

July 18, 2018

Outbreak Identification and Management

Nicole M. Iovine, MD, PhD
Associate Professor of Medicine
Hospital Epidemiologist
University of Florida Health
Gainesville, Florida

Advisory Panel Member, CDC/SHEA Outbreak Response Training Program

Disclosure

- None

Objectives

- Review the SHEA/CDC Outbreak Response Training Program (ORTP)
- Define “outbreak”
- Outline the steps to identify and manage the outbreak

Outbreak Response Training Program (ORTP)

Goal is to provide the knowledge, tools and skills needed for effective management of facility-level outbreaks and large-scale public health emergencies

<http://ortp.shea-online.org>



The screenshot shows the website for the SHEA/CDC Outbreak Response Training Program (ORTP). At the top left, there are logos for SHEA (The Society for Healthcare Epidemiology of America) and the CDC (Centers for Disease Control and Prevention). To the right of these logos is the text 'SHEA/CDC Outbreak Response Training Program (ORTP)'. Below the logos is a dark blue navigation bar with white text links: 'ABOUT', 'WEBINARS', 'WORKSHOPS', 'ONLINE TRAINING', 'GUIDANCE', and 'CONTACT US'. The main content area features a large image of a person wearing a white protective suit, a face shield, and green gloves, working in a biosafety cabinet. Overlaid on the bottom right of this image is a white button with the text 'Check out the Free Training Resources'. At the bottom of the page, there is a dark blue banner with white text that reads 'CDC/SHEA Outbreak Response Training Program (ORTP)'.

On-line Resources from ORTP

Outbreak Response Tool Kits

Notes Bookmarks Register/Login

Index Incident Management Communication, Negotiation, Implementation Horizontal Strategies Emerging Pathogens

SHEA Outbreak Response Training Program (ORTP)

Outbreak Response Tool Kits

Four free tool kits to help healthcare providers rapidly find resources important to outbreak preparedness, response, and recovery.



- ✓ Expert-selected checklists, flow charts, case studies, and more
- ✓ Bookmarking and notes capability when you create a free account
- ✓ Guidance in implementation and leadership during a crisis
- ✓ Full access online on mobile devices and desktops
- ✓ Downloadable, fillable, printable tables to make sure you have the information you need
- ✓ Offline access to internal content through the Guideline Central app on iTunes and Google Play
- ✓ Notifications when tool kit is updated

your@email.com [Create Free Account](#)



Webinars Workshops Resources

SUPPORTING PARTNERS

American Academy of Emergency Physicians
American Association of Critical Care Nurses
Council of State and Territorial Epidemiologists
HCA Health System

National Foundation for Infectious Diseases
Pediatric Infectious Disease Society
Surgical Infection Society
The Joint Commission

INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY

SHEA EXPERT GUIDANCE

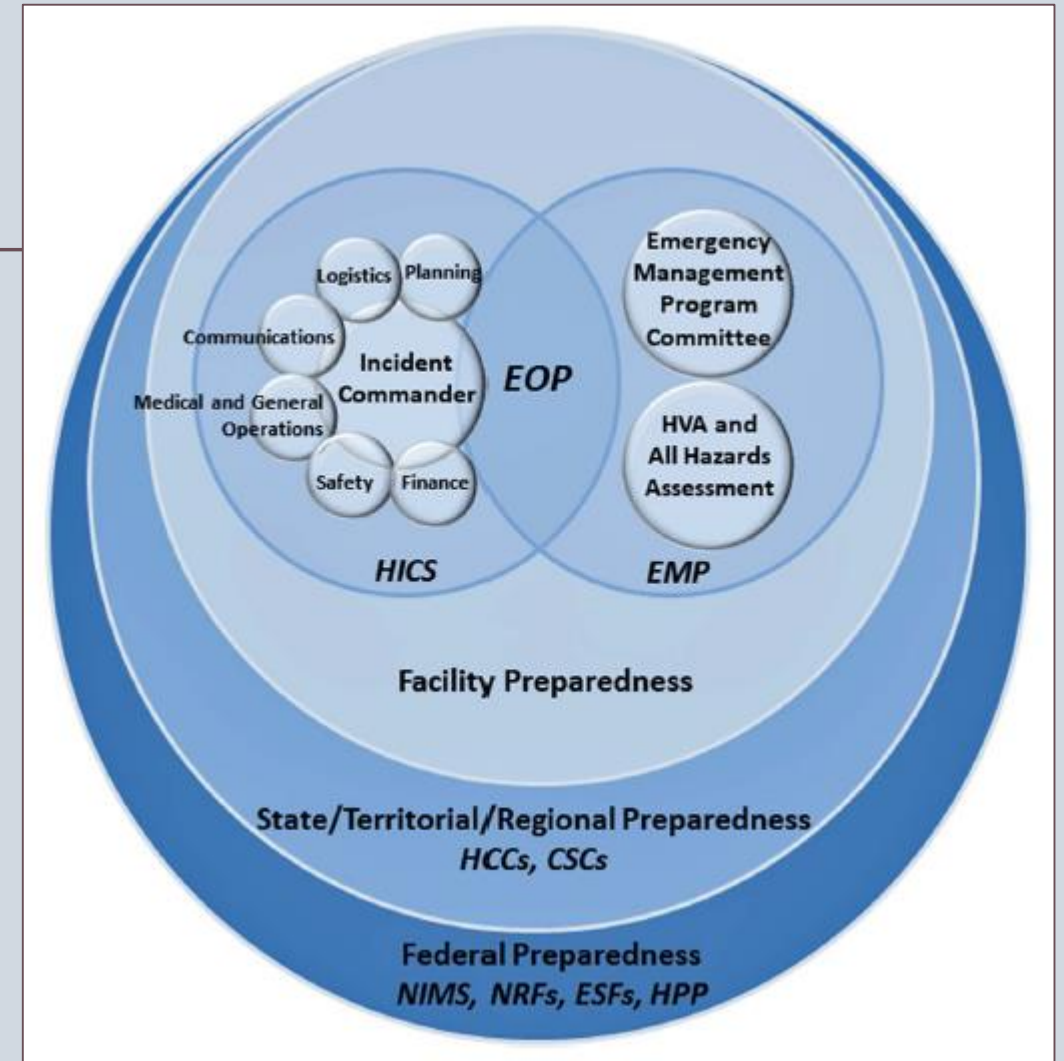
Outbreak Response and Incident Management: SHEA Guidance and Resources for Healthcare Epidemiologists in United States Acute-Care Hospitals

David B. Banach, MD, MPH, MS;^{1,a} B. Lynn Johnston, MD, MS, FRCPC;^{2,a} Duha Al-Zubeidi, MD;³ Allison H. Bartlett, MD, MS;⁴
Susan Casey Bleasdale, MD;⁵ Valerie M. Deloney, MBA;⁶ Kyle B. Enfield, MD, MS;⁷ Judith A. Guzman-Cottrill, DO;⁸
Christopher Lowe, MD, MSc;⁹ Luis Ostrosky-Zeichner, MD;¹⁰ Kyle J. Popovich, MD, MS;¹¹
Payal K. Patel, MD;¹² Karen Ravin, MD, MS;¹³ Theresa Rowe, DO, MS;¹⁴ Erica S. Shenoy, MD, PhD;¹⁵
Roger Stienecker, MD;¹⁶ Pritish K. Tosh, MD;¹⁷ Kavita K. Trivedi, MD;¹⁸ and the Outbreak Response Training Program (ORTP)
Advisory Panel^b

Branch, et al. ICHE 2017; 38:1391.

Levels of Response

- Federal
- State/Regional
- Facility
 - Emergency Management Program
 - Emergency Operations Plan



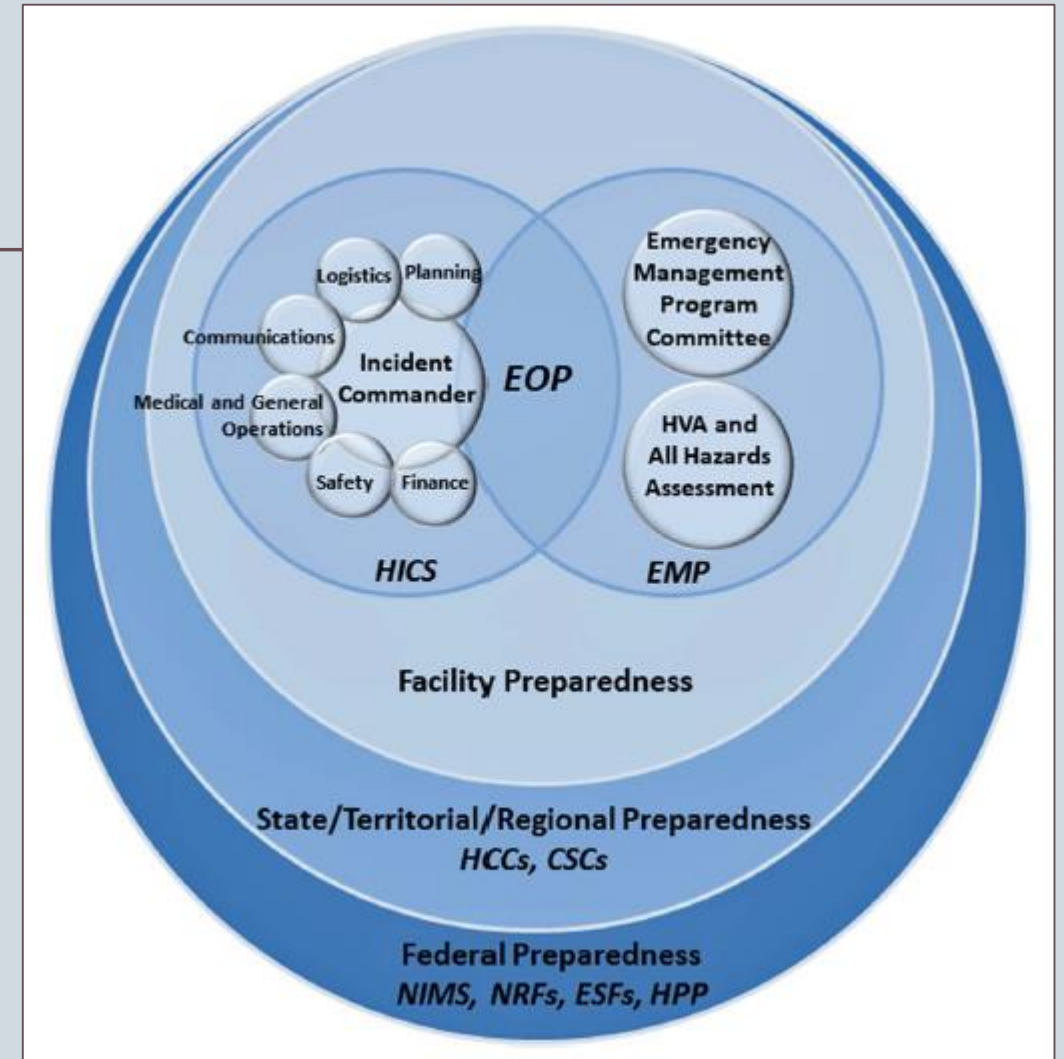
Levels of Response

- Federal
- State/Regional
- **Facility**
 - Emergency Management Program
 - Emergency Operations Plan



Levels of Response

- Federal
- State/Regional
- Facility
 - Emergency Management Program
 - Emergency Operations Plan
 - Hospital Incident Command System / Incident Commander
 - Planning
 - Logistics
 - Communications
 - Medical Operations
 - Safety
 - Finance

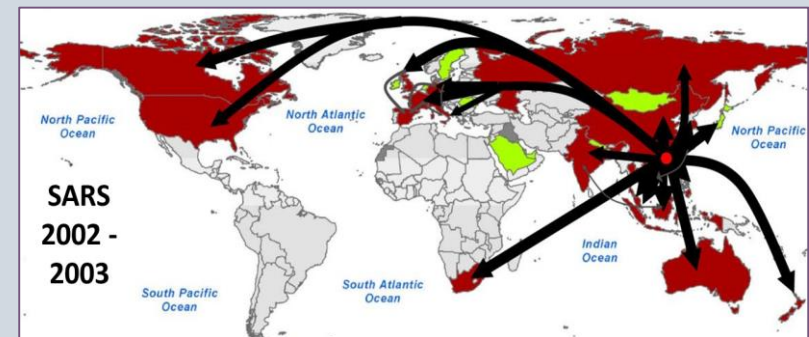


Incident Management



The activities an organization takes to prepare for, respond to, and learn from an event

- **Service interruptions**
 - Telecommunication breakdown
 - Drug or vaccine shortages
- **Local/hospital events**
 - Norovirus outbreak at community picnic
 - Influenza outbreak on a geriatric unit
- **Larger events**
 - Natural disasters
 - Epidemics and pandemics



Incident Management Team

- **Clinical Staff**
 - Hospital Epidemiologist / Infection Control
 - CMO
 - CNO
 - Occupational Health
- **Administration**
 - Hospital Executives
 - Internal Communication
 - Media Relations
 - Finance
- **Facility Services**
 - Facilities Management
 - Supply Chain
 - Security
 - Risk Management
- **Support Services**
 - Laboratory
 - Pharmacy
 - Environmental
 - Dietary



**MUST have a
clearly designated
Incident
Commander!**

Levels of Disease - Definitions



- **Sporadic** – cases occur infrequently and irregularly
- **Outbreak** – an increase, usually sudden, in the # cases above what is normally expected in a regional or smaller area (hospital)
- **Epidemic** – an increase, usually sudden, in the # cases above what is normally expected in a larger geographic area
- **Cluster** – a group of cases suspected to be greater than expected, but the true expected # of cases is not known
- **Endemic** – the usual # of cases typically present in an area; baseline
- **Hyperendemic** – persistent, high # of cases; also can be a baseline for that area
- **Pandemic** – epidemic that has spread across several countries or continents



Decide Whether to Act

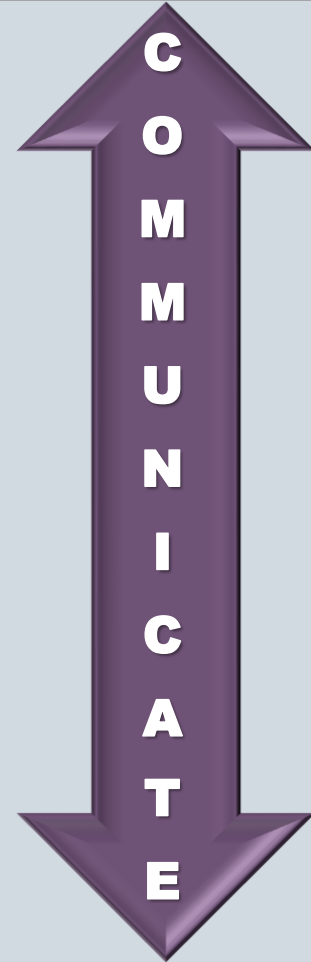
- **Factors to consider:**
 - Severity of the illness
 - Potential for spread
 - Availability of control measures / resources
 - Public relations
- **Single CRE on a general medical floor ≠ Single CRE on the Transplant Unit**

Teen Saved by Transplant, Killed by Superbug at NIH Hospital

Oct. 14, 2014 / 12:48 PM ET

Steps in an Investigation

1. Confirm that there's really an outbreak
2. Make the epidemiology curve, line list, and bed trace
3. Develop your hypothesis
4. Take appropriate infection control measures
5. Test your hypothesis
6. Monitor impact
7. Revise and refine your strategy



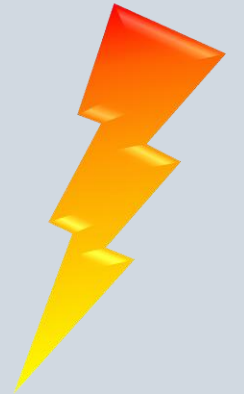
Steps in an Investigation: Step #1

1. Confirm that there's really an outbreak

- Is the increase real, or did something else change (lab diagnostics)?
- Have there been notable events in the community (new LTACH in town)?
- Check for product recalls: <https://www.fda.gov/safety/recalls/>

Role of Molecular Testing?

- *Discriminate clonal outbreak from independent importations of a pathogen*
- *Even if the molecular test shows the infections are non-clonal, you may still have a problem if more nasty bugs are coming into the hospital*

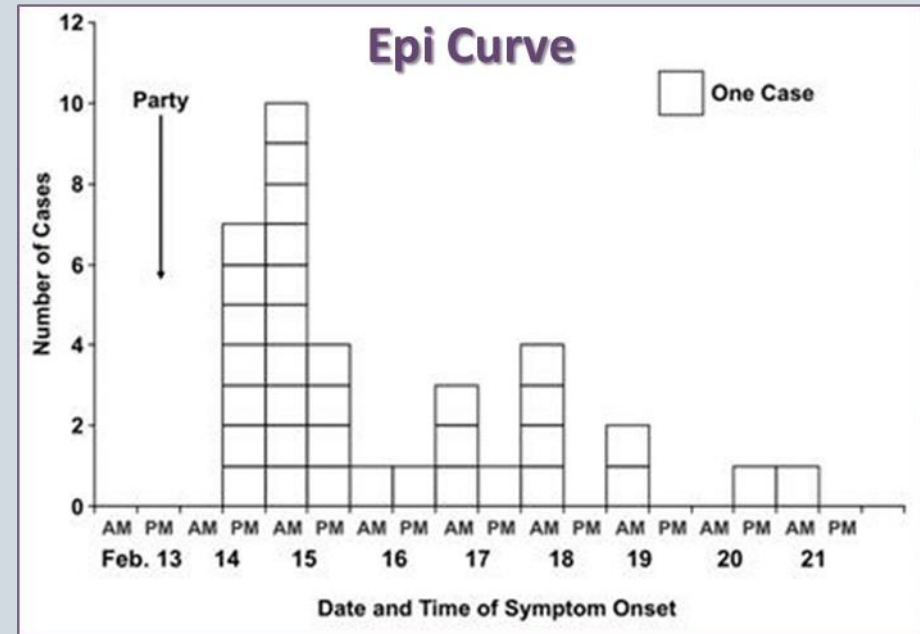


**Activate
Incident
Command**

Steps in an Investigation: Step #2, Epi Curve

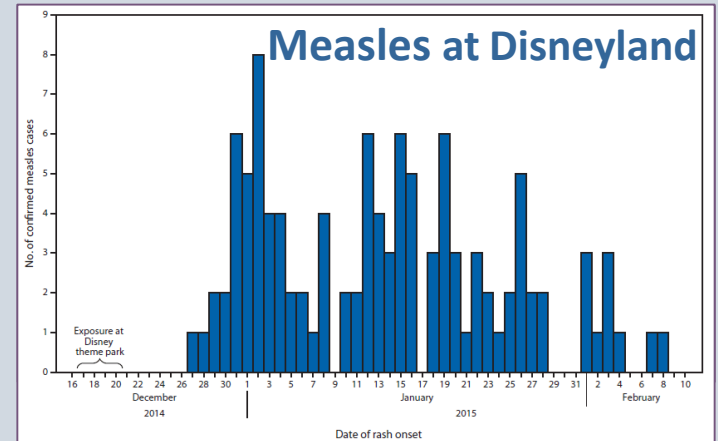
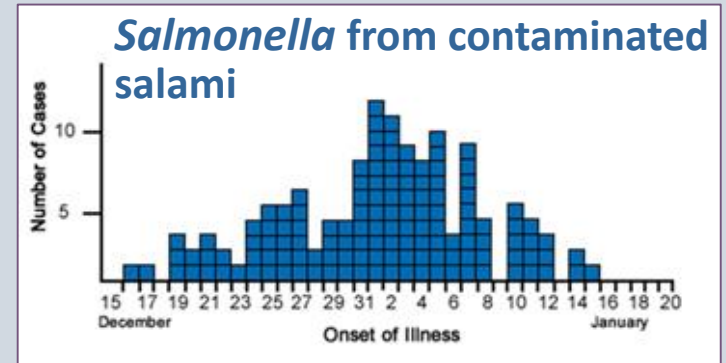
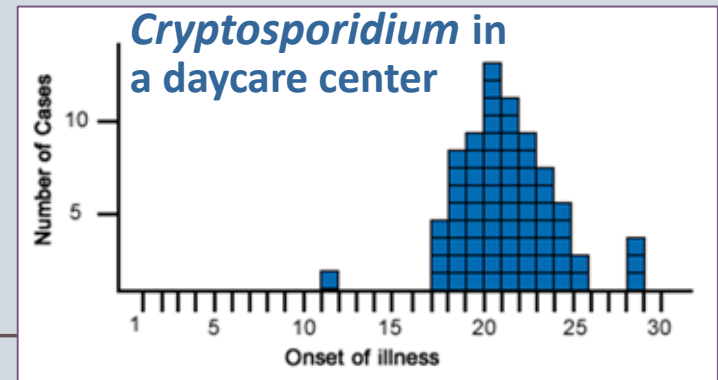
2. Make the epidemiology curve, line list and bed trace

- Specific group of people
 - LTACH residents – *C. difficile*
 - Children in daycare – *Shigella*
- Presumed to be related
 - County fair attendees – *E. coli*
 - Airline passengers – *Salmonella*
- Clues to the source come from the epidemic curve



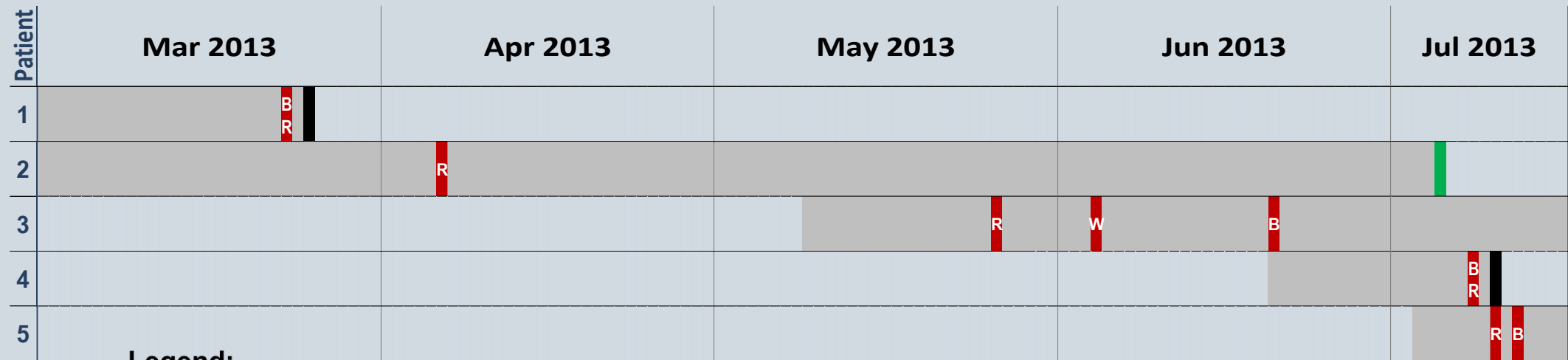
Epi Curve Clues

- **Point Source**
 - People come in contact with the source for a short time (picnic, flight)
 - Fast increase, slower decline
- **Continuous Common Source**
 - People come in contact with the source over a longer period of time (foodborne outbreaks)
 - Slow increase, slow decline
- **Propagated Outbreak**
 - No common source; rather, person-to-person
Pattern follows the incubation period



Steps in an Investigation: Step #2, Bed Trace

2. Make the epidemiology curve, line list and bed trace



Legend:

- Days in Burn Unit
- Positive culture for *Acinetobacter* (“B” = blood, “R” = respiratory, “W” = wound)
- Patient death
- Patient transferred out of Burn Unit


Steps in an Investigation: #3 - 5

3. **Develop a hypothesis** – driven by line list / bed trace
 - Transmission: person to person, fomite, airborne, droplet
 - Source: recent community picnic; construction or hospital maintenance
 - May need a case-control study to identify risk factors

4. **Take appropriate infection control measures**
 - Isolation, PPE
 - No new admits to a unit
 - Unit closure
 - Remove certain products / lot #'s

Steps in an Investigation: #6

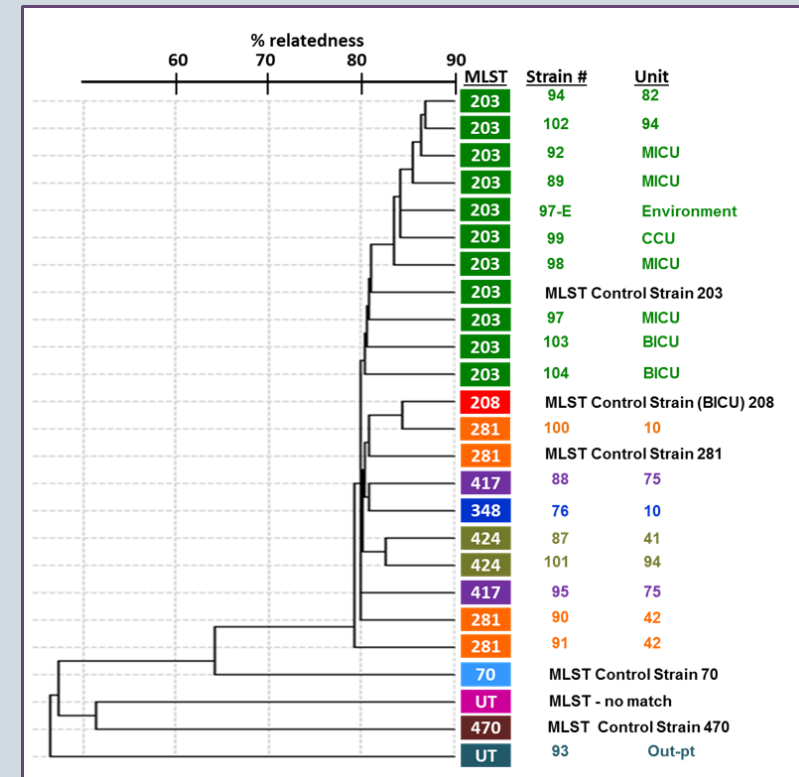
6. Test your hypothesis

- Cultures
 - Devices (duodenoscopes)
 - Infusates
 - Environment
 - Patient cultures (active surveillance)
 - Unit education
 - Develop talking points for patients
 - Media relations assistance
 - Molecular testing / typing
- 
- Seek expert guidance: Department of Health, CDC, manufacturer
 - May need to contact FDA (Safe Medical Device Act – SMDA)

Molecular testing / typing

Help determine if there's truly an outbreak or multiple importations of the same organism

- **Typing methods:**
 - Multi-locus sequence typing (MLST)
 - PCR ribotyping
 - Pulse field gel electrophoresis (PFGE)
 - Whole genome sequencing (WGS)
- **Rapid tests**
 - PCR detection of different carbapenem-resistance genes
 - (MALDI-TOF)

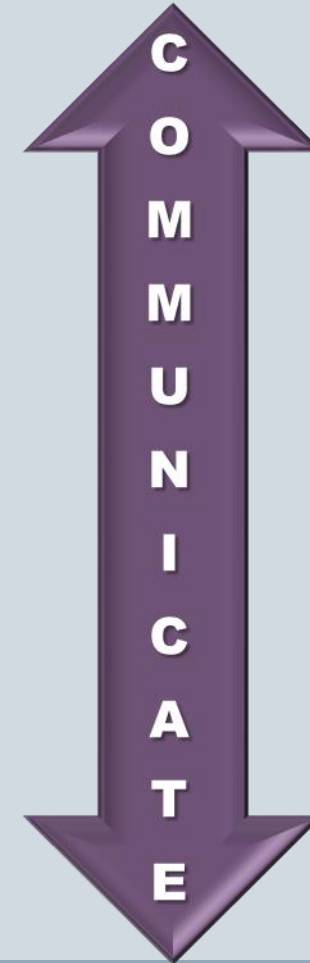


Steps in an Investigation: #7 - 8

7. Monitor impact

- Review epi curve line list, bed trace
- Testing results

8. Revise and refine your strategy



Communicating Effectively

- Seek media training at your institution
- On-line training at CDC's Crisis & Emergency Risk Communication:
<https://emergency.cdc.gov/cerc/index.asp>
- Know your audience and work with your media relations colleagues to craft your message:
 - Internal/hospital communication
 - Patients and visitors
 - Media



Be timely, be calm, be credible

Key Elements of Your Message

- Keep it concise and avoid jargon: *“We are seeing an unusually high number of flu patients coming into the hospital.”*
- Don’t overly reassure: *“Many people with flu will recover on their own, but some will need medical attention or hospitalization, especially if they have weakened immune systems.”*
- Emphasize that processes are in place to deal with the crisis: *“Our clinical staff is working with the Health Department to facilitate access to vaccination.”*
- Give ~3 action steps; use positive language: *“Get your flu shot. Cover your cough. Clean your hands frequently.”*

Key Elements of Your Message

- Provide options: *“You can get your flu shot at your local pharmacy, doctor’s office or the downtown free clinic.”*
- Use personal pronouns: *“We are committed to maintaining the health...”*
- Acknowledge people’s fears and maintain cultural sensitivity: *“We understand that it is normal to feel anxious...”*
- Avoid humor and be cognizant of live microphones

SUMMARY

- SHEA/CDC Outbreak Response Training Program (ORTP)

<http://ortp.shea-online.org>

- 7 Investigation steps
 1. Confirm
 2. Epi curve, line list, bed trace
 3. Hypothesize
 4. Infection control
 5. Hypothesis testing
 6. Monitor
 7. Revise and refine
- COMMUNICATE
 - Be timely
 - Be calm
 - Be credible

References and Free On-Line Trainings

- Principles of Epidemiology in Public Health Practice, Third Edition:
<https://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson1/section11.html>
- Outbreak Response Training Program: <http://ortp.shea-online.org>
- Effective Communication in Emergencies:
<https://emergency.cdc.gov/cerc/resources/index.asp>
- Fun outbreak-solving exercises:
<https://www.cdc.gov/mobile/applications/sto/web-app.html>

Thank you!!!!

Questions?

nicole.iovine@medicine.ufl.edu