



Using data from illnesses that are not part of outbreaks

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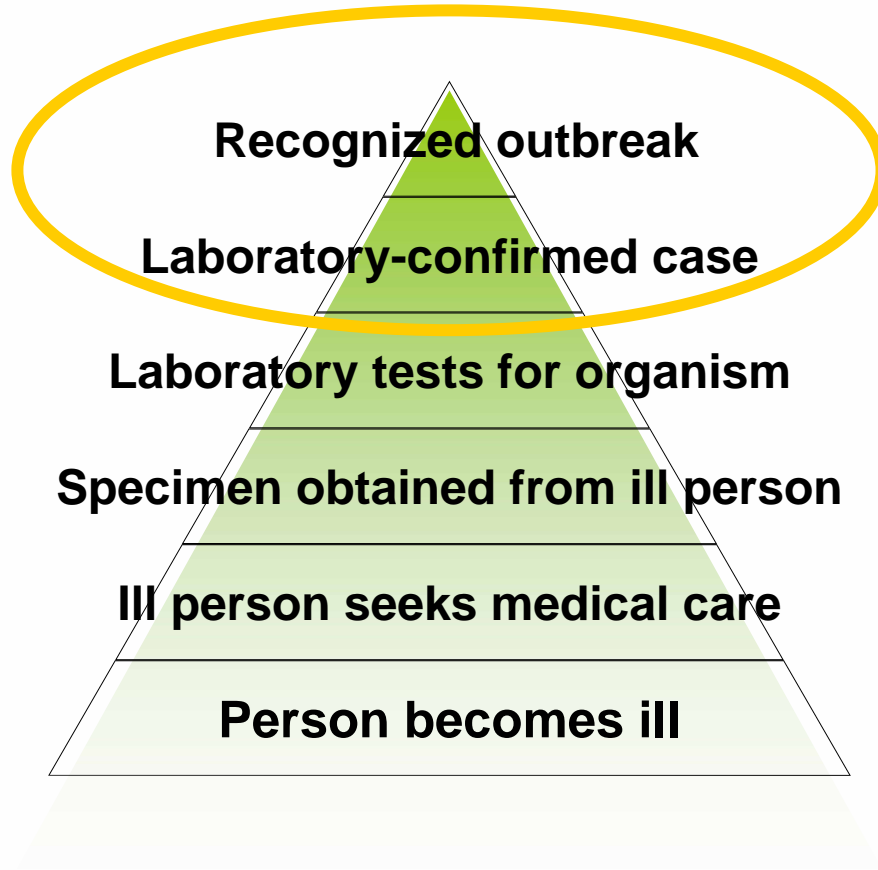
Division of Foodborne, Bacterial and Mycotic Diseases

National Center for Zoonotic, Vectorborne, and Enteric Diseases

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Surveillance pyramid



Recognized outbreaks

- Proportion of laboratory-confirmed infections associated with a recognized outbreak varies:

5% of Salmonella

variation by serotype (25% of *S. Enteritidis*)

10-20% of *E. coli* O157

Public health surveillance

- Most public health surveillance activities are conducted at the top of pyramid
- Many but not all patients with laboratory-confirmed infections are interviewed by local/state health departments
- Information from patient interviews may be used for “attribution”
 - Point of consumption attribution

Information from patient interviews

- Travel outside the US prior to illness onset
 - Patient interviews provide vital information for estimating attribution of domestically-acquired infections
 - Patient travel information is reported to CDC for the major foodborne diseases
 - Nationwide - *Listeria*, *Vibrio*, *S. Typhi*
 - FoodNet - *E. coli* O157, *Salmonella*,

Information from patient interviews

- Other exposures prior to illness onset
 - Individual case reports
 - Case-control studies

Individual case reports

- Nationwide surveillance
 - *Listeria*
 - *Salmonella* Typhi
 - Botulism
 - *Vibrio*
 - Proportion of cases that are wound infections
 - Foodborne cases associated with oysters
- FoodNet – special study
 - *Shigella*

Information from individual case reports for attribution

- Strengths
 - Useful for distinct exposures (wound)
 - Useful for uncommon exposures (oysters)
- Limitations
 - Only practical for uncommon diseases
 - Limited number of diseases with individual case reports
 - For common exposures, need comparison group

Case-control studies

- Compare exposures of ill persons (cases) with exposures of well persons (controls)
- Interviews of well persons not part of routine public health surveillance
 - Require “human subjects” review
- FoodNet provides a platform for conducting case-control studies
 - 16 studies from 1996-2006

FoodNet Case-Control Studies

1996

1998

1999

2000

2002

2006



E. coli O157:H7

E. coli O157:H7

Infant *Salmonella*
Infant *Campylobacter*

Salmonella
Typhimurium,
Enteritidis,
Heidelberg

Cryptosporidium

Salmonella
Newport
Enteritidis

Salmonella
Javiana,
14,5,12:-

Campylobacter

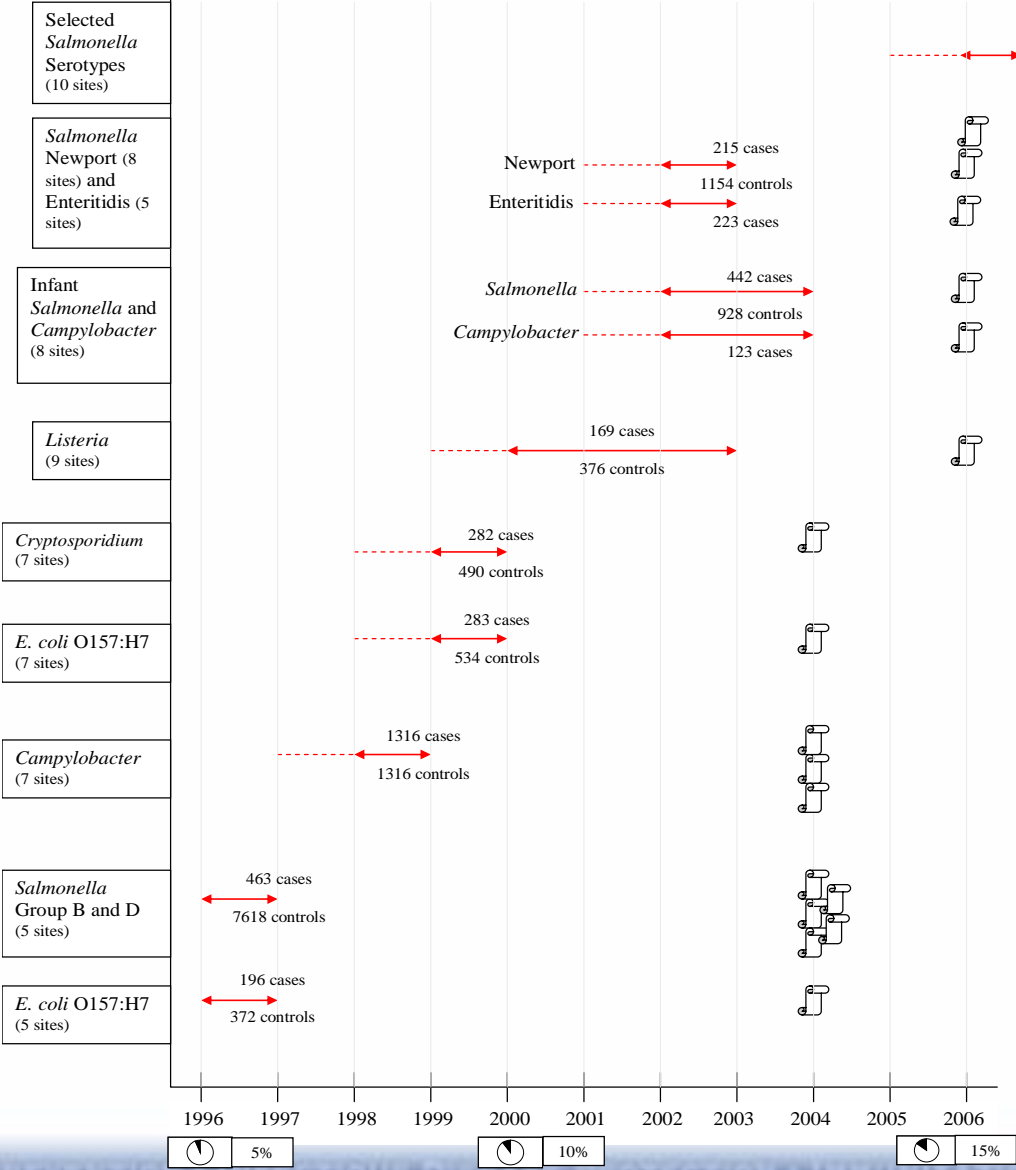
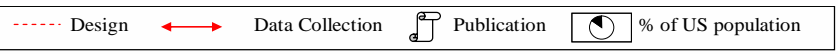
Listeria

FoodNet *Campylobacter* case-control study, 1998-1999

- 12 month study
- 1600 cases, 1600 controls
- *Campylobacter* infections associated with
 - international travel
 - eating chicken outside the home

FoodNet *Listeria* case-control study, 1998-1999

- 3 year study
- 169 cases, 376 controls
- *Listeria* infections associated with
 - hummus



Information from case-control studies for attribution

- Strengths
 - Excellent for memorable exposures (reptile exposure)
 - May be useful for common exposures (ground beef)
 - May identify exposures not identified in outbreak investigations
- Limitations
 - Resource intensive
 - Need to be focused in time, and on specific exposures

Combining information

- Information useful for “point of consumption” attribution may be provided from both
 - Outbreaks investigations
 - Interviews of cases not involved in outbreaks
- Example – *Campylobacter*
 - Outbreaks: produce, dairy, chicken
 - Non-outbreak: international travel, chicken
- Methods for combining this information are being explored

Summary

- Data from cases not involved in outbreaks are useful for attribution
 - Enables attribution of domestically-acquired infections
 - Other exposures
 - Individual case reports
 - Case-control studies
- Combining information from outbreaks and information from cases not involved in outbreaks helpful