

Prepared on Paper: Lassa in the Heartland

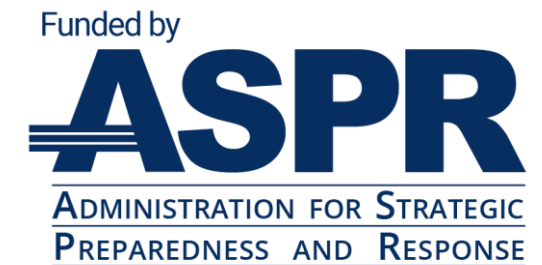
Karen Brust, MD, FSHEA
Michael Hartley

Erica Shenoy, MD, PhD



Acknowledgement

This webinar is presented by the Region 1 Disaster Health Response System (RDHRS) in collaboration with the Regional Emerging Special Pathogens Treatment Center (RESPTC). Both programs are funded by the Administration for Strategic Preparedness and Response (ASPR) within the US Department of Health and Human Services.



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Moderators & Speakers

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Hospital Epidemiologist

Associate Professor of Internal Medicine – Infectious Diseases

University of Iowa Health Care

Michael Hartley, former NRP, CCP, CHEC

Emergency Manager - Retired

University of Iowa Health Care

Learning Objectives

1. Review the timeline and major challenges encountered by healthcare facilities with the delayed recognition and eventual diagnosis of Lassa Fever in Iowa in 2024.
2. Using the lens of this recent experience, identify the challenges of moving from plans on paper to implementation for evaluation and management of patients with suspected a high consequence infectious diseases (HCIDs).
3. Demonstrate lessons learned regarding the value of planning and developing a network of relationships with local, state, and regional partners.

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Mike Hartley, Emergency Manager-Retired

March 7, 2025

Learning Objectives

1. Review the timeline & major challenges encountered with the delayed recognition & eventual diagnosis of Lassa Fever in Iowa, 2024
2. Identify the challenges of moving from plans on paper to implementation for evaluation & management of patients with suspected a high consequence infectious diseases (HCIDs)
3. Demonstrate lessons learned regarding the value of planning & developing a network of relationships with local, state, and regional partners



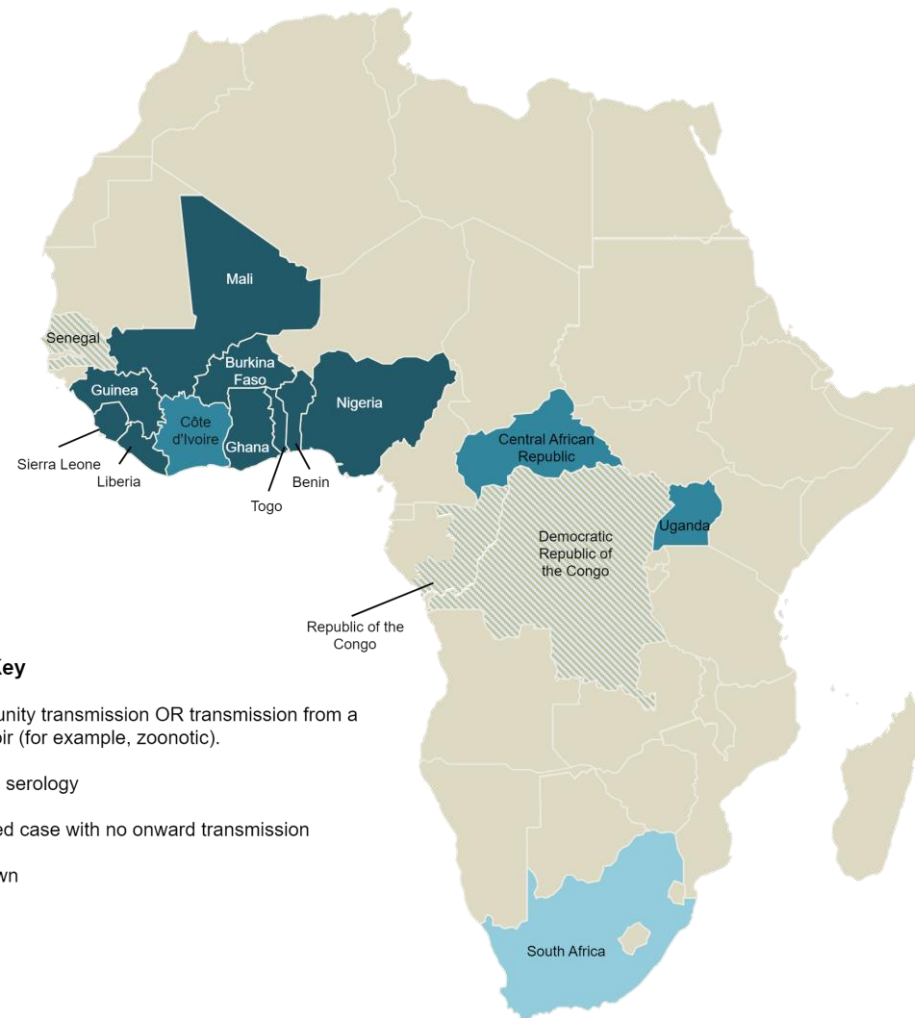
Clinical Case

Presentation through time of death

Lassa Fever

Overview:

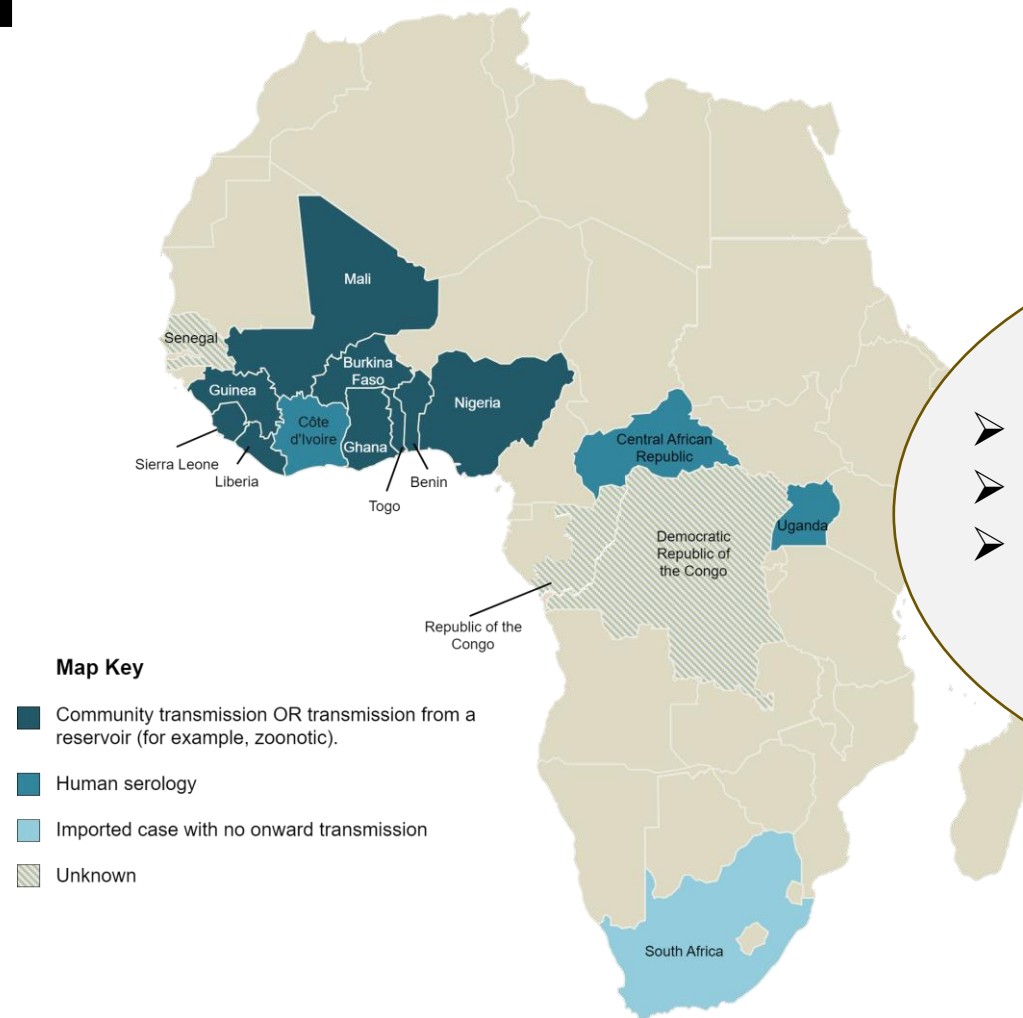
- Endemic in W. Africa
- Viral hemorrhagic fever = arenavirus.
- Transmission
 - Items contaminated with multimammate rodent urine or feces
 - Person-to-person transmission can occur in healthcare settings through contact with infective fluid materials



Lassa Fever

Signs and Symptoms:

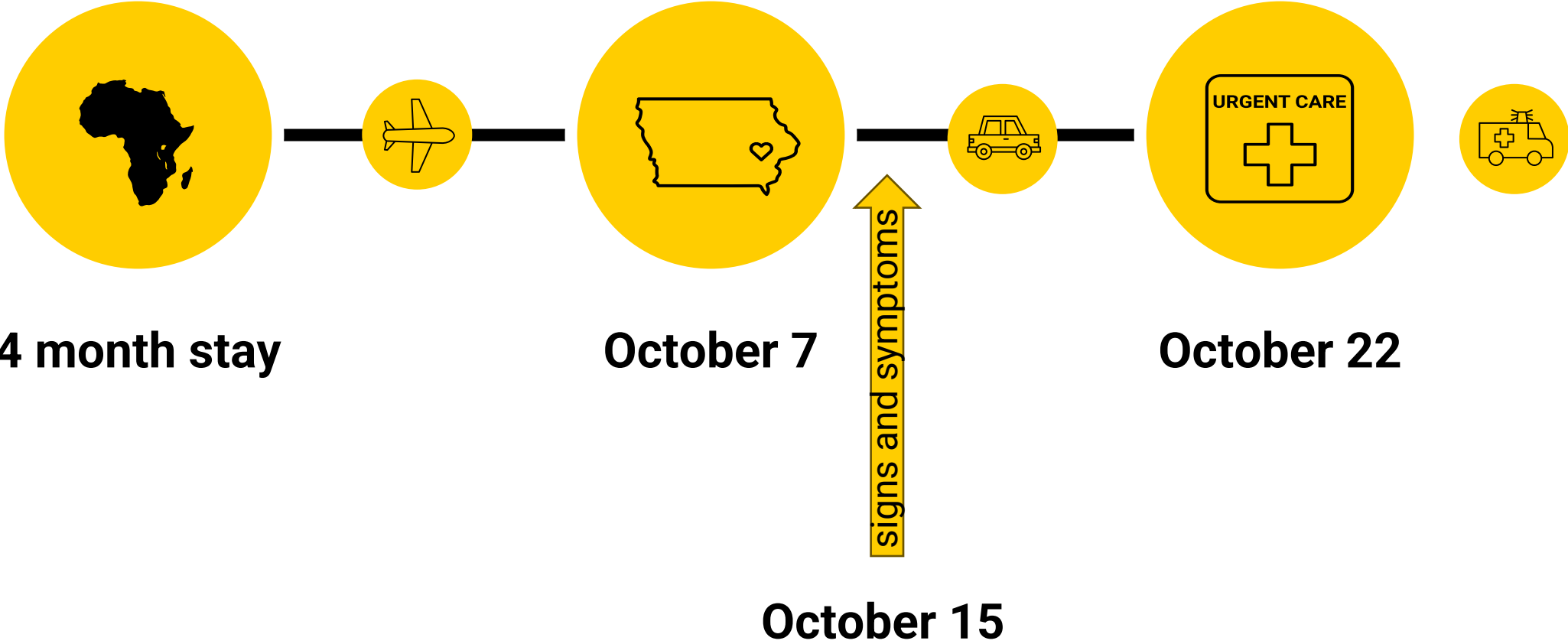
- Only 1 in 5 will go on to have severe disease and organ disfunction
- Starts as fever, malaise, headache.
 - Progresses to pharyngitis, myalgias, n/v/d
 - Progresses to facial swelling, bleeding, shock



Case Fatality Rate

- Overall is 1%
- Severe hospitalized cases 15-20%
- Fetal death and maternal death in 3rd TM pregnancy approximates 80% and 30%, respectively

Clinical case



Clinical case



Hospital 1: Days 0 - 4



PE: temperature of 38.1C, VS o/w stable

coherent, conversive, oriented, non-toxic but ill

Normal cardiac / lung exam, no abd TTP, normal extremities

Notable labs:

WBC 3.5, platelets 58K,

AST 155, ALT 63, and

creatinine 1.27

Notable negative diagnostics:

(-) respiratory panel, malaria smear and PCR, and

(-) urine and blood cultures

(-) chest imaging with x-ray and CT



Clinical case



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(-) respiratory panel, malaria smear and PCR, and
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(-) chest imaging with x-ray and CT



Hospital 2: Admission

→ transferred to UIHC for higher level of care,
MICU, for increasing encephalopathy and elevated
liver enzymes

PE: temperature of 37.7C, VS o/w stable, Alert but
slow to respond, 1 episode of witnessed **emesis**

Notable labs:

WBC 11, platelets 81K (nl 150-400)
AST >2000, ALT >300 (nl 0-40), and creatinine 1.17
INR 1.1 (nl 0.8-1.2)
lactate 3.7 (nl 0.5-22mmol/L)

Notable negative diagnostics:

(+) trace pericardial effusion on POCUS

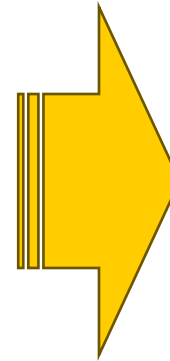


Clinical case



Hours 0200-1100





- EPIDEMIOLOGIC HISTORY
- INCUBATION PERIOD
- SIGNS AND SYMPTOMS
- SUPPORTIVE LAB EVIDENCE





PERSON UNDER INVESTIGATION

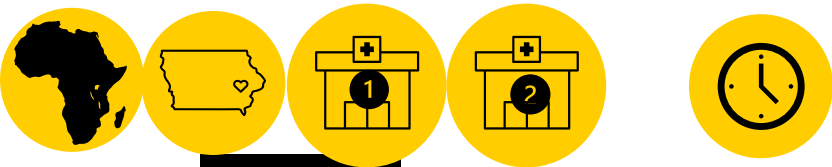


Clinical case

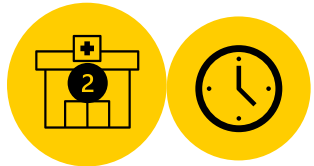
-  Hospital 1: Days 0 - 4
-  Hospital 2: 10/26
-  Day 5 at admission
-  10/27 mid-morning

-   Hours 1100-1500
- Hospital incident command system (HICS)
- Incident Commander – CEO

- Virtual Attendees
- Modified group of the usual 110 total positions



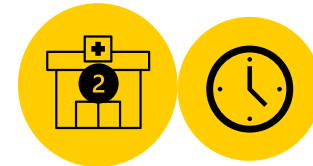
Clinical case



Hours 0200 - 2400

MICU:

- Supportive care
- Intubation
- Pressor support
- Too unstable to be moved to Level 1

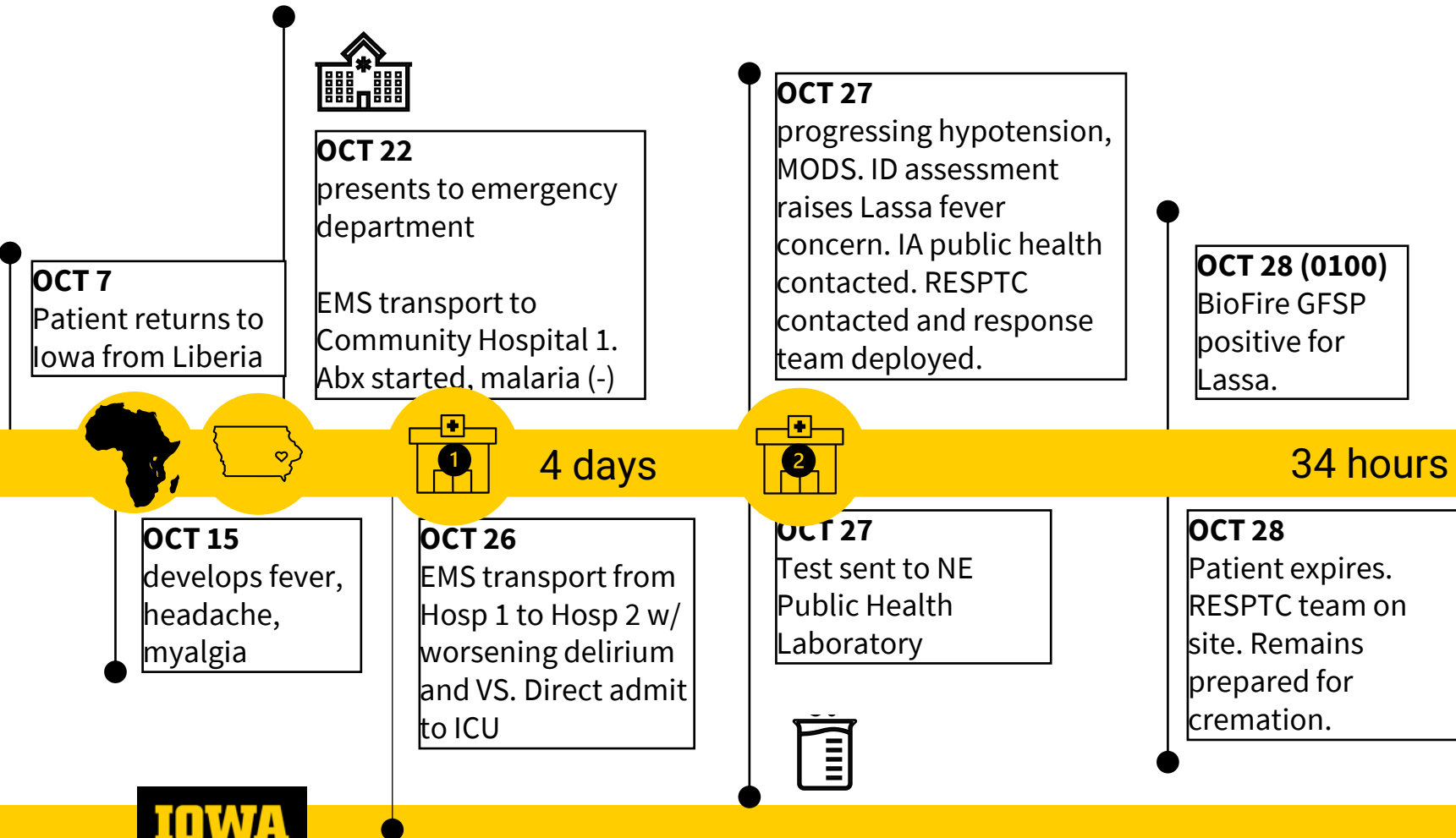


Hours 2400 - 1130

SPU:

- Dialysis by CRRT
- DCCV for unstable atrial fibrillation x 2
- Steroids and Anakinra, Ferritin >202K (nl 30-400)
- TAG, INR >10
- Cardiac arrest and no further escalation of care

Timeline of Events



Activation of the Special Pathogens Unit (SPU)

Conversion of a clinical space to a biocontainment unit

UIHC Special Pathogens Unit

History

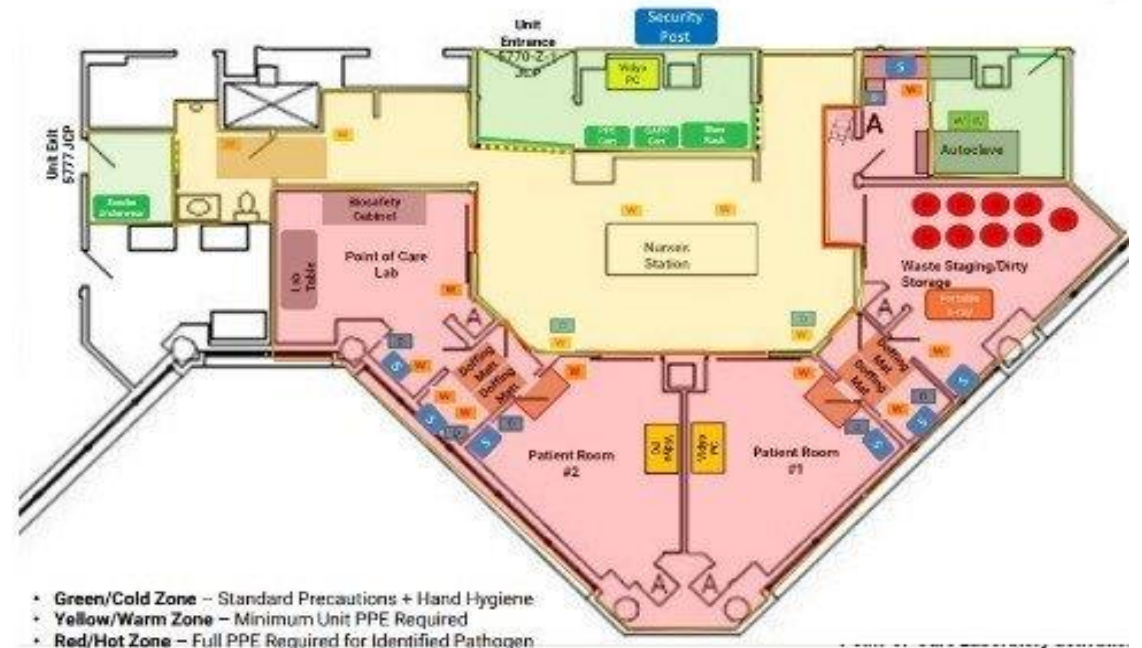
- December 2014 - Iowa's Only State-Designated "Ebola Treatment Center" (term prior to National Special Pathogen System)
- February 2015 - last U.S. Center to be visited and verified by CDC Rapid Ebola Preparedness Team
- February 2020 – five years of major biosafety enhancement projects were complete. NETEC consultation team visit...deemed ready, on paper, to be Region VII's only Level 2 SPTC.
- March 9, 2020 - first state COVID-19 patient admitted in March 2020; no Category A disease admissions
- Present Day - serve as Iowa's only SPTC and the primary back up to the RESPTC and National Quarantine Center at Univ. of Nebraska

UIHC Special Pathogens Unit

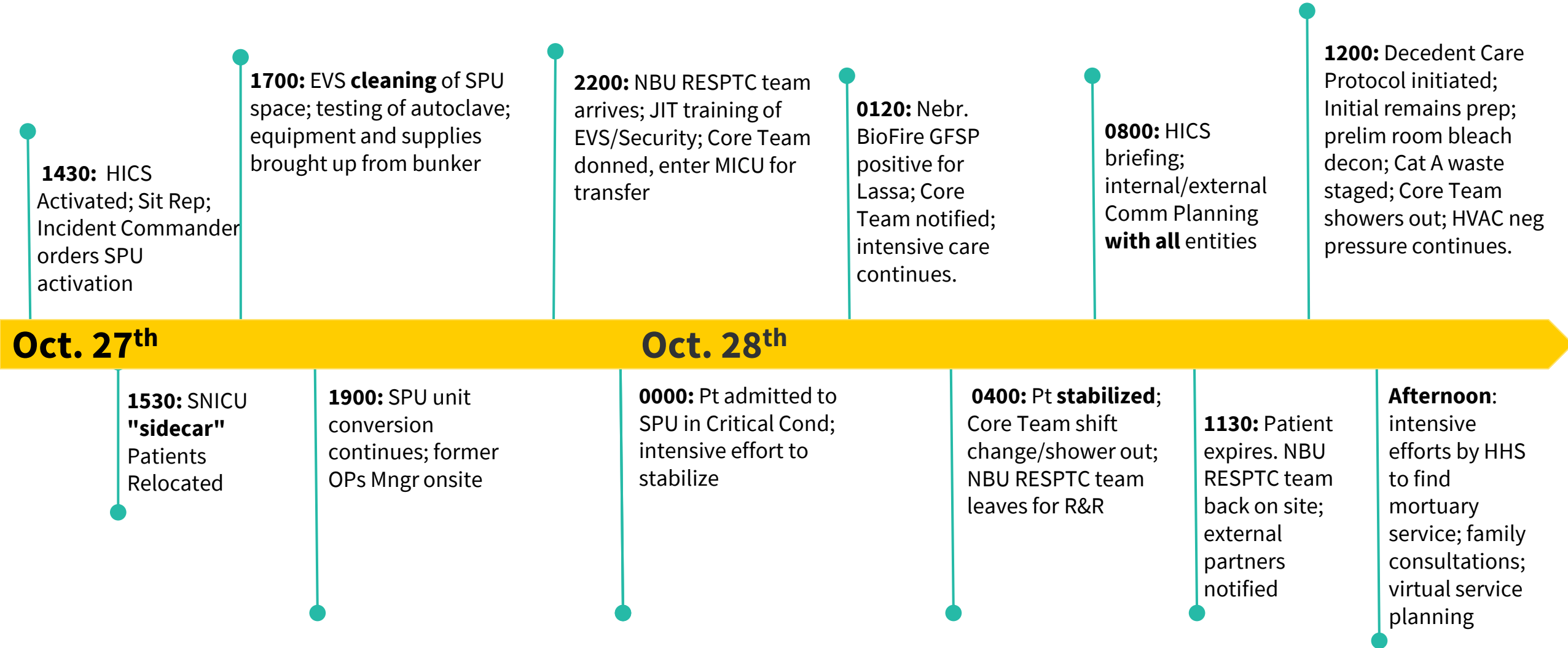
Layout / Features

- A pod of four rooms within a 36-bed Surgical Neurosciences Intensive Care Unit.
- Separate air handler, enhanced air exchange rate ~20/hr.; exhaust direct to rooftop
- Large pass-through waste processing autoclave
- Decon shower exit with locker room.
- Four patient rooms, two anterooms; up to two Category A patients.
- Activation/conversion time: 4-6 hours

SPU Maximum Isolation – 3 Zones



Special Pathogen Unit Activation Timeline





Decedent Care

Coordination with External Partners

Decedent Care Protocol

- Intensive effort by IAHHHS to find mortuary service
- Back-up planning – use of single body cooler
- Service provider found, logistics planning for final disposition
- Virtual family/spiritual service via secure video platform – 120 min.
- County ME team onsite; modified I.D. process
- DCC team assembled, equipment obtained
- **Slow, meticulous adherence to protocol**
- Two carts, 1-hospital body bag, 2-heavy duty ME bags, two slider boards, bioseal system



Deactivation of the Biocontainment Unit

Primary/Secondary/Terminal Disinfection

Waste Processing and Environmental Disinfection

11:45: Initial wipe down and mopping; waste bagged left in place; room secured, 72 hrs. of desiccation begun

1000: All Cat A waste double bagged, removed from room and transported to SPU waste staging room; bleach mop, wipe down. Total 80 bags of Cat A waste; desiccation continued.

08:00: Secondary bleach wipe/mop of room and equipment; 24 hrs. Of Desiccation

1630: Terminal disinfection of room and equipment with ionized H2O2 mist.

Final aesthetic clean by EVS team.

Room ready for use

MICU Oct. 27 Oct. 29 Oct. 31 Nov. 1

WASTE: Category A waste packaged/autoclaved --> Barreled

DISINFECTION: Initial Bleach Wipe/Mop with decedent in room --> 72hrs Desiccation --> Primary Bleach Wipe/Mop

--> 24 hrs Desiccation --> Secondary Bleach Wipe/Mop --> Terminal Disinfection with Ionized Hydrogen Peroxide (IHP) --> EVS aesthetic clean

SPU Oct. 28 Oct. 29 Oct. 31 Nov. 1-3 Nov. 4 Nov. 5

1200: Initial wipe down and mopping; Cat A waste bagged; room secured, 72 hrs. of desiccation begun

0800: Autoclave technicians on site, repair begun, addition of effluent cooling coil; Region V RESPTC video conference, waste vendor Cat A program, DOT permit to add LF

1300: 24-55gal. Cat A barrels on site, packaging of waste begun, simultaneously autoclaving 2-3 bags per batch (1.5h); primary bleach wipe/mop of unit

Secondary bleach wipe/mop of unit spaces not used for waste processing.

Weekend activity minimal, some autoclaving.

1300: 18 – 55gal barrels arrive; all Cat A waste processed/removed; final bleach wipe/mop of rest of SPU

1830 Terminal disinfection of unit and equipment with ionized H2O2 mist.

Final aesthetic clean by EVS team.

Unit ready for use

MICU **Oct. 27** **Oct. 29** **Oct. 31** **Nov. 1**

WASTE: Category A waste packaged/autoclaved --> Barreled
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SPU **Oct. 28** **Oct. 29** **Oct. 31** **Nov. 1-3** **Nov. 4** **Nov. 5**



Risk Assessments and Monitoring

External Partnership with Iowa Department of Health and Human Services

Risk Assessments



180

Exposed contacts



172

Healthcare-associated contacts



67 exposed
50 high-risk

45: PPE omissions¹, and
5: skin-to-skin²

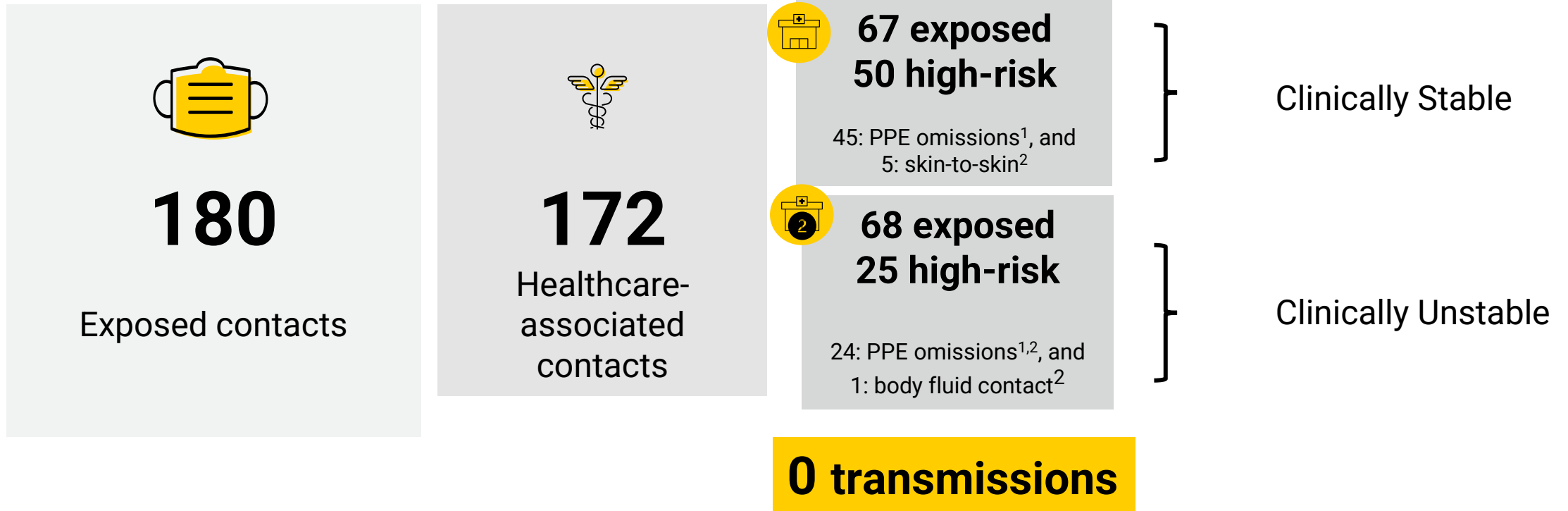


68 exposed
25 high-risk

24: PPE omissions^{1,2}, and
1: body fluid contact²

0 transmissions

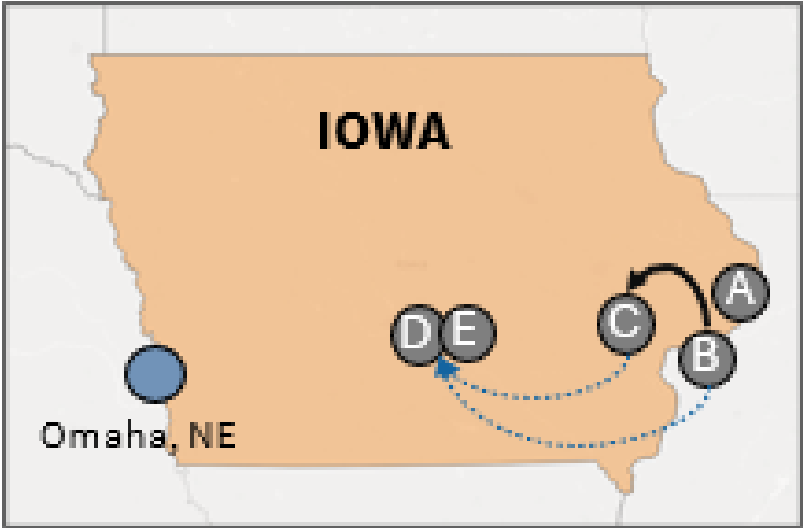
Risk Assessments



[PPE: Clinically Stable Patients Suspected to have VHF | Viral Hemorrhagic Fevers \(VHFs\) | CDC](#)

[PPE: Confirmed Patients and Clinically Unstable Patients Suspected to have VHF | Viral Hemorrhagic Fevers \(VHFs\) | CDC](#)

Monitoring



Map of the Case

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

Monitoring



Daily fusion cell forum

ALL partners at the table.

Major response milestones AND specific individual needs addressed



Single mission - no ongoing transmission

Clarity in goal across all partners



Three top priorities for the day

Flexible, changed daily, identifying contacts, ensuring exclusions, managing waste, testing contacts



Communications

Press release, two HANs, no information shielded from partners in fusion cell forum

Monitoring



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Evaluation: 1st PUI “drill”

- **Monitoring --> Evaluation of the symptomatic**
- County partners call us (IPC/ EH) to inform us of a fever on e-monitoring in the morning
- Dr Donahue assists with the call to patient
- And then ... silence ...

Evaluation: 1st PUI “drill”



Watchful waiting

Enteric GI Panel

Respiratory Viral Panel

Blood testing for Lassa Fever



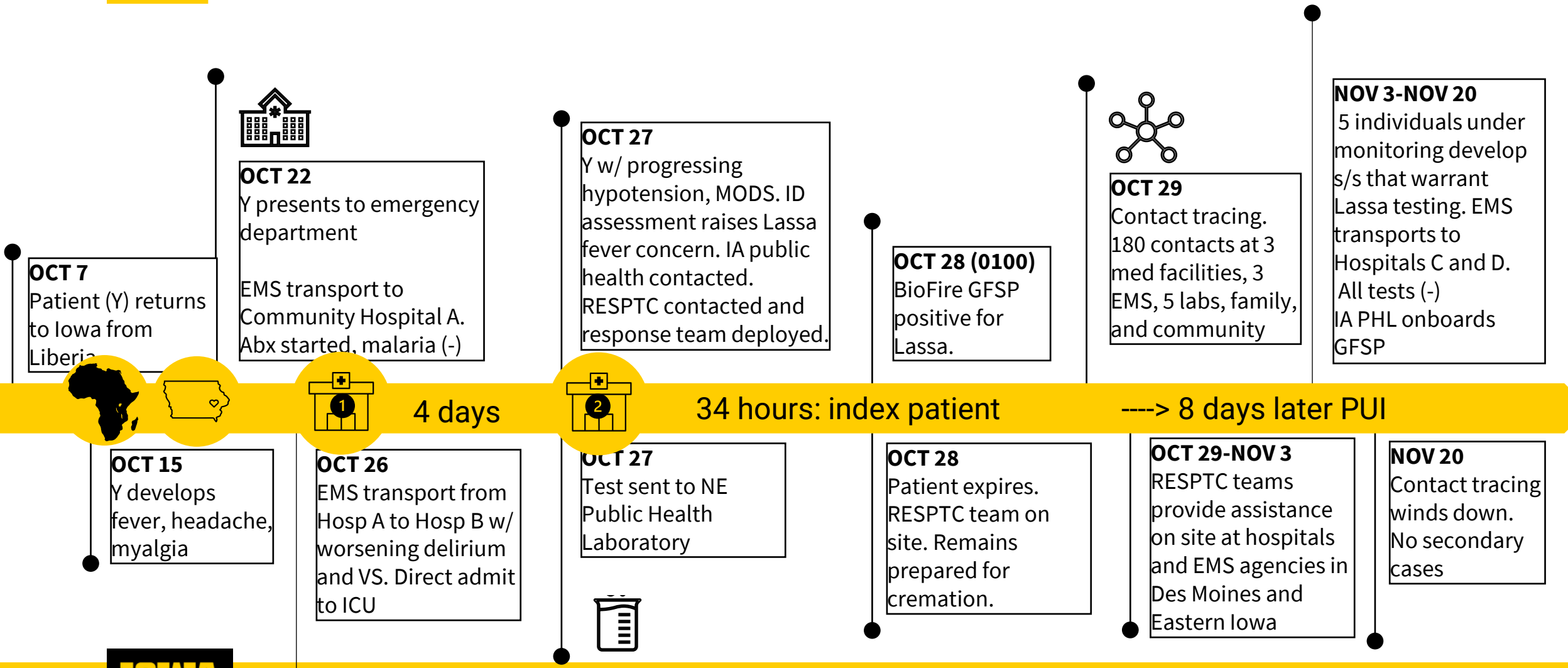
Evaluation: 1st PUI “drill”

1st: negative

2nd: negative

Baby healthy

Timeline of Events





**What will we change moving
forward?**

Successful response

Preparation

- Drills, drills, drills
 - Written plan known by local leaders
-

Relationships

- Well-established partnerships in Region 7
- Serendipitous timing of new partnerships

“Our success [in response] was because of the groundwork that was laid over the past decade.”
– NETEC Leader

Coordination and Communication

- Clear roles during the response as led externally by Iowa HHS
- Clear roles internally as led by HICS

Successful response → Even better, if

Preparation

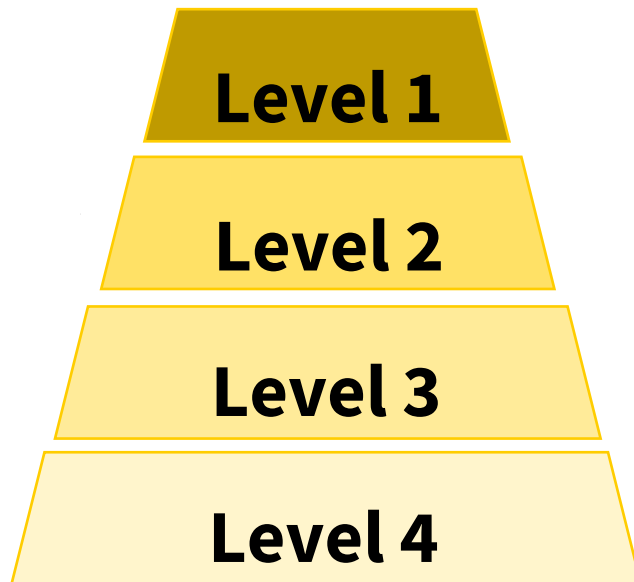
- Drill within the space
 - Active EM manager, active trained group, active maintenance of supplies/ equipment, & local testing availability
-

Successful response → Even better, if

Preparation

- Drill within the space
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Earlier Recognition



Level 1

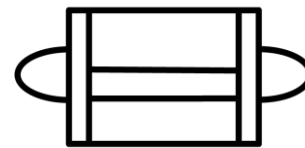
Level 2

Level 3

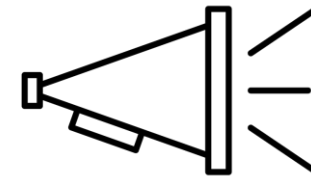
Level 4



IDENTIFY



ISOLATE



INFORM

Successful response → Even better, if

Preparation

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Coordination and Communication

- Clear roles during the response as led externally by Iowa HHS
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Scalability

Successful response

NETEC facilitated national coordination & real-time information sharing

Level 1 or RESPTC to provided just-in-time training, technical assistance, & regional coordination

NSPS

Level 2 & 3 collaborated with NSPS partners and cared for confirmed patient & suspect patients

EMS provided transport for patients & suspect cases to higher levels of care and for assessment & testing

**In conclusion, thank you!
If it can happen in Iowa...!**

Thank you

→ Karen.brust@uiowa.edu

Questions



Thank you!



REGION 1
**Regional Disaster
Health Response
System**



RESPTC
REGION 1 EMERGING
SPECIAL PATHOGENS
TREATMENT CENTER



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