www.netec.org

Beyond Ebola: Applying lessons learned to what comes next

Laura Evans, MD MSc

Jill Morgan, BSN RN

Kate Boulter, BAN RN MPH

National Ebola Training and Education Center (NETEC)

Mission: To increase the capability of United States public health and health care systems to safely and effectively manage individuals with suspected and confirmed special pathogens

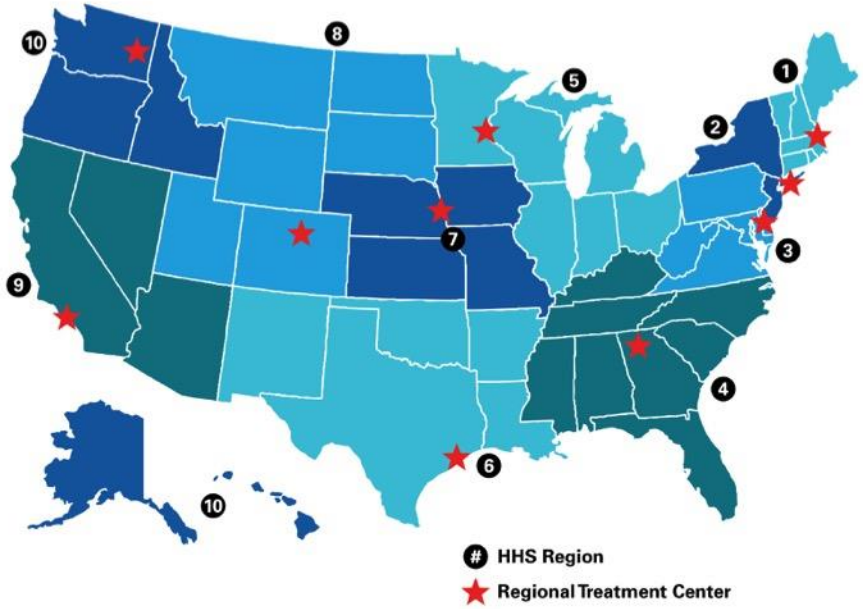
For more information, visit www.netec.org or email us at info@netec.org

NETEC

Role of NETEC

Through the 5 year project period and in collaboration with ASPR, CDC and other stakeholders, the NETEC will:

- Create readiness metrics.
- Conduct peer review readiness assessments of regional and state ETCs as well as assessment centers as requested by state health departments.



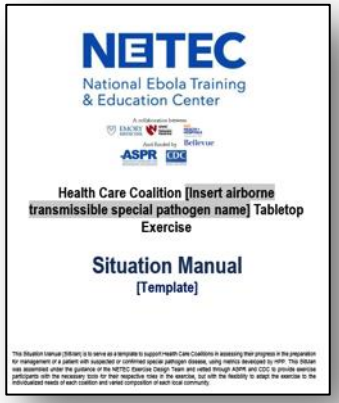
Regional Treatment Centers

1: Massachusetts General Hospital
2: NYC Health + Hospitals - Bellevue
3: Johns Hopkins Hospital
4: Emory University Hospital and Children's Healthcare of Atlanta-Egleston Hospital
5: University of Minnesota Medical Center
6: University of Texas Medical Branch at Galveston
7: University of Nebraska Medical Center/ Nebraska Medicine
8: Denver Health Medical Center
9: Cedars-Sinai
10: Providence Sacred Heart Medical Center and Children's Hospital

NETEC

Role of NETEC (continued)

- Create, conduct, and maintain a comprehensive suite of onsite and online education courses and helpful resources and tools.
- Develop a repository for education resources, announcements, links to key information, exercise templates at www.netec.org
- Provide technical assistance to public health departments and healthcare facilities.
- Create a research infrastructure across the
- 10 regional ETCs.



NETEC
National Ebola Training & Education Center

Health Care Coalition [Insert airborne transmissible special pathogen name] Tabletop Exercise

Situation Manual
[Template]

Learning Objectives

- Describe the experiences of US medical centers in caring for patients with high consequence infectious diseases
- Recognize the importance of screening for infectious diseases
- Apply principles of Identify, Isolate, and Inform to high consequence infectious diseases
- Describe strategies to build and sustain infectious disease preparedness

What is a "Special Pathogen"?

- No defined terminology:
  - Special Pathogen
  - High Consequence Infectious Disease
  - Highly Hazardous Communicable Pathogens

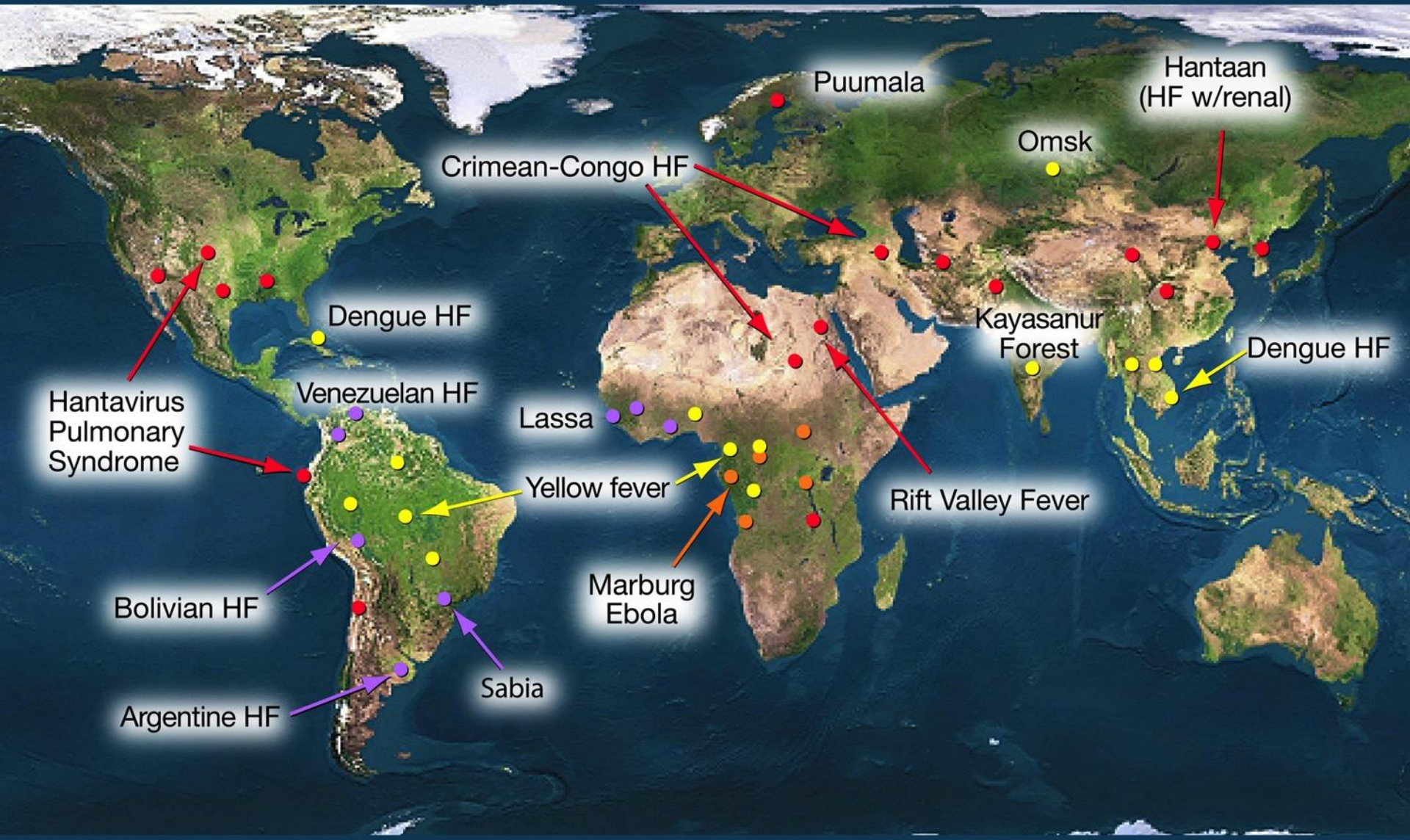
- No master list of pathogens
  - But there are some defining characteristics

NETEC

"Special Pathogen" Characteristics

- Pathogen associated with high morbidity and/or mortality
- Pathogen with high likelihood of secondary cases (person-to-person spread)
- Absence of an effective vaccine or prophylaxis or treatment
- Pathogen for which clinical or public assuredness concerns might prompt the use of a biocontainment unit

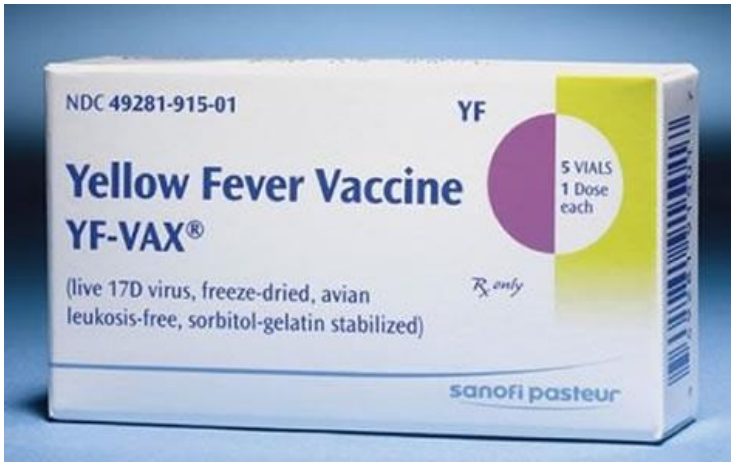
Viral Hemorrhagic Fever



Filoviruses Flaviviruses Bunyaviruses Arenaviruses

Licensed Therapy and Prophylaxis

Ribavirin for Lassa Rx



YF-Vax for Yellow Fever Prevention

Providing Clinical Care in High-Level Containment

- Relatively limited diagnostic testing
  - Laboratory tests
  - Imaging tests
    - Portable x-rays require advance planning/protocols
    - Use of point of care ultrasound for diagnostic imaging and procedure guidance
- Consider telemedicine based consultations when possible
  - Limit the number of providers who need to enter the patient room

Providing Clinical Care in High-Level Containment

- Invasive procedures in PPE
  - Threshold may be different – response time to deteriorating patient is longer in isolation due to PPE donning
  - Emergent procedures more likely to lead to exposures
  - Consider simulation exercises of procedures – central line placement, endotracheal intubation

Caring for the VHF Patient: the Wide Range of Severity

- There is a differential diagnosis when patients present
- Some have presented relatively well with fever, prodromal symptoms
- Some have become critically ill with multi-organ system failure
  - Need for emergent dialysis, intubation and mechanical ventilation
- Preparations should include plans for handling this range of illness until diagnosis of a serious communicable disease is either confirmed or ruled out

Additional considerations for range of ages possible from infants to older adults

BSL-4 Pathogens

- Filoviridae
  - Ebola
  - Marburg
- Arenaviridae
  - Lassa
  - Guanarito
  - Junin
  - Machupo
  - Sabia
- Flaviviridae*
  - RSSE & CEE
  - TBE Complex
  - Kyasanur Forest
  - Omsk
- Bunyaviridae
  - CCHF
- Orthopoxviruses
  - Variola

*Vector-Borne; no known PTP transmission

All cause VHF except for Variola

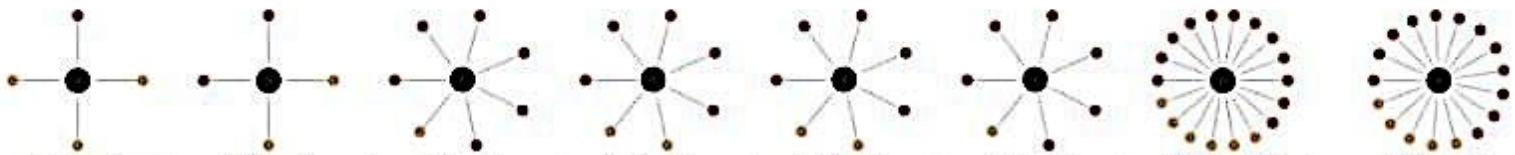
Ebola Spread in Perspective

How contagious is Ebola?

How the Ebola virus compares with other contagious viruses. The reproduction rate or R_0, calculates the number of people likely to be infected by one person who has a disease.

REPRODUCTION RATE (R_0)

Initial infected patient ● —• Person he or she has infected



R_0	1 to 4 people	2 to 4	4 to 7	5 to 7	5 to 7	6 to 7	12 to18	12 to 17
DISEASE	Ebola	SARS	Mumps	Polio	Smallpox	Rubella	Measles	Pertussis (Whooping cough)
HOW IT SPREADS	Bodily fluids	Airborne droplets	Airborne droplets	Fecal-oral route	Airborne droplets	Airborne droplets	Airborne	Airborne droplets

Sources: Michigan Center for Public Health; WHO; Transmission Dynamics and Control of Severe Acute Respiratory Syndrome, Nature; Understanding the Dynamics of Ebola Epidemics, National Institute of Health

M. Murray, M. Weber, 3/10/2014

REUTERS

Human-to-Human Transmission

- Infectiousness of Ebola Virus Disease
  - Infected persons are not contagious until onset of symptoms
  - Infectiousness of body fluids increases as patients become more ill
  - Remains from deceased infected persons are highly infectious

- Human-to-human transmission of Ebola virus via inhalation has not been demonstrated
  - However, respiratory protection (e.g. N-95, PAPR) are recommended in case there is an unexpected need to perform an aerosol-generating procedure (e.g. emergency intubation)

VHF Misperceptions

- They all have the same features
- They all spread easily
- They are easily recognizable
- Bleeding is the primary cause of death

NETEC

The Lethal VHFs

Virus	Mortality Rate
Ebola Zaire	65-90%
Marburg	25-90%
Lassa	15-20% of hospitalized
CCHF	3-30%
RVF	50% with hemorrhagic form

NETEC

EVD: Early Clinical Presentation

- Acute onset
  - typically 8–10 days after exposure (range 2–21 days)
- Signs and symptoms
  - Initial: Fever, chills, myalgia, malaise, anorexia
  - After 5 days: GI symptoms, such as nausea, vomiting, diarrhea, abdominal pain
  - Other: Headache, conjunctivitis, hiccups, rash, chest pain, shortness of breath, confusion, seizures
  - Hemorrhagic symptoms in 18% of cases (usually occur late)

NETEC

EVD: Differential Diagnosis

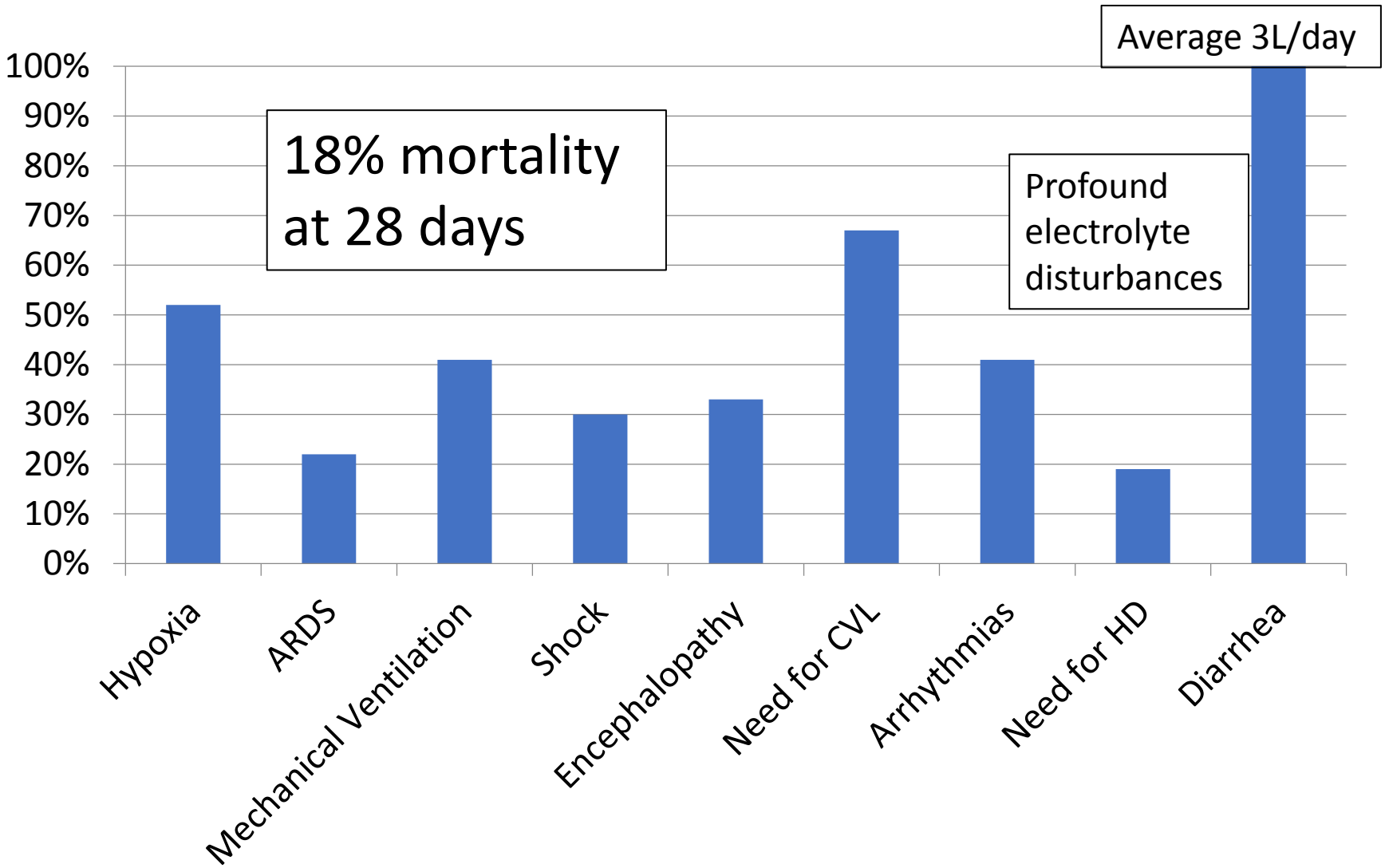
- Initial symptoms are non-specific:
- Other possible infectious causes of symptoms
- Malaria
- Typhoid fever
- Meningococcemia
- Dengue
- Influenza
- Lassa fever
- Sepsis
- Other bacterial infections (e.g., pneumonia, sepsis)
- PCR testing may be negative early in the course of illness

NETEC

EVD: Clinical Features

- Nonspecific early symptoms may progress to:
  - Hypovolemic shock and multi-organ failure
  - Hemorrhagic disease
  - Death
- Non-fatal cases:
  - Typically improve 6–11 days after symptom onset if supportive care is provided promptly
- Fatal disease associated with more severe early symptoms:
  - Fatality rates of 70% have been reported in rural Africa
  - Intensive care, especially early intravenous and electrolyte management, may increase the survival rate

EVD in Well Resourced Environments



Uyeki TM et al. Clinical Management of Ebola Virus Disease in the United States and Europe. N Engl J Med. 2016 Feb 18;374(7):636-46. doi: 10.1056/NEJMoa1504874. PubMed PMID: 26886522; PubMed Central PMCID: PMC4972324.

NETEC

Impact of Nutrition and Electrolytes

- Patients may have marked electrolyte abnormalities and nutritional deficiencies
  - Hypokalemia, hypocalcemia and hyponatremia
  - Both intravenous and oral replacement
  - Used oral nutritional supplements including nutritional drinks high in easily absorbed proteins, minerals and vitamins

- Laboratory testing for chemistries was **critical** to provide supportive care

NETEC

EVD: Managing Critical Illness

- No proven EVD-specific organ support beyond established CCM "best" practices for most infections
- Lung protective ventilation & minimizing sedation as possible
- Target euvolemia
- Nutrition support – early & aggressive

Delivery of critical care requires special consideration/planning

NETEC

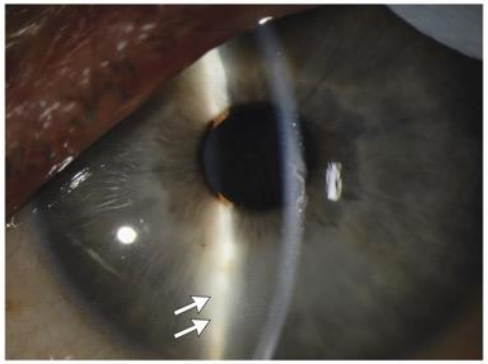
EVD: Recovery

- Case-fatality rate between 50%-70% in the 2014 Ebola outbreak
  - Case-fatality rate is likely much lower with access to intensive care- 18% in resource-rich environments
- Patients who survive often have signs of clinical improvement by the second week of illness
  - Associated with the development of virus-specific antibodies
  - Antibody with neutralizing activity against Ebola persists greater than 12 years after infection

WHO Ebola Response Team. *NEJM* 2014; Feldman H & Geisbert TW. *Lancet* 2011; Ksiazek TG et al. *JID* 1999; Sanchez A et al. *J Virol* 2004; Sobarzo A et al. *NEJM* 2013; Rowe AK et al. *JID* 1999.

EVD: Recovery

- Prolonged convalescence in Ebola
  - Includes arthralgia, myalgia, uveitis, abdominal pain, extreme fatigue, and anorexia; many symptoms resolve by 21 months
  - Significant arthralgia and myalgia may persist for >21 months
  - Depression, headache, skin sloughing, and hair, vision, and hearing loss have also been reported



Slit-Lamp Photograph of the Left Eye 14 Weeks after the Onset of Ebola Virus Disease (Varkey et al, NEJM 2015)

WHO Ebola Response Team. *NEJM* 2014; Feldman H & Geisbert TW. *Lancet* 2011; Ksiazek TG et al. *JID* 1999; Sanchez A et al. *J Virol* 2004; Sobarzo A et al. *NEJM* 2013; Rowe AK et al. *JID* 1999; Varkey et al. NEJM 2015.

Beyond the VHFs: Other Special Pathogens

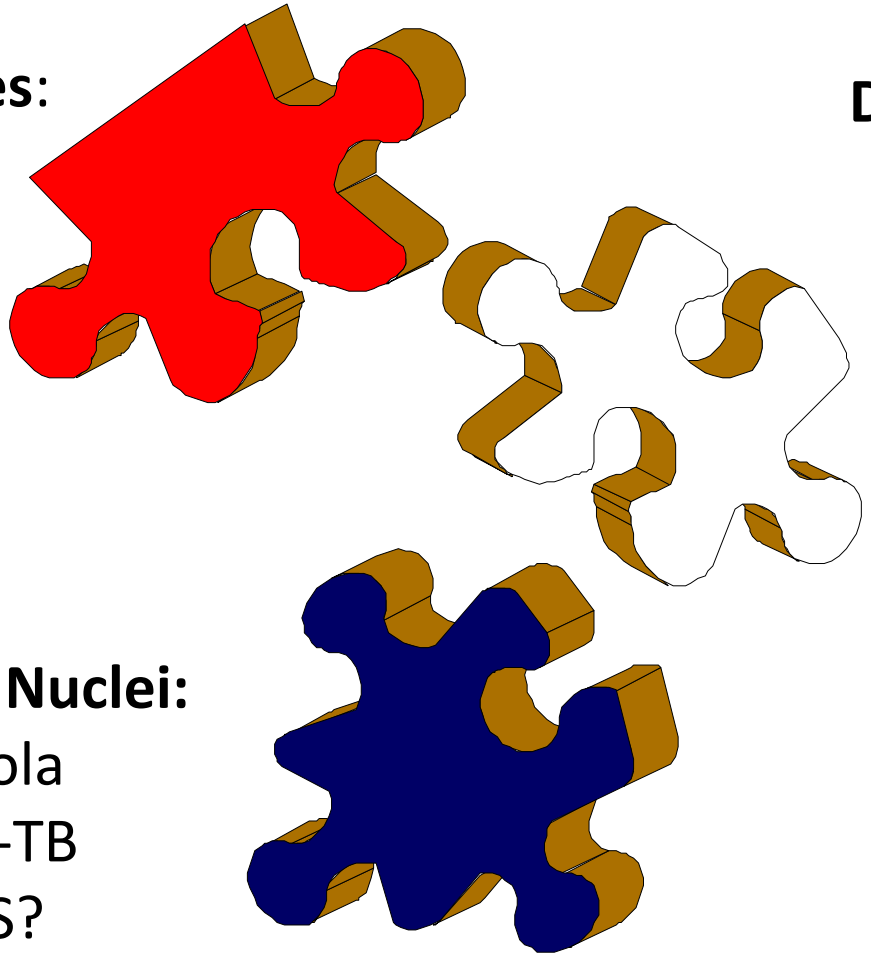
- **Coronaviruses**
  - SARS
  - MERS
- **Henipiviruses**
  - Nipah
  - Hendra?
- **Orthopoxviruses**
  - Smallpox*
  - Monkeypox
- **Highly Pathogenic Avian Influenza (HPAI)**
- **Other novel and pathogenic influenza viruses**
- **Pneumonic Plague**
- **XDR-TB**

*included in the list of BSL-4 pathogens

Mechanisms of Transmission

Contact or Fomites:

- Ebola
- Marburg
- Lassa
- Other VHFs
- Variola
- Monkeypox



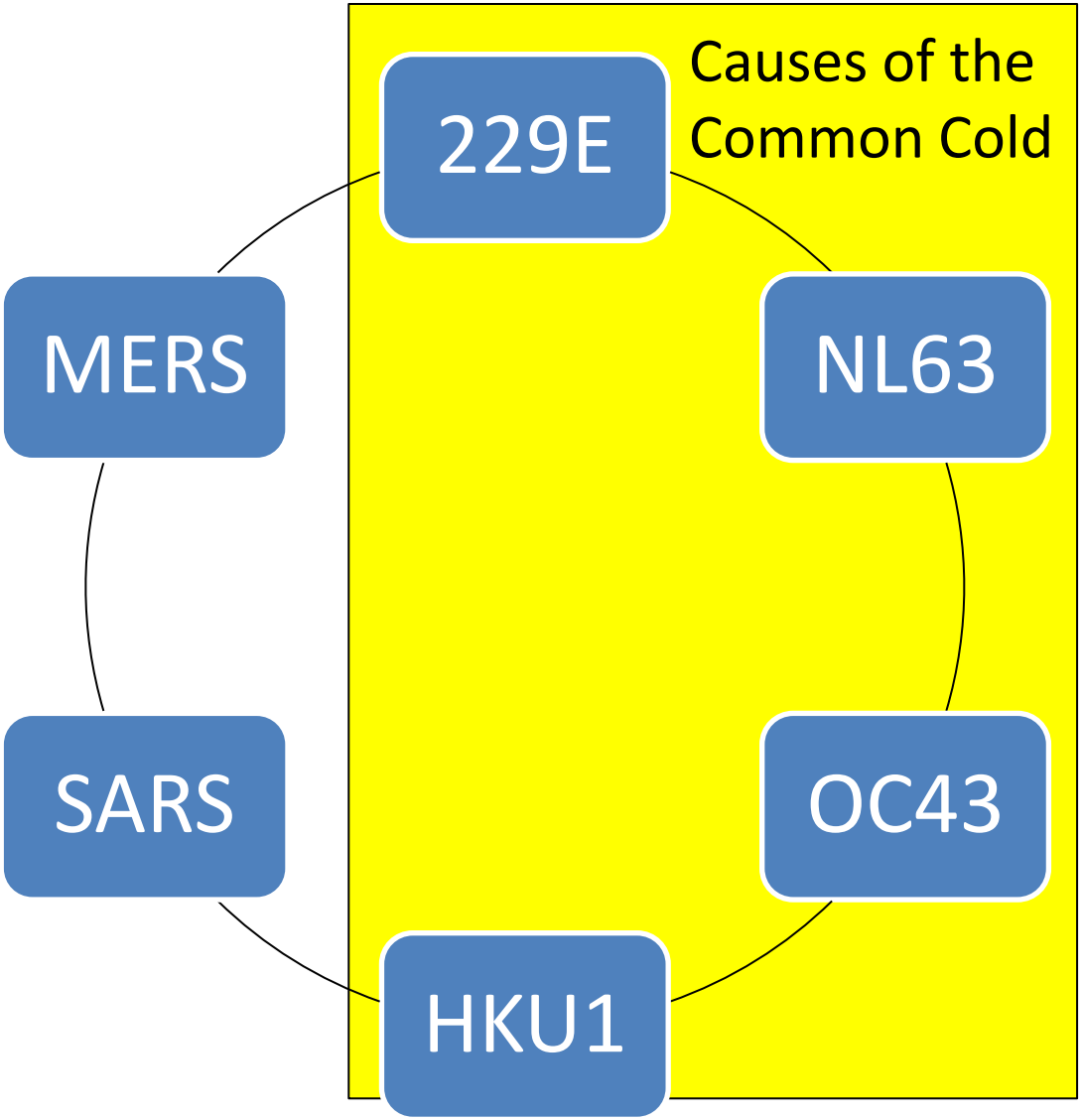
Droplets:

- Ebola
- Marburg?
- Nipah
- Hendra?
- Influenza
- Plague
- Monkeypox

Droplet Nuclei:

- Variola
- XDR-TB
- SARS?
- MERS?

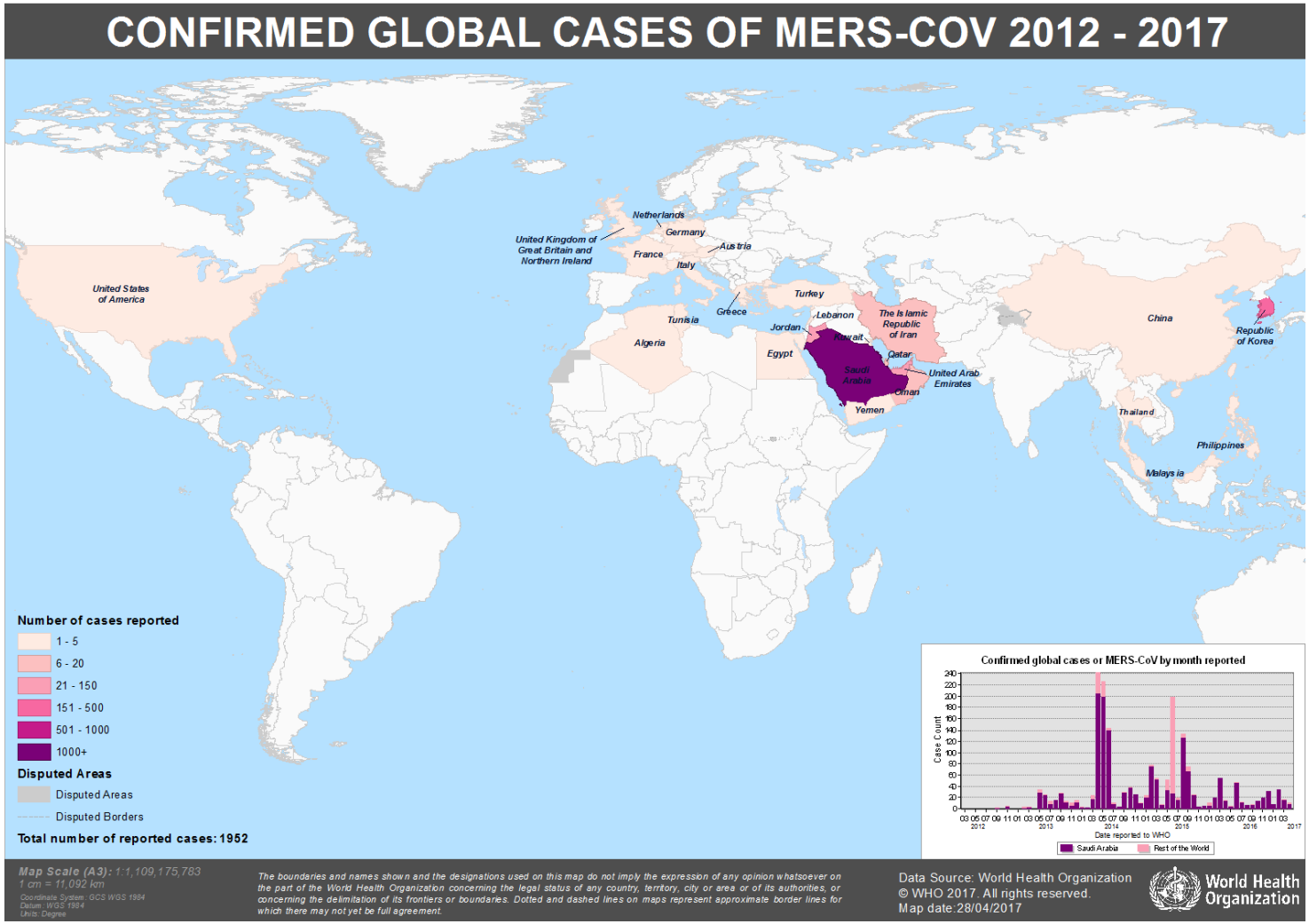
The Coronaviruses



SARS

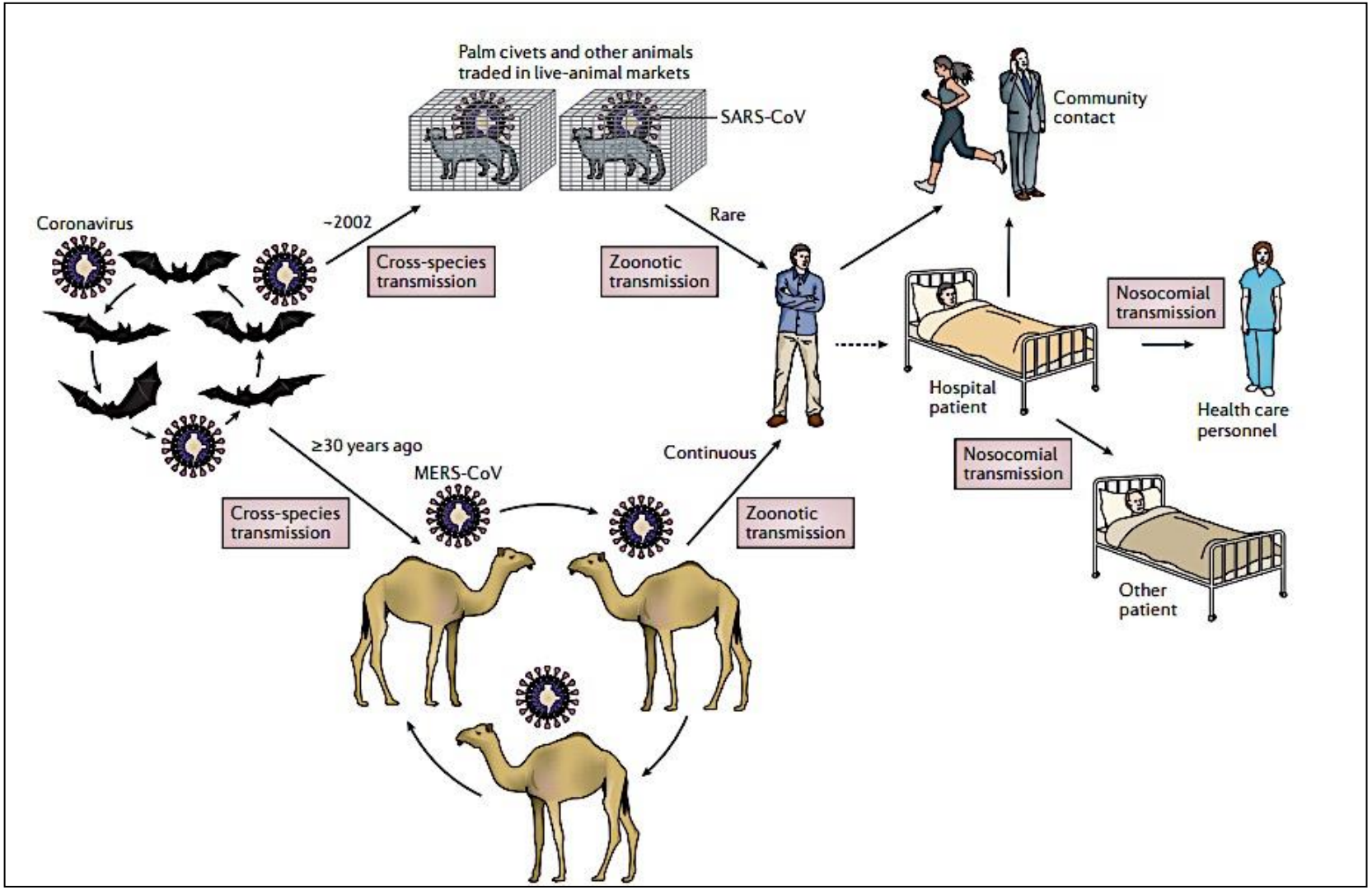
- Produces severe lower respiratory illness
- Appeared in China in 2002
- No reported cases since 2004
- 8273 total cases recorded
  - 775 deaths
  - 27 US cases (no deaths)
- Overall mortality was 9.6%

MERS



http://www.who.int/csr/disease/coronavirus_infections/maps-epicurves/en/. Accessed 16 June 2017

MERS Transmission



de Wit E, van Doremalen N, Falzarano D, Munster VJ. SARS and MERS: recent insights into emerging coronaviruses. Nat Rev Microbiol. 2016 Aug;14(8):523-34. doi: 10.1038/nrmicro.2016.81. Epub 2016 Jun 27. Review. PubMed PMID: 27344959.

MERS Clinical Presentation

Among 47 patients in Saudi Arabia

Symptom	Frequency
Fever	98%
Cough	83%
Shortness of breath	74%
Diarrhea	26%
Myalgias	32%
Abnormal CXR	100%

89% required intensive care
72% required mechanical ventilation

Assiri A et al. Epidemiological, demographic, and clinical characteristics of 47 cases of Middle East respiratory syndrome coronavirus disease from Saudi Arabia: a descriptive study. Lancet Infect Dis. 2013;13(9):752

MERS Clinical Presentation

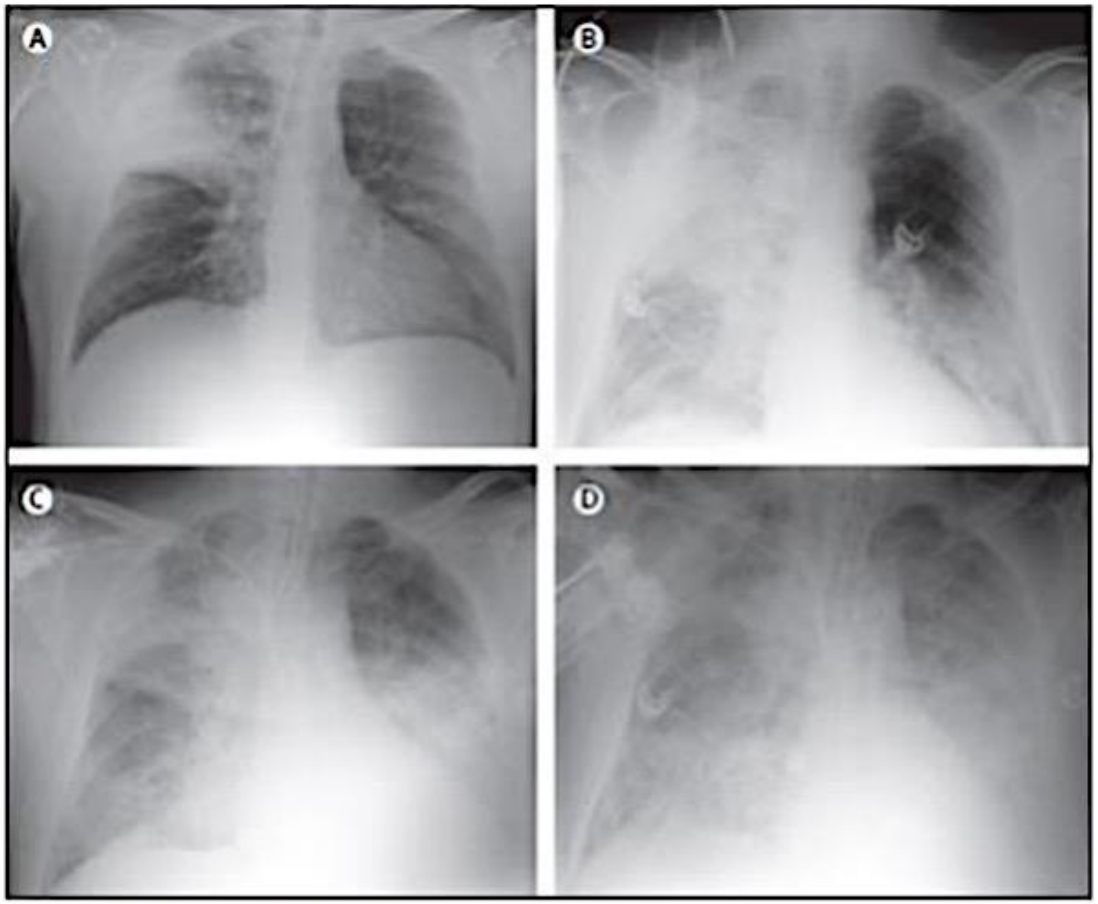
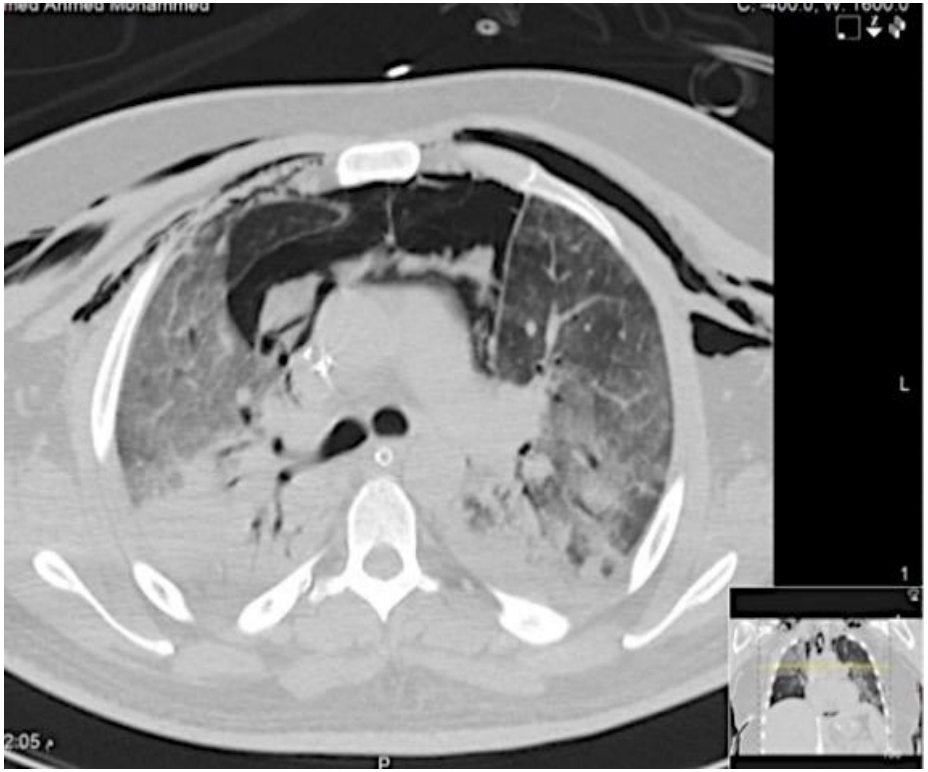


Figure 2: Radiographs of the chest of patient 2
(A) Chest radiograph obtained on May 9 showed a systematic consolidation of the upper right lung lobe. (B) On May 12, ground-glass opacity and consolidation could also be seen in the lower left lobe. Bilateral ground-glass opacities and consolidation were noted afterwards on May 15 (C) and May 17 (D).

- Diagnosis by rRT-PCR
- Samples should be sent from:
  - Lower respiratory tract
  - Upper respiratory tract
  - Serum

Arabi YM et al. Clinical course and outcomes of critically ill patients with Middle East respiratory syndrome coronavirus infection. Ann Intern Med. 2014 Mar 18;160(6):389-97. doi: 10.7326/M13-2486. PubMed PMID: 24474051.

MERS-CoV



Abbas et al, Critical Care Summit, Egypt 2015

NETEC

MERS-CoV Outcomes

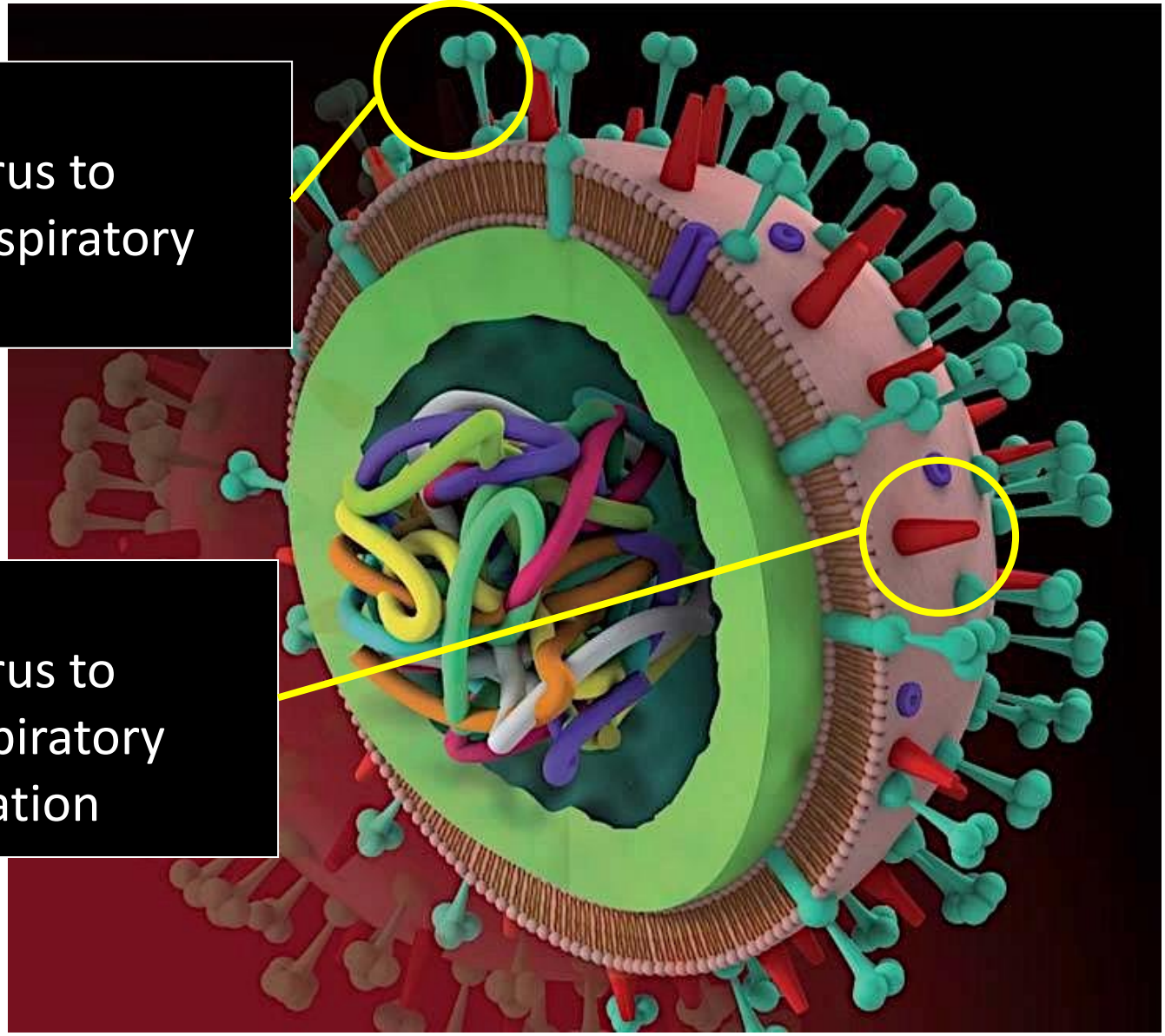
- 2015 confirmed cases reported to WHO since September 2012
- 703 fatalities (35%)
- Milder cases may not be confirmed via testing
- Older age and medical co-morbidities are risk factors for fatal disease

http://www.who.int/emergencies/mers-cov/en/. Accessed 16 June 2017. Gomersall CD, Joynt GM. Middle East respiratory syndrome: new disease, old lessons. Lancet. 2013 Jun;381(9885):2229-30

Influenza Virus

Hemagglutinin
Allows the flu virus to adhere to the respiratory tract

Neuraminidase
Allows the flu virus to escape from respiratory cells after replication

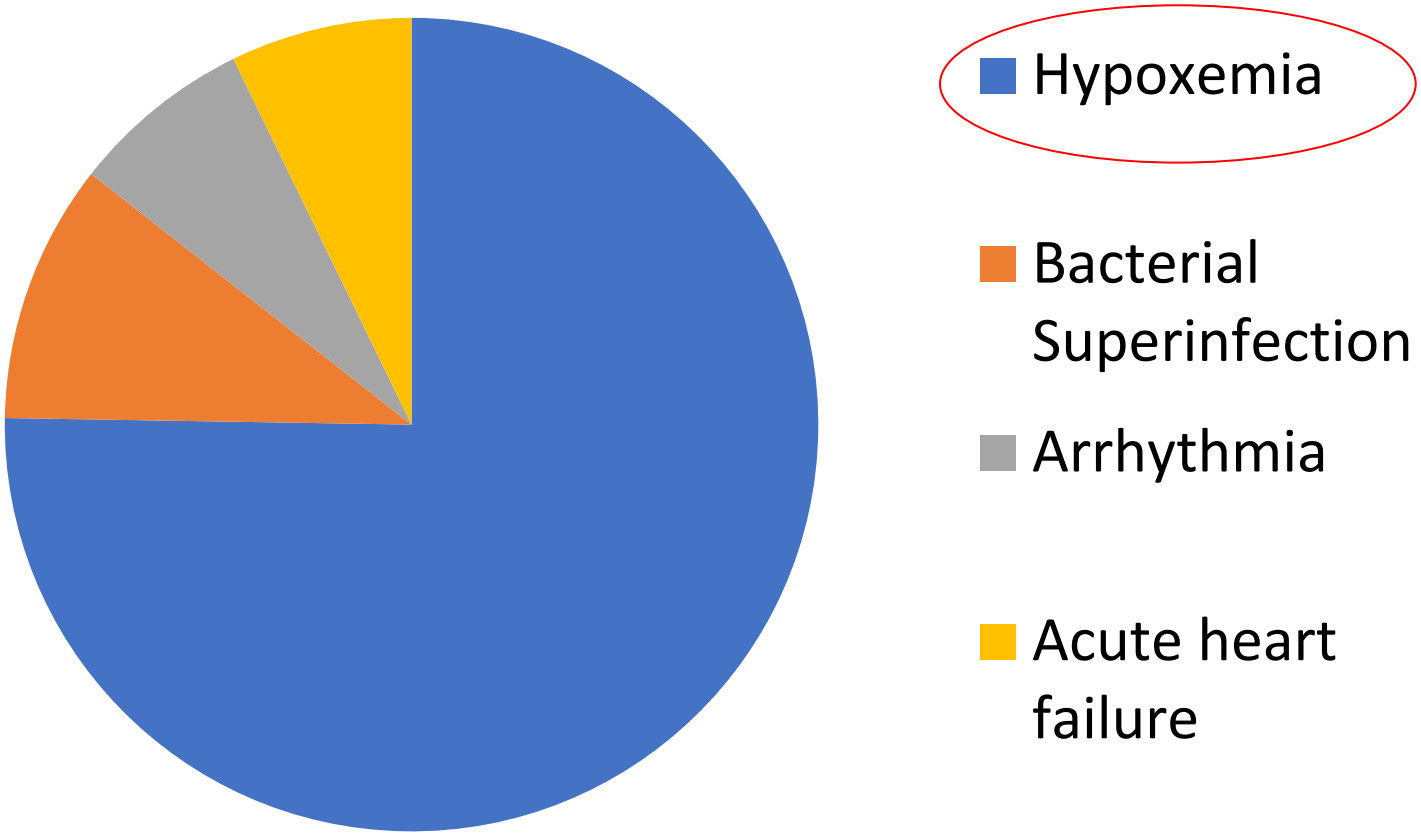


Risk Factors
for Novel Influenza or HPAI

- Pigs harbor human strains
- Pigs harbor avian strains
- Pigs thus serve as “mixing vessels”
- Antigenic shift occurs in the pig
- The fear: a new virus with human affinity and avian mortality

Avian Influenza

Deaths



Gao HN et al Clinical findings in 111 cases of influenza A (H7N9) virus infection. N Engl J Med. 2013 Jun 13;368(24):2277-85. doi: 10.1056/NEJMoa1305584. Epub 2013 May 22.

"The Andromeda Strain"

- Patients with unknown diseases could be admitted to a BCU or ETC
- At the time of their initial outbreaks, these could have been "Andromeda Strains"
    - Nipah
    - Hendra
    - SARS
    - MERS
    - Sin Nombre
    - Many others

Why Emory?

This was not a random act of kindness!

Built in 2002, Emory's Serious Communicable Disease Unit was created to serve our neighbors at the CDC

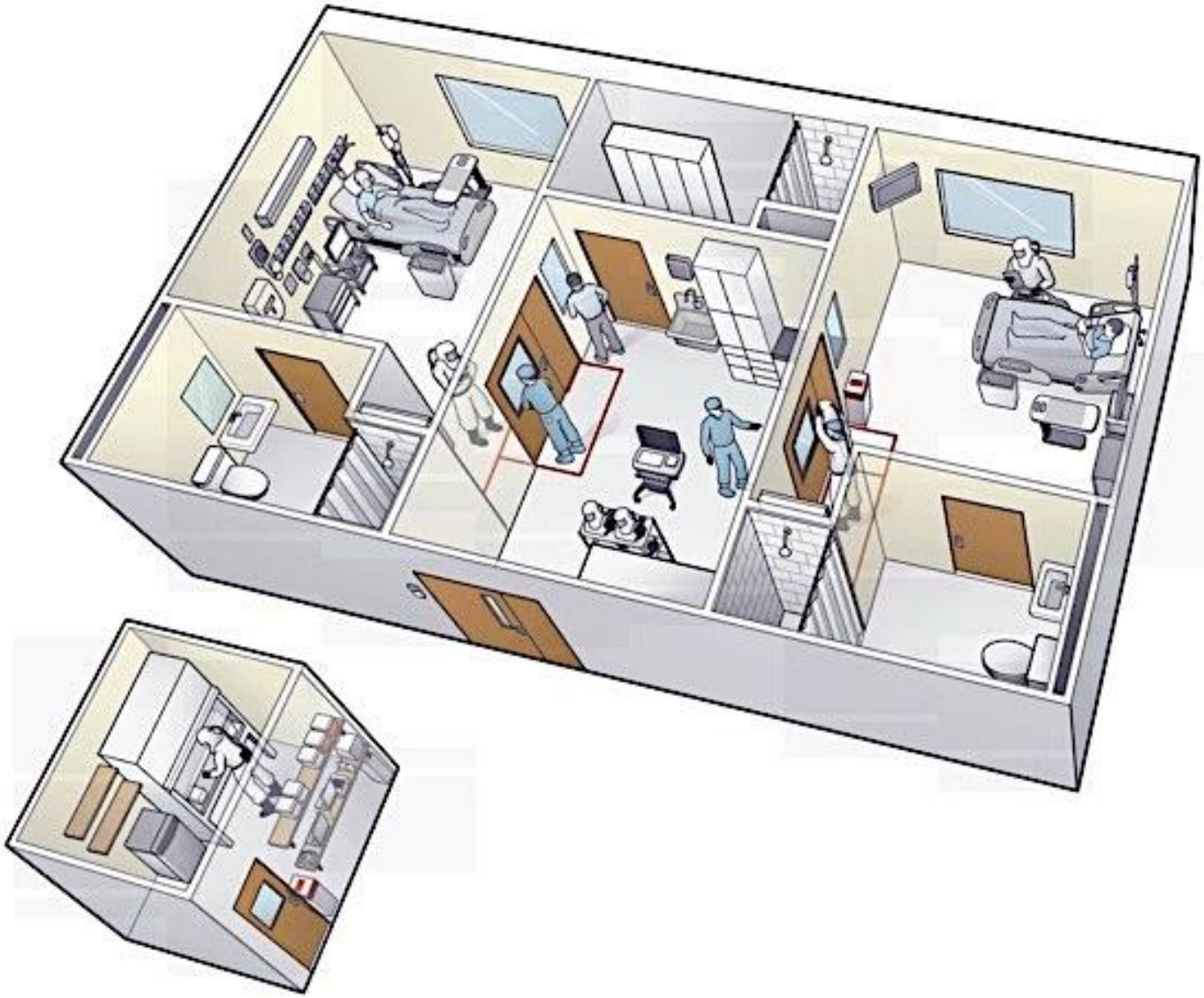
Team of Infectious Disease physicians, nurses and laboratorians on-call 24/7

This pathogen is part of our world, and if we want eradicate these types of potentially fatal diseases before they reach our shores uncontrolled, we have to contribute to the global research effort.

We can either let our actions be guided by misunderstandings, fear and self-interest, or we can lead by knowledge, science and compassion. We can fear, or we can care.

Dr. Susan Grant, Washington Post, August 6, 2014

Emory's SCDU



NETEC

Our Experience

- 36 hours notice of patient arrival
- JIT training and competency demonstration by all caregivers
- Crash course in security, PR, waste handling
- Eventually treated 4 EVD patients, one of whom set the new standard for what care could be safely delivered in a biocontainment unit, especially for a VHF

Lessons 1 - Emory

- **Teams and Teamwork**
  - Witnessing competency helped build trust
  - Diversity was a plus – different specialties of nurses/MD's
  - Clearly defined roles helped – rotation of equals

- **Communication** – scheduled, open, inclusive
  - Lack of hierarchy
  - Diverse institutional support – chaplain, EAP, security
  - Impossible act to follow – returning to home units hard

Lesson 2 PPE

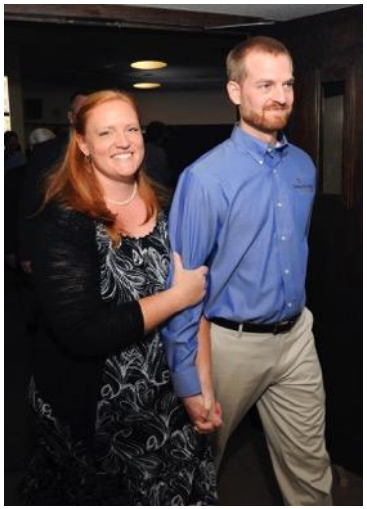
- PPE is not intuitive. We make dangerous errors every day.
- PPE, at least for special pathogens, is NOT something we do every day
- How we **behave** in PPE and how we **remove** PPE, is more important than what our chosen ensemble looks like

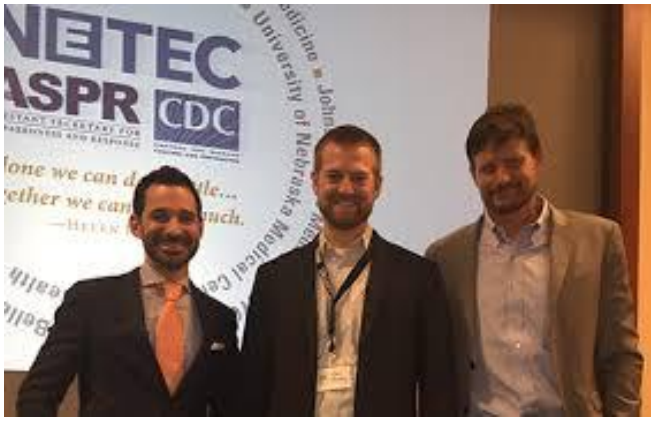
Lesson 3 The Unknown

We didn't know much about what Ebola would look like in a real patient, in a US healthcare setting.

- Electrolyte abnormalities despite the ability to replace
- Inability to leave patient alone
- Deconditioning
- Never thought I would wish for a cholera cot
  - Patients can (and will!) suddenly vomit, stool, cough, sneeze
  - Droplets of all that liquid will slowly settle on you and your environment

Lessons 4 Humility





We could not forget this:

All of our patients were healthcare providers

Who had no idea how they had contracted the virus

NETEC

Lesson 5 PUI's

PUI's in Georgia:

- **2,960** travelers monitored (as of 03/24/16)
- **6 high-risk** returning healthcare workers quarantined
- **32 some-risk** returning healthcare workers directly monitored

NETEC

PUI's

Ill Travelers:

- 44 required medical evaluations
- 8 were tested for Ebola Virus Disease (**all negative**)
- Diagnoses**:** Viral upper respiratory infection (11), flu (8), traveler's diarrhea (8), malaria (6), other (sinusitis, pregnancy, miscarriage, chronic disease exacerbation, stroke, HIV, parasitic infection)

Lesson:

- 99.9% Won't have a special pathogen, BUT
- They can and will have something else that could kill them
- Figure out NOW how you will deliver care until diagnosis is known

Nebraska Experience

- Homeland Security – A new Federal agency
- Monkey Pox – Healthcare Workers afraid to care for patients
- SARS – Emerging diseases are a threat to Public Health

Visits to Other Units

USAMRIID - Emory

NBU Features

- Five double occupancy patient care rooms
- Negative air handling system with no fewer than 20 air exchanges per hour - with no recirculation of air
- All exhaust air is HEPA filtered before being exhausted outside
- Exhaust air is located more than 25 feet fron building openings
- Waste stream – Dual effluent pass through autoclaves
- Highly trained staff who meticulously adhere to NBU protocols

NETEC

NBU Team

NBU Staff

Physicians

Registered Nurses

Respiratory Care Practitioners

Patient Care Technicians

Nursing Skills/ Specialties

Critical Care /Medical/ Surgical

Operating Room/ Procedural

Infusion Services / Emergency/ Trauma Care/ Cardiac Telemetry/ Perfusionists

Labor and Delivery /Pediatrics

Core Support Staff

Critical Care/ Consulting Medical Team

Public Health/ Core Lab Scientists

EVS / Failities / Security / Supply Analysts

Administrative Staff Assistants

Diagnostic

Team Work

Training

- Pediatrics – Adult
- Competency based
- Skill training
  - While wearing PPE
  - Emphasis on preventing cross contamination
- Shared governance

Drills

- Involve other departments
- Involve the entire team
- PPE

Sharing Lessons

OR Manager Inc

OR Manager
Vol. 31 No. 4
April 2015

Patient safety

Ebola surgical protocols enhance safety of patients and personnel

In the months since Ebola patients were first treated in US hospitals, much progress has been made in establishing protocols to protect patients and healthcare workers from harm.

Though the number of Ebola patients in the US remains small compared with the thousands in African countries, the disease continues to claim lives. At press time, four Americans who may have been exposed to the Ebola virus in Sierra Leone were under observation at Nebraska Medicine in Omaha, and one who had contracted Ebola was being treated at the National Institutes of Health Clinical Center in Bethesda, Maryland. According to the Centers for Disease Control and Prevention (CDC), state health officials have identified and designated 54 hospitals as Ebola treatment centers. These centers supplement the three national biocontainment centers at Nebraska Medicine, Emory University Hospital in Atlanta, and the National Institutes of Health.

In addition to the designated treatment centers, the CDC has been working with state and local public health officials to identify Ebola assessment hospitals for those individuals being actively monitored who may or may not develop symptoms of Ebola.

Shelly Schwedhelm, MSN, RN

The Department of Health and Human Services has made funding available for Ebola preparedness that includes Ebola treatment and assessment hospitals (http://www.grants.gov/view-opportunity.html?oppId=274709).

"Every state is now looking at which hospitals have the infrastructure to serve as Ebola assessment hospitals," Shelly Schwedhelm, MSN, RN, executive director, emergency preparedness and infection prevention at Nebraska Medicine, told OR Manager. Those hospitals will evaluate and care for a patient under investigation (PUI) for a period of time until Ebola is either ruled in or ruled out.

"This can be challenging," she says, "because as soon as someone has symptom onset, it can be another 72 hours before the virus would be at a level in their blood to test positive."

If Ebola is ruled out, the PUI will go home. If Ebola is ruled in, the patient will be transported from the assessment hospital to an Ebola treatment center.

"All of these new protocols, guidelines, treatment centers, and assessment centers have sprung up just in the past several months," says Schwedhelm, a former OR Manager of the Year. "Now managers have to start thinking about what will be next."

What if a patient under investigation to rule out Ebola diagnosis is in need of an emergent surgical procedure?

Surgical protocol

Perioperative leaders need to proactively prepare for a PUI who may need an emergent surgical procedure, says Schwedhelm.

Numerous ethical and clinical considerations must be weighed in order to make a sound decision about whether to proceed with an emergent surgical intervention, she says.

Copyright © 2015. Access Intelligence. All rights reserved. 888/707-5814. www.ormanager.com

Activations

September 5, 2014

Day #8 of illness

Discharged on hospital day #21

October 6, 2014

Day # 6 of illness

Discharged on hospital day #17

November 15, 2014

Day # 13 of illness

Multi-organ failure on admission

Died on hospital day #3

Was It What We Expected?

Transport

NETEC

Nursing Care in the NBU

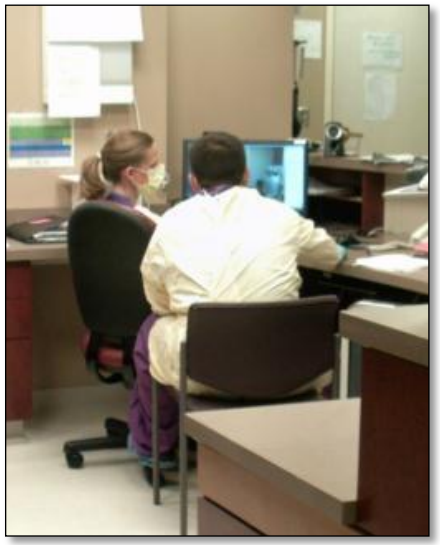
Was not significantly different than caring for a patient in any other unit

- Chart in the EHR
- Nursing care plan
- Patient education
- Coordinate all care needs
- Bar-code scan Medications
- Process and complete medical orders
- Count the Narcotics in the Automated Dispensing System
- Consult and communicate with the medical team
- Provide support to the patient's family

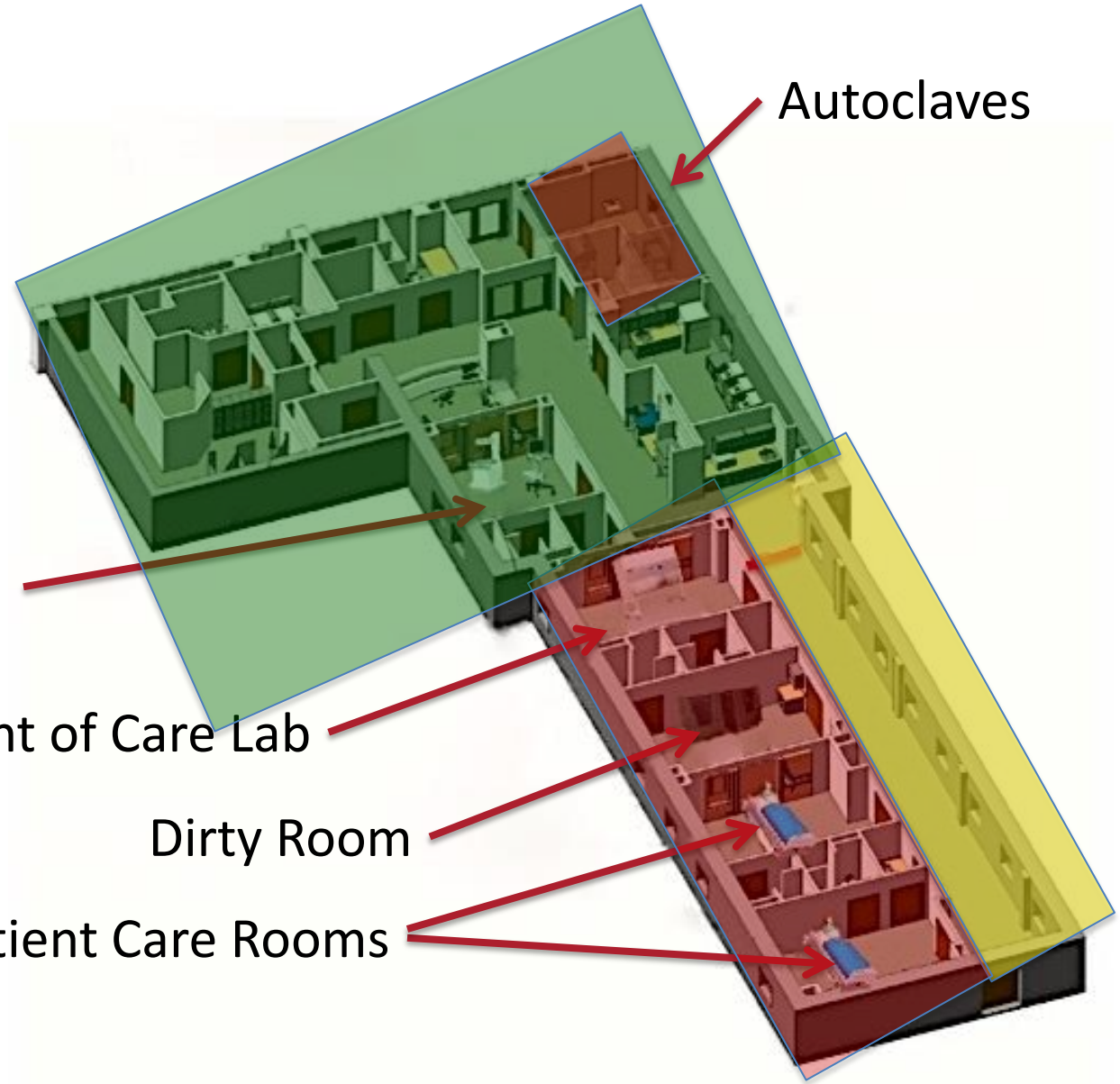
The difference is adhering to strict Infection Control Procedures

Infection Control Procedures

- Donning and Doffing PPE procedures
- Designated donning and doffing PPE areas
- Daily cleaning checklists with dedicated cleaning equipment for each zone
- A method for communication
- Designated **Hot**, **Warm** and **Cold** zones
- Designated pathways for all tasks i.e. waste



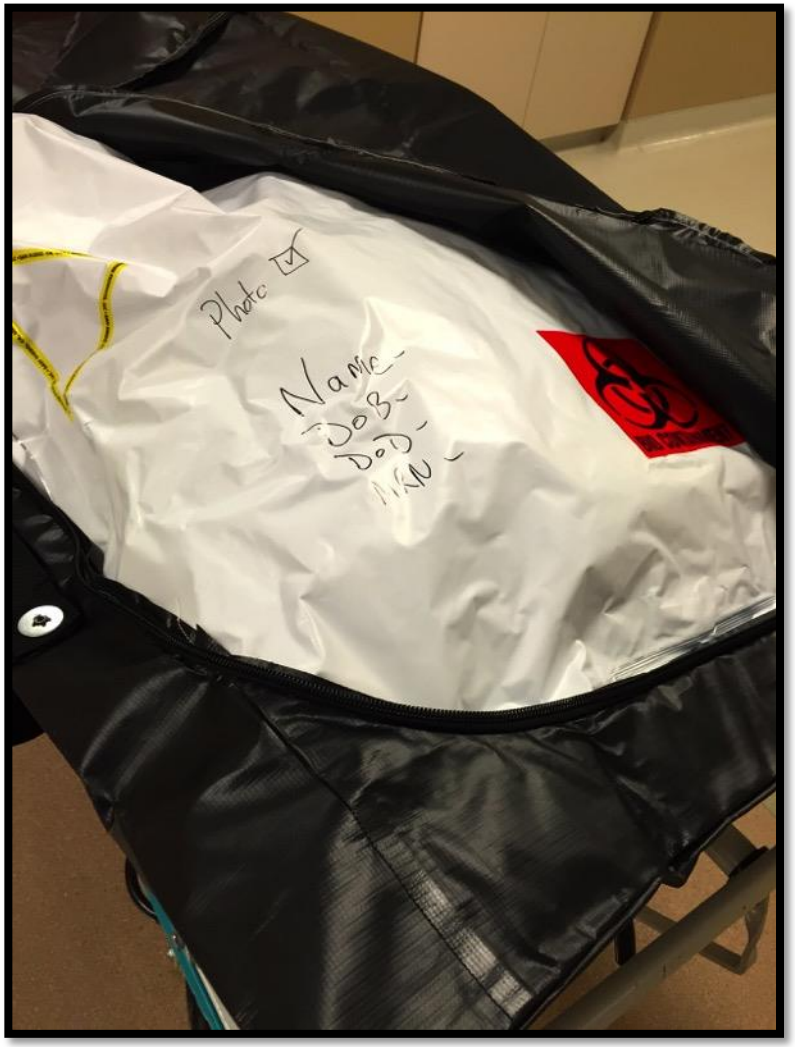
NBU Ebola Activations Layout



Waste

Activation	Containers	Cubic Feet	Weight (lbs)
1	101	464.4	1011.5
2	88	387.2	1806.5
3	34	156.4	880.2

Deceased Care



- Protocol
- Training
- MOU
- State and Local Public Health involvement

NY Experience

The Ebola Preparedness & Response Paradox

- Low patient count
- High resource demand
- Low resource capacity
- High risk perception
- No experience

NETEC

NYC Health + Hospitals Mission

- **To extend equally** to all New Yorkers, **regardless of their ability to pay,** comprehensive health services of the highest quality in an atmosphere of humane care, dignity and respect.
- **To promote and protect,** as both innovator and advocate, the health, welfare and safety of the people of the City of New York.
- **To join with other health workers and with communities** to promote and protect health in its fullest sense – the total physical, mental and social well-being of the people

NETEC

NYC Health + Hospitals Experience

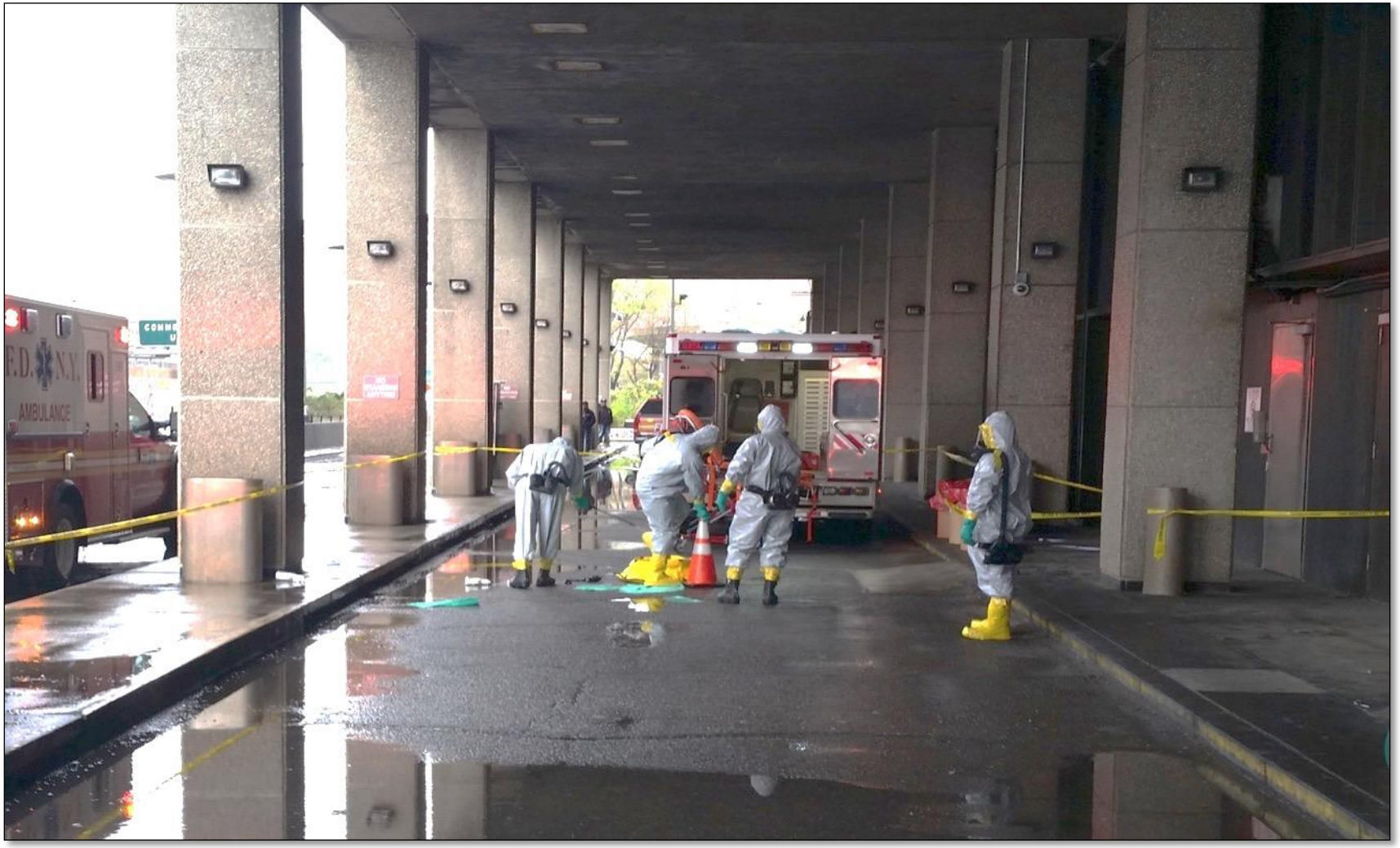
- One patient with confirmed EVD
- 19 persons under investigation (PUI)
  - 4 pediatric PUIs

NETEC

Key to Success

- Single, system-wide tiered plan
  - Patient recognition, evaluation & treatment
    - Personal Protective Equipment (PPE)
    - Labs
    - Transfer / transport
  - Logistics / Supply Chain
  - Training
  - Exercises

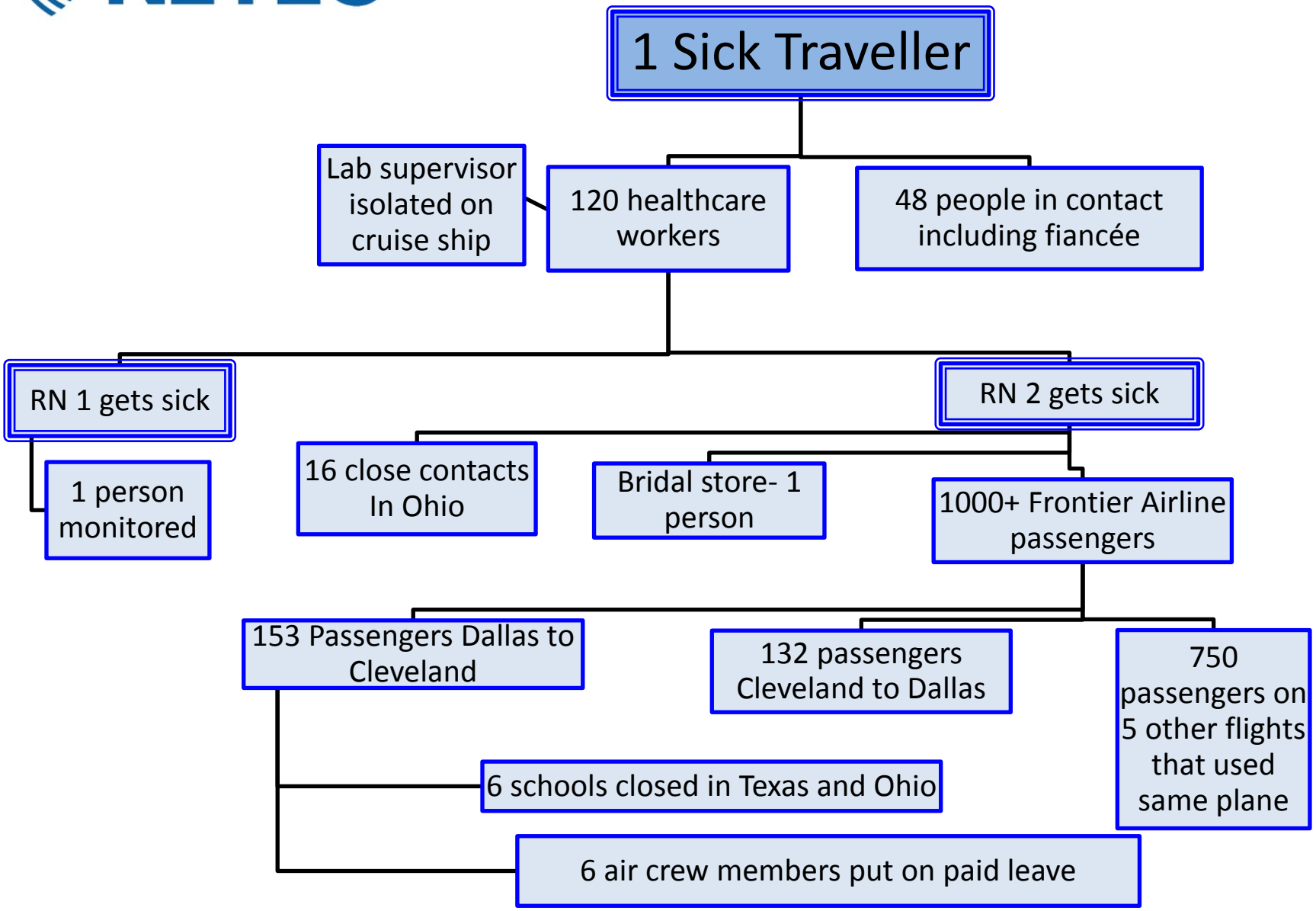
NETEC



Strategies to Sustain Infectious Disease Preparedness

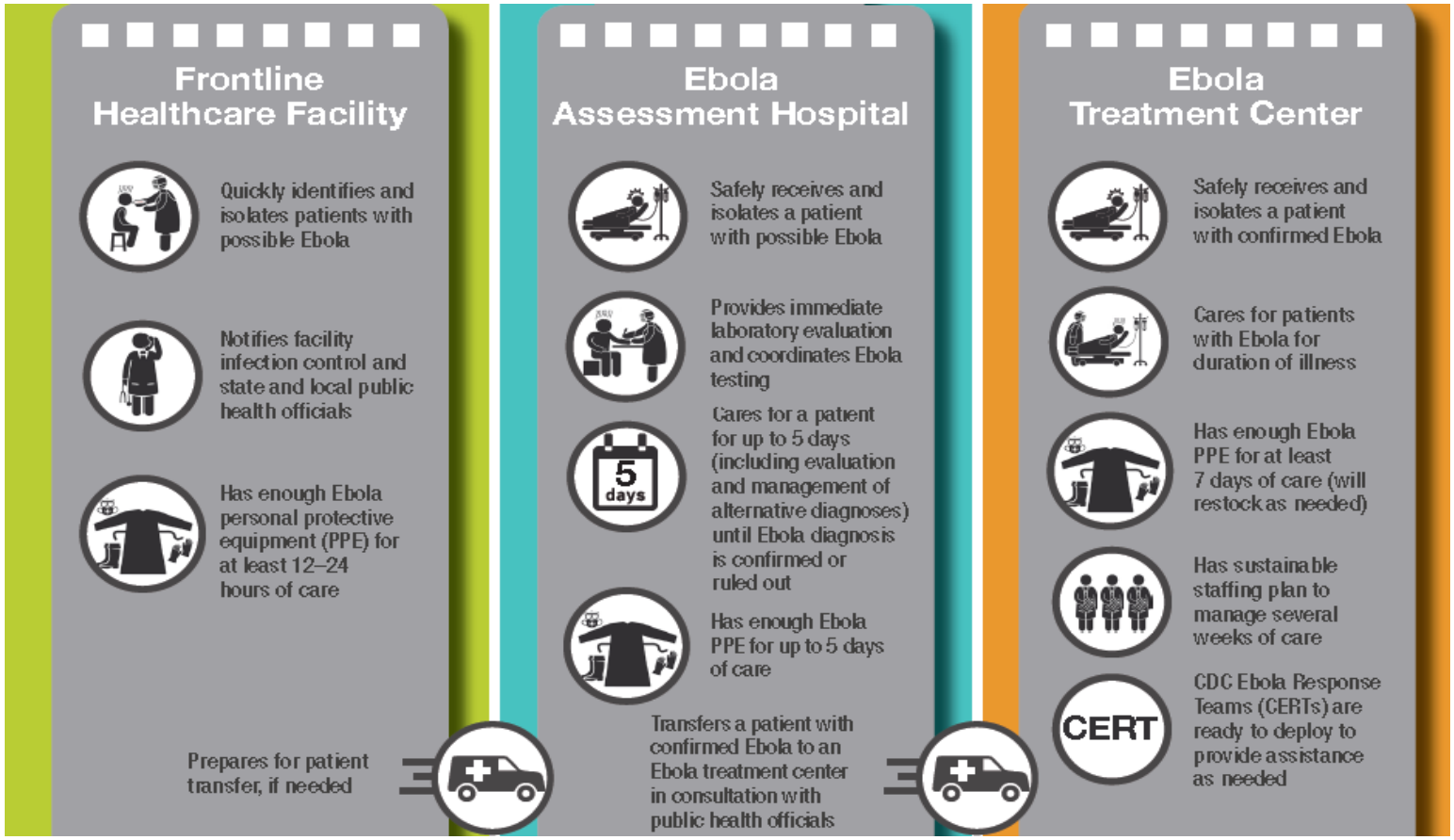
https://youtu.be/q9dngzXwtaQ

NETEC


1 Sick Traveller
Lab supervisor isolated on cruise ship
120 healthcare workers
48 people in contact including fiancée
RN 1 gets sick
RN 2 gets sick
1 person monitored
16 close contacts In Ohio
Bridal store- 1 person
1000+ Frontier Airline passengers
153 Passengers Dallas to Cleveland
132 passengers Cleveland to Dallas
750 passengers on 5 other flights that used same plane
6 schools closed in Texas and Ohio
6 air crew members put on paid leave

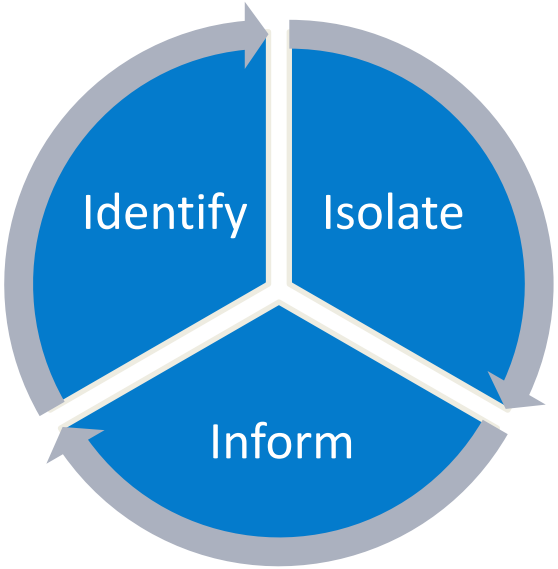
NETEC

A National Framework



Coordinated Networked Approach

NETEC



Identify, Isolate, Inform: Emergency Department Evaluation and Management of Patients Under Investigation for Ebola Virus Disease

1 Identify exposure history:
Has patient lived in or traveled to a country with widespread Ebola transmission or had contact with an individual with confirmed Ebola Virus Disease within the previous 21 days?

NO → Continue with usual triage and assessment

YES ↓

2 Identify signs and symptoms:
Fever (subjective or ≥100.4°F or 38.0°C) or Ebola-compatible symptoms: headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain, or hemorrhage

NO →
A. Continue with usual triage and assessment
B. Notify relevant health department
C. Monitor for fever and symptoms for 21 days after last exposure in consultation with the relevant health department

YES ↓

3 Isolate and determine personal protective equipment (PPE) needed
Place patient in private room or separate enclosed area with private bathroom or covered, bedside commode. Only essential personnel with designated roles should evaluate patient and provide care to minimize transmission risk. The use of PPE should be determined based on the patient's clinical status:
- Is the patient exhibiting obvious bleeding, vomiting, copious diarrhea or a clinical condition that warrants invasive or aerosol-generating procedures (e.g., intubation, suctioning, active resuscitation)?

YES →

4 Inform
A. IMMEDIATELY notify the hospital infection control program and other appropriate staff
B. IMMEDIATELY report to the health department

NO →
For clinically stable patients that do not have bleeding, vomiting, or diarrhea, healthcare workers should use PPE outlined in CDC's guidance found here: http://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance-clinically-stable-pts.html

YES →
A. Use PPE designated for the care of hospitalized patients http://www.cdc.gov/vhf/ebola/hcp/procedures-for-ppe.html
B. If the patient requires active resuscitation, this should be done in a pre-designated area using pre-designated equipment.

5 Further evaluation and management
A. Complete history and physical examination; decision to test for Ebola should be made in consultation with relevant health department
B. Perform routine interventions (e.g. placement of peripheral IV, phlebotomy for diagnosis) as indicated by clinical status
C. Evaluate patient with dedicated equipment (e.g. stethoscope)

Developed in collaboration with American College of Emergency Physicians and Emergency Nursing Association

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

Identify Early!

Resources

- Facility Infection Prevention
- Local and State Health Departments
- CDC Current Outbreak List

http://www.cdc.gov/outbreaks/

- Health Alert Network Network (HAN)

http://emergency.cdc.gov/han/hantable.asp

- World Health Organization Disease Outbreak News (DONs)

http://www.who.int/csr/don/en/

Sustaining Readiness – Training Requirements

Regional ETC

- Rostered staff are to receive quarterly training in infection control, safety, and patient care
- Rostered staff are to receive JIT refresher training within 72 hours when activated

State-Designated ETC

- Rostered staff trained in safely donning and doffing PPE

Sustaining Readiness – Training Requirements

Assessment hospitals

- ED staff trained at least annually in infection control and safety
- ICU staff trained at least annually in infection control and safety

Frontline Facilities

- Not clearly defined
- Annual training
- Ensure knowledge of available resources

NETEC: http://netec.org/

Thank you!