



MI FluFocus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories



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Updates of Interest:

- **International:** A cluster of oseltamivir-resistant A(H1N1) 2009 influenza cases have been detected in New South Wales, Australia
- **International:** A new strain of avian influenza H5N1 has been discovered in poultry in China and Vietnam

Table of Contents

| | |
|-------------------------------------|-----|
| Influenza Surveillance Reports | |
| Michigan..... | 1-3 |
| National..... | 3 |
| International..... | 3 |
| Novel Influenza and Other News | |
| WHO Pandemic Phase..... | 3 |
| Avian Influenza Surveillance..... | 5 |
| Avian Influenza H5N1 in Humans..... | 5 |

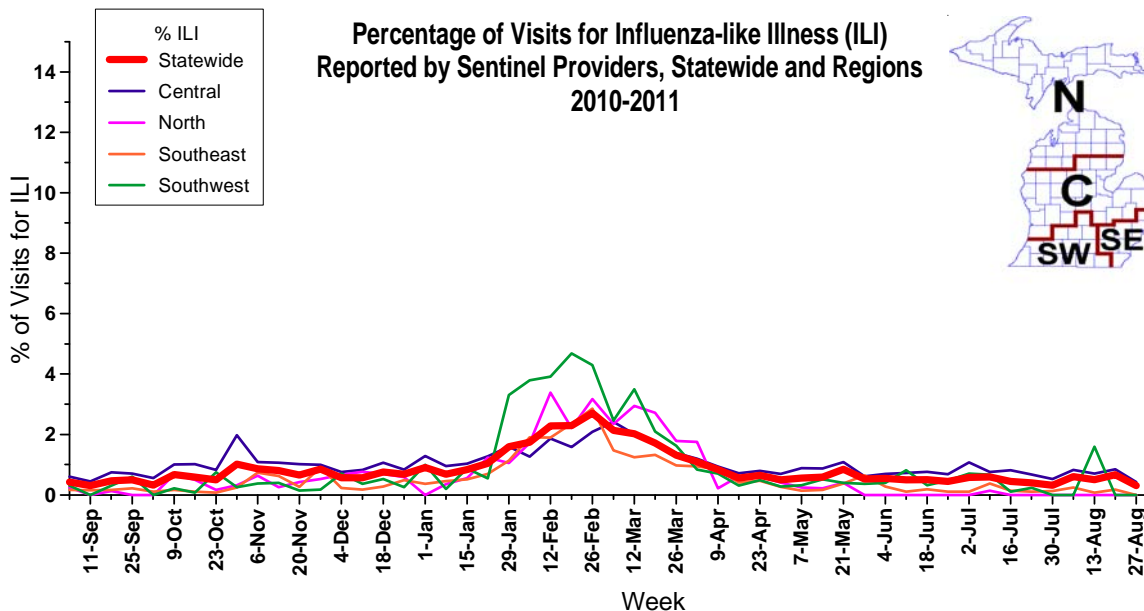
Influenza Surveillance Reports

Michigan Disease Surveillance System: MDSS data for the week ending August 27th indicated that both aggregate and individual reports remained steady at very low levels. Both aggregate and individual influenza cases are similar to levels seen during the same time last year.

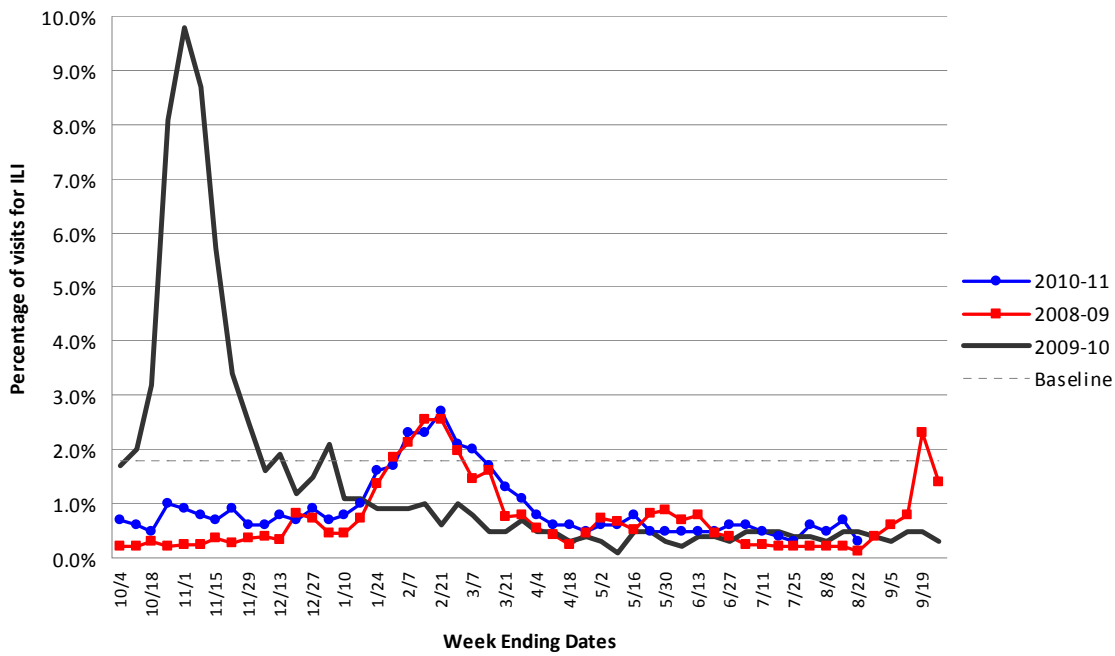
Emergency Department Surveillance: Compared to the previous week's levels, emergency department visits from constitutional complaints decreased slightly, while respiratory complaints increased slightly. Constitutional and respiratory complaints are similar to levels reported during the same time period last year. In the past week, there were seven constitutional alerts in the SE (1), SW(1), C(2) and N(3) Influenza Surveillance Regions and one respiratory alert in the N Region.

Sentinel Provider Surveillance (as of September 1): During the week ending August 27, 2011, the proportion of visits due to influenza-like illness (ILI) decreased to 0.3% overall; this is below the regional baseline of 1.8%. A total of 13 patient visits due to ILI were reported out of 4,266 office visits. Eighteen sentinel sites provided data for this report. Activity decreased in one surveillance region: Central (0.4%) and remained at no activity in the remaining three regions: Southwest (0.0%), North (0.0%) and Southeast (0.0%). Please note these rates may change as additional reports are received.

As part of pandemic influenza surveillance, CDC and MDCH highly encourage year-round participation from all sentinel providers. New practices are encouraged to join the sentinel surveillance program today! Contact Cristi Carlton at 517-335-9104 or CarltonC2@michigan.gov for more information.



**Percentage of Visits for Influenza Like Illness (ILI) Reported by the US Outpatient
Influenza-like Illness Surveillance Network (ILINet) - Michigan, 2008-2011**



Hospital Surveillance: The total number of cases for the 2010-11 season is 51 adult and 49 pediatric cases, and the estimated influenza hospitalization incidence rate in the catchment area (Clinton, Eaton and Ingham counties) is 49 per 100,000 for children and 14 per 100,000 for adults.

Laboratory Surveillance (as of August 27): During August 21-27, no positive specimens were reported by MDCH Bureau of Laboratories. For the 2010-11 season (starting October 3, 2010), MDCH BOL has identified 390 influenza results:

- 2009 Influenza A/H1N1: 157
- Influenza A/H3: 162
- Influenza A unsubtypeable: 1
- Influenza B: 70

Six sentinel labs (SE, SW, C, N) reported for the week ending August 27, 2011. No labs reported influenza A or influenza B positive results. Testing volumes are at very low levels.

Michigan Influenza Antigenic Characterization (as of September 1): One influenza A/H3 positive specimen, collected in January from the SE Region, was characterized at CDC as the A/H3/Perth/16/2009-like strain, which is the A/H3 component of the 2010-11 influenza vaccine. Five influenza B positive specimens, collected in March from the SE and SW Regions, were characterized at MDCH as the B/Brisbane/60/2008-like strain, which is the B component of the 2010-11 influenza vaccine.

Michigan Influenza Antiviral Resistance Data (as of September 1): One of the 24 Michigan influenza isolates tested for antiviral resistance at the CDC during the 2010-2011 season has been found to be resistant to oseltamivir (H275Y mutation present). This specimen was a 2009 influenza A/H1N1 positive specimen collected in early March; additional epidemiologic information is pending.

Antiviral resistance testing takes months to complete and cannot be used to guide individual patient treatment. However, CDC has made recommendations regarding the use of antivirals for treatment and prophylaxis of influenza, which are available at <http://www.cdc.gov/flu/professionals/antivirals/index.htm>.

Influenza-Associated Pediatric Mortality (as of September 1): Six influenza-associated pediatric mortalities (2SE, 4C), one associated with flu A and five with flu B, have been reported to MDCH this season.

***CDC has asked states for information on any pediatric death associated with influenza. This includes not only any pediatric death (<18 years) resulting from a compatible illness with laboratory confirmation of influenza, but also any unexplained pediatric death with evidence of an infectious process. Please immediately call MDCH to ensure proper specimens are obtained. View the complete MDCH protocol online at http://www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf.

Influenza Congregate Settings Outbreaks (as of September 1): 25 total outbreaks have been reported to MDCH for the 2010-2011 season:

- Influenza A/H3: 11 (4SE, 3SW, 1C, 3N)
- Influenza A/H1N1 2009: 2 (2SW)
- Influenza A/H3 and B both found: 1 (SW)
- Influenza A and B both found: 1 (C)
- Influenza B: 1 (C)
- Influenza positive, subtype unknown: 1 (SW)
- RSV and parainfluenza 3: 1 (C)
- RSV: 1 (C)
- No testing or negative: 6 (2SE, 2SW, 2N)

National (CDC, August 26): Limited national surveillance data is updated weekly during the summer months at the following website: <http://www.cdc.gov/flu/weekly/>.

International (WHO [edited], August 26): During weeks 31-32 (31 July to 13 August 2011), a number of countries in the southern hemisphere reported lab confirmed influenza virus activity at variable levels ranging from regional to sporadic. Influenza detection in the northern hemisphere remained sporadic.

In Australia, increased influenza activity due to both A(H1N1)2009 and influenza B virus was reported. The predominant virus in New Zealand was influenza B with lower levels of influenza A(H3N2) and A(H1N1)2009 co-circulating. In southern Asia, regional outbreaks of A(H1N1)2009 occurred in Cambodia. In South America, the predominant circulating virus in Chile was A(H1N1)2009 with co-circulation of A(H3N2). Some other countries in central and South America also reported detection of influenza viruses. In Africa, sporadic detections of influenza A(H1N1)2009, A(H3N2) and B were reported from some countries. In general, influenza virus activity was low.

The vast majority of viruses characterized recently in the WHO Global Influenza Surveillance and Response System (GISRS) remain antigenically similar to the WHO recommended vaccines for the 2010-2011 northern hemisphere and 2011 southern hemisphere influenza seasons.

During weeks 31 to 32 (31 July to 13 August 2011), National Influenza Centres from 70 countries, areas or territories reported data to FluNet. A total of 923 specimens were reported as positive for influenza viruses, 660 (71.5%) were typed as influenza A and 263 (28.5%) as influenza B. Of the sub-typed influenza A viruses reported, 51.8% were influenza A(H1N1)2009 and 48.2% were influenza A(H3N2).

The entire summary is available online at http://www.who.int/influenza/gisrs_laboratory/updates/summaryreport/en/index.html.

Map of International Activity (CDC): A Map of International Co-circulation of Seasonal Influenza is available online at <http://cdc.gov/flu/international/map.htm>.

Weekly reporting to the CDC has ended for the 2010-2011 influenza season.

For additional flu vaccination and education information, the MDCH *FluBytes* newsletter is available at http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_22779_40563-125027--,00.html.

Novel Influenza Activity and Other News

WHO Pandemic Phase: Post pandemic - Influenza disease activity has returned to levels normally seen for seasonal influenza. It is expected that the pandemic virus will behave as a seasonal influenza A virus. It is important to maintain surveillance and update pandemic preparedness/response plans accordingly.

National, Research (Rutgers, University of Texas press release [edited], August 25): Researchers at Rutgers University and the University of Texas at Austin have reported a discovery that could help scientists develop drugs to fight seasonal influenza epidemics caused by the common influenza B strain.

Their discovery also helps explain how influenza B is limited to humans, and why it cannot be as virulent as A strains that incorporate new genes from influenza viruses that infect other species. The devastating flu pandemic of 1918, the pandemics of 1968 and 1977, and the avian influenza that emerged in the middle of the last decade were caused by influenza A viruses. Understanding features of influenza B virus that limit it to humans will help scientists better understand how A strains are able to cross species.

The researchers have determined the three-dimensional structure of a complex between an influenza B virus protein and one of its human protein targets, resulting in suppression of the cell's natural defenses

to the infection and paving the way for the virus to replicate efficiently.

Their findings are detailed in a paper published in the most recent issue of PNAS (Proceedings of the US National Academy of Sciences).

“Our study shows the basis by which non-structural protein 1 of influenza B, or NS1B, binds to a human host protein, immobilizing it to prevent it from fighting the virus,” said Gaetano Montelione, a lead author and professor of biochemistry and molecular biology, School of Arts and Sciences, at Rutgers. That human protein, known as interferon-stimulated gene 15 protein or ISG15, is an essential part of the defense mechanism that human cells use to protect themselves from viral infections. Chemicals that block the binding of NS1B to ISG15 may have antiviral potential against influenza B virus.

The study, led by professors Montelione and Robert Krug at the University of Texas at Austin, also reveals why NS1B cannot bind ISG15 molecules in other species, such as dogs or mice. Only human and non-human primate ISG15 proteins have a unique molecular sequence in a small part of the protein that makes it possible to bind to the NS1B protein. So far, influenza B virus has been found only in humans.

“The three-dimensional structure of the NS1B-ISG15 complex, which we determined using X-ray crystallography, has given us a clear understanding of the molecular basis for this species specificity,” said Krug, professor and chair of molecular genetics and microbiology.

“Flu infections continue to be a major health problem, with more effective drugs critically needed to treat infected individuals and control potential pandemics,” said Aaron Shatkin, director of the Center for Advanced Biotechnology and Medicine (CABM) at Rutgers and an eminent virologist. “This discovery opens new possibilities for achieving these very important goals.”

National, Research (CIDRAP, August 26): In what is thought to be the most extensive investigation of human response to influenza exposure, researchers from the University of Michigan and Duke University have found gene expression patterns that provide clues about how disease progresses in symptomatic and asymptomatic people. As detailed in *Public Library of Science (PLOS) Genetics*, they exposed 17 healthy volunteers to influenza A (H3N2), and took peripheral blood samples 16 times over 132 hours. To identify gene expression patterns, they used a recognition tool called Bayes linear unmixing, which has previously been used to process satellite images of earth, according to a University of Michigan press release. They found a molecular signature that correlated with clinical disease and biomarkers that distinguished early from late infection phases and suggested that the findings could be used to identify new treatment targets and provide diagnostic assessment for seasonal and pandemic flu.

The entire article is available online at <http://www.plosgenetics.org/article/info%3Adoi%2F10.1371%2Fjournal.pgen.1002234>.

International, Antiviral Resistance (ProMed, August 24): A cluster of oseltamivir-resistant A(H1N1)2009 influenza cases with onset between May and August 2011 has been detected in the Hunter region of New South Wales (NSW), Australia.

Viruses from 25 of 184 (14 percent) A(H1N1)2009 cases from the Hunter New England region exhibited highly reduced oseltamivir sensitivity due to the H275Y substitution in the neuraminidase. The H275Y mutation is a well-established substitution previously reported to confer oseltamivir resistance in N1 neuraminidases and was present in the oseltamivir resistant pre-pandemic seasonal A(H1N1) virus.

15 of the 1st 16 cases lived within a 50-km radius of the regional centre of Newcastle. 16 of the 25 patients have been interviewed, and none had received oseltamivir prior to influenza specimen collection. Only 5 were hospitalized at the time of specimen collection. None of the 16 had a history of immune suppression; 3 cases were pregnant. No one was admitted to ICU or had a fatal outcome. Further interviews with cases and virological analyses are ongoing.

The post is available online at http://www.promedmail.org/pls/otn/f?p=2400:1001:1669275093415613::NO::F2400_P1001_BACK_PAGE,F2400_P1001_PUB_MAIL_ID:1000,89966.

International, Poultry (Agence France-Presse [edited], August 29): The UN Food and Agriculture Organization (FAO) on Monday warned about a new mutant strain of the deadly bird flu H5N1 virus in China and Vietnam, saying there could be a "major resurgence" of the disease. The Rome-based

organization said it was concerned about "the appearance in China and Vietnam of a variant virus able to sidestep the defenses provided by existing vaccines," adding the new strain was known as H5N1 2.3.2.1.

"Virus circulation in Vietnam poses a direct threat to Cambodia, Thailand and Malaysia as well as endangering the Korean peninsula and Japan," it said, warning that the virus could be spread beyond Asia by wild bird migration. It called for "heightened readiness and surveillance against a possible major resurgence" of the virus, which developed into a pandemic in 2009.

The UN's World Health Organization says 565 people have been infected since the deadly H5N1 strain first appeared and 331 of them have died as a result. FAO said the latest death occurred earlier this month in Cambodia, which has registered eight cases of human infection this year -- all of them fatal.

"This is no time for complacency. No one can let their guard down with H5N1," Juan Lubroth, FAO's chief veterinary officer, was quoted as saying. "The general departure from the progressive decline observed in 2004-2008 could mean that there will be a flare-up of H5N1 this fall and winter, with people unexpectedly finding the virus in their backyard," he said.

FAO said that the areas recently affected by deadly bird flu also included Bulgaria, Israel, Mongolia, Nepal, the Palestinian Territories and Romania.

Michigan Wild Bird Surveillance (USDA, as of September 1): For the 2011 season (April 1, 2011-March 31, 2012), highly pathogenic avian influenza H5N1 has not been recovered from 166 samples tested nationwide. For more information, visit <http://wildlifedisease.nbio.gov/ai/>.

To learn about avian influenza surveillance in Michigan wild birds or to report dead waterfowl, go to Michigan's Emerging Disease website at <http://www.michigan.gov/emergingdiseases>.

International Poultry and Wild Bird Surveillance (OIE): Reports of avian influenza activity, including summary graphs of avian influenza H5N1 outbreaks in poultry, can be found at the following website: http://www.oie.int/download/AVIAN%20INFLUENZA/A_AI-Asia.htm.

For questions or to be added to the distribution list, please contact Susan Peters at PetersS1@michigan.gov

Contributors

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Table. H5N1 Influenza in Humans - Cases up to August 19, 2011. http://www.who.int/csr/disease/avian_influenza/country/cases_table_2011_08_19/en/index.html. Downloaded 8/22/2011. Cumulative number of lab-confirmed cases reported to WHO. Total cases includes deaths.

| Country | 2003 | | 2004 | | 2005 | | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | | Total | |
|------------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | 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 | 8 | 5 |
| Bangladesh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 |
| Cambodia | 0 | 0 | 0 | 0 | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 8 | 8 | 18 | 16 |
| China | 1 | 1 | 0 | 0 | 8 | 5 | 13 | 8 | 5 | 3 | 4 | 4 | 7 | 4 | 2 | 1 | 0 | 0 | 40 | 26 |
| Djibouti | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 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 | 32 | 12 | 151 | 52 |
| Indonesia | 0 | 0 | 0 | 0 | 20 | 13 | 55 | 45 | 42 | 37 | 24 | 20 | 21 | 19 | 9 | 7 | 7 | 5 | 178 | 146 |
| Iraq | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 |
| Lao PDR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 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 | 1 | 0 |
| Nigeria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 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 | 3 | 1 |
| Thailand | 0 | 0 | 17 | 12 | 5 | 2 | 3 | 3 | 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 | 12 | 4 |
| Viet Nam | 3 | 3 | 29 | 20 | 61 | 19 | 0 | 0 | 8 | 5 | 6 | 5 | 5 | 5 | 7 | 2 | 0 | 0 | 119 | 59 |
| Total | 4 | 4 | 46 | 32 | 98 | 43 | 115 | 79 | 88 | 59 | 44 | 33 | 73 | 32 | 48 | 24 | 48 | 24 | 565 | 331 |