Outbreak Response

Facilitator Name
Date

Objectives

When you have completed this session, you will be able to:

- Determine the appropriate response based on priorities
- Determine the correct control strategy
- Plan to conduct a response

What are the objectives of your investigation?

- Identify the
  - agent
  - source, and/or
  - mode of transmission
- Characterize the extent of the outbreak, e.g., who has been affected, who is at risk
- Identify exposures or risk factors that increase risk of disease
- Develop and implement control and prevention measures

Goal for controlling infectious diseases

- Reduction
- Elimination
- Eradication

Components of control measures

- Inform health professionals and the public of the
  - Likely causes of disease
  - Risk of contracting the disease
  - Essential control steps to manage the disease
- Implement control measures
- Monitor effectiveness of control measures through continued surveillance

Determinants for intervention

- Severity of a specific problem:
  - Degree and nature of complications (mortality)
  - Duration of illness
  - Need for treatment and hospitalization
  - Economic impact
- How certain you are that an investigation is needed
- The source and/or mode of spread

Relative priority of investigative and control measures

Causative Agent \ Source/Mode of Transmission	***Known***	***Unknown***
Known	Investigation **+** Control **+++**	Investigation **+++** Control **+**
Unknown	Investigation **+++** Control **+++**	Investigation **+++** Control **+**

+++ Higher Priority

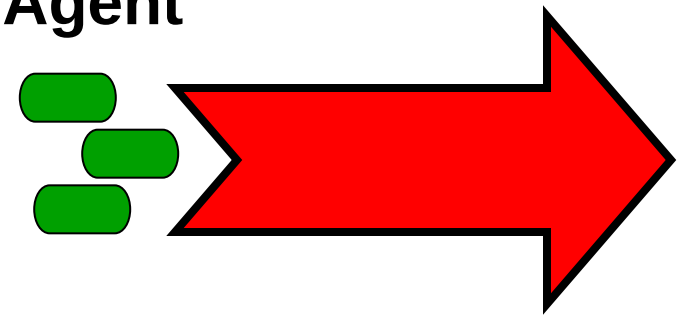
+ Lower Priority

Chain of Infection

Reservoir

Agent

Route of Transmission

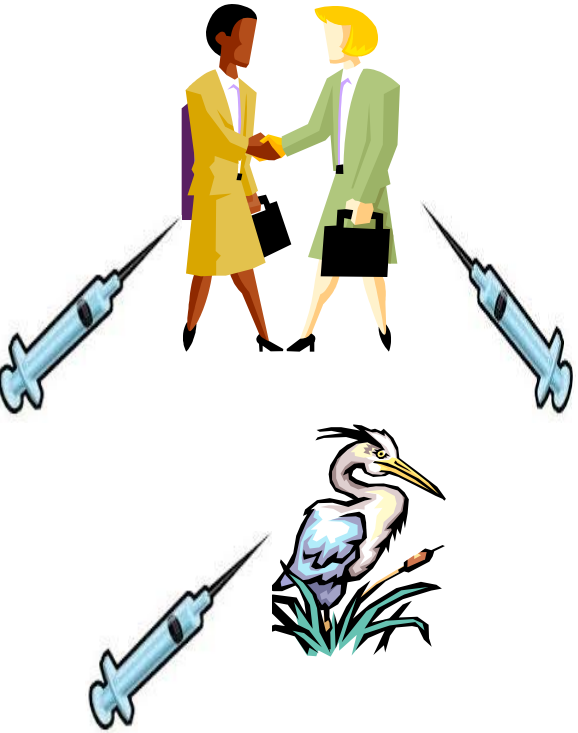


Susceptible Host (via portal of entry)

Control Strategies for Reservoir: Humans

- Vaccinate potential members of reservoir

Reservoir



Control Strategies for Reservoir

Reservoir

- Vaccinate potential members of reservoir
- Treat infected patients

Control Strategies for Reservoir

Reservoir

- Vaccinate potential members of reservoir
- Treat infected persons
- Isolate infected persons

Control Strategies for Reservoir

Reservoir

- Vaccinate potential members of reservoir
- Treat infected persons
- Isolate infected persons
- Quarantine exposed persons

Control Strategies for Reservoir

Reservoir

- Vaccinate potential members of reservoir
- Treat infected persons
- Isolate infected persons
- Quarantine exposed persons
- Implement cordon sanitaire

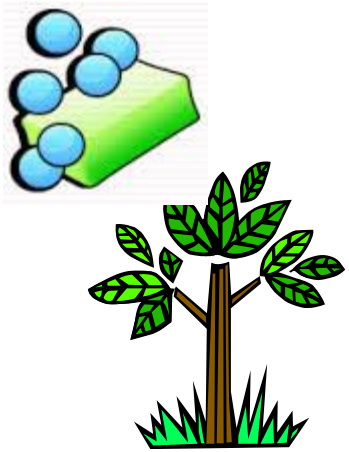
Control Strategies for Reservoir

Reservoir

- Vaccinate potential members of reservoir
- Treat infected persons
- Isolate infected persons
- Quarantine exposed persons
- Implement cordon sanitaire
- Cull

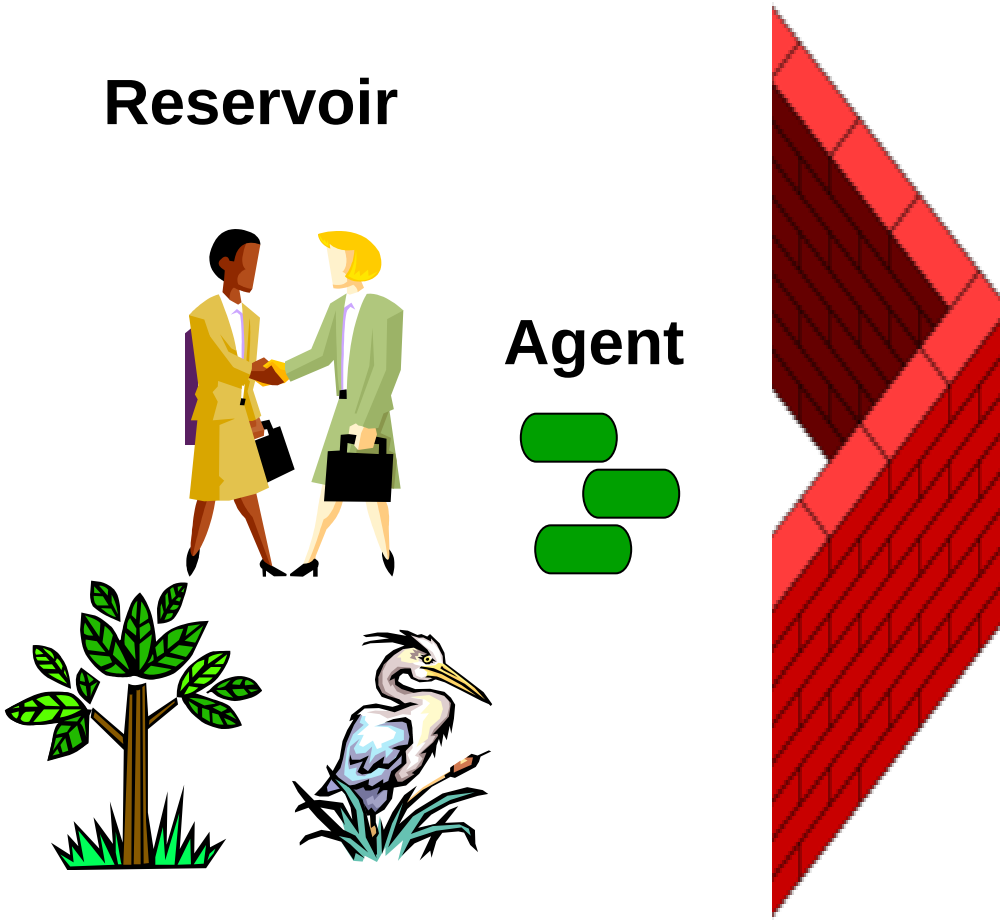
Control Strategies for Reservoir

Reservoir



- Vaccinate potential members of reservoir
- Treat infected persons
- Isolate infected persons
- Quarantine exposed persons
- Implement cordon sanitaire
- Cull
- Clean or disinfect

Control Strategies at Portal of Exit

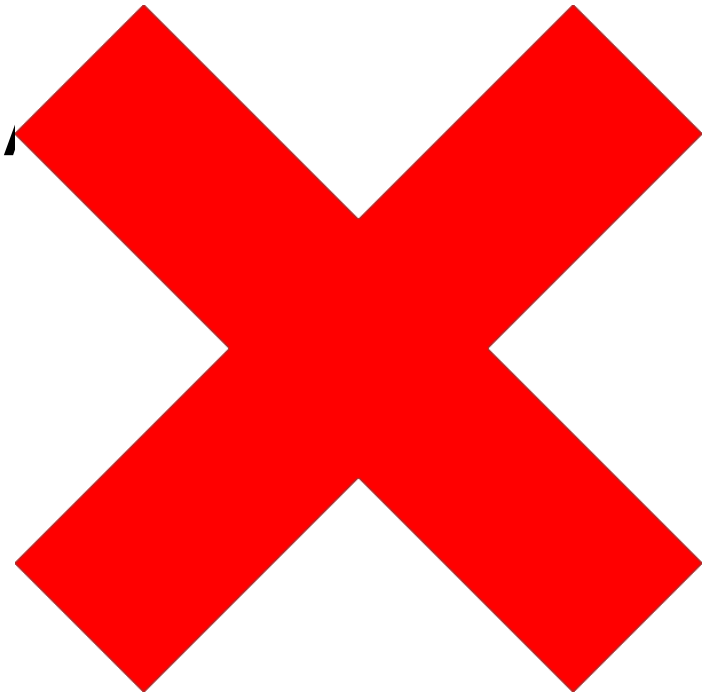


- Behavior change
- Barriers

Control Strategies Based on Transmission

Reservoir

Route of Transmission



Susceptible Host (via portal of entry)

Chain of Infection: Routes of Transmission

Direct:

- Touching, kissing, intercourse
- Droplet
- Transplacental

Indirect:

- Airborne
- Vector-borne
- Vehicle-borne
  - Food
  - Water
  - Biologics
  - Fomites
  - Other

Chain of Infection: Routes of Transmission

Indirect:

- Airborne
- Vector-borne
- Vehicle-borne
  - Food
  - Water
  - Biologics
  - Fomites
  - Other

Chain of Infection: Routes of Transmission

Indirect:

- Airborne
- Vector-borne
- Vehicle-borne
  - Food
  - Water
  - Biologics
  - Fomites
  - Other

- Private room with negative pressure
- Door closed, wear N95 masks

Chain of Infection: Routes of Transmission

Indirect:

- Airborne
- Vector-borne
- Vehicle-borne
  - Food
  - Water
  - Biologics
  - Fomites
  - Other

- Eliminate breeding sites
- Kill vector (larvicide, adulticide)

Chain of Infection: Routes of Transmission

Indirect:

- Airborne
- Vector-borne
- Vehicle-borne
  - Food
  - Water
  - Biologics
  - Fomites
  - Other

- Heat, pasteurize, irradiate
- Bar infected foodhandler from working

- Chlorinate

Chain of Infection: Routes of Transmission

Indirect:

- Airborne
- Vector-borne
- Vehicle-borne
  - Food
  - Water
  - Biologics
  - Fomites
  - Other

- Toss
- Sterilize

- Disinfect / sterilize

Prevent Entry, Protect the Host

- Behavior change
- Exclusion
- Use barriers
- Vaccination
- Passive immunization
- Pre-exposure prophylaxis
- Post-exposure prophylaxis
- Improved host resistance
- Contact tracing or partner notification, then screening / treatment

Susceptible Host
(via portal of entry)

Long-term Response

- Why did the outbreak occur?
- Do these conditions still exist, i.e., could another outbreak occur again?
- What is needed to change the conditions and reduce possibility of future outbreak?
  - Education?
  - Sanitation improvement / inspection?
  - Vaccination?
  - Legislation?
  - Other?

Exercise 6: Control the Outbreak!

1. On your own, review the scenario in your workbook.
2. Participate in the class discussion to answer the following questions.
   - What control measures would you recommend?
   - Is further investigation needed?

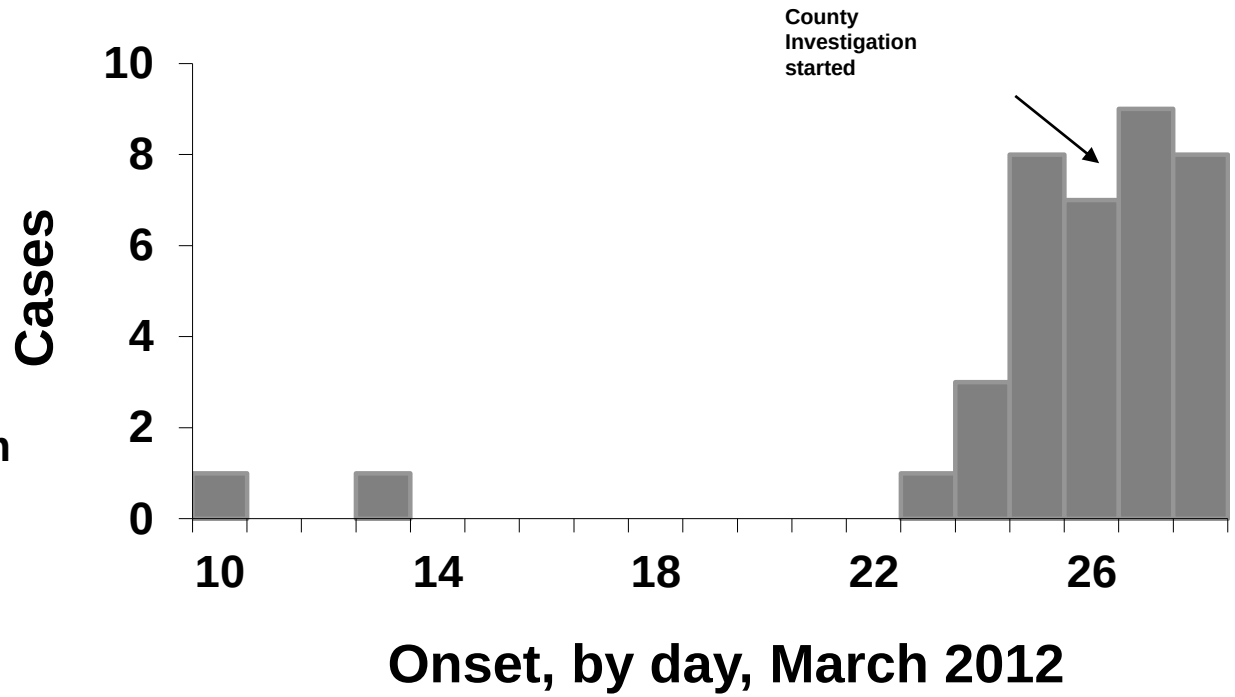
Exercise 6 Discussion

Cases ate at 3 branches of the same restaurant

Some workers at each restaurant had fever

Some workers at each restaurant had diarrhea

Salmonella isolated from workers and cases



Summary

- The ultimate reason for investigating an outbreak is to learn enough to stop the outbreak
- Control measures can be aimed at the reservoir, mode of transmission, or protecting the host
- Continued monitoring is essential to ensure that control measures actually work
- Broader and longer-term interventions may be appropriate to reduce the likelihood of recurrences