MI FluFocus

Influenza Surveillance and Avian Influenza Update

Bureau of Epidemiology
Bureau of Laboratories

Editor: Susan Peters, DVM
Surveillance and Infectious Disease Epidemiology
VagaskyS@Michigan.gov

August 6, 2009
Vol. 6; No. 30

New updates in this issue:

- **Michigan Surveillance:** Surveillance indicators show a low, steady level of influenza activity.
- **National Surveillance:** 98% of subtyped influenza A viruses are novel influenza A (H1N1) viruses.
- **International Surveillance:** The majority of pandemic influenza A (H1N1) detections during week 30 were reported by China, Hong Kong SAR, Australia and Italy.

******Pandemic Influenza A (H1N1) virus (Swine-origin Flu) Investigation******

Michigan (MDCH): MDCH is no longer updating the table of confirmed and probable H1N1 cases by county. Instead, we have moved to aggregate flu reporting, which includes flu-like illness and confirmed and probable cases of seasonal and novel influenza. This report is updated every Tuesday by 5:00 pm and can be accessed at a link on this website: http://www.michigan.gov/h1n1flu. As of August 1, 3233 cases of flu-like illness and confirmed and probable cases of seasonal and novel influenza, including 10 deaths, were reported in Michigan.

Please continue to reference the State of Michigan's novel influenza A (H1N1) website at www.michigan.gov/h1n1flu for additional information. Local health departments can find additional guidance documents in the MI-HAN document library.

National (CDC): As of July 30, 2009, 11:00am ET, the Centers for Disease Control and Prevention (CDC) is reporting 5514 hospitalizations and 353 deaths due to novel H1N1 influenza in the United States. CDC will report the total number of hospitalizations and deaths each week, and continue to use its traditional surveillance systems to track the progress of the novel H1N1 flu outbreak. For the most up to date information, please visit the CDC's website at www.cdc.gov/h1n1flu/.

International (WHO Update 60 [edited]): As of July 31, 2009, 168 countries and overseas territories/communities have reported at least one laboratory confirmed case of pandemic (H1N1) 09. All continents are affected by the pandemic.

The countries and overseas territories/communities that have newly reported their first pandemic (H1N1) 2009 confirmed case(s) since the last web update (27 July 2009) as of 31 July 2009 are: Azerbaijan, Gabon, Grenada, Kazakhstan, Moldova, Monaco, Nauru, Swaziland, Suriname

Region	**Cumulative total as of 31 July 2009**	
	Cases*	Deaths
WHO Regional Office for Africa (AFRO)	229	0
WHO Regional Office for the Americas (AMRO)	98242	1008
WHO Regional Office for the Eastern Mediterranean (EMRO)	1301	1
WHO Regional Office for Europe (EURO)	26089	41
WHO Regional Office for South-East Asia (SEARO)	9858	65
WHO Regional Office for the Western Pacific (WPRO)	26661	39
Grand Total	162380	1154

*Given that countries are no longer required to test and report individual cases, the number of cases reported actually understates the real number of cases.

Qualitative indicators (as of Week 29: 13 July - 19 July 2009)

1. Geographic spread of influenza activity
Most countries in North and South America experienced widespread activity. In Europe, only two countries, the United Kingdom and Portugal, experienced widespread activity, while several others experienced localized or regional activity. Among countries reporting from Asia, most experienced localized activity.

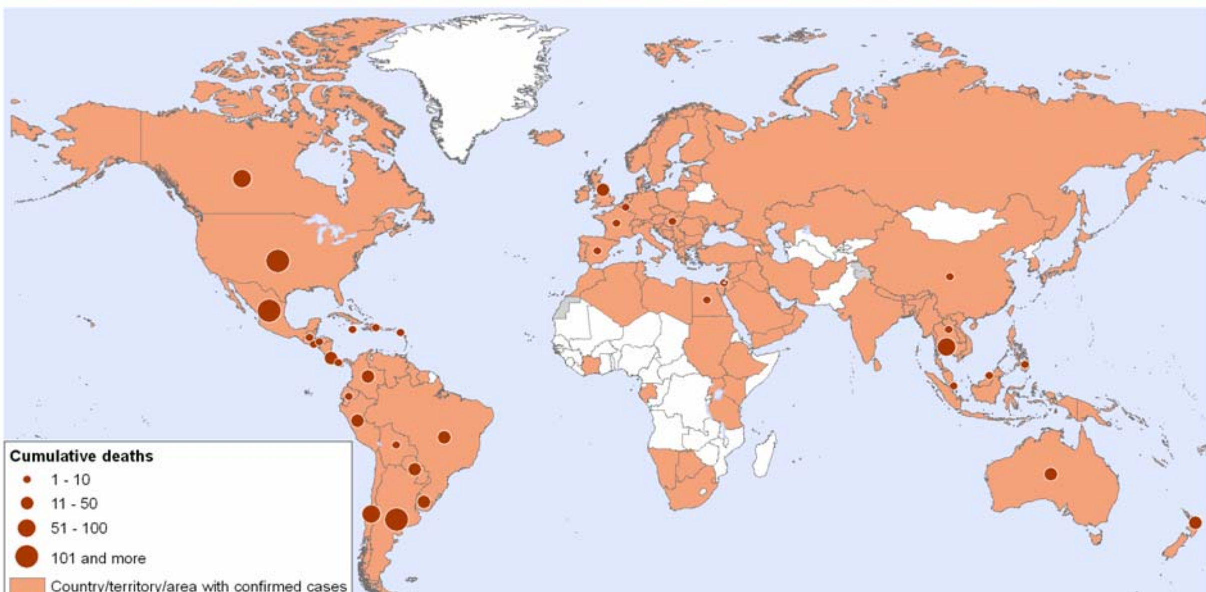
2. Trend of respiratory diseases activity compared to the previous week
All North American countries reported decreasing respiratory diseases activity trend, while several South and Central American countries reported increasing respiratory diseases activity trend. Among countries reporting in Europe, most countries reported an increasing or unchanged respiratory diseases activity trend during a period outside of the normal influenza season. Among countries reporting from Asia, most experienced an increase in respiratory diseases activity trend.

3. Intensity of acute respiratory diseases in the population
Among countries who reported on intensity, Chile and Argentina experienced very high intensity acute respiratory disease activity, while Canada, Mexico, the United Kingdom, Thailand, Uruguay, and Paraguay reported high intensity activity; the United States and much of the rest of Europe and Asia reported low or moderate intensity activity.

4. Impact on health care services
Few countries have reported on this indicator. Five countries are reporting moderate impact on the healthcare system, while the remaining are reporting low levels of impact.

Update on the virus situation (as of Week 30: 20 July - 26 July 2009)
According to FluNet reporting from the Global Influenza Surveillance Network (GISN), 3548 detections of the pandemic (H1N1) 2009 influenza virus were reported from 13 countries in week 30. The majority of detections were reported by China, Hong Kong SAR (25%, 1788 detections), followed by Australia (21%, 834 detections) and Italy (16%, 600 detections). Among the 13 countries, on average, the pandemic (H1N1) 2009 influenza virus accounted for 71% of all influenza virus detections (66% in northern hemisphere and 89% in southern hemisphere). The highest rate of detection of pandemic (H1N1) 2009 influenza virus was reported by Greece (99%; 147 out of 149 detections), Chile (98%; 160 out of 163), the Republic of Korea (98%; 258 out of 263), Italy (97%; 584 out of 600), and Australia (89%; 745 out of 834).

All pandemic (H1N1) 2009 influenza viruses analyzed to date are antigenically and genetically similar. A total of six oseltamivir resistant pandemic (H1N1) 2009 influenza viruses have now been detected from Denmark, Hong Kong SAR, Japan and Canada. Of these three were from patients in Japan. All six patients had received oseltamivir with the exception of one and have recovered well. All resistant viruses had the characteristic mutation at position 274/275 associated with resistance.

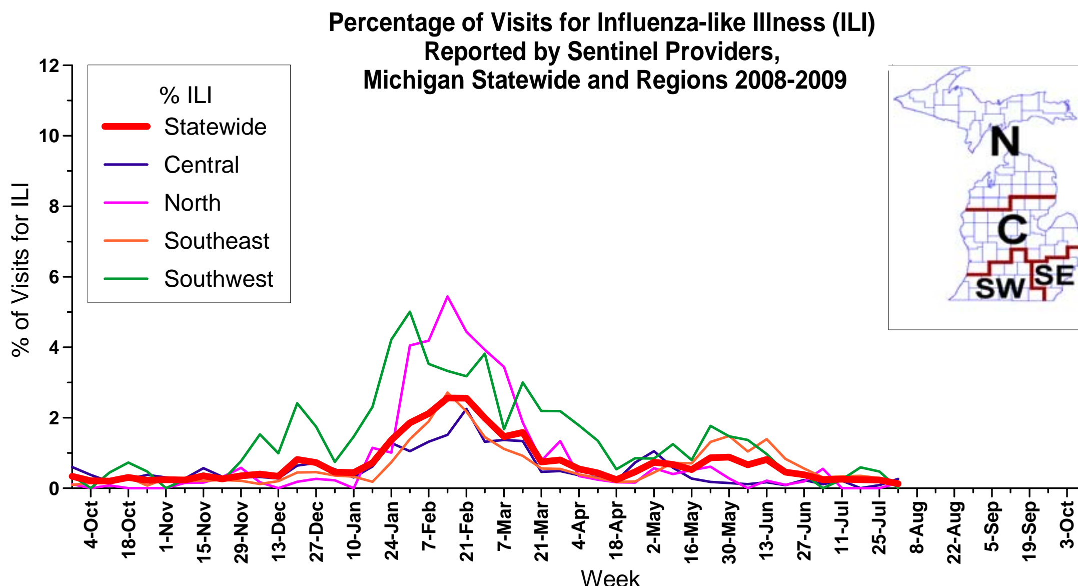


Michigan Disease Surveillance System: The week ending August 1 saw aggregate flu-like numbers and individual influenza reports hold steady near baseline levels. Novel influenza reports have decreased slightly over the past two weeks. All numbers, except novel influenza reports, which are slightly higher, are near summer baseline levels and are consistent with the numbers seen this time last year.

Emergency Department Surveillance: Emergency department visits from both constitutional and respiratory complaints held steady near the previous week's levels. Both constitutional and respiratory numbers are comparable to numbers seen at this time last year. Four constitutional alerts in the C(1), N(2) and SW(1) Influenza Surveillance Regions and two respiratory alerts in the C(1) and SW(1) Influenza Surveillance Regions were generated last week.

Over-the-Counter Product Surveillance: Overall, OTC product sales were mixed last week. All indicators, except children's electrolytes, saw a slight increase in sales. Children's electrolyte sales 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 August 6): During the week ending August 1, 2009, the proportion of visits due to influenza-like illness (ILI) decreased slightly compared to the previous week at 0.1% overall; 9 patient visits due to ILI were reported out of 6,893 office visits. Twenty-five sentinel sites provided data for this report. Activity increased in two surveillance regions: Central (0.3%) and North (0.2%); and decreased in the remaining two regions: Southeast (0.1%) and Southwest (0.0%). 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 August 6): 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)

7 sentinel laboratories reported for the week ending August 1, 2009. 3 labs (SW, N) reported sporadic influenza A positives and 5 labs reported zero influenza A positives (SE, C, N). 2 labs (SE, N) reported sporadic influenza B positives and 5 labs reported zero influenza B positives (SW, C, N).

Michigan Influenza Antigenic Characterization (as of August 6): 36 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.

8 Michigan pandemic influenza A (H1N1) specimens have been antigenically characterized by the CDC; all 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 August 6): 36 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 36 viruses were resistant to oseltamivir (Tamiflu®) and sensitive to zanamivir, amantadine and rimantadine. These viruses were collected in the SE(15), SW(13), C(2) and N(6) Influenza Surveillance Regions. 4 influenza A/H3N2 isolates, collected in the C(2) and N(2) Regions, have been tested for antiviral resistance; these viruses were resistant to the adamantanes (amantadine and rimantadine) and sensitive to oseltamivir and zanamivir.

6 Michigan pandemic influenza A (H1N1) specimens have been evaluated by CDC for resistance to the adamantane class of antiviral medications; all specimens were resistant. 5 specimens were evaluated for resistance to oseltamivir and zanamivir; all were 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 August 6): 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 August 6): Three congregate setting outbreaks (1C, 2N) due to seasonal influenza (1 influenza A, 1 influenza B, 1 unsubtyped) have been reported to MDCH for the 2008-09 influenza season.

6 congregate setting outbreaks in Michigan associated with pandemic influenza A H1N1 have been reported to MDCH (1SE, 3SW, 1C, 1N).

National (CDC [edited], July 31): During week 29 (July 19-25, 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. Six hundred forty-three (16.1%) 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. A total of 5,514 hospitalizations and 353 deaths associated with novel influenza A (H1N1) viruses have been reported to CDC. Over 98% 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. Two influenza-associated pediatric deaths were reported; both deaths were 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. Four states and Puerto Rico reported geographically widespread influenza activity, eight states reported regional influenza activity, 19 states and the District of Columbia reported local influenza activity, and 19 states reported sporadic influenza activity.

CDC has antigenically characterized 1,981 seasonal human influenza viruses [1,155 influenza A (H1), 201 influenza A (H3) and 625 influenza B viruses] collected by U.S. laboratories since October 1, 2008, and 242 novel influenza A (H1N1) viruses.

All 1,155 seasonal influenza A (H1) viruses are related to the influenza A (H1N1) component of the 2008-09 influenza vaccine (A/Brisbane/59/2007). One hundred ninety-three (96%) of 201 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.

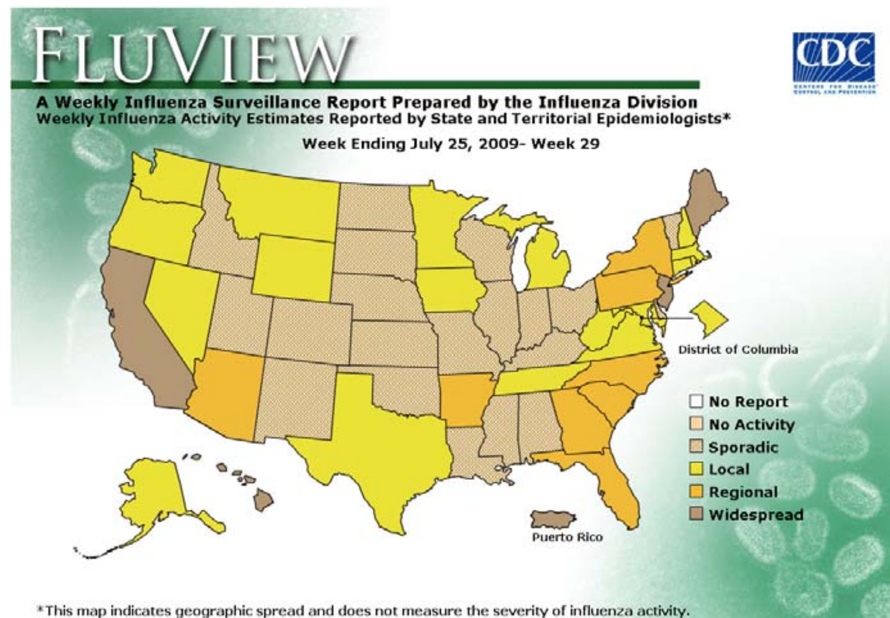
All 242 novel influenza A (H1N1) viruses are related to the A/California/07/2009 (H1N1) reference virus selected by WHO as a potential candidate for novel influenza A (H1N1) vaccine.

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. Seventy-two (12%) of 625 influenza B viruses tested belong to the B/Yamagata lineage and are related to the vaccine strain (B/Florida/04/2006). The remaining 553 (88%) viruses belong to the B/Victoria lineage and are not related to the vaccine strain.

Since October 1, 2008, 1,128 seasonal influenza A (H1N1), 222 influenza A (H3N2), and 635 influenza B viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Also, 1,133 seasonal influenza A (H1N1) and 224 influenza A (H3N2) viruses have been tested for resistance to the adamantanes (amantadine and rimantadine). Two hundred seventy-four novel influenza A (H1N1) viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Three hundred twenty-one 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**		**Adamantanes**
Seasonal Influenza A (H1N1)	1,128	1,123 (99.6%)	0 (0)	1,133	6 (0.5%)
Influenza A (H3N2)	222	0 (0)	0 (0)	224	224 (100%)
Influenza B	635	0 (0)	0 (0)	N/A*	N/A*
Novel Influenza A (H1N1)	274	0 (0)	0 (0)	321	321 (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 24): 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 27-28, Chile reported predominantly H3 activity with low numbers of influenza B while influenza A was detected in Brazil. Influenza activity in South Africa was still regional and the predominant virus was H3. In Australia local activity occurred with H3 and H1 cocirculating while New Zealand reported predominantly H1. Local outbreaks of influenza B have been reported by Madagascar and Réunion.

Sporadic seasonal influenza activity was observed in Algeria (A), Cameroon (H3), Canada (H3), China (H1,H3,B), Côte d'Ivoire (H1,H3), Greece (H3), Iran (H1,H3,B), Italy (H3), Japan (H1,H3), Republic of Korea (H1,H3), Romania (H3), Russian Federation (H1,H3,B), Tunisia (B), Senegal (H3), Sri Lanka (A) and United States of America (H1,H3,B). Albania, Belarus, Belgium, Bulgaria, Denmark, Estonia, Kazakhstan, Latvia, Lithuania, Morocco, Netherlands, Poland, Serbia, Slovakia, Slovenia, Turkey and Ukraine reported no activity.

MDCH reported **LOCAL INFLUENZA ACTIVITY** to the CDC for the week ending August 1, 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.

International (WHO Pandemic H1N1 2009 Briefing note 5, July 31): Research conducted in the USA and published 29 July in The Lancet [1] has drawn attention to an increased risk of severe or fatal illness in pregnant women when infected with the H1N1 pandemic virus.

Several other countries experiencing widespread transmission of the pandemic virus have similarly reported an increased risk in pregnant women, particularly during the second and third trimesters of pregnancy. An increased risk of fetal death or spontaneous abortions in infected women has also been reported.

Increased risk for pregnant women
Evidence from previous pandemics further supports the conclusion that pregnant women are at heightened risk. While pregnant women are also at increased risk during epidemics of seasonal influenza, the risk takes on added importance in the current pandemic, which continues to affect a younger age group than that seen during seasonal epidemics.

WHO strongly recommends that, in areas where infection with the H1N1 virus is widespread, pregnant women, and the clinicians treating them, be alert to symptoms of influenza-like illness.

WHO recommendations for treatment
Treatment with the antiviral drug oseltamivir should be administered as soon as possible after symptom onset. As the benefits of oseltamivir are greatest when administered within 48 hours after symptom onset, clinicians should initiate treatment immediately and not wait for the results of laboratory tests.

While treatment within 48 hours of symptom onset brings the greatest benefits, later initiation of treatment may also be beneficial. Clinical benefits associated with oseltamivir treatment include a reduced risk of pneumonia (one of the most frequently reported causes of death in infected people) and a reduced need for hospitalization.

WHO has further recommended that, when pandemic vaccines become available, health authorities should consider making pregnant women a priority group for immunization.

Danger signs in all patients
Worldwide, the majority of patients infected with the pandemic virus continue to experience mild symptoms and recover fully within a week, even in the absence of any medical treatment. Monitoring of viruses from multiple outbreaks has detected no evidence of change in the ability of the virus to spread or to cause severe illness.

In addition to the enhanced risk documented in pregnant women, groups at increased risk of severe or fatal illness include people with underlying medical conditions, most notably chronic lung disease (including asthma), cardiovascular disease, diabetes, and immunosuppression. Some preliminary studies suggest that obesity, and especially extreme obesity, may be a risk factor for more severe disease.

Within this largely reassuring picture, a small number of otherwise healthy people, usually under the age of 50 years, experience very rapid progression to severe and often fatal illness, characterized by severe pneumonia that destroys the lung tissue, and the failure of multiple organs. No factors that can predict this pattern of severe disease have yet been identified, though studies are under way.

Clinicians, patients, and those providing home-based care need to be alert to danger signs that can signal progression to more severe disease. As progression can be very rapid, medical attention should be sought when any of the following danger signs appear in a person with confirmed or suspected H1N1 infection:

- shortness of breath, either during physical activity or while resting
- difficulty in breathing
- turning blue
- bloody or coloured sputum
- chest pain
- altered mental status
- high fever that persists beyond 3 days
- low blood pressure.

In children, danger signs include fast or difficult breathing, lack of alertness, difficulty in waking up, and little or no desire to play.

[1] Jamiesan DG et al. H1N1 2009 influenza virus infection during pregnancy in the USA. Lancet 2009; published online July 29, 2009

International, Swine (Australian Broadcasting Corporation, July 31): Tests have confirmed that swine flu [pandemic influenza A H1N1] has broken out at a piggery in the central west of New South Wales (NSW). It is the 1st case of the virus among pigs in Australia and the State Government believes the animals probably caught the disease from workers at the piggery.

A total of 280 pigs have been placed in quarantine and strict biosecurity measures are in place to try to contain the spread of the virus. NSW Primary Industries Minister Ian Macdonald says the piggery's owner and staff have previously suffered flu-like symptoms and are being tested for swine flu by the health department. Mr. Macdonald says the outbreak poses no threat to humans.

Michigan Wild Bird Surveillance (USDA, as of August 6): For the 2009 testing season (April 1, 2009 - March 31, 2010), HPAI subtype H5N1 has not been recovered from any of the 35 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 5,246 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.nbii.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

MDCH Bureau of Epidemiology - Sally Bidol, MPH; Cristi Carlton, MPH; Edward Hartwick, MS

Table 1. H5N1 Influenza in Poultry (Outbreaks up to July 15, 2009)

(Source: http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm Downloaded 8/3/09)

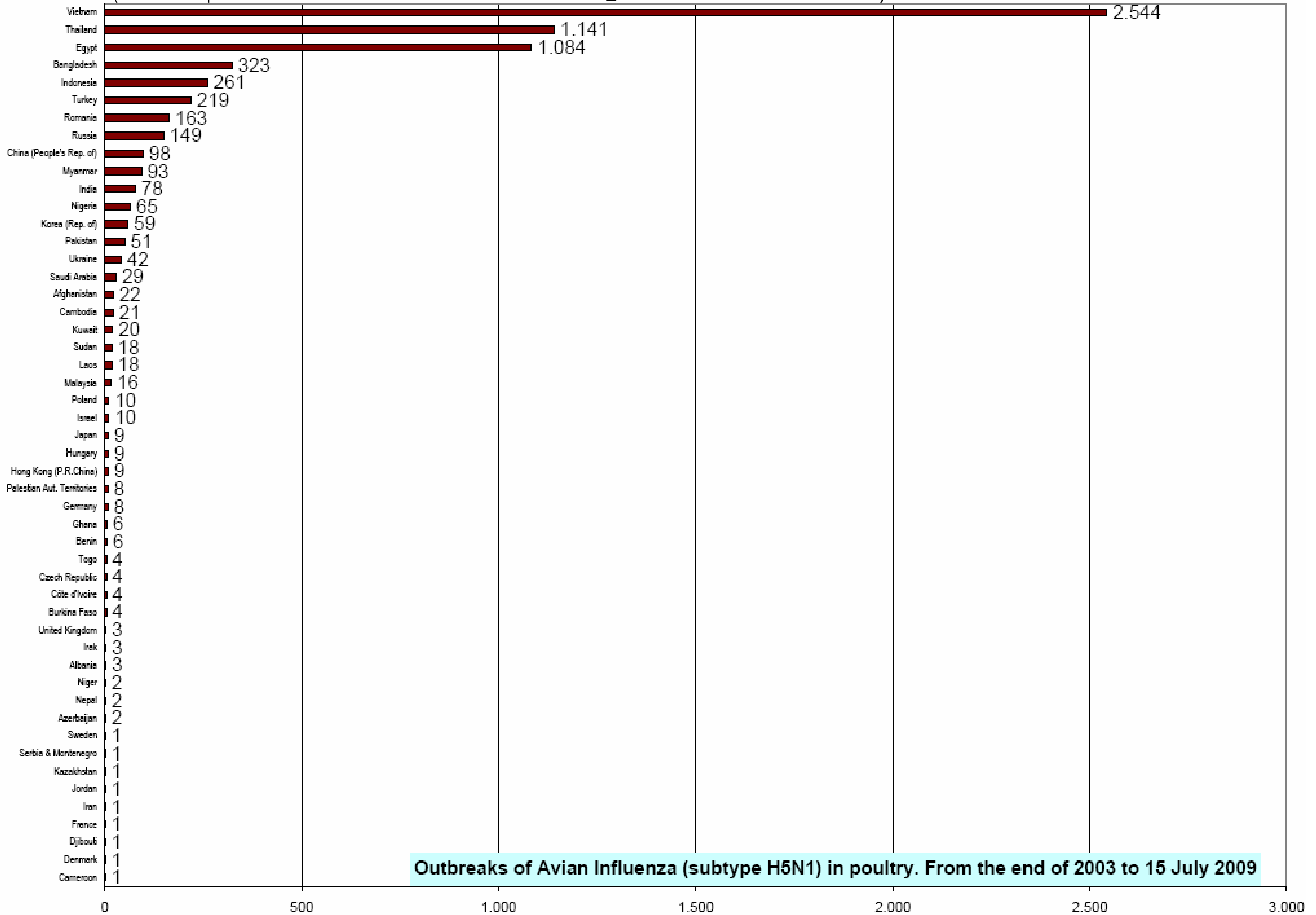


Table 2. H5N1 Influenza in Humans (Cases up to July 1, 2009)

(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