Outbreak Investigation

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Definitions

- Endemic
  - The usual occurrence of a disease in a given area during a specific time
- Epidemic
  - Occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time
- Outbreak
  - Epidemic in a more limited geographic area
- Cluster
  - Aggregation of cases in a given area over a particular period without regard to whether the number of cases is more than expected
- Pandemic
  - An epidemic that has spread over several countries or continents, usually affecting a large number of people

Where do outbreaks occur?

- Healthcare facility
- Community
- Community- originated in healthcare facility
- Congregate settings

Infection control in a healthcare facility may also prevent an outbreak in the community

Who should be involved?

In the hospital

- Infection prevention
- Epidemiology
- Microbiologist
- Clinician
- Staff from the affected ward/unit

Other partners

- Local Health Department
- State Health Department
- State Bureau of Laboratories

Outbreak investigation

1. Establish existence of an outbreak
2. Confirm diagnosis
3. Case definition (who's at risk? Person, place and time)
4. Case finding- systematically
    a) Create a Case line list
5. Descriptive epidemiology
6. Develop hypothesis
7. Evaluate hypothesis using epi data
8. Use laboratory information
9. Re-evaluate, reconsider hypothesis
10. Implement infection control and prevention measures
11. Initiate or maintain surveillance
12. Communicate findings

1. Establish the existence of an outbreak

- Make sure the outbreak is real. Ask questions!
  - What's the background rate?
  - New lab tests?
  - Increased testing?
  - New procedure/surgery?
  - New definition?

2. Confirm the diagnosis

- Call the lab
- Talk to physicians
- Do not rely on word of mouth!

3. Case definition

- Always contains
  - Person
  - Place
  - Time
  - Identifying clinical/laboratory criteria
- May have different classifications
  - Suspect
  - Probable
  - Confirmed

4.Systematic case finding

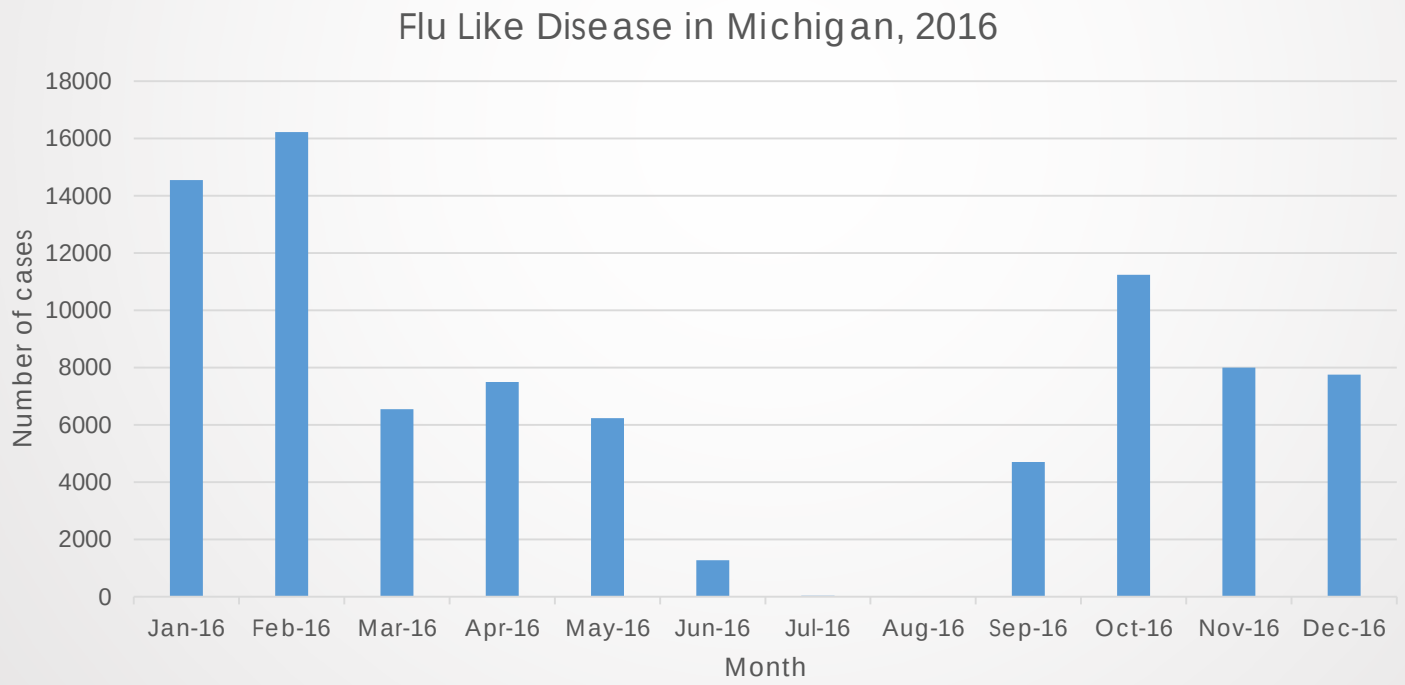
- Create a line list- What to include?
  - ID
  - Name
  - DOB
  - Admit date
  - Admit Dx
  - Admit unit
  - Procedure Date
  - Specimen Collection
  - Specimen Source
  - ABX

5. Descriptive epidemiology

- Describe your data by person, place, and time
- Characterization of the outbreak
- Provides clues
- Can begin intervention/prevention measures

5. Descriptive epidemiology

- Epidemic Curves



Other useful descriptive epidemiology tools

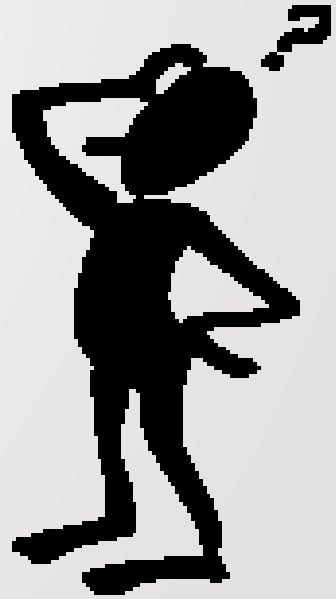
Map of Hospital/LTC

Geographic Map

(+) Animal Rabies Tests in Mammals- 2016

6. Develop hypothesis

- Using descriptive epidemiology, create a testable proposition for the cause of the outbreak
- Conduct a literature review?
- Hypothesis should contain person, place, time



7. Evaluate hypothesis

- Does your hypothesis match the facts?
- Consider
  - Environmental evidence
  - Laboratory results
  - Epidemiology

8. Use laboratory information

- Epidemiology information can implicate but laboratory evidence is the confirmation!
  - Maybe…

9. Re-evaluate, reconsider hypothesis

- If exposure histories for ill vs well are not significantly different- try again!

10. Implement infection control and prevention measures

- Prevent exposure
- Prevent infection
- Prevent disease
- Prevent death

11. Initiate or maintain surveillance

- Initiate Active Surveillance: Plan to monitor for new or on-going cases. First figure out the scope
  - Who, what, when, where, how
  - Duration
  - Is it sustainable?

12. Communicate findings

- Communication is key. Remember to keep people in the loop.
- Prepare a final report and distribute to all stakeholders