



MI Flu Focus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories

Michigan Department
of Community Health



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Current Influenza Activity Levels:

- **Michigan:** Regional influenza activity
- **National:** During December 8-14, influenza activity continued to increase in the U.S.

Updates of Interest:

- **International:** An additional MERS-CoV case is reported from the United Arab Emirates

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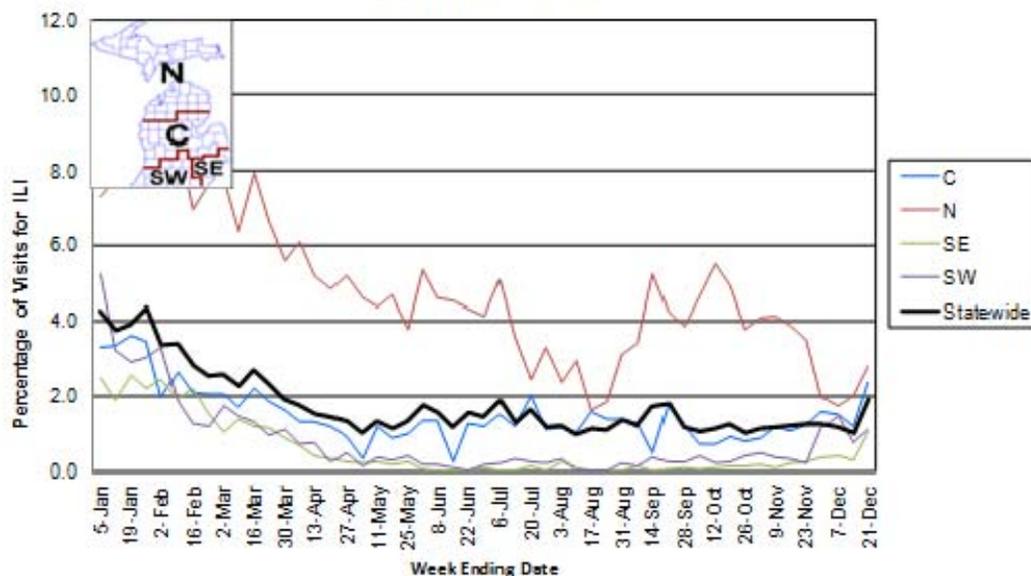
Influenza Surveillance Reports

Michigan Disease Surveillance System (as of December 26): MDSS influenza data for the week ending December 21, 2013 indicated that compared to levels from the previous week, aggregate reports decreased and individual reports moderately increased. The decrease in aggregate reports may be partially explained by the school holiday breaks. Aggregate reports are significantly lower than levels seen during the same time period last year, while individual reports are similar.

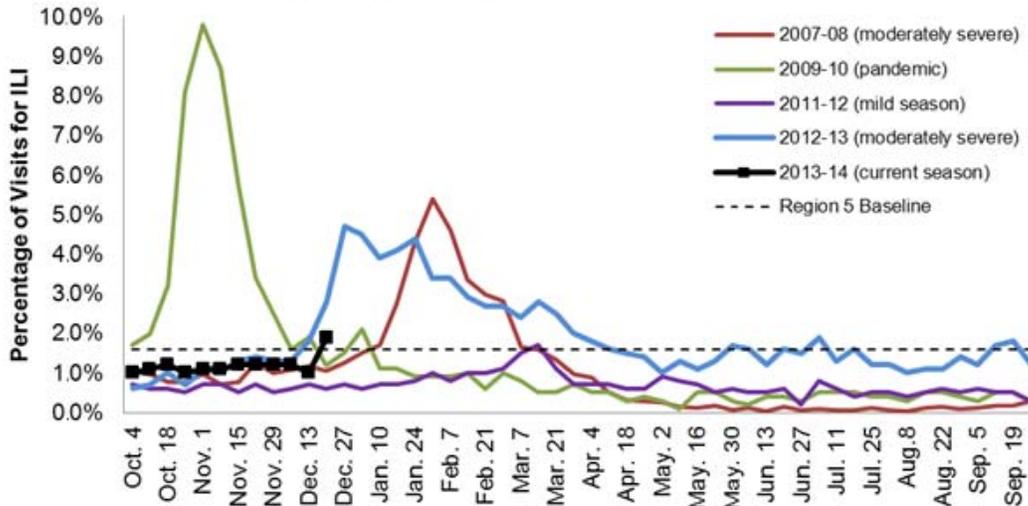
Emergency Department Surveillance (as of December 26): Emergency department visits due to constitutional complaints moderately increased during the week ending December 21, 2013, while respiratory complaints slightly increased. Emergency department visits from respiratory complaints were similar to levels during the same time period last year, while constitutional complaints were slightly lower. In the past week, there were 12 constitutional alerts in the SE(1), SW(6), C(3) and N(2) Influenza Surveillance Regions and 1 statewide alert and 5 respiratory alerts in the SE(2), SW(2) and C(1) Regions.

Sentinel Provider Surveillance (as of December 26): During the week ending December 21, 2013, the proportion of visits due to influenza-like illness (ILI) increased to 1.9% overall; this is above the regional baseline (1.6%). A total of 153 patient visits due to ILI were reported out of 8,098 office visits. Data were provided by 25 sentinel sites from the following regions: Central (8), North (3), Southeast (10), and Southwest (4). ILI activity increased in all four regions: C (2.3%), N (2.8%), SE (1.0%), and SW (1.1%). 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
2013-14 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 December 21): 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, 2013, for Clinton, Eaton, Genesee, and Ingham counties. 13 new cases (8 pediatric, 5 adult) were identified during the past week. As of December 21st, there have been 24 influenza hospitalizations (13 pediatric, 11 adult) within the catchment area.

The MDCH Influenza Sentinel Hospital Network monitors influenza hospitalizations reported voluntarily by hospitals statewide. 7 hospitals (SE,SW,C) reported for the week ending December 21, 2013. Results are listed in the table below.

Age Group	Hospitalizations Reported During Current Week	Total Hospitalizations 2013-14 Season
0-4 years	2 (2C)	12 (1SE, 11C)
5-17 years	2 (2C)	5 (5C)
18-49 years	2 (1SE, 1C)	13 (8SE, 5C)
50-64 years	4 (3SE, 1C)	12 (7SE, 3C, 2N)
≥65 years	0	3 (3SE)
Total	10 (4SE, 6C)	45 (19SE, 24C, 2N)

Laboratory Surveillance (as of December 21): During December 15-21, 27 influenza 2009 A/H1N1pdm (2SE, 9SW, 10C, 6N) results were reported by MDCH Bureau of Laboratories. For the 2013-14 season (starting Sept. 29, 2013), MDCH has identified 122 positive influenza results:

- Influenza 2009 A/H1N1pdm: 111 (46SE, 25SW, 28C, 12N)
- Influenza A/H3: 6 (6SE)
- Influenza A unsubtypeable: 1 (1SE)
- Influenza B: 3 (1SE, 1SW, 1C)
- Influenza A and B (LAIV recovery): 1 (1SE)
- Parainfluenza: 2 (1SE, 1SW)

13 sentinel labs (SE, SW, C, N) reported for the week ending December 21, 2013. 13 labs (SE, SW, C, N) reported increasing influenza A activity, with several SE sites approaching high levels. 1 lab (SE) reported sporadic influenza B activity. 7 labs (SE, SW, C) had low or increasing RSV activity. 5 labs (SE, SW, C) had sporadic parainfluenza activity. 4 labs (SE, SW, C) reported sporadic adenovirus activity. 4 labs (SE, SW) reported sporadic hMPV activity. Testing volumes increased, with most sites at moderate to high levels.

Michigan Influenza Antigenic Characterization (as of December 26): For the 2013-14 season, no influenza specimens have been characterized at MDCH BOL.

Michigan Influenza Antiviral Resistance Data (as of December 26): For the 2013-14 season, 23 2009 A/H1N1pdm (12SE,2SW,5C,4N) and 4 A/H3 (4SE) influenza specimens have been tested at the MDCH BOL for antiviral resistance. None of the influenza specimens 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 December 26): No new pediatric influenza-associated deaths were reported to MDCH during the previous week. One pediatric influenza-associated influenza mortality (1C) has been reported to MDCH for the 2013-14 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_pediatic_influenza_guidance_v2_214270_7.pdf.

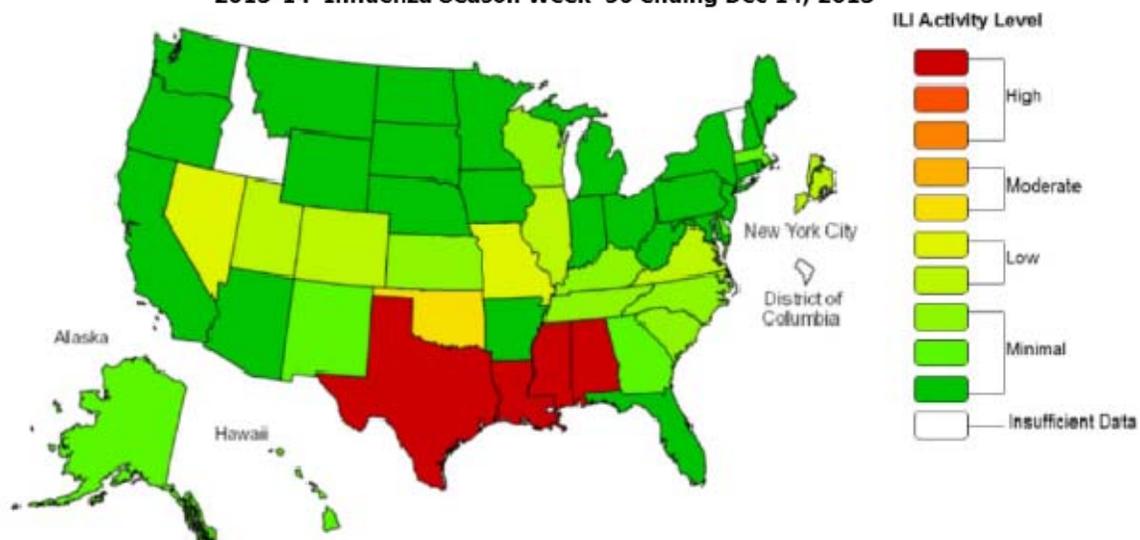
Influenza Congregate Settings Outbreaks (as of December 26): No new outbreaks were reported during the previous week. 1 respiratory outbreak (1C) has been reported during the 2013-14 season.

National (CDC [edited], December 20): During week 50 (December 8-14, 2013), influenza activity continued to increase in the U.S. Of 7,294 specimens tested and reported by U.S. WHO and NREVSS collaborating labs during week 50, 1,301 (17.8%) were positive for influenza. The proportion of deaths attributed to pneumonia and influenza was below the epidemic threshold. Two influenza-associated pediatric deaths were reported, one of which occurred during the 2012-13 season. A cumulative rate for the season of 3.0 laboratory confirmed influenza-associated hospitalizations per 100,000 population was reported. The proportion of outpatient visits for influenza-like illness (ILI) was 2.3%, above the national baseline of 2.0%. 5 regions reported ILI at or above region-specific baseline levels. 4 states experienced high ILI activity, 1 state experienced moderate ILI activity; 6 states and New York City experienced low ILI activity, 37 states experienced minimal activity and the District of Columbia and 2 states had insufficient data. The geographic spread of influenza in 4 states was reported as widespread; 20 states reported regional activity; 17 states reported local activity; the District of Columbia, Guam, Puerto Rico, and 8 states reported sporadic activity; one state reported no activity, and the U.S. Virgin Islands did not report.

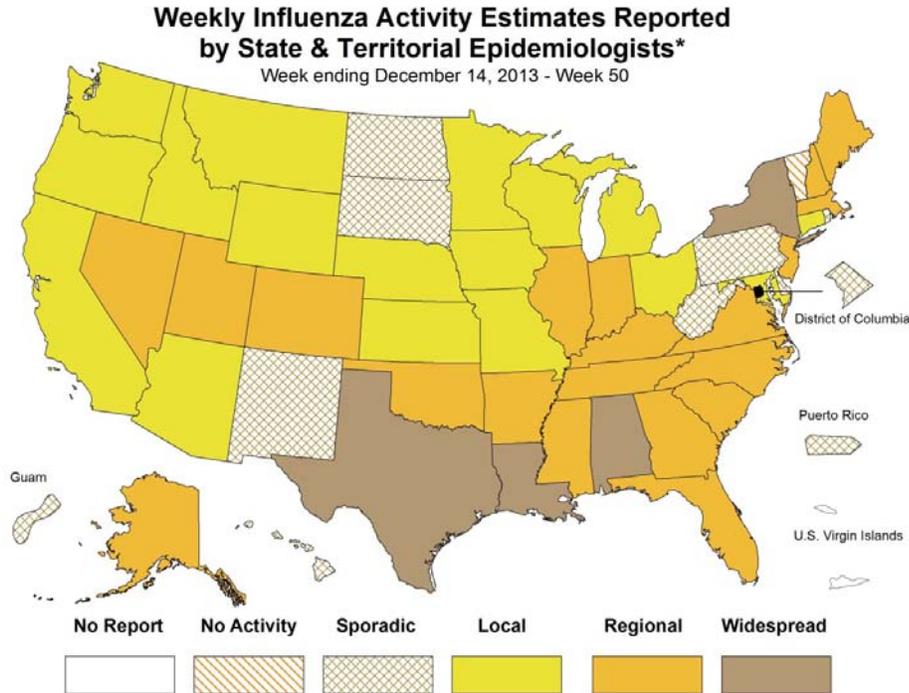
CDC has antigenically characterized 317 influenza viruses collected by U.S. labs since October 1, 2013:

- 2009 H1N1: All 265 2009 H1N1 viruses tested were characterized as A/California/7/2009-like, the influenza A (H1N1) component of the 2013-2014 Northern Hemisphere influenza vaccine
- Influenza A (H3N2): All 46 influenza A (H3N2) viruses tested have been characterized as A/Texas/50/2012-like, the A (H3N2) component of the 2013-2014 Northern Hemisphere vaccine
- Influenza B: Two (33%) of the six influenza B viruses tested belong to B/Yamagata/16/88-lineage and the remaining four (67%) influenza B viruses tested belong to B/Victoria/02/87 lineage
 - Yamagata Lineage: 2 B/Yamagata-lineage viruses were characterized as B/Massachusetts/2/1012-like, which is included as an influenza B component of the 2013-14 trivalent and quadrivalent vaccines
 - Victoria Lineage: 4 B/Victoria-lineage viruses were characterized as B/Brisbane/60/2008-like, which is included as an influenza B component of the 2013-14 quadrivalent influenza vaccine

**Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILINet
2013-14 Influenza Season Week 50 ending Dec 14, 2013**



This map uses the proportion of outpatient visits to healthcare providers for influenza-like illness to measure the ILI activity level within a state. Therefore, outbreaks occurring in a single city could cause the state to display high activity levels. Data collected in ILINet may disproportionately represent certain populations within a state, and therefore, may not accurately depict the full picture of influenza activity for the whole state. Data displayed on this map are based on data collected in ILINet, whereas the State and Territorial flu activity map are based on reports from state and territorial epidemiologists.



Complete weekly FluView reports are available online at: <http://www.cdc.gov/flu/weekly/>.

International (WHO [edited], December 20): In North America the influenza season has started. The predominant subtype of influenza viruses detected was A(H1N1)pdm09. For the rest of the northern hemisphere as well as in the southern hemisphere influenza activity remained low. In countries of tropical areas variable influenza activity was reported. Based on FluNet reporting (as of 19 December 2013), during weeks 48 to 49 (24 November to 7 December 2013), National Influenza Centres (NICs) and other national influenza laboratories from 89 countries, areas or territories reported influenza surveillance data. The WHO GISRS laboratories tested more than 42360 specimens. 3304 were positive for influenza viruses, of which 2816 (85.3%) were typed as seasonal influenza A and 487 (14.7%) as influenza B. Of the sub-typed A viruses, 1166 (66.4%) were A(H1N1)pdm09 and 591 (33.6%) were A(H3N2). Of the characterized B viruses, 39 (70.9%) belonged to the B-Yamagata lineage and 16 (29.1%) to the B-Victoria lineage.

The full report is online at www.who.int/influenza/surveillance_monitoring/updates/latest_update_GIP_surveillance/en/index.html.

MDCH reported REGIONAL INFLUENZA ACTIVITY to CDC for the week ending December 21, 2013

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.

International, Research (Proceedings of the National Academy of Sciences abstract, December 23): Early hypercytokinemia is associated with interferon-induced transmembrane protein-3 dysfunction and predictive of fatal H7N9 infection. Zhongfang W., et al. PNAS 2013; published ahead of print Dec 23, 2013, doi:10.1073/pnas.1321748111

A unique avian-origin A/H7N9 influenza virus has so far caused 134 cases with 44 deaths. Probing the host factors contributing to disease severity, we found that lower levels of plasma inflammatory cytokines on hospital admission correlated with faster recovery in 18 patients with A/H7N9 influenza virus, whereas high concentrations of (in particular) IL-6, IL-8, and macrophage inflammatory protein-1 β were predictive of a less favorable or fatal outcome. Analysis of bronchoalveolar lavage samples showed up to 1,000-fold greater cytokine/chemokine levels relative to plasma. Furthermore, patients with the rs12252-C/C IFN-induced transmembrane protein-3 (IFITM3) genotype had more rapid disease progression and were less likely to survive. Compared with patients with the rs12252-T/T or rs12252-T/C genotype of IFITM3, patients with the C/C genotype had a shorter time from disease onset to the time point when they sought medical aid (hospital admission or antiviral therapy) and a shorter interval to development of the acute respiratory distress syndrome stage (reflected by shorter intervals between clinical onset and methylprednisolone treatments and higher rates of mechanical ventilator use), as well as experiencing elevated/prolonged lung virus titers and cytokine production and higher mortality. The present analysis provides reported data on the H7N9 influenza-induced “cytokine storm” at the site of infection in humans and identifies the rs12252-C genotype that compromises IFITM3 function as a primary genetic correlate of severe H7N9 pneumonia. Together with rs12252 sequencing, early monitoring of plasma cytokines is thus of prognostic value for the treatment and management of severe influenza pneumonia.

The full article is available online at www.pnas.org/content/early/2013/12/17/1321748111.full.pdf+html.

International, MERS-CoV (WHO [edited], December 22): On 20 December 2013, WHO has been informed of an additional laboratory-confirmed case of Middle East Respiratory Syndrome coronavirus (MERS-CoV) in United Arab Emirates (UAE).

A 68 year-old male with onset of illness on 13 December, was admitted to hospital on 14 December 2013 for Joint replacement, he was also complaining of cough and transferred to the intensive care unit on 16 December due to rapid deterioration. On 19 December 2013, the diagnosis was laboratory confirmed for MERS-CoV. The patient has underlying medical conditions. Preliminary investigations reveal that he had no recent travel history and no contact with animals, and no contact with laboratory confirmed case. Investigation among family and healthcare contacts is ongoing.

Globally, from September 2012 to date, WHO has been informed of a total of 166 laboratory-confirmed cases of infection with MERS-CoV, including 71 deaths.

The full report is available online at http://www.who.int/csr/don/2013_12_22/en/index.html.

International, Poultry (OIE [edited], December 21): Highly pathogenic avian influenza H5N2; China Outbreak 1: Zhuzhuang village, Jiaozhuang, Baoding, HEBEI; Date of start of the outbreak: 21/12/2013 Epidemiological unit: Farm; Susceptible: 129700; Cases: 4000; Deaths: 4000; Destroyed: 125700

International, Poultry (OIE [edited], December 23): Low pathogenic avian influenza H7N7; South Africa LPAI_2013H7N7_010, Oudtshoorn, WESTERN CAPE PROVINCE; Date of start of outbreak: 8/10/2013 Epidemiological unit: Farm; Affected population: Commercial ostriches Species: Birds; Susceptible: 1005; Cases: 1; Deaths: 0; Destroyed: 0

International, Poultry (OIE [edited], December 23): Low pathogenic avian influenza H5N2; South Africa Total outbreaks: 7; Affected population: Commercial ostriches Total animals affected: Susceptible: 10171; Cases: 2230; Deaths: 0; Destroyed: 0

International, Poultry (OIE [edited], December 24): Low pathogenic avian influenza H7N1; South Africa Total outbreaks: 3; Affected population: Commercial ostriches Total animals affected: Susceptible: 2906; Cases: 64; Deaths: 0; Destroyed: 0

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

MDCH Contributors

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Table. H5N1 Influenza in Humans – As of October 8, 2013. http://www.who.int/influenza/human_animal_interface/EN_GIP_20131008CumulativeNumberH5N1cases.pdf. Downloaded 10/8/2013. 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	20	11	41	30
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	2	2	194	162
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	31	20	641	380