Introduction to Communicable Disease Surveillance and Investigation in North Carolina

Practice of Communicable Disease Surveillance in North Carolina

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North Carolina Public Health

nc department of health and human services

Learning Objectives

1. Describe the network of surveillance partnerships for communicable disease in North Carolina

2. Interpret reported data as an indicator of disease incidence within the community

3. List 4 public health uses of surveillance data

Public Health Partners in N.C.

- 85 Local Health Departments
- Clinicians and laboratories
- 9 Hospital-based Public Health Epidemiologists
- 8 Regional Immunization Consultants
- Regional Disease Intervention Specialists
- 4 Preparedness and Response Field Offices

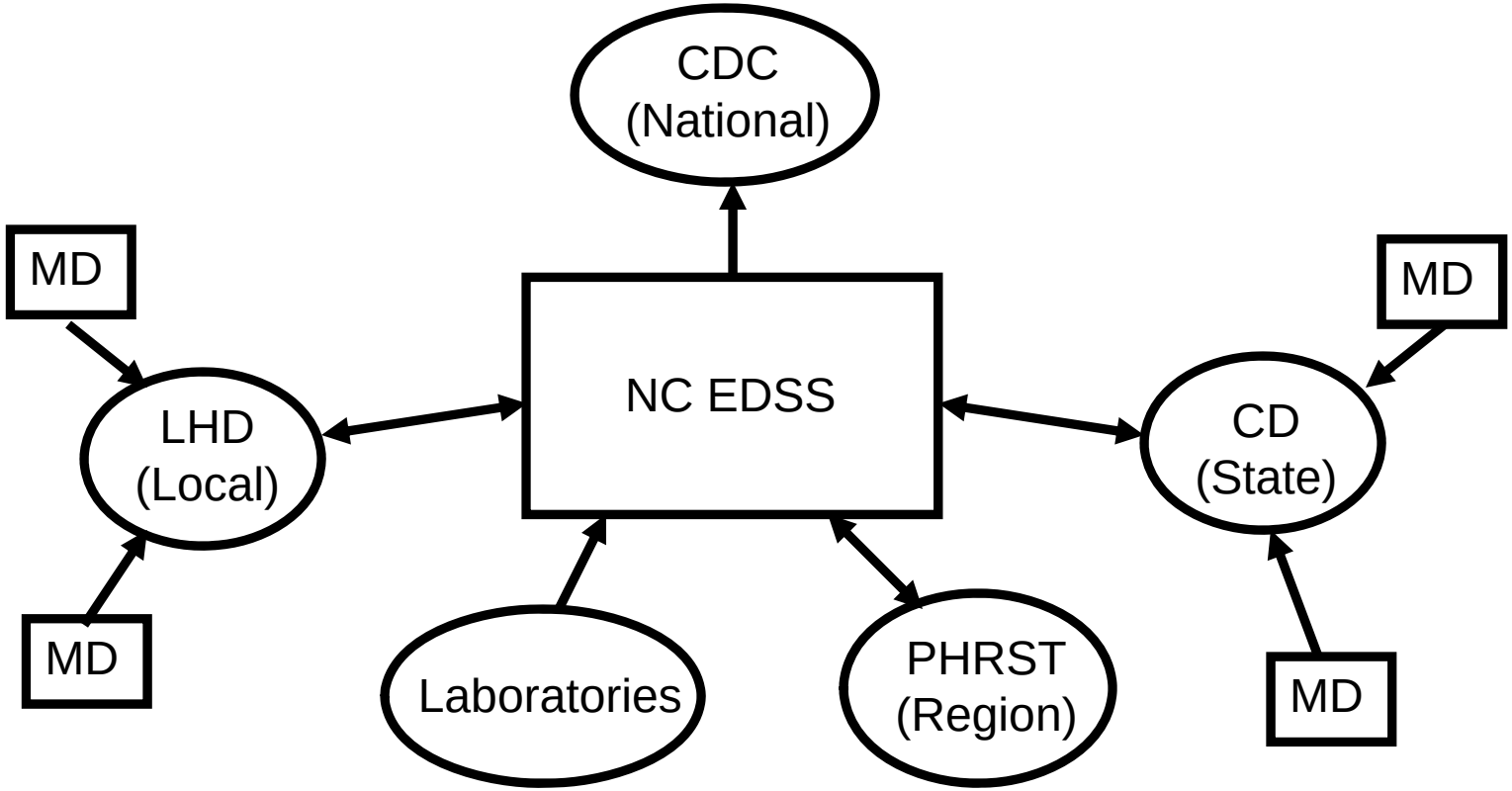
Other Partners

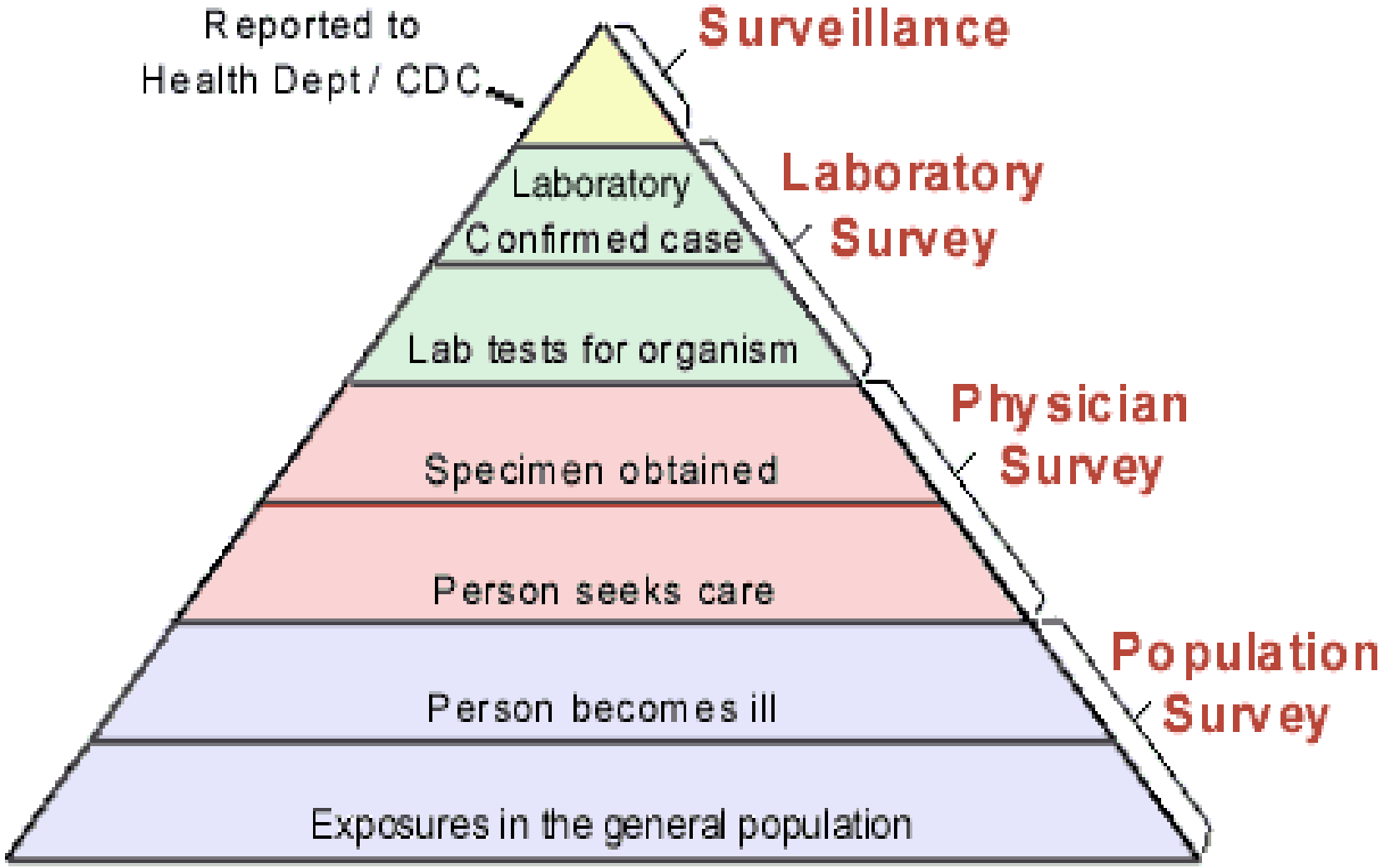
Centers for Disease Control and Prevention

Within state government:

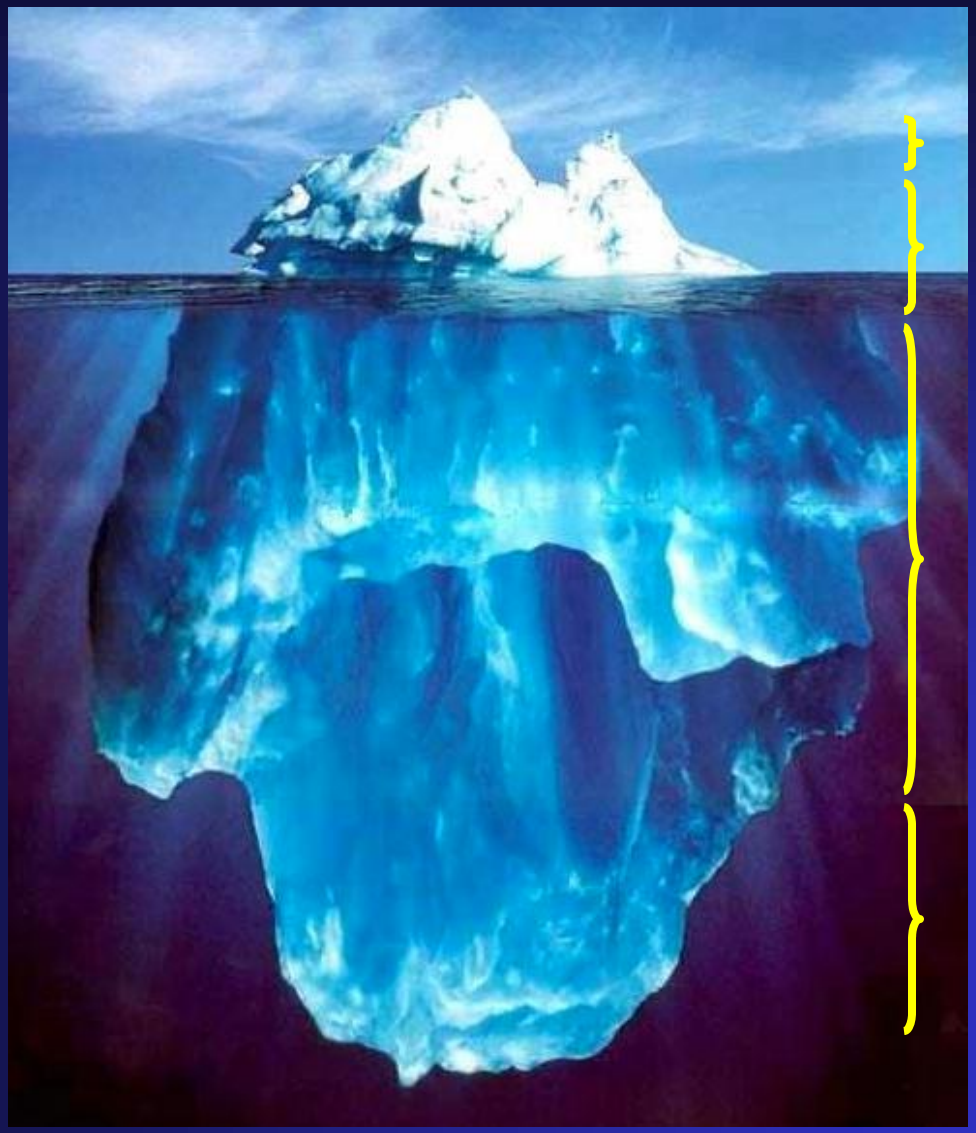
- In the Epidemiology Section: Occupational and Environmental Epidemiology Branch, and Office of Preparedness and Response
- State Laboratory of Public Health
- Office of the Chief Medical Examiner

North Carolina Electronic Disease Surveillance System, NC EDSS

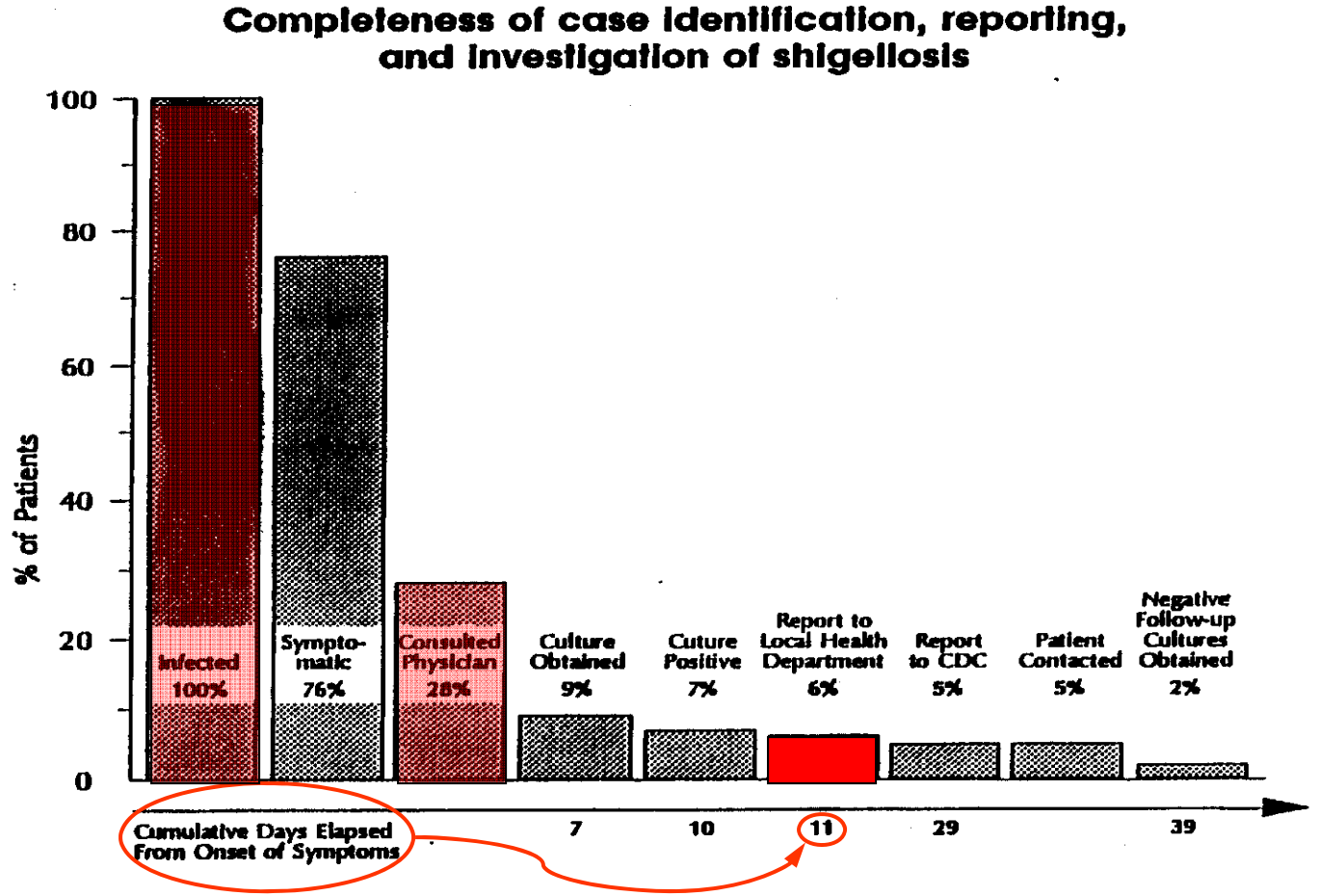



Reported to
Health Dept / CDC
Surveillance
Laboratory
Confirmed case
Laboratory
Survey
Lab tests for organism
Physician
Survey
Specimen obtained
Person seeks care
Population
Survey
Person becomes ill
Exposures in the general population

Influenza Surveillance

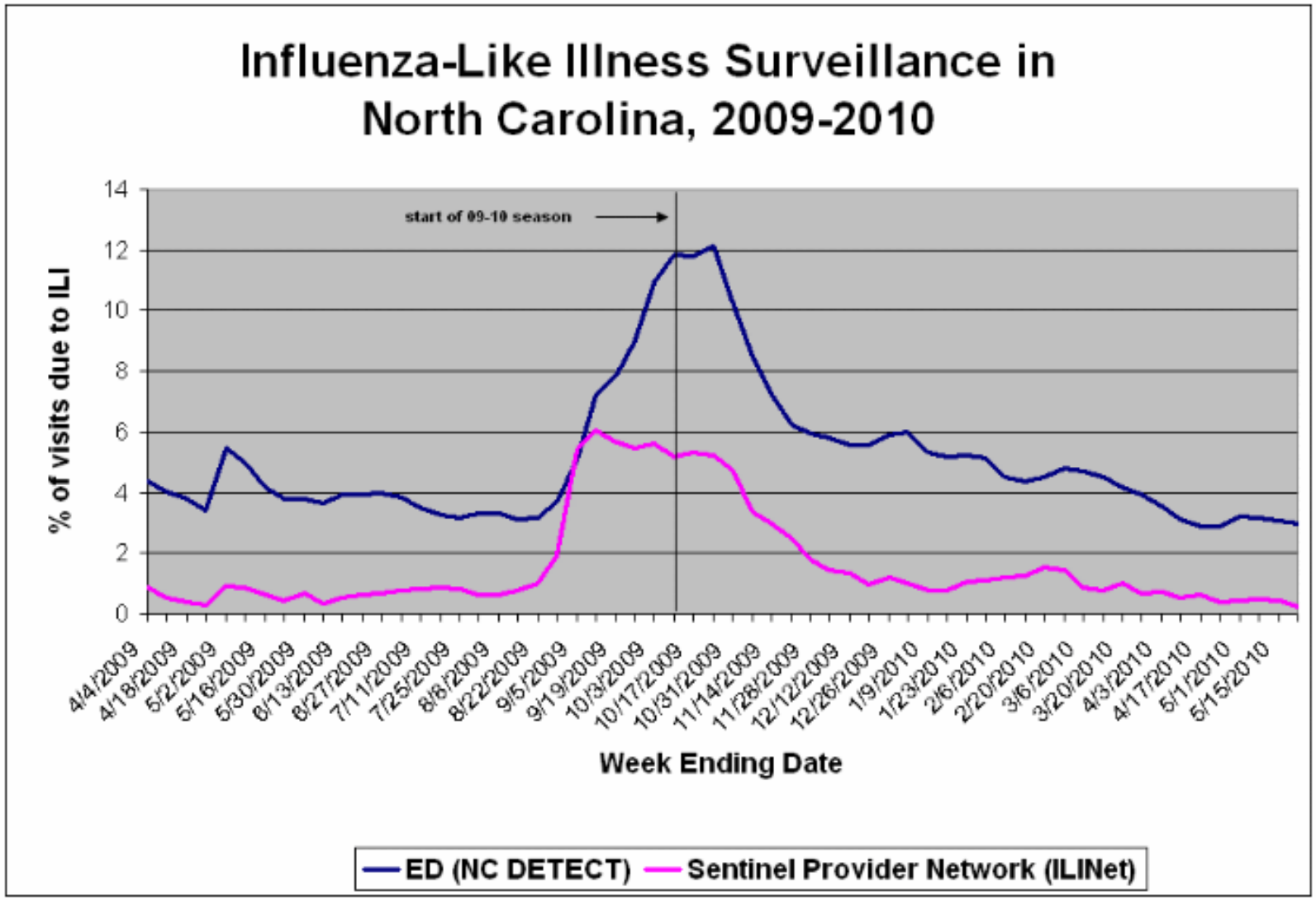


"Traditional" Surveillance
Lacks Sensitivity and Provides Delayed Information



Uses of Surveillance Data

- Count Cases and Measure Trends
- Identify Risk Factors
- Verify Efficacy of Control Measures
- Allocate Resources


Influenza-Like Illness Surveillance in North Carolina, 2009-2010
% of visits due to ILI
14
12
10
8
6
4
2
0
start of 09-10 season
4/4/2009
4/18/2009
5/2/2009
5/16/2009
5/30/2009
6/13/2009
6/27/2009
7/11/2009
7/25/2009
8/8/2009
8/22/2009
9/5/2009
9/19/2009
10/3/2009
10/17/2009
10/31/2009
11/14/2009
11/28/2009
12/12/2009
12/26/2009
1/9/2010
1/23/2010
2/6/2010
2/20/2010
3/6/2010
3/20/2010
4/3/2010
4/17/2010
5/1/2010
5/15/2010
Week Ending Date
ED (NC DETECT)
Sentinel Provider Network (ILINet)

Analysis

- Changes in reported number of cases or incidence rate
  - Unexpected vs. expected or caused by artifacts
  - Trend

- Analyze in epidemiologic terms:
  - Time
  - Place
  - Persons

Interpretation

Taking into account:

- Population changes
- Changes in reporting procedure
- Changes in personnel
- Scientific progress: diagnostic techniques, control measures
- Changes in disease patterns

Outbreak Patterns

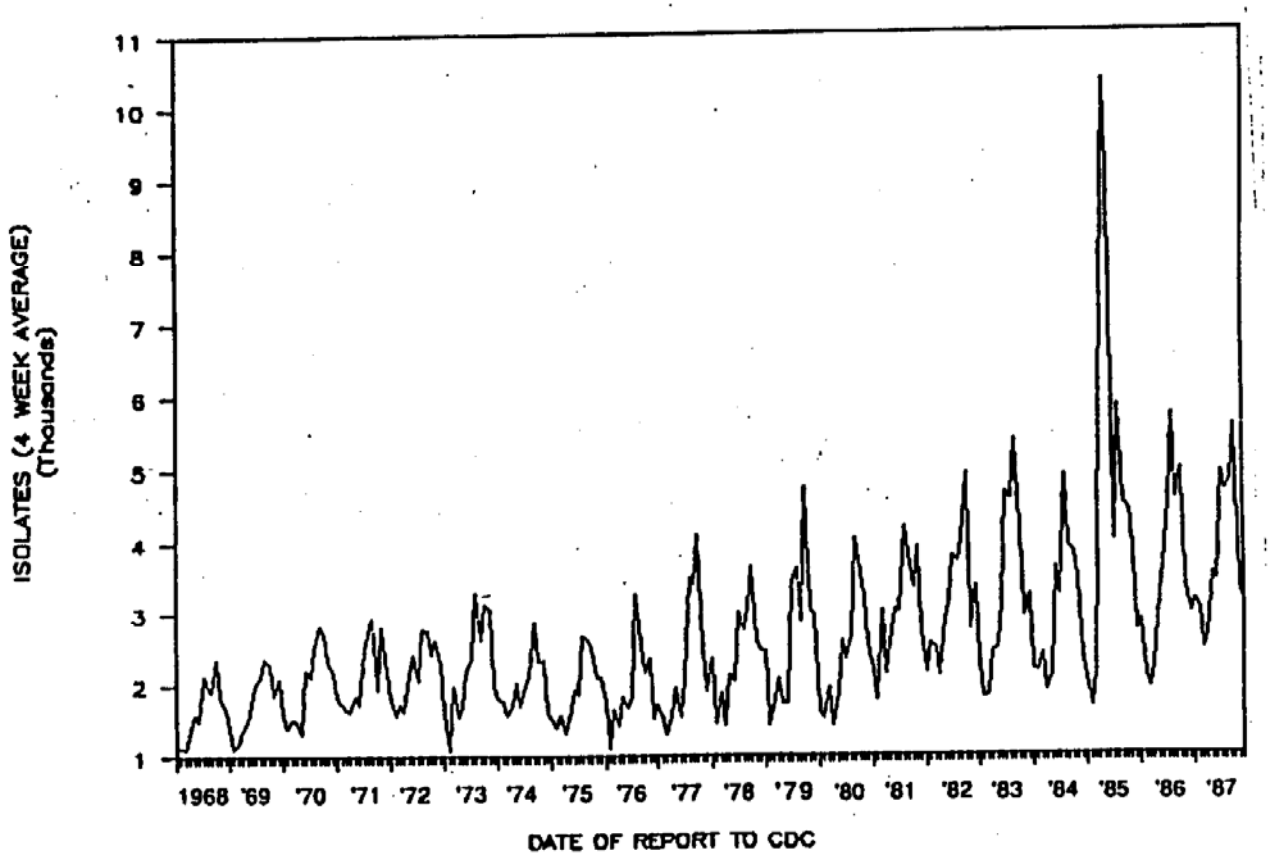
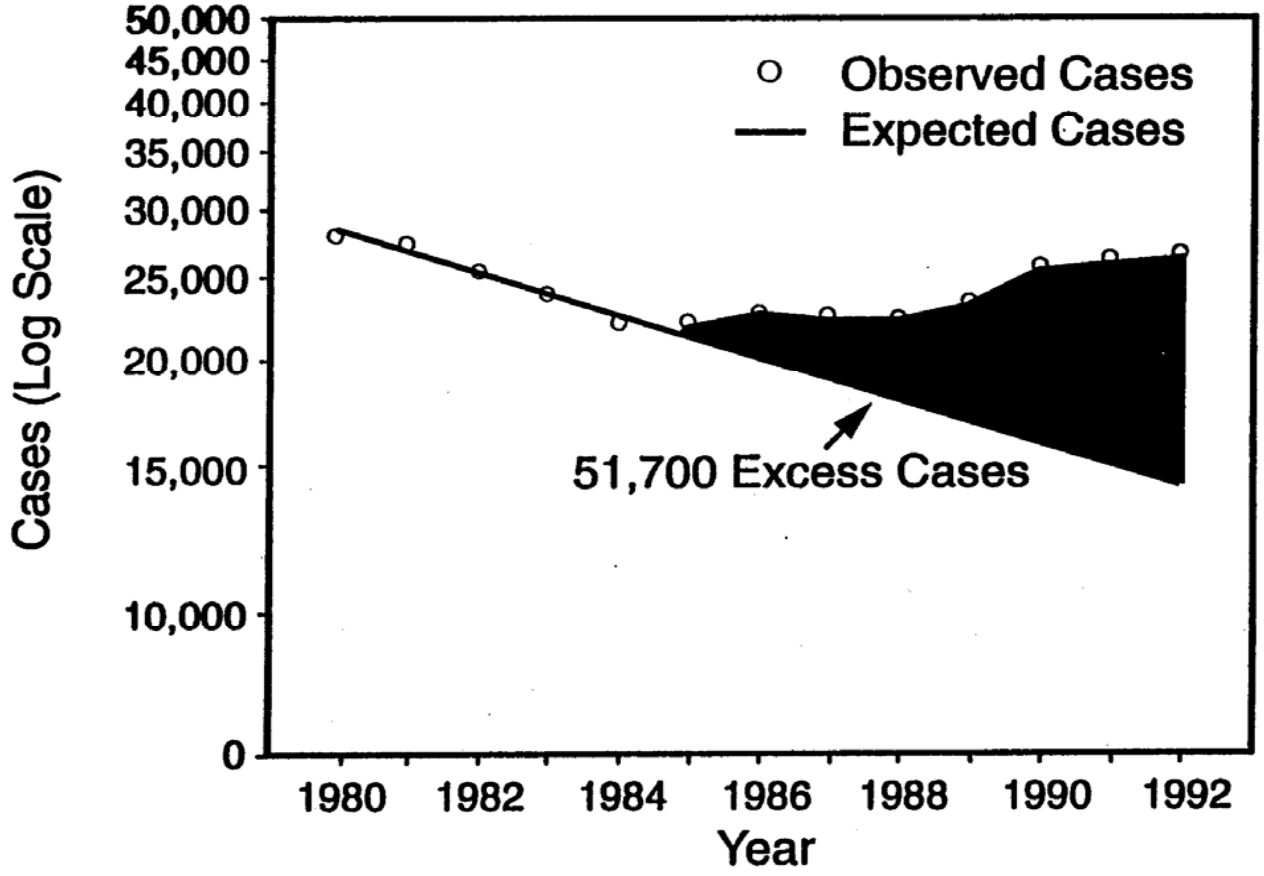


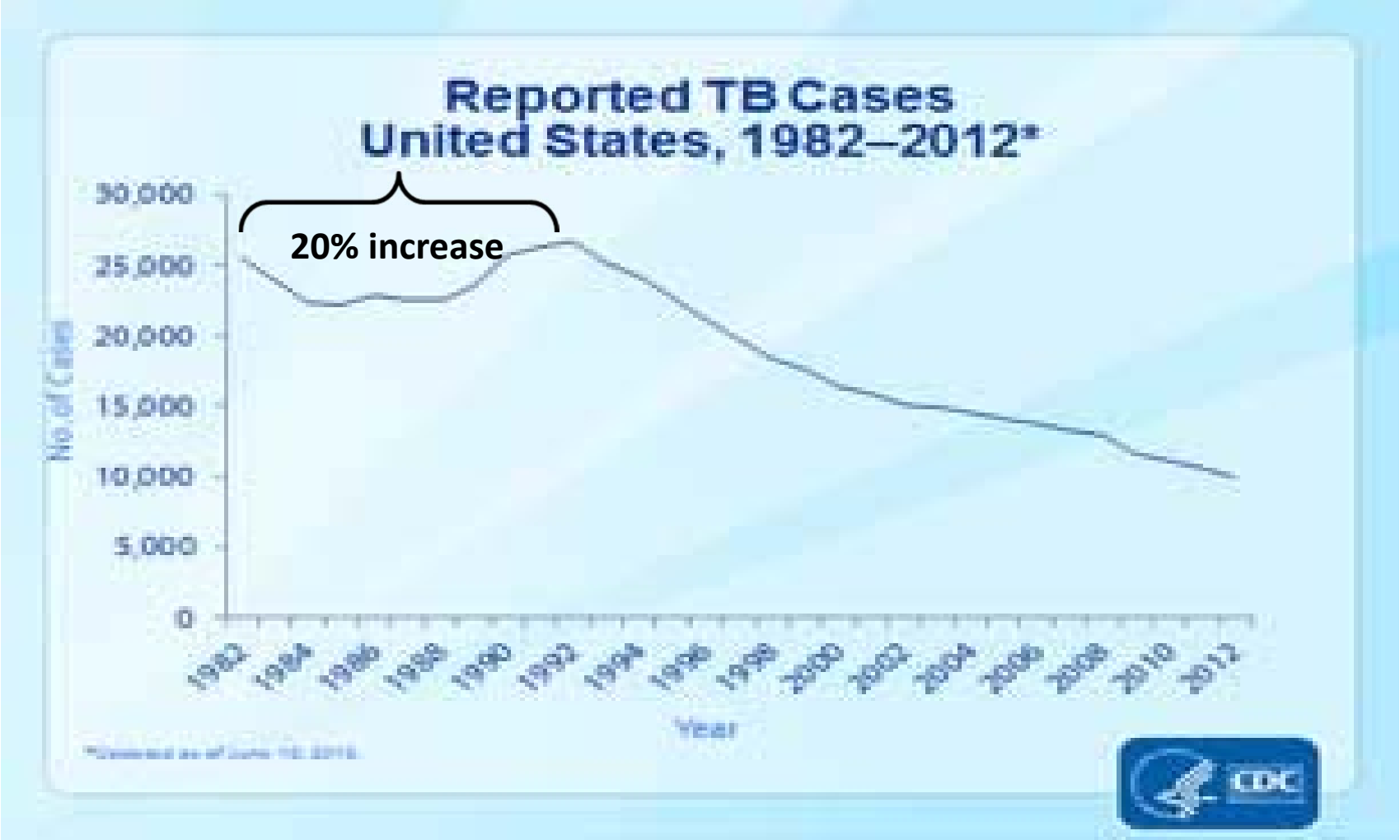
FIG. 3. Reported isolations of salmonellae from humans in the United States, 1968–1987. (Courtesy of Centers for Disease Control, Enteric Diseases Branch, Division of Bacterial Diseases, Atlanta, GA).

More Cases Observed Than Expected

FIGURE 1. Expected and observed number of tuberculosis cases — United States, 1980–1992

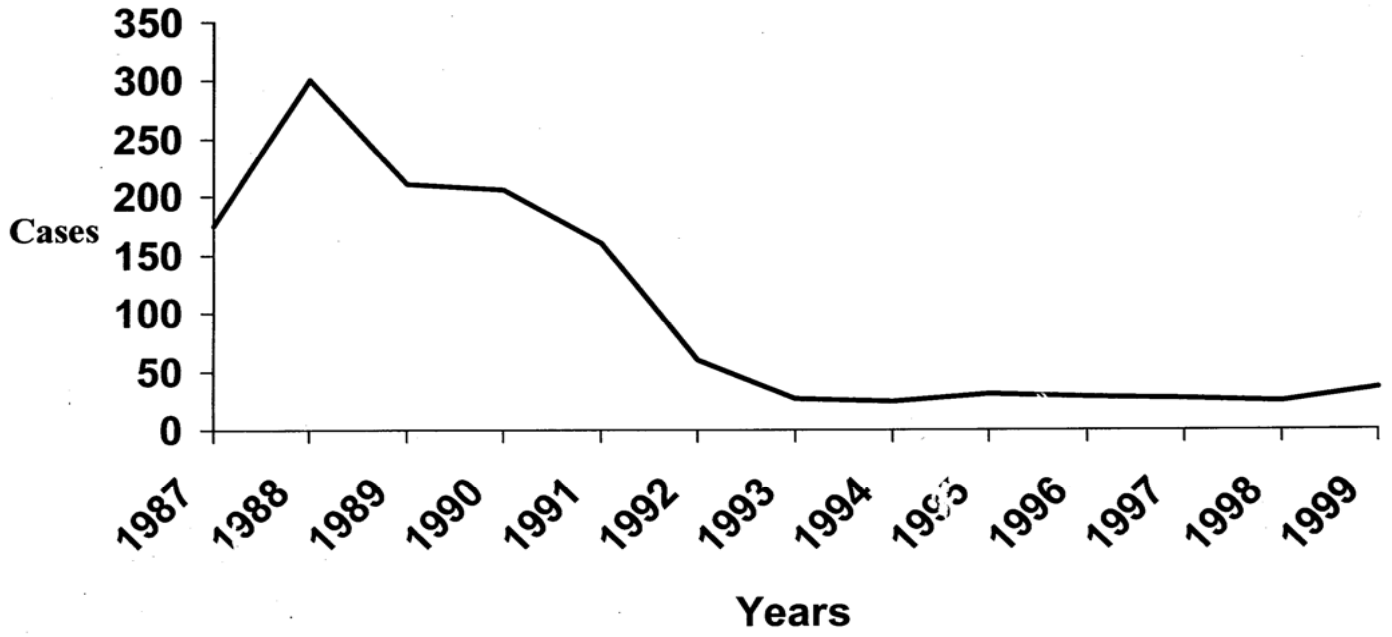


U.S. TB Resurgence
1986 - 1992



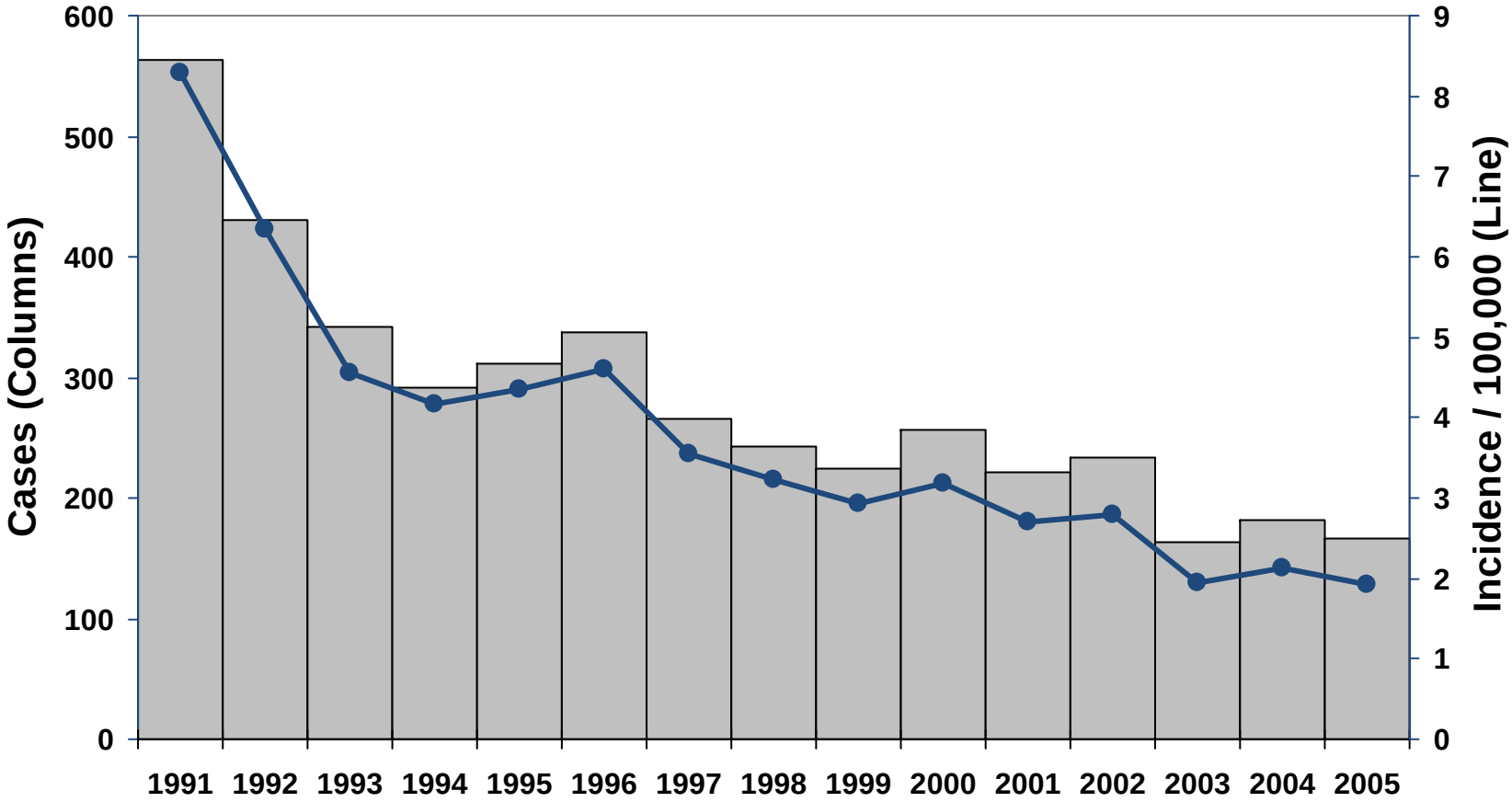
Monitoring effect of intervention

Cases of *H. influenza invasive disease reported in NC, 1987 - 1999*



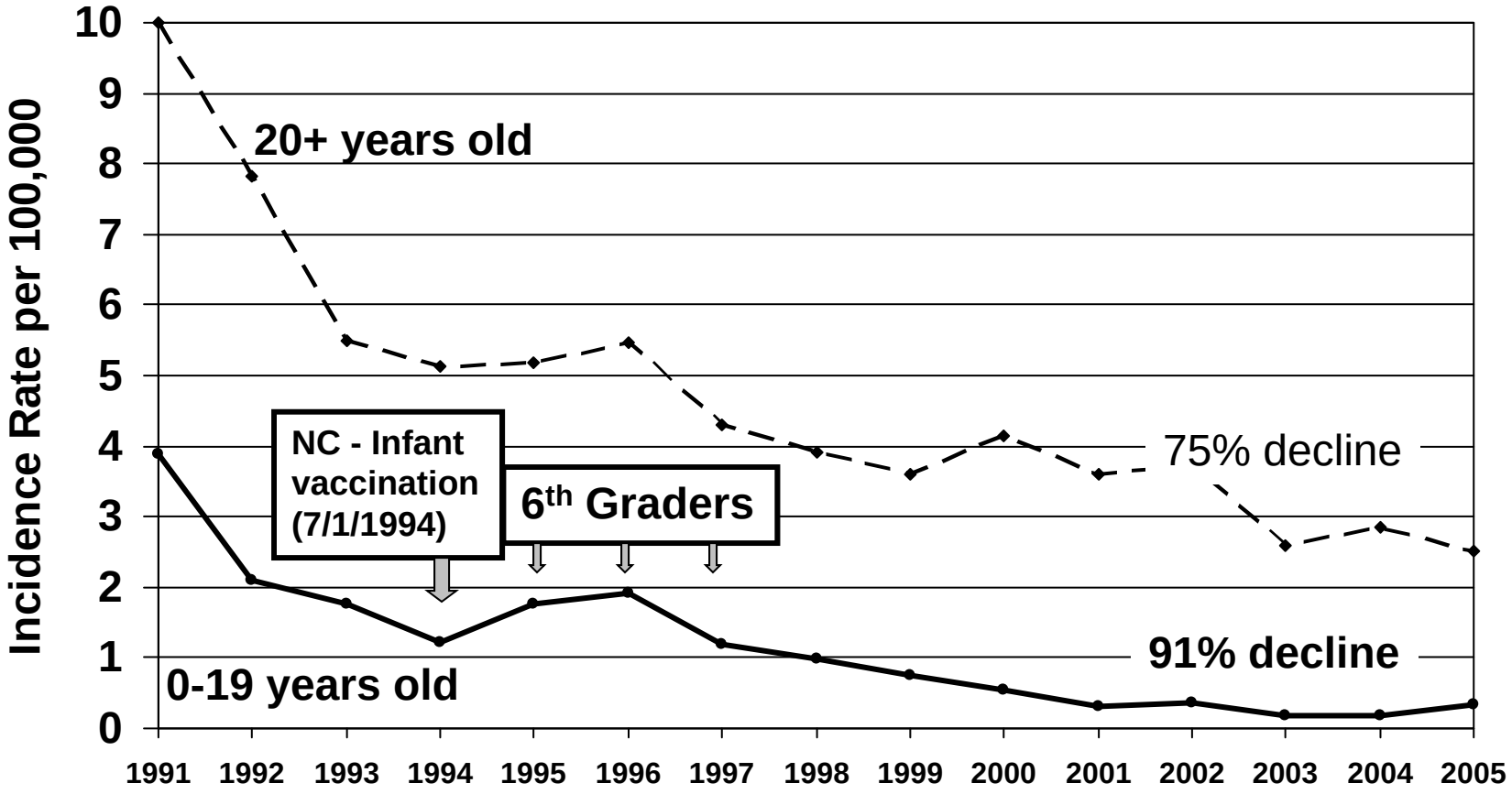
Hepatitis B, acute

Reported cases, North Carolina, 1991-2005

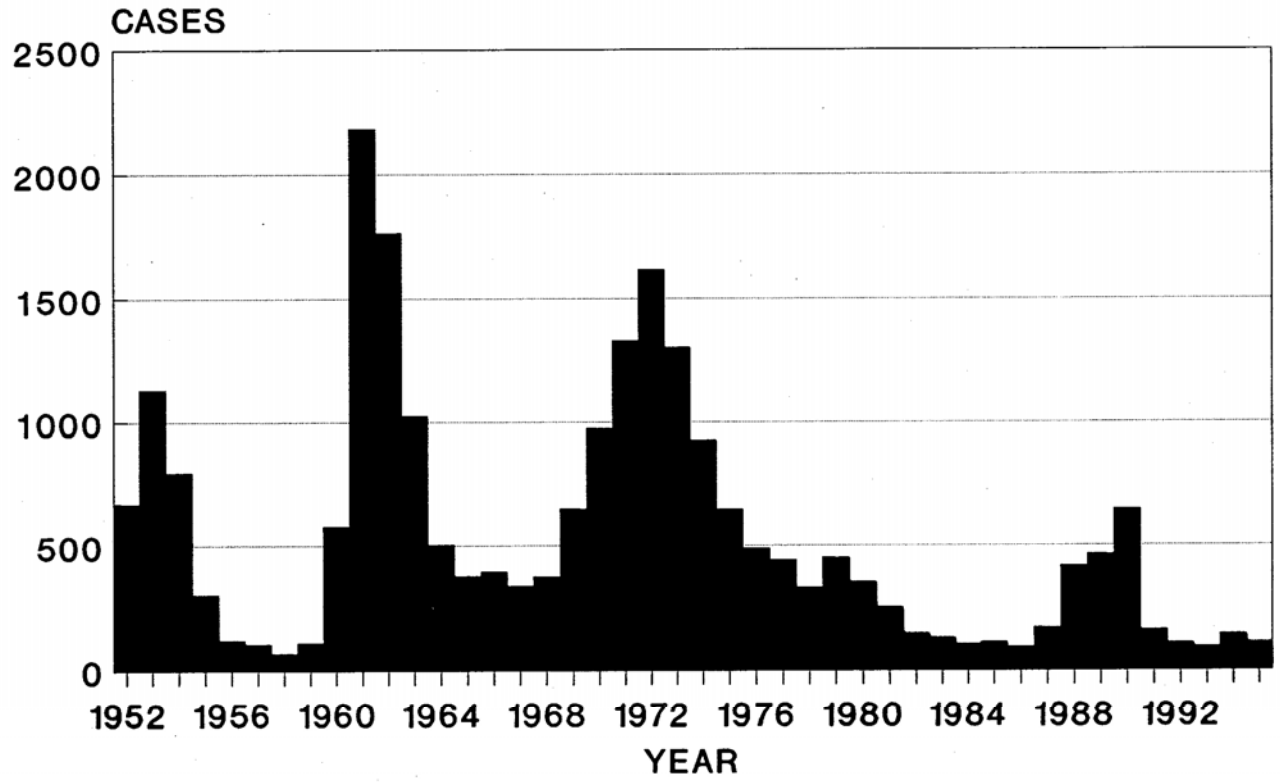


Hepatitis B, acute – North Carolina

1991-2005 - Incidence rate by Age Group

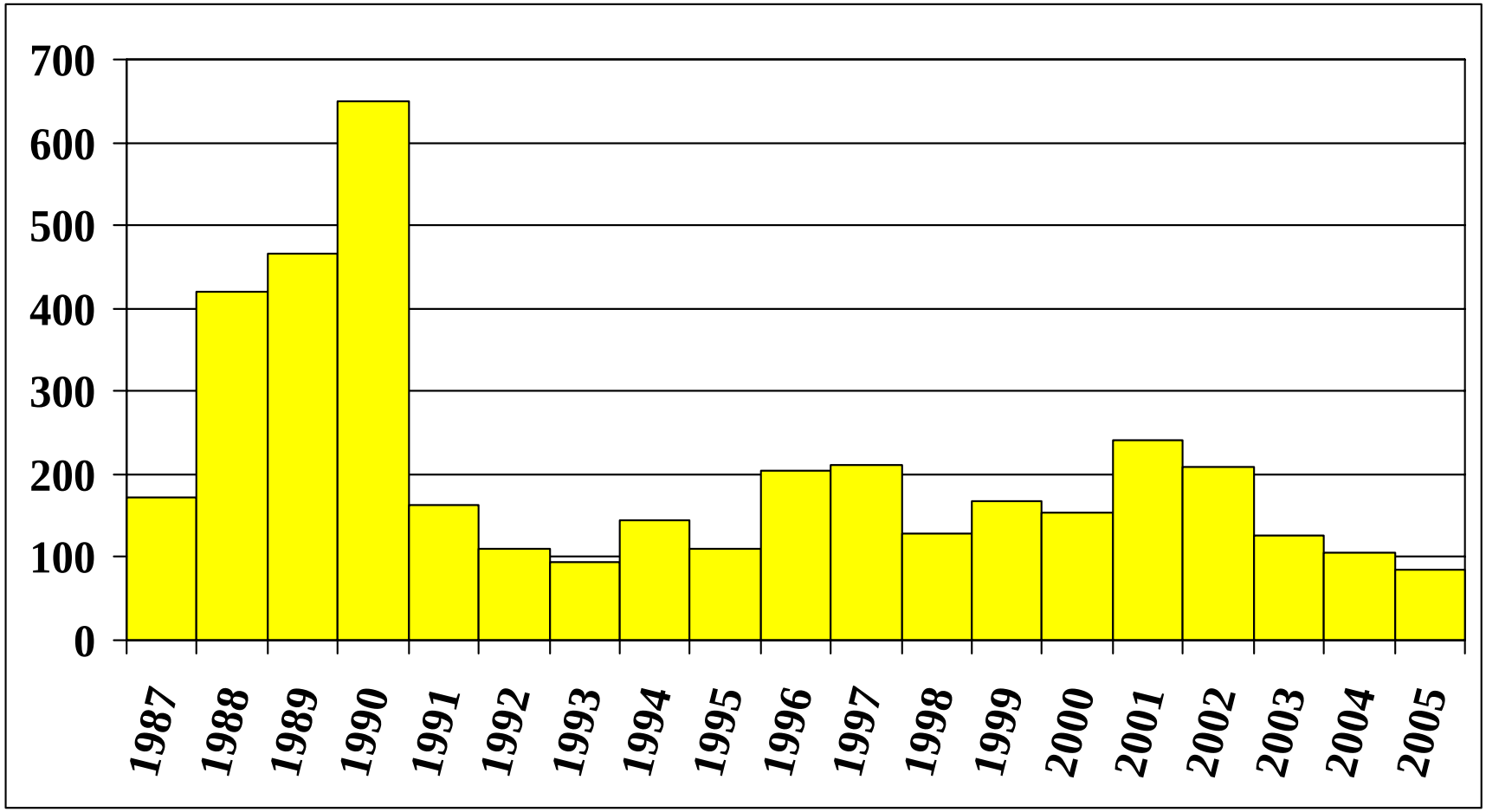


HEPATITIS A, NC
1952-1995



SOURCE: COMMUNICABLE DISEASE
CONTROL SECTION, NCDEHNR

Hepatitis A – N.C., 1987-2005
(N=3,958)



Hepatitis A – N.C., 1987-2005
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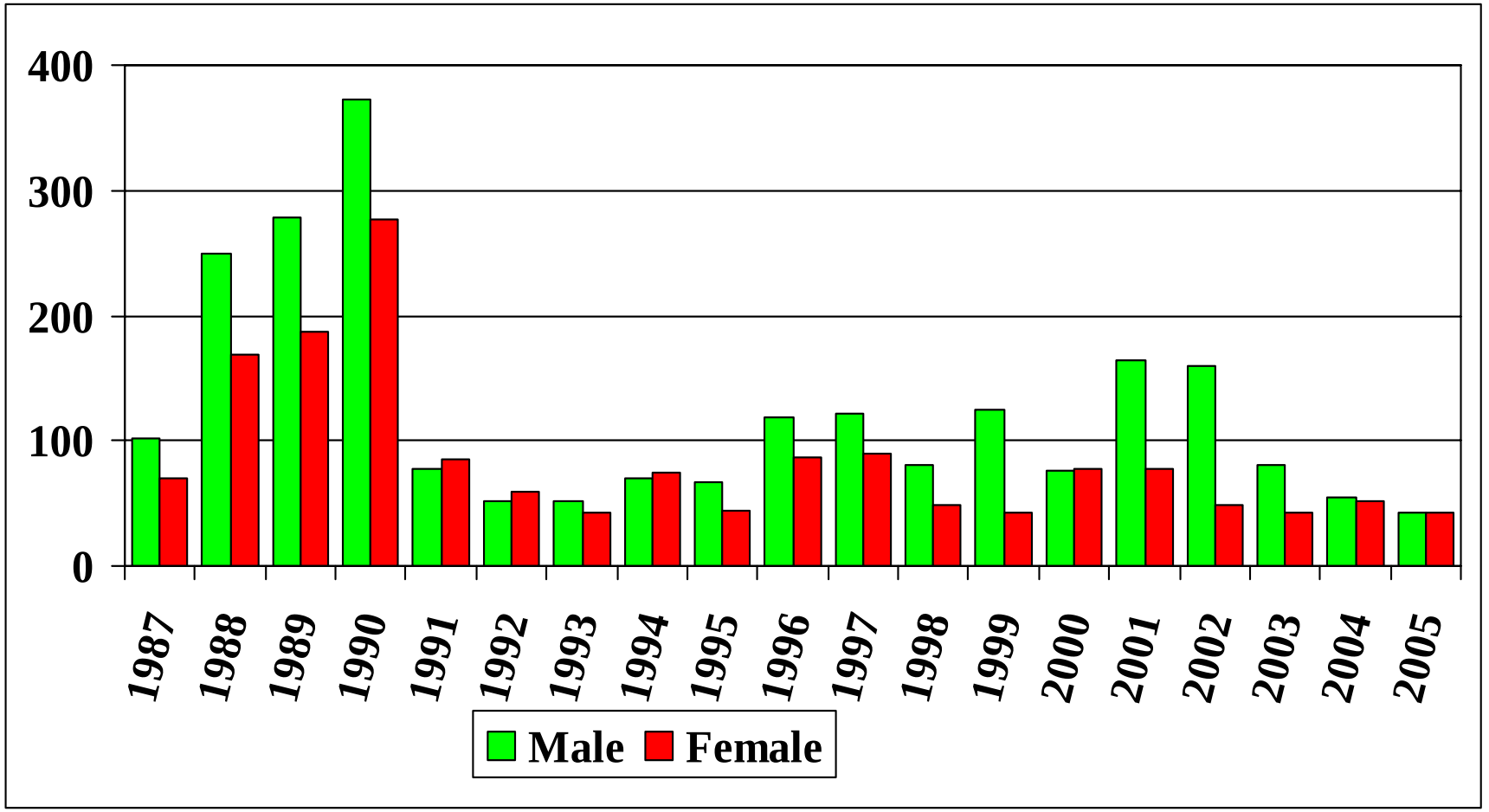
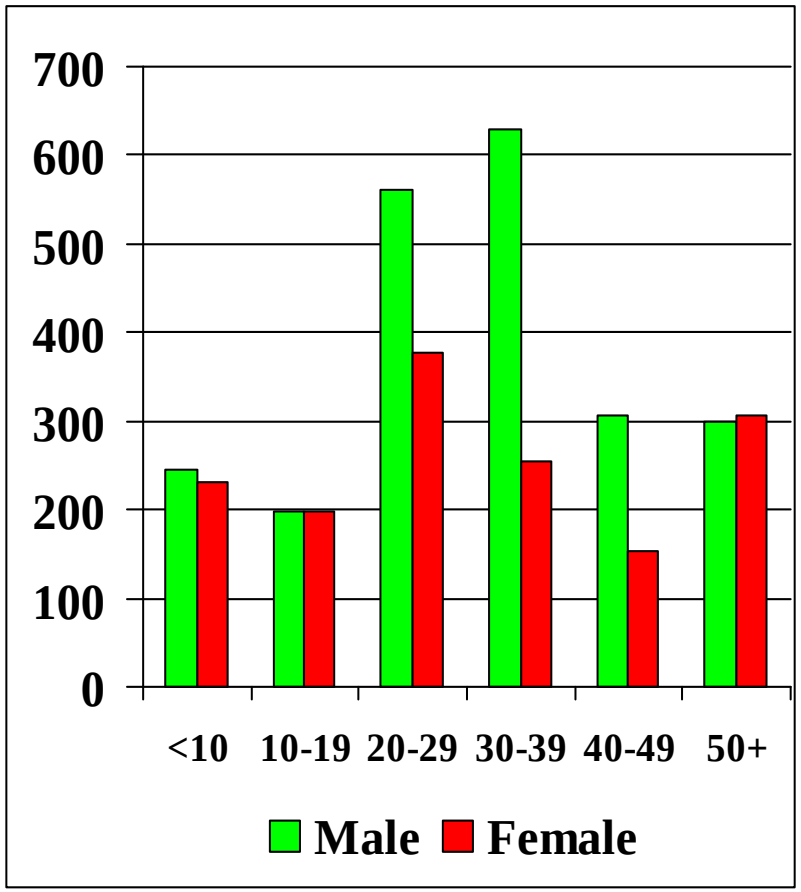


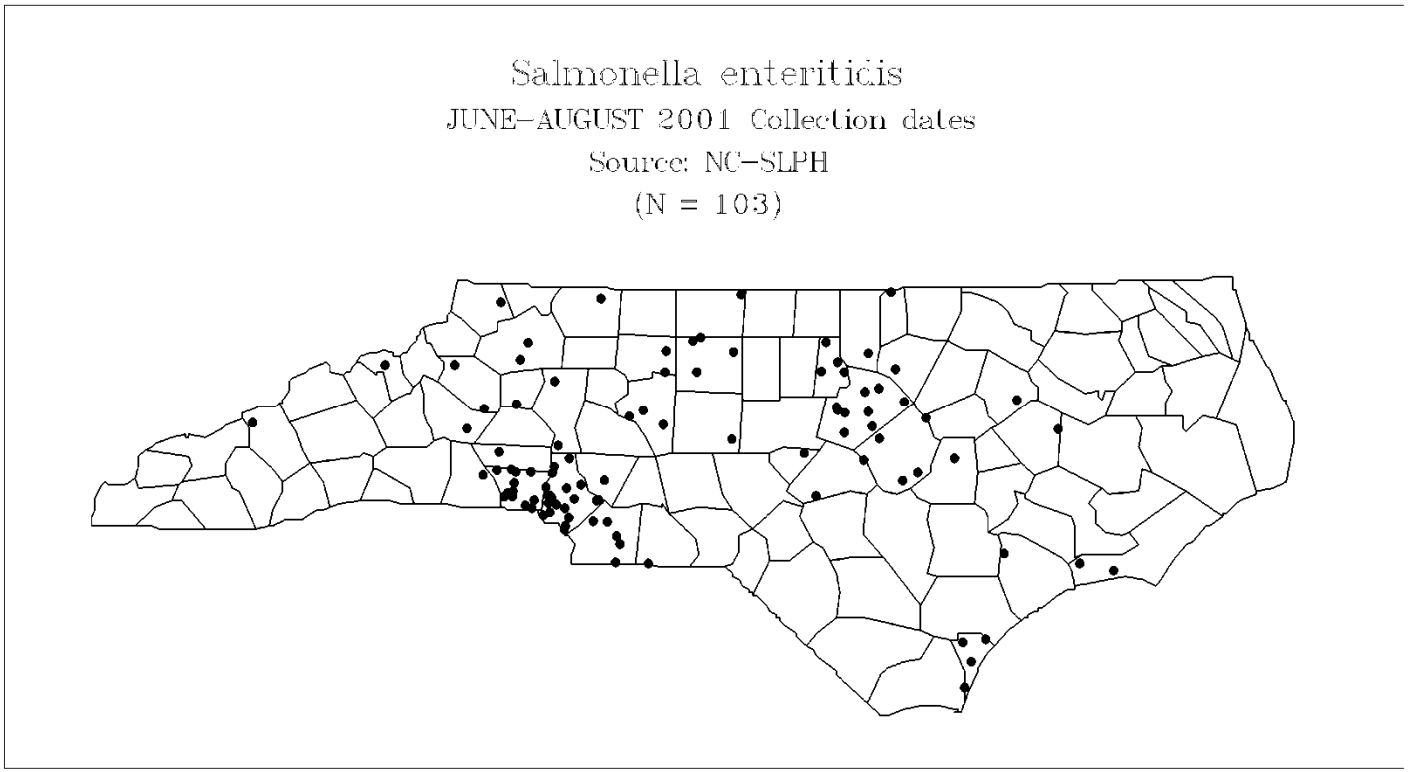
Hepatitis A - by gender and age group



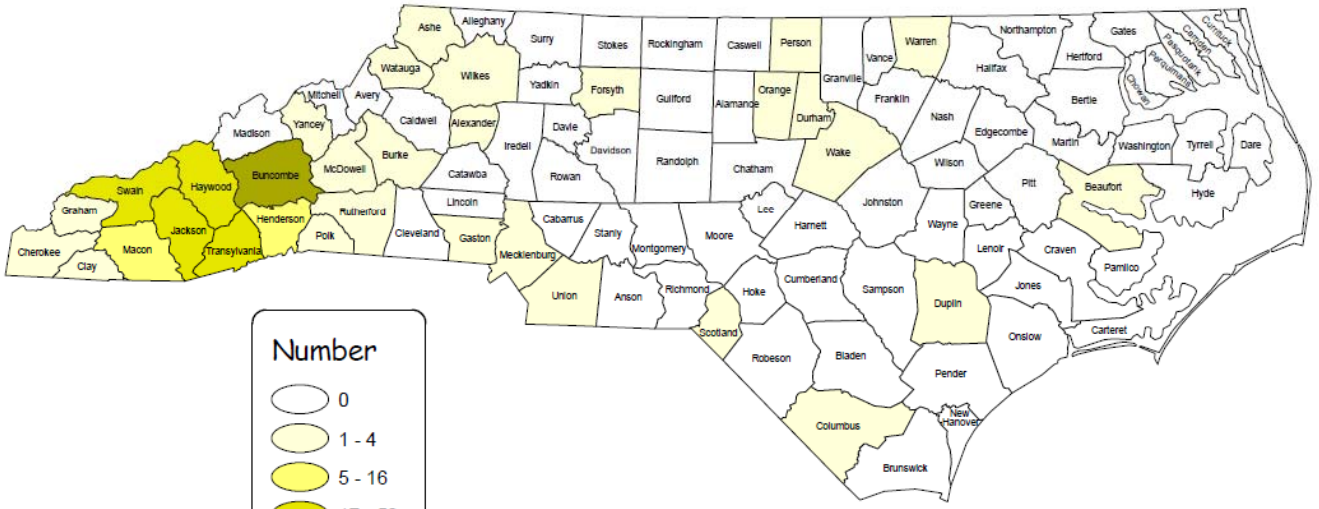
NC, 1987-2003; N=3,767 (2,243 M, 1,524 F)

- Hepatitis A transmission:
  - Foodborne
  - Person-to-person
- Gender distribution: Male>Female (60%-40%)
- Age/Gender distribution: Young Males, 20-39 years old
- MSM high risk for hepatitis A in these years

Salmonella enteritidis



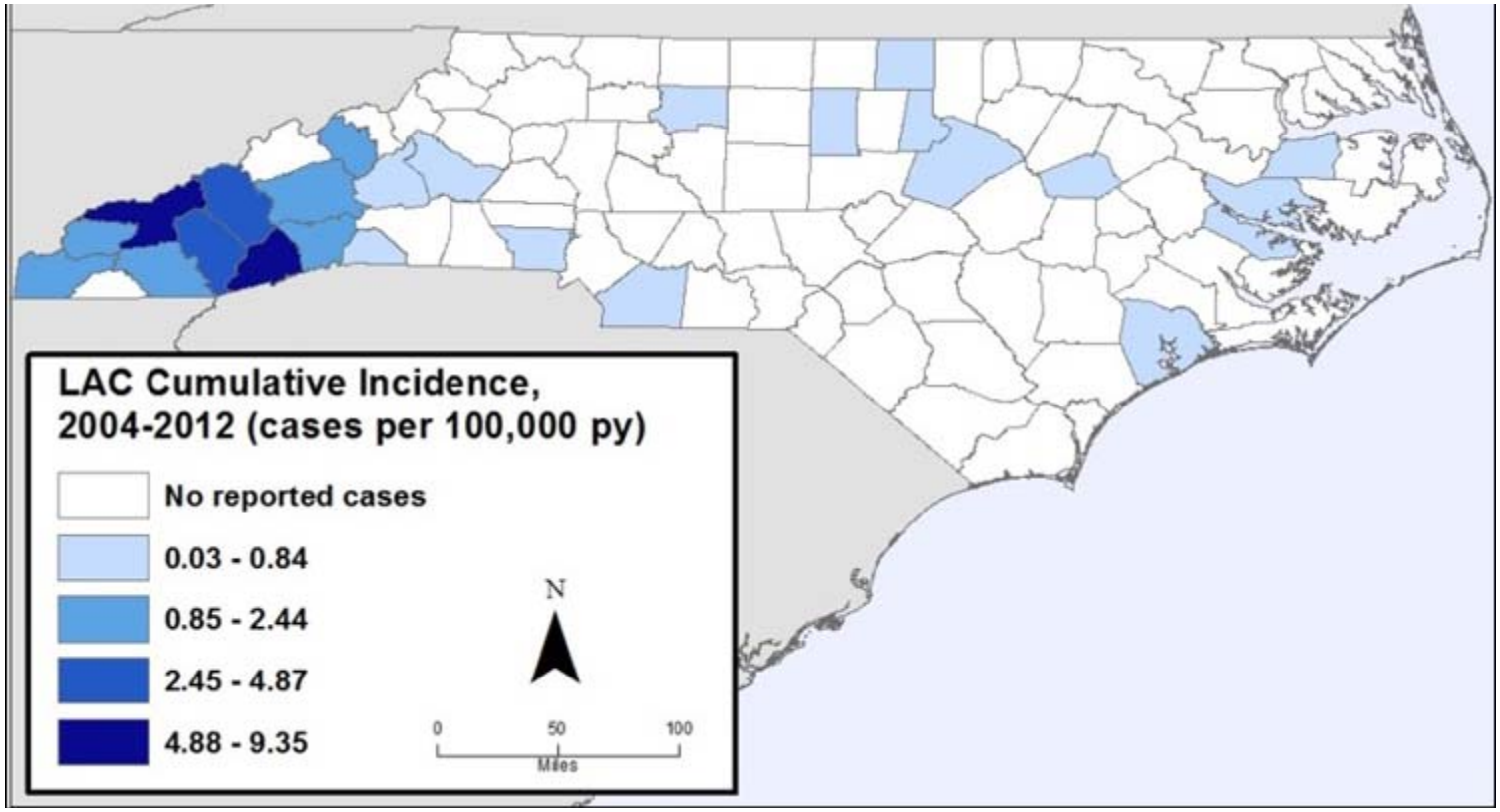
North Carolina
Confirmed and Probable LaCrosse Encephalitis Cases
1998 - 2011



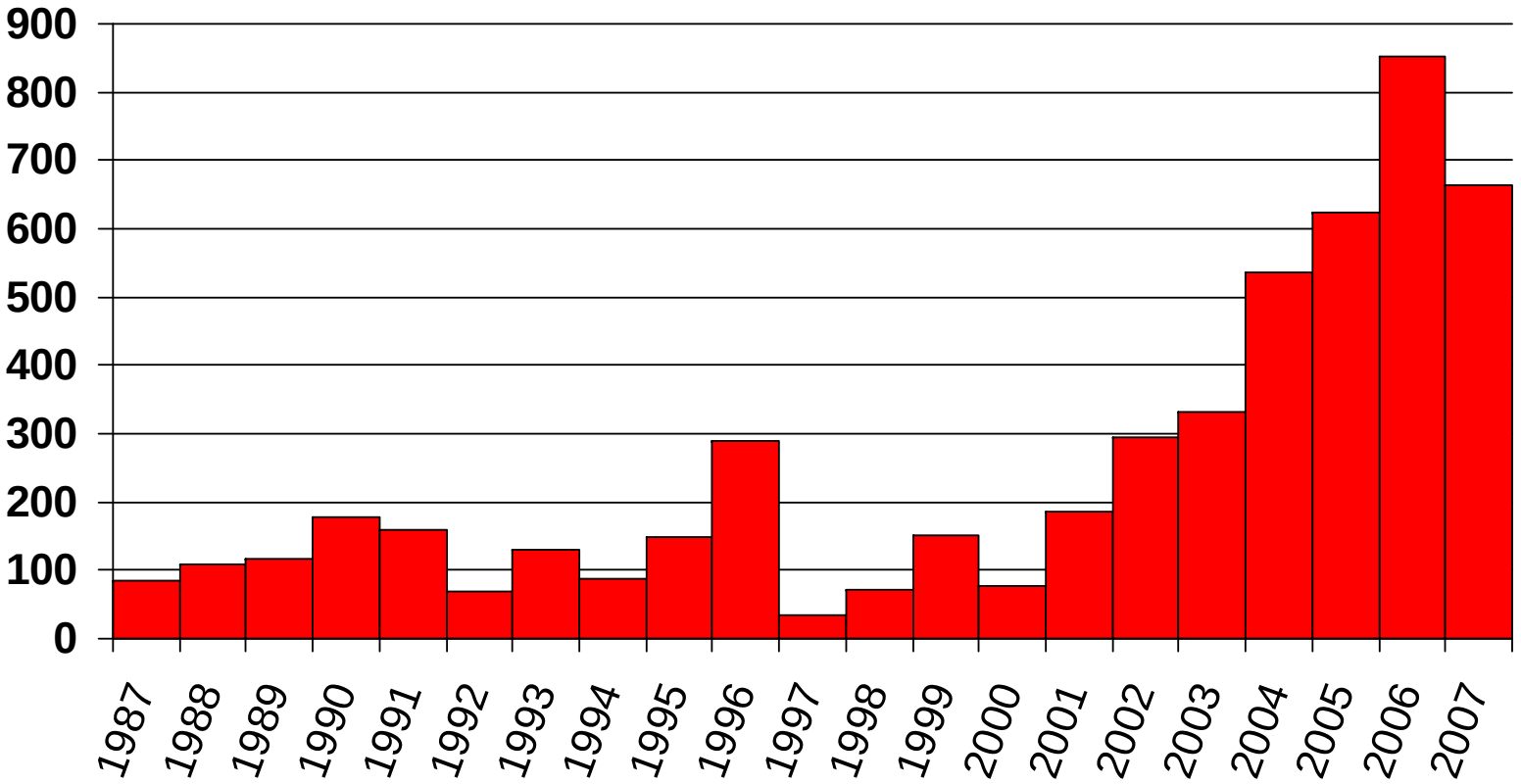
N = 212

schs
State Center for Health Statistics

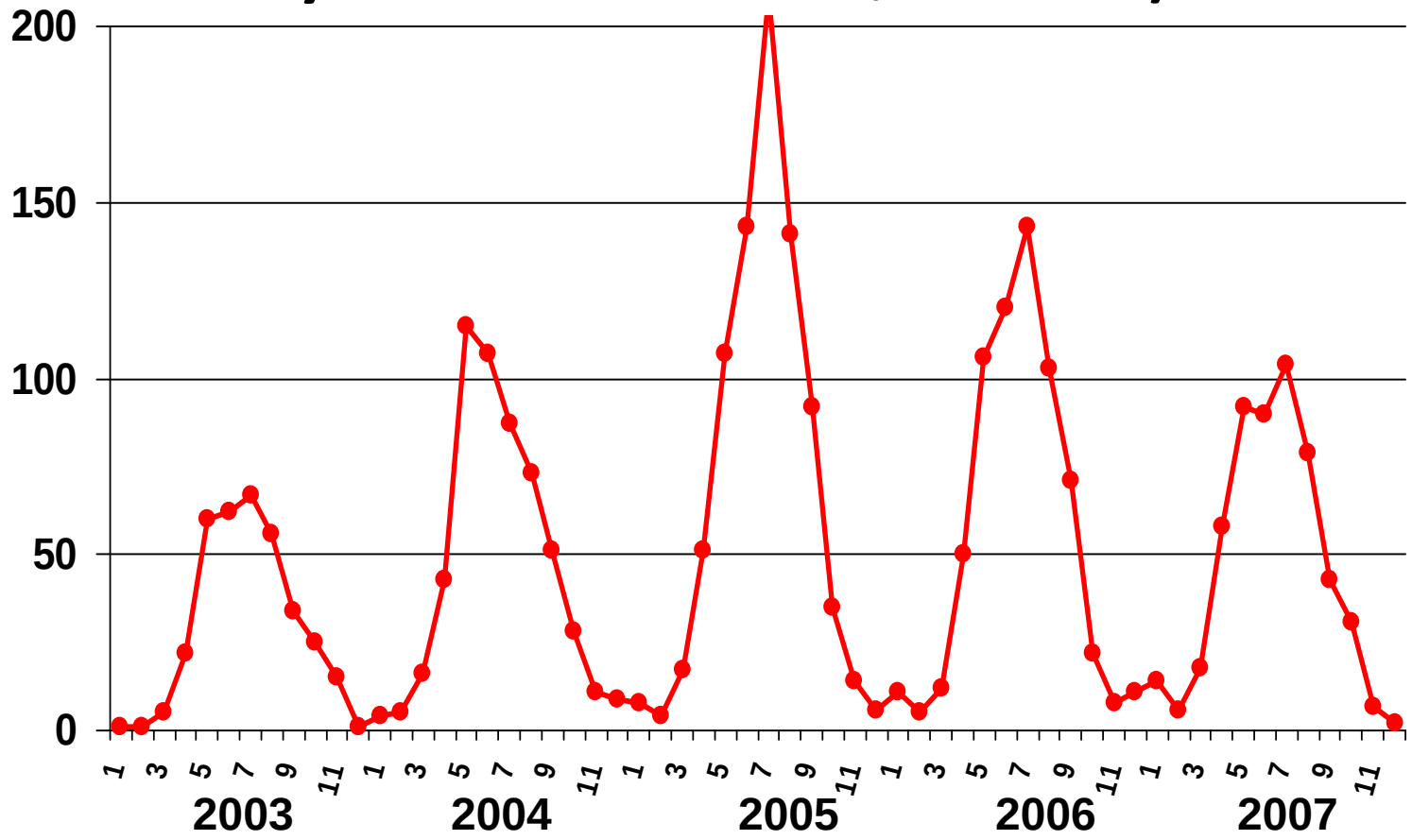
NCPH
North Carolina Public Health


LAC Cumulative Incidence,
2004-2012 (cases per 100,000 py)
No reported cases
0.03 - 0.84
0.85 - 2.44
2.45 - 4.87
4.88 - 9.35
N
0
50
100
Miles

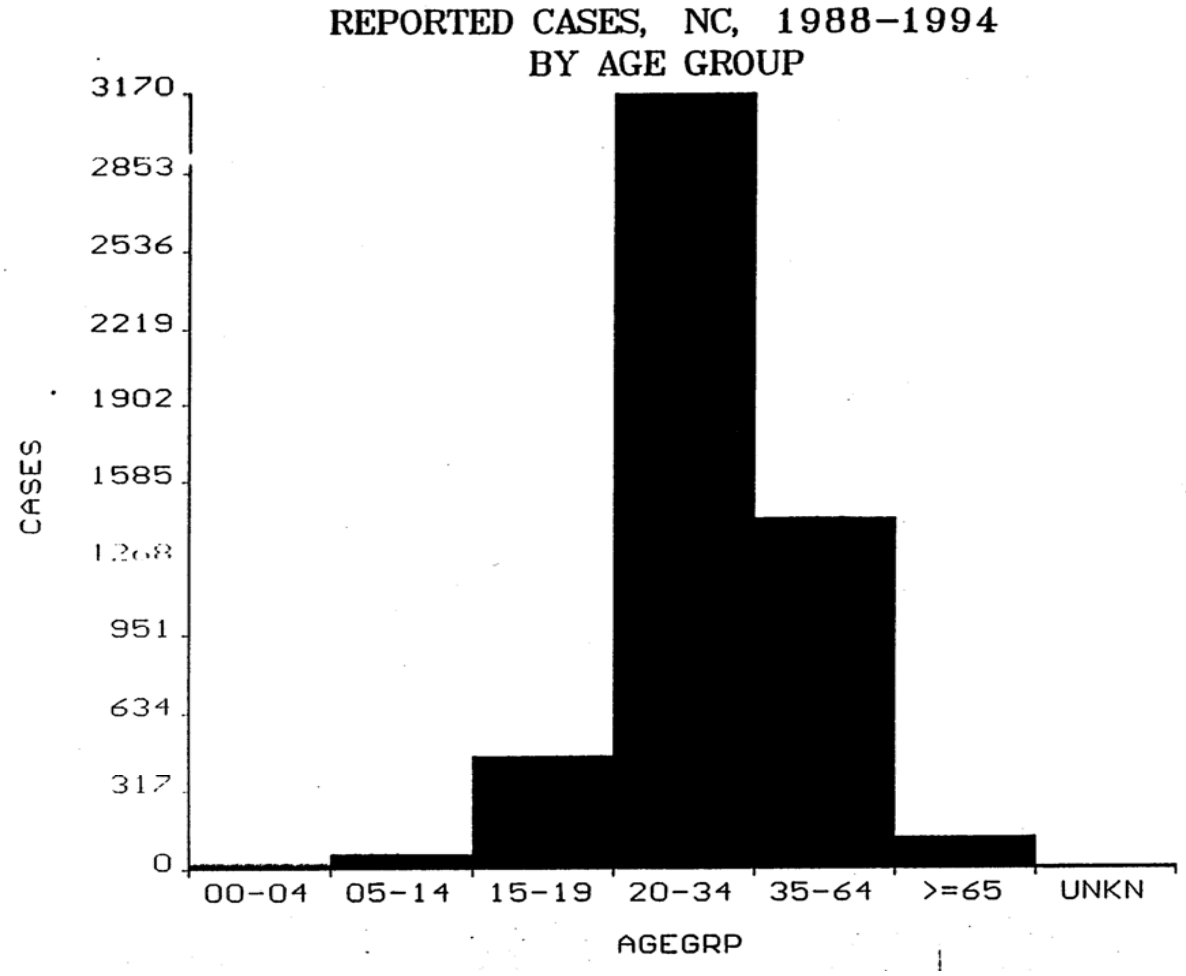
RMSF, N.C.
Reported Cases, by Year of Report



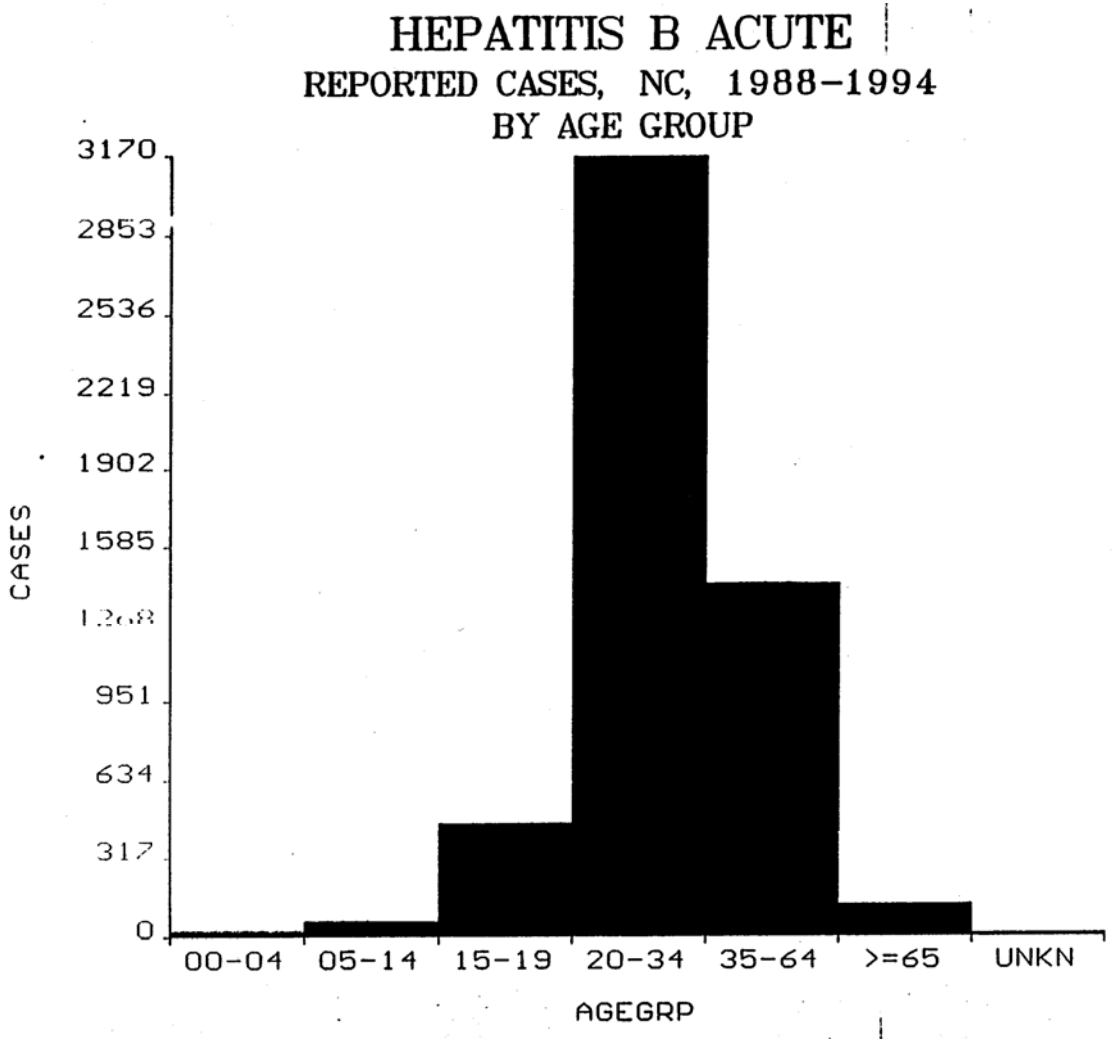
Rocky Mountain Spotted Fever Reported Cases, NC, 2003-2007 by Month of Onset (N = 2931)



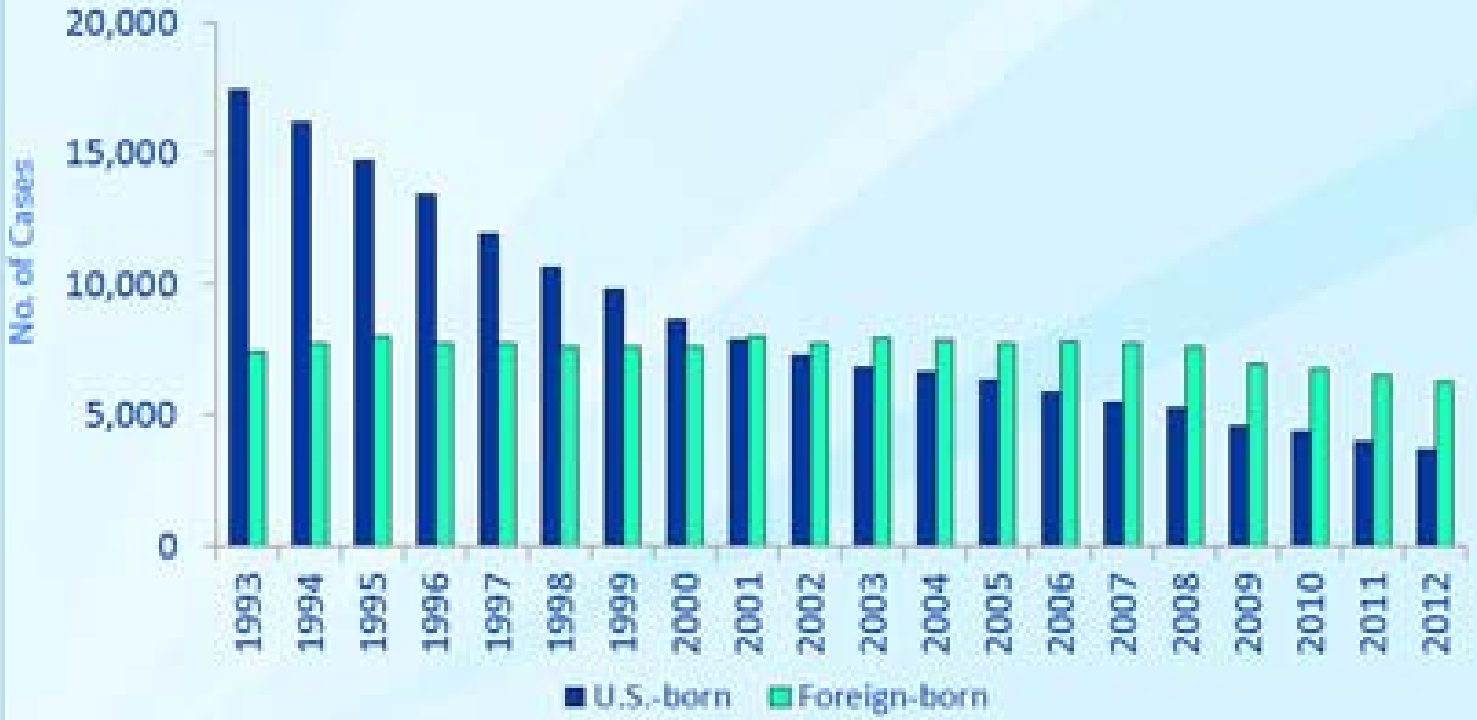
Reported Cases N.C., 1988-1994 by age group



Acute Hepatitis B



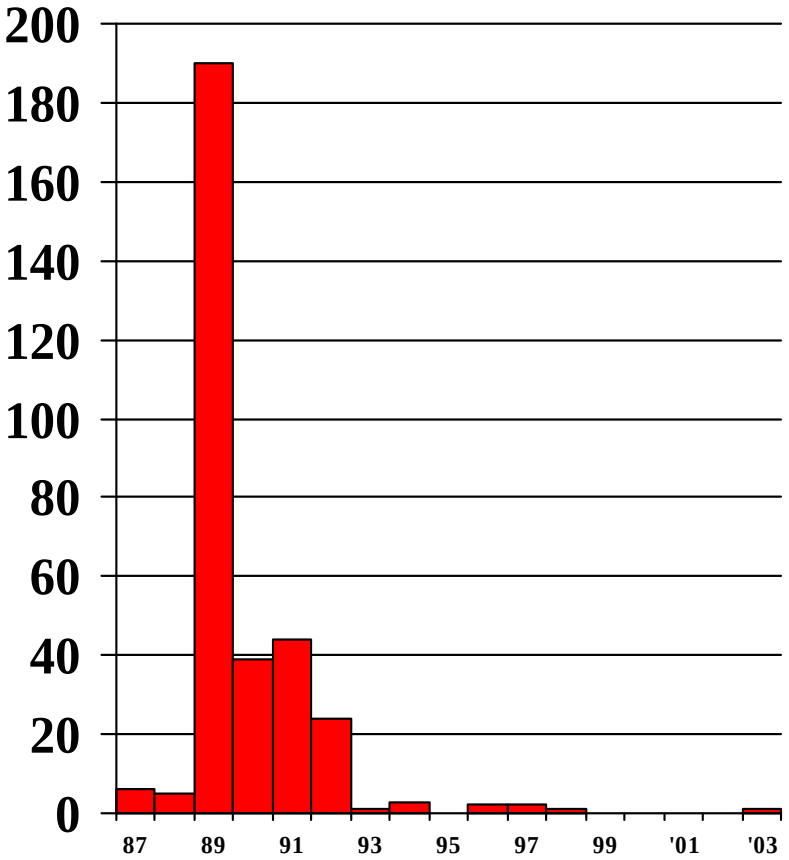
Number of TB Cases in U.S.-born vs. Foreign-born Persons, United States, 1993–2012*



*Updated as of June 10, 2013

CDC

Measles – N.C., 1987-2003

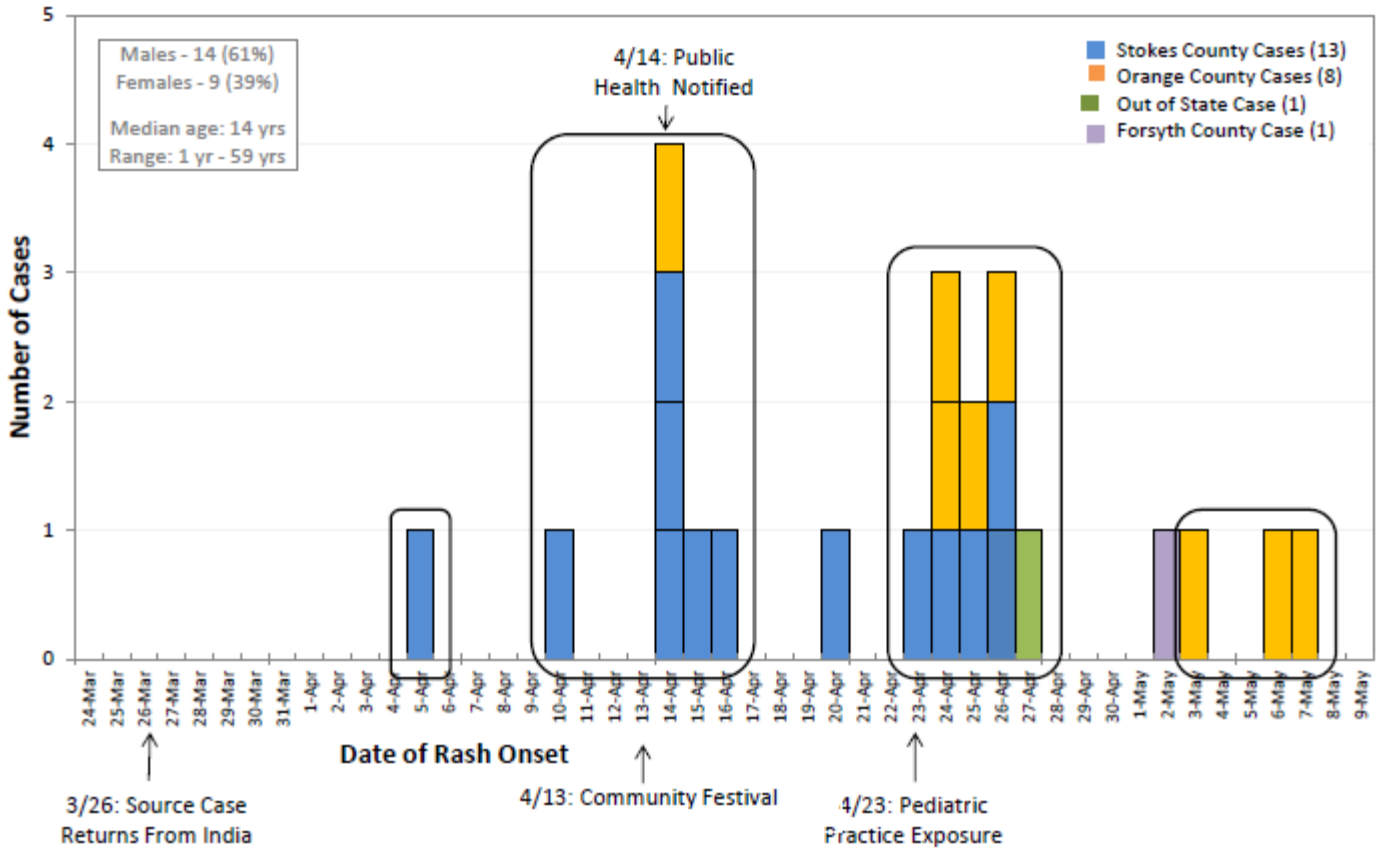


N=318 Reported Cases - NC 1987-2003

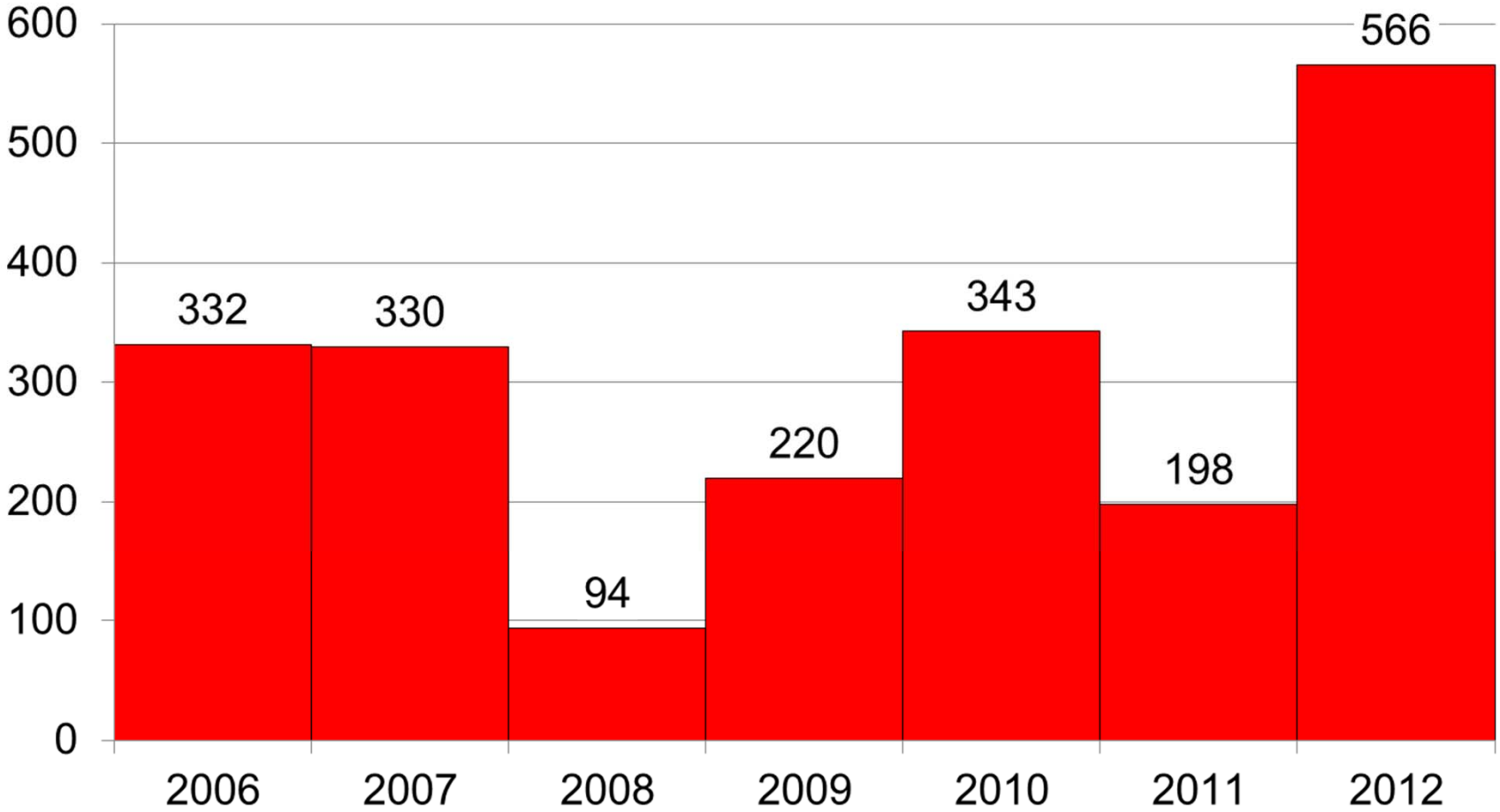
- A Vaccine Preventable Disease
- A Childhood Disease
- Background Rate: ~ 0
- 1989 Outbreak:
  - Atypical age:
    - 19% aged < 10 y.o.
    - 76% aged 10-24 y.o.
- Use: Policy Changes

Measles in N.C., 2013

Number of Measles Cases by Date of Rash Onset (n=23)



Pertussis Reported Cases
N.C. 2006-2012

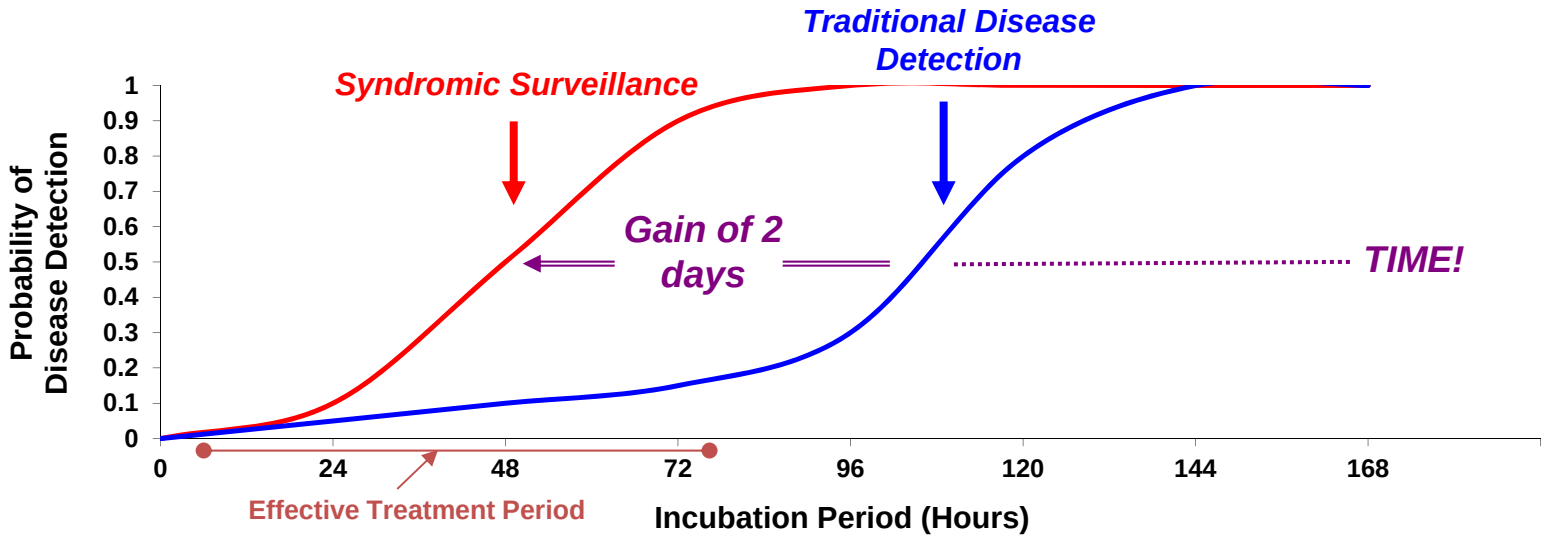


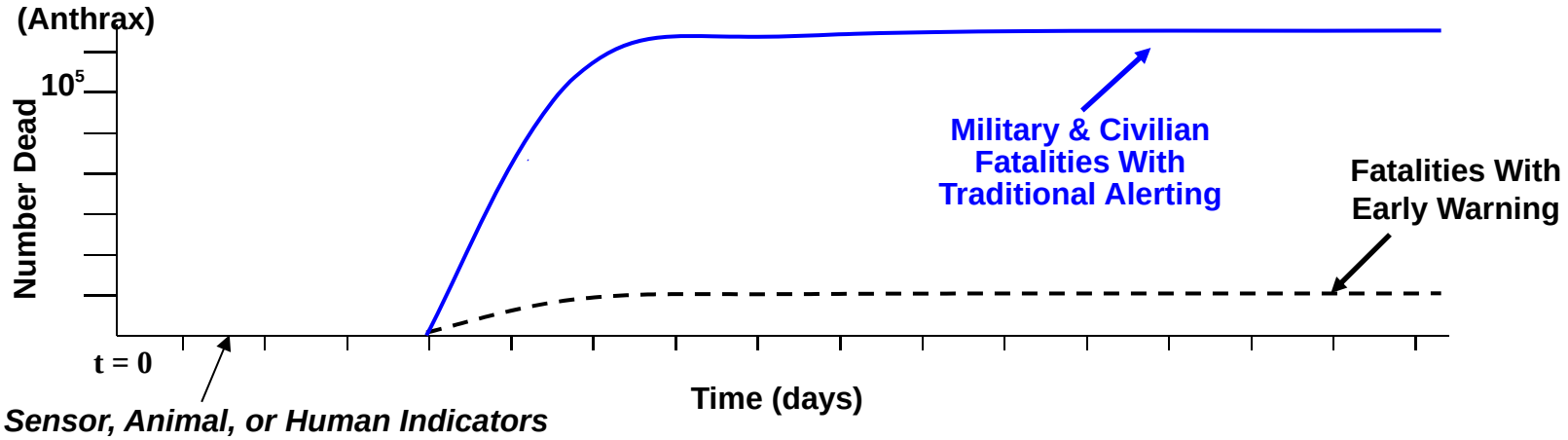
Surveillance: Recent Trend

- Electronic reporting
- Reporting of events providing earlier warning
- Healthcare-Associated Infection

Syndromic/Electronic Surveillance

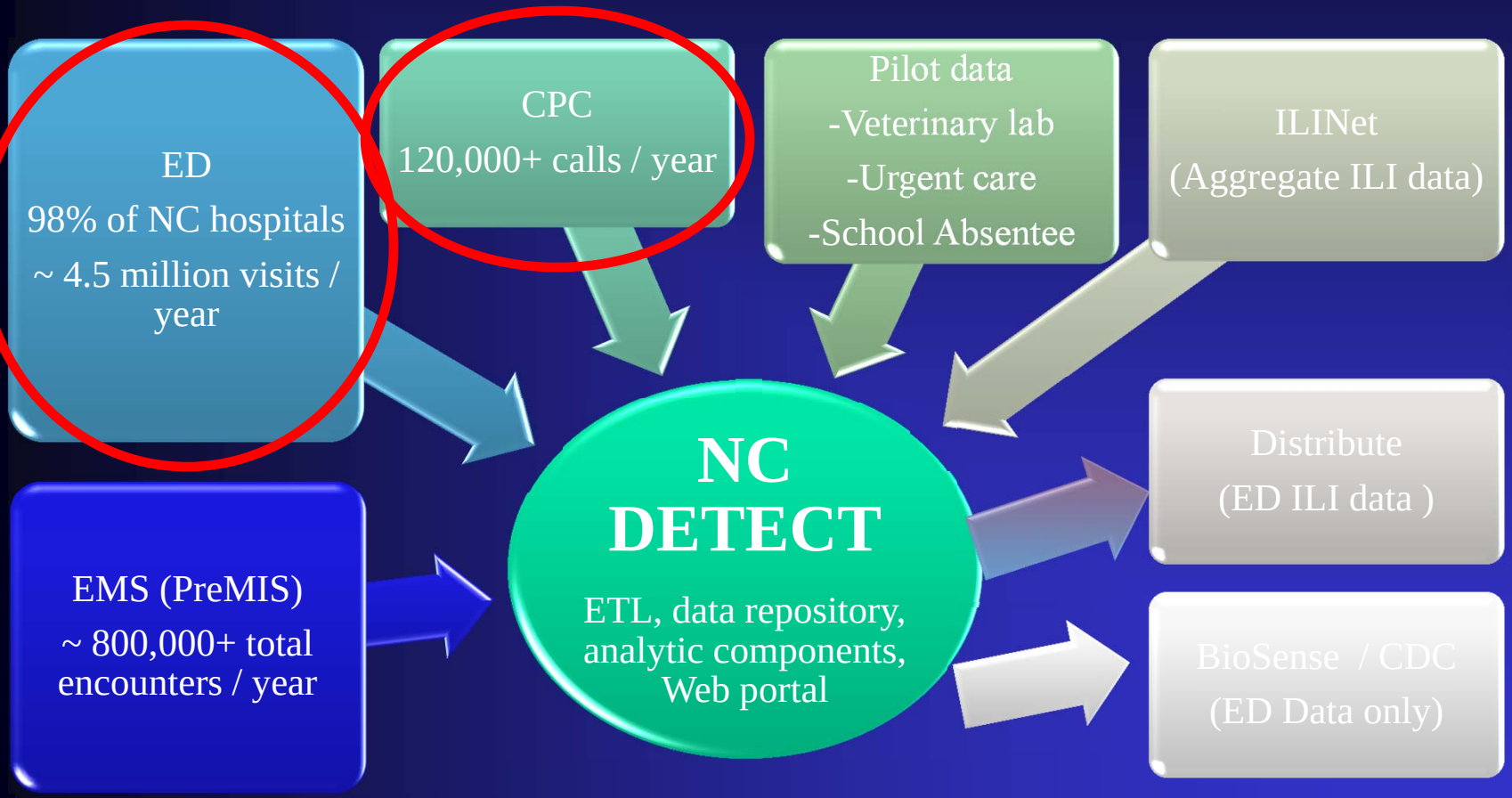
Traditional vs. Indicator Surveillance in Outbreak Detection



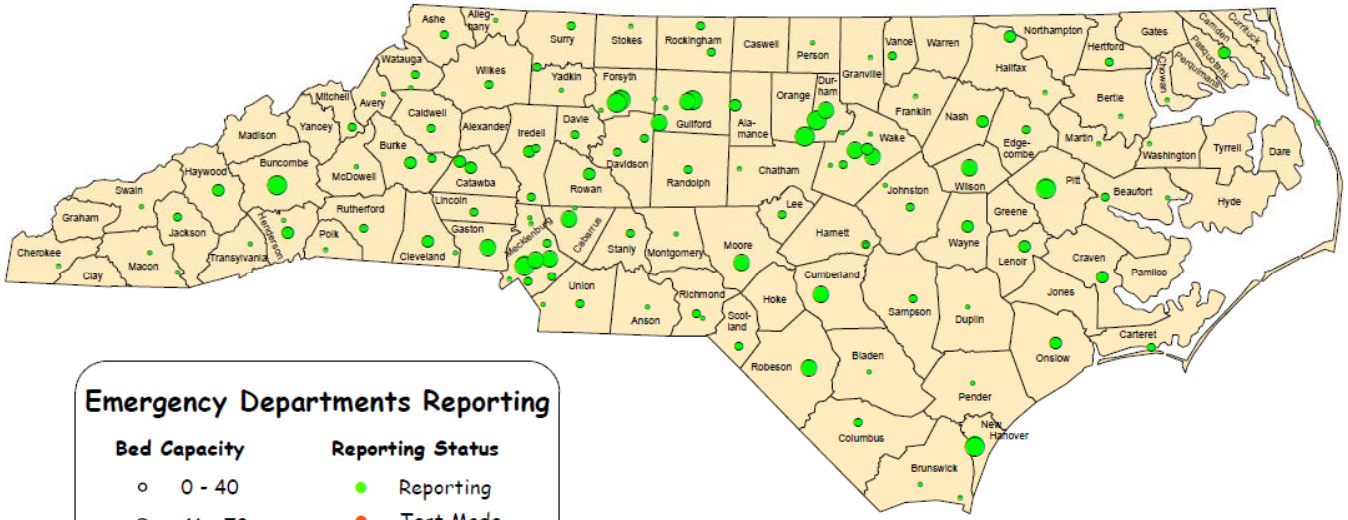


Source: Johns Hopkins University / DoD Global Emerging Infections System

NC DETECT: real-time surveillance during an event of public health significance

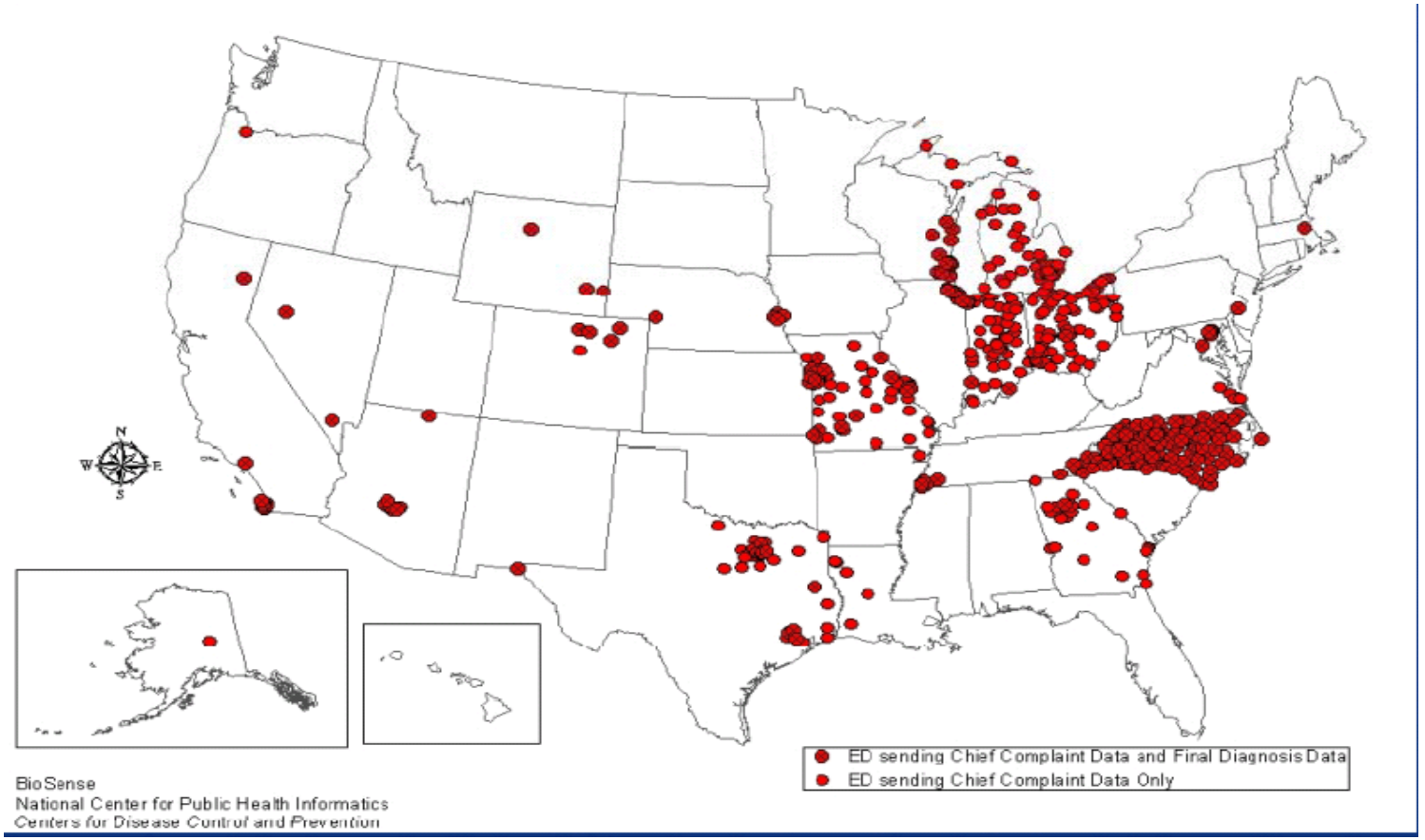


Emergency Departments Reporting to NC DETECT
by General Bed Capacity
As of August 13th, 2013, 122 EDs reporting

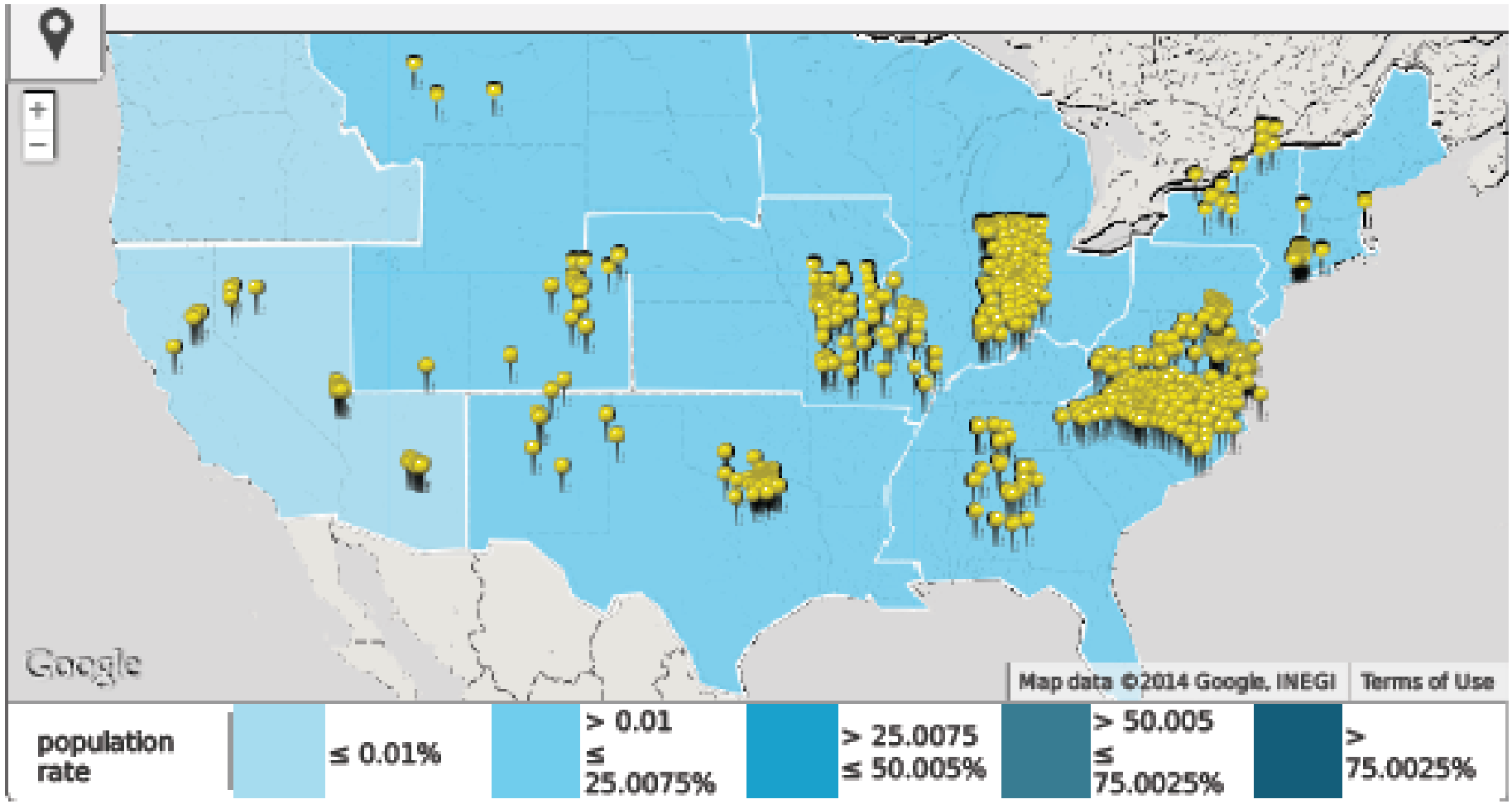


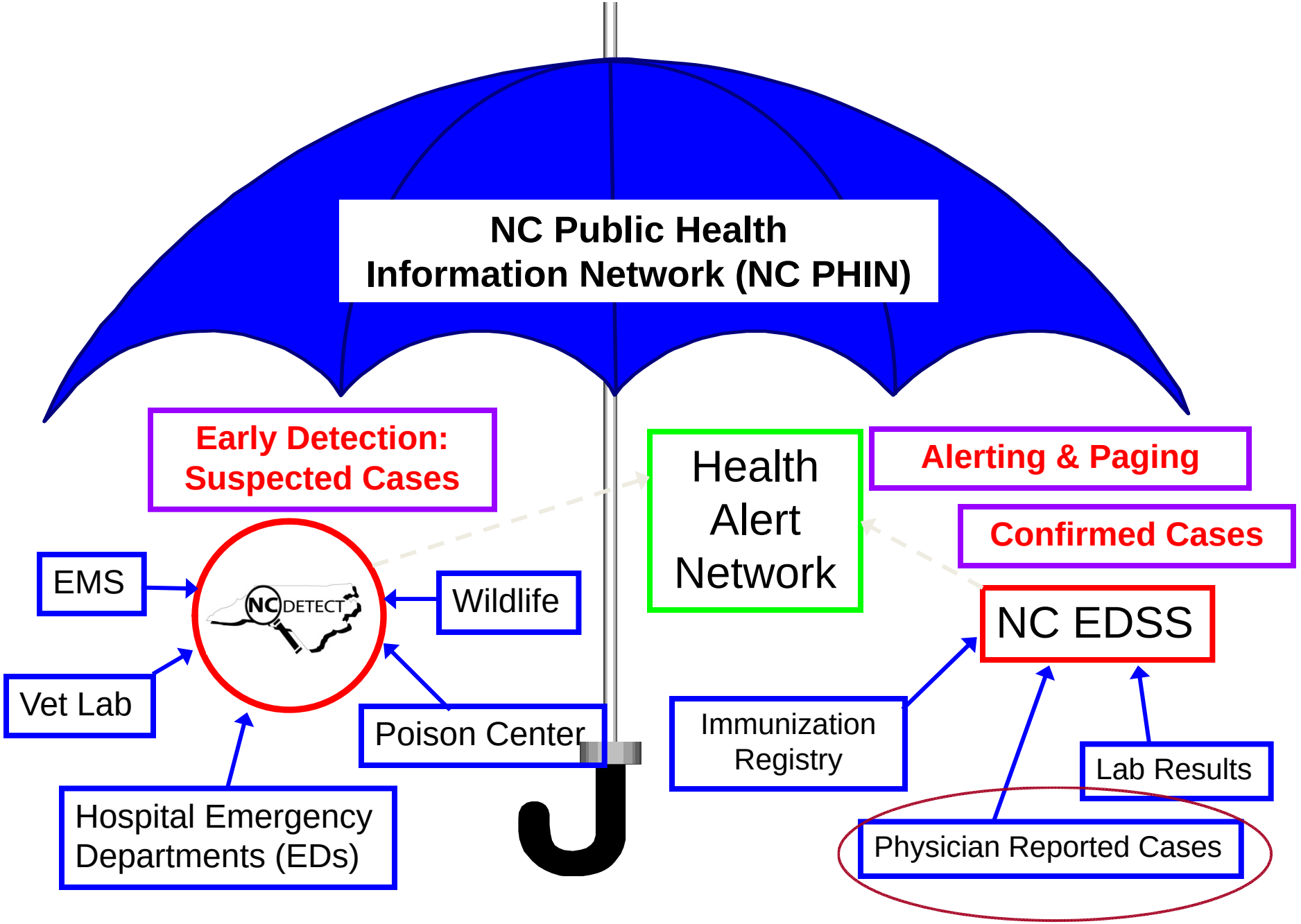
State Center for Health Statistics

Hospital EDs Contributing to BioSense (Non-DoD facilities)



BioSense 2 reporting hospitals (Non-DoD facilities), Feb. 2014





"Traditional surveillance"