



Iowa Influenza Surveillance Network (IISN) 2008-2009 Annual Report



Background and Methods

The Iowa Influenza Surveillance Network (IISN) was established in 2005 though flu surveillance has occurred in Iowa for many years. In 2008-2009, the core components of the IISN were outpatient health care providers (ILINet), hospitals, long term care facilities, schools, and laboratories. All surveillance data is reported through web-based reporting tools. The Iowa Department of Public Health (IDPH) maintains the reporting tools for schools, hospitals, and long term care facilities. The Centers for Disease Control and Prevention (CDC) hosts the reporting site for ILINet or outpatient health care provider surveillance sites. The University Hygienic Laboratory (UHL) coordinates the laboratory reporting site using a Web-based reporting tool. Data from all web sites may be pulled and utilized at any time.

National influenza activity

Influenza activity nationally was less severe than in recent years. The most common strain of influenza reported was A H1N1. Of significance was that this dominant strain was resistant to oseltamivir, a commonly used anti-viral medication. Resistance was reported in only a few specimens submitted to CDC in 2007-2008. In 2008-2009 more than 95% of H1N1 viruses were resistant to oseltamivir. Interestingly, the H1N1 resistant viruses were susceptible to amantadines (antiviral medication) and H3N2 viruses were not. Resistance to amantadine has been reported by CDC for years among commonly circulating seasonal influenza strains.

CDC antigenically characterized a subset of specimens submitted in 2008-2009. The subset consisted of 947 influenza A H1 viruses, 171 A H3, and 517 influenza B viruses. All of the influenza A H1 and H3 were similar to the H1 and H3 vaccine components in the 2008-2009 vaccine (A/Brisbane/59/2007 and A/Brisbane/10/2007). As seen in previous years, there were two circulating strains of influenza B; B/Yamagata/16/88 and B/Victoria/02/87. These strains are not genetically similar and belong to different lineages of influenza B strains. Only 65 of 517 influenza B viruses characterized were B/Yamagata, which was genetically similar to the influenza B component of the 2008-2009 vaccine. The remaining 452 viruses belonged to the B/Victoria lineage that was not related to the vaccine. In 2007-2008, the opposite situation occurred where the B/Victoria was in the vaccine but the B/Yamagata was the most common circulating B virus.

Iowa surveillance summary

Influenza activity in Iowa, like the national picture, was mild compared to previous years. Activity was low in all programs including school-based surveillance. There were no pediatric deaths attributed to influenza known to IDPH. There was one case of H1N1 classical swine influenza reported in December 2008, and the case had significant contact with hogs. Since 2005, 12 other human cases of classical swine influenza have been reported in the

U.S. Of those, three occurred in Iowa. The classical swine influenza virus that caused illness in these three Iowa patients was not related to the pandemic H1N1 virus.

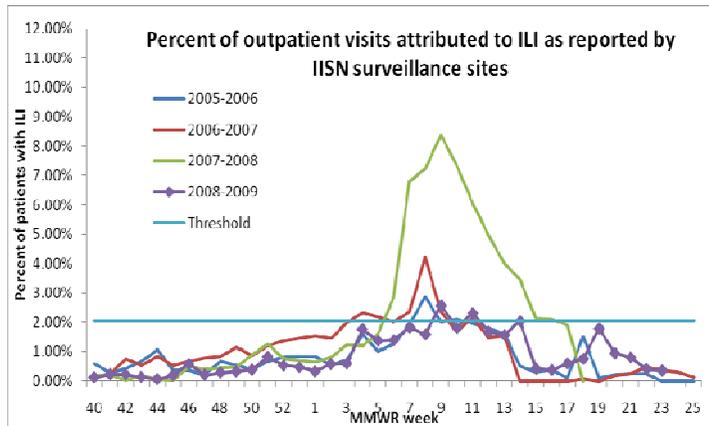


Figure 1

ILINet

There were 16 health care providers that participated in ILINet this season. Of those, 11 reported on a regular basis. Providers report the total number of patients seen and number of patients with influenza-like illness (ILI) by age group. This was a very mild flu season overall as was reflected in the ILINet data. The percent of patients with ILI only exceeded threshold three weeks in 2009. Comparing data from the past four years, only 2005-2006 had fewer instances of significant ILI percentage. An average of 3,000 patients visits were reviewed for ILI each week.

Hospital surveillance

There were only 77 influenza-associated hospitalizations reported through the IISN this season. This was a 70% decrease in the number of hospitalizations reported the previous season. The distribution of hospitalizations by age group was unusual in that most hospitalizations occurred in patients aged 0-64. In most flu seasons, patients ages 0-4 and >64 experience a higher proportion of hospitalizations than people ages 5-64.

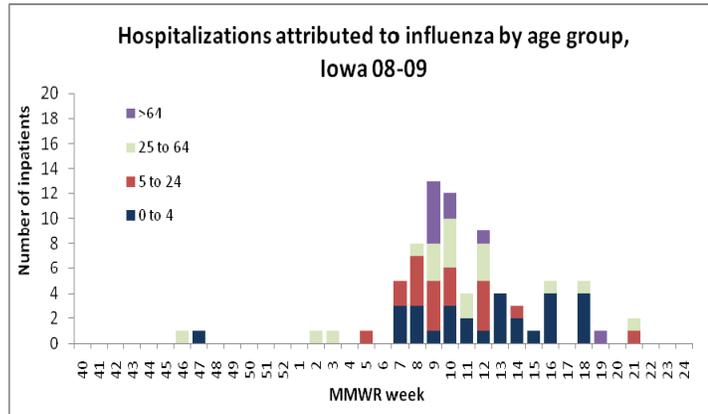


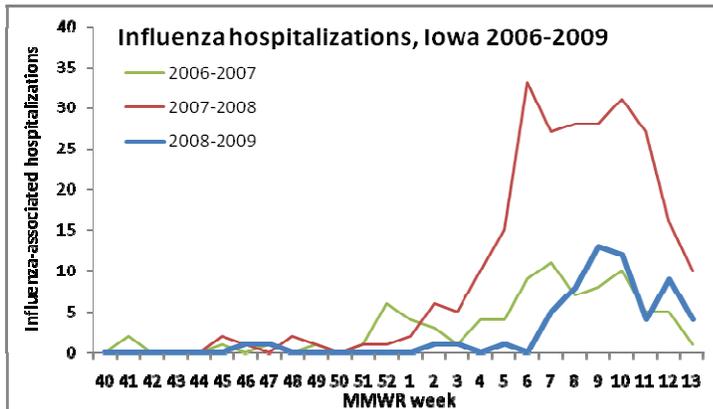
Figure 2

Individual case data was reported for the first time through an expansion of the existing hospital-based surveillance system.

The two demographic characteristics collected by the individual case report form are age and county of residence. Cases were reported from Iowa’s most populous counties including Polk, Johnson, and Scott. There were hospitalizations reported from 15 counties. The mean age at time of hospitalization was 31.6 years, median 26 years, with a range of 2 months to 82 years.

Of those hospitalized to date, 29 have recovered, 11 were still ill at time of hospitalization, and one death was reported. The death was reported in a 78 year old patient hospitalized with pneumonia. The

mean number of days hospitalized was 2.45, median 2, with a range of 0 to 15 days.



To date, 60 cases of influenza were reported through the aggregate system and 41 individual cases were reported in the individual case reporting system. Therefore the IDPH received individual case data on 68% of all cases reported in the surveillance network.

Figure 3

Of the 28 facilities enrolled, 19 report more than 70% of the time.

School surveillance

There were 52 schools enrolled in the IISN this season and of those an average of 25 reported every week. School data has historically been an excellent predictor of peak influenza activity and this year was no exception. Activity breached the threshold early in February, which was the same time ILINet providers saw an increase in patients with ILI.

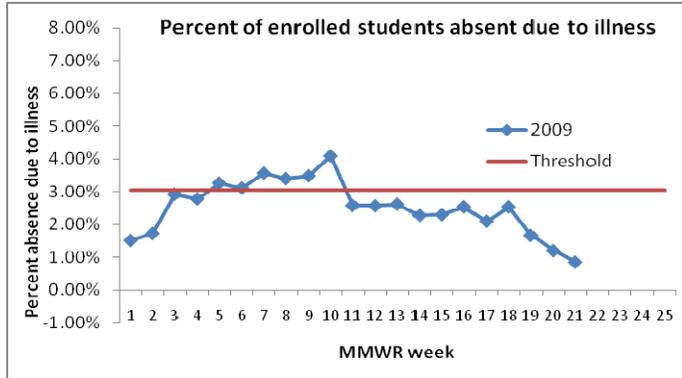


Figure 4

Laboratory surveillance

A primary function of influenza surveillance is confirmatory testing. Many health care providers rely on rapid antigen (RA) testing, in addition to a clinical evaluation, to determine whether a patient has influenza or not. There are two significant limitations with RA flu tests. When flu activity is low the ability of RA tests to accurately detect flu is low. Though some tests differentiate between flu types, RA tests lack the ability to determine the strain of influenza infecting a patient. Confirmatory testing solves both problems. PCR and viral culture have high sensitivity and specificity and allow the assignment of type and strain. UHL influenza tests will reveal the type (A or B) and strain for the hemagglutinin (H1, 3, 5, or 7) portion of the virus. Neuraminidase assignment is completed at CDC for a subset of Iowa influenza specimens.

UHL tests influenza specimens submitted for confirmation year-round. All results are sent electronically to IDPH on a daily basis. In addition to seasonal flu strains, UHL can detect unusual human cases of influenza like classical swine flu.

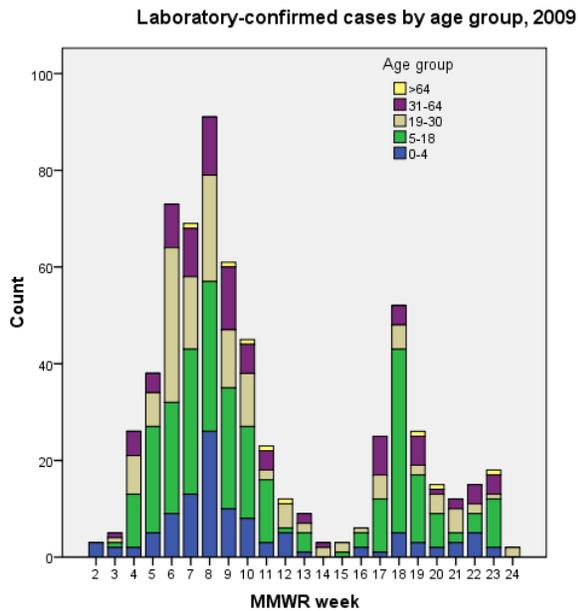


Figure 5

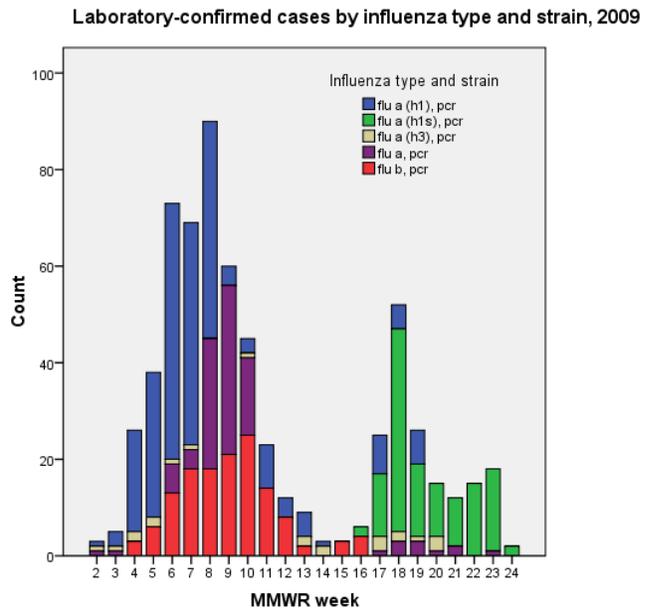


Figure 6

UHL maintained and expanded a statewide network of Iowa Laboratory Response Network (Iowa LRN) Laboratories that reported rapid antigen influenza and RSV data throughout the influenza season. There were 144 labs that registered to participate a little more than one-quarter reported on time each week. There were sites in every region of Iowa though some regions had a low number of tests performed compared to others. Detailed graphs of each region of Iowa are in Appendix A.

Slightly more laboratory-confirmed cases were seen in school-age patients than in other age groups. Very few cases were reported in patients over 64 years of age. Laboratory-confirmed cases were highest at the end of February.

Influenza A peaked at the end of February and the dominant strain was seasonal AH1N1. Influenza B peaked approximately two weeks after.

RSV surveillance

Health care providers and IISN participants have often commented over the years that they would appreciate viral prevalence data in addition to influenza. Respiratory Syncytial virus (RSV) is always of particular interest because of its high prevalence among young infants and the availability of a high-cost immune globulin treatment to infants more susceptible to RSV and RSV complications than otherwise healthy infants.

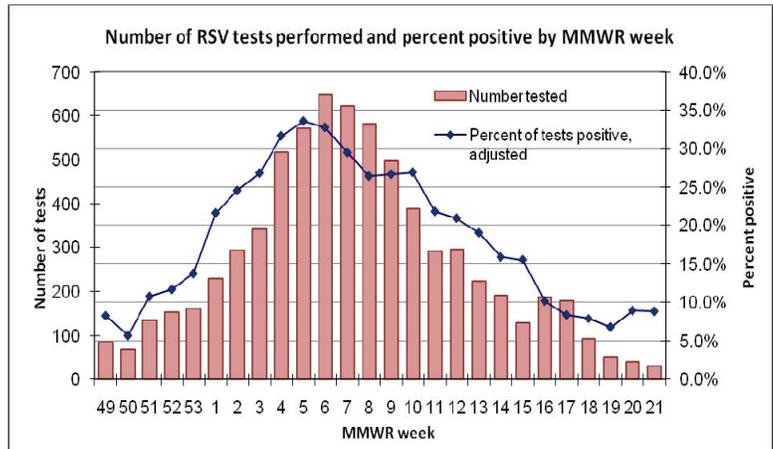


Figure 7

With the success of RA reporting through the Iowa LRN, UHL added reporting of RSV rapid antigen testing to their weekly influenza survey. Laboratories now report total tests performed and total positive. The results are calculated into a regional and state average. CDC has determined that when 10% or more of tests are positive, it is likely that RSV is prevalent in the surveyed community.

RSV RA test positivity exceeded 10% starting the end of December and continued until the end of April. Reporting did not begin until the beginning of December but will occur year-round now so that IDPH and UHL gain a better understanding of the actual RSV season in Iowa.

Pandemic influenza A H1N1

On April 16th, two cases of influenza AH1N1 swine-like virus were reported in two children from California. Neither case had contact with pigs or each other. Within days it was discovered that the cases had a novel strain of influenza never before seen in humans or animals. The virus had genetic components of human, avian, and swine viruses. Outbreaks were soon reported in multiple states and widespread activity was reported by Mexico.

Iowa experienced its first case the first week of May. The case had recently traveled to Mexico and was believed to have acquired disease there. Subsequent cases did not have links to other countries. The mean patient age was 15.8, gender was evenly dispersed, and nearly all cases had a cough and fever $\geq 100^{\circ}\text{F}$. As of June 20, 2009, there were 139 cases of pandemic influenza AH1N1 reported to the IDPH. It must be noted that not all suspected cases are recommended for testing and have not been since late May. Testing likely detects a very small percentage of actual cases.

Cases continue to occur throughout the U.S. and in other countries. It is unknown whether the virus will circulate again in the fall.

Goals and expectations for 2009-2010

Goals for next year include exciting expansions in planning and surveillance activities. IDPH will be partnering with UHL again and will also collaborate with University of Iowa researchers to better plan and expand the existing Iowa Influenza Surveillance Network. Improvements in planning and surveillance will save recruitment time and will create a network better prepared to respond to not only season influenza activity, but potential pandemic influenza as well.

IDPH will work to increase the number of hospital surveillance sites and will continue to capture aggregate and individual case data on those inpatients. IDPH has been participating in a pilot project to improve surveillance in hospitals and will be in the second year of that program for the 2009-2010 flu season. *Strategies to Improve Surveillance of Influenza in Hospitals* is granted by the Council of State and Territorial Epidemiologists and supervised by CDC.

Given the potential for five circulating influenza strains this fall, IDPH will continue all surveillance programs except school-based throughout the summer and into fall.

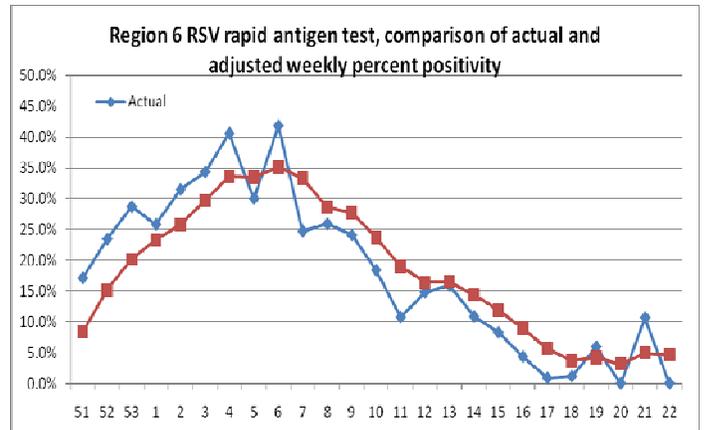
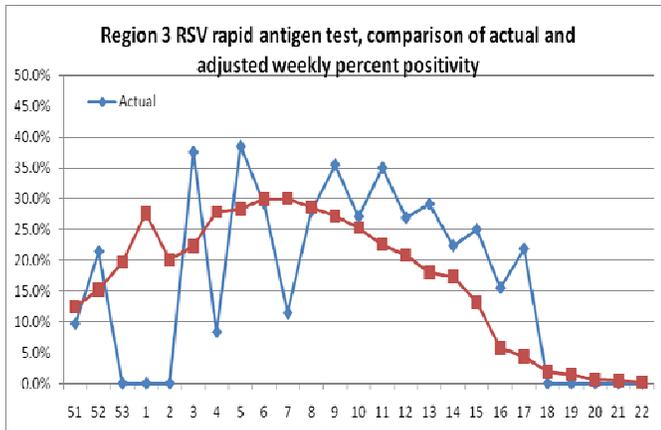
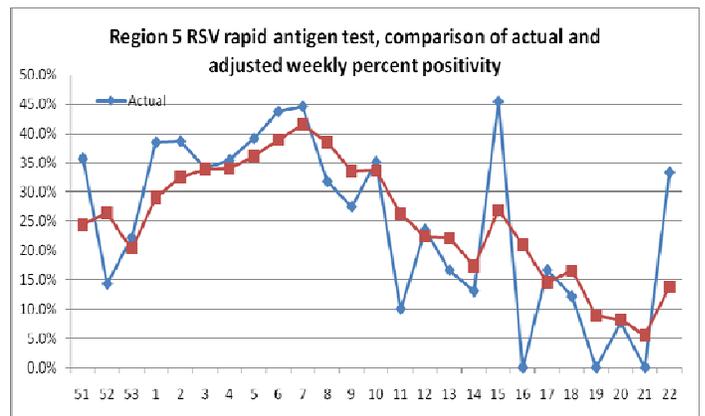
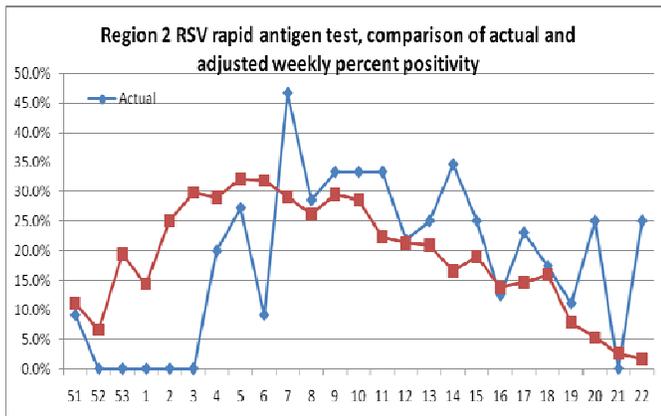
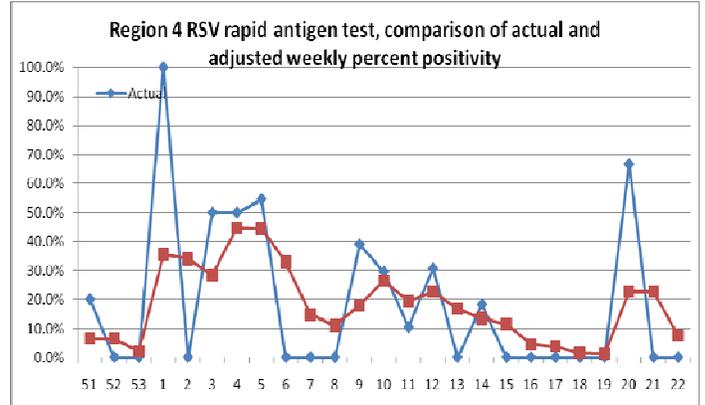
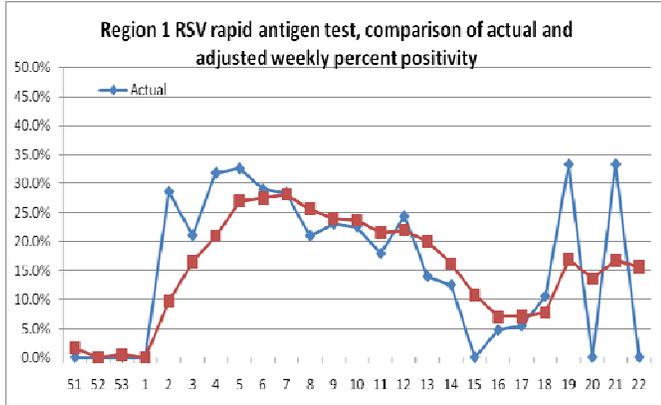
IDPH and UHL are also working to better validate the RSV data reported. UHL will start confirming RSV RA tests at the beginning and end of the season when the ability of the test to detect the virus is weak. In addition, IDPH will report three-week average percentages instead of the weekly statistic. This will help account for weeks when the number of laboratories reporting is lower than expected. It is the goal of UHL and IDPH to have one laboratory actively reporting for every 50,000 residents in each of six regions of Iowa (Table 1).

Table 1. Number of laboratory surveillance sites for every 50,000 residents by region

Region	Population of region	Pop. of region/50,000
1	806,425	16.12
2	289,212	5.78
3	326,562	6.53
4	283,189	5.66
5	347,572	6.95
6	886,537	17.73

All tasks related to influenza surveillance have be catalogued in the IISN work plan for 2009-2010 found in Appendix B.

Appendix A



Appendix B- Iowa Influenza Surveillance Network work plan 2009-2010