Influenza Surveillance in the United States

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National Adult and Influenza Immunization Summit Call
October 11, 2018

Outline

- Goals of the system
- System overview
- Reporting timeline
- Component by component
  - Methods
  - Current activity
- Influenza information resources

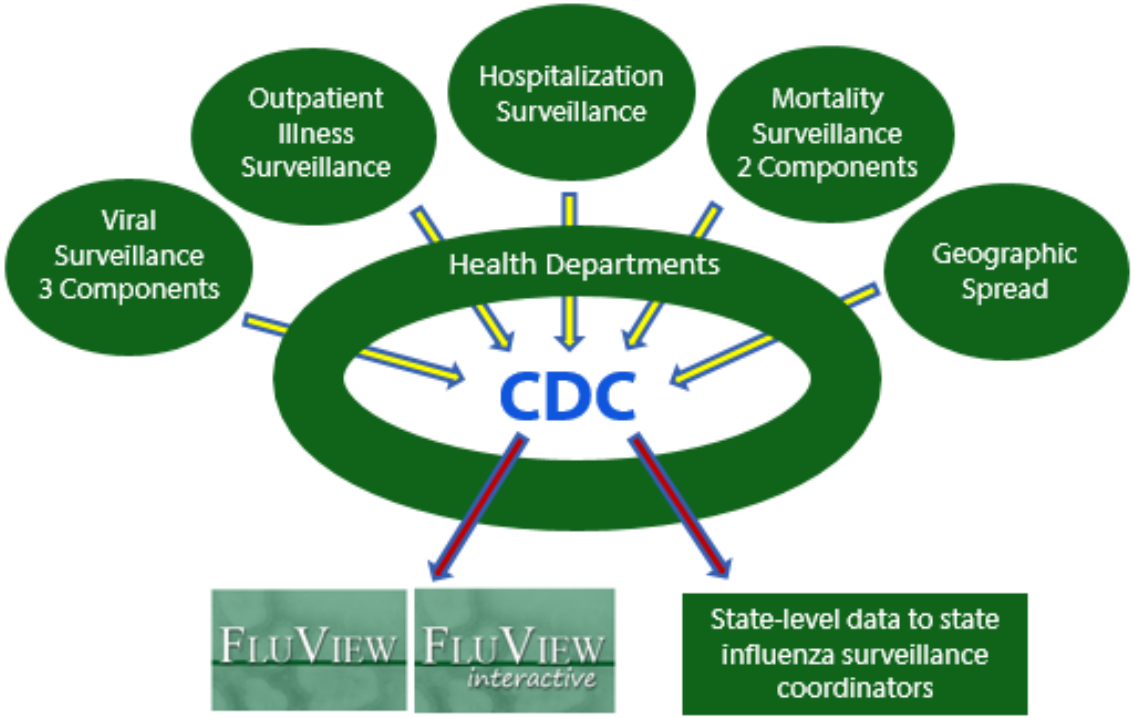
Goals of Influenza Surveillance

- Identify and characterize viruses/strains
- Identify viruses with pandemic potential
- Provide situational awareness
  - Describe the onset and duration of the season
  - Track geographic spread
- Monitor severity
- Describe clinical infections and those at risk
- Guide decisions for interventions

U.S. Influenza Surveillance

- National influenza surveillance is a collaborative effort
  - CDC Influenza Division coordinates the system
  - State and local public health staff are our primary partners
    - Influenza surveillance coordinator in every state, Chicago, DC, NYC, Puerto Rico, US Virgin Islands, Palau, Mariana Islands
    - Public health laboratorian in all states, NYC, DC
  - Data providers
    - Clinicians
    - Vital statistics staff
    - Laboratorians

U.S. Influenza Surveillance System



U.S. Influenza Surveillance Reports

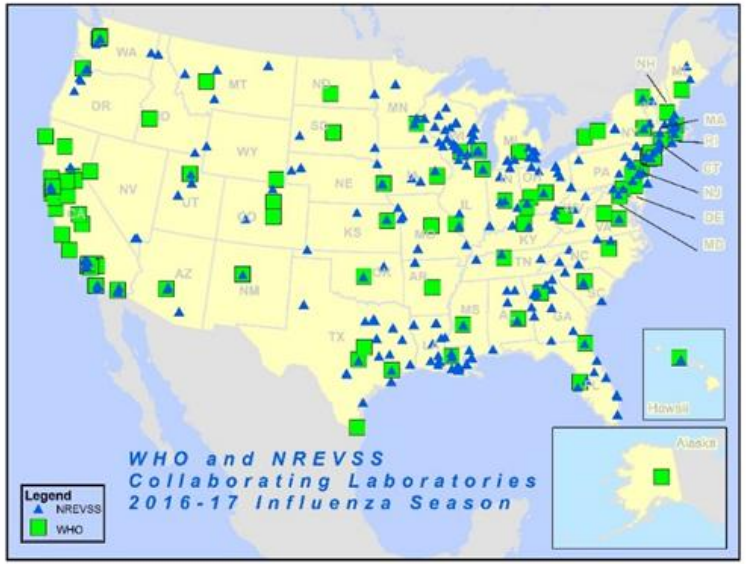
https://www.cdc.gov/flu/weekly/fluactivitysurv.htm

Reporting and Analysis Timeline

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
Collect data about influenza activity occurring this week.						
8	9	10	11	12	13	14
	Report data.		Analyze data.	Review data; write FluView report.	Post FluView report; update FluView interactive	

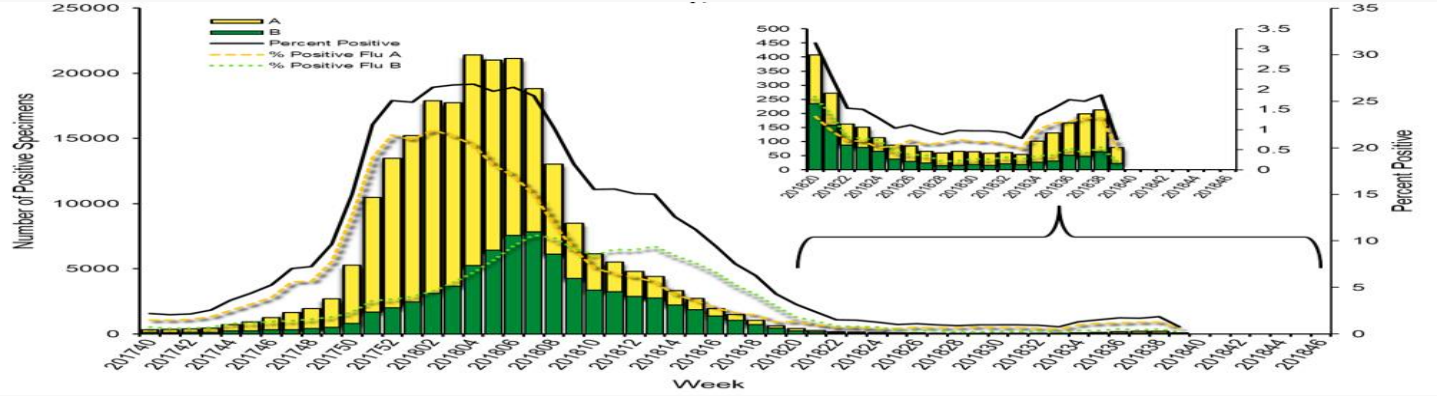
Virologic Surveillance: (1) U.S. World Health Organization (WHO) Collaborating Laboratories, (2) National Respiratory and Enteric Virus Surveillance System Laboratories (NREVSS), (3) Novel Influenza A Virus Reporting

- ~400 participating laboratories
  - ~100 public health laboratories
  - ~300 clinical laboratories
- Weekly reports
  - # specimens tested
  - # positive for influenza by type, subtype
  - Age data from WHO collaborating labs
- Data Uses/Interpretation
  - Is influenza activity increasing/decreasing and where?
  - Distribution of circulating viruses – A vs B; influenza A subtypes and B lineages
  - Identification of viruses with pandemic potential (novel influenza A virus surveillance)

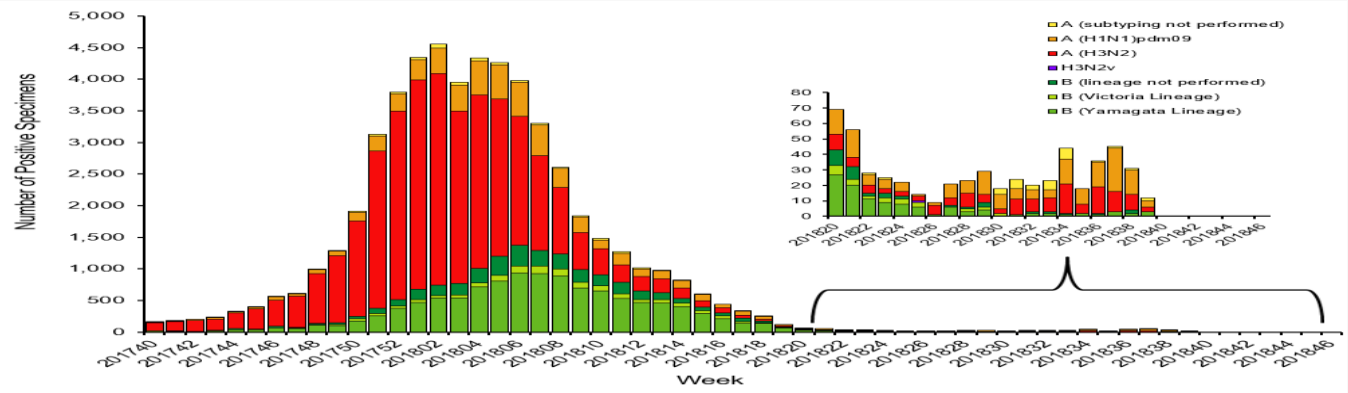


Influenza Positive Tests Reported to CDC by U.S. Clinical and Public Health Laboratories, 2017-2018 Season

Clinical Laboratories



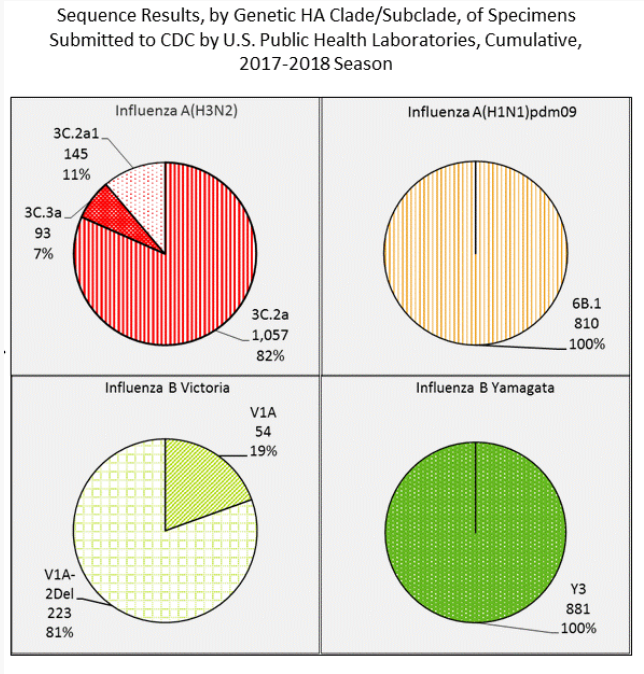
Public Health Laboratories



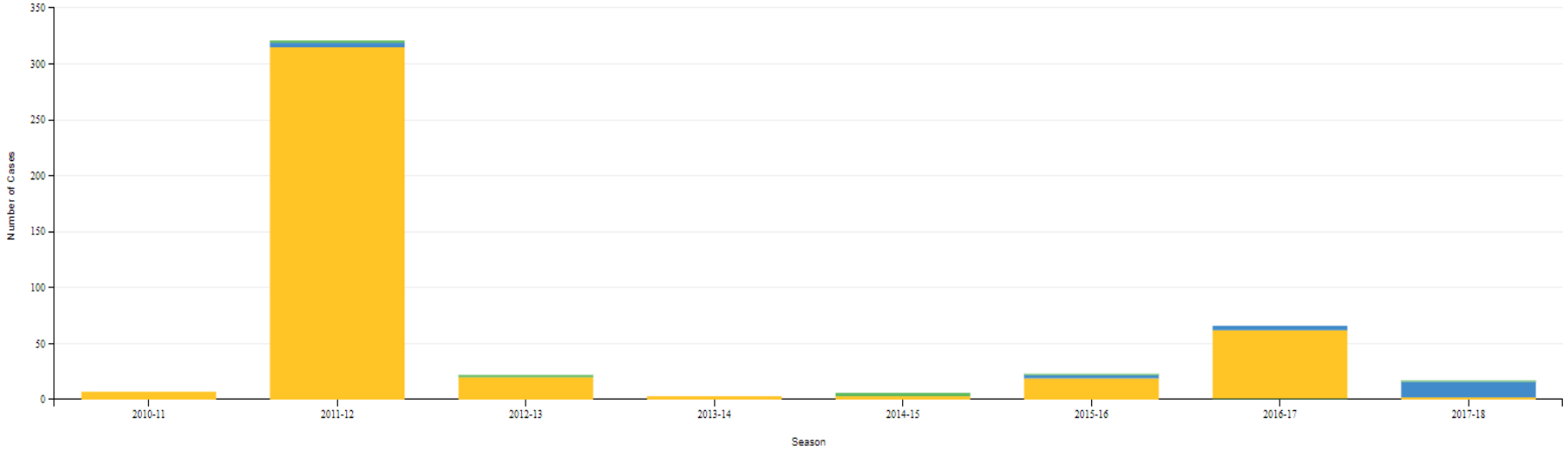
Viral Strain Surveillance

- Public health labs submit subset of influenza positives to CDC for additional testing
  - Full genome sequencing of all specimens
  - Detailed antigenic characterization
  - Antiviral resistance testing
  - Development of vaccine candidate strains as needed

- Data Uses/Interpretation
  - Monitor influenza virus evolution
  - Guide decisions about antiviral use and vaccine strain selection



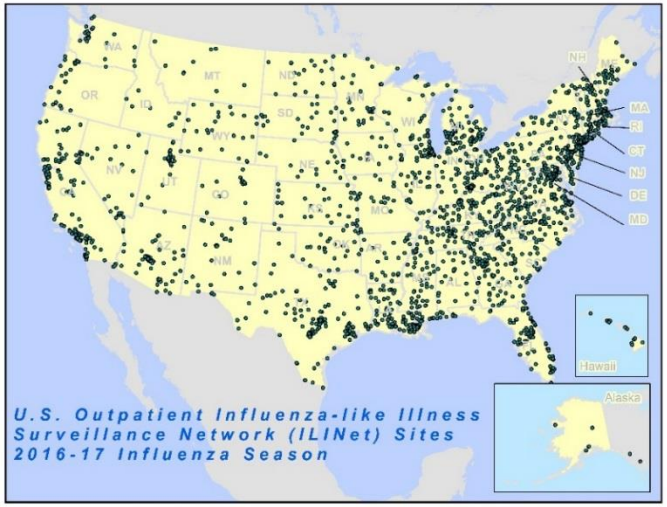
Novel Influenza A Reporting: Cases by Season and Subtype



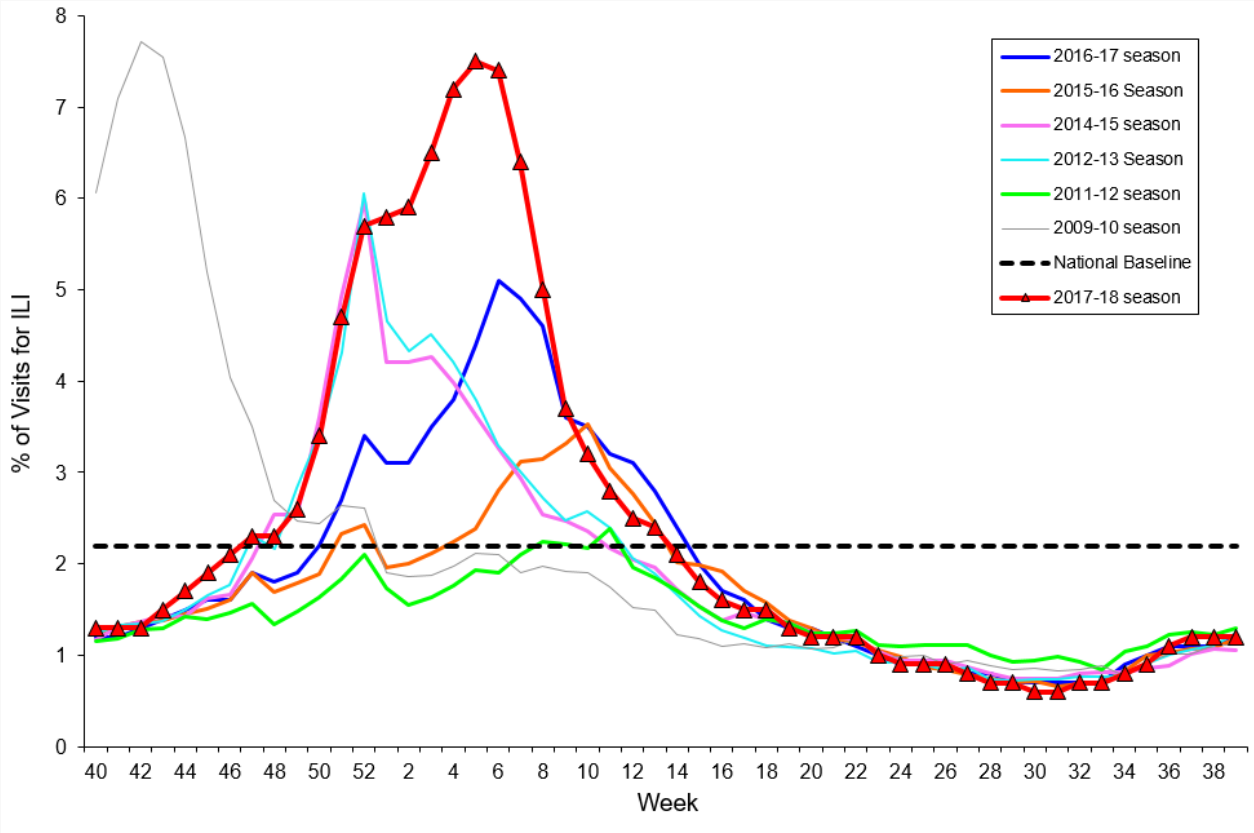
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Influenza A H1N1v	0	2	2	0	3	1	0	1	9
Influenza A H1N2v	0	4	0	0	0	3	4	14	25
Influenza A H3N2v	7	315	20	3	3	19	61	2	430
Influenza A H7N2	0	0	0	0	0	0	1	0	1
Total	7	321	22	3	6	23	66	17	465

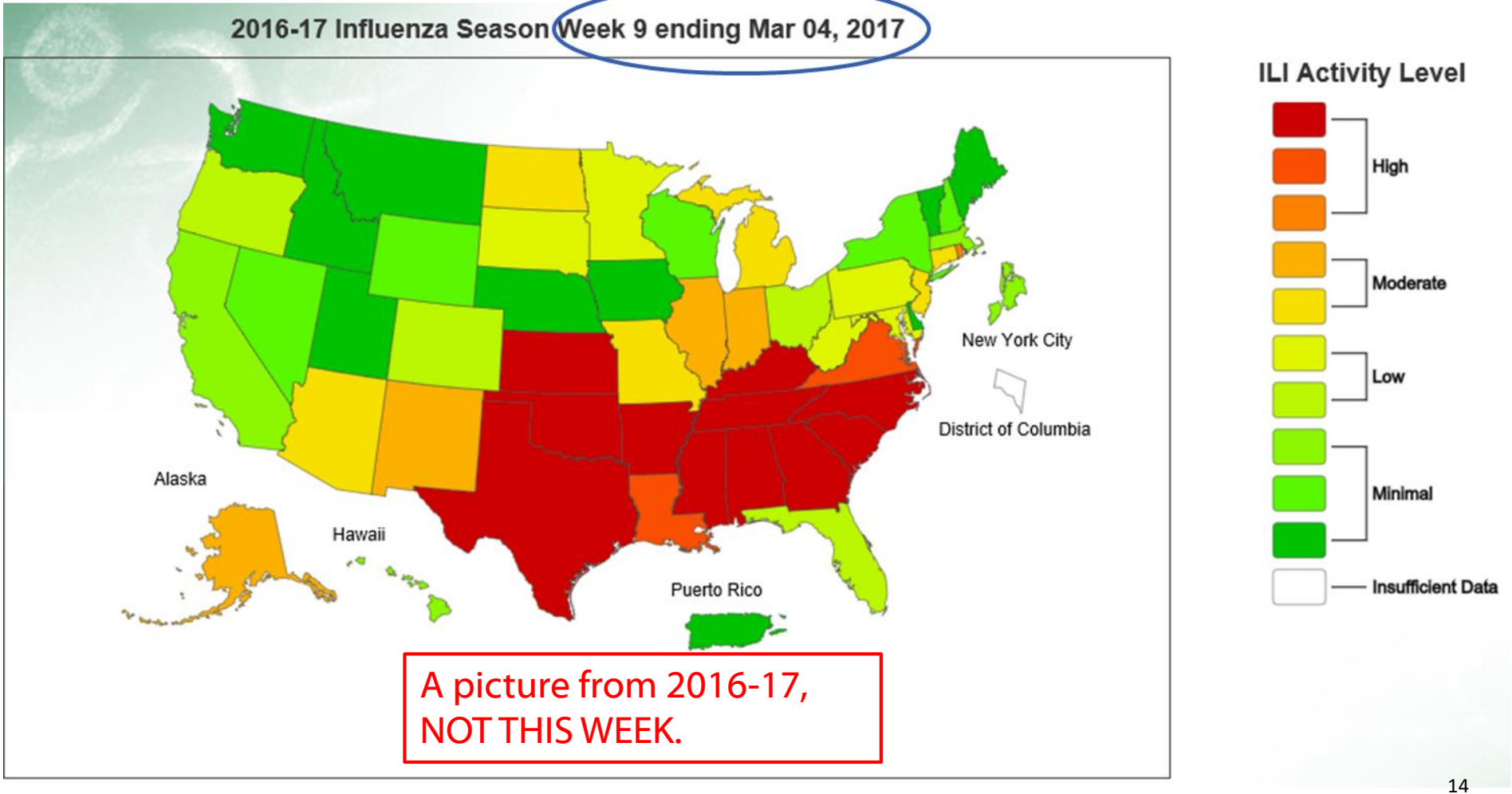
Outpatient Influenza-Like Illness (ILI) Surveillance: ILINet

- Monitor ILI
  - Fever ≥100F AND cough and/or sore throat
- Primary care providers (~2,500)
  - >35 million patient visits per season
- Weekly reports
  - # of patient visits for ILI
  - # patient visits for any reason
- Data Uses/Interpretation
  - Is ILI (% of all visits that are for ILI) increasing/decreasing and where?
  - How does this season compare to previous season in terms of weeks with elevated activity, timing of increased activity and intensity of peak?



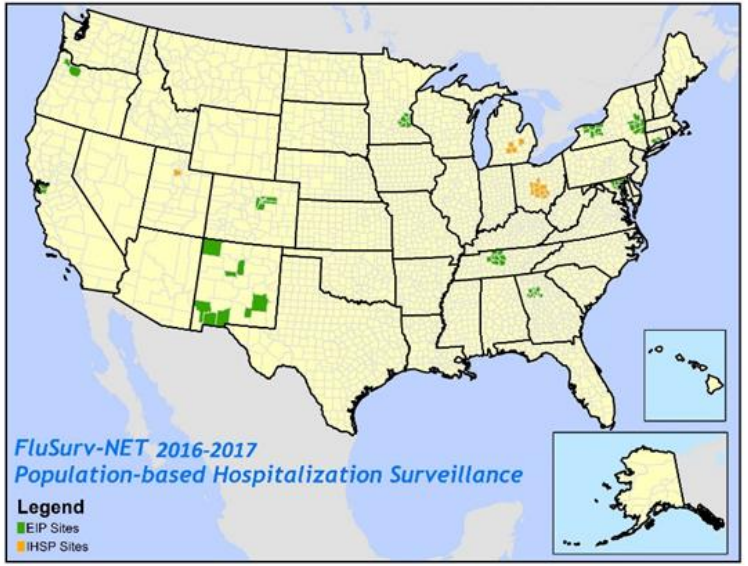
Percentage of Visits for Influenza-like Illness (ILI), 2017-2018 and Selected Previous Seasons




2016-17 Influenza Season Week 9 ending Mar 04, 2017
ILI Activity Level
High
Moderate
Low
Minimal
Insufficient Data
New York City
District of Columbia
Alaska
Hawaii
Puerto Rico
A picture from 2016-17,
NOT THIS WEEK.

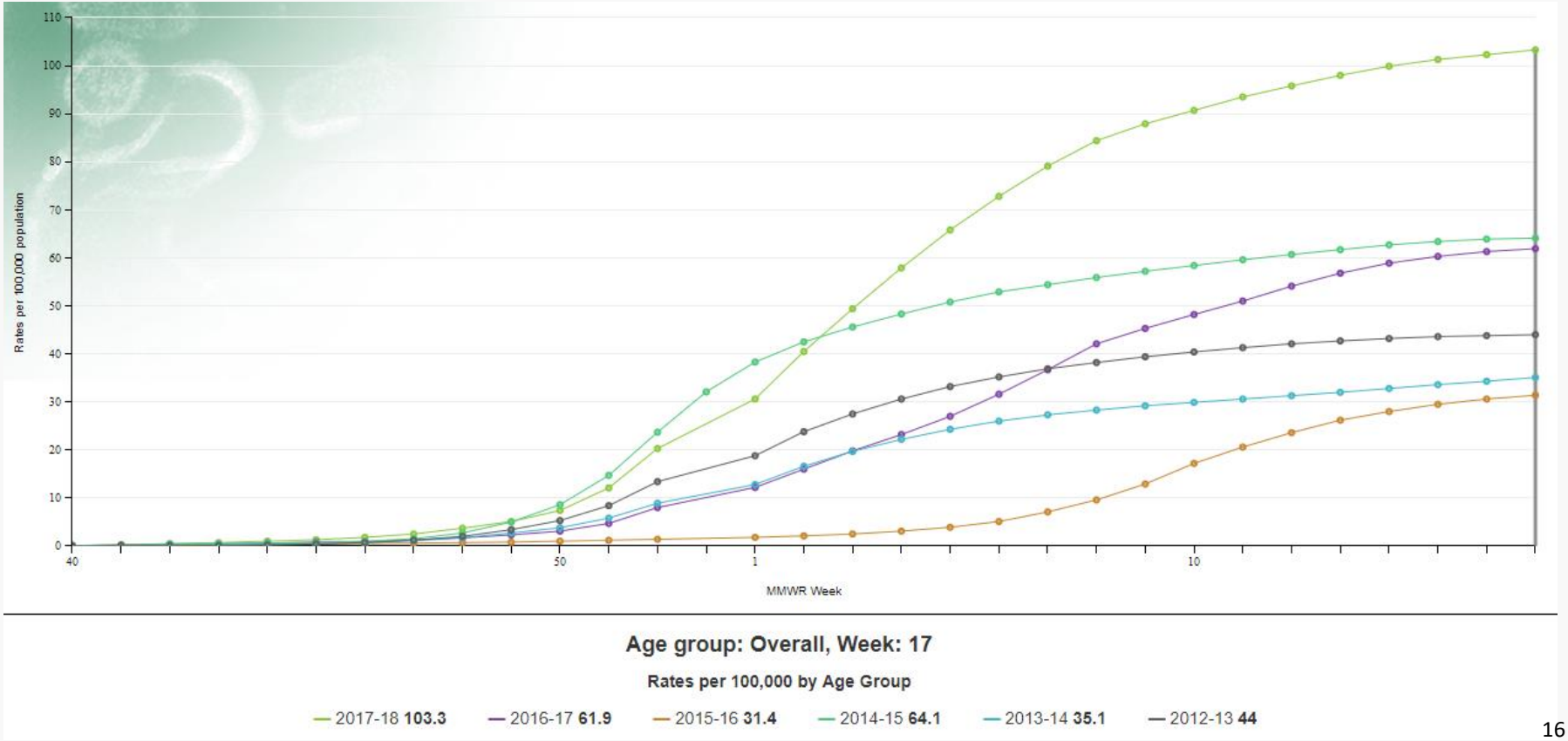
Hospitalization Surveillance: FluSurv-Net

- Population-based surveillance for laboratory-confirmed influenza-related hospitalizations
  - 13 states (70 counties)
  - ~ 9% US population under surveillance
- Weekly reports
  - # of patients admitted to the hospital that have a positive laboratory test for influenza and reside in the catchment area
  - Clinical/demographic information



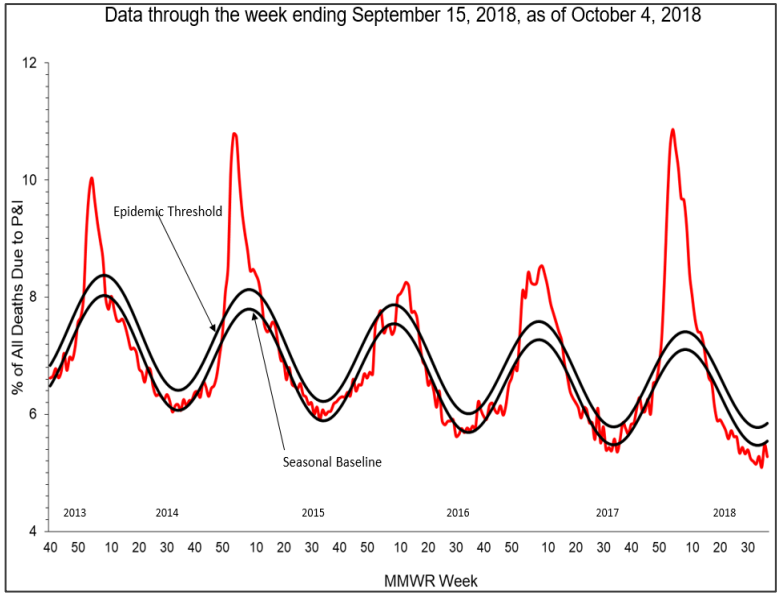
- Data Uses/Interpretation
  - How does rate of influenza hospitalizations compare to previous seasons?
  - Are there changes to expected age/underlying condition/clinical characteristics?

Laboratory-Confirmed Influenza-Associated Hospitalizations, Cumulative Rate, 2017-2018 and Previous 5 Seasons



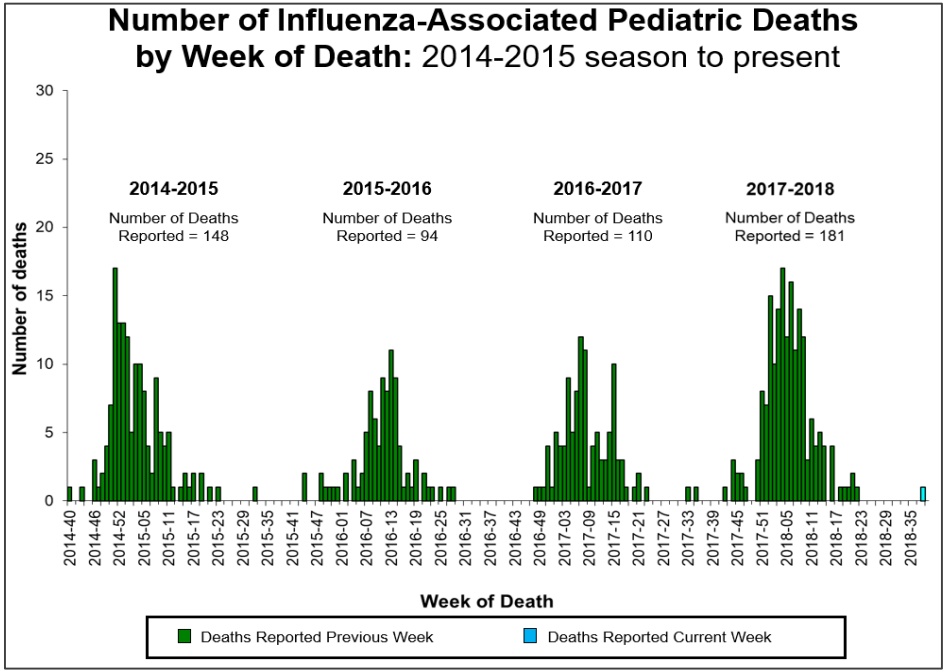
Mortality Data: National Center for Health Statistics (NCHS) National Vital Statistics

- Death certificate data
  - >99% of deaths occurring in the United States
  - Preliminary data available as NCHS mortality surveillance data
- Daily updates of reports from state vital statistics office
  - # of total deaths, pneumonia deaths and influenza deaths
  - > 50% of expected deaths available at time of report (2 week lag)
- Data Uses/Interpretation
  - Compare timing and severity of influenza impact on mortality (% of deaths due to pneumonia and influenza) to previous seasons



Influenza-Associated Pediatric Mortality

- Influenza-associated death in a person <18 years of age
  - Requires laboratory confirmation of influenza
  - Clinical and epidemiologic data
- Nationally notifiable condition since 2004-2005 season
- Data Uses/Interpretation
  - Are the number of reported deaths similar to previous seasons?
  - Does clinical/epidemiologic data show anything new about risk factors/clinical course?

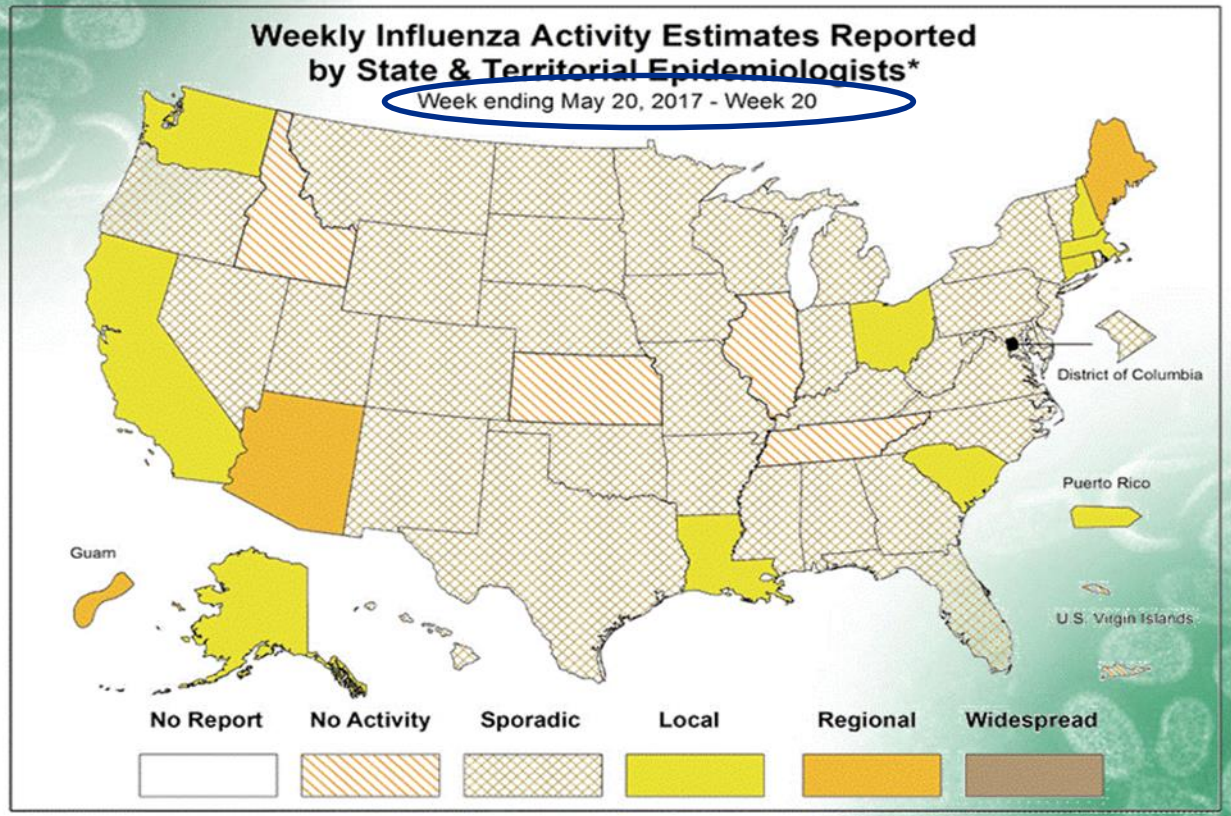


From 2016-17, NOT THIS WEEK.

FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

CDC
Centers for Disease Control and Prevention



* This map indicates geographic spread & does not measure the severity of influenza activity

Summary of U.S. National Influenza Surveillance System

- Multi-component system that provides indicators of
  - Where, when and to what extent influenza activity is occurring and
  - Which viruses are responsible for that activity
- Requires participation of many partners – healthcare, public health
- Is NOT trying to count every case of influenza or influenza-related illness
  - Data from each component is analyzed/reported in way that most appropriately allows comparison from season to season
  - Can only compare case counts for novel influenza A and pediatric death
- Ultimate goal: provide data needed to guide public health and clinical decision making in order to minimize the impact of influenza

Often Confused Influenza Resources

- Influenza Activity
  - FluView (www.cdc.gov/flu/weekly/)
  - FluView *interactive* (www.cdc.gov/flu/weekly/fluviewinteractive.htm)
- Vaccine Availability
  - Flu Vaccine Finder (vaccinefinder.org)
- Vaccine Coverage
  - FluVaxView (www.cdc.gov/flu/fluvaxview/index.htm)

Questions?

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.