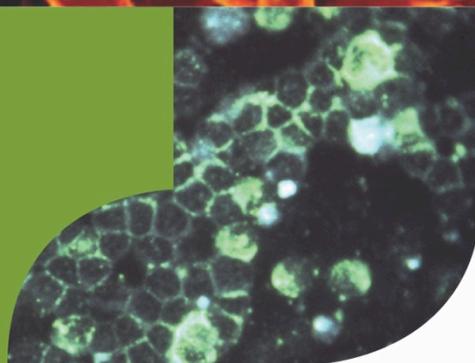
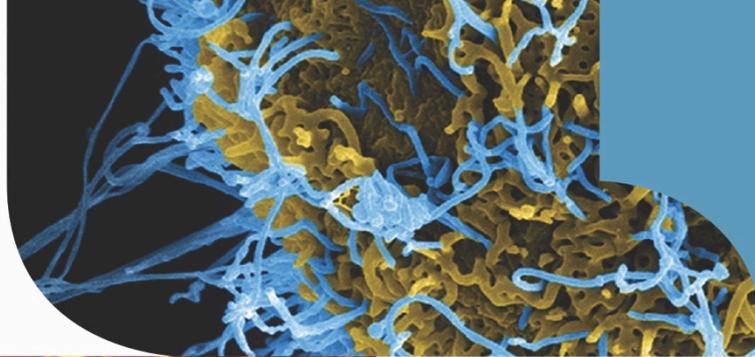




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# Pathogen Safety Data (PSD) Guide Training Module

OCTOBER 2016

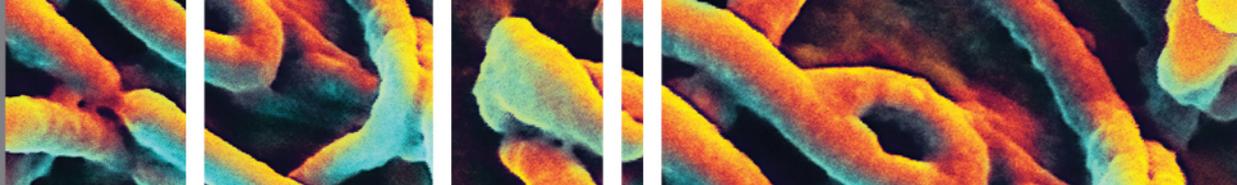
NOTE: This module should not be used as a comprehensive stand alone safety & health training module on infectious diseases. Rather, users are encouraged to adapt and incorporate this module into new and existing programs. Also, the Trainer notes below each slide contain important information that should be reviewed prior to using this module.



# Objectives

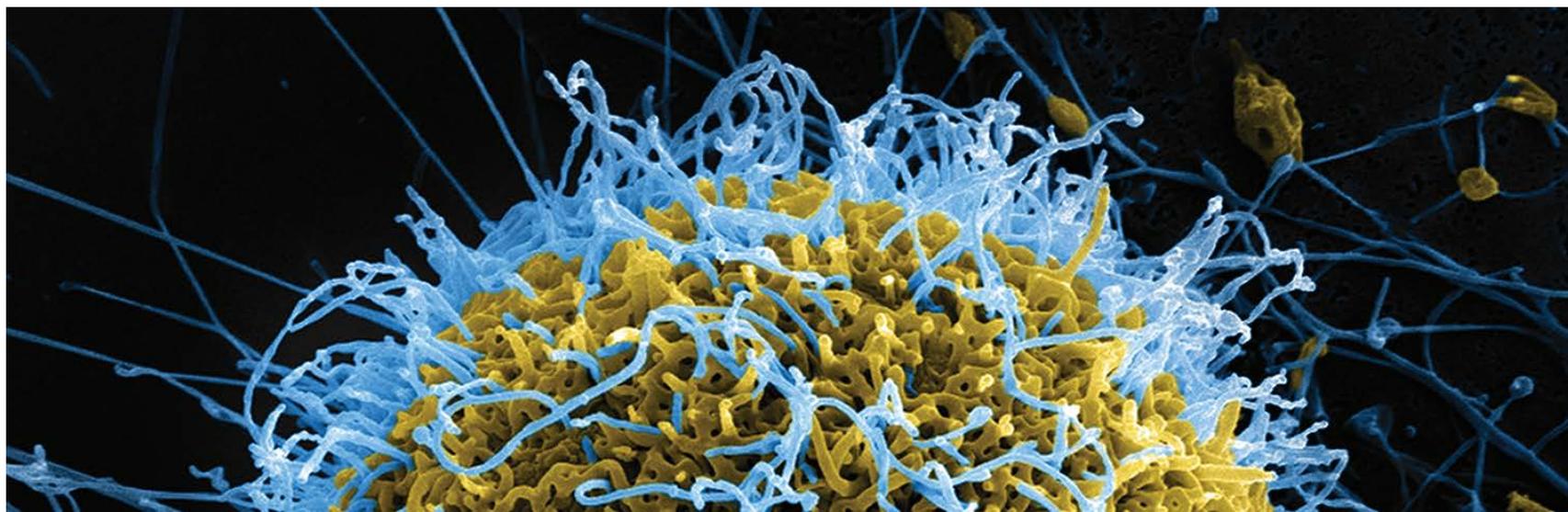
Upon taking this module, participants will be able to:

1. Access and use existing resources for pathogen safety data.
2. Look up key terminology used in pathogen safety data resources.
3. Explain the use of pathogen safety data resources in risk assessment and infection prevention and control activities.



# What Is a Pathogen?

**Pathogen** is a term used to describe a bacterium, virus or other microorganism that can cause disease. It is synonymous with “infectious” or “biological agent”.



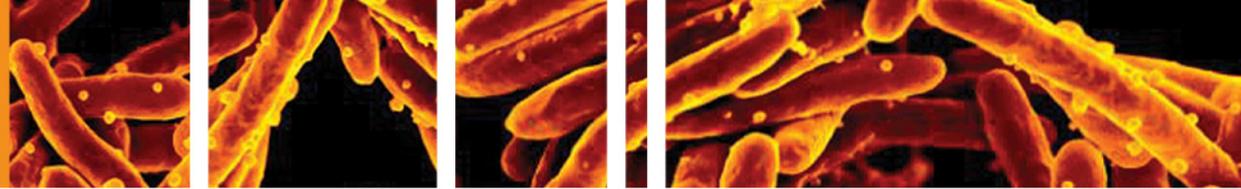


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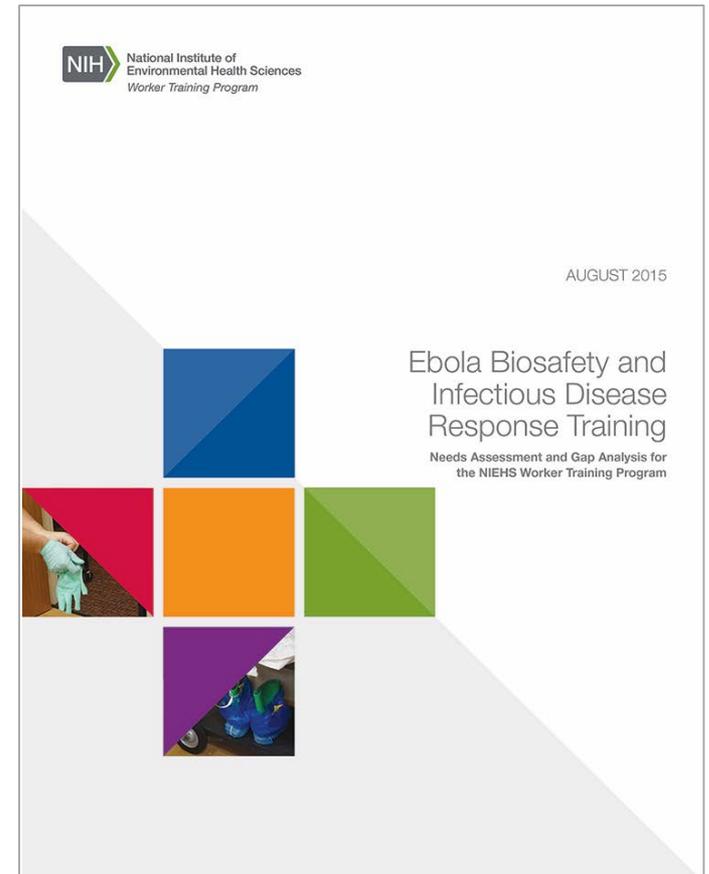
## Pathogen Safety Data Guide and Training Module

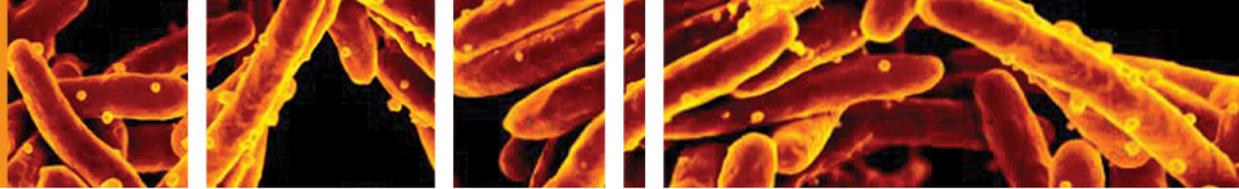
# SECTION I: INTRODUCTION AND BACKGROUND



# Gap Analysis

- Guidance issued by federal authorities was inconsistent and left out key items that adversely affected worker safety and health.
- Resources on infectious diseases from trusted sources is sometimes conflicting or lacking in enough specificity to be immediately helpful.





# NIEHS WTP Training Tools

 National Institute of  
Environmental Health Sciences  
Worker Training Program

November 2014

## Ebola Awareness Orientation

Health and Safety Essentials for Workers



 National Institute of  
Environmental Health Sciences  
Worker Training Program

Ebola Operations Level Training

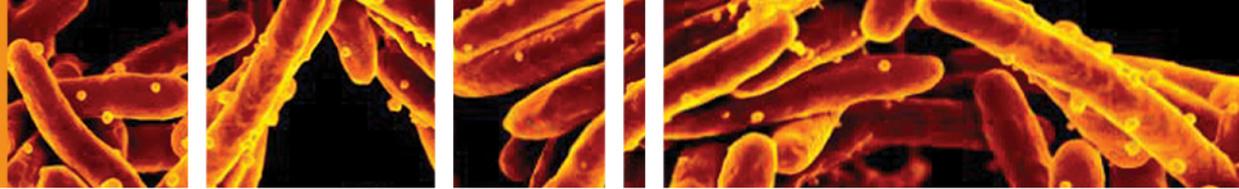
## Ebola Operations Level Training





# PSD Guide Formats

NIEHS grantees and the safety and health community are encouraged to make use of NIEHS educational resources to strengthen their infectious disease training programs. The Guide can be integrated, adapted, and modified into existing training programs.



# PSD Guide Formats

NIEHS grantees and the safety and health community are encouraged to make use of NIEHS educational resources to strengthen their infectious disease training programs. The Guide can be integrated, adapted, and modified into existing training programs.



# Activity 1: Introductions

**Objective:** Get to know one another, identify key infectious disease hazards in workplaces, and get oriented to the experience and needs of participants.

**Task:** Small group activity with worksheet question 1. Discuss the 3 questions and report back.

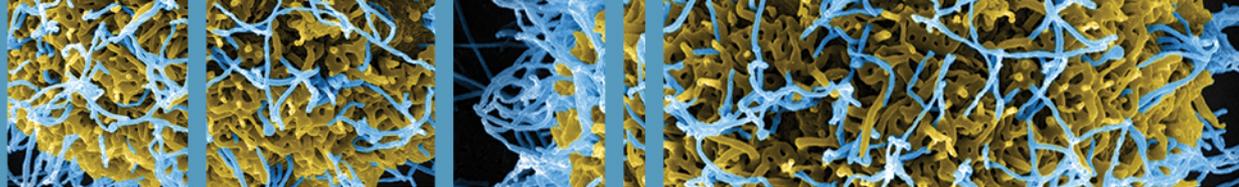
**Breakout Time:** 15 minutes

**Reporting Time:** 10 minutes

**Total Time:** 25 minutes

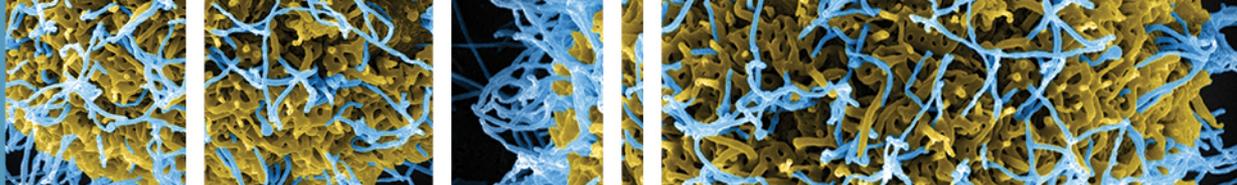


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## Pathogen Safety Data Guide and Training Module

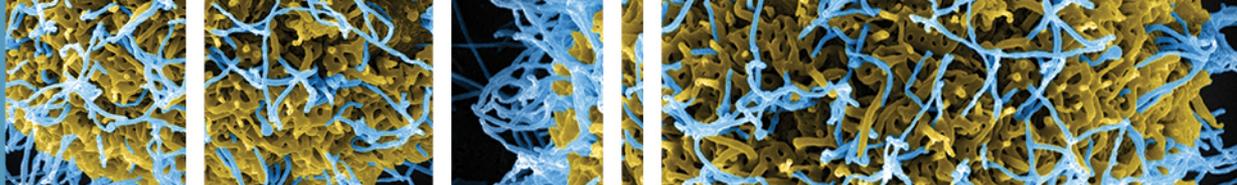
# SECTION II: PATHOGEN SAFETY DATA AND OCCUPATIONAL HAZARDS AND RISKS



# Pathogen Safety Data

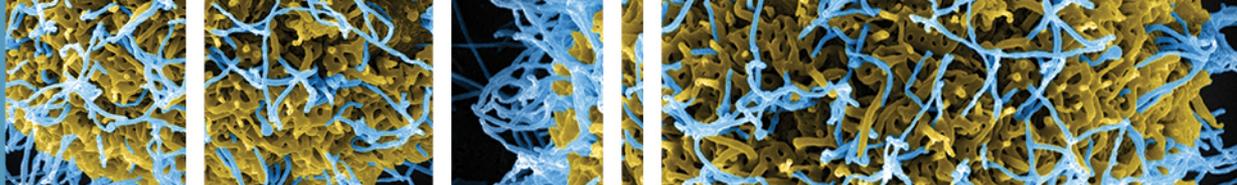
## May include:

- Classification
- Epidemiology
- Pathogen Reservoirs
- Transmission Route
- Pathogenesis
- Diagnosis, Treatment, and Prevention
- Laboratory Hazards
- Exposure Controls
- Personal Protection
- Handling and Storage
- Regulatory and Other Information
- Date of Last Update
- Name and Institution of Preparer
- References



## PSDS Data Is Used to Develop...

- Industry and site specific infectious disease prevention and control plans
- The complexity of these plans will depend on the type of work that is being done and whether or not the job tasks involve potential exposure to infectious agents



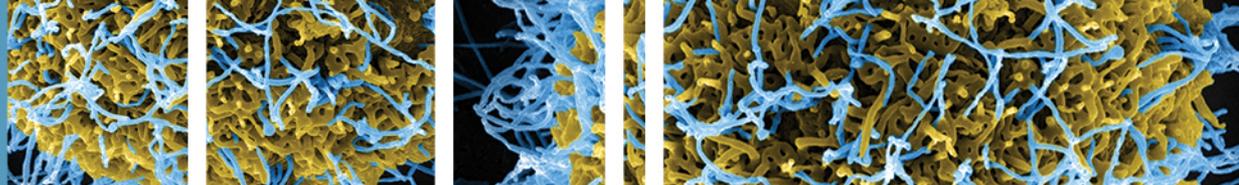
# What Are Typical Problems with Existing Pathogen Safety Data?

**Technical jargon**

**Not specific to worker protection**

**Inconsistent guidance**

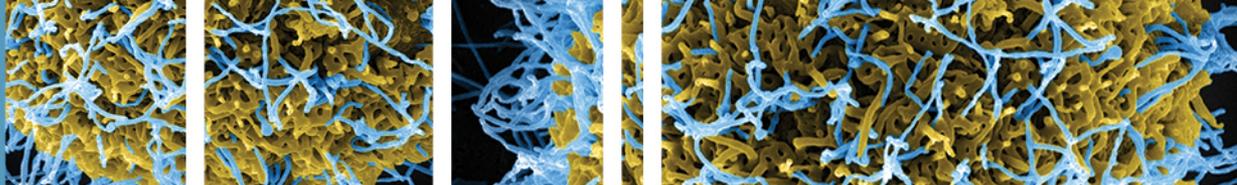
**Information on control measures  
lacks detail and specificity**



# What Is Occupational Exposure?

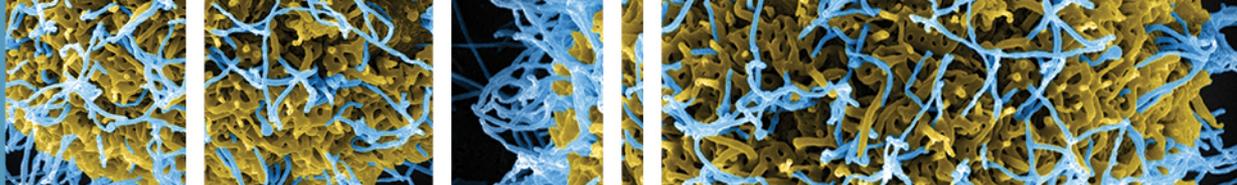
**Occupational exposure** means exposure to sources of infectious agents resulting from an employee's execution of job duties.





# Preventing Occupational Exposure

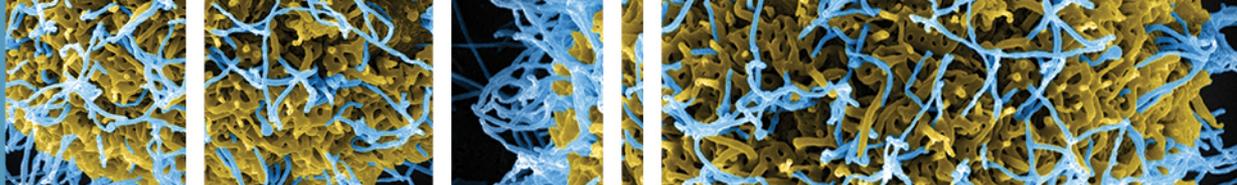
Begins with employers developing a written **infectious disease occupational exposure control plan** to assure procedures are in place to protect all employees who have potential contact with infectious agents.



# Infectious Disease Exposure Control Plan for High Risks Settings

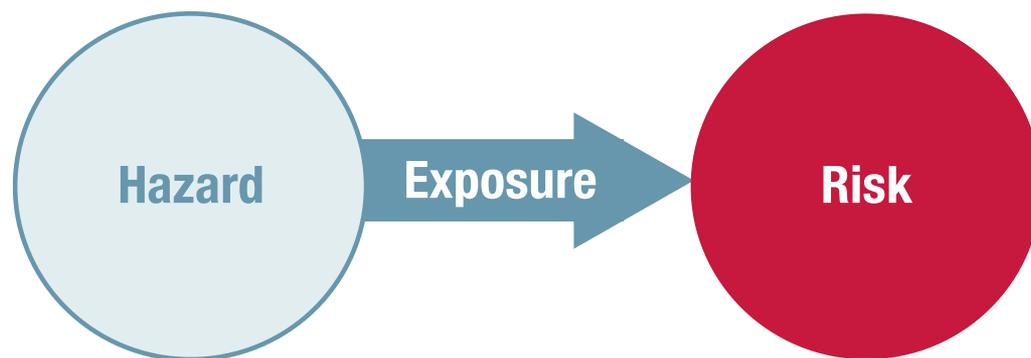
## Key elements:

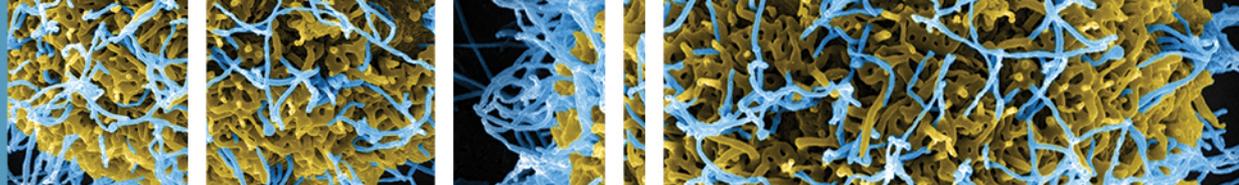
- Management  
Commitment and  
Worker Involvement
- Risk Assessment
- Hazard Control
- Decontamination
- Reporting and  
Recordkeeping
- Training
- Post-exposure,  
Occupational Health  
Procedures, Medical  
Surveillance
- Plan Updates
- Evaluation



# Occupational Hazards and Risks

- **Hazards** – any source of potential damage or adverse health effects on a group of workers
- **Risk** – the chance that a person will be harmed if exposed to a hazard at work.





# Risk, Exposure and Assessment

## Risk

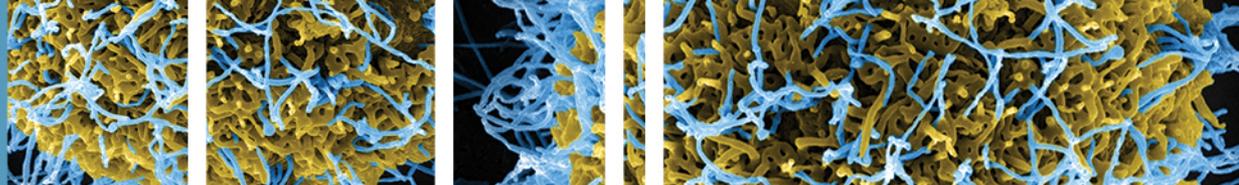
Likelihood  $\times$  Severity

## Exposure

Contact with a chemical, physical, radiological, and/or biological agent

## Assessment

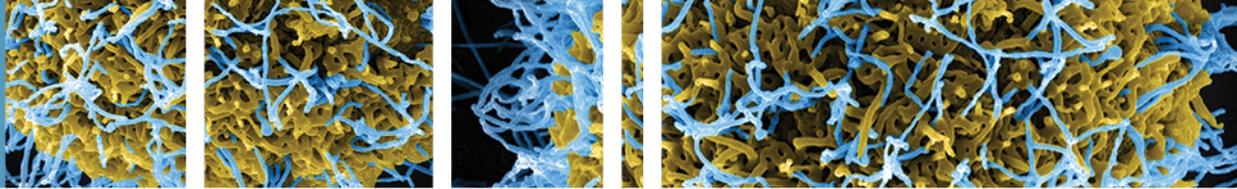
A process of gathering, analyzing, and documenting; evaluation



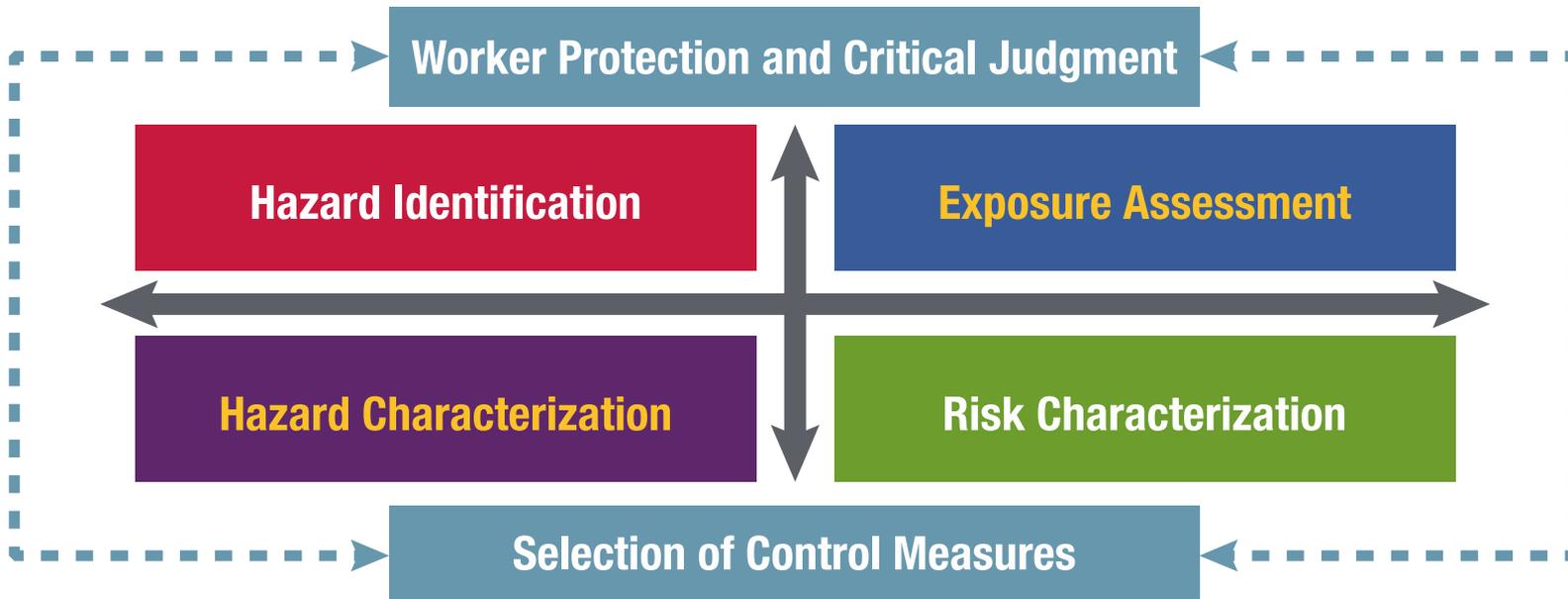
# What Is Risk Assessment?

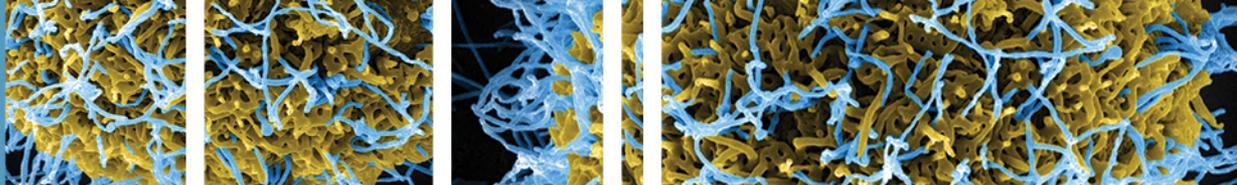
**Risk assessment** is the process where you:

- Identify hazards.
- Evaluate the risk associated with that hazard.
- Determine appropriate ways to eliminate or control the hazard.



# Risk Assessment and Hazard Control Process





# Means of Transmission

## Contact

- Direct
- Indirect
- Intermittent

What type of infectious material may be found on a coffee cup?

## Droplet

- Droplet



es, etc

## Airborne

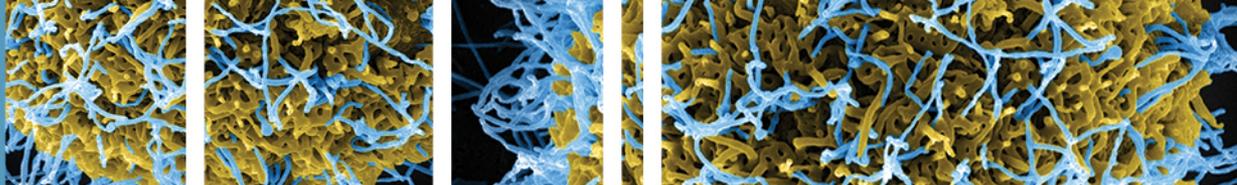
- Droplet nuclei are inhaled
- away from the infectious source
- occur



ceptible person is far away from the infectious source, transmission cannot occur

## Aerosol (new!)

- Aerosols can be simultaneously generated and propelled



## Activity 2: Terms and Definitions

**Objective:** To become familiar with key terms and definitions used in pathogen safety data resources and become comfortable using the glossary in the Guide.

**Task:** Individual activity with worksheet question 2.

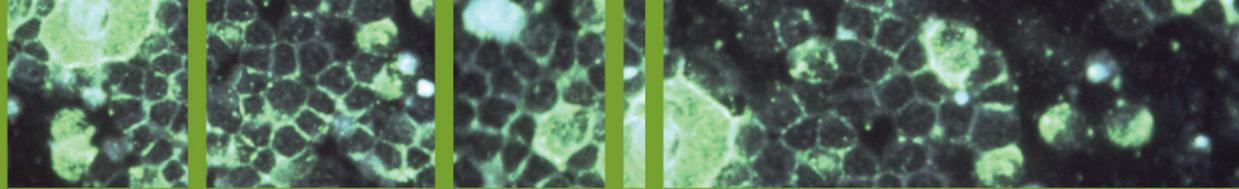
**Breakout Time:** 10 minutes

**Reporting Time:** 10 minutes

**Total Time:** 20 minutes

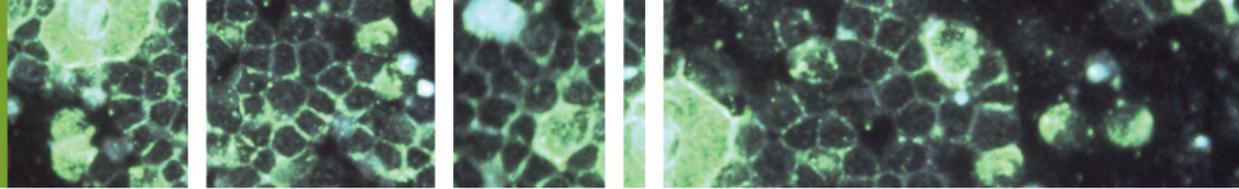


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## Pathogen Safety Data Guide and Training Module

# SECTION III: EXISTING SOURCES OF PATHOGEN SAFETY DATA (PSD)



# Existing Pathogen Safety Databases



**Public Health  
Agency of Canada**

**Agence de la santé  
publique du Canada**

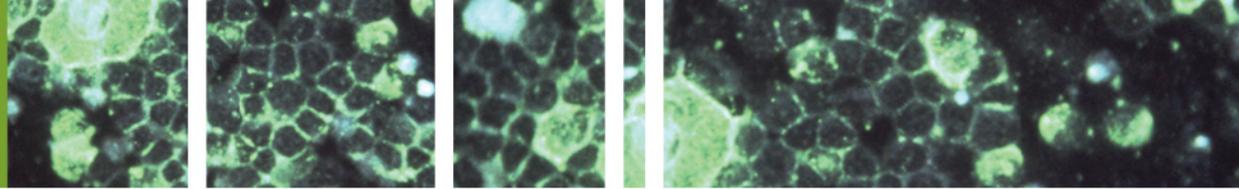


**National Institute of  
Allergy and  
Infectious Diseases**



**World Health  
Organization**





# Public Health Agency of Canada

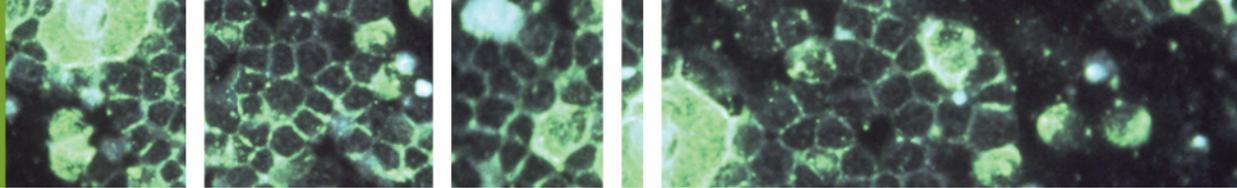
- **PHAC PSD website:** <http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php>
- Download the app to your iPhone, Smart phone, or blackberry
- **Target Audience:** Clinical Laboratory Workers
- **Review Strengths and Weaknesses:**  
Go to page 12 in the Guidebook



Public Health  
Agency of Canada

Agence de la santé  
publique du Canada





Public Health Agency of Canada  
www.publichealth.gc.ca

[Français](#) | [Home](#) | [Contact Us](#) | [Help](#) | [Search](#) | [Canada.ca](#)  
 Home > Laboratory Biosafety and Biosecurity > Pathogen Safety Data Sheets and Risk Assessment > Ebola virus

Main Menu

- About the Agency
- Infectious Diseases
- Chronic Diseases
- Travel Health
- Food Safety
- Immunization & Vaccines
- Emergency Preparedness & Response
- Health Promotion
- Injury Prevention
- Lab Biosafety & Biosecurity
- Surveillance
- Explore**
- Media Room
- Acts & Regulations
- Reports & Publications
- A-Z Index
- Transparency**
- External Advisory Bodies
- Public Engagement
- Completed Access to Information Requests
- Proactive Disclosure

+/- TEXT | PRINT | SHARE

## EBOLAVIRUS

For more information about Ebola, visit [Ebola Virus Disease](#)

## PATHOGEN SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

### SECTION I - INFECTIOUS AGENT

**NAME:** Ebola virus

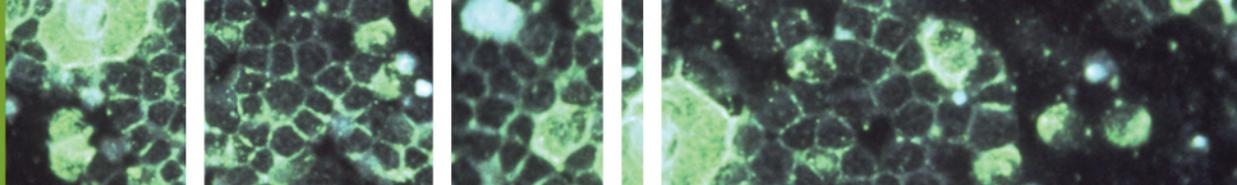
**SYNONYM OR CROSS REFERENCE:** African haemorrhagic fever, Ebola haemorrhagic fever (EHF, Ebola HF), filovirus, EBO virus (EBOV), Zaire ebolavirus (ZEBOV), Sudan ebolavirus (SEBOV, SUDV), Ivory Coast ebolavirus (ICEBOV), Tai Forest ebolavirus (TAFV), Ebola-Reston (REBOV, EBO-R, Reston Virus, RESTV), Bundibugyo ebolavirus (BEBOV, BBBV), and Ebola virus disease (EVD) [1](#) [2](#) [3](#) [4](#).

**CHARACTERISTICS:** Ebola was discovered in 1976 and is a member of the Filoviridae family (previously part of Rhabdoviridae family, which were later given a family of their own based on their genetic structure). Five Ebola species have been identified: Zaire ebolavirus (ZEBOV), which was first identified in 1976 and is the most virulent; Sudan ebolavirus, (SEBOV); Tai Forest ebolavirus (formerly Ivory Coast ebolavirus); Ebola-Reston (REBOV), originating from the Philippines; and Bundibugyo ebolavirus (BEBOV), the most recent species discovered (2008) [1](#) [3](#) [5](#) [6](#) [7](#).

Ebola is an elongated filamentous virus, which can vary between 800 - 1000 nm in length, and can reach up to 14000 nm long (due to concatamerization) with a uniform diameter of 80 nm [2](#) [5](#) [8](#) [9](#). It contains a helical nucleocapsid (with a central axis), 20 - 30 nm in diameter, and is enveloped by a helical capsid, 40 - 50 nm in diameter, with 5 nm cross-striations [2](#) [5](#) [8](#) [9](#) [10](#). The pleomorphic viral fragment may take on several distinct shapes (e.g., in the shape of a "6", a "U", or a circle), and are contained within a lipid membrane [2](#) [5](#). Each virion contains a single-strand of non-segmented, negative-sense viral genomic RNA [5](#) [11](#).

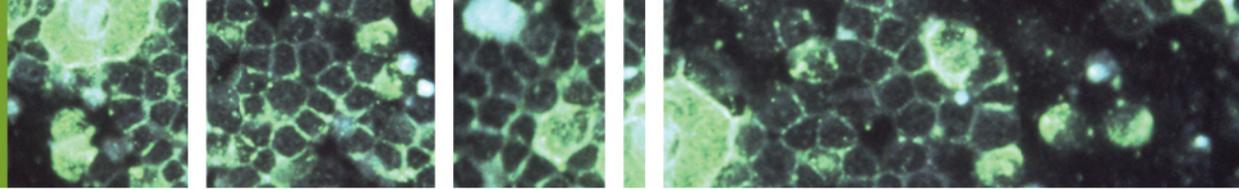
### SECTION II - HAZARD IDENTIFICATION

**PATHOGENICITY/TOXICITY:** Ebola virions enter host cells through endocytosis and replication occurs in the cytoplasm. Upon infection, the virus affects the host blood coagulative and immune defence system and leads to severe immunosuppression [10](#) [12](#). Early signs of infection are non-specific and flu-like, and may include sudden onset of fever, asthenia, diarrhea, headache, myalgia, arthralgia, vomiting, and abdominal pains [13](#). Less



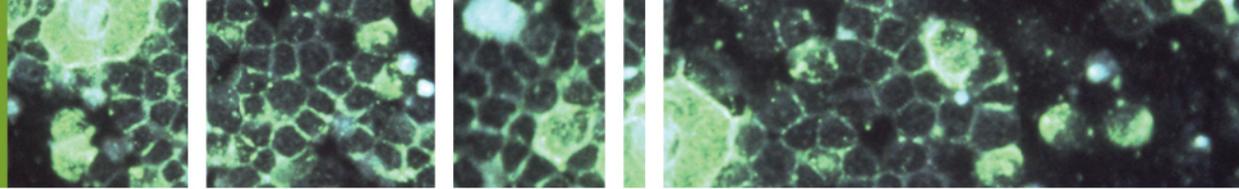
# Comparison of Elements in a Safety Data Sheet to a Pathogen Safety Data Sheet

| Element (Examples)                      | SDS   | PSDS   |
|---|---|--|
| <b>Hazard Identification</b>            | Chemical or Product   | Infectious Agent   |
| <b>Composition</b>                      | Name, components, CAS#, concentration                       | Name, Taxonomy   |
| <b>Hazard Characterization</b>          | Toxicological information (e.g., LD50, carcinogenicity)     | Pathogenicity, infectious dose, communicability, etc                               |
| <b>Stability</b>                        | Chemical stability, reactivity, incompatible materials      | Drug susceptibility/resistance, survival outside the host                          |
| <b>First aid</b>                        | First aid measures  | First aid measures, prophylaxis, immunization                                      |
| <b>Exposure controls</b>                | Exposure limits, protective equipment, engineering controls | Containment requirements (physical and operational controls), protective equipment |
| <b>Handling and Storage</b>             | Safe handling and storage, including incompatible chemicals | Spills, disposal, and storage  |
| <b>Physical and chemical properties</b> | Odor, pH, flash point, etc.                                 | N/A  |

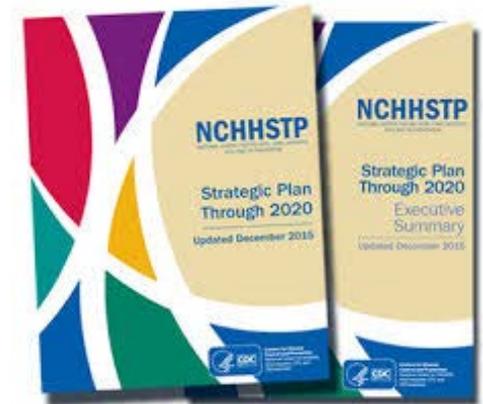
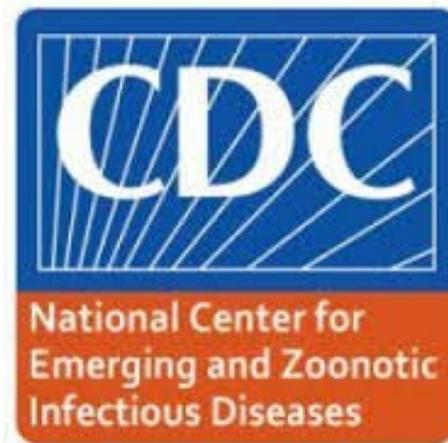


# Sections of the PHAC PSDS

- I. Infectious Agent
  - II. Hazard Identification
  - III. Dissemination
  - IV. Stability and Viability
  - V. First Aid/ Medical
  - VI. Laboratory Hazards
  - VII. Exposure Controls/  
Personal Protection
  - VIII. Handling and Storage
  - IX. : Regulatory and Other  
Information
- Date of Last Update,  
Name and Institution of  
Preparer, and References

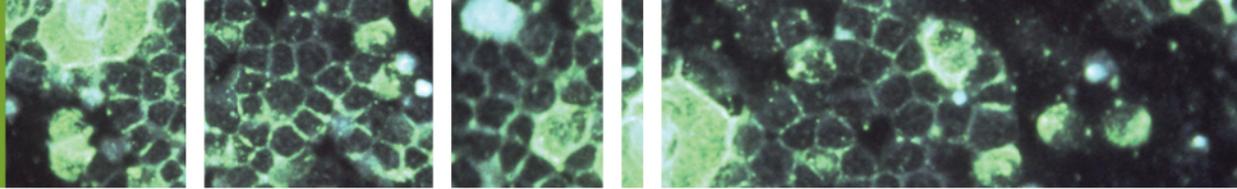


# U.S. Centers for Disease Control and Prevention (CDC)



National Center for Immunization and Respiratory Diseases (NCIRD)

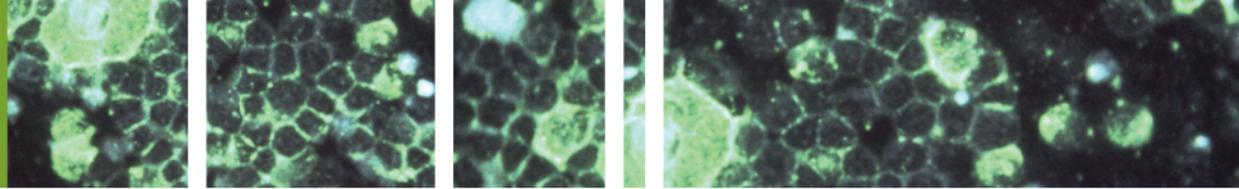




# U.S. Centers for Disease Control and Prevention (CDC)

- **CDC website:** <http://www.cdc.gov/>
- **NIOSH website:** <http://www.cdc.gov/niosh/>
- CDC's infectious disease pages contain links to detailed guidance documents on topics such as:
  - Countries with confirmed patient cases
  - US patient case profile
  - People who may be at increased risk
  - Guidance for travel, and related materials
- **Audience:** Clinical Healthcare Workers
- **Review Strengths and Weaknesses:**  
Go to page 14 in the Guidebook





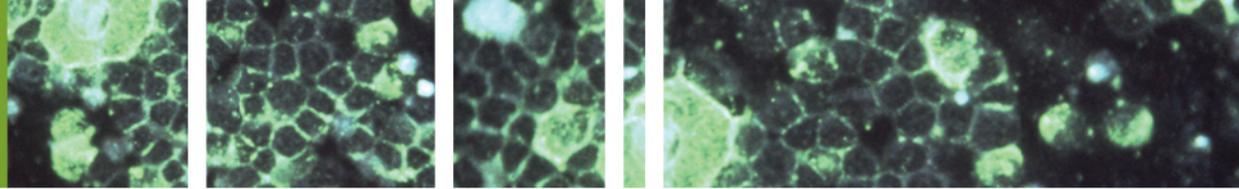
# National Institute of Allergy and Infectious Diseases



- **NIAID website:**

<https://www.niaid.nih.gov/pages/default.aspx?wt.ac=tn>  
[Home](#)

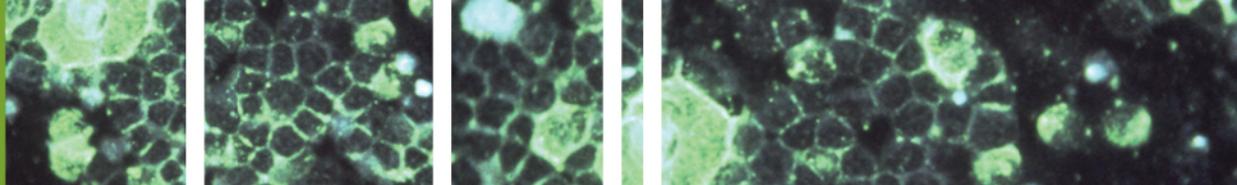
- NIAID's Health and Research Topics page includes links to more than 70
- Also a link to emerging infectious diseases.
- **Target Audience:** Researchers and Scientists
- **Review Strengths and Weaknesses:**  
Go to page 16 in the Guidebook



# The National Library of Medicine's WISER



- **WISER website:** <https://wiser.nlm.nih.gov/>
- Limited information on 30 infectious diseases from USAMRIID's Medical Management of Biological Casualties Handbook and the WMD Response Guidebook, as well as others.
- Download the app to your iPhone, Smart phone, or blackberry
- **Target Audience:** Emergency Responders
- **Review Strengths and Weaknesses:**  
Go to page 16 in the Guidebook



Key Info

Indicators

Emergency Response

**WMD Response Guidelines**

Protective Equipment/Clothing

Protective Distance

Protective Distance Map

Treatment Overview

▶ Basic

▶ Properties

▶ Hazmat

▶ Medical

▶ Environment

## Anthrax

### WMD Response Guidelines

#### Anthrax

Guide 1

Classification: Bacteria

#### SIGNS AND SYMPTOMS

- **Inhalation Route:** Chest Cold Symptoms, Fever, Non-Productive Cough, Shortness of Breath, Shock, Cyanosis, Death
- **Ingestion Route:** Intense Stomach Pain, Bowel Obstruction, Diarrhea, Fever, Dehydration, Death
- **Skin Route:** Sores or Blisters on Exposed Skin

#### CHARACTERISTICS

- **Incubation Period:** 1-7 days (Usually within 48 hours)
- **Inhalational Anthrax has a 90-95% fatality rate if therapy is not initiated early**
- **Untreated Cutaneous Anthrax has a fatality rate of 5-20%**
- **Non-Contagious, Except for Cutaneous**
- **Treatment Available**

#### INDICATORS

- Focused Response
- Public Health Emergency
- Verbal or Written Threats or Claims of Responsibility
- Unusual Number of Sick or Dying People or Animals
- Suspicious Bombing Incident with Little Blast or Fire Damage
- Unscheduled or Unusual Spray Being or Having Been Disseminated
- Abandoned Spray or Dispersion Devices
- Laboratory Containers
- Biohazard Cultures or Culture Media Labels
- Casualty Distribution Aligned with Wind Direction

#### ROUTES OF EXPOSURE

- Inhalation
- Absorption
- Ingestion

#### EMERGENCY RESPONSE

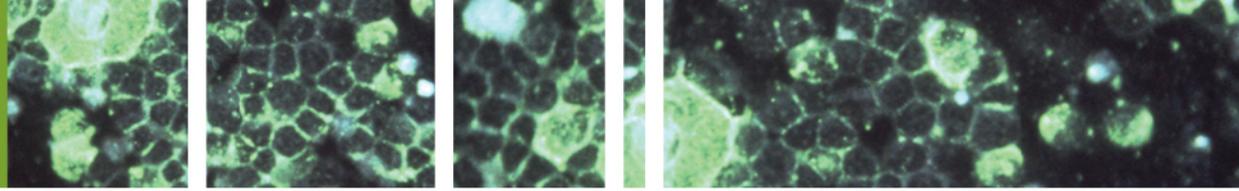
- Approach from Upwind, Uphill, or Upstream
- Isolate Immediate Area for at Least 300 Feet in all Directions
- Keep Unauthorized Persons Away (Crowd Control)
- Stay Upwind
- Make Notifications
- Decon with 5% bleach solution (for surface contamination if present) or soap and water (for personal contamination)
- Obtain immediate medical attention

#### TYPE OF HARM

- Etiological

#### PERSONAL PROTECTION

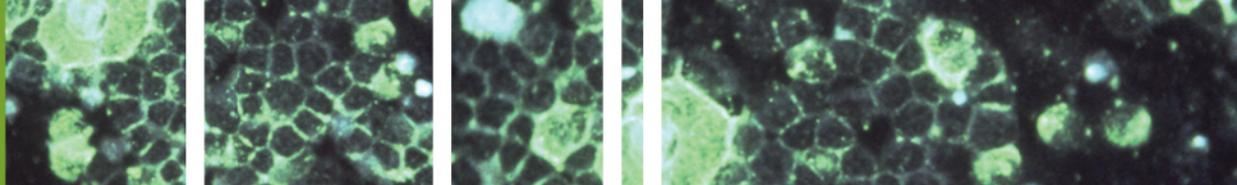
- **Time:** Keep Exposure and Product Contact to Minimum
- **Distance:** Stay at least 300 feet away on Upwind Side Until Agent is Identified



# Occupational Safety and Health Administration

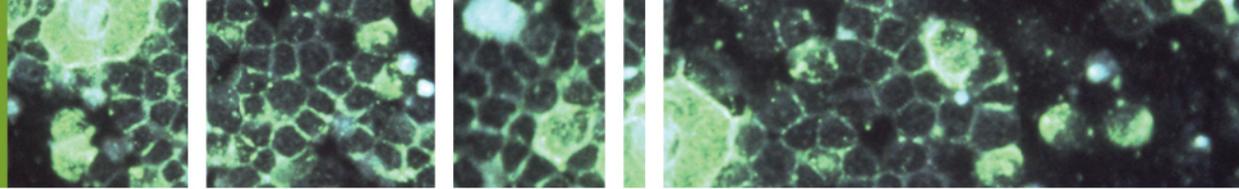


- **OSHA website:** [www.osha.gov](http://www.osha.gov)
- OSHA enforces S&H standards and is authorized to issues new ones.
- OSHA does **NOT** have an infectious disease standard or a database of PSDSs.
- OSHA relies on CDC as the source of pathogen safety data.
- OSHA has important standards that are relevant.
- **Target Audience:** Industry Workers
- **Review Strengths and Weaknesses:**  
Go to page 17 in the Guidebook



# Relevant OSHA Standards

- **Bloodborne Pathogens:** [29 CFR 1910.1030](#)
- **Personal Protective Equipment:** [29 CFR 1910.132](#)
- **Respiratory Protection:** [29 CFR 1910.134](#)
- **HAZWOPER:** [29 CFR 1910.120](#)
- Enforcement Procedures and Scheduling for [Occupational Exposure to Tuberculosis](#)
- [General Duty Clause](#)

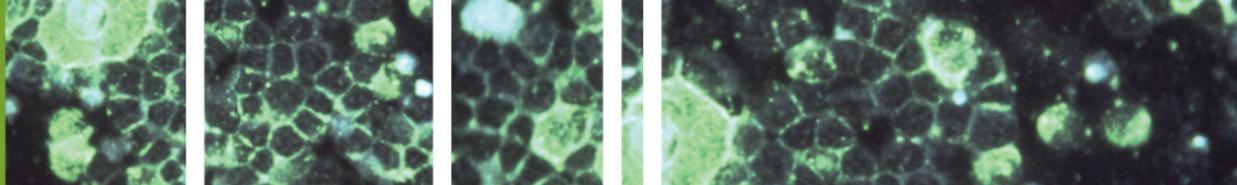


# OSHA 1910.132 (d) Hazard Assessment

## OSHA PPE Standard

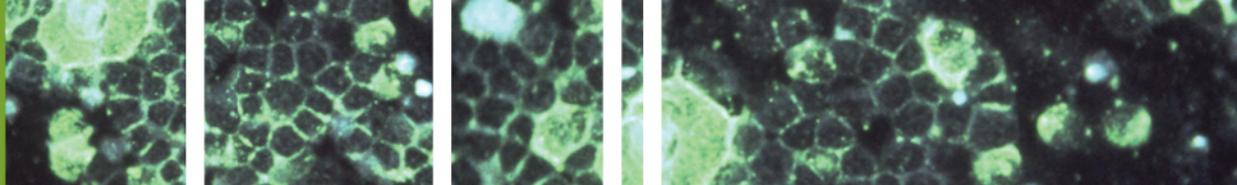
- Employers shall assess the workplace to determine necessary PPE
- If hazards are present the employer shall:
  - Select and have each affected employees use appropriate PPE for identified hazards
  - Communicate selection decisions
  - Select PPE that fits each employee





# OSHA Issues Ebola Clean-up Violations

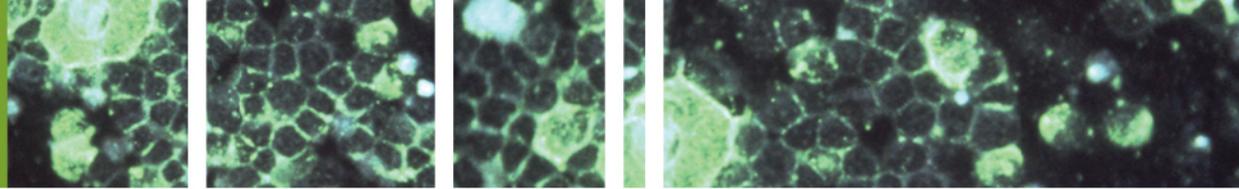
- October 2014
- OSHA Office investigation of contractor that handled cleanups related to a NYC Ebola Patient.
- Falsification of training records and documents and safety and health issues.
- Violations of OSHA's Bloodborne, HAZWOPR, Respiratory Protection, and PPE Standards totaling \$78,400.



# Ca/OSHA

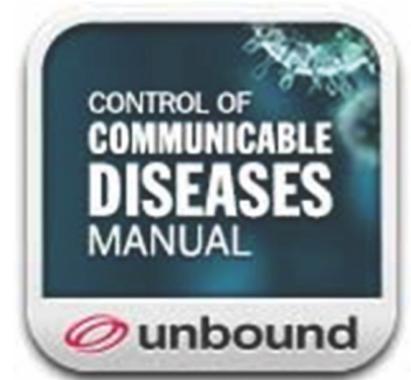
- Aerosol Transmissible Disease Standard, §5199.
- **Website:** <http://www.dir.ca.gov/title8/5199.HTML>

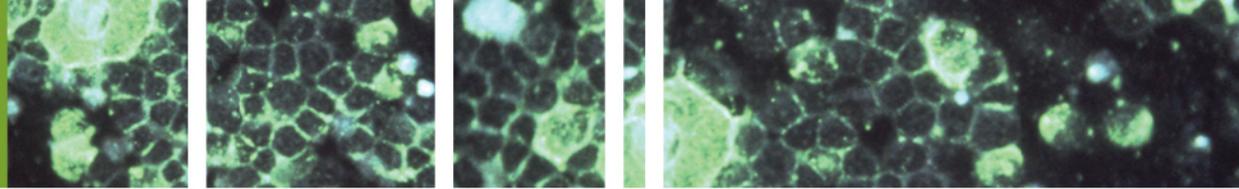




# APHA Control of Communicable Disease Manual (CCDM)

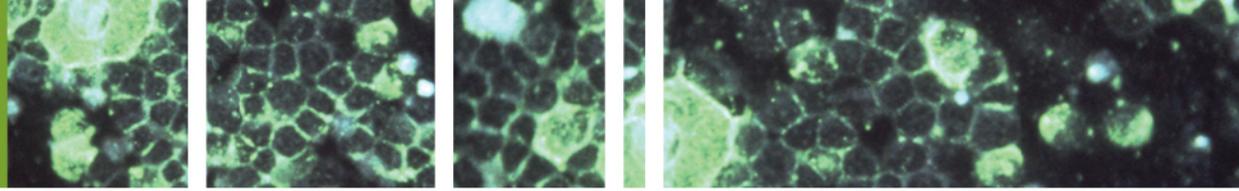
- **Website:** <http://www.apha.org/ccdm>
- CCDM is available in hardcopy, on the Web, and as an app.
- It contains 500 infectious agents.
- It is for purchase, not free.
- No section is dedicated to worker protection information.
- **Target Audience:** Healthcare Workers
- **Review Strengths and Weaknesses:**  
Go to page 20 in the Guidebook





# CCDM Categories

- Clinical features
- Causative agent
- Diagnosis
- Occurrence
- Reservoir
- Incubation period
- Transmission
- Risk groups
- Prevention
- Management of patient
- Management of contacts and the immediate environment
- Special considerations

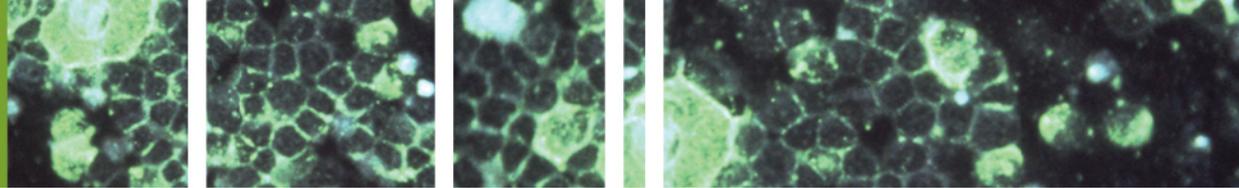


# World Health Organization

- **WHO website:** <http://www.who.int/en/>
- Describes international activities to prevent and control outbreaks.
- Main focus NOT for occupational safety and health purposes.
- International guidelines may differ from US.
- **Target Audience:** Healthcare Workers and Public Health
- **Review Strengths and Weaknesses:**  
Go to page 20 in the Guidebook

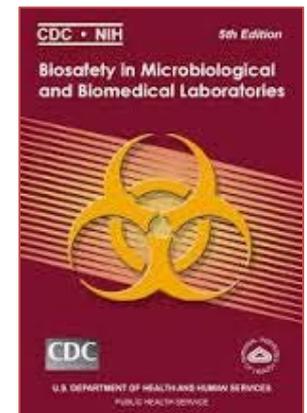


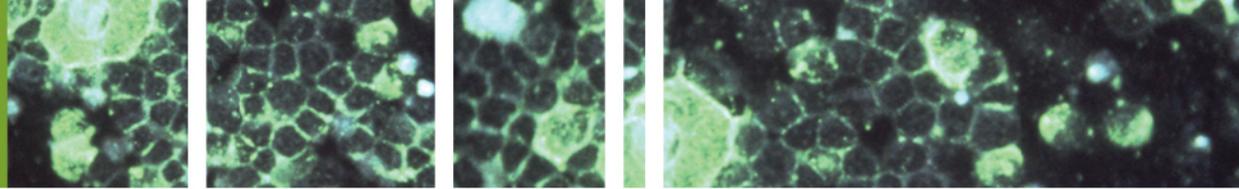
World Health  
Organization



# Additional Sources

- **ASPR Tracie:** <https://asprtracie.hhs.gov/>
- **Pubmed:** <http://www.ncbi.nlm.nih.gov/pubmed>
- **Biosafety in Microbiological and Biomedical Laboratories (BMBL):** <http://www.cdc.gov/biosafety/publications/bmbl5/>





# Activity 3: Characterizing Infectious Disease Hazards

**Objective:** Familiarize participants with existing pathogen safety data resources to identify an infectious agent's properties.

**Task:** Small group activity with worksheet question 3.

**Breakout Time:** 20 minutes

**Reporting Time:** 10 minutes

**Total Time:** 30 minutes

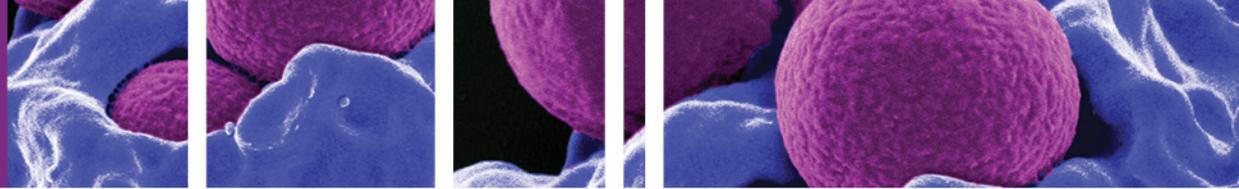


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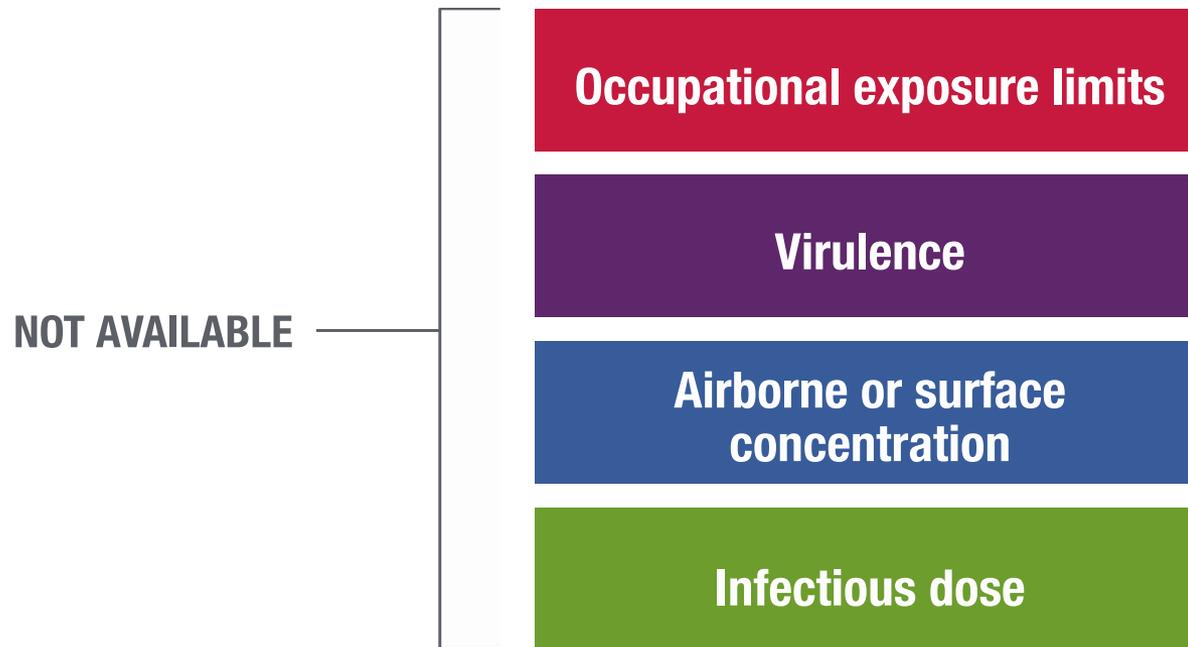
## Pathogen Safety Data Guide and Training Module

# SECTION IV: OCCUPATIONAL EXPOSURE AND RISK ASSESSMENT FOR INFECTIOUS DISEASES



# Occupational Exposure Assessment for Infectious Diseases

## Some key considerations





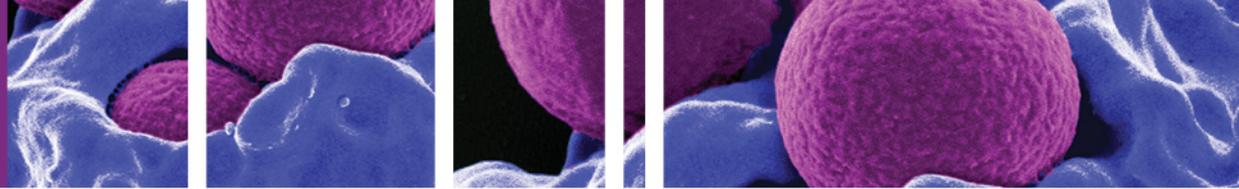
# Considerations for Occupational Exposure Assessment

**Will job tasks include potential exposure to infectious materials?**

**What is the proximity of workers to the contagious individual, contaminated waste, surfaces/equipment, or animals?**

**Will workers be at risk for exposure through contact, splash, inhalation, ingestion, or injection?**

**Will job tasks, work environment, fatigue, and related factors increase risk of exposure or illness?**



# Key Characteristics of ID Exposure Assessment

**Pathogenicity,  
virulence,  
and infectious dose**

**Severity of potential  
health effects**

**Environmental  
survivability  
and transmission**

**Potential for sprays,  
splashes, and aerosols  
generated during  
work-related  
procedures**

**Effectiveness of  
existing controls**



# Methods to Evaluate Industry Specific Hazards

**Worksite inspections,  
checklists**

**Injury and illness  
records**

**Job descriptions**

**Worker surveys,  
focus groups**

**Industry publications**



# What-Where-When-How Risk Assessment Flow Chart





# Understanding Exposure Risk Levels

## Occupational Exposure

- **Conducting normal work activities**
- **Causal interaction**
- **Physical contact**
- **Providing direct medical/supportive care**
- **Conducting clinical laboratory or research**
- **Handling dead bodies**
- **Cleaning and disinfecting environments**
- **Performing maintenance work**
- **Handling, transporting, treating and disposing of waste**

*Reference: OSHA PPE Matrix*

**Exposure Risk**

## Target Populations At-Risk

- **Determine level of risk**
- **Determine minimum engineering and administrative controls required**
- **Determine if exposure has occurred**
- **Determine if symptoms are present**
- **Understand available post-exposure treatment options**

**Low Risk**

**Intermediate Risk**

**High Risk**

## First Aid/Medical Surveillance

- **Become fluent with personal protective equipment (PPE) options**
- **Understand hazard communication plan; know when to appropriately escalate**
- **Become familiar with site-specific standard operating procedures, if available**

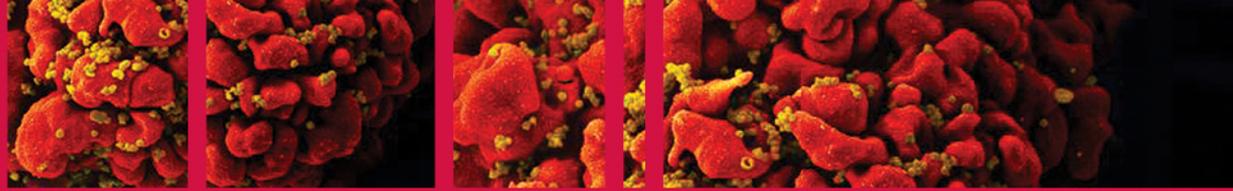
**PPE**

**Hazard  
Communication Plan**

**Site-Specific Plan**

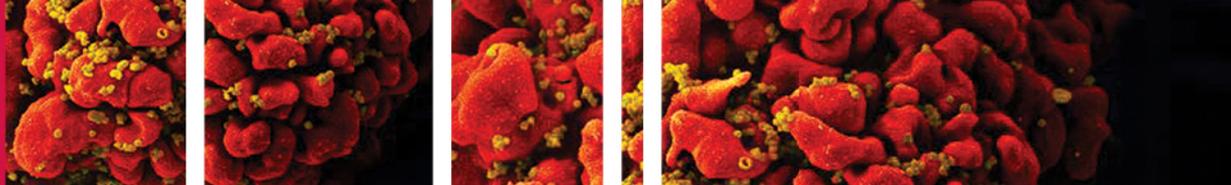


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## Pathogen Safety Data Guide and Training Module

# SECTION V: INFECTION PREVENTION AND CONTROL: BEST PRACTICE EXAMPLE AND ADDITIONAL RESOURCES



# Best Practice Example

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## Guide to Prevention and Control of Infectious Diseases in the Workplace



2007

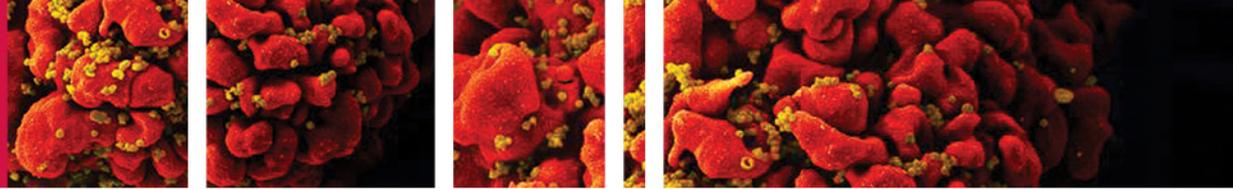
*A Joint Initiative*



BC Government and  
Service Employees' Union



The Best Place on Earth  
BC Public Service Agency



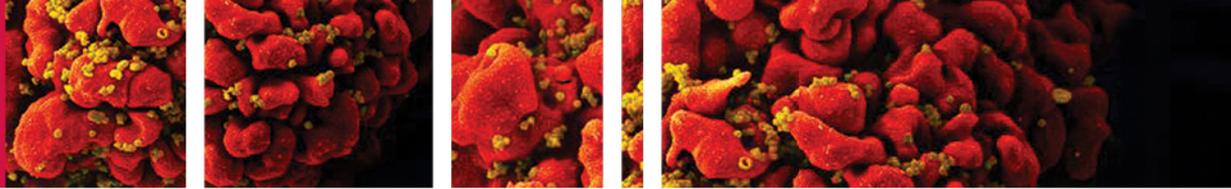
# Sample Infectious Diseases: Hazard Groups

| Hazards  | Infectious Agents/ Diseases  | Transmission Source   |
|--|--|---|
| <b>Blood and body fluid (OPIM)</b>                             | Hep B, C, D<br>HIV<br>Ebola<br>Lassa Fever   | human blood, body fluids, OPIM, fomites<br>human blood, body fluids, OPIM, fomites<br>human blood, body fluids, OPIM<br>human blood, body fluids, OPIM  |
| <b>Respiratory droplets, aerosols</b>                          | Tuberculosis<br>Measles<br>Ebola<br>MERS<br>SARS   | Droplets, coughing, sneezing<br>coughing, sneezing<br>Infectious aerosols, fomites  |
| <b>Animal vector (animal carrier required by the pathogen)</b> | Hantavirus<br>Rabies<br>Lyme Disease<br>Cryptosporidiosis<br>Giardiasis<br>Zika<br>Ebola<br>MERS<br>SARS | Deer mouse feces; rodent urine and feces<br>Bat saliva<br>Tick bites<br>Animal /human feces, contaminated water<br>Animal feces, contaminated water<br><i>a. Aedes</i> or <i>A. albopictus</i> mosquitos<br>Fruit bat or primate (suspected)<br>Bats and camels (suspected)<br>Exotic animals: Himalayan palm civets and raccoon dogs |



# Routes of Exposure

| Route of Exposure           | Explanations for Risk Identification   |
|-----------------------------|--|
| <b>Needlestick or sharp</b> | Puncture or cutting of the skin by object  |
| <b>Non-intact skin</b>      | Open cut, sore or rash contact with blood or body fluid                              |
| <b>Human bite</b>           | Human bite to skin   |
| <b>Mucous membrane</b>      | Blood or body fluid contacting eyes, nose or mouth                                   |
| <b>Feces</b>                | Hepatitis A or other pathogens from food handlers with contaminated hands            |
| <b>Air</b>                  | Inhalation of aerosols or airborne pathogens generated from coughing, vomiting, etc. |
| <b>Urine, saliva, feces</b> | Contact by skin, ingestion or inhalation of animal or human sources                  |
| <b>Contaminated water</b>   | Ingesting water contaminated by animal feces   |

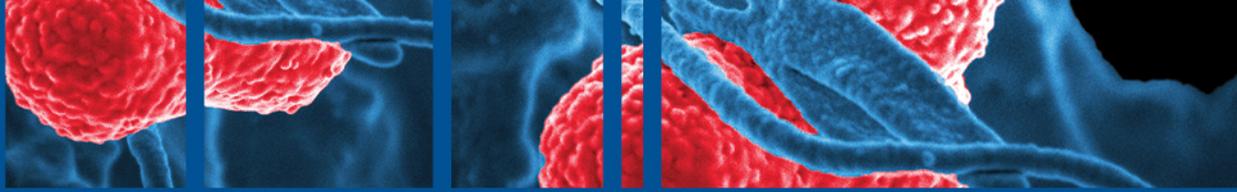


# Sample Job Classification and Task List

| Job Classifications                                 | Job Tasks   | Hazard Groups   |
|---|---|---|
| <b>First Responders</b>                             | Provide immediate care to ill and injured patients  | Blood and Body Fluid<br>Respiratory                       |
| <b>Security, Police, Corrections Officers, etc.</b> | Restraining<br>Arresting<br>Searching<br>Transporting   | Blood and Body Fluid<br>Respiratory<br>Animal (dog bites) |
| <b>Environmental Services</b>                       | Cleaning blood and body fluids and contaminated facilities, equipment, and materials                                | Blood and Body Fluid<br>Respiratory                       |
| <b>Funeral and Mortuary Services</b>                | Exposure to blood and body fluids and contaminated equipment and materials while transporting and handling corpses. | Blood and Body Fluid<br>Respiratory                       |

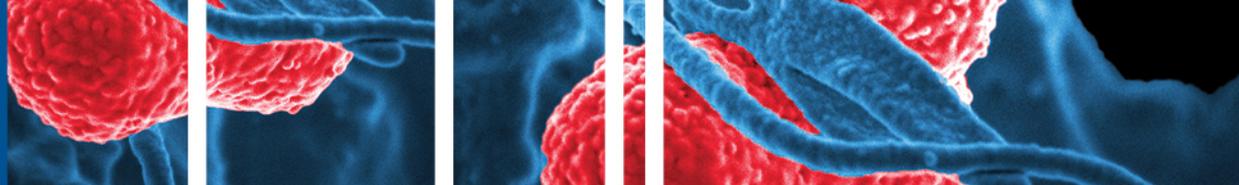


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## Pathogen Safety Data Guide and Training Module

# SECTION VI: SELECTION OF CONTROL MEASURES



# Selection of Controls, Consider:

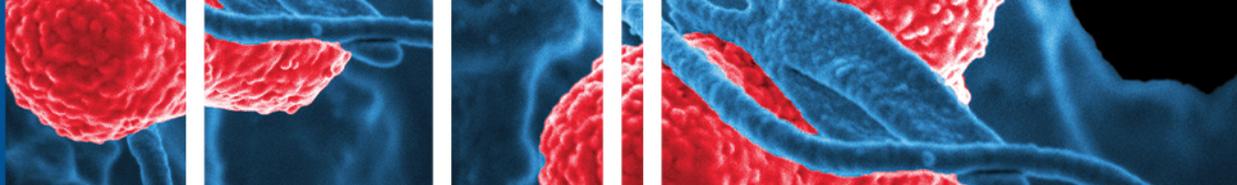
**What is the likelihood  
of exposure?**

**What are the  
consequences?**

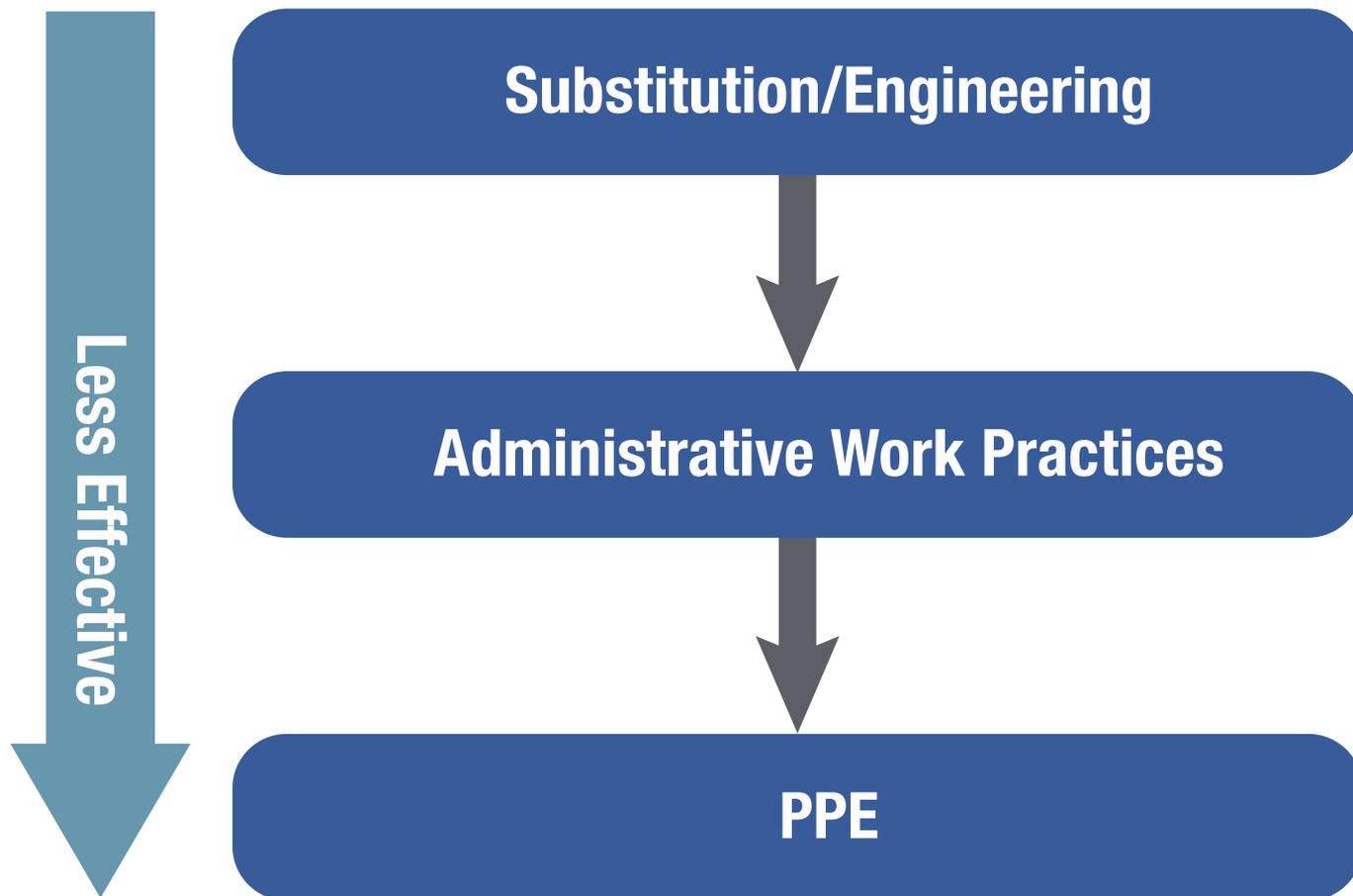
**Have exposures  
occurred?**

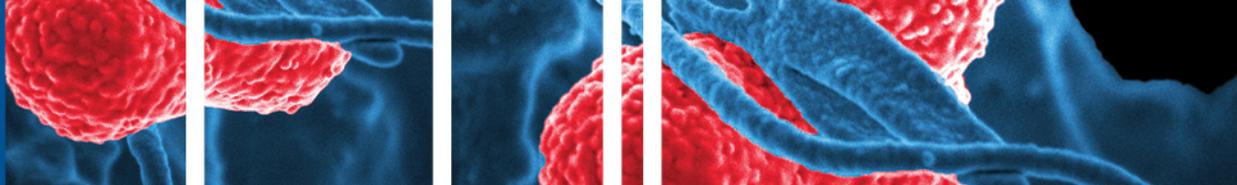
**Does exposure result  
from specific  
job duties?**

**Hierarchy of controls?**



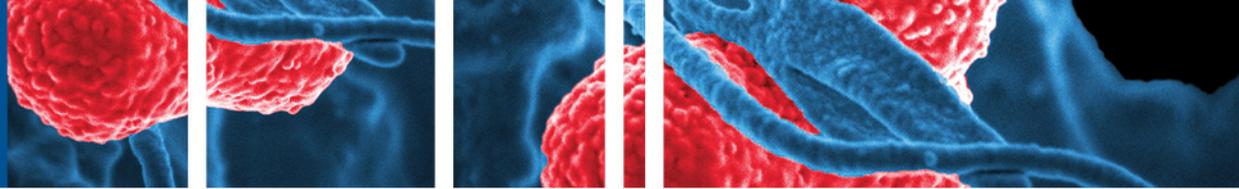
# The Hierarchy of Control Measures





# Examples of Controls

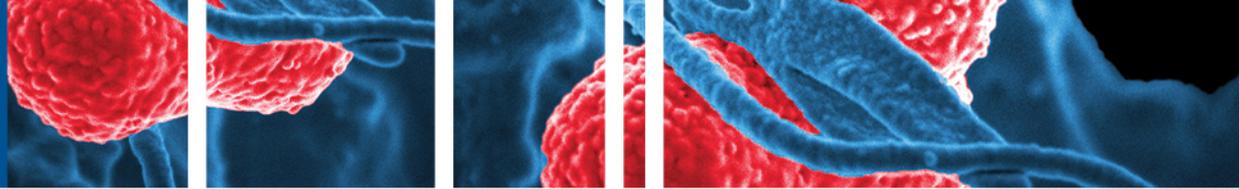
| Hierarchy of Controls                   | Examples of controls  |   |
|---|---|---|
| Elimination or substitution             | <ul style="list-style-type: none"> <li>• Not applicable to infectious disease hazards</li> </ul>  |   |
| Engineering                             | <ul style="list-style-type: none"> <li>• Tongs or other tools</li> <li>• Sharps containers</li> <li>• Leak/puncture proof container</li> <li>• HEPA Filtration</li> <li>• Disinfectant, Sterilizer, Autoclave</li> </ul>                | <ul style="list-style-type: none"> <li>• Safer Medical Devices</li> <li>• Ventilation</li> <li>• Closed systems</li> <li>• Ultraviolet Lights</li> </ul>  |
| Administrative (work practice controls) | <ul style="list-style-type: none"> <li>• Policies and procedures</li> <li>• Redesign of work process, flow</li> <li>• Training and education</li> <li>• Job task rotation</li> <li>• Hazard communication, labeling, signage</li> </ul> | <ul style="list-style-type: none"> <li>• Buddy system</li> <li>• Avoid areas where hazards are present</li> <li>• Hand washing</li> <li>• Adequate staffing</li> <li>• Hire experts to control/clean up biohazards</li> </ul> |
| PPE                                     | <ul style="list-style-type: none"> <li>• Gloves</li> <li>• Goggles</li> <li>• Hoods</li> <li>• Other protective suits or shields</li> </ul>   | <ul style="list-style-type: none"> <li>• Face shields</li> <li>• Respirators</li> <li>• Protective gowns</li> </ul>   |



# Engineering Control



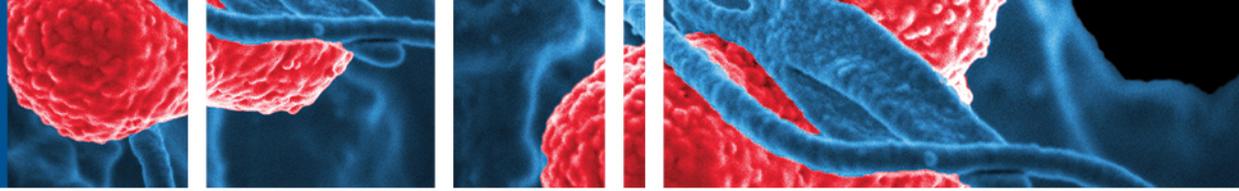
Using 6 mil plastic liner inside ambulance.  
Photo courtesy of Pre-Hospital Emergency Care Journal, December 2014



# Personal Protective Equipment

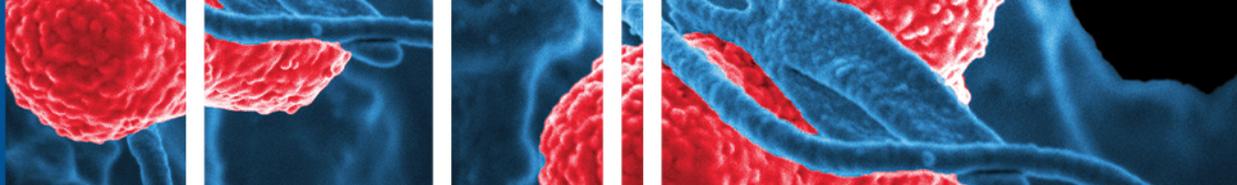
- Respiratory
- Eye protection
- Hearing protection
- Hand/Arm protection
- Foot/Leg protection
- Head protection
- Working from heights
- Skin protection
- Other personal protective equipment:  
This may include PPE for specific tasks





# Selection of Respiratory Protection





# OSHA Assigned Protection Factors (APF)

- Employers must use the APF Table to select a respirator that meets or exceeds the required level of employee



Disposable  
APR, 10



Elastomeric 1/2  
Face APR, 10



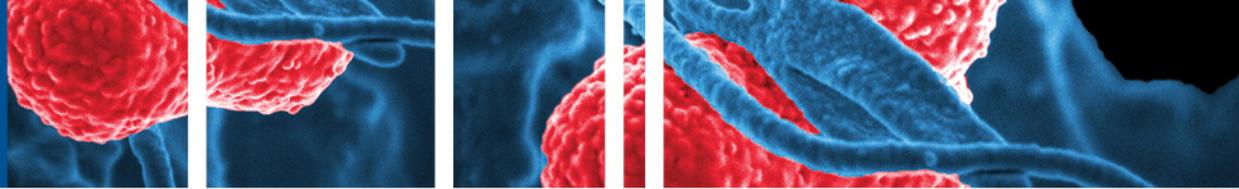
Elastomeric Full  
Face APR, 50



PAPR, Loose  
Fitting, 25

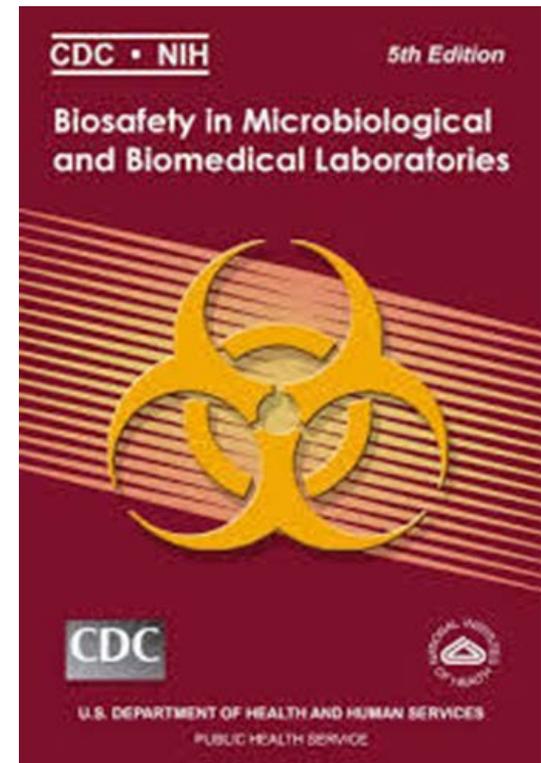


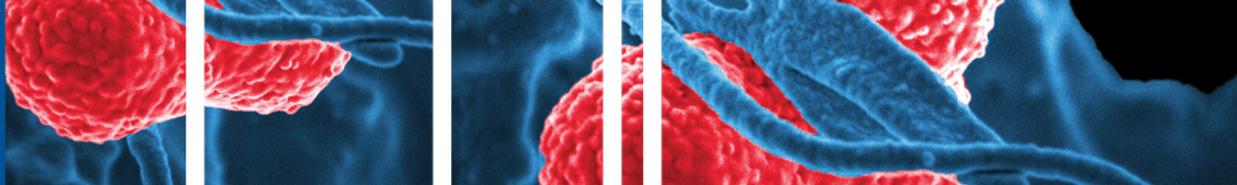
PAPR, Hood,  
25/1000



# The Biosafety in Microbiological and Biomedical Laboratories (BMBL) 5th Edition

- CDC guidance for safety and health in biomedical and clinical laboratories.
- Rich risk assessment info and clear methods of evaluating pathogens, work environments, and selection of appropriate control measures.

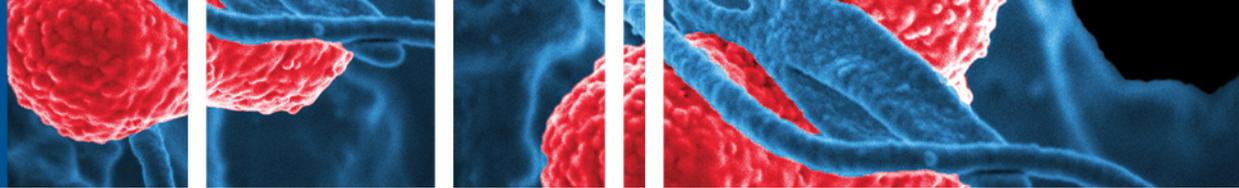




# BMBL Classification of Infectious Microorganisms by Risk Group

| Risk Group Classification | NIH Guidelines for Research involving Recombinant DNA Molecules 20022  | World Health Organization Laboratory Biosafety Manual 3rd Edition 20041   |
|---------------------------|--|---|
| <b>Risk Group 1</b>       | Agents not associated with disease in healthy adult humans.  | (No or low individual and community risk) A microorganism unlikely to cause human or animal disease.  |
| <b>Risk Group 2</b>       | Agents associated with human disease that is rarely serious and for which preventive or therapeutic interventions are <i>often</i> available.                                      | (Moderate individual risk; low community risk) A pathogen that can cause human or animal disease but is unlikely to be a serious hazard to laboratory workers, the community, livestock or the environment. Laboratory exposures may cause serious infection, but effective treatment and preventive measures are available and the risk of spread of infection is limited. |
| <b>Risk Group 3</b>       | Agents associated with serious or lethal human disease for which preventive or therapeutic interventions may be available (high individual risk but low community risk).           | (High individual risk; low community risk) A pathogen that usually causes serious human or animal disease but does not ordinarily spread from one infected individual to another. Effective treatment and preventive measures are available.  |
| <b>Risk Group 4</b>       | Agents likely to cause serious or lethal human disease for which preventive or therapeutic interventions are not usually available (high individual risk and high community risk). | (High individual and community risk) A pathogen that usually causes serious human or animal disease and can be readily transmitted from one individual to another, directly or indirectly. Effective treatment and preventive measures are not usually available  |

Risk groups from NIH and WHO are similar to those used by the BMBL.



## Activity 4: Occupational Risk Exposure Assessment and Selection of Controls

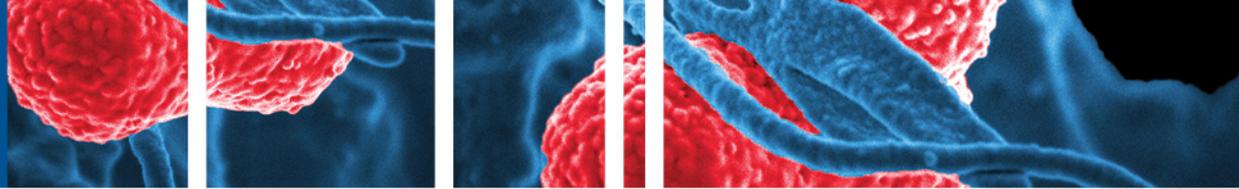
**Objective:** Participants will become familiar with using Pathogen Safety Data for assessing occupational exposure and selection of control measures for infectious agents.

**Task:** Small group activity with worksheet question 4. Discuss the questions and report back.

**Breakout Time:** 15 minutes

**Reporting Time:** 10 minutes

**Total Time:** 25 minutes

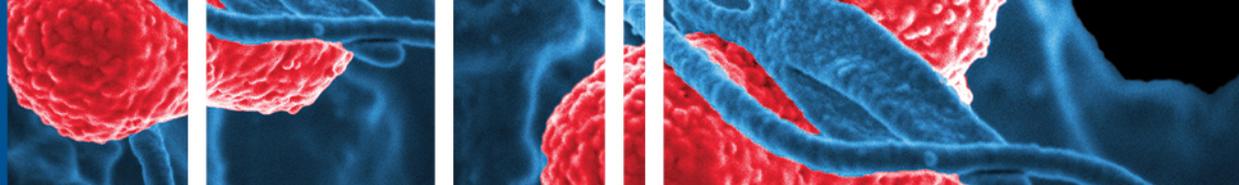


## **Activity 5: Brainstorm, Action Planning and Realistic Implementation Approach**

**Objective:** Participants will begin planning for use of the Guide and Training Module in their infection prevention activities.

**Task:** Class activity

**Total Time:** 25 minutes



# Conclusion

- Please complete class evaluations
- Please use the PSD information you learned today to protect yourself and your co-workers
- Any final questions or comments?