



**INFLUENZA SURVEILLANCE PROGRAM**  
**2010-11 INFLUENZA SURVEILLANCE SEASON**  
**WASHOE COUNTY HEALTH DISTRICT**

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**Date:** June 23, 2011

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**To:** Dr. Joseph Iser, District Health Officer  
Randy Todd, Epi Center Director  
Participating Health Care Providers  
Ihsan Azaam, Nevada State Health Division  
L. D. Brown, Medical Director, Nevada State Public Health Laboratory

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**From:** Denise Stokich, Epidemiologist  
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**Subject:** Summary of 2010-11 Influenza Surveillance Program

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**The Program:** The 2010-11 influenza surveillance program was conducted between October 3, 2010 and May 21, 2011. Eight local health care providers sent weekly reports of the numbers of persons seen with a fever of  $\geq 100^{\circ}$  F AND cough and/or sore throat in the absence of a KNOWN cause other than influenza.

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**The Participants:** The health care providers participating in the program were:

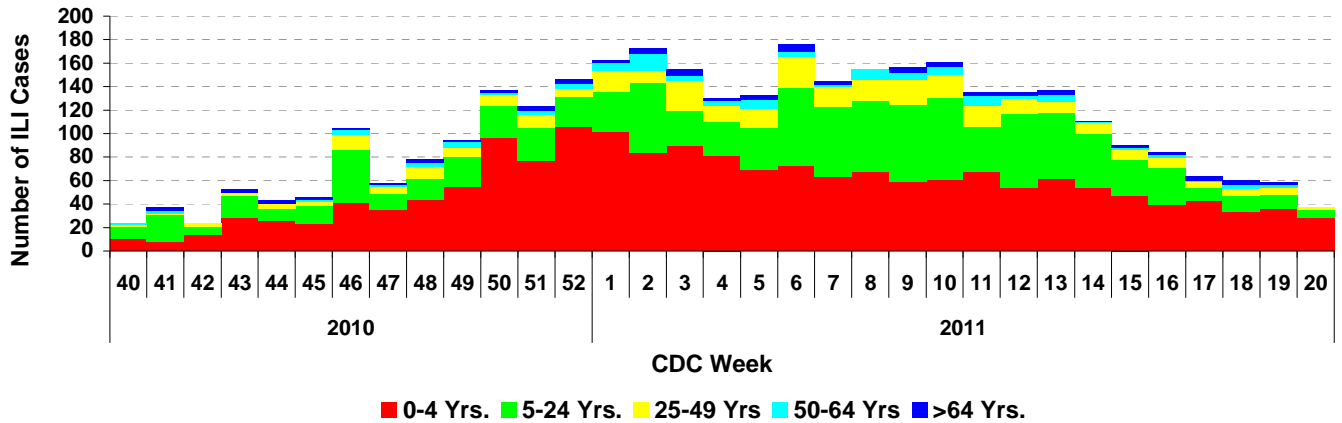
- Family Medicine Associates, Ltd.
- UNR Student Health Services
- Renown Medical Group - Pediatrics
- Emily A. Smith, MD
- Northern Nevada Medical Center Emergency Department
- Renown Regional Medical Center Emergency Department
- Renown South Meadows Regional Medical Center Emergency Department
- Saint Mary's Regional Medical Center Emergency Department

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**Level of Influenza Activity:** The following graph illustrates the number of ILI cases by age group and week. Influenza activity in the > 65-year age group was consistently low through the season. This age group is the main target for influenza immunization. These data suggest the vaccination program was successful at lowering influenza illness in the targeted age group.

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**Number of ILI Cases by Week and Age Group Reported by Sentinel Providers, Washoe County  
Influenza Surveillance, 2010–11.**



The Centers for Disease Control and Prevention (CDC) established a Region 9 (Arizona, California, Hawaii, Nevada) baseline of 4.1% for this season. The percentage of overall patient visits for ILI in Washoe County peaked between December 26, 2010 and January 15, 2011 (weeks 52, 1 and 2) at 3.9%, 4.0% and 3.9% respectively. The U.S. baselines for the same weeks were 2.6%, 2.2% and 2.9%.

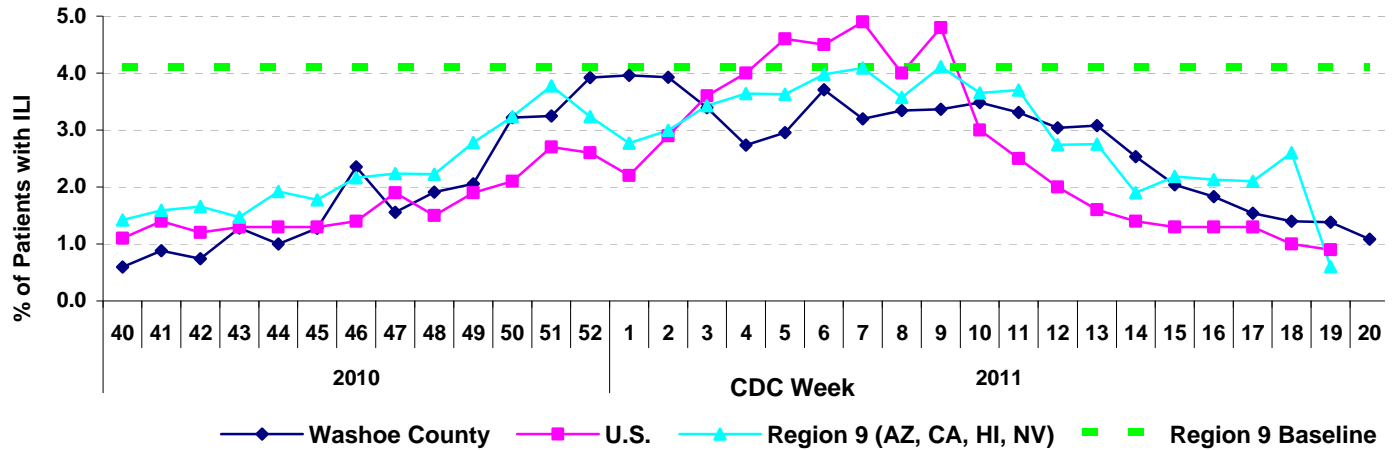
The Region 9 baseline set by CDC for the 2009-2010 influenza season was 2.8%. During the influenza A (2009 H1N1) pandemic of 2009-2010 the overall percentage of patient visits for ILI in Washoe County peaked at 7.2% between October 4 and October 17, 2009 (weeks 40 and 41). The timing of this peak was very unusual for Washoe County, but was comparable to that seen nationally.

For the three seasons prior to the pandemic, the peak percentage of patient visits for ILI in Washoe County ranged from 2.0% to 7.3% and occurred in February.

Nationally, the percentage of overall patient visits for ILI peaked at 4.9% during the week ending February 19, 2011 (week 7). During the influenza A (2009 H1N1) pandemic of 2009-2010 the percentage peaked at 8.0% for the week ending October 24, 2009 (week 42). For the three seasons prior to the pandemic, the peak percentage of patient visits for ILI nationally ranged from 3.6% to 6.4% and occurred in February.

In summary, the percentage of overall patient visits for ILI in Washoe County and the timing of the peak for the 2010-2011 season seems to have returned to that which is more consistent with past seasons. Historically, the peak percentage of patient visits for ILI in Washoe County occurs anytime between late-December through February.

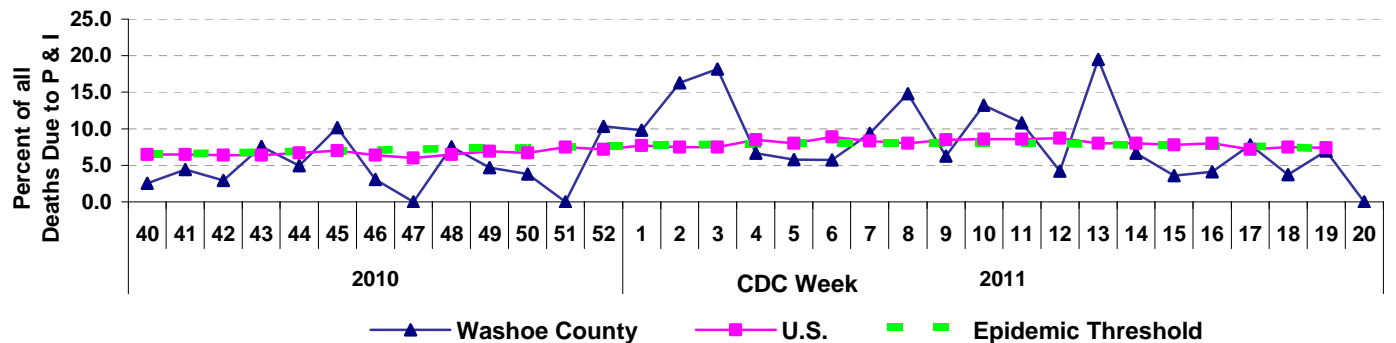
**Proportion of Patients Seen with ILI by Sentinel Physicians, Washoe County Influenza Surveillance, 2010–11.**



The proportion of deaths due to pneumonia and influenza (P & I ratio) in Washoe County was monitored during the 2010-11 influenza season. Large variations in P & I from week to week were observed, and were likely attributable to the relatively small population size of the county as compared to the U.S. as a whole. In addition, staffing issues in the office of Vital Statistics (which consists of only two individuals) can result in skewed data if vacation, sick leave or a holiday occurs during a particular week.

The P & I ratio as reported by the 122 Cities Mortality Reporting System peaked at 8.9% during the week ending April 12, 2011 (week 06). The U.S. epidemic threshold was 8.0% for this week.

**Pneumonia and Influenza Mortality, Washoe County Influenza Surveillance, 2010–11.**



The large variation is likely attributable to the relatively small population size of the county as compared to the U.S. as a whole, as well as due to staffing issues in the office of Vital Statistics which consists of only two individuals. The data can be skewed as a result of vacation, sick leave or a holiday occurring during a particular week.

**Testing:**

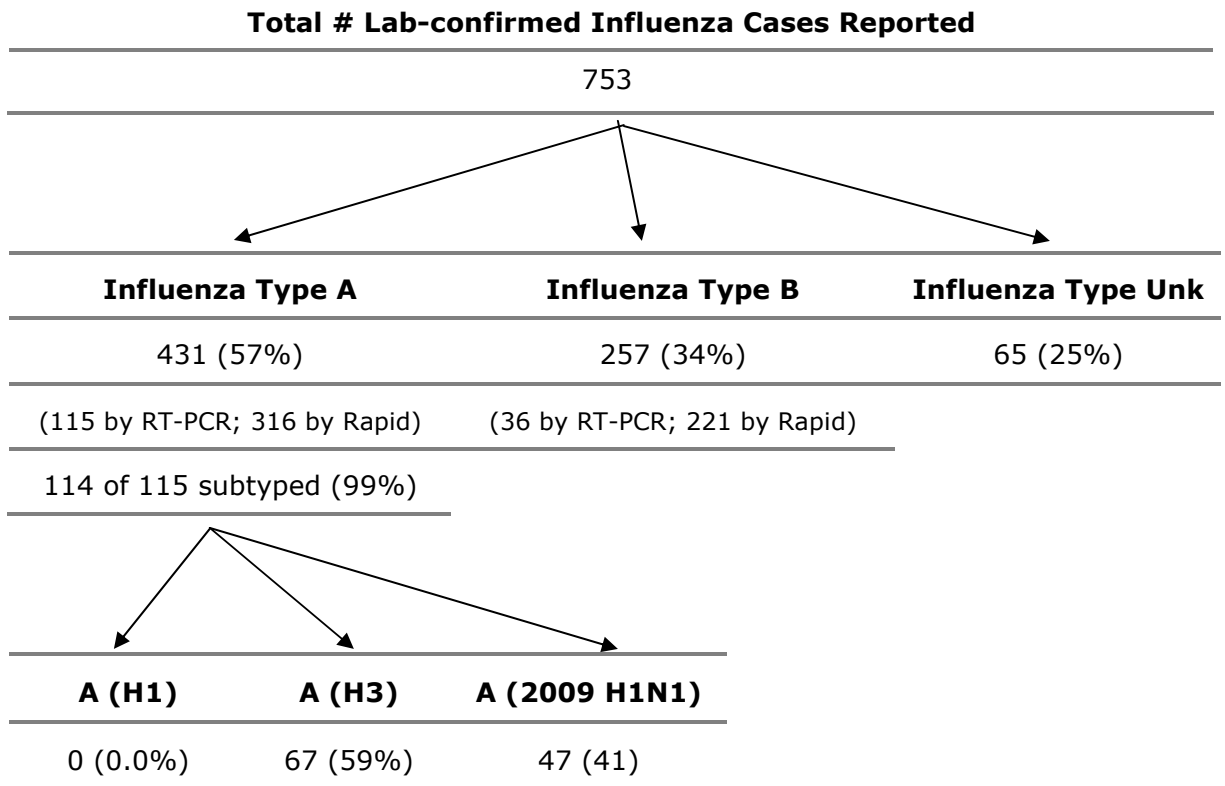
Family Medicine Associates, UNR Student Health Services, Renown Medical Group – Pediatrics, and Dr. Emily Smith’s office were given viral culture media to test patients who fit the criteria for influenza-like illness (ILI). The hospital providers did not participate in the testing component of surveillance. Thirty-eight (46%) of 82 specimens

submitted for viral testing to the Nevada State Public Health Laboratory (NSPHL) were positive for influenza by RT-PCR (Real Time Reverse Transcription Polymerase Chain Reaction). Twenty-nine (76%) of the 38 positive specimens were identified as influenza type A (19 were subtyped as A (2009 H1N1) and ten as influenza A (H3). The remaining 9 positive specimens (24%) were identified as influenza type B.

A total of 753 laboratory-confirmed cases of influenza were reported in Washoe County during the 2010-11 surveillance season.

- ◆ Four hundred thirty-one (57%) of the 753 cases were identified as influenza type A.
  - One hundred fourteen of the 115 (99%) influenza type A specimens identified by RT-PCR had subtyping performed by NSPHL/CDC. One specimen did not have subtyping performed as the PCR was done in a commercial laboratory and was not forwarded to the NSPHL.
  - Forty-seven specimens (41%) were identified as influenza A (2009 H1N1) and 67 (59%) were influenza A (H3).
  - The remaining 316 influenza A specimens were not further identified.
- ◆ Two hundred fifty-seven (34%) of the 753 cases were identified as influenza type B.
- ◆ The remaining 65 cases (25%) were laboratory-confirmed by a type of rapid test that does not differentiate between influenza type A or B.

**Laboratory-Confirmed Influenza Cases, Washoe County, 2010-2011**



The earliest specimens confirmed by PCR were three specimens collected between November 7 and November 13, 2010. (week 45). One was identified as influenza A (2009 H1N1) and two were identified as seasonal influenza A (H3).

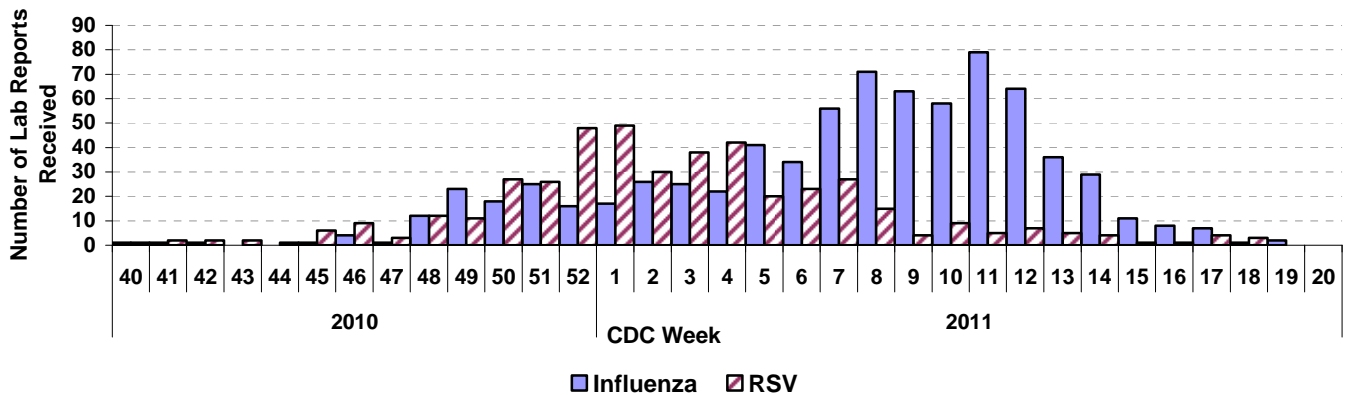
Each year, NSPHL sends a select sample of influenza isolates to CDC for antigenic characterization. Seventeen Washoe County isolates were sent to CDC during the 2010-11 influenza season: eleven influenza A isolates and six influenza B isolates. These influenza isolates were identified as follows:

**Influenza Specimens Sent to CDC, Washoe County Influenza Surveillance, 2010-2011**

Total #	Influenza Type	PCR Suptype	Antigenic Characterization
2	A	A (2009 H1N1)	A/California/07/2009-like
9	A	A (H3N2)	A/Perth/16/2009-like
6	B	B	B/Brisbane/60/2008-like

These are the same viruses that were selected for the Northern Hemisphere for the 2010-2011 influenza vaccine.

**Influenza and RSV Lab Reports, Washoe County Communicable Disease Surveillance, 2010–11.**



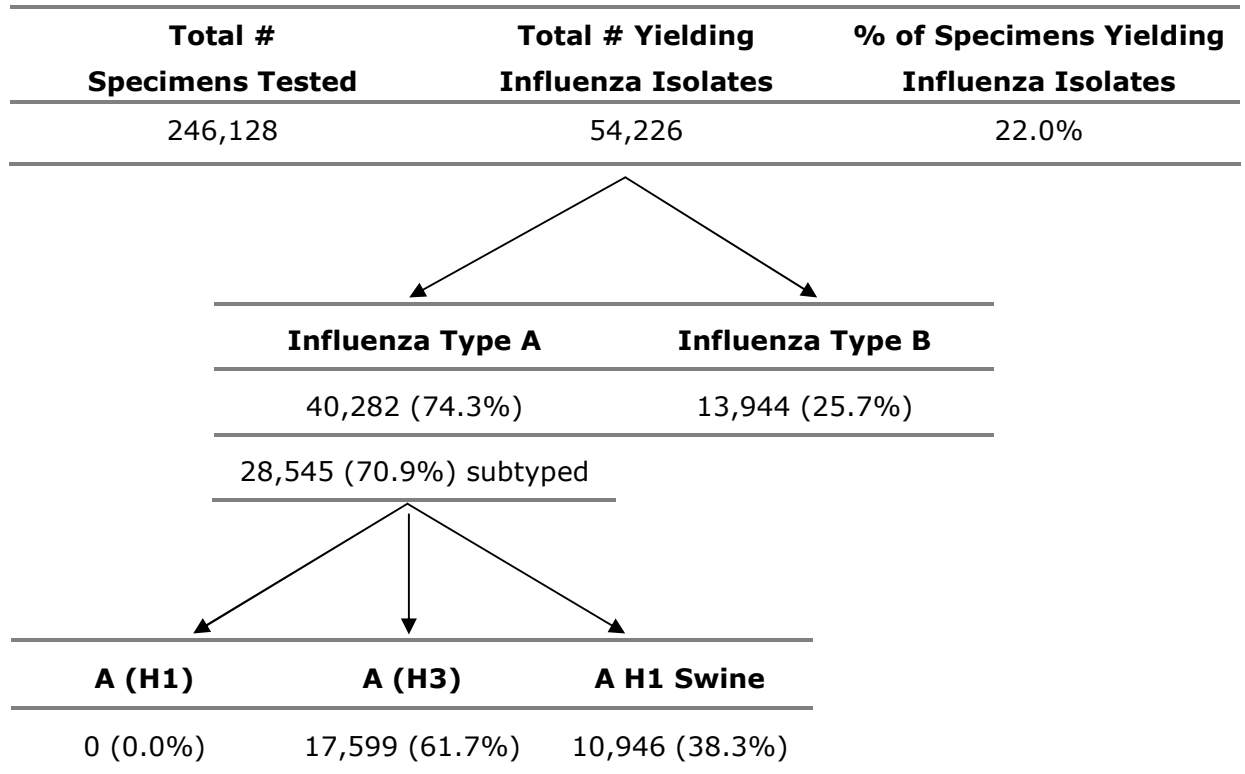
The surveillance case definition for influenza is broad enough to also include symptoms of another reportable disease in Nevada, respiratory syncytial virus (RSV). The above graph compares the number of positive RSV lab reports with the number of positive influenza lab reports received in Washoe County. As the graph illustrates, influenza and RSV frequently occur within the same time frame and occasionally present as a co-infection, especially in young children.

Nationally the percentage of specimens testing positive for influenza, a key indicator of the level of influenza activity, peaked at 35.05 – 35.82% between January 30 and February 19, 2011. (weeks 5-7) A percentage of specimens testing positive for influenza could not be calculated for Washoe County as denominator data was not available.

A season summary for 2010-11 was not published at the national level, therefore, the following breakdown of isolates is based on data provided in the CDC's weekly influenza surveillance report (FluView) for week 20 which includes the isolate numbers for October 1, 2010 through May 21, 2011.

Seventy-four percent of isolates reported nationally were influenza type A and 26% were influenza type B. Among the influenza A viruses, 28,545 (70.9%) were subtyped; 0 (0%) were influenza A (H1), 17,599 (61.7%) were influenza A (H3), and 10,946 (38.3%) were influenza A H1 Swine viruses.

Results of testing performed in the United States by the World Health Organization (WHO) and the National Respiratory and Enteric Virus Surveillance System (NREVSS) laboratories between October 3, 2010 and May 21, 2011 are displayed in the following chart:



Between October 1, 2010 and May 21, 2011, CDC antigenically characterized the following specimens collected by U.S. laboratories:

- ◆ 2494 influenza viruses
  - 613 influenza A (2009 H1N1) viruses
  - 1139 influenza A (H3N2) viruses
  - 742 influenza B viruses

### **Influenza A (2009 H1N1) [613]**

- Six hundred twelve (99.8%) of the 613 influenza A (2009 H1N1) viruses tested were characterized as A/California/7/2009-like, the influenza A (H1N1) component of the 2010-11 influenza vaccine for the Northern Hemisphere.
- One virus (0.2%) of the 613 influenza A (2009 H1N1) viruses tested showed reduced titers with antisera produced against A/California/7/2009.

### **Influenza A (H3N2) [1139]**

- One thousand one hundred three (96.8%) of 1139 influenza A (H3N2) viruses tested were characterized as A/Perth/16/2009-like, the influenza A (H3N2) component of the 2010-11 influenza vaccine for the Northern Hemisphere.
- Thirty-six viruses (3.2%) of the 1139 tested showed reduced titers with antiserum produced against A/Perth/16/2009.

### **Influenza B (B/Victoria/02/87 and B/Yamagata/16/88 lineages) [742]**

Influenza B viruses currently circulating can be divided into two distinct lineages represented by the B/Yamagata/16/88 and B/Victoria/02/87 viruses.

#### **Victoria lineage [699]**

- Six hundred ninety-nine (94.2%) of 742 influenza B viruses tested belong to the B/Victoria lineage of viruses. Of these, 698 (99.9%) were characterized as B/Brisbane/60/2008-like, the recommended influenza B component for the 2010-11 Northern Hemisphere influenza vaccine.
- One (0.1%) of these 699 viruses showed somewhat reduced titers with antiserum produced against B/Brisbane/60/2008.

#### **Yamagata lineage [43]**

- Forty-three (5.8%) of the 742 influenza B viruses tested belong to the B/Yamagata lineage of viruses.

In summary, almost all of the 2494 influenza viruses submitted to CDC for antigenic characterization were found to be similar to the components of the 2010-2011 influenza vaccine. Of the viruses tested, 99.8% of the influenza A (2009 H1N1) viruses, 96.8% of the influenza A (H3N2) viruses, and 94.2% of the influenza B viruses were similar to the components of the 2010-2011 season vaccine.

### **Antiviral resistance**

High levels of resistance to the adamantanes (amantadine and rimantadine) persisted among influenza A (2009 H1N1) and influenza A (H3N2) viruses circulating globally. As a result of the sustained high levels of resistance, data from adamantane resistance testing are not presented in the table below.

**Neuraminidase Inhibitor Resistance Testing Results on Samples Collected October 1, 2010 – May 21, 2011 (Source: CDC)\*.**

	Virus samples tested (n)	Resistant Viruses, Number (%)	Virus samples tested (n)	Resistant Viruses, Number (%)
		Oseltamivir		Zanamivir
<b>Seasonal Influenza A (H1N1)</b>	0	0 (0.0)	0	0 (0.0)
<b>Influenza A (H3N2)</b>	806	2 (0.2)	784	0 (0.0)
<b>Influenza B 2009</b>	723	0 (0.0)	723	0 (0.0)
<b>Influenza A (H1N1)</b>	4,229	39 (0.9)	771	0 (0.0)

\* Includes specimens tested in national surveillance and additional specimens tested at public health laboratories in six states (CA, ME, MD, MN, TX, and WA) who share testing results with CDC.

The CDC reported that by the end of the 2010-2011 season, almost all (99.1%) of the H1N1 influenza viruses tested for antiviral resistance at CDC were susceptible to oseltamivir (Tamiflu®), and 99.8% of the H3N2 viruses tested were susceptible to Tamiflu®. All of the influenza B viruses tested were susceptible to Tamiflu®. All virus types and subtypes tested were susceptible to zanamivir (Relenza®).

Although a number of Washoe County specimens were submitted by NSPHL for anti-viral resistance testing, individual specimen results were not reported. All results were aggregated and reported by CDC in the previous table.

**Hospitalizations and Deaths**

Thirty-three Washoe County cases (4.4%) were hospitalized with laboratory-confirmed influenza during the 2010-2011 season. A hospitalized case was defined as a laboratory confirmed influenza case with a hospital stay greater than equal to 24 hours. During the influenza A (2009 H1N1) pandemic, 3.9% of cases were hospitalized. Seven of the 33 hospitalized cases reported during the 2010-2011 season were admitted to the intensive care unit (ICU). Three of the seven cases required mechanical ventilation. These three cases recovered but required lengthy hospitalizations and rehabilitation. An additional six cases were hospitalized for a period of less than 24 hours.

During the 2010-2011 season, one death in a Washoe County resident was influenza-associated. The case was not hospitalized but was investigated by the Washoe County Medical Examiner’s office. The case was male, in the 25-49 year age group, and expired in late January, 2011. Specimens were submitted to the CDC for influenza testing. Final results were not received until June 17, 2011, therefore, this case was not previously reported in the influenza surveillance weekly report. Lung tissue was positive for influenza A (H3) by immunohistochemical (IHC) and PCR testing. No history of influenza

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vaccine or of treatment with an antiviral medication was reported for this case.

**Hospitalized Laboratory-Confirmed Cases of Influenza, Washoe County Influenza Surveillance, October 3 – May 21, 2011.**

	<u>Total</u>		<u>Hospitalized</u>		<u>ICU</u>		<u>Death</u>	
			#	%	#	%	#	%
<b>Total number of cases reported</b>	753		33	4.4	7	0.9	1	0.1
Influenza A (2009 H1N1)	47		10	30.3	4	57.1	0	0.0
Influenza A (seasonal H1)	0		0	0.0	0	0.0	0	0.0
Influenza A (seasonal H3)	67		16	48.5	3	42.9	1	100.0
Influenza A - unable to subtype	1		0	0.0	0	0.0	0	0.0
Influenza A - rapid test only	316		4	12.1	0	0.0	0	0.0
Influenza B - PCR	36		1	3.0	0	0.0	0	0.0
Influenza B - rapid test only	221		2	6.1	0	0.0	0	0.0
Influenza unknown type	65		0	0.0	0	0.0	0	0.0

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**Conclusions:** The CDC reported that in comparison to the last three seasons, the 2010-2011 influenza season was less severe than both the pandemic year (2009-2010) and the 2007-2008 season, but more severe than the 2008-2009 influenza season. This was determined by the percentage of deaths resulting from pneumonia or influenza, the number of influenza-associated pediatric deaths reported, adult and pediatric hospitalization rates, and the percentage of visits to outpatient clinics for influenza-like illness. Such a comparison is difficult to do for Washoe County due to the relatively small population.

During the 2010-2011 influenza season in Washoe County, influenza activity peaked in late December through mid-January but did not exceed the region's baseline of 4.1%. This is the expected time frame for seasonal influenza circulation in Washoe County.

Influenza type A viruses predominated at 57% of lab-confirmed cases in Washoe County, followed by influenza type B at 34% and influenza type unknown at 9%. Influenza A (2009 H1N1), the pandemic strain, continued to circulate widely in Washoe County (41%); however, the virus co-circulated with other influenza viruses and was not the predominate strain. The predominate strain both nationally and in Washoe County (59%) was Influenza A (H3).

The World Health Organization (WHO)<sup>1</sup> reports all three circulating viruses demonstrated little antigenic drift during the past year and were closely related to the three strains contained in the seasonal influenza vaccine. WHO has recommended the Northern Hemisphere's 2011-2012 seasonal influenza vaccine contain the following three vaccine viruses:

1. an A/California/7/2009 (H1N1)-like virus;
2. an A/Perth/16/2009 (H3N2)-like virus; and
3. a B/Brisbane/60/2008-like virus.

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<sup>1</sup> Review of the 2010-2011 winter influenza season, northern hemisphere. Weekly Epidemiological Record, No.22, 27 May 2011.  
*Summary of 2010-11 Influenza Surveillance Program*

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These are the same components as the 2010-2011 influenza vaccine for the Northern Hemisphere.

WHO also reports all but a small percentage of the viruses that were tested remained sensitive to neuraminidase inhibitors. This re-emphasizes the need to continue to vaccinate patients considered to be at high risk for severe disease and to treat them at an early stage. Those who should be targeted for vaccination and early treatment are people at the extremes of age, those with certain chronic illnesses and pregnant women.

The District Health Department would like to thank the Vital Statistics program staff, the participating health care providers, and the Nevada State Public Health Laboratory for their support and cooperation. With their support, we hope we have been able to provide physicians and the general public with important information about influenza activity in our community.

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