UNIVERSITY OF MINNESOTA MEDICAL CENTER

From First Response to Regional Treatment Center: How the National Special Pathogen Systems (NSPS) is "Ready for the Rare"

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PREPARE. PROTECT. RESPOND.

NSPS
Region 5 RESPTC

Financial Relationships

The speaker has no relevant financial relationships or conflicts of interest to disclose.

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Objectives
Review practical strategies that emergency response teams can employ to provide safe and effective care for patients with high-consequence infectious diseases
Describe the ways in which the National Special Pathogen System (NSPS) supports front-line clinicians who encounter patients with high-consequence and emerging infectious diseases

Learning objective:

Review practical strategies that emergency response teams can employ to provide safe care for patients with high consequence infectious diseases

Source: University of AZ Health Sciences

What is a "*Special*" Pathogen?

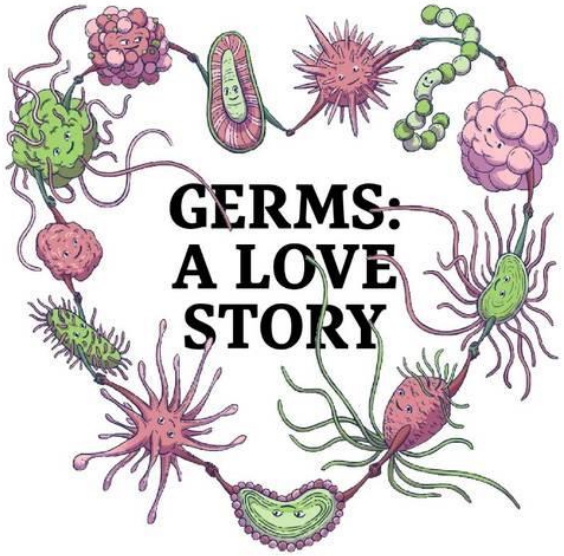


Image source

Special pathogens are high-consequence infectious diseases (HCIDs) that have the potential serious public health impacts and require deliberate and special action for public health preparedness.

- ✓ ***Causes severe symptoms, high case fatality rate***
- ✓ ***Limited treatment options***
- ✓ ***Easily transmitted (spread) person-to-person***

Key Special Pathogens

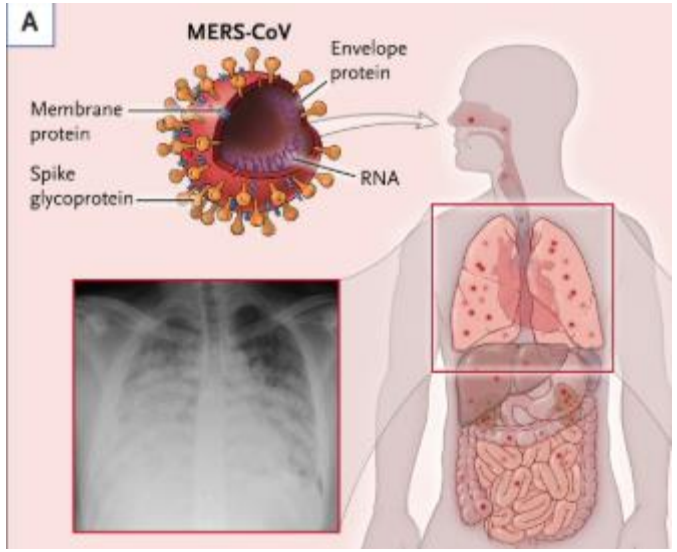
Weber et.al AJIC (2016); Belhadi A et al *PLOS Neglected Tropical Diseases* (2022)

	Novel Coronaviruses	Highly Pathogenic Influenza Viruses	Viral Hemorrhagic Fevers		
Examples	Middle East Respiratory Syndrome (MERS)	H5N1 (Avian Influenza A)	Ebola virus	Lassa virus	Crimean Congo Hemorrhagic Fever
Reservoir	Bats, camels, Middle East	Migratory birds, swine, worldwide	Fruit bat, Africa	Rodents, Africa	Cattle, sheep, goats, small mammals, ticks; Middle East, Asia, Africa
Incubation	2-15 days	1-17 days	2-21 days	6-21 days	1-13 days
Clinical symptoms	Fever, cough, shortness of breath, GI symptoms	Fever, cough, shortness of breath, conjunctivitis	"Dry" symptoms: fever, weakness, muscle aches (including headache), rash "Wet" symptoms: diarrhea, vomiting, bleeding		
Treatment	Not vaccine-preventable, No directed therapies	Not vaccine-preventable, Treated with antiviral	Vaccine-preventable, Treated with antibody	Not vaccine-preventable, Treated (?) with antiviral	Not vaccine-preventable, No directed therapies
Cases	~3,000	~1,000	~30,000	~100,000/year	10,000/year
	Mortality: 36%	Mortality: 10-50%	Mortality: 50%	Mortality: 15%	Mortality: 30%

Novel Coronavirus: MERS

Cases by country	Total
Algeria	2
Austria	2
Bahrain	1
China	1
Egypt	1
France	2
Germany	3
Greece	1
Iran	6
Italy	1
Jordan	28
Kuwait	4
Lebanon	2
Malaysia	2
Netherlands	2
Oman	24
Philippines	2
Qatar	19
Saudi Arabia	2106
South Korea	186
Thailand	3
Tunisia	3
Turkey	1
United Arab Emirates	89
UK	5
USA	2
Yemen	1
Grand Total	2499

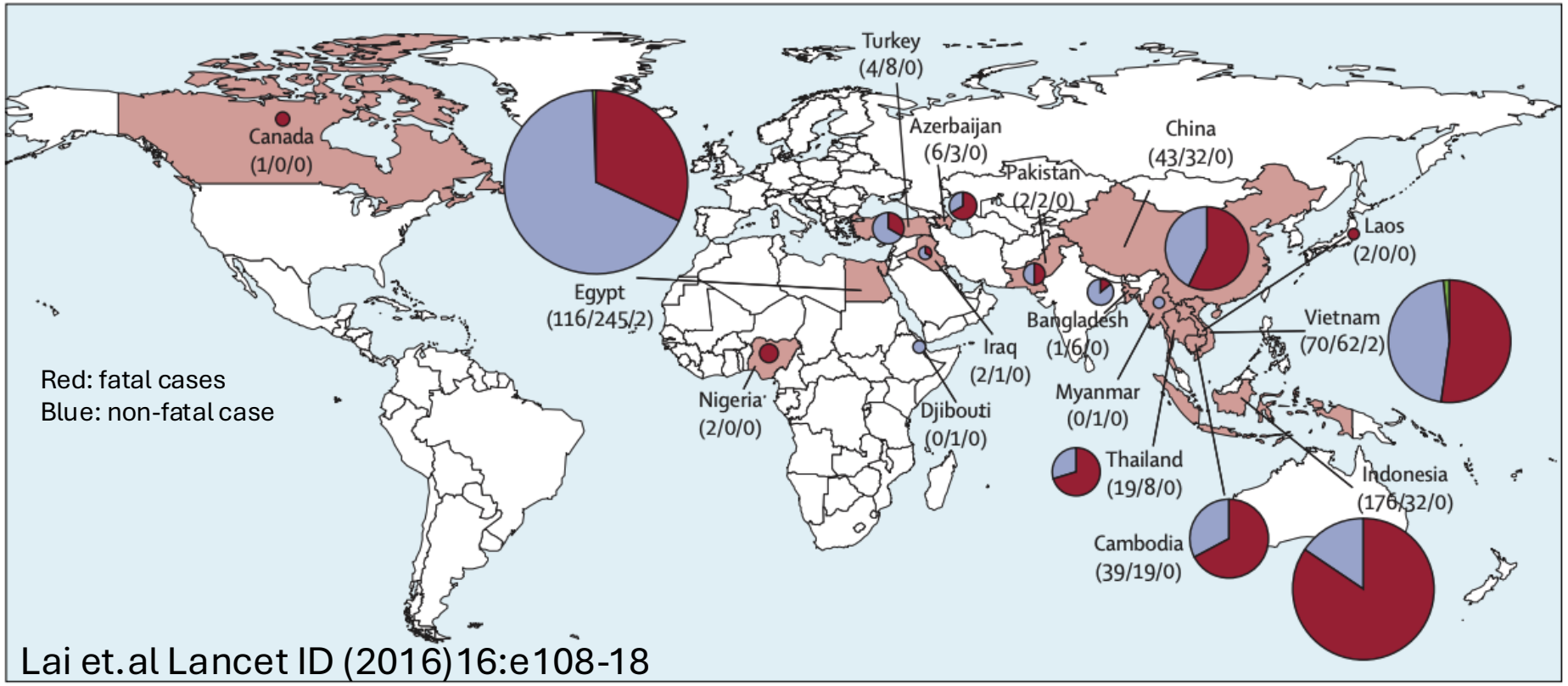
Memish et.al Lancet (2020) 395:10229



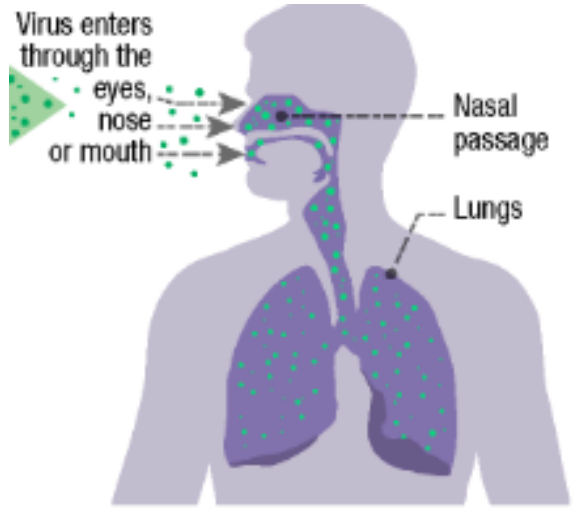
Arabi et. Al (2017) *NEJM*

- Bats, camels in the **Middle East**
- 2-15 day incubation period
- Fever, cough, shortness of breath, GI symptoms
- Not vaccine-preventable, No directed therapies; mortality 10-30%
- ~3000 reported world-wide cases; ~36% mortality rate

Highly-pathogenic influenza virus (H5N1)



Lai et.al Lancet ID (2016)16:e108-18



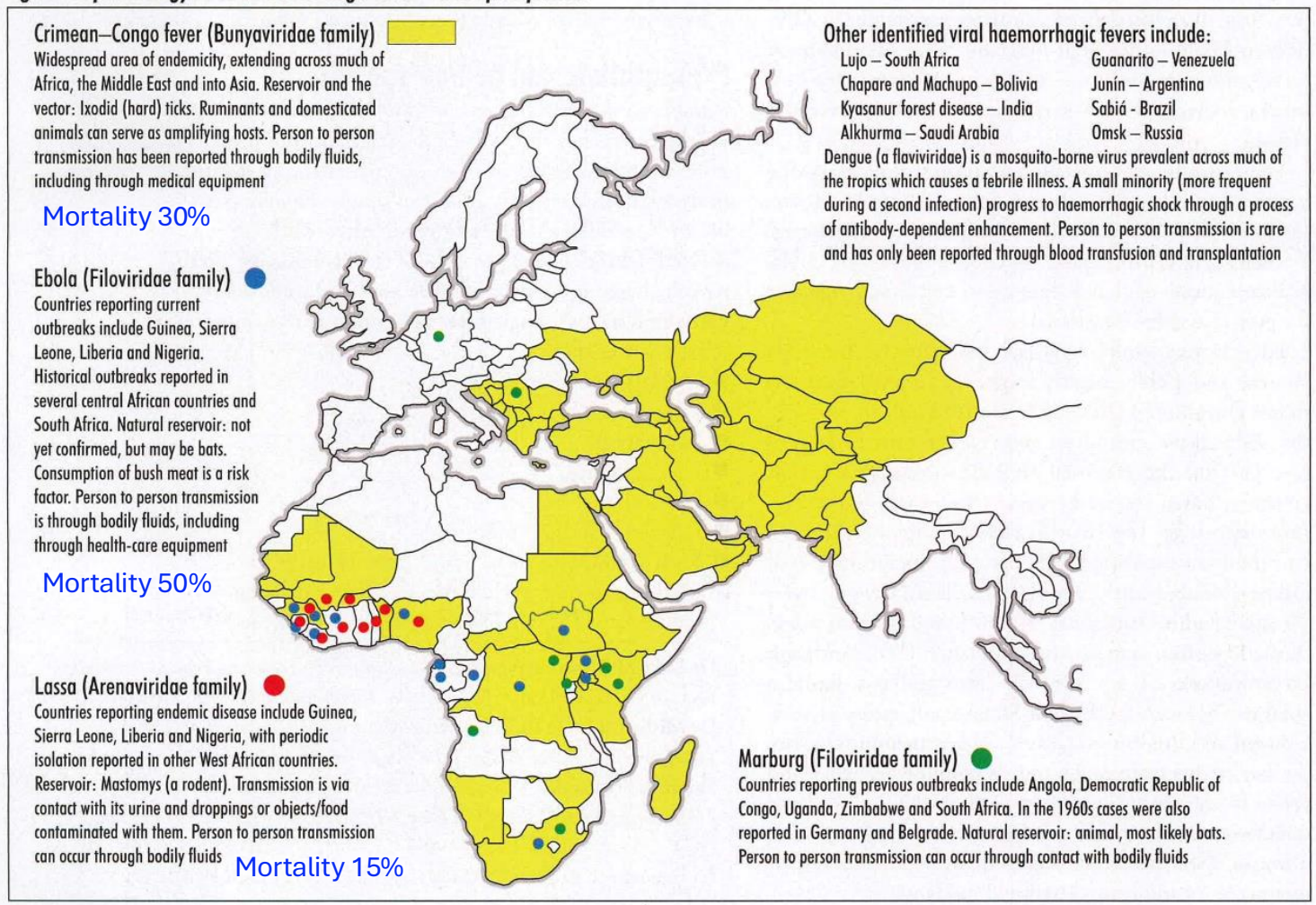
CA Dept Health

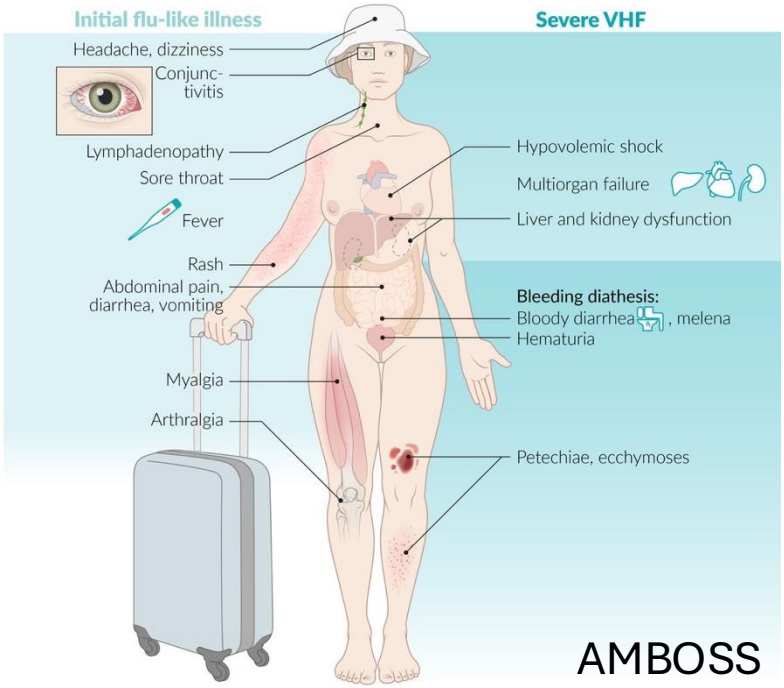
- Migratory birds, swine, **worldwide, especially in the Far East and in Egypt**
- 1-17 day incubation period
- Fever, cough, shortness of breath, conjunctivitis
- Not vaccine-preventable,
- Treated with antiviral
- ~At least 900 reported world-wide cases; 10-50% mortality rate

Viral Hemorrhagic Fever Distribution

Moore L et al. (2014) British *J Hospital Medicine*

Figure 1. Epidemiology of viral haemorrhagic fever – a complex picture.

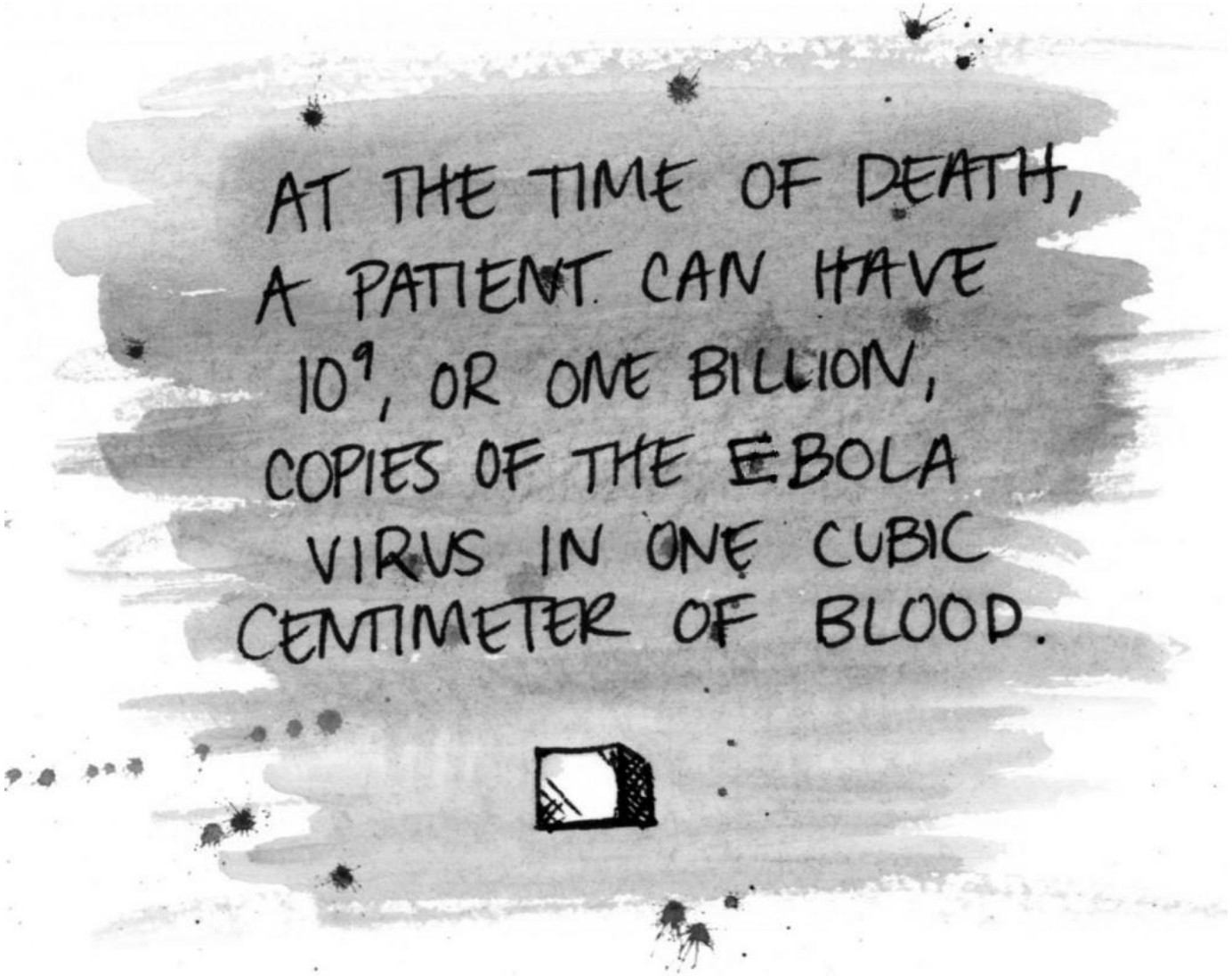




- Mammals and ticks in Africa and the Middle East
- Up to 21 day incubation period
- Whole-body symptoms, with GI symptoms and bleeding in advanced stages

- ~*Thousands* of reported world-wide cases

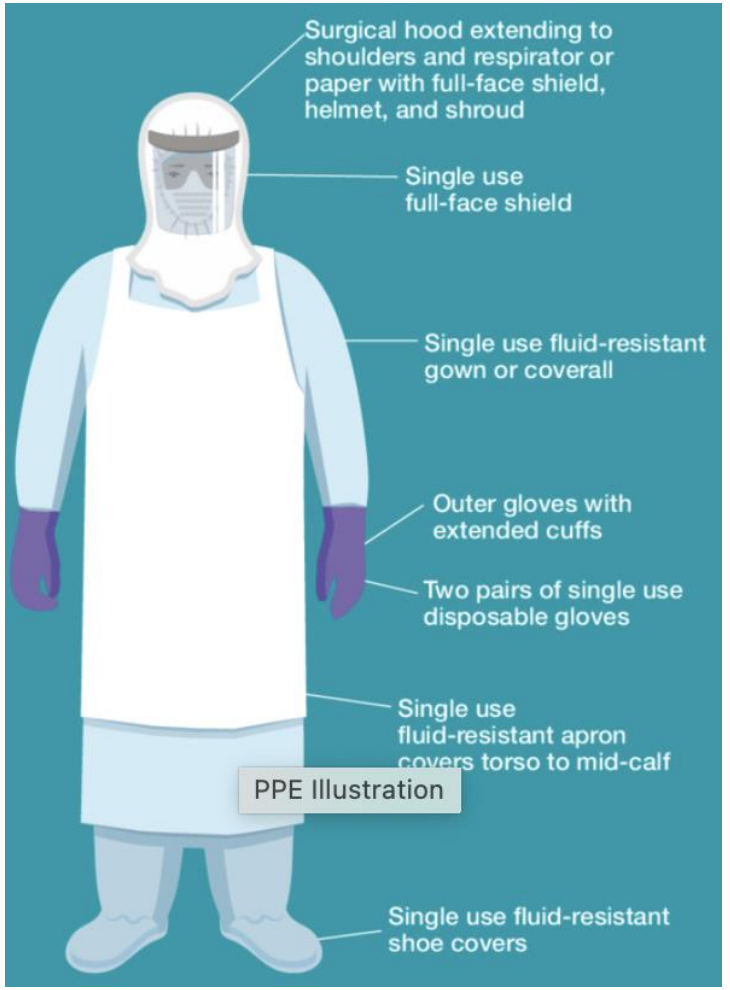
Viral hemorrhagic fever transmission



Source: PBS

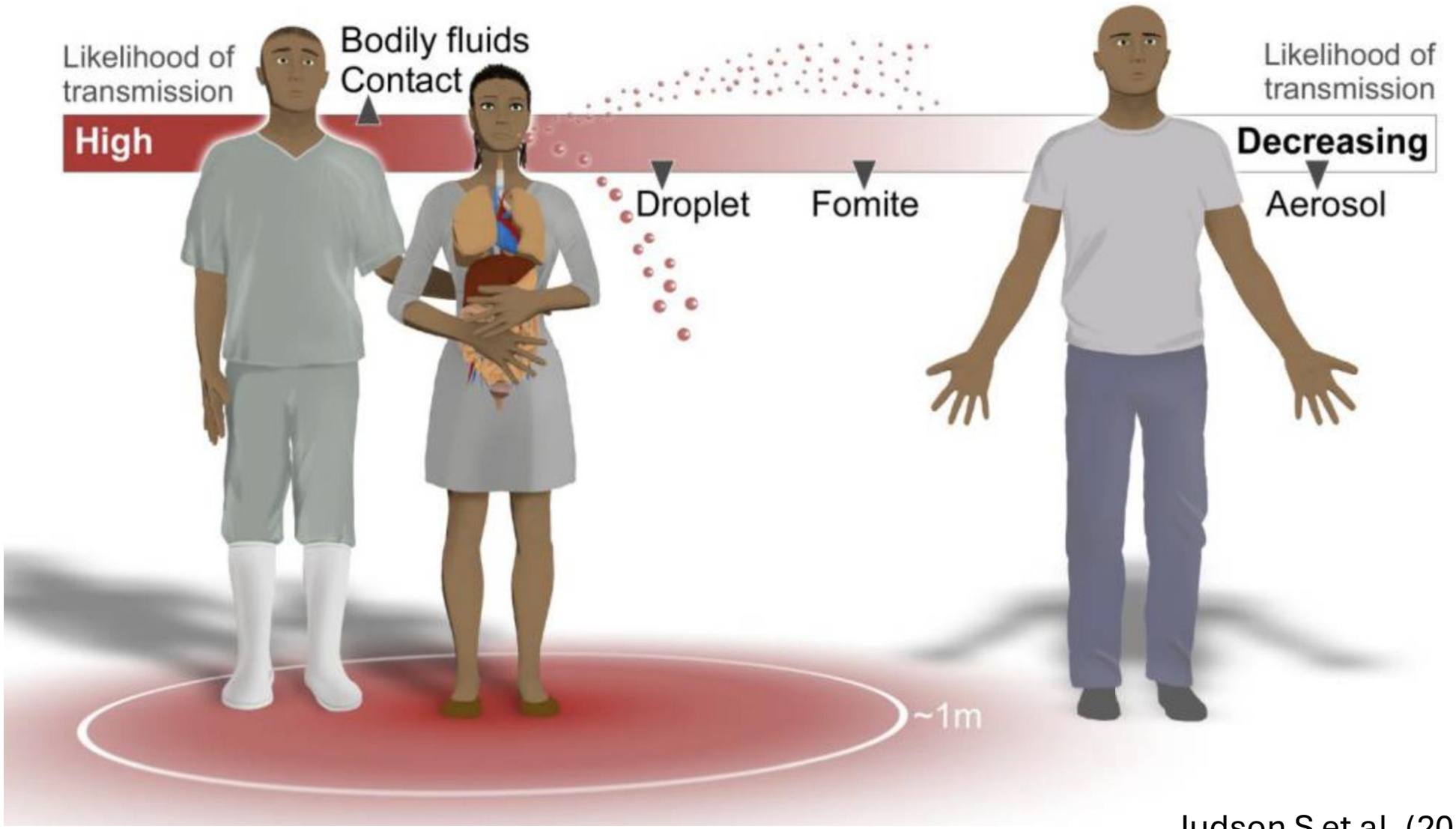
Personal protective equipment (PPE): viral hemorrhagic fever

Personal Protective Equipment recommendations for care of patients with **suspected or confirmed viral hemorrhagic fever**



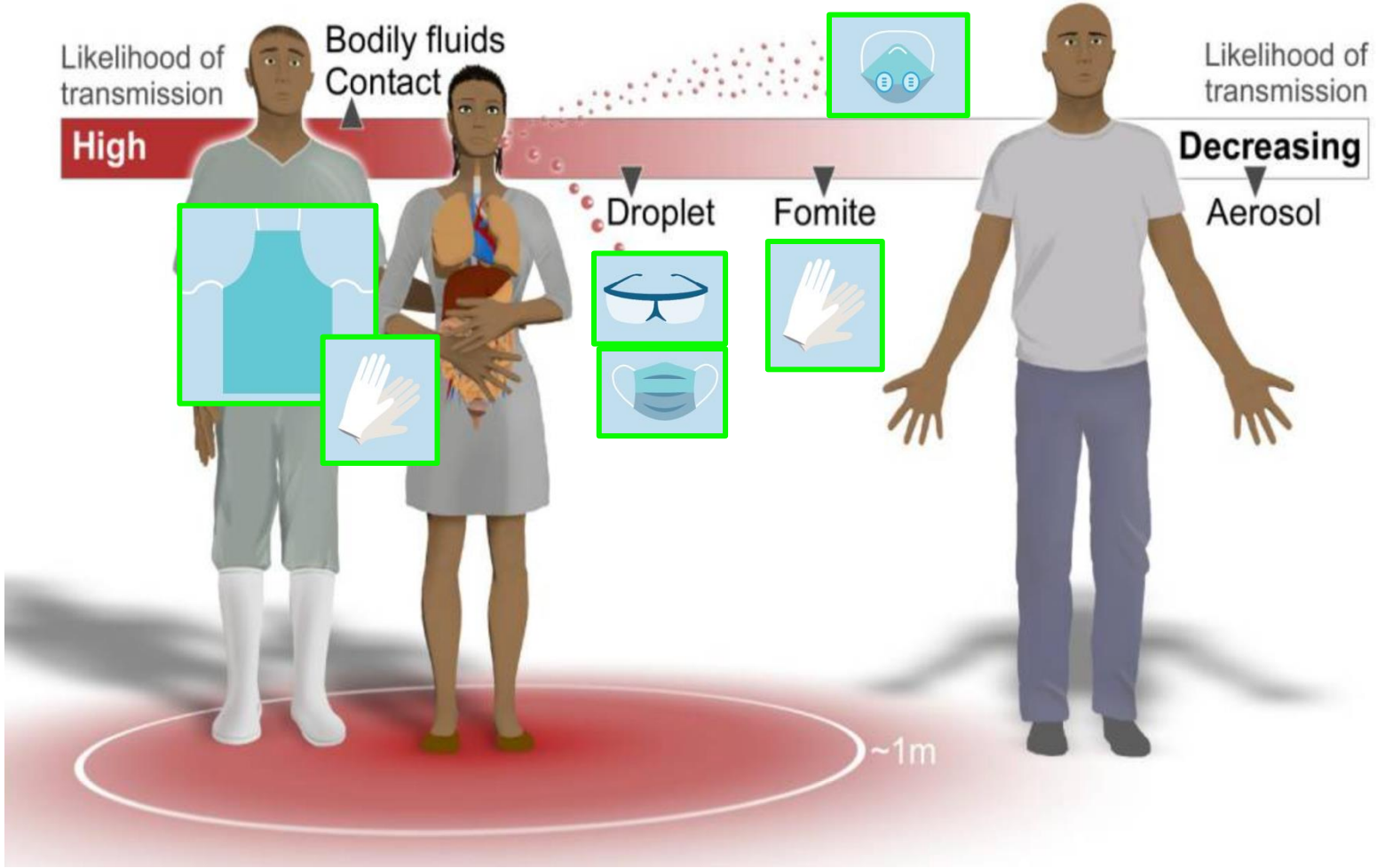
Source: CDC Museum

Pathogen transmission



Judson S et al. (2015) *Viruses*

PPE elements protect the wearer from infectious particles



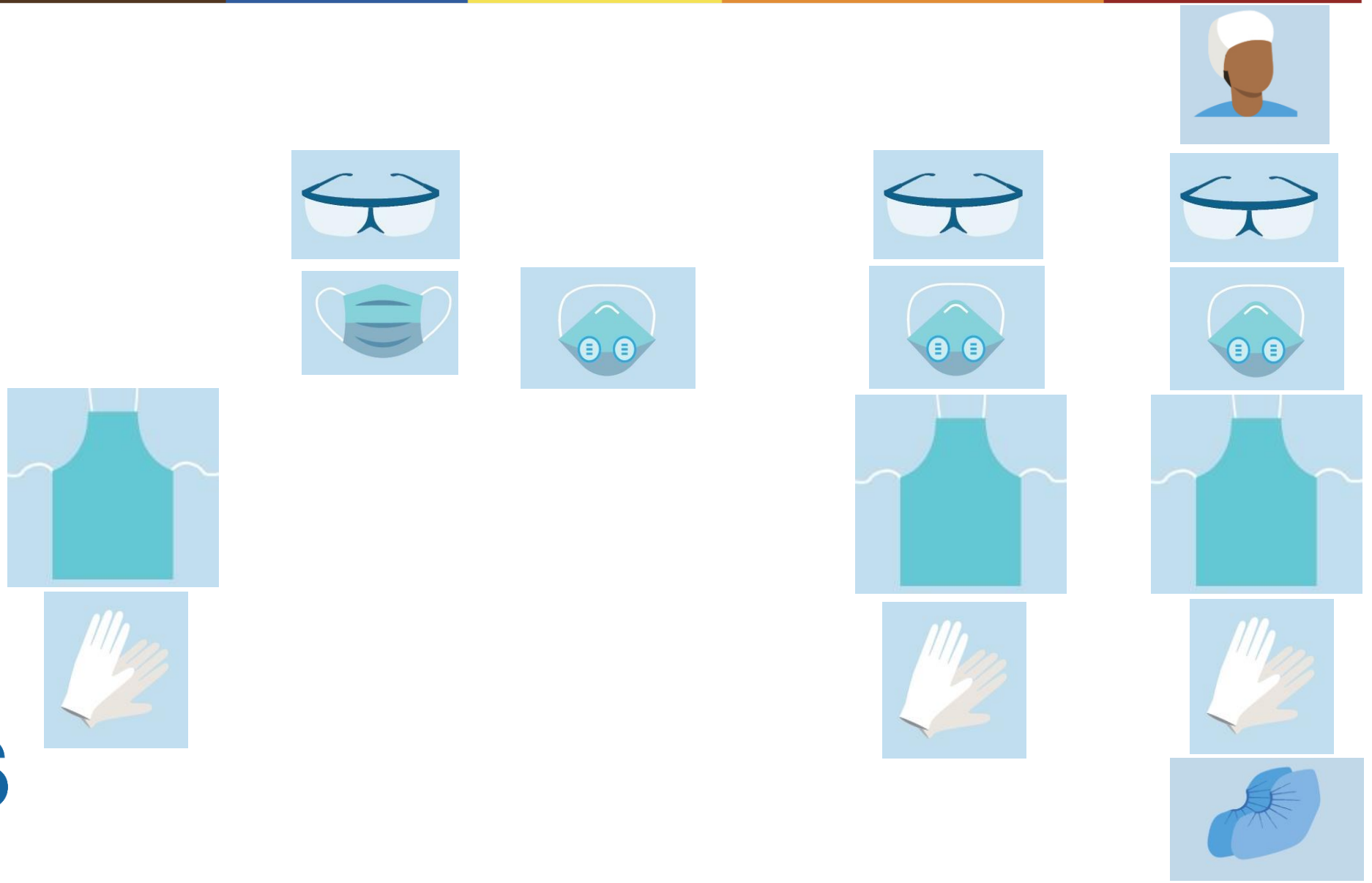
Aprons and gloves are a barrier to pathogens that spread by **C Contact** or touch (Examples: a person that has a skin infection from *Staphylococcus* or diarrhea from *C. difficile)*

Eye protection and masks are a barrier to pathogens that spread by **D Droplet** (Examples: a person that is vomiting from Meningococcus, or coughing from influenza)

Filtering face pieces, like N95s, are a barrier to pathogens that spread by **A Airborne** aerosols. (Examples: a person that is breathing with measles, or coughing from tuberculosis

S Standard	C Contact	D Droplet	A Airborne	SR Special Respiratory	E EVD-VHF

Standard precautions = what does the scene require?



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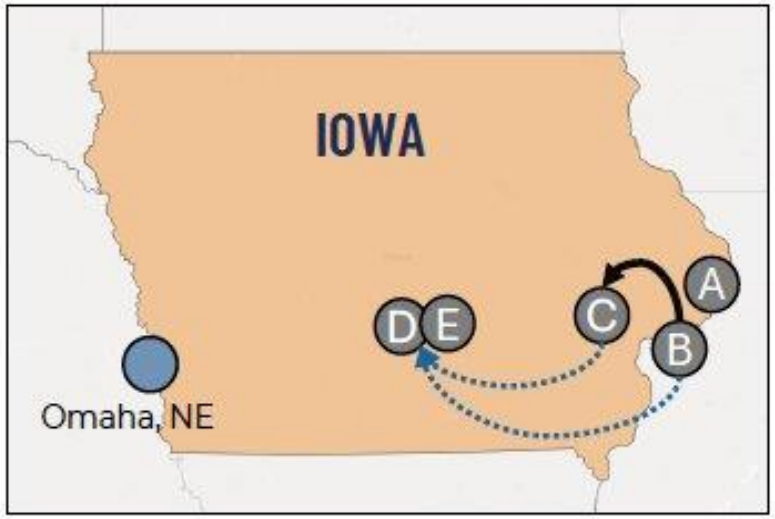
Special Pathogen Recent Event – Lassa Fever

October 2024, An American citizen returned from Liberia to their home in **Iowa**.

- 8 days after their return → presented to local emergency department with **fever, headache, and myalgia**
  - Automated travel alert not triggered
  - Symptoms triggered concern for infection due to viral pathogen

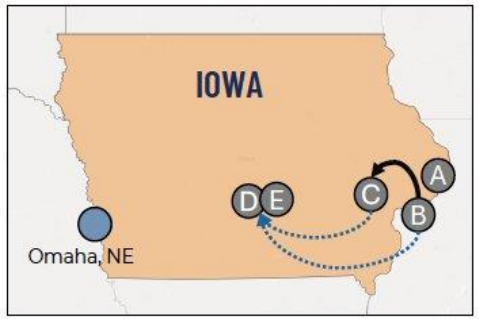
Cared for at 3 different healthcare facilities and eventually succumbed to Lassa Fever.



MAP OF THE CASE

- A — Level 4 facility - patient initially presented and discharged
- B — Level 4 facility - patient presented & was admitted
- C — Level 2 facility - patient was transferred in declining condition
- D E — Level 3 facilities – suspect patients were evaluated & tested
- R7 RESPTC facility - provided regional support & training
- EMS - transported patient with Lassa from facility B to C
- EMS - transported suspect cases from B & C to D & E

Lassa Fever Case Outcomes



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- EMS - transported suspect cases from B & C to D & E

5

Healthcare facilities involved

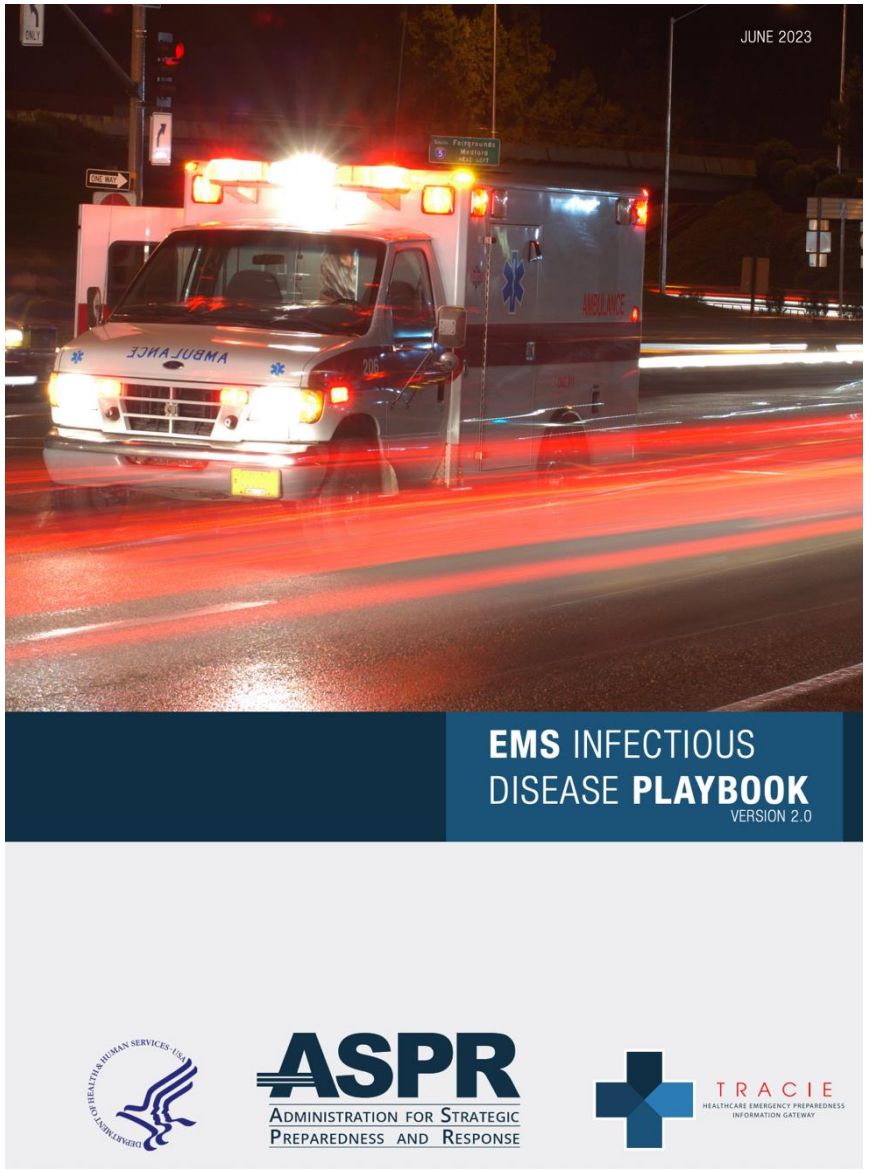
172

EMS & healthcare workers met criteria for exposure

Zero

Transmitted infections

Key triage questions



- Is there a local/widespread infectious disease outbreak in my area?
  - Eg, measles
- Has my patient traveled internationally, or do they have household members that have traveled internationally?
- Does my patient have symptoms that might represent infection?
  - General: fever/flu-like symptoms
  - GI: vomiting or diarrhea
  - Respiratory: cough
  - Skin: rash

Culturally-competent clinical observations

- Newcomers and returned travelers to the United States face unique challenges
- Fear and reluctance from patients and families is best met with compassion and understanding

Wikipedia

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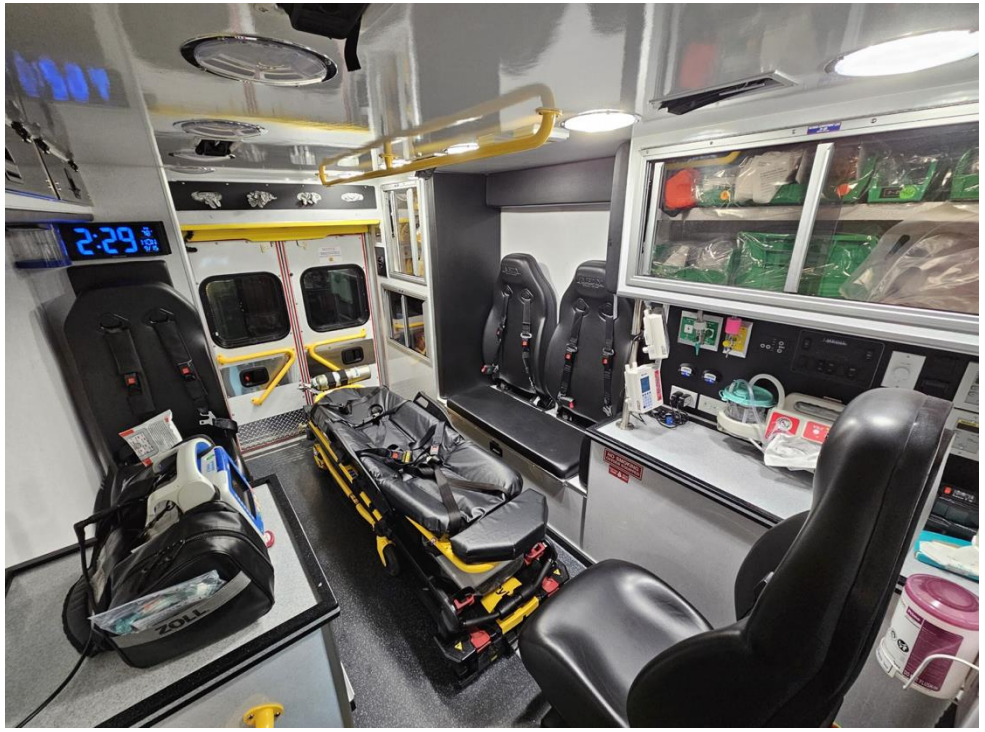


Rig Ready: Partnering with EMS for Cleaner, Safer Ambulances

APIC MN Fall Conference 2025

Adam Valine, Diana Sorlie, and Terra Menier

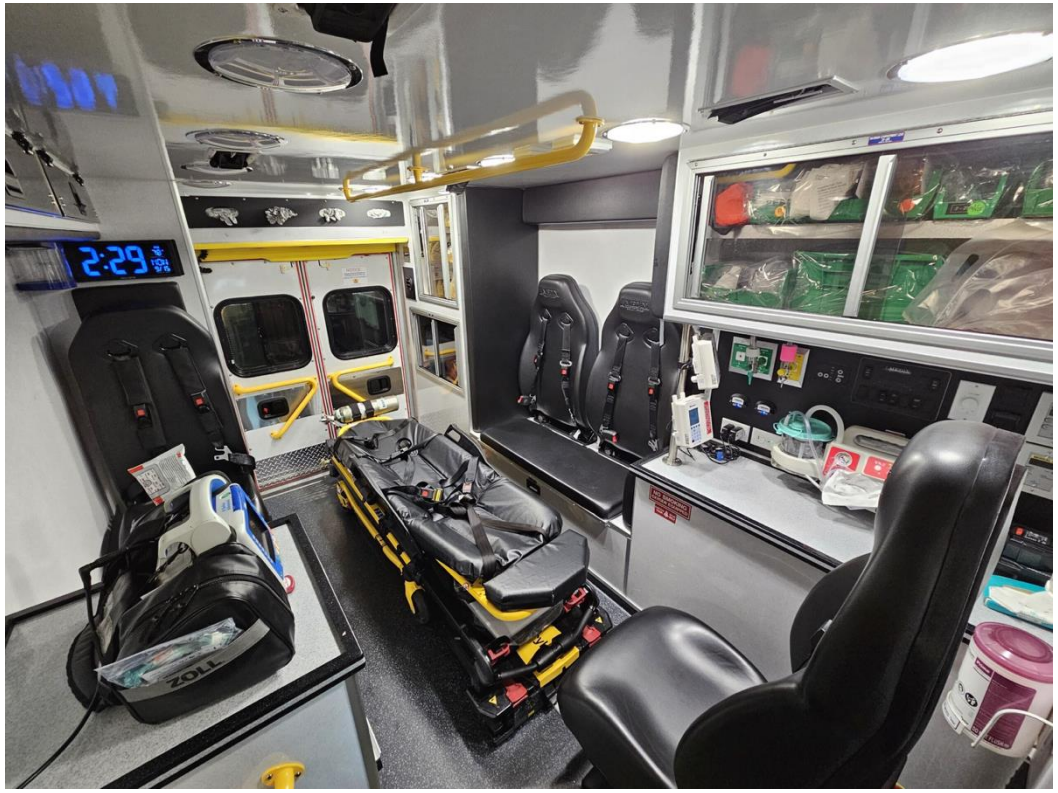
Shining the "black light" on an ALS rig

Item	Photo Letter	Rig #	Service Type	Date	Time	ATP result
Stretcher seatbelt	A	117	ALS	7/17/2024	0930	16
Stretcher frame	B	117	ALS	7/17/2024	0930	204
Stretcher Pad (crease)	C	117	ALS	7/17/2024	0930	87
Stretcher side rail	D	117	ALS	7/17/2024	0930	51
Stretecher seat belt buckle	E	117	ALS	7/17/2024	0930	48
Stretcher front driving handles	F	117	ALS	7/17/2024	0930	224
Patient care area front staff jumpseat seatbelt and buckle	G	117	ALS	7/17/2024	0935	32
IV Pump #6	H	117	ALS	7/17/2024	0935	104
Patient care areas front storage cabinet handles	I	117	ALS	7/17/2024	0940	27
Zoll cardiac Pulse Ox	J	117	ALS	7/17/2024	0940	337
Zoll cardiac BP cuff	K	117	ALS	7/17/2024	0940	133
Zoll cardiac Monitor	L	117	ALS	7/17/2024	0940	592
Red bag zipper	M	117	ALS	7/17/2024	0945	46
Red bag bottom	N	117	ALS	7/17/2024	0945	222
Red bag handles	O	117	ALS	7/17/2024	0945	83
Red bag IV roll-inside	P	117	ALS	7/17/2024	0945	35
Red bag IV roll- pocket	Q	117	ALS	7/17/2024	0945	53
Red bag IV roll- outside	R	117	ALS	7/17/2024	0945	139
Red bag glucometer	S	117	ALS	7/17/2024	0945	667
Red bag med brick- vials inside	T	117	ALS	7/17/2024	0945	98
Red bag med brick- outside	U	117	ALS	7/17/2024	0945	3
Pateint care area inside back door handles	V	117	ALS	7/17/2024	0955	363
Patient care area inside back door bars	W	117	ALS	7/17/2024	0955	539
Front cab lap top	X	117	ALS	7/17/2024	1000	125
Front cab cell phone	Y	117	ALS	7/17/2024	1000	122
Front cab cell phone	Z	117	ALS	7/17/2024	1005	156
Front cab drivers seatbelt	AB	117	ALS	7/17/2024	1005	204
Front cab drivers seatcover	AC	117	ALS	7/17/2024	1005	121
Front door panel	AD	117	ALS	7/17/2024	1005	201
Patient care areas front staff jumpseat seat (crack)						
Patient care areas front staff jumpseat seat (no crack)						

- Adenosine triphosphate testing (ATP) can assess the abundance of cells that are or were once living, (human, bacteria, fungi, otherwise) also referred to as "organic matter"
- ATP testing of rig elements showed that high-touch surfaces showed greater quantities of organic matter

High-touch areas demonstrate heavy organic contamination

- Areas shaded red demonstrate higher levels of organic matter and/or living cells



Streamline disinfection

- Focus on areas of the EMS vehicle surfaces that are *most prone to contamination*
  - Start of shift
  - After each patient contact

	Process: EMS Ambulance Daily Clean Expectations **Role(s) performing tasks: EMS Staff**	
WORK STANDARD	**Location:** EMS Garage	**Department:** M Health Fairview Infection Prevention EMS
Document Owner: EMS	**Origination Date:**	**Date of Last Review/Revision:**

Summary: This work standard describes the process for cleaning the ambulance rig after each patient and once per shift.

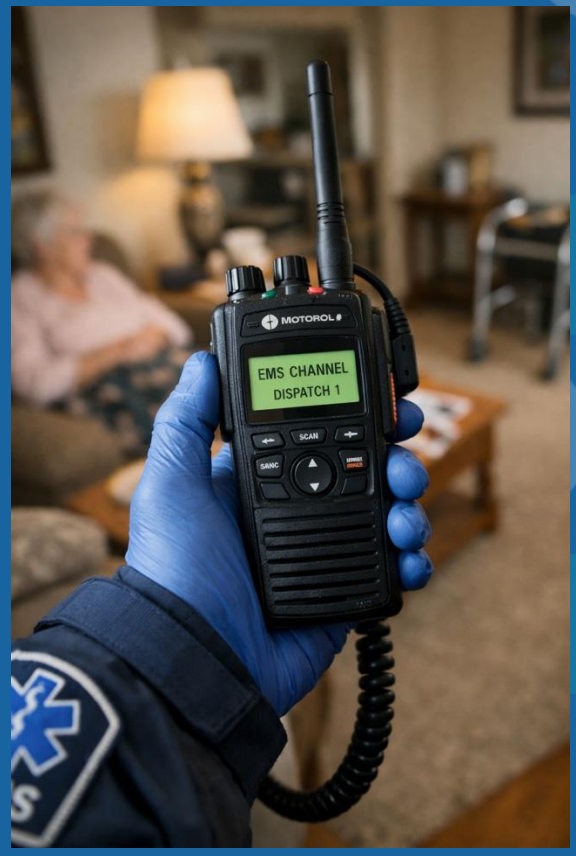
All cleaning should be done with prime purple top wipes unless **enteric contact** (C. Diff, Noro etc.) which require orange top bleach wipes.

Start of Shift Cleaning	
1.	Radio body and mic
2.	Steering wheel, shifter and blinker handles
3.	High touch surfaces in front cab: radio, dash buttons, arm rests
4.	Cell phone, MDT and laptop computer
5.	All door handles inside and out
Cleaning after each patient contact IF used/touched	
6.	Stretcher Mattress
7.	Stretcher Touch Points (oxygen tank, handles, button, rails etc.)
8.	Pulse Ox, blood pressure cuff, stethoscope, EU Scope Video Screens, glucometer
9.	Laptop computer / cell phone
10.	Cardiac monitor screen, touch points and cables
End of Shift Cleaning	
11.	Restock all needed items to return truck to ready state
12.	Ensure main oxygen tanks greater than 500 psi
13.	Sweep and Mop floors and feet wells
14.	Wash rig (weather pending- check with operations supervisor to confirm)
As needed Cleaning	
Grossly soiled items not listed above should be cleaned	

Total time taken for start of shift: _____

Learning objective:

Describe the ways in which the National Special Pathogen System (NSPS) supports front-line clinicians who encounter patients with high-consequence infectious diseases

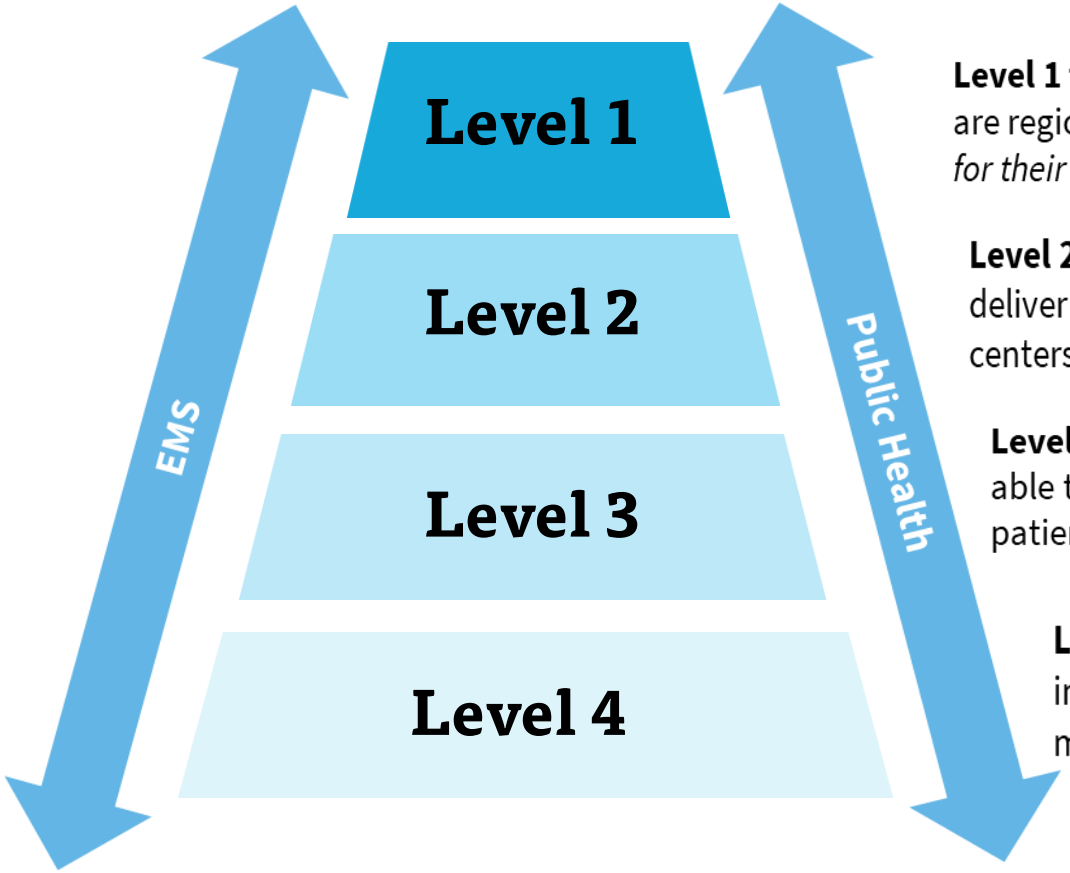


NSPS Overview

What is the NSPS?

The National Special Pathogen System (NSPS) is a tiered System of Care with four facility levels (e.g., Level 1, Level 2, Level 3, Level 4) that have increasing capabilities to care for suspected or confirmed patients with High Consequence Infectious Diseases (HCIDs).

NSPS Tiered System of Care



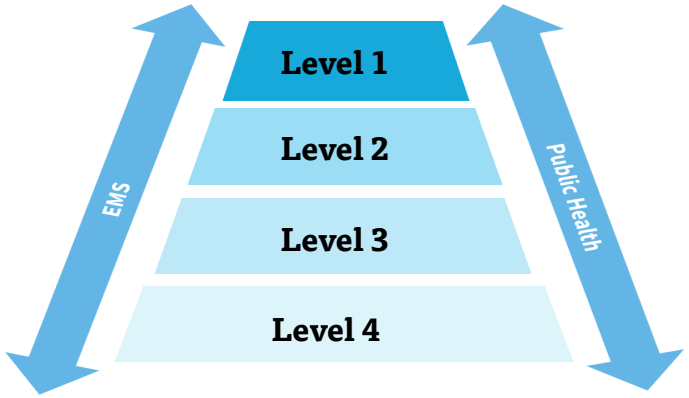
Level 1 facilities, or Regional Emerging Special Pathogen Treatment Centers (RESPTCs), are regional resources hubs which provide highly specialized care. *Level 1s care for patients for their duration of illness.*

Level 2 facilities, or Special Pathogen Treatment Centers (SPTCs), have the capacity to deliver specialized care to clusters of patients and serve as primary patient care delivery centers. *Level 2s can care for patients for their duration of illness.*

Level 3 facilities, or Assessment Centers, are widely accessible care delivery facilities, able to conduct limited basic laboratory testing, stabilize patients, and coordinate rapid patient transfer. *Level 3s can care for patients for 12-36 hours.*

Level 4 facilities, or All Other Healthcare Facilities, can identify, isolate, inform, & initiate stabilizing medical care; protect staff; and arrange timely patient transport to minimize impact to normal facility operations.

NSPS - System of care



Frontline Facility

- Care for patient for a minimum of 8 hours.
- Log staff contacts with patient, specimens, and waste.
- Sequester waste in preparation for removal.
- Escalate any operations/logistics questions to health department; patient care questions to RESPTC/NETEC.

Health Department

- Notify/contact ASPR/HHS, CDC, other state health departments if needed.
- Facilitate transportation
- Identify/Notify potential receiving facility(ies)
    - Connect Frontline Facility to receiving hospital and/or RESPTC/NETEC for support.
- Discuss testing process/lab work and transporting sample to state public health lab for presumptive positive.

Level 1 Facilities: Regional Emerging Special Pathogen Treatment Centers (RESPTCs)

1. **CT, ME, MA, NH, RI, VT**
   Massachusetts General Hospital
2. **NJ, NY, PR, VI**
   NYC Health + Hospitals / Bellevue
3. **DC, DE, MD, PA, VA, WV**
   Johns Hopkins Hospital
   MedStar Washington Hospital Center
4. **AL, FL, GA, KY, MS, NC, SC, TN**
   Emory University Hospital
   UNC Health
5. **IL, IN, MI, MN, OH, WI**
   University of Minnesota Medical Center
   Corewell Health
6. **AR, LA, NM, OK, TX**
   University of Texas Medical Branch
7. **IA, KS, MO, NE**
   University of Nebraska Medical Center/Nebraska Medicine
8. **CO, MT, ND, SD, UT, WY**
   Denver Health & Hospital Authority
9. **AZ, CA, HI, NV, AS, MP, FM, GU, MH, PW**
   Cedars-Sinai Medical Center
10. **AK, ID, OR, WA**
    Providence Sacred Heart Medical Center & Children's Hospital

University of MN Medical Center RESPTC

- NSPS Level 1 RESPTC since 2015
- Ability to care for 2 adult or pediatric viral hemorrhagic fever patients
- Ability to care for 10 airborne isolation patients
- On-unit laboratory
- Rostered staff members (deployments extension of their floating clusters)
- Provide outreach and education throughout Region 5

NSPS Region 5 RESPTC

Corewell Health
University of Minnesota Medical Center

University of Minnesota Medical Center RESPTC

- Quarterly drills and exercises
- Multi-disciplinary team

Photo credit: E.B. Floersh, University of Minnesota

HCID Education & Consultation Opportunities

- Full-day HCID Training
- PPE consultation
- HCID policy consultation

Recap- Objectives

Objectives
Identify the *basic* signs and symptoms of high-consequence infectious diseases and identify key risk factors based on patient history and scene clues.
Apply straightforward isolation practices—including donning available PPE and limiting exposure—appropriate for the first few minutes on scene.
Communicate quickly and clearly with dispatch, incoming transport units, and local public health when a potential HCID case is suspected.

Learn More!

NETEC | NSPS

NETEC | RESOURCE LIBRARY

https://repository.netecweb.org

Know Your PPE
PPE Components and Ensembles for Special Pathogen Patient Care

QR code will bring you to the "Know Your PPE" resource guide within the NETEC Resource Library, just one of *many* topics covered within the guide!

Acknowledgements

University of Minnesota Medical Center Special Pathogens Team

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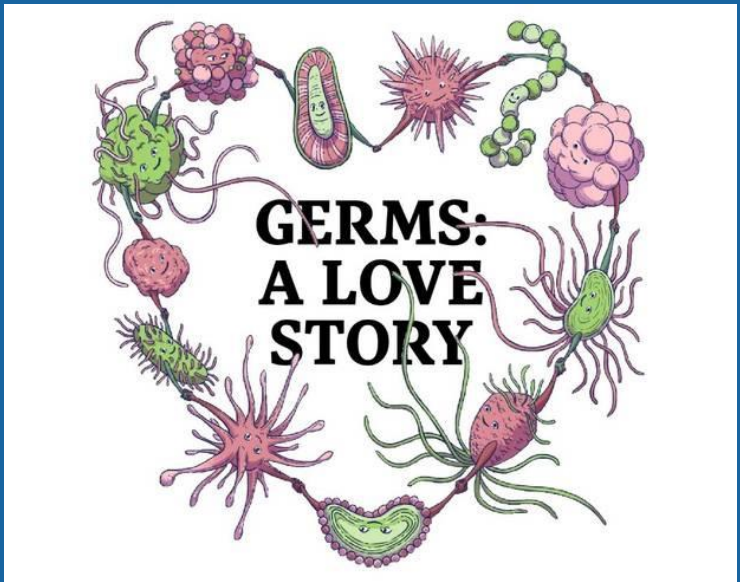

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