



MI FluFocus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories



Editor: Susan Peters, DVM PetersS1@Michigan.gov
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Current Influenza Activity Levels:

- **Michigan:** Influenza activity reporting to the CDC is completed for the 2010-11 season
- **United States:** 21 states reported sporadic influenza activity, and 29 states had no activity

Updates of Interest:

- **Michigan:** A previously reported Central Region outbreak from April was confirmed as a co-circulation of RSV and parainfluenza 3

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
Avian Influenza H5N1 in Humans.....	4,6

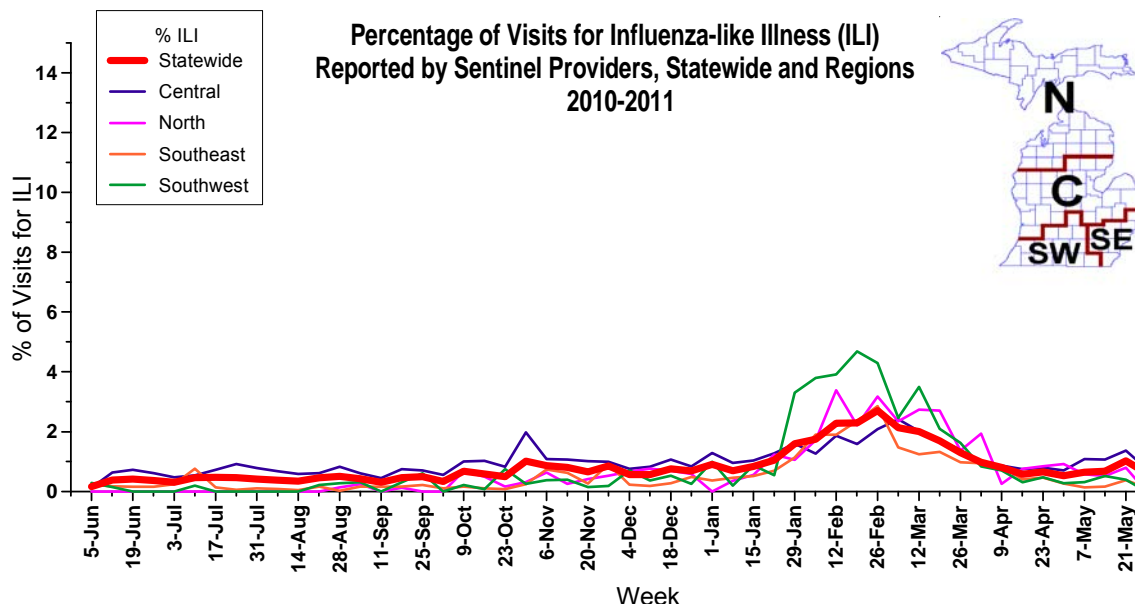
Influenza Surveillance Reports

Michigan Disease Surveillance System: MDSS data for the week ending May 28th indicated that aggregate reports decreased when compared to the previous week, while individual reports remained steady at a very low level. Aggregate influenza cases are slightly lower than levels seen during the same time last year, while individual influenza cases are similar.

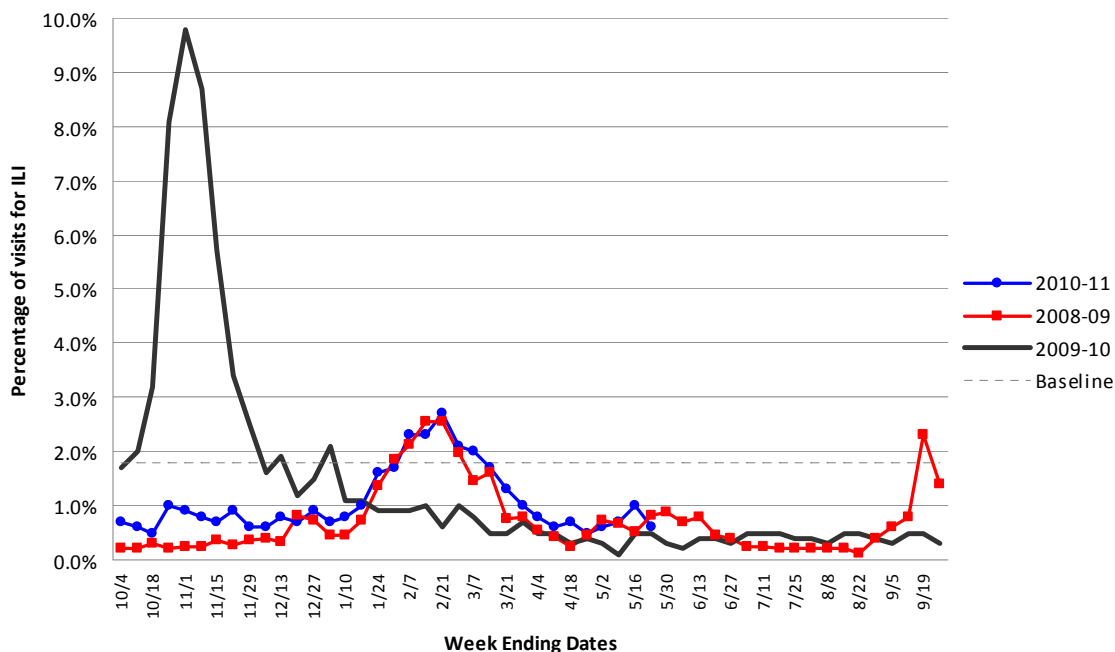
Emergency Department Surveillance: Compared to the previous week's levels, emergency department visits from constitutional complaints remained steady, while respiratory complaints decreased slightly. Constitutional complaints are slightly lower, and respiratory complaints are similar, than levels reported during the same time period last year. In the past week, there were two constitutional alerts in the C Influenza Surveillance Region and two respiratory alerts in the C Region.

Over-the-Counter Product Surveillance: When compared to the previous week's data, sales of chest rubs increased slightly, while all other indicators remained steady. When compared to this time last year, chest rub and cough/cold medication sales are slightly increased; all other indicators are at similar levels.

Sentinel Provider Surveillance (as of June 2): During the week ending May 28, 2011, the proportion of visits due to influenza-like illness (ILI) decreased to 0.6% overall; this is below the regional baseline of 1.8%. A total of 38 patient visits due to ILI were reported out of 6,179 office visits. 25 sites provided data for this report. Activity decreased in all four surveillance regions: Central (0.8%); Southeast (0.1%); North (0.0%) and Southwest (0.0%). Please note these rates may change as additional reports are received.



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



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: 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 May 28): During May 22-28, no positive specimens were reported by MDCH Bureau of Laboratories. For the 2010-11 season (starting October 3, 2010), MDCH BOL has identified 359 influenza results:

- 2009 Influenza A/H1N1: 148
- Influenza A unsubtypeable: 1
- Influenza A/H3: 157
- Influenza B: 53

10 sentinel labs (SE, SW, C, N) reported for the week ending May 28, 2011. No labs reported influenza A or B positives. 2 labs (SE) reported sporadic RSV positive results. Testing volumes are at very low levels.

Michigan Influenza Antigenic Characterization (as of June 2): 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 June 2): 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 June 2): Six influenza-associated pediatric mortalities (2SE, 4C), one associated with flu A and five with flu B, have been reported to MDCH this season.

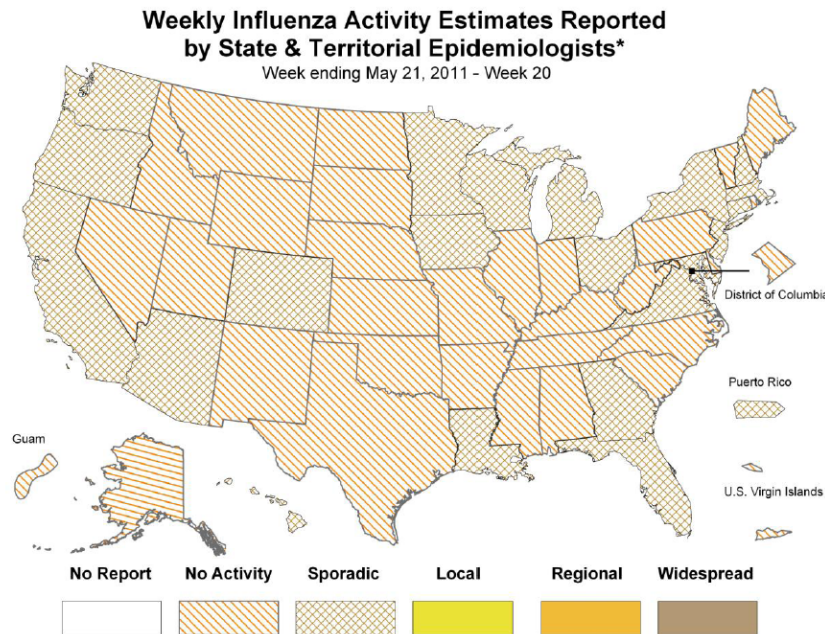
***CDC has asked states for information on any pediatric death associated with influenza. This includes not only any pediatric death (<18 years) resulting from a compatible illness with laboratory confirmation of influenza, but also any unexplained pediatric death with evidence of an infectious process. 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 June 2): One previously reported C Region outbreak from April was confirmed to have both RSV and parainfluenza 3 co-circulation. 24 total outbreaks have been reported to MDCH for the 2010-2011 season:

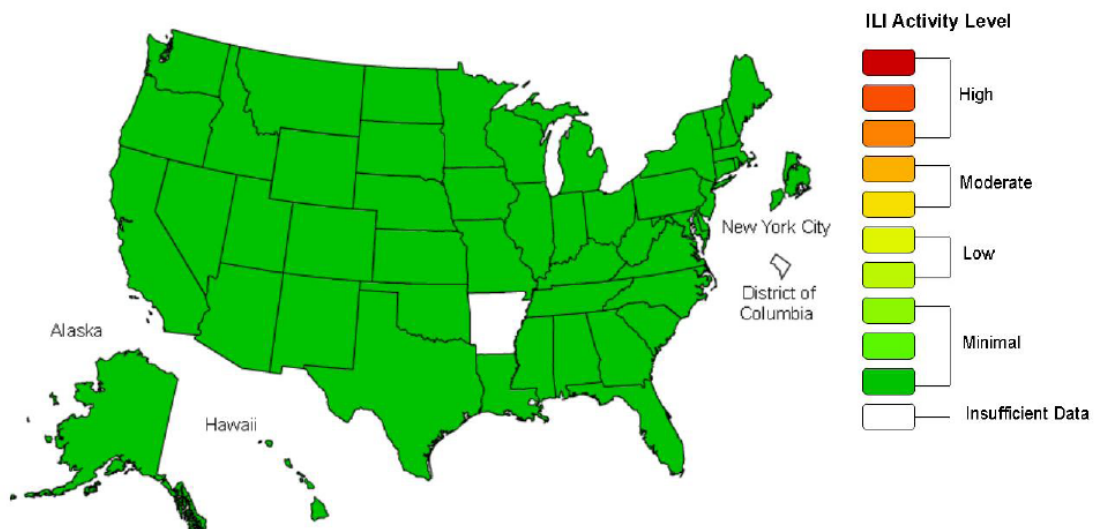
- Influenza A/H3: 11 (4SE, 3SW, 1C, 3N)
- Influenza A/H1N1 2009: 2 (2SW)
- Influenza A/H3 and B both found: 1 (SW)
- Influenza A and B both found: 1 (C)
- Influenza B: 1 (C)
- Influenza positive, subtype unknown: 1 (SW)
- RSV and parainfluenza 3: 1 (C)
- RSV: 1 (C)
- No testing or negative: 5 (2SE, 1SW, 2N)

National (CDC [edited], May 27): During week 20 (May 15-21, 2011), influenza activity in the United States remained low. Of the 1,192 specimens tested by U.S. World Health Organization and National Respiratory and Enteric Virus Surveillance System collaborating labs and reported to CDC/Influenza Division, 9 (0.8%) were positive for influenza. The proportion of deaths attributed to pneumonia and influenza was slightly above the epidemic threshold. No influenza-associated pediatric deaths were reported. This season, 105 laboratory-confirmed influenza-associated pediatric deaths have been reported to CDC. The proportion of outpatient visits for influenza-like illness (ILI) was 0.9%, which is below the national baseline of 2.5%. All 10 regions reported ILI below region-specific baselines. 49 states experienced minimal ILI activity, and the one state had insufficient data to calculate an ILI activity level. The geographic spread of influenza in Puerto Rico and 21 states was reported as sporadic, and the District of Columbia, U.S. Virgin Islands, Guam, and 29 states reported no activity.



This map indicates the geographic spread and does not measure the severity of influenza activity.

**Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILInet
2010-11 Influenza Season Week 20 ending May 21, 2011**



This map uses the proportion of outpatient visits to health care 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 in 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>.

National (MMWR, June 3): A recent United States influenza update titled "Update: Influenza Activity --- United States, 2010--11 Season, and Composition of the 2011--12 Influenza Vaccine" is now available online at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6021a5.htm?s_cid=mm6021a5_w.

International (WHO [edited], May 20): The influenza season is largely finished in the temperate countries of the northern hemisphere with transmission now either undetectable or at very low levels in most areas. A few tropical countries are experiencing low grade transmission including the Dominican Republic, Venezuela (influenza A(H1N1)2009) and Jamaica (influenza type B) in the Americas, Rwanda (influenza A(H3N2)) and Madagascar (influenza type B) in Sub-Saharan Africa. The influenza season has not yet started in the temperate countries of the southern hemisphere. Australia has reported a small increase in reports of influenza-like illness however actual detections of influenza virus have decreased in

The entire summary is available online at http://www.who.int/csr/disease/influenza/latest_update_GIP_surveillance/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.

International, Human (WHO [edited], June 1): The Ministry of Health of Egypt has announced a new confirmed case of human infection with avian influenza A (H5N1) virus. The case is a 30 year old female from Amria District, Alexandria Governorate. She developed symptoms on 26 April and was hospitalized on 3 May. She was in a critical condition under artificial ventilation and died on 9 May. She received oseltamivir treatment at the time of hospitalization. Investigations into the source of infection indicate that the case had exposure to sick poultry suspected to have avian influenza.

The case was confirmed by the Egyptian Central Public Health Laboratory, a National Influenza Center of the WHO Global Influenza Surveillance Network. Of the 144 cases confirmed to date in Egypt, 48 have been fatal.

International, Research (PLoS Pathogens abstract, May 26): Watanabe Y, Ibrahim MS, Ellakany HF, Kawashita N, Mizuike R, et al. (2011) Acquisition of Human-Type Receptor Binding Specificity by New H5N1 Influenza Virus Sublineages during Their Emergence in Birds in Egypt. *PLoS Pathog* 7(5): e1002068. doi:10.1371/journal.ppat.1002068

Highly pathogenic avian influenza A virus subtype H5N1 is currently widespread in Asia, Europe, and Africa, with 60% mortality in humans. In particular, since 2009 Egypt has unexpectedly had the highest number of human cases of H5N1 virus infection, with more than 50% of the cases worldwide, but the basis for this high incidence has not been elucidated. A change in receptor binding affinity of the viral hemagglutinin (HA) from α 2,3- to α 2,6-linked sialic acid (SA) is thought to be necessary for H5N1 virus to become pandemic. In this study, we conducted a phylogenetic analysis of H5N1 viruses isolated between 2006 and 2009 in Egypt. The phylogenetic results showed that recent human isolates clustered disproportionately into several new H5 sublineages suggesting that their HAs have changed their receptor specificity. Using reverse genetics, we found that these H5 sublineages have acquired an enhanced binding affinity for α 2,6 SA in combination with residual affinity for α 2,3 SA, and identified the amino acid

mutations that produced this new receptor specificity. Recombinant H5N1 viruses with a single mutation at HA residue 192 or a double mutation at HA residues 129 and 151 had increased attachment to and infectivity in the human lower respiratory tract but not in the larynx. These findings correlated with enhanced virulence of the mutant viruses in mice. Interestingly, these H5 viruses, with increased affinity to α 2,6 SA, emerged during viral diversification in bird populations and subsequently spread to humans. Our findings suggested that emergence of new H5 sublineages with α 2,6 SA specificity caused a subsequent increase in human H5N1 influenza virus infections in Egypt, and provided data for understanding the virus's pandemic potential.

International, Research (CIDRAP News [edited], May 26): It has long been suspected that influenza increases the risk of heart attacks, but the connection has been nebulous because it's difficult to distinguish the effects of flu from the effects of cold weather, which prevails in flu season in temperate regions.

Now, a British-Chinese research team says its analysis of 10 years' worth of flu, heart-attack, and weather data in the United Kingdom, a temperate country, and Hong Kong, a subtropical place, provides stronger evidence that flu contributes to myocardial infarction (MI).

Writing in the *Journal of Infectious Diseases*, the researchers conclude that up to 5.6% of MI-related deaths in Hong Kong and up to 3.4% of such deaths in England and Wales between 1999 and 2008 were attributable to flu.

"We found a consistent association between seasonal influenza circulation and acute MI-associated hospitalizations and deaths in 2 different settings characterized by differing populations, climates, and patterns of health-seeking behavior," says the report. The study was led by Charlotte Warren-Gash of Royal Free Hospital in London.

In an accompanying commentary, two flu specialists from the US Centers for Disease Control and Prevention (CDC) say the study strengthens the case for a link between flu and heart attacks and points up the need for flu vaccines that are more effective in elderly people.

The authors say their study apparently is the first to examine the connection between flu activity and national rates of fatal and nonfatal MI in two different places and populations.

The findings were most striking for weeks of peak flu activity, according to the authors' models. At those times, 9.7% to 13.6% of MI deaths in Hong Kong and 10.7% to 11.8% of MI deaths in England and Wales were attributable to flu.

In the commentary, Lynn Finelli and Sandra S. Chaves of the CDC write, "This well-designed and -analyzed study adds to the pool of evidence supporting a relationship between influenza and AMI [acute MI] independent of temperature and humidity and is the first to our knowledge to propose influenza-attributable proportions for acute myocardial hospitalization and death."

The commentators note a couple of limitations in the study. For one, the authors did not look into the effects of viruses other than flu. Another problem is the "inconsistent lag times observed between countries and among outcomes for ILI visits/influenza circulation and hospitalizations and deaths."

The study does not address exactly how influenza might contribute to cardiovascular events. Finelli and Chaves say acute respiratory infections trigger responses such as an increase in white blood cells and release of cytokines, which may make atherosclerotic plaques more prone to rupture and block coronary arteries.

As for the overall case for flu as a contributor to MI, the commentators say, "There is consistent ecologic evidence that overall cardiovascular mortality is related to influenza virus circulation and ILI activity, and there is consistent ecologic and individual level evidence that occurrence of AMI can be temporally related to acute respiratory infection including ILI."

The data "are compelling so far," but the evidence is not yet conclusive, they add. Still needed are prospective studies of MI in individuals with laboratory evidence of flu infection.

The entire article is available online at <http://www.cidrap.umn.edu/cidrap/content/influenza/general/news/may2611fluandmi.html>.

International, Poultry (OIE [edited], May 27): Low pathogenic avian influenza virus (H7); Germany
 Date of first confirmation of the event: 27/05/2011; Date of Start of Event: 23/05/2011
 Province: NORDRHEIN-WESTFALEN; District: Guetersloh; Sub-district: Rietberg; Location: Bokel
 Species: Birds; Susceptible: 20,000; Cases: 4000; Deaths: 0; Destroyed: 20,000
 Source of the outbreak(s) or origin of infection: Unknown or inconclusive

International, Poultry (OIE [edited], May 30): Low pathogenic avian influenza virus H7N3
 Country: Chinese Taipei; Outbreak 1: Dalin Township, CHIA-I
 Date of start of the outbreak: 20/05/2011
 Species: Birds; Susceptible: 1900; Cases: 20; Deaths: 0; Destroyed: 0
 Epidemiological comments: After the H7N3 outbreak confirmed on 7 April 2011, epidemiological investigation and intensified surveillance were carried out on the surrounding poultry farms within a 3-km-radius area around the index farm. Samples taken from a duck breeder tested positive with both RT-PCR and virus isolation, and identified as H7N3 strain avian influenza virus (AIV) on 26 May 2011. Movement restriction was implemented on the farm immediately after AIV was detected. Clinical investigation on that farm was done and the result showed that the breeders in the farm were healthy without abnormal mortality. The pathogenicity assays of this virus isolate are now in progress.

Michigan Wild Bird Surveillance (USDA, as of June 2): For the 2010 season (April 1, 2010-March 31, 2011), highly pathogenic avian influenza H5N1 has not been recovered from 40,659 samples tested nationwide, including 1283 Michigan samples (7 live bird, 1203 hunter-killed birds, 73 morbidity/mortality). For more information, visit <http://wildlifedisease.nbi.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. Muyombwe, PhD; V. Vavricka, MS**

Table. H5N1 Influenza in Humans - Cases up to June 1, 2011. http://www.who.int/csr/disease/avian_influenza/country/cases_table_2011_06_1/en/index.html. Downloaded 6/1/2011. 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	5	5	15	13
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	25	8	144	48
Indonesia	0	0	0	0	20	13	55	45	42	37	24	20	21	19	9	7	6	5	177	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	38	18	554	324