Foodborne Disease Surveillance and Control

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Overview

- Objectives
- Resources
- Routine Surveillance
    - Burden of Foodborne Illness
- Outbreak Surveillance
    - Logistics
    - Control measures
    - Key partners

Learning Objectives

- Know surveillance strategies (and their limitations)
- Recognize your role in the surveillance process
- Characterize the enteric disease burden in N.C.
- Describe key pieces of outbreak investigation
- Know where to find control measures
- State key partners for outbreak investigation

Resources

NC Communicable Disease Manual

- http://epi.publichealth.nc.gov/cd/lhds/manuals/cd/toc.html

North Carolina Food Code

- http://www.ncdhhs.gov/aging/food/NC_Food_Code_Manual_2009.pdf

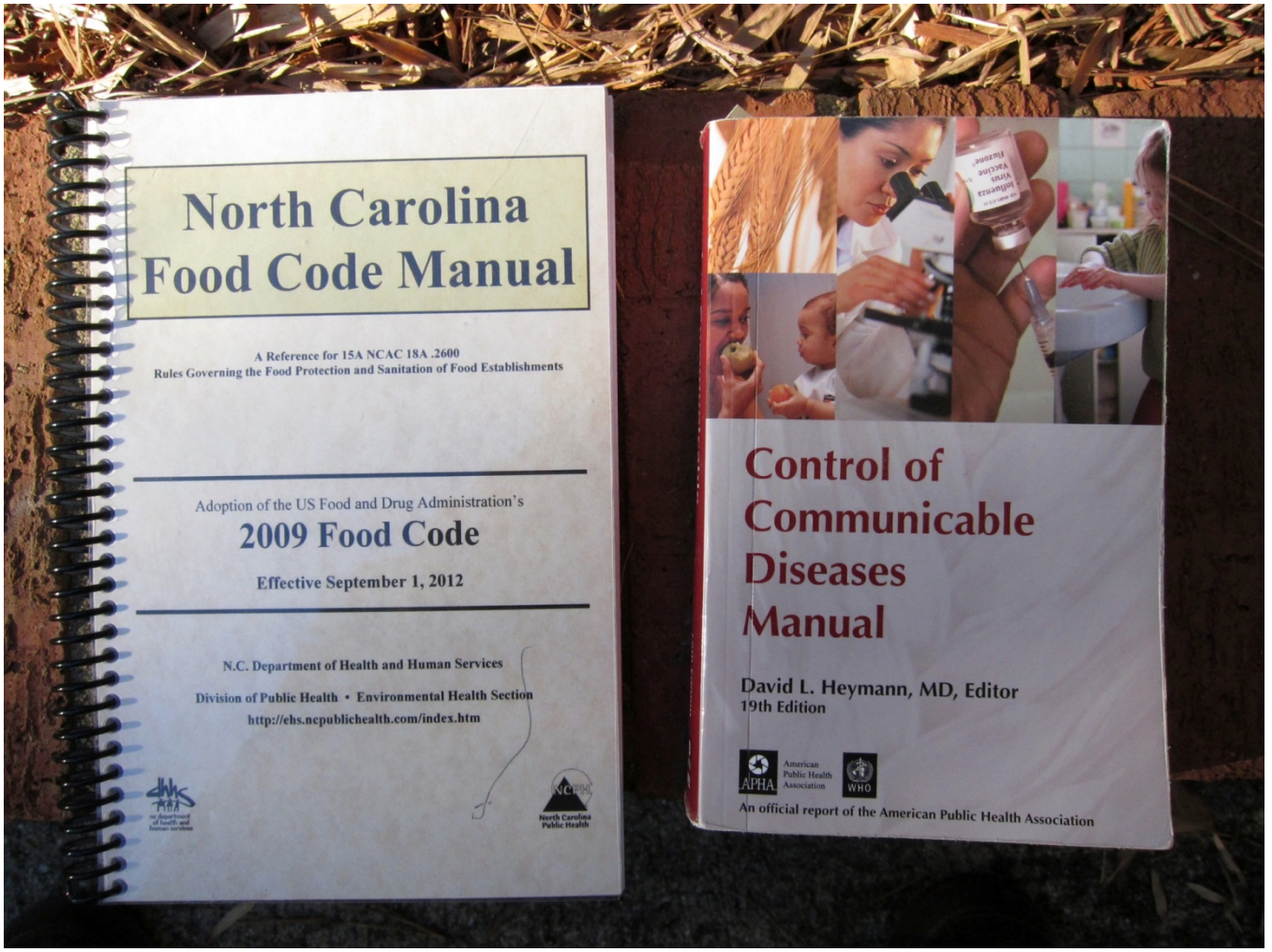
APHA Control of Communicable Diseases Manual

MMWR April 16, 2004 / Vol. 53 / No. RR-4

- Diagnosis and Management of Foodborne Illnesses

CDC: http://www.cdc.gov/foodborneburden/

Control Measures Resources: Don’t leave home without them



Concepts of Public Health Surveillance and Foodborne Disease

- Cases of foodborne disease illness and outbreaks likely represent a failure, at some level, of food safety processes
- Because of the possibility that a foodborne disease agent may be widely distributed throughout the community or nation it is important to investigate these cases

Surveillance

- Routine
  - Passive
  - Based on national case definition
- Outbreak
  - Active
  - Based on locally derived case definition

Causes Foodborne Illness/Intoxication

- Many causes, including infectious agents like bacteria, viruses and parasites, and noninfectious such as preformed algal toxins and chemicals
- The CIFOR guidelines provide a good overview

CIFOR
Council to Improve Foodborne Outbreak Response
Detect · Investigate · Control · Prevent

Foodborne Illness in NC is Reportable

- Campylobacter
- Cholera
- Cryptosporidium
- Cyclospora
- E. coli (STEC only)
- HUS
- Listeria
- Hepatitis A
- Norovirus
- Salmonella
- Shigella
- Vibrio (non-Cholera)
- foodborne disease, including Clostridium perfringens, staphylococcal, Bacillus cereus, and other and unknown causes
- Trichinosis
- Typhoid / Paratyphoid

Red = Have unique supplemental case report forms

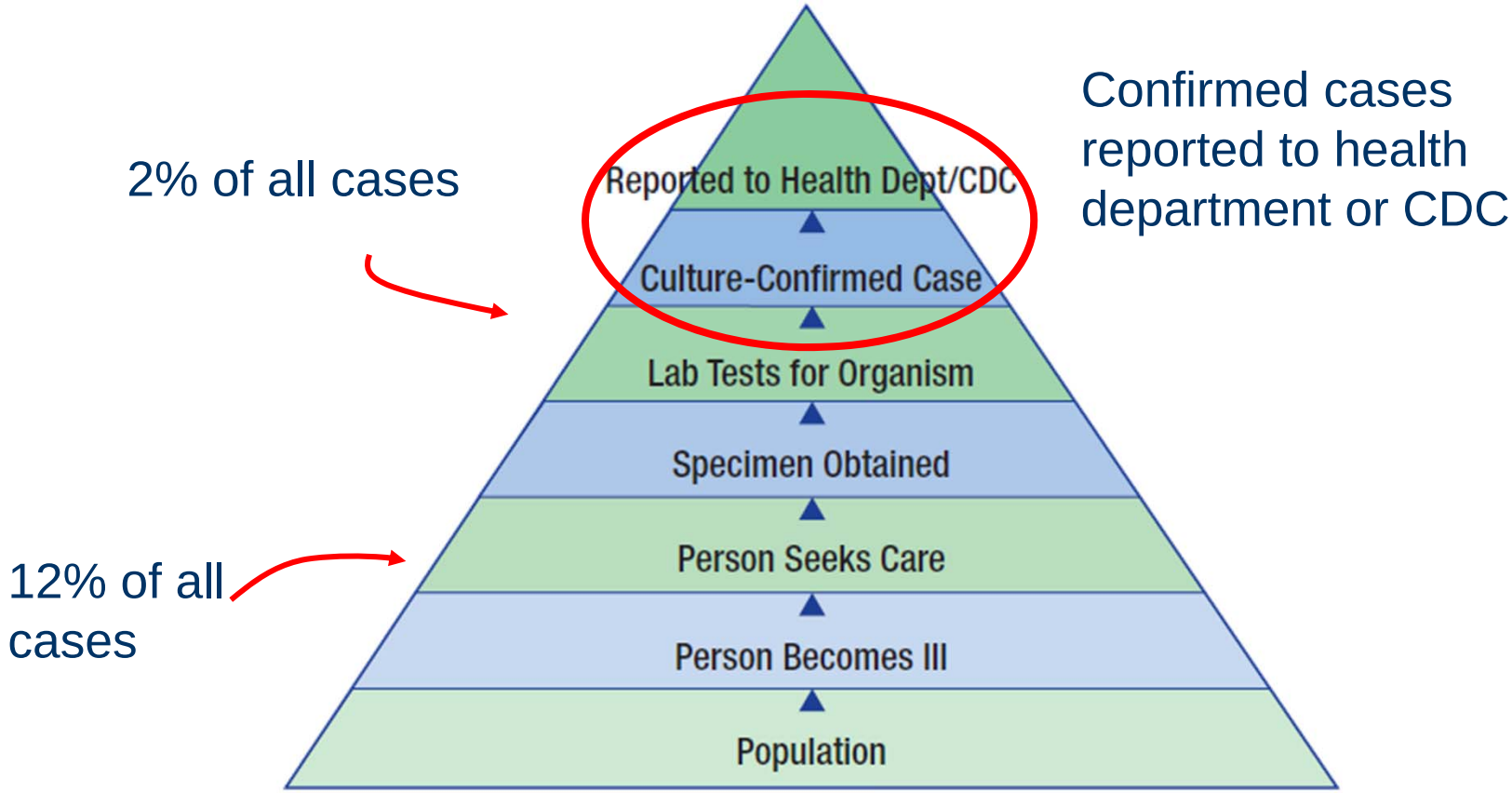
Surveillance Systems

- There are a number of national surveillance systems
- For now, lets discuss routine surveillance based on NCEDSS and NNDSS

Foundation of Surveillance in North Carolina

- National Notifiable Disease Surveillance System
- N.C. Electronic Disease Surveillance System Passive disease surveillance system
- HCPs and Laboratories required to report
- Underreporting is common

Why Under Reporting?



From Angulo et al, United States Department of Agriculture Report to Congress Food Safety and Inspection Service United States Department of Agriculture Washington, D.C. March 1999

More about under reporting…

- Known phenomena ; represents a limitation of the NNDSS
- ELR should increase the timeliness and sensitivity of reporting
  - 2009: 41% of 2056 salmonella events created by ELR
  - 2012: 49% of 2247 salmonella events created by ELR
- Less manual data entry will free staff time for other tasks
- ELR should diminish underreporting

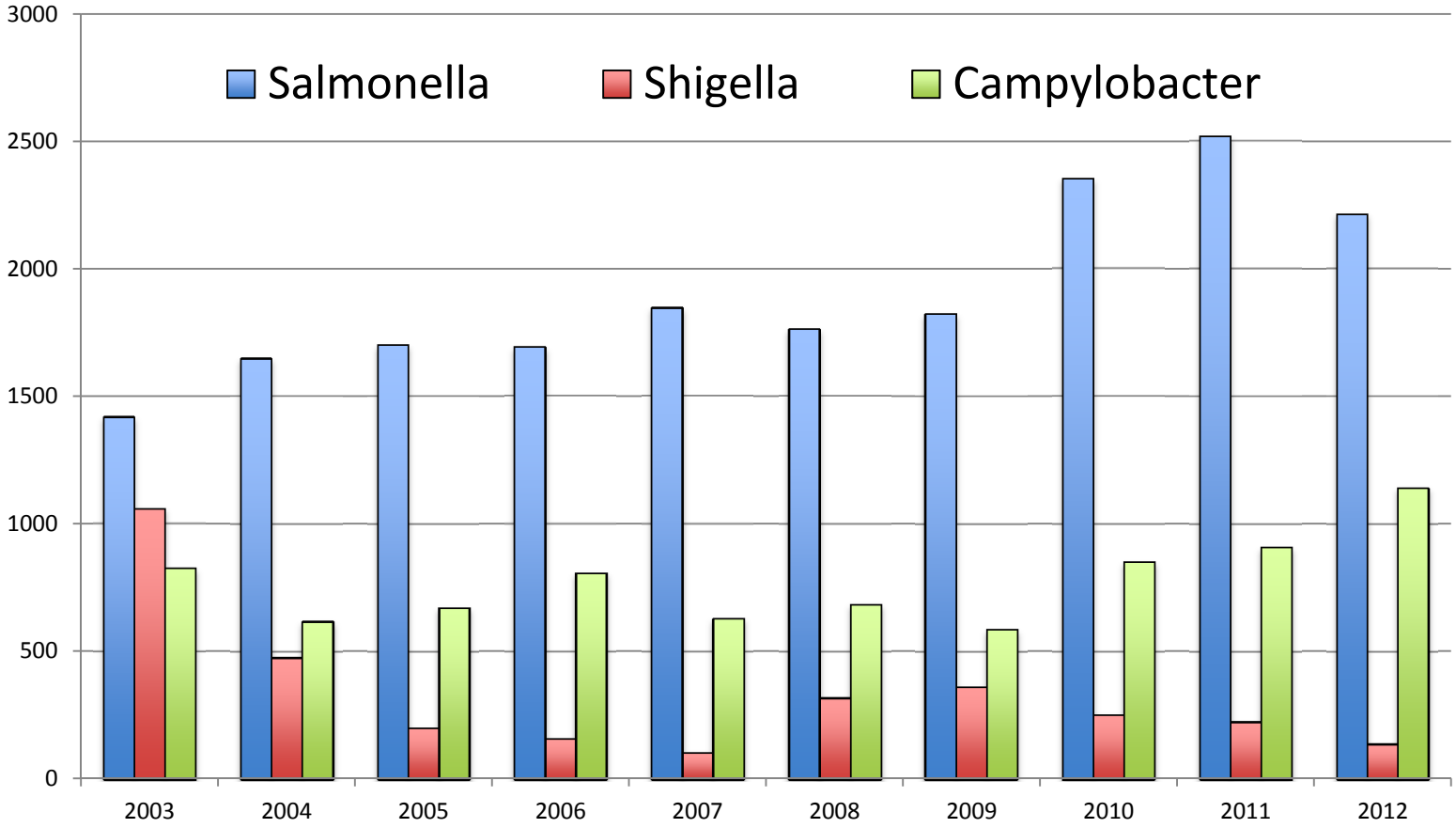
Non-culture Diagnostic Tests for Enteric Diseases

- Salmonella
- Campylobacter
- STEC
- Cryptosporidium (covered in waterborne)
- Be aware of false positives

Routine Surveillance

- Collection of laboratory and epidemiologic data on an ongoing basis is key to uncovering nationwide clusters and outbreaks that historically would have gone unrecognized
- Provides the basis for descriptive epidemiology for organisms under surveillance

Reported Cases by Year, NC, 2003-2012



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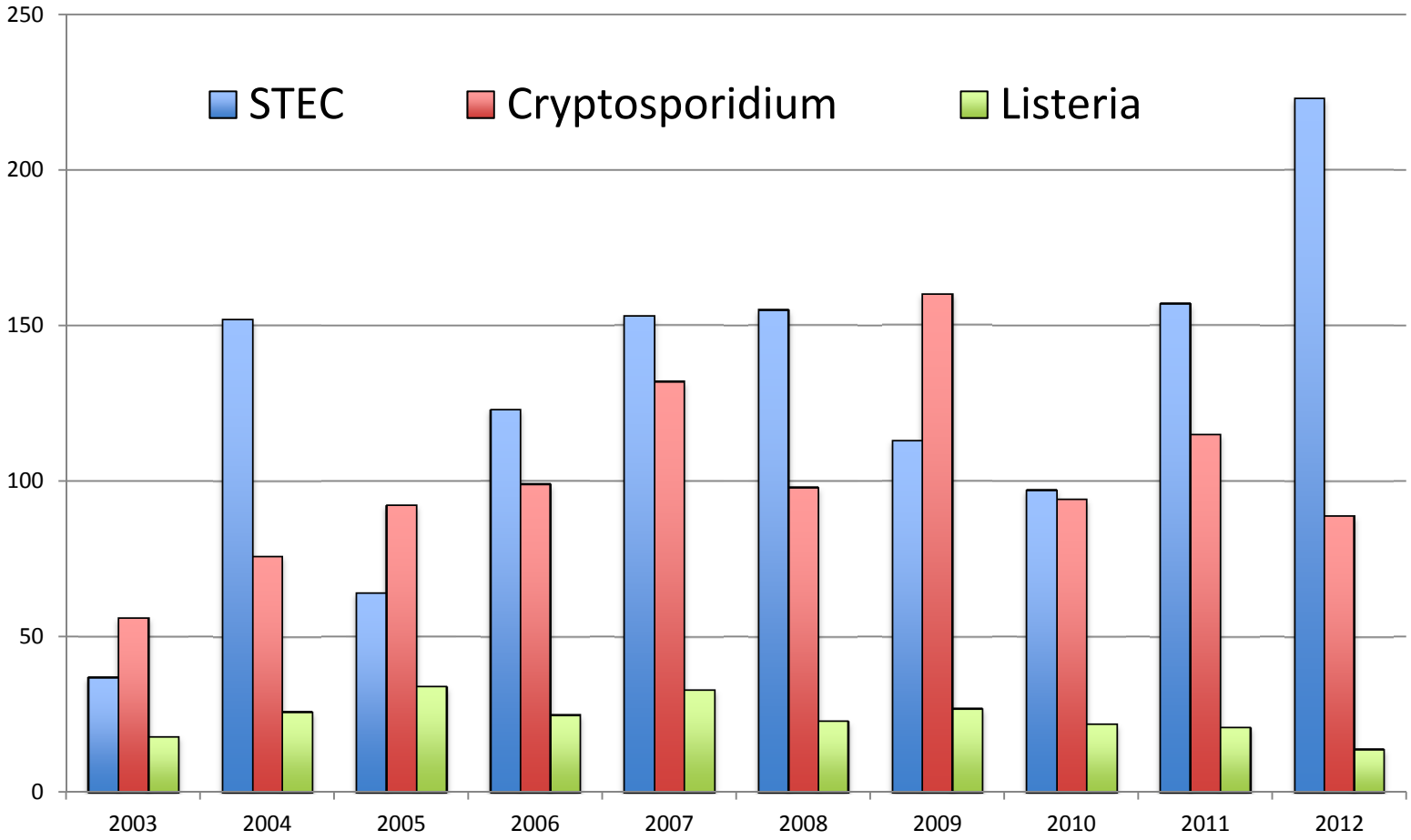
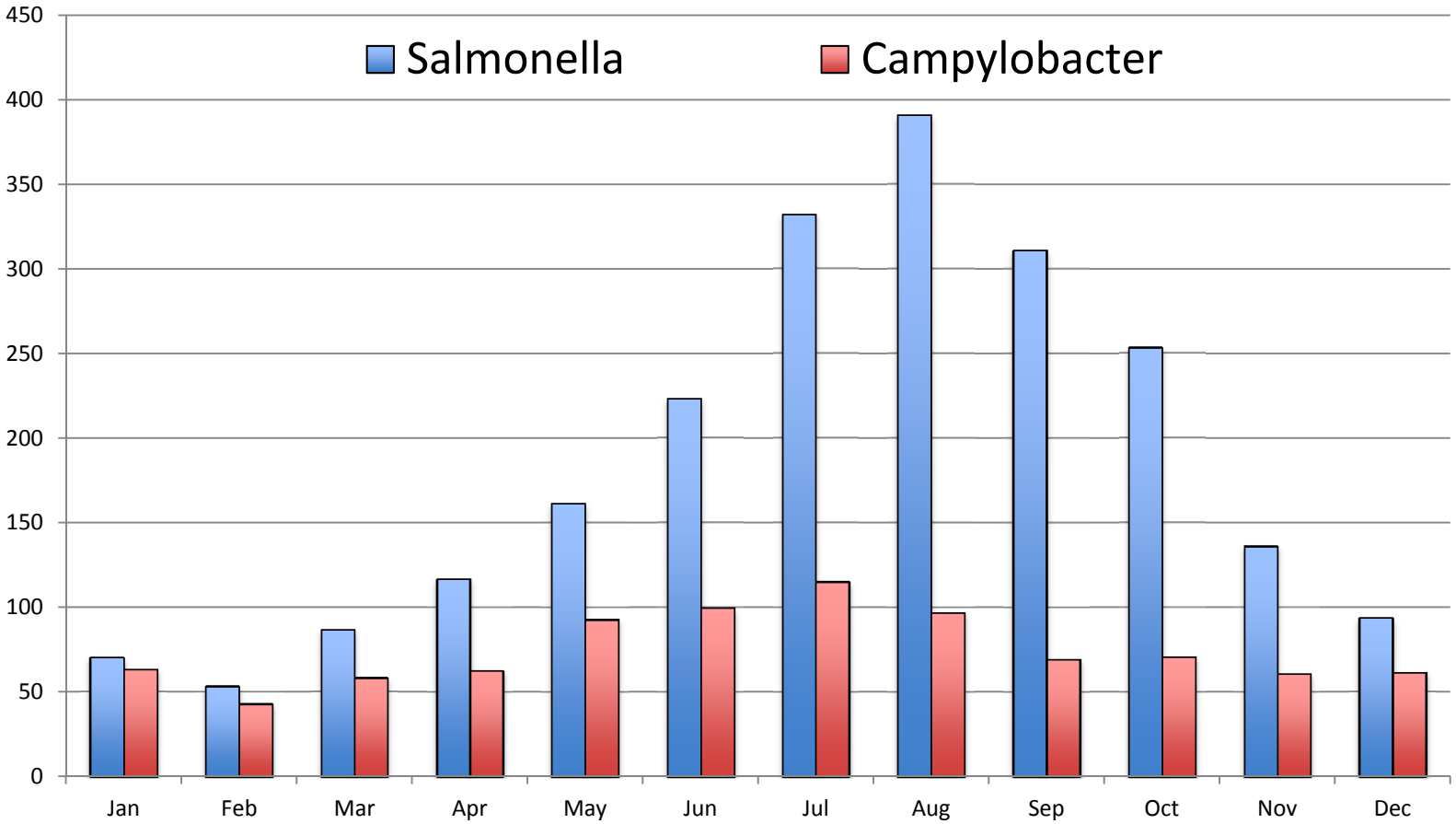


Seasonality of Reported Cases by Month of Disease Onset, NC, 2009-2012 (average)



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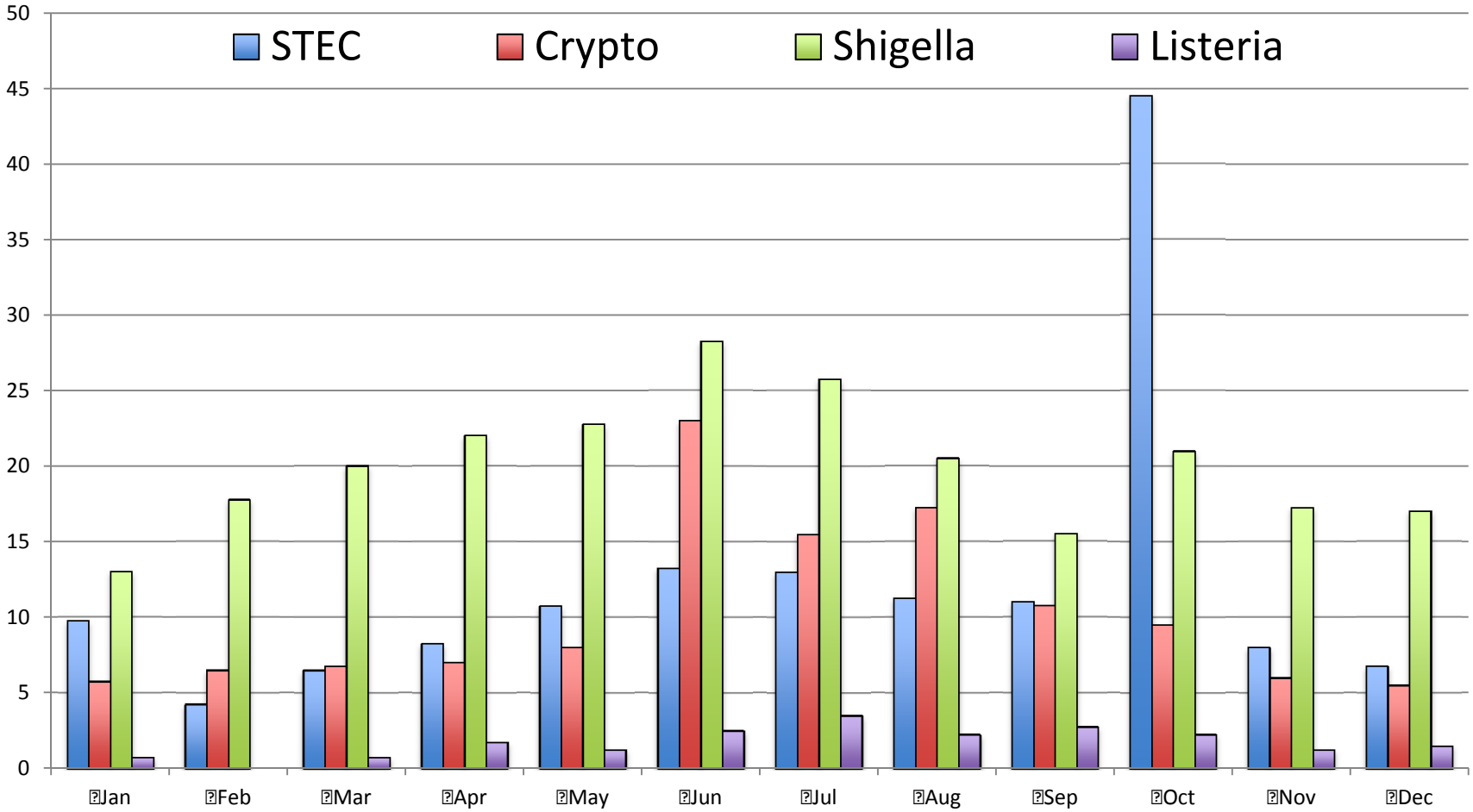
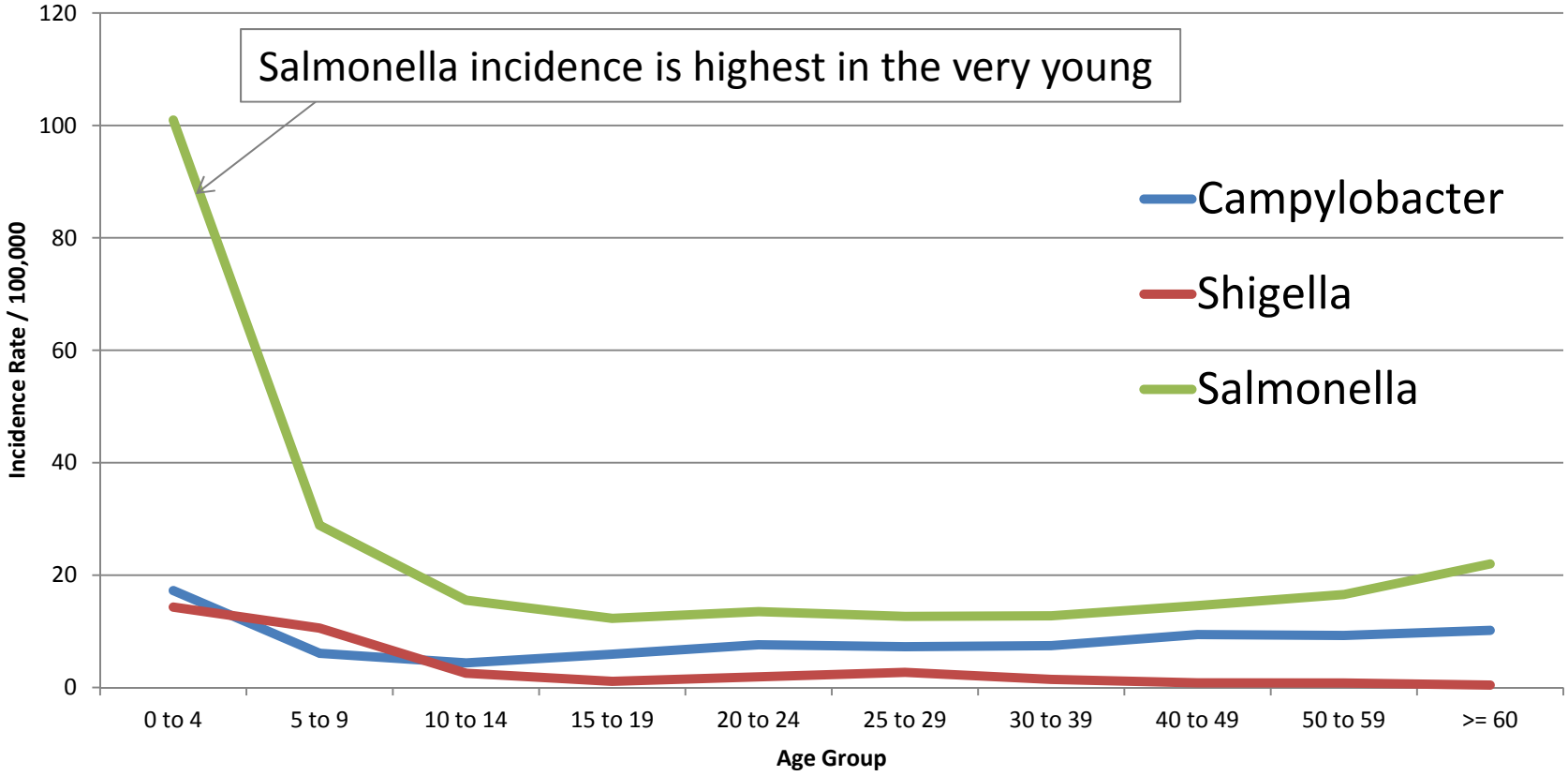


Average Annual Incidence Rate, NC, 2008-2012



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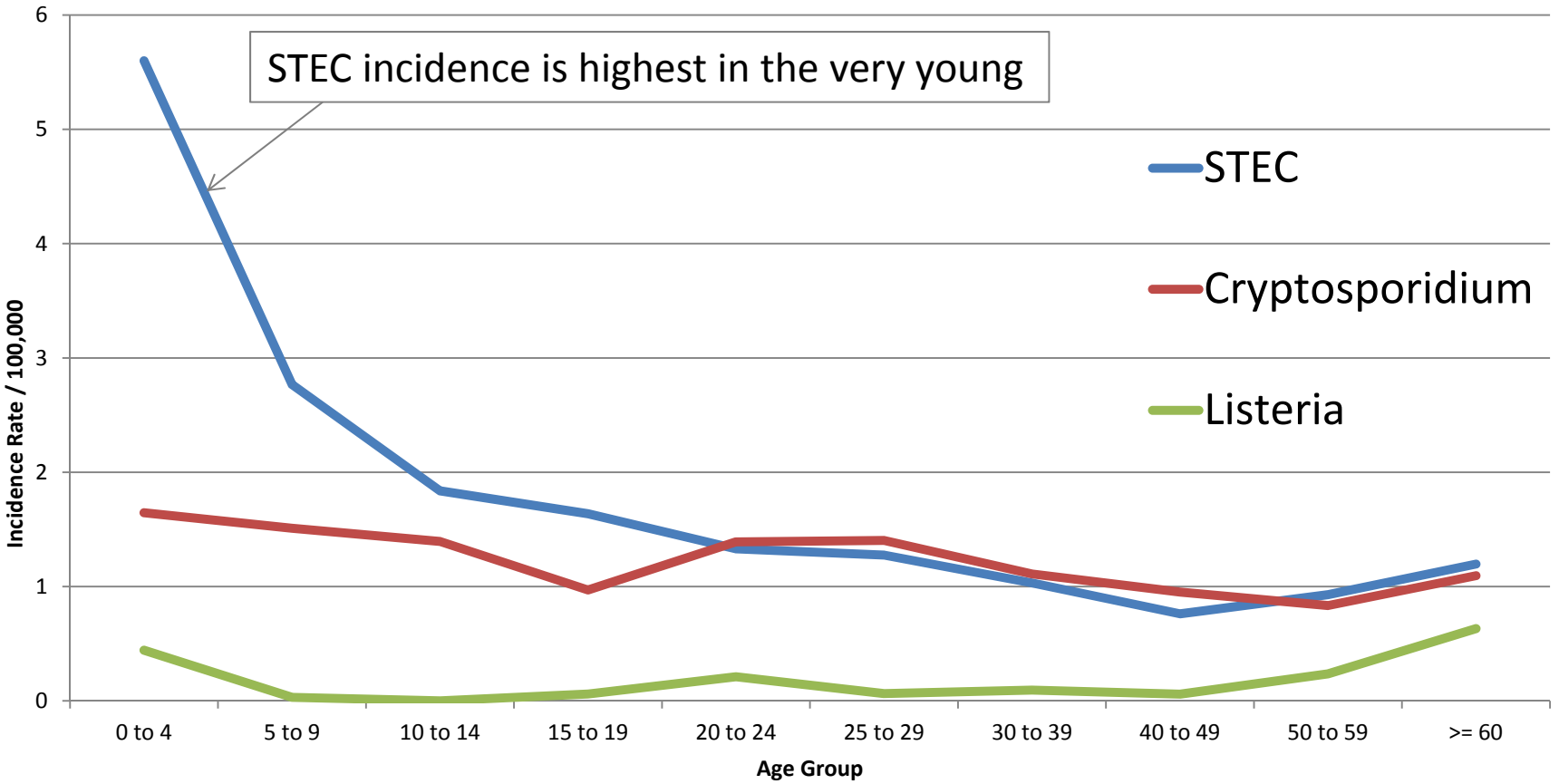

OUTBREAK SURVEILLANCE

LOGISTICS
CONTROL MEASURES
KEY PARTNERS

Investigating Reportable Disease Cases

- Is it reportable?
- Verify clinical information
- Interview patient / parent
  - Symptoms
  - Risk history
  - Control measures
- Document in NC EDSS
- Keep the case investigation form for 1 year

Collect Clinical Information

- Determine reported onset date
- Review symptom profile
- Was the patient hospitalized?
- Diagnosed by a physician?
- Read admission/discharge summaries
- Look for evidence that helps establish a case definition

Laboratory Evidence

- Were samples taken?
- What are the results?
- Can samples be obtained to submit to the state lab?
- Consult with Communicable Disease Branch and/or the State Laboratory for Public Health **before** submitting samples to the state lab

Control Measures

- Implement control measures
- Restrictions to freedom of action or movement
  Child with diarrhea excluded from child care
  Food handler restricted from working while ill
- Attempt to identify source of exposure

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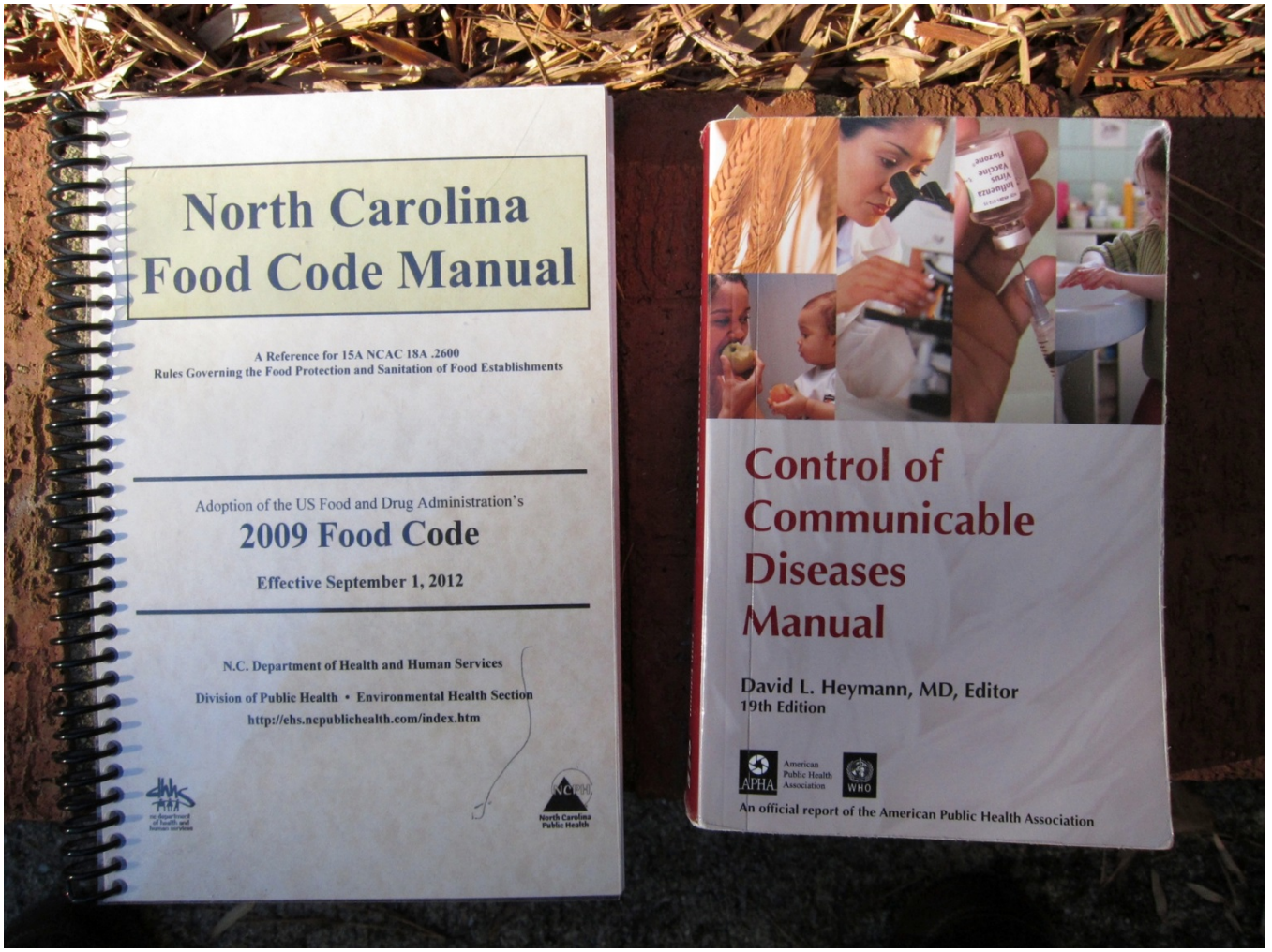

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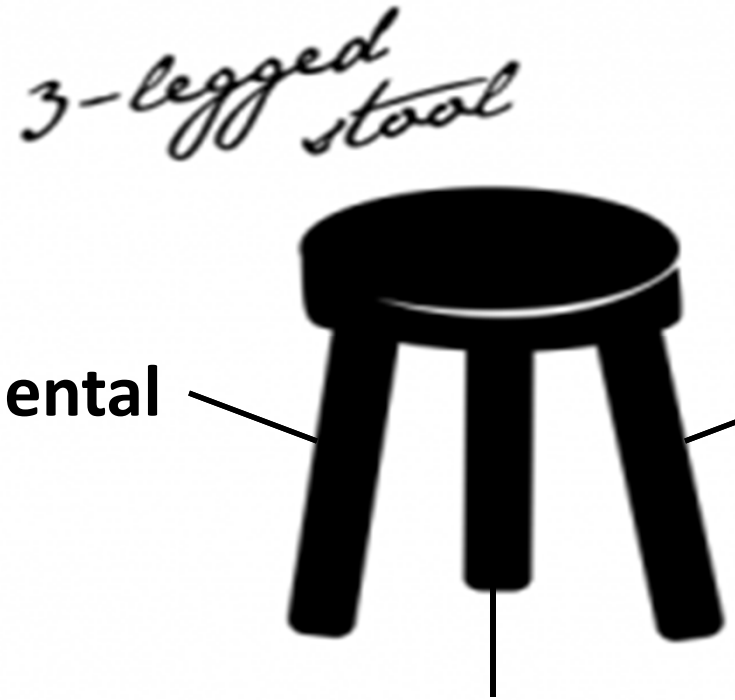

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- **Epidemiology**

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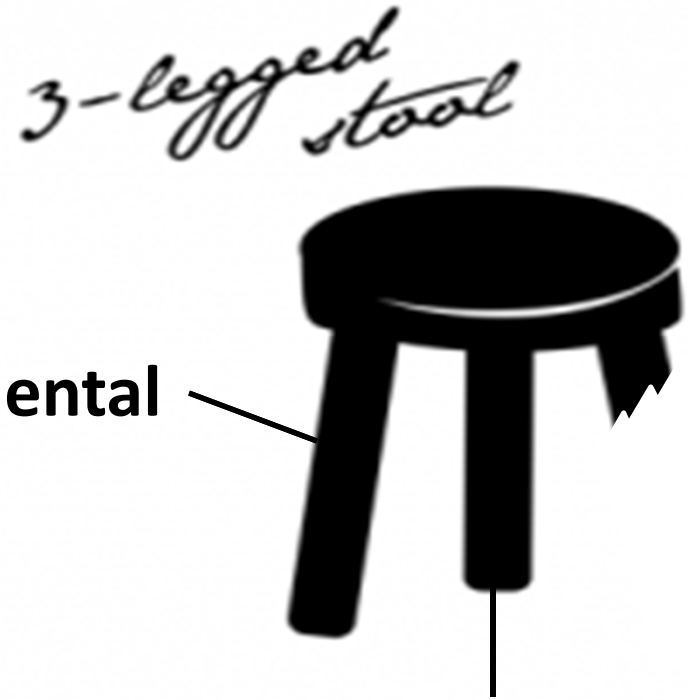

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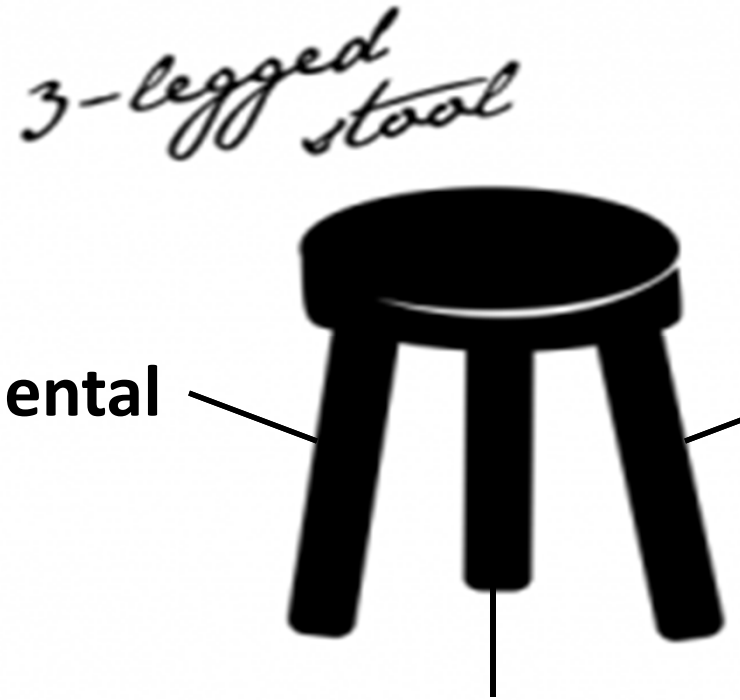

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Purpose of Partners

Laboratory

- Agent specific
- Verify diagnosis

Environmental Health

- Facility specific
- Identify exposure and transmission opportunities
- Implement control measures

Epidemiology

- Outbreak specific
- Identify source
- Implement control measures

Activities of Partners

Laboratory

- Test stool
  - Grow isolate
  - Biochem tests
  - Subtyping
  - PFGE
- Environmental testing (partner labs)

Environmental Health

- Facility Assessment
  - Processes
  - Employees

Epidemiology

- Coordinate activities
- Case finding, complete interviews, data entry, specimen collection
- Characterize illness
- Analyze data from all partners

3 Partners - 1 Goal

Laboratory

- Test stool samples

Environmental Health

- Assess facilities

Epidemiology

- Coordinate activities
- Interview patients
- Characterize ill

Foodborne Outbreak

Stop the Outbreak & Prevent Future Outbreaks

Review:
Learning Objectives

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