



MI FluFocus

Influenza Surveillance and Avian Influenza Update

Bureau of Epidemiology
Bureau of Laboratories



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New updates in this issue:

- **Michigan Surveillance:** Some indicators rise slightly while others (lab data, outbreaks) remain steady.
- **National Surveillance:** New reports available on novel H1N1 influenza antiviral resistance and mortality.
- **International Surveillance:** 21 oseltamivir-resistant novel H1N1 viruses have been identified (WHO).

2009 Influenza A (H1N1) virus 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 September 12, 3976 cases of flu-like illness and confirmed and probable cases of seasonal and novel influenza, including 12 deaths, were reported in Michigan. 1 hospitalization due to influenza was reported during the week of September 6-12, 2009.

Ed. Note: Since MDCH is reporting all influenza-related illness, hospitalizations and deaths, not just those due to 2009 H1N1 influenza, this data will be incorporated into the relevant Michigan sections of the *MI FluFocus* starting next week.

On August 17, MDCH released new guidance for healthcare providers, laboratorians and public health personnel regarding appropriate patients for influenza testing at the MDCH lab. The guidance is available at http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_22779_53388-214191--,00.html.

Please continue to reference the State of Michigan's novel 2009 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. All State of Michigan influenza information can be found online at www.michigan.gov/flu. In addition to the information for laboratories on the previous websites, additional laboratory-specific information is located at the Bureau of Laboratories H1N1 page at http://www.michigan.gov/mdch/0,1607,7-132-2945_5103-213906--,00.html.

National (CDC, September 11): This is the first week that CDC is reporting data from a new system for monitoring the trend of influenza-related hospitalizations and deaths. This new system replaces the weekly report of laboratory confirmed 2009 H1N1-related hospitalizations and deaths. States and territories can now report to CDC either laboratory confirmed or pneumonia and influenza syndromic hospitalizations and deaths resulting from all types or subtypes of influenza, not just those from 2009 H1N1 influenza virus. To allow jurisdictions to implement the new case definition, counts were reset to zero on August 30, 2009. For week 35 (August 30-September 5, 2009) 1,380 hospitalizations and 196 deaths associated with influenza virus infection, or based on syndromic surveillance for influenza and pneumonia, were reported to CDC. This is the first week of data from this new system and reflects reports by 29 states and territories. CDC will continue to use its traditional surveillance systems to track the progress of the remainder of the 2008-09 season, and the 2009-10 influenza season, which officially begins October 4, 2009. For the most up to date information, please visit the CDC's website at www.cdc.gov/h1n1flu/.

Ed. Note: Since CDC is now reporting all influenza-related hospitalizations and deaths, not just those due to 2009 H1N1 influenza, this data will be reported in the National update section of the *MI FluFocus* starting next week.

International (WHO Pandemic Update 65 [edited], September 11): In the temperate region of the southern hemisphere (represented by countries such as Chile, Argentina, Australia, New Zealand, and

South Africa), influenza activity continues to decrease or return to baseline.

Active transmission persists in tropical regions of the Americas and Asia. Many countries in Central America and the Caribbean continue to report declining activity for the second week in a row. However, countries in the tropical region of South America (represented by countries such as Bolivia, Ecuador, and Venezuela) are reporting increasing levels of respiratory disease. In the tropical regions of Asia, respiratory disease activity remains geographically regional or widespread but the trend is generally increasing as noted in India, Bangladesh, and Cambodia.

In the temperate regions of the Northern Hemisphere activity is variable. In the United States, regional increases in influenza activity are being reported, most notably in the south eastern states. Most of Europe is reporting low or moderate respiratory diseases activity, but parts of Eastern Europe are beginning to report increases in activity.

WHO Collaborating Centres and other laboratories continue to report sporadic isolates of oseltamivir resistant influenza virus. 21 such virus isolates have now been described from around the world, all of which carry the same H275Y mutation that confers resistance to the antiviral oseltamivir but not to the antiviral zanamivir. Of these, 12 have been associated with post-exposure prophylaxis, four with long term oseltamivir treatment in patients with immunosuppression. Worldwide, over 10,000 isolates of the pandemic (H1N1) 2009 virus have been tested and found to be sensitive to oseltamivir. WHO will continue to monitor the situation closely in collaboration with its partners, but is not changing its guidelines for use of antiviral drugs at this time.

Pandemic (H1N1) influenza virus continues to be the predominant circulating virus of influenza, both in the northern and southern hemisphere. All pandemic H1N1 2009 influenza viruses analysed to date have been antigenically and genetically similar to A/California/7/2009-like pandemic H1N1 2009 virus. See below for detailed laboratory surveillance update.

Of note, the U.S. Centers for Disease Control and Prevention this week reported on an analysis of 36 fatal pandemic influenza cases in children under the age of 18 years. Sixty-seven percent of the children had one or more high-risk medical conditions, most commonly neurodevelopmental disorders. In addition, ten of 23 children for whom data were available were found to have strong evidence of secondary bacterial co-infections.

The countries and overseas territories/communities that have newly reported their first (H1N1) 2009 confirmed case(s) since the last web update (No. 64) as of 6 September 2009 are: Lesotho and Angola.

Region	Cumulative total	
	as of 6 September 2009	
	Cases*	Deaths
WHO Regional Office for Africa (AFRO)	6336	35
WHO Regional Office for the Americas (AMRO)	120653	2467
WHO Regional Office for the Eastern Mediterranean (EMRO)	9844	51
WHO Regional Office for Europe (EURO)	Over 49000	At least 125
WHO Regional Office for South-East Asia (SEARO)	22387	221
WHO Regional Office for the Western Pacific (WPRO)	69387	306
Total	Over 277607	At least 3205

*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.

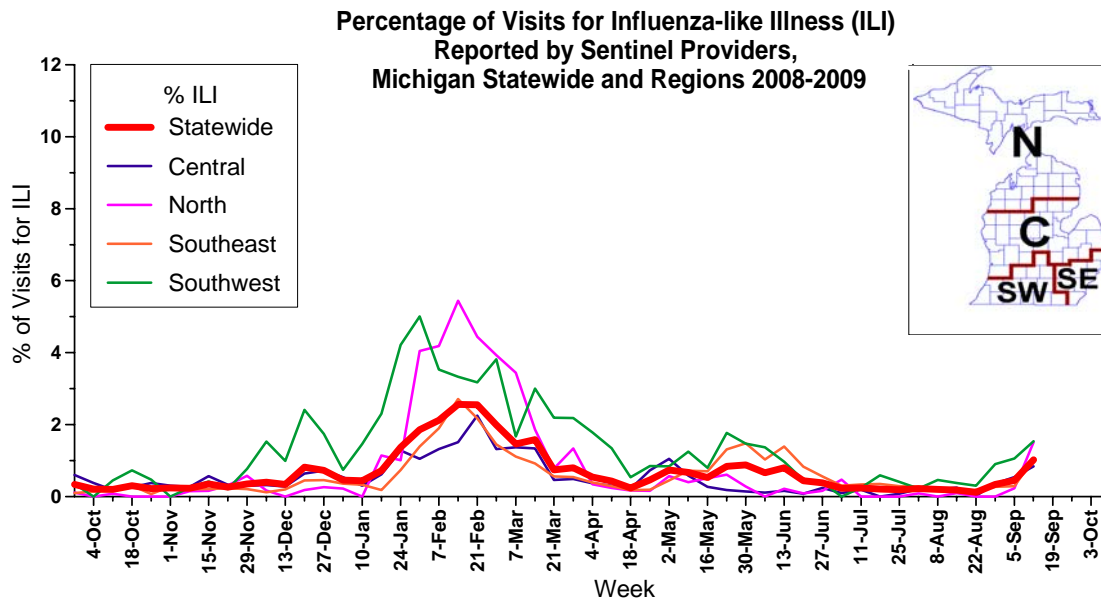
Michigan Disease Surveillance System: The week ending September 12 saw both aggregate flu-like numbers and individual influenza reports increase slightly. Novel influenza reports held steady near the previous week's numbers. Aggregate numbers are consistent with the numbers seen this time last year, while individual and novel influenza reports are slightly higher.

Emergency Department Surveillance: Emergency department visits from both constitutional and respiratory complaints increased compared to the previous week's levels. Both constitutional and respiratory numbers are comparable to numbers seen at this time last year. Six constitutional alerts in the N(2), SE(1), and SW(2) Influenza Surveillance Regions as well as one Statewide alert and ten respiratory

alerts in the C(2), N(3), and SW(4) Influenza Surveillance Regions including one Statewide alert were generated last week.

Over-the-Counter Product Surveillance: Overall, OTC product sales were elevated last week. Every indicator showed a slight increase in sales over the previous week. All indicator levels are comparable to those seen at this time last year.

Sentinel Provider Surveillance (as of September 17): During the week ending September 12, 2009, the proportion of visits due to influenza-like illness (ILI) increased notably compared to the previous week at 1.0% overall; 84 patient visits due to ILI were reported out of 8,195 office visits. Twenty-eight sentinel sites provided data for this report; 6 (21%) were from Student Health facilities which includes colleges and universities. This increased trend is similar to what has been seen nationally. Activity increased in all four surveillance regions: Central (0.8%), North (1.5%), Southeast (1.0%) and Southwest (1.5%). 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 September 17): During the past week, no new seasonal influenza isolates were identified at the MDCH Bureau of Laboratories. For the 2008-2009 season, MDCH BOL has identified 319 seasonal influenza isolates (followed by Influenza Surveillance Regions of origin):

- 188 A/H1N1 or A/H1 (63SE, 43SW, 25C, 57N)
- 12 A/H3N2 or A/H3 (5SE, 3SW, 1C, 3N)
- 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)

8 sentinel laboratories reported for the week ending September 12, 2009. 1 lab reported increasing influenza A positives (SE), 3 labs reported sporadic influenza A positives (SW, C), and 4 labs reported zero influenza A positives (SE, C, N). 8 labs reported zero influenza B positives (SE, SW, C, N).

Michigan Influenza Antigenic Characterization (as of September 17): 38 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.

11 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 September 17): 39 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 39 viruses were resistant to oseltamivir (Tamiflu®) and sensitive to zanamivir, amantadine and rimantadine. These viruses were collected in the SE(15), SW(13), C(3) and N(8) 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.

8 Michigan pandemic influenza A (H1N1) specimens have been evaluated by CDC for resistance to the adamantane class of antiviral medications; all specimens were resistant. 6 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 September 17): Three influenza-associated pediatric mortalities (1 influenza A (SW), 2 influenza B (SE)) have been reported to MDCH for the 2008-2009 influenza season.

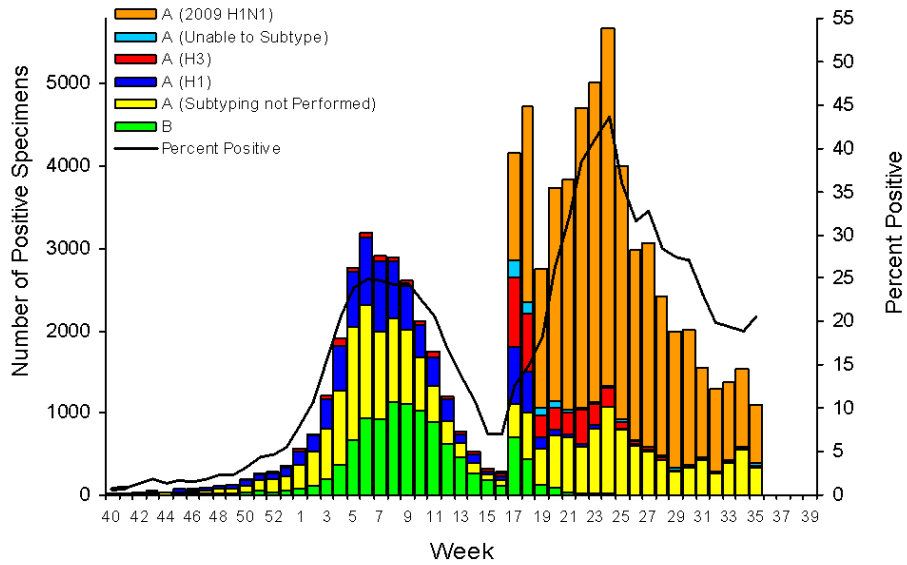
***The CDC has asked all states to collect information on any pediatric death associated with influenza infection. This includes not only any death in a child (<18 years) resulting from a compatible illness confirmed to be influenza by an appropriate diagnostic test, but also any unexplained death with 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 September 17): 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.

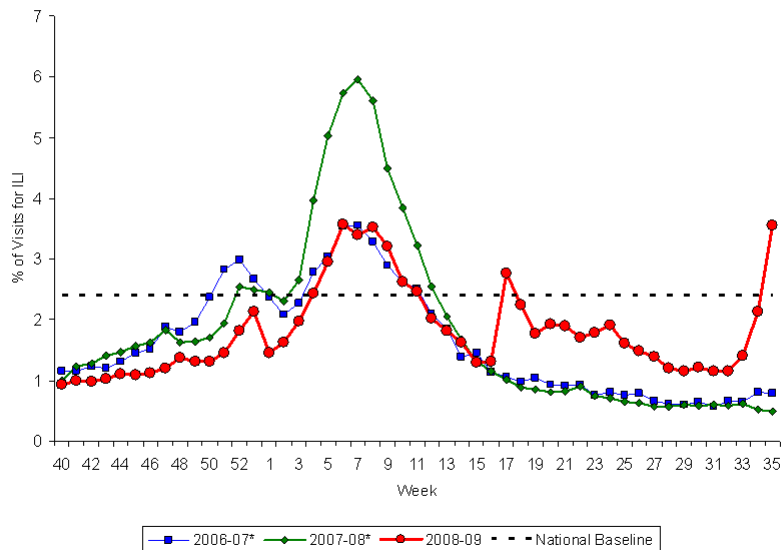
6 congregate setting outbreaks in Michigan associated with pandemic influenza A H1N1 have been reported to MDCH (1SE, 3SW, 1C, 1N).

National (CDC [edited], September 11): During week 35 (August 30-September 5, 2009), influenza activity increased in the U.S. During week 35: 1,085 (20.5%) 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. 97% of all subtyped influenza A viruses being reported to CDC were 2009 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 a 2009 influenza A (H1N1) virus infection. The proportion of outpatient visits for influenza-like illness (ILI) was above the national baseline. Regions 2, 4, 6, and 9 reported ILI above region-specific baseline levels. Eleven states and Guam reported geographically widespread influenza activity, 13 states and Puerto Rico reported regional influenza activity, 10 states and the District of Columbia reported local influenza activity, 14 states reported sporadic influenza activity, two states reported no influenza activity, and the U.S. Virgin Islands did not report. The 2009-10 influenza season officially begins October 4, 2009.

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2008-09



Percentage of Visits for Influenza-like Illness (ILI) Reported by the US Outpatient Influenza-like Illness Surveillance Network (ILINet), National Summary 2008-09 and Previous Two Seasons



*There was no week 53 during the 2006-07 and 2007-08 seasons, therefore the week 53 data point for those seasons is an average of weeks 52 and 1.

FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division
Weekly Influenza Activity Estimates Reported by State and Territorial Epidemiologists*

Week Ending September 05, 2009 - Week 35

District of Columbia

- No Report
- No Activity
- Sporadic
- Local
- Regional
- Widespread

Alaska Hawaii US Virgin Islands Puerto Rico

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

International (WHO, August 7): 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 29-30, the overall level of seasonal influenza activity decreased in the southern hemisphere. In Australia local activity occurred with H3 and H1 cocirculating. The predominant strain in New Zealand was still H1 with sporadic H3 viruses detected. Local outbreaks of influenza B were reported by Madagascar and Réunion. Influenza activity due to H3 in South Africa declined to local levels. In China Hong Kong Special Administrative Region, influenza activity due to H3 increased with some H1 and B also detected. Sporadic seasonal influenza activity was observed in Cameroon (H3), Canada (B), Chile (H3), Côte d'Ivoire (H1,H3), French Guiana (H1,H3), Greece (A), Iran (H1,H3,B), Italy (H1,H3), Kenya (H1,B), Japan (H3), Morocco (H1), Norway (B), Republic of Korea (H3,B), Russian Federation (H1,H3,B), Tunisia (H3) and United States of America (H1,H3,B). Albania, Austria, Belgium, Bulgaria, Denmark, Estonia, Georgia, Kazakhstan, Lithuania, Netherlands, Oman, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sri Lanka, Turkey, Ukraine and United Kingdom reported no seasonal activity.

MDCH reported **SPORADIC INFLUENZA ACTIVITY** to the CDC for the week ending Sept. 12, 2009.

For those interested in additional influenza vaccination and education information, the MDCH *FluBytes* is available at http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_22779_40563-125027--,00.html.

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, Antiviral Resistance (MMWR Rep 2009 58(35); 969-72 [edited], September 11): Initial testing of the pandemic influenza A (H1N1) 2009 virus found it susceptible to neuraminidase inhibitors (oseltamivir and zanamivir) and resistant to adamantanes (amantadine and rimantadine). Neuraminidase inhibitors have been used widely for treatment and chemoprophylaxis of 2009 pandemic influenza A (H1N1); however, sporadic cases of oseltamivir-resistant 2009 pandemic influenza A (H1N1) virus infection have been reported worldwide, including 9 US cases identified as of 4 Sep 2009. On 14 Jul 2009, CDC was contacted by a physician at a summer camp in North Carolina regarding 2 cases of influenza-like illness (ILI) in adolescent girls receiving oseltamivir chemoprophylaxis during an ILI outbreak that had begun 18 Jun 2009. The 2 girls stayed in the same cabin, and both received oseltamivir during a mass chemoprophylaxis program in which approximately 600 campers and staff members received oseltamivir or zanamivir. On 20 Jul and 22 Jul 2009, the North Carolina State Laboratory of Public Health confirmed pandemic H1N1 virus infection in respiratory specimens from both girls. On 14 Aug and 19 Aug 2009, CDC detected the H275Y mutation (N1 numbering) in neuraminidase from both specimens by pyrosequencing. The H275Y mutation is associated with resistance to oseltamivir; zanamivir susceptibility is retained. A 2nd mutation (I223V) in neuraminidase also was detected in both specimens. This is the 1st report of oseltamivir resistance in pandemic H1N1 cases with an epidemiologic link. Health-care providers should be aware that antiviral resistance can develop during chemoprophylaxis or treatment with subtherapeutic dosages and should follow published recommendations for antiviral medications.

The report is located at www.cdc.gov/mmwr/preview/mmwrhtml/mm5835a1.htm?s_cid=3Dmm5835a1_x.

National, 2009 H1N1 Research (Reuters via MSNBC, September 15): Autopsies on people who have died from the new pandemic H1N1 flu show this virus is different from seasonal influenza, even if it has not yet caused more deaths, experts told a meeting on Tuesday.

Americans who died from swine flu had infections deep in their lungs, Dr. Sherif Zaki of the U.S. Centers for Disease Control and Prevention told a meeting of flu experts, including damage to the alveoli — the structures in the lung that deliver oxygen to the blood. This in turn caused what is known as acute respiratory distress syndrome — an often fatal development that leaves patients gasping for breath.

The World Health Organization has confirmed 3,205 deaths globally from swine flu but experts agree all estimates of the extent of the pandemic are grossly understated because so few patients are ever actually tested.

Seasonal flu kills, too — about 250,000 to 500,000 cases a year globally, according to the WHO. But not in the same way as swine flu, which unlike seasonal flu frequently causes severe disease in young adults and children. "It is very rarely you see what we call diffuse alveolar damage in fatal seasonal influenza," Zaki told a meeting sponsored by the U.S. Institute of Medicine, which advises government on health matters.

Seasonal flu causes bronchitis and other upper respiratory disease. But Zaki, the chief infectious disease pathologist at CDC, said the new virus had burrowed into the lungs of the 90 or so people he examined after they died, and they had huge amounts of the virus in their blood.

"This is almost exactly what we see with avian flu," Zaki said. "This looks like avian flu on steroids." Dr. Yoshi Kawaoka of the University of Wisconsin said tests in monkeys showed the virus lives and replicates 1,000-fold better in the lungs than does seasonal flu.

He said the No. 1 drug of choice against H1N1 — Roche AG's and Gilead Sciences Inc's Tamiflu — lowered the so-called viral load of virus in the lungs just enough to help the body fight back. Experimental flu drugs lower it even more, notably Daiichi Sankyo Co Ltd's CS 8958 and another drug called T-705 or favipiravir, made by Fujifilm Holdings Corp unit Toyama Chemical Co, Kawaoka said.

Zaki said 90 percent of the fatalities he looked at had some condition that would predispose them to serious disease. They had a median age of 38 and one victim was a two-month-old infant who died within a day of getting sick. Nearly half — 46 percent — were obese, many had fatty liver disease, 27 percent had heart disease and 22 percent had asthma, he said.

Dr. Guillermo Ruiz-Palacios of Mexico's National Institute of Medical Sciences and Nutrition said many Mexican patients with severe disease were also obese. In addition, patients came in late for treatment and many were infected with a second common virus, called parainfluenza virus.

Fewer than a third of the U.S. deaths, 29 percent, had a so-called secondary bacterial infection, usually *Streptococcus pneumoniae*, Zaki said.

Ruiz-Palacios also said the new virus can be found in the urine and feces of patients, something that may affect how it spreads.

National, 2009 H1N1 Vaccine (FDA Press Release, September 15): The U.S. Food and Drug Administration announced today that it has approved four vaccines against the 2009 H1N1 influenza virus. The vaccines will be distributed nationally after the initial lots become available, which is expected within the next four weeks.

"Today's approval is good news for our nation's response to the 2009 H1N1 influenza virus," said Commissioner of Food and Drugs Margaret A. Hamburg, M.D. "This vaccine will help protect individuals from serious illness and death from influenza."

The vaccines are made by CSL Limited, MedImmune LLC, Novartis Vaccines and Diagnostics Limited, and sanofi pasteur Inc. All four firms manufacture the H1N1 vaccines using the same processes, which have a long record of producing safe seasonal influenza vaccines.

"The H1N1 vaccines approved today undergo the same rigorous FDA manufacturing oversight, product quality testing and lot release procedures that apply to seasonal influenza vaccines," said Jesse Goodman, M.D., FDA acting chief scientist.

Based on preliminary data from adults participating in multiple clinical studies, the 2009 H1N1 vaccines induce a robust immune response in most healthy adults eight to 10 days after a single dose, as occurs with the seasonal influenza vaccine.

Clinical studies under way will provide additional information about the optimal dose in children. The recommendations for dosing will be updated if indicated by findings from those studies. The findings are expected in the near future.

As with the seasonal influenza vaccines, the 2009 H1N1 vaccines are being produced in formulations that contain thimerosal, a mercury-containing preservative, and in formulations that do not contain thimerosal.

People with severe or life-threatening allergies to chicken eggs, or to any other substance in the vaccine, should not be vaccinated.

In the ongoing clinical studies, the vaccines have been well tolerated. Potential side effects of the H1N1 vaccines are expected to be similar to those of seasonal flu vaccines.

For the injected vaccine, the most common side effect is soreness at the injection site. Other side effects may include mild fever, body aches, and fatigue for a few days after the inoculation. For the nasal spray vaccine, the most common side effects include runny nose or nasal congestion for all ages, sore throats in adults, and -- in children 2 to 6 years old -- fever.

As with any medical product, unexpected or rare serious adverse events may occur. The FDA is working closely with governmental and nongovernmental organizations to enhance the capacity for adverse event monitoring, information sharing and analysis during and after the 2009 H1N1 vaccination program. In the U.S. Department of Health and Human Services, these agencies include the Centers for Disease Control and Prevention.

Vaccines against three seasonal virus strains are already available and should be used (see [information on the seasonal flu](#)). However, they do not protect against the 2009 H1N1 virus (see [information on H1N1 flu](#)).

International, Swine (ChannelNewsAsia [edited], September 3): The Agri-Food and Veterinary Authority (AVA) has detected the pandemic A (H1N1) virus in some pigs imported into Singapore from Indonesia's Pulau Bulan. But the AVA stressed that the pork available [in Singapore] is safe for consumption, as the H1N1 virus is not transmitted through the handling and consumption of pork and pork products including ham, bacon, sausages, and canned pork.

AVA added it will step up its monitoring and inspection to ensure food safety, like increasing the number of daily pork samples taken for tests from 30 to 100. It will also take part in a comprehensive disease surveillance programme on the Pulau Bulan farm, led by the Indonesian authorities. The aim is to identify and isolate affected pig houses.

Dr Chew Siang Thai, AVA's director-general for services, said: "AVA is now working closely with the Indonesian authorities and the farm management to ensure that clinically healthy pigs are exported to Singapore. "And these pigs, when they are in the abattoir, are also subjected to a series of inspections that ensure that safe pork get released into the market."

Restricted animal movement will also be imposed to ensure only healthy pigs are exported to Singapore. The AVA said this is in line with the World Organization for Animal Health's recommendation.

Suppliers have been informed of the steps being taken so that they too can play their part by enhancing measures and ensuring everybody complies with the requirements. AVA said that Singapore has adequate sources of pork supplies from 25 countries. Singapore's import of 1000 pigs daily from Pulau Bulan constitutes some 20 per cent of the total pork consumed there.

Michigan Wild Bird Surveillance (USDA, as of September 17): For the 2009 testing season (April 1, 2009 - March 31, 2010), HPAI subtype H5N1 has not been recovered from any of the 38 Michigan samples tested to date, including 29 live wild bird and 9 morbidity/mortality specimens. H5N1 HPAI has not been recovered from 7885 bird or environmental samples tested nationwide for the 2009 season. For more information, visit the National HPAI Early Detection Data System 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 PetersS1@Michigan.gov with any questions regarding this newsletter or to be added to the weekly electronic mailing list.

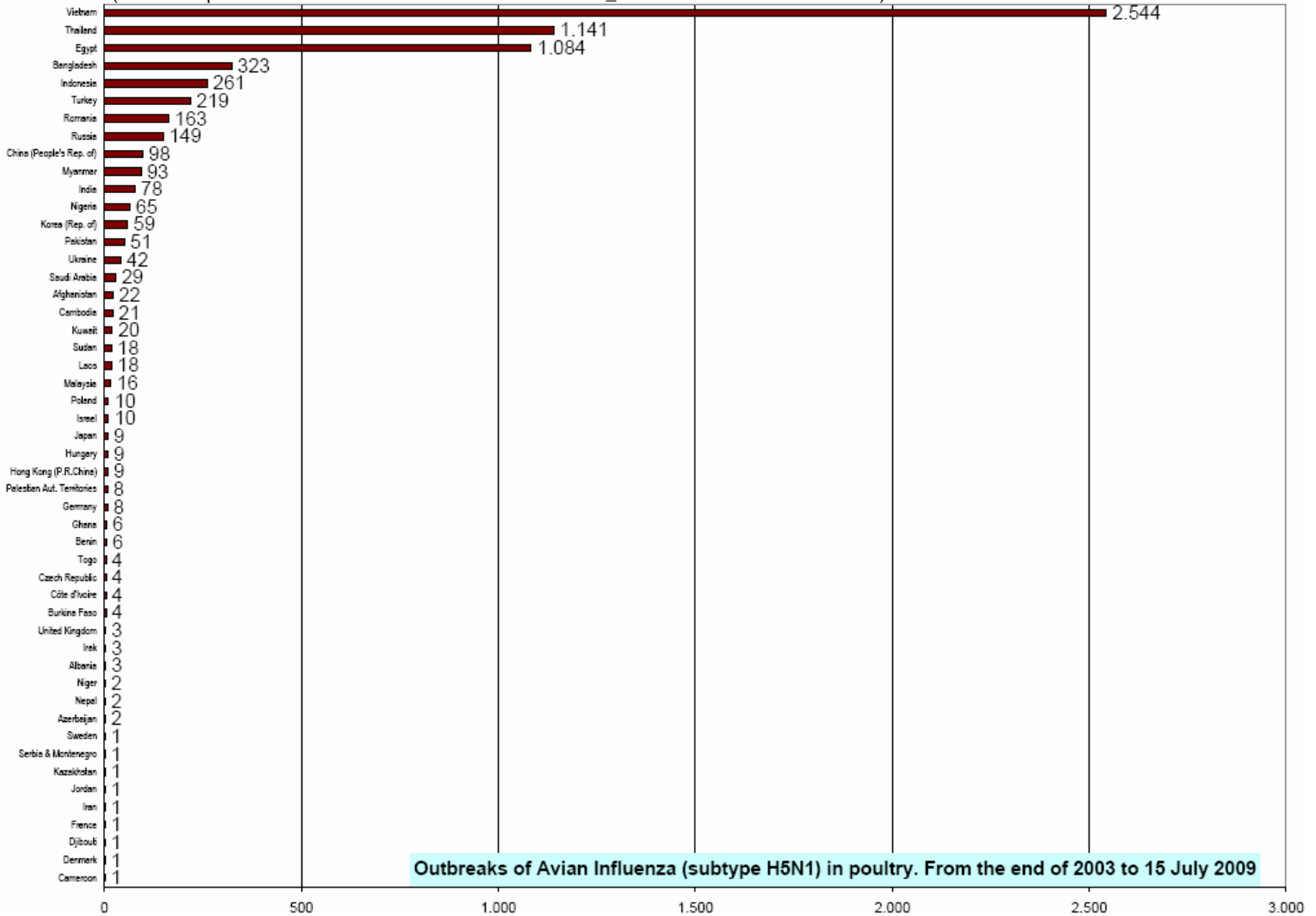
Contributors

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

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



Outbreaks of Avian Influenza (subtype H5N1) in poultry. From the end of 2003 to 15 July 2009

Table 2. H5N1 Influenza in Humans (Cases up to August 31, 2009)

(http://www.who.int/csr/disease/avian_influenza/country/cases_table_2009_08_31/en/index.html Downloaded 8/31/2009)

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	34	4	85	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	45	12	440	262