



# 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 activity
- **National:** During November 25-December 1, influenza activity increased in the U.S.

## Updates of Interest

- **Research:** In a study, 30% of patients' tested positive for flu the day before symptoms developed, and asymptomatic patients had about the same viral loads as sick patients

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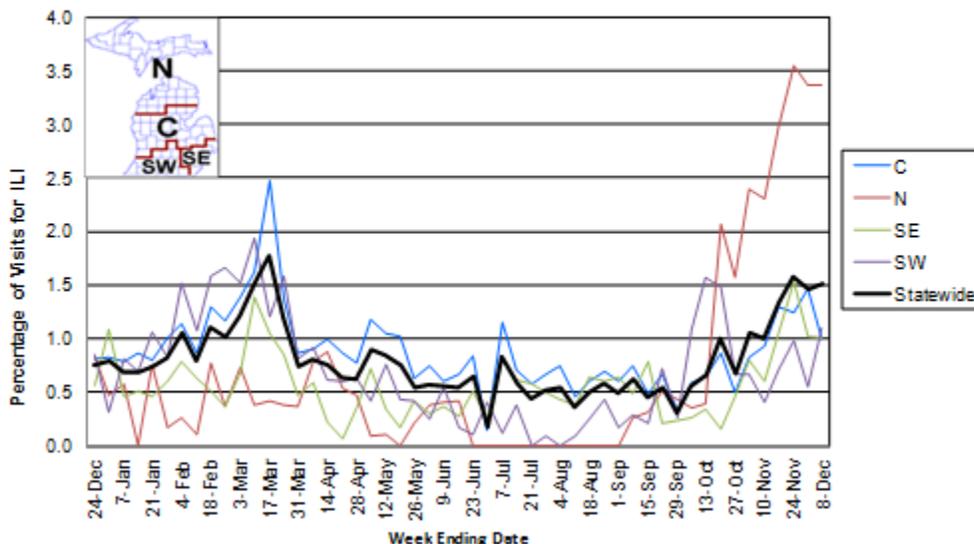
## Influenza Surveillance Reports

**Michigan Disease Surveillance System (as of December 13):** MDSS data for the week ending December 8<sup>th</sup> indicated that compared to levels from the previous week, both aggregate and individual reports increased. Aggregate reports are similar to levels seen during the same time period last year, while individual reports are increased.

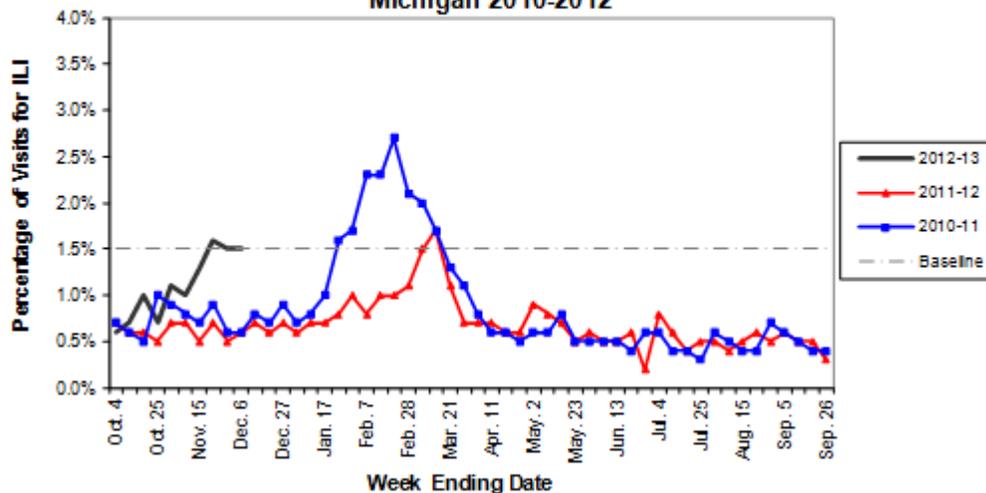
**Emergency Department Surveillance (as of December 13):** Compared to levels from the week prior, emergency department visits from constitutional complaints increased slightly, while respiratory complaints decreased slightly. Constitutional complaints are slightly higher than levels reported during the same time period last year, while respiratory complaints are slightly lower. In the past week, there were ten constitutional alerts in the SW(3) and C(7) Influenza Surveillance Regions and two statewide alerts and three respiratory alerts in the SW(1) and C(2) Regions.

**Sentinel Provider Surveillance (as of December 13):** During the week ending December 8, 2012, the proportion of visits due to influenza-like illness (ILI) remained at 1.5% overall; this is at the regional baseline. A total of 127 patient visits due to ILI were reported out of 8,426 office visits. Data were provided by thirty-five sentinel sites from the following regions: C (12), N (9), SE (11) and SW (3). ILI activity increased in one surveillance region: Southwest (1.1%); remained the same in two surveillance regions: North (3.4%), Southeast (1.0%) and decreased in the remaining surveillance region: Central (1.0%). 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  
2011-2012 and 2012-13 Flu Seasons



**Percentage of Visits for Influenza-like Illness (ILI) Reported by the  
US Outpatient Influenza-like Illness Surveillance Network (ILINet):  
Michigan 2010-2012**



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.

**Hospital Surveillance (as of December 8):** 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. One new pediatric case was identified during the past week. As of December 8<sup>th</sup>, there have been 6 influenza hospitalizations (2 adult and 4 pediatric cases) within the catchment area.

The MDCH Influenza Sentinel Hospital Network monitors influenza hospitalizations reported voluntarily by hospitals statewide. 8 hospitals (SE, SW, N) reported for the week ending December 8, 2012. Results are listed in the table below.

Age Group	Hospitalizations Reported During Current Week	Total Hospitalizations 2012-13 Season
0-4 years	0	2 (1SE, 1C)
5-17 years	1 (1SE)	3 (2SE, 1N)
18-49 years	2 (2SE)	2 (2SE)
50-64 years	0	2 (1SE, 1N)
≥65 years	1 (1N)	3 (1SE, 2N)
<b>Total</b>	<b>4 (3SE, 1N)</b>	<b>12 (7SE, 1C, 4N)</b>

**Laboratory Surveillance (as of December 8):** During December 2-8, 24 positive influenza A/H3 results (12SE, 5SW, 4C, 3N), 1 2009 A/H1N1pdm (1N) and 4 influenza B (1SE, 3SW) results were reported by MDCH BOL. For the 2012-13 season (starting Sept. 30, 2012), MDCH has identified 63 influenza results:

- Influenza A(H3): 44 (18SE, 13SW, 8C, 5N)
- Influenza B: 17 (6SE, 5SW, 6C)
- Influenza A(H1N1)pdm09: 2 (1SE, 1N)
- Parainfluenza: 6 (2SW, 4N)

13 sentinel labs (SE, SW, C, N) reported for the week ending December 8, 2012. 8 labs (SE, SW, C, N) reported flu A activity, most of which were low activity or increasing. 4 labs (SE, SW, C) had sporadic flu B positives. 5 labs (SE, SW, C) had low or increasing parainfluenza activity. 6 labs (SE, SW, C, N) had RSV activity; 1 was moderate. Testing volumes are at low or moderate levels, with a few sites at high levels.

**Michigan Influenza Antigenic Characterization (as of December 13):** For the 2012-13 season, 8 Michigan influenza B specimens have been characterized at MDCH BOL. 7 specimens are B/Wisconsin/01/2010-like, matching the B component of the 2012-13 influenza vaccine. 1 influenza B specimen was characterized as B/Brisbane/60/2008-like, which is not included in the 2012-13 vaccine.

**Michigan Influenza Antiviral Resistance Data (as of December 13):** For the 2012-13 season, no influenza isolates have been tested for antiviral resistance.

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>.

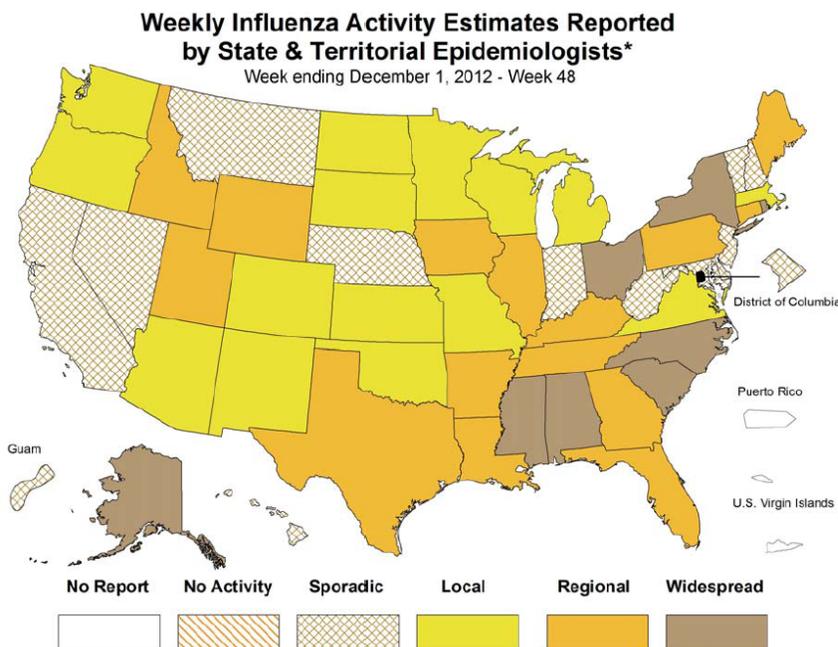
**Influenza-associated Pediatric Mortality (as of December 13):** No pediatric influenza-associated influenza mortalities have been reported to MDCH for the 2012-13 season.

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](http://www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf).

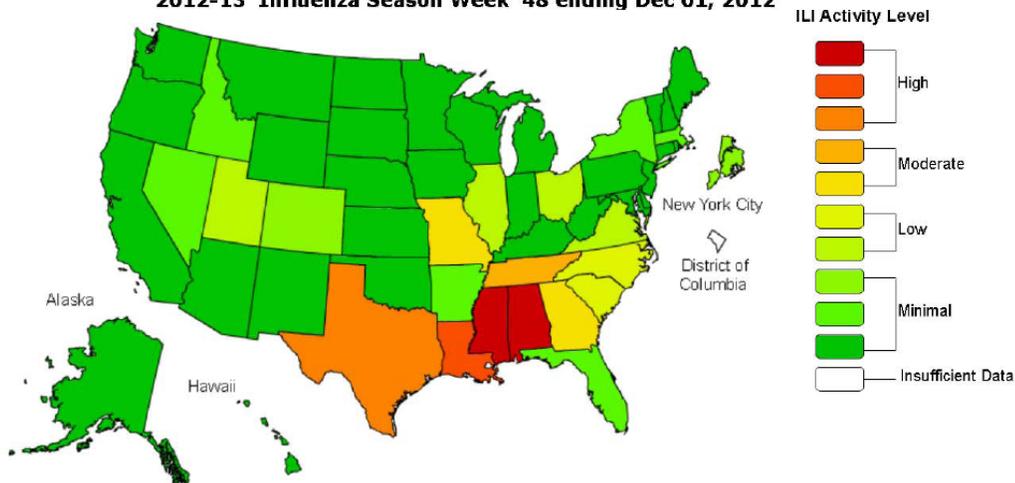
**Influenza Congregate Settings Outbreaks (as of December 13):** Six new respiratory outbreaks were reported to MDCH during the past week. These included two that were positive for influenza A (2SW) and four that did not have testing performed (1SW, 1C, 2N). Eight respiratory outbreaks (4SW, 2C, 2N) have been reported to MDCH during the 2012-13 season; testing results are listed below.

- Influenza A: 2 (2SW)
- Influenza B: 2 (1SW, 1C)
- Negative/testing not performed: (1SW, 1C, 2N)

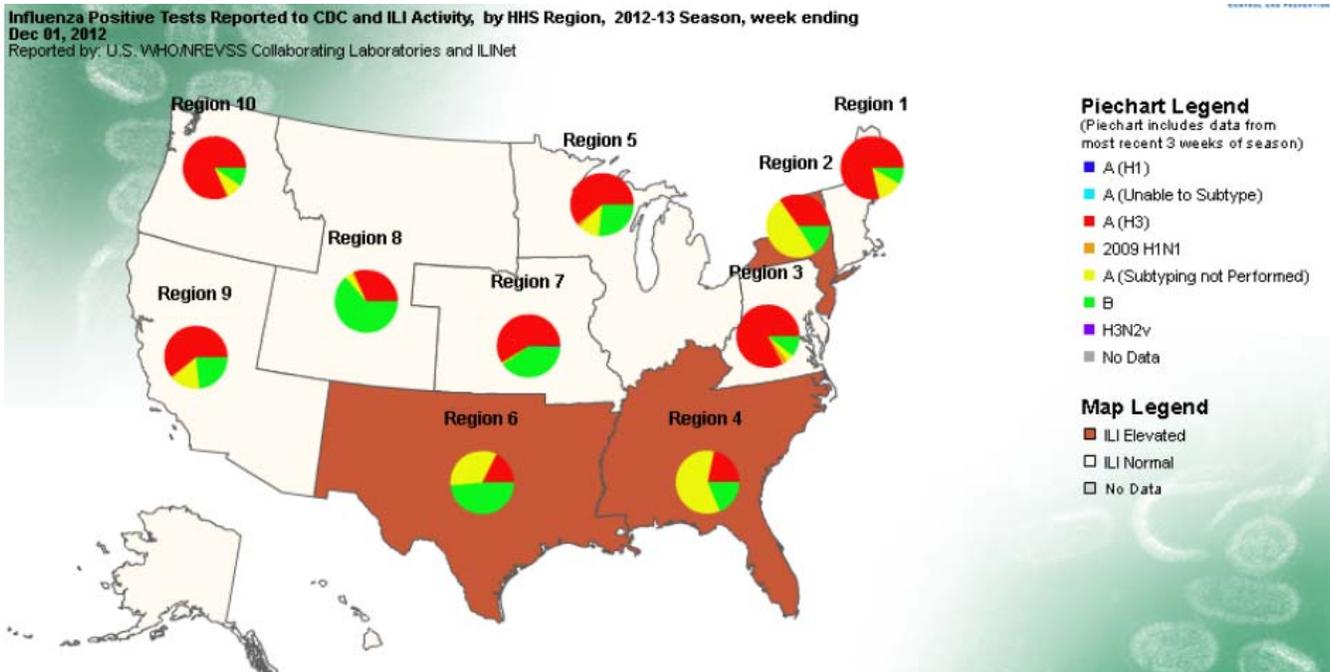
**National (CDC [edited], December 7):** During week 48 (November 25-December 1), influenza activity increased in the U.S. Of 5,511 specimens tested and reported by U.S. WHO and NREVSS collaborating labs during week 48, 1,139 (20.7%) were positive for influenza. The proportion of deaths attributed to pneumonia and influenza was below the epidemic threshold. 3 influenza-associated pediatric deaths were reported. One of these deaths was associated with an influenza B virus and two were associated with influenza A viruses for which the subtype was not determined. The proportion of outpatient visits for influenza-like illness (ILI) was 1.9%, which is below the national baseline of 2.2%. 3 regions reported ILI above region-specific baseline levels. 4 states experienced high ILI activity, 3 states experienced moderate activity; 6 states experienced low activity; New York City and 37 states experienced minimal activity, and the District of Columbia had insufficient data. The geographic spread of influenza in 8 states was reported as widespread; 15 states reported regional; 15 states reported local; the District of Columbia, Guam, and 12 states reported activity, and Puerto Rico and U.S. Virgin Islands did not report.



**Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILINet**  
2012-13 Influenza Season Week 48 ending Dec 01, 2012



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.



The complete FluView report is available online at <http://www.cdc.gov/flu/weekly/fluactivity.htm>.

**International (WHO [edited], December 7):** Many countries of the northern hemisphere temperate region, especially in North America, reported increasing influenza virus detections. Canada and the United States of America (USA) crossed their seasonal threshold but activity was highest in the southern part of the USA. Influenza activity remained low in Europe but has continued to increase slightly. Low levels of influenza activity were reported in countries in southern and southeast Asia, except Cambodia. In Sub-Saharan Africa, influenza activity remains at low levels. Influenza activity in the temperate countries of the southern hemisphere continued at inter-seasonal levels.

The entire WHO report is available online at [www.who.int/influenza/surveillance\\_monitoring/updates/latest\\_update\\_GIP\\_surveillance/en/index.html](http://www.who.int/influenza/surveillance_monitoring/updates/latest_update_GIP_surveillance/en/index.html).

MDCH reported REGIONAL FLU ACTIVITY to CDC for the week ending December 8, 2012.

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](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 (CIDRAP, December 7):** Influenza C generally isn't thought to be a cause clinically significant disease, but a study in Italian children who were seen in the emergency department for pneumonia found the virus in five children, with a disease severity that resembled influenza A.

The study evaluated data from four flu seasons from 2008-09 to 2011-12 at a pediatric clinic in Milan and appeared today in an early online edition of *Influenza and Other Respiratory Viruses*.

Influenza C can infect humans and pigs, and infections are rare compared with influenza A and B.

The researchers included healthy children from ages 1 month to 14 years who were seen because of fever and lower respiratory tract symptoms and whose chest radiographs suggested community-acquired pneumonia. Respiratory swabs and sera were collected, and researchers noted patients' clinical information and whether each child was hospitalized.

Respiratory samples were tested for influenza A, B, and C, and the samples that tested positive were tested for several other viral coinfections. Researchers sequenced the positive influenza C samples to determine the lineage.

Of 391 children included in the study, influenza C was identified in 5 (1.3%). Influenza A was detected in 26 children, and influenza B was found in 3. Influenza C was found only during two of the four seasons: 2008-09 and 2009-10.

Four of the children with influenza C were younger than 3 years old, and one was 14 years old. No viral coinfections were found in the children who had influenza C.

All of the children with influenza C infections were hospitalized, but their clinical symptoms improved a few days later. Researchers observed that the severity of influenza C symptoms was similar to those for influenza A, but worse than in kids with pneumonia related to influenza B. All children with influenza C pneumonia recovered with no disease recurrence, according to the study.

Phylogenetic analysis showed that the five influenza C viruses clustered in two of the six lineages: Kanagawa/1/76 and Sao Paulo/378/82.

The group wrote that the study is the first that they know of that gauges the importance of influenza C in pediatric community-acquired pneumonia. However, they noted that further study is needed to determine what role influenza C plays during other parts of the year, given that previous studies have shown that the virus doesn't have the same seasonal pattern as the other two flu types.

Though the similar clinical pictures between influenza A and influenza C have been found in other studies, the role of influenza C is notable, especially since it can be an important cause of community-acquired pneumonia in kids, the authors write.

The findings of the study have parallels to a 2006 study on hospitalized Spanish infants conducted from September 1999 through July 2003, which found influenza C infections in six of 706 children.

Three of the six, however, had viral coinfections, and the earlier study did not focus exclusively on community-acquired pneumonia. As with the Italian study, though, the influenza C infections in the Spanish study were clinically similar to influenza A infections.

The abstract is available online at <http://onlinelibrary.wiley.com/doi/10.1111/irv.12062/abstract>.

**International, Human (CIDRAP, December 12):** In a German study, 30% of patients' tested positive for flu the day before symptoms developed, and asymptomatic patients had about the same viral loads as sick patients, according to a report yesterday in *PLoS One*. Investigators conducted a prospective household study using data from 2007 to 2011 in Berlin and Munich. They analyzed data from 122 index patients and 320 household contacts, of whom 67 became secondary flu case-patients. Of the 189 case-patients, 12 had seasonal H1N1 flu, 19 had H3N2, 98 had pandemic 2009 H1N1, and 60 had influenza B. Nine (14%) of 65 unvaccinated secondary case-patients—all adults—were asymptomatic. Viral loads in patients' nasal specimens peaked on day 1, 2, or 3 for all flu strains, then declined steadily till days 7 through 9. On the day before symptom onset, 12 of 40 specimens (30%) were positive. Viral load in six asymptomatic patients was similar to that in those having symptoms. Infectiousness, as measured by viral culture, lasted 4 to 6 days after symptom onset, and viral load did not seem to be influenced by antiviral therapy, age, or vaccination status, the team found. They conclude, "Asymptomatic/subclinical infections occur infrequently, but may be associated with substantial amounts of viral shedding."

The article is online at <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0051653>.

**International, Research (Proceedings of the National Academy of Sciences abstract, December 10):** The hemagglutinin (HA) of influenza A(H3N2) virus responsible for the 1968 influenza pandemic derived from an avian virus. On introduction into humans, its receptor binding properties had changed

from a preference for avian receptors ( $\alpha$ 2,3-linked sialic acid) to a preference for human receptors ( $\alpha$ 2,6-linked sialic acid). By 2001, the avidity of human H3 viruses for avian receptors had declined, and since then the affinity for human receptors has also decreased significantly. These changes in receptor binding, which correlate with increased difficulties in virus propagation in vitro and in antigenic analysis, have been assessed by virus hemagglutination of erythrocytes from different species and quantified by measuring virus binding to receptor analogs using surface biolayer interferometry. Crystal structures of HA–receptor analog complexes formed with HAs from viruses isolated in 2004 and 2005 reveal significant differences in the conformation of the 220-loop of HA1, relative to the 1968 structure, resulting in altered interactions between the HA and the receptor analog that explain the changes in receptor affinity. Site-specific mutagenesis shows the HA1 Asp-225→Asn substitution to be the key determinant of the decreased receptor binding in viruses circulating since 2005. Our results indicate that the evolution of human influenza A(H3N2) viruses since 1968 has produced a virus with a low propensity to bind human receptor analogs, and this loss of avidity correlates with the marked reduction in A(H3N2) virus disease impact in the last 10 y.

The article is available online at <http://www.pnas.org/content/early/2012/12/07/1218841110.full.pdf+html>.

**International, Poultry (OIE [edited], December 7):** High path avian influenza H5N2; Chinese Taipei Outbreak 1: Ma-Gong, P'ENG-HU; Affected population: Native chicken  
Date of start of the outbreak: 17/11/2012; Outbreak status: Continuing; Epidemiological unit: Farm  
Species: Birds; Susceptible: 831; Cases: 300; Deaths: 200; Destroyed: 631

**International, Poultry (ProMed via ChannelNewsAsia, December 11):** Indonesia has identified the bird flu [avian A(H5N1)] virus that killed hundreds of thousands of ducks in recent weeks as a more virulent type which is new to the country, according to a letter seen Tuesday [11 Dec 2012].

"We found a highly pathogenic avian influenza sub-type H5N1 (virus) with clade 2.3..." the agriculture ministry's veterinary chief Syukur Iwantoro said in the letter obtained by AFP.

"This clade is a new clade found for the 1st time in Indonesia, that is very different to the avian influenza found before, which is clade 2.1." A clade is a group of organisms, usually species, with a common ancestor.

A poultry breeders' association had reported the death of more than 300 000 ducks in several provinces on Java Island since November [2012] to the ministry.

The veterinary office found the H5N1 virus involved was a different clade to that usually found in Indonesia, said Iwantoro's letter to local government offices and the World Health Organisation (WHO).

Iwantoro called for further research into whether there had been a genetic shift in the virus previously found in the country, or whether the new strain originated overseas.

"There is a suspicion that the virus has spread from other countries, possibly from Viet Nam or Thailand," Emil Agustiono, secretary of the national commission of zoonosis control that oversees bird flu, told AFP.

Health officials have told local governments to stop and check motorbikes and pick-up trucks commonly used to transport poultry, to try to reduce the spread of the virus.

The health ministry has told local offices to be vigilant for more massive poultry deaths, or for deaths of people in the vicinity, its head of communicable disease Tjandra Yoga Aditama told AFP.

Bird flu typically spreads from birds to humans through direct contact, but experts fear it could mutate into a form that is easily transmissible between humans.

Indonesia has suffered the world's worst human fatalities from bird flu with 159 deaths since 2003 out of 359 worldwide, according to the WHO.

**International, Wild Birds (OIE [edited], December 12):** High pathogenic avian influenza H7N3; Mexico Outbreak 1(45): Tepatitlan de Morelos, foco 45, Tepatitlan de Morelos, JALISCO  
Date of start of the outbreak: 06/08/2012; Outbreak status: Resolved  
Affected animals: Common Grackle: *Quiscalus quiscula*; Cases: 10; Deaths: 8; Destroyed: 2

Outbreak 2(46): Tepatitlan de Morelos, foco 46, Tepatitlan de Morelos, JALISCO  
 Date of start of the outbreak: 28/09/2012; Outbreak status: Resolved  
 Affected animals: Barn Swallow: *Hirundo rustica*; Cases: 1; Deaths: 1; Destroyed: 1

**Michigan Wild Bird Surveillance (USDA, as of December 13):** For the 2012 season (April 1, 2012-March 31, 2013), highly pathogenic avian influenza H5N1 has not been recovered from the 68 samples tested nationwide. For more information, visit <http://www.nwhc.usgs.gov/ai/>. To learn about avian influenza surveillance in wild birds or to report dead waterfowl, go to the 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](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](mailto:peterss1@michigan.gov)

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**Table. H5N1 Influenza in Humans – As of August 10, 2012.** [http://www.who.int/influenza/human\\_animal\\_interface/EN\\_GIP\\_20120810\\_CumulativeNumberH5N1cases.pdf](http://www.who.int/influenza/human_animal_interface/EN_GIP_20120810_CumulativeNumberH5N1cases.pdf). Downloaded 8/13/2012. Cumulative lab-confirmed cases reported to WHO. Total cases include deaths.

Country	2003-2005		2006		2007		2008		2009		2010		2011		2012		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Azerbaijan	0	0	8	5	0	0	0	0	0	0	0	0	0	0	0	0	8	5
Bangladesh	0	0	0	0	0	0	1	0	0	0	0	0	2	0	3	0	6	0
Cambodia	4	4	2	2	1	1	1	0	1	0	1	1	8	8	3	3	21	19
China	9	6	13	8	5	3	4	4	7	4	2	1	1	1	2	1	43	28
Djibouti	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Egypt	0	0	18	10	25	9	8	4	39	4	29	13	39	15	10	5	168	60
Indonesia	20	13	55	45	42	37	24	20	21	19	9	7	12	10	8	8	191	159
Iraq	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	3	2
Lao PDR	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2	2
Myanmar	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Nigeria	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Pakistan	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	3	1
Thailand	22	14	3	3	0	0	0	0	0	0	0	0	0	0	0	0	25	17
Turkey	0	0	12	4	0	0	0	0	0	0	0	0	0	0	0	0	12	4
Vietnam	93	42	0	0	8	5	6	5	5	5	7	2	0	0	4	2	123	61
Total	148	79	115	79	88	59	44	33	73	32	48	24	62	34	30	19	608	359