

# Texas Influenza Surveillance

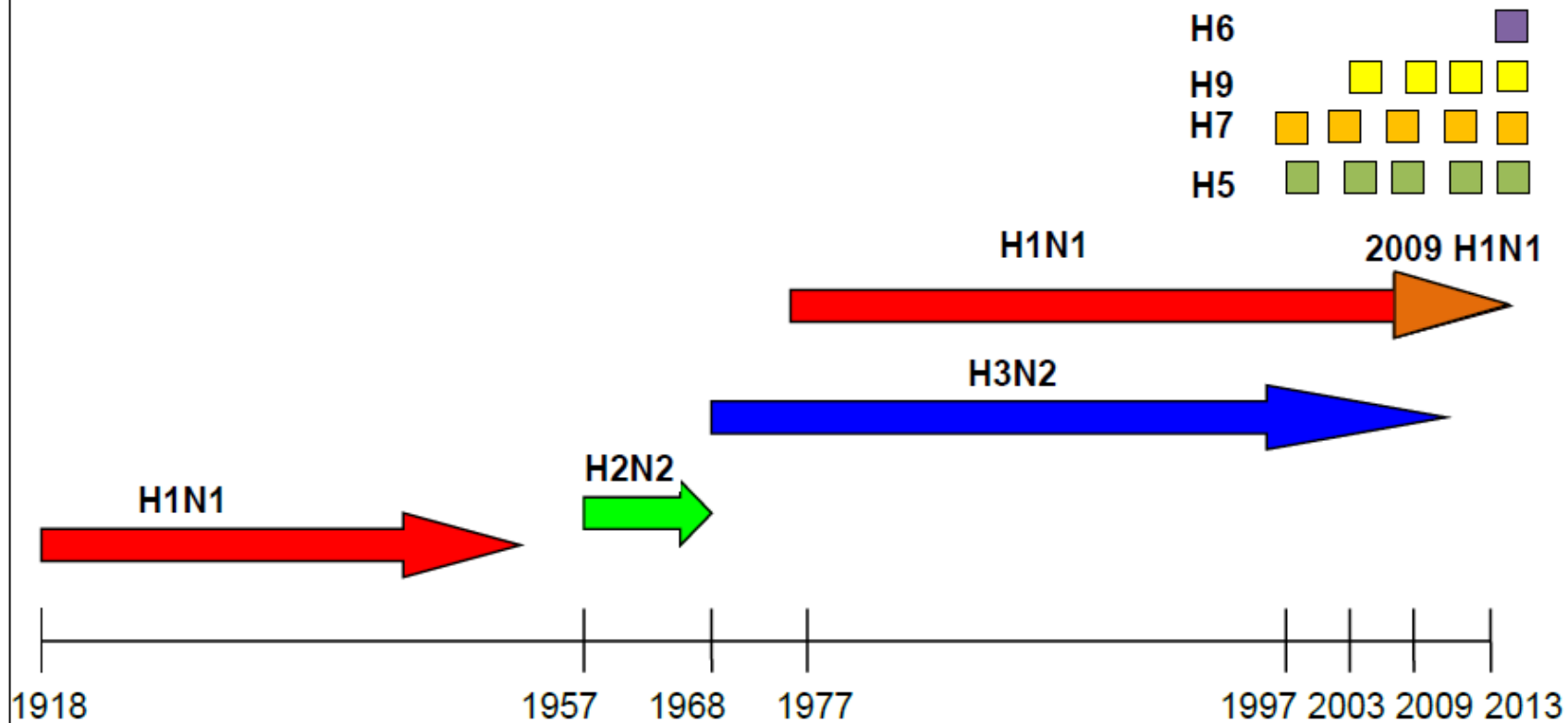
# Impact of Influenza

- Influenza (flu) causes yearly epidemics
- An estimated 5%-20% of population gets the flu each year
- Infection can lead to severe illness, complications, and death
  - More than 200,000 people in the US are hospitalized each year
  - Adults 65+ account for 90% of deaths attributed to pneumonia and influenza
  - Estimated 23,607 (range: 3,349-48,614) deaths associated in US each year
- Influenza viruses have the potential to change significantly and suddenly to cause pandemics

# Risk Groups for Severe Flu Illnesses and Complications

- <5 years of age
- $\geq 65$  years of age
- Persons with chronic pulmonary, cardiovascular, endocrine, renal, hepatic, neurologic, hematologic or metabolic disorders
- Immunosuppressed persons
- Pregnant or postpartum women
- <19 years of age and receiving long-term aspirin therapy
- Residents of nursing homes/LTCFs
- Persons with morbid obesity (BMI  $\geq 40$ )
- American Indians and Alaskan Natives

## Emergence of Novel Influenza A Subtypes in Humans



\*1918–H1N1 appears, “Spanish Influenza”, 500,000 excess deaths

\*1957–H2N2 appears, “Asian Influenza”, 69,800 excess deaths

\*1968–H3N2 appears, “Hong Kong Influenza”, 33,800 excess deaths

\*Adapted from Cox NJ, Kawaoka Y. In: Microbiology and Microbial Infections. 9<sup>th</sup> ed. 1998; 413

# Flu Reporting and Surveillance

# Why Do We Perform Flu Surveillance?

- To gain an understanding of the epidemiology of influenza in order to make public health recommendations to prevent flu-related morbidity and mortality
- National flu surveillance goals:
  - Determine when and where influenza viruses are circulating
  - Determine if circulating influenza viruses match the vaccine strains
  - Detect changes in the influenza viruses
  - Track influenza-related illness and
  - Determine the severity of influenza activity

# How is Flu Surveillance Accomplished?

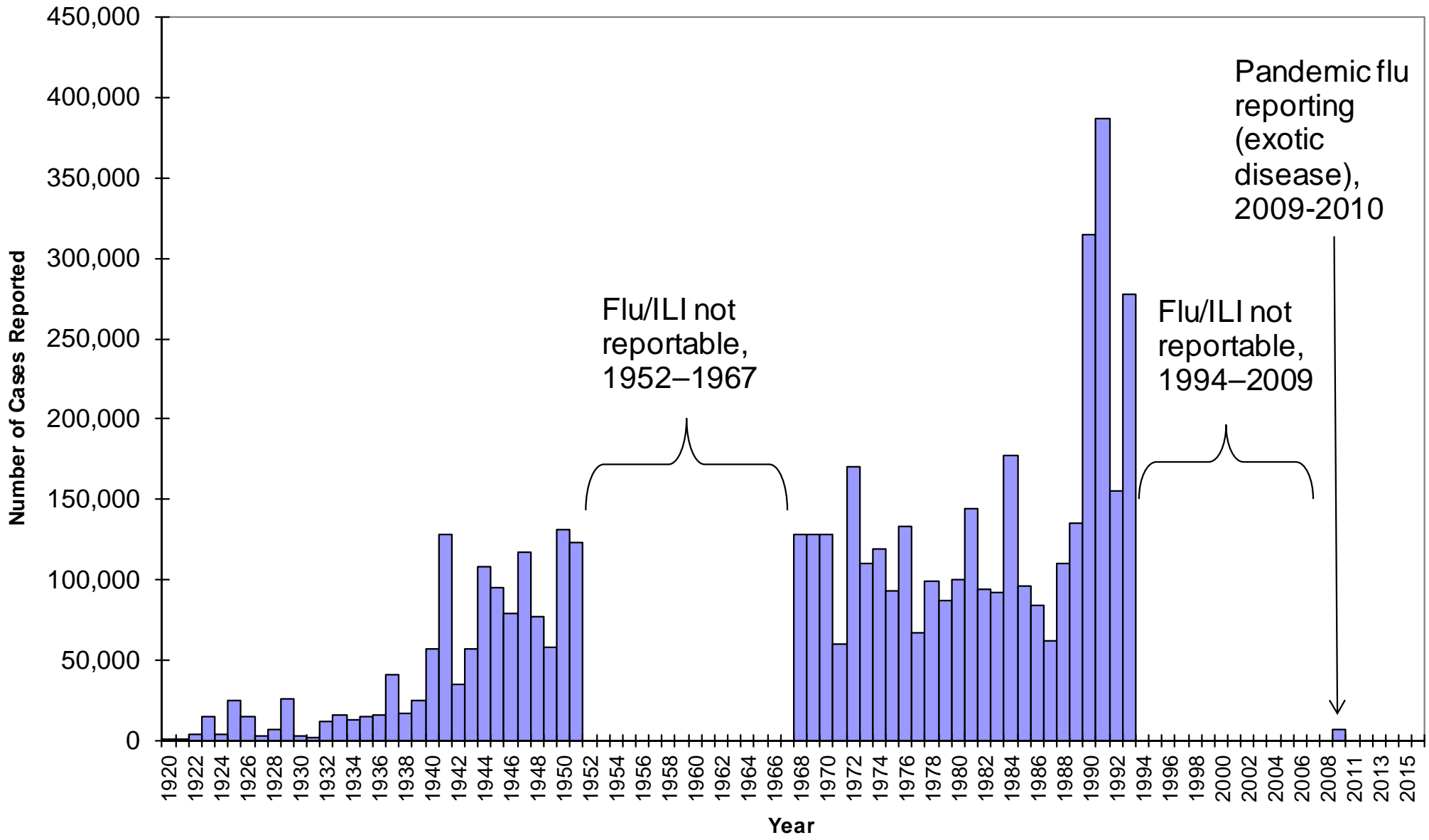
- DSHS accomplishes flu surveillance goals through a combination of reportable influenza conditions, sentinel surveillance systems, and other systems
- Data are collected and reported weekly
- National influenza surveillance season is October through May
- Many activities are voluntary (not required by law)
- Partners:
  - Local health departments and DSHS Health Service Regions
  - DSHS Laboratory and Laboratory Response Network (LRN) Laboratories
  - DSHS Center for Health Statistics
  - Centers for Disease Control and Prevention (CDC)
  - Hospital and clinic laboratories
  - ILINet providers

# State Funding for Influenza

- Funded approximately 10 years ago
- Currently \$375,000 per year for flu surveillance activities
- Funds used to support
  - Influenza laboratory testing at DSHS Austin and LRN laboratories
  - A dedicated state Influenza Surveillance Coordinator
  - An annual influenza surveillance workshop to train public health investigators and other flu surveillance staff
  - Contracts with local health departments to meet flu surveillance goals



# ILI and Influenza Morbidity as Reportable Conditions in Texas, 1920–2016



# Reportable Influenza Conditions (2016)

- Reportable influenza conditions vary by state
- Three reportable influenza-related conditions in Texas:
  - Novel influenza A cases in humans
  - Influenza-associated pediatric mortality
    - Deaths associated with influenza in persons < 18 years
  - Outbreaks due to any cause (e.g., flu, influenza-like illness, etc.)
- Texas reportable conditions rules: Texas Administrative Code, Title 25, Part 1, Chapter 97, Subchapter A

# “Sentinel” Influenza Surveillance

- Small, (ideally) representative subset of providers and facilities reporting influenza data to the local, regional, or state health departments
- Reporting is voluntary
- Reporters must be recruited
- Sentinel surveillance differs by jurisdiction and may include:
  - Outpatient and/or inpatient influenza-like illnesses (ILI)
    - ILI is defined as fever  $\geq 100^{\circ}\text{F}$  plus cough and/or sore throat
    - “ILI” captures influenza and other common respiratory illnesses
  - Influenza testing results (point-of-care and laboratory)
  - School absenteeism reporting
  - Mortality reporting from Medical Examiners

# Influenza Surveillance Components

- Virology/Laboratory
  - Identifies circulating influenza strains
  - Determines when and where influenza viruses are circulating
  - Determines whether circulating influenza viruses match vaccine strains
  - Detects novel strains of influenza and monitors antiviral resistance
- Morbidity
  - Focuses on identifying and tracking influenza illnesses
  - Subdivided into surveillance activities related to influenza-like illness (ILI), lab confirmed flu, or a combination
- Mortality
  - Focuses on tracking deaths associated with influenza
  - Used as an indicator of severity of influenza epidemics

# Virologic Surveillance Activities

# National Respiratory and Enteric Virus Surveillance System (NREVSS)

- CDC web-based reporting system for select respiratory and enteric viruses including influenza
  - NREVSS reporters are mainly hospital laboratories
  - Reporting is voluntary
- Data are reported weekly and include:
  - Number of tests performed for each virus
  - Number of tests positive for each virus type/subtype
  - Type of testing performed (i.e., PCR, culture, antigen)
- Data used to monitor trends for influenza, other respiratory viruses
- NREVSS data help meet Right Size situational awareness objective





# Laboratory Surveillance at Public Health Labs

- Providers and laboratories are recruited by local and regional health departments to submit surveillance specimens to public health laboratories for influenza testing
  - Texas public health labs include 9 Laboratory Response Network (LRN) labs across Texas and DSHS Virology Lab in Austin
  - Participants receive free specimen collection kits, shipping, and flu testing
  - Specimens tested using CDC Flu PCR assay
    - Detects seasonal and novel influenza viruses
- Viruses tested by public health laboratories contribute to national surveillance
  - Antigenic characterization, genetic sequencing to determine changes in flu viruses and identify candidate vaccine viruses
  - Antiviral resistance testing to monitor trends and make treatment recommendations



# Laboratory Response Network (LRN) Laboratories

- LRNs have performed flu testing since 2008
- Enhanced testing capacity during 2009 flu pandemic



# Morbidity Surveillance Activities

# Morbidity Surveillance Activities Overview

- Novel/variant influenza cases
- Influenza-like illness reporting
- Outbreaks
- Other activities

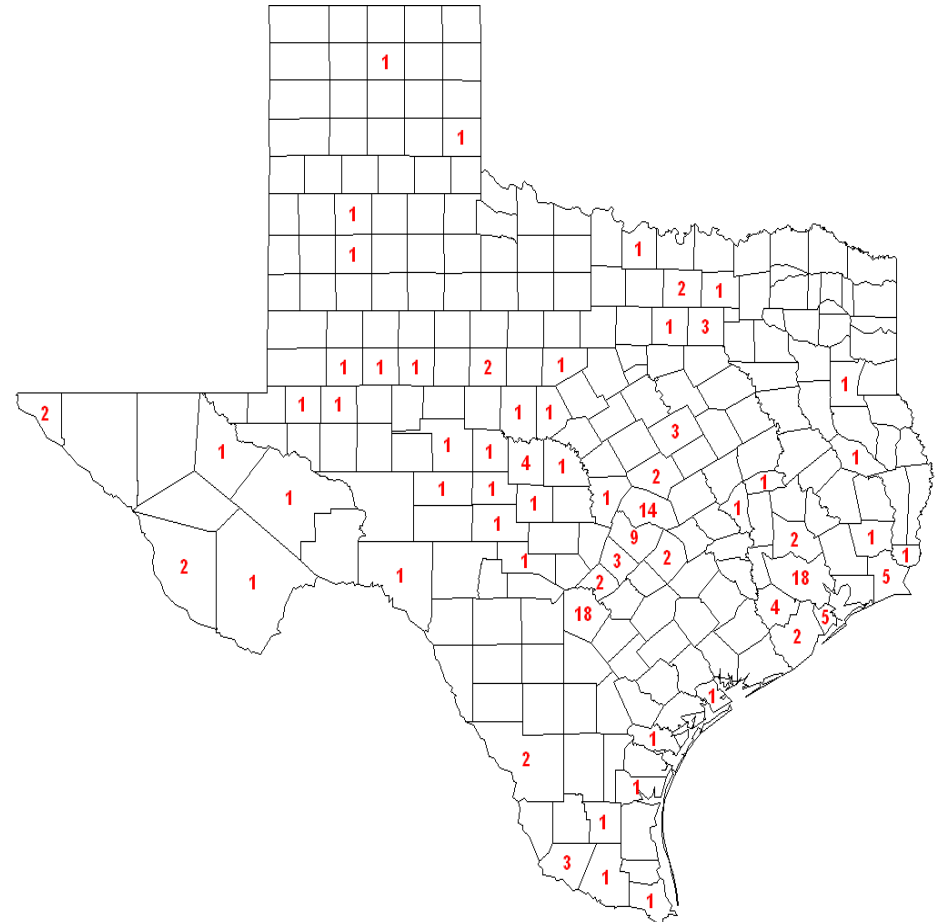
# Novel/Variant Influenza Surveillance

- Accomplished as part of routine seasonal flu surveillance activities
- Specimens are tested at public health laboratories to detect novel influenza A virus infections
- Important to facilitate prompt awareness and characterization of influenza A viruses with pandemic potential and accelerate the implementation of effective public health responses
- Once identified, cases of novel/variant influenza are thoroughly investigated (case and contact investigations) to prevent spread
  - Cases of novel influenza are immediate reportable
- No novel/variant influenza infections detected in Texas since 2009

# U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet)

- CDC web-based reporting system
- Healthcare providers submit weekly reports on the total number of patients seen for any reason and the number of patients seen with ILI by age category
- Percentage of ILI is calculated each week
- ILI is an indicator for influenza activity

- 149 Texas healthcare providers are currently participating\*



\* As of Nov. 4, 2016

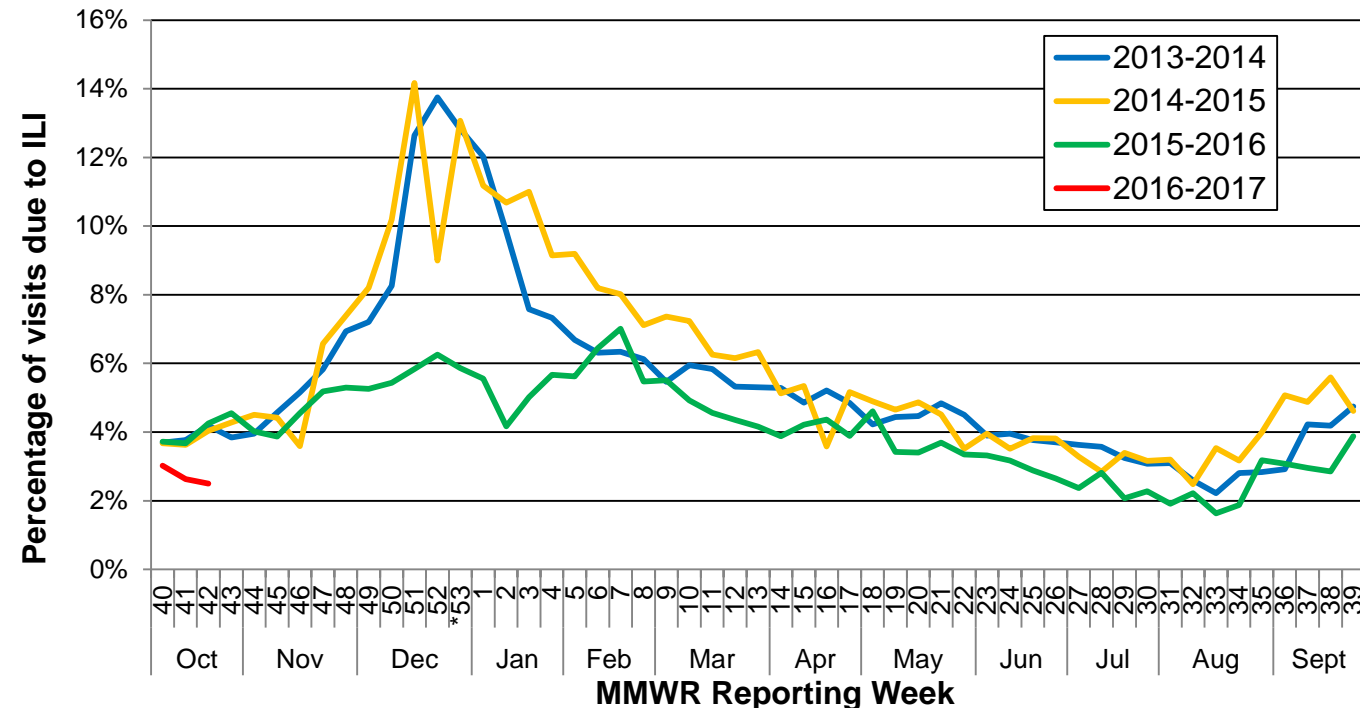
# ILINet Data in the Texas Weekly Flu Report

Percentage of Visits for Influenza-like Illness Reported by Texas ILINet Providers (as of 10/27/16 12:35 PM)

Week	Providers Reporting	Number of ILI Cases by Age Group (Years)					Total ILI (all ages)	Total Patients	% ILI
		0-4	5-24	25-49	50-64	65+			
201640	111	162	313	138	102	143	858	28361	3.03%
201641	110	133	267	148	86	134	768	29244	2.63%
201642	99	118	232	123	114	106	693	27744	2.50%

- Can determine start, end, and peak of season
- Can compare timing of seasons
- Helps to detect unusual trends (e.g., start of 2009 pandemic was seen in ILINet data)

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.

# ILI/Influenza Outbreak Reporting

- TAC RULE §97.3: “...any outbreak, exotic disease, or unusual group expression of disease that may be of public health concern should be reported by the most expeditious means”
- Anyone (e.g., medical providers, healthcare facilities, schools, etc.) who has knowledge of the outbreak is required to report
- Local health departments investigate outbreaks to
  - Ensure infection control and prevention methods in place to prevent further illnesses
  - Address problems that may have led to the outbreak
  - Contribute to epidemiologic knowledge of the disease
- Outbreak data are reported in Texas Weekly Flu Report to identify areas of the state with local epidemic activity

# Other Activities

- Flu surveillance activities are highly variable among local and regional health departments in Texas
- Health departments often use their own systems and methods for data collection
- Health departments (HD) may choose to collect:
  - ILI and flu illness reports from clinics or hospitals (non-ILINet)
  - ILI and flu death reports from medical examiners
  - Flu laboratory test results from clinics or hospital labs (non-NREVSS)
  - Absenteeism data from schools
  - Syndromic surveillance data from emergency departments



# Mortality Surveillance Activities

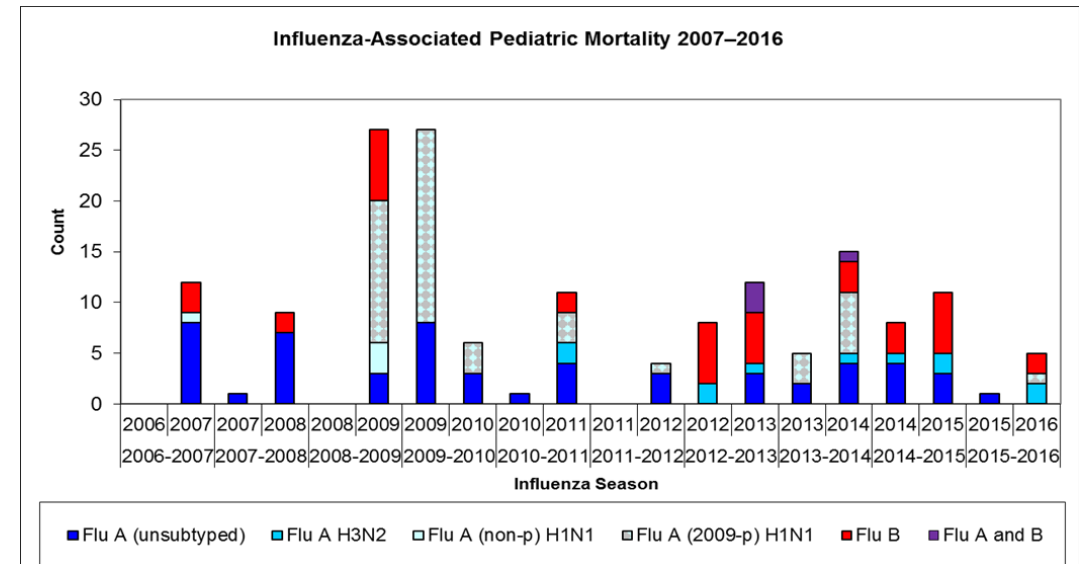
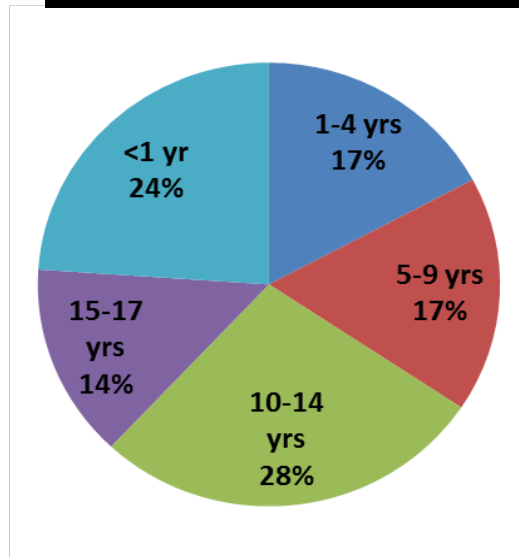
# Influenza-Associated Pediatric Deaths

- Deaths in children < 18 years of age are reported to local health departments as required by law
- Purpose:
  - Monitor trends in pediatric flu deaths
  - Identify risk factors associated with death
  - Support public health recommendations for influenza prevention
- Data collected include age, location, influenza virus type/subtype, presence of underlying health conditions, coinfections, vaccination status, treatment type and timing

# Influenza-Associated Pediatric Deaths

- Expect about 15 deaths/year
- No influenza-associated pediatric deaths have been reported in Texas during the 2016-2017 influenza season\*
- 7 influenza-associated pediatric deaths for last influenza season\*

Age Groups: 2007-2016



\*As of Oct. 31, 2016

# Pneumonia and Influenza (P&I) Death Certificate Reporting

- Purpose:
  - To establish a baseline for P&I deaths and monitor trends each season
  - To identify unreported influenza-associated pediatric deaths
  - To describe the severity of influenza epidemics
- Mechanism: Data use agreement between Emerging and Acute Infectious Disease and DSHS Center for Health Statistics
- Data collected:
  - P&I deaths are identified based on ICD-10 multiple cause of death codes
    - Important to collect pneumonia death data because many influenza deaths are not coded/identified as influenza
  - 2-3 week lag in timeliness of data received

# Pneumonia and Influenza (P&I) Deaths

- P&I deaths are reported in the state flu report by age group and geography (Health Service Region)
- No P&I deaths have been reported in Texas during the 2016-2017 influenza season\*
- 8415 P&I deaths have been reported last season\*

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

Age Category (years)	Number of P&I Deaths <sup>†</sup>	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

<sup>†</sup>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

\*As of Oct. 31, 2016

# Texas Weekly Flu Report

- Published each Friday and available at <http://www.dshs.texas.gov/idcu/disease/influenza/surveillance/>



## Texas Influenza Summer Surveillance Report 2015–2016 Season/2016 MMWR Week 39

(Sept. 25, 2016 – Oct. 01, 2016)  
Report produced on 10/07/2016

### Summary

Influenza activity remains low across Texas. Compared to the previous week, the percentage of specimens positive for influenza decreased and the percentage of patient visits due to influenza-like illness (ILI) marginally increased. No influenza-associated pediatric deaths were reported. No ILI or influenza-associated outbreaks were reported. In addition to flu, other respiratory viruses—especially rhinovirus/enterovirus—were detected in Texas during week 39.

Table 1: Summary of Texas Influenza (Flu) and Influenza-like Illness (ILI) Activity for the Current Week

Texas Surveillance Component	Change from Previous Week	Current Week	Previous Week <sup>†</sup>	Page of Report
Statewide influenza activity level reported to CDC (geographic spread of influenza)	Not determined during the summer	N/A	N/A	--
Statewide ILINet Activity Indicator assigned by CDC (intensity of influenza-like illness)	Not determined during the summer	N/A	N/A	--
Percentage of specimens positive for influenza	▼ 1.86%	1.38%	3.24% <sup>†</sup>	1
Percentage of visits due to ILI (ILINet)	▲ 1.03%	3.88%	2.85% <sup>†</sup>	2
Number of regions reporting increased flu/ILI activity	No change	1	1	4
Number of regions reporting decreased flu/ILI activity	▲ 1	1	0	4
Number of variant/novel influenza infections	No change	0	0	4
Number of ILI/influenza outbreaks	No change	0	0	4

# Future Surveillance Activities

- 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 in March 2017 if there is minimal negative feedback
  - When to report: Within 1 week
- Achieve Right Size surveillance objectives by strengthening current surveillance components, initiating new surveillance projects, and improving partnerships

# Respiratory Syncytial Virus (RSV) Surveillance in Texas



# RSV Background

- Most common cause of bronchiolitis and pneumonia in infants
- Gaining recognition as a significant cause of respiratory illness in older adults
- Each year in the US, RSV infection causes or is associated with:
  - 2.1 million outpatient visits and >57,000 hospitalizations among children < 5 years of age
  - 177,000 hospitalizations and 14,000 deaths among adults 65+ years of age
- RSV season is approximately October through April
  - Illnesses usually peak in Texas in December or January

# High Risk Groups

- Children
  - Premature infants
  - Children < 2 years of age with congenital heart or chronic lung disease
  - Children with compromised immune systems
- Adults
  - Adults with compromised immune systems
  - Adults  $\geq$  65 years of age

# Immunoprophylaxis is Available for Children

- Palivizumab (Synagis), a monoclonal antibody
- Recommended by the American Academy of Pediatrics for prevention of severe RSV disease for certain high-risk infants and children
  - Not a treatment for RSV disease, cannot prevent infections
- Must be given monthly during RSV season
- Cost is \$1,000-2,000+ per dose without insurance
- Insurance coverage for a 5-month period determined by surveillance data



# Establishing RSV Surveillance in Texas

- 2005: 79th Texas Legislature passed HB 1677
  - Required a sentinel surveillance system for RSV be established
- Texas Administrative Code (TAC) Title 25, Part 1, Chapter 97, Subchapter K
  - DSHS shall establish and maintain a sentinel surveillance program for RSV infection in children
  - The program will:
    - Maintain a central database of laboratory-confirmed cases of RSV that can be used to investigate the incidence, prevalence, and trends of RSV
    - Recruit at least one health care facility or provider associated with a health care facility in each Health Service Region of the State to report RSV data

# RSV Surveillance System

- Used existing surveillance and reporting system for RSV surveillance: CDC's National Respiratory and Enteric Virus Surveillance System (NREVSS)
  - CDC web-based laboratory reporting system
  - Reporting is voluntary
  - Reports are from hospital laboratories
  - Collects total number of RSV tests performed and number of tests positive each week
  - Data are available to state health departments

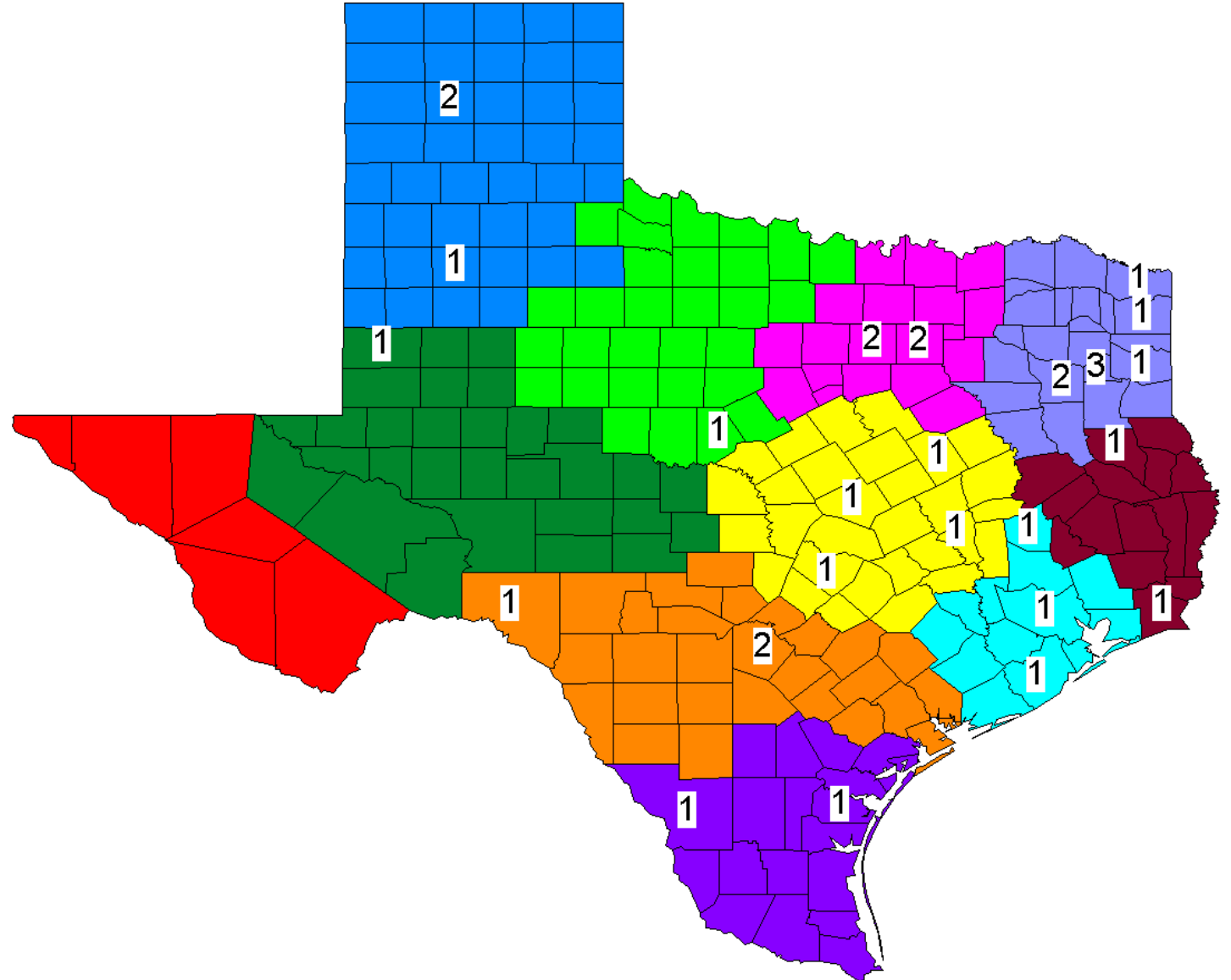


**NREVSS**  
National Respiratory and Enteric Virus Surveillance System

# Number of RSV Reporting Laboratories per County

Laboratories reporting RSV data, 2016-2017 season:

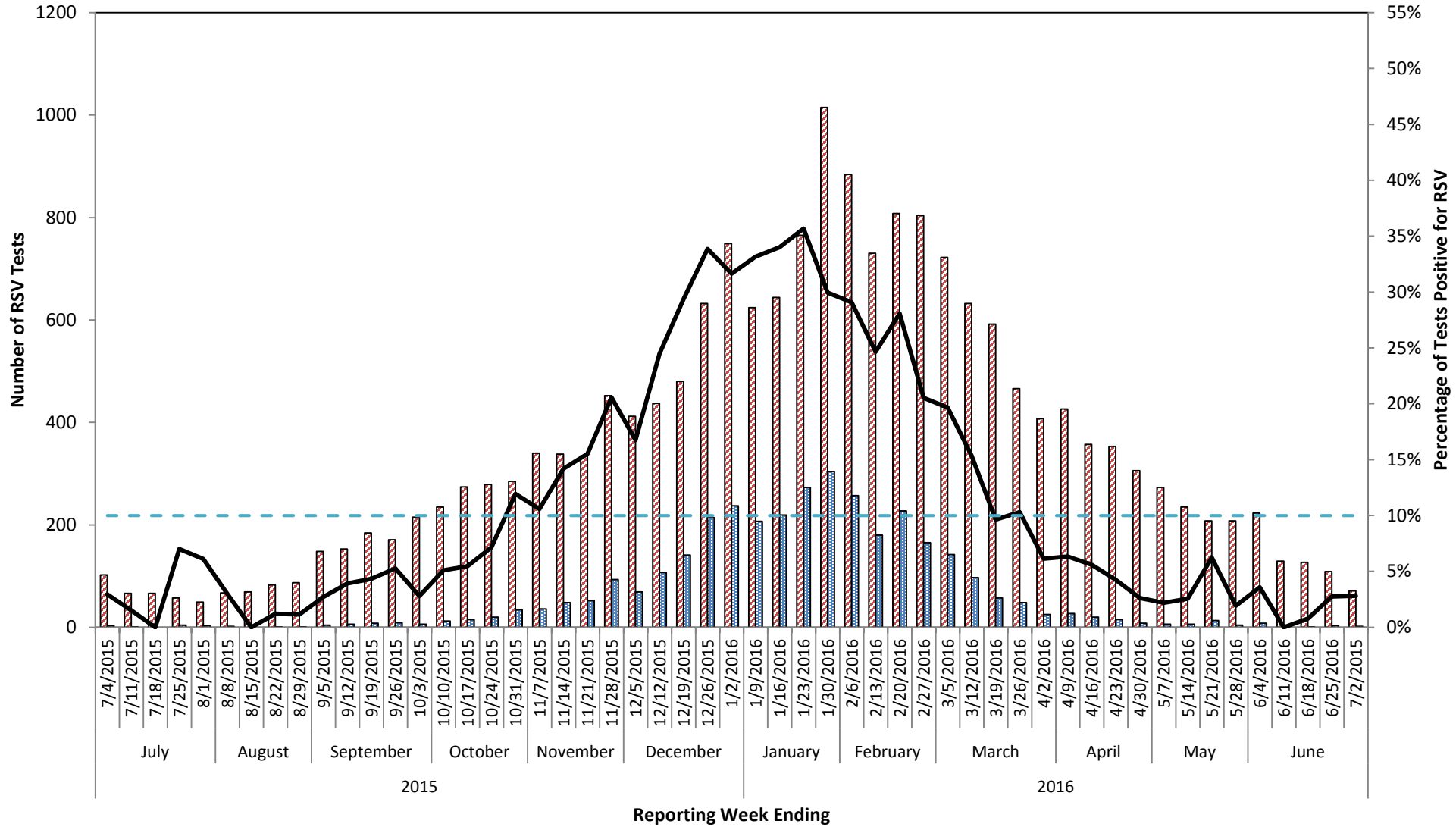
- 1 public health lab
- 1 Air Force base
- 29 hospital labs
  - 5 are children’s hospitals



# Texas RSV Report

- DSHS RSV page: [www.rsvtexas.org](http://www.rsvtexas.org)
- Click on “Data” link to find the state RSV report
  - Weekly RSV reports posted each Tuesday from September through May
  - Report contains graphs displaying state and regional RSV laboratory data
    - Data help us to understand when RSV season begins, peaks, and ends in each Texas Health Service Region (HSR)
  - Season summary graphs also available

## Number and Percentage of Antigen Tests Positive for Respiratory Syncytial Virus (RSV) All Texas Sites, 2015-2016

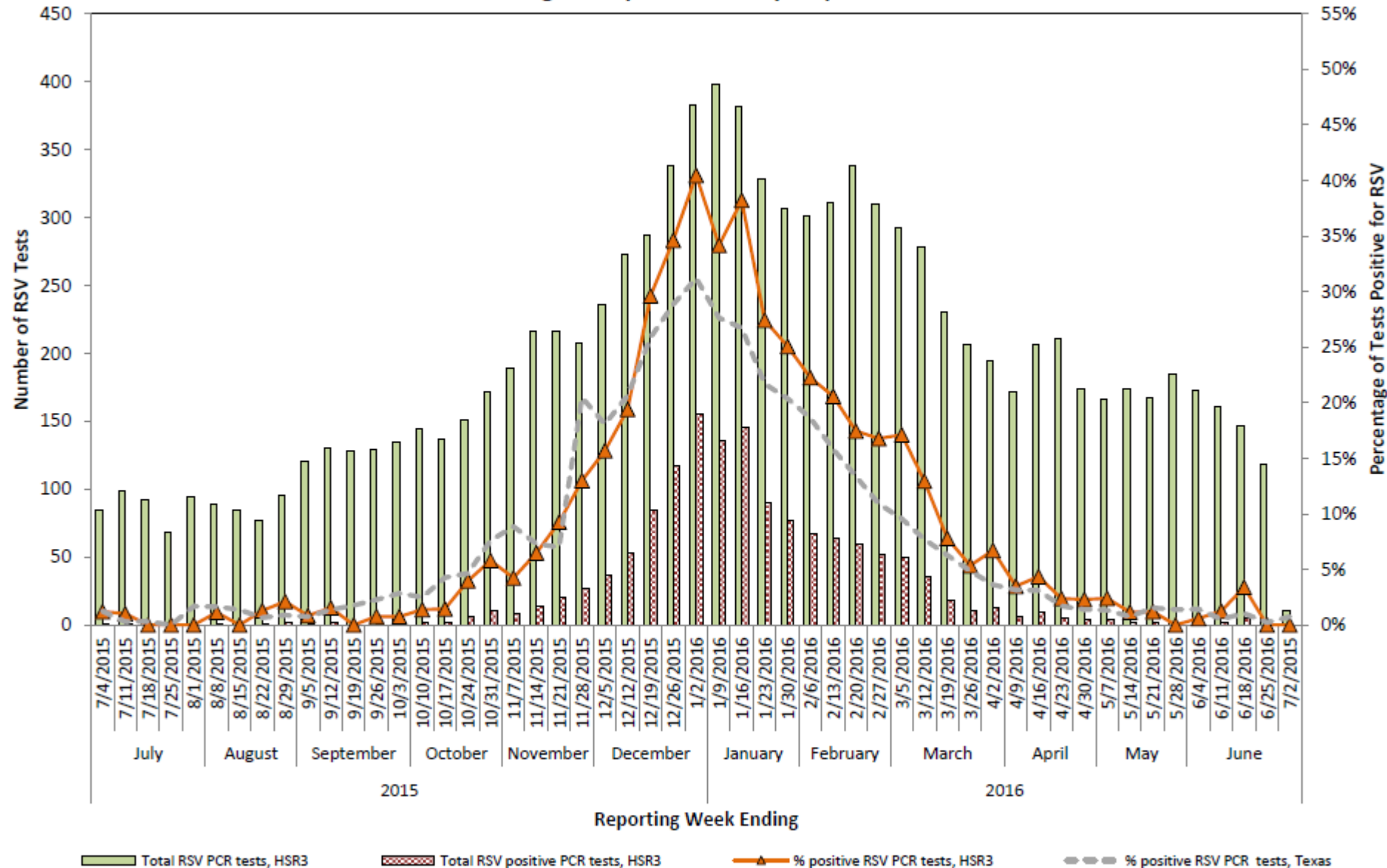


Total RSV antigen tests, Texas    
 Total RSV positive antigen tests, Texas    
 — % positive RSV antigen tests, Texas    
 10% positive threshold

*The start of RSV season is the first of two consecutive weeks with  $\geq 10\%$  of tests positive, and the end is the last of two consecutive weeks with  $\geq 10\%$  of tests positive.*



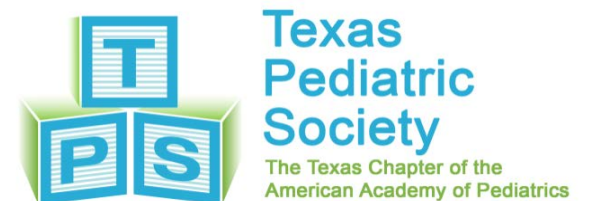
## Number and Percentage of PCR Tests Positive for Respiratory Syncytial Virus (RSV) Health Service Region 3 (DFW Metroplex), 2015-2016 Season



*Regional-level results may not be reliable if the number of RSV tests performed each week is small or if reporting is inconsistent.  
National and state RSV analyses typically rely on antigen test data. However, PCR testing for RSV is relatively new but is becoming more common.*

# Using RSV Data for Prophylaxis Recommendations

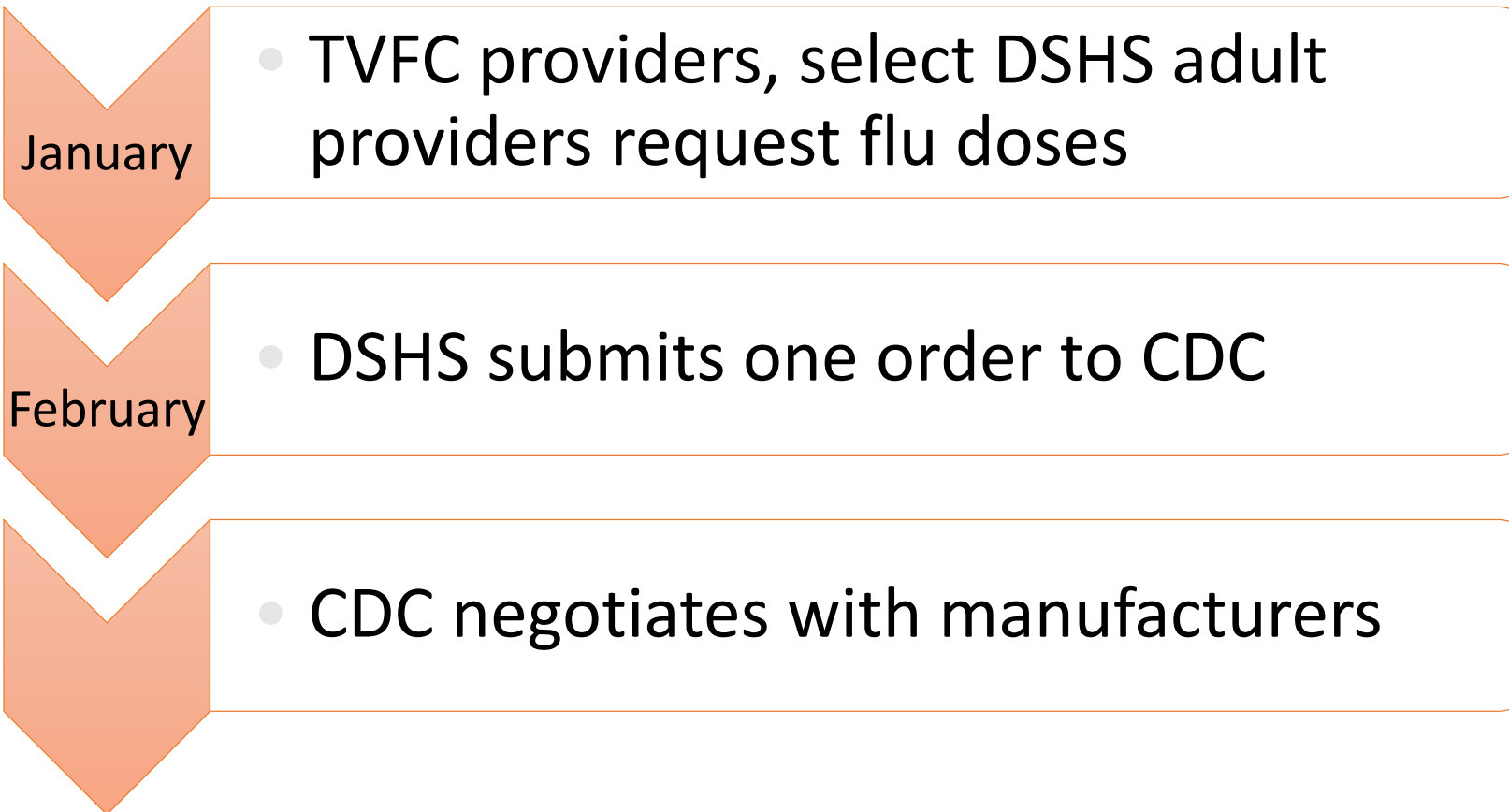
- RSV data and trends reviewed twice per month during RSV season by Texas Pediatric Society (TPS) and DSHS RSV epidemiologist
- RSV data used to monitor state and regional trends and determine timing of initiation of RSV prophylaxis
  - TPS makes recommendations to Texas Medicaid Program
  - RSV prophylaxis recommendations may differ by Texas Health Service Region, based on RSV data



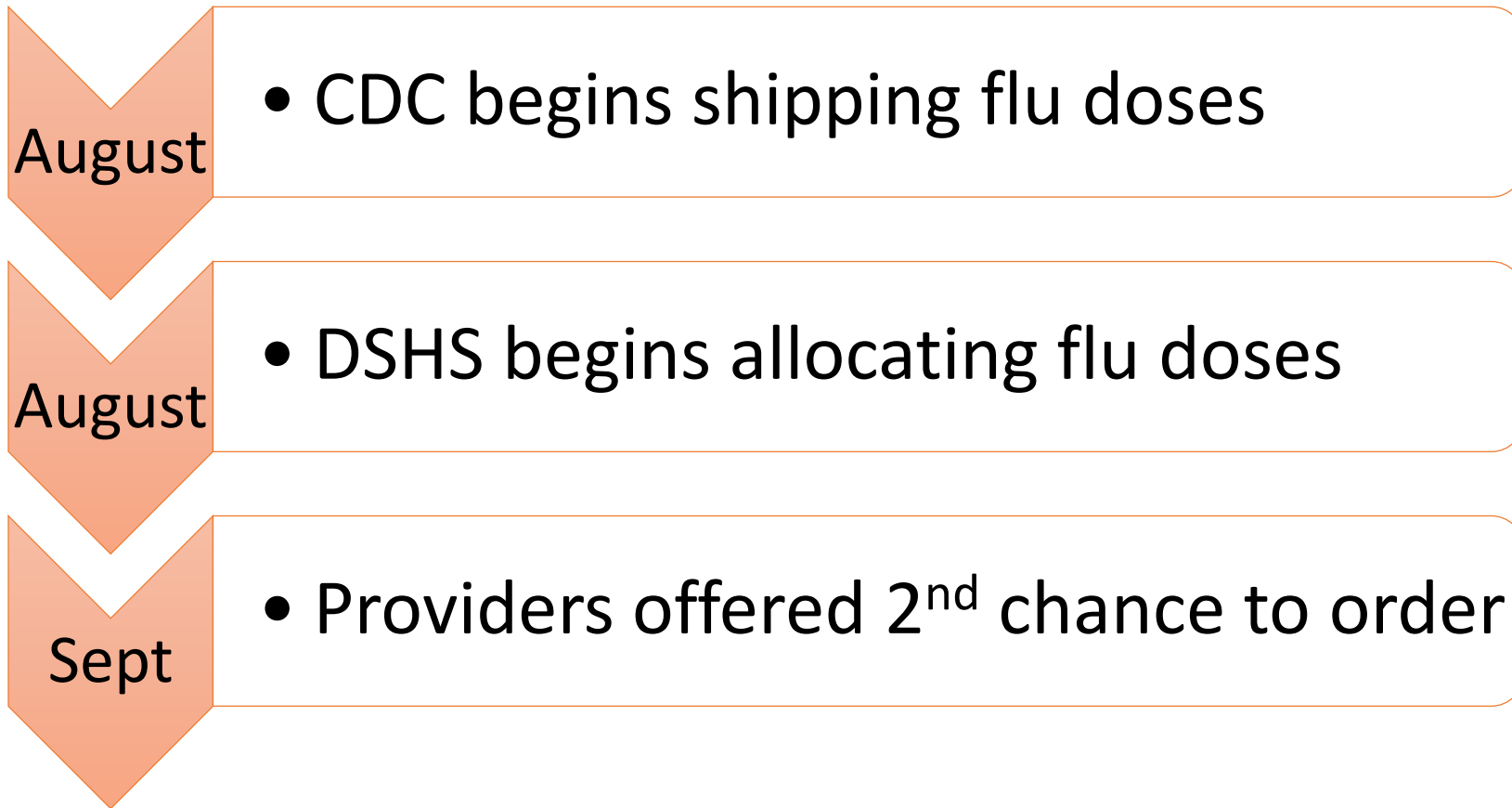
# Future RSV Surveillance Activities

- Recruit additional hospital laboratories in areas of the state where there is limited RSV laboratory data reporting
  - HSR 2 (Northwest Texas)
  - HSR 9 (West Texas/Midland/Odessa)
  - HSR 10 (Upper Rio Grande/El Paso)

# Flu Vaccine Order Process



# Flu Vaccine Order Process



# 2016 Flu Allocation

- 1.99 million pediatric doses pre-booked by 2,648 TVFC providers
  - \$31,537,863.75 in vaccine
  - 78% of doses received thus far
  - 53% of providers have received 100% of their pre-booked doses
- 15,000 adult doses pre-booked
  - 100% received thus far
  - \$205,800 in vaccine

# Changes in Vaccine Availability

- The Advisory Committee on Immunization Practices recommended that live attenuated intranasal vaccine (FluMist) NOT be used this season
  - Recommendation made due to poor vaccine efficacy in previous seasons
  - Recommendation made after pre-booking
- FluMist pre-booked orders were replaced with two other products (Fluarix and Fluzone), but this caused a nationwide back log for those products