



MI Flu Focus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories



Editor: Susan Peters, DVM PetersS1@michigan.gov
Surveillance and Infectious Disease Epidemiology

March 29, 2012
Vol. 9; No. 13

Current Influenza Activity Levels:

- **Michigan:** Widespread activity
- **National:** During March 11-17, influenza activity was elevated in some areas of the U.S., but remained relatively low nationally

Updates of Interest

- **Research:** A gene is found that influences how humans respond to influenza infection

Table of Contents

Influenza Surveillance Reports	
Michigan.....	1-3
National.....	3-4
International.....	4
Novel Influenza and Other News	
WHO Pandemic Phase.....	5
Avian Influenza Surveillance.....	6-7
Avian Influenza H5N1 in Humans.....	6-7

****Update: Novel A (H3N2) Guidance****

In December 2011, CDC asked all states to conduct surveillance for suspect human cases of a novel influenza A (H3N2) virus by increasing influenza testing. Subsequently, MDCH issued an interim guidance requesting all healthcare providers to forward all positive influenza specimens to MDCH for further testing. MDCH would like to thank the healthcare providers who contributed to this effort. Since no cases of novel influenza A (H3N2) have been identified in Michigan, or any additional cases identified nationwide, MDCH is revising this guidance. For surveillance purposes, healthcare providers may now submit up to 5 representative specimens per week to MDCH Bureau of Laboratories, with priority on pediatric or severe cases. Please call the MDCH Division of Communicable Disease at 517-335-8165 with any questions.

Influenza Surveillance Reports

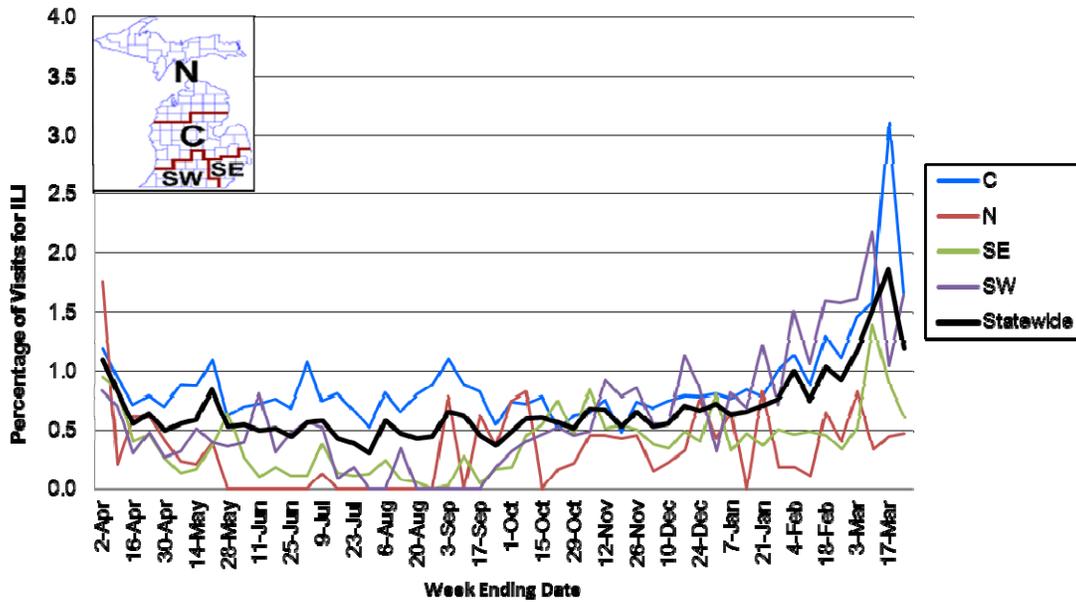
Michigan Disease Surveillance System: MDSS data for the week ending March 24th indicated that individual reports slightly increased, while aggregate influenza cases slightly decreased. Individual reports are similar, while aggregate reports are lower, to levels seen during the same time last year.

Emergency Department Surveillance: Compared to levels from the week prior, emergency department visits from constitutional complaints significantly decreased, while respiratory complaints moderately decreased. Constitutional complaints are similar, while respiratory complaints are moderately lower, to levels reported during the same time period last year. In the past week, there were seven constitutional alerts in the SE(1), SW(2), and C(4) Influenza Surveillance Regions and 1 respiratory alert in the N Region.

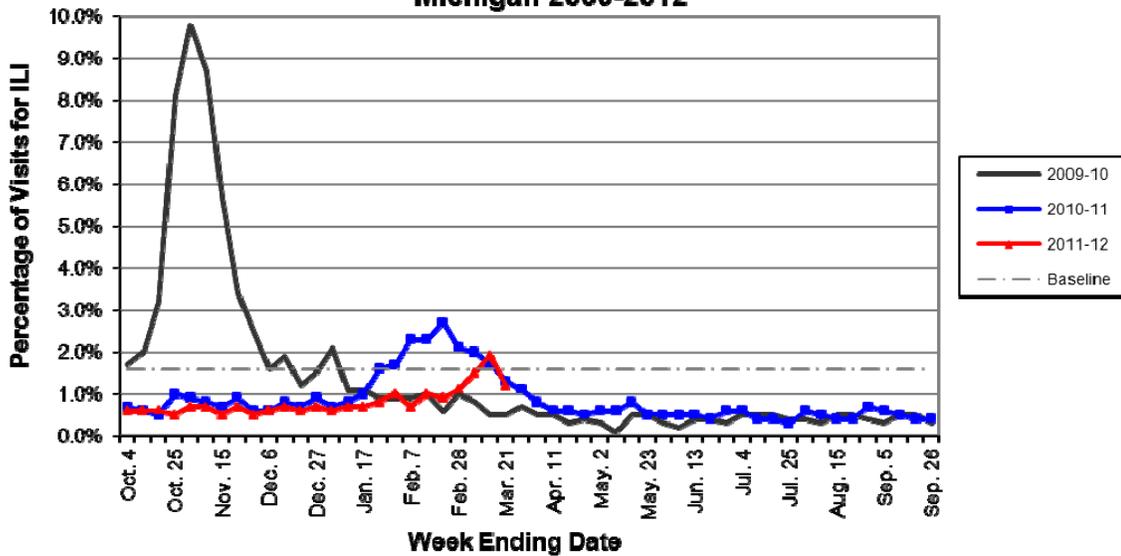
Sentinel Provider Surveillance (as of March 29): During the week ending March 24, 2012, the proportion of visits due to influenza-like illness (ILI) decreased to 1.2% overall; this is below the regional baseline of (1.6%). A total of 151 patient visits due to ILI were reported out of 12,667 office visits. Thirty-four sentinel sites provided data for this report. Activity increased in two surveillance regions: North (0.5%) and Southwest (1.6%); and decreased in the remaining two surveillance regions: Central (1.7%) and Southeast (0.6%). 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 Sentinel Providers, Statewide and Regions
2010-2011 and 2011-12 Flu Seasons**



**Percentage of Visits for Influenza-like Illness (ILI) Reported by the
US Outpatient Influenza-like Illness Surveillance Network (ILINet):
Michigan 2009-2012**



Hospital Surveillance (as of March 24): The Influenza Hospitalization Surveillance Project provides population-based rates of severe influenza illness in Clinton, Eaton and Ingham counties. 4 lab-confirmed influenza hospitalizations were reported during the week ending March 24, 2012. For the 2011-12 season, 17 influenza hospitalizations (6 adult, 11 pediatric) have been reported in the catchment area.

The MDCH Influenza Sentinel Hospital Network monitors influenza hospitalizations reported voluntarily by hospitals statewide. 8 hospitals (SE, SW, C, N) reported for the week ending March 24, 2012. Results are listed in the table below. Total hospitalizations were adjusted to reflect amended reports from past weeks.

Age Group	Hospitalizations Reported During Current Week	Total Hospitalizations 2011-12 Season
0-4 years	2	14
5-17 years	3	14
18-49 years	5	22
50-64 years	3	19
≥65 years	7	24
Total	20	93

Laboratory Surveillance (as of March 24): During March 18-24, 94 influenza A/H3 (60SE, 9SW, 19C, 6N), 2 2009 A/H1N1 (1SE, 1N) and 7 influenza B (3SE, 3SW, 1N) results were reported by MDCH BOL. For the 2011-12 season (starting October 2, 2011), MDCH has identified 874 influenza results:

- Influenza A(H3): 828 (458SE, 56SW, 272C, 42N)
- Influenza A(H1N1)pdm09: 23 (15SE, 1SW, 5C, 2N)
- Influenza B: 23 (11SE, 7SW, 3C, 2N)
- Parainfluenza: 2 (1SE, 1C)
- Adenovirus: 1 (SE)
- RSV: 4 (1SW, 1C, 2N)

13 sentinel labs (SE, SW, C, N) reported for the week ending March 24, 2012. Most labs (SE, SW, C, N) reported moderate but decreasing influenza A activity. 4 labs (SE, SW) had low or steady influenza B positives. 12 labs (SE, SW, C, N) saw steady or slightly decreasing RSV activity. 1 lab (SE) had sporadic parainfluenza activity. 2 labs (SE, SW) saw continued hMPV activity. Most test volumes are decreasing.

Michigan Influenza Antigenic Characterization (as of March 29): For the 2011-12 season, 14 Michigan influenza B specimens have been characterized at MDCH BOL. 6 specimens have been characterized as B/Brisbane/60/2008-like, matching the B component of the 2011-12 influenza vaccine. 8 influenza B specimens were B/Wisconsin/01/2010-like, which is not included in the 2011-12 vaccine.

Michigan Influenza Antiviral Resistance Data (as of March 29): For the 2011-12 season, 12 Michigan influenza A(H1N1)pdm09 specimens and 62 influenza A(H3) specimens have been tested for antiviral resistance at MDCH Bureau of Laboratories; all have tested negative for oseltamivir 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 March 29): No pediatric influenza-associated influenza mortalities have been reported to MDCH for the 2011-12 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.

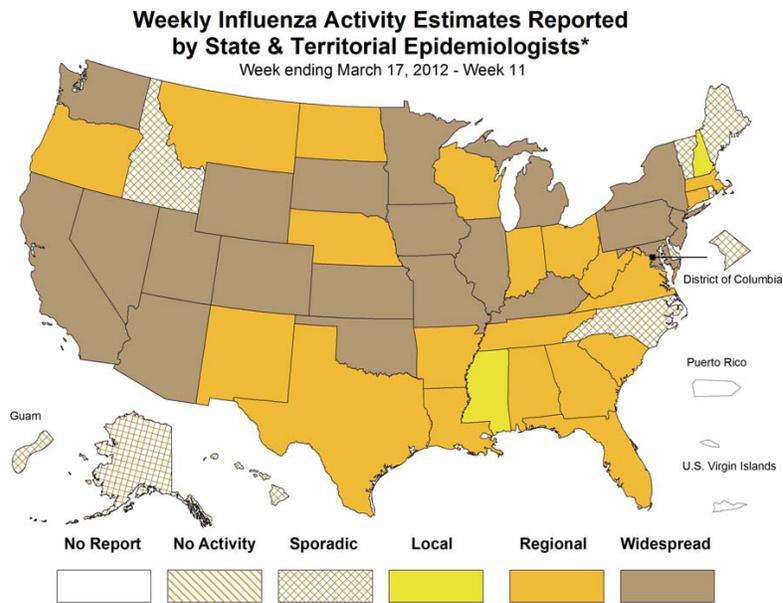
Influenza Congregate Settings Outbreaks (as of March 29): No respiratory outbreaks were reported to MDCH during the past week. 19 respiratory outbreaks (5SE, 2SW, 12C) have been reported to MDCH during the 2011-12 season; testing results are listed below.

- Influenza A/H3: 9 (3SE, 6C)
- Influenza A: 1 (C)
- Human metapneumovirus: 1 (SW)
- Negative or not tested: 8 (1SE, 1SW, 6C)

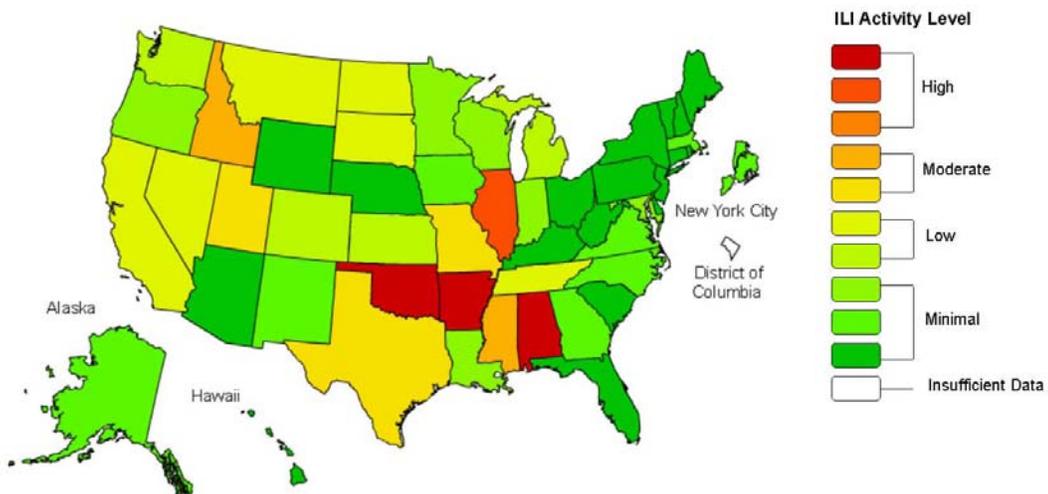
National (CDC [edited], March 23): During week 11 (March 11-17, 2012), influenza activity was elevated in some areas of the U.S., but remained relatively low nationally. Of the 5,088 specimens tested by U.S. WHO and NREVSS collaborating laboratories and reported to CDC/Influenza Division, 1,353 (26.6%) were positive for influenza. The proportion of deaths attributed to P&I was below the epidemic threshold. Three influenza-associated pediatric deaths were reported and were associated with 2009 H1N1 (2) and influenza B (1) viruses. The proportion of outpatient visits for influenza-like illness (ILI) was 2.4%, which is at the national baseline of 2.4%. Regions 5, 6, 7, 8, and 10 reported ILI at or above region-specific baseline levels. 4 states experienced high ILI activity; 5 state experienced moderate ILI activity; 10 states experienced low ILI activity; New York City and 31 states experienced minimal ILI activity, and the District of Columbia had insufficient data to calculate ILI activity. Twenty states reported widespread geographic activity; 20 states reported regional activity; 2 states reported local activity; the District of Columbia, Guam, and 8 states reported sporadic activity, and Puerto Rico and the U.S. Virgin Islands did not report.

The Influenza Surveillance Network (FluSurv-NET) conducts population-based surveillance for laboratory-confirmed influenza-related hospitalizations in children younger than 18 years of age (since 2003-2004) and adults (since 2005-2006). Between October 1, 2011 and March 17, 2012, 992 laboratory-confirmed influenza-associated hospitalizations were reported at a rate of 3.6 per 100,000 population, an increase of 35% from last week. Among cases, 891 (89.8%) were influenza A, 89 (9.0%) were influenza B, and 1 (0.1%) was an A and B co-infection; 11 (1.1%) had no virus type information. Among those with influenza A subtype information, 270 were H3N2 and 105 were 2009 H1N1. The most common underlying medical conditions among adults were chronic lung diseases, metabolic disorders and obesity. The most common

underlying medical conditions in children were chronic lung diseases, asthma and neurologic disorders. However, almost half of hospitalized children had no identified underlying medical conditions.



**Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILINet
2011-12 Influenza Season Week 11 ending Mar 17, 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 entire weekly report is available online at <http://www.cdc.gov/flu/weekly/fluactivity.htm>.

International (WHO [edited], March 16): Active influenza transmission continued in the temperate regions of the Northern Hemisphere with increasing activity in North America, northern China and several countries in Europe. A few countries in southern Europe and North Africa have peaked as well as Japan and the Republic of Korea. Most countries of the tropical zone reported low levels of influenza activity. The most commonly detected virus type or subtype throughout most of the temperate areas of northern hemisphere temperate zone has been influenza A(H3N2). In Mexico and Central America where influenza A(H1N1)pdm09 is the predominant subtype circulating; China and the surrounding countries which are still reporting a predominance of influenza type B virus. Antiviral resistance continues to be observed at very low levels and has not increased notably over levels reported in previous seasons.

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

MDCH reported **WIDESPREAD ACTIVITY** to the CDC for the week ending March 24, 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.

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, Research (Wellcome Trust Sanger Institute press release, March 25): A genetic finding could help explain why influenza becomes a life-threatening disease to some people while it has only mild effects in others. New research led by the Wellcome Trust Sanger Institute has identified for the first time a human gene that influences how we respond to influenza infection.

People who carry a particular variant of a gene called IFITM3 are significantly more likely to be hospitalised when they fall ill with influenza than those who carry other variants, the team found. This gene plays a critical role in protecting the body against infection with influenza and a rare version of it appears to make people more susceptible to severe forms of the disease. The results are published in the journal *Nature*.

A central question about viruses is why some people suffer badly from an infection and others do not. IFITM3 is an important protein that protects cells against virus infection and is thought to play a critical role in the immune system's response against such viruses as H1N1 pandemic influenza, commonly known as 'swine flu'. When the protein is present in large quantities, the spread of the virus in lungs is hindered, but if the protein is defective or absent, the virus can spread more easily, causing severe disease.

"Although this protein is extremely important in limiting the spread of viruses in cells, little is known about how it works in lungs," explains Aaron Everitt, first author from the Wellcome Trust Sanger Institute. "Our research plays a fundamental part in explaining how both the gene and protein are linked to viral susceptibility."

The antiviral role of IFITM3 in humans was first suggested by studies using a genetic screen, which showed that the protein blocked the growth of influenza virus and dengue virus in cells. This led the team to ask whether IFITM3 protected mice from viral infections. They removed the IFITM3 gene in mice and found that once they contracted influenza, the symptoms became much more severe compared to mice with IFITM3. In effect, they found the loss of this single gene in mice can turn a mild case of influenza into a fatal infection.

The researchers then sequenced the IFITM3 genes of 53 patients hospitalised with influenza and found that some have a genetic mutant form of IFITM3, which is rare in normal people. This variant gene encodes a shortened version of the protein which makes cells more susceptible to viral infection.

"Since IFITM3 appears to be a first line defender against infection, our efforts suggest that individuals and populations with less IFITM3 activity may be at increased risk during a pandemic and that IFITM3 could be vital for defending human populations against other viruses such as avian influenza virus and dengue virus" says Dr. Abraham Brass, co-senior author and Assistant Professor at the Ragon Institute and Gastrointestinal Unit of Massachusetts General Hospital.

This research was a collaboration between institutes in the United States and the United Kingdom. The samples for this study were obtained from the MOSAIC consortium in England and Scotland, co-ordinated from the Centre for Respiratory Infection (CRI) at Imperial College London, and the GenISIS consortium in Scotland at the Roslin Institute of the University of Edinburgh. These were pivotal for the human genetics component of the work.

"Collectively, these data reveal that the action of a single antiviral protein, IFITM3, can profoundly alter the course of the flu and potentially other viruses in both human and mouse," explains Professor Paul Kellam, co-senior author from the Wellcome Trust Sanger Institute. "To fully understand how both the

protein and gene control our susceptibility to viral infections, we need to study the mechanisms of the gene variant more closely.

"Our research is important for people who have this variant as we predict their immune defenses could be weakened to some virus infections. Ultimately as we learn more about the genetics of susceptibility to viruses, then people can take informed precautions, such as vaccination to prevent infection."

Sir Mark Walport, director of the Wellcome Trust, said: "During the recent swine flu pandemic, many people found it remarkable that the same virus could provoke only mild symptoms in most people, while, more rarely, threatening the lives of others. This discovery points to a piece of the explanation: genetic variations affect the way in which different people respond to infection.

"This important research adds to a growing scientific understanding that genetic factors affect the course of disease in more than one way. Genetic variations in a virus can increase its virulence, but genetic variations in that virus's host – us – matter greatly as well."

The abstract is available at <http://www.nature.com/nature/journal/vaop/ncurrent/abs/nature10921.html>.

International, Human (WHO, March 26): The Ministry of Health of Indonesia has notified WHO of a new case of human infection with avian influenza A(H5N1) virus.

The case is a 17 year-old male from Nusa Tenggara Barat Province. He developed fever on 28 February 2012 and sought treatment on 1 March 2012. His condition deteriorated and he was admitted to a referral hospital but he died on 9 March 2012.

Epidemiological investigation conducted by a team from the health office indicated that there were sudden poultry die-offs in his neighbourhood.

To date, of the 188 cases reported in Indonesia since 2005, 156 have been fatal.

International, Poultry (CIDRAP, March 22): Three unique triple reassortant (TR) H3N2 influenza viruses bearing gene segments from 2009 pandemic H1N1 (pH1N1) in domestic turkeys were reported by a Canadian group in PLoS One yesterday. To the authors' knowledge, this is the first time pH1N1/TR H3N2 reassortant viruses have been reported in domestic poultry. Tracheal and cloacal swabs were obtained from turkeys on three geographically separate breeder turkey farms in southern Ontario that had experienced significant drops in egg production but no clinical signs of disease. Genetic characterization of the samples from one farm showed the eight gene segments of the virus to all be of TR H3N2 lineage. The samples from the other two farms, however, were unique reassortants, with gene segments from both pH1N1 and TR H3N2. The turkeys on the latter two farms had been vaccinated before the outbreak with the only vaccine approved in Canada against H3N2 influenza in turkeys, an H3N4 oil emulsion vaccine. The researchers found that sera collected from the vaccinated turkeys were not able to neutralize the new pH1N1/TR H3N2 virus isolated in the study. The authors note that close proximity of turkey and swine farms, which is thought to play a role in the epidemiology of TR H3N2 flu virus infection in turkeys, is common in the area where the tested farms are located. They also say that, despite the common view of pigs as efficient "mixing vessels" for generations of reassortant influenza viruses, "We cannot exclude the possibility that the reassortment between TR H3N2 and pH1N1 took place in turkeys."

The article is online at <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0032858>.

International, Poultry (OIE [edited], March 26): Highly pathogenic avian influenza H5N1; Nepal
Outbreak 1: Dullu, Sheshnarayan-8, Kathmandu, BAGMATI

Date of start of the outbreak: 05/03/2012; Outbreak status: Resolved; Epidemiological unit: Farm

Species: Birds; Susceptible: 15220; Cases: 15160; Deaths: 15160; Destroyed: 60

Affected population: A commercial layer farm located in a village where ducks, quails and pigs were raised separately inside the farm premises.

Outbreak 2: Khadakagaun, Saibu-5, Lalitpur, BAGMATI

Date of start of the outbreak: 16/03/2012; Outbreak status: Continuing; Epidemiological unit: Farm

Species: Birds; Susceptible: 9600; Cases: 6646; Deaths: 6646; Destroyed: 2954

Affected population: Two adjoining commercial poultry farms having layers in two sheds and broilers in one shed.

International, Wild Birds (OIE [edited], March 23): High path avian influenza H5N1; Hong Kong
 Outbreak 1: 80 South Perimeter Road, Lantau, HONG KONG
 Date of start of the outbreak: 12/03/2012; Outbreak status: Resolved
 Species: Wild species; Cases: 1; Deaths: 1
 Affected population: A peregrine falcon (*Falco peregrinus calidus*) was collected on 12 March 2012 at Lantau. The peregrine falcon is a rare winter visitor in Hong Kong.

Outbreak 2: Tai Hang Tung Recreation Ground, Shek Kip Mei, HONG KONG
 Date of start of the outbreak: 15/03/2012; Outbreak status: Resolved
 Species: Wild species; Cases: 1; Deaths: 1
 Affected population: A house crow (*Corvus splendens*) was collected on 15 March 2012 at Shek Kip Mei. The house crow is an invasive bird species in Hong Kong.

Michigan Wild Bird Surveillance (USDA, as of March 29): For the 2011 season (April 1, 2011-March 31, 2012), highly pathogenic avian influenza H5N1 has not been recovered from 7 Michigan samples or 408 samples tested nationwide. For more information, visit <http://www.nwhc.usgs.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

MDCH Bureau of Epidemiology – S. Bidol, MPH; C. Carlton, MPH; E. Hartwick, MS; R. Sharangpani, MD, MPH

MDCH Bureau of Laboratories – A. Muvombwe, PhD; V. Vavricka, MS

Table. H5N1 Influenza in Humans – As of March 26, 2012. http://www.who.int/influenza/human_animal_interface/EN_GIP_20120326_CumulativeNumberH5N1cases.pdf. Downloaded 3/27/2012. Cumulative lab-confirmed cases reported to WHO. Total cases includes 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	1	1	19	17
China	9	6	13	8	5	3	4	4	7	4	2	1	1	1	1	1	42	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	6	3	164	58
Indonesia	20	13	55	45	42	37	24	20	21	19	9	7	12	10	5	5	188	156
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	20	12	598	352