

Texas Influenza Summary Report, 2013-2014 Influenza Season (September 29, 2013 – September 27, 2014)

Overview

The 2013-2014 influenza season began on September 29, 2013 and went through September 27, 2014. During the season, influenza activity increased through early December and peaked the last week in December. It steadily declined throughout the rest of the season. This mirrored what was seen at the national level. Influenza activity during the summer months was low which is considered usual for this time of year¹.

The dominant strain, at least for the first half of the influenza season, was influenza A 2009 H1N1. This was the first influenza season since the 2009 H1N1 pandemic in which the 2009 influenza viruses were the predominant strain¹. Toward the second half of the influenza season, 2009 H1N1 viruses declined in circulation and influenza B viruses became the dominant strain in circulation. Very few influenza A H3 viruses were reported in Texas throughout the influenza season.

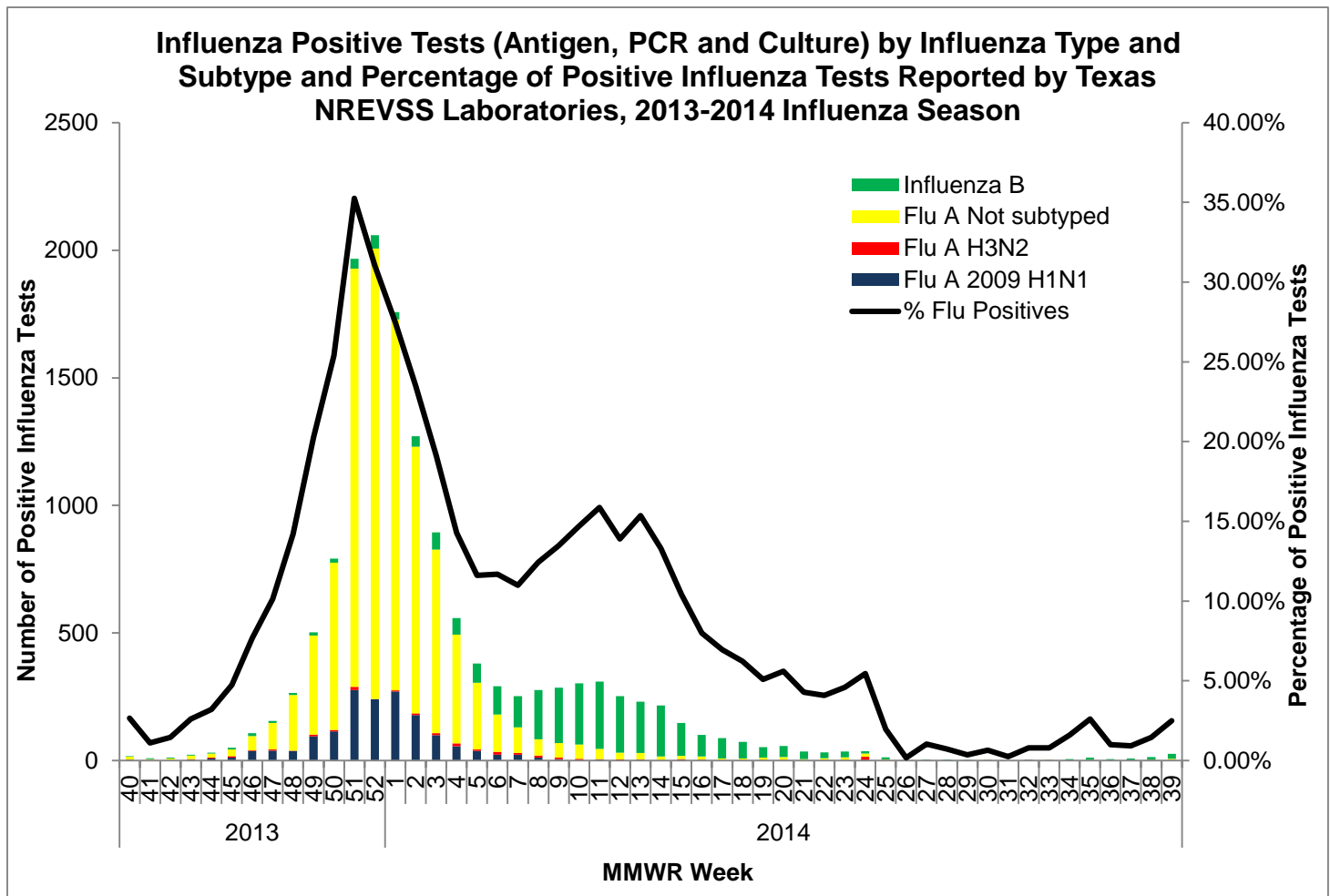
The influenza season in the US saw lower levels of outpatient illness and mortality than influenza seasons where influenza A (H3N2) was the predominant strain¹. Influenza-like illness reported by Texas ILINet providers, for the most part, was higher than compared to the previous influenza season. As far as mortality for the 2013-2014 influenza season, a total of 109 influenza-associated pediatric deaths were reported in the US of which 20 were reported from Texas².

Viral Surveillance

National Respiratory and Enteric Virus Surveillance System (NREVSS)^j

During the 2013–14 season, 30 participating laboratories in most Texas Health Service Regions (HSRs) submitted data to NREVSS on antigen detection, virus isolation (i.e. culture), and polymerase chain reaction (PCR) testing for influenza. Of the 88,533 influenza tests that were reported to NREVSS from Texas laboratories, 14,036 (15.9%) were positive for influenza virus. Of the 14,036 positive tests, 11,212 (79.9%) tests were positive for influenza A and 2,824 (20.1%) tests were positive for influenza B. The majority (84.3%) of the positive test results for influenza A reported through NREVSS were reported as influenza A (not subtyped) because most laboratories in Texas do not perform subtyping or perform mostly antigen detection tests (which do not provide a subtype result). Of the 1,762 influenza A results for which subtyping was reported, 89.9% were identified as influenza A 2009 H1N1 and 10.1% were identified as influenza A (H3N2). The peak of influenza activity reported by Texas NREVSS laboratories occurred during the week ending December 21, 2013 (MMWR week 51), when 35.3% of tests were positive for an influenza virus (Figure 1).

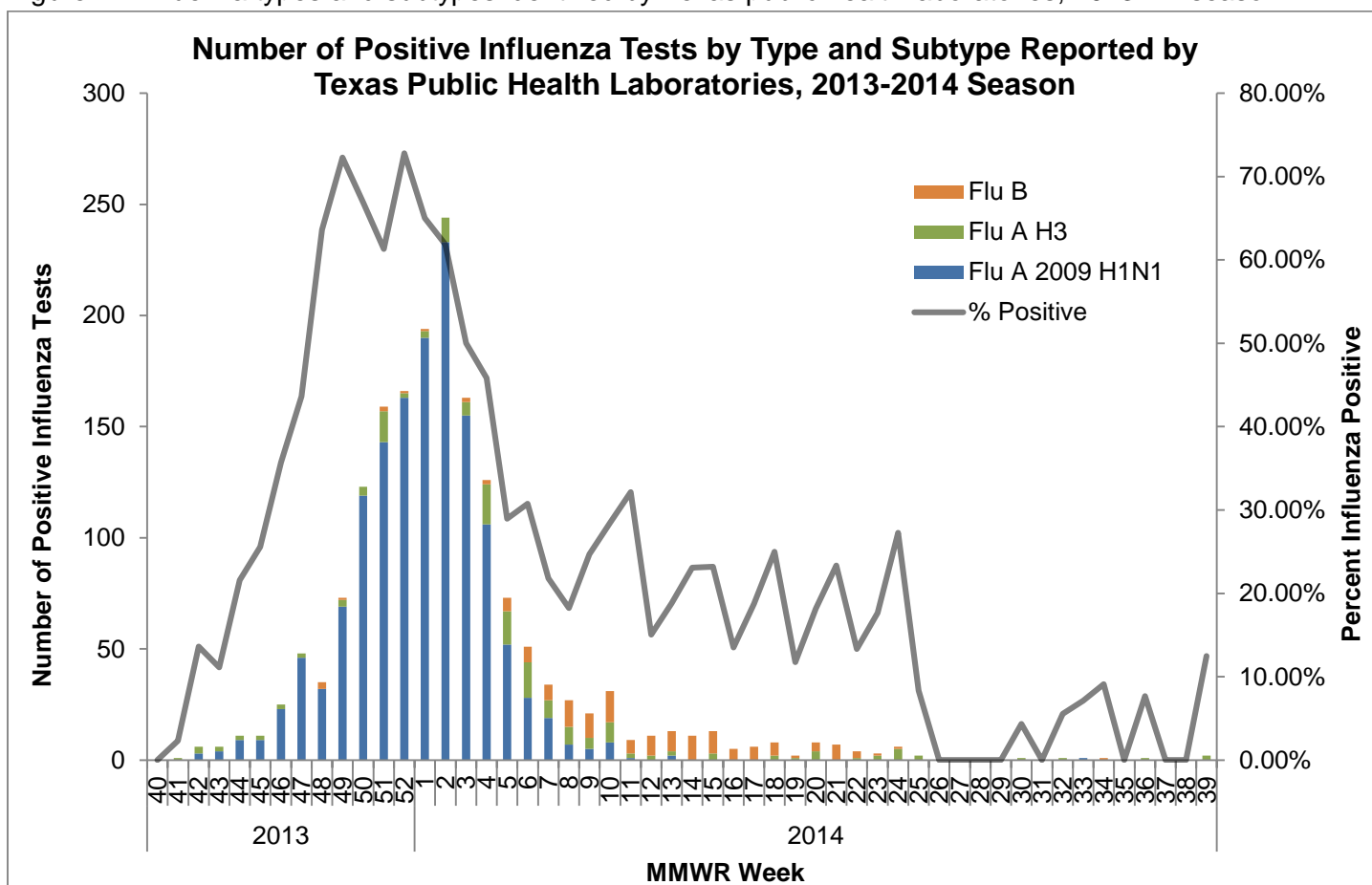
Figure 1. Influenza types and subtypes reported by National Respiratory and Enteric Virus Surveillance System Laboratories, 2013-2014 Season



*Texas Public Health Laboratories*ⁱⁱ

The first PCR positive influenza specimen of the season was collected from a patient in HSR 6/5S during the week ending October 6, 2013 (week 41) and was identified as influenza A H3 by the Houston Health and Human Services Lab. Influenza viruses were detected every week from the first full week in October through mid-June (week 41 through week 25), and then sporadically thereafter. The first positive specimen for influenza A 2009 H1N1 was confirmed in mid-October (week 42) and influenza B was confirmed at the last of November (week 48). All three virus types and subtypes circulated throughout the remainder of the season; however, influenza A 2009 H1N1 was the predominant subtype of influenza A that was detected during the 2013–14 season in Texas.

Figure 2. Influenza types and subtypes identified by Texas public health laboratories, 2013–14 season



Specimen submission began to increase during the week ending November 16, 2013 (week 46). The peak percentage of specimens positive for influenza, 72.8% (Figure 2), occurred during the week ending December 28, 2013 (week 52). The proportion of specimens positive for influenza virus in the 2013–14 season equaled or exceeded 10% for 35 consecutive weeks. Specimen submission began to decline beginning in the week ending January 18 (week 03).

Over the course of the 2013–14 influenza season, Texas public health laboratories received 4,249 specimens for influenza surveillance that met specimen testing and handling requirements; of those, 1,755 (41.3%) were positive for influenza virus. Of those that were positive for influenza virus, 1,606 (91.5%) were identified as influenza A viruses and 149 (8.5%) were identified as influenza B viruses. Of the 1,594 influenza A positives that were subtyped, 1,427 (89.5%) were identified as influenza A 2009 H1N1 and 167 (10.5%) were identified as influenza A (H3N2).

Antigenic Characterization of DSHS Austin Laboratory Influenza Positive ⁱⁱⁱ

One hundred seventy-eight influenza viruses from Texas were submitted for antigenic characterization during the 2013–14 season: 85 influenza A 2009 H1N1 viruses, 44 influenza A (H3N2) viruses, and 49 influenza B viruses.

All 85 of the influenza A 2009 H1N1 viruses were characterized as A/California/07/2009 (H1N1)-like, the 2013–14 Northern Hemisphere vaccine influenza A (H1N1) component. Of the 44 influenza A (H3N2) viruses characterized, 32 (72.7%) were characterized as A/Texas/50/2012 (H3N2)-like, the 2013–14 Northern Hemisphere influenza A (H3N2) vaccine component. Six (13.6%) of the influenza A (H3N2) viruses tested had reduced titers to the 2013-2014 influenza A (H3N2) vaccine component and six (13.6%) viruses tested showed reduced titers with antiserum produced against A/Texas/50/2012 and were antigenically similar to A/Switzerland/9715293/2013, the H3N2 virus selected for the 2015 Southern Hemisphere influenza vaccine.

A/Switzerland/9715293/2013 is related to, but antigenically and genetically distinguishable from the A/Texas/50/2012 vaccine virus. A/Switzerland-like H3N2 viruses were first detected in the United States in small numbers in March of 2014 and began to increase through the spring and summer.

Of the 49 influenza B viruses characterized, 16 (32.65%) were characterized as B/Massachusetts/02/2012-like (part of the B/Yamagata lineage), the influenza B component of the 2013-2014 Northern Hemisphere trivalent and quadrivalent influenza vaccines. Thirty-three (67.35%) viruses were characterized as B/Brisbane/60/2008-like (a B/Victoria lineage virus), the influenza B component of the 2013-2014 Northern Hemisphere quadrivalent influenza vaccine. Both lineages were detected during the winter of 2013 through the spring of 2014.

Antiviral Resistance Testing of DSHS Austin Laboratory Influenza Positives

During the 2013–14 season, 374 influenza isolates were tested by the CDC for resistance to commonly prescribed influenza antiviral medications (Table 1). Three influenza A (H1N1) viruses were resistant to oseltamivir. All other tested viruses from Texas were sensitive to oseltamivir and zanamivir.

Table 1: Antiviral Resistance Results from Texas Influenza Viruses, 2013-2014 Season

	Oseltamivir		Zanamivir	
	Virus samples tested (n)	Resistant viruses, number (%)	Virus samples tested (n)	Resistant viruses, number (%)
Influenza A (H1N1)	354	3 (0.85%)	75	0 (0%)
Influenza A (H3N2)	15	0 (0%)	15	0 (0%)
Influenza B	5	0 (0%)	5	0 (0%)

Morbidity Surveillance

US Outpatient Influenza-like Illness Surveillance Network (ILINet)^{iv}

One hundred forty one providers in Texas submitted data to ILINet for at least one week during the 2013–14 season (i.e., 2013 MMWR week 40 to 2014 week 40) (Figure 3). During the official influenza reporting season (i.e., 2013 week 40 to 2014 week 20), an average of 120 providers submitted data on an average of 30,429 patient visits each week.

The Texas ILI baseline for the 2013–14 season was 4.35%^v. According to data from Texas ILINet participants, the percentage of visits due to ILI first exceeded the Texas baseline during the week ending November 09, 2013 (week 45), with 4.56% of visits due to ILI (Figure 4). Influenza-like illness peaked during the week ending December 28, 2013 (week 52). During that week, ILINet providers reported that influenza-like illness accounted for 13.75% of all patient visits. The

percentage of visits due to ILI fell below the state baseline in the week ending May 3, 2014 (week 18). However, from the week ending May 10, 2014 (week 19) to the week ending May 31, 2014 (week 22) the percentage of visits due to ILI went back over the state baseline. It was not until the week ending June 7, 2014 (week 23) that the percentage of visits due to ILI went below the state baseline and remained below the state baseline for the remainder of the 2013–14 season, except during the week ending September 27, 2014 (week 39).

Overall, ILI activity in Texas exceeded the Texas baseline for 25 consecutive weeks and one week at the end of the season. The peak percentage of visits due to ILI reported in Texas ILINet for the 2013–14 season was the highest peak reported since 2001. It was even higher than the peak percentage of visits due to ILI while the 2009 pandemic was occurring (13.75% versus 13.30%). The peak occurred on the same week (week 52) as the previous influenza season.

Figure 3. Number of active Texas participants per county in the US Outpatient Influenza-like Illness Surveillance Network, 2013-14 influenza season^{vi}

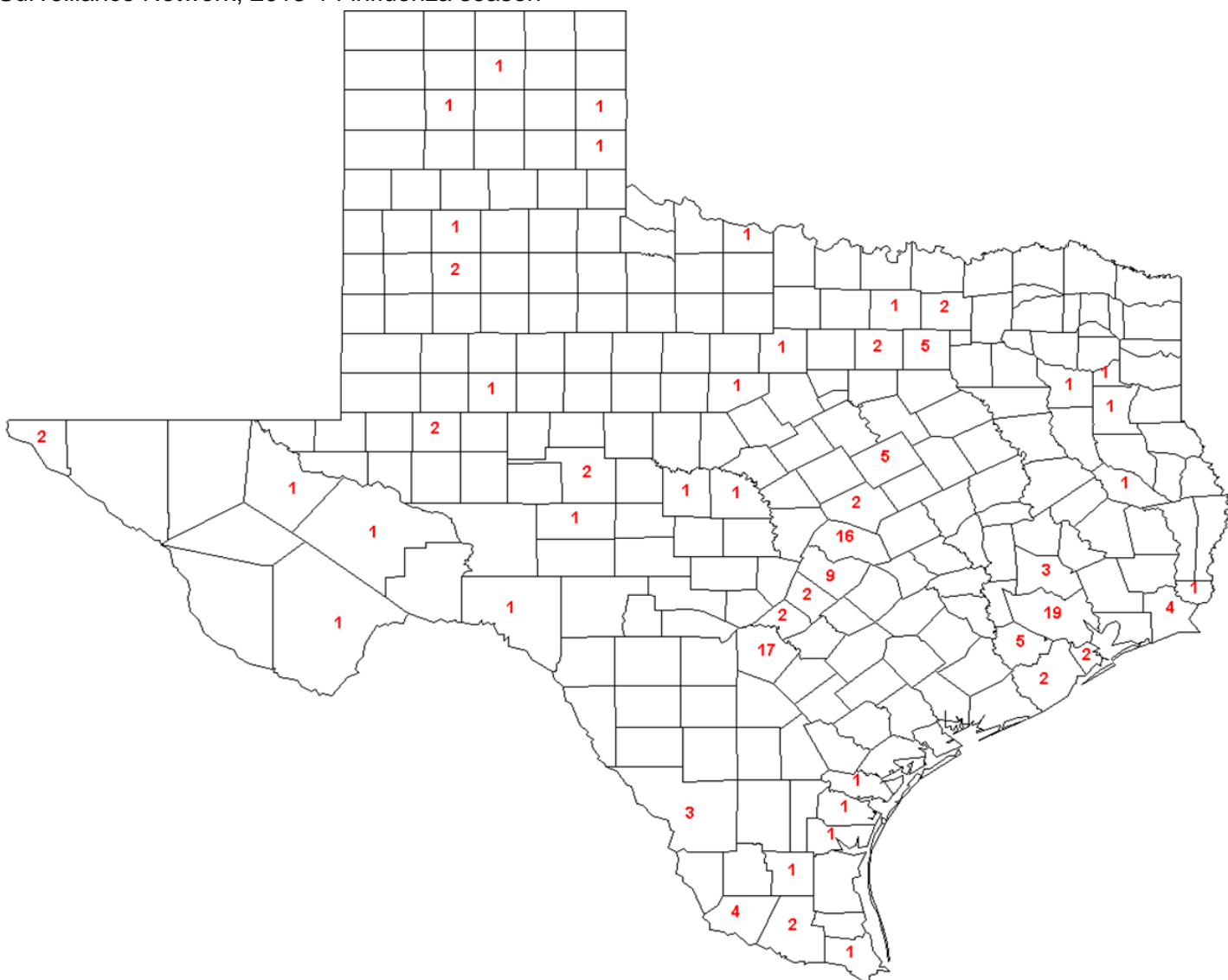
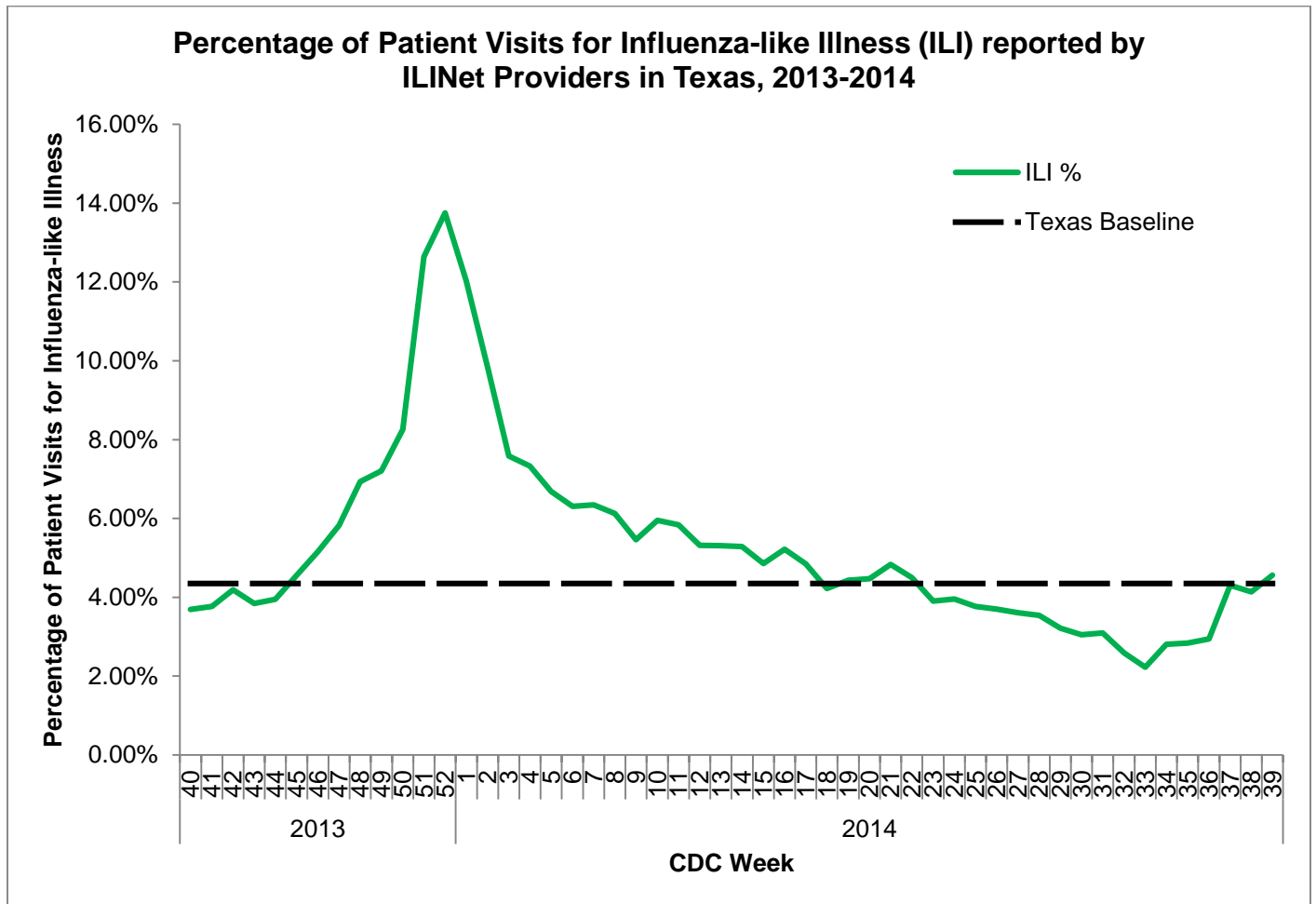


Figure 4. Percentage of visits for influenza-like illness reported by the US Outpatient Influenza-like Illness Surveillance Network in Texas, 2013–14 season



Enhanced ILINet/ Influenza Incidence Surveillance Project (IISP)^{vii}
 From September 29, 2013 through August 30, 2014, twelve Texas providers reported a total of 57,583 patient visits for any reason and 4,024 patient visits for influenza-like illness (ILI), or 6.99% of visits for ILI during this time period. Over this time period, the percentage of visits for ILI was highest in people in the age category 5 to 24 years of age (2.4%) and lowest for adults aged 50 to 64 years (0.7%). The percentage of visits for ILI peaked at 14.7% in the week ending December 28, 2013 (week 52) (Figure 5).

A total of 523 ILI specimens were submitted for testing from September 29, 2013 to August 30, 2014 and 446 (85.3%) of those were acceptable for testing. Overall, 200 (44.8%) ILI specimens tested for the Enhanced ILINet/IISP project were positive for at least one respiratory virus and 19.3% of all specimens tested were positive for an influenza virus (includes single and mixed infections). Results are displayed in Table 2.

Providers began submitting specimens for Enhanced ILINet/IISP in October 2013. Rhinoviruses, influenza viruses and a human metapneumovirus were detected in October and November 2013 (Figure 6). Rhinoviruses, influenza viruses, parainfluenza 3 viruses, and human

metapneumoviruses were the predominant viruses detected from December 2013 through August 2014; respiratory syncytial viruses, parainfluenza 1 viruses, and adenoviruses were detected sporadically during this timeframe. No patient specimens were submitted after the week ending August 9, 2014 (week 32) even though participating providers were still seeing patients with ILI during these weeks (weekly median ILI patients seen by all providers combined: 80 ILI patients; range: 16 to 228 ILI patients per week).

Figure 5. Percentage of visits for influenza-like illness reported by providers in the Enhanced ILINet/Influenza Incidence Surveillance Project (IISP), Texas, 2013–14 season

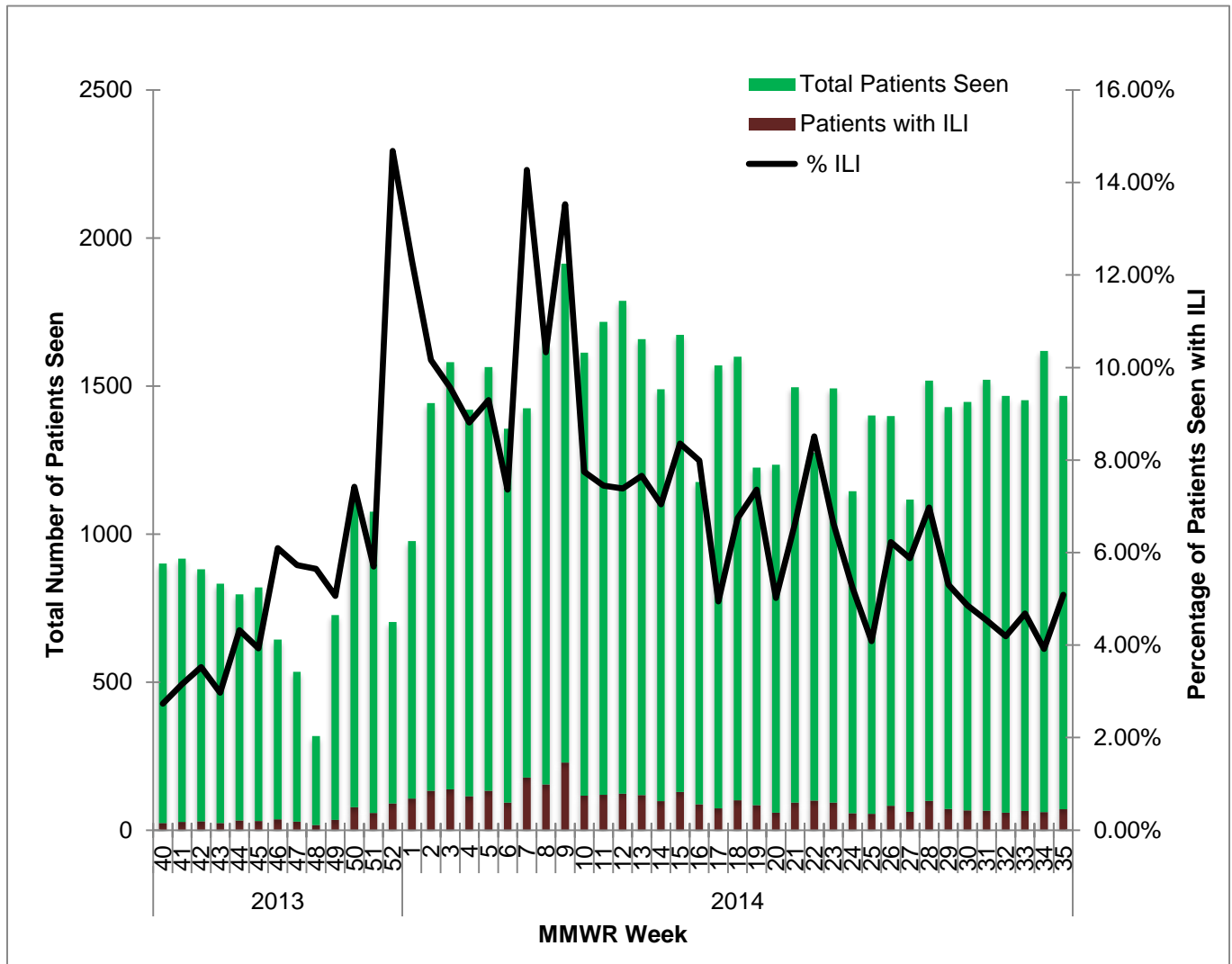
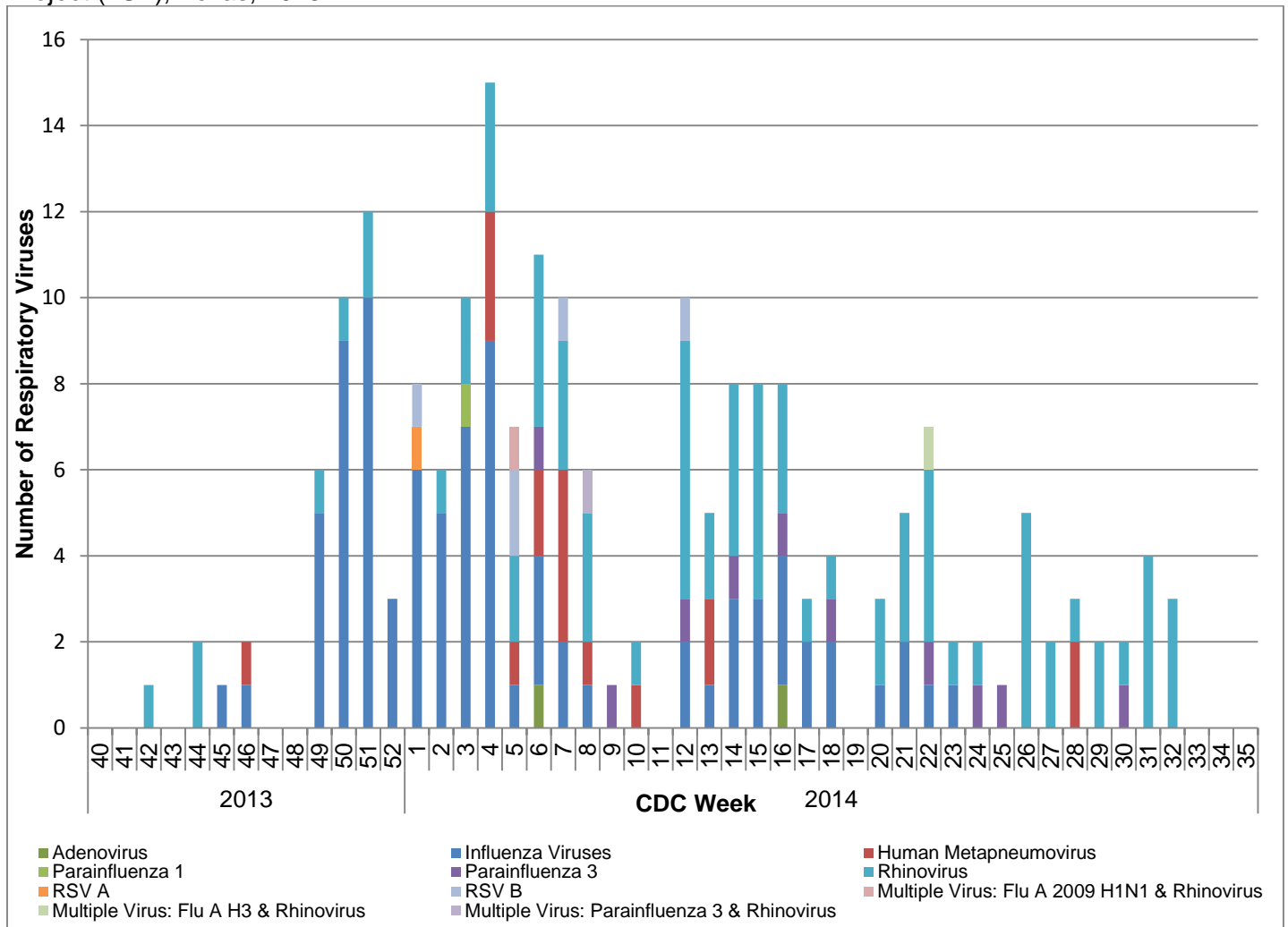


Table 2. Number and percentage of respiratory viruses detected through the Enhanced ILINet/Influenza Incidence Surveillance Project (IISP), Texas, 2013–14 season

Viruses detected	Number of specimens positive	Percentage of total specimens positive
Positive for one or more respiratory viruses	200	44.8%
Influenza virus (all types/subtypes)	84	42.0%
<i>Influenza A (H1N1)</i>	46	54.8%
<i>Influenza A (H3N2)</i>	18	21.4%
<i>Influenza B</i>	20	23.8%
Adenovirus	2	1.0%
Human metapneumovirus (HMPV)	17	8.5%
Parainfluenza virus 1	1	0.5%
Parainfluenza virus 3	10	5.0%
Respiratory syncytial viruses (RSV)	6	3.0%
<i>RSV A</i>	1	16.7%
<i>RSV B</i>	5	83.3%
Rhinovirus	77	38.5%
Multiple viruses detected	3	1.5%
<i>Influenza A H1N1 (2009) and rhinovirus</i>	1	33.4%
<i>Influenza A (H3N2) and rhinovirus</i>	1	33.3%
<i>Parainfluenza virus 3 and rhinovirus</i>	1	33.3%
Negative or inconclusive	246	55.2%
Total tested	446	100.0%

Figure 6. Respiratory viruses detected through Enhanced ILINet/Influenza Incidence Surveillance Project (IISP), Texas, 2013–14



School Closures and Institutional Outbreaks

Three influenza outbreaks were reported in schools during the 2013–14 season. Outbreaks were reported from HSRs 4/5N, 6/5S, and 7. The reported school outbreaks occurred from October through December and were attributed to influenza with unknown type (1 school) and influenza A (2 schools).

Thirteen institutional outbreaks of ILI or influenza were reported during the 2013–14 season. Outbreaks were reported from HSRs 2/3, 4/5N, 6/5S, 7, and 8. Seven long-term care facility (LTCF) outbreaks were reported from November 2013 through June 2014. Six of the LTCF outbreaks were caused by influenza (2 influenza A [not subtyped], 2 influenza A [H3N2], 2 influenza A [H1N1]) and one was caused by influenza-like illness. Three outbreaks were reported in correctional facilities in January and August 2014. Two correctional facility outbreaks were caused by influenza (1 influenza A [H1N1] and 1 influenza B) and one was caused by influenza-like illness. Three outbreaks of influenza (2 influenza A [not subtyped] and 1 influenza B) were reported in hospitals from November 2013 through May 2014.

Mortality Surveillance

Influenza-Associated Pediatric Mortality^{viii}

Twenty influenza-associated pediatric fatalities were reported to DSHS during the 2013–14 influenza season. The 2013-2014 influenza season tied the 2012-2013 influenza season for the most number of influenza-associated pediatric deaths reported in a single non-pandemic influenza season since reporting for this condition began in Texas in 2007.

The reported deaths occurred during the week ending December 28, 2013 (week 52) through the week ending August 30, 2013 (week 35). These deaths were reported in residents of all Texas HSRs except HSRs 1 and 9/10. Sixteen (80.0%) patients had confirmed influenza A infections, 3 (15.0%) patients had influenza B infections, and 1 (5.0%) patient had co-infections of influenza A and B. Subtyping of the influenza A virus was performed for ten of the influenza A infections; nine of these viruses were identified as influenza A 2009 H1N1 and one virus was identified as influenza A (H3N2).

The median age at death was 8 years with patients ranging in age from 9 days to 17 years. Of the twenty reported cases, four cases were younger than 6 months of age, four cases were 6 months to 4 years of age, five cases were 5 to 10 years of age, and seven cases were 11 to 17 years of age. Of the 14 cases who were eligible for vaccination and for whom influenza vaccination status was known, four (28.6%) were fully vaccinated for the current season. Fourteen (70.0%) cases had significant underlying medical conditions.

Texas Influenza Surveillance System

Background

Influenza and influenza-like illnesses (ILI) were last reportable by law in any county in Texas in 1993³. During that year, over 275,000 cases of influenza and influenza-like illness were reported to the Texas Department of State Health Services (DSHS) (legacy agency Texas Department of Health). The only influenza categories reportable by law in Texas for the 2013–14 season included influenza-associated pediatric fatalities, outbreaks associated with influenza, and novel influenza A infections in humans. Because there is no current reporting requirement for the majority of influenza illnesses, it is not known how many influenza-related illnesses, hospitalizations, and deaths occur each year in Texas residents. A small number of influenza cases are reported voluntarily through sentinel surveillance networks composed of laboratories, hospitals, physicians, nurses, schools, and universities located throughout the state. Additional resources include web-based influenza and ILI reporting systems, as well as local and regional health departments that gather data from surveillance participants in their jurisdictions. Data from all sources are reported to the DSHS Central Office in Austin, compiled, and presented weekly in the Texas Influenza Surveillance Report.

Components

The national influenza reporting period begins in early October [Morbidity and Mortality Weekly Report (MMWR) week 40] and continues through late May (MMWR week 20). Influenza surveillance in Texas continues year-round, although in reduced capacity during the summer months. The goals of influenza surveillance are to determine when and where influenza viruses are circulating, if the circulating viruses match the vaccine strains, what changes are occurring in the viruses, what impact influenza is having on hospitalizations and deaths, and the severity of influenza activity. The three main Texas influenza surveillance components are viral, morbidity, and mortality surveillance. Viral influenza surveillance at the state level consists of influenza test results reported by Texas laboratories in the National Respiratory and Enteric Virus Surveillance System (NREVSS) and specimens sent to public health laboratories for influenza surveillance testing. Morbidity surveillance consists of reports of novel influenza A virus infections in humans; reports of

ILI from Texas participants in the US Outpatient Influenza-like Illness Surveillance Network (ILINet), the Enhanced ILINet/Influenza Incidence Surveillance Project (IISP), and local and regional health department surveillance; and reports of influenza or ILI outbreaks. Mortality surveillance includes influenza-associated deaths in children younger than 18 years of age.

References

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ⁱ NREVSS is an online laboratory results reporting system for several respiratory and enteric viruses that is maintained by the CDC. NREVSS reporters in Texas are primarily hospital laboratories, although two public health laboratories (Tarrant County Public Health [Laboratory Response Network] Lab and the DSHS Austin Laboratory) also participate. See <http://www.cdc.gov/surveillance/nrevss/> for more information.

ⁱⁱ Influenza surveillance specimens are submitted for PCR testing to the DSHS Austin laboratory, the Houston Department of Health and Human Services Laboratory, and the Texas Laboratory Response Network (LRN) laboratories throughout the season by physicians, hospitals, clinics, and health departments across Texas. The Texas LRN laboratories have been participating in influenza surveillance since the 2008–2009 influenza season; the participating LRN laboratories are located in Corpus Christi, Dallas, El Paso, Fort Worth, Harlingen, Houston, Lubbock, San Antonio, and Tyler.

ⁱⁱⁱ Like other state virology laboratories in the country, DSHS submits early, mid, and late-season as well as unusual influenza viruses to the CDC for strain characterization. Specimens and influenza viruses are also submitted at regular intervals according to CDC's instructions.

^{iv} Texas participants in ILINet report weekly on the number of patient visits for ILI by age group and the total number of patients seen for any reason. For ILINet reporting, ILI is defined as "fever ($\geq 100^{\circ}\text{F}$ [37.8°C], oral or equivalent) *and* cough and/or sore throat in the absence of a known cause other than influenza"⁴. ILINet data are used to calculate a weekly percentage of visits due to ILI.

^v The baseline is the mean percentage of patient visits for ILI during non-influenza weeks for the previous three seasons plus two standard deviations. A "non-influenza week" is defined as a week that accounted for less than 2% of the season's total number of specimens that tested positive for influenza.

^{vi} In order to be considered an active participant in ILINet, a provider must report at least one week during the season. Therefore, active providers did not necessarily report every week of the influenza reporting season.

^{vii} Enhanced ILINet/IISP is an IISP-like project. IISP is a collaborative project among CDC, the Council of State and Territorial Epidemiologists (CSTE), and state and local health departments to "[monitor] the age-specific incidence of medically-attended ILI and influenza-associated ILI in real time throughout the influenza season"⁵. Providers submit weekly data on the number of patients with ILI by age group and the total patients seen by age group. Specimens collected from the first 10 ILI patients seen each week by each participating provider are tested for the presence of influenza and other respiratory viruses (adenovirus, rhinovirus, respiratory syncytial virus, human metapneumovirus, and parainfluenza virus). Texas participated in IISP for the first time during the 2011–12 season.

^{viii} "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. There should be no period of complete recovery between the illness and death. Influenza-associated deaths in all persons aged <18 years should be reported"⁶.