State of Wyoming

Department of Health

Wyoming Influenza Summary Report
2007-2008 Season

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WYOMING INFLUENZA SUMMARY REPORT
2007 – 2008 SEASON

SYNOPSIS

Influenza activity during the 2007-2008 influenza season was moderate in severity. There was a two-thirds (66.4%) increase in the number of reported cases of influenza this season as compared to last season. Accordingly, the percentage of outpatient visits for influenza-like illnesses (ILI) was also higher than last season. From October through the end of December, low levels of influenza activity were reported across Wyoming. Activity began to increase sharply in January, and peaked in February. Wyoming activity, as measured by reports of influenza-like illness, peaked during the week ending February 9, 2008 (MMWR Week 6). Conversely, influenza activity, as measured by reported cases, peaked during the week ending March 1, 2008 (MMWR Week 9). Influenza seasons are unpredictable in a number of ways. Although epidemics of influenza occur every year, multiple factors may influence the timing and severity of the season. This influenza season was marked by significant pharmaceutical issues, specifically influenza vaccine effectiveness (VE) and antiviral drug resistance.

VACCINE EFFECTIVENESS

The viruses used in making influenza vaccine are chosen each year based on information gathered over the previous year about the strains of the viruses that are infecting humans and how they are changing. Circulating influenza strains and information on disease trends are gathered by 122 national influenza centers in 94 countries. The combined data is analyzed by the four World Health Organization (WHO) Collaborating Centers for Reference and Research on Influenza. Based on this information, experts forecast which viruses are likely to circulate the following season, and the WHO recommends specific virus strains that can be used to make the vaccine. The recommendation for vaccines produced for the Northern Hemisphere is made by the WHO in February each year. Each country can then use the recommendations made by the WHO to assist with national decisions about what viruses to use in influenza vaccines for their country. In the United States, an advisory committee convened by the Food and Drug Administration (FDA) makes the final decision about vaccine strains in February. Manufacturers grow vaccine strains based on these recommendations. How well the influenza vaccine works each year depends on how closely related (or matched) the viruses in the vaccine are to the influenza viruses circulating that year.

Vaccine effectiveness also varies depending on how well a vaccinated person responds to the vaccine in terms of producing protective antibody, and how successful vaccination programs are at vaccinating people in advance of the season. A good match is said to occur when the viruses in the vaccine and the viruses circulating among people during a given influenza season are closely related and the antibodies produced by the vaccine are able to provide protection against infection. In years when the vaccine strains and the virus strains are well-matched, the vaccine can reduce the chances of becoming infected with influenza by 70%-90% in healthy adults. Influenza viruses constantly change as the virus replicates. The ability to constantly change is a trademark of influenza viruses. Influenza viruses often change from one season to the next or change within the course of the influenza season. When influenza viruses change, they may no longer closely match viruses used to make that season's vaccine. This can make the vaccine less effective.

ANTIVIRAL DRUG RESISTANCE

Antiviral resistance occurs when a virus has changed in such a way that the antiviral drug is less effective in preventing or treating illnesses caused by the virus. In the United States, four antiviral drugs are FDA-approved for use against influenza: amantadine, rimantadine, zanamivir and oseltamivir. However, amantadine and rimantadine (the adamantane drugs) were not recommended for use in the United States during the 2007-2008 influenza season because many recent influenza viruses are resistant to these drugs. The adamantane drugs are approved for influenza A, while the neuraminidase inhibitor drugs zanamivir and oseltamivir are approved for both influenza A and B. As of April 5, 2008, 8.3% of all influenza A and B viruses analyzed by the Centers for Disease Control and Prevention (CDC) this season were found to be resistant to oseltamivir. Of those, 10.2% of H1N1 viruses and 0% of H3N2 and B viruses have been resistant to the antiviral drug oseltamivir.

The United States antiviral drug stockpile contains both of the neuraminidase inhibitor agents, oseltamivir and zanamivir. These medications are to be used in the event that a novel influenza A subtype virus emerges and spreads easily among humans. Current pandemic antiviral drug use strategies include containment of an initial outbreak and treatment of persons with pandemic disease. This season, influenza surveillance in the United States found that 10.2% of seasonal influenza A (H1N1) viruses have genetic mutations that make them resistant to oseltamivir. There was no resistance to zanamivir detected. The stockpile is for the control of pandemic influenza, and is not for seasonal influenza use. Therefore, resistance among seasonal strains does not

predict resistance among pandemic influenza viruses. Antiviral drugs, such as oseltamivir are one component of a multi-faceted approach to pandemic preparedness planning and response. The effectiveness of any drug during a pandemic is difficult to predict; as it is not possible to know which virus will cause the next pandemic.

SURVEILLANCE AND THE INFLUENZA SENTINEL PROVIDER NETWORK

Influenza surveillance is designed to determine when influenza viruses are circulating, identify circulating strains, identify outbreaks and detect changes in the viruses. Influenza is a reportable disease in the State of Wyoming. The Wyoming Department of Health (WDH) receives reports of both positive rapid test and culture positive cases from physicians, hospitals, and laboratories. The program relies on these sectors to test for and subsequently report all positive results for surveillance purposes. In addition, Wyoming has a network of influenza sentinel providers located across the state. An influenza sentinel provider conducts surveillance for influenza-like illness in collaboration with the WDH and CDC. Reports are submitted each week, even when no influenza activity is observed by the sentinel providers. This information is used to develop annual epidemic thresholds. In addition, the sentinel providers collect specimens from a small number of patients with influenza-like illness. The samples are sent to the Wyoming Public Health Laboratory (WPHL) for influenza testing. This information often provides public health officials the earliest identification of circulating virus types, subtypes, and strains during the influenza season.

THE WYOMING INFLUENZA SENTINEL SURVEILLANCE NETWORK

The WDH is always seeking new health care providers to participate in this important surveillance system. Influenza viruses cause substantial morbidity and mortality every winter. Data from sentinel providers are critical for monitoring the impact of influenza and, in combination with other influenza surveillance data, can be used to guide prevention and control activities, vaccine strain selection, and patient care. Providers of any specialty (e.g., family practice, internal medicine, pediatrics, infectious diseases) in any type of practice (e.g., private practice, public health clinic, urgent care center, emergency room, university student health center) are eligible to be sentinel providers. The sentinel provider program involves two major components: weekly ILI reporting and lab specimen collection.

Weekly ILI reporting consists of recording and reporting summary data (total number of patient visits for any reason and the number of patient visits for ILI by age group) each week to the CDC via the internet or fax. The ILI case definition used by the CDC for national surveillance is fever ≥100° F AND cough and/or sore throat (in the absence of a known cause other than influenza). Reports were submitted weekly beginning September 30, 2007 (MMWR Week 40) and continue through May 17, 2008 (MMWR Week 20). This process is continued even when no ILI activity is seen; this is done in order to develop annual epidemic thresholds.

Lab specimen collection consists of collecting specimens from a small number of patients with ILI. The specimens are sent to the WPHL for influenza testing. This testing often provides the earliest identification of circulating virus types, subtypes, and strains in a season.

Participating sentinels are offered summaries of state and national influenza data, free subscriptions to CDC's Morbidity and Mortality Weekly Report and Emerging Infectious Diseases Journal, and a number of viral isolation test kits for free influenza testing. The most important consideration is that the data provided are critical for protecting the public's health.

For more information on the Influenza Sentinel Surveillance Network, or if you are interested in becoming a sentinel provider, please contact the Infectious Disease Epidemiology Program at (877) 996-9000.

REPORTED CASES

This season, 2,640 cases of influenza (rapid test and culture positives combined) were reported from all of Wyoming's twenty-three counties. The first positive cases were reported the week ending October 13, 2008 (MMWR Week 41). Reporting of influenza peaked the week ending March 1, 2008 (MMWR Week 9), when 324 cases of influenza were reported. In comparison, the 2006-2007 influenza season, reporting of influenza peaked the week ending March 17, 2007 (MMWR Week 11), when 223 cases were reported. Table 1 displays the number of cases reported by week, county, age group, and gender. Although all positive laboratory tests for influenza are required by law to be reported to the WDH, not all providers report these results. Additionally, many ill persons do not seek medical care or are not tested for the disease. Comparing reported cases of influenza from year to year or week to week may not be valid because many factors influence both testing and reporting.

REPORTED CASES OF INFLUENZA (RAPID AND CULTURE TEST POSITIVE)
WYOMING, (2002-2003 to 2007-2008)

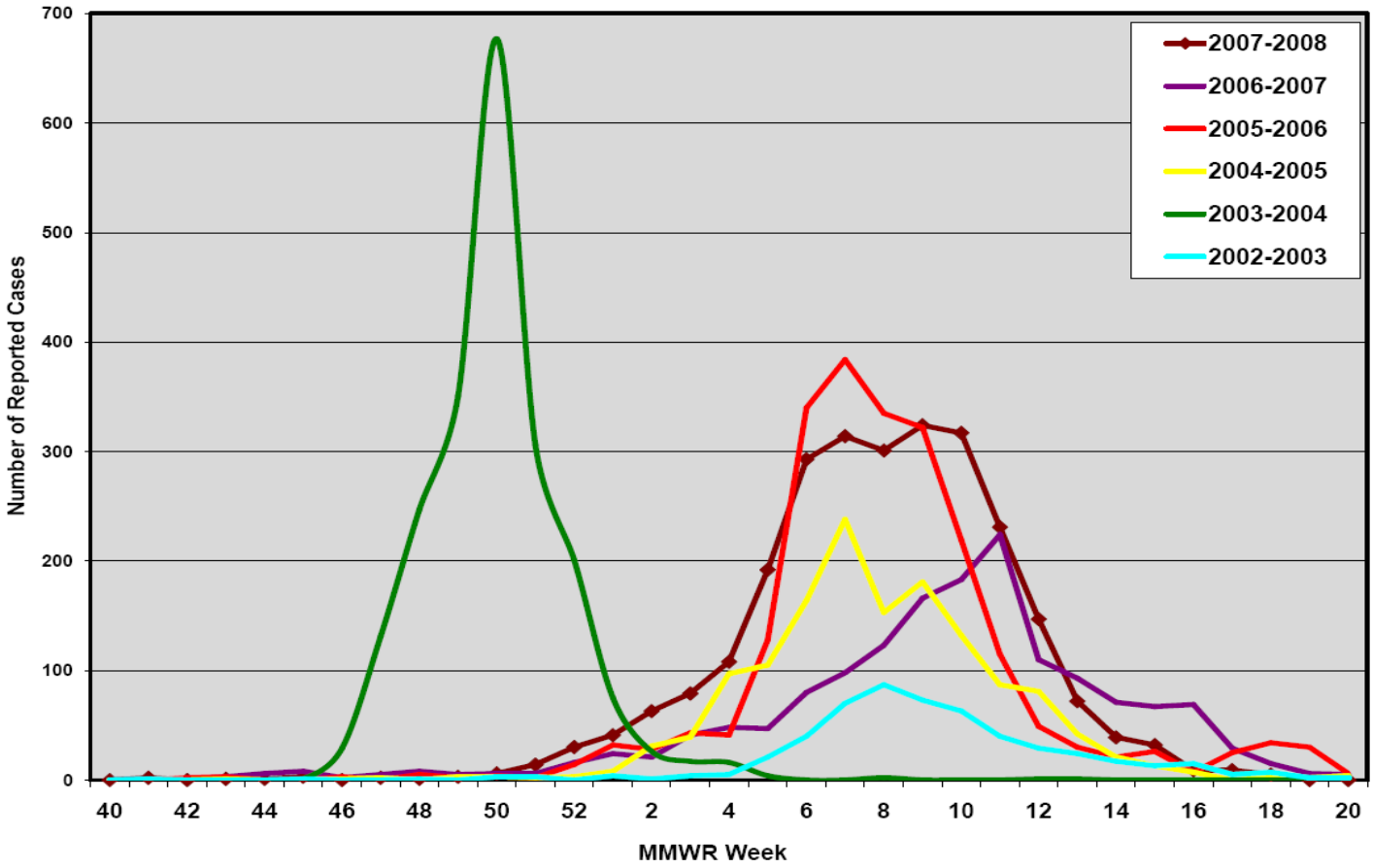


Table 1. REPORTED CASES OF INFLUENZA; WYOMING, 2007-2008 SEASON

Week Ending	Number
6-Oct	0
13-Oct	2
20-Oct	0
27-Oct	1
3-Nov	1
10-Nov	3
17-Nov	0
24-Nov	2
1-Dec	1
8-Dec	3
15-Dec	6
22-Dec	14
29-Dec	30
5-Jan	41
12-Jan	63
19-Jan	79
26-Jan	108
2-Feb	192
9-Feb	293
16-Feb	314
23-Feb	301
1-Mar	324
8-Mar	318
15-Mar	231
22-Mar	147
29-Mar	72
5-Apr	39
12-Apr	32
19-Apr	9
26-Apr	9
3-May	5
10-May	0
17-May	0
Total	2640

County	Number
Albany	38
Big Horn	36
Campbell	252
Carbon	10
Converse	118
Crook	39
Fremont	295
Goshen	86
Hot Springs	27
Johnson	16
Laramie	840
Lincoln	21
Natrona	296
Niobrara	9
Park	99
Platte	25
Sheridan	100
Sublette	43
Sweetwater	172
Teton	16
Uinta	22
Washakie	62
Weston	18
Unknown	
Total	2640

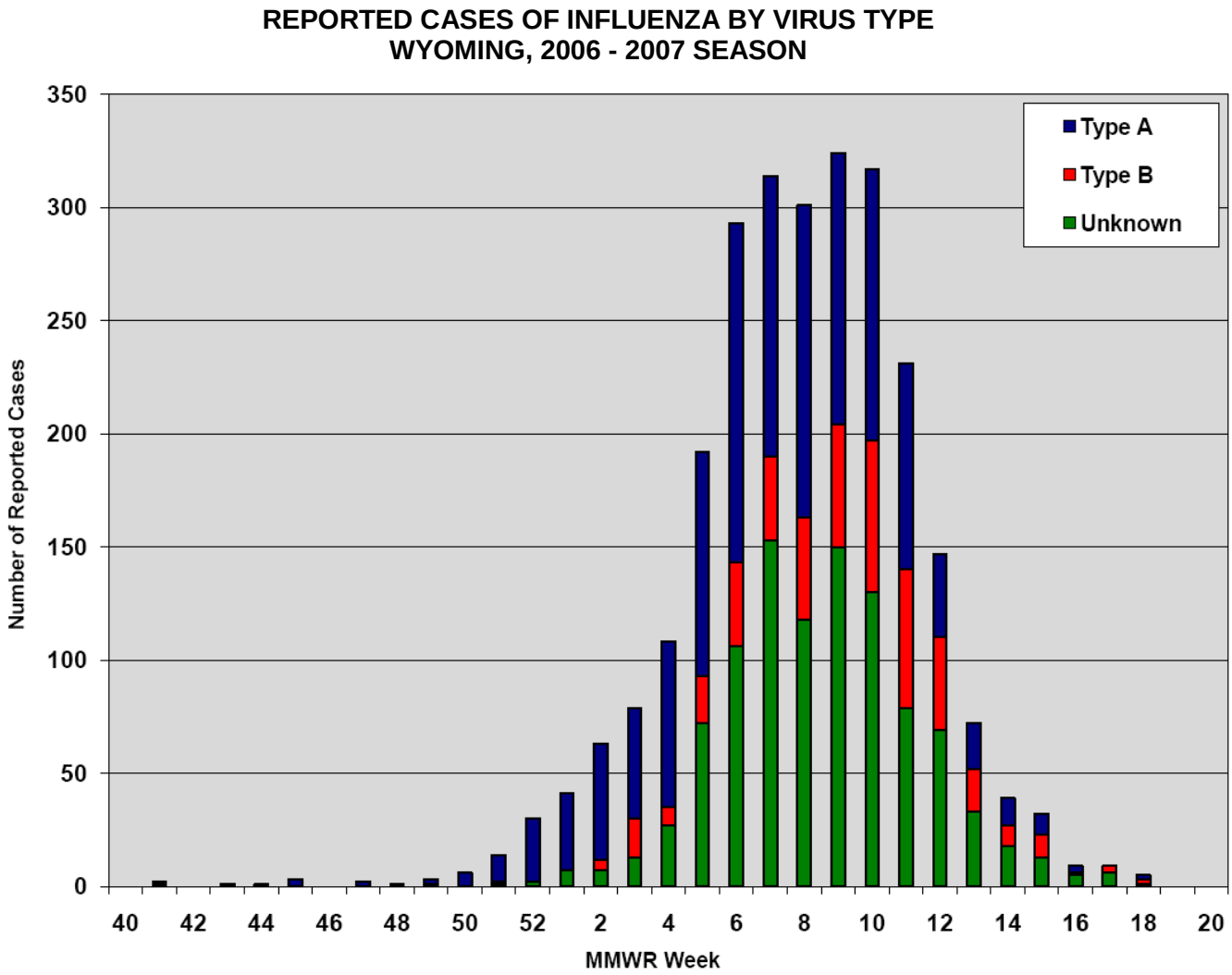
Age	Number
0-4	479
5-10	438
11-19	399
20-39	671
40-59	466
60+	168
Unknown	49
Total	2640

Gender	Number
Male	1342
Female	1298
Unknown	
Total	2640

Type	Number
A	1189
B	440
Unknown	1011
Total	2640

LABORATORY DATA

Of the 2,640 reported cases, 1,189 (45.0%) were type A, 440 (16.7%) were type B, and 1,011 (38.3%) were not typed. Fifty-one of these cases were confirmed by cell culture at the WPHL; four were confirmed by direct fluorescent antibody (DFA); the remaining 2,585 were confirmed by rapid test only. During the 2007-2008 influenza season, the WPHL tested a total of 102 specimens for influenza virus and 52 (51.0%) were positive. One isolate of influenza A (H3N2) was cultured from an out of state resident and was not counted in the Wyoming total for this influenza season. The first culture positive isolate confirmed by WPHL was tested during the week ending December 29, 2007 (MMWR Week 52), and the last positive isolate was tested during the week ending April 12, 2008 (MMWR Week 15). Among the 51 influenza isolates, 28 (54.9%) were A (H1N1) viruses; 15 (29.4%) were A (H3N2) viruses; and the remaining 8 (15.7%) isolates were cultured as influenza B.



On a national level, WHO and National Respiratory and Enteric Virus Surveillance System collaborating laboratories tested a total of 220,666 specimens for influenza viruses and 39,453 (17.9%) were positive. Among the 39,453 influenza viruses, 28,105 (71.2%) were influenza A viruses and 11,348 (28.8%) were influenza B viruses. Eight thousand two hundred seventy-four (29.4%) of the 28,105 influenza A viruses have been subtyped: 2,173 (26.3%) were influenza A (H1N1) viruses and 6,101 (73.7%) were influenza A (H3N2) viruses. During the 2007-2008 influenza season, influenza A (H1N1), influenza A (H3N2), and influenza B viruses co-circulated in the United States. Overall, influenza A (H3N2) viruses predominated during the season; however, the most commonly reported influenza virus types and subtypes varied throughout the influenza season. From MMWR Week 40 through MMWR Week 3, influenza A (H1N1) viruses were more frequently reported; from MMWR Week 4 through MMWR Week 12, influenza A (H3N2) viruses were more commonly reported; and from MMWR Week 13 through MMWR Week 20, more influenza B than influenza A viruses were reported. As of May 17, 2008, the CDC antigenically characterized 947 influenza viruses [395 influenza A (H1N1), 280 influenza A (H3N2) viruses, and 272 influenza B viruses] collected by United States laboratories since September 30, 2007.

Two hundred sixty-seven (68%) of the 395 influenza A (H1N1) viruses were characterized as A/Solomon Islands/3/2006-like, which is the influenza A (H1N1) component of the 2007-08 influenza vaccine for the Northern Hemisphere. Twenty (5%) of the 395 viruses showed somewhat reduced titers with antisera produced against A/Solomon Islands/3/2006. One hundred eight (27%) of the 395 viruses were characterized as A/Brisbane/59/2007-like. A/Brisbane/59/2007 is a recent antigenic variant which evolved from A/Solomon Islands/3/2006. An A/Brisbane/59/2007-like virus is the WHO recommended influenza A (H1N1) strain for the 2008-2009 Northern Hemisphere vaccine formulation.

Fifty-nine (21%) of the 280 influenza A (H3N2) viruses were characterized as A/Wisconsin/67/2005-like, which is the influenza A (H3N2) component of the 2007-08 influenza vaccine for the Northern Hemisphere. One hundred eighty-two (65%) of the 280 viruses were characterized as A/Brisbane/10/2007-like. A/Brisbane/10/2007 is a recent antigenic variant which evolved from, but are antigenically distinct from, A/Wisconsin/67/2005-like viruses. A/Brisbane/10/2007-like virus is the WHO recommended influenza (H3N2) component of the 2008-2009 Northern Hemisphere vaccine. Thirty-nine (14%) of the 280 viruses showed somewhat reduced titers with antisera produced against A/Wisconsin/67/2005 and A/Brisbane/10/2007.

Two hundred sixty-four (97%) of the 272 influenza B viruses were characterized as belonging to the B/Yamagata lineage of viruses. Two hundred forty-two (92%) of the 264 viruses were identified as B/Florida/04/2006-like. This is the WHO recommended influenza B component for the 2008-2009 Northern Hemisphere vaccine formulation. Twenty-two (8%) of the 264 viruses showed somewhat reduced titers with antiserum produced against B/Florida/04/2006.

The remaining eight (3%) of the 272 influenza B viruses were characterized as belonging to the B/Victoria lineage of viruses. Six (75%) of the eight viruses were characterized as B/Ohio/01/2005-like. The recommended influenza B component for the 2007-2008 influenza vaccine was B/Malaysia/2506/2004-like virus, belonging to the B/Victoria lineage. B/Ohio/01/2005 is a recent B/Malaysia/2506/2004-like reference strain. Two (25%) of the eight viruses showed somewhat reduced titers with antisera produced against B/Ohio/01/2005 and B/Malaysia/2506/2004.

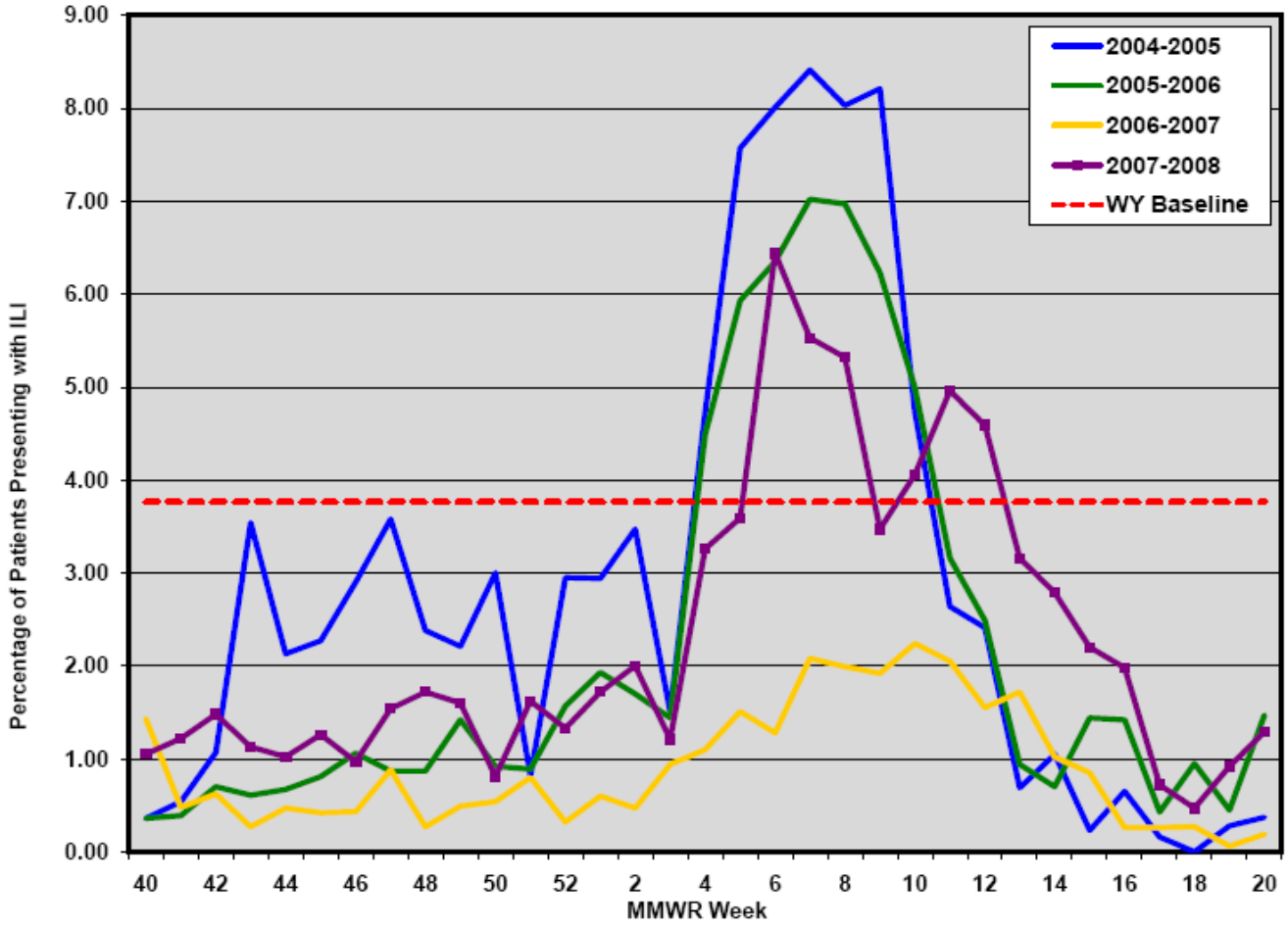
REPORTED INFLUENZA-ASSOCIATED DEATHS

Influenza-associated deaths are reportable in the state of Wyoming. This season, two influenza-associated deaths were reported. One death occurred in an elderly individual and the other death occurred in an individual in their late fifties. Over the past three seasons, Wyoming had an average of two influenza deaths reported per year during the influenza season.

INFLUENZA-LIKE ILLNESS REPORTS FROM WYOMING SENTINEL SITES

Each week, sentinel providers reported the total number of patients seen and the number of those patients with ILI by age group. Influenza-like illness morbidity as reported by Wyoming sentinel providers remained below the baseline level (0 - 3.76%)* until the week ending February 9, 2008 (MMWR Week 6). The peak percentage of patient visits for ILI occurred during this timeframe. The peak was 6.44% during this week. During the 2006-2007 influenza season, the peak percentage of patient visits for ILI was 2.57%, during the week ending March 10, 2007 (MMWR Week 10).

WEEKLY INFLUENZA-LIKE ILLNESS (ILI) REPORTING BY WYOMING SENTINEL PROVIDER, (2004-2005 to 2007-2008)



* This baseline was calculated as the mean percentage of visits for ILI during non-influenza weeks plus two standard deviations.

AVIAN INFLUENZA H5N1

Influenza A (H5N1) is an influenza A virus subtype that occurs mainly in birds and is highly contagious among birds. Outbreaks of highly pathogenic H5N1 among poultry and wild birds are ongoing in a number of countries. Historically, H5N1 rarely infects people; however, a small number of human cases of H5N1 infection have been reported in association with these avian outbreaks. Most of these cases have occurred from direct or close contact with infected poultry or contaminated surfaces. Currently, the H5N1 virus does not infect people easily, but infection in humans is very serious. Of the reported cases, over sixty percent of the individuals with the virus died. In rare instances, limited human-to-human spread of H5N1 virus has occurred.

Nonetheless, because all influenza viruses have the ability to change, scientists are concerned that the H5N1 virus one day could be able to infect humans and spread easily from one person to another. Although 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. Experts from around the world are watching the H5N1 situation very closely and are preparing for the possibility that the virus may begin to spread more easily from person to person.

PANDEMIC INFLUENZA PLANNING

The presence of a virulent strain of avian influenza H5N1 in parts of Asia and Europe has resulted in a sense of urgency among health officials world-wide to prepare for the possibility of a future influenza pandemic. The Wyoming Department of Health has a state public health pandemic influenza plan that can be used to provide guidance on the control of such an outbreak. The plan contains information on measures that may be helpful, such as, surveillance methods to detect an outbreak early, controlling the early spread of the disease through isolation of those ill, and using antiviral medications and vaccine in the most effective ways. A copy of the Wyoming Pandemic Influenza Response Plan can be found at: http://www.health.wyo.gov/phsd/epiid/pandemic.html. In addition, the federal government maintains a comprehensive website about avian and pandemic influenza. This website is located at: http://www.pandemicflu.gov.

COMPOSITION OF THE 2008-2009 VACCINE

The WHO has recommended that the 2008-2009 trivalent influenza vaccine for the Northern Hemisphere contain A/Brisbane/59/2007 (H1N1)-like virus, A/Brisbane/10/2007 (H3N2)-like virus and B/Florida/4/2006-like virus. All of the recommended vaccine components have changed from the 2007-2008 vaccine formulation. A/Brisbane/59/2007 is a recent genetic/antigenic variant which evolved from the current vaccine strain A/Solomon Islands/3/2006. A/Brisbane/10/2007 is a recent antigenic variant which evolved from, but are antigenically distinct from, A/Wisconsin/67/2005-like virus. The B/Florida/4/2006 virus belongs to the B/Yamagata/16/88 lineage. This vaccine recommendation from the WHO was based on antigenic analyses of recently isolated influenza viruses, epidemiologic data, and post-vaccination serologic studies in humans.

REPORTING REMINDER

All of the following are reportable to the Wyoming Department of Health: laboratory confirmed cases of influenza, influenza-associated deaths; an unusual incidence of influenza-like illness; and outbreaks or unusual clusters of influenza or influenza-like illness in schools, nursing homes, and other institutions. A report is required by state statute from <u>both</u> the attending health care provider/hospital <u>and</u> any laboratory performing diagnostic testing. Reports can be faxed to our secure fax machine at (307) 777-5573 or can be made by phone to (307) 777-3593.