Introduction to Communicable Disease Surveillance and Investigation in North Carolina

Influenza

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Learning Objectives

Describe basic epidemiologic features of seasonal and novel/pandemic influenza

Locate and interpret current influenza surveillance data

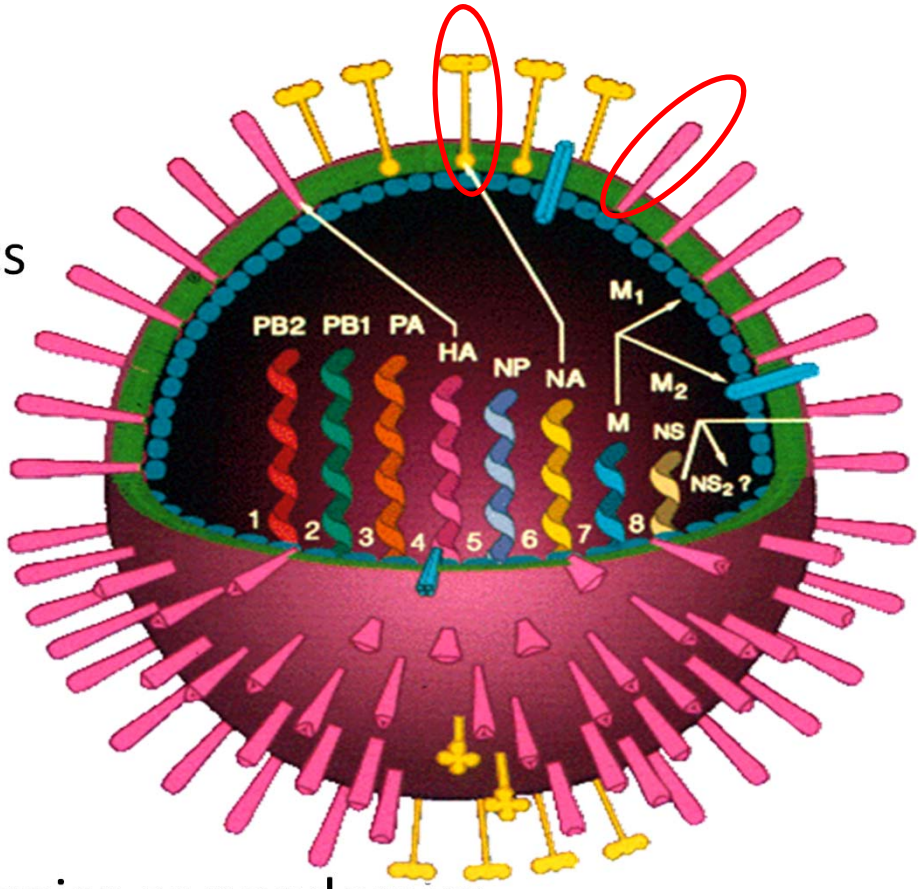
Correctly classify and report influenza-associated deaths

Identify resources for responding to influenza outbreaks in long-term care settings

Flu Background

Type A

- Animals and humans
- Epidemics, pandemics



Type B

- Humans
- Epidemics

Type C

- Mild illness; no epidemics or pandemics

Genetic Changes in Flu

- Antigenic **DRIFT**
  - Continual development of new strains through genetic mutations
  - A viruses >> B viruses
  - Seasonal epidemics
- Antigenic **SHIFT**
  - New HA or HA & NA
  - Influenza A only
  - Associated with pandemics

How Flu Spreads

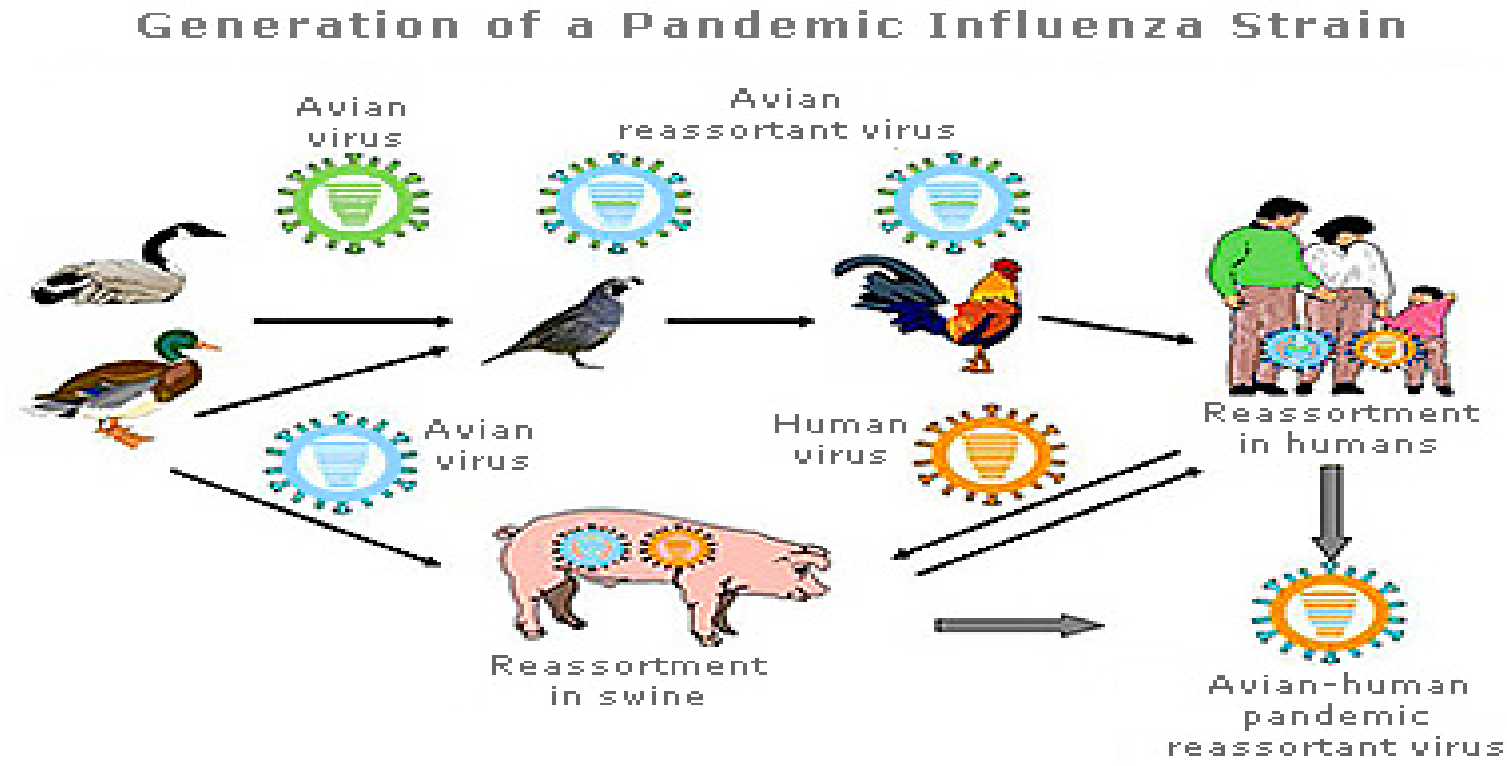
- Spread through coughing and sneezing
- Contact transmission also important
  - Hand to hand, contaminated surfaces
- Airborne transmission possible

Seasonal Flu

- Affects 5–20% of population each year
  - >200,000 hospitalizations*
  - Average 24,000 deaths (range, 3–49,000)**
- $10 billion direct medical costs,
- $87 billion total economic burden***

Thompson, JAMA 2004; **MMWR 59(33) 2010; ***Molinari, Vaccine 2007

Generation of a New ("Novel") Influenza Virus



Source: CDC | Influenza Division, Centers for Disease Control and Prevention. Modified from Emergence of H5N1 influenza virus and control options. (Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 12, No. 1, January 2006)

Pandemic Influenza

Three Conditions:

1. New (“novel”) virus; all or most susceptible
2. Transmissible from person to person
3. Wide geographic spread

http://www.army.mil/-images/2008/09/24/22729/army.mil-2008-09-25-103608.jpg

Impact of Past Influenza Pandemics

Pandemic, or Antigenic Shift	Excess Deaths in US	Populations Affected
1918-19 (A/H1N1)	500,000	Persons <65 years
1957-58 (A/H2N2)	70,000	Infants, elderly
1968-69 (A/H3N2)	36,000	Infants, elderly
2009-10 (A/H1N1)	12,500	Persons <65 years

Testing for Influenza

- Viral culture*
- PCR*
- Direct fluorescent antibody (DFA)
- Rapid influenza diagnostic tests

*Offered at State Lab

Rapid Influenza Diagnostic Tests (RIDT): Warning

- A negative RIDT does NOT rule out infection

- Treatment and infection control decisions should NOT be based on negative RIDT results when influenza is circulating

Influenza Antiviral Medications

- Adamantanes (M2 inhibitors)
  - Amantidine and rimantidine
  - Active against influenza A only
  - Not effective against currently circulating strains

- Neuraminidase Inhibitors (NAIs)
  - Oseltamivir and zanamivir
  - Active against influenza A and B

Antiviral Treatment Recommendations

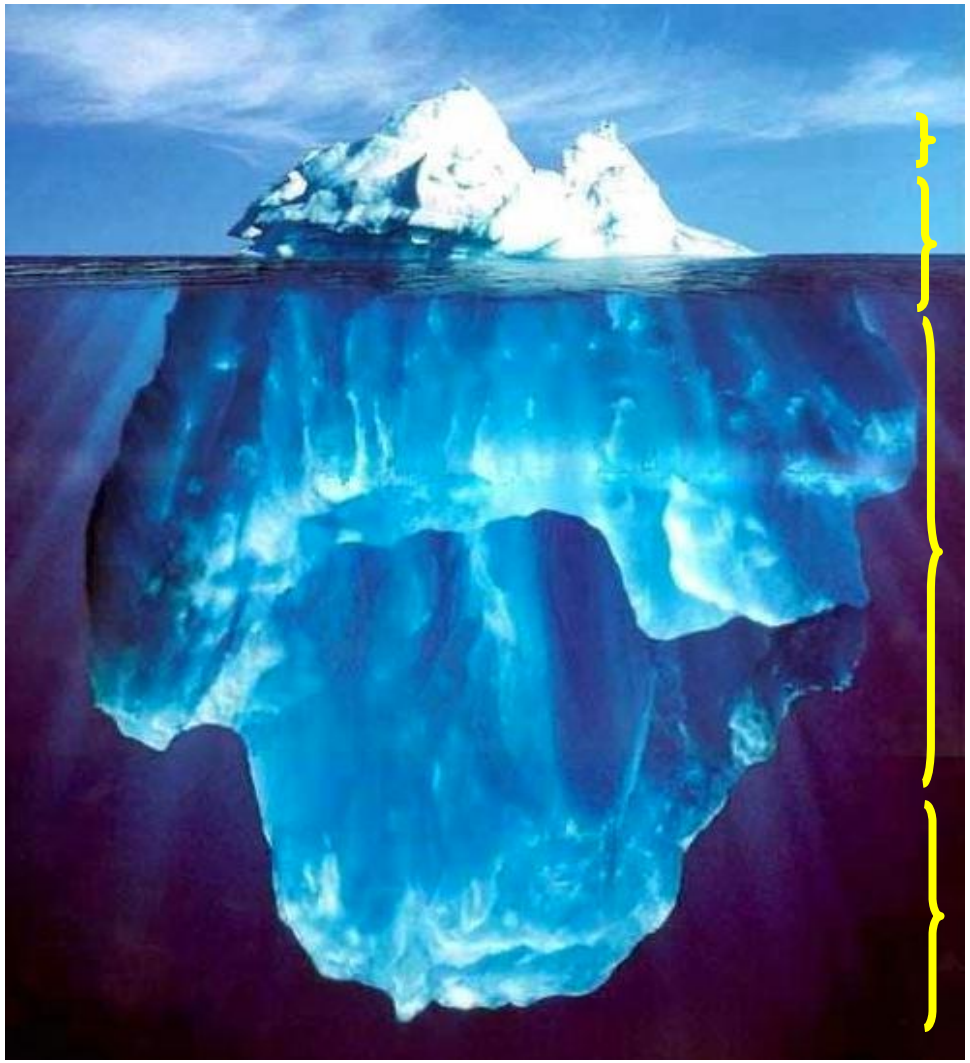
- Antiviral treatment is recommended as early as possible for any patient with confirmed or suspected influenza who
  - is hospitalized;
  - has severe, complicated, or progressive illness; or
  - is at higher risk for influenza complications
- Can reduce mortality even if started more than 48 hours after onset

Flu Vaccines

- Best way to prevent infection
- Recommended for everyone ≥6 months of age
- Especially important for:
  - People who are at high risk
  - People who live with or care for others who are high risk

FLU SURVEILLANCE

Influenza Surveillance



Hospitalization

Outpatient visits

Not medically attended

Subclinical

Influenza Surveillance

Relies on:

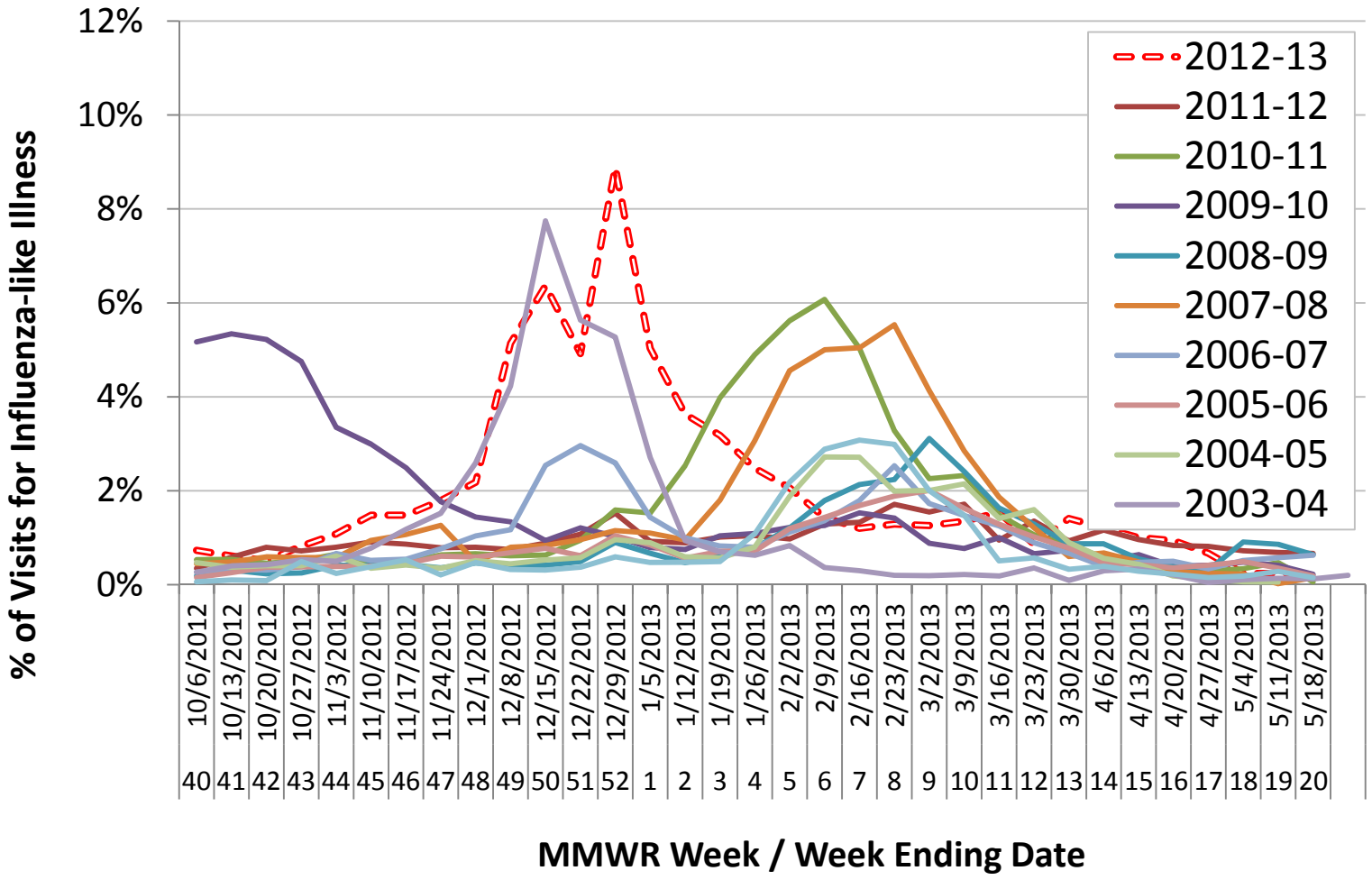
1. Tracking influenza-like illness
   - Influenza-Like Illness Network (ILINet)
   - NC DETECT
2. Performing systematic laboratory testing
3. Reporting of flu-associated deaths and novel influenza infections

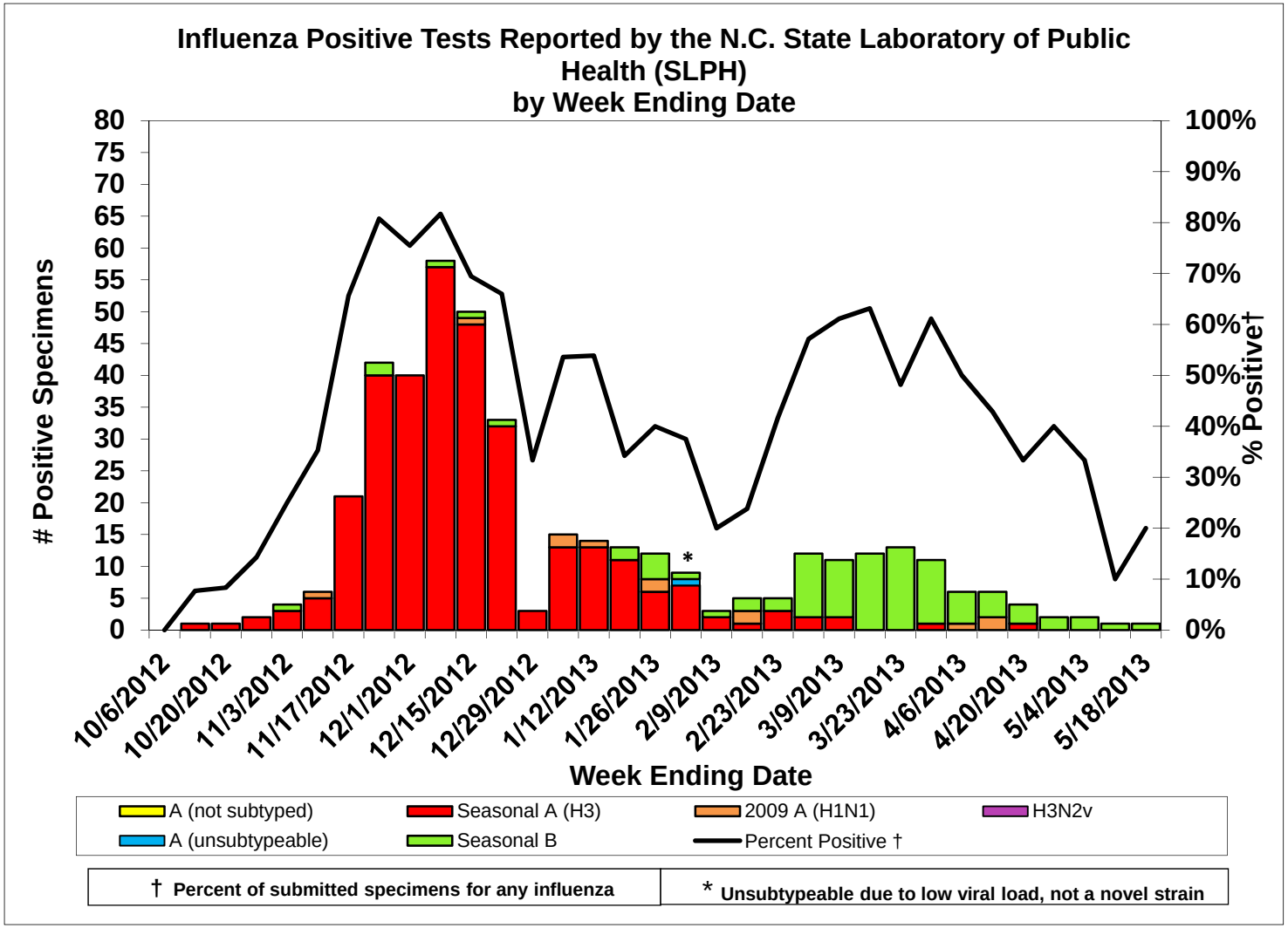
Influenza-Associated Death: Case Definition

- Clinically compatible illness
- Influenza confirmed by an appropriate laboratory or rapid diagnostic test
- No period of complete recovery between positive test and death
- No alternative agreed upon cause of death

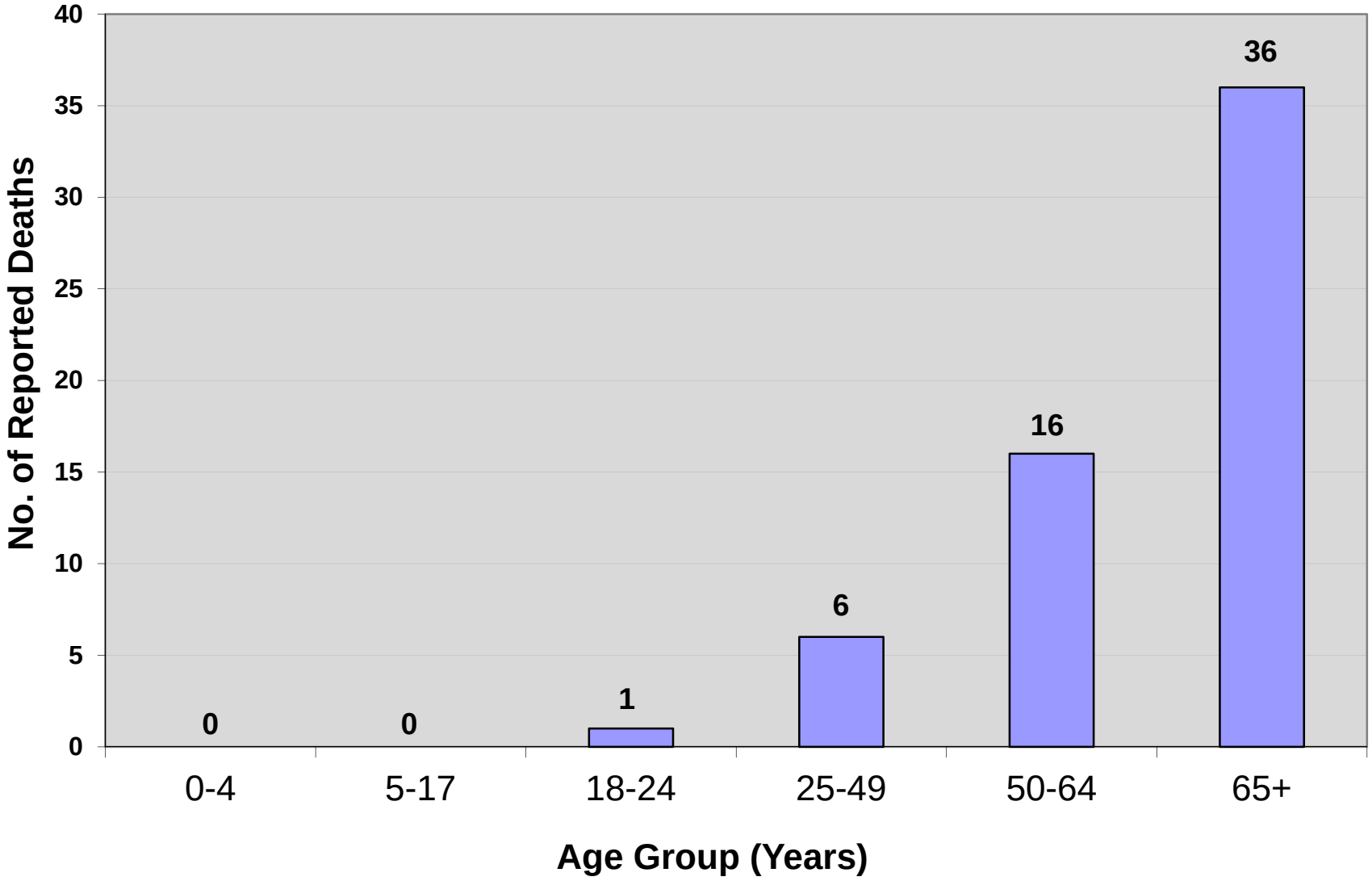
➢ *Flu does not have to be the primary cause of death*

Influenza-Like Illness in North Carolina, 2002–2013



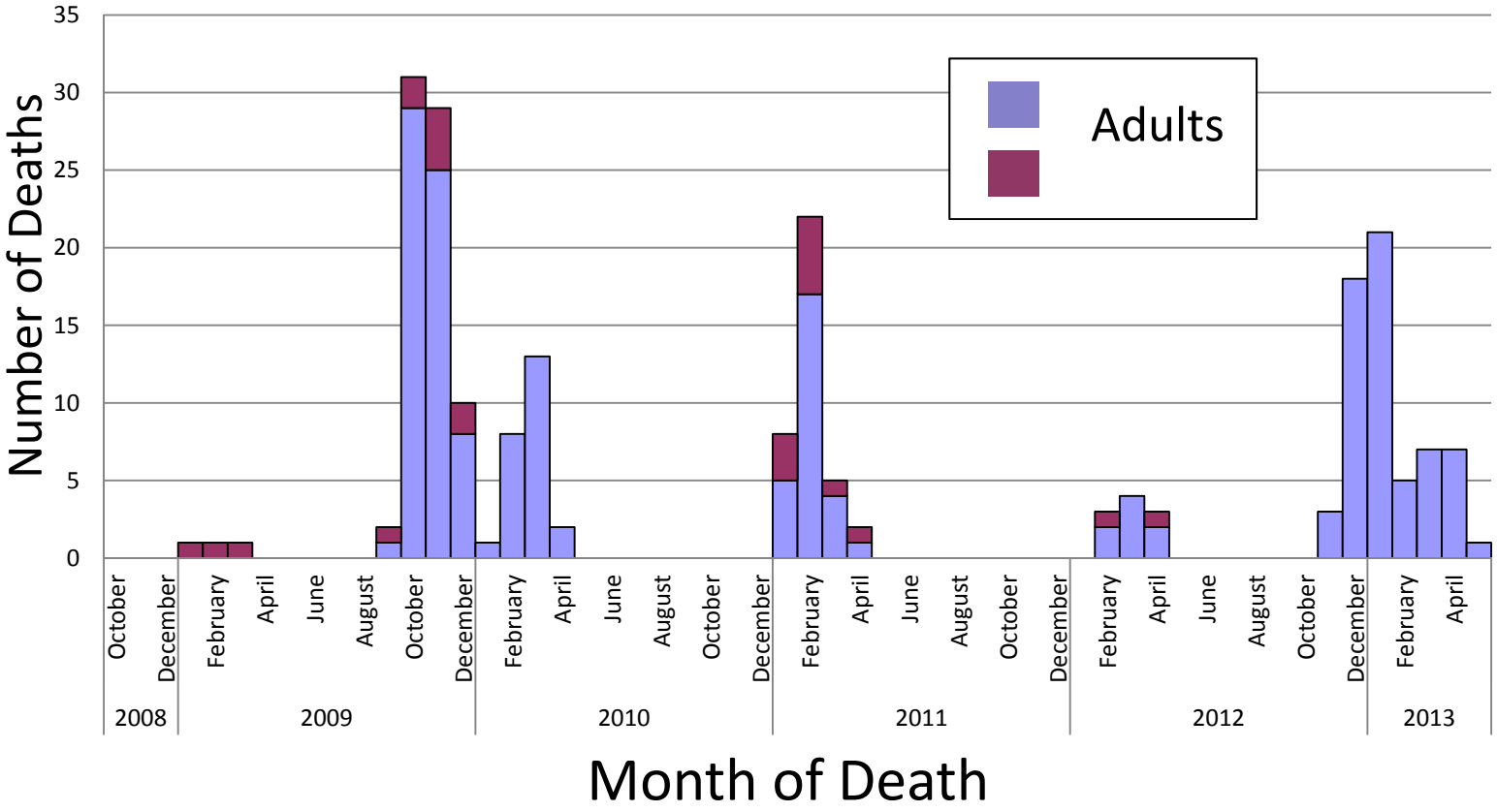

Influenza Positive Tests Reported by the N.C. State Laboratory of Public Health (SLPH)
by Week Ending Date
Positive Specimens
% Positive†
Week Ending Date
10/6/2012
10/20/2012
11/3/2012
11/17/2012
12/1/2012
12/15/2012
12/29/2012
1/12/2013
1/26/2013
2/9/2013
2/23/2013
3/9/2013
3/23/2013
4/6/2013
4/20/2013
5/4/2013
5/18/2013
*
A (not subtyped)
Seasonal A (H3)
2009 A (H1N1)
H3N2v
A (unsubtypeable)
Seasonal B
Percent Positive †
† Percent of submitted specimens for any influenza
* Unsubtypeable due to low viral load, not a novel strain

Laboratory Confirmed Influenza-Associated Deaths Reported in North Carolina, by Age Group (n=59)*



*An influenza-associated death is defined for surveillance purposes as a death resulting from a clinically compatible illness that was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test. The 2012-13 influenza season began on September 30, 2012.

Reported Influenza-Associated Deaths — North Carolina, 2009–2013



Flu Surveillance Information

Updated weekly at flu.nc.gov

CONTROL MEASURES: LONG-TERM CARE

Influenza Outbreaks in Long-Term Care Facilities

- One laboratory-confirmed case

- and -

- Other residents with respiratory illness on the same unit

Influenza Outbreaks in Long-Term Care

1. Conduct daily active surveillance and maintain line list
2. Implement standard and droplet precautions for ill residents
3. Provide antiviral treatment to all ill residents
4. Provide antiviral chemoprophylaxis to all non-ill residents* regardless of vaccine status

* Might include staff in some cases

Other Control Measures

- Limit group activities
- Suspend admissions or transfers
- Limit visitation
- Exclude those ill staff until at least 24 hours after resolution of fever
- Restrict personnel movement from affected to unaffected units
- Administer flu vaccine to all unvaccinated residents and staff

Summary

- Influenza is a major cause of morbidity and mortality
- Annual vaccination is the best way to prevent flu
- Look for influenza surveillance data and updated control measures at flu.nc.gov