# Influenza Epidemiology Summary Report
# Rhode Island 2011-2012

**Rhode Island Department of Health (HEALTH)**
**Division of Infectious Disease & Epidemiology (IDE)**

## Table of Contents

# Synopsis

This report provides a summary of seasonal influenza surveillance observations for Rhode Island from October 2, 2011 through May 19, 2012 and compares them with the previous four seasons (2007-2008, 2008-2009, 2009-2010 and 2010-2011). As indicated by surveillance data, the 2011-2012 influenza season was milder as compared to previous seasons.

Data from participating ILINet physicians for the 2011-2012 season suggests higher reports of influenza-like illness among patients in the 5-24 year old age groups. This trend is consistent with state-wide reports of positive rapid influenza test results, which illustrate the highest reports among persons in the 5-24 age group. Conversely, inpatient data shows a disproportionately higher rate of influenza-related hospitalizations among persons ages 65 and older.

Both influenza type A and type B viruses were in circulation in Rhode Island during the 2011-2012 season. Rapid test results from both outpatient and inpatient facilities were predominantly positive for influenza type B while flu test results from the Rhode Island State laboratory were positive for influenza type A (H3), a trend which was consistent with national data which illustrated influenza type A (H3) was the predominant circulating strain.

This report summarizes data reported by: The Centers for Disease Control (CDC), the World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories (of which the Rhode Island State Laboratory is a member), the Rhode Island Outpatient Influenza-Like Illness Surveillance Network (ILINet), the CDC/CTSE Population-based Influenza Hospitalization Surveillance Project (IHSP) (of which Providence is a participating city), the 122 Cities Mortality Reporting System (of which Providence is a participating city), the Real-Time Outbreak and Disease Surveillance System (RODS), reports of Institutional Clusters/Outbreaks, and data submitted by point of care testing facilities and hospital laboratories.

# Rhode Island Influenza Surveillance Systems

The Rhode Island Department of Health, Division of Infectious Disease and Epidemiology (IDE) maintain a multifaceted influenza surveillance system each year. This surveillance system is designed to adequately monitor and track influenza activity, influenza-like illness (ILI), assess and measure the burden of influenza infections within the community, characterize circulating influenza strains and detect novel influenza viruses. In Rhode Island the following surveillance systems are monitored closely in order to accomplish the goals as set forth.

1. **Outpatient Influenza-Like Illness Surveillance Network (ILINet) (previously Sentinel Provider Network):** The Rhode Island Department of Health (HEALTH) participates in the U.S. Outpatient Influenza-Like Illness Surveillance Network (ILINet), a collaborative effort between the Centers for Disease Control and Prevention (CDC), state health departments, and volunteer ILINet physicians. ILINet providers are recruited annually by state health departments and conducts surveillance for influenza-like illness (ILI). For this surveillance system, ILI is defined as a fever (≥ 100° F or 37.8°C) **AND** cough and/or sore throat in the absence of a known cause other than influenza. ILINet physicians record and report the total number of patient visits and the number of patient visits for ILI by age group (0-4 years, 5-24 years, 25-49 years, 50-64 years, and 65 and older). These data are transmitted on a weekly basis to the Centers for Disease Control and Prevention (CDC) via faxed reports or entered into a secure internet data repository. ILINet providers are also responsible for routine submission of nasopharyngeal (NP) swabs to the state laboratory for influenza virus testing by polymerase chain reaction (RT-PCR). For the 2011-2012 influenza season, twenty (20) providers agreed to participate and were enrolled for the season. These consisted of (6) student health centers, (4)

internal medicine practices, (4) pediatric facilities (4) family practices and (2) urgent care centers **(Table 2, page 21)**.

2. **Rhode Island Influenza Rapid Flu Test Surveillance:** Laboratories throughout the state (including 11 Rhode Island hospital labs) conduct rapid and PCR (Luminex) tests for influenza and fax results to the Department of Health, Division of Infectious Disease and Epidemiology. This reporting is on a voluntary basis with the exception of influenza-associated hospitalizations and influenza-associated pediatric deaths, which are mandatory reportable events in Rhode Island.

3. **Rhode Island State Laboratory Virology Surveillance:** Since 2004, the Rhode Island state laboratory has been typing and subtyping influenza viruses using real time PCR techniques. The state virology laboratory was certified as a WHO accredited laboratory in 2005. Additionally, testing specimens of suspected cases of avian influenza, influenza-associated pediatric deaths and respiratory outbreaks/clusters are a priority for testing at the State molecular diagnostics laboratory.

4. **Statewide Influenza Hospitalizations:** Influenza hospitalizations became reportable in Rhode Island in February 2006. All hospital laboratories conducting influenza testing on inpatients are required to report all positive test results to the Department of Health. Hospitals transmit information in spreadsheet format on a weekly basis via secure email or fax reports on each positive case of influenza. Variables collected includes patient's first and last name, gender, date of birth, address, phone number, admission/discharge date, test date, inpatient location, type of influenza test, and influenza type.

5. **Population-Based Influenza Hospitalization Surveillance Project (IHSP):** Rhode Island has participated in the Influenza Hospitalization Surveillance Project since the 2010-2011 influenza season. As a participating site for the second year (2011-2012 season), HEALTH conducted population-based influenza surveillance on Providence county residents admitted to any of the twelve Rhode Island hospitals. Similar to statewide influenza surveillance, hospitals report on a weekly basis via secure email or fax all inpatient Providence county residents with a positive influenza test. In addition, a community Health Nurse Coordinator conducts follow-up chart reviews on each case to collect information including demographic, employment status, laboratory testing methods and results, ICD-9 codes, underlying high-risk medical conditions, patient's height & weight, results of chest x-rays(within 24 hours of admission), test results and interventions during hospital stay (ex: ECMO, mechanical interventions, secondary infections), treatment, influenza vaccination history and discharge status.

6. **Influenza-Associated Pediatric Mortality:** Influenza-associated pediatric deaths became a notifiable condition in Rhode Island in February 2006. All laboratory-confirmed influenza-associated deaths in persons less than 18 years of age are reported through the Nationally Notifiable Disease Surveillance System (NNDSS).

7. **Pneumonia and Influenza Mortality:** The city of Providence is included in the 122 Cities Pneumonia and Influenza (P&I) mortality reporting system. This data is reported by the Department of Health's Office of Vital Records and is published weekly in the Morbidity and Mortality Weekly Report (MMWR) and in the National Influenza Surveillance Reports published by CDC.

8. **Institutional Clusters and Outbreaks Surveillance:** Institutional clusters and outbreaks are mandatory reportable events to the Department of Health. By regulation 2 cases of ILI should trigger reporting for investigation and testing. An institutional cluster is defined as one laboratory confirmed case of influenza or two or more cases of acute febrile respiratory illness

(AFRI) occurring within 48 to 72 hours in a long-term care facility (LTCF), school or other congregate environment (**Appendix B**).

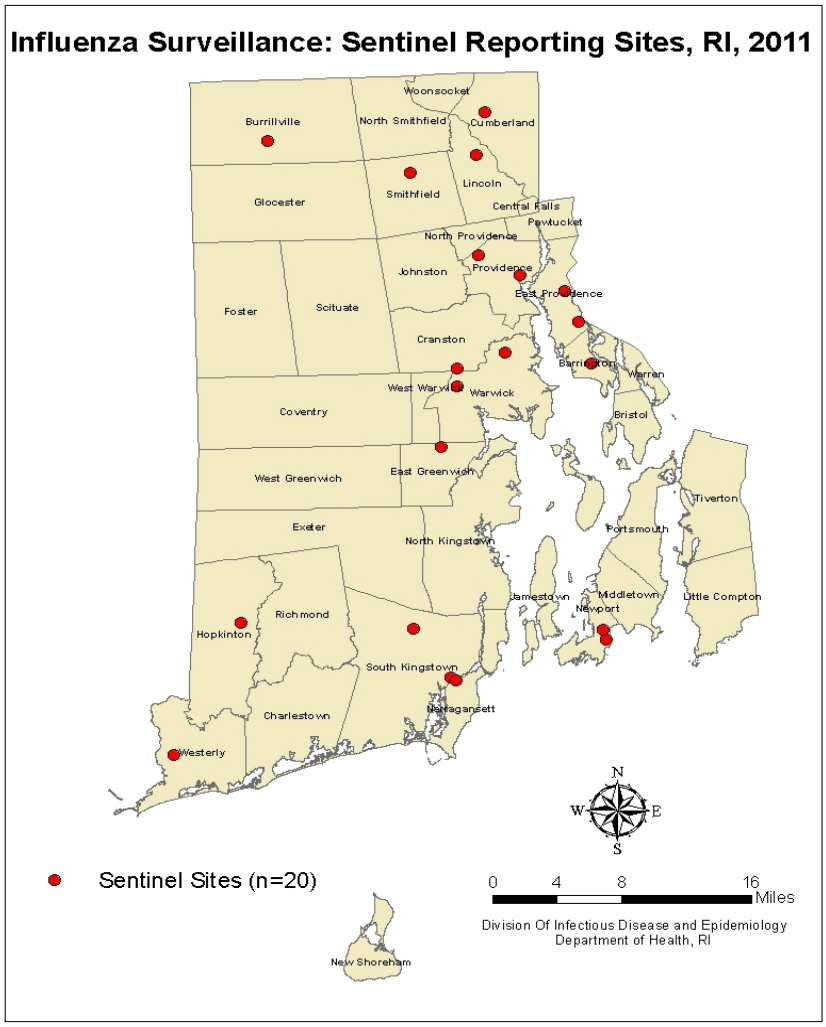
9. **Real-time Outbreak and Disease Surveillance System:** The Rhode Island Department of Health has implemented syndromic surveillance using Real-time Outbreak and Disease Surveillance (RODS) System at eight major hospitals within the state. This allows real-time monitoring of chief complaints (from patients upon arrival in emergency departments) from several syndromes to include respiratory, constitutional, gastrointestinal, hemorrhagic and neurologic. Constitutional symptoms most closely resemble those of influenza (fever, myalgia, or chief compliant of flu). Syndrome trends are also studied by child vs. adult distribution, hospital and zip code.

10. **State Epidemiologists Report of Weekly Activity Levels to CDC:** The State Epidemiologist reports Rhode Island's influenza activity level to CDC on a weekly basis. The activity level is a composite of ILI data as reported by participating ILINet physicians combined with laboratory positive results and institutional outbreak reports (see **Appendix A** for description of how influenza activity is determined). This information is then posted weekly on the Department of Health's website at http://www.health.ri.gov/flu/activity.php.

11. **Influenza-like illness (ILI) Activity Indicator Map:** The flu surveillance coordinator reviews and verifies Rhode Island's state level ILI activity indicator as calculated by CDC. The state-specific ILI activity indicator was implemented for the first time during the 2010-2011 influenza season and is generated based on ILI data as reported by participating ILINet physicians and measures the intensity of ILI activity within a state. Activity levels range from MINIMAL (patient visits for ILI below average) to HIGH (patient visits for ILI above baseline levels) and are displayed on a scale of 1-10 (1 being the least intense and 10 being the most intense). Activity levels correspond with the given percentage of patient visits for ILI in a state and measures deviations above or below a state's baseline ILI level. State-specific baseline ILI levels are estimated from the average seen during the weeks when influenza viruses are at their lowest (<10% positive for influenza). In order to account for variations in reporting frequency from week to week by providers, baselines are adjusted weekly depending on which site provides data for a particular week (see **Appendix D** for an example of the weekly activity indicator map).

12. **Avian Influenza:** To continue to monitor for cases of avian influenza, the Division of Infectious Disease and Epidemiology recommends that all cases of clinically suspected avian influenza (acquired during travel to areas of the world with reported avian cases in birds, and/or from direct exposure to a known case of avian influenza in a human) be reported immediately by telephone to (401) 222-2577 or (401) 272-5952 (after hours).

# ILINet Provider Surveillance System

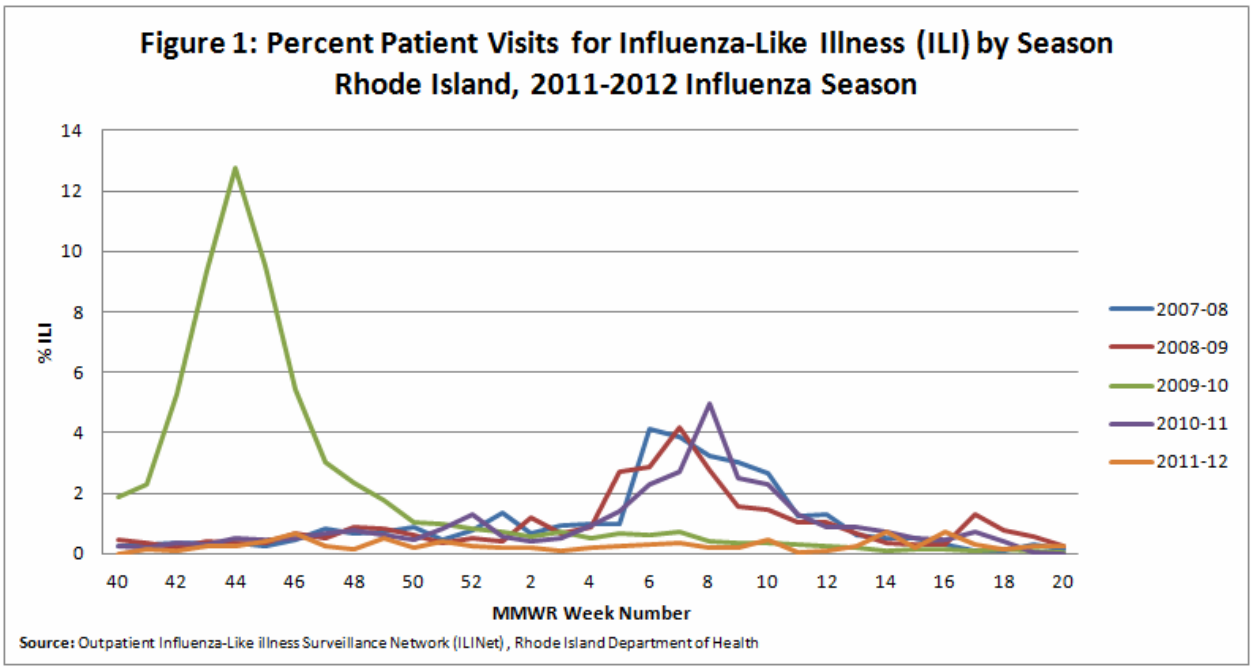



**See page 21 for a complete list of participating ILINet providers in Rhode Island.**

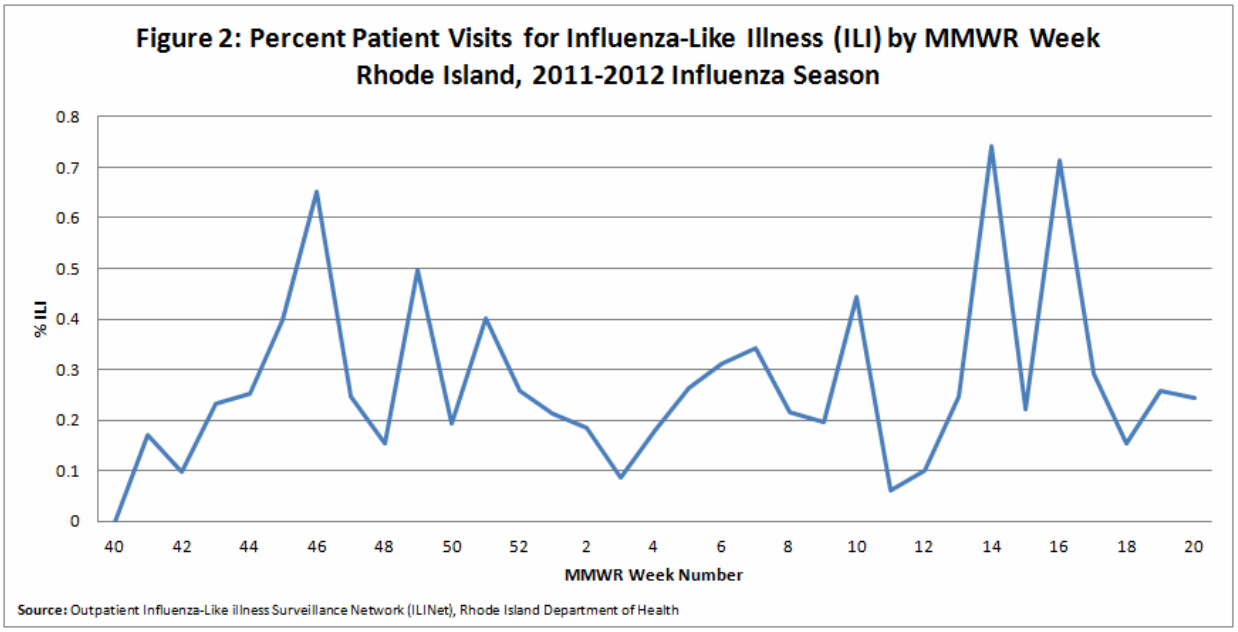
## Influenza-Like Illness (ILI) Reports

Based on surveillance data provided by participating ILINet physicians during the 2011-2012 influenza season, the current influenza season was of the least severity as compared to previous seasons from 2007-2008 to 2010-2011. The significantly higher percent ILI reports for the 2009-2010 season is attributed to the 2009 H1N1 influenza pandemic when ILI activity increased to about 13%. Peak activity during the 2011-2012 season occurred later as the season progressed as compared to previous seasons. During the 2007-2008, 2008-2009 and 2011-2012 influenza seasons, peak activity was between 0.96% and 4.95% between weeks 5 (January 29-February 4, 2012) through 8 (February 19-February 25, 2012), while activity during this time in the 2011-2012 season ranged only from 0.26% to 0.34%. Influenza activity did not peak until later in the season during weeks 14 (April 1-April 7, 2012) through 16 (April 15-April 21, 2012) when it reached .74% and .71% respectively.

**NOTE:** All figures are presented using the convention of Morbidity and Mortality Weekly Report (MMWR) week number. For the corresponding dates, please see **Appendix C**.



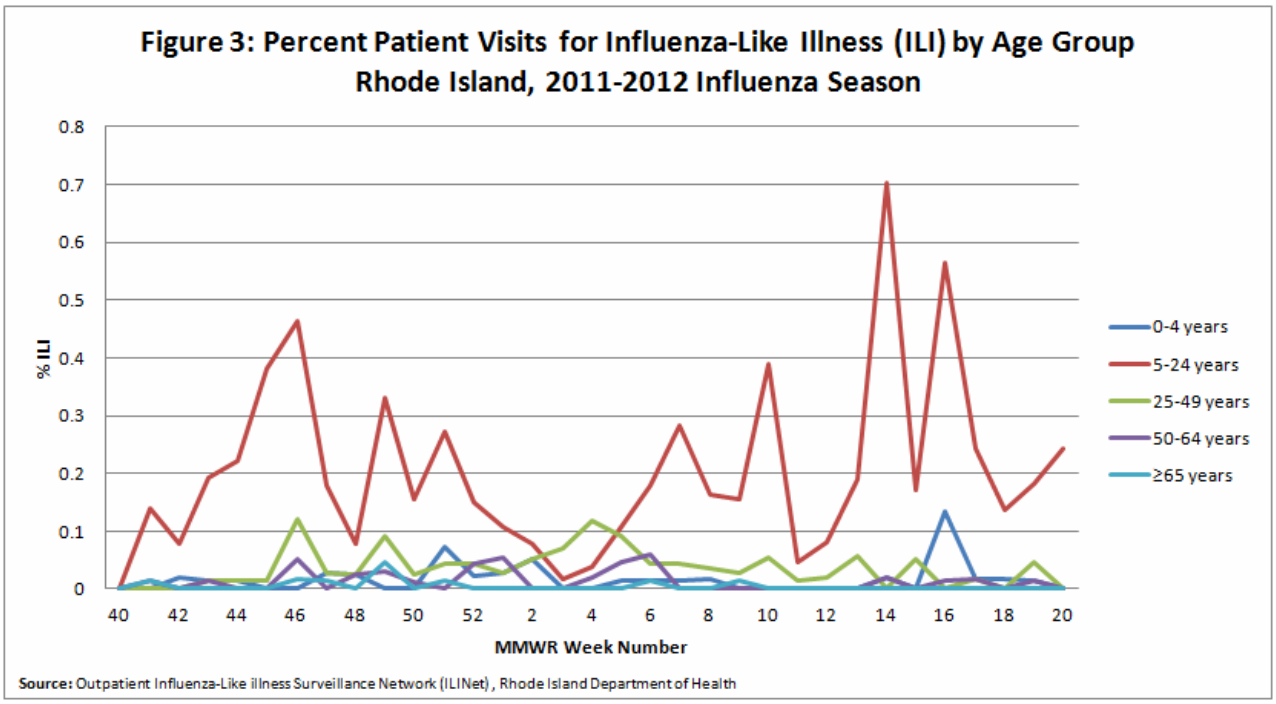

During the 2011-2012 flu season, there were two distinct increases in the number of reported ILI. The first increase in activity was noted early in the season during week 46 (November 13-November 19, 2011) when the percent patient visits reported was 0.65%. The second wave of activity was observed during week 14 (April 1-April 7, 2012) at 0.74%. This contrasts peak ILI activity observed during previous seasons at which peak activity was observed in late January to early February. Furthermore, peak ILI activity (0.74%) during the 2011-2012 season was mild as it was well below the regional baseline of 1.6.




## Influenza-Like Illness by Age Group

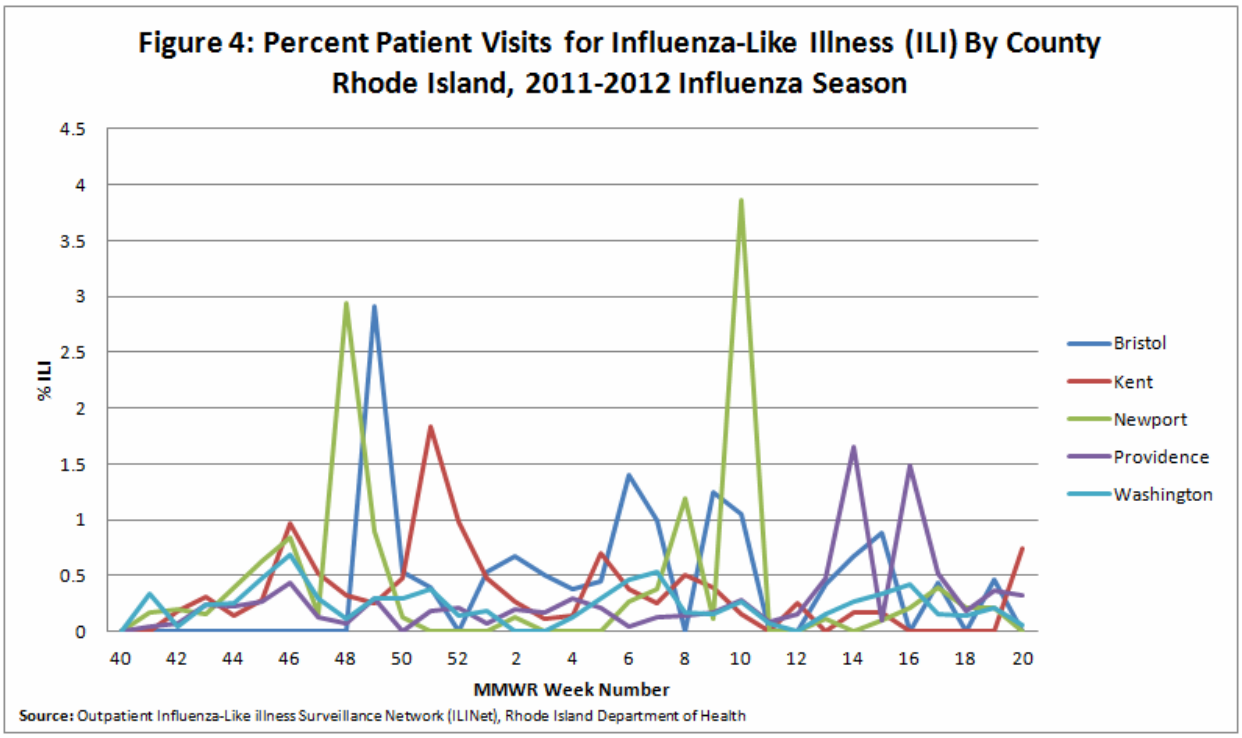
The 2011-2012 ILI surveillance data was further analyzed based on patient's age in order to determine groups most susceptible to influenza-like infections. As illustrated in **figure 3**, school-aged individuals (5-24 years) were the most susceptible age group for influenza-like illness during this season.

Throughout the season, the percent patient visit for ILI among people in this age group was higher as compared to all other age groups. The second highest increase occurred in the 0-4 year age group, with a peak in week 16 (April 15-April 21, 2012). The lowest frequency of patient visits reported by sentinel providers for ILI was among individuals ages 65 yeas and older.



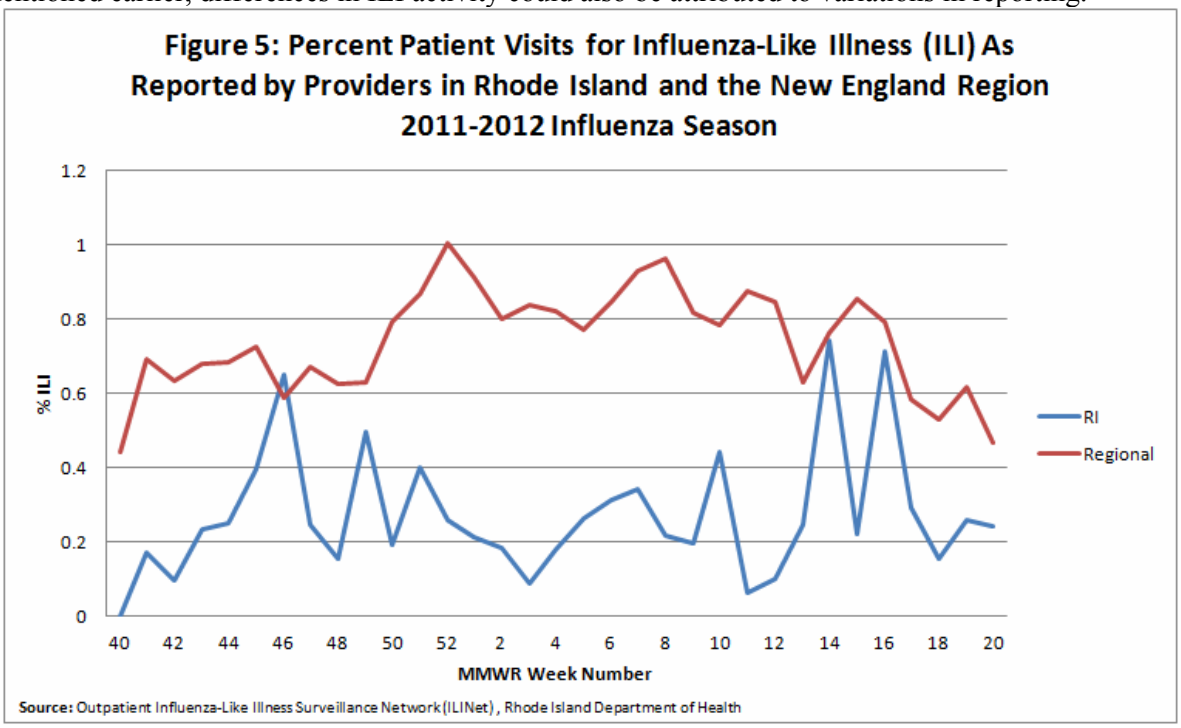

## Influenza-Like Illness by County

County level analysis is consistent with the trends observed with overall ILI activity. All counties showed an increase in ILI activity during week 46 (November 13-November 19, 2012) and a decrease around week 3 (January 15-January 21, 2012). A second peak in ILI activity was noted in Bristol, Providence and Newport counties in the mid to late part of the season. A plausible explanation for significantly higher reports in a few counties can be attributed to variations in reporting frequency from week to week as well as providers within each region.




## Rhode Island ILINet Surveillance Data Compared with the New England Region

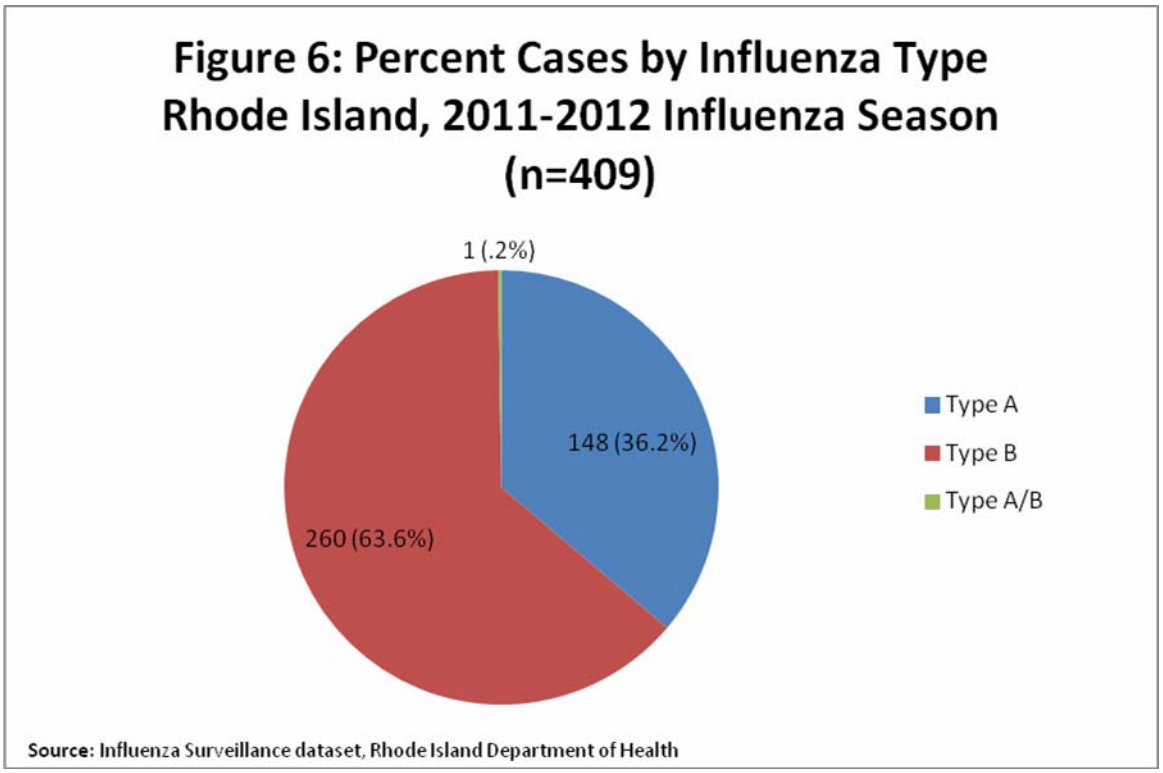
Regional and state-specific comparison of ILI reports displays slight variations in ILI activity during the 2011-2012 influenza season. Regional surveillance data indicate an overall higher percent patient visit for influenza-like illness as compared to influenza activity as observed in Rhode Island. In addition, regional ILI data suggest a one time period of peak activity with an increase in ILI activity occurring earlier in the season (week 52). In contrast, Rhode Island experienced lower percent patient visits for influenza-like illness during the season, with an early peak occurring during week 46 and maximum ILI activity observed later in the season during week 14 (April 1-April 7, 2012). As mentioned earlier, differences in ILI activity could also be attributed to variations in reporting.



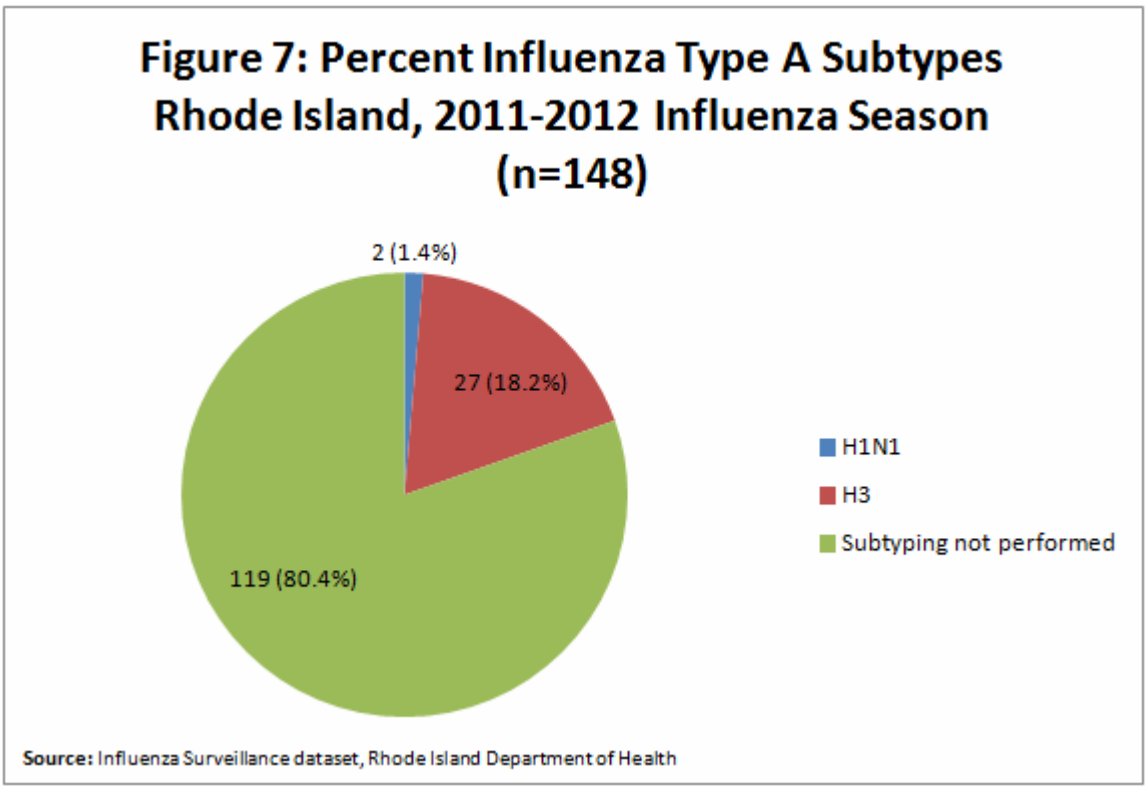
# Influenza Rapid Testing Surveillance

## Rapid Flu Test Results

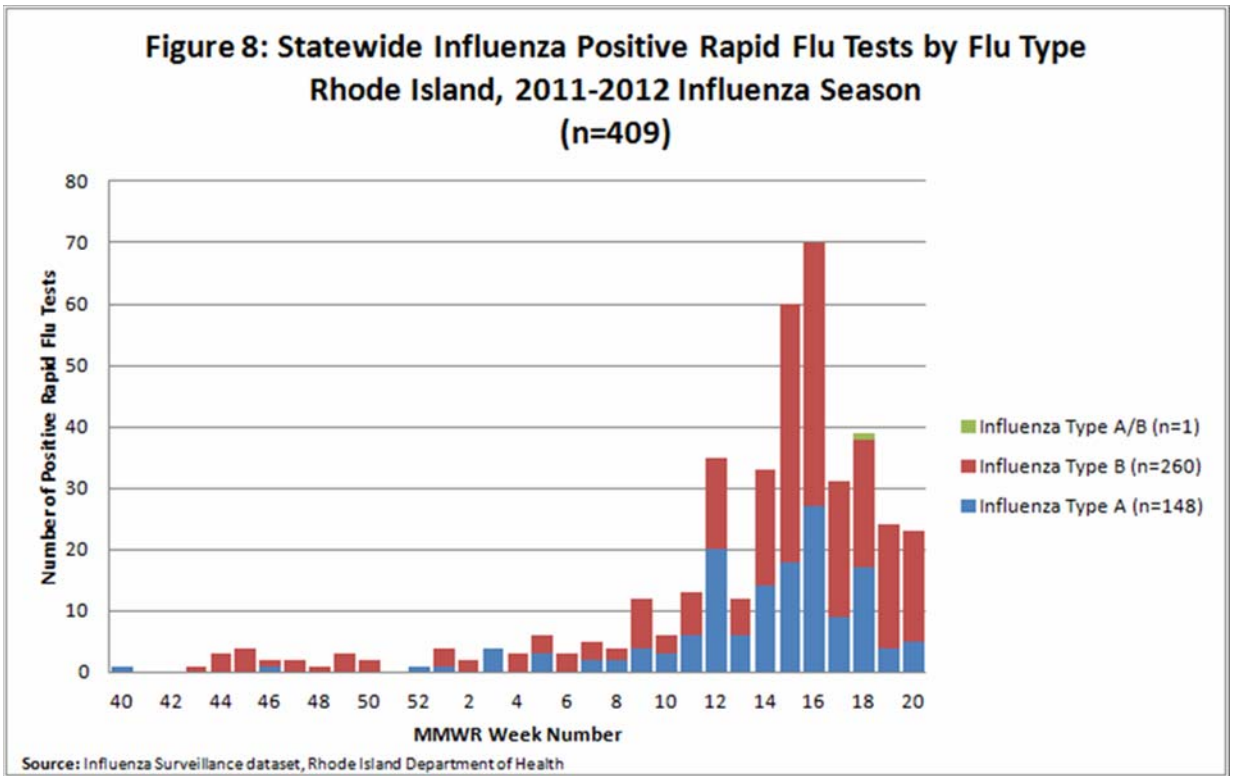
Laboratories throughout the state conduct rapid tests and report positive results on a voluntary basis to IDE. Rapid test data in addition to ILINet data is monitored weekly and helps guide the decision making process for designation of flu activity code. During the course of the 2011-2012 influenza season, there were a total of 409 positive rapid tests reported to HEALTH compared to a total of 1,169 during the 2010-2011 season (last season). This further supports the observation of a milder season for 2011-2012. Influenza type B was the predominant strain accounting for approximately 64% or 260 of all results followed by influenza type A (36%) and less than one percent testing positive for influenza type A/B (**Figure 6**). These trends differ from national surveillance data, which suggest influenza type A was the predominant virus in circulation throughout the season.




Of the flu tests that tested positive for influenza A, the most predominant subtype was H3, accounting for 18% or 27 of the total 148 positive tests. The majority of those that tested positive for influenza A, however, were not subtyped (81%). This is largely due to the fact that rapid flu test results are reported from providers within the community or laboratories (including some hospital labs) that do not have the capacity to subtype influenza specimens.

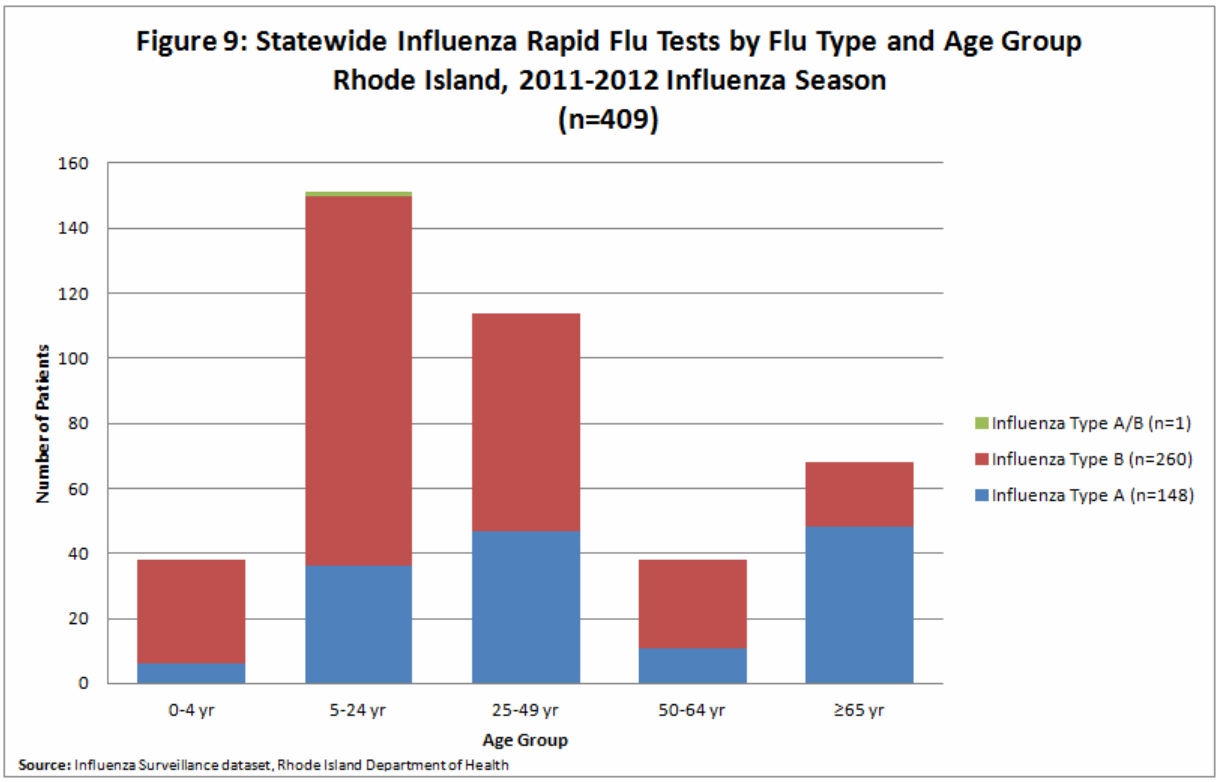



Similar to ILI activity, the number of reported positive influenza results provides additional evidence of a late influenza season. As illustrated in **Figure 8,** flu activity began to increase during week 12 (March 18-March 24, 2012) and reached peak activity in week 16 (April 15-April 21, 2012), which is also consistent with observed increase in ILI activity.



## Positive Rapid Flu Test Results by Flu Type and Age Group

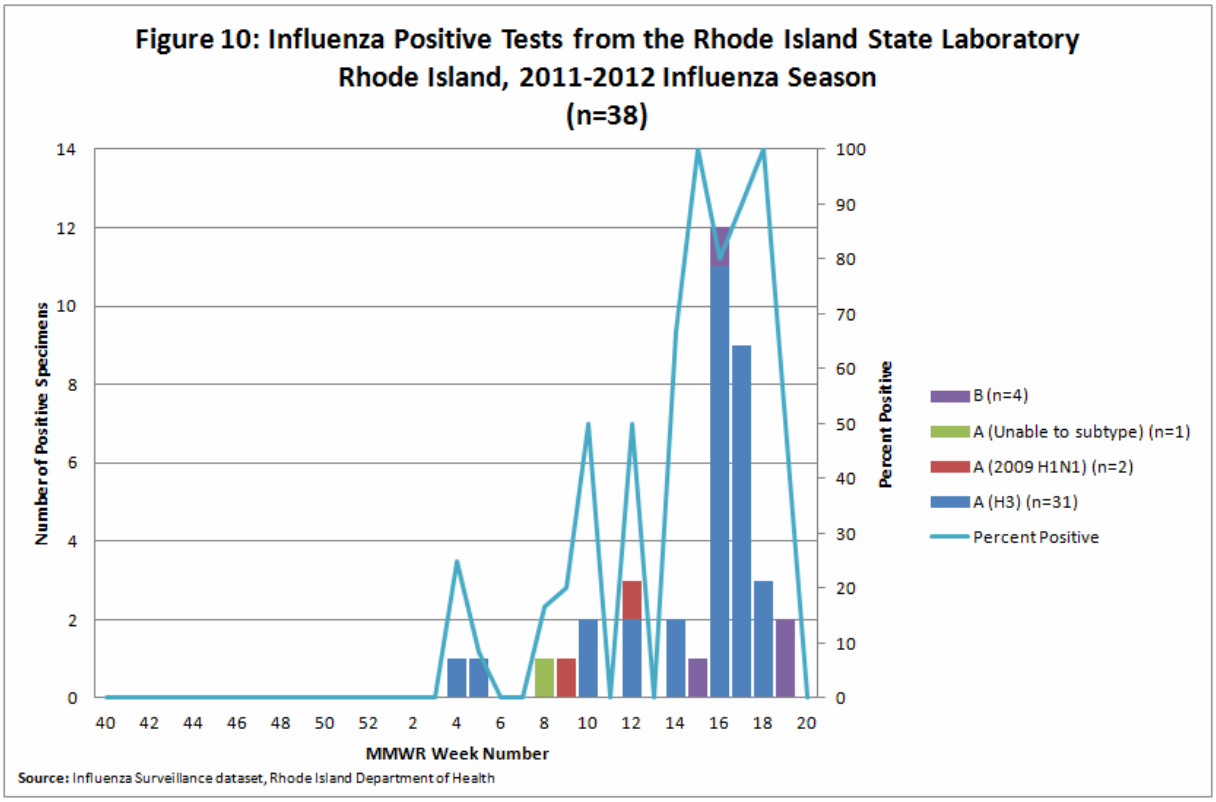
Statewide rapid flu tests were analyzed further to determine which age groups were more susceptible to a specific flu type. Persons ages 5-24 years of age were at increased risk for influenza infection during the 2011-2012 season. This age group accounted for 151 (36.8%) of the total 409 rapid test results reported to HEALTH. The 0-4 and 50-64 age groups were the least likely to test positive for flu during the same period, accounting for 9.27% of the total case count each. These results are consistent with the ILI percentage patient visits based on age group as observed from ILINet surveillance data.



# Rhode Island State Laboratory Virology Surveillance

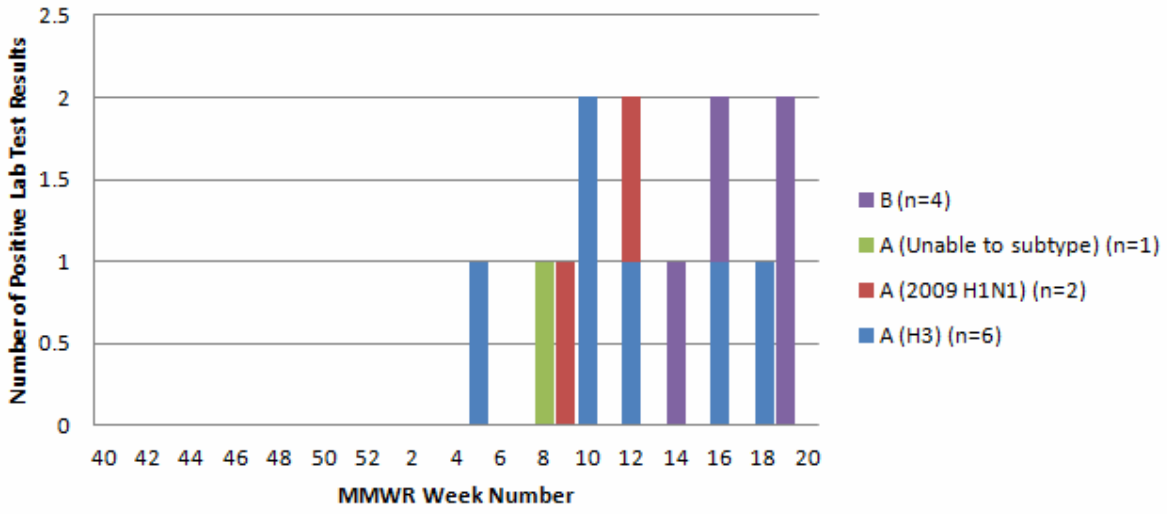
The vast majority of seasonal influenza infections can be classified as either influenza A or influenza B viral infections. Influenza A viruses can be further categorized into subtypes on the basis of two surface antigens: hemagglutinin (H) and neuraminidase (N). Since 1977, influenza A (H1N1) viruses, influenza A (H3N2) viruses, and influenza B viruses predominantly have been in global circulation. Following the H1N1 pandemic of 2009, a novel virus, influenza A (2009-H1N1) emerged and has since been in circulation.

During the 2011-2012 season, the RI state laboratory tested a total of 135 specimens, of which 38 (28.2%) tested positive for influenza. Clinical specimens were submitted by participating ILINet physicians, area acute care hospitals and facilities within the community reporting influenza/respiratory outbreaks to IDE. As illustrated in **Figure 10**, the first specimen confirmed at the State lab did not occur until mid January, during week 4. Of the 38 positive specimens, influenza A (H3) was the predominant virus accounting for roughly 82% of all subtyping performed. National surveillance data also illustrated a similar pattern for the 2011-2012 season, for which H3 was the predominant virus in circulation. Influenza type B, which was the predominant virus in rapid flu test positives, was not seen until week 15, and only accounted for 10.5% of all positive test results performed the State Laboratory.




Of the 135 specimens submitted for testing at the RI State Laboratory, the majority (104 or 77%) was submitted by participating ILINet providers and 12.5% (13/104) tested positive for influenza. Laboratory data indicate that 9 (69.2%) of the 13 positive specimens were influenza type A and 4 (30.8%) were type B. Influenza A (H3) was the predominant subtype. The data reflects the overall ILI activity trends, which indicate that peak ILI activity occurred late in the season. Additionally, the majority of positive tests for influenza type B did not occur until late in the season.

## Figure 11: Influenza Positive Specimens from Sentinels Tested at State Laboratory by Subtypes Rhode Island, 2011-2012 Influenza Season



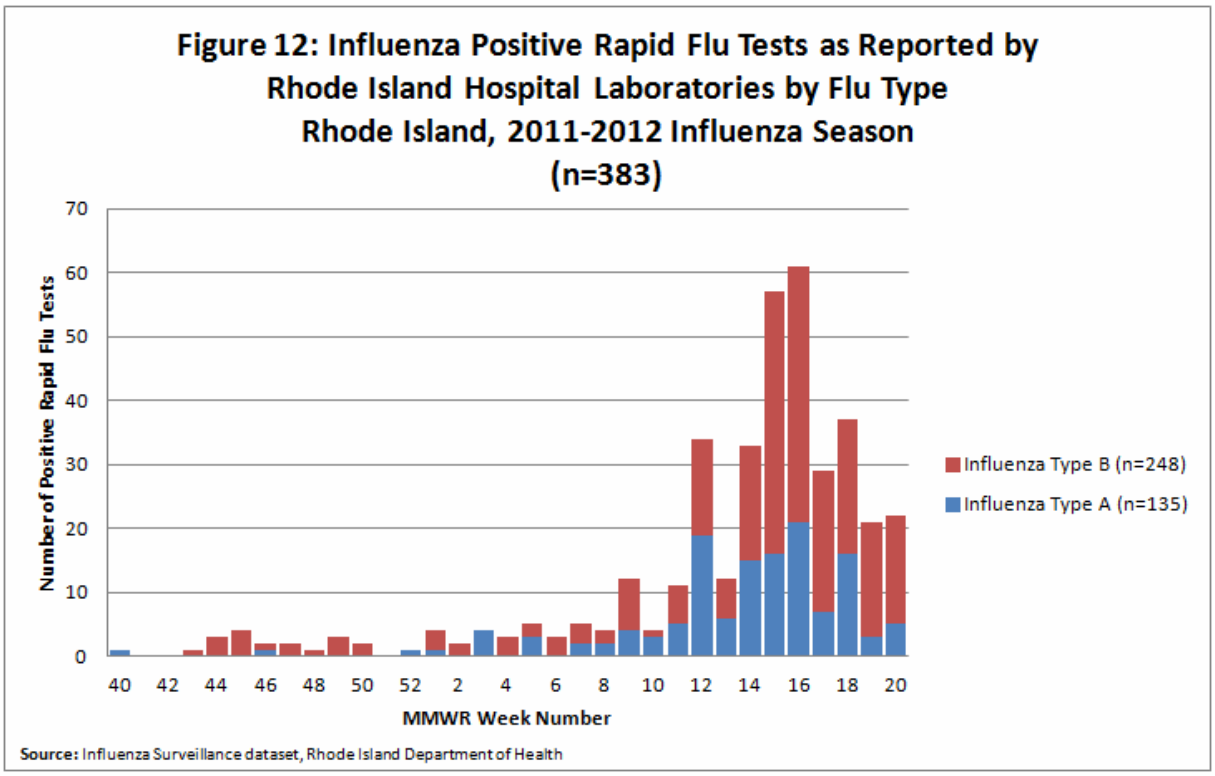

**Source:** Influenza Surveillance dataset, Rhode Island Department of Health

# Influenza-Associated Hospitalizations

Rhode Island's twelve (12) acute care hospitals report rapid test results for both inpatient and outpatient Rhode Island residents. These facilities reported a total of 383 positive rapid influenza results for the 2011-2012 season. This accounted for 94% of all positive rapid reports statewide. Of the 383 positive results 293 (77%) were collected from outpatient visits and 90 (23%) were collected from hospitalized persons (inpatients).

## Influenza Hospitalizations

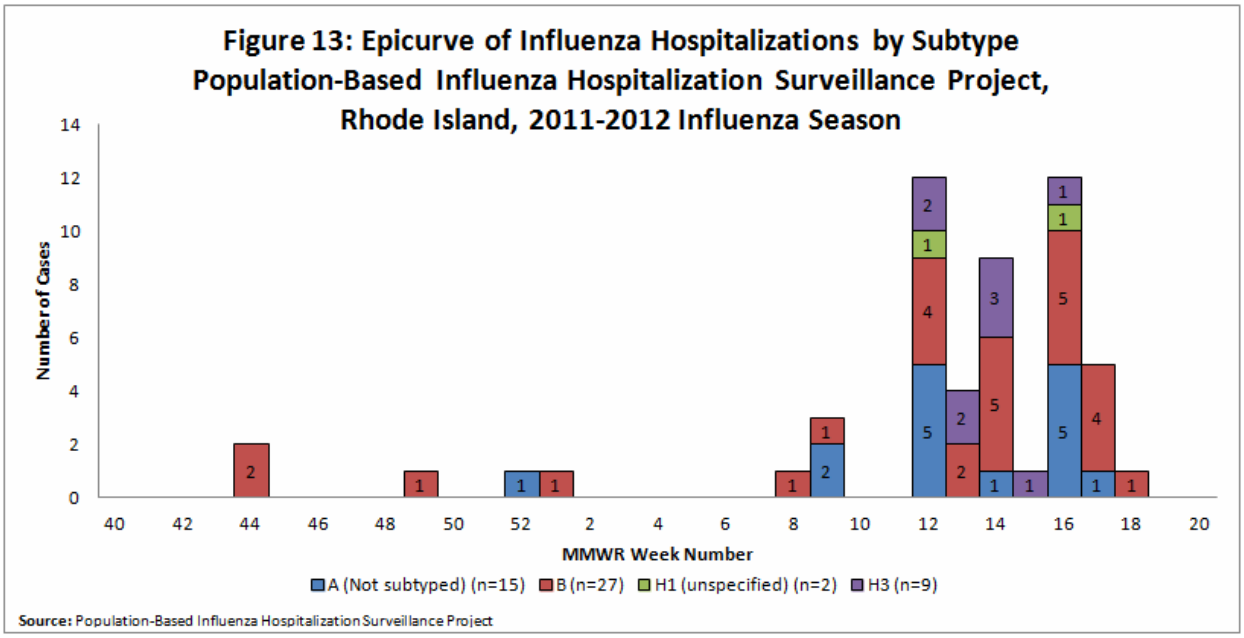
The data displayed represents a subset of the statewide rapid test data reported in **figure 8** above. Of the total 409 rapid influenza reports received by HEALTH, hospital laboratories rapid tests accounted for 383 or approximately 94% of the total. Of this, 248 or 55.8% tested positive for influenza type B and 135 or 30.3% tested positive for influenza type A. The highest frequency of positive results occurred in weeks 15 (April 8-April 14, 2012) and 16 (April 15-April 21, 2012) for both influenza type A and B.




## Population-Based Influenza Hospitalization Surveillance Project (IHSP)

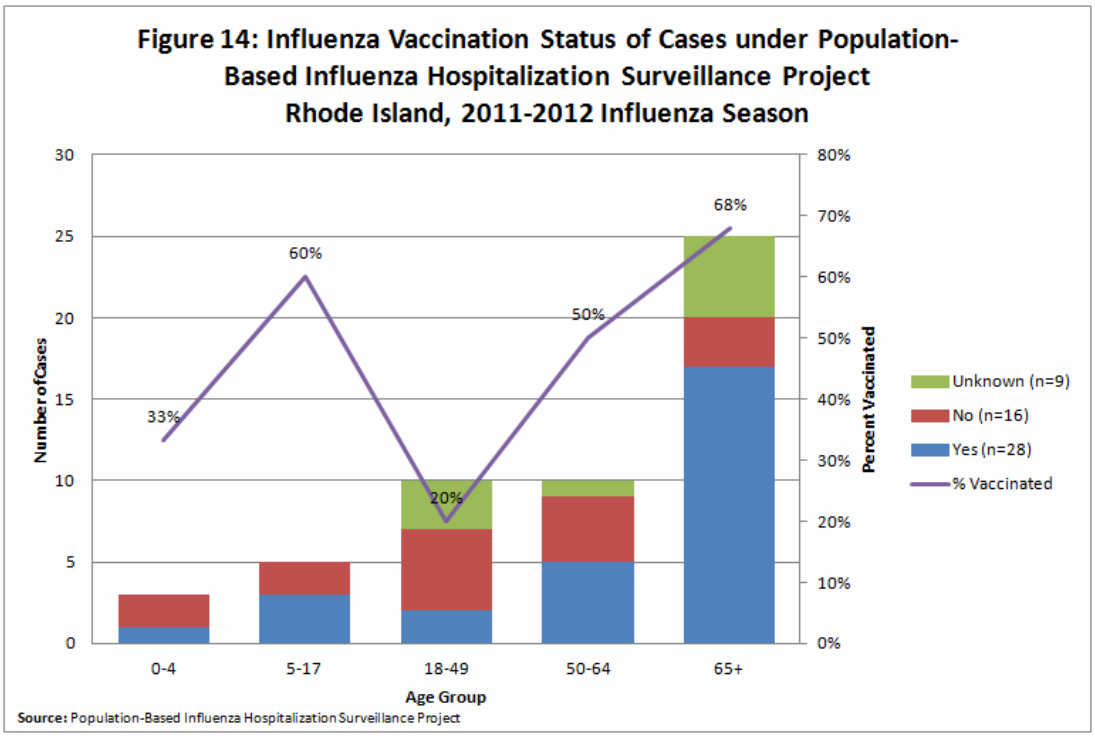
In addition to state-wide influenza-associated hospitalizations, Rhode Island also participates in the CSTE/CDC Influenza Hospitalizations Surveillance Project (IHSP), a project that RI initiated in June of 2010 and is specific to Providence county. All acute care hospitals are required to notify HEALTH of any Providence county resident admitted with a positive influenza test result. For each reported case, the lead nurse conducts an extensive investigation which consists of performing medical chart abstractions to collect clinical information, vaccination history and underlying medical conditions. From October 1, 2011 through April 30, 2012 RI identified 53 laboratory confirmed influenza hospitalizations in Providence county residents. Demographic characteristics and city/town rates of hospitalized patients can be found in **table 3 (Appendix F)** and **figure 20** (**Appendix G).**

Influenza B was the predominant strain accounting for approximately 51% (27/53) of all Providence county hospitalizations. The first laboratory confirmed influenza type A hospitalization of the season occurred during week 52 (December 25-December 31, 2011) and the first laboratory confirmed influenza B hospitalization occurred in week 44 (early November) (**Figure 13**). Peak influenza activity lasted from week 12 through week 16. During this season, flu type A (H3N2) accounted for 16.9% (9/53) of all hospitalizations reported among Providence county residents.

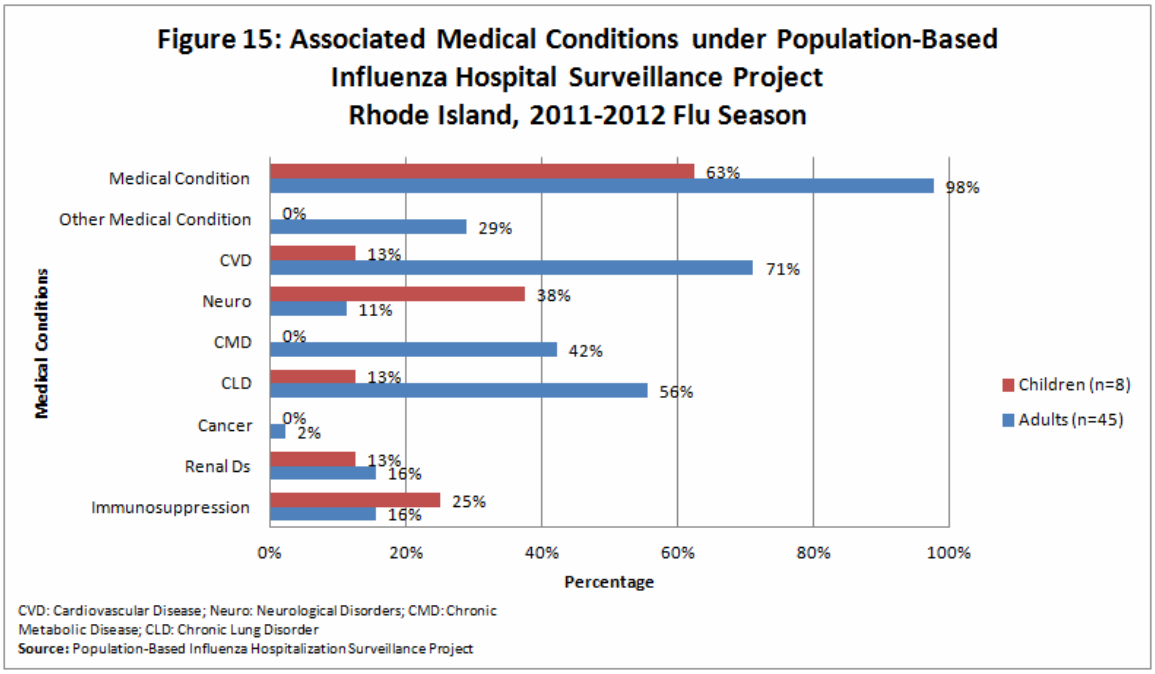



## Hospitalizations by Age Group and Influenza Vaccination Status

Persons ages 65 and older had the highest frequency for hospitalizations, accounting for 47.2% of all hospitalized cases reported. This is expected since many people over the age of 65 years have underlying medical conditions, which put them at an increased risk for hospitalization compared to other groups. Influenza vaccination rate was also highest among this age group (68%), followed closely by patients ages 5-17 years (60%) and 50-64 years (50%). Conversely, the 0-4 years and 5-17 year age groups represented the lowest frequency of inpatient hospitalizations. Working adults (ages 18-49 years) had the lowest flu vaccination rate at 20%.

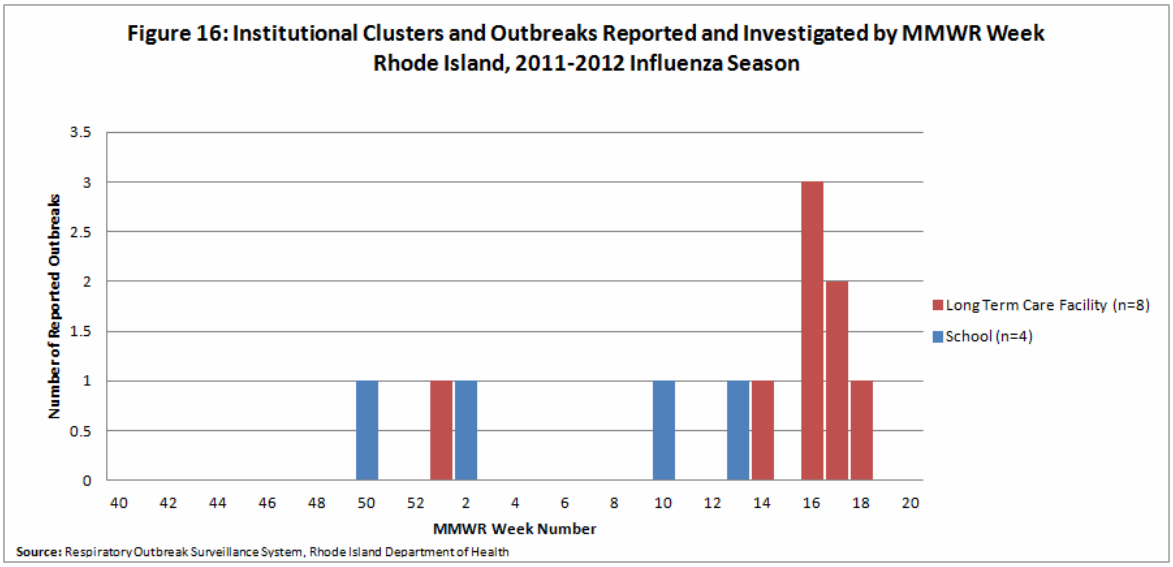



Overall, 98% of adults and 63% of children in the IHSP had at least one documented underlying medical condition that put them at an increased risk for severe influenza complications. For adults, the most commonly reported underlying medical condition was cardiovascular disease (71%) followed by chronic lung disease (56%). The most commonly reported conditions for children were neurological disorders (38%) and immunosuppression (25%) (**Figure 15).**

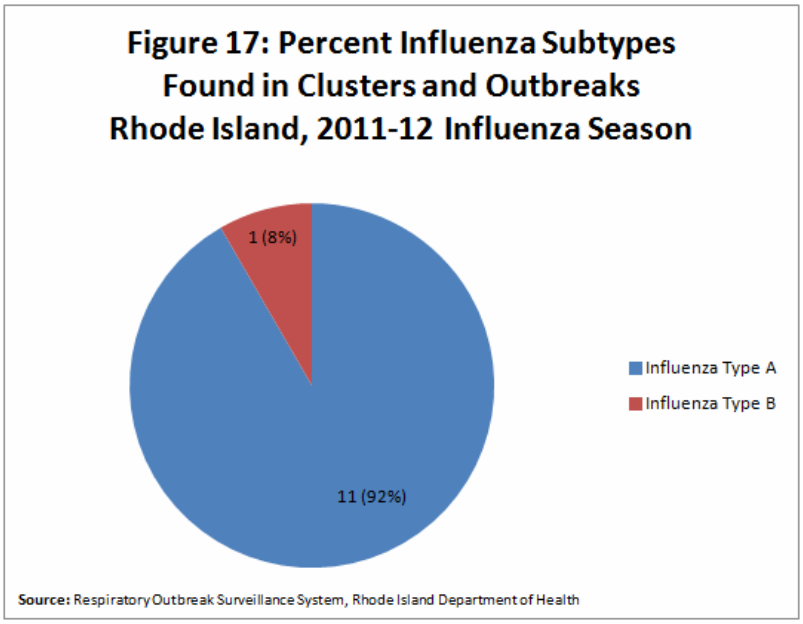


# Institutional Clusters and Outbreaks Surveillance

From October 2011 to May 2012, there were 12 influenza clusters investigated and actively monitored by IDE staff. The majority were reported by Long-Term Care Facilities (LTCF) (67% or 8 of the total). Four (4) or 33% were from area schools. The first confirmed influenza outbreak occurred during week 50 (December 11-December 17, 2011) with maximum activity observed during week 16 with a total of 3 outbreaks reported and investigated during that week. The outbreak data further illustrate the late appearance of influenza cases during the 2011-2012 influenza season.




Influenza A was the predominant virus (92%) associated with all reported institutional outbreaks. Predominance of influenza A is consistent with flu result data reported to IDE from the Rhode Island State Virology Lab.

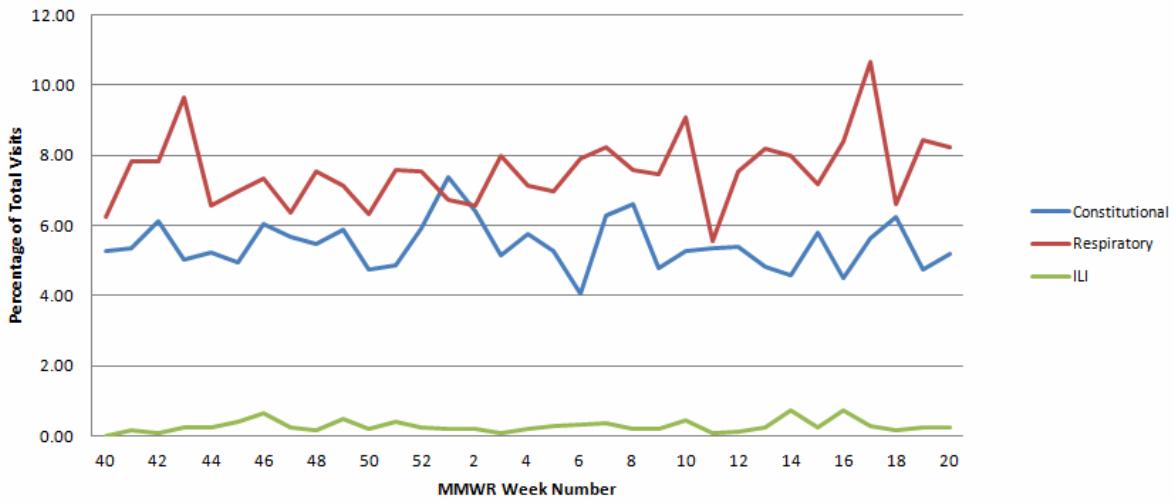


# Real-Time Outbreak and Disease Surveillance System

## Syndromic Surveillance

The Real-Time Outbreak and Disease Surveillance System (RODS) monitor chief complaints from emergency departments of eight reporting hospitals. The data is then analyzed based on syndrome in order to detect patterns of disease outbreaks. The system triggers alerts based on algorithms that detect an unexpected increase in the number of visits for a specific syndrome. While there is no specific syndrome for influenza, an increase in influenza-like illness would most likely trigger an alert for "Respiratory" or "Constitutional" symptoms. The figure below demonstrates an increase in patient visits for constitutional and respiratory chief complaints around week 16 which had one of the highest ILI percentages. Respiratory alerts peaked during week 16, while constitutional alerts reach a peak in week 1 (January 1-January 7, 2012). The trends in respiratory and constitutional syndromes are similar to those seen in the ILI data. These occurrences illustrate the importance of the RODS system as an early detection tool, as this would be the time period for which there would be an increase in the number of emergency room visitors for influenza-like illness.

**Figure 18: Percent Patient Visits for Constitutional and Respiratory Syndromes Rhode Island, 2011-2012 Influenza Season**




**Source:** Real-Time Outbreak and Disease Surveillance System, Rhode Island Department of Health

# Influenza-Associated Pediatric Mortality

Influenza-associated pediatric deaths became reportable in Rhode Island in February 2006. Since that time, observed pediatric deaths associated with influenza in the state remains low. There were three (3) influenza-associated pediatric death cases investigated and confirmed during the 2009-2012 influenza A (H1N1) pandemic; prior to that, there was one (1) confirmed case reported during the 2005-2006 influenza season. There were no influenza-associated pediatric deaths reported or identified during the 2010-2011 or 2011-2012 influenza seasons.

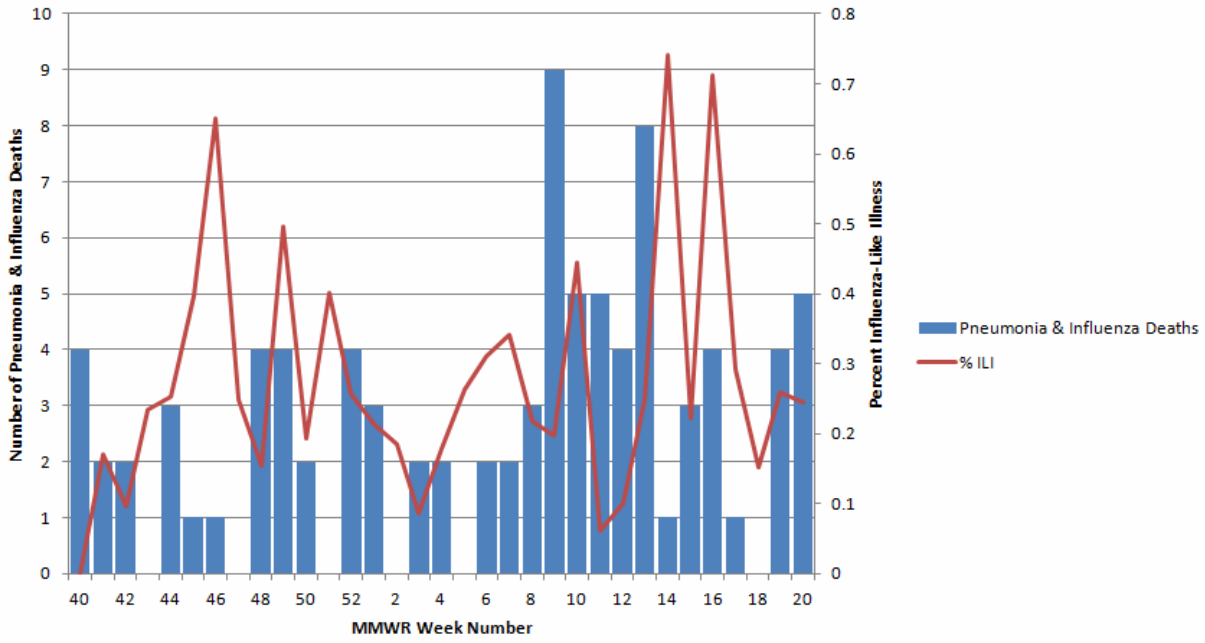
# Pneumonia and Influenza (P&I) Mortality Surveillance

As part of its national influenza surveillance effort, the Centers for Disease Control and Prevention (CDC) receives weekly mortality reports from vital statistic offices of 122 cities and metropolitan areas across the United States within 2-3 weeks from the date of death. Participating areas report the total

number of death certificates received and the number of those for which pneumonia or influenza was listed as the underlying or contributing cause of death by age groups (less than 1 year, 1-24 years, 25-44 years, 45-64 years, ≥ 65 years). Together with the World Health Organization laboratory results, U.S. private physicians' reports, and state epidemiologist estimates of influenza morbidity, the 122 Cities mortality data are used to assess the impact of influenza each winter. This system consistently covers approximately one-third of the deaths in the United States and provides CDC influenza team with preliminary information with which to evaluate the impact of influenza on mortality in the United States and the severity of the currently circulating virus strains. Providence, RI is one of several participating cities.

Displayed in **figure 19,** is the number of reported pneumonia and influenza mortality cases for Providence during the 2011-2012 influenza season superimposed on the percent ILI visits reported by participating ILINet physicians during the same time period. As indicated by the data, the highest number of deaths resulting from pneumonia and influenza occurred during week 9 (February 26-March 3, 2012). The highest percent ILI activity occurred during week 14 (April 1-April 7, 2012). Trends in pneumonia and influenza mortality reflect those seen in the overall ILI data, which indicates that influenza activity was greatest during the latter half of the season.

**Figure 19: Pneumonia & Influenza Mortality in Providence Compared to Percentage Influenza-Like Illness Visits in Rhode Island Rhode Island, 2011-2012 Season**




Note: Weeks 51 and 18 are unreported
**Source:** Morbidity and Mortality Weekly Report (MMWR)

# Avian Influenza (H5N1) Current Information

Type A influenza viruses, which cause many of the human flu infections that occur each fall and winter, are the only viruses ever known to have caused human influenza pandemics, in 1918, 1957, 1968 and recently in 2009.

Influenza A (H5N1) virus, also known as "bird flu" is an influenza A virus subtype that occurs mainly in birds, is highly contagious among birds, and can be deadly to them. H5N1 virus does not usually infect people, but infections with these viruses have occurred in humans. Most of these cases have been the result of direct or close contact with H5N1-infected poultry or H5N1-contaminated surfaces.

Because all influenza viruses have the ability to evolve, scientists are concerned that H5N1 virus one day may be able to infect humans as well as spread easily from person-to-person. Because these viruses do not commonly infect humans, there is little or no immune protection against them in the human population and an influenza pandemic (worldwide outbreak of disease) could begin. There currently is no commercially available vaccine to protect humans against H5N1 virus. However, vaccine development efforts are taking place. In April 2007, the FDA approved the first US vaccine against the avian influenza virus for human use. The vaccine will not be sold commercially; instead it will be included in the National Stockpile for distribution by public health authorities in case of a disease outbreak. Further research studies are underway to develop vaccines against the H5N1 virus for human use.

As of December 17, 2012, there have been 610 reported cases of avian influenza resulting in 360 deaths.

**Table 1:** Cumulative number of confirmed human cases of avian influenza A (H5N1) reported to the World Health Organization (WHO), 2003-2012.

| Country | 2003 | | 2004 | | 2005 | | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | cases | deaths | cases | deaths | cases | deaths | cases | deaths | cases | deaths | cases | deaths | cases | deaths | cases | deaths | cases | deaths | cases | deaths | cases | deaths |
| Azerbaijan | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 5 |
| Bangladesh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 6 | 0 |
| Cambodia | 0 | 0 | 0 | 0 | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 8 | 8 | 3 | 3 | 21 | 19 |
| China | 1 | 1 | 0 | 0 | 8 | 5 | 13 | 8 | 5 | 3 | 4 | 4 | 7 | 4 | 2 | 1 | 1 | 1 | 2 | 1 | 43 | 28 |
| Djibouti | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Egypt | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 10 | 25 | 9 | 8 | 4 | 39 | 4 | 29 | 13 | 39 | 15 | 11 | 5 | 169 | 60 |
| Indonesia | 0 | 0 | 0 | 0 | 20 | 13 | 55 | 45 | 42 | 37 | 24 | 20 | 21 | 19 | 9 | 7 | 12 | 10 | 9 | 9 | 192 | 160 |
| Iraq | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 |
| Lao People's Democratic Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Myanmar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Nigeria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Pakistan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 |
| Thailand | 0 | 0 | 17 | 12 | 5 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 17 |
| Turkey | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 4 |
| Viet Nam | 3 | 3 | 29 | 20 | 61 | 19 | 0 | 0 | 8 | 5 | 6 | 5 | 5 | 5 | 7 | 2 | 0 | 0 | 4 | 2 | 123 | 61 |
| Total | 4 | 4 | 46 | 32 | 98 | 43 | 115 | 79 | 88 | 59 | 44 | 33 | 73 | 32 | 48 | 24 | 62 | 34 | 32 | 20 | 610 | 360 |

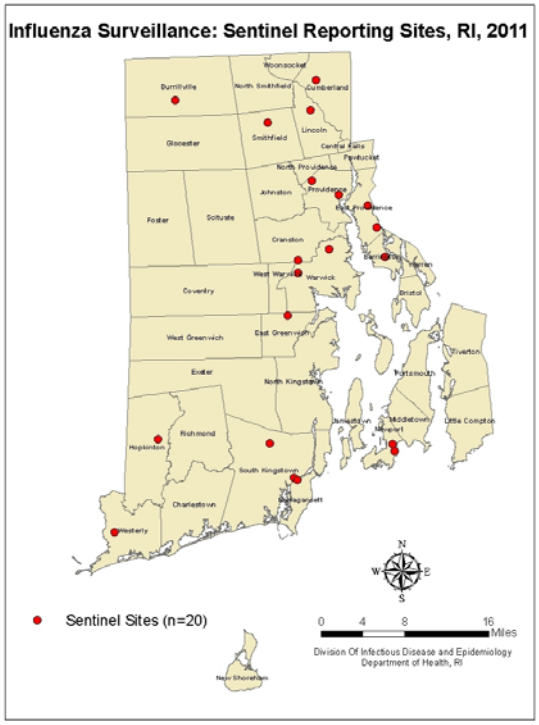
**Source: World Health Organization (WHO)**

- Total number of cases include number of deaths
- WHO reports only laboratory cases
- All dates refer to onset of illness

HEALTH greatly appreciates the efforts of all our ILINet providers and their staff. These ILINet providers generate data for much of the influenza surveillance program and for the information presented in this report. Participating providers for the 2011-2012 season are listed below.

## Table 2. Sentinel Providers

### RI Sentinel Providers




| | |
|---|---|
| 1. Dr. Rocco Andreozzi<br>Westerly Urgent Care<br>77 Franklin Street<br>Westerly, RI 02891 | 11. Dr. David Leibowitz<br>Warrren Family Practice<br>851 Main Street<br>Warren, RI 02885 |
| 2. Dr. Rex Appenfeller<br>Anchor Medical Associates<br>1 Commerce Street<br>Lincoln, RI 02865 | 12. Dr. William Levin<br>Salve Regina College Health Center<br>100 Ochre Point Ave<br>Newport, RI 02840 |
| 3. Dr. Stephen Beaupre<br>Midland Medical<br>1312 Oaklawn Avenue<br>Cranston, RI 02920 | 13. Dr. Claire McMillian<br>East Greenwich Pediatrics, Inc<br>1377 South County Trail-Suite 2B<br>East Greenwich, RI 02818 |
| 4. Dr. Christopher Campagnari<br>Wood River Health Services, Inc<br>823 Main Street<br>Hope Valley, RI 02832 | 14. Joan Mullaney, RNP<br>Well One Primary Medical<br>36 Bridgeway<br>Pascoag, RI 02825 |
| 5. Dr. Nitin Damle<br>South County Internal Medicine<br>481 Kingstown Road<br>Wakefield, RI 02879 | 15. Dr. Fortunato Procopio<br>University of Rhode Island<br>Potter Building Health Center<br>6 Butterfield Road<br>Kingston, RI 02881 |
| 6. Dr. Michael Felder<br>University Medicine Foundation<br>1035 Post Road<br>Warwick, RI 02888 | 16. Dr. Jennifer Salm<br>Aquidnick Medical Associates, Inc<br>50 Memorial Boulevard<br>Newport, RI 02840 |
| 7. Dr. John Finigan<br>Coastal Waterman Pediatrics<br>900 Warren Avenue<br>East Providence, RI 02914 | 17. Dr. Edward Stulik<br>University Medical Foundation<br>1525 Wampanoag Trail, Suite 202<br>East Providence, RI 02915 |
| 8. Dr. William Garrahan<br>Community College of Rhode Island<br>400 East Avenue<br>Warwick, RI 02860 | 18. Lynn Wachtel, RNP<br>Rhode Island College<br>Brown Hall<br>600 Mount Pleasant Avenue<br>Providence, RI 02908 |
| 9. Dr. Monica Gross<br>South County Walk-in & Primary<br>360 Kingstown Road Suite 104<br>Narragansett, RI 02883 | 19. Dr. Edward Wheeler<br>Brown University Health Center<br>13 Brown Street<br>Providence, RI 02912 |
| 10. Dr. Steven Hokeness<br>Bryant University Health Center<br>1150 Douglas Pike<br>Smithfield, RI 02917 | 20. Dr. Peter Yasigian<br>Blackstone Valley Pediatrics<br>2 Meehan Lane<br>Cumberland, RI 02864 |

# References:


1. "Background on Influenza. Centers for Disease Control and Prevention." http://www.cdc.gov/flu/professionals/background.htm

2. "Key Facts about Avian Influenza (Bird Flu) and Avian Influenza A (H5N1) Virus." Centers for Disease Control and Prevention... http://www.cdc.gov/flu/avian/gen-info/facts.htm

3. "Avian Influenza: Current Situation." Centers for Disease Control and Prevention. http://www.cdc.gov/flu/avian/outbreaks/current.htm

4. "Overview of Influenza Surveillance in the United States." Centers for Disease Control and Prevention. http://www.cdc.gov/flu/weekly/overview.htm

5. "Archive of tables with cumulative number of confirmed human cases of avian influenza A (H5N1) reported to WHO. http://www.who.int/influenza/human_animal_interface/H5N1_cumulative_table_archives/en/index.html

# *Appendix A. Estimated Level of Influenza Activity*

**State health departments report the estimated level of influenza activity in their states each week. These levels are defined as follows (note that region corresponds to county in RI):**

- **No Activity:** Overall clinical activity remains low and there are no lab confirmed cases.
- **Sporadic:** Isolated cases of lab confirmed influenza in the state; ILI activity is not increased OR a lab confirmed outbreak in a single institution in state; IL I activity is not increased
- **Local:** Increased ILI within a single region AND recent (within the past 3 weeks) laboratory evidence of influenza in the region. ILI activity in other regions is not increased. OR two or more institutional outbreaks (ILI or lab confirmed) within a single region AND recent lab confirmed influenza in that region. Other regions do not have increased ILI and virus activity is no greater than sporadic in those regions.
- **Regional:** Increased ILI in ≥2 but less than half of the regions AND recent lab confirmed influenza in the affected regions. OR Institutional outbreaks (ILI or lab confirmed in ≥2 and less than half of the regions AND recent lab confirmed influenza in the affected regions.
- **Widespread:** Increase ILI and/or institutional outbreaks (ILI or lab confirmed) in at least half of the regions AND recent (within the past 3 weeks) lab confirmed influenza in the state.

# *Appendix B. Infection Control Measures During Times of Influenza Outbreaks*

## INFLUENZA INSTITUTIONAL OUTBREAKS

**Definitions**

- **Cluster: Three or more cases of acute febrile respiratory illness (AFRI) occurring within 48 to 72 hours, in residents who are in close proximity to each other (e.g., in the same area of the facility).**
- **Outbreak: A sudden increase of AFRI cases over the normal background rate or when any resident tests positive for influenza. One case of confirmed influenza by any testing method in a long-term care facility resident is an outbreak.**

**When influenza outbreaks occur in health-care settings, additional measures should be taken to limit transmission. These include:**

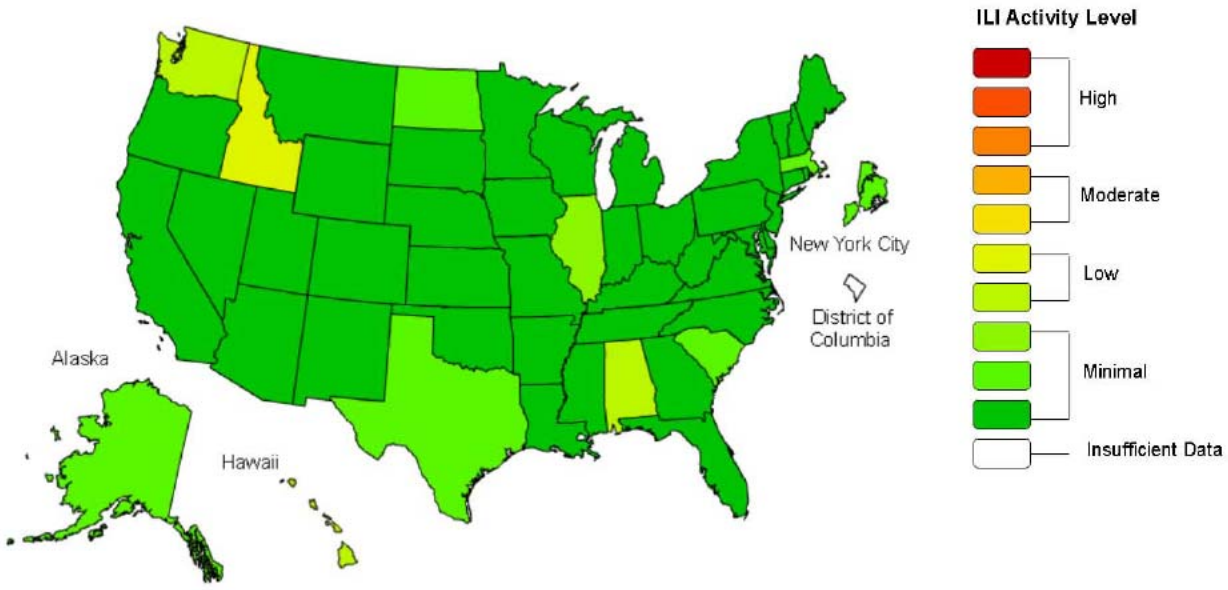
- Inform local and state health department officials within 24 hours of outbreak recognition. Determine if the health department wants clinical specimens or viral isolates.
- Implement daily active surveillance for respiratory illness among all residents and health care personnel until at least 1 week after the last confirmed influenza case occurred.
- Identify influenza virus as the causative agent early in the outbreak by performing rapid influenza virus testing of residents with recent onset of symptoms suggestive of influenza. In addition, obtain viral cultures from a subset of residents to confirm rapid test results (both positive and negative) and to determine the influenza virus type and influenza A subtype. Ensure that the laboratory performing the tests notifies the facility of tests results promptly.
- Implement Droplet Precautions (http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html) for all residents with suspected or confirmed influenza.
- Confine the first symptomatic resident and exposed roommate to their room, restrict them from common activities, and serve meals in their rooms.
- If other patients become symptomatic, cancel common activities and serve all meals in patient rooms. If patients are ill on specific wards, do not move patients or personnel to other wards, or admit new patients to the wards with symptomatic patients.
- Limit visitation, exclude ill visitors, and consider restricting visitation of children via posted notices.
- Monitor personnel absenteeism due to respiratory symptoms and exclude those with influenza-like symptoms from patient care for 5 days following onset of symptoms, when possible.
- Restrict personnel movement from areas of the facility having outbreaks to areas without patients with influenza.
- Limit new admissions.
- Administer the current season's influenza vaccine to unvaccinated residents and health care personnel as per current vaccination recommendations for nasal and intramuscular influenza vaccines.
- Administer influenza antiviral chemoprophylaxis and treatment to residents and health care personnel according to current recommendations.
- Consider antiviral chemoprophylaxis for all health care personnel, regardless of their vaccination status, if the health department has announced that the outbreak is caused by a variant of influenza virus that is a sub-optimal match with the vaccine.

# *Appendix C. MMWR Week Number and Corresponding Dates for 2011-2012*

| CDC Week Number for 2011-2012 | Beginning Date | End Date |
|---|---|---|
| **40** | 2-Oct | 8-Oct |
| **41** | 9-Oct | 15-Oct |
| **42** | 16-Oct | 22-Oct |
| **43** | 23-Oct | 29-Oct |
| **44** | 30-Oct | 5-Nov |
| **45** | 6-Nov | 12-Nov |
| **46** | 13-Nov | 19-Nov |
| **47** | 20-Nov | 26-Nov |
| **48** | 27-Nov | 3-Dec |
| **49** | 4-Dec | 10-Dec |
| **50** | 11-Dec | 17-Dec |
| **51** | 18-Dec | 24-Dec |
| **52** | 25-Dec | 31-Dec |
| **1** | 1-Jan | 7-Jan |
| **2** | 8-Jan | 14-Jan |
| **3** | 15-Jan | 21-Jan |
| **4** | 22-Jan | 28-Jan |
| **5** | 29-Jan | 4-Feb |
| **6** | 5-Feb | 11-Feb |
| **7** | 12-Feb | 18-Feb |
| **8** | 19-Feb | 25-Feb |
| **9** | 26-Feb | 3-Mar |
| **10** | 4-Mar | 10-Mar |
| **11** | 11-Mar | 17-Mar |
| **12** | 18-Mar | 24-Mar |
| **13** | 25-Mar | 31-Mar |
| **14** | 1-Apr | 7-Apr |
| **15** | 8-Apr | 14-Apr |
| **16** | 15-Apr | 21-Apr |
| **17** | 22-Apr | 28-Apr |
| **18** | 29-Apr | 5-May |
| **19** | 6-May | 12-May |
| **20** | 13-May | 19-May |

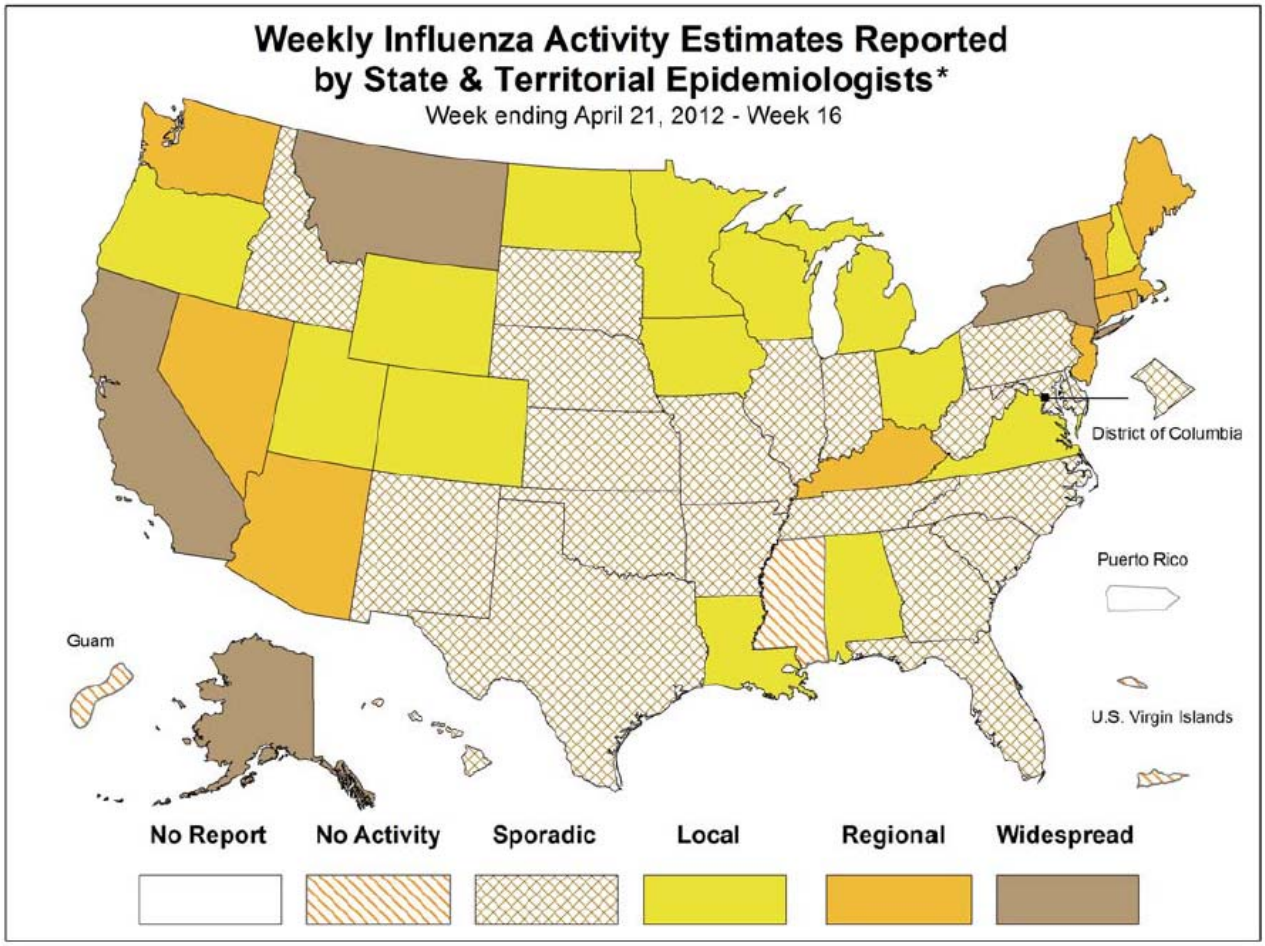
# *Appendix D. Influenza-Like Illness (ILI) Activity Level Indicator Map*

**Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILINet**
**2011-12 Influenza Season Week 16 ending Apr 21, 2012**




*This map uses the proportion of outpatient visits to health care providers for influenza-like illness to measure the ILI activity level within a state. It does not, however, measure the extent of geographic spread of influenza viruses within a state. Therefore, outbreaks occurring in a single city could cause the state to display high activity levels.
Data collected in ILINet may disproportionally represent certain populations within a state, and therefore, may not accurately depict the full picture of influenza activity for the whole state.
Data displayed in this map are based on data collected in ILINet, whereas the State and Territorial influenza activity map is based on reports from state and territorial epidemiologists. The data presented in this map is preliminary and may change as more data is received.
Differences in the data presented here by CDC and independently by some state health departments likely represent differing levels of data completeness with data presented by the state likely being the more complete.

# *Appendix E. Influenza Activity Level Indicator Map*




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

# *Appendix F: Population-Based Influenza Hospitalization Surveillance Project (IHSP) Demographic Data*

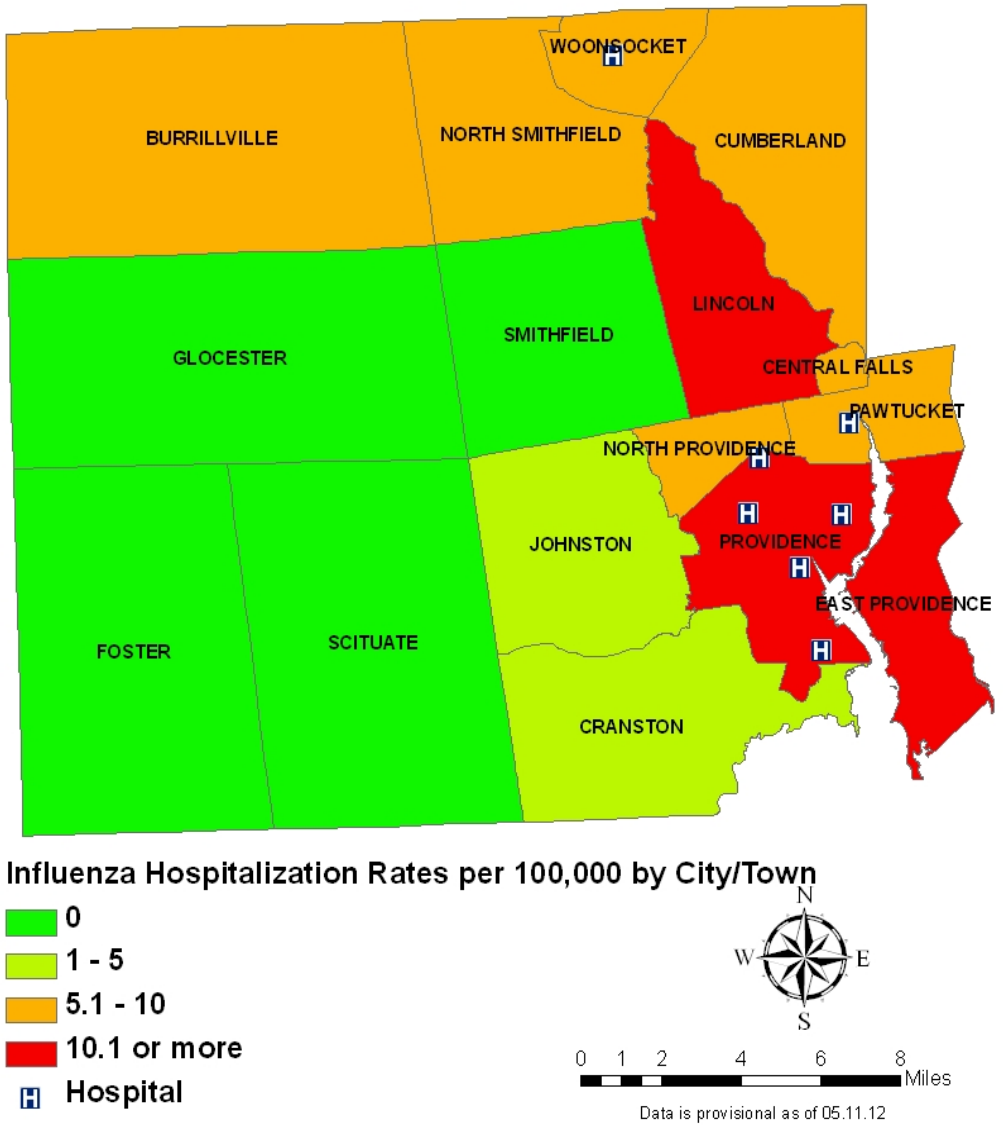
**Table 3:** Demographic characteristics of laboratory confirmed, influenza-associated hospitalizations in Providence county residents, Rhode Island FluServ-NET site, 2011-2012

| Characteristic | Total number of cases | Percent | Rate per 100,000 |
|---|---|---|---|
| **Age in years** | | | |
| 0-4 | 3 | 6 | 8.03 |
| 5-19 | 5 | 9 | 4.04 |
| 20-49 | 10 | 19 | 3.77 |
| 50-64 | 10 | 19 | 8.64 |
| 65+ | 25 | 47 | 29.62 |
| **Sex** | | | |
| Male | 19 | 36 | 6.28 |
| Female | 34 | 64 | 10.48 |
| **Race/Ethnicity** | | | |
| **Race** | | | |
| White | 32 | 60 | 6.96 |
| Asian and Pacific Islander | 3 | 6 | 13.04 |
| Black | 8 | 15 | 15.08 |
| American Indian and Alaskan Native | 0 | 0 | 0 |
| Multiracial | 0 | 0 | 0 |
| Race unknown | 6 | 11 | NA |
| Missing | 4 | 8 | NA |
| **Ethnicity** | | | |
| Hispanic or Latino | 4 | 8 | 3.40 |
| Non-Hispanic or Latino | 45 | 85 | 8.84 |
| Not Specified | 3 | 6 | NA |
| Missing | 1 | 2 | NA |

**Source:** Rates are based on 2010 census estimates, U.S Census Bureau

# *Appendix G: Population-Based Influenza Hospitalization Surveillance Project (IHSP) Geographic Data*

Figure 20: Influenza Hospitalization Rates in Providence county residents by City/Town
Rhode Island, 2011-2012 Influenza Season



# *Appendix H. Glossary*

**RI ILINet Provider:** A healthcare provider in Rhode Island who volunteers to monitor outpatient visits for ILI during an influenza season. The Rhode Island ILINet providers are part of the Outpatient Influenza-Like Illness Surveillance Network that is a collaborative effort between CDC and state health departments. The purpose of ILINet is to monitor outpatient visits for ILI. ILINet providers report ILI information to CDC on a weekly basis. Information is provided by age group and by total patient visits for all causes for each week. The %ILI for each state is calculated based on the total number of ILI visits during a particular week divided by the sum total of all patient visits during the same week.

**Influenza-Like Illness (ILI):** Defined as a temperature of ≥100.0$^{o}$F (37.8$^{o}$C) and either cough or sore throat in the absence of known cause.

**National Baseline:** Percent ILI that would be expected if influenza viruses were not circulating. The national baseline is 2.1% for this season. The national baseline was calculated as the mean weighted percentage of visits for ILI during non-influenza weeks, plus two standard deviations.

**Avian Flu (H5N1)**: Avian influenza is caused by influenza viruses that occur naturally among wild birds. The H5N1 variant is deadly to domestic fowl and can be transmitted from birds to humans. At this time the H5N1 virus cannot easily be transmitted from person to person. There is no human immunity to this virus and no vaccine is available.

**Pandemic Flu**: Pandemic influenza is a worldwide outbreak of severe flu caused by a virus that is new to humans. Pandemics occur when a new or markedly changed virus develops. Because the virus is new or very different from any virus seen before, there is no natural immunity (defenses) in the human population, and the disease can spread easily from person to person. In a pandemic, many people may get sick at the same time, and many may die.

http://www.cdc.gov/flu/**Seasonal Flu**: Seasonal influenza is a respiratory illness that can be transmitted person to person. Most people have some immunity, and a vaccine is available.

# *Appendix I: For More Information:*

Rhode Island Department of Health Influenza Website
http://www.health.ri.gov/flu/index.php

Centers for Disease Control (CDC)
http://www.cdc.gov/flu/

World Health Organization (WHO)
http://www.who.int/topics/influenza/en/

Prevention: Cover your cough print ready flyer
http://www.cdc.gov/flu/protect/pdf/covercough_school8-5x11.pdf

Rules and Regulations Pertaining to the Reporting of Communicable, Environmental, and Occupational Diseases – February 2006.
http://www2.sec.state.ri.us/rules/released/pdf/DOH/DOH_3844.pdf

MMWR Influenza reports:
http://www.cdc.gov/mmwr/mguide_flu.html

## Avian and Pandemic Influenza:

World Health Organization Avian Influenza page
http://www.who.int/csr/disease/avian_influenza/en/

CDC Avian Influenza page:
http://www.cdc.gov/flu/avian/outbreaks/current.htm

**Michael Fine, MD. . . . ……..... Director of Health**
**Donna Costantino, MBA …….. Director, Division of Infectious Diseases & Epidemiology**
**Utpala Bandy, MD, MPH. ..... State Epidemiologist**
**Tara Cooper, MPH. ……..... Program Manager**
**Mardea Caulcrick-Grimes, MPH, BS..... Public Health Epidemiologist**
**Ananda Bandyopadhyay, MBBS,MPH ..... Public Health Epidemiologist**
**Diane Brady, MS, RN ……..... Public Health Nurse Coordinator**
**Robert Ireland PhD. ……. Molecular Biologist**
**Gabriella Corvese…… Student Intern**