



MI FluFocus

Influenza Surveillance and Avian Influenza Update

Bureau of Epidemiology
Bureau of Laboratories



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July 23, 2009
Vol. 6; No. 28

New updates in this issue:

- **Michigan Surveillance:** All surveillance indicators point towards decreasing influenza activity.
 - **National Surveillance:** Activity continues to decrease; 99% of influenza viruses are pandemic H1N1.
 - **International Surveillance:** Southern hemisphere countries report regional to widespread activity.
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*****Pandemic Influenza A (H1N1) virus (Swine-origin Flu) Investigation*****

Michigan (MDCH): MDCH will no longer update the table of confirmed and probable H1N1 cases by county. Instead, we are moving to aggregate flu reporting, which includes flu-like illness and confirmed and probable cases of seasonal and novel influenza. Beginning the week ending June 20, 2009, this aggregate flu report will be updated every Tuesday by 5:00 pm at the following website: http://www.michigan.gov/documents/mdch/20090623_5pm_FLI_283516_7.pdf. As of July 18, 2014 cases of flu-like illness and confirmed and probable cases of seasonal and novel influenza, including 9 deaths, were reported in Michigan.

MDCH is now reporting the aggregate number of confirmed and probable cases by county, using the Michigan Disease Surveillance System (MDSS) as the data source. A confirmed case of pandemic influenza A (H1N1) virus infection is defined as a person with an influenza-like illness (ILI) who tests positive for pandemic influenza A (H1N1) by RT-PCR as performed by the MDCH Bureau of Laboratories. A probable case is defined as a person with an ILI who tests positive with either a commercial pandemic influenza A H1 PCR test that has not been validated by the MDCH Bureau of Laboratories or who tests positive for influenza A, but is negative for seasonal influenza H1 and H3 by RT-PCR.

Please continue to reference the State of Michigan's swine-origin influenza A (H1N1) website at www.michigan.gov/swineflu for additional information. Local health departments can find additional guidance documents on the MI-HAN homepage.

National (CDC): As of July 17, 2009, 11:00am ET, the Centers for Disease Control and Prevention (CDC) is reporting 40,617 confirmed human infections, including 263 deaths, in the United States. These cases are being reported from 55 states and territories. This number is expected to rise as the outbreak evolves and now that state public health laboratories have a diagnostic test to confirm swine-origin influenza A (H1N1) infections. For the most up to date information, please visit the CDC's website at www.cdc.gov/h1n1flu/.

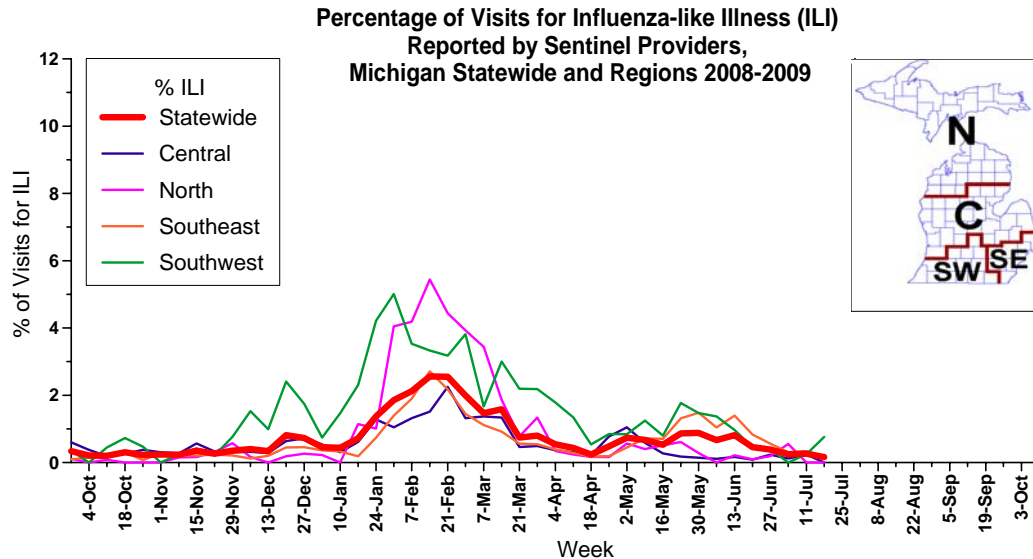
Michigan Disease Surveillance System: The week ending July 18 saw aggregate flu-like numbers and individual influenza reports hold steady near baseline levels. Novel influenza reports held steady as well during the week. All numbers, except novel influenza, which is slightly higher, are near summer baseline levels and are consistent with the numbers seen this time last year.

Emergency Department Surveillance: Emergency department visits from constitutional complaints held steady near the previous week's levels and respiratory complaints saw a slight decrease. Both constitutional and respiratory numbers are comparable to numbers seen at this time last year. Three constitutional alerts in the C(2) and SW(1) Influenza Surveillance Regions and no respiratory alerts were generated last week.

Over-the-Counter Product Surveillance: Overall, OTC product sales were mixed last week. Thermometers and children's electrolytes saw a slight increase in sales, the remaining indicators held

steady near the previous week's levels. All indicator levels are comparable to those seen at this time last year.

Sentinel Provider Surveillance (as of July 23): During the week ending July 18, 2009, the proportion of visits due to influenza-like illness (ILI) slightly decreased compared to the previous week at 0.2% overall; 11 patient visits due to ILI were reported out of 6,778 office visits. Twenty-three sentinel sites provided data for this report. The increased level of ILI activity for this time of year may be an indication of pandemic influenza A (H1N1) circulation. Activity increased in one surveillance region: Southwest (0.8%); remained the same in the North (0.0%) region and decreased in the remaining two regions: Central (0.0%) and Southeast (0.2%). Note that 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.

Laboratory Surveillance (as of July 23): During the past week, no new seasonal influenza isolates were identified at the MDCH Bureau of Laboratories (BOL). For the 2008-2009 influenza season, MDCH BOL has identified 317 seasonal influenza isolates (followed by Influenza Surveillance Regions of origin):

- 188 A/H1N1 or A/H1 (63SE, 43SW, 25C, 57N)
- 10 A/H3N2 or A/H3 (5SE, 2SW, 1C, 2N)
- 119 B (24SE, 45SW, 14C, 36N)
 - 9 B/Florida/4/2006-like (4SE, 1SW, 1C, 3N)
 - 108 B/Malaysia/2506/2004-like (20SE, 43SW, 12C, 33N)
 - 1 untypable (SW)
 - 1 pending subtyping (C)

9 sentinel laboratories reported for the week ending July 18, 2009. 2 labs (SE, C) reported sporadic to increasing influenza A positives and 7 labs reported zero influenza A positives (SE, SW, C, N). 9 labs reported zero influenza B positives (SE, SW, C, N).

Michigan Influenza Antigenic Characterization (as of July 23): 35 influenza seasonal A/H1N1 isolates have been antigenically characterized by the CDC; results indicate all seasonal isolates are A/Brisbane/59/2007-like, which matches the influenza A/H1N1 component of this season's Northern Hemisphere vaccine. One influenza A/H3N2 has been characterized as A/Brisbane/10/2007-like, which matches the A/H3N2 component of this season's vaccine.

2 Michigan pandemic influenza A (H1N1) specimens have been antigenically characterized by the CDC; both of these specimens have been characterized as A/California/07/2009-like (H1N1)v. This strain is the variant reference virus selected by WHO as a potential candidate for pandemic influenza A(H1N1) vaccine.

20 influenza B isolates have been antigenically characterized by the CDC. 3 influenza B isolates have been characterized as B/Florida/4/2006-like, which matches the influenza B component of this season's vaccine. 17 influenza B isolates have been characterized as B/Brisbane/60/2008-like, which does not match this season's vaccine, but is a recommended component of the 2009-2010 vaccine.

Michigan Influenza Antiviral Resistance Data (as of July 23): 35 influenza seasonal A/H1N1 viruses from the MDCH Bureau of Laboratories have been tested for antiviral resistance at CDC for the 2008-2009 season. All 35 viruses were resistant to oseltamivir (Tamiflu®) and sensitive to zanamivir, amantadine and rimantadine. These viruses were collected in the SE(15), SW(13), C(1) and N(6) Influenza Surveillance Regions. 3 influenza A/H3N2 isolates, collected in the C(2) and N(1) Regions, have been tested for antiviral resistance; these viruses were resistant to the adamantanes (amantadine and rimantadine) and sensitive to oseltamivir and zanamivir.

2 Michigan pandemic influenza A (H1N1) specimens have been evaluated by CDC for resistance to the adamantane class of antiviral medications; both of these specimens were resistant. One of the specimens was evaluated for resistance to oseltamivir and zanamivir; it was sensitive to these antivirals. For information about antiviral susceptibility for swine-origin influenza A (H1N1), go to <http://www.cdc.gov/h1n1flu/antiviral.htm>.

19 influenza B isolates, collected in the SE(8), SW(2), C(1) and N(5) Regions, have been tested for antiviral resistance; these viruses were sensitive to oseltamivir and zanamivir (the adamantanes are not effective against B viruses).

Antiviral resistance testing often takes several weeks to complete, and thus cannot be used to guide treatment of individual patients. However, CDC has made interim recommendations regarding the use of antiviral medications for the treatment of influenza and for prophylaxis. This guidance is available at <http://www2a.cdc.gov/HAN/ArchiveSys/ViewMsgV.asp?AlertNum=00279>.

Seasonal Influenza-Associated Pediatric Mortality (as of July 23): Three influenza-associated pediatric mortalities (1 influenza A (SW), 2 influenza B (SE)) have been reported to MDCH for the 2008-2009 influenza season.

***The CDC has asked all states to collect information on any pediatric death associated with influenza infection. This includes not only any death in a child (<18 years) resulting from a compatible illness confirmed to be influenza by an appropriate diagnostic test, but also any unexplained death with evidence of an infectious process in a child. Please immediately call MDCH to ensure that proper clinical 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 July 23): Three congregate setting outbreaks (1C, 2N) due to seasonal influenza (1 influenza A, 1 influenza B, 1 unsubtype) have been reported to MDCH for the 2008-09 influenza season.

4 congregate setting outbreaks in Michigan associated with pandemic influenza A H1N1 have been reported to MDCH (1SE, 1SW, 1C, 1N).

National (CDC [edited], July 17): During week 27 (July 5-11, 2009), influenza activity decreased in the United States, however, there were still higher levels of influenza-like illness than is normal for this time of year. One thousand two hundred seventy-eight (23.8%) specimens tested by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories and reported to CDC/Influenza Division were positive for influenza. Over 99% of all subtyped influenza A viruses being reported to CDC were novel influenza A (H1N1) viruses. The proportion of deaths attributed to pneumonia and influenza (P&I) was below the epidemic threshold. One influenza-associated pediatric death was reported and was associated with novel influenza A (H1N1) virus infection. The proportion of outpatient visits for influenza-like illness (ILI) was below national and region-specific baseline levels. Nine states reported geographically widespread influenza activity, 12 states and Puerto Rico reported regional influenza activity, 12 states and the District of Columbia reported local influenza activity, 16 states reported sporadic influenza activity, and one state did not report.

CDC has antigenically characterized 1,817 seasonal human influenza viruses [1,049 influenza A (H1), 196 influenza A (H3) and 572 influenza B viruses] collected by U.S. laboratories since October 1, 2008, and 233 novel influenza A (H1N1) viruses. All 1,049 influenza seasonal A (H1) viruses are related to the influenza A (H1N1) component of the 2008-09 influenza vaccine (A/Brisbane/59/2007). One hundred eighty-eight (96%) of 196 influenza A (H3N2) viruses tested are related to the A (H3N2) vaccine component (A/Brisbane/10/2007) and eight viruses (4%) tested showed reduced titers with antisera produced against A/Brisbane/10/2007. All 233 novel influenza A (H1N1) viruses are related to

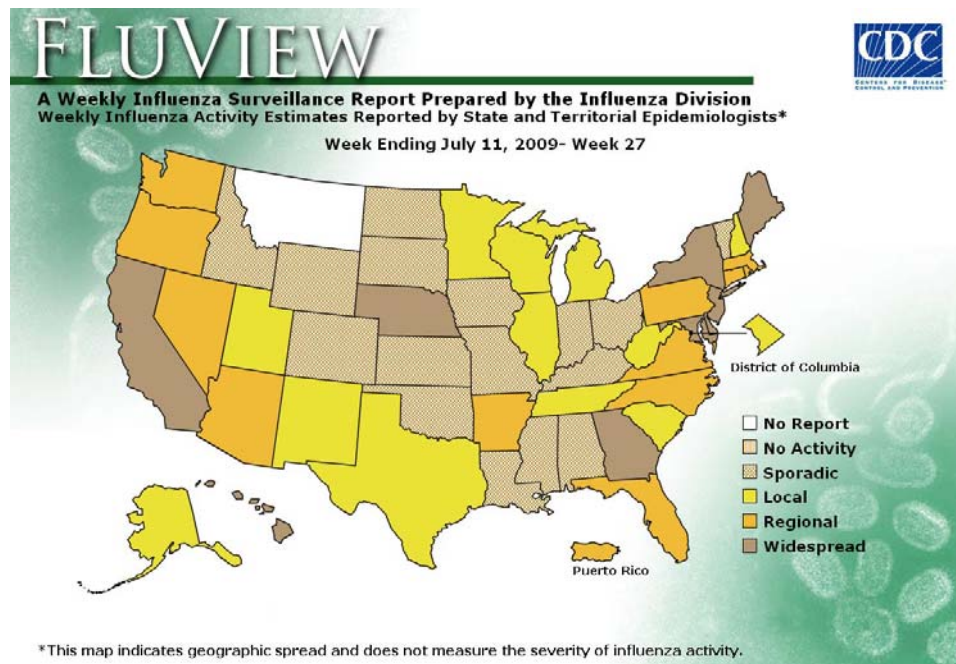
the A/California/07/2009 (H1N1) reference virus selected by WHO as a potential candidate for novel influenza A (H1N1) vaccine. Influenza B viruses currently circulating can be divided into two distinct lineages represented by the B/Yamagata/16/88 and B/Victoria/02/87 viruses. Sixty-eight (12%) of 573 influenza B viruses tested belong to the B/Yamagata lineage and are related to the vaccine strain (B/Florida/04/2006). The remaining 504 (88%) viruses belong to the B/Victoria lineage and are not related to the vaccine strain.

Since October 1, 2008, 1,071 seasonal influenza A (H1N1), 201 influenza A (H3N2), and 606 influenza B viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Also, 1,078 seasonal influenza A (H1N1) and 212 influenza A (H3N2) viruses have been tested for resistance to the adamantanes (amantadine and rimantadine). Two hundred sixty-seven novel influenza A (H1N1) viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Three hundred five novel influenza A (H1N1) viruses have been tested for resistance to the adamantanes (amantadine and rimantadine). The results of antiviral resistance testing performed on these viruses are summarized in the table below.

	Isolates tested (n)	Resistant Viruses, Number (%)		Isolates tested (n)	Resistant Viruses, Number (%)
		Oseltamivir	Zanamivir		
Seasonal Influenza A (H1N1)	1,071	1,066 (99.5%)	0 (0)	1,078	6 (0.6%)
Influenza A (H3N2)	201	0 (0)	0 (0)	212	212 (100%)
Influenza B	606	0 (0)	0 (0)	N/A*	N/A*
Novel Influenza A (H1N1)	267	0 (0)	0 (0)	305	305 (100%)

*The adamantanes (amantadine and rimantadine) are not effective against influenza B viruses.

To access the entire CDC weekly surveillance report throughout the influenza season, visit <http://www.cdc.gov/flu/weekly/fluactivity.htm>



International (WHO, July 10): This summary provides an updated report of seasonal influenza activity. It does not include reports of avian influenza in humans, available at: [the WHO avian influenza page](#), or reports of the recent influenza A (H1N1) virus, available at: [the WHO page for influenza A\(H1N1\)](#).

During the weeks 25-26, widespread outbreaks in the southern hemisphere continued to be reported in Brazil due to H1. Regional H3 outbreaks were once again reported in South Africa with low levels of H1 and B circulating. In Australia, regional activity occurred with H3 and H1 cocirculating as well as sporadic B. New Zealand experienced local outbreaks of H3 and H1 while sporadic B activity was also detected. Local outbreaks of influenza B have been reported by Madagascar, with low levels of H3 and H1.

Sporadic seasonal influenza activity was observed in Belgium (A), Cameroon (H3), Canada (A), China (H1,H3,B), Denmark (A,B), Ecuador (H3), El Salvador (A,B), Greece (H3,B), Iran (B), Italy (H3), Japan (H3,B), Morocco (A), Norway (B), Republic of Korea (H3), Réunion (B), Romania (H1), Russian Federation (H1,H3,B), Slovenia (H3), Sri Lanka (H1), Tunisia (H1,B) and United States of America (H1,H3,B).

Albania, Algeria, Azerbaijan, Belarus, Bulgaria, Estonia, Germany, Kazakhstan, Latvia, Lithuania, Mongolia, Netherlands, Oman, Poland, Serbia, Slovakia, Spain, Sweden and Turkey reported no activity.

MDCH reported **LOCAL INFLUENZA ACTIVITY** to the CDC for the week ending July 18, 2009.

For stakeholders interested in additional information regarding influenza vaccination and education, the MDCH publication *Michigan FluBytes* is available online at http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_22779_40563-125027--,00.html. *FluBytes* is published weekly during the influenza season.

Avian and Novel Influenza Activity

WHO Pandemic Phase: Phase 6 – characterized by increased and sustained transmission in the general population. Human to human transmission of an animal or human-animal influenza reassortant virus has caused sustained community level outbreaks in at least two WHO regions.

National, H1N1 cases (MMWR excerpt, July 24): Neurologic complications, including seizures, encephalitis, encephalopathy, Reye syndrome, and other neurologic disorders, have been described previously in association with respiratory tract infection with seasonal influenza A or B viruses, but not with novel influenza A (H1N1) virus. On May 28, 2009, the Dallas County Department of Health and Human Services (DCHHS) notified CDC of four children with neurologic complications associated with novel influenza A (H1N1) virus infection admitted to hospitals in Dallas County, Texas, during May 18--28. This report summarizes the clinical characteristics of those four cases. Patients were aged 7--17 years and were admitted with signs of influenza-like illness (ILI) and seizures or altered mental status. Three of the four patients had abnormal electroencephalograms (EEGs). In all four patients, novel influenza A (H1N1) viral RNA was detected in nasopharyngeal specimens but not in cerebrospinal fluid (CSF). Antiviral therapy included oseltamivir (four patients) and rimantadine (three patients). All four patients recovered fully and had no neurologic sequelae at discharge. These findings indicate that, as with seasonal influenza, neurologic complications can occur after respiratory tract infection with novel influenza A (H1N1) virus. For children who have ILI accompanied by unexplained seizures or mental status changes, clinicians should consider acute seasonal influenza or novel influenza A (H1N1) virus infection in the differential diagnosis, send respiratory specimens for appropriate diagnostic testing, and promptly initiate empirical antiviral treatment, especially in hospitalized patients.

International, Swine (Buenos Aires Herald [edited], July 17): The government declared a nationwide animal health emergency following the discovery of the new H1N1 flu virus in at least one pig herd. The flu strain has killed 137 people in the South American country during the Southern Hemisphere winter and the government has closed schools and urged Argentines to avoid crowded places to halt its spread.

"The contingency plan ... allows for an increase in testing in pig farms and in slaughter houses in order to guarantee early detection," the government's Official Gazette said.

The emergency measure, which will also give officials extra funding to deal with the outbreak, was drawn up by the state-run SENASA agency, responsible for animal health and food safety.

Earlier this month, SENASA officials said workers at a pig farm in Buenos Aires province were suspected of having passed the new strain onto the animals. That added weight to the theory that pigs can be infected by humans. Another pig herd later tested positive for the virus although Friday's statement only made mention of the 1st case.

International, Antiviral Resistance (The Canadian Press [edited], July 22): Canada has recorded a case of Tamiflu-resistant swine flu virus in a Quebec man who had been given the drug to prevent infection. Meanwhile, Japan revealed Tuesday [21 Jul 2009] it had found a 2nd such case of Tamiflu resistance, in a person who has no ties to the country's earlier reported case. The cases are the 4th and 5th globally since the new H1N1 virus was discovered in April [2009].

The Quebec man, 60, was given the flu antiviral after his son fell ill with the pandemic virus. It's believed the resistance arose in the man, and there is no evidence he transmitted resistant virus to anyone else. "It appears to be an isolated case," said Jirina Vlk, spokesperson for the Public Health Agency of Canada. "Although the strain does not appear to have spread beyond the reported individual case, we continue to be vigilant on this front."

Use of Tamiflu to prevent infection -- a procedure called prophylaxis -- has been seen on occasion to give rise to resistant viruses. "We know that it was going to happen, and it's not good news that it's happening," said Dr. Allison McGeer, an influenza expert at Toronto's Mount Sinai Hospital. But she said given the amount of Tamiflu being used in the world right now, such cases are bound to arise. "It's the problem with influenza, right? Either we're going to see small numbers of these, and they're just going to kind of appear periodically, and we're all going to worry, or it's going to go big," McGeer said. "There's probably not going to be much in between."

Another such case cropped up in Japan in the city of Yamaguchi. Japan's National Institute of Infectious Diseases logged genetic sequence data for the virus on Tuesday [21 Jul 2009] in GenBank, a repository for genetic sequences used by flu researchers. The lab's director, Dr. Masato Tashiro, confirmed the case in an email containing details provided to the World Health Organization. The new case was a person who had been given the antiviral drug as post-exposure prophylaxis, an attempt to prevent illness in a person exposed to the pandemic virus. The person has since recovered, and it appears that there has been no spread, the email stated. The virus was sensitive to Relenza, a 2nd drug in the same class as Tamiflu. The earlier Japanese case had occurred in a person in the city of Osaka.

Other cases have been reported by Denmark and Hong Kong. Four of the 5 cases arose in people who had been taking the drug. One, however, was recorded in a girl from San Francisco who traveled while sick to Hong Kong. Health inspectors at the airport there pulled her aside and tested her for swine flu. She was positive but told doctors there she hadn't taken Tamiflu. That suggests the virus that caused her infection was already resistant. U.S. officials have intensified surveillance for resistant viruses in the San Francisco area but say they have not found other cases.

The Public Health Agency says the Quebec man recovered from his bout of swine flu without complications and never needed hospitalization. Vlk said the agency recommends using Tamiflu for treatment only, adding prudent use of the drug could stave off the development of resistance.

Michigan Wild Bird Surveillance (USDA, as of July 23): For the 2009 testing season (April 1, 2009 - March 31, 2010), HPAI subtype H5N1 has not been recovered from any of the Michigan samples tested to date, which includes 26 live wild bird and 9 morbidity/mortality specimens. HPAI subtype H5N1 has not been recovered from the 4,132 birds or environmental samples tested nationwide for the 2009 season. For more information, visit the National HPAI Early Detection Data System website at <http://wildlifedisease.nbio.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>.

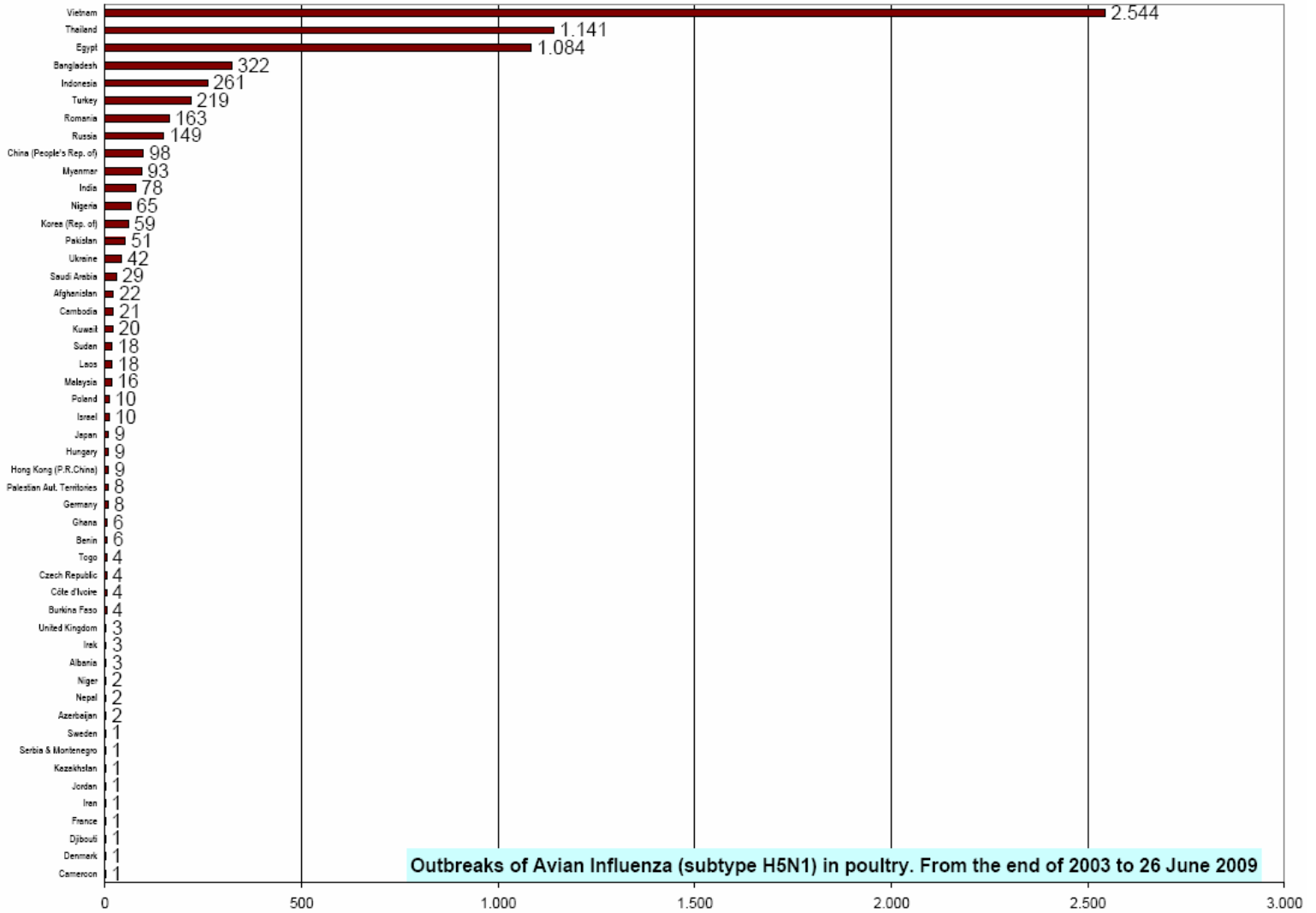
Please contact Susan Peters at VagaskyS@Michigan.gov with any questions regarding this newsletter or to be added to the weekly electronic mailing list.

Contributors

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Table 1. H5N1 Influenza in Poultry (Outbreaks up to June 26, 2009)

(Source: http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm Downloaded 7/2/09)



Outbreaks of Avian Influenza (subtype H5N1) in poultry. From the end of 2003 to 26 June 2009

Table 2. H5N1 Influenza in Humans (Cases up to July 1, 2009)

(http://www.who.int/csr/disease/avian_influenza/country/cases_table_2009_07_01/en/index.html Downloaded 7/7/2009)

Cumulative number of lab-confirmed human cases reported to WHO. Total number of cases includes deaths.

Country	2003		2004		2005		2006		2007		2008		2009		Total	
	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	8	5
Bangladesh	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Cambodia	0	0	0	0	4	4	2	2	1	1	1	0	0	0	8	7
China	1	1	0	0	8	5	13	8	5	3	4	4	7	4	38	25
Djibouti	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Egypt	0	0	0	0	0	0	18	10	25	9	8	4	30	4	81	27
Indonesia	0	0	0	0	20	13	55	45	42	37	24	20	0	0	141	115
Iraq	0	0	0	0	0	0	3	2	0	0	0	0	0	0	3	2
Lao People's Democratic Republic	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	2
Myanmar	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Nigeria	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1
Pakistan	0	0	0	0	0	0	0	0	3	1	0	0	0	0	3	1
Thailand	0	0	17	12	5	2	3	3	0	0	0	0	0	0	25	17
Turkey	0	0	0	0	0	0	12	4	0	0	0	0	0	0	12	4
Viet Nam	3	3	29	20	61	19	0	0	8	5	6	5	4	4	111	56
Total	4	4	46	32	98	43	115	79	88	59	44	33	41	12	436	262