

# Using the Pathogen Safety Training Guide & Module to Prepare Workers to Research Occupational Infectious Disease Hazards and Controls

Shawn Gibbs & Jonathan Rosen

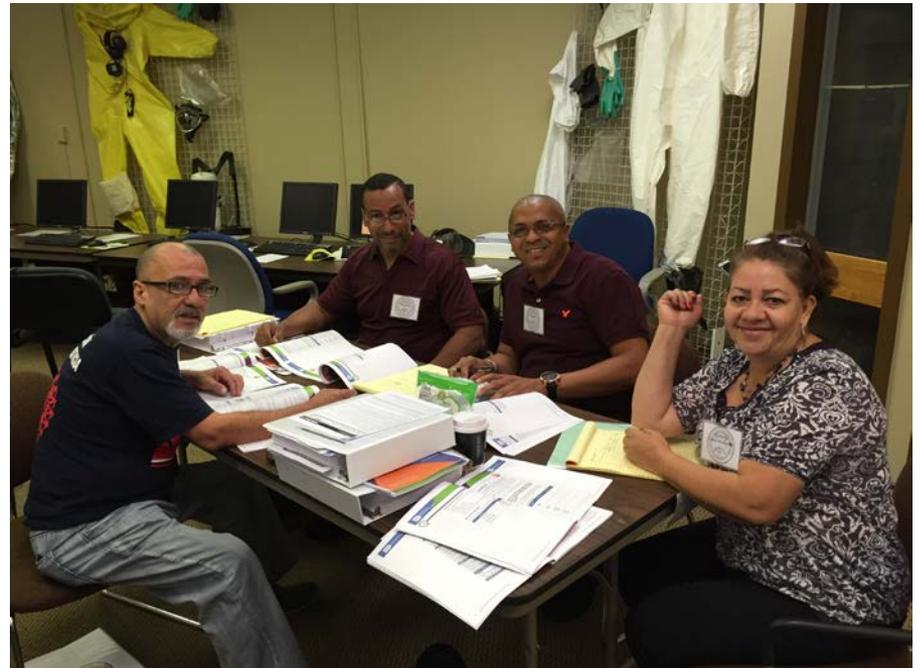


# Workshop Outline

1	Introductions & workshop needs assessment	10
2	Background on establishment of PSD Guide & Training Module	10
3	Adapting or integrating the program	10
4	Brief review of materials and activities	15
5	Small group activity with worksheet and scenarios	30
6	Lessons learned & recommendations for training	15

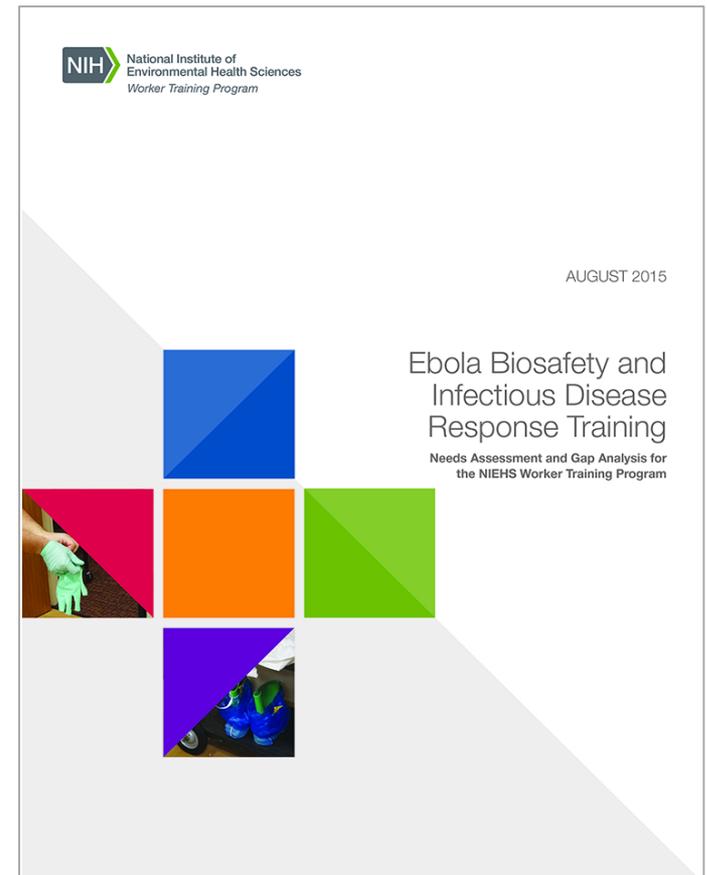
# Introductions / Needs Assessment

1. What's your name/organization?
2. What prior infectious disease training have you done?
3. Are you familiar with the PSD module?  
Have you used it?



# NIEHS WTP 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.



OSHA PPE Selection Matrix for Occupational Exposure to Ebola Virus

✓ Use at a minimum  
 + Use when higher-risk exposure is present

Conducting normal work activities	Casual interaction (outside of a healthcare setting)		Physical contact (outside of a healthcare setting)		Providing medical and supportive care							Conducting clinical laboratory work	Conducting research laboratory work	Handling dead bodies	Cleaning and disinfecting environments			Performing maintenance work		Handling, transporting, treating, and disposing of waste					
	In settings where there is no reason to anticipate exposure to Ebola virus?	in.g. face-to-face conversation without physical contact with individuals with risk factors for Ebola? but with no signs or symptoms?	in.g. face-to-face conversation without physical contact with individuals with signs or symptoms of Ebola	with individuals with risk factors for Ebola, but with no signs or symptoms	with individuals with signs or symptoms of Ebola	to individuals with no signs, symptoms, or risk factors for Ebola	to individuals with risk factors for Ebola, but with no signs or symptoms	during initial evaluation of individuals with suspected Ebola (including those with some signs or symptoms) but without obvious bleeding, vomiting, or diarrhea	during initial evaluation of individuals with suspected Ebola who have bleeding, vomiting, or diarrhea, or when these symptoms are likely to develop or during hospitalization of individuals with suspected or confirmed Ebola	to individuals with suspected or confirmed Ebola, which involve performing aerosol-generating procedures (AGPs)	while transporting sick individuals with risk factors for Ebola or who are suspected or confirmed to have Ebola	on samples from patients with suspected or confirmed Ebola, including testing which results in bio-aerosol generation?	on samples or other material suspected of containing or known to contain Ebola?	of individuals suspected of dying or known to have died of Ebola, such as during packaging of remains in an appropriate container, bag or transferring of packaged remains to a crematory	with suspected or confirmed Ebola virus contamination, but without significant, visible contamination from blood or other body fluids	with suspected or confirmed Ebola virus contamination that includes significant, visible contamination from blood or other body fluids	with suspected or confirmed Ebola virus contamination and using disinfectants which may pose a chemical hazard	In areas that have been fully and appropriately decontaminated in a way that eliminates Ebola virus	In areas suspected or known to have Ebola virus contamination, which have not been fully and appropriately decontaminated in a way that eliminates Ebola virus (e.g., in emergencies)	suspected or known to have Ebola virus contamination (considered Category A waste), and that has been appropriately packaged <sup>1</sup> at its point of origin	suspected or known to have Ebola virus contamination (considered Category A waste), and where waste containers must be opened or waste otherwise handled directly				
Typical procedures/TPE, TAPs, for normal work tasks	✓	✓	✓	✓	✓	Standard procedures	Standard procedures	Standard procedures	Standard procedures	Standard procedures	Standard procedures	According to biosafety level	According to biosafety level	✓	✓	✓	✓	✓	✓	✓	✓				
Dedicated clothing (uniforms/shirts, shoes)			✓	✓															+	✓	✓				
Gloves, Single (nitrile)		+	✓	✓																					
Gloves, Double (nitrile)					+																				
Gloves, Double (nitrile + heavy duty)																+	For chemical protection	For chemical protection		As appropriate for hazard	✓ Puncture-resistant gloves	✓ Puncture-resistant gloves			
Face mask (e.g., surgical mask)			✓	✓				✓								✓					+				
Face and eye protection (e.g., shield/ goggles)			✓	✓																		✓	✓		
Head/neck cover (e.g., surgical hood)									Impervious	Impervious	Impervious	Fluid-resistant	Impervious	Impervious	Impervious	+	Impervious	Impervious	Impervious	Impervious	+	Impervious	+		
Fluid-resistant or impervious gown <sup>2</sup>			+	Fluid-resistant				Fluid-resistant (should fully cover skin)	Appropriate garment (should fully cover skin)	Impervious (should fully cover skin)	Impervious (should fully cover skin)	Fluid-resistant	Impervious	Impervious	Fluid-resistant	Impervious	Impervious	Impervious	Impervious	Impervious	+	Fluid-resistant	Impervious		
Fluid-resistant or impervious coveralls <sup>2</sup>			+	Fluid-resistant								Fluid-resistant	+	Impervious	Impervious	Fluid-resistant	Impervious	Impervious	Impervious	Impervious	Impervious	+	Impervious	+	
Fluid-resistant or impervious apron <sup>2</sup>								+	Fluid-resistant	Impervious	Impervious	Impervious		Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious					
Shoe/foot covers (high enough to cover lower leg)			+	Fluid-resistant								Fluid-resistant	Impervious	Impervious	Impervious	Fluid-resistant	Impervious	Impervious	Impervious	Impervious	Impervious	+	Impervious	+	
Disposable N95 respirator					+							+	✓			+								✓	
Disinfectant respirator + appropriate cartridge													✓			+	✓	✓						+	
Powered Air-Purifying Respirator (PAPR)													+				+	+						+	
Full-body, air-supplied positive pressure suit																									+
Example of workers who may require this level of PPE	Most types of U.S. workers who do not fit into other categories on this matrix	Airline crews and other transportation workers; customs/ border protection officers; transportation security screeners; other law enforcement personnel; public health workers	Airline crews and other transportation workers; customs/ border protection officers; transportation security screeners; other law enforcement personnel; public health workers	Healthcare workers, including physicians, nurses, and others; air workers; airline and other transportation workers	Healthcare workers, including physicians, nurses, and others	All medical transport workers, EMS workers	Clinical laboratory scientists and technicians; other laboratory personnel	Laboratory scientists and technicians	Morticians; coroners; forensic investigators; forensic scientists	Environmental service workers in all settings, including hospitals, aircraft and airports, and other areas	Maintenance workers in all settings	Environmental service and waste collection workers in hospitals and other settings; DOT-permitted waste disposal and collection company workers													

# 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.

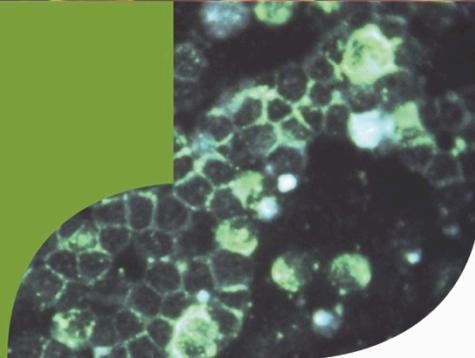
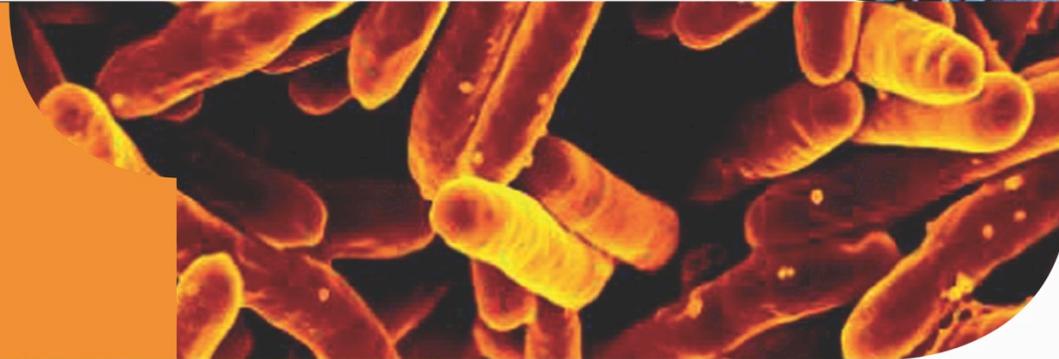
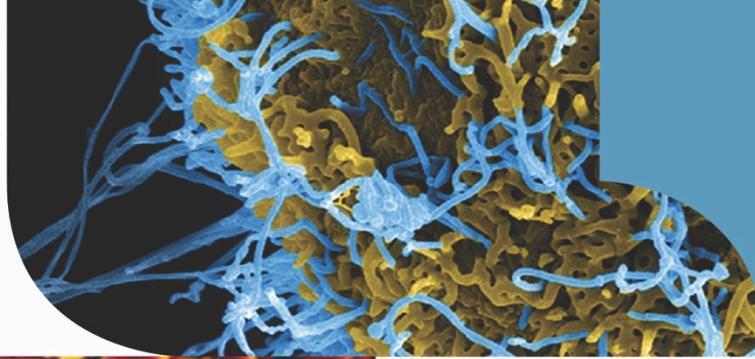
# Website – Materials

1. Agenda
2. PPT presentation (English/ Spanish)
3. Participant worksheet and answer guide
4. The PSD Guide
5. Glossary
6. Four case studies
7. Instructor guide

<https://tools.niehs.nih.gov/wetp/index.cfm?id=2554>



National Institute of  
Environmental Health Sciences  
*Worker Training Program*



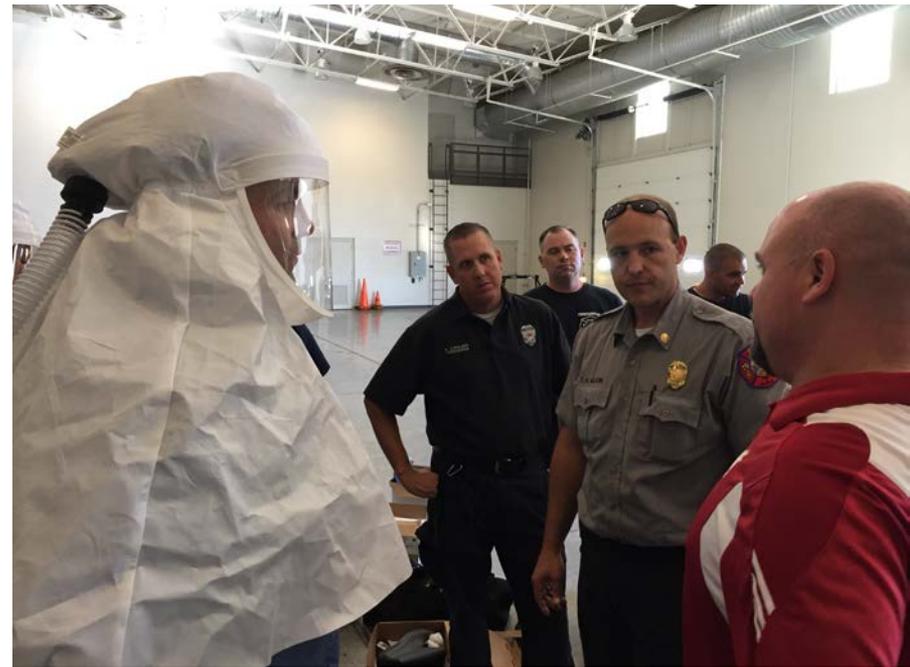
# Pathogen Safety Data (PSD) Guide Training Module

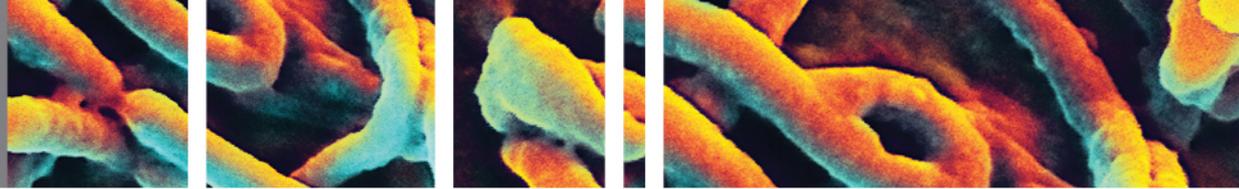
OCTOBER 2016

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.

# Program Design

- Interactive
- Adult training techniques
- Designed for workers & community
- All hazards approach
- Structured training materials
- Piloted in NYC, Atlanta, Nebraska





# 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.

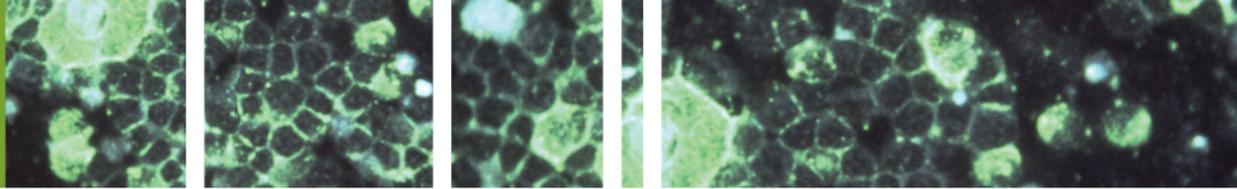
# Course Agenda

1. Introduction & Background
2. Pathogen Safety Data and Occupational Hazards and Risks
3. Existing Sources of Pathogen Safety Data (PSD)
4. Occupational Exposure and Risk Assessment for Infectious Diseases
5. Infection Prevention and Control: Best Practice Example and Additional Resources
6. Selection of Control Measures

# List of Activities

1. Introductions: 3 questions	SGAM	25
2. Terms & Definitions (using the Glossary)	SGAM or Individual	20
3. Characterizing Infectious Disease Hazards	SGAM	30
4. Occupational Risk Exposure Assessment and Selection of Controls	SGAM	25
5. Brainstorm, Action Planning and Realistic Implementation Approach	SGAM	25

**4 Scenarios:** C Diff, Ebola, N Meningitidis, MERS. Can be used to supplement or instead of 3. and 4.

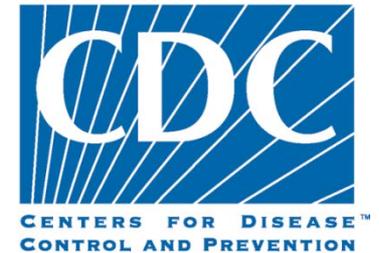


# Existing Pathogen Safety Databases



Public Health  
Agency of Canada

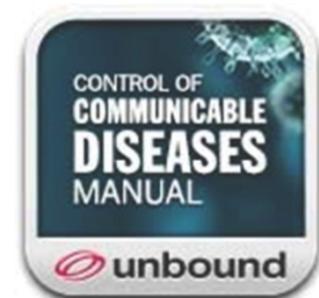
Agence de la santé  
publique du Canada

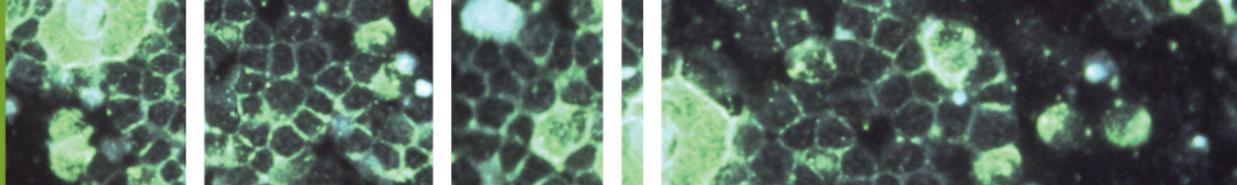


National Institute of  
Allergy and  
Infectious Diseases



World Health  
Organization





# Public Health Agency of Canada

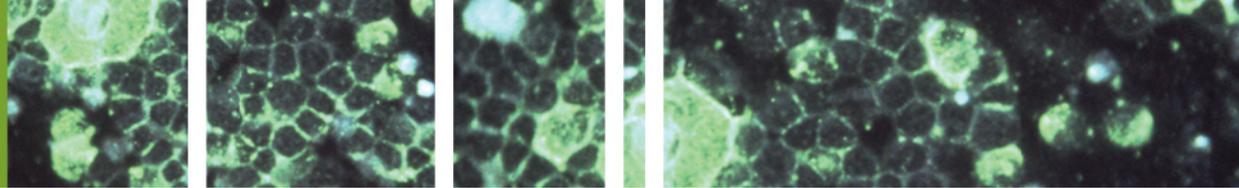
- **PHAC PSD website:** <http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php>
- Download the app to your iPhone, Smart phone, or blackberry
- **Target Audience:** Clinical Laboratory Workers
- **Review Strengths and Weaknesses:**  
Go to page 12 in the Guidebook



Public Health  
Agency of Canada

Agence de la santé  
publique du Canada





## Public Health Agency of Canada

www.publichealth.gc.ca

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# EBOLAVIRUS

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

## PATHOGEN SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

### SECTION I - INFECTIOUS AGENT

**NAME:** Ebolavirus

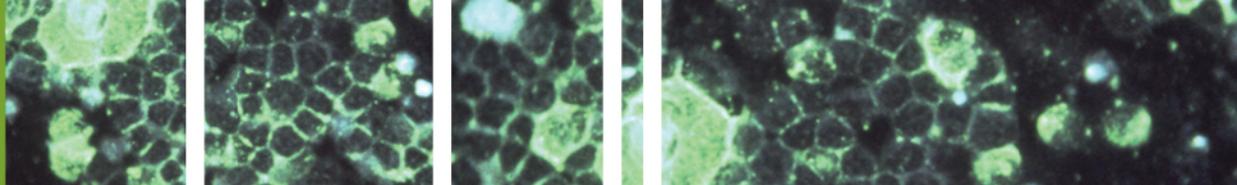
**SYNONYM OR CROSS REFERENCE:** African haemorrhagic fever, Ebola haemorrhagic fever (EHF, Ebola HF), filovirus, EBO virus (EBOV), Zaire ebolavirus (ZEBOV), Sudan ebolavirus (SEBOV, SUDV), Ivory Coast ebolavirus (ICEBOV), Tai Forest ebolavirus (TAFV), Ebola-Reston (REBOV, EBO-R, Reston Virus, RESTV),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

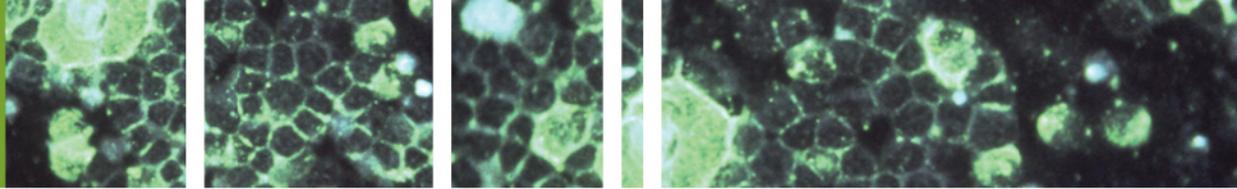
### SECTION II - HAZARD IDENTIFICATION

**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



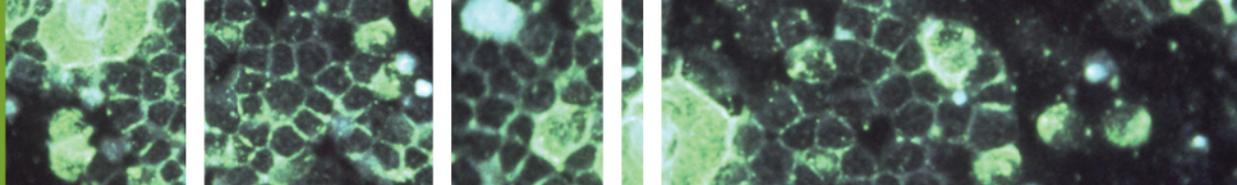
# Comparison of Elements in a Safety Data Sheet to a Pathogen Safety Data Sheet

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

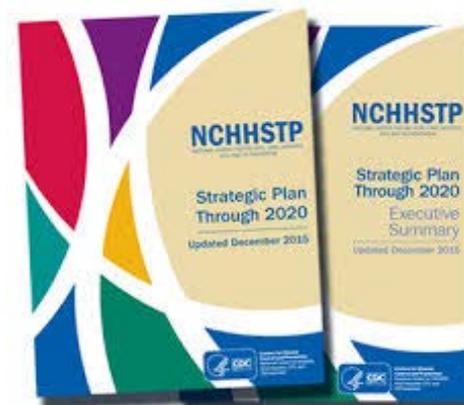
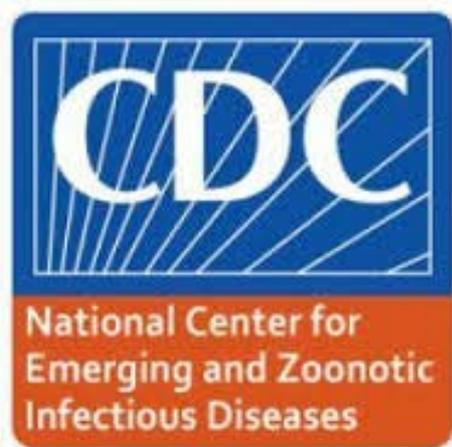
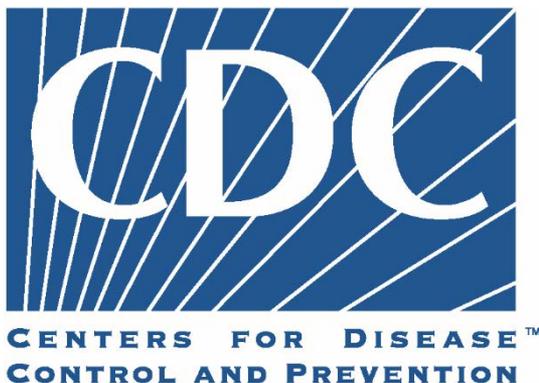


# Sections of the PHAC PSDS

- 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

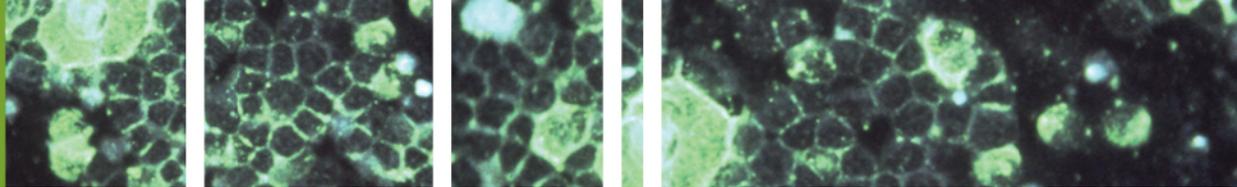


# U.S. Centers for Disease Control and Prevention (CDC)



National Center for Immunization and Respiratory Diseases (NCIRD)

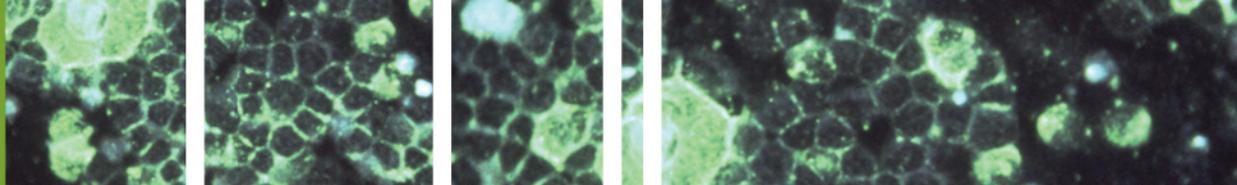




# U.S. Centers for Disease Control and Prevention (CDC)

- **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

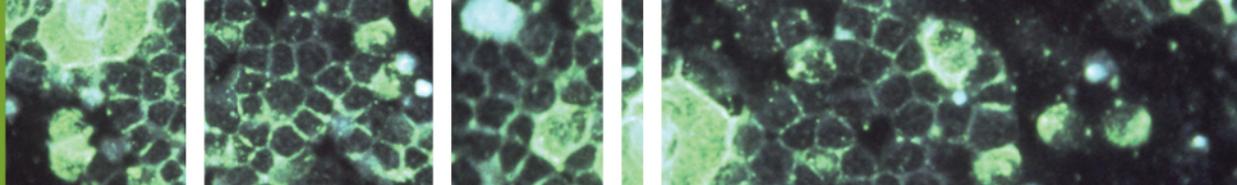




# The National Library of Medicine's WISER



- **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

# Small Group Activity

- Divide up activities in small groups.
- Briefly go through the exercise.
- Report back on the experience.

# Recommendations

1. Review key lessons learned
2. Develop recommendations for future use of PSD training

## To Do List


# Questions?

Jonathan Rosen, MS CIH  
AJ Rosen & Associates LLC  
110 Benjamin St  
Schenectady, NY 12303  
[Jrosen396@gmail.com](mailto:Jrosen396@gmail.com)

Shawn G. Gibbs, PhD, MBA, CIH  
Executive Associate Dean  
Professor of Environmental Health  
Indiana University School of Public  
Health-Bloomington  
[gibbss@Indiana.edu](mailto:gibbss@Indiana.edu)