



**Bureau of Infectious Disease Control
Infectious Disease Surveillance Section (IDSS)**

**2014-15 Influenza Season
Summary Report for New Hampshire
September 28, 2014 – May 23, 2015**

In New Hampshire (NH), influenza is not a reportable disease, but surveillance systems are in place to help determine the extent of influenza morbidity and mortality in the State. During each influenza season (beginning of October through mid-May), a weekly influenza surveillance report is posted on the NH Department of Health and Human Services' website at the following link: <http://www.dhhs.nh.gov/dphs/cdcs/influenza/activity.htm>. In addition, a weekly assessment of influenza activity in NH is submitted to the Centers for Disease Control and Prevention for inclusion in the weekly U.S. influenza surveillance report.

This report summarizes outpatient illness surveillance data reported by NH participants in the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) and by the Automated Hospital Emergency Department Data (AHEDD) system, virologic surveillance data from the NH Public Health Laboratories, and pneumonia and influenza mortality data from the NH Division of Vital Records Administration.

New Hampshire Surveillance

Outpatient Illness Surveillance

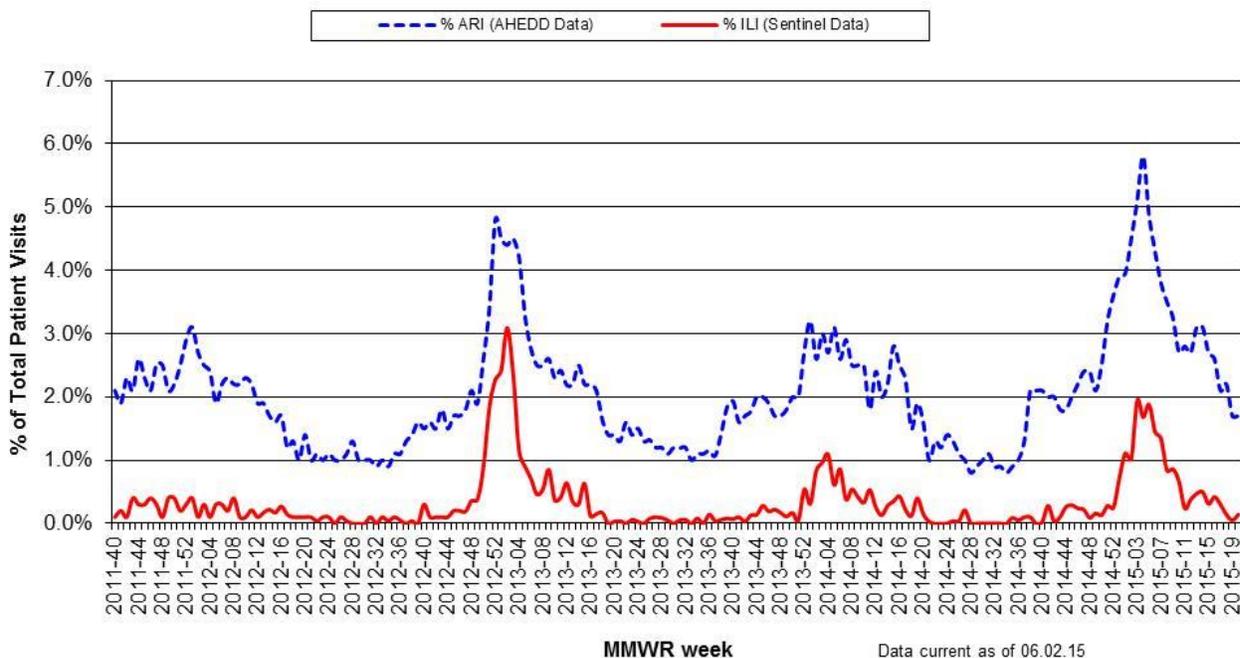
The two components of outpatient illness surveillance in New Hampshire are as follows:

1. **U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet):** Beginning in 1997, NH has participated in this collaborative effort between the Centers for Disease Control and Prevention, state and local health departments, and health care providers. For the 2014-15 influenza season, 29 NH health care providers participated. ILINet sentinel providers reported the proportion of patients who presented with influenza-like illness (ILI) on a weekly basis. ILI is defined as 1) a fever and 2) cough and/or sore throat, in the absence of a known cause. Participating providers were also asked to collect respiratory specimens from select patients and submit them to the PHL for viral subtyping.
2. **The Automated Hospital Emergency Department Data (AHEDD) system:** This system is a collaborative effort between NH acute care hospitals and the NH DHHS. The goal is for all 26 acute care hospitals in the State to participate in this system. For the 2014-15 influenza season, 25 hospitals electronically transmitted real-time data from emergency department encounters throughout the day to NH DHHS. Chief complaint text within the system was queried for complaints of acute respiratory illness (ARI) in patients seen in emergency departments. While ARI includes encounters that fit the definition of ILI above, it also includes encounters for complaints such as acute bronchitis or otitis media. Because these two systems collect information using different methods and represent different patient populations, it is expected that the proportions of ILI and ARI seen in these systems will differ. However, the overall trend of activity is expected to be similar.

For the 2014-15 season, reported ILI activity in NH reached its highest levels during MMWR weeks 3 and 5 (weeks ending January 24th and February 7th 2015, respectively), when 1.9% of patient visits to NH ILINet providers were from patients presenting with ILI. The highest level of ARI reported through the AHEDD system was during week 4 (week ending January 31st) when 5.8% of patient encounters in hospital emergency departments were due to ARI.

Using percent ARI and ILI together as indicators for when flu activity was highest, activity for the 2014-15 season peaked during week 4, when ARI and ILI were at 5.8% and 1.7%, respectively, which is similar timing for peak activity compared to the previous 2013-14 season when highest activity was observed during week 3 (however, peaks for both seasons occurred somewhat earlier than what is typically seen for most seasons). The 2014-15 season was much more intense compared to the previous 2013-14 season, as indicated by comparing the peaks for ARI and ILI. For example during the 2013-14 season ARI and ILI peaked at 3.2% and 1.1%, respectively. See Figure 1 below for ILI and ARI reported during the 2014-15 season and the previous three influenza seasons.

Figure 1: Acute Respiratory Illness (ARI) & Influenza-like Illness (ILI) as a Percentage of Total Patient Visits Reported through the Automated Hospital Emergency Department Data (AHEDD) System and by NH ILINet Providers, 10/02/11 - 5/23/15



Reported Influenza-like Illness (ILI) by Age Group & Practice Type

During the 2014-15 influenza season, persons in the 5-24 year age group accounted for the greatest percentage (47%) of patients presenting with ILI reported by NH ILINet providers, followed by the 25-49 year age group (20%). The next highest percentage ILI by age category was in the 50-64 year age group (16%) followed by the 0-4 year age group (9%), then the 65-plus year age group (8%). The percentages of ILI cases by age categories were observed to follow the same order of ranking when compared to the

2013-14 season. Reported ILI by age groups for the 2014-15 influenza season is shown in Figure 2 and Table 1 below.

Each year there are typically some changes in NH healthcare providers who participate in the U.S. ILINet program. For the 2014-15 influenza season there were 29 providers enrolled in the ILINet program, somewhat less compared to the previous season which had 32. Twenty-seven (93%) of the 29 providers reported on a regular basis throughout the season. The majority were family practice offices, where patients of all ages are seen.

Figure 2: Influenza-like Illness (ILI) by Age Group and Practice Type as Reported by NH ILINet Providers, 2014-15 Influenza Season (9/28/14 – 5/23/15)

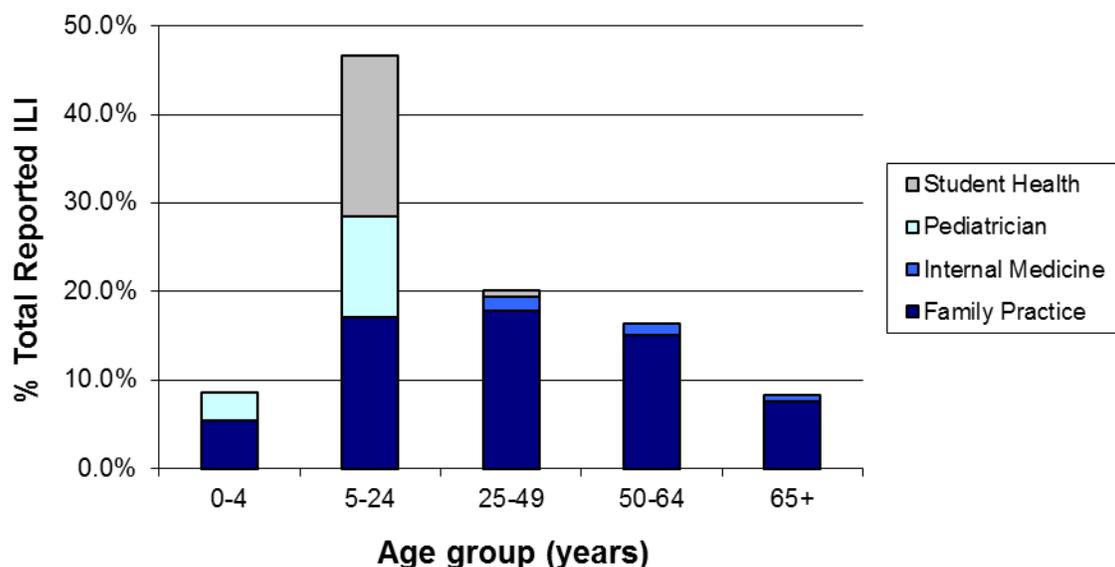


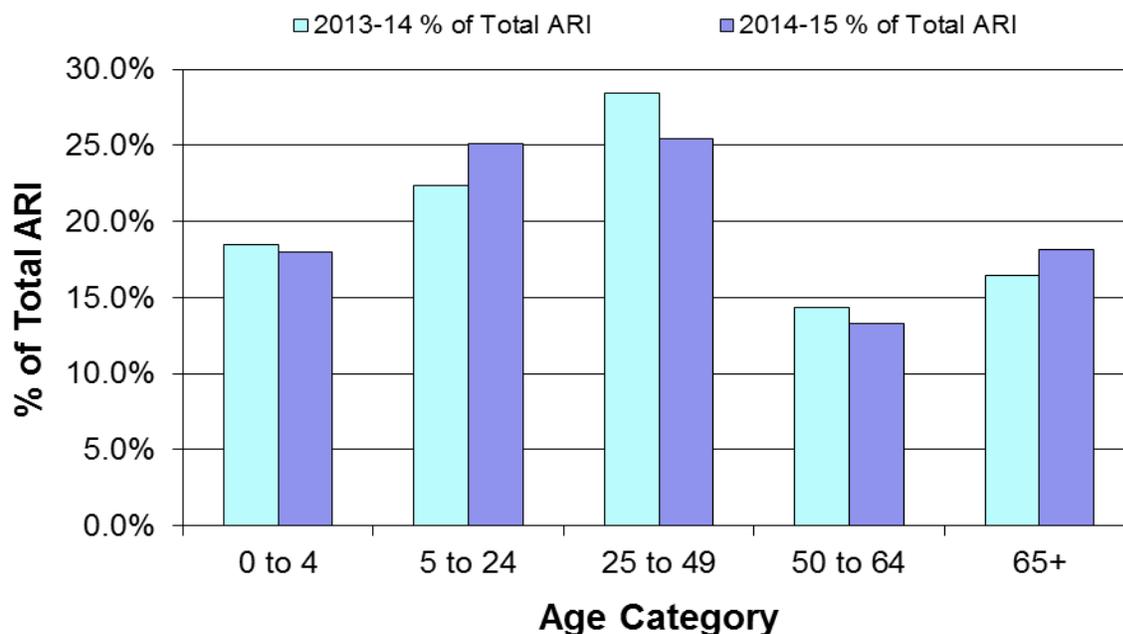
Table 1: Patient Visits for Influenza-like Illness (ILI) by Age Group and Practice Type, NH ILINet Providers, 2014-15 Influenza Season (9/28/14 – 5/23/15)

Practice type	Age Group (years)					Total ILI	Total Patient Visits
	0-4	5-24	25-49	50-64	65+		
Family Practice	46	145	151	128	64	534	98,637
Internal Medicine	0	0	14	11	6	31	19,691
Pediatrics	27	96	0	0	0	123	21,325
Student Health	0	155	5	0	0	160	13,080
Total	73	396	170	139	70	848	152,733

Reported Acute Respiratory Illness (ARI) by Age Group

In the 2014-15 influenza season, persons in the 25-49 year age group accounted for the largest percent (25.4%) of all ARI encounters in hospital emergency departments (see Figure 3 below) followed by age groups 5-24 (25.1%), 65-plus (18.1%), 0-4 (18.0%), and 50-64 (13.3%). As seen in Figure 3 the percentage distributions by age category were similar to the previous 2013-14 influenza season, only with a noticeable decrease observed for composition of total ARI made up by the 25-49 year age group and slight increases observed in the 5-24 and 65+ year age categories.

Figure 3: Acute Respiratory Illness (ARI) by Age Group as Reported by NH Automated Hospital Emergency Department Data (AHEDD) System, 2014-15 Influenza Season (9/28/14 – 5/23/14) (N = 11,457 ARI encounters) and 2013-14 Influenza Season (9/29/13 – 5/17/14; N = 8,097 ARI encounters)



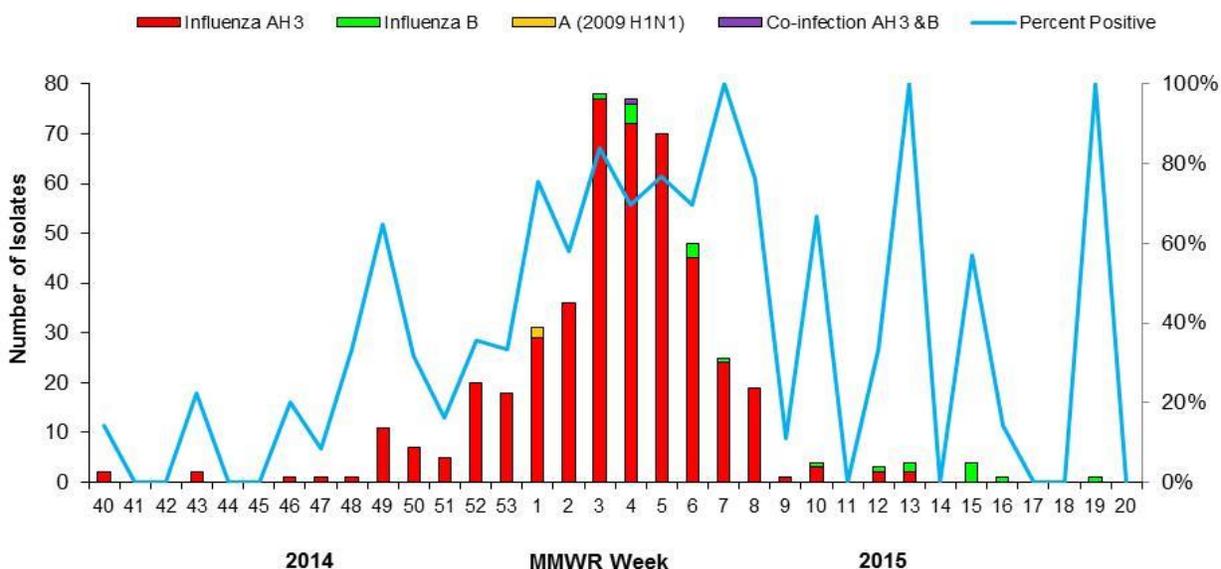
Laboratory Surveillance

The NH Public Health Laboratories (PHL) receives respiratory specimens for influenza testing from ILINet providers, other health care providers and hospitals throughout the State, and from respiratory outbreak settings such as in long-term care facilities. Testing is important to identify circulating influenza viral subtypes, and to confirm specimens that test positive by rapid test. Typically, a large majority of specimens submitted to the PHL have previously tested positive by rapid test in health care provider offices or hospital laboratories. Therefore, it is expected that a high percentage of specimens received by the PHL for influenza testing will be positive. This was observed in the previous 2011-12, 2012-13, and 2013-14 seasons when 40%, 59%, and 54% of total submitted specimens, respectively, tested positive. During the 2014-15 season 57% (n=470) of 828 total specimens submitted tested positive for influenza.

The number of positive specimens and subtypes reported for each MMWR week of the 2014-15 season is shown in Figure 4. The first positive specimens were detected at the start of the flu season during

MMWR week 40 in early October, when two specimens tested positive for influenza A (H3). This is somewhat early in the regular flu season to begin observing positive specimens (e.g., first positive specimens were reported during weeks 47, 40 and 52 during the previous 2013-14, 2012-13 and 2011-12 flu seasons, respectively). Figure 4 depicts a peak for the number of positive specimens during weeks 3 and 4 (last 2 weeks of January) of 2015 which is somewhat earlier than what is typically seen in other regular flu seasons when the highest number of positives tend to occur in the month of February (e.g., typically during weeks 6 through 9). The peak weeks for positive specimens (weeks 3 and 4) coincide with those weeks when combined ARI and ILI activity peaked (weeks 3-5), and is comparable with what is normally observed over past regular flu seasons.

Figure 4: Influenza Virus Isolates, by Viral Subtype, NH Public Health Laboratories, 2014-15 Influenza Season (9/28/14 – 5/23/15) (N = 470)



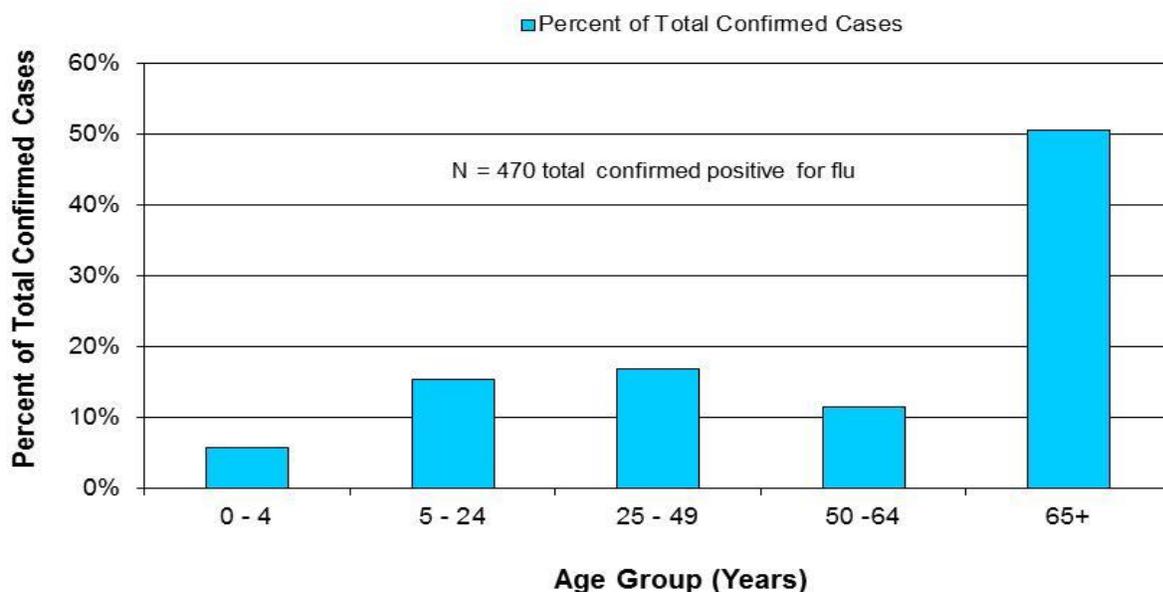
The three different viral subtypes that circulated in NH during the 2014-15 influenza season are presented in table 2. Positive isolates consisted of 95.3% influenza A (H3), 0.4% 2009 influenza A (H1N1), 4.0% influenza B, and 0.2% co-infection with influenza A (H3) and B. In comparison during NH's 2013-14 season positive isolates consisted of 13% influenza A (H3), 75% 2009 influenza A (H1N1), 13% influenza B, and 0 co-infections. Compared to the previous 2013-14 season a much higher percentage of specimens tested positive for influenza A (H3), a much lower percentage was positive for 2009 influenza A (H1N1), and a lower percentage was positive for influenza B. The first influenza B detections this season occurred during week 3, with scattered positive detections occurring during weeks 3 through 19. The only two positive specimens for 2009 influenza A (H1N1) were detected during week 1.

Table 2: Results of Specimens Received by NH Public Health Laboratories, 2014-15 Influenza Season (9/28/14 – 5/23/15)

Results	# Specimens	% of total positive
Influenza A (H3)	448	95.3%
2009 influenza A (H1N1)	2	0.4%
Influenza B	19	4.0%
Influenza A (H3) & B Co-infection	1	0.2%
Negative for influenza	356	
Inconclusive/invalid	2	
Total	828	

Influenza test results reported by CDC for the New England region as a whole indicated the following percentages of each subtype (denominator equals specimens with known subtypes): 0.3% 2009 influenza A (H1N1), 73.9% influenza A (H3), and 25.8% influenza B. Compared to regional New England data NH had a similar percentage of total positive for 2009 influenza A (H1N1) (0.4% vs. 0.3%), and a greater percentage of total positives for influenza A (H3) (95% vs. 74%), and a lower percentage of influenza B (4% vs. 26%). Subtypeable flu results for the New England Region were fairly similar when compared to the national test results, with the same percentage positive for 2009 influenza A (H1N1) (both 0.3%), a similar percentage for both influenza A (H3) (74% vs. 71%), and influenza B (26% vs. 28%). Figure 5 below further describes PHL influenza test results for NH according to different age groups. Compared to the 2013-14 season a much lower percentage of positive specimens were observed in the 25-49 (17% vs 38%) and 50-64 (11% vs 24%) year age groups, while the 65+ year age group comprised a much greater percentage of the total (51% vs. 18%).

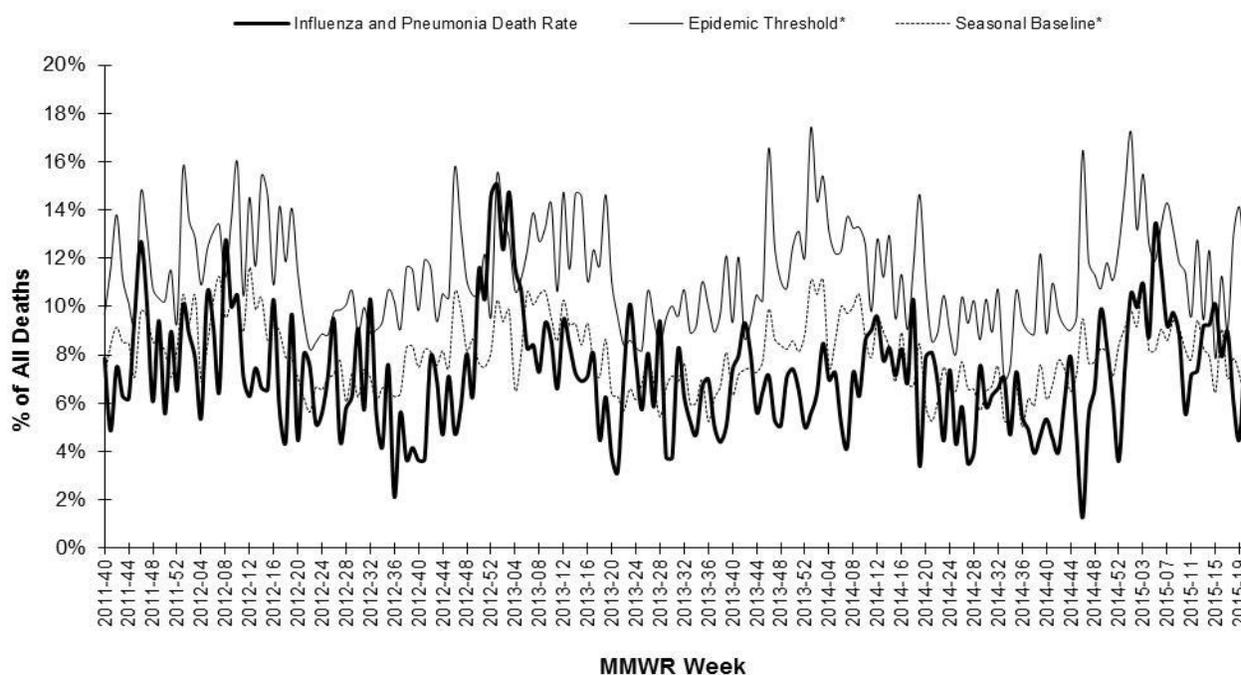
Figure 5: Age Distribution of Laboratory Confirmed Influenza, NH Public Health Laboratories, 2014-15 Influenza Season (9/28/14 – 5/23/14)



Pneumonia and Influenza (P&I) Mortality

Pneumonia and Influenza (P&I) deaths in New Hampshire are identified through review of electronically filed death certificates by looking at the causes of death listed on each death certificate. The following graph, which shows the proportion of deaths attributed to P&I, represents all deaths recorded by NH's Division of Vital Records Administration. This includes resident and non-resident deaths that occurred within the State, and may not include deaths of NH residents that occurred out-of-state, or cases being investigated by the Medical Examiner's Office.

Figure 6: Pneumonia and Influenza Mortality, New Hampshire, MMWR Week 40 2011 to MMWR Week 20 2015 (10/2/11 – 5/23/15)



**Seasonal baseline is calculated using the previous 5 years of data. If the proportion of P&I deaths for a given week exceeds the baseline value for that week by a statistically significant amount (1.645 standard deviations), then P&I deaths are said to be above the epidemic threshold, and the proportion of deaths above threshold are considered attributable to influenza.*

During the 2014-15 influenza season, the percent of all deaths recorded in NH that were reported as due to P&I remained below the weekly epidemic threshold, except for two weeks, including MMWR weeks 5 and 15, when the threshold was exceeded (see Table 3 below).

Table 3. Percent of Total Reported Deaths in NH Attributed to Pneumonia and Influenza (P&I) Above the Epidemic Threshold by MMWR Week, 2014-15 Influenza Season (9/28/14– 5/23/15)

MMWR Week	Dates	P&I Deaths (% of Total Deaths)	Weekly Epidemic Threshold
2015-05	2/01/15 - 2/07/15	13.4%	11.9%
2015-15	4/12/15 - 4/18/15	10.1%	7.9%

Based on electronic surveillance of death certificates a total of 49 influenza-associated NH deaths (i.e., deaths where influenza is specifically listed as a cause or contributing cause of death on the death certificate) were observed during the 2014-15 influenza season, which is the highest number of such deaths on record since NH first began tracking this parameter in 1997.

Influenza Activity in New Hampshire as Assessed by the State Epidemiologist

Influenza activity levels in NH are reported each week to CDC to be included in the national weekly influenza surveillance report. Such activity levels help to describe the degree of geographic distribution of influenza activity. CDC defines influenza activity levels as follows:

- **No Activity:** Low ILI activity and no laboratory-confirmed cases of influenza.
- **Sporadic:** Low ILI activity and isolated laboratory-confirmed influenza cases or a single influenza outbreak has been reported.
- **Local:** Increased ILI activity or influenza outbreaks in a single region of the state, and recent laboratory-confirmed influenza in that region.
- **Regional:** Increased ILI activity or influenza outbreaks in ≥ 2 , but less than half of state regions, and recent laboratory-confirmed influenza in affected regions.
- **Widespread:** Increased ILI activity or influenza outbreaks in at least half of state regions, and recent laboratory-confirmed influenza in the state.

In NH, the reported influenza activity level is based on ILI and ARI reported by the Sentinel Providers and the AHEDD surveillance systems respectively, reports of laboratory confirmed influenza, and reported outbreaks in facilities.

In the 2014-15 season, geographic distribution of influenza activity was at a level of either no activity, sporadic, or local activity from weeks 40-47, with the first sign of clearly increased activity observed at week 48 (week ending November 29, 2014), when it reached regional activity. Starting at week 50 of 2014, activity remained at either regional or widespread for 22 consecutive weeks, lasting through week 18 of 2015. Activity declined to sporadic during weeks 19-20 before reaching of no activity during week 21.

National Surveillance

During the 2014-15 season, of the subtypable viruses, influenza A (H3) viruses predominated nationally (71%), with fewer influenza B viruses (28%) and a very small percentage of 2009 influenza A (H1N1) identified (<1%). There was also one influenza A(H3N2) variant virus detected. CDC reports that this was a moderately severe flu season, similar to previous H3N2-predominant seasons. The majority of circulating influenza A (H3N2) viruses were different from the influenza A (H3N2) component of the 2014–15 Northern Hemisphere seasonal vaccines, and the predominance of these drifted viruses resulted in reduced vaccine effectiveness.

Overall the season was characterized by high levels of outpatient illness and flu-associated hospitalizations and deaths, especially for people 65 years and older. Regarding flu-associated hospitalizations, people 65 years and older accounted for approximately 60% of these hospitalizations this season. The cumulative hospitalization rate for people 65 years and older this season was 323 per 100,000, which is more than one-and-a-half times greater than the highest rate previously reported for this age group, illustrating the severity of this season.

Based on the percentage of specimens testing positive for influenza the national peak of influenza activity occurred during week 52 (week ending December 27, 2014). However, differences among U.S. Department of Health and Human Services regions were observed in the timing of influenza activity, with region 1 (comprised of the six New England states), peaking the latest during week 3 (ending January 24, 2015). Although H3N2 activity peaked between late December and early January, substantial influenza B activity occurred late in the season. Influenza A viruses predominated until late February, with influenza B viruses predominating from the week 8 (ending February 28, 2015) through the week 20 (ending May 23, 2015).

CDC has antigenically and/or genetically characterized 2,193 influenza viruses collected and submitted by U.S. laboratories since October 1, 2014. All of the 2009 A(H1N1) viruses and over 97% of the B viruses sent to CDC for antigenic characterization were the same as the components of the 2014-15 Northern Hemisphere influenza vaccine. However, only 18.6% of the H3N2 viruses tested were characterized as A/Texas/50/2012-like, the influenza A (H3N2) component of the 2014-15 Northern Hemisphere influenza vaccine. The viruses that showed reduced titers to A/Texas/50/2012 belonged to multiple genetic groups; most but not all were antigenically similar to the influenza A (H3N2) virus selected in February 2015 for the 2015-16 Northern Hemisphere influenza vaccines, A/Switzerland/9715293/2013.

The Food and Drug Administration has recommended that the 2015-16 influenza trivalent vaccines used in the United States contain an A/California/7/2009 (H1N1)pdm09- like virus, an A/Switzerland/9715293/2013 (H3N2)-like virus, and a B/Phuket/3073/2013-like (B/Yamagata lineage) virus. For the quadrivalent vaccines, which have two influenza B viruses, the FDA recommended these contain the viruses recommended for the trivalent vaccines, as well as a B/Brisbane/60/2008- like (B/Victoria lineage) virus. This represents a change in the influenza A (H3) and influenza B (Yamagata lineage) components compared with the 2014-15 influenza vaccine.

During the 2014-15 season, nationally the percentage of deaths attributed to P&I exceeded the epidemic threshold for 8 consecutive weeks (weeks 53-7), peaking at 9.3% during week 2.

Regarding pediatric influenza associated mortality, there were 141 laboratory-confirmed deaths reported from 40 states and New York City (none were reported in New Hampshire). Among the 141 deaths, 109 were associated with an influenza A virus, 29 were associated with an influenza B virus, two were associated with an influenza virus for which the type was not determined, and one was associated with an influenza A and influenza B virus coinfection. As a reference, since influenza-associated pediatric deaths became nationally notifiable in 2004, the total number has ranged from 34 to 171 per season (excluding the 2009 pandemic when there were 358 such deaths reported between April 15, 2009-October 2, 2010).

Based on national data reported to CDC via ILINet, for the 2014-15 influenza season, influenza activity as measured by percentage of outpatient visits for ILI peaked nationally during week 52 at 6.0% (i.e., late December), and was somewhat higher than the previous season's peak (4.6%).

The Centers for Disease Control and Prevention influenza season summary report can be found on the CDC website at <http://www.cdc.gov/flu/>.

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All data in this report are based upon information provided to the New Hampshire Department of Health and Human Services under specific legislative authority. The numbers reported may represent an underestimate of the true absolute number and incidence rate of cases in the state. The unauthorized disclosure of any confidential medical or scientific data is a misdemeanor under New Hampshire law. The department is not responsible for any duplication or misrepresentation of surveillance data released in accordance with this guideline.

Division of Public Health Services

Bureau of Infectious Disease Control