



# MI FluFocus

## Influenza Surveillance and Avian Influenza Update

Bureau of Epidemiology  
Bureau of Laboratories

Michigan Department  
of Community Health



Jennifer M. Granholm, Governor  
Janet Olszewski, Director

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

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### ***New updates in this issue:***

- **Michigan Surveillance:** Overall influenza activity is decreasing but remains above baseline levels.
- **National Surveillance:** Over 99% of influenza viruses currently isolated are pandemic A (H1N1) viruses.
- **International Surveillance:** First oseltamivir-resistant pandemic A (H1N1) influenza virus identified.

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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](http://www.michigan.gov/documents/mdch/20090623_5pm_FLI_283516_7.pdf). As of June 27, 1806 cases of flu-like illness and confirmed and probable cases of seasonal and novel influenza, including 7 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](http://www.michigan.gov/swineflu) for additional information. Local health departments can find additional guidance documents on the MI-HAN homepage.

**Michigan Pandemic Influenza A (H1N1) Influenza Virus Antigenic Characterization and Antiviral Resistance Data (as of July 2):** 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.

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.

**National (CDC):** As of June 25, 2009, 11:00am ET, the Centers for Disease Control and Prevention (CDC) is reporting 27,717 confirmed human infections, including 127 deaths, in the United States. These cases are being reported from 50 states, the District of Columbia, Puerto Rico and the Virgin Islands. 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, including guidance documents, please visit the CDC's website at [www.cdc.gov/h1n1flu/](http://www.cdc.gov/h1n1flu/).

Novel influenza A (H1N1) activity is now being detected through CDC's [routine influenza surveillance systems](#) and reported weekly in FluView. CDC tracks U.S. influenza activity through multiple systems across five categories. The fact that novel H1N1 activity can now be monitored through seasonal

surveillance systems is an indication that there are higher levels of influenza-like illness in the United States than is normal for this time of year.

**International (WHO):** As of 9:00 GMT, 1 July 2009, 120 countries have officially reported 77,201 cases of influenza A (H1N1) infection, including 332 deaths. Updated case counts and notices can be found online at <http://www.who.int/csr/disease/swineflu/en/index.html>.

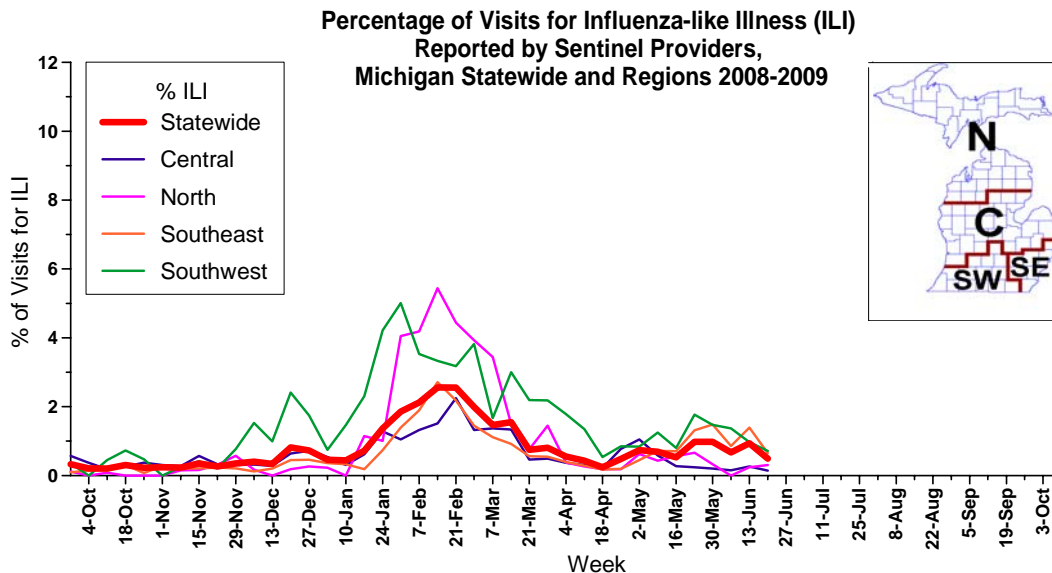
**Michigan Disease Surveillance System:** The week ending June 27 saw aggregate flu-like numbers hold steady compared to last week, while individual influenza reports continued to decline from the previous week's numbers. Aggregate flu-like reports are near last year's levels, and individual influenza numbers are higher than those of last year, likely due to increased testing.

On the novel influenza front, the week ending June 27 saw suspect, probable, and confirmed pandemic H1N1 cases reported to MDSS remain near the previous week's levels. Beginning June 15<sup>th</sup>, MDCH transitioned from individual case reporting to aggregate reporting for influenza cases (A and B). Aggregate flu counts will include flu-like illness and confirmed and probable cases of seasonal and novel H1N1 influenza. This information can be found in the Pandemic Influenza update on page 1.

**Emergency Department Surveillance:** Emergency department visits from both constitutional and respiratory complaints decreased compared to last week's numbers. Respiratory numbers are comparable to numbers seen at this time last year, while constitutional numbers are slightly higher. Four constitutional alerts in the C(1), N(2), and SW(1) Influenza Surveillance Regions and one respiratory alert in the C(1) Influenza Surveillance Region were generated last week.

**Over-the-Counter Product Surveillance:** Overall, OTC product sales were mixed last week. Chest rubs sales saw a slight decrease compared to the previous week and children's electrolytes sales remained steady, except for a mid-week bump in sales. The remainder of the indicators held steady near the previous week's sales levels. Indicator levels are comparable to those seen at this time last year.

**Sentinel Provider Surveillance (as of June 25):** During the week ending June 20, 2009, the proportion of visits due to influenza-like illness (ILI) decreased compared to the previous week at 0.5% overall; 35 patient visits due to ILI were reported out of 7,122 office visits. Twenty-six sentinel sites provided data for this report. The increased level of ILI activity may be an indication of novel influenza A (H1N1) circulation, or this finding may also be due to an increase in the number of patients seeking care for ILI. Activity increased in one surveillance region: North (0.3%); and decreased in the remaining three regions: Central (0.1%), Southeast (0.7%) and Southwest (0.7%) region. 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](mailto:CarltonC2@michigan.gov) for more information.

**Laboratory Surveillance (as of July 2):** 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 316 seasonal influenza isolates (followed by Influenza Surveillance Regions of origin):

- 187 A/H1N1 or A/H1 (63SE, 43SW, 25C, 56N)
- 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)

8 sentinel laboratories reported for the week ending June 27, 2009. 3 laboratories (SW, C) reported sporadic influenza A positives, 4 labs reported zero influenza A positives (SE, C, N) and 1 lab (SE) had decreasing influenza A positives but were still elevated above baseline levels. All 8 labs reported zero influenza B positives.

**Michigan Seasonal Influenza Antigenic Characterization (as of July 2):** 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.

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 Seasonal Influenza Antiviral Resistance Data (as of July 2):** 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. 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>.

For information about antiviral susceptibility for swine-origin influenza A (H1N1), go to <http://www.cdc.gov/h1n1flu/antiviral.htm>.

**Seasonal Influenza-Associated Pediatric Mortality (as of July 2):** 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](http://www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf).

**Seasonal Influenza Congregate Settings Outbreaks (as of July 2):** Three congregate setting outbreaks (1C, 2N) due to seasonal influenza (1 influenza A, 1 influenza B, 1 untyped) have been reported to MDCH for the 2008-09 influenza season.

**National (CDC [edited], June 26):** During week 24 (June 14-20, 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. Three thousand two hundred eighty-six (41.9%) 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 pandemic influenza A (H1N1) viruses.

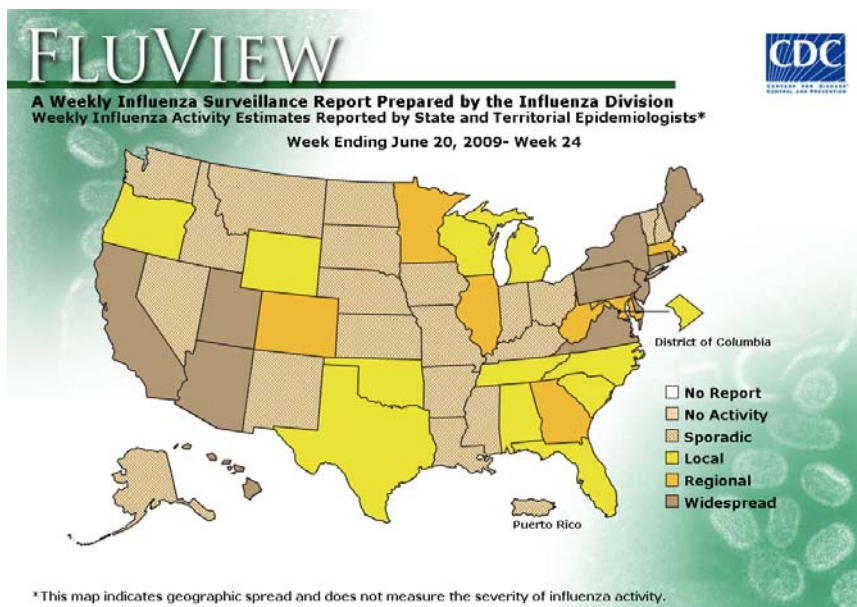
The proportion of deaths attributed to pneumonia and influenza (P&I) was below the epidemic threshold. Five influenza-associated pediatric deaths were reported and four of the five deaths were associated with pandemic influenza A (H1N1) virus infection. The proportion of outpatient visits for influenza-like illness (ILI) was below the national baseline. Two of the 10 surveillance regions reported ILI above their region-specific baseline. Twelve states reported geographically widespread influenza activity, seven states reported regional influenza activity, the District of Columbia and 11 states reported local influenza activity, and Puerto Rico and 20 states reported sporadic influenza activity.

Since October 1, 2008, 1,010 seasonal influenza A (H1N1), 183 influenza A (H3N2), and 550 influenza B viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). One thousand twelve seasonal influenza A (H1N1) and 187 influenza A (H3N2) viruses have been tested for resistance to the adamantanes (amantadine and rimantadine). One hundred ninety-one pandemic influenza A (H1N1) viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). One hundred seventy-seven pandemic 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		
<b>Seasonal Influenza A (H1N1)</b>	1,010	1,005 (99.5%)	0 (0)	1,012	6 (0.6%)
<b>Influenza A (H3N2)</b>	183	0 (0)	0 (0)	187	187 (100%)
<b>Influenza B</b>	550	0 (0)	0 (0)	N/A*	N/A*
<b>Pandemic Influenza A (H1N1)</b>	191	0 (0)	0 (0)	177	177 (100%)

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

Three seasonal influenza A (H1N1) viruses collected between February 8 and May 11, 2009 were found to be resistant to both oseltamivir and the adamantanes (amantadine and rimantadine). All influenza A (H1N1) viruses tested retain their sensitivity to zanamivir. The three dually resistant viruses represent less than 0.5% of all seasonal influenza A (H1N1) viruses tested during the 2008-09 influenza season, and as a result, no changes to the influenza antiviral treatment or prophylaxis recommendations will be made at this time. CDC will continue to monitor trends in antiviral resistance over the summer and throughout the upcoming 2009-10 influenza season.



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

**International (WHO, June 25):** *This summary provides an updated report of seasonal influenza activity for weeks 19-20 of 2009. It does not include reports of avian influenza in humans, which are available at:*

[the WHO avian influenza page](#). or reports of the recent influenza A (H1N1) virus which has recently emerged, which are available at: [the WHO page for influenza A\(H1N1\)](#).

During the weeks 23-24, widespread outbreaks in the southern hemisphere were reported in Brazil and South Africa due to H3. Low levels of influenza B were also detected in Brazil and South Africa as well as sporadic H1 activity in Brazil. Australia reported local outbreaks due to H3 while some H1 and B were also detected. New Zealand experienced local outbreaks mainly due to H1. Low levels of H3 activity were also reported.

In the northern hemisphere, seasonal influenza was at or below base line levels. Local activity was still reported in a number of regions in Canada (H1,H3,B).

Sporadic seasonal influenza activity was observed in Cameroon (H3), China (H1,H3,B), Denmark (H1,H3,B), Ecuador (H1,H3), Estonia (A,B), Iran (H3), Italy (H1,H3), Japan (H3,B), Madagascar (H3,B), Morocco (A), Norway (H3), Poland (H1,H3), Portugal (B), Romania (H1,H3), Russian Federation (H1,H3,B), Sri Lanka (A), Sweden (A,B) and United States of America (H1,H3,B).

Albania, Bulgaria, Finland, Georgia, Germany, Greece, Kazakhstan, Latvia, Lithuania, Mongolia, Netherlands, Oman, Serbia, Slovakia, Slovenia and Spain reported no activity.

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MDCH reported **LOCAL INFLUENZA ACTIVITY** to the CDC for the week ending June 27, 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](http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_22779_40563-125027--,00.html). *FluBytes* is published weekly during the influenza season.

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### **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, Antiviral Resistance (BBC News [edited], June 29):** Experts have reported the 1st case of swine flu that is resistant to Tamiflu [oseltamivir], the main drug being used to fight the pandemic. Roche Holding AG confirmed a patient with H1N1 influenza in Denmark showed resistance to the antiviral drug. David Reddy, company executive, said it was not unexpected given that common seasonal flu could do the same.

The news comes as a 9 year old girl has become the 3rd to die in the UK with swine flu. It is understood from her doctors at Birmingham Children's Hospital that she had underlying health conditions. It is not yet known whether swine flu contributed to her death.

Meanwhile, the Department of Health has announced a big jump in the number of patients in England confirmed with swine flu, up 1604 since Friday [26 Jun 2009], taking the UK total so far to 5937. A Health Protection Agency spokeswoman stated that: "Routine sampling in the UK has shown that there is currently no resistance to oseltamivir or zanamivir." Experts have been using Tamiflu, also known as oseltamivir, in a bid to stop the H1N1 spreading in communities. If taken early, it ensures that symptoms are mild and reduces the chance of a victim giving the illness to someone else.

This 1st reported case of resistance developed in a swine flu patient taking Tamiflu. Mr Reddy stressed that there were no signs of a Tamiflu-resistant strain of H1N1 circulating in the community. This is in contrast to seasonal H1N1 flu, where a Tamiflu resistant strain emerged last year and is now widely circulating. Experts fear if this were to happen, it could render Tamiflu ineffective.

Another antiviral drug, called zanamivir or Relenza, made by GlaxoSmithKline, is also effective against swine flu. The UK government has been stockpiling these antiviral drugs and currently has enough to treat half of the population, with a contract to bring that up to 80 per cent as soon as possible. Supplies of flu vaccine have also been ordered, and the 1st doses could be administered in the autumn.

A spokeswoman for the Health Protection Agency said: "The Health Protection Agency continues to watch for antiviral resistance and will be carrying out regular sample testing throughout this outbreak. We

have been monitoring antiviral drug resistance since the beginning of this outbreak. Routine sampling in the UK has shown that there is currently no resistance to oseltamivir or zanamivir." Virologist Professor John Oxford said: "I'm not surprised about this finding. The question is whether it is going to spread. We will soon know the answer."

**International, Avian (Jakarta Post [edited], June 26):** At least 20 villages in Purbalingga regency, Central Java, have been hit with cases of bird flu, forcing local authorities to remain alert to prevent it from infecting other areas, officials said Thursday [25 Jun 2009]. Purbalingga husbandry office head Hartono said the contagious disease had 1st been detected in the regency in January 2009.

More than 1000 infected chickens had been culled between January and May [2009] by local authorities, he said. Hartono said his office was collecting data and information on the spread of bird flu this month [June 2009].

"We are continuing to collect data based on information from local people whose chickens have died suddenly. The tests on those birds have come back positive for bird flu," he told The Jakarta Post. The chickens were culled, and their bodies incinerated, he said.

"We don't want to take any risks, and such a \*culling method\* is based on existing official procedures," he said. Hartono said most of the virus-infected poultry were domestic chickens that were not kept in cages. "Because local villagers traditionally have chickens roaming free, not kept in cages, bird flu has spread very quickly," he said.

To curb the virus from spreading further in Purbalingga, the local authorities have set up a special team to combat bird flu. "The team is already working 24 hours a day. Any time we receive a report on a dead chicken we will go to the location immediately," Hartono said. The dead chickens, he said, would be used as samples for tests.

Purbalingga has also received 240 000 doses of vaccine from the World Health Organization to help control the spread of bird flu, Hartono said. "Around 30 percent of the vaccines have already been used."

The WHO has also provided Purbalingga with anti-bird flu disinfectants. "We have enough medical stocks to deal with bird flu cases. What we need to do more is improve people's awareness so they will keep their poultry cages clean," Hartono said.

**International, Swine (OIE [edited], June 26):** Information received on (and dated) 25 Jun 2009 from Dr Jorge Nestor Amaya, Presidente, SENASA, Buenos Aires, Argentina

Report type: immediate notification

Start date: 15 Jun 2009

Date of first confirmation of the event: 24 Jun 2009

Date submitted to OIE: 25 Jun 2009

Reason for notification: emerging disease

Morbidity: 30 percent

Mortality: 0 percent

Zoonotic impact: Under investigation, since the hypothesis suggests that the origin of animal infection is contact with infected humans.

Causal agent: A/H1N1 influenza virus

Total outbreaks: 1

Outbreak Location and affected population: Buenos Aires (San Andres de Giles, San Andres de Giles). A commercial pig farm (4.5-hectares area) with biosecurity measures in place and its own restocking system. No other animal species in the farm. The distribution of the animals is as follows: 516 sows, 7 hogs, 2900 castrated pigs, 58 young sows, and 2105 sucking pigs.

Total animals affected

Species / Susceptible / Cases / Deaths / Destroyed / Slaughtered

Swine / 5586 / 1676 / 0 / 0 / 0

Source of the outbreak(s) or origin of infection: under investigation.

Epidemiological comments: between 7 and 9 Jun 2009, 2 workers of the farm showed flu signs, but they did not consult a doctor nor made diagnostic tests. The farm has its own restocking system. The last entry of animals occurred in July 2008. The farm applies biosecurity measures and the animals only leave the

farm for slaughter. Since 24 Jun 2009, no clinical signs have been observed in the animals of that establishment.

Measures applied: quarantine; disinfection of infected premises/establishment(s); no vaccination; no treatment of affected animals

Laboratory name and type: Malbran Institute (National laboratory)

Species / Test / Test date / Result

Swine / reverse transcription - polymerase chain reaction (RT-PCR) / 24 Jun 2009 / positive

The event is continuing. Weekly follow-up reports will be submitted.

**International, Wild Birds (OIE [edited], June 25):** Information received on (and dated) 24 Jun 2009 from Dr Nicolay Vlasov, CVO, Veterinary services, Ministry of Agriculture and Food, Moscow, Russia

Report type: immediate notification (final report)

Date of first confirmation of the event: 12 Jun 2009

Date submitted to OIE: 24 Jun 2009

Causal agent: highly pathogenic avian influenza virus

Serotype: H5N1

New outbreaks

Outbreak 1 Ubsu-Nur, Ovursky, Respublika Tyva

Date of start of the outbreak: 11 Jun 2009

Outbreak status: resolved (24 Jun 2009)

Affected animals

Species / Susceptible / Cases / Deaths / Destroyed / Slaughtered

Wild species // 58 / 58 / 0 / 0

Affected population: a lake

Source of the outbreak(s) or origin of infection: contact with wild species

Measures applied: control of wildlife reservoirs; screening; disinfection of infected premises/establishment(s); no vaccination; no treatment of affected animals

Laboratory name and type: All-Russian Research Institute for Animal Health (National laboratory)

Species / Test / Test date / Result

Wild species / polymerase chain reaction (PCR) / 23 Jun 2009 / positive

Wild species / virus isolation / 23 Jun 2009 / positive

Laboratory name and type: Kemerovo Interoblast Veterinary Laboratory (National laboratory)

Species / Test / Test date / Result

Wild species / polymerase chain reaction (PCR) / 12 Jun 2009 / positive

**Michigan Wild Bird Surveillance (USDA, as of July 2):** For the 2009 testing season, HPAI subtype H5N1 has not been recovered from any of the Michigan samples tested to date, which includes 26 live wild bird specimens. HPAI subtype H5N1 has not been recovered from the 758 birds or environmental samples tested nationwide for the 2009 testing season, which will run from April 1, 2009 - March 31, 2010. 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>.

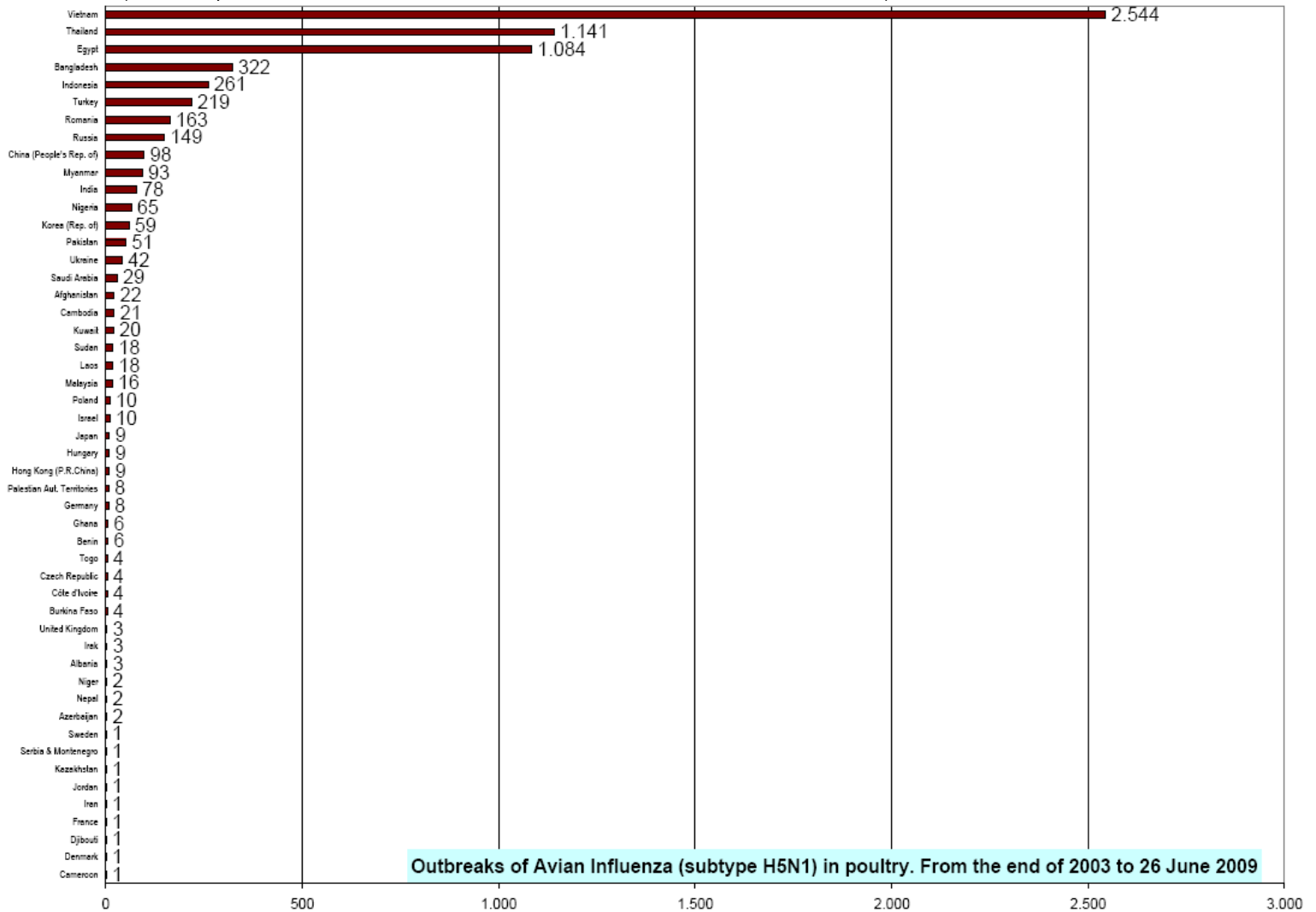
**Please contact Susan Vagasky at [VagaskyS@Michigan.gov](mailto:VagaskyS@Michigan.gov) with any questions regarding this newsletter or to be added to the weekly electronic mailing list.**

**Contributors**

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

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

(Source: [http://www.oie.int/downld/AVIAN%20INFLUENZA/A\\_AI-Asia.htm](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 June 2, 2009)**

([http://www.who.int/csr/disease/avian\\_influenza/country/cases\\_table\\_2009\\_05\\_28/en/index.html](http://www.who.int/csr/disease/avian_influenza/country/cases_table_2009_05_28/en/index.html) Downloaded 6/2/2009)

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	25	4	76	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
<b>Total</b>	<b>4</b>	<b>4</b>	<b>46</b>	<b>32</b>	<b>98</b>	<b>43</b>	<b>115</b>	<b>79</b>	<b>88</b>	<b>59</b>	<b>44</b>	<b>33</b>	<b>36</b>	<b>12</b>	<b>431</b>	<b>262</b>