Welcome to the Emory SCDP ECHO "Defining a Special Pathogen"

The session will begin soon.

EMORY

Serious Communicable Diseases Program

NETEC

Project ECHO

Southern Regional Disaster Response System
HHS Region 4

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For educational and quality improvement purposes, we will be recording this video session. By participating in this clinic you are consenting to be recorded – we appreciate and value your participation.

Project ECHO® collects registration, participation, questions/answers, chat comments, and poll responses for some teleECHO® programs. Your individual data will be kept confidential. These data may be used for reports, maps, communications, surveys, quality assurance, evaluation, research, and to inform new initiatives.

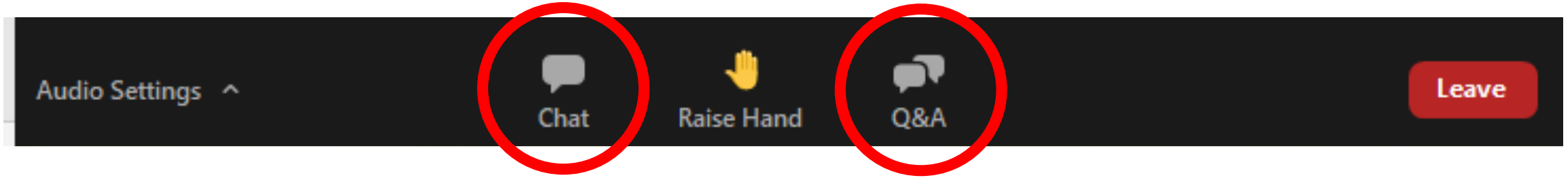
If you have any questions or concerns about this ECHO program, please email scdp.echo@emory.edu.

About this ECHO Program

- ECHO stands for “Extension for Community Healthcare Outcomes”
- Telementoring model, in which expert teams lead virtual clinics, amplifying the capacity for providers to deliver best-in-practice care to their own communities
- This ECHO program meets every other Thursday and discusses bioprepardness topics and special pathogens
- Sessions are recorded and published as a podcast- subscribe so you never miss an episode!

Reminders

- Experiencing IT issues? Send a message to IT ECHO in the Zoom chat.
- If you would like to ask a question, type it into the Q&A feature.



Continuing Education Accreditation

- In support of improving patient care, this activity has been planned and implemented by Emory University and Project ECHO® . Project ECHO® is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

AMA Designation Statement

- Project ECHO® designates this live activity for a maximum of 1.0 *AMA PRA Category 1 Credit™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

ANCC Designation Statement

- Project ECHO® designates this live activity for a maximum of 1.0 ANCC contact hour. Nursing contact hours will be awarded for successful completion of program components based upon documented attendance and completion of evaluation.

Disclosures

Project ECHO®, in compliance with the ACCME Standards for Integrity and Independence in Accredited Continuing Education, requires that anyone who is in a position to control the content of an educational activity disclose all relevant financial relationships they have had within the last 24 months with an ineligible company.

None of the planners and presenters for this educational activity have relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

	Nature of Relationship	Name of Ineligible Company
Angela Hewlett, MD, MS	Consultant	ForeCast Orthopedics
	Researcher	Mapp Biopharmaceutic

All of the relevant financial relationships listed for this individual have been mitigated.

PRESENTERS

Jill Morgan, RN, BSN

Marshall Lyon III, MD, MMSc

PLANNING COMMITTEE

Gavin Harris, MD

Aneesh Mehta, MD

Sharon Vanairsdale, DNP, APRN, ACNS-BC, NP-C, CEN, FAEN, FAAN

Allison Klajbor, MBA

Yasmin Thornton, MPH

Agenda

- Welcome & Introductions
- HHS Region 4 Situation Report
- Poll Questions
- Case Presentations
- Case Discussions
- Q&A
- Closing Remarks & Poll Question

Expert Panelist

Jill Morgan RN, BSN

- Member of Emory's Serious Communicable Disease Unit (SCDU) for more than fifteen years and cared for all four of Emory's Ebola virus disease patients
- Involved in clinical research, National Institute for Occupational Safety and Health (NIOSH), the National Personal Protective Technologies Laboratory (NPPTL), and PPE standards organizations - American Society for Testing and Materials (ASTM) and Association for the Advancement of Medical Instrumentation (AAMI)
- Serves as the in-person education lead for the National Emerging Special Pathogens Training and Education Center (NETEC)
- Sponsors biomedical engineering students from GA Tech in their capstone projects

Expert Panelist

Marshall Lyon, MD, MMSc

- Professor of Medicine at Emory University School of Medicine, and Director of Transplant Infectious Diseases
- Previously served as the CDC Epidemic Intelligence Officer, from 1998-2000
- Experience caring for Ebola Patients
- Has an active clinical research program - investigating novel therapies for fungal infections, cytomegalovirus, and COVID-19
- Has authored over 90 publications, books, and book chapters

Expert Panelist

Angela Hewlett, MD, MS

- Professor of Internal Medicine and Infectious Diseases at the University of Nebraska Medical Center (UNMC), and the University of Nebraska College of Public Health
- George W. Orr and Linda Orr Chair in Health Security
- Serves as Medical Director of the Nebraska Biocontainment Unit, where she actively participated in the care of several patients with Ebola virus disease
- Has provided subject matter expertise through the National Emerging Special Pathogens Training and Education Center (NETEC), the SHEA/CDC Outbreak Response Training Program, and multiple other national and international bio-preparedness advisory groups and venues
- Has authored more than 100 publications and book chapters.

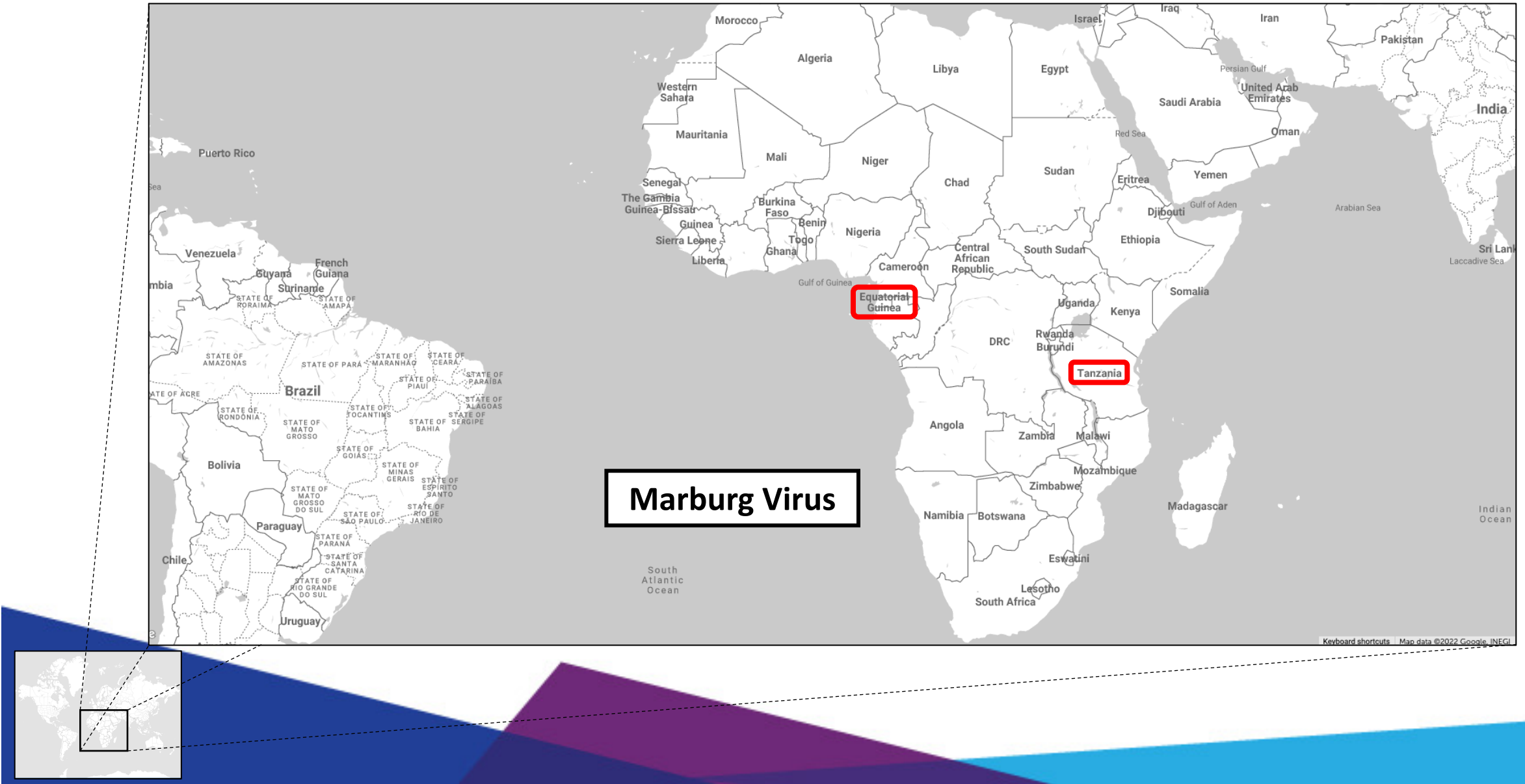
Region 4
Special Pathogens of Concern Situation Report

13 April 2023

EMORY UNIVERSITY
Serious Communicable Diseases Program

Southern Regional Disaster Response System
HHS Region 4

Situation Report 13 April 2023



Situation Report 13 April 2023

Situation Report 13 April 2023

https://scdu.emory.edu

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Poll Questions

Case #1

Gavin Harris, MD

First, Some Terminology

- Alignment of terminology is challenging
- Distinction between “pathogen” and “disease”
  - High-consequence pathogen vs. special pathogen
  - Causes a life-threatening disease/presents a serious hazard in a healthcare setting, requires specific advanced prevention and control measures
  - High-consequence infectious disease

HPI

- CC: fever, malaise, headaches x 4 days
- Brief HPI: 21F w/ no pmhx, no allergies, no medications presenting to the ED for above complaints
- Nursing student returning from a medical mission to Uganda 9 days prior

HPI

- Recently had provided over one week of care to several patients initially thought to have presumed sepsis
- Symptoms rapidly developed at home including fever to 103.4F, abdominal pain, emesis
- Initial examination revealed an acutely ill woman with tachycardia, tachypnea, hypotension a/w pancytopenia, hypokalemia, hypomagnesemia, acute kidney injury, elevated transaminases

Questions, questions…

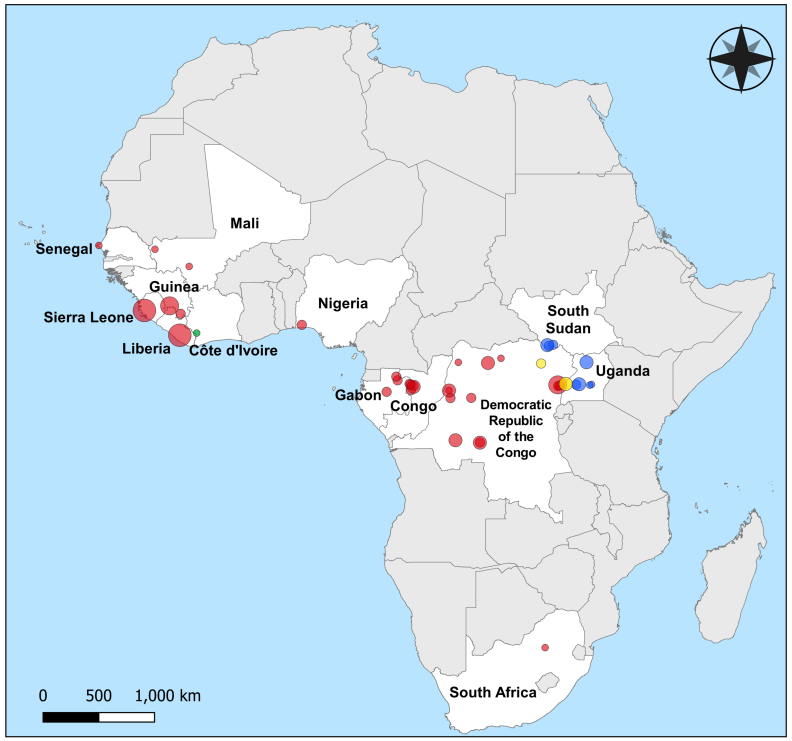
- What is in the differential?
- What can you test for safely?
- What information would help you make the next decision?
- Who might be the best resource for assistance?

Patient Results

- Plasmodium falciparum RDT ***positive***
- Initial Warrior Panel test ***positive*** for EBOV
- Confirmatory RT-PCR testing at CDC ***positive*** for EBOV

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%



Ebola Virus Disease

Ebola Virus Species	Vaccine
Ebola virus *(Zaire ebolavirus)*	YES
Sudan virus *(Sudan ebolavirus)*	IN DEVELOPMENT
Taï Forest virus *(Taï Forest ebolavirus)*	NO
Bundibugyo virus *(Bundibugyo ebolavirus)*	NO
Reston virus *(Reston ebolavirus)*	NO
Bombali virus *(Bombali ebolavirus)*	NO

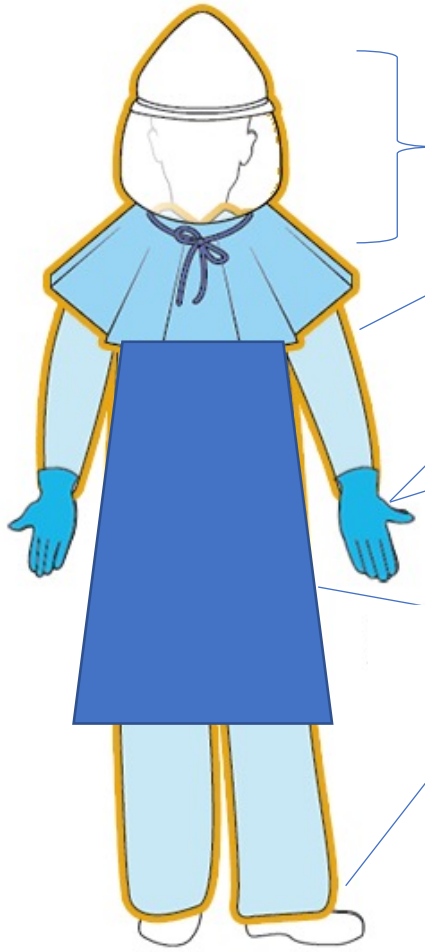
Therapeutic	Special Pathogen Target
BCX4430 Galidesivir – PI	MARV
MBP091 – pre-clinical	MARV
MBP134 – PI	SUDV
(ZMAPP – PII/III	EBOV)
Inmazeb – Licensed (REGN)	EBOV*
Ebanga – Licensed (MAb114)	EBOV*

Considerations for Discussion – Ebola Virus Disease

- What personal protective equipment /infection prevention measures are needed?
- What do you do with the waste generated by a patient with a suspected or confirmed viral special pathogen?
- What is the best environment in which to manage our patient in question?

Viral Hemorrhagic Fever PPE

Acute (Wet)Phase and Body Fluid Exposure



Surgical hood (extends to shoulders)
Respirator or PAPR with full face shield, and helmet

Impermeable gown or coverall

2 pair of gloves
Outer gloves must have extended cuffs

Single use fluid resistant apron
covers torso to mid-calf

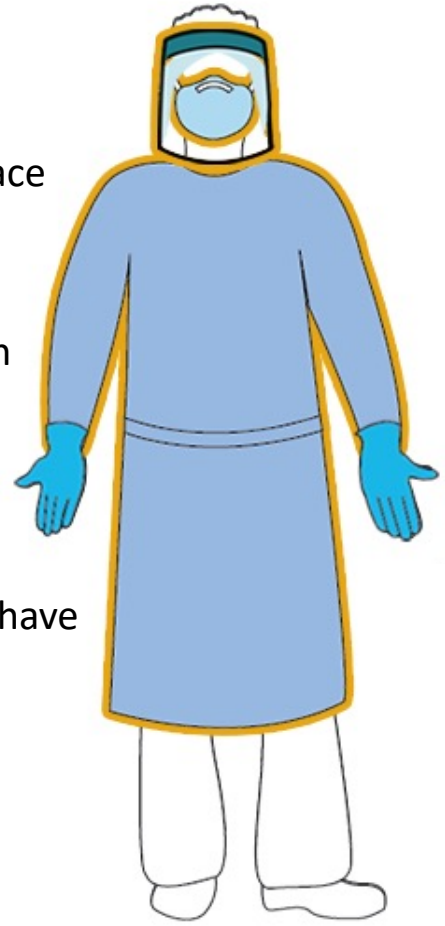
Single use shoe or boot cover

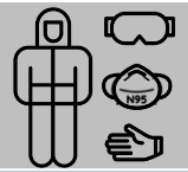
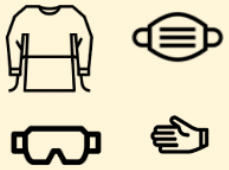
Absolute Minimum for suspect case – no vomiting, bleeding or diarrhea

Face mask and full face shield

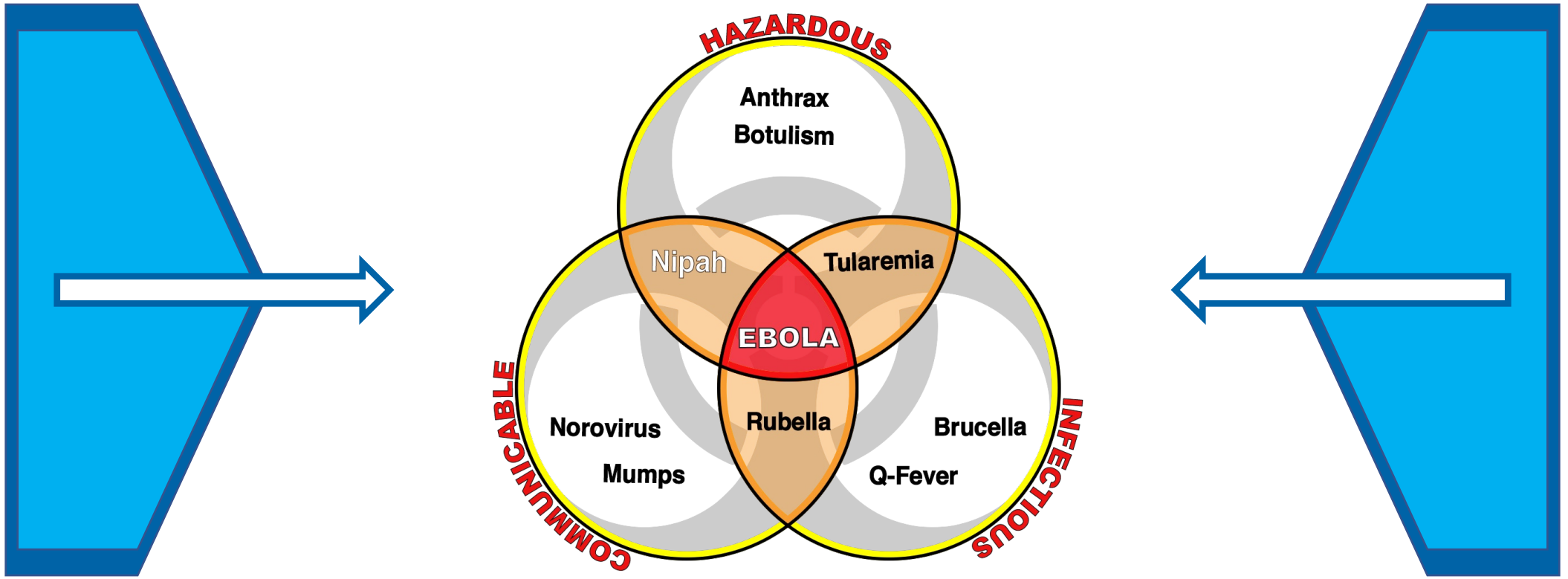
Fluid resistant gown or coverall

2 pair of gloves
Outer gloves must have extended cuffs



Virus Family	Illness Caused	Common Geography	Vector or Source	Person-to-person spread	Precautions	PPE	Comments
Filoviridae	Ebola Virus Disease	Central, sub-Saharan Africa	Presumed bat	YES	Contact, Droplet/Airborne, Eye		Full body coverage for acute (wet) phase
	Marburg virus		Fruit bat				
Arenaviridae	Lassa fever	West Africa	Rodents	YES	Contact, Droplet/Airborne, Eye		Full body coverage for acute (wet) phase
	Junín Machupo (Bolivian HF) Guanarito (Venezuelan HF) Sabia (Brazilian HF)	South America					
Bunyaviridae	CCHF – Crimean Congo Hemorrhagic Fever	Europe, Mediterranean, Middle East, Africa, India, China	Tick, infected livestock	YES	Contact, Droplet*, Eye		*Add respiratory protection (N95 or ↑) for centrifugation 
	Hantaviruses (HPS/HFRS*) (Sin Nombre, Andes virus)	Worldwide	Rodent	Possible	Standard Precautions unless Andes virus suspected		Contact, Droplet/Airborne, Eye for potential Andes virus or contact/clean-up of rodent droppings
	Rift Valley Fever	All of sub-Saharan Africa	Mosquito	No	Standard Precautions		
Flaviviridae	Yellow Fever	Tropics	Mosquito	Blood*	Standard Precautions		*Potential risk of Yellow Fever transmission in blood transfusion, immediately post vaccination 
	Dengue	Tropics	Mosquito	No			
	Kyanasur	India	Tick	No			
	Omsk	Siberia					

Special Pathogens – A Framework



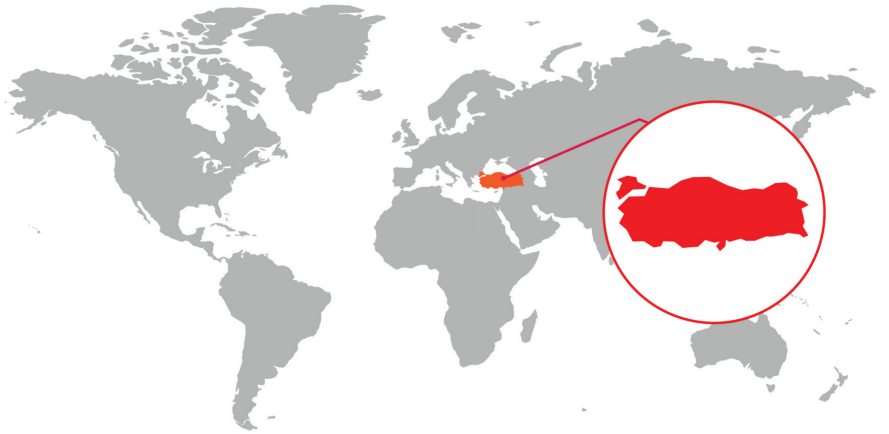
Cieslak et al. A Methodology for Determining Which Disease Warrant Care in a High-Level Containment Care Unit. *Viruses* 2019.

Case #2

Gavin Harris, MD

HPI

- CC: fever, malaise, joint pains, scrotal pain x 3 days
- Brief HPI: 51M w/ no history of known diseases or intake of regular medications
- Landscape manager x 20years, reported symptoms started after removal of tick from R leg the week prior



Am J Trop Med Hyg, 2021.

HPI

- Physical examination revealed temp 38.5C, conjunctival hyperemia, disseminated maculopapular rash, scrotal edema with hyperesthesia

- Laboratory results showed pancytopenia, elevated LDH, elevated ESR

Am J Trop Med Hyg, 2021.

Questions, questions…

- What is in the differential?
- What can you test for safely?
- What information would help you make the next decision?
- Who might be the best resource for assistance?

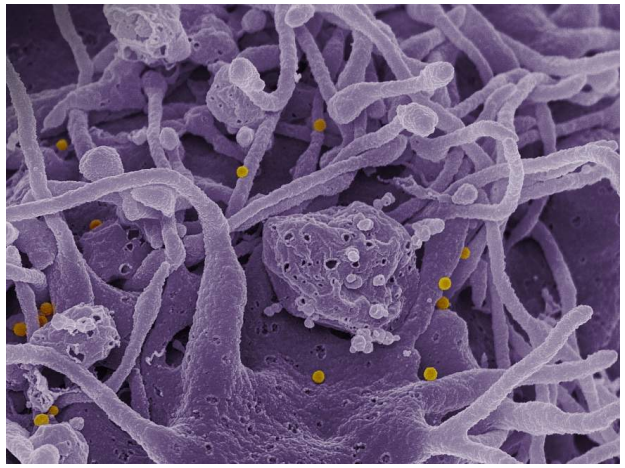
Patient Results

- RT-PCR performed from blood returned ***positive*** for CCHFV

Am J Trop Med Hyg, 2021.

Crimean-Congo Hemorrhagic Fever

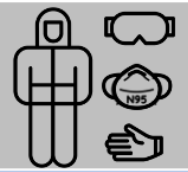
- *Nairovirus*; family *Bunyaviridae*
  - First isolated in Crimea 1944; 1969 in Congo
- Reservoir/host is Ixodid ticks (*Hyalomma)*
  - Domesticated animals serve as amplifying hosts
  - Human transmission occurs through contact with infected ticks/animals or bodily fluids, contaminated surfaces
- Duration of illness/incubation: 3-13days (avg 5-6d); typical CFR 30-50%



CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Considerations for Discussion – Crimean-Congo Hemorrhagic Fever

- What personal protective equipment/infection prevention measures are needed?
- What do you do with the waste generated by a patient with a suspected or confirmed viral special pathogen?
- What is the best environment in which to manage our patient in question?

Virus Family	Illness Caused	Common Geography	Vector or Source	Person-to-person spread	Precautions	PPE	Comments
Filoviridae	Ebola Virus Disease	Central, sub-Saharan Africa	Presumed bat	YES	Contact, Droplet/Airborne, Eye		Full body coverage for acute (wet) phase
	Marburg virus		Fruit bat				
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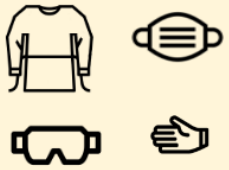
	Junín Machupo (Bolivian HF) Guanarito (Venezuelan HF) Sabia (Brazilian HF)	South America					
Bunyaviridae	CCHF – Crimean Congo Hemorrhagic Fever	Europe, Mediterranean, Middle East, Africa, India, China	Tick, infected livestock	YES	Contact, Droplet*, Eye		*Add respiratory protection (N95 or ↑) for centrifugation 
	Hantaviruses (HPS/HFRS*) (Sin Nombre, Andes virus)	Worldwide	Rodent	Possible	Standard Precautions unless Andes virus suspected		Contact, Droplet/Airborne, Eye for potential Andes virus or contact/clean-up of rodent droppings
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Flaviviridae	Yellow Fever	Tropics	Mosquito	Blood*	Standard Precautions		*Potential risk of Yellow Fever transmission in blood transfusion, immediately post vaccination 
	Dengue	Tropics	Mosquito	No			
	Kyanasur	India	Tick	No			
	Omsk	Siberia					

Case #3

Gavin Harris, MD

HPI

- CC: Conjunctivitis & rhinorrhea x 3 days
- Brief HPI: 9F with no known medical history
- Family had recently acquired poultry in their backyard

Questions, questions…

- What is in the differential?
- What can you test for safely?
- What information would help you make the next decision?
- Who might be the best resource for assistance?

HPI

- Five days after initial symptoms she developed gastrointestinal symptoms including pain, diarrhea, and was hospitalized one day later

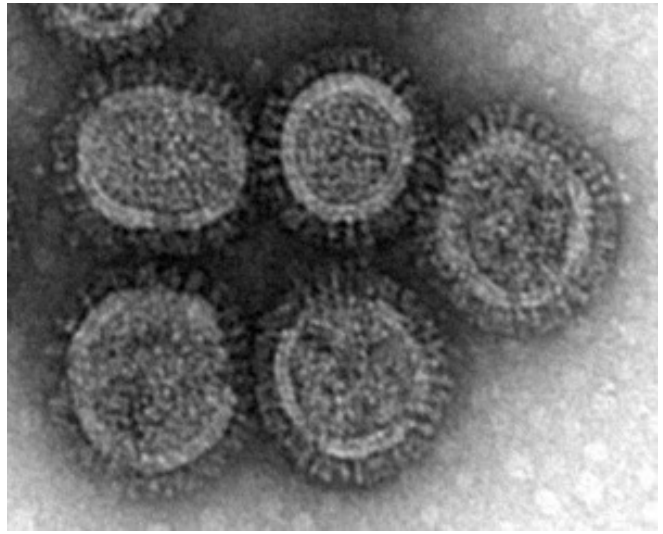
- She rapidly developed profound shock requiring intubation and vasopressor support and died a week later

Patient Results

- Two days after admission to ICU, respiratory swab was collected and returned ***positive*** for Influenza A H5 type

Highly Pathogenic Avian Influenza A

- Highly pathogenic avian 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



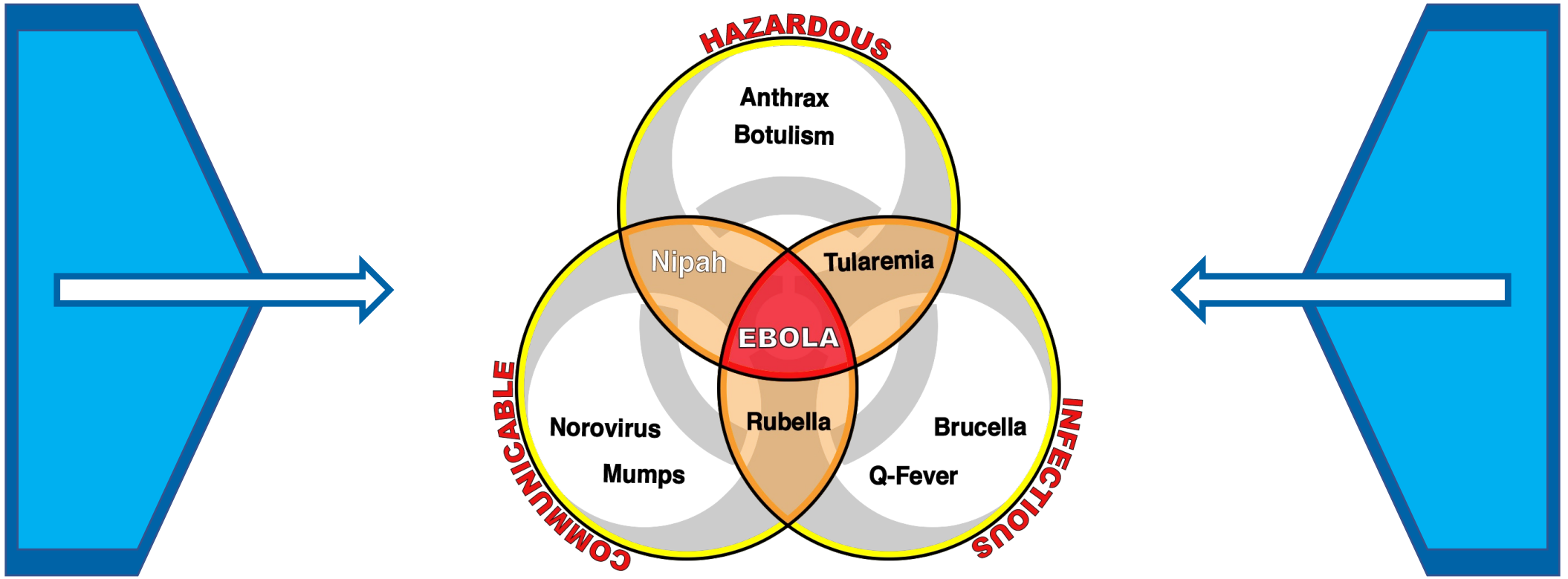
- **2003-2023:** 869 human cases, 457 deaths (CFR 53%), 22 countries
  - United States: 2022, 1 case (mild)
  - Ecuador: 2023, 1 pediatric case (critically ill)
  - Cambodia: 2023, 2 cases, 1 pediatric death
  - China: 2023, 1 case
  - Chile: 2023, 1 case (critically ill)
- Transmission has been observed in multiple terrestrial and marine mammalian species; all 50 states

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Considerations for Discussion – Novel Influenza

- What personal protective equipment/infection prevention measures are needed?
- What do you do with the waste generated by a patient with a suspected or confirmed viral special pathogen?
- What is the best environment in which to manage our patient in question?

Special Pathogens – A Framework



Cieslak et al. A Methodology for Determining Which Disease Warrant Care in a High-Level Containment Care Unit. *Viruses* 2019.

Table 1

ID_{50} and R_0 data for putative HLCC pathogens.

Pathogen	Mechanism of PTP Spread	ID_{50}	R_0	References
Ebola	Blood & Body Fluids	1-10 aerosolized organisms	1.3–2.53	[15,16,17,18,19,20,21,22]
Marburg	Blood & Body Fluids	1-10 aerosolized organisms	1.59	[11,23]
Lassa	Blood & Body Fluids	1-10 aerosolized organisms	1.23–1.33	[11,24]
Lujo	Scant data; Presumably Blood & Body Fluids	No data	No data	
Junin	Blood & Body Fluids	No data	<1	[25,26]
Machupo	Blood & Body Fluids	No data	<1	[21,22]
Guanarito	Scant data; Presumably Blood & Body Fluids	No data	No data	
Sabia	No data	No data	<1	[21]
CCHF	Blood & Body Fluids	No data	<1	[21,27]
SARS	Respiratory Droplets; Possibly Droplet Nuclei	No data	2.2–3.6	[28,29,30,31]
MERS	Respiratory Droplets; Possibly Droplet Nuclei	No data	0.60–11.5 [1]	[32,33,34,35,36]
H5N1 Influenza	Respiratory Droplets; Possibly Droplet Nuclei	1000 viral particles [2]	1.14	[37]
H7N9 Influenza	Respiratory Droplets; Possibly Droplet Nuclei	1000 viral particles	0.1–0.47	[37]
Smallpox	Droplet Nuclei, Scabs	1–100	3.5–7.0	[38,39,40,41]
Monkeypox	Respiratory Droplets; Possibly Droplet Nuclei and Scabs	No data	0.32	[42]
Nipah	Respiratory Droplets	No data	0.33	[43]
Hendra	No Data	No data	No data	
Pneumonic Plague	Respiratory Droplets	100 to 500 organisms by inhalation	1.3–3.5	[44,45,46,47,48]
XDR-TB	Droplet Nuclei	<10 bacilli [3]	1.97	[49,50]

[1] Estimates from South Korean and Saudi studies vary widely; [2] Influenza data is not specific to these strains; [3] TB data is not specific to XDR strains. Key: HLCC = High Level Containment Care; PTP = Person-to-Person; CCHF = Crimean-Congo Hemorrhagic Fever; SARS = Severe Acute Respiratory Syndrome; MERS = Middle East Respiratory Syndrome; XDR-TB = Extensively Drug-Resistant Tuberculosis.

Cieslak et al. A Methodology for Determining Which Disease Warrant Care in a High-Level Containment Care Unit. *Viruses* 2019.

Question & Answer

Please submit any questions using the Q&A function on your screen.

Poll Question

Thank you for participating in today's session!

Please take a moment to provide us feedback on this ECHO session by completing our brief survey – please use the link provided in the chat.

A certificate of attendance is available upon completing the survey.

Access Resources & Subscribe to the Podcast

- Podcast version of this session, slide deck, and other resources will be available next week on our website.
  - https://med.emory.edu/departments/medicine/divisions/infectious-diseases/serious-communicable-diseases-program/covid-19-resources/access-past-echo-recordings.html
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Upcoming Sessions

- 5.25.23 : EMS Hierarchy of Controls
  - Register today
    - https://zoom.us/webinar/register/WN_wiyUD5lZQ8GCCqL-CtIwFg

Thank you!