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# The Intersection of Laboratory Safety and Ethics

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# Disclaimer

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- I am not an ethicist
- Those that write about ethics and safety seem to have a lot of questions and ideas, but not many concrete answers and solutions
- I will continue that trend

# Safe Laboratories – Who is Responsible?

- *Who is ethically responsible for keeping an academic laboratory safe?*
- The Principal Investigator
- *Who is responsible for training of students in the laboratory?*
- The Principal Investigator
- NIH Guidelines – PI Responsibilities
  - Supervise the safety performance of the laboratory staff
  - Instruct and train laboratory staff in the practices and techniques required to ensure safety

# Safe Laboratories – Who is Responsible?

- *What is the responsibility of the institution?*
  - *What is the responsibility of the EHS/biosafety officer?*
  - *Where do we fit in?*
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- OSHA
    - Employers have the responsibility to provide a safe workplace
  - NIH Guidelines:
    - Institution responsible for ensuring appropriate training of Principal Investigators and laboratory staff regarding laboratory safety
  - To some degree, employers delegate this responsibility to EHS/biosafety

# Safe Laboratories – Who is Responsible?

- *If an inspection turns up issues, is the inspector ethically responsible to ensure the issues have been addressed?*
- *If the training is not completed, is EHS ethically responsible for ensuring training is completed?*
- *Do they have the resources to do that?*

# Are we meeting our ethical responsibility?

- Highly publicized laboratory incidents and exposures

- Sheri Sangji
- Michele Dufault



- *“Safety practices at US universities leave a lot to be desired”*
  - Rafael Moure-Eraso, Chemical Safety Board Chairman
- *“I have come to the disheartening conclusion that most academic laboratories are unsafe venues for work and study”*
  - Neal Langerman, a consultant to the ACS Committee on Chemical Safety and an officer of its Division of Chemical Health and Safety

# Are we producing a safe work environment?

- These incidents occurred in chemistry labs and machine shops
- But, are biological laboratories any safer?
- If so, why?
  - Low risk agents?
  - More resources for biosafety?
  - Better training?
  - Better inspections?
  - IBC oversight?

# Are we producing a safe work environment?

MICROBIOLOGY

## *Salmonella* hits US teaching labs

*Wave of infections triggers investigation into biosafety practices.*

BY ERIKA CHECK HAYDEN

A spate of lab-associated *Salmonella* infections has swept across the United States during the past year, prompting public-health officials to examine how closely labs are following infection-prevention

the illnesses have been traced back to clinical or teaching laboratories, according to the CDC report.

The agency conducted an in-depth investigation of 32 people made ill during the current outbreak, and found that 60% of them had had some connection with a microbiol-

is investigating how this may have happened, in part by surveying the biosafety practices of members of the American Society for Microbiology, based in Washington DC, and the Association of Public Health Laboratories in Silver Spring, Maryland.

The CDC is also concerned because some of

- *“The fact that cases seem to be happening all over the country has raised the question of whether there are issues with laboratory safety and appropriate training techniques”*
  - Mack Sewell, state epidemiologist at the New Mexico Department of Health

# A shared responsibility

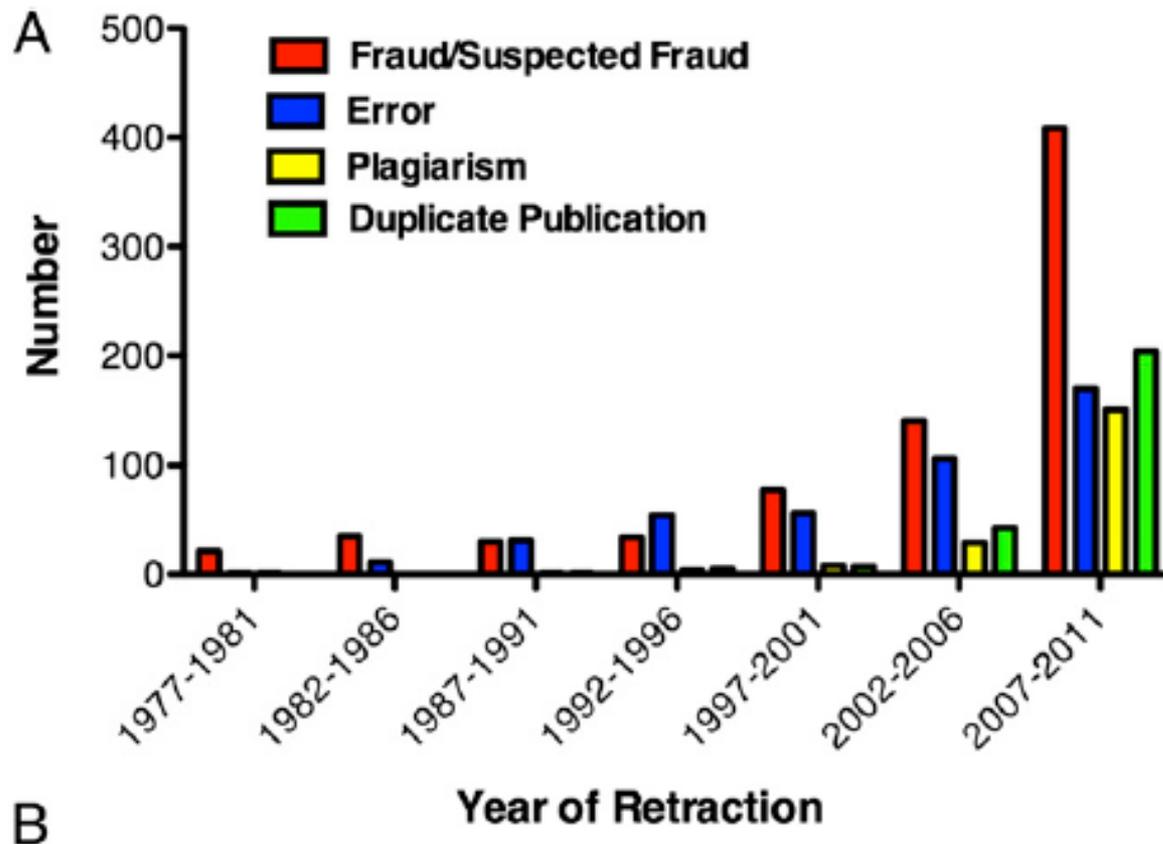
- Start at the top
  - Ensure strong, adequately resourced safety program
  - Develop safety policies, responsibilities in job descriptions, performance evaluations
  - Push to integrate safety topics into undergrad courses, build awareness
- Build relationships
  - Ensure relationship between EHS and Occupational Health
  - Expand relationships between compliance committees (e.g., IBC, IACUC)
- Participation of research community a must
  - Foster relationship between EHS and department leaders and investigators

# Understanding the research community

- Academic Research
  - High pressure to publish, obtain grants
    - Number of scientists increase competition
    - Top tier journals have increasing number of submissions, but the quality of manuscripts is down.
    - NIH funding – flat budgets, declining success rates
  - Pressures appear to be contributing to increases in research misconduct cases
    - Research Misconduct: Fabrication, falsification, or plagiarism
- Corporate Research
  - Downsizing, pressure for results, etc.

# Research Misconduct

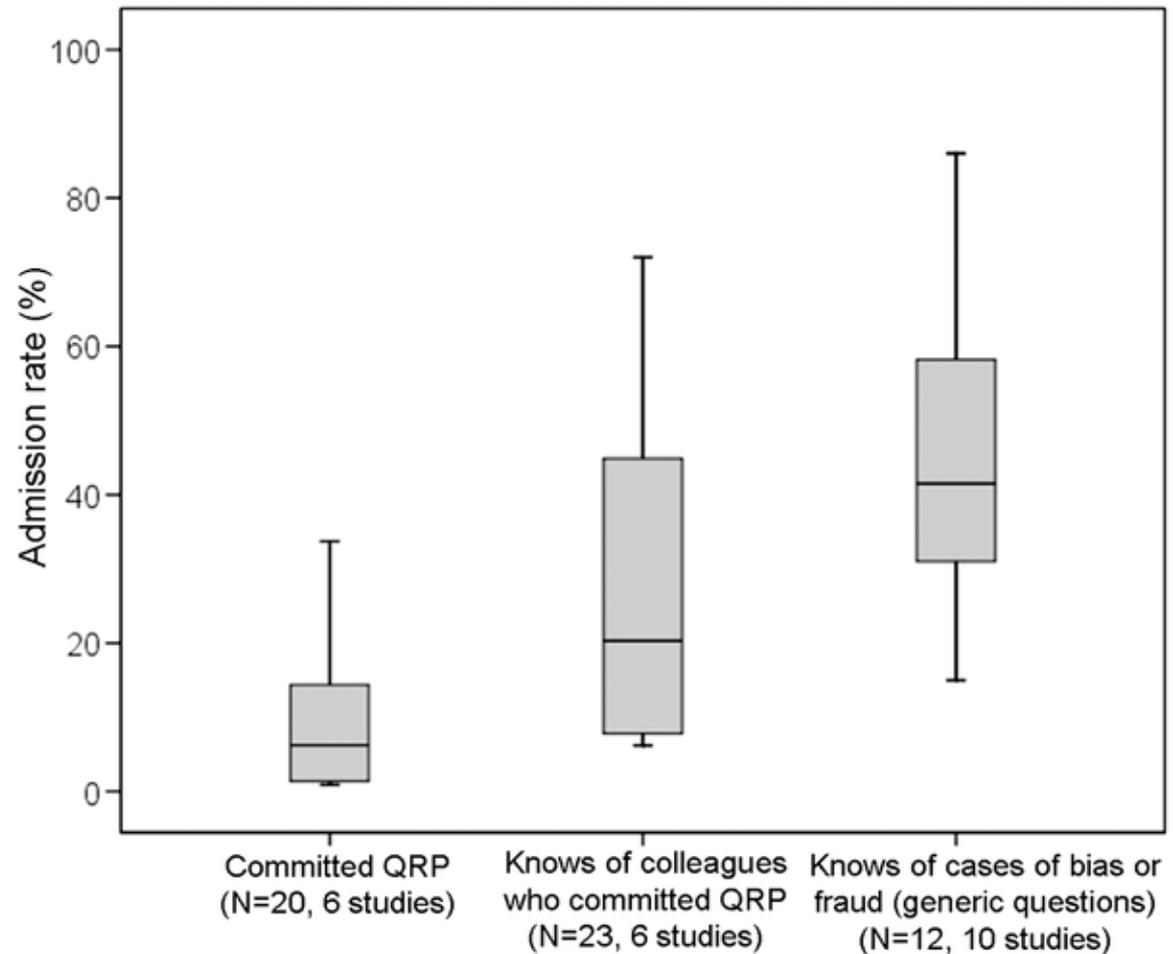
- Retraction notices have surged
- Retractions up 1,200% since 2001
- **67% of retractions due to misconduct**



Fang et al., 2012 PNAS <http://www.pnas.org/content/early/2012/09/27/1212247109> notices

# Research Misconduct

- ~2% of scientists admitted to have fabricated, falsified or modified data or results at least once
- Many admit to have committed QRP (Questionable Research Practices)
  - Falsified or altered data
  - Reported untrue data



Fanelli, 2009, PLOS One

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0005738>

# Is safety taken for granted?

- *Can the same academic pressures that have led to the increases in academic misconduct cases lead to unsafe science?*
- Overcommitted PI
  - Lack of oversight
- Overcrowding in the laboratory
- Research in a new field with available funding
  - Knowledge of appropriate safety procedures?
  - Access to appropriate safety equipment?

# How do we reach this stressed audience?

- Typically, through training and inspections
- Ethically bound to “Provide information regarding potential risks to employee or environmental health precautions needed to avoid adverse effects”
  - ABSA Ethics Statement
- Are training courses (online?) and inspections the best, most effective way to provide this information?

# Training – Checking the box?

- In most institutions, safety lectures or online courses are required before an employee or student can begin work in a laboratory
  - However, surveys indicate the hands-on training is much more effective in communicating information and ensuring a safe work environment
  - Laboratory safety staff at many institutions may not have the resources to conduct hands-on training for all new employees/students.
- *Do we have an ethical responsibility to ensure this training is performed? How is training validated?*
- *Can EHS/biosafety be expected to train in a hands-on way?*

# Responsible Conduct of Research (RCR)

- RCR training required for students and postdoctoral researchers who receive NSF/NIH funds
  - Goal to help prepare the next generation of researchers.
  - Typical topics include:
    - Mentor/Trainee Responsibilities
    - Peer review, publication practices
    - Conflict of Interest and Conflict of Commitment
  - Safety should play a significant and substantial role in RCR training
- Is EHS/Biosafety part of this process at your institution?

# Inspections – Partners or police?

- Once a year inspections do not create a safety culture
- “Good” labs typically have little to do with EHS, but due to a specific lab member (PI, lab manager) that has taken the responsibility for safety and created a “Safety Culture”
- Missing an opportunity to educate?
  - In many cases, results of inspections are not communicated to those that need it
- Reactive v. proactive approach to safety

# Culture of ethical (and safety) behavior

- We must go beyond compliance
  - Look for creative ways to encourage researchers to take a more active role
    - Build a safety presence through email communications; printed materials; special seminars or events discussing or promoting safety
      - Monthly email series, email safety quizzes with prizes
    - Develop a recognition system for good safety performance; and a process to solicit, review, and act on suggestions for improving safety and identifying safety issues.
- Create the Safety Ethic

# Promote the Safety Ethic

- **Value safety:** Safety is an integral part of what one does, its automatic, and it does not change its priorities—it is never questioned and never compromised.
- **Work safely:** One continues to learn about safety, learns to recognize hazards, assesses the risks of hazards, manages the risks of hazards, and prepares to handle emergencies.
- **Prevent at-risk behavior:** One does not cut corners or bypass safety measures in the laboratory and shares this information with others, as needed.
- **Promote safety:** One encourages and acknowledges others for working safely.
- **Accept responsibility for safety:** One takes steps to work safely, setting a positive example for others, and being accountable for safety.

# ABSA Ethics Statement

- Members of ABSA are expected to conduct themselves in an ethical manner as they practice their profession. ABSA members should:
  - Maintain personal integrity and act responsibly to uphold the integrity of the profession.
  - Avoid situations, and actively work to prevent occurrences presenting a conflict of interest or that will compromise professional judgment.
  - Provide biological safety services only in areas of competence.
  - Follow recognized biological safety guidelines and standards as set forth by established professional groups or local, state and federal governmental agencies, centers, or institutes, in performing work in biological safety.
  - Provide information regarding potential risks to employee or environmental health and precautions needed to avoid adverse effects.
  - Maintain confidentiality regarding services provided.