



# MI FluFocus

## Influenza Surveillance and Avian Influenza Update

Bureau of Epidemiology  
Bureau of Laboratories



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

April 2, 2009  
Vol. 6; No. 13

### New updates in this issue:

- **Michigan Surveillance:** Overall, influenza activity is decreasing; majority of isolates are influenza B.
- **National Surveillance:** Influenza activity decreases; 24 states are still reporting widespread activity.
- **Avian Influenza:** Egypt reports a new human H5N1 case; new research on H5N1 in swine.

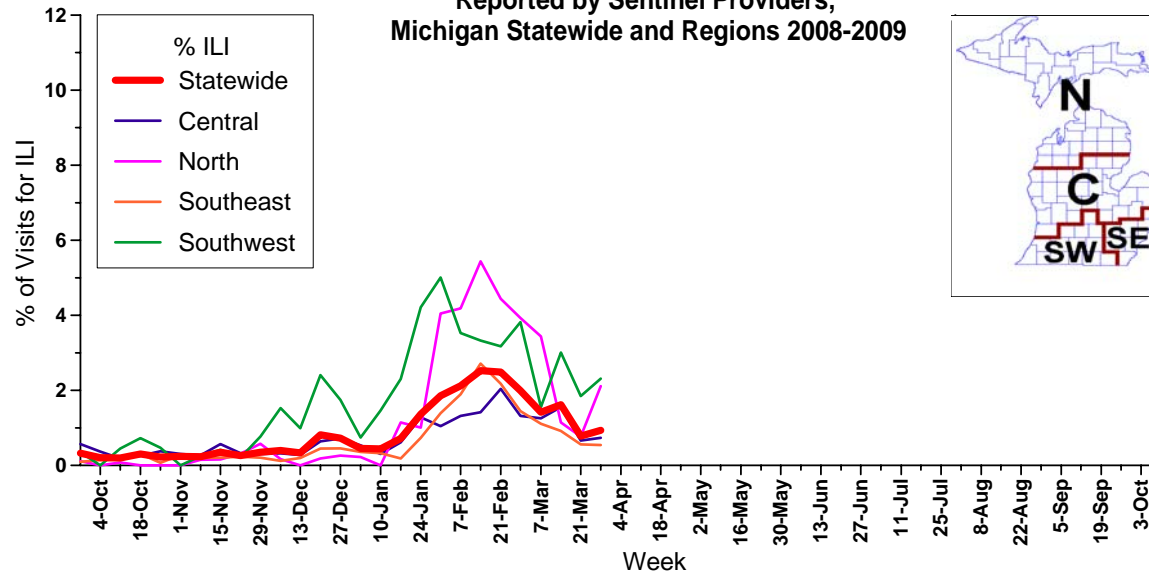
**Michigan Disease Surveillance System:** The week ending March 28 saw both aggregate flu-like numbers and individual case reports decrease compared to what was seen during the previous week. Aggregate numbers are comparable to numbers seen this time last year, while individual influenza numbers are slightly lower.

**Emergency Department Surveillance:** Emergency department visits from both constitutional and respiratory complaints decreased slightly from the previous week. Visits due to constitutional complaints are comparable to numbers seen at this time last year, while respiratory complaints are slightly lower. Three constitutional alerts in the C(1) and N(2) Influenza Surveillance Regions and one respiratory alert in the SE(1) Influenza Surveillance Region was generated last week.

**Over-the-Counter Product Surveillance:** Overall, OTC product sales were steady last week. Children's electrolyte sales increased very slightly in comparison to last week, while remaining indicators saw very little variation. Indicator levels are comparable to those seen at this time last year.

**Sentinel Provider Surveillance (as of April 2):** During the week ending March 28, 2009, 0.9% of all office visits reported by Michigan influenza sentinel sites were due to influenza-like illness (ILI); this is a slight increase from the previous week. This represents 101 patient visits due to ILI reported out of 10,754 office visits; 36 sentinel sites provided data for this report. Activity remained the same in the Central (0.7%) region; declined in the Southeast (0.5%); and increased in the North (2.1%) and Southwest (2.3%) regions. Note that these rates may change as additional reports are received.

Percentage of Visits for Influenza-like Illness (ILI)  
Reported by Sentinel Providers,  
Michigan Statewide and Regions 2008-2009



As part of pandemic influenza preparedness, 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 April 2):** During the past week, 2 new influenza A isolates and 10 new influenza B isolates were identified at the MDCH Bureau of Laboratories (BOL). For the 2008-2009 influenza season, MDCH BOL has identified 269 influenza isolates (followed by Influenza Surveillance Regions of origin):

- 159 A/H1N1 (55SE, 35SW, 22C, 47N)
- 3 A/H3N2 (1SE, 1C, 1N)
- 107 B (20SE, 40SW, 13C, 34N)
  - 9 B/Florida/4/2006-like (4SE, 1SW, 1C, 3N)
  - 88 B/Malaysia/2506/2004-like (16SE, 31SW, 12C, 29N)
  - 9 are pending characterization (7SW, 2N)
  - 1 untypable (SW)

For the week ending March 28, 12 sentinel labs reported. Influenza A positives are steady to decreasing, with four labs (SE, SW, C, N) reporting no influenza A activity. Influenza B reporting is mixed, as 4 labs (SE, SW) reported increasing influenza B positives, 5 labs (SE, SW, N) reported level to decreasing B activity, and 3 labs reported no B activity (C). RSV activity was level to decreasing at the majority of labs.

\*\*\*As a reminder, the positive predictive value of influenza rapid tests decreases during times of low influenza prevalence. MDCH suggests that during periods of low influenza activity in your community, all positive rapid tests results be confirmed by sending in a specimen for viral culture; this can be arranged through your local health department.

**Michigan Antigenic Characterization (as of April 2):** At this time, 24 influenza A/H1N1 isolates have been antigenically characterized by the CDC; results indicate all 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.

At this time, 3 influenza B isolates have been antigenically characterized by the CDC. One influenza B isolate has been characterized as B/Florida/4/2006-like, which matches the influenza B component of this season's vaccine. Two 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 Antiviral Resistance Data (as of April 2):** 24 influenza A/H1N1 viruses from the MDCH Bureau of Laboratories have been tested for antiviral resistance at CDC for the 2008-2009 season. All 24 viruses were resistant to oseltamivir (Tamiflu®) and sensitive to zanamivir, amantadine and rimantadine. These viruses were collected in the SE(11), SW(12) and N(1) Influenza Surveillance Regions. One influenza A/H3N2, collected in the C Region, has been tested for antiviral resistance; that virus was resistant to the adamantanes (amantadine and rimantadine) and sensitive to oseltamivir and zanamivir. Two influenza B isolates, collected in the SW Region, 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>.

**Influenza-Associated Pediatric Mortality (as of April 2):** One influenza-associated pediatric mortality due to influenza A (SW) has 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).

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

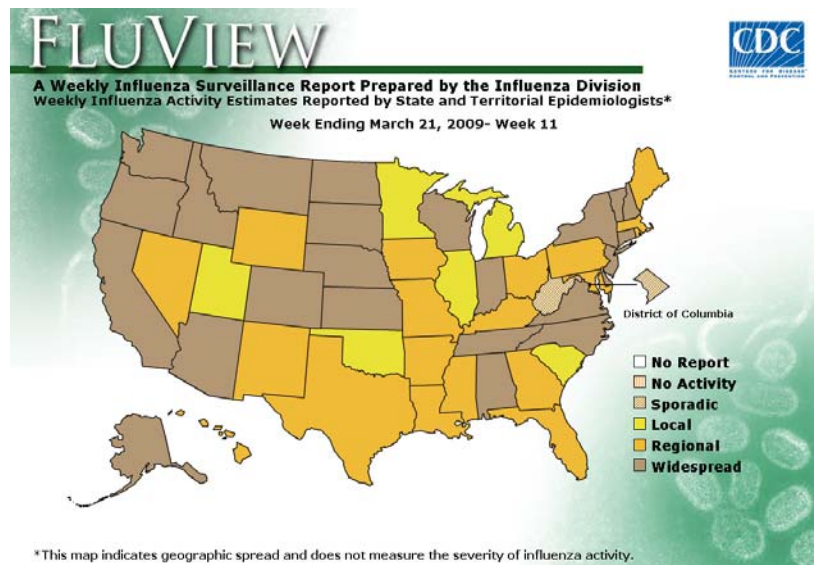
**National (CDC [edited], March 27):** During week 11 (March 15-21, 2009), influenza activity continued to decrease in the United States. One thousand one hundred four (21.4%) specimens tested by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories and reported to CDC/Influenza Division were positive for influenza. The proportion of deaths attributed to pneumonia and influenza (P&I) was below the epidemic threshold. Three influenza-associated pediatric deaths were reported. The proportion of outpatient visits for influenza-like illness (ILI) was above the national baseline. Six of nine surveillance regions reported ILI at or above their region-specific baselines. Twenty-four states reported widespread influenza activity, 19 states reported regional activity; six states reported local influenza activity; and the District of Columbia and one state reported sporadic influenza activity.

Since October 1, 2008, 554 influenza A (H1N1), 86 influenza A (H3N2), and 258 influenza B viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Five hundred fifty-four influenza A (H1N1) and 86 influenza A (H3N2) 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>Influenza A (H1N1)</b>	554	549 (99.1%)	0 (0)	554	3 (0.5%)
<b>Influenza A (H3N2)</b>	86	0 (0)	0 (0)	86	86 (100%)
<b>Influenza B</b>	258	0 (0)	0 (0)	N/A*	N/A*

\*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 [edited], March 19):** During the weeks 9-10, the level of influenza activity increased in some parts of the world while it declined in other countries. Influenza activity has continued to decline in western Europe and is below baseline levels in most countries. For many of the remaining countries activity has shown relatively little change compared to the previous fortnight although increased activity has been reported in some central and eastern European countries as well as in a large part of the Russian Federation. While influenza A (H3) continues to be the dominant influenza virus circulating in Europe, an increasing number of countries reported influenza B as the dominant or co-dominant virus type. In Canada and the United States of America, influenza activity continued to increase with both influenza A and B viruses circulating.

Sporadic influenza activity was observed in Austria (H3,B), Denmark (H1,H3,B), China (H1,H3,B), Kazakhstan (A,B), Mongolia (H1), Poland (B), Portugal (H3), Spain (B), Sri Lanka, Tunisia (H3,B), and United Kingdom of Great Britain and Northern Ireland (H1,H3,B).

Argentina, Bulgaria, Cameroon and Malta reported no activity.

To access the entire report, visit <http://www.who.int/csr/disease/influenza/update/en/>

---

MDCH reported **LOCAL INFLUENZA ACTIVITY** to the CDC for the week ending March 28, 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.

## **End of Seasonal Report**

---

### **Avian Influenza Activity**

**WHO Pandemic Phase:** Phase 3 - Human infection(s) with a new subtype, but no human-to-human spread or rare instances of spread to a close contact.

**International, Human (WHO, March 30):** The Ministry of Health and Population of Egypt has reported a new confirmed human case of avian influenza. The case is a two and a half year old female from Qena District, Qena Governorate. Her symptoms began on 23 March. She was admitted to Qena Fever Hospital on 24 March where she was started on oseltamivir the same day (24 March) and remains in a stable condition. Infection with H5N1 avian influenza was confirmed by the Egyptian Central Public Health Laboratory on 26 March.

Investigations into the source of infection indicate a history of close contact with dead and sick poultry prior to becoming ill.

Of the 60 cases confirmed to date in Egypt, 23 have been fatal.

**International, Poultry (The Statesman [edited], March 29):** North Dinajpur [India] district administration has decided to kill around 14000 birds in several villages under Daspara and Ghinnigaon gram panchayats [villages] near the Chopra police station of the district in the next 4 days. The decision followed the official announcement declaring the block as bird flu affected. It was reported that hundreds of birds died in the region over the past week, alarming the district administration. The North Dinajpur animal husbandry department officials promptly visited the 'affected' villages and collected samples from the dead birds, which were later sent to a Pune-based national laboratory. The laboratory report confirmed bird flu in the area. The culling exercise is scheduled to commence tomorrow [30 Mar 2009].

The deputy director of the North Dinajpur animal husbandry department, Mr. Sajal Bhunia, said that his department had formed around 40 teams to complete the exercise at the earliest.

**International, Swine (CIDRAP News, March 31):** Scientists report that H5N1 avian influenza viruses may be adapting to pigs, as evidenced by the finding that H5N1 viruses isolated from pigs in Indonesia were less harmful to mice than were H5N1 viruses from chickens.

The finding suggests that in growing in pigs, the virus may have become less harmful to mammals in general, the authors report. That sounds reassuring, but the authors say it may mean the virus is one step closer to turning into a human pandemic strain.

In the study, scientists from Japan and Indonesia collected viruses from chickens and pigs in Indonesia, grew them in laboratory cell cultures, and used them to infect mice. They found that the viruses from pigs were less lethal to mice than the viruses from chickens, according to their recent report in the *Archives of Virology*.

"We found that swine isolates were less virulent to mice than avian isolates, suggesting that the viruses became attenuated during their replication in pigs," the report states.

### *An intermediate host*

Pigs are seen as a possible intermediate host that can help avian flu viruses adapt to humans, because the epithelial cells in pigs' trachea can be infected by both avian and human flu viruses, the article notes. If avian and human viruses infected a pig at the same time, they could mix or reassort, giving rise to a novel strain that might be able to spread in humans. The flu pandemics of 1957-58 and 1968-69 were caused by avian-human hybrid viruses, though it is not known if they arose in pigs.

But even if they don't mix with human strains, avian flu viruses that infect pigs are believed capable of adapting to them—gaining the capability to grow efficiently in swine cells—and thereby adapting to other mammals, the authors write. Humans occasionally are infected with swine flu viruses, something that has been reported at least twice this flu season in the United States, according to the Centers for Disease Control and Prevention.

So far, H5N1 infections in pigs have been reported rarely or gone unnoticed because infected pigs show no signs of illness, the scientists write. But the authors, who include Chairul Nidom of Airlangga University in Surabaya, Indonesia, report that they found H5N1 infections in pigs in Indonesia in 2005, 2006, and 2007. They determined that the swine viruses were closely related to viruses in chickens found nearby, indicating H5N1 spread from chickens to pigs at least three different times.

They gathered three viruses from pigs and two from chickens on East Java in 2006 and 2007. They first determined that all the viruses grew well in embryonated eggs and in cultures of canine kidney cells, demonstrating that both avian and swine strains could grow in mammalian cell cultures. They then infected groups of mice with a range of doses of the five isolates.

The results showed that all three pig viruses were less virulent in mice than the chicken viruses were, as measured by how large a dose it took to kill half of the mice. Two of the pig isolates were "strongly attenuated" in mice.

In a genetic analysis, the scientists found several amino acid differences that might explain the lower virulence of the swine isolates, but they "were unable to determine which mutations were strongly correlated to low virulence in mice because these mutations are frequently found among avian and human H5N1 viruses," the report says.

### *Prelude to a pandemic strain?*

The authors offer this interpretation of their findings: "Since our swine strains were isolated from pigs with no apparent influenza-like symptoms, the decrease of pathogenicity in mice suggests that the H5N1 viruses may have lost their pathogenicity in mammals during replication in pigs. Given that for the H5N1 viruses to cause a pandemic, they would likely become attenuated in humans, becoming attenuated in mammals may be a prelude to the generation of a pandemic strain."

They add that because H5N1 infections in swine increase the risk that a pandemic strain could emerge, the findings point up the need for "continuous surveillance and management of H5N1 viruses in pigs."

The findings may mean that H5N1 viruses from swine will be less virulent in mammals generally, but it's not clear that the viruses have truly adapted to swine, said Richard Webby, PhD, a virologist, flu researcher, and associate member of the Department of Infectious Diseases at St. Jude Children's Research Hospital in Memphis.

Noting that the study authors used only five isolates, Webby said, "Trying to make too much of a conclusion from that number would be premature. The two least lethal viruses were both from swine, but one [swine isolate] was lethal. So perhaps if these become adapted to mammals, they're potentially going to be less pathogenic."

Whether H5N1 viruses become more or less virulent when they adapt to mammals is a very important question, he said, adding that the findings "might be to some extent reassuring."

Regarding the authors' statement that attenuation of the virus in mammals might be a prelude to the development of a pandemic strain, Webby commented, "I guess the thought behind that is that for a pathogen to be successful, it's got to transmit readily, so if it makes the host too sick, so they go to a hospital or die, the chances of its transmitting to someone else are reduced."

But Webby told CIDRAP News that it's not clear that H5N1 viruses have really become established in swine anywhere. "If these viruses have gone into swine, I think the key is whether they become

established in swine. If that happened, we'd be concerned. I think the consensus now is that pigs are like humans; they can be infected, but it's unlikely there'd be a lot of transmission."

He said US Department of Agriculture researchers have infected pigs with H5N1 viruses and found that the viruses didn't grow at all. But those researchers used viruses that didn't come from pigs in the first place. He noted that pigs often are fed broken eggs or even chicken carcasses, and such pigs might carry the virus in their snouts without becoming truly infected.

Webby suggested that researchers now should "put these swine viruses back into swine and see if they actually are more adapted to swine than the avian viruses."

**Michigan Wild Bird Surveillance (USDA, as of April 2):** For the 2008 testing season, 2105 Michigan samples have been taken so far, comprised of 327 live birds, 1218 hunter-killed birds, 35 morbidity or mortality samples and 525 environmental samples.

H5N1 subtype H5N1 has not been recovered from any Michigan samples tested to date, or from the 77,769 birds or environmental samples tested nationwide for the 2008 testing season, which will run from April 1, 2008 - March 31, 2009. For more information, visit the National H5N1 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.**

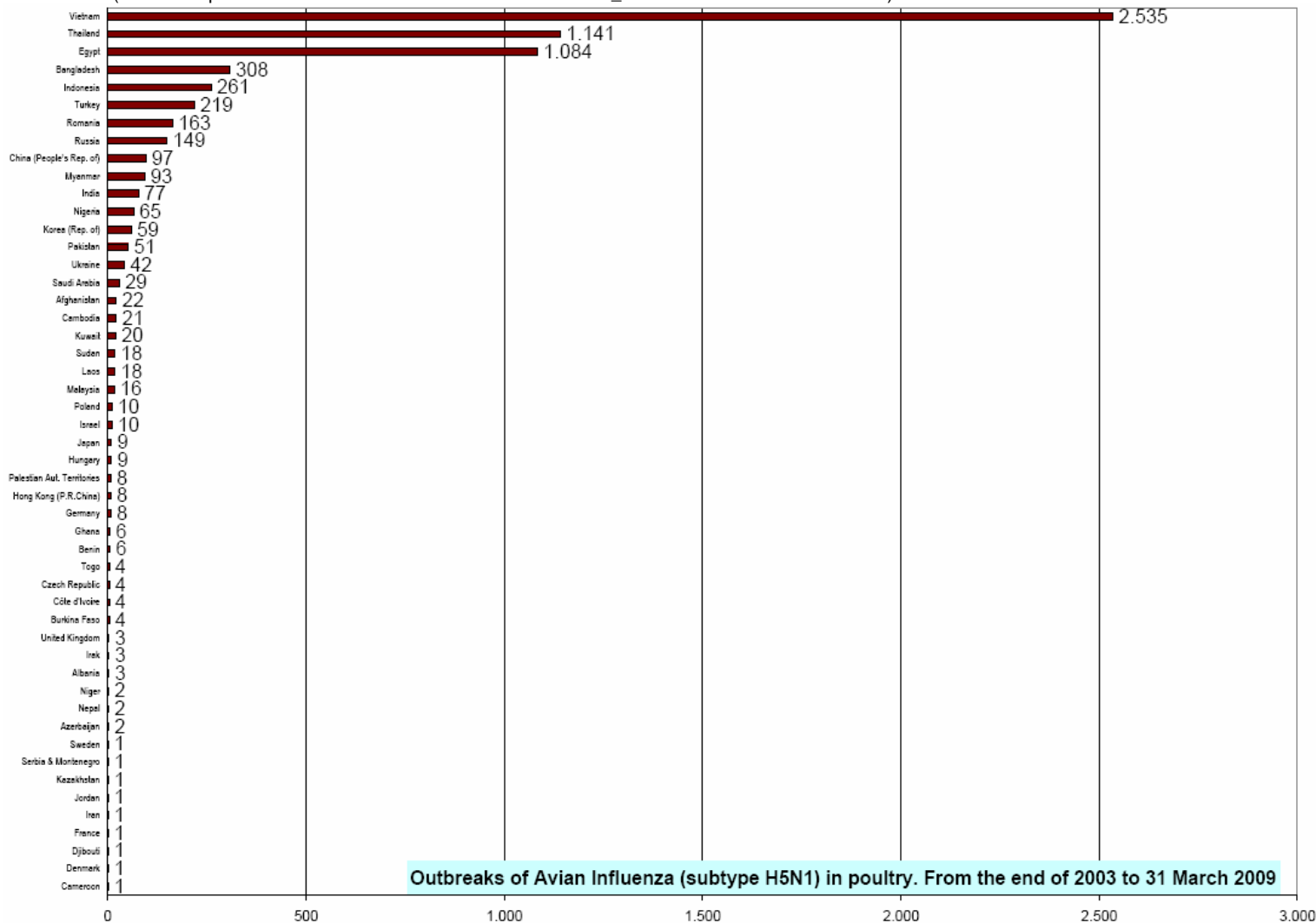
**Contributors**

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

**MDCH Bureau of Laboratories – Patricia Clark, MPH**

**Table 1. H5N1 Influenza in Poultry (Outbreaks up to March 31, 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 4/1/09)



**Table 2. H5N1 Influenza in Humans (Cases up to March 30, 2009)**

([http://www.who.int/csr/disease/avian\\_influenza/country/cases\\_table\\_2009\\_03\\_30/en/index.html](http://www.who.int/csr/disease/avian_influenza/country/cases_table_2009_03_30/en/index.html) Downloaded 3/30/2009)

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	9	0	60	23
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	2	2	109	54
<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>18</b>	<b>6</b>	<b>413</b>	<b>256</b>