

2015-16 Flu Season Summary & 2016-17 Flu Season Update

BY JOHNATHAN LEDBETTER, MPH

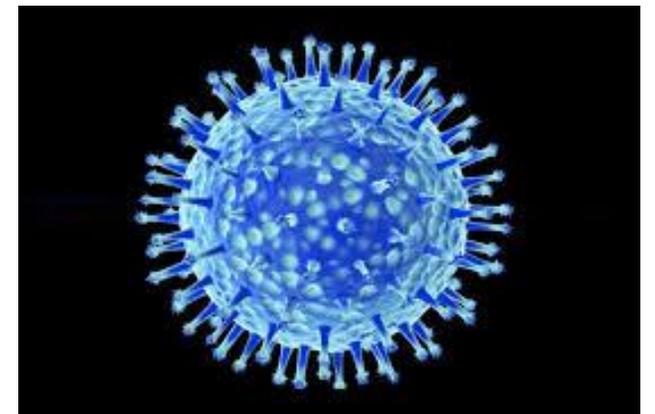


Outline

- Influenza (flu) Key Terms
- Influenza Reporting
- Goals of Influenza Surveillance
- Influenza Surveillance Components
- 2015-16 Flu Season Summary
- 2016-17 Flu Season Update

Key Terms

- Influenza Like Illness (ILI)
 - Fever $\geq 100^{\circ}\text{F}$, plus:
 - Cough and/or
 - Sore throat
 - Without a KNOWN cause other than influenza
- Influenza (flu) A
 - May include both seasonal and novel/variant strains
- Influenza (flu) B



Influenza Reporting

- Individual cases of influenza not reportable, except:
 - Influenza-associated deaths in children <18 years
 - Novel (new) influenza virus infections
 - Influenza/influenza-like illness (ILI) outbreaks
- Flu surveillance is sentinel and voluntary
 - National flu surveillance season: October – May (MMWR week 40 through week 20)
 - Texas performs flu surveillance year round



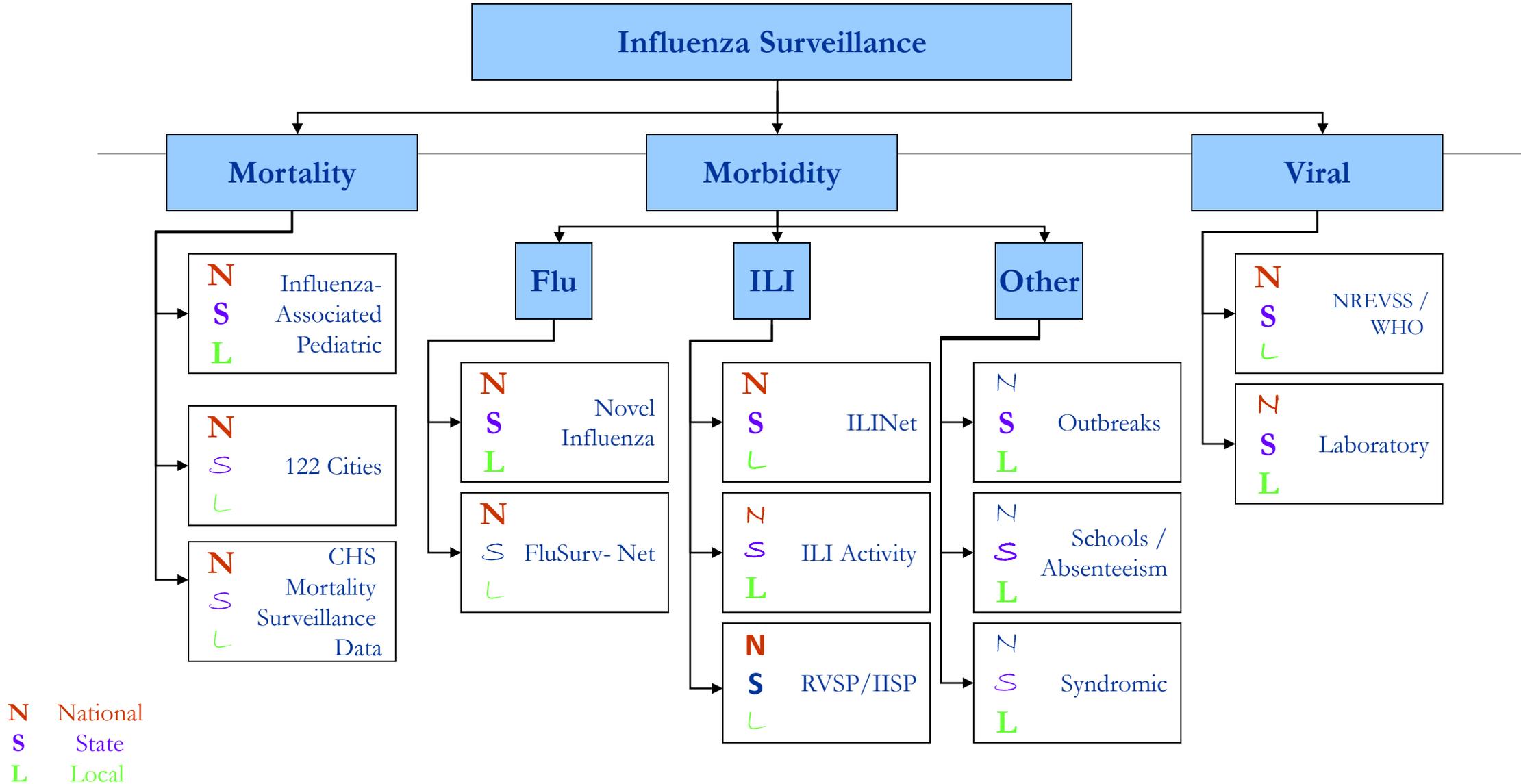
Infectious Disease Control

Influenza-Associated Pediatric Mortality

Goals of Influenza Surveillance

- Find out when and where influenza activity is occurring,
- Determine what type of influenza viruses are circulating,
- Detect changes in the influenza viruses,
- Track influenza-related illness and
- Measure the impact influenza is having on deaths in the United States.

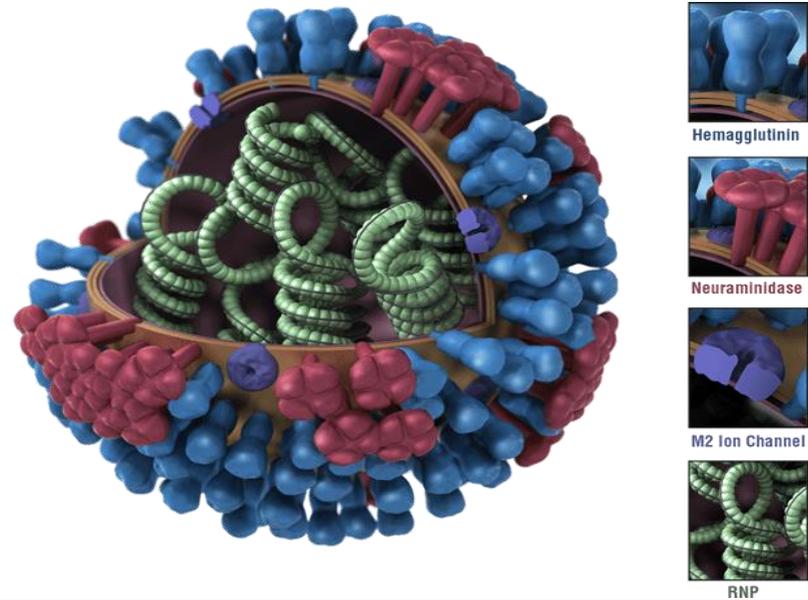
Influenza Surveillance Components



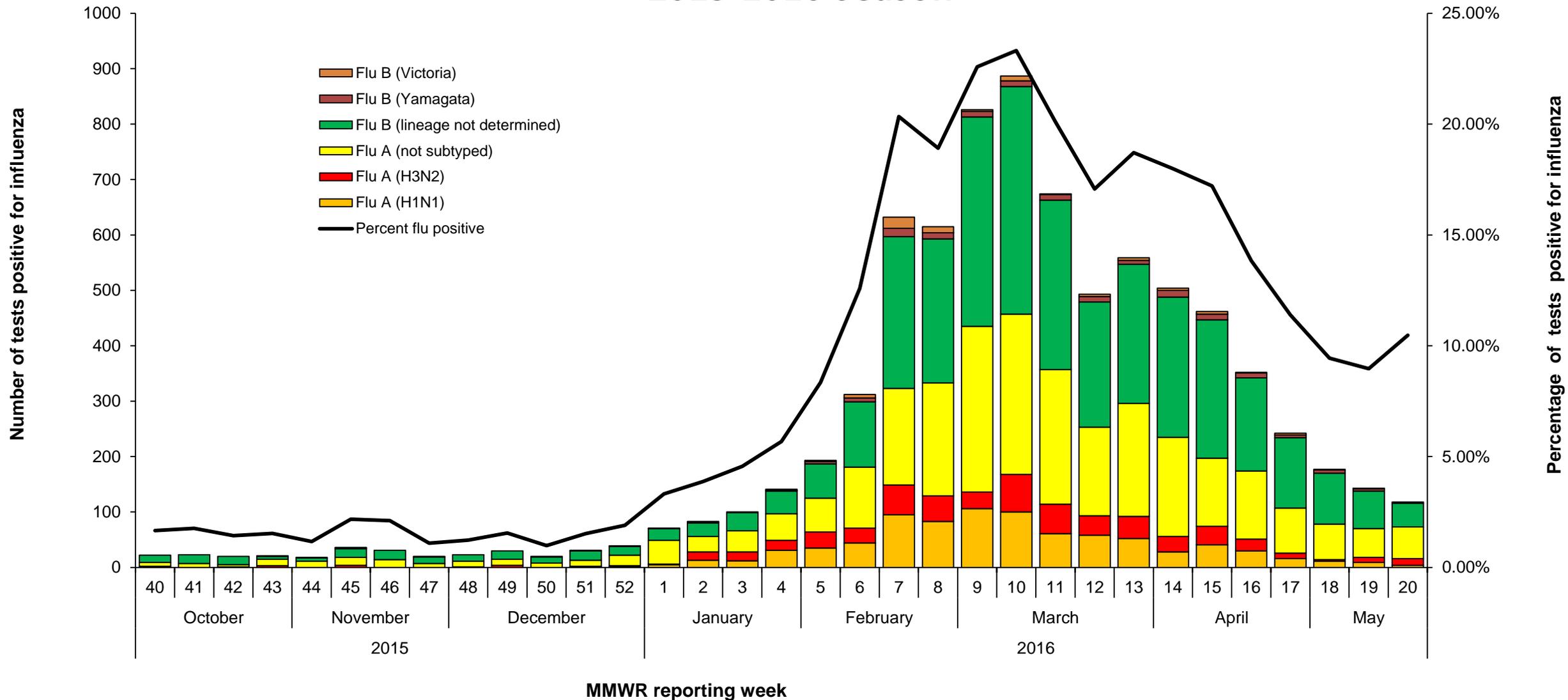
2015-16 Flu Season Summary

Virology

- Influenza viruses circulating
 - Predominant virus: Influenza A (H1N1)
 - Early in the season: Influenza A (H3N2)
 - Both lineages of influenza B circulated throughout the season



Number and Percentage of Tests (Antigen, Culture, PCR) Positive for Influenza by Type, Subtype, and Lineage Reported by Texas Laboratories, 2015-2016 Season



Flu Activity

- Peak of Flu Activity
 - According to laboratory data, flu peaked in Texas in March 2016
 - Late flu activity peak when compared to the previous three seasons (2012–13, 2013–14, and 2014–15)



March

The word "March" is written in a playful, bubbly font. The letters are colored as follows: 'M' is green, 'a' is yellow, 'r' is light green, 'c' is green, and 'h' is yellow. Each letter has a thick black outline and a dotted line border around it, giving it a hand-drawn, cartoonish appearance.

Antigenic Characterization

- 110 Texas influenza viruses characterized*
 - 35 influenza A 2009 (H1N1) viruses
 - 100% matched the 2015-16 flu vaccine H1 strain
 - 29 influenza A (H3N2) viruses
 - 65.5% matched the 2015-16 flu vaccine H3 strain
 - 34.5% matched the 2016-17 flu vaccine H3 strain
 - 46 influenza B viruses
 - Yamagata lineage (60.9%)
 - 100% matched the 2015-16 vaccine flu B strain (trivalent & quadrivalent)
 - Victoria lineage (39.1%)
 - This flu B strain included in quadrivalent vaccine only

2015–16 Influenza Vaccine Effectiveness (VE) Estimate

- 2015-16 vaccine was a better match than the 2014-15 influenza vaccine
 - Adjusted* overall VE is 47%^ vs. 23% for last season
- Individual influenza virus strains adjusted* overall VEs
 - A/H1N1- 41% (31% to 51%)
 - A/H3N2- 45% (9% to 66%)
 - B/Yamagata- 55% (41% to 66%)
 - B/Victoria- 55% (38% to 68%)

^Estimate from Nov 2, 2015–April 15, 2016

*Multivariate logistic regression models adjusted for site, age categories (6m-8y, 9-17y, 18-49y, 50-64y, ≥65y), sex, race/Hispanic ethnicity, self-rated general health status, interval from onset to enrollment, and calendar time (biweekly intervals)

Antiviral Resistance Testing

Table: Cumulative Antiviral Resistance Results from Texas Influenza Viruses, 2015-16 Season†

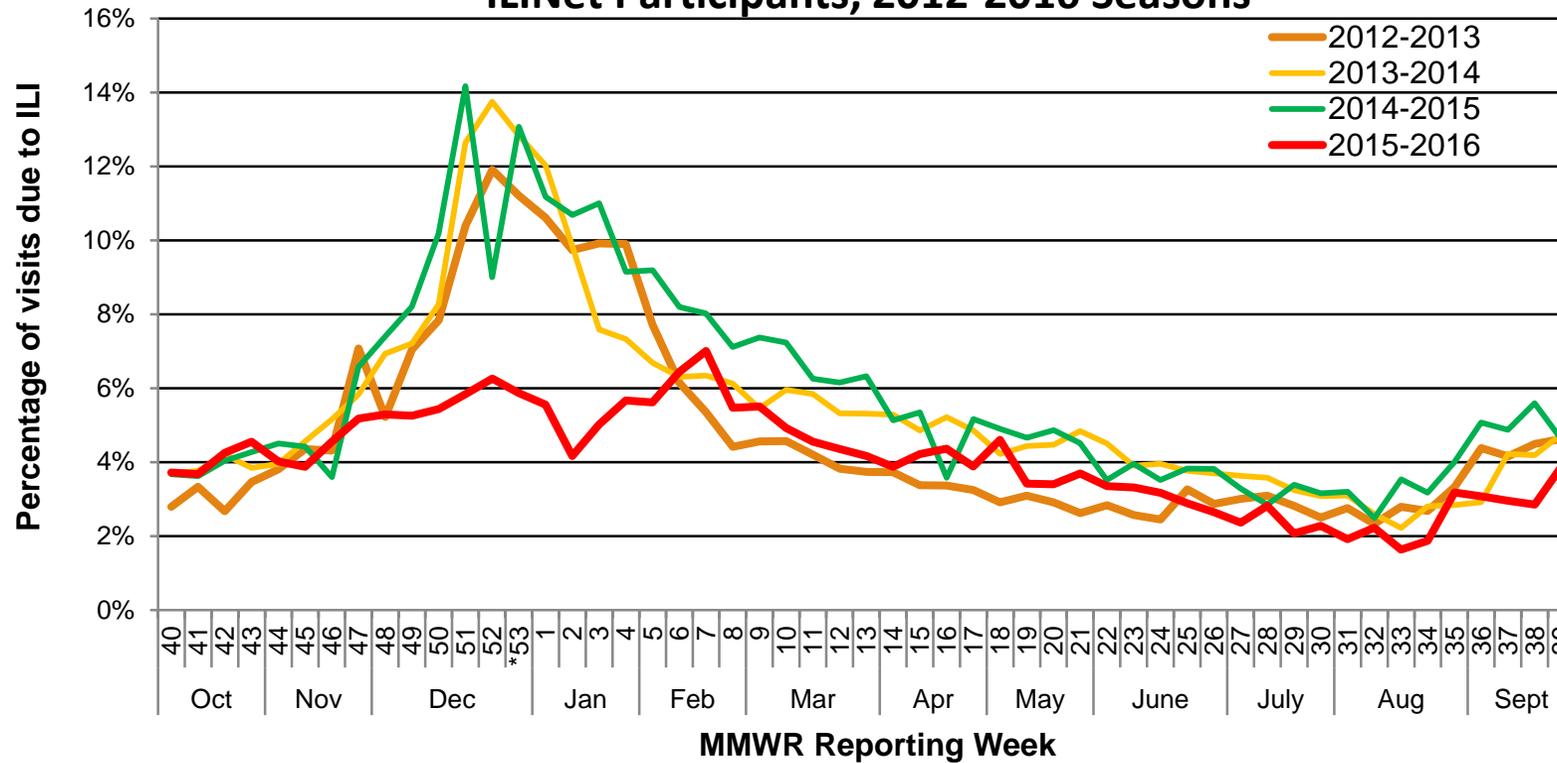
	Oseltamivir		Zanamivir		Peramivir^	
	Virus samples tested (n)	Resistant viruses, number (%)	Virus samples tested (n)	Resistant viruses, number (%)	Virus samples tested (n)	Resistant viruses, number (%)
Influenza A (H1N1)	33	0 (0%)	33	0 (0%)	33	0 (0%)
Influenza A (H3N2)	0	0 (0%)	0	0 (0%)	0	0 (0%)
Influenza B	0	0 (0%)	0	0 (0%)	0	0 (0%)

† This table includes specimens submitted as part of routine surveillance and not for diagnostic purposes.

^ Peramivir is an intravenous antiviral medication that was FDA-approved for use on December 19, 2014.

ILI Activity

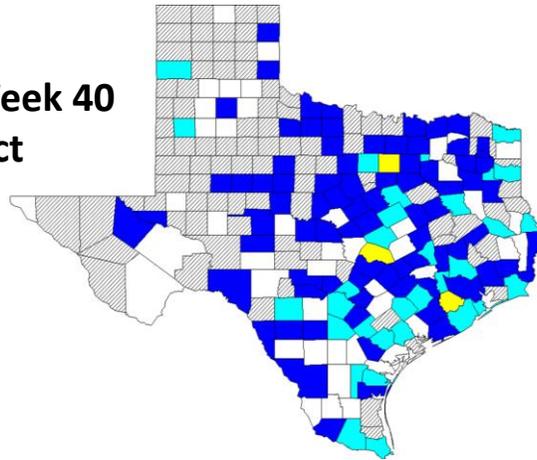
**Percentage of Visits Due to Influenza-like Illness Reported by Texas
ILINet Participants, 2012-2016 Seasons***



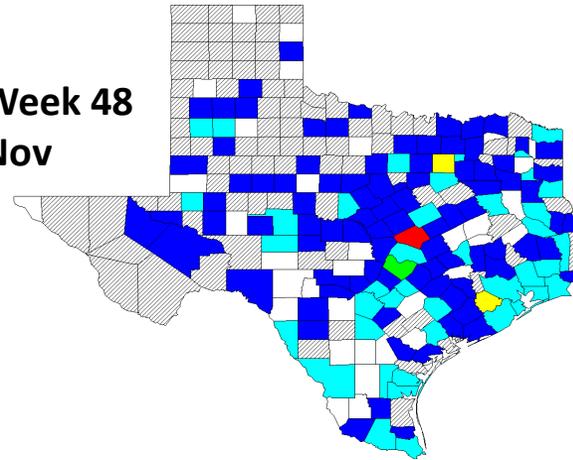
*There was a week 53 in the 2014-2015 influenza season, but there is not a week 53 in the 2015-2016 influenza season or the other previous seasons; therefore the week 53 data point for those seasons is an average of week 52 and 1.

ILI/Influenza Activity

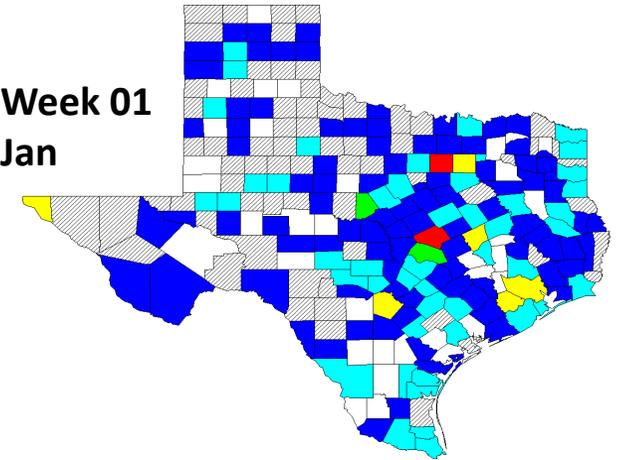
Week 40
Oct



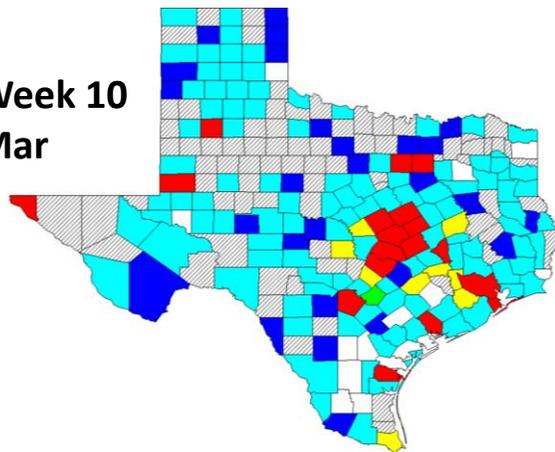
Week 48
Nov



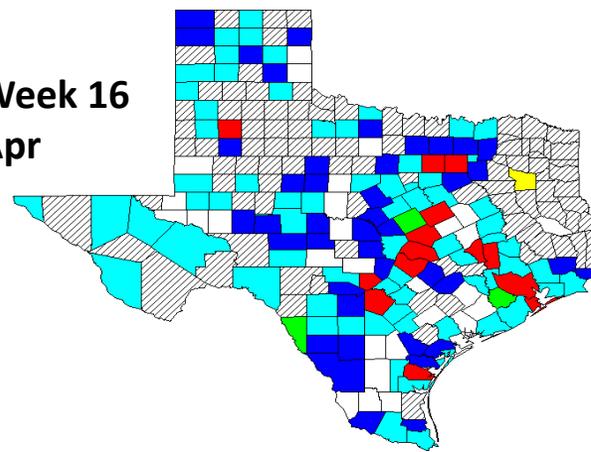
Week 01
Jan



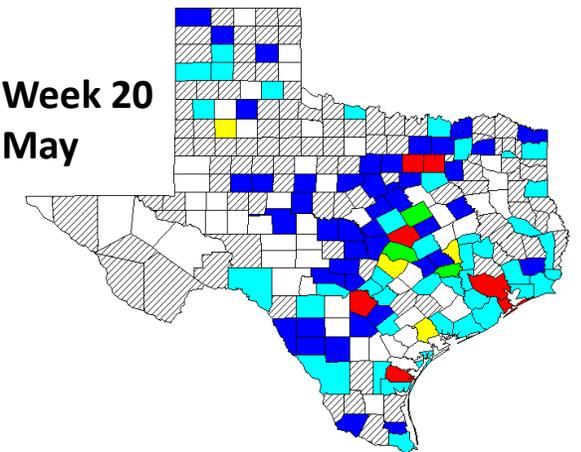
Week 10
Mar



Week 16
Apr



Week 20
May

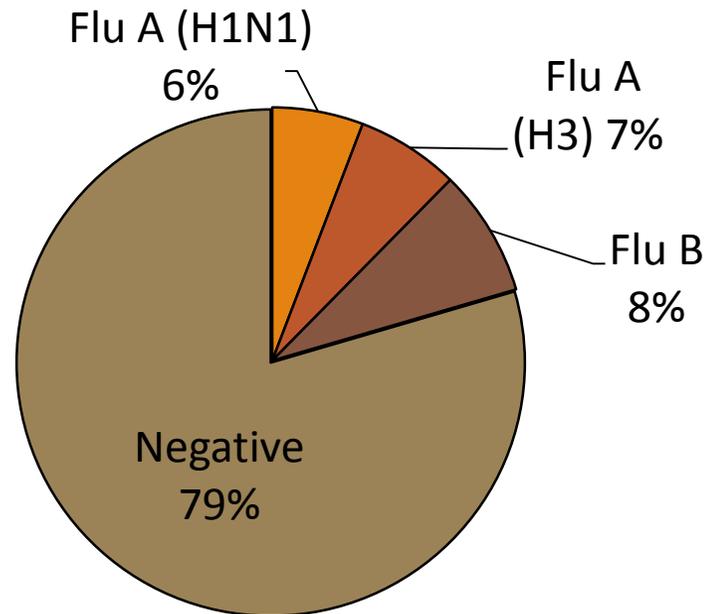


Respiratory Virus Surveillance Project (RVSP)/IISP

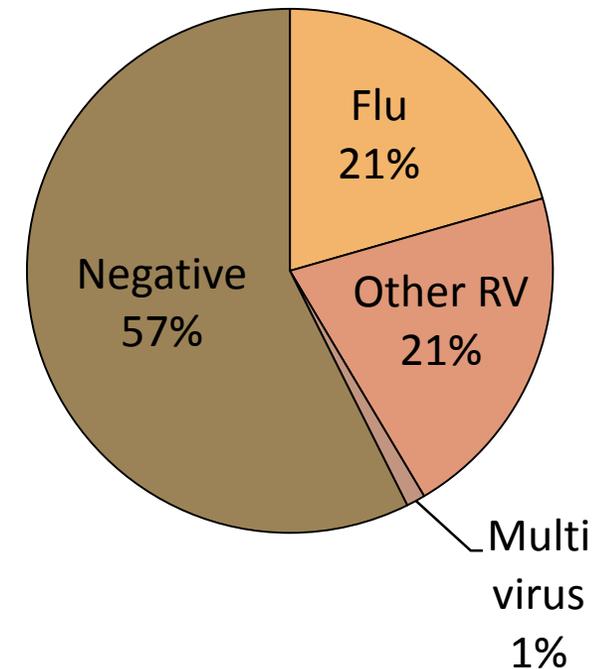
- Discontinued for the 2016-17 season
 - Project officially ended on Aug. 25, 2016
 - 5 providers from 5 LHDs participated during the 2015-16 season
 - Reported ILI
 - 3.92% of patient visits were due to ILI
 - Submitted up to 10 ILI specimens per week
 - 267 submitted for influenza and respiratory virus testing
 - 259 tested for influenza
 - 258 tested for respiratory viruses including influenza

Respiratory Virus Surveillance Project (RVSP)/IISP Specimen Laboratory Results

**Influenza Results by Type and Subtype
using PCR Testing, 2015-2016 Season**



**Respiratory Virus Testing Results
using GenMark, 2015-2016 Season**

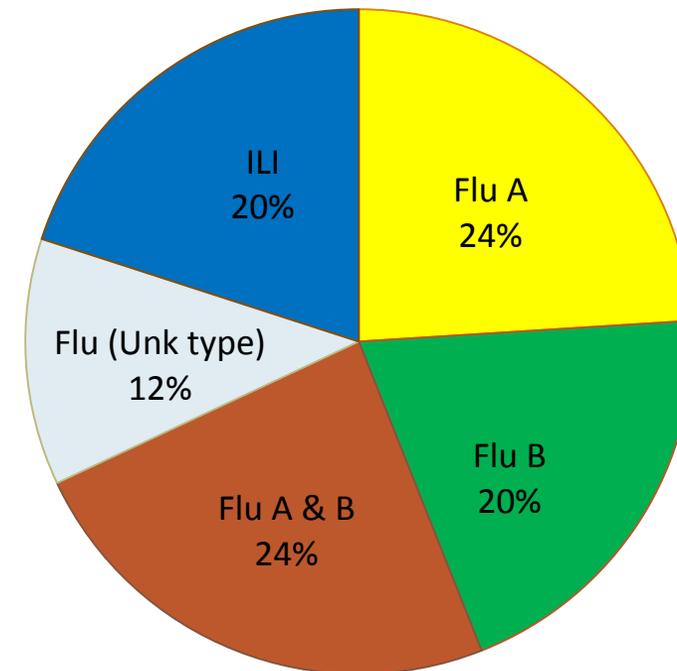


* Respiratory Virus Testing Results: 38 rhinovirus, 5 adenovirus, 7 RSV, 2 HMPV, and 2 parainfluenza viruses

ILI/Flu-associated Outbreaks*

- The number of reported outbreaks in Texas decreased by 54.5% when compared to the last flu season
 - 25 in 2015-16 season vs 55 in 2014-15 season
- 68% of the outbreaks were associated with schools

Number of Reported ILI/Influenza-associated Outbreaks in Texas by Influenza Type, 2015-2016 Season



*As of Oct. 12, 2016

2015–16 Influenza-associated Pediatric Mortality

- 7 influenza-associated pediatric deaths*
 - More than half of the children were positive for influenza A
 - 3 (~43%) children had no underlying health conditions
 - 2014-15 season: 9 out of 19 (~47%) had no underlying health conditions
 - 33.3% of the children with a known vaccination status were vaccinated for influenza

Pneumonia & Influenza (P&I) Mortality Data

- 8415 P&I deaths have been reported for the season*

Table 7: Texas P&I Deaths Occurring Oct. 04, 2015-Oct. 05, 2016* by Age

Age Category (years)	Number of P&I Deaths ⁺	Mortality Rate (per 100,000)
0 - 4	42	2.06
5 - 17	21	0.39
18 - 49	491	3.93
50 - 64	1418	28.52
65 +	6443	191.46
Overall	8415	29.80

*NOTE: Data are provisional and subject to change, errors, and duplicates

⁺ If the cell count is less than 10, the number of P&I deaths is suppressed and <10 is written in the cell.

Table 8: Texas P&I Deaths Occurring Oct. 04, 2015-Oct. 05, 2016* by Health Service Region (HSR)

HSR	Number of P&I Deaths	Mortality Rate (per 100,000)
1	362	40.24
2/3	2348	28.76
4/5N	675	42.50
6/5S	1899	25.83
7	979	28.70
8	870	29.76
9/10	481	31.44
11	801	33.79
Overall	8415	29.80

*NOTE: Data are provisional and subject to change, errors, and duplicates

HPAI & LPAI H7N8 – 2016

- Turkey flocks in Dubois Co, Indiana
 - HPAI & LPAI H7N8 detected in January
- Outbreak response
 - USDA-APHIS response involved USDA employees and contractors
 - Depopulation of
 - Commercial turkeys: 258,045
 - Commercial chickens (layers): 156,178
 - Outbreak response ended 2/22/16
- States asked to monitor human health
- No human H7N8 cases detected



Human Infections with Influenza A (H3N2)v virus

- 18 human infections with influenza A (H3N2)v were reported during August, 2016*
 - 12 cases in Michigan
 - 6 cases in Ohio
- Everyone reported exposure to swine at fair settings in the week preceding illness.
 - Pigs at the fairs have reportedly tested positive for swine influenza A (H3N2) infection

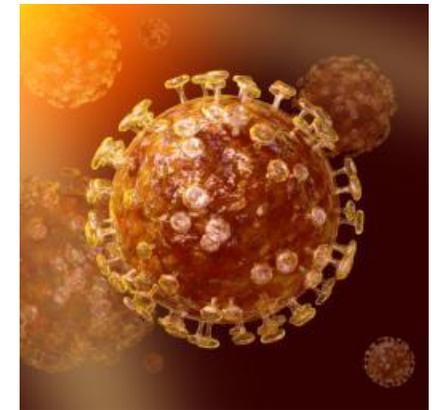
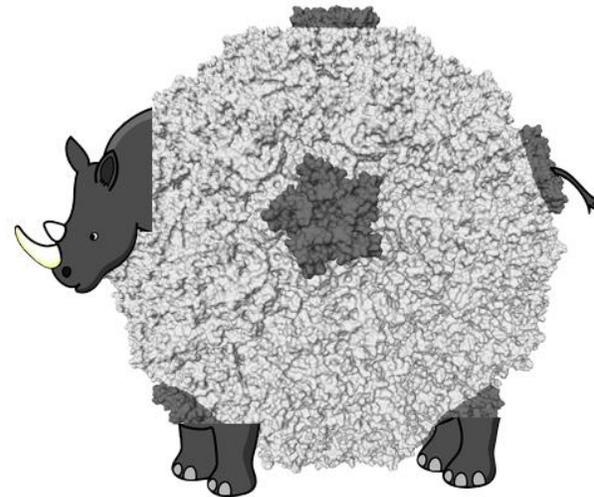


* As of August 26, 2016

2016-17 Flu Season Update

Early 2016-17 Flu Season Activity

- Influenza and ILI activity is low*
- Respiratory viruses circulating, Sept.-Oct. 2016
 - Influenza
 - Rhino/enterovirus
 - Parainfluenza virus
 - RSV
 - Seasonal Coronavirus
 - Adenovirus
 - Human metapneumovirus



* As of Oct. 12, 2016

Early 2016-17 Flu Season Activity

- One ILI-associated outbreak in a school located in HSR 11 has been reported*
 - Started at the end of Sept. so outbreak is counted in 2015-16 flu season
 - Still under investigation
- No influenza-associated pediatric deaths have been reported*
- No novel/variant influenza viruses have been detected in Texas in 2016

Texas Laboratory Results, 2016-17 Season

INFLUENZA TESTING BY TEXAS HOSPITAL LABORATORIES, WEEK 40

	Week 40	Season to Date
Number of labs reporting flu tests	12	
Number of specimens tested	1109	1109
Number of positive specimens (%) [†]	30 (2.71%)	30 (2.71%)
Percentage of total tests that were antigen detection tests	42.74%	
Positive specimens by type/subtype [n (%)]		
Influenza A	19 (63.33%)	19 (63.33%)
Subtyping performed	4 (21.05%)	4 (21.05%)
A (H1N1)	0 (0.00%)	0 (0.00%)
A (H3N2)	4 (100.00%)	4 (100.00%)
Subtyping not performed	15 (78.95%)	15 (78.95%)
Influenza B	11 (36.67%)	11 (36.67%)

[†]Laboratory data in 2016-2017 season reports may not be comparable to reports from previous seasons because the data only includes hospital laboratories data for the current season.

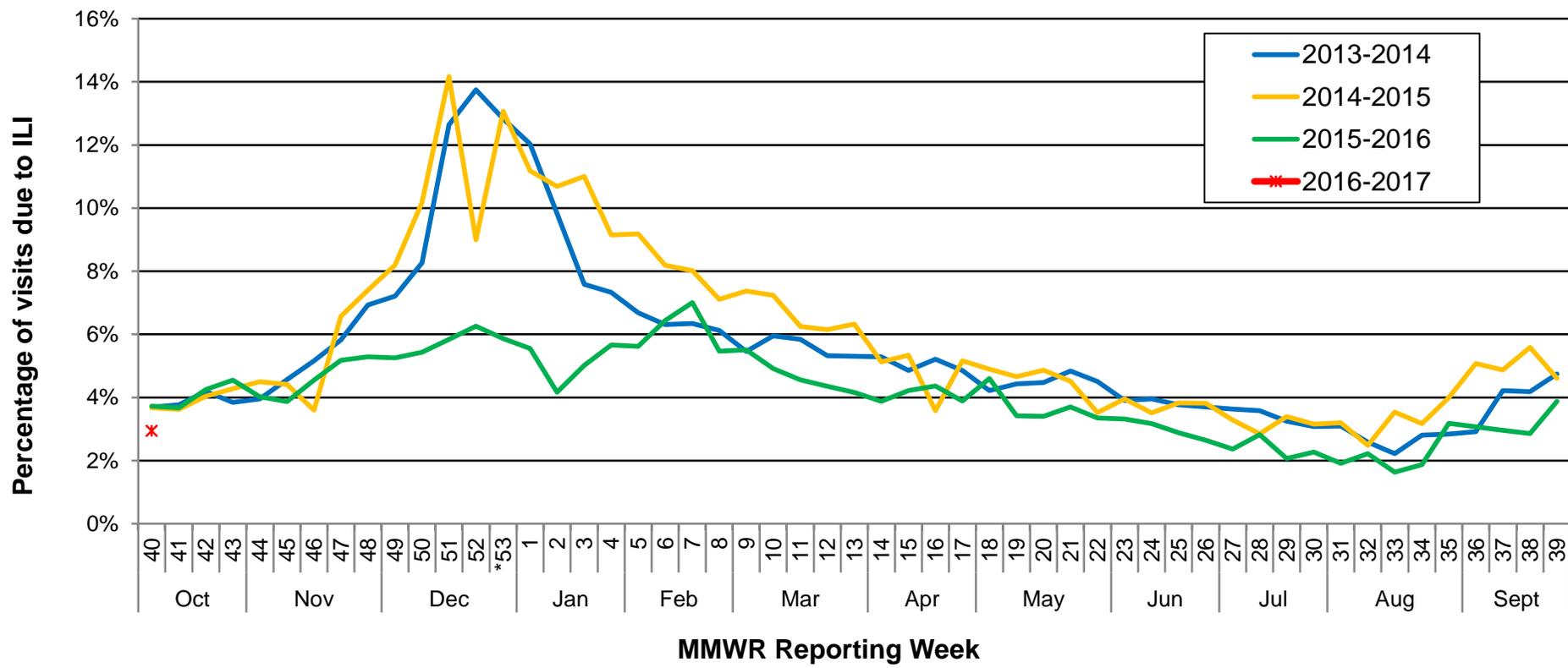
INFLUENZA TESTING BY TEXAS PUBLIC HEALTH LABORATORIES, WEEK 40

	Week 40	Season to Date
Number of labs reporting flu tests	3	
Number of specimens tested	15	15
Number of positive specimens (%) [†]	0 (0.00%)	0 (00.00%)
Positive specimens by type/subtype/lineage [n (%)]		
Influenza A	0 (0.00%)	0 (0.00%)
Subtyping performed	0 (0.00%)	0 (0.00%)
A (H1N1)	0 (0.00%)	0 (0.00%)
A (H3N2)	0 (0.00%)	0 (0.00%)
Subtyping not performed	0 (0.00%)	0 (0.00%)
Influenza B	0 (0.00%)	0 (0.00%)
Lineage testing performed	0 (0.00%)	0 (0.00%)
B/Victoria	0 (0.00%)	0 (0.00%)
B/Yamagata	0 (0.00%)	0 (0.00%)
Lineage testing not performed	0 (0.00%)	0 (0.00%)

[†]Laboratory data in 2016-2017 season reports may not be comparable to reports from previous seasons because the data only includes DSHS and LRN laboratory data for the current season.

ILI Activity

Percentage of Visits Due to Influenza-like Illness Reported by Texas ILINet Participants, 2013–2017 Seasons*

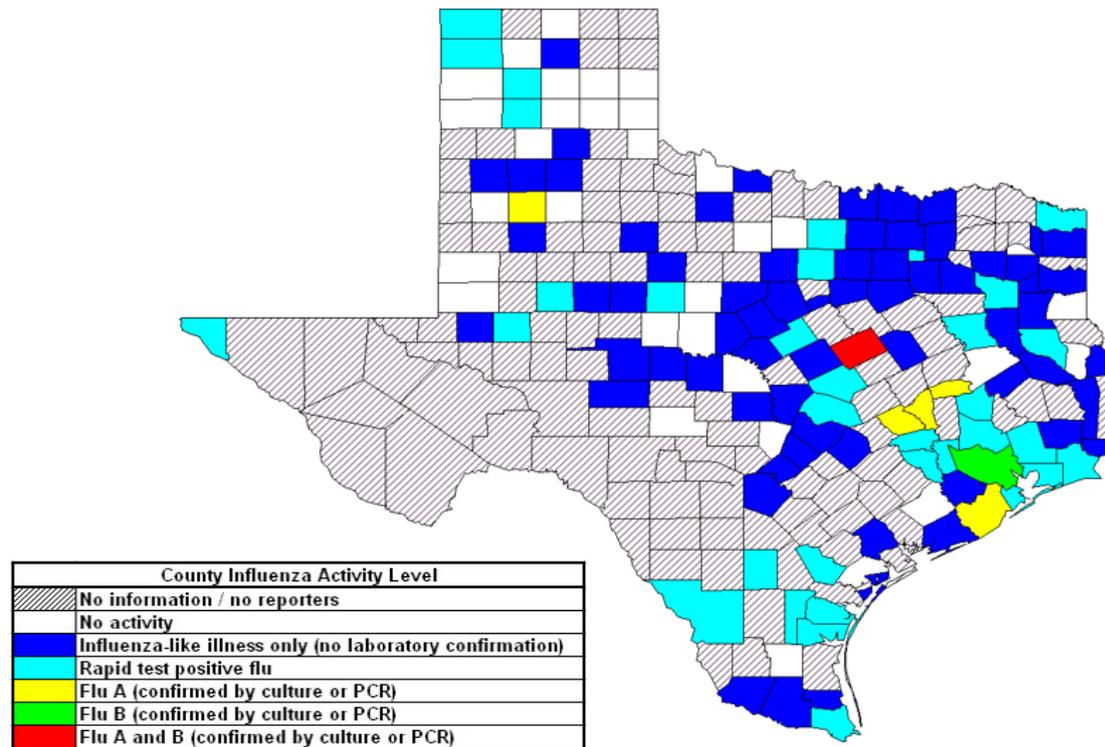


*There was a week 53 in the 2014-2015 influenza season, but there is not a week 53 in the 2016-2017 influenza season or the other previous seasons; therefore the week 53 data point for those seasons is an average of week 52 and 1.

Statewide Influenza Activity Map

Statewide Influenza Activity Map

Figure 5: Texas Map Displaying the Highest Level of Influenza or ILI Activity Reported by County for the Week Ending Oct. 08, 2016 (MMWR Week 40)



Please note: The majority of influenza cases are not reportable by law in Texas. This map contains data from sentinel sites and only displays influenza and ILI cases that were reported to public health. Positive laboratory results are reported according to specimen collection date, or date received in the laboratory if the former is unknown.

2016-17 U.S. Influenza Vaccine Composition

- Vaccine virus strains for the 2016-17 U.S. Influenza Vaccine
 - Trivalent Vaccine
 - an A/California/7/2009 (H1N1)pdm09-like virus
 - an A/Hong Kong/4801/2014 (H3N2)-like virus
 - a B/Brisbane/60/2008-like virus (B/Victoria lineage)
 - Quadrivalent vaccine
 - Three viruses listed above
 - B/Phuket/3073/2013-like virus (B/Yamagata lineage)



2016-17 Flu Vaccine Recommendations from Advisory Committee on Immunization Practices

- Recommendations
 - Everyone 6 months and older is recommended for annual flu vaccination with rare exception
 - “Nasal spray” flu vaccine should **not** be used during the 2016-17 flu season
 - No preferential recommendation is made for one influenza vaccine product over another for persons for whom more than one licensed, recommended product is otherwise appropriate.

Flu-associated Deaths of All Ages

- In process of making flu-associated deaths of all age a notifiable disease condition in Texas
 - Initial comments from public health stakeholders were positive
 - Approved at the August State Health Services Council Meeting
 - Currently, going out for public comment and has to be finalized
- Becomes a notifiable condition on Thurs. Mar. 2, 2017 if there is minimal negative feedback
- When to report: Within 1 week

Contact Us

- Sign up for flu report notifications:
<http://www.dshs.texas.gov/idcu/disease/influenza/surveillance/2017/>



- DSHS Central Office's Flu Team mailbox:
flutexas@dshs.state.tx.us