Influenza Surveillance Update and Interim Estimates of 2015–16 Seasonal Influenza Vaccine Effectiveness against Medically-Attended Influenza from the U.S. Flu VE Network

Lynnette Brammer, MPH

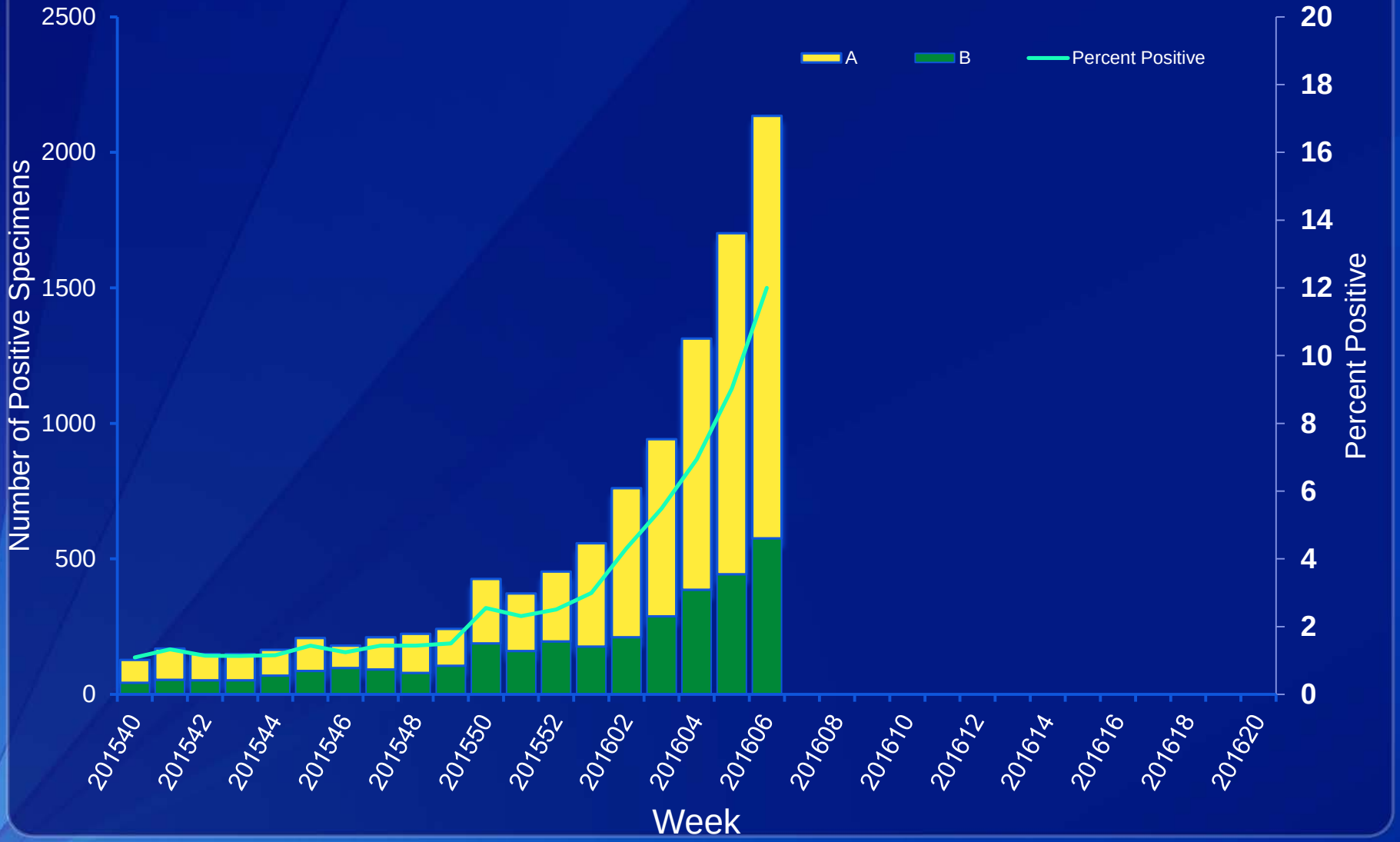
Advisory Committee on Immunization Practices

February 24, 2016

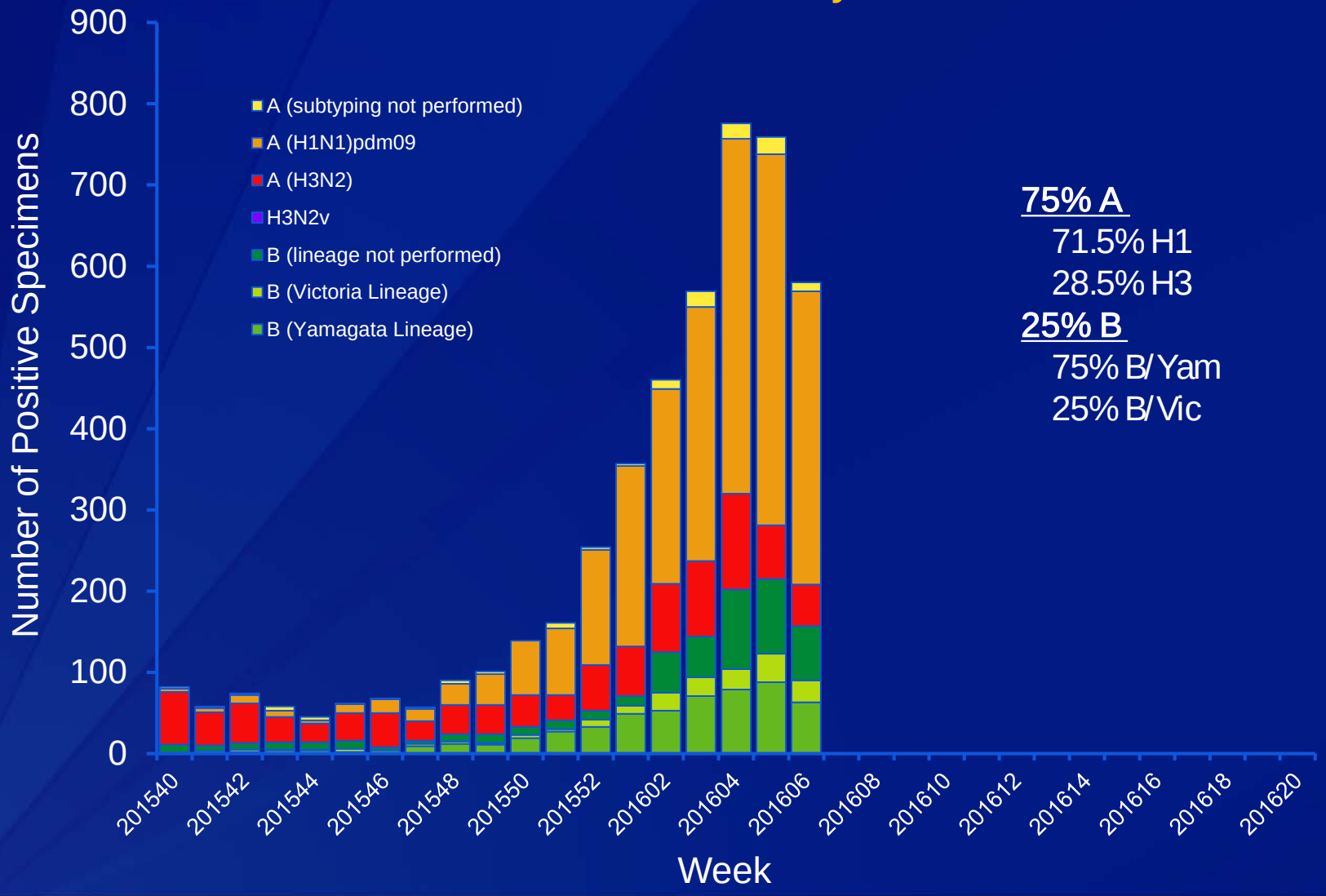
National Center for Immunization & Respiratory Diseases

Influenza Division, Epidemiology and Prevention Branch

Influenza Positive Tests Reported to CDC by U.S. Clinical Laboratories, National Summary, 2015-2016 Season



Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, 2015-2016 Season



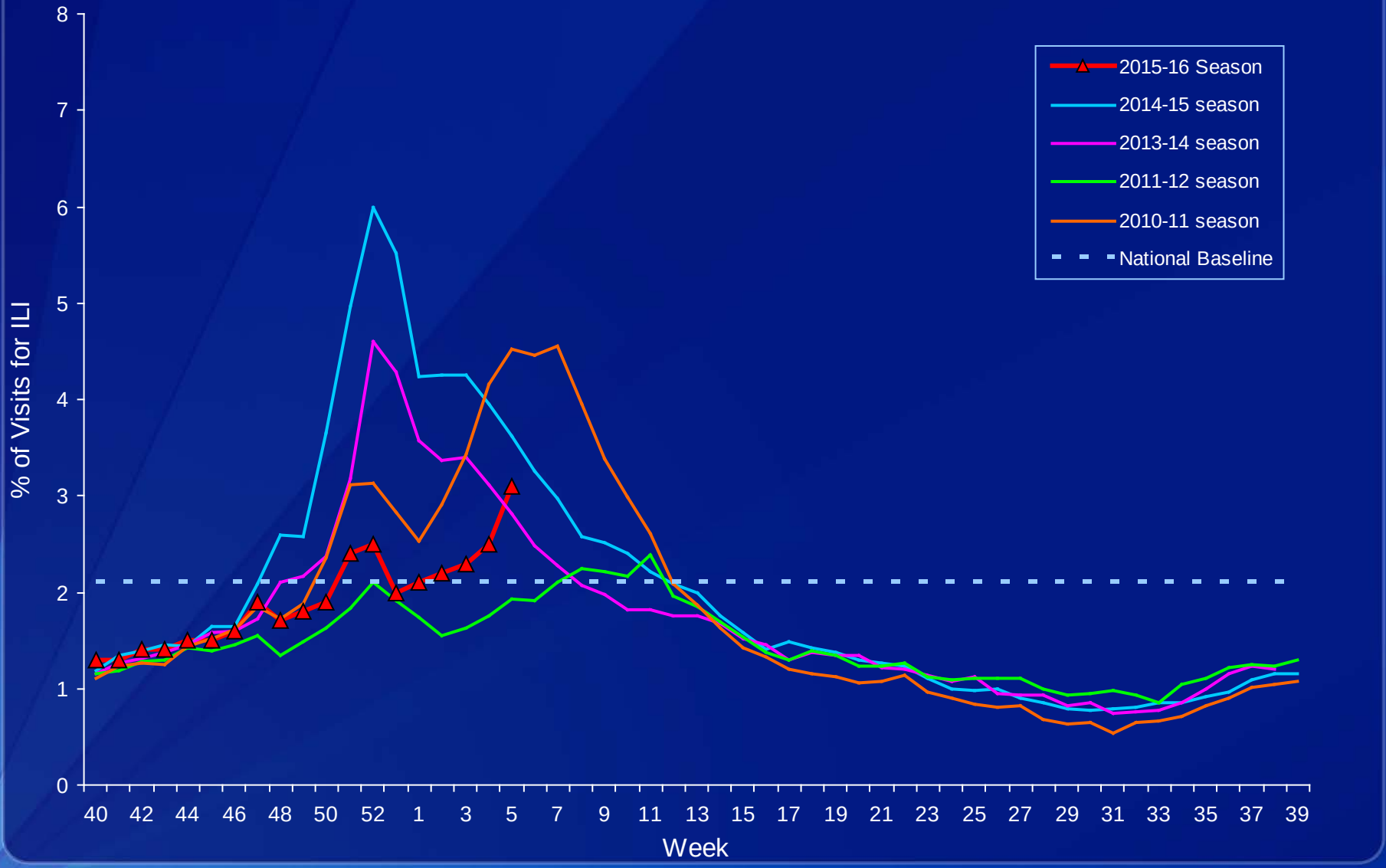
Virus Characterization Influenza A Viruses

- **All 181 influenza A (H1N1)pdm09 viruses were antigenically characterized as A/California/7/2009-like**
- **All 228 H3N2 viruses genetically sequenced belonged to genetic groups for which a majority of viruses antigenically characterized were similar to the cell-propagated A/Switzerland/9715293/2013**
  - Of 107 H3N2 viruses also antigenically characterized, 100 (93.5%) were A/Switzerland/9715293/2013-like by HI testing or neutralization testing

Virus Characterization Influenza B Viruses

- All 88 B/Yamagata-lineage viruses antigenically characterized were B/Phuket/3073/2013-like, which is included as an influenza B component of the 2015-2016 Northern Hemisphere trivalent and quadrivalent influenza vaccines.
- All 35 B/Victoria-lineage viruses antigenically characterized were B/Brisbane/60/2008-like, which is included as an influenza B component of the 2015-2016 Northern Hemisphere quadrivalent influenza vaccines.

Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2015-2016 and Selected Previous Seasons

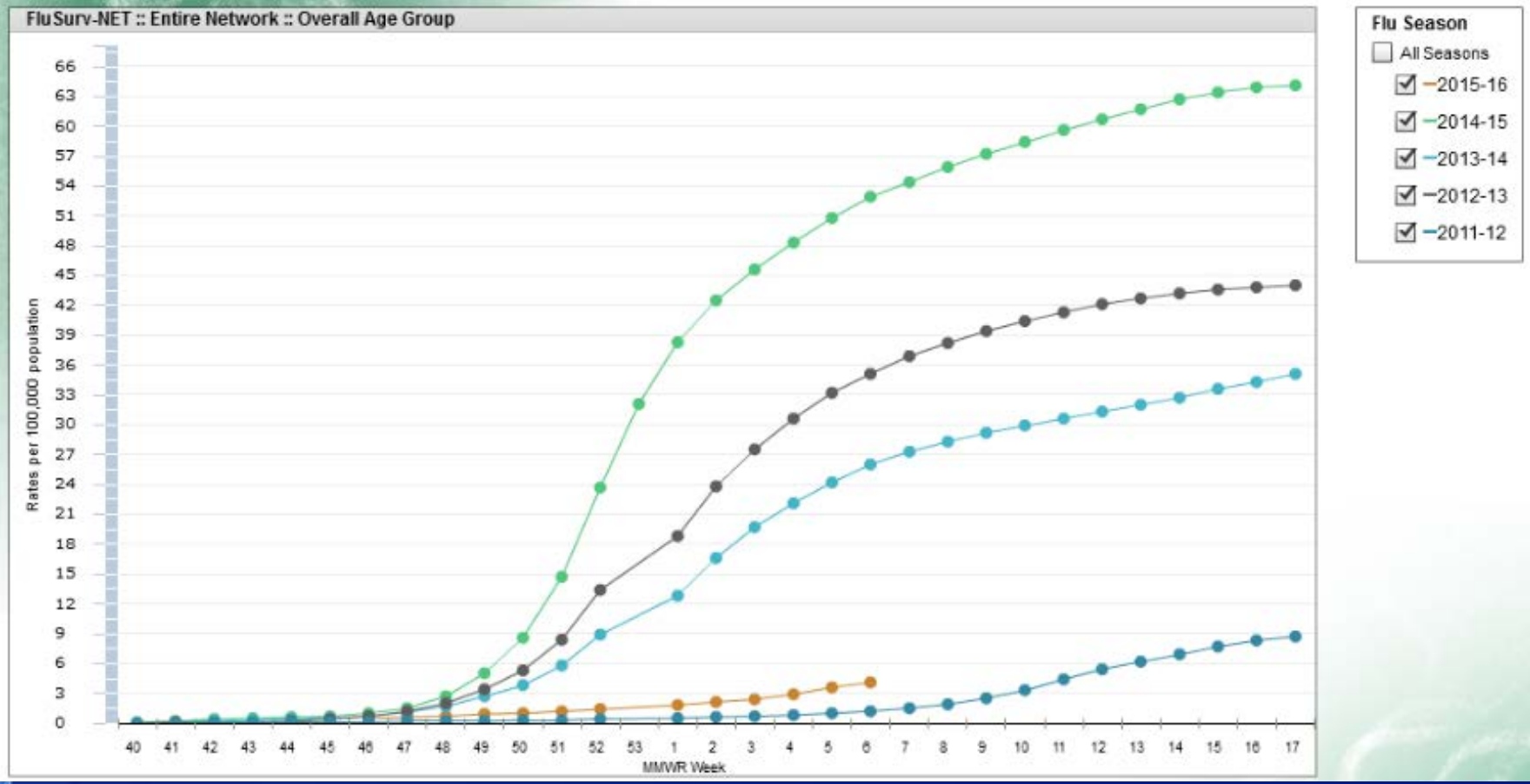


FLUVIEW

Laboratory-Confirmed Influenza Hospitalizations

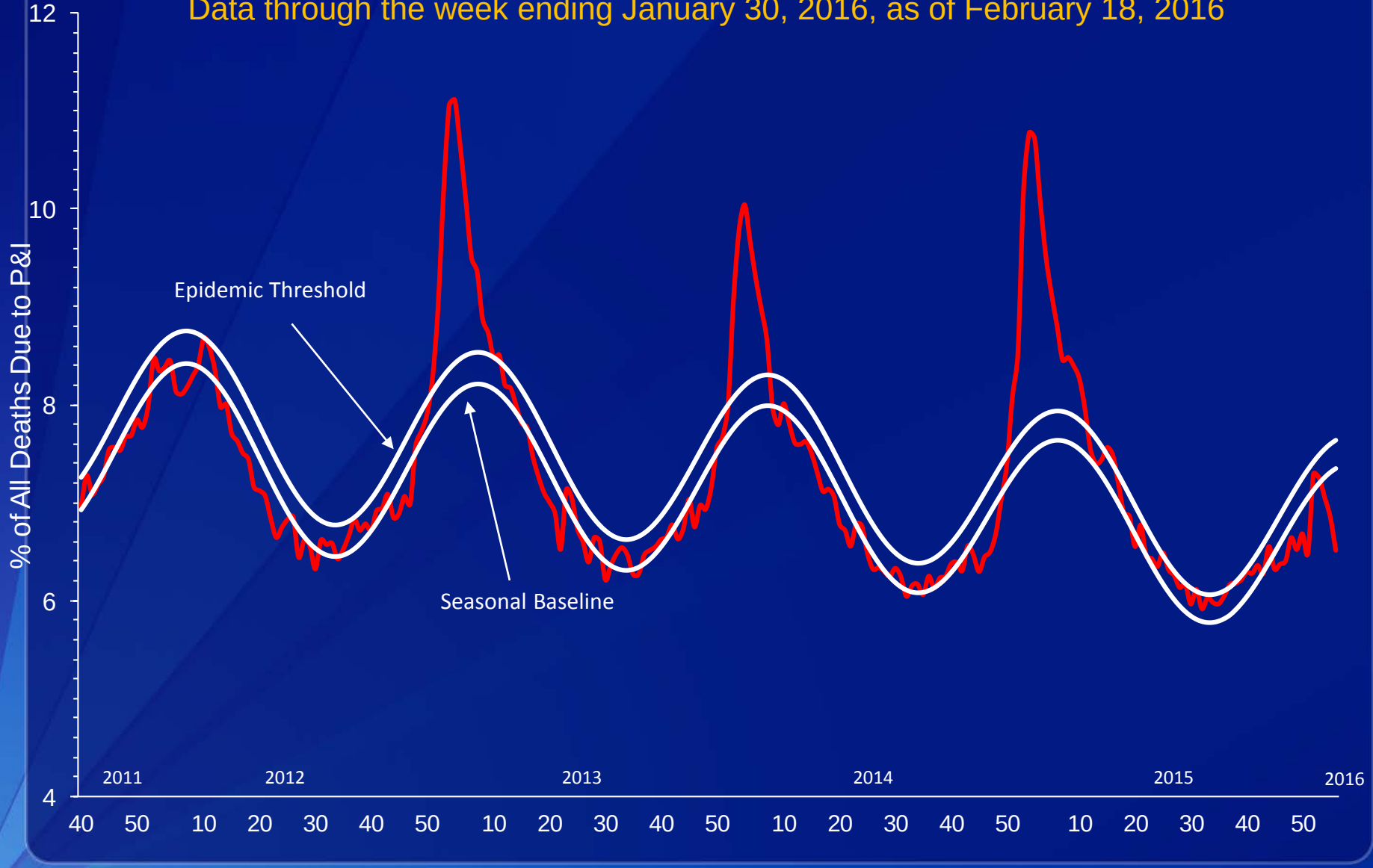
Preliminary cumulative rates as of Feb 13, 2016

CDC

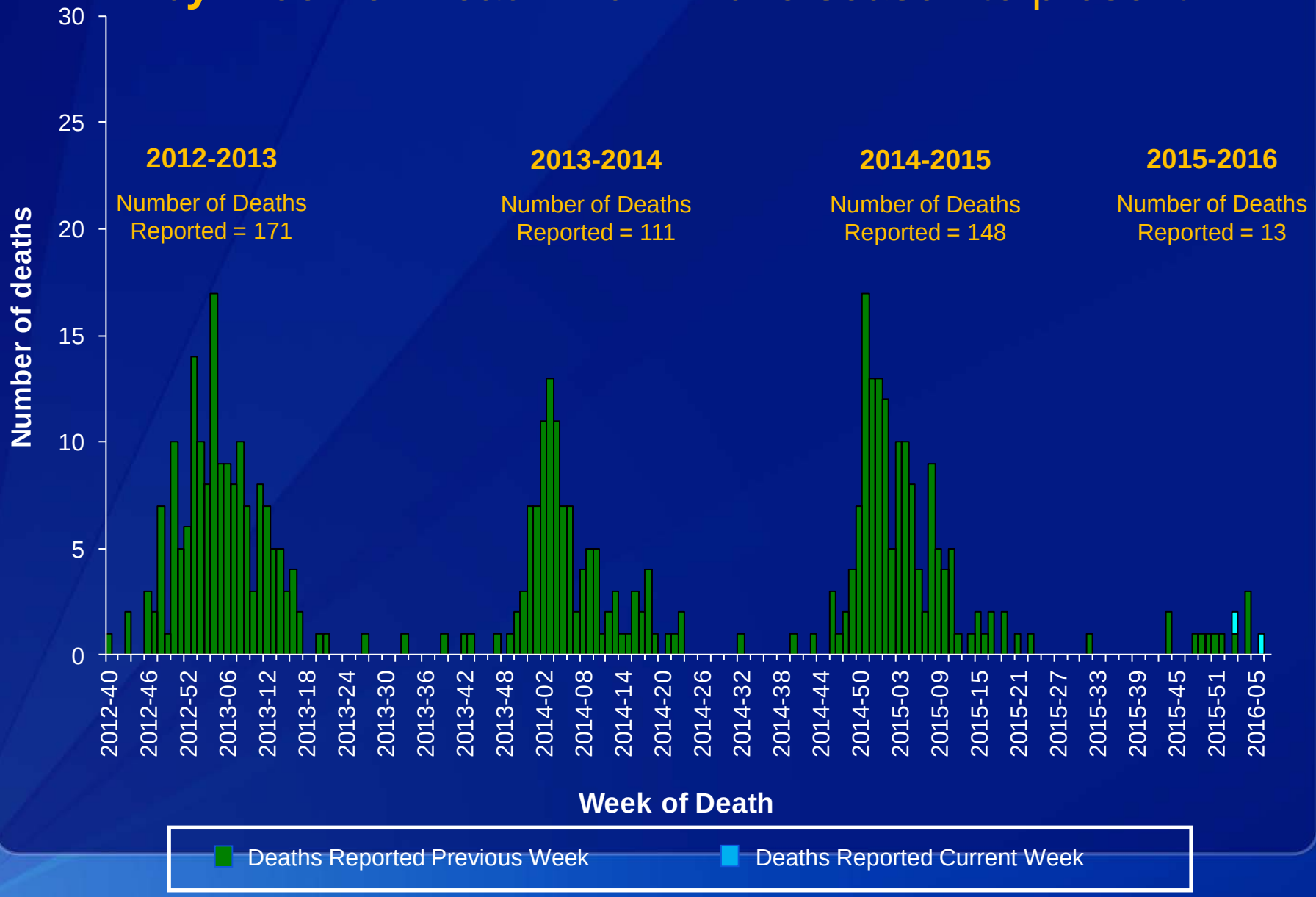


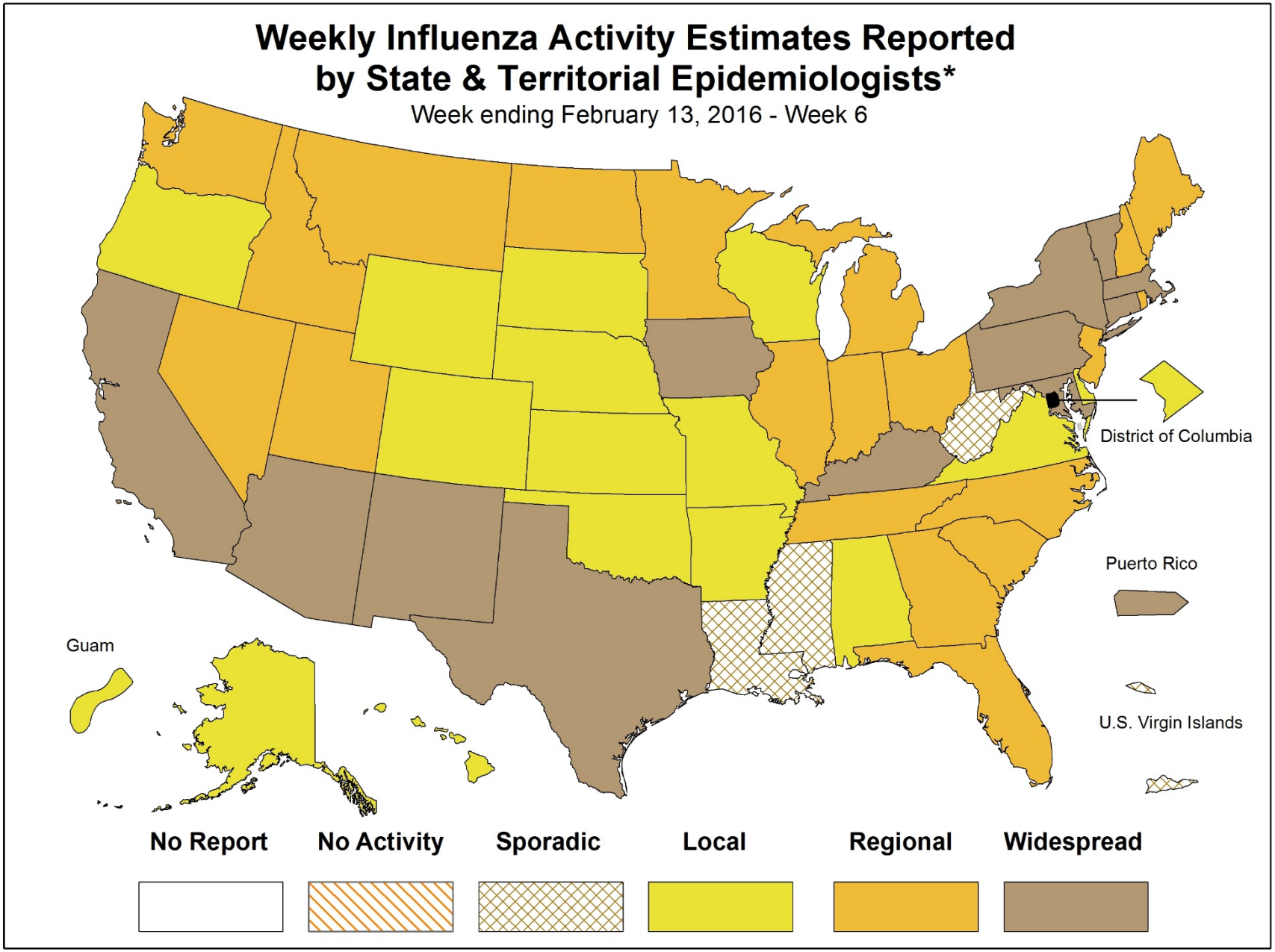
Pneumonia and Influenza Mortality from the National Center for Health Statistics Mortality Surveillance System

Data through the week ending January 30, 2016, as of February 18, 2016



Number of Influenza-Associated Pediatric Deaths by Week of Death: 2012-2013 season to present





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

Vaccine Virus Selection for the 2016-17 Influenza Season

- **WHO Consultation on the Composition on Influenza Virus Vaccines for the Northern Hemisphere 2016-17 is being held February 22-24**
  - Announcement of decision on February 25
- **March 4 - FDA's Vaccines and Related Biological Products Advisory Committee will meet to make recommendations on the selection of vaccine virus strains for the US vaccines**

Summary of Influenza Activity

- **Influenza activity to date is low compared to the previous 3 seasons**
  - Rate of influenza associated hospitalizations low
  - Pneumonia and influenza mortality has not exceeded threshold levels
- **Influenza A (H1N1) viruses have predominated but A (H3N2) and B viruses of both lineages have co-circulated**
- **Majority of viruses are similar to vaccine viruses**

Interim Estimates of 2015–16 Seasonal Influenza Vaccine Effectiveness against Medically-Attended Influenza from the U.S. Flu VE Network

Enrollment through February 12, 2016

US Flu VE Network: Methods

Enrollees: Outpatients aged ≥6 months with acute respiratory illness with cough ≤7 days duration

Dates of enrollment: November 2, 2015–February 12, 2016

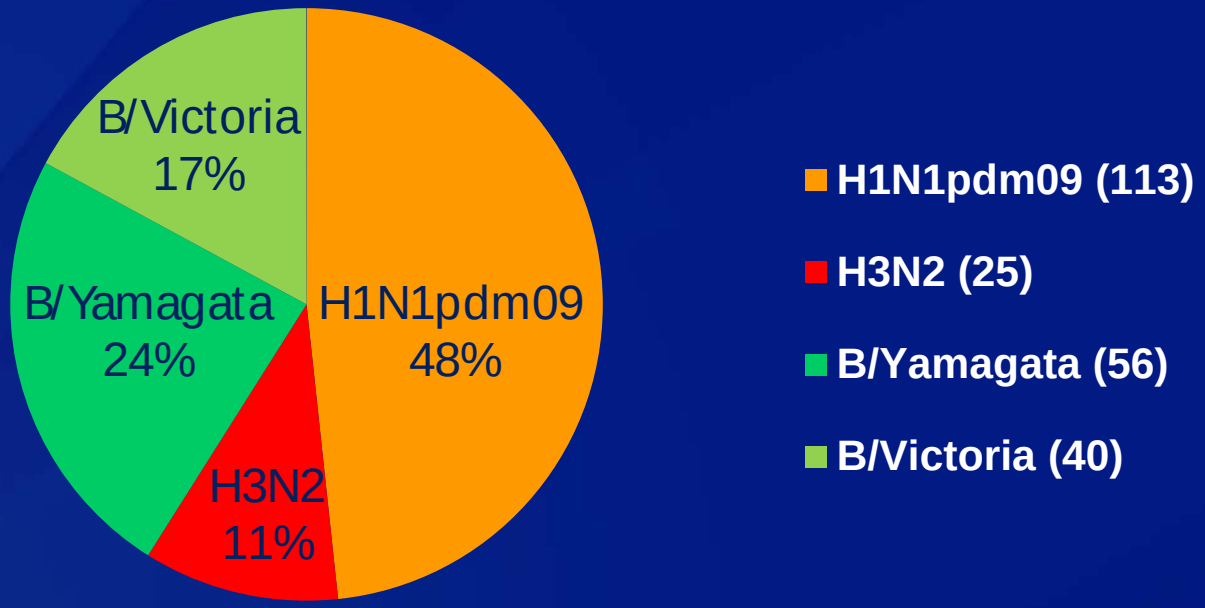
Design: Test-negative design

- Comparing vaccination odds among influenza RT-PCR positive cases and RT-PCR negative controls
- Vaccination status: receipt of at least one dose of any 2015–16 seasonal flu vaccine according to medical records, immunization registries, and/or self-report
- **Analysis:** VE = (1 – adjusted OR) x 100%
  - Adjustment for study site, age, self-rated general health status, race/Hispanic ethnicity, interval (days) from onset to enrollment, and calendar time

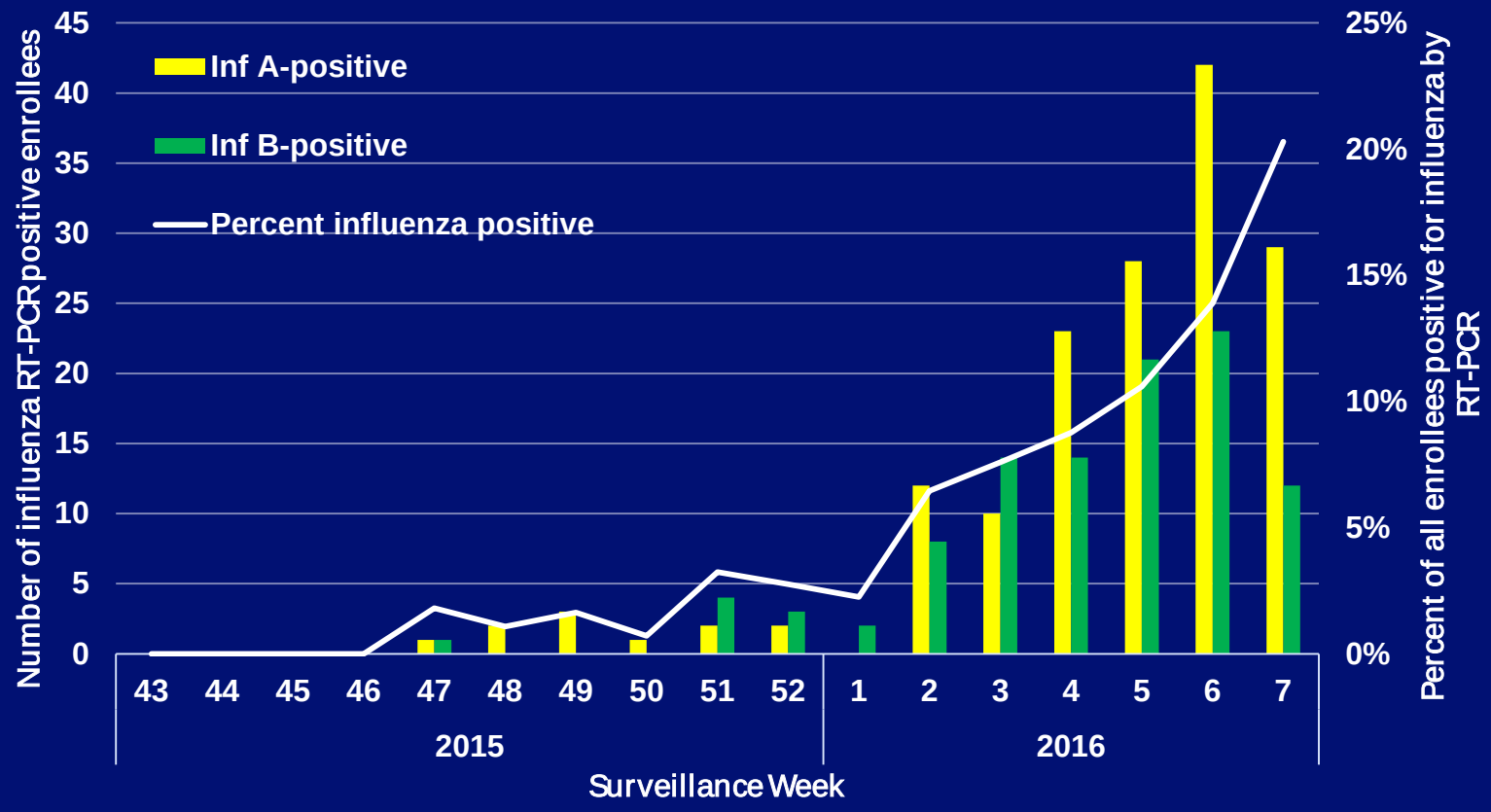
US Flu VE Network: Interim Results

- 3,333 enrolled from Nov 2, 2015–Feb 12, 2016 at 5 sites
- 3,081 (92%) influenza RT-PCR negative
- 252 (8%) influenza RT-PCR positive

Cases enrolled by (sub)type, N=234 (18 pending)



Number of enrolled participants with RT-PCR confirmed influenza and percent positivity by week of onset



Note: Week 6 only includes patients with completed laboratory tests and thus does not reflect all enrolled patients during that week across study sites.

Interim adjusted vaccine effectiveness against medically attended influenza, 2015–2016

	Influenza positive		Influenza negative		Vaccine Effectiveness			
					Unadjusted		Adjusted*	
Any influenza A or B virus	N vaccinated/ Total	(%)	N vaccinated /Total	(%)	VE%	95% CI	VE%	95% CI
Overall	81/227	36	1382/2537	54	54	(38 to 65)	**59**	**(44 to 70)**

* Multivariate logistic regression models adjusted for site, age categories (6m-17y, 18-49y, ≥50y), sex, race/Hispanic ethnicity, self-rated general health status, interval from onset to enrollment, and month of onset.

Interim adjusted VE against A/H1N1pdm09, B and B/Yamagata viruses, 2015–2016

	Influenza positive		Influenza negative		Vaccine Effectiveness			
					Unadjusted		Adjusted*	
Influenza A (H1N1)pdm09	N vaccinated /Total	(%)	N vaccinated /Total	(%)	VE%	95% CI	VE%	95% CI
All ages	39/107	36	1382/2537	54	52	(28 to 68)	**51**	**(25 to 69)**
Influenza B								
All ages	26/87	30	1382/2537	54	64	(43 to 78)	**76**	**(59 to 86)**
Influenza B/Yamagata								
All ages	17/51	33	1382/2537	54	58	(25 to 77)	**79**	**(59 to 89)**

* Multivariate logistic models adjusted for site, age categories (6m-17y, 18-49y, ≥50y), sex, race/Hispanic ethnicity, self-rated general health status, interval from onset to enrollment, and month of onset.

Summary

- Interim results for 2015-16 season (through February 12, 2016) indicate vaccine effectiveness of 59% against medically attended influenza
  - Interim estimate similar to previous seasons when vaccine was well-matched to circulating influenza viruses
- Significant protection against circulating influenza H1N1pdm09 and B viruses
  - VE not estimated against A(H3N2) viruses due to small numbers of cases
- Enrollment continues—end of season VE estimates may differ from interim estimates