



MI Flu Focus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories

Michigan Department
of Community Health



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Updates of Interest

- **National:** A total of 16 cases of human infection with H3N2 variant virus (H3N2v) have been reported this summer
- **International:** WHO is reporting 94 cases of MERS-CoV including 46 deaths

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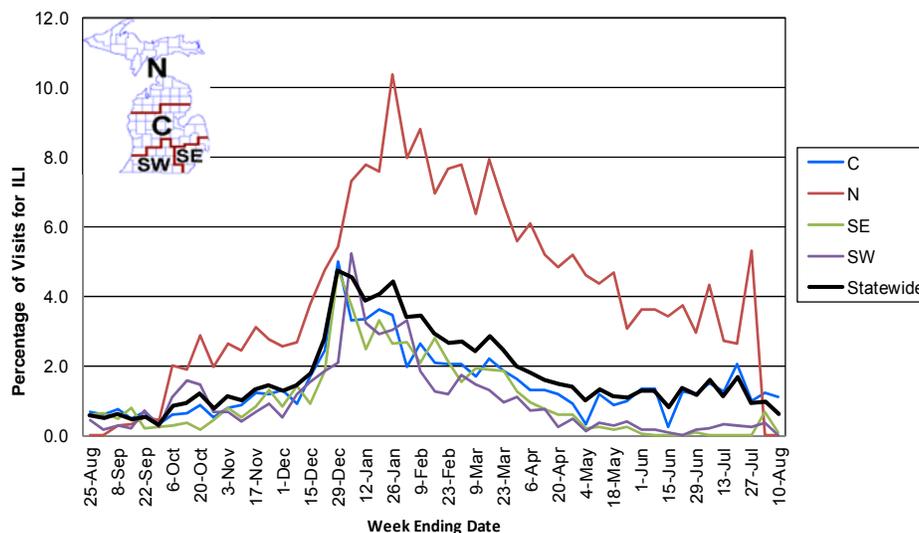
Influenza Surveillance Reports

Michigan Disease Surveillance System (as of August 15): MDSS influenza data for the week ending August 10, 2013 indicated that compared to levels from the previous week, aggregate reports remained the same and individual reports decreased. Aggregate reports are lower than levels seen during the same time period last year, while individual reports are similar.

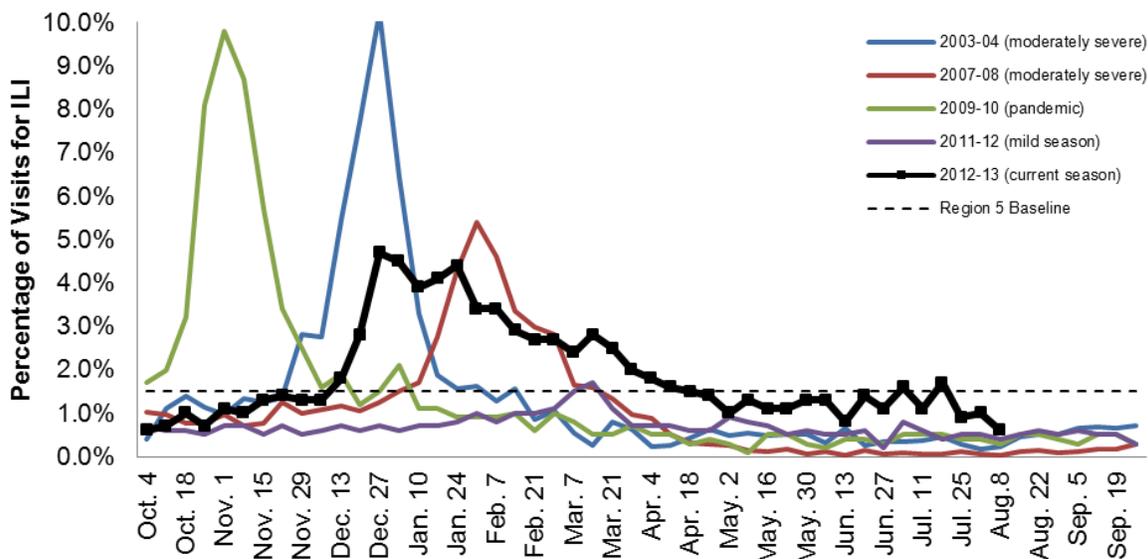
Emergency Department Surveillance (as of August 15): Emergency department visits due to constitutional complaints have increased from the previous week but remain lower when compared to levels reported during the same time period last year. Emergency department visits from respiratory complaints are similar when compared to levels from the week prior and are lower than levels reported during the same time period last year. In the past week, there were 10 constitutional alerts in the N (1), C (4), SW (3), and SE (2) Influenza Surveillance Regions and 11 respiratory alerts in the N (3), C (4), and SW (4) Regions.

Sentinel Provider Surveillance (as of August 15): During the week ending August 10, 2013, the proportion of visits due to influenza-like illness (ILI) decreased to 0.6% overall; this is below the regional baseline (1.5%). A total of 31 patient visits due to ILI were reported out of 5,131 office visits. Data were provided by 15 sentinel sites from the following regions: Central (6), Southeast (8), and Southwest (1). There were no reports from the North region. ILI activity decreased in three regions: C (1.1%), SE (0.1%), and SW (0.0%). Please Note: these rates may change as additional reports are received.

**Percentage of Visits for Influenza-like Illness (ILI)
Reported by Sentinel Providers, Statewide and Regions
2012-13 Flu Season**



**Percentage of Visits for Influenza-like Illness (ILI) Reported by
the US Outpatient Influenza-like Illness Surveillance Network
(ILINet): Michigan, Select Seasons**



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 Stefanie DeVita at 517-335-3385 or DeVitaS1@michigan.gov for more information.

Hospital Surveillance (as of May 18): The CDC Influenza Hospitalization Surveillance Project provides population-based rates of severe influenza illness through active surveillance and chart review of lab-confirmed cases, starting on October 1, 2012, in the Clinton, Eaton, Genesee, and Ingham counties. Reporting for the season has concluded. There were 258 influenza hospitalizations (168 adult, 90 pediatric) within the catchment area. The incidence rate for adults was 24.7 hospitalizations per 100,000 population and for children was 43.0 hospitalizations per 100,000.

The MDCH Influenza Sentinel Hospital Network monitors influenza hospitalizations reported voluntarily by hospitals statewide. Reporting for the 2012-13 influenza season has concluded. 437 hospitalizations (278SE, 21SW, 64C, 74N) were reported by 12 hospitals during the 2012-13 season.

Laboratory Surveillance (as of August 10): During July 28-August 10, no positive influenza results were reported by MDCH. For the 2012-13 season (starting Sept. 30, 2012), MDCH has identified 681 influenza results:

- Influenza A(H3): 500 (124SE, 169SW, 169C, 38N)
- Influenza A(H1N1)pdm09: 36 (20SE, 4SW, 9C, 3N)
- Influenza B: 153 (30SE, 31SW, 74C, 18N)
- Parainfluenza: 8 (3SW, 1C, 4N)
- RSV: 1 (1N)
- hMPV: 2 (2SW)

7 sentinel labs (SE(2), SW(2), C(3), N(0)) reported for the week ending August 10, 2013. No labs reported influenza A or B activity. One lab (SW) reported sporadic Parainfluenza activity. One lab (SE) reported sporadic RSV activity. No labs reported hMPV activity. All sites remain at very low testing volumes.

Michigan Influenza Antigenic Characterization (as of August 15): For the 2012-13 season, 113 Michigan influenza B specimens have been characterized at MDCH BOL. 94 specimens are B/Wisconsin/01/2010-like, matching the B component of the 2012-13 influenza vaccine. 19 influenza B specimens were characterized as B/Brisbane/60/2008-like, which is not included in the 2012-13 vaccine.

Michigan Influenza Antiviral Resistance Data (as of August 15): For the 2012-13 season, 32 influenza A/H3 specimens and 25 influenza A(H1N1)pdm09 specimens have been tested at the MDCH BOL for antiviral resistance. None of the influenza isolates tested have been resistant.

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 August 15): 7 pediatric influenza-associated influenza mortalities (3 A/H3, 4B) have been reported for the 2012-13 season.

CDC requires reporting of flu-associated pediatric deaths (<18 yrs), including pediatric deaths due to an influenza-like illness with lab confirmation of influenza or any unexplained pediatric death with evidence of an infectious process. Contact MDCH immediately for proper specimen collection. The MDCH protocol is at www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf.

Influenza Congregate Settings Outbreaks (as of August 15): 112 respiratory outbreaks (22SE, 30SW, 41C, 19N) have been reported to MDCH during the 2012-13 season; testing results are listed below.

- Influenza A/H3: 16 (7SW, 9C)
- Influenza A: 55 (10SE, 13SW, 20C, 12N)
- Influenza B: 8 (1SE, 3SW, 2C, 2N)
- Influenza A and B: 2 (1SE, 1SW)
- Influenza A/H3 and B: 1 (1C)
- Influenza positive: 4 (1SE, 1SW, 2C)
- Influenza and RSV positive: 1 (1C)
- Influenza B and RSV positive: 1 (1SE)
- hMPV: 1 (1SW)
- Negative/no testing: 23 (8SE, 4SW, 6C, 5N)

National (CDC): Past weekly reports and updated data during the summer months are available online at: <http://www.cdc.gov/flu/weekly/>.

One additional infection with influenza A (H3N2) variant (H3N2v) virus was reported to CDC during week 31 by Indiana. A total of 16 H3N2v cases have been reported this summer (Illinois [1], Indiana [14], and Ohio [1]). So far during 2013, one person has been hospitalized as a result of H3N2v illness; no deaths have occurred. At this time no ongoing human-to-human transmission has been identified and all 16 cases have reported close contact with swine in the week prior to illness onset. Public health and agriculture officials are investigating the extent of disease among humans and swine, and additional cases may be identified as the investigation continues.

Because of reporting schedules, state totals posted by CDC may not always be consistent with those reported by state health departments. If there is a discrepancy between state and CDC case counts, data from the state health department should be used as the most accurate number.

Early identification and investigation of human infections with novel influenza A viruses is critical in order to evaluate the extent of the outbreak and possible human-to-human transmission. Additional information on influenza in swine, variant influenza infection in humans, and strategies to interact safely with livestock can be found at <http://www.cdc.gov/flu/swineflu/h3n2v-cases.htm>.

International (WHO [edited], August 16): Influenza activity in the northern hemisphere temperate zones remained at inter-seasonal levels. The United States of America reported 16 cases of human infection with influenza A(H3N2)v. More details can be found at <http://www.cdc.gov/flu/swineflu/h3n2v-cases.htm>. In most regions of tropical Asia influenza activity decreased. In Central America and the Caribbean regions, influenza and RSV transmission showed a decreasing trend. RSV and influenza A(H1N1)pdm09 were the main respiratory viruses reported. In Nicaragua transmission activity has decreased again after a sharp increase of transmission activity due to influenza A(H3N2) in the beginning of July. In tropical South America, influenza A(H1N1)pdm09 remained the most commonly detected respiratory virus in the region. A sharp increase in influenza A(H1N1)pdm09 transmission has been observed in Peru in the middle of July. Influenza activity is decreasing in Colombia, Venezuela, Bolivia and Brazil. Influenza transmission has peaked in the southern cone of South America and in South Africa in late June. In all of those areas, transmission was primarily associated with influenza A(H1N1)pdm09. In Australia and New Zealand, numbers of influenza viruses detected and rates of influenza-like illness have been lower than in previous years, but have not yet definitively peaked. Influenza A(H3N2) and type B have been much more commonly detected than A(H1N1)pdm09 in both countries. As of 11 August, a total of 135 cases of influenza A(H7N9) virus infection have been reported. For more details, refer to http://www.who.int/influenza/human_animal_interface/influenza_h7n9/en/index.html

The entire WHO report is available online at http://www.who.int/influenza/surveillance_monitoring/updates/latest_update_GIP_surveillance/en/index.html

Weekly reporting to the CDC has ended for the 2012-2013 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.

International, Human (WHO, August 1): WHO has been informed of an additional three laboratory-confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection in Saudi Arabia. The first patient is a 67-year-old woman from Riyadh with underlying medical conditions. She became ill on 25 July 2013. She has no known exposure to animals or to a case confirmed with MERS-CoV infection. She is currently hospitalized.

The other two patients are health care workers, both women, from Assir and Riyadh regions. Both of them have mild symptoms and were exposed to patients who were laboratory-confirmed cases. Globally, from September 2012 to date, WHO has been informed of a total of 94 laboratory-confirmed cases of infection with MERS-CoV, including 46 deaths.

Based on the current situation and available information, WHO encourages all Member States to continue their surveillance for severe acute respiratory infections (SARI) and to carefully review any unusual patterns.

Health care providers are advised to maintain vigilance. Recent travellers returning from the Middle East who develop SARI should be tested for MERS-CoV as advised in the current surveillance recommendations.

Specimens from patients' lower respiratory tracts should be obtained for diagnosis where possible. Clinicians are reminded that MERS-CoV infection should be considered even with atypical signs and symptoms, such as diarrhoea, in patients who are immunocompromised.

Health care facilities are reminded of the importance of systematic implementation of infection prevention and control (IPC). Health care facilities that provide care for patients suspected or confirmed with MERS-CoV infection should take appropriate measures to decrease the risk of transmission of the virus to other patients, health care workers and visitors.

All Member States are reminded to promptly assess and notify WHO of any new case of infection with MERS-CoV, along with information about potential exposures that may have resulted in infection and a description of the clinical course. Investigation into the source of exposure should promptly be initiated to identify the mode of exposure, so that further transmission of the virus can be prevented.

WHO does not advise special screening at points of entry with regard to this event nor does it currently recommend the application of any travel or trade restrictions.

WHO has convened an Emergency Committee under the International Health Regulations (IHR) to advise the Director-General on the status of the current situation. The Emergency Committee, which comprises international experts from all WHO Regions, unanimously advised that, with the information now available, and using a risk-assessment approach, the conditions for a Public Health Emergency of International Concern (PHEIC) have not at present been met.

The update is available online at http://www.who.int/csr/don/2013_08_01/en/index.html

International, Human (The Lancet [abstract], August 9): Middle East respiratory syndrome coronavirus neutralising serum antibodies in dromedary camels: a comparative serological study

Background: A new betacoronavirus—Middle East respiratory syndrome coronavirus (MERS-CoV)—has been identified in patients with severe acute respiratory infection. Although related viruses infect bats, molecular clock analyses have been unable to identify direct ancestors of MERS-CoV. Anecdotal exposure histories suggest that patients had been in contact with dromedary camels or goats. We investigated possible animal reservoirs of MERS-CoV by assessing specific serum antibodies in livestock.

Methods: We took sera from animals in the Middle East (Oman) and from elsewhere (Spain, Netherlands, Chile). Cattle (n=80), sheep (n=40), goats (n=40), dromedary camels (n=155), and various other camelid species (n=34) were tested for specific serum IgG by protein microarray using the receptor-binding S1 subunits of spike proteins of MERS-CoV, severe acute respiratory syndrome coronavirus, and

human coronavirus OC43. Results were confirmed by virus neutralisation tests for MERS-CoV and bovine coronavirus.

Findings: 50 of 50 (100%) sera from Omani camels and 15 of 105 (14%) from Spanish camels had protein-specific antibodies against MERS-CoV spike. Sera from European sheep, goats, cattle, and other camelids had no such antibodies. MERS-CoV neutralising antibody titres varied between 1/320 and 1/2560 for the Omani camel sera and between 1/20 and 1/320 for the Spanish camel sera. There was no evidence for cross-neutralisation by bovine coronavirus antibodies.

Interpretation: MERS-CoV or a related virus has infected camel populations. Both titres and seroprevalences in sera from different locations in Oman suggest widespread infection.

The abstract is available online here [http://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(13\)70164-6/abstract](http://www.thelancet.com/journals/laninf/article/PIIS1473-3099(13)70164-6/abstract)

International, Human (WHO, August 11): The National Health and Family Planning Commission, China notified WHO of a new laboratory-confirmed case of human infection with avian influenza A(H7N9) virus. This is the first new confirmed case of human infection with avian influenza A(H7N9) virus since 20 July 2013.

The patient is a 51-year-old woman from Huizhou, Guangdong Province. She became ill on 27 July 2013, was admitted to a local hospital on 28 July 2013 and transferred to a hospital in Huizhou City on 3 August 2013. She is currently in a critical condition.

Laboratory test conducted by Guangdong Provincial Centre for Disease Control on 9 August 2013 was positive for avian influenza A(H7N9) virus infection, and was confirmed by the Beijing Municipal Center for Disease Control (CDC) on 10 August 2013.

To date, WHO has been informed of a total of 135 laboratory-confirmed human cases with avian influenza A(H7N9) virus including 44 deaths. Currently, four cases are hospitalised and 87 have been discharged. There is no evidence of sustained human to human transmission.

The Chinese government continues to take strict monitoring, prevention and control measures, including: strengthening of epidemic surveillance and analysis; deployment of medical treatment; conducting public risk communication and information dissemination; strengthening international cooperation and exchanges; and is continuing to carry out scientific research.

WHO does not advise special screening at points of entry with regard to this event, nor does it currently recommend any travel or trade restrictions.

The update is available online at http://www.who.int/csr/don/2013_08_11/en/index.html

International, Human (Clinical Infectious Diseases Journal [abstract], August 9): Avian-origin H7N9 virus infection in H7N9-affected areas of China: a serological study

Abstract: Serological surveillance conducted in H7N9 outbreak areas of China found no sero-positivity for antibodies specific for avian-origin H7N9 virus among 1129 individuals of the general population, whereas greater than 6% among 396 poultry workers were positive (HI titers ≥ 80), confirming that infected poultry is the principal source of human infections and subclinical infections are possible. Elevated antibodies to the H7N9 virus were found in 65.8% (25/38) of survival cases but only in 28.6% (2/7) of fatal cases after an interval of 10-14 days, suggesting the presence of antibodies may improve clinical outcome in infected patients.

The abstract is available online here <http://jid.oxfordjournals.org/content/early/2013/08/09/infdis.jit430.abstract?sid=a5625730-8829-49dd-9bc7-c435a4139e04>

International, Human (Clinical Infectious Diseases Journal [abstract], August 13): Clinical, virological, and histopathological manifestations of fatal human infections by avian influenza A(H7N9) virus

Background: Systematic analysis of histopathological and serial virological changes of fatal influenza A(H7N9) cases is lacking.

Methods: Patients with A(H7N9) infection admitted to our intensive care unit between April 10-23, 2013, were included. Viral loads in the respiratory tract, as inferred from the Ct value of RT-PCR, and the serum

hemagglutination inhibition antibody titer, were analyzed. Postmortem biopsies of the lung, liver, kidney, spleen, bone marrow and heart were examined.

Results: Twelve patients (six fatal cases, six survivors) were included. Median viral load was higher in sputa than the nasopharyngeal swabs for fatal cases (median Ct, 23 vs 30.5; P=0.08). RT-PCR for A(H7N9) was positive in stool samples (67%, 4/6) of fatal cases and (33%, 2/6) of survivors, but was negative in the cerebrospinal fluid, urine or blood of all patients. Nosocomial bacterial infections were more common in fatal cases than survivors (83% vs 50%). HI titer increased by ≥ 4 -fold in those with convalescent sera. Postmortem biopsy for three patients showed acute diffuse alveolar damage. Patient 1, who died eight days after symptom onset, had intra-alveolar hemorrhage. Patient 2 and 3, who died 11 days after symptom onset, had pulmonary fibroproliferative changes. Reactive hemophagocytosis in the bone marrow and lymphoid atrophy in splenic tissues were compatible with laboratory findings of leukopenia, lymphopenia and thrombocytopenia. Hypoxic and fatty changes of kidney and liver tissues are compatible with impaired renal or liver function.

Conclusion: Fatal A(H7N9) infection was characterized by viral and secondary bacterial pneumonia with 67% having positive RT-PCR in stool.

The abstract is available online here

<http://cid.oxfordjournals.org/content/early/2013/08/13/cid.cit541.abstract?sid=a5625730-8829-49dd-9bc7-c435a4139e04>

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Table. H5N1 Influenza in Humans – As of July 5, 2013. http://www.who.int/influenza/human_animal_interface/EN_GIP_20130705CumulativeNumberH5N1cases_2.pdf. Downloaded 07/19/2013. Cumulative lab-confirmed cases reported to WHO. Total cases include deaths.

| Country | 2003-2009 | | 2010 | | 2011 | | 2012 | | 2013 | | Total | |
|------------|-----------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths |
| Azerbaijan | 8 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 5 |
| Bangladesh | 1 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 1 | 1 | 7 | 1 |
| Cambodia | 9 | 7 | 1 | 1 | 8 | 8 | 3 | 3 | 13 | 9 | 34 | 28 |
| China | 38 | 25 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 45 | 30 |
| Djibouti | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Egypt | 90 | 27 | 29 | 13 | 39 | 15 | 11 | 5 | 4 | 3 | 173 | 63 |
| Indonesia | 162 | 134 | 9 | 7 | 12 | 10 | 9 | 9 | 1 | 1 | 193 | 161 |
| Iraq | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 |
| Lao PDR | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Myanmar | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Nigeria | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Pakistan | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 |
| Thailand | 25 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 17 |
| Turkey | 12 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 4 |
| Vietnam | 112 | 57 | 7 | 2 | 0 | 0 | 4 | 2 | 2 | 1 | 125 | 62 |
| Total | 468 | 282 | 48 | 24 | 62 | 34 | 32 | 20 | 23 | 17 | 633 | 377 |