

Michigan Influenza Surveillance Summary 2007-2008 Influenza Season

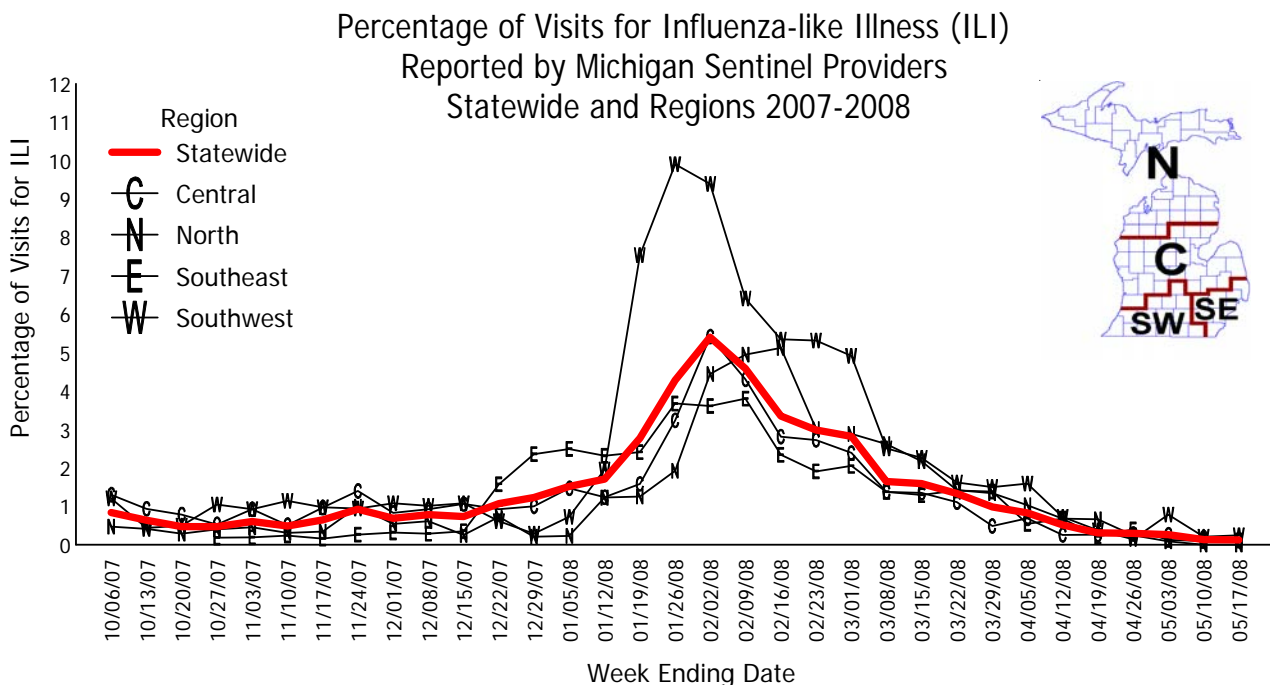
**Michigan Department of Community Health
July 10, 2008**

SEASONAL INFLUENZA

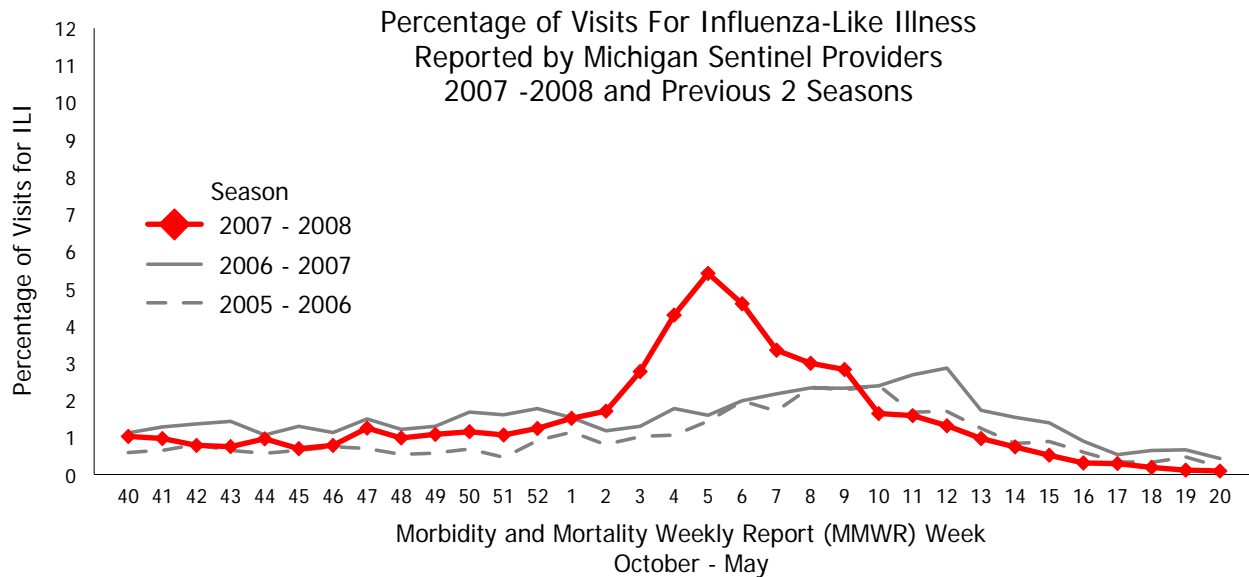
The 2007-2008 Michigan influenza season can be characterized as moderate overall, with increased activity compared to the previous two seasons. The first influenza virus isolated at the Michigan Department of Community Health Bureau of Laboratories was announced on December 3, 2007. Peak influenza activity occurred in early February. Influenza A (H3N2) viruses started to increase in January and continued through early March. In contrast to nationwide activity, influenza A (H1N1) virus activity in Michigan was negligible this season. Influenza B viruses co-circulated throughout the season, peaking in March. “Widespread” statewide activity, the highest level of weekly reporting to the Centers for Disease Control and Prevention (CDC), was reached for four weeks during the weeks ending February 9, 2008 (MMWR Week 6) through March 1, 2008 (MMWR Week 9)*.

Sentinel Provider Data

The percentage of visits to providers participating in the Michigan component of the CDC U.S. Influenza Sentinel Provider Surveillance Network due to influenza-like illness (ILI) peaked statewide at 5.4% during the week ending February 2, 2008. Rates of ILI began to increase rapidly during the week ending January 19, peaked, remained elevated through the month of February, and returned to off-season levels by the week ending March 8. Activity in each of the four surveillance regions followed a similar pattern, peaking between late January and early February. Because sentinel practices in each region vary by type, size, and number, these data should not be used to make direct comparisons of intensity between regions.



During the previous two influenza seasons, peak activity occurred in mid- to late-March and the percentage of visits due to ILI did not exceed 3%.



Individual Influenza Reports

Cases included in the data below are probable, confirmed, suspect or unknown status, with an investigation status of completed, active or new. The data may not be representative of the statewide impact of influenza as local health departments are not required to individually report influenza; in addition, the greater number of reports from large local health jurisdictions may unintentionally bias statewide results.

From October 1, 2007 – May 31, 2008, a total of 2866 individual cases were reported in MDSS; however, only 2786 of these cases were used for analysis. 80 cases were excluded due to incomplete or inaccurate serologic testing or being incorrectly reported as influenza when another etiologic agent, such as parainfluenza, respiratory syncytial virus, or *H. influenzae*, was identified. By comparison, for the same time frame during the 2006-2007 influenza season, 1296 cases were correctly reported to MDSS. The increase in individual cases may be a result of a more severe influenza season, improved reporting, and/or increased influenza testing.

During the 2007-2008 influenza season, peak activity for individually reported influenza cases in MDSS was seen during the week ending February 9 (MMWR Week 6). In contrast, for the 2006-2007 season, peak individually reported influenza activity occurred between the weeks ending March 17 (MMWR Week 11) and April 7 (MMWR Week 14). Overall, this data indicates that the 2007-2008 season experienced increased influenza activity with a more defined peak than the 2006-2007 season.

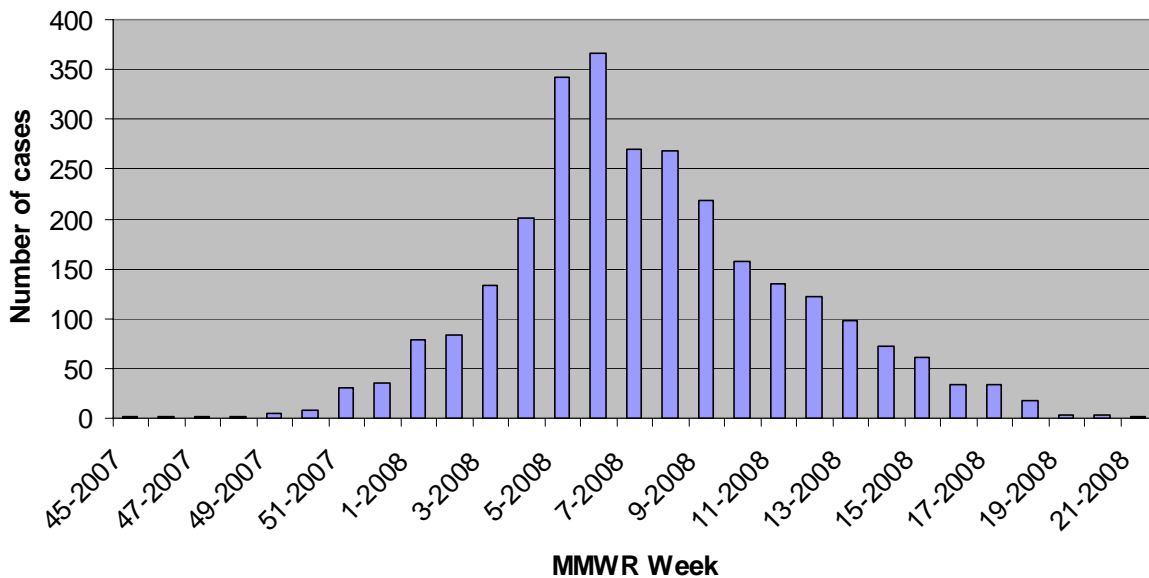
For this influenza season, the median age of individually reported cases was 26 years, with a mean of 31 years. In comparison, the median age for the previous season was 12 years. 53% of reported cases were female. The largest percentage of individually reported cases (38.6%) was in the adult population (19-49 years of age). In contrast,

the largest percentage of individually reported cases in the 2006-2007 season occurred in very young children (0-4 years of age). As reported into MDSS, 2393 (86%) of cases were classified as “Outpatient,” 391 cases (14%) were “Inpatient,” and 2 died (< 1%).

Individually Reported Influenza by Month and Age Group, Michigan, 2007-2008

Month	Age Group; No. %										
	0-4 y		5-9 y		10-18 y		19-49 y		50+ y		Total
Nov	0	0.0%	1	20.0%	1	20.0%	2	40.0%	1	20.0%	5
Dec	20	18.5%	10	9.3%	19	17.6%	34	31.5%	25	23.1%	108
Jan	137	19.5%	68	9.7%	104	14.8%	263	37.4%	132	18.8%	704
Feb	200	16.3%	80	6.5%	180	14.7%	502	41.0%	262	21.4%	1224
Mar	96	17.9%	51	9.5%	40	7.5%	193	36.4%	152	28.6%	532
Apr	22	11.8%	16	8.6%	10	5.3%	73	39.0%	66	35.3%	187
May	3	17.6%	3	17.6%	0	0.0%	4	23.5%	7	41.2%	17
Total	478	17.2%	229	8.2%	354	12.7%	1071	38.6%	645	23.2%	2777

Individually Reported Influenza Cases, Michigan, 2007-2008



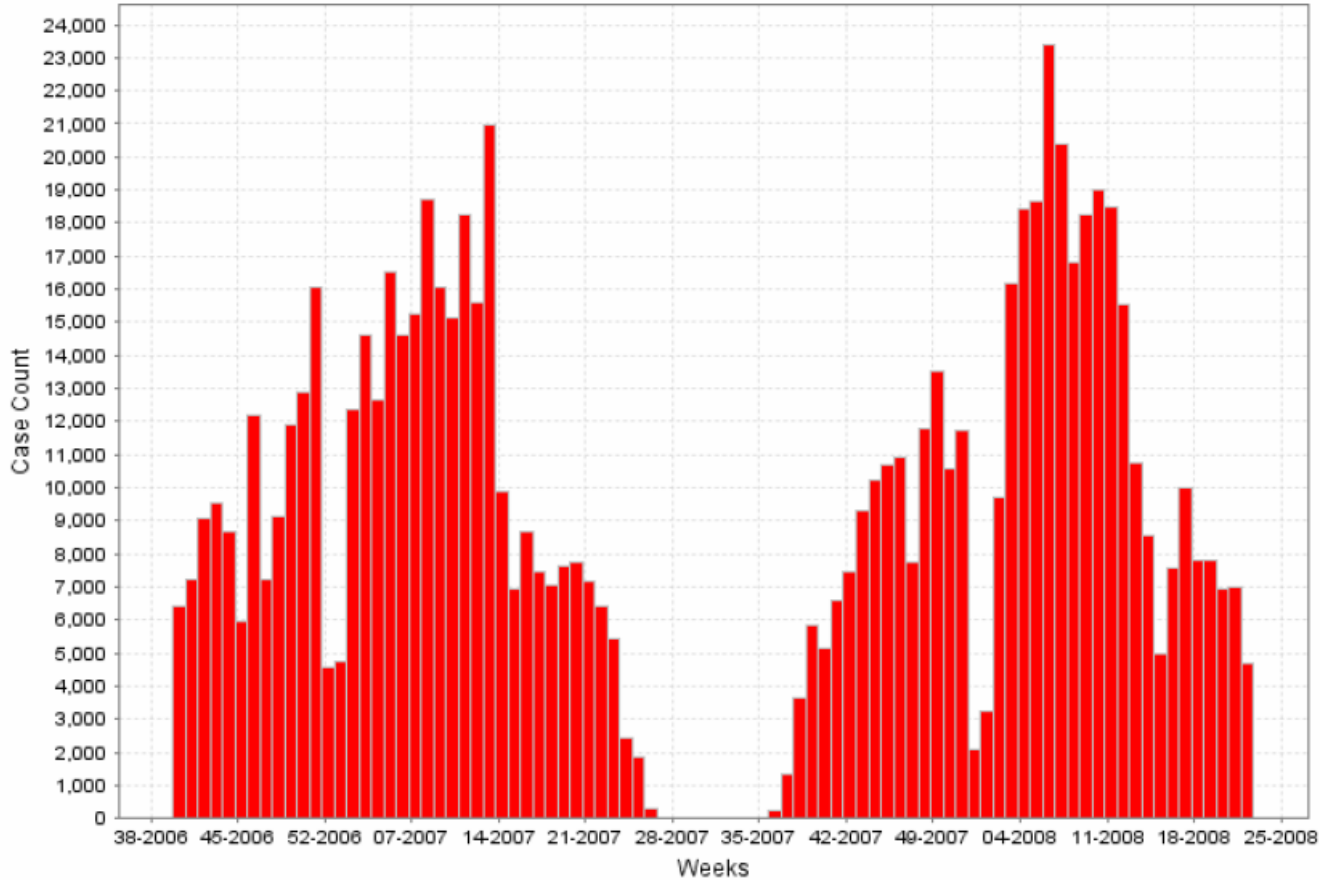
Aggregate Influenza-like Illness

Aggregate influenza-like illness reports from local health departments are entered into MDSS as “Flu-like Disease” cases on a weekly basis. Cases included in the data below are probable, confirmed, suspect or unknown status, with an investigation status of completed, active or new. As a reminder, while the majority of aggregate reports come from school-based absenteeism due to influenza-like illness, sometimes these reports capture absenteeism due to other causes. However, even with possible confounding data, aggregate reporting trends with confirmed cases of influenza in most years.

In the 2007-2008 influenza season, peak activity was seen during the weeks ending February 9 (23,415 reports), February 16 (20,405 reports) and March 8 (18,995

reports). The timing of peak activity for aggregate reports was identical to the peak of individual influenza reports and was one week after peak activity reported by sentinel providers. The noticeable decreases in cases during weeks 52, 1 and 15 correlate with school holiday breaks. During the 2006-2007 influenza season, the top three weeks of the season were the weeks ending March 31 (20,996 reports), February 24 (18,742 reports) and March 17 (18,240 reports). This data indicates that aggregate influenza-like illness in Michigan for the 2007-2008 season was similar to the previous season but with a slightly higher and earlier peak.

Aggregate Counts of Influenza-like Illness, By MMWR Week, October 1, 2006 – May 31, 2008

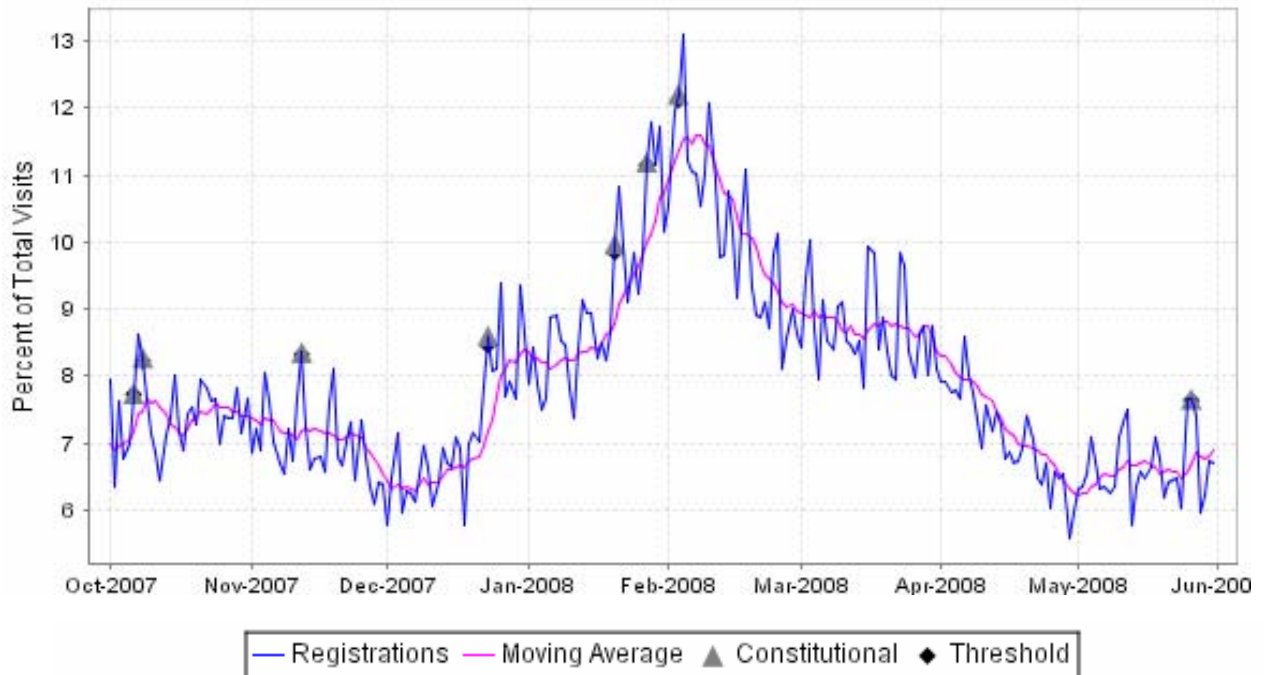


Syndromic Surveillance

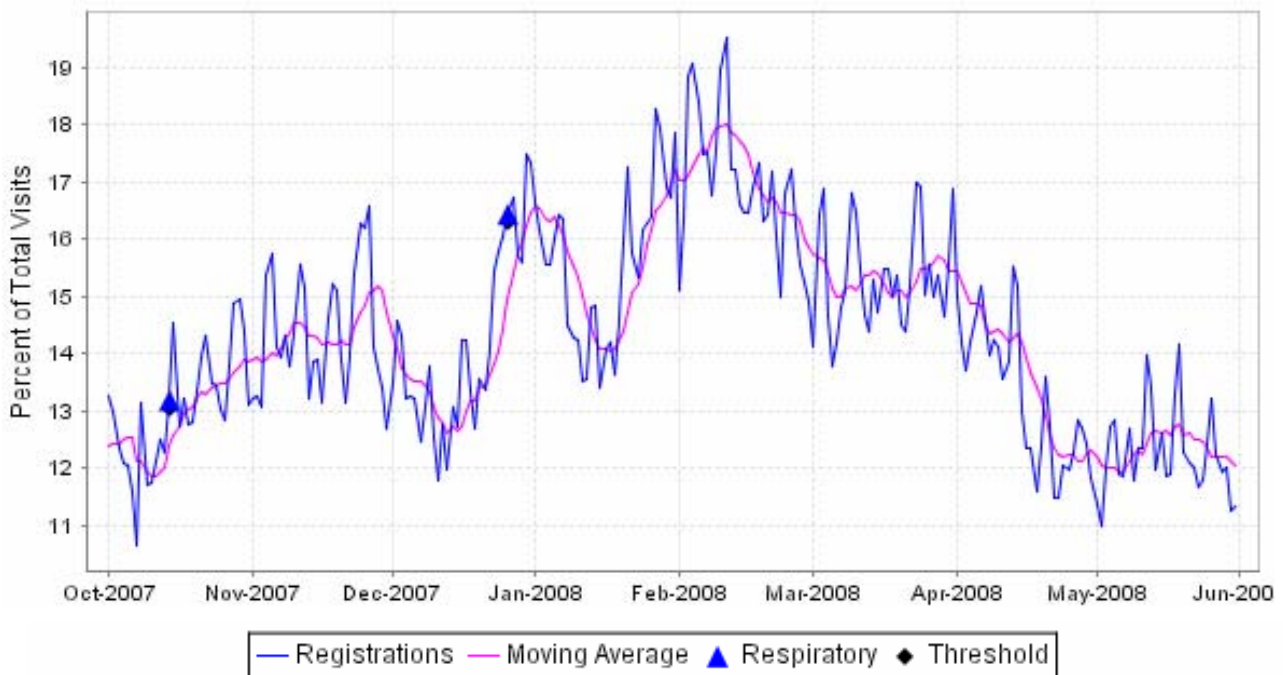
For the 2007-2008 season, emergency department visits due to constitutional complaints started increasing above baseline levels in late December, peaked in early February at just over 13% of all visits, and steadily declined to baseline by the end of April. Visits due to respiratory complaints increased above baseline starting in late September, and returned to baseline around mid-April. Two peaks occurred, one in late December and early January at 17.5% of all visits, and the second in early February at 19.5% of all visits. The peak percentage of visits due to constitutional and respiratory complaints correlated with other influenza surveillance indicators. During the 2006-2007 season, visits due to constitutional complaints peaked twice – in late December at 11.5% of all visits and again in late March at just over 11.5% of all visits, while visits due

to respiratory complaints remained elevated around 13-15% throughout the season and peaked at 19% of all visits in early January. This data indicates that the 2007-2008 influenza season may have affected emergency department visits slightly more than the previous season. However, comparisons between the two seasons are difficult to make, as the number of emergency departments providing syndromic data increased from 62 to around 70 between the two seasons. In addition, this method of surveillance only captures chief complaints, not clinical or laboratory diagnoses.

“Constitutional” Emergency Department Complaints, Michigan, October 2007-May 2008



“Respiratory” Emergency Department Complaints, Michigan, October 2007-May 2008



Over-the-counter product sales were more variable over the course of the season but were consistent with other indicators in suggesting a peak in flu-like illness activity in early February 2008, with sales levels that were similar or slightly increased over those seen in the previous year.

Pediatric Mortalities and Congregate Setting Outbreaks

One confirmed pediatric influenza-related mortality, a 13 year-old male from the Central Influenza Surveillance Region, was identified in Michigan over this season. This case was an influenza and MRSA co-infection; further laboratory analysis revealed an influenza A/H3N2 strain and a MRSA USA300 strain. The child had a previous history of asthma and an uncertain vaccination history for this influenza season.

22 congregate setting outbreaks due to influenza or influenza-like illness were reported to MDCH over the influenza season, which was a substantial increase over the previous season. Outbreaks were reported from all influenza surveillance regions, with the majority of reports occurring in early to mid-February. Seven outbreaks were culture-confirmed at MDCH; six as influenza A/H3N2 and one as influenza B.

MDCH Laboratory Isolates

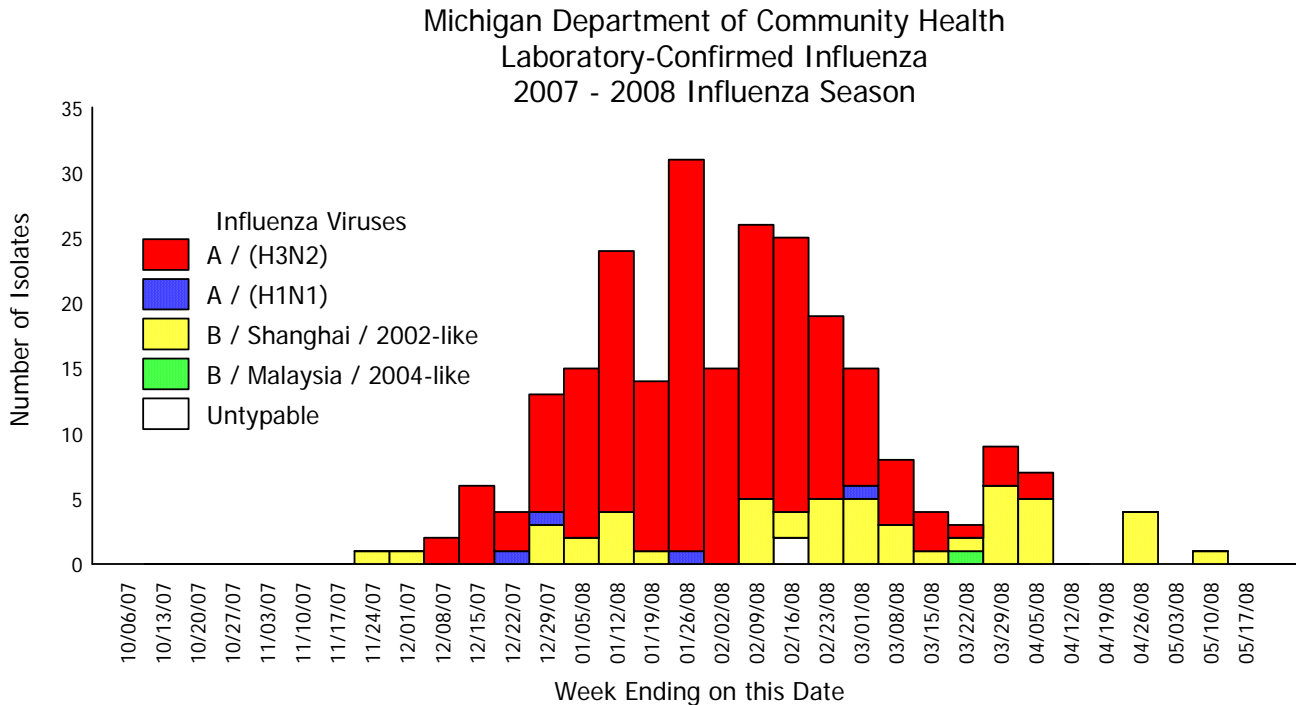
Sentinel physicians, sentinel laboratories and other clinical health partners provide virologic data by submitting clinical specimens and/or viral isolates for respiratory virus culture at the MDCH laboratory. During October 1, 2007 to May 31, 2008, there were 247 laboratory-confirmed influenza cases from the MDCH laboratory. 196 (79%) of these isolates were identified as influenza A, and 51 (21%) were influenza B. Of the 196 influenza A isolates, 190 (97%) were influenza A (H3N2), 4 (2%) were due to influenza A (H1N1), and 2 (1%) were influenza A with unsatisfactory subtyping. Of the 51 influenza B isolates, 50 (98%) were classified as B/Shanghai/2002-like and 1 (2%) was B/Malaysia/2004-like.

Overall, influenza A (H3N2) contributed to 77% of MDCH laboratory-confirmed cases, influenza A (H1N1), 2% of cases, and influenza B, 21% of cases. In comparison, during the previous season, 157 total influenza cases were identified, with 69 (44%) attributed to influenza A (H1N1), 34 (22%) to influenza A (H3N2), and 54 (34%) to influenza B.

MDCH has submitted influenza isolates to the Centers for Disease Control and Prevention (CDC) for additional strain typing. At the present time, all influenza B isolates submitted were determined to be either B/Shanghai/361/2002-like, which belongs to the B/Yamagata lineage, or B/Florida/07/2004-like, which is a more recent strain of the B/Shanghai/361/2002-like viruses. The B/Yamagata lineage was not represented in the 2007-2008 Northern Hemisphere influenza vaccine but will be for the 2008-2009 Northern Hemisphere vaccine. Additional isolates from the influenza season have been submitted for strain typing; results are pending.

These results suggest that there were a variety of influenza viruses circulating in Michigan during the 2007-2008 season, but the majority were influenza A (H3N2) and

influenza B/Shanghai/2002-like viruses. The majority of influenza B isolates tested at MDCH did not match the 2007-2008 influenza B vaccine strain.



MDCH lab-confirmed cases are charted by date of collection. For six isolates, the date of collection was unknown and date received at MDCH laboratory was used. Four of these isolates were received during the week ending January 12, one February 8, and one April 5.

Sentinel Laboratories

Eight sentinel laboratories across the state submitted weekly respiratory virologic testing results to MDCH. Positive influenza A test results were first seen in December by the majority of sentinel laboratories; there was more variation in the first occurrence of positive influenza B results. Most laboratories saw their highest number of positive influenza A test results in late January or early February, which corresponded with other influenza activity indicators. Peak influenza B activity occurred throughout March.

Data for other respiratory virus testing indicates that parainfluenza and adenovirus activity was low and steady throughout October to April. Peak respiratory syncytial virus activity was variable but occurred mainly in late January through mid-February.

2008-2009 Influenza Vaccine

WHO and FDA have recommended that the 2008-09 trivalent influenza vaccine for the Northern Hemisphere contain A/Brisbane/59/2007-like (H1N1), A/Brisbane/10/2007-like (H3N2), and B/Florida/4/2006-like viruses. All three components have been changed from the 2007-08 Northern Hemisphere vaccine formulation. A/Brisbane/10/2007-like (H3N2) and B/Florida/4/2006-like viruses are currently included in the 2008 Southern Hemisphere vaccines. This recommendation was based on surveillance data related to epidemiology and antigenic characteristics,

serological responses to 2007-08 vaccines, and the availability of candidate strains and reagents.

National Data (Centers for Disease Control and Prevention)

Influenza activity peaked nationwide in mid-February, which was about one to two weeks prior to peak activity in Michigan. The 2007-2008 season was associated with greater mortality and higher rates of pediatric hospitalizations than during the previous three seasons. Nationwide virologic data differed somewhat from that seen in Michigan, with influenza A (H1) viruses predominating early in the season, but influenza A (H3) viruses became more frequent starting January and predominated overall for the season. All 50 states reported widespread influenza activity for at least two weeks during the 2007-2008 season, with peak activity reported during weeks 7 and 8. The percentage of deaths attributed to pneumonia and influenza, as reported by the 122 Cities Mortality Reporting System, exceeded the epidemic threshold for 19 consecutive weeks. 83 pediatric deaths associated with influenza were reported from 33 states.

In January 2008, a Health Alert Network advisory was issued by CDC reminding stakeholders of the increase in the number of influenza-associated pediatric deaths and co-infections with *Staphylococcus aureus* seen during the 2006-2007 season. At this time, information is not available on the number of pediatric influenza and *S. aureus* co-infection mortalities reported for the 2007-2008 influenza season.

WORLDWIDE NOVEL AND AVIAN INFLUENZA STRAINS

2007-2008 saw the continuation of the highly pathogenic avian influenza A (H5N1) outbreak in human, poultry and wild birds. The Czech Republic, Togo, Poland and Benin reported their first H5N1 outbreaks in poultry during this time period. From 2003 to July 2, 2008, there have been 385 human cases, including 243 deaths, in 15 countries spanning Asia, the Middle East and Africa. Myanmar, Bangladesh and Pakistan recorded their first human fatalities due to H5N1 in late 2007-2008.

In December 2007, Pakistan reported a cluster of eight suspect human cases of H5N1 avian influenza that followed a poultry outbreak in November. In April 2008, the World Health Organization (WHO) reported that three cases from this cluster were confirmed H5N1 infections and one case was a probable infection. The index case (confirmed) was a veterinarian who assisted with the poultry outbreak. He was cared for by relatives, who had no known poultry exposure. WHO concluded that limited human-to-human transmission likely occurred in this family cluster. There was no evidence of sustained or community human-to-human transmission.

National and international surveillance has also revealed cases of low pathogenic H5N1 avian influenza and other subtypes of highly pathogenic avian influenza. Wild birds in multiple states, including Michigan, have tested positive for a strain of low pathogenic H5N1 that is unrelated to the current highly pathogenic H5N1 outbreak in the Eastern Hemisphere. Low pathogenic avian influenza A strains, including H5N1, have been found to circulate normally in wild birds, especially waterfowl. Recent highly pathogenic

avian influenza outbreaks of other subtypes include H7N7 in the United Kingdom and H7N3 in Saskatchewan, Canada. Low pathogenic H7N3 poultry outbreaks have occurred in the United States (Arkansas), Italy and Vietnam. Italy, Portugal, the Dominican Republic, and Haiti have reported low pathogenic H5N2 in poultry.

RESOURCES

- For information about influenza, go to the MDCH influenza homepage at <http://www.michigan.gov/influenza>.
 - From October to May, the most current U.S. influenza data is available from the CDC at <http://www.cdc.gov/flu/weekly/fluactivity.htm>.
 - The CDC 2007-2008 Influenza Activity Summary is available online at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5725a5.htm?s_cid=mm5725a5_e.
 - Current worldwide human avian influenza activity from the World Health Organization (WHO): http://www.who.int/csr/disease/avian_influenza/en/.
- * For more information on the designation of MMWR weeks, please visit http://www.cdc.gov/epo/dphsi/phs/mmwrweek/MMWR_Week_Fact_Sheet.doc.