

CDC PUBLIC HEALTH GRAND ROUNDS

Strengthening a Culture of Laboratory Safety



December 15, 2015



U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

Evolution of Laboratory Safety Standards



Steve Monroe, PhD

Associate Director for Laboratory Science and Safety
Centers for Disease Control and Prevention

Origins of Laboratory Science at CDC

- 1942 Malaria Control in War Areas**
- 1943 Communicable Disease Center**
- 1970 Center for Disease Control**
- 1992 Centers for Disease Control and Prevention**



Dr. Joseph W. Mountin



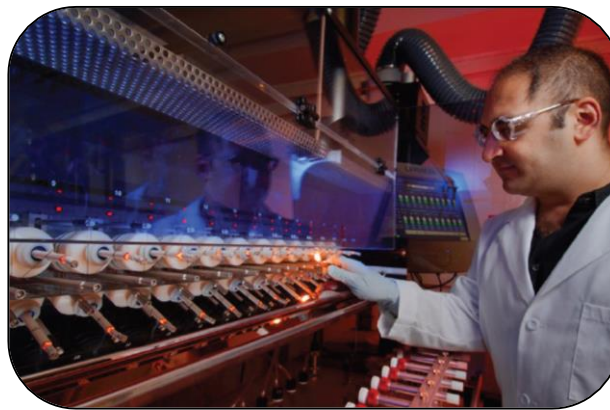
Class of state laboratory personnel at the Communicable Disease Center

Current Scope of Laboratory Science at CDC

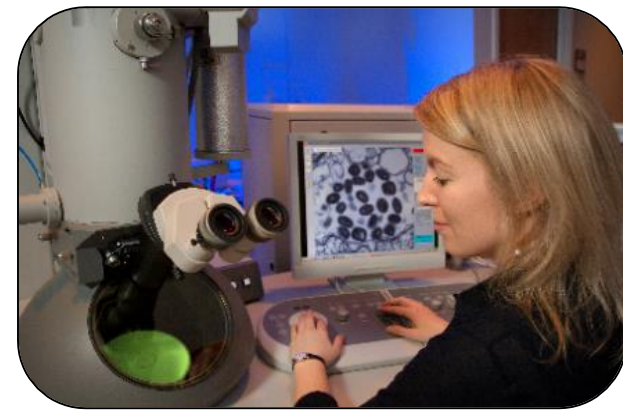
- **CDC's laboratory work now includes:**
 - Infectious diseases
 - Noninfectious diseases
 - Environmental health
 - Occupational health
 - Laboratory systems (e.g. standards, quality guidelines)



Viral Special
Pathogens Branch



Tobacco and Volatiles
Branch



Infectious Diseases
Pathology Branch

Current Scope of Laboratory Science at CDC

- ❑ **Outbreak investigations**
- ❑ **Emergency response**
- ❑ **Population health studies**
- ❑ **Laboratory quality improvement**
- ❑ **Advanced Molecular Detection**
- ❑ **Genetic studies**
- ❑ **Biomonitoring**
- ❑ **Vaccine development**
- ❑ **Pathogen discovery**
- ❑ **Newborn screening**



The National Institute for
Occupational Safety and Health



Poxvirus and Rabies
Branch



Newborn Screening and
Molecular Biology Branch

Present-Day Scope of Laboratory Science at CDC

Over 2,000 laboratory staff



Laboratory Staff

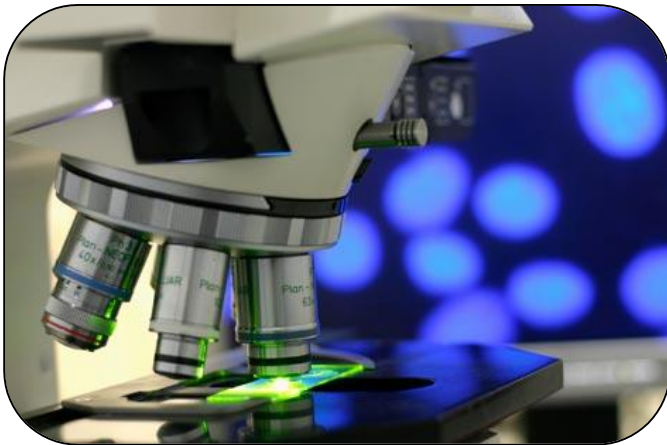
- Biologists
- Chemists
- Veterinarians
- Engineers
- Medical technologists
- Biosafety experts
- Quality managers

Present-Day Scope of Laboratory Science at CDC

Over 2,000 laboratory staff



Over 150 laboratory groups



Biosafety Level (BSL)

❑ BSL-1:

- Low potential of disease and risk to environment

❑ BSL-2:

- Moderate potential of disease and risk to environment

❑ BSL-3:

- Serious or potentially lethal disease after inhalation

❑ BSL-4:

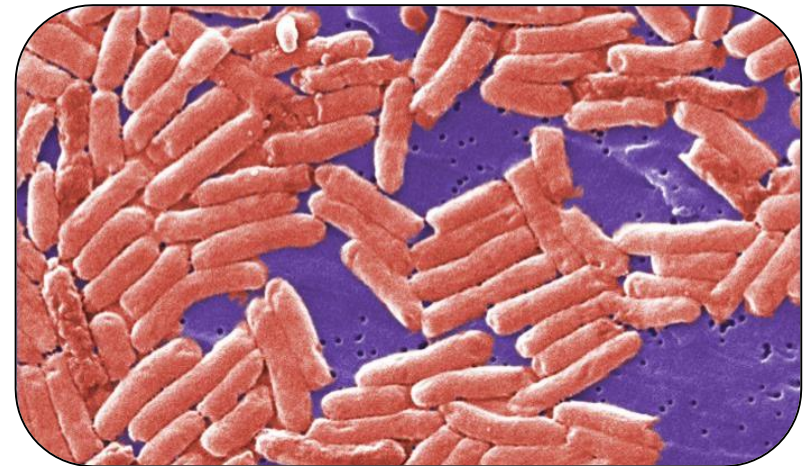
- High risk of disease through aerosol exposure, causing severe to fatal illness with no vaccine or treatment available

Present-Day Scope of Laboratory Science at CDC

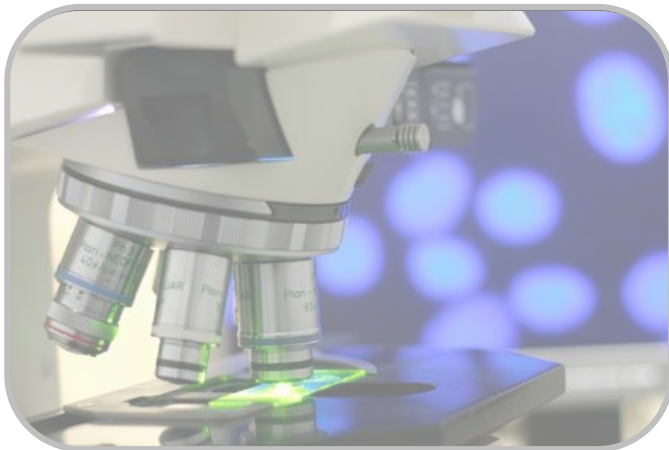
Over 2,000 laboratory staff



Over 200 infectious pathogens



Over 150 laboratory groups



Pathogens

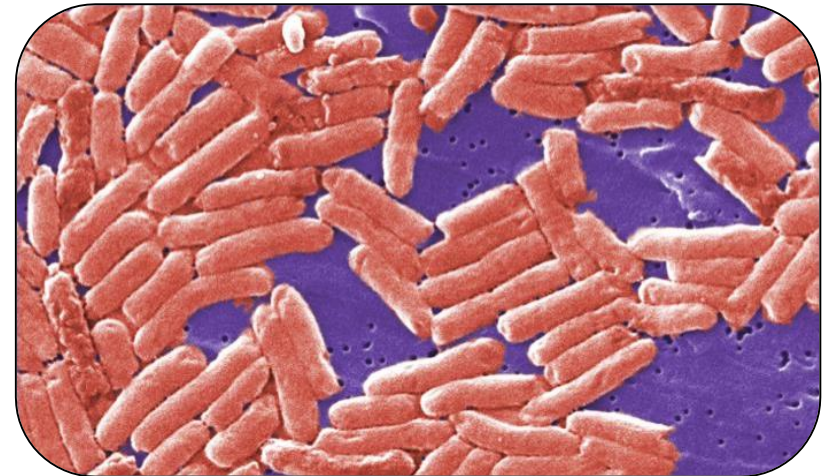
- Viruses
- Bacteria
- Parasites
- Fungi
- Prions (infectious agents composed of misfolded protein)

Present-Day Scope of Laboratory Science at CDC

Over 2,000 laboratory staff



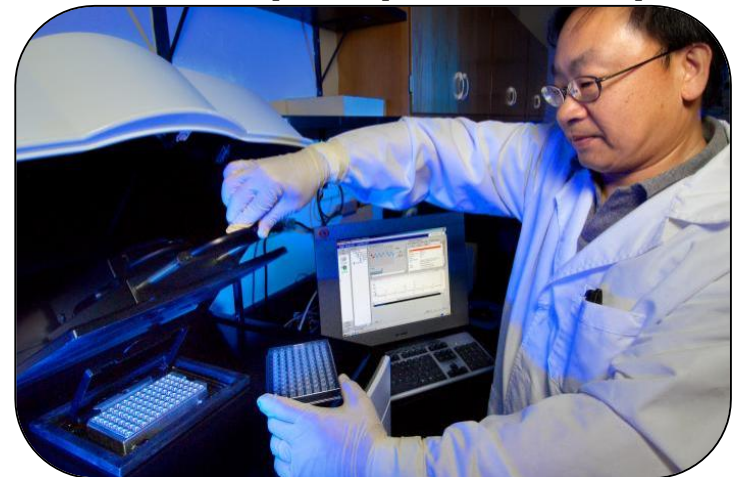
Over 200 infectious pathogens



Over 150 laboratory groups

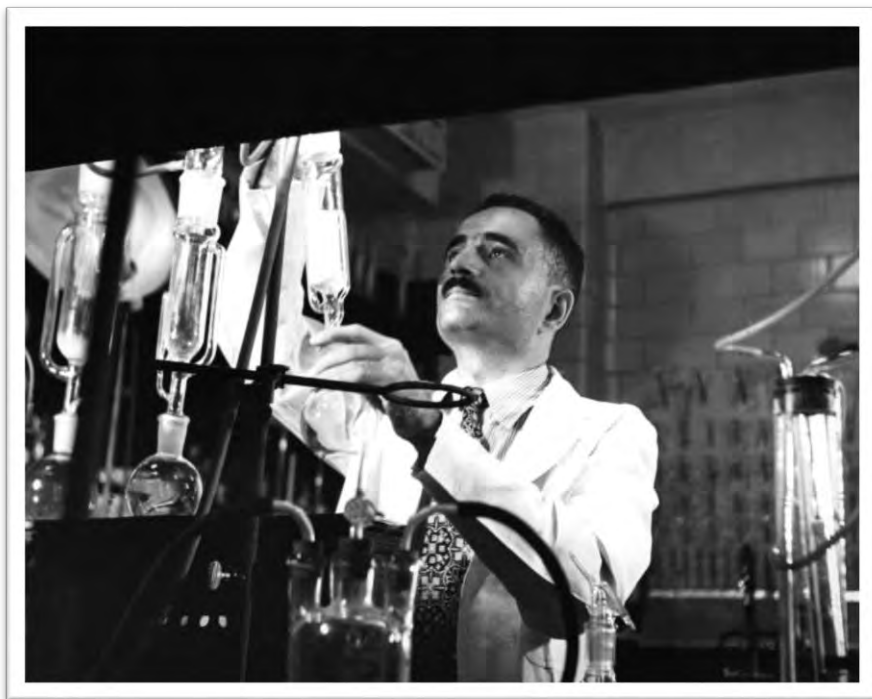


Over 5,000 samples processed per day



Laboratory Safety Standard Evolution

Safety standards change as new information becomes available



A scientist in 1943 works with potentially dangerous chemicals without modern personal protective equipment (PPE)



Two scientists in 1967 using practices no longer considered appropriate today

Laboratory Safety Standard Evolution

Evolving Practices



A scientist works with infectious influenza virus without modern personal protective equipment (PPE)




Today, scientists use biological safety cabinets (BSC) and powered air purifying respirators (PAPR) when working with highly pathogenic avian influenza virus

2014 Laboratory Safety Incidents


“What we’re seeing is a pattern that we missed, and the pattern is an insufficient culture of safety.”

**– Dr. Thomas Frieden,
Director, CDC**

 Testimony before the
Subcommittee on Oversight and
Investigations
Committee on Energy and Commerce
U.S. House of Representatives

Review of CDC Anthrax Lab Incident

Thomas R. Frieden, M.D., M.P.H.
Director
Centers for Disease Control and Prevention
U.S. Department of Health and Human Services


SAFER • HEALTHIER • PEOPLE™

For Release upon Delivery
Expected at 10:00 a.m.
July 16, 2014

2014 Laboratory Safety Incidents

Incident

Anthrax

Influenza

Ebola

Problem

Improper
inactivation

Cross-
contamination

Sample
misidentification

Solution

Inactivation
protocols
reviewed
agency-wide

Separation
and quality
testing

Color-coded
sample
identifier

2014 Laboratory Safety Incidents

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Changes Implemented at CDC in Response to External Review Findings

- ❑ **Established clear laboratory leadership**
 - Provide scientific, technical, and managerial guidance to enhance science, safety and quality
 - Advocate for laboratory science within the agency
- ❑ **Revised laboratory competency training**
 - Laboratory Safety Training Board to develop and update courses to support a standardized, competency based CDC curriculum
- ❑ **Creating a “CDC Way” of performing risk assessments**
- ❑ **Pursuing external accreditation**
 - Identify best practices for broad QMS implementation across CDC
- ❑ **Clarified incident notification**

New Laboratory Science and Safety Leadership

□ Vision

- Make CDC labs the gold standard for scientific excellence and safety

□ Goals

- Leadership
- Policy and compliance
- Communication and collaboration
- Laboratory improvement
- Training



OADLSS

Office of the Associate Director for
Laboratory Science and Safety

Laboratory Leadership Service

❑ Mission

- Develop future public health laboratory leaders who integrate laboratory safety and quality as a principal standard of practice in every facet of their work

❑ Laboratory Leadership Service Principles

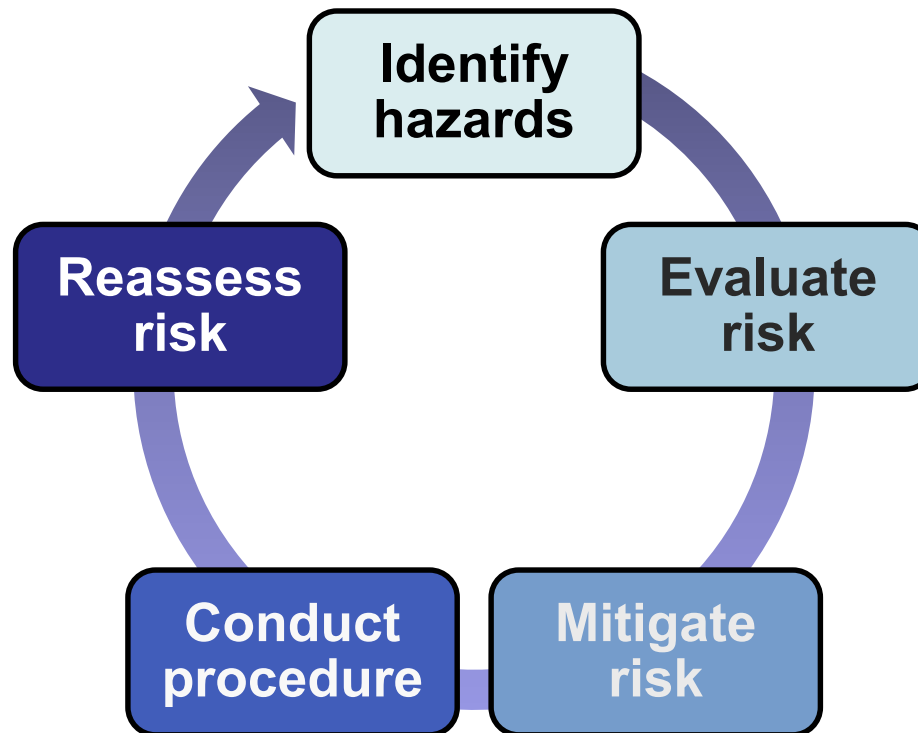
- Integrate safety and quality into laboratory science
- Provide training through service
- Promote applied public health laboratory research
- Produce future public health laboratory leaders



Inaugural LLS Fellowship Class of 2015

Reinforcing the CDC Way of Risk Assessment

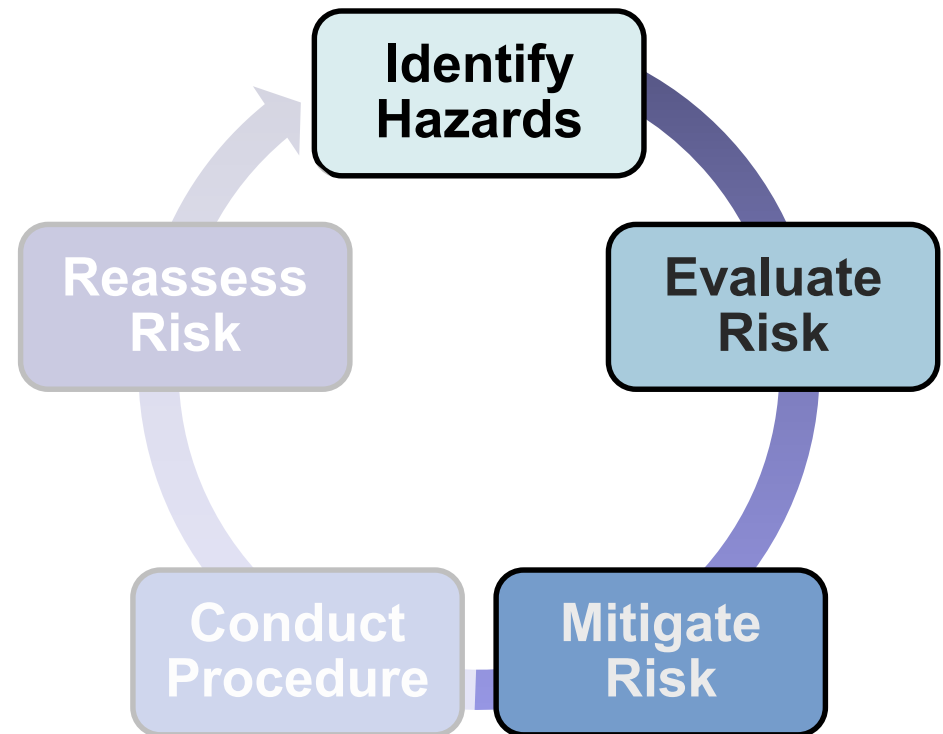
Risk Assessment Process



Reinforcing the CDC Way of Risk Assessment

Before

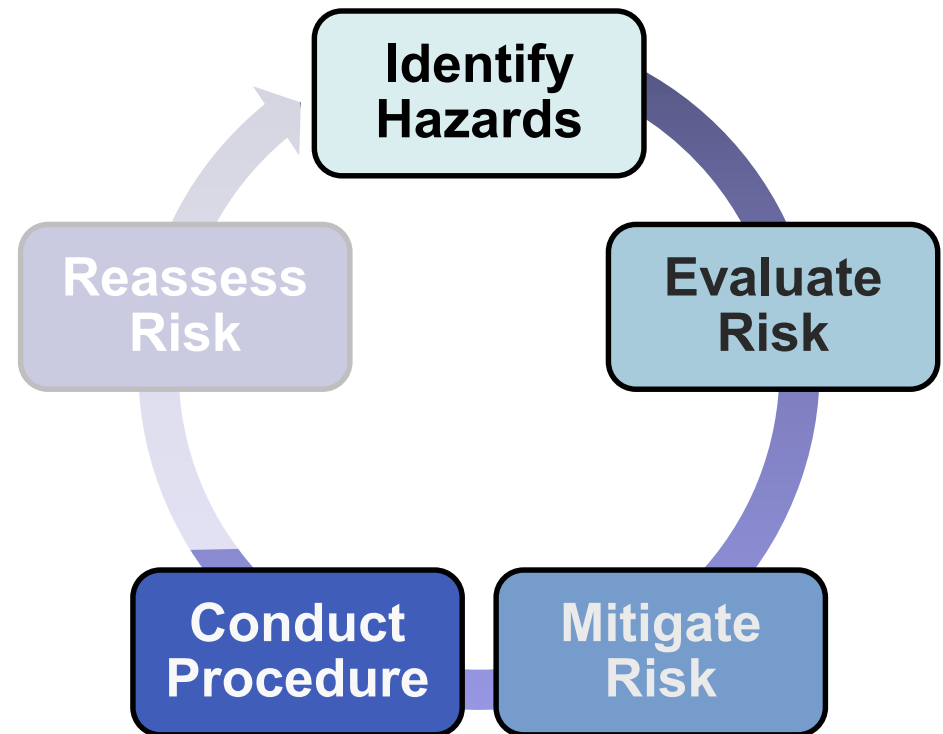
- Ensure research benefits outweigh the risks
- Explore safer alternatives
 - Use of non-pathogenic strains
- Predict potential problems



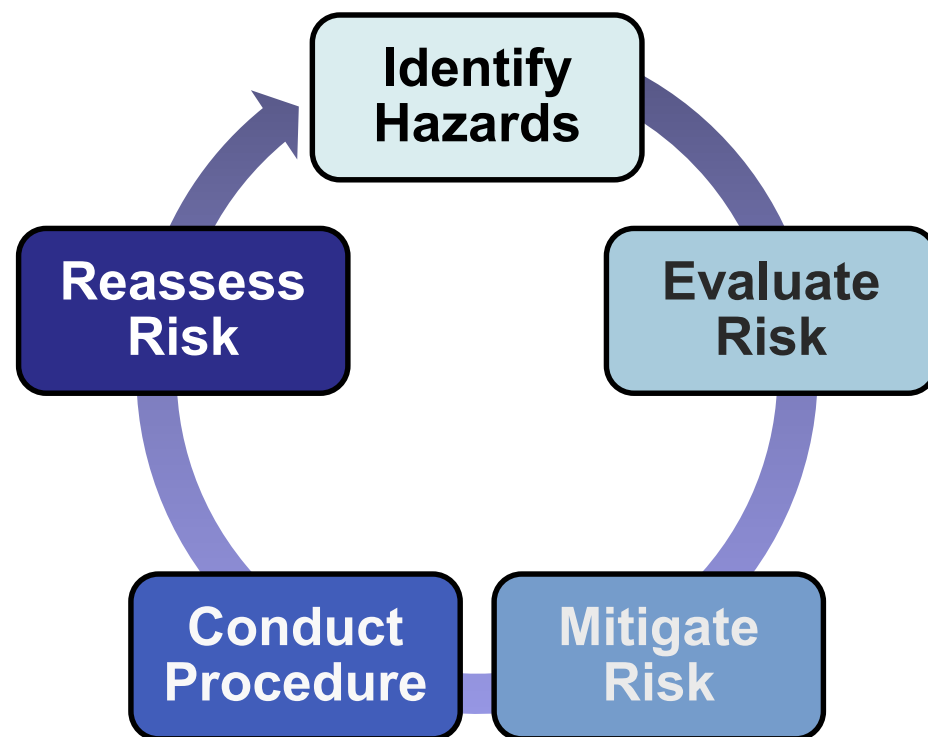
Reinforcing the CDC Way of Risk Assessment

During

- Have a contingency plan
- Prompt notification of incidents and near misses



Reinforcing the CDC Way of Risk Assessment



After

- Use lessons learned
- Reassess the risk

Reinforcing the CDC Way of Risk Assessment

Before

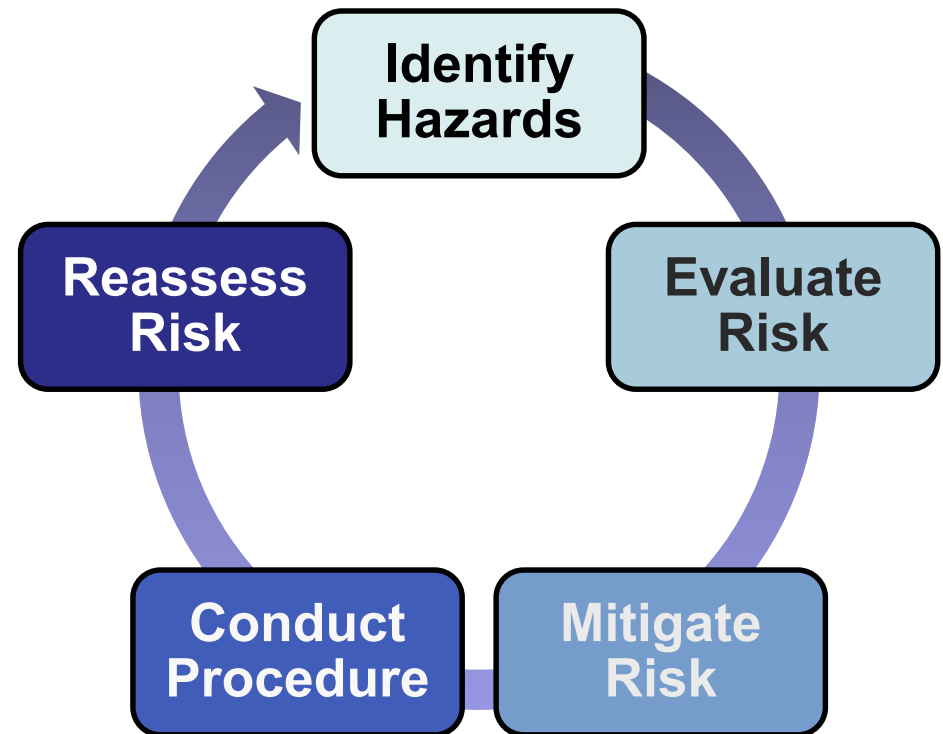
- Ensure research benefits outweigh the risks
- Explore safer alternatives
 - Use of non-pathogenic strains
- Predict potential problems

During

- Have a contingency plan
- Prompt notification of incidents and near misses

After

- Use lessons learned
- Reassess the risk



Conclusions

- ❑ **Laboratories and lab scientists are essential to all aspects of public health**
- ❑ **CDC laboratories have a unique scope of work**
- ❑ **CDC laboratory science has the opportunity for improvement in safety and quality of work**
- ❑ **Risk assessment is critical at the agency, individual laboratory, and worker level**

Quality, Safety and Public Health Impact of Laboratory Science: A Case Study



Conrad P. Quinn, PhD

Chief, Meningitis and Vaccine Preventable Diseases Branch
Division of Bacterial Diseases
National Center for Immunization and Respiratory Diseases
Office of Infectious Diseases

The CDC Anthrax Vaccine Research Program: A Congressional Mandate

- ❑ **Designed, managed, analyzed, and reported under CDC sponsored Investigational New Drug application**
- ❑ **Why CDC?**
 - High public trust
 - No conflict of interest
 - Quality of science
- ❑ **Comprehensive and collaborative**
 - Laboratory scientists
 - Clinical practitioners
 - Statisticians
 - Academics
 - Interagency partners



The CDC Anthrax Vaccine Research Program: A First for CDC

□ Regulatory compliant

- Good Clinical Practice (cGCP)
- Good Laboratory Practice (cGLP)
- Quality assured laboratory data

□ Data submission to FDA

- Manufacturer's supplemental BLA
- Basis for regulatory action

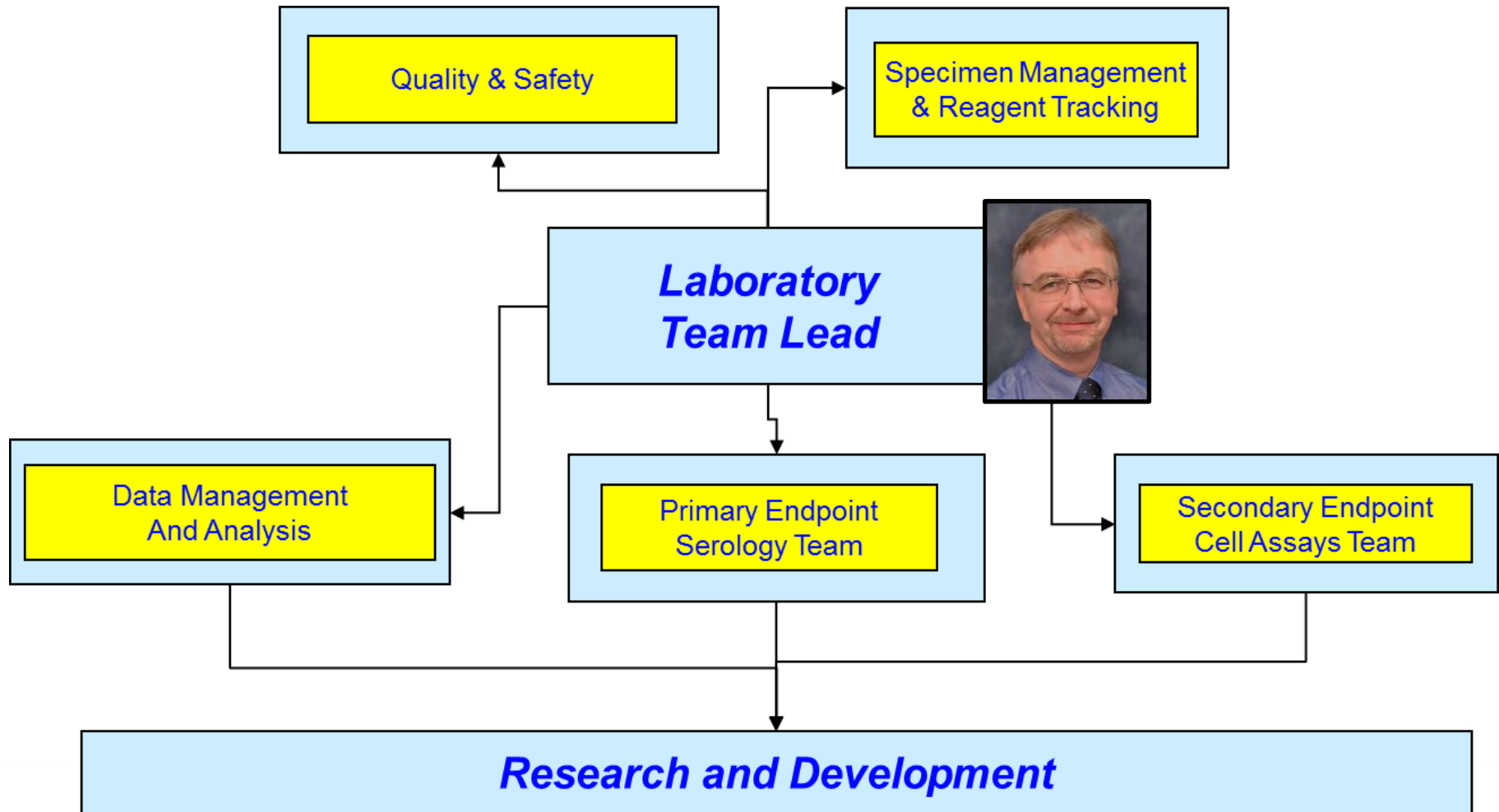


The Laboratory Component

- ❑ **Microbial Pathogenesis and Immune Response (MPIR) laboratory**
 - Established February 2001
 - Laboratory support to AVRP
 - To build human clinical trials capability
 - Expertise of Anthrax disease development
- ❑ **Build and apply a customized QMS**
 - CLIA, ISO-9000, 21 CFR Part 58, CDC
- ❑ **Quality and safety are integral and inseparable**
 - Regulatory compliant methods validation—ICH
 - QMS controlled and monitored processes and procedures



Embracing a Culture of Laboratory Quality and Safety from Day 1



An Effective QMS Encourages Public Trust in CDC Science and Recommendations

□ **Team development was guided by**

- Recognition that high public trust in CDC was an earned privilege
- Functional structure
- Specialized staff for specialized activities
 - Safety and quality management
 - Specimen management
 - Data management
 - Laboratory science

□ **QMS documented evidence**

- Processes and procedures
- Competent and proficient
- Primary record data

An Investment of Leadership and Management

- ❑ Ensure support from management
- ❑ Create the proper environment
- ❑ Craft a strategy
- ❑ Lead by example

ISO 9000: 2000 QUALITY MANAGEMENT PRINCIPLES

- Principle 1: Customer Focus
- Principle 2: Leadership
- Principle 3: Involvement of people
- Principle 4: Process approach
- Principle 5: Systems approach for management
- Principle 6: Continual improvement
- Principle 7: Factual approach to decision making
- Principle 8: Mutually beneficial supplier relationships.

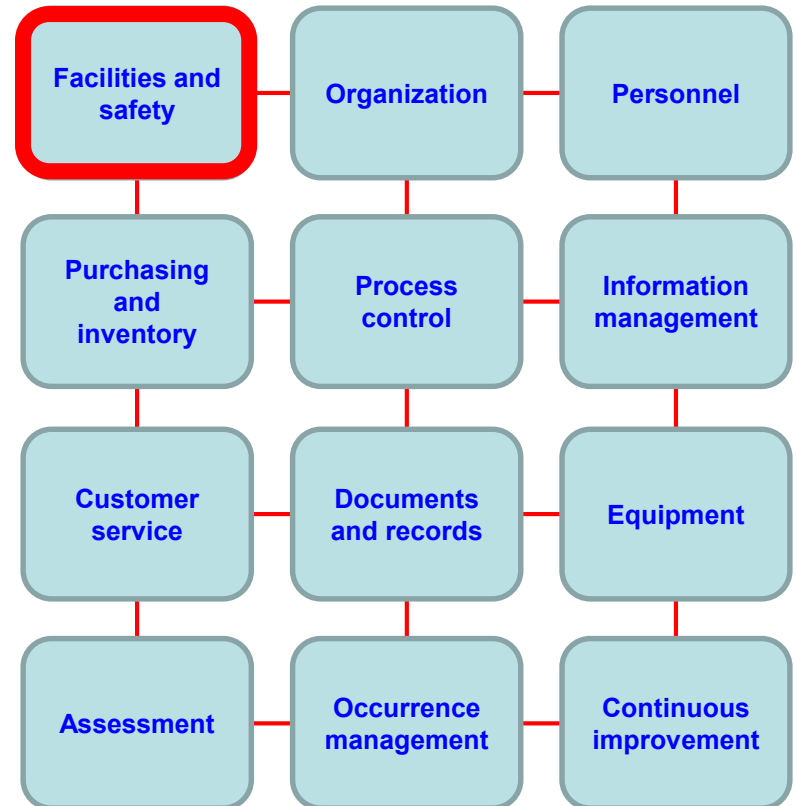
**“Perfection is not attainable,
but if we chase perfection
we can catch excellence”
– Vince Lombardi**



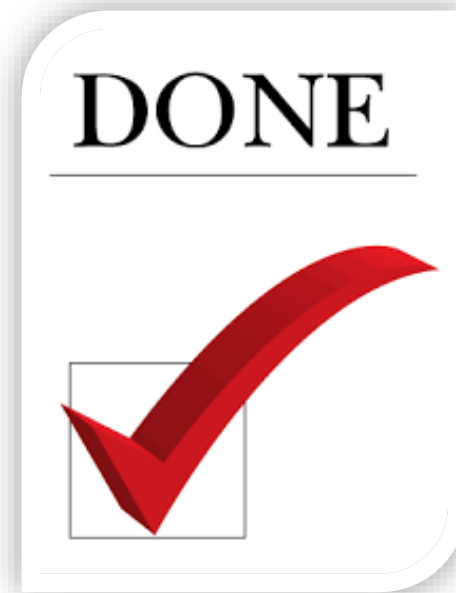
What Leaders Must Understand First

- ❑ What does the project I am leading involve?
- ❑ What are the benefits from success?
- ❑ Who benefits from success?
- ❑ What does my team need to succeed?

The Quality Essentials



What Gets Measured, Gets Done



Leaders Should Designate Resources Based on Initial Assessment

- ❑ **Make investments that are**
 - Tangible
 - Sustainable
- ❑ **Develop assets including**
 - Personnel
 - Roles and responsibilities
 - Training
 - Skillsets
 - Equipment
 - Reagent standards
 - Quality controls
 - Standardized technologies
 - Data reduction and analysis



Soroka SD, Schiffer JM, Semenova VA, et al. *Biologicals*: 2010; 38(6): 675-683.

Resources Must be Valued and Protected

❑ People are our most valuable resource

- Practice accountability and empowerment
- Know where you fit
- Own what you do
- Establish study-specific role descriptions
- Maintain training and competency records

❑ Protecting our state of the art facilities and equipment

- Perform preventative equipment maintenance
- Monitor performance
- Manage facilities and equipment



Quality Management Systems (QMS): Building on Existing Expertise

❑ Implementation of enterprise level LIMS

- Specimen and data management
- Study data management, analysis and reporting
- Specimen and critical reagent inventory

❑ Use existing agency expertise

- Specimen barcoding
- CASPIR inventory
- Information management
- Facilities management



Quality and Safety are Integrally Linked

□ Quality managers, safety liaisons, and team members should engage in

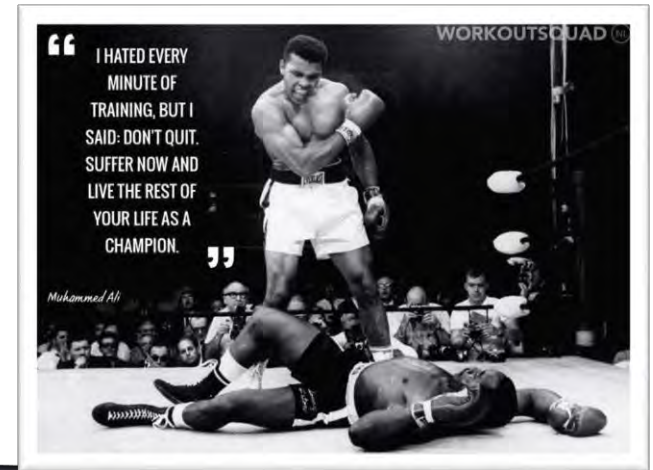
- Developing risk assessments
- Managing content
- Controlling documents
- Monitoring compliance
 - Requirements
 - Frequency
 - Competency



Laboratories Should Train With Intent

A core safety training curriculum is critical

- ❑ **Train like you fight, fight like you train**
- ❑ **What training do I need?**
 - Know where I fit
 - Set clear expectations
- ❑ **What am I trained to do?**
 - Defined curriculum
 - Defined outcomes
- ❑ **How do I know I am trained?**
 - Competency based outcome and proficiency measures



Documenting Safety and the Quality of Science

- ❑ Document control system
- ❑ Laboratory risk assessments
 - Process linked
 - Biological and chemical hazards
 - Risk mitigation and response
- ❑ Event and incident reporting
 - Root cause analysis
 - Impact assessment
 - Corrective action
 - Preventative action

The image displays three overlapping CDC laboratory forms. The top form is the MPIR-6001 Laboratory Risk Assessment Form, titled "MPIR-6001-14 Working with *Neisseria meningitidis* Cultures". The middle form is the MPIR-6005 Chemical Risk Assessment Form, titled "Preparing MIT solution". The bottom form is the MPIR-7075 Event Reporting Form, titled "Event Report # Attachment # 2".

MPIR-6001 LABORATORY RISK ASSESSMENT FORM			
Laboratory:	Microbial Pathogenesis and Immune Response (MPIR)	Assessment No.	MPIR 6001-14 Rev 1
TITLE	MPIR-6001-14 Working with <i>Neisseria meningitidis</i> Cultures		
Procedure	Manipulation of <i>Neisseria meningitidis</i> bacterial cultures		
Team Lead	Li Han	Laboratory Area	Bldg 18, B424
Personnel	Applies to any MPIR Laboratory staff members using this procedure		

MPIR-6005 CHEMICAL RISK ASSESSMENT FORM			
No.	Date Originated (Day/Month/Year)	Revision No.	Effective Date (Day/Month/Year)
MPIR-6005	05/MAY/2001	1	Day/Month/Year
Title: Preparing MIT solution			
Prepared by: Daria Boulay	QA Review: Name: Rita Desai Initials and Date:	Approving Authority: Name: Conrad P. Quinn Signature and Date:	
1. Brief description of procedure, hazards, and summary of controls:		2. Risk Assessment Rating	
<ul style="list-style-type: none">MIT (Chromoly Blue Tetrazolium Bromide) is a skin, eye and respiratory irritant and also is a possible mutagen.PBS has no associated OSHA hazards			

MPIR-7075 EVENT REPORTING FORM	
Event Report # Attachment # 2	
1. Description of the Event:	
2. Root Cause of Event:	
3. Corrective Action Taken:	
4. Preventive Action:	
5. Impact:	

Validated Science Adds Value and Confidence

Documented validation

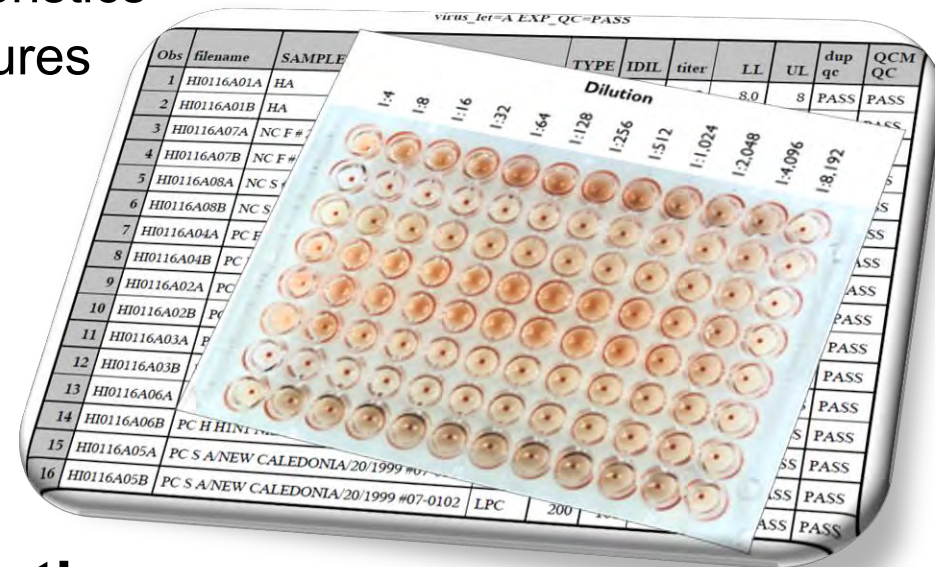
- Defined performance characteristics
- Established acceptable measures of confidence and uncertainty

Data management

- Traceable
- Transparent
- Reliable

Secure reporting

Evidence-based interpretation



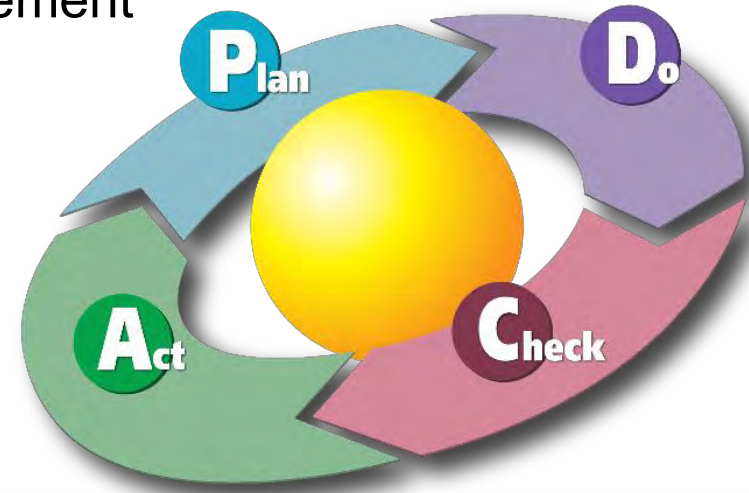
Be Flexible

**“Effective leadership is putting first things first. Effective management is discipline, carrying it out”
– Stephen Covey**



The Plan–Do–Check–Act Cycle

- ❑ **A process for implementing change**
 - **Plan:** Recognize an opportunity and plan a change
 - **Do:** Test the change – start small
 - **Check:** Review, analyze, and identify lessons learned
 - **Act:** Take action based on lessons learned
 - **Repeat:** Promotes continuous improvement
- ❑ **Set targets – quality indicators**
- ❑ **Measure progress**
- ❑ **Adapt to improve**



AVRP Demonstrates that Attention to Quality and Safety Does Not Compromise Productivity

- ❑ Laboratory tests for diagnosis and patient management
- ❑ Analysis models for immune correlates of protection
- ❑ A basis for regulatory action
- ❑ More than 70 laboratory specific publications
- ❑ More than 10 Patents
- ❑ Nine Shepard Award nominations



Marano N, Plikaytis BD, Martin SW, et al. *JAMA*. 2008;300(13):1532-1543.
Wright JG, Plikaytis BD, Rose CE, et al. *Vaccine*. 2014;32(8): 1019-1028.
Schiffer JM, Chen L, Dalton S, et al. *Vaccine*. 2015;33(31): 3709-3716.
AVRP: Anthrax Vaccine Research Program

A Congressional Mandate Fulfilled

- ❑ **A first for the anthrax vaccine**
 - Only data-driven changes in AVA use in 38 years
- ❑ **Improved safety profile – 2008**
 - Change to intramuscular injection route
 - Reduction in frequency, severity and duration of injection site adverse events
- ❑ **Simplified regimen – 2012**
 - Reduction in priming series to 3 doses IM
 - Protection in 6 months
- ❑ **Correlates of protection in humans**
 - Application of the *Animal Rule*
- ❑ **sBLA for booster schedule reduction – 2016**



AVA: anthrax vaccine adsorbed

IM: intramuscular

sBLA: Supplemental Biologics License Application

Wright JG, Quinn CP, Shadomy S, et al. *MMWR*. 2010;59(6):1–36.

MPIR Laboratory Contributions to Enhancing Research and Collaboration

❑ Emergency response capacity

- Anthrax letter attacks of 2001
- Pandemic H1N1 response contributions 2009
- STRIVE and Phase 1 Ebola vaccine studies
- Laboratory surge capacity

❑ Expertise

- PEP anthrax vaccine optimization
- Pertussis and bacterial meningitis

❑ Technology

- Methods development and technology transfer
- Emergency response laboratory capability

❑ Reputation

- Associated funding
- Research-base expansion



Agrawal A, Lingappa J, Leppla SH. et al. *Nature*. 2003;424:329-334.

Veguilla V, Hancock K, Schiffer J, et al. *Journal of Clinical Microbiology*. 2011;49(6):2210-2215.

Fay MP, Follmann DA, Lynn F, et al. *Science translational medicine*. 2012;4(151):151ra126.

MPIR: Microbial Pathogenesis and Immune Response

STRIVE: Sierra Leone Trial to Introduce a Vaccine against Ebola

PEP: post-exposure prophylaxis

Inspire Your Team

- ❑ **Recognize the value your team contributes to quality, safety, and public health or patient impact**
- ❑ **Share the vision you see for what the laboratory team can accomplish, and how it can best achieve its goals**
- ❑ **Articulate the importance of attention to safety and quality best practices**
 - Catch people being good—recognize exemplary practices and performers
- ❑ **Continue to improve**

Embracing a Culture of Quality and Safety

**“Change will not come if we wait for some other person or some other time.”
— Barack Obama**



**“The illiterate of the 21st century will not be the person who cannot read. It will be those who cannot learn, unlearn and relearn.”
— Alvin Toffler**

Establishing a Culture of Safety in an Academic Research Institution: Teaching Safety to Scientists



Joseph Kanabrocki, PhD, NRCM(SM)

Associate Vice-President of Research Safety

Professor of Microbiology

University of Chicago

Chair, External Laboratory Safety Workgroup, CDC



U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

Building A Culture of Responsible Science

□ **People**

- Provide leadership and support at all levels, especially high levels
- Develop and track training needs
- Support development of laboratory professionals

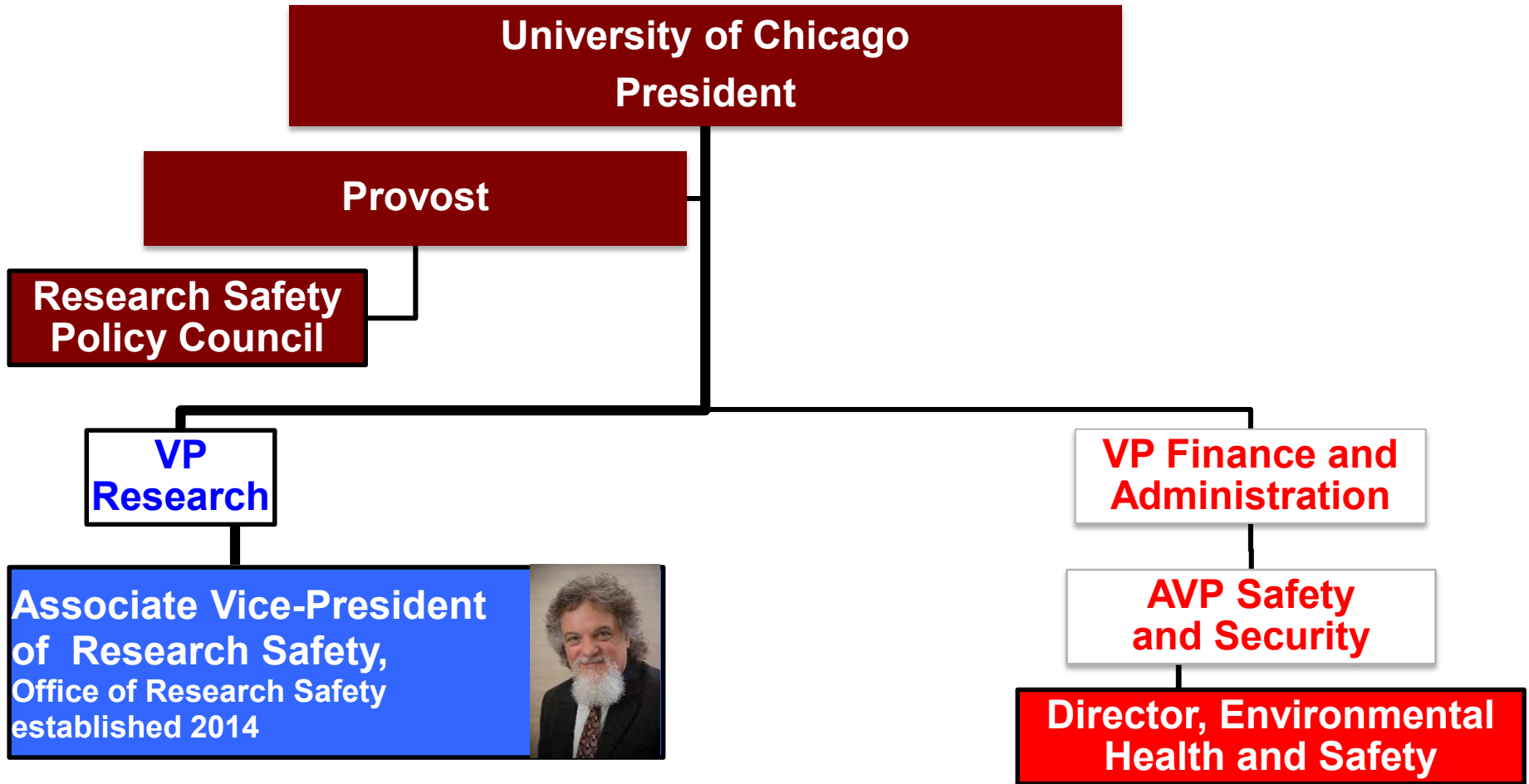
□ **Institutional infrastructure and oversight**

- Use institutional controls to assess and monitor risk
- Improve biosafety procedures
- Encourage reporting of incidents

□ **Knowledge, awareness, and communication**

- Engage broader community
- Increase awareness through multiple media

Leadership and Governance for Lab Safety at the University of Chicago



AVP: Associate Vice-President

University of Chicago Office of Research Safety

**Provost's
Research
Safety Policy
Council**



**AVP
Research
Safety**



**Environmental
Health and
Safety**

Research Safety Fellow

**Office of Research Safety
Department Administrator**

IT and Training Coordinator

Biosafety

- Biosafety Officer/ARO (PhD Microbiology)
DURC Admin.
- Biosafety Officer/ARO (PhD Microbiology)
- Biosafety Officer (PhD Cell & Molecular Biology, MBA)
- H.T. Ricketts Laboratory Biosafety Officer/ARO (IH)

Lab Compliance

- Director, Regulatory Compliance for Lab Programs (IBC, IACUC, DURC)
- 3 IBC/IACUC Administrators

Chemical Safety

- 2 Chemical Safety Officers (PhD Chemistry)

Radiation and Laser Safety

- Radiation and Laser Safety Officer
- Administrative Ass't
- 3 Health Physicists
- Laser Safety Specialist

AVP: Associate Vice-President
IBC: Institutional Biosafety Committee
IACUC: Institutional Animal Use and Care Committee
DURC: Dual Use Research of Concern
ARO: Alternate Responsible Official

Risk Assessments: Institutional Biosafety Committee (IBC)

- **IBC is responsible for all life-sciences research protocols at University of Chicago**
 - Review and approval
 - Surveillance
- **Review the use of biohazardous materials including**
 - Recombinant DNA
 - Infectious agents
 - Humans
 - Animals
 - Plants
 - Biological toxins

Laboratory Safety Training

- ❑ **Laboratory safety training designed to meet needs of personnel working on research**
 - Training requirements dictated by research description as detailed in IBC protocol
- ❑ **Variety of courses, matched to protocol needs**
 - Bloodborne Pathogens for Research Staff
 - BSL1 and rDNA
 - BSL2 and rDNA
 - Viral Vectors
 - Biological Toxins
 - Human Gene Transfer (in development)
 - Chemical Hygiene

Cognitive and Practical Biosafety Education for the Host-Pathogen Investigator

- ❑ Intensive 4-day course
- ❑ Basic BSL3 lab safety, PPE, and respiratory protection
- ❑ Decontamination and disinfection
- ❑ History of biodefense programs, biologic toxins, biosecurity, and dual-use research
- ❑ Emergency response
- ❑ Epidemiology of lab-acquired infections
- ❑ Risk assessment of:
 - Recombinant DNA and pathogenic microorganisms
 - Laboratory animals and exposure
 - Vivarium and zoonoses

Cognitive and Practical Biosafety Education for Host-Pathogen Investigators



Learning How to Prepare to Enter Laboratory Environment

Cognitive and Practical Biosafety Education for Host-Pathogen Investigators



Learning how to put on personal protective equipment to enter BSL3 laboratory

Working with First Responders to Improve Understanding Risks in Laboratory Setting

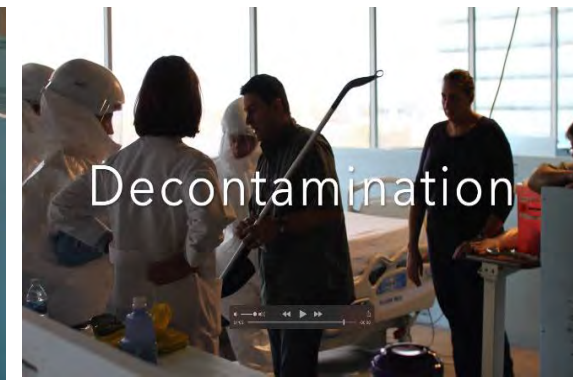


First responders from the Argonne National Labs being shown laboratory work environment



Responding to Ebola: Training Healthcare Workers How to Don and Doff PPE

- **Ebola PPE protocol for healthcare workers similar to those used by laboratory workers**
- **Biosafety personnel rapidly developed training for proper use of PPE, clinical procedures, decontamination**



PPE: Personal protective equipment
PAPR: Powered air purifying respirators

Shaping the Future: GLRCE Biosafety Research Fellow Program

- ❑ **One fellow per year in-residence program**
 - NIH stipend, plus benefits
- ❑ **Fellows support biosafety and IBC activities, with primary focus on laboratory and research safety**
 - IBC protocol review and risk assessment
 - Select Agent Program management
 - Laboratory inspections, including external inspections (USDA, CDC, FAA)
 - Training
 - BSL3 facility operations and maintenance
 - Emergency spill response
 - Export controls/DURC program and material transfer agreements

Additional Experience for GLRCE Biosafety Research Fellows

- ❑ **Fellows are expected to participate in applied biosafety research**
- ❑ **Fellows are encouraged to take advantage of resources and projects conducted at the H.T. Ricketts Laboratory (NIAID Regional Biocontainment Laboratory)**
- ❑ **Fellows attend and present at national and regional meetings**
- ❑ **Fellows prepare and sit for certification exams**
 - National Registry of Certified Microbiologists (NRCM) and Specialist in Microbiology (SM)

Using Applied Biosafety Research to Improve Safety and Facilitate Research

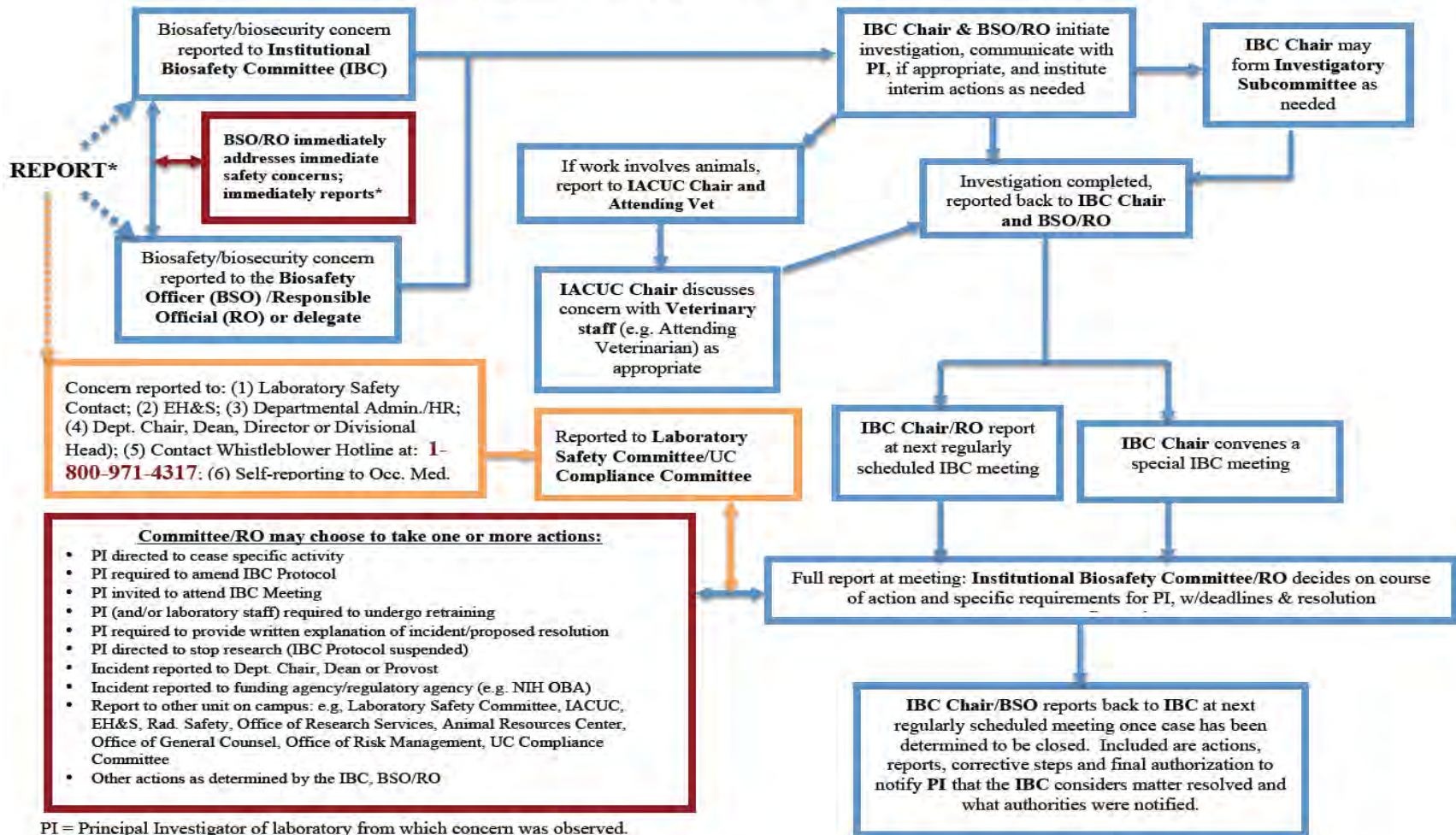
- ❑ **Two previously established University of Chicago autoclave standard operating procedures**
 - Non-spore-formers: **40-min cycle at 121°C**
 - Spore-formers (*B. anthracis*): **180-min cycle at 121°C**
- ❑ **Study found**
 - **40-min cycle safely decontaminates all infectious waste generated at H.T. Ricketts Laboratory (HTRL)**
 - Effective regardless of whether spores are in moist or dry waste
 - Reproducible using several different types of bacteria
- ❑ **New SOP with reduced autoclave times**
 - Approved by IBC
 - Increased efficiency and safety of operations

GLRCE Programmatic Legacy and Direct Impact: Biosafety Fellows

- ❑ **Previous fellows now work in key laboratory safety positions with various organizations including**
 - **Universities**
 - Massachusetts Institute of Technology
 - Northwestern University
 - University of Chicago-Hyde Park
 - University of Cincinnati
 - University of Illinois at Chicago
 - University of Nebraska-Lincoln
 - Washington University in St Louis
 - **Research Institutes**
 - **Governmental Agencies (DHS)**

Incident Reporting Is Encouraged: Multiple Reporting Pathways Established

IBC PROCEDURES FOR DEALING WITH BIOSAFETY/BIOSECURITY CONCERNS



Code of Conduct Includes Reporting Incidents

- Heightens awareness
- Reinforces importance of safety
- Employees are required to sign annually

Individual Code of Conduct for the University of Chicago Select Agent Program and the Howard Taylor Ricketts Laboratory

For the individual scientist, an ethical code of conduct centers on personal integrity. It embodies, above all, a commitment to intellectual honesty and personal responsibility for one's actions, and to a range of practices that characterize the responsible conduct of research, including:

- Intellectual honesty in proposing, performing, and reporting research;

- Immediate reporting to the Principal Investigator and Responsible Official of behavior or activities that are inconsistent with HTRL Safety and Security Plans.
- Awareness of and adherence to security protocols necessary to protect and secure the Select Agents with which an individual works. Included in this responsibility to maintain security are the following:
 - Awareness of, and adherence to, all security protocols required by the Protective Force of Argonne National Laboratories. These procedures are found in the HTRL Security Plan.
 - Participation in all required training programs and drill exercises conducted at

- Immediate reporting to the Principal Investigator and Responsible Official of behavior or activities that are inconsistent with HTRL Safety and Security Plans.
- Awareness of and adherence to security protocols necessary to protect and secure the Select Agents with which an individual works. Included in this responsibility to maintain security are the following:
 - Awareness of, and adherence to, all security protocols required by the Protective Force of Argonne National Laboratories. These procedures are found in the HTRL Security Plan.

NAME: _____
SIGNATURE: _____
DATE: _____

Services Provided by University of Chicago Office of Research Safety

***“How do we get investigators to even
know we exist?”***

***“How do we get investigators to realize
we are here to help?”***

Communication and Outreach to Frontline Laboratory Workers



DO NOT APPLY COSMETICS IN THE LAB
(THIS INCLUDES CHAPSTICK®)

DON'T EAT OR DRINK OR STORE FOOD IN THE LAB.

DON'T HANDLE CONTACT LENSES IN THE LAB.



<http://biologicalsafety.uchicago.edu/>

This message brought to you by the Office of Biological Safety and BSL Awesome Productions.



YOU SHALL NOT PASS



...IBC approval without the appropriate biosafety training.



biologicalsafety.uchicago.edu/

facebook.com/UChicagoBiosafety

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BSL
Awesome



ABIDE

BY THE NIH GUIDELINES

**THE NIH GUIDELINES,
OR THE NIH
GUIDELINES FOR
RESEARCH INVOLVING
RECOMBINANT AND
SYNTHETIC DNA
MOLECULES, IF
YOU'RE NOT INTO
THE WHOLE BREVITY
THING, APPLY TO ALL
RESEARCH INVOLVING
rDNA AND SYNTHETIC
DNA REGARDLESS OF
ITS FUNDING SOURCE.**

**FOR ANY QUESTIONS
REGARDING
COMPLIANCE WITH
THE NIH GUIDELINES,
CONTACT THE OFFICE
OF BIOLOGICAL
SAFETY**

773.834.2707

biosafety@

bsd.uchicago.edu

BSI
Awesome

Clever Posters Designed to Increase Awareness

**Introducing The Most
Interesting Man in Biosafety.**




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BSL
AWESOME



... and Reinforce Good Behavior

I don't always work with recombinant or synthetic DNA...



But when I do, I have an IBC-approved protocol.

This message brought to you by the Office of Biological Safety and BSL Awesome Productions.
<http://biologicalsafety.uchicago.edu/>

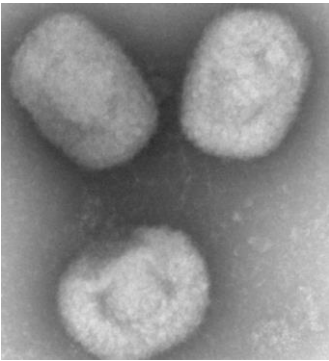


How to Strengthen A Culture of Lab Safety

- ❑ **Leadership at high levels**
 - UC – Office of Research Safety
 - CDC – Office of the Associate Director for Laboratory Science and Safety
- ❑ **Developing future leaders**
 - UC – GLRCE Biosafety Research Fellows
 - CDC – Laboratory Leadership Service
- ❑ **Review mechanisms for lab safety**
 - UC – Institutional Biosafety Committee
 - CDC – Laboratory Safety Review Board
- ❑ **Engaging and proactive communication**

Questions?

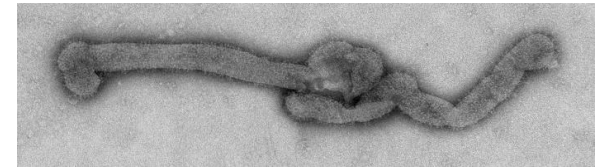
Selected CDC Pathogen and Toxin Discoveries



Akhmeta Virus



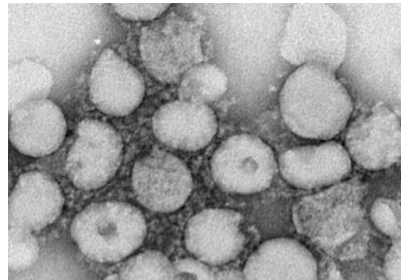
Legionella



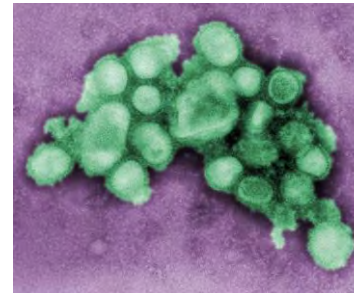
Bourbon Virus



Lychee Nut Toxin



SARS



2009 pandemic
H1N1 Influenza



Carcinogens in Smoke

For more information about CDC Laboratory Safety
www.cdc.gov/about/lab-safety/index.html

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15530, 11152, 19479