Pandemic Planning: Focus on Emerging Pathogens

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SPECIAL PATHOGENS RESPONSE CENTER

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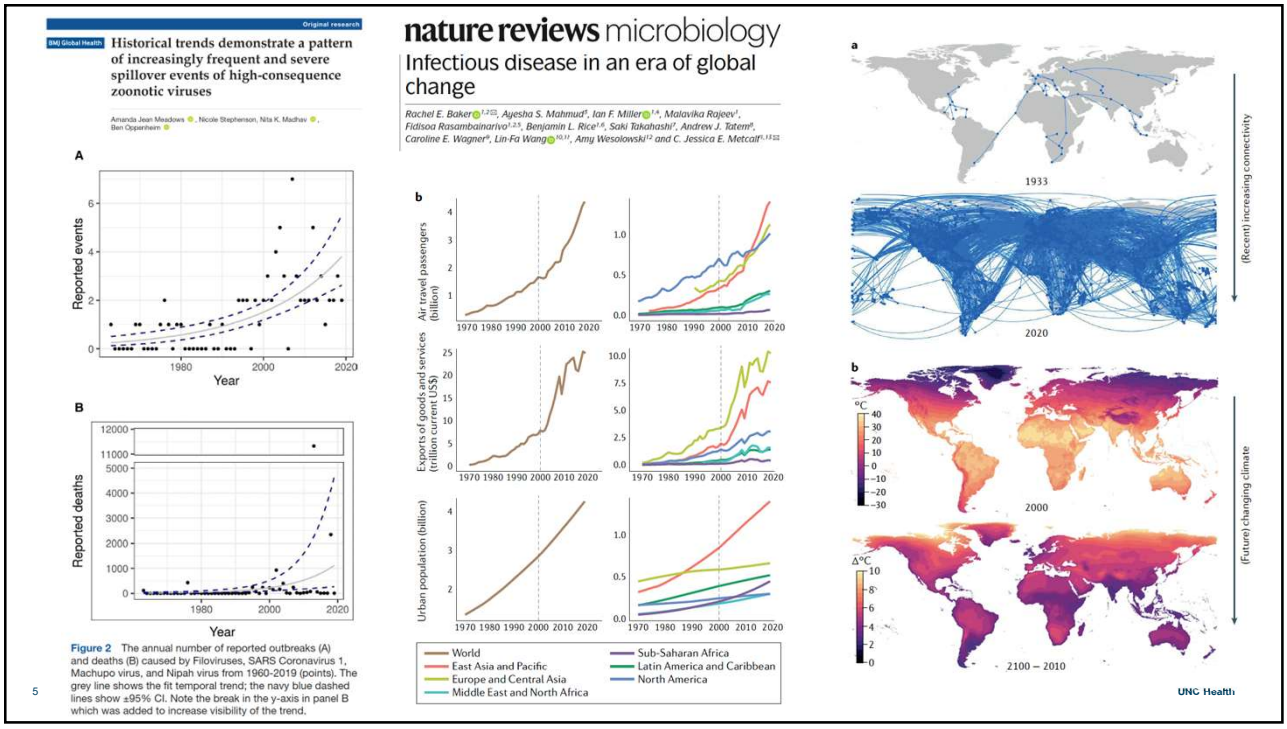
Definitions

- Emerging Disease: diseases that have newly appeared in the population, OR have existed but are rapidly increasing in incidence or geographic range
- Re-emerging Disease: diseases that were once a major health problem, declined dramatically, but are again becoming health problems
- Endemic: a “long-term” problem, never significantly declining (e.g., pneumonia)
- Epidemic: an increase in disease incidence over baseline
- Pandemic: Epidemic involving >2 continents (e.g., COVID-19, MPOX)

Basic Concepts in Infectious Disease Emergence

- Emergence of infectious disease is complex
- Diseases are dynamic, changing
- Most new infections are not caused by completely new pathogens (e.g., coronaviruses, influenzas)
- Agents involved in new and reemerging infections cross taxonomic lines (e.g., bats and Ebola Virus Disease, fleas and plague)
- Human behavior drives disease emergence
  - Social, economic, political, technologic, climatic, and environmental factors all shape disease patterns and influence emergence

What's Increasing Our Risk?


Original research
BMJ Global Health
Historical trends demonstrate a pattern of increasingly frequent and severe spillover events of high-consequence zoonotic viruses
Amanda Jean Meadows, Nicole Stephenson, Nita K. Madhav, Ben Oppenheim
A
Reported events
Year
B
Reported deaths
Year
Figure 2 The annual number of reported outbreaks (A) and deaths (B) caused by Filoviruses, SARS Coronavirus 1, Machupo virus, and Nipah virus from 1960-2019 (points). The grey line shows the fit temporal trend; the navy blue dashed lines show ±95% CI. Note the break in the y-axis in panel B which was added to increase visibility of the trend.
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nature reviews microbiology
Infectious disease in an era of global change
Rachel E. Baker, Ayesha S. Mahmud, Ian F. Miller, Malavika Rajeev, Fidisoa Rasambainarivo, Benjamin L. Rice, Saki Takahashi, Andrew J. Tatem, Caroline E. Wagner, Lin-Fa Wang, Amy Wesolowski and C. Jessica E. Metcalf
b
Air travel passengers (billion)
Exports of goods and services (trillion current US$)
Urban population (billion)
1970 1980 1990 2000 2010 2020
World
East Asia and Pacific
Europe and Central Asia
Middle East and North Africa
Sub-Saharan Africa
Latin America and Caribbean
North America
a
1933
2020
(Recent) increasing connectivity
b
°C
2000
Δ°C
2100 – 2010
(Future) changing climate
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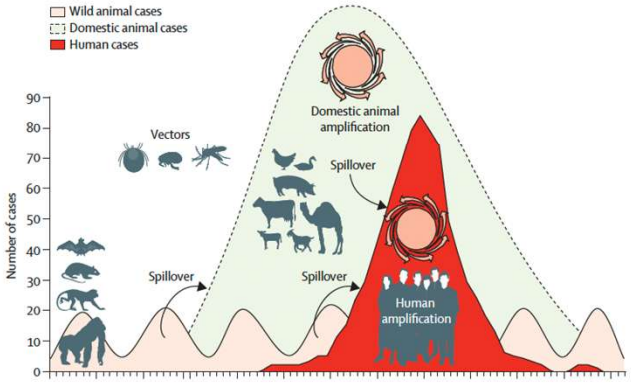
microoorganisms

MDPI

Editorial

Emerging and Re-Emerging Infectious Diseases: Humankind's Companions and Competitors

Nikolaos Spernovasilis [1,*], Sotirios Tsiodras [2,3] and Garyphallia Poulakou [3,4]



Ecology of zoonoses: natural and unnatural histories

William B Karesh, Andy Dobson, James O Lloyd-Smith, Juan Lubroth, Matthew A Dixon, Malcolm Bennett, Stephen Aldrich, Todd Harrington, Pierre Formenty, Elizabeth H Loh, Catherine C Machalaba, Mathew Jason Thomas, David L Heymann

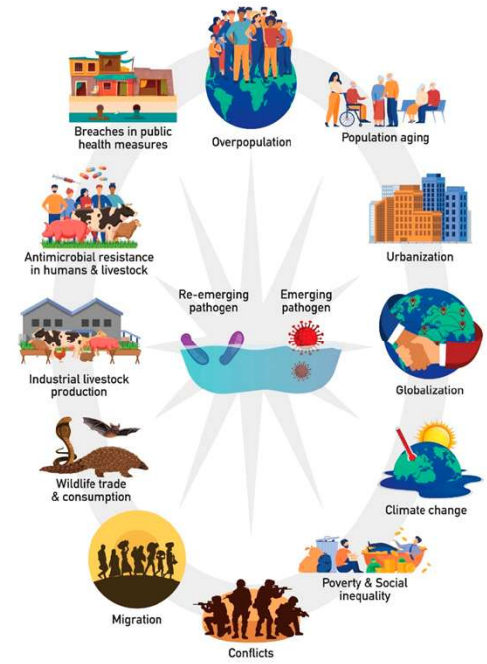


Figure 1. Factors that precipitate the occurrence and transmission of EIDs and REIDs.

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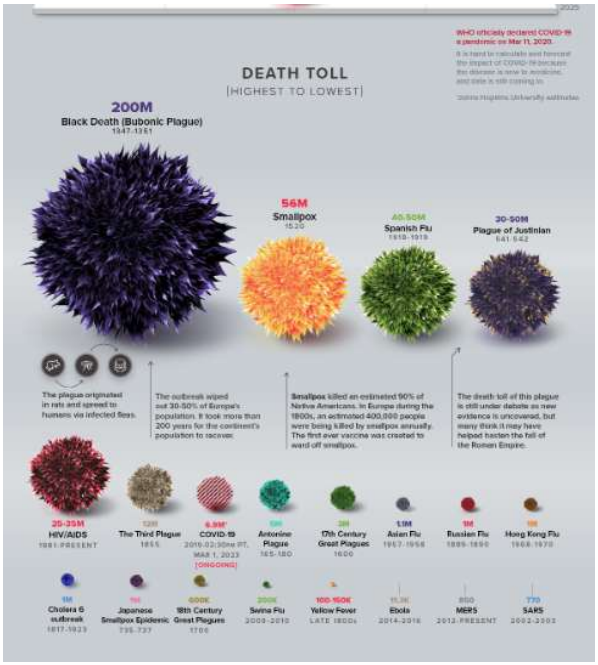

https://www.visualcapitalist.com/history-of-pandemics-deadliest/

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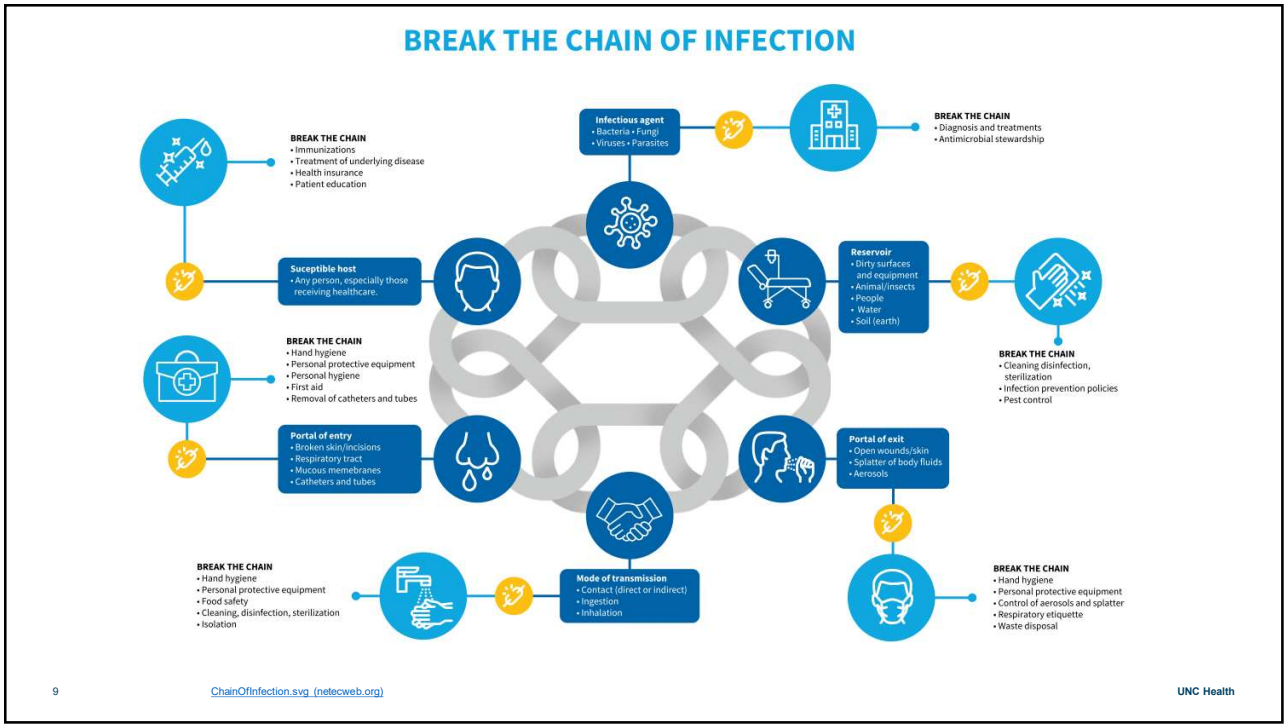
What's Increasing Our Risk?

- **More than 900 new viruses identified since 2009**
- **Human encroachment on natural habitats**
- **Climate change**
- **Wet markets**
- **"Jump Zones"**
  - Areas with the greatest risk of viruses jumping from bats to humans
    - West Africa: 1 in 5 people at risk; exploitation of natural resources
    - China & Laos: where COVID-19 began, and where scientists have found the closest relatives in wildlife to the virus responsible for the current pandemic
    - India: Almost half a *billion* people live in fast-expanding jump zones, the most of any nation
    - Brazil: the most land at risk of any country


BREAK THE CHAIN OF INFECTION
Infectious agent
• Bacteria • Fungi
• Viruses • Parasites
BREAK THE CHAIN
• Diagnosis and treatments
• Antimicrobial stewardship
BREAK THE CHAIN
• Immunizations
• Treatment of underlying disease
• Health insurance
• Patient education
Suceptible host
• Any person, especially those receiving healthcare.
Reservoir
• Dirty surfaces and equipment
• Animal/insects
• People
• Water
• Soil (earth)
BREAK THE CHAIN
• Cleaning disinfection, sterilization
• Infection prevention policies
• Pest control
BREAK THE CHAIN
• Hand hygiene
• Personal protective equipment
• Personal hygiene
• First aid
• Removal of catheters and tubes
Portal of entry
• Broken skin/incisions
• Respiratory tract
• Mucous membranes
• Catheters and tubes
Portal of exit
• Open wounds/skin
• Splatter of body fluids
• Aerosols
BREAK THE CHAIN
• Hand hygiene
• Personal protective equipment
• Food safety
• Cleaning, disinfection, sterilization
• Isolation
Mode of transmission
• Contact (direct or indirect)
• Ingestion
• Inhalation
BREAK THE CHAIN
• Hand hygiene
• Personal protective equipment
• Control of aerosols and splatter
• Respiratory etiquette
• Waste disposal
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ChainOfInfection.svg (netecweb.org)
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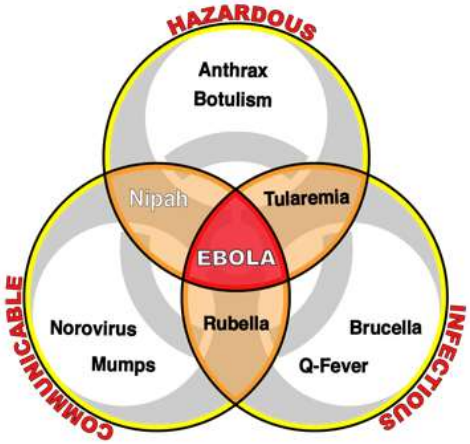
What is a special pathogen?

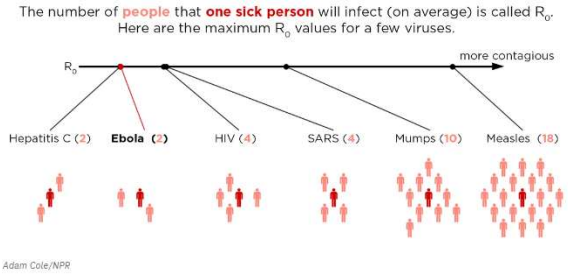
- **Highly contagious (communicable)**
- **Highly hazardous**
- **Highly infectious**
- **Very few pathogens have all 3 characteristics!**
- **4th consideration: Medical countermeasures**



Cieslak TJ, Herstein JJ, Kortepeter MG, Hewlett AL. A Methodology for Determining Which Diseases Warrant Care in a High-Level Containment Care Unit. Viruses. 2019;11(9):773. Published 2019 Aug 22. doi:10.3390/v11090773

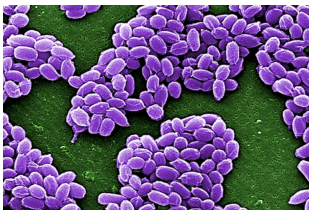
Highly Contagious

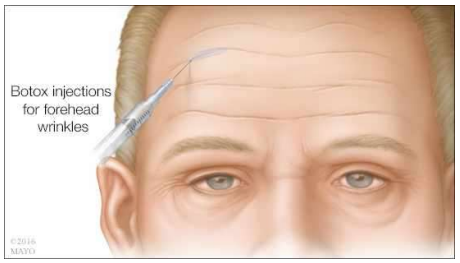
- How many people will it infect?
- Expressed in terms of the reproductive number, R_0
- The number of secondary cases resulting from a single primary case in the absence of medical interventions
- "Epidemic threshold" – pathogens with a R_0 greater than 1 have the capability to cause an outbreak
- Influenza: 1.3
- Mpox: 2.1
- Polio: 5-7
- COVID-19: 2.9 (ancestral strain)



Highly Hazardous

- **Measured by morbidity and mortality**
- **Inhalation anthrax has a mortality rate close to 100%**
  - Not very infectious: ID_{50} estimated at 8,000 – 40,000 spores
  - Not transmissible P2P
- ***Clostridium botulinum* is also highly hazardous (but neither infectious nor contagious)**





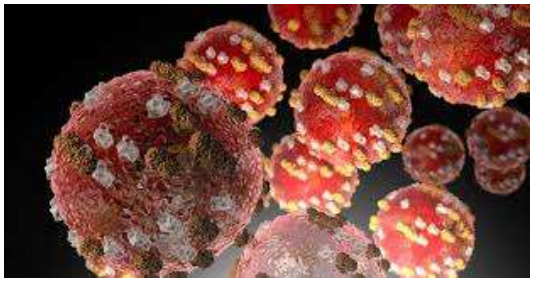
Highly Infectious

- **How much of the pathogen will it take to make someone sick?**
  - Usually measured by the infectious dose needed to infect 50% of a given population (ID_{50})
    - Lower number indicates greater infectious nature of a pathogen
- **SARS-CoV-2: estimated to be <100 viral particles**
- **Influenza A: >790 viral particles**
- **RSV: 160-640 viral units**
- **Norovirus: 10-18 viral particles**
- **Shigella: 10-200 organisms**
- ***Mycobacterium tuberculosis*: <10 bacilli**
- ***S. aureus*: at least 100,000 organisms**
- ***Coxiella burnetii* (Q-fever): 1 bacterial cell**

Pathogen	Mechanism of PTP Spread	ID_{50}
Ebola	Blood & Body Fluids	1-10 aerosolized organisms
Marburg	Blood & Body Fluids	1-10 aerosolized organisms
Lassa	Blood & Body Fluids	1-10 aerosolized organisms
Lujo	Scant data; Presumably Blood & Body Fluids	No data
Junin	Blood & Body Fluids	No data
Machupo	Blood & Body Fluids	No data
Guanarito	Scant data; Presumably Blood & Body Fluids	No data
Sabia	No data	No data
CCHF	Blood & Body Fluids	No data
SARS	Respiratory Droplets; Possibly Droplet Nuclei	No data
MERS	Respiratory Droplets; Possibly Droplet Nuclei	No data
H5N1 Influenza	Respiratory Droplets; Possibly Droplet Nuclei	1000 viral particles [2]

A fourth consideration: effective medical countermeasures

- **Immunizations (prevent it)**
- **Therapeutics (treat it)**
- **Example: Measles**
  - One of the most communicable diseases known
    - R_0 12-18
  - Highly hazardous
    - Over 136,000 worldwide deaths in 2022
  - Highly infectious
    - 0.2 organisms by intranasal spray (lab setting)
  - ➢ Medical countermeasure: immunizations
    - 75% decrease in mortality since the turn of the century
  - Does not require biocontainment level care, but only airborne precautions



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KEY CONSIDERATIONS IN ASSESSING AND MANAGING THE THREAT OF AN EMERGING INFECTIOUS DISEASE

Pathogen

- Taxonomy (provides clues regarding transmission routes, environmental stability, germicide susceptibility)
- Hosts

Epidemiology

- Locations of endemicity (i.e., locations in the world where sources or reservoirs reside)
- Incubation period
- Transmission routes
- Infectivity (i.e., communicability)
- Duration of infectivity

Clinical

- Symptoms
- Signs
- Risk factors for acquisition of infection
- Morbidity
- Mortality
- Risk factors for morbidity and mortality
- Diagnostic methods (sensitivity, specificity, biosafety)
- Therapy (availability, efficacy, safety)

Weber DJ, et al. Am J Infect Control 2016;44:e91-100 UNC Health

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KEY CONSIDERATIONS IN ASSESSING AND MANAGING THE THREAT OF AN EMERGING INFECTIOUS DISEASE

Infection Prevention

- Environmental survival
- Germicide susceptibility
- Isolation recommendations
- Recommended personal protective equipment
- Pre-exposure prophylaxis (availability, efficacy, safety)
- Post-exposure prophylaxis (availability, efficacy, safety)
- Recommended biosafety level in the laboratory
- Recommended waste disposal (liquids and solids

Managing a pandemic

- Sensitive and specific (ideally rapid) diagnostic test
- Early identification of patients
- Protecting our healthcare personnel (appropriate isolation, PPE, donning, doffing)
- Sufficient staff, inpatient/ICU beds, ventilators
- Managing shortages
- Rapid development and approval of therapeutics and vaccines

Weber DJ, et al. Am J Infect Control 2016;44:e91-100 UNC Health

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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).

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NSPS Mission, Vision, & Goals

NSPS

Mission

To develop a coordinated network of high-quality special pathogen care dedicated to protecting patients, communities, and the health care workforce in the United States.

Vision

To save lives and protect the health care workforce through an agile and comprehensive special pathogen system of care.

ASPIRATIONAL GOALS

Zero
Preventable Deaths
after special pathogen infection

2 hours
Network Mobilization
after suspected special pathogen infection

100%
Have Access
to high-quality special pathogen care for all of the U.S. population

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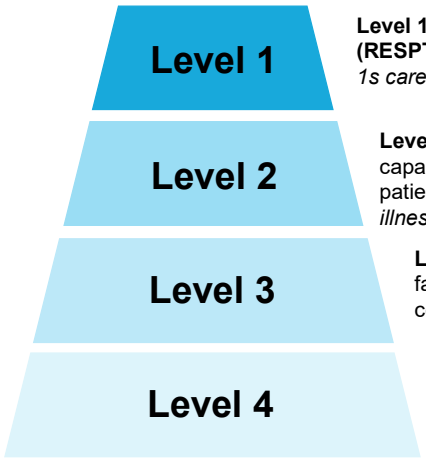
The Tiered System of Care



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.

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Facility Overviews

NSPS

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
• Can safely identify, isolate, initiate stabilizing medical care, perform required laboratory testing, and inform local public health partners • Can activate internal processes for confirmed patients from nearby Level 2, 3, or 4 facilities within **two hours time,** coordinate transfer within **four hours time**, and are able to **admit** suspect or confirmed high consequence infectious disease (HCID) patients at the direction of the Administration for Strategic Preparedness and Response (ASPR) within **eight hours time**; these may be repatriated US citizens from OCONUS, inter-regional air/ground transports or transfers from a lower tier of the National Special Pathogen System (NSPS) • Represents the capacity to hospitalize HCID patients, provide all levels of care up to and including critical care for the **duration of their illness**, and support continued follow up care when isolation is no longer required • When patient volumes exceed Level 1 facility capacity, supports, in collaboration with ASPR and the NSPS Coordinating Body, coordination, and communication amongst other area Level 1 and 2 facilities for optimal patient placement, quality care, and resource utilization • Provides care for adult, pediatric, and neonatal patients and must be prepared to offer labor and delivery services if necessary	• Can safely identify, isolate, initiate stabilizing medical care, and perform limited basic laboratory testing, and inform local public health partners • Can activate internal processes for suspect case(s) from nearby Level 3 or 4 facilities within **two hours time**, and coordinate transfer within **four hours time,** and are able to **admit** suspect or confirmed HCID patients at the direction of ASPR within **eight hours time** • Represents the capacity to hospitalize HCID patients for the **duration of their illness** and support continued follow up care when isolation is no longer required • When patient volumes exceed Level 2 facility capacity, the Regional Emerging Special Pathogen Treatment Centers (RESPTCs) will support collaboration, coordination, and communication among other area Level 1 and 2 facilities for optimal patient placement, quality care, and resource utilization • Can be adult focused and/or pediatric focused. Obstetric care is preferred but not required for capability of Level 2	• Can safely identify, isolate, initiate stabilizing medical care, and perform limited basic laboratory testing, and inform local public health partners • Can activate internal processes for suspect case(s) from nearby Level 4 facilities within **two hours time,** and coordinate transfer within **four hours time**. • Can safely provide medical care for **12-36 hours** and should initiate transfer after stabilization if/when the suspect case rules in for an HCID and/or potentially meets other criteria for transfer • Maintains transfer relationships with Level 2 and RESPTCs to support inpatient care for suspect HCID patient who rule-in for HCIDs • Can be adult focused and/or pediatric focused	**Considerations to Meet Accreditation Standards** • Can safely Identify, Isolate, initiate stabilizing medical care, and Inform local public health partners. • Can safely initiate transfer after stabilization if/when the suspect case rules in for an HCID and/or potentially meets other criteria for transfer. • Can be any type of health care facility (e.g., hospitals, urgent cares, nursing homes, etc.) • Can be focused on any patient population (i.e., adult, pediatric)

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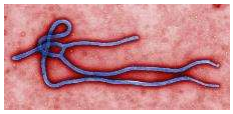
Ebola Virus Disease

Acute viral hemorrhagic illness (filovirus)



Discovered 1976

Affects humans and non-human primates

Reservoir/host remains unknown - Presumed bat and/or non-human primate species

Animal-human and human-human transmission occurs through direct contact with blood and bodily fluids and tissues of infection animal, contaminated surfaces, sexual contact; virus can persist for long periods of time

Duration of Illness/Incubation period: 2-21d (avg 8-10d); not contagious prior to symptoms; typical CFR 25-90%

West Africa Outbreak: 2014-2015

Guinea, Liberia, Sierra Leone; >28,600 cases; >11,300 deaths; exportations to 7 countries

Year(s)	Location(s)	Cases	Deaths	Case Fatality Rate (CFR)
Aug 2018-Jun 2020	DRC, Uganda	3470	2280	66%
May-Nov 2020	DRC	130	55	42%
Feb-May 2021	DRC	12	6	50%
Feb-Jun 2021	Guinea	23	12	50%
Oct-Dec 2021	DRC	11	9	82%
Sept 2022 - Jan 2023	Uganda	164	77	47%
2025	Uganda	14	4	ongoing

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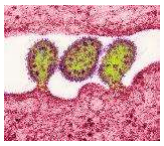
Lassa Fever

Acute viral hemorrhagic illness (arenavirus)



Discovered in 1969 in Nigeria

Reservoir is multimammate rat

Transmission occurs via contact with infected rodent urine/feces, contaminated surfaces, ingestion, direct exposure

Human-human transmission via blood/bodily fluids exposure, secretions/excretions, contaminated surfaces

Duration of illness/incubation period = 2-21d (7-10 most common); not contagious prior to symptoms; typical CFR 1-15%

Year	Country	Suspect Cases	Confirmed Cases	Deaths	Case Fatality Rate (CFR)
2024	Guinea	29	3	2	6.5%
2024	Liberia	174	38	11	5.2%
2024	Nigeria	4253	686	129	18.8%
2025	Nigeria	10098	1309	214	16.3%

NCDC.gov.ng

CDC

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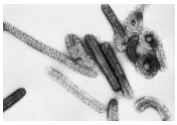
Marburg Virus Disease



Acute viral hemorrhagic illness (filovirus)

Recognized in 1967

Affects both humans and non-human primates

Reservoir is African fruit bat

Unknown spillover dynamics (infected guano exposure? aerosol?)

Human-human transmission via blood or bodily fluids, contaminated surfaces/objects, sexual contact (male)

Incubation period: 2-21d (7-10 most common); not contagious prior to symptoms; typical CFR 23-90%

Year	Country	Human Cases	Human Deaths	Case Fatality Rate (CFR)
2021	Guinea	1	1	100%
2022	Ghana	3	2	66%
2023	Equatorial Guinea	40	35	88%
2023	Tanzania	9	6	66%
2024	Rwanda	58	13	22%
2025	Tanzania	9	8	88%

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Crimean-Congo Hemorrhagic Fever Virus

Nairovirus; family *Bunyaviridae*

First isolated in Crimea 1944; 1969 in Congo

Reservoir/host is Ixodid ticks (*Hyalomma)*

Domesticated animals serve as amplifying hosts

Human transmission occurs through contact with infected ticks/animals or bodily fluids, contaminated surfaces

Duration of illness/incubation: 3-13days (avg 5-6d); typical CFR 30-50%

Country	Cases (approx.)
Iraq	212 (2022)
Pakistan	36 (2023)
Turkey	100+ (2022-2023)
Uganda	13 (2022-2023)
Georgia	12 (2023)
North Macedonia	2 (2023)
Bulgaria	2 (2022)
Spain	2 (2022)
Senegal	8 (2023)
India	2 (2022)

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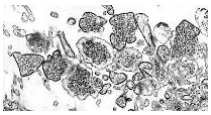
Nipah Virus



Family *Paramyxoviridae,* genus *Henipavirus*

First discovered in 1999 in Malaysia and Singapore

Affects humans and pigs (mainly)

Reservoir is the fruit bat (flying fox)

Transmission occurs via close or direct contact with infected animal's bodily fluids (saliva, urine); consumption of contaminated food products; those in contact with pigs

Duration of illness/incubation period: 3-14 days, range of generalized symptoms to rapidly progressive respiratory distress to fatal encephalitis; typical CFR 40-75%

Year(s)	Location(s)	Cases	Deaths	Case Fatality Rate (CFR)
2020	Kerala, India	1	0	0%
2021	Kerala, India	1	0	0%
2023	Kerala, India	6	2	33%
2023	Bangladesh	11	8	73%
2024	Bangladesh	2	2	100%
2025	Bangladesh	5	3	60%

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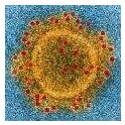
Middle East Respiratory Syndrome



Coronavirus

Recognized in 2012 – all cases linked to Arabian Peninsula

Detected in 27 countries

Reservoir poorly understood, possibly from bats to camels

Transmission occurs from direct and/or indirect contact with camels, human to human transmission appears extremely rare

Duration of illness/incubation: 2-14 days (avg 5-6d); spectrum of illness including rapidly progressive ARDS; typical CFR 35%

Republic of Korea: 2015, 185cases/38deaths, largest outbreak outside of Middle East (travel-related)

Outbreak Data (2020-2025, approx.)

Country	Total Cases	Total Deaths	Case Fatality Rate (CFR)
Saudi Arabia	228	74	33%
United Arab Emirates	10	4	40%
Oman	2	1	50%
Qatar	3	1	33%
Kuwait	1	0	0%

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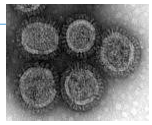
"Species of mammals known to be infected with [redacted] viruses to date: ferret, mink, European otter, North American river otter, marine otter, European badger, skunk, Virginia opossum, Amur leopard, Amur tiger, mountain lion, fisher, European polecat, lynx, bobcat, domestic cat, red fox, coyote, racoon, racoon dog, South American bush dog, American black bear, brown bear, grizzly bear, Kodiak bear, domestic pig (serology only), grey seal, harbour seal, fur seal, sea lion, porpoise, bottlenose dolphin, short-beaked common dolphin, white sided dolphin, dogs, Japanese raccoon dogs, Beech marten, Caspian seals, Asiatic black bear, Chilean dolphin, Burmeister's porpoise."

-WHO, 7/12/2023

Answer: Highly Pathogenic Avian Influenza H5N1



Novel influenza virus

First infections identified in humans in Hong Kong, 1997

Sporadic cases of avian-human transmission

Human-human transmission is rare

Direct/close exposure to sick/dead infected poultry

Wide range of disease severity

2003-2025: nearly 1000 human cases, 463 deaths (CFR 52%), 23 countries

United States: 70 cases (1 death)

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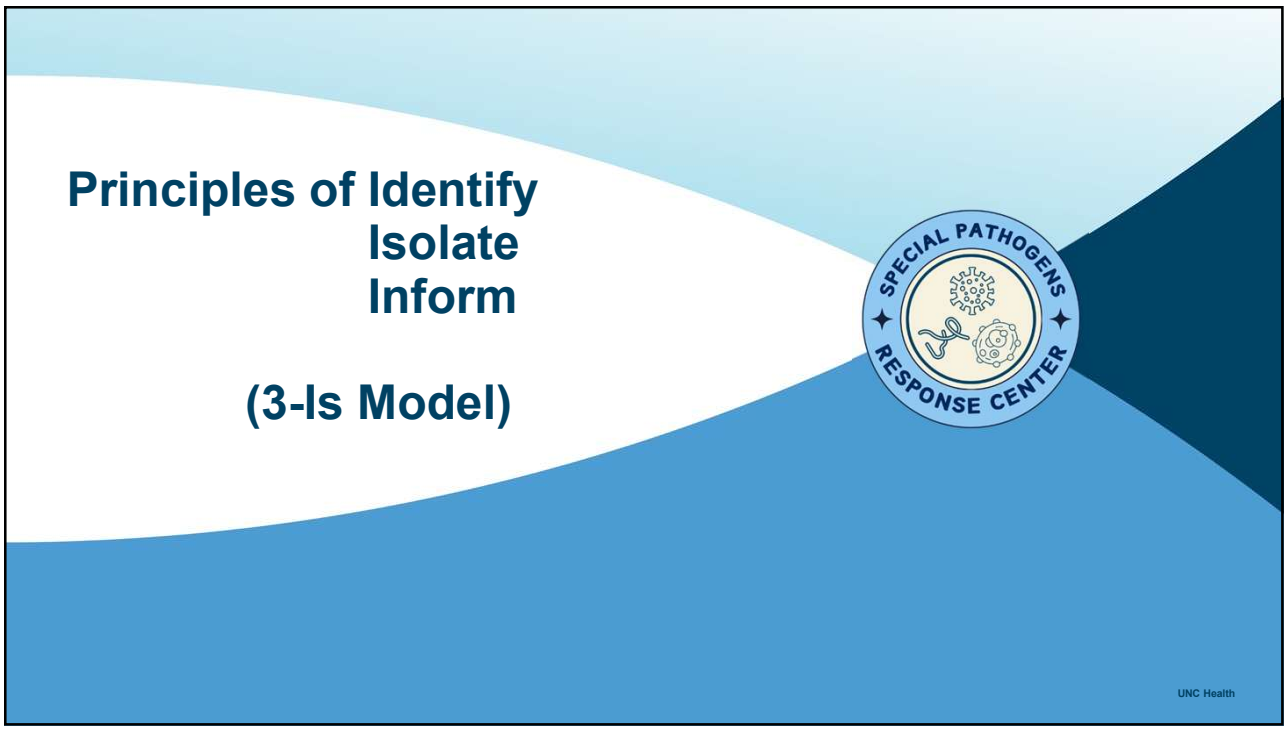
Mitigating the Risk: Staff - Stuff - Space

- Staff – who will care for patients in a pandemic
  - Do you have a team of specialized staff?
  - Do you have a staff who are Subject Matter Experts (SMEs) in pandemic care?
  - Emergency Management teams
- Stuff
  - PPE
    - What types?
    - How much?
    - Where is it stored?
  - Dedicated equipment
- Space
  - Where will you care for patients?
  - Do you have space to store extra PPE in the event of an outbreak or pandemic?
  - Do you have training space?
  - What will you do with your waste if it is Category A?


Principles of Identify
Isolate
Inform
(3-Is Model)
SPECIAL PATHOGENS
RESPONSE CENTER
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The Joint Commission

- **Requirements as of *July 1, 2024***

Joint Commission Standard IC.07.01.01

This standard requires processes to support preparedness for high-consequence infectious diseases (HCIDs) or special pathogens

- Early recognition of a patient with symptomology suggestive of a special pathogen
  - **Identify:** Procedures for screening at points of entry
  - **Isolate:** Procedures for transmission-based precautions
  - **Inform:** Procedures for informing public health and key hospital staff
- Infection control procedures to support continued and safe provision of care while the patient is in isolation and to reduce exposure among staff, patients, and visitors using hierarchy of controls.
- Education and training programs to assess competencies for staff who will implement these protocols.
  - Assessments are facility dependent and based on a facility's definition of competent.

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The Joint Commission

- **Rationale for changes**
- Throughout the recent history of outbreaks and pandemics, hospital facilities were at the epicenter of the response and had to mobilize quickly.
- The preparedness of hospitals is highly variable, and there are no mandatory requirements for hospitals to implement training or competency assessment on special pathogens.
- A standardized approach to preparedness for high-consequence infectious diseases and special pathogens, grounded in hierarchy of controls, will strengthen basic infection control protocols and processes for all infectious threats.

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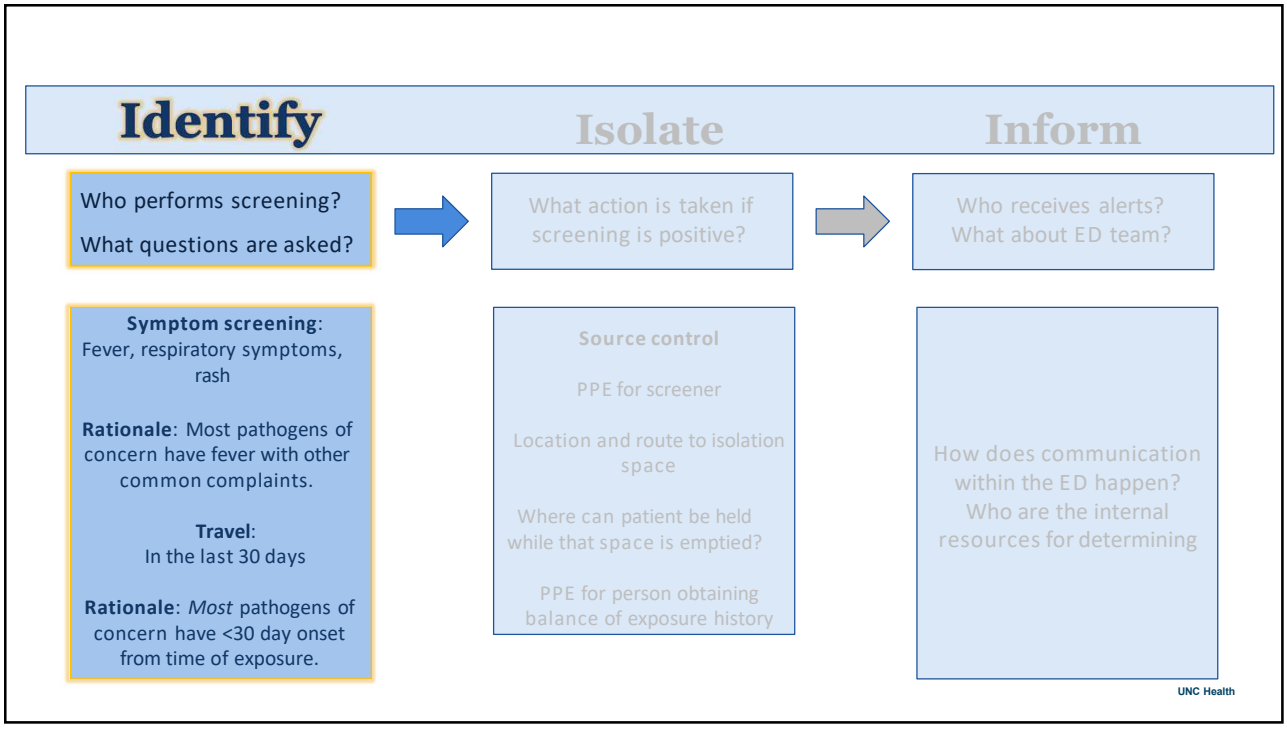
Identify
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Inform
Who performs screening?
What questions are asked?
What action is taken if screening is positive?
Who receives alerts?
What about ED team?
Symptom screening: Fever, respiratory symptoms, rash
Rationale: Most pathogens of concern have fever with other common complaints.
Travel: In the last 30 days
Rationale: Most pathogens of concern have <30 day onset from time of exposure.
Source control
PPE for screener
Location and route to isolation space
Where can patient be held while that space is emptied?
PPE for person obtaining balance of exposure history
How does communication within the ED happen?
Who are the internal resources for determining
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Patient Arrival

Potential Points of Entry

- Emergency department
- Clinics
- Ambulatory care centers

Walk-ins

- Arrive by themselves
- Brought in by another person(s)

By Ambulance

- Pre-identified as a Suspect Case
- Identified en route as a Suspect Case
- May not be identified as a Suspect Case until arrival

Patient Condition

- Non-Emergent
- Emergent
- Critical
- Expired

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Identify: Early Recognition is KEY

- **Early detection = better protection**
- **Visual cues of a potentially infectious person**
  - Facial cues
    - Puffy face
    - Droopy eyes
    - Dark eyes
    - Red nose
  - Body language
    - Posture
  - Skin
    - Pale or flushed
    - Diaphoretic

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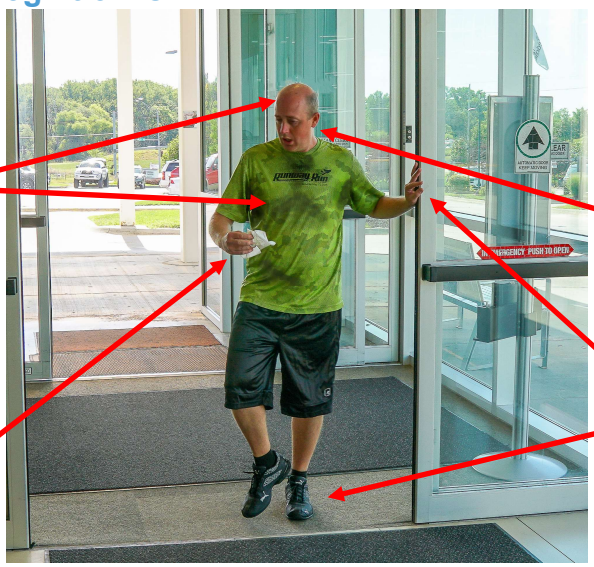
Identify: Early Recognition is KEY

Fever?

Sweat on skin and clothing

Runny nose?

Facial tissue in hand



Labored breathing?

Breathing through mouth, coughing

Fatigue?

Difficulty standing

YOU CANNOT TELL

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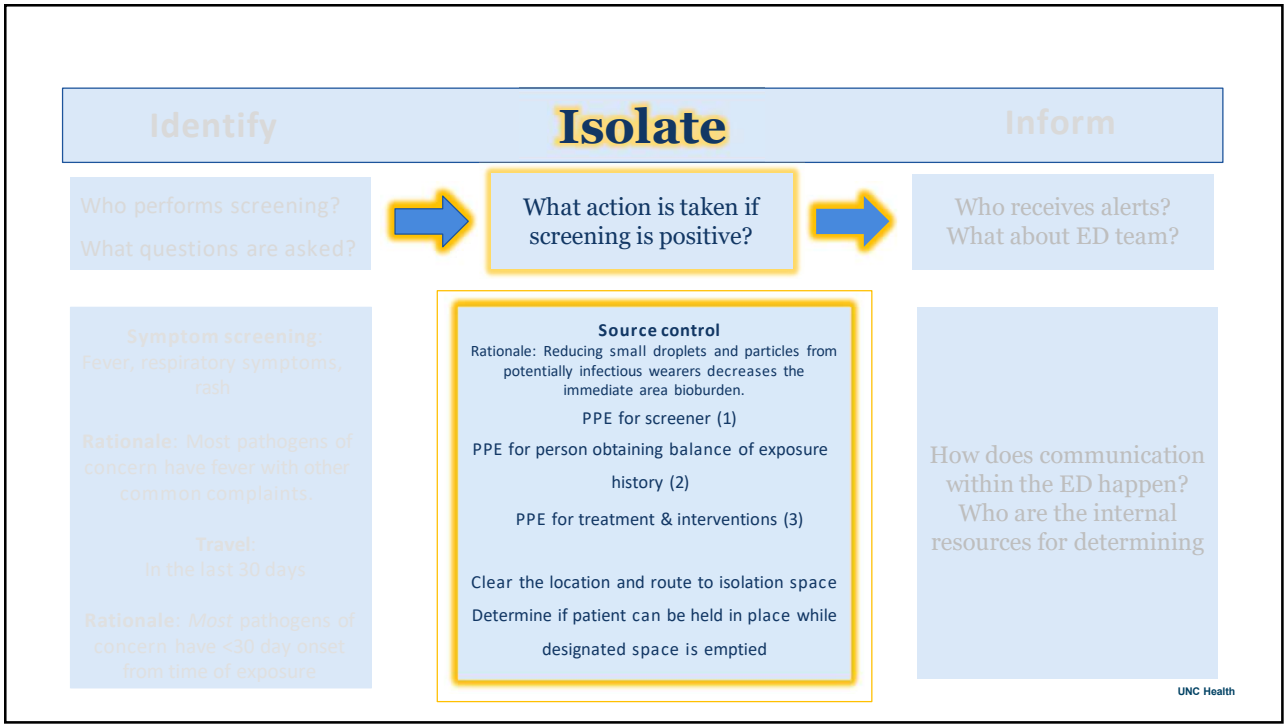
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Isolate: Workflow

When screening is positive, think about:

Stuff

Are there source control masks available?
Is hand sanitizer readily available?
Where is PPE for staff located?
Where are containment supplies?
What needs to be removed from or moved into the designated care space?

Staff

Who empties the designated space?
Who clears the path and secures the route?
Who is involved in decisions and actions?
Who cleans and turns over the initial location?

Space

Can the patient stay in place while the designated care space is prepared?
How is access to contaminated spaces limited?
How does communication happen into and out of these spaces?

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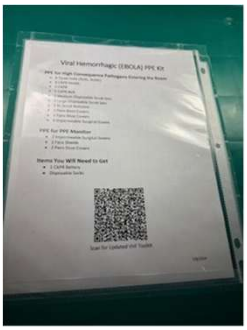
Isolate: Be prepared to respond quickly

- **Have a plan & know how you will transfer the patient to the designated room**
- **Retrieve your PPE box**
  - **Know the location**
  - **Should be accessible**
  - **Review contents and how to use**
  - **QR Code on box with additional information**
- **Remove extra equipment from the room**
- **Consider how you'll manage waste**
- **Consider how you'll communicate**



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Isolate: Room Setup & Preparation

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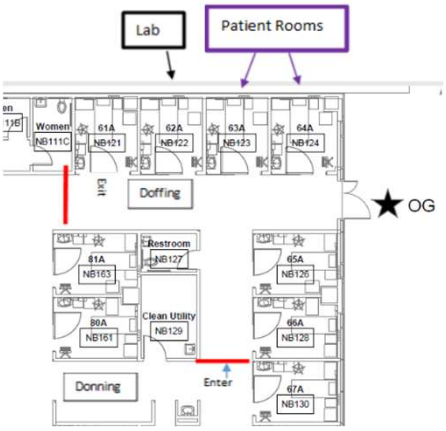
Isolate

- **What PPE to use for what pathogen of concern**
  - Generally, special airborne-contact PPE (or higher)
- **Where to place the patient (and how to get them there)**
  - Which route? Stretcher or wheelchair? How many transporting?
  - Room preparation
    - What stays in the room & what leaves?
    - Supplies
    - Bathroom?
- **Who has interacted with the patient?**
- **Review IP practices**
- **Waste management**
  - What are we doing with all the PPE and used supplies?



ED – Team D

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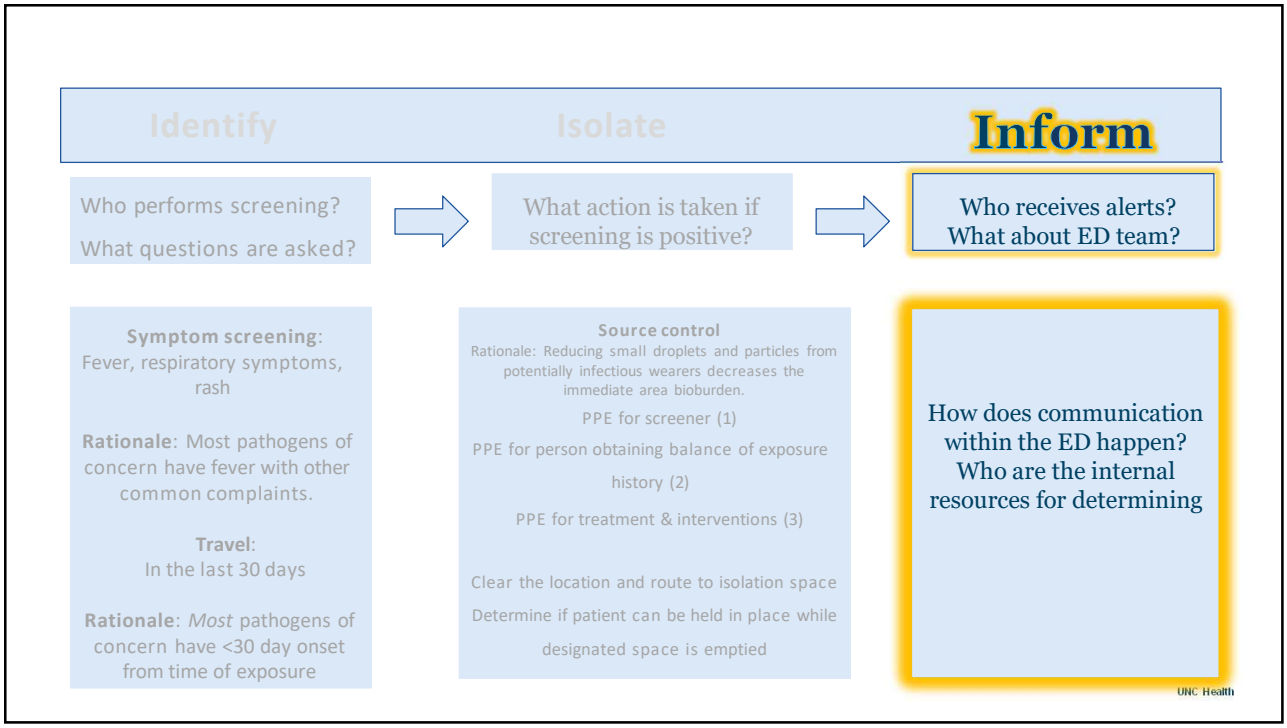
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Inform

- **Hospital policies & incident command structure**
  - **Policy - High Consequence Pathogens: Preparedness and Response Plan**
- **Notification pathway**
  - Make sure you are contacting a position not necessarily a person since people change
- **Details are important!**
  - The health department will want to know extensive details regarding travel history, symptom onset, contacts
  - Move forward & have information prepared, not backward (i.e., "I have to find out and call you back")

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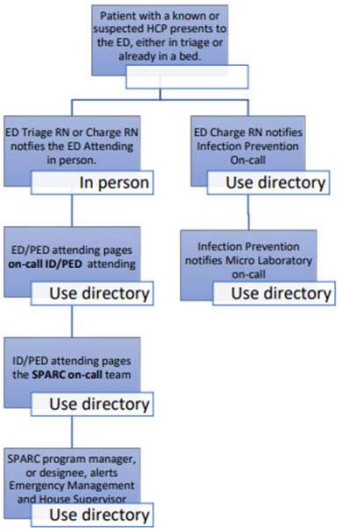
Notification Pathway-ED



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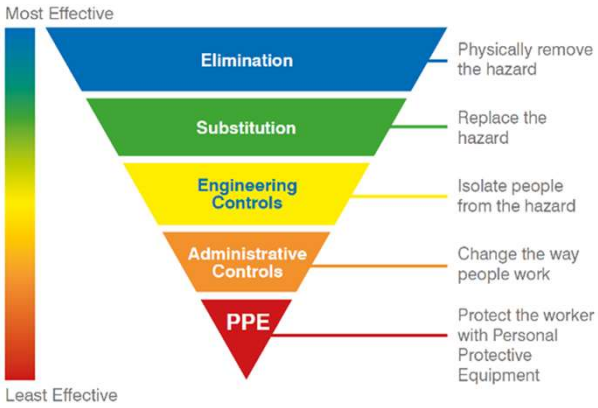
3 Is to Protect Healthcare Workers



Index of Suspicion > Diagnosis

Consider other methods for risk reduction from the hierarchy of controls

- **Ventilation: triage area, waiting areas, care spaces**
- **Disposable, single-use coverings**
- **Mucous membrane protections includes EYES**
- **Intact skin, Hand hygiene**
- **PPE etiquette**

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Exposures & Healthcare Worker Monitoring

- **Exposed persons**
  - Monitoring differs based on level of exposure and disease
  - PPE breach, provider down, ill-fitting PPE
- **Methods to reach Occupational Health Services**
- **Plans for monitoring**
  - Local or state Health Department
- **Create a culture of trust so that staff are forthcoming with any possible breach in PPE or hazard experienced, no matter how minor the incident**

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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).

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NSPS Mission, Vision, & Goals

NSPS

Mission

To develop a coordinated network of high-quality special pathogen care dedicated to protecting patients, communities, and the health care workforce in the United States.

Vision

To save lives and protect the health care workforce through an agile and comprehensive special pathogen system of care.

ASPIRATIONAL GOALS

Zero
Preventable Deaths
after special pathogen infection

2 hours
Network Mobilization
after suspected special pathogen infection

100%
Have Access
to high-quality special pathogen care for all of the U.S. population

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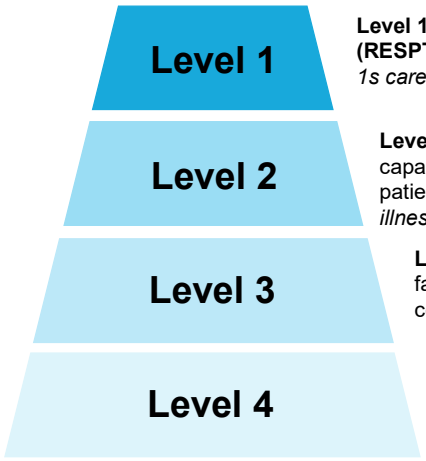
The Tiered System of Care



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.

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Facility Overviews

NSPS

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
• Can safely identify, isolate, initiate stabilizing medical care, perform required laboratory testing, and inform local public health partners • Can activate internal processes for confirmed patients from nearby Level 2, 3, or 4 facilities within **two hours time,** coordinate transfer within **four hours time**, and are able to **admit** suspect or confirmed high consequence infectious disease (HCID) patients at the direction of the Administration for Strategic Preparedness and Response (ASPR) within **eight hours time**; these may be repatriated US citizens from OCONUS, inter-regional air/ground transports or transfers from a lower tier of the National Special Pathogen System (NSPS) • Represents the capacity to hospitalize HCID patients, provide all levels of care up to and including critical care for the **duration of their illness**, and support continued follow up care when isolation is no longer required • When patient volumes exceed Level 1 facility capacity, supports, in collaboration with ASPR and the NSPS Coordinating Body, coordination, and communication amongst other area Level 1 and 2 facilities for optimal patient placement, quality care, and resource utilization • Provides care for adult, pediatric, and neonatal patients and must be prepared to offer labor and delivery services if necessary	• Can safely identify, isolate, initiate stabilizing medical care, and perform limited basic laboratory testing, and inform local public health partners • Can activate internal processes for suspect case(s) from nearby Level 3 or 4 facilities within **two hours time**, and coordinate transfer within **four hours time,** and are able to **admit** suspect or confirmed HCID patients at the direction of ASPR within **eight hours time** • Represents the capacity to hospitalize HCID patients for the **duration of their illness** and support continued follow up care when isolation is no longer required • When patient volumes exceed Level 2 facility capacity, the Regional Emerging Special Pathogen Treatment Centers (RESPTCs) will support collaboration, coordination, and communication among other area Level 1 and 2 facilities for optimal patient placement, quality care, and resource utilization • Can be adult focused and/or pediatric focused. Obstetric care is preferred but not required for capability of Level 2	• Can safely identify, isolate, initiate stabilizing medical care, and perform limited basic laboratory testing, and inform local public health partners • Can activate internal processes for suspect case(s) from nearby Level 4 facilities within **two hours time,** and coordinate transfer within **four hours time**. • Can safely provide medical care for **12-36 hours** and should initiate transfer after stabilization if/when the suspect case rules in for an HCID and/or potentially meets other criteria for transfer • Maintains transfer relationships with Level 2 and RESPTCs to support inpatient care for suspect HCID patient who rule-in for HCIDs • Can be adult focused and/or pediatric focused	**Considerations to Meet Accreditation Standards** • Can safely Identify, Isolate, initiate stabilizing medical care, and Inform local public health partners. • Can safely initiate transfer after stabilization if/when the suspect case rules in for an HCID and/or potentially meets other criteria for transfer. • Can be any type of health care facility (e.g., hospitals, urgent cares, nursing homes, etc.) • Can be focused on any patient population (i.e., adult, pediatric)

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Preventing future pandemics

- Identify threats early – Identify, Isolate, Inform
- Combat mis- and disinformation
- Engage the community – this is where outbreaks begin and end
- Work with local partners on training and education for special pathogens
- Understand your PPE inventory and how it is tracked
  - Is it real-time tracking?
  - How often is the inventory updated?
- Does your organization have plans for a surge of patients?
  - Staffing plan
  - Bed plan
  - Outpatient clinic plan
  - Waste management plan


“The worst potential bio-terrorist is nature itself”
Anthony Fauci
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