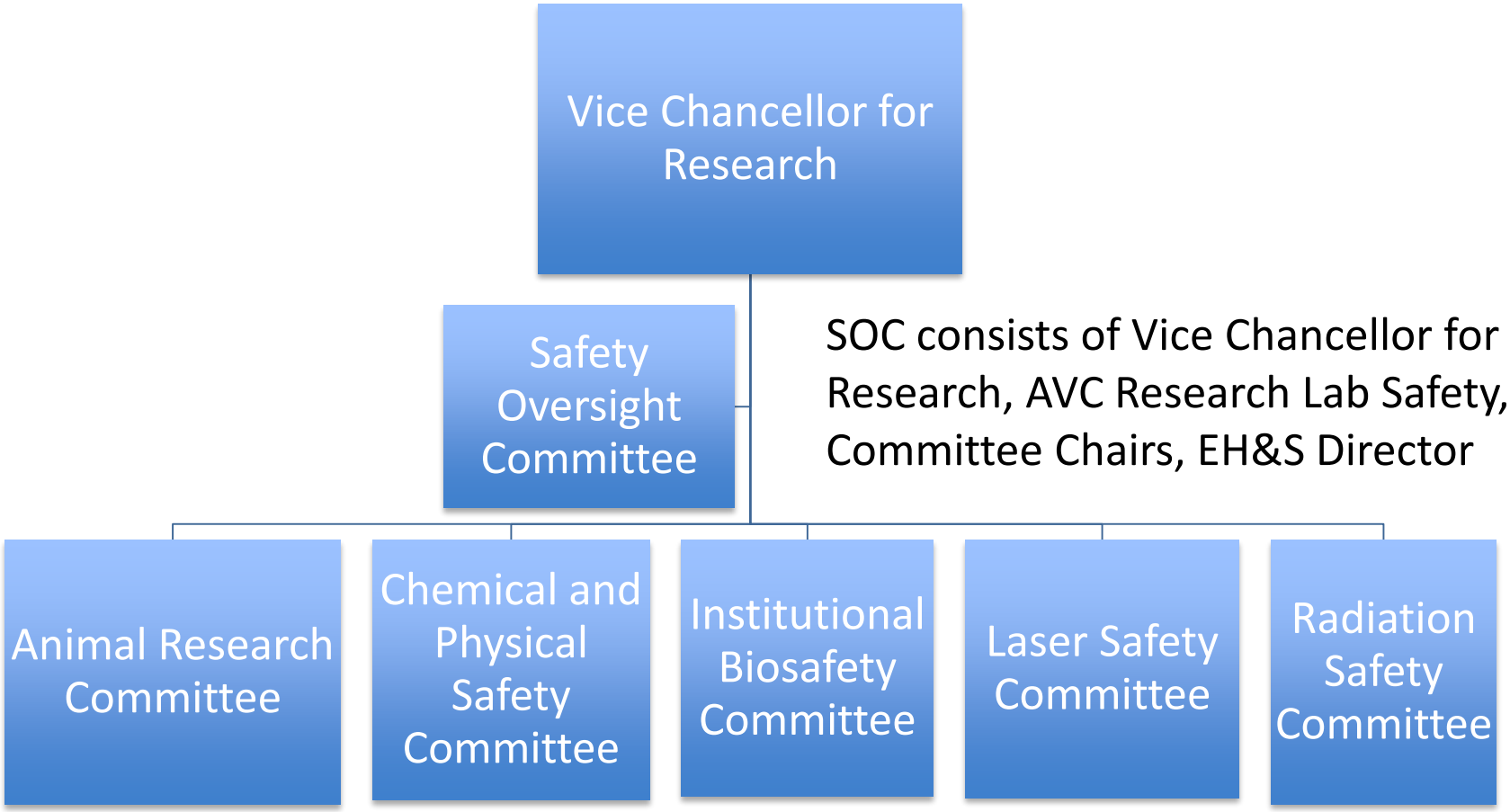
- Chancellor
- Vice Chancellor for Research
- Associate Vice Chancellor for Research – Laboratory Safety
- UC Center for Laboratory Safety
- Laboratory Safety Committee
- Environment, Health and Safety
- Departments
- Faculty
- Research Staff
- Graduate Students and Undergraduate Students

**Changes top to bottom were required to change the safety culture**

# UCLA Response: Chancellor's Office

- Chancellor made safety a high priority on campus
- Chancellor has allocated financial resources (mainly to EH&S) to meet increased safety demands
- Vice Chancellor for Research charged with follow-through
- Associate Vice Chancellor for Research – Laboratory Safety
  - *new position to coordinate safety activities*
- New structure for campus safety committees

# Administrative Structure for Safety




All committees are faculty-led

# UCLA Response: Environment, Health & Safety

- Increased staff
- Increased frequency and scope of inspections
- Revised inspection checklist and procedures
- Revised inspection reports
- Increased training programs
- Created Laboratory Hazard Assessment Tool (LHAT)
- Enhanced performance metrics
- Increased technical expertise – PhD Scientists
- Safety videos
- SOP library
- Safety incentive programs

# UCLA Response: Faculty

Defined Responsibilities and Required Engagement in Safety

- Required PI safety training – initial and annual
- Required monitoring of researchers PPE
- Required training of lab staff
- Required documentation of training
- Required response to inspections
- Required changes to lab maintenance
- Required changes to chemical storage and handling
- Required changes to lab protocols
- Required documentation of protocols

# UCLA Response: Graduate Students

**Requirements:**

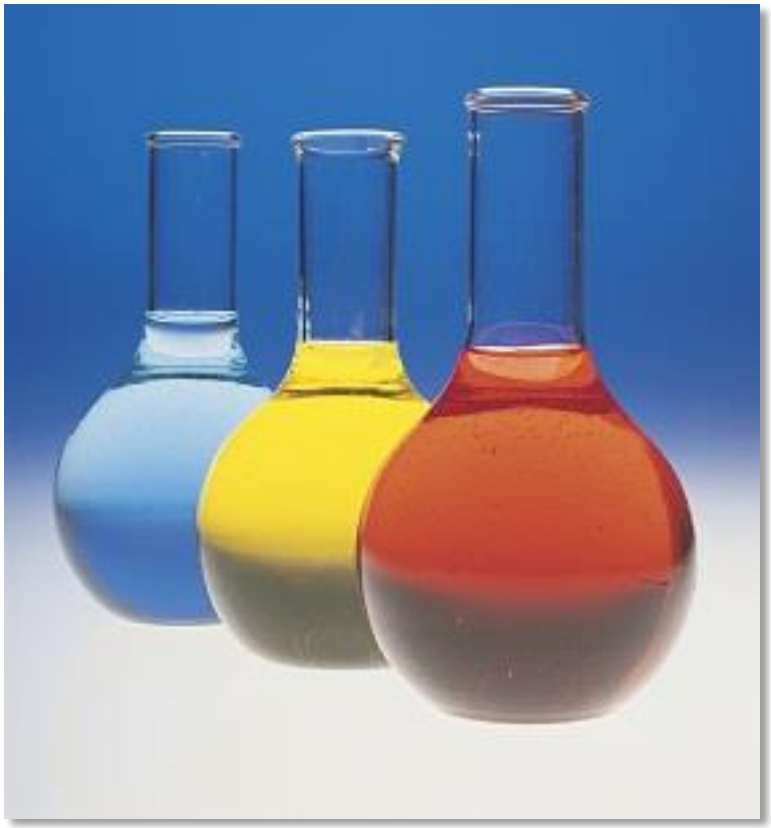
- Increased training
- Increased expectations
- Increased responsibilities

Front line for implementation of safety practices!

**Outcome:**

- Changed behavior regarding personal clothing
- Changed behavior regarding PPE
- Changed attitudes about safety procedures (mostly)
- Have active roles as Laboratory Safety Officers

# UC Center for Laboratory Safety



**Tripartite Mission**

- Conduct and Sponsor research in laboratory safety
- Develop evidence-based best practices for researchers
- Facilitate implementation and optimization of laboratory safety practices

Established in March 2011

# Safety Training Consortium

- Organization of research universities developing online safety training modules
- 40 University campuses to date
- Top quality and engaging online training modules
- Courses customized according to institution needs
- Priced near $1 per researcher per year

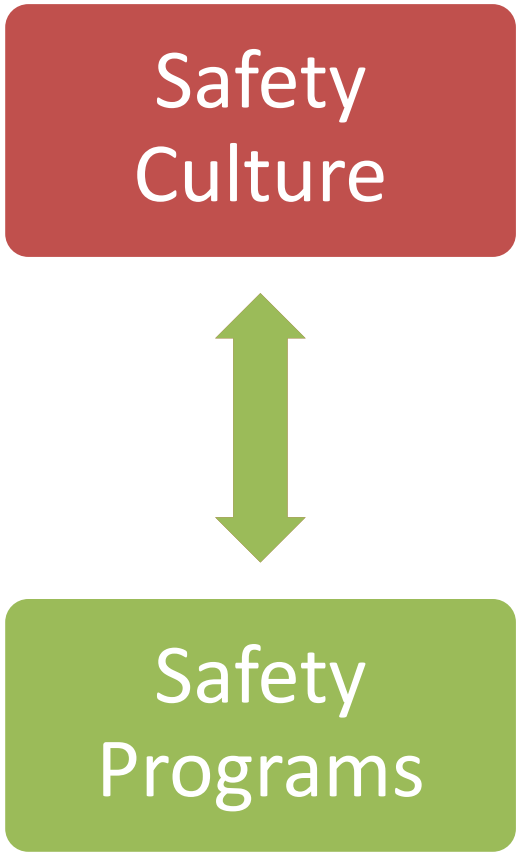
SAFETY TRAINING
CONSORTIUM

**Lab Safety Fundamentals**
**Animal Safety**
**Biological Safety**
**Chemical Safety**
**Laser Safety**
**Nanosafety**
**Physical Safety**
**Radiation Safety**

# Safety Programs

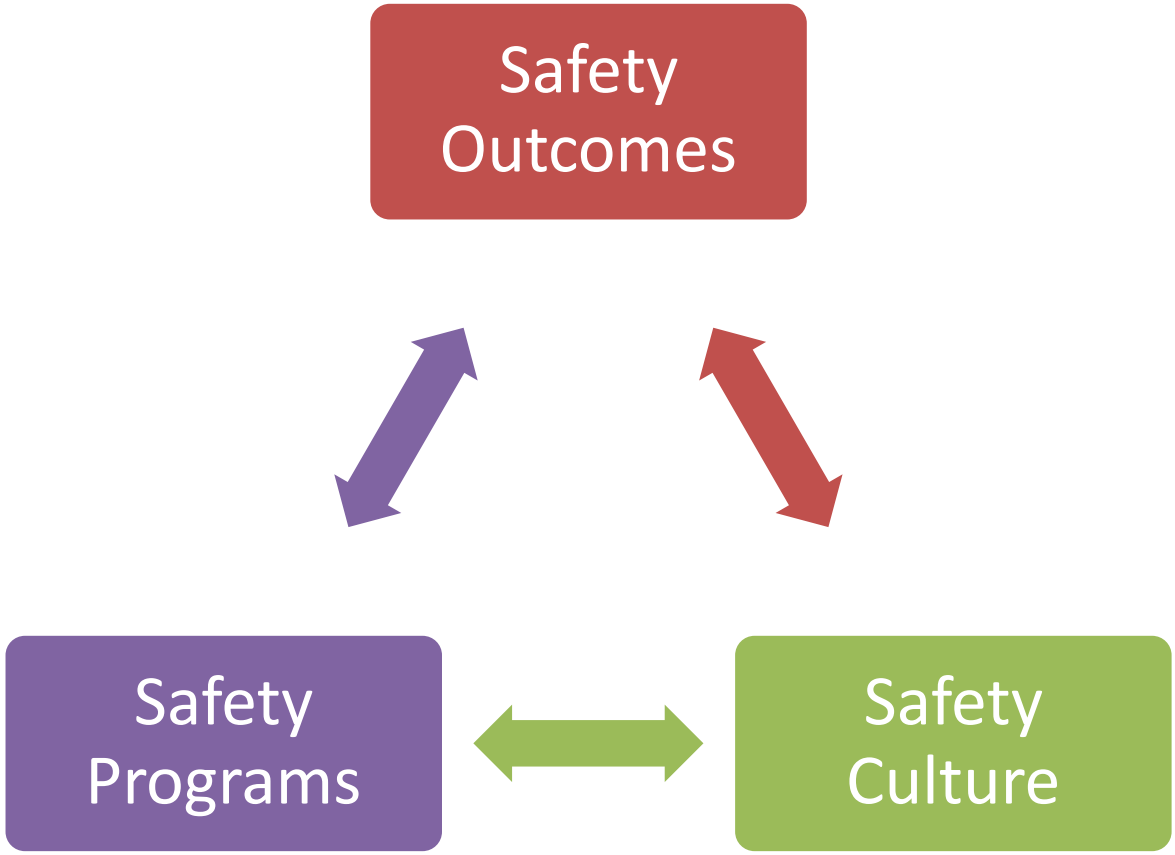
**Safety Programs:**

Activities by EH&S, Writing SOP procedures, PPE Usage, Safety Training, Online Videos, Faculty Engagement, and more.




**Safety Culture:**

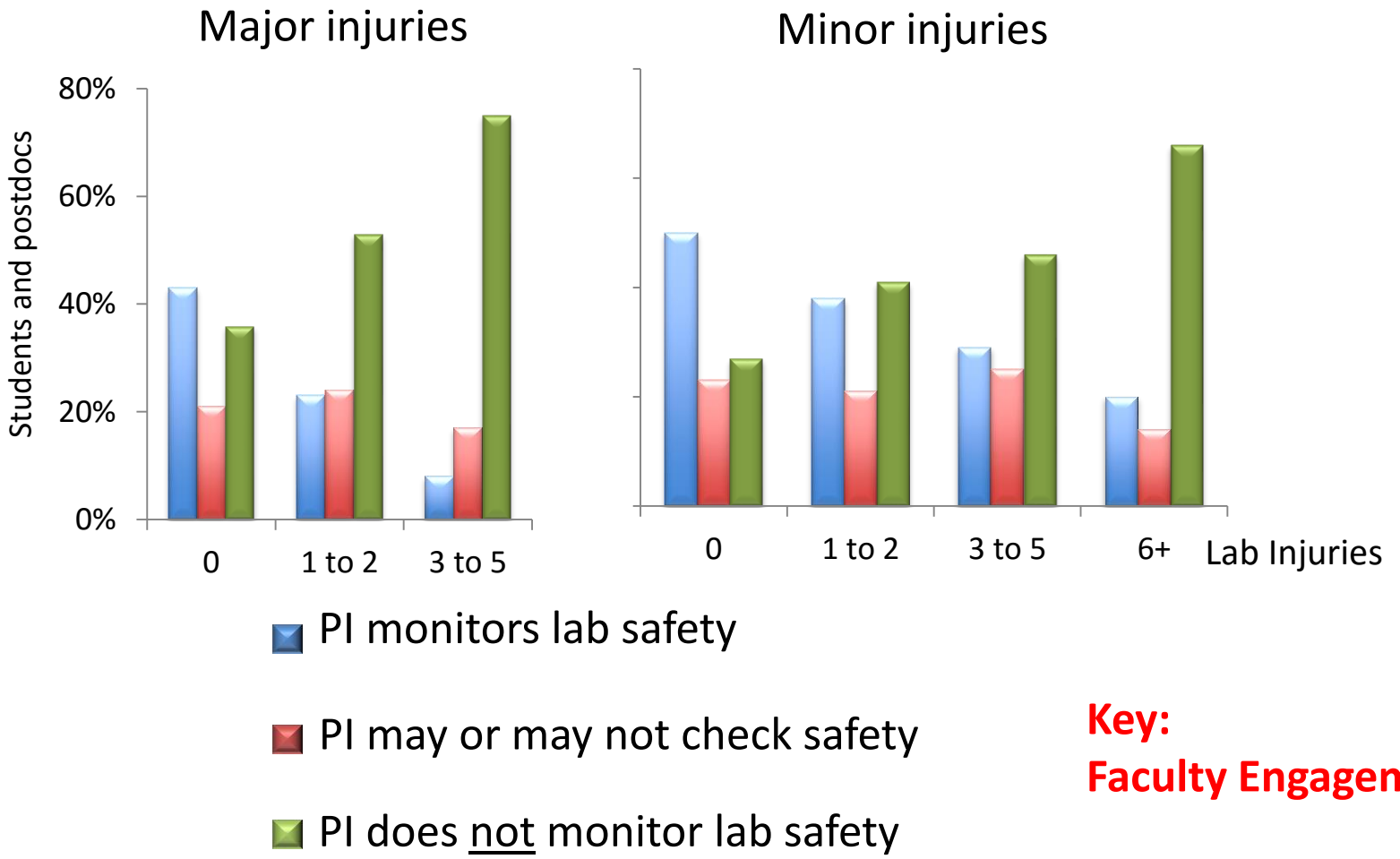
- Shared values, assumptions, and beliefs on workplace safety
- Relative importance of safety within the organization
- What people do when no one is looking




**Safety Outcomes:** What incidents occur?
Where do incidents occur?
How often do incidents occur?

# Impact of PI or Lab Supervisor Safety Engagement on the Number of Injuries in the Lab

Injuries witnessed or personally experienced by students and postdocs (n=406)



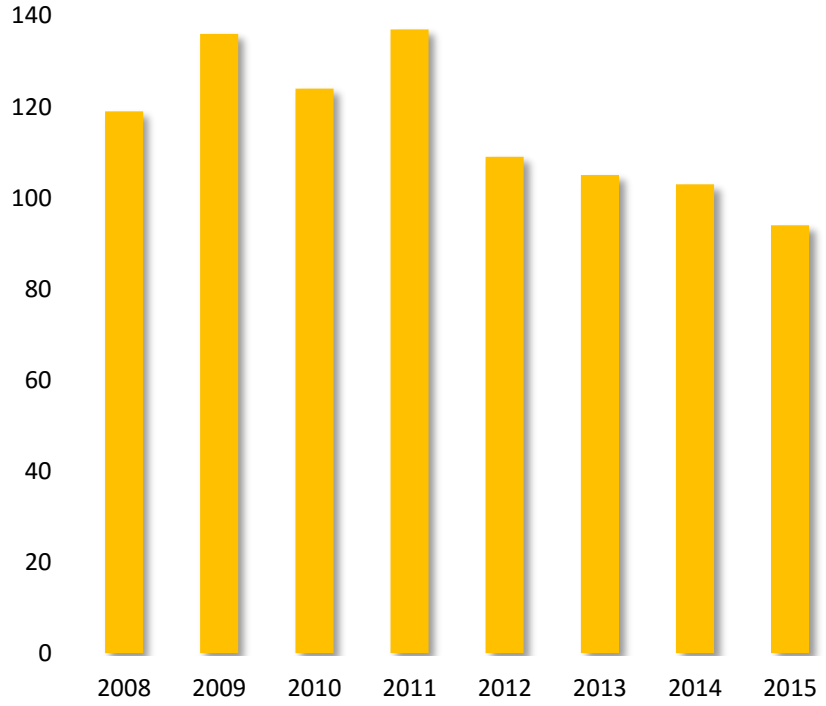

**Key:**
**Faculty Engagement**

I. Schröder, D.Y.Q. Huang, O. Ellis, J. H. Gibson, N. L. Wayne; *J Chem Health and Safety, 2015*

# UCLA Reported Research Laboratory Incidents

Laboratory accidents comprise a small fraction of the 1,400 annual accidents reported from UCLA employees in 182 departments

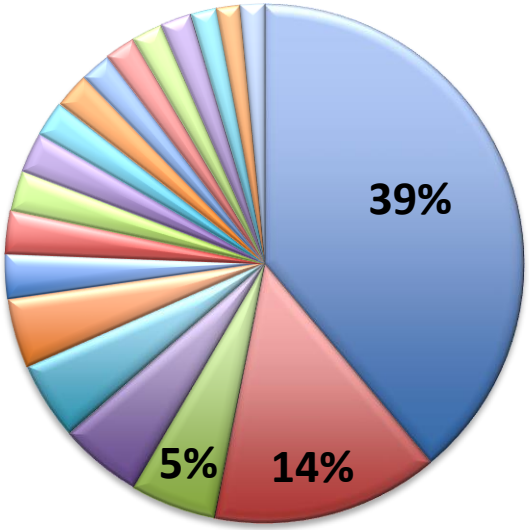
94 lab accidents in 2015 solidifies the reduction in lab accidents since the massive overhaul of our safety programs




**TYPES IN ORDER**

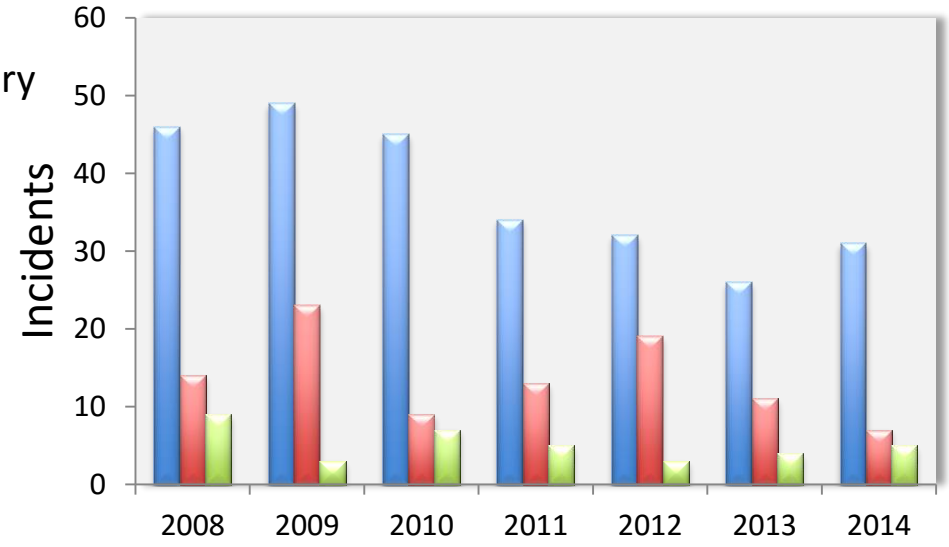
- Chemical exposures
- Lacerations
- Ergonomic issues
- Animal bites/scratches
- Biohazard exposures
- Bodily trauma
- Needle sticks

# 19/62 Departments had more than 10 incidents in the last 7 years



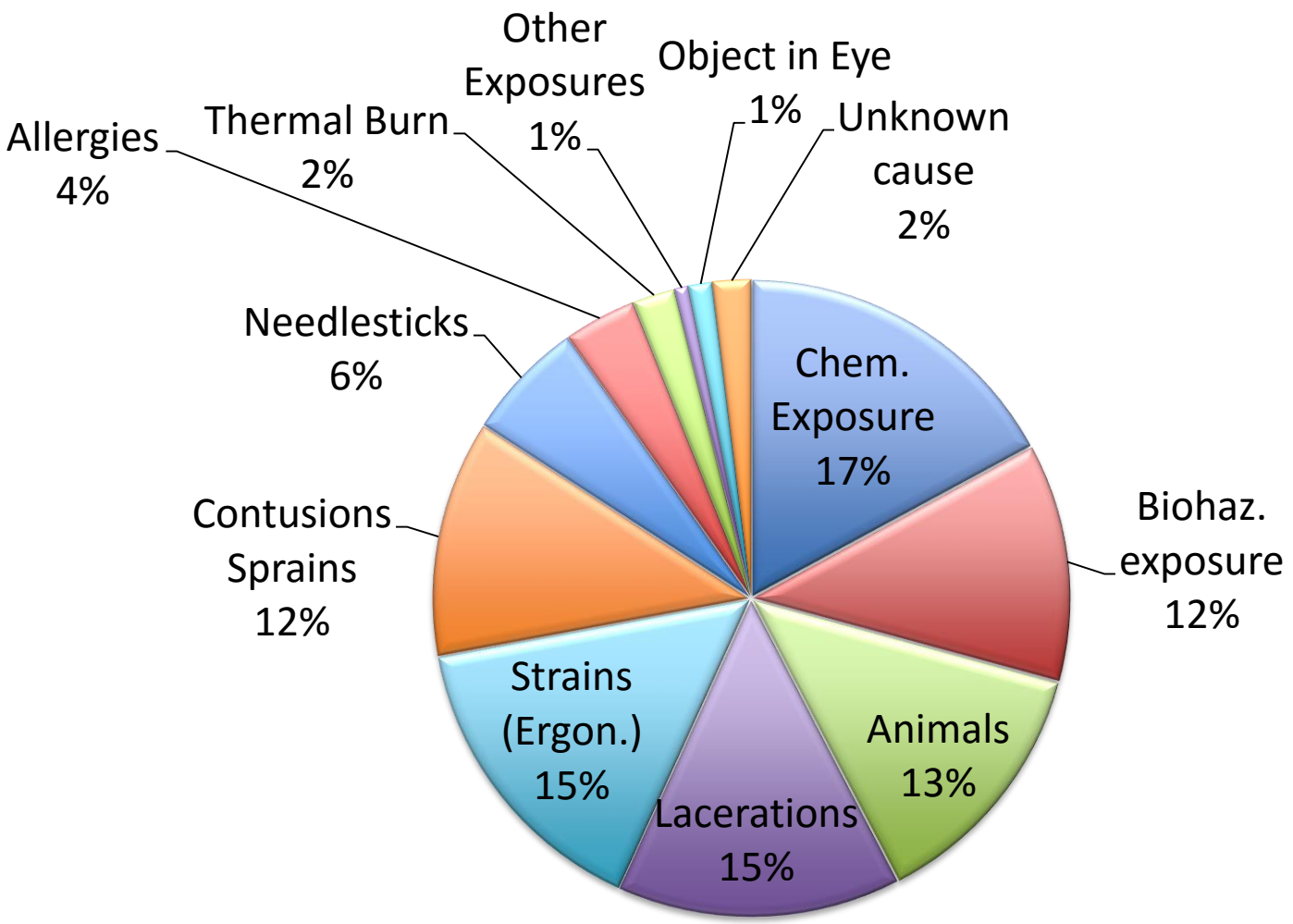

- Div. Lab Animal Medicine
- Pathology & Lab Medicine
- Chemistry &Biochemistry

2 Departments/Divisions reported 359/833 lab incidents




Incidents in the Division of Lab Animal Medicine decreased 50%

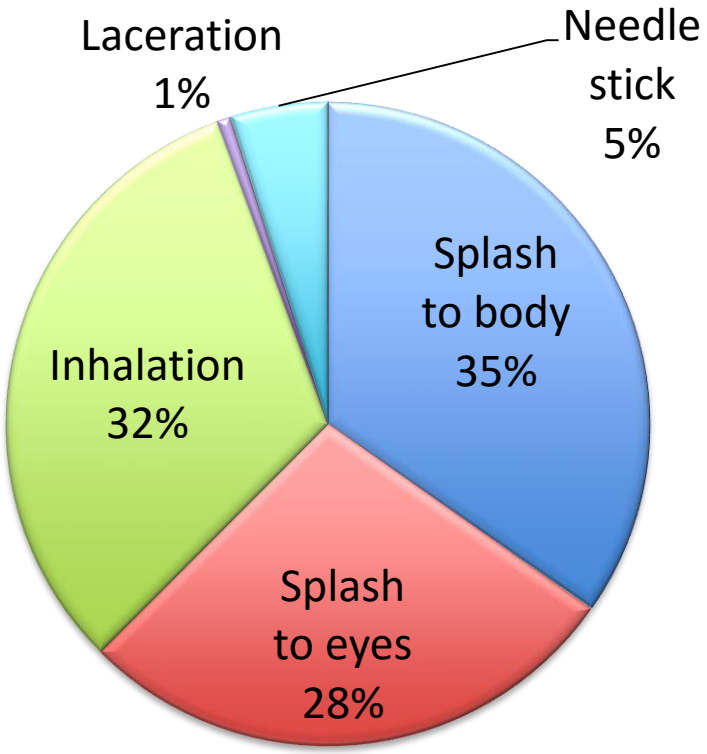
# Types of Lab Incidents 2008-2014 (833 total)



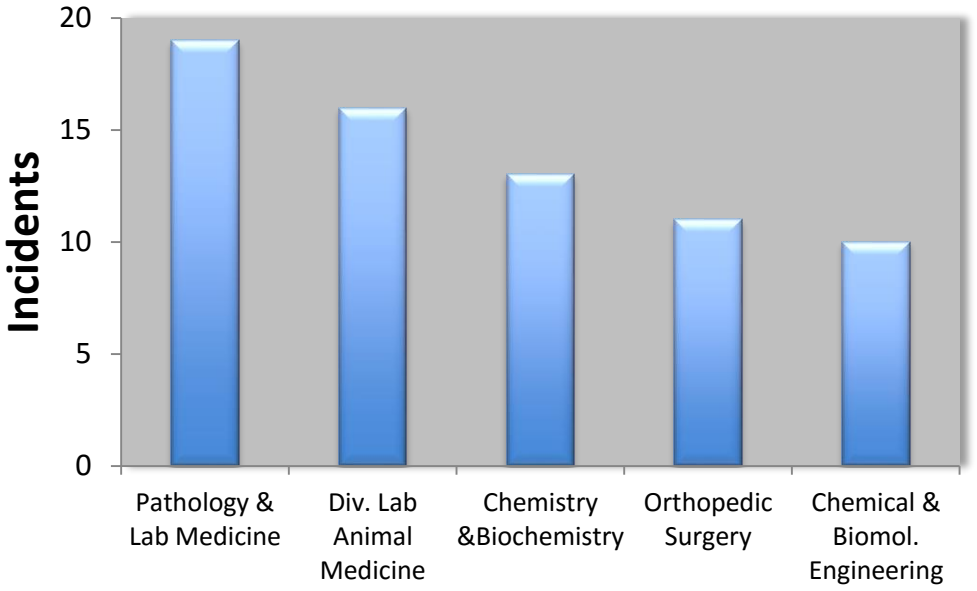

55% of lacerations are due to glass, razor blades, and scalpels

# Chemical Exposures 2008-2014

**144 Incidents**




- 35/62 departments with chemical exposures
- 5 departments with 10 or more chemical exposures (48% of total)




**Largely Preventable Incidents**

# Reducing Chemical Exposures: Lab Coats

## Performance Requirements for Lab Coats

1. Comfortable material to wear
2. Breathable
3. Non-porous for liquids
4. Non-wicking for liquids
5. Chemically resistant
6. Flame resistant

Cotton
Or
Polyester

Flame
Resistant
Treated
Cotton


Flame
Resistant
Nomex

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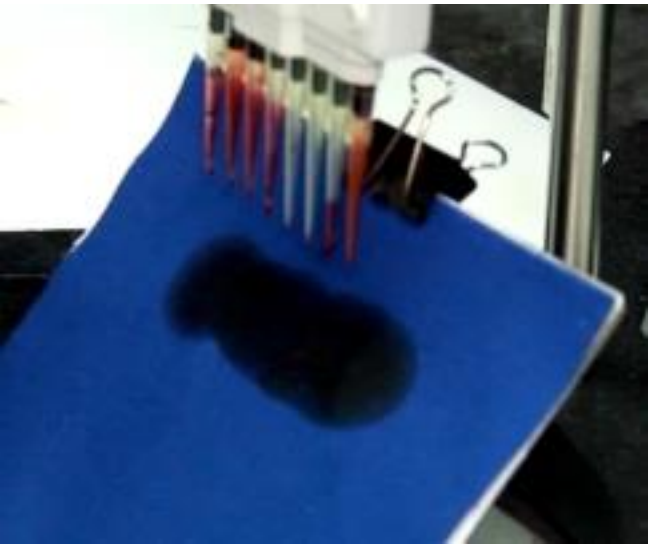
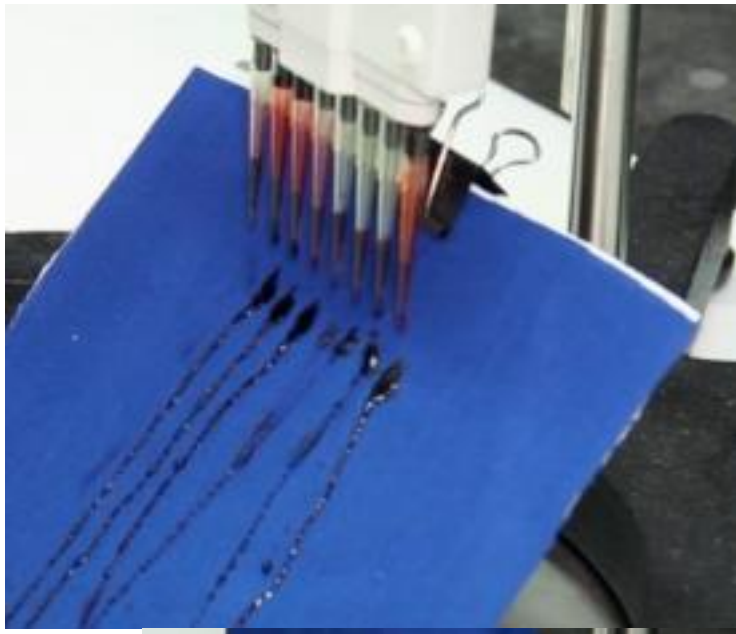
But, more than 150 years after the invention of lab coats, they FAIL criteria 3, 4 and 5!

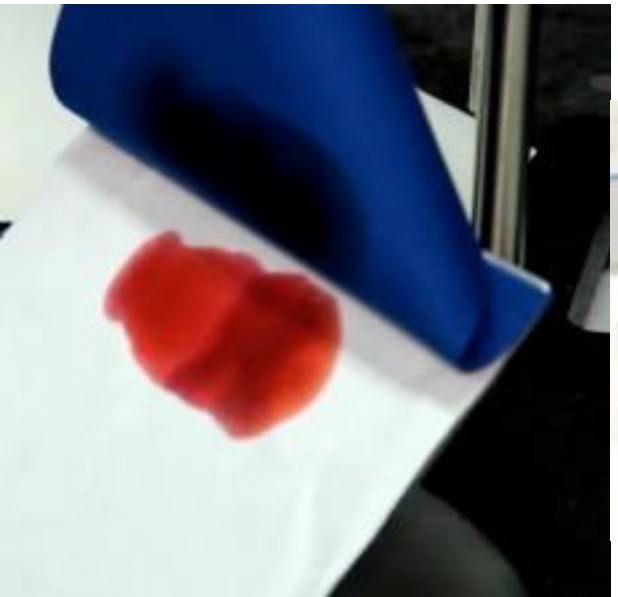
A potential solution has emerged –
Westex ShieldTEC fabric by Milliken & Co.

# Reducing Chemical Exposures: Lab Coats



New lab coat fabric is flame resistant, chemically inert, and non-wicking





# CONCLUSIONS

- Lab safety is a lot like exercise, thinking about it once a month is not good enough
  – *A sustained and multipronged approach is necessary*

- ENGAGEMENT by faculty is the most effective action with a documented impact on safety
  – *Reduces injuries and promotes a culture of safety*

- DATA on safety incidents can focus efforts and resources – *Reducing incidents is the ultimate goal*

**SETTING EXPECTATIONS is the Best Action for Leaders**

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SAFETY TRAINING CONSORTIUM

UCLA

# Acknowledgements


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- UC Risk & Safety Solutions