Outbreaks and Infection Emergencies

Basics of Infection Prevention
2-Day Mini-Course
2015

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)

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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

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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

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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

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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

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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

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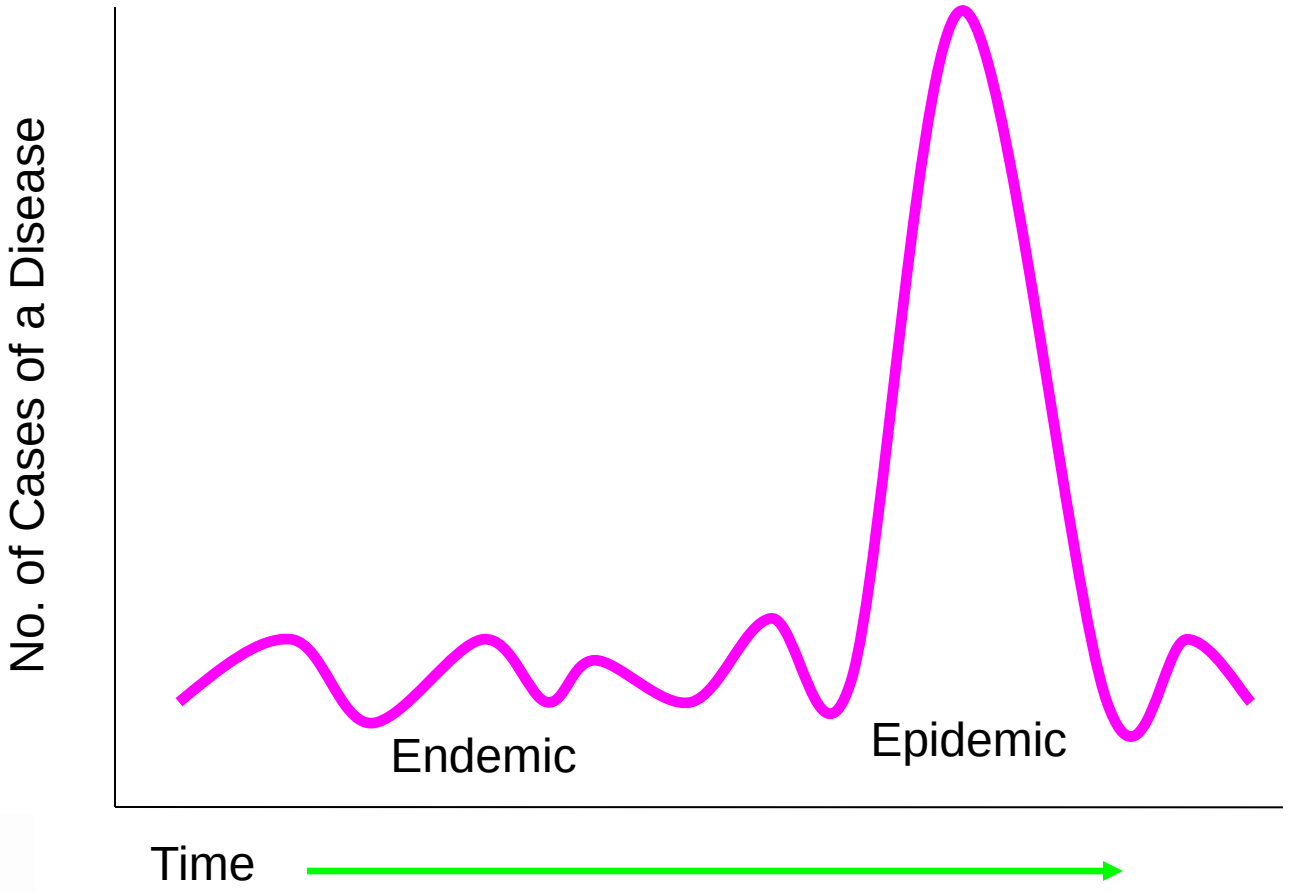
Endemic vs. Epidemic Infections



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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

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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

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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

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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!

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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?

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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

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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?

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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

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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?

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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

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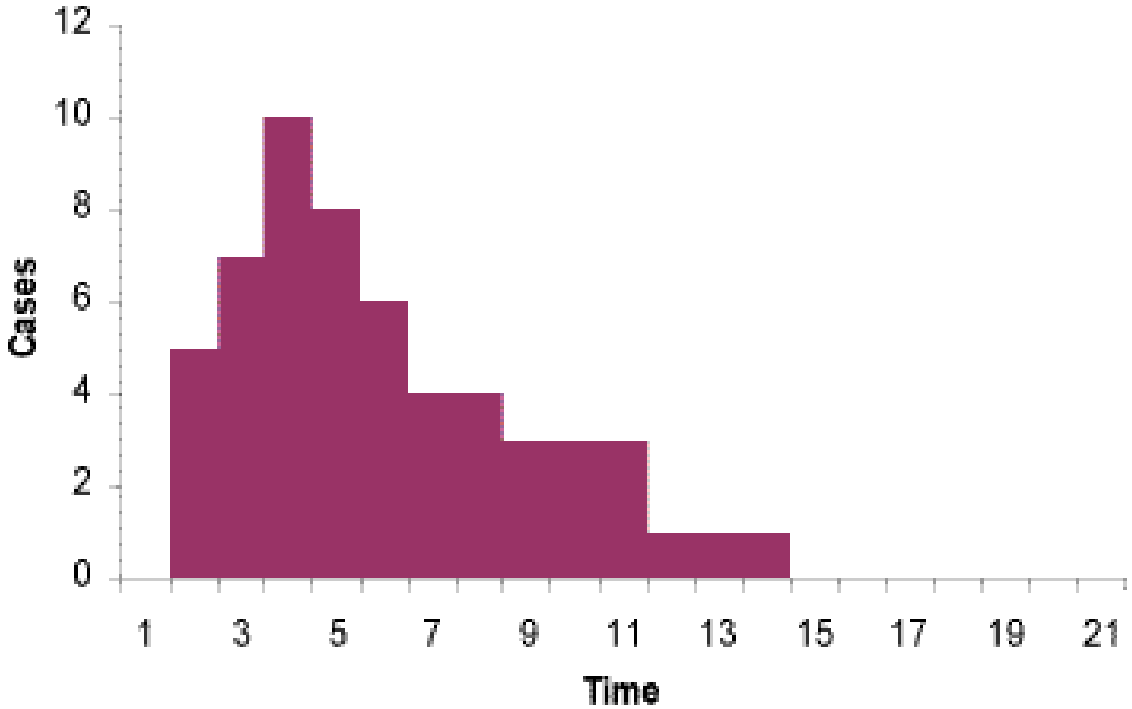
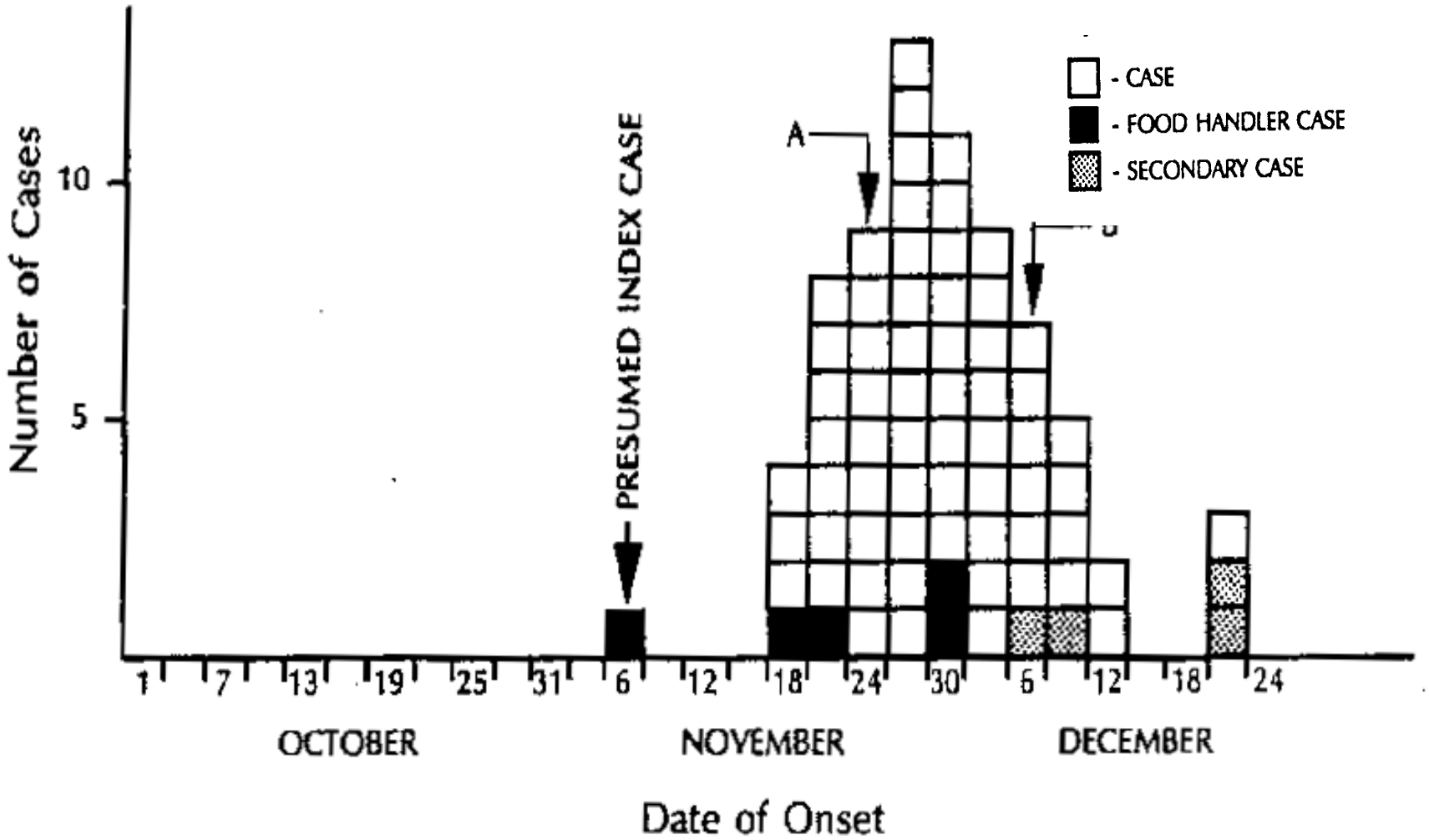
Epi Curve of Point Source Outbreak



- 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?

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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

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Resources and References

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

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Questions?

For more information, please contact any HAI Liaison Team member

Thank you

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