



Outbreaks and Infection Emergencies



Basics of Infection Prevention
2-Day Mini-Course
2016

Objectives

- Recognize unusual infections or disease occurrences that require action
- List steps to begin an outbreak investigation
- Discuss development of line lists and epi curves for investigating, confirming, and managing an outbreak
- Describe internal and external communication

Unusual Infectious Disease Occurrences and Emergencies

- Infectious disease outbreaks and other healthcare emergencies must be reported to local public health *and* CDPH
- All cases of reportable diseases and conditions* must be reported to local public health
- Single cases of certain diseases are emergencies and require immediate action, e.g. meningococcal infections

* Refer to California Reportable Diseases and Conditions list (see references)



Examples of Unusual Occurrences in Hospitals

- Increase or cluster of healthcare-associated **infections**
- Increase in cases of a **reportable disease**
- **Water leak** damage to hospital kitchen, resulting in interruption in ability to provide food for patients
- **Fire** in pharmacy resulting in loss of medication stock
- **NICU** admits more neonates than hospital has license to care for leading to possible overcrowding
- **Food poisoning** affects patients or staff

Notification of Public Health Officials

- **Coordinate** with your facility Administration; discuss situation and how it affects patient safety
- **Determine** who makes the phone call and have information available about the occurrence and steps you and your team are taking to keep patients and staff safe
- **Contact:** local public health office (Acute Communicable Disease Unit)
- **Contact:** California Department of Public Health, Licensing and Certification



Recognizing an Outbreak

- Greater number of infections than usual are found during routine surveillance
 - Example: Resistant Acinetobacter in sputum in several ICU patients
- An unusual pathogen or infection is identified
 - Example: Botulism, Legionella
- Reports of a “cluster” of patients or employees with same symptoms during same time period
 - Example: sudden onset of GI symptoms or diarrhea

Sources for Identifying Potential Outbreaks

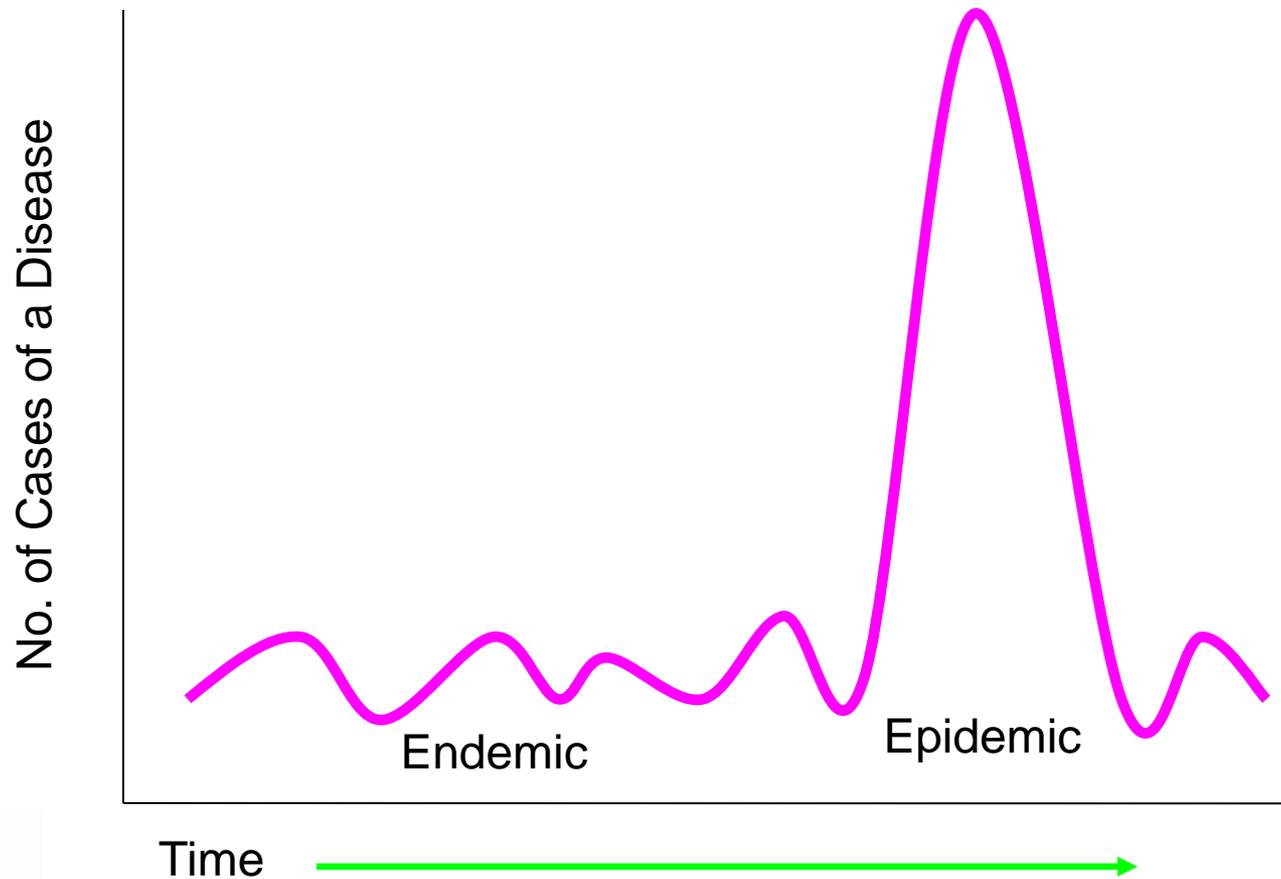
- Microbiology lab: Reviews culture reports for trends and unusual pathogens
- Local physicians: Phone calls or office visits from patients reporting similar unusual symptoms
- Public Health: Seeing large volume of an illness in community
- Nursing units: new symptoms common to multiple patients or ill employees
- Emergency Department



Common Healthcare-related Outbreaks

- Related to food
 - Salmonella, campylobacter, norovirus, staph
- Related to improper sterilization / disinfection
 - Pseudomonas related to scope processing
- Related to community visits to ER / admits
 - Influenza, measles, pertussis
- Related to improper infection prevention practices
 - Cluster of MRSA, VRE, Acinetobacter, C difficile
 - Scabies transmission

Endemic vs. Epidemic Infections



Confirming an Outbreak

If you suspect an outbreak

- Don't panic
 - Many suspected outbreaks are "pseudo-outbreaks"
 - Result from problems with collection methods, rumors, data inaccuracies
- Evaluate initial data or reports of disease
 - Look carefully at lab or clinical reports to confirm initial findings
 - Interview staff
 - Rule out misdiagnoses or lab errors
- Ask microbiology lab to save isolates

Is it an Outbreak?

An increase in number of cases of disease above what is normally expected (baseline) on a particular unit or specific site

- Influenza
- Norovirus
- Clostridium difficile
- Carbapenem-Resistant Enterobacteriaceae (CRE)
- One case of healthcare-associated *Legionella*, *Salmonellosis*
- One case of post-operative group A *streptococcus* infection

Steps in an Outbreak Investigation

- Verify the diagnosis and confirm possible outbreak
- Define a case; refine as you learn more
 - Example “patient with new onset diarrhea after surgery”
- Conduct case finding
 - Make a line list
 - Characterize by **person, place, time**
- Identify team members, e.g. ICU director, lab manager
- Implement immediate control measures if needed
- Evaluate control measures – any new cases?
- Communicate findings with leadership throughout

Document the Outbreak Investigation

Word to the wise...

- Start a file folder immediately
- Make notes of
 - What you did each day
 - Who was notified
 - Include dates and times
- Keep a timeline
- Your documentation will be needed
- Keep everything!



Case Finding

- Look back in time for more cases
 - Lab or medical records may be able to help
- May need to collect specimens
 - Patient cultures
 - Environmental cultures
 - Be wary of swabbing noses of employees/physicians
- Characterize cases of disease by person, place and time
 - add info to your line list
 - Who got sick?
 - Where were they when they got sick?
 - When did they get sick?

Develop a Line List

- Include
 - Name and Medical Record Number
 - Age, Sex, Diagnosis
 - Unit or location
 - Date of Admission / Date of onset
 - Procedures
 - Symptoms
 - Positive cultures
- Use of an Excel spread sheet can be helpful
- Blank outbreak logs may be available from local public health

Investigate Symptomatic Patients

- What are the prominent symptoms?
- When did they begin?
- Did fever occur? When? Other vital signs?
- Who may have been exposed?
 - Maintain census for affected unit
 - List staff who provided care
- How many and who ate which foods? Who became ill?

Sample Line List

Name	MR#	Admit Date	Age	Sex	Unit / Room	Culture	Surgery	Surgeon Room
Smith	23456	3/1	49	F	313	MRSA	CABG	Doe / 6
Jones	54328	3/2	55	M	314	MRSA	Appy	Moore / 5
Brown	34567	3/2	61	F	315	MRSA	Chole	Stone / 4

Checkpoint: What do these patients have in common?

Sample Line List for Foodborne Outbreak

Name	MR #	Unit/Room	Symptoms	Onset	Foods Eaten
Lopez	64654	414	N/V/D	3/3	Potato Salad Tuna Sandwich Iced Tea
Ball	45463	623	N/V/D	3/3	Potato Salad Meat Loaf Lemonade
Penn	76785	733	N/V/D	3/3	Potato Salad Ham Sandwich Pepsi
Newby	33435	544	N	3/3	Macaroni & Cheese Coffee

Before you begin...

- Talk to the lab and ask them to save ALL isolates that might be part of the outbreak!
- Save potential reservoirs (e.g., multidose medications, antiseptics, equipment, food) for possible culturing later.

Implement Outbreak Control Measures

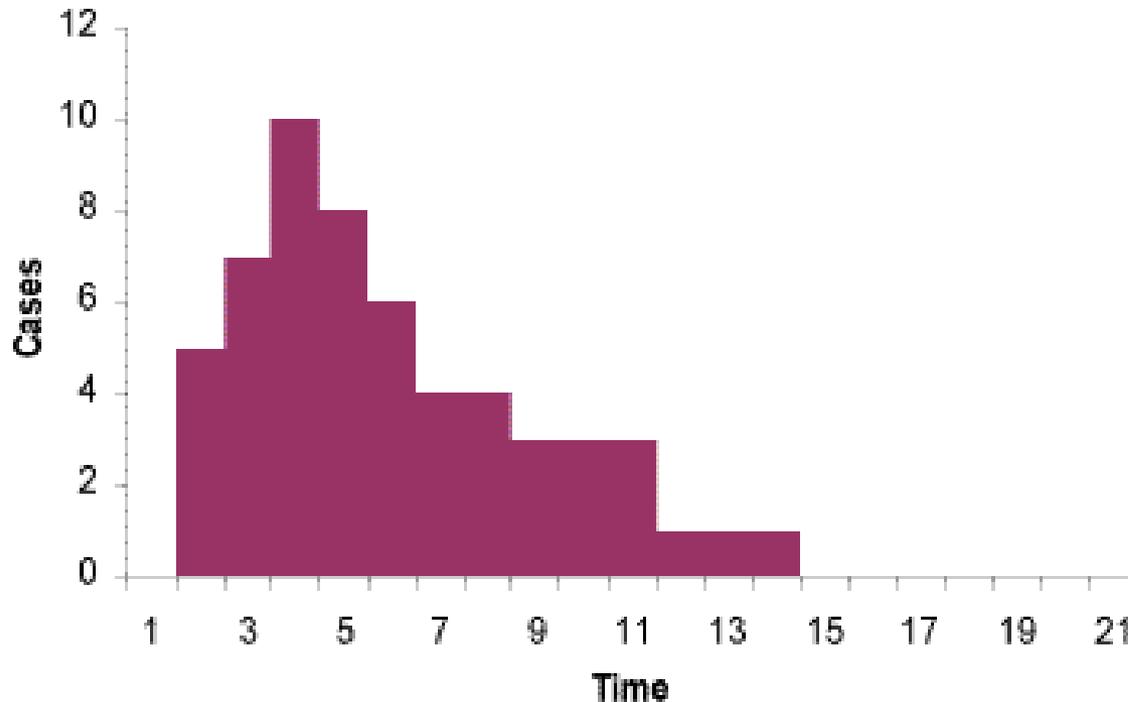
Based on working hypothesis

- Food outbreak?
 - Stop serving suspected food item
 - Ask dietary to save food (Testing may be useful)
- Suspect contaminated IV fluids?
 - Remove from use and save suspected lot numbers
 - Consider culturing
 - Notify manufacturer or distributor
- Acinetobacter cluster in ICU?
 - Review hand hygiene compliance
 - Observe equipment and cleaning protocol
 - Need to cohort/isolate?

Develop an Epidemic Curve

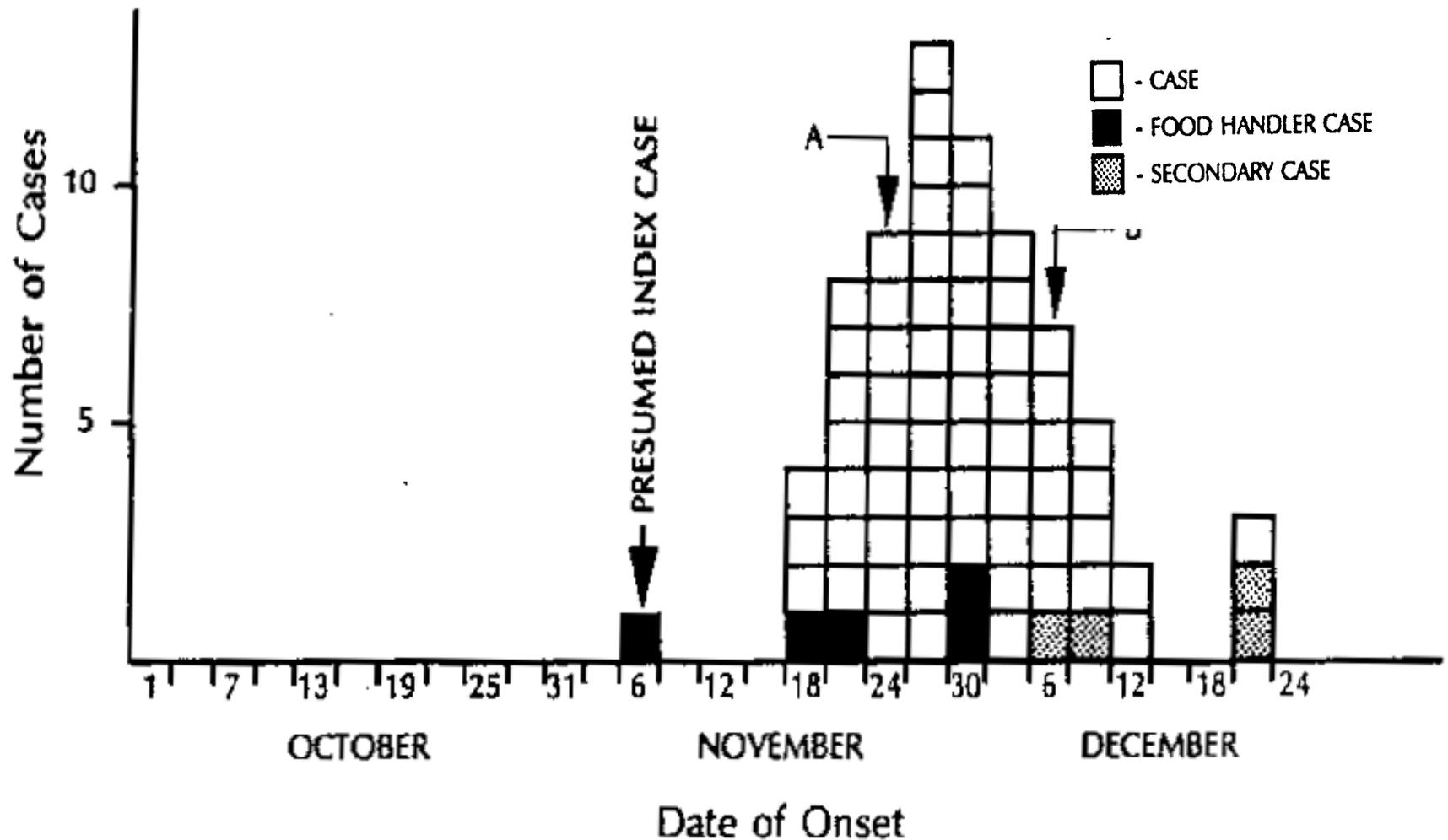
- Graph showing all cases of disease during the epidemic period
 - Cases plotted by illness onset date or time
- Helps to determine
 - whether problem is ongoing
 - if additional cases are forthcoming
 - if control measures are effective
- Visualization of cases with and without suspected exposure variables can assist in determining cause of the outbreak

Epi Curve of Point Source Outbreak



- Most common form of transmission in food-borne disease outbreak
- Large population is exposed for a short period of time.

Foodborne Outbreak with Secondary Transmission



Source: CDC, unpublished data, 1978



Outbreaks Happen

Where would you look?

- Hepatitis C transmission in an outpatient clinic
 - Question if improper injection practices are used
 - Clean medication preparation area?
- Cluster of NICU pseudomonas infections
 - Who cleans the respiratory therapy equipment?
 - Any “common bags” of medication used?
- Patients with positive Legionella
 - Can you rule out community onset?
 - Did you have units out of service for some time so water lines are contaminated?

Outbreak Investigation Considerations

- Investigation may not occur in a step-wise fashion
- Steps often done simultaneously
- Information constantly evolving
- Case definition may change
- You may feel like you are “drinking from a fire hose” because things can move very quickly
- You may not know which intervention was the most effective
- Sometimes cause of outbreak cannot be identified

Resources and References

- Local public health officer
- APIC Text
- Control of Communicable Disease in Man
- www.outbreak-database.com
- www.cdc.gov
- APIC colleagues

Questions?

For more information, please contact any
HAI Liaison Team member

Thank you

