



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:** MDCH switches to aggregate influenza reporting; please see notice below.
 - **National Surveillance:** Over 98% of influenza viruses isolated nationally are the pandemic H1N1 virus.
 - **International Surveillance:** A/H3 influenza viruses are causing outbreaks in the southern hemisphere.
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******Novel Influenza A (H1N1) virus (Swine-origin Flu) Investigation******

Michigan (MDCH): MDCH will no longer update the table of confirmed and probable H1N1 cases by county. Instead, we are moving to aggregate flu reporting, which includes flu-like illness and confirmed and probable cases of seasonal and novel influenza. Beginning the week ending June 20, 2009, this aggregate flu report will be updated every Tuesday by 5:00 pm at the following website: http://www.michigan.gov/documents/mdch/20090623_5pm_FLI_283516_7.pdf. As of June 20, 1077 cases of flu-like illness and confirmed and probable cases of seasonal and novel influenza were reported in Michigan.

The Michigan Department of Community Health (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 novel influenza A (H1N1) virus infection is defined as a person with an influenza-like illness (ILI) who tests positive for novel 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 novel influenza A H1 PCR test that has not been validated by the MDCH Bureau of Laboratories or who tests positive for influenza A, but is negative for seasonal influenza H1 and H3 by RT-PCR.

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

Michigan Novel Influenza A (H1N1) Influenza Virus Antigenic Characterization and Antiviral Resistance Data (as of June 25): 2 Michigan novel 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 novel influenza A(H1N1) vaccine.

2 Michigan novel 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 has been evaluated for resistance to oseltamivir and zanamivir; this specimen was sensitive to these antiviral medications.

National (CDC): As of June 18, 2009, 11:00am ET, the Centers for Disease Control and Prevention (CDC) is reporting 21,449 confirmed human infections, including 87 deaths, in the United States. These cases are being reported from 50 states and the District of Columbia and Puerto Rico. 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/.

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 12:00 GMT, 24 June 2009, 106 countries have officially reported 55,867 cases of influenza A (H1N1) infection, including 238 deaths. Updated case counts and notices can be found online at <http://www.who.int/csr/disease/swineflu/en/index.html>.

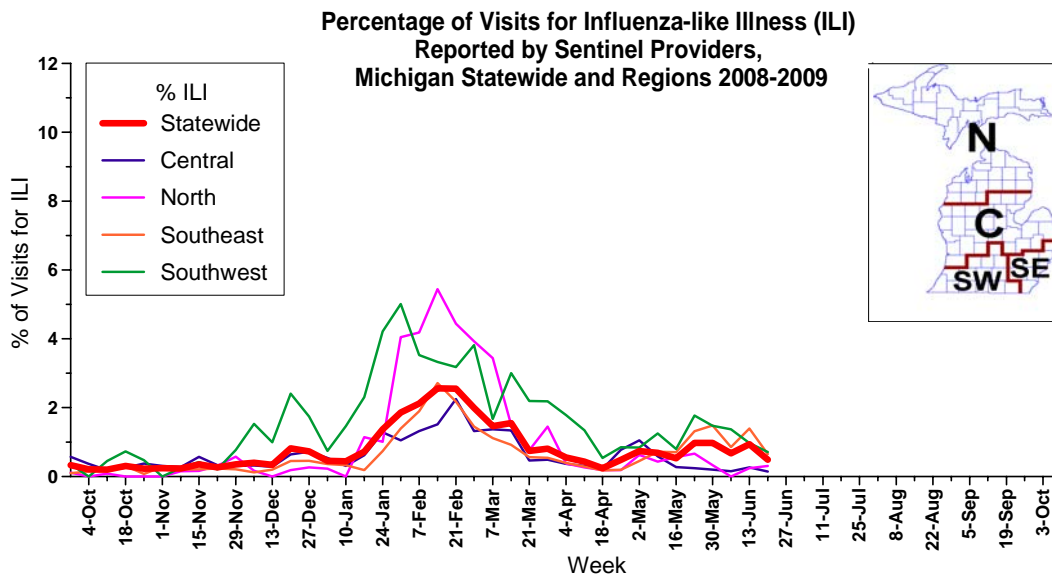
Michigan Disease Surveillance System: The week ending June 20 saw both aggregate flu-like numbers and individual influenza reports decline from the previous week's numbers. Aggregate flu-like reports and individual influenza numbers are higher than those of last year, likely due to increased testing.

On the novel influenza front, the week ending June 20 saw a decrease in suspect, probable, and confirmed pandemic H1N1 cases reported to MDSS.

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 considerably higher. Four constitutional alerts in the C(1), N(1), and SW(2) Influenza Surveillance Regions and four respiratory alert in the C(2), N(1) and SE(1) Influenza Surveillance Regions were generated last week.

Over-the-Counter Product Surveillance: Overall, OTC product sales were mixed last week. Children's electrolytes and thermometer sales remained steady near last week's levels while remaining indicators saw a slight decrease in sales. 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 for more information.

Laboratory Surveillance (as of June 25): 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 20, 2009. 3 laboratories (SW, C) reported sporadic influenza A positives, 3 labs reported zero influenza A positives (C, N) and 2 labs (SE) had decreasing influenza A positives but were still elevated well above baseline levels. All 8 labs reported zero to sporadic influenza B positives.

Michigan Seasonal Influenza Antigenic Characterization (as of June 25): 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 June 25): 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 June 25): Three influenza-associated pediatric mortalities (1 influenza A (SW), 2 influenza B (SE)) have been reported to MDCH for the 2008-2009 influenza season.

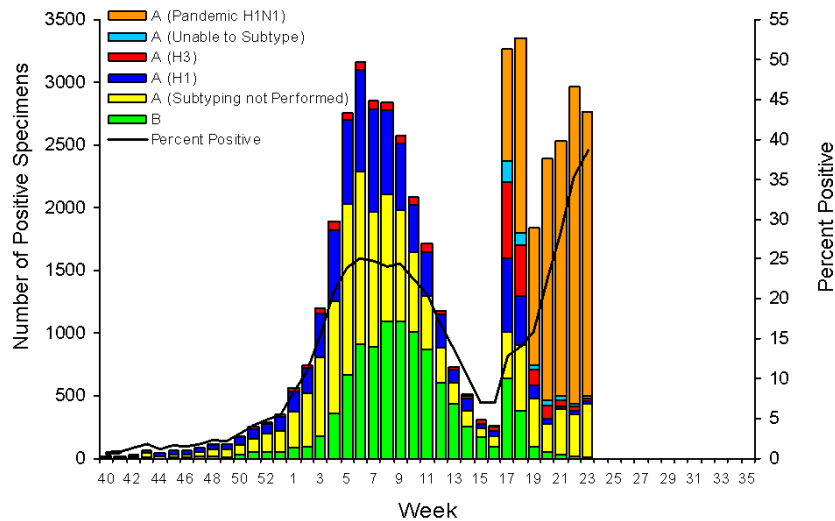
***The CDC has asked all states to collect information on any pediatric death associated with influenza infection. This includes not only any death in a child (<18 years) resulting from a compatible illness confirmed to be influenza by an appropriate diagnostic test, but also any unexplained death with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

Seasonal Influenza Congregate Settings Outbreaks (as of June 25): 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 19): During week 23 (June 7-13, 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. Two thousand seven hundred sixty-five (38.7%) 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 98% 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 slightly above the epidemic threshold. One influenza-associated pediatric death was reported and was associated with pandemic influenza A (H1N1) virus infection. The proportion of outpatient visits for influenza-like illness (ILI) was

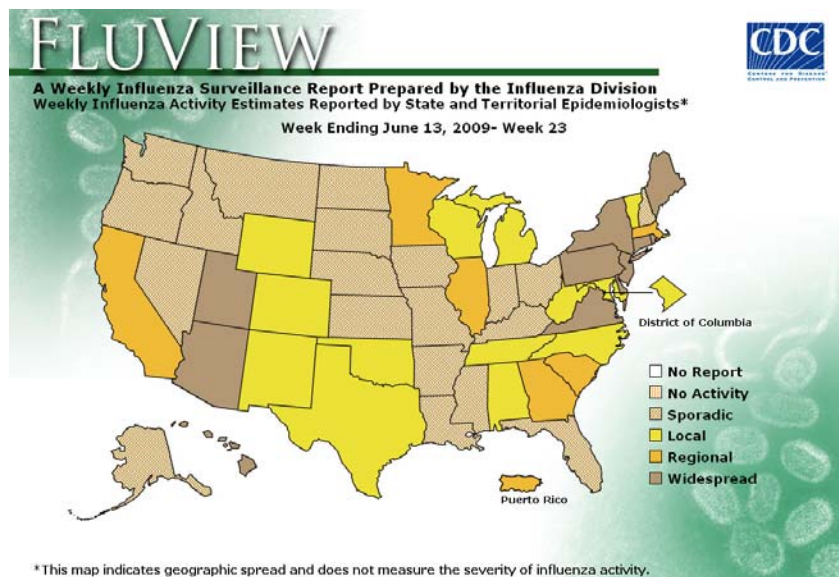
below the national baseline. One of the 10 surveillance regions reported ILI above their region-specific baseline. Eleven states reported geographically widespread influenza activity, six states and Puerto Rico reported regional influenza activity, the District of Columbia and 13 states reported local influenza activity, and 20 states reported sporadic influenza activity.

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



Since October 1, 2008, 988 seasonal influenza A (H1N1), 172 influenza A (H3N2), and 529 influenza B viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Nine hundred ninety-one seasonal influenza A (H1N1) and 179 influenza A (H3N2) viruses have been tested for resistance to the adamantanes (amantadine and rimantadine). One hundred eighty-eight pandemic influenza A (H1N1) viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). One hundred forty-two 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		
Seasonal Influenza A (H1N1)	988	983 (99.5%)	0 (0)	991	6 (0.6%)
Influenza A (H3N2)	172	0 (0)	0 (0)	179	179 (100%)
Influenza B	529	0 (0)	0 (0)	N/A*	N/A*
Novel Influenza A (H1N1)	188	0 (0)	0 (0)	142	142 (100)



*This map indicates geographic spread and does not measure the severity of influenza activity.

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.

MDCH reported **LOCAL INFLUENZA ACTIVITY** to the CDC for the week ending June 20, 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, Swine (New York Times, June 23): Contrary to the popular assumption that the new swine flu pandemic arose on factory farms in Mexico, federal agriculture officials now believe that it most likely emerged in pigs in Asia, but then traveled to North America in a human. But they emphasized that there was no way to prove their theory and only sketchy data underpinning it.

There is no evidence that this new virus, which combines Eurasian and North American genes, has ever circulated in North American pigs, while there is tantalizing evidence that a closely related "sister virus" has circulated in Asia.

American breeding pigs, possibly carrying North American swine flu, are frequently exported to Asia, where the flu could have combined with Asian strains. But because of disease quarantines that make it hard to import Asian pigs, experts said, it is unlikely that a pig brought the new strain back West. "The most likely scenario is that it came over in the mammalian species that moves most freely around the world," said Dr. Amy L. Vincent, a swine flu specialist at the Agriculture Department's laboratory in Ames, Iowa, referring, of course, to people.

The 1st person to carry the flu to North America from Asia, assuming that is what happened, has never been found and never will be, because people stop carrying the virus when they get better. Moreover, the officials said, the chances of proving their theory are diminishing as the virus infects more people globally. It has now reached more than 90 countries, according to the World Health Organization. Since some of those people will inevitably spread it to pigs, its history will become impossible to trace. "To tell whether a pig is newly infected by a human or had the virus before the human epidemic began really can't be done," said Dr. Kelly M. Lager, another Agriculture Department swine disease expert.

The highly unusual virus -- which includes genetic bits of North American human, avian and swine flu and Eurasian swine flu -- has not been detected in any pigs except those in a single herd in Canada that was found infected in late April 2009. A carpenter who worked on the farm after visiting Mexico had been thought to have infected the herd. But in mid-June 2009, Canadian health agencies said he was not to blame. The whole herd was culled, and the virus has not been found elsewhere in Canada, as it would have been if it were endemic, since American and Canadian laboratories test thousands of flu samples to help the pork industry develop vaccines.

But a sample taken from a pig in Hong Kong in 2004 was recently found to have a virus nearly matching the new flu. That flu, which had 7 of the new flu's 8 genome sequences, was noted in an article in Nature magazine on 11 Jun 2009, which called it a "sister virus."

Scientists tracking the virus's lineage have complained that there is far too little global surveillance of flu in swine. Public databases have 10 times as many human and avian flu sequences as they do porcine ones, said Dr. Michael W. Shaw, a scientist in the flu division of the Centers for Disease Control and Prevention, and there are far fewer pig flu sequences from Asia than from North America and Europe, and virtually none from South America or Africa. "Something could have been going on there for a long time, and we wouldn't know," Dr. Shaw said. But national veterinary officials said they knew of no close relatives of the new virus in the large private North American databases either. That makes it most likely, they said, that it has been circulating in Asia.

The new virus was 1st isolated in late April 2009 by American and Canadian laboratories from samples taken from people with flu in Mexico, Southern California and Texas. Soon, the earliest known human case was traced to a 5-year-old boy in La Gloria, Mexico, a rural town in Veracruz. Because that area is home to hog-fattening operations with thousands of pigs in crowded barns near lagoons of manure, opponents of factory farming were quick to blame the industry. In May 2009, the Mexican government said it had tested pigs on the Veracruz farms and found them free of the virus. Smithfield Foods, an owner of the farms, and the National Pork Producers Council, the industry's lobbying arm, were quick to publicize that announcement. But outside veterinary experts still disagree on whether those tests proved anything. According to Smithfield, Mexican government veterinarians tested snout swabs taken on 30 Apr 2009 and blood samples stored since January 2009. But since the human outbreak in Veracruz is believed to have started in February 2009, many veterinary experts said testing pig snouts for live virus in April 2009 proved nothing. Any pig sick in February 2009 would have long since recovered and, since hogs are usually slaughtered at 6 months old, many of those alive in early February 2009 would be bacon by April 2009. But Dr. Greg Stevenson, an expert in swine diagnostics at Iowa State University, said that since flu could persist in a large herd for months, "if it had been there in February 2009, it would probably still be there at the end of April 2009."

The blood tests -- in which scientists look for antibodies formed in response to a previous infection -- present a different set of problems. Antibodies are much harder to tell apart from one another than viruses are. A pig that had the new H1N1 flu would come up positive on an antibody test. But so would a pig that had the regular H1N1 swine flu that has circulated since 1930, or even a pig that had been vaccinated against the earlier H1N1 flu, and all the Smithfield pigs routinely get flu shots. The company said vaccinated pigs could be distinguished from previously ill pigs because illness produced more antibodies. But outside experts were skeptical. An antibody test specific enough to identify only the new flu strain "would take months to develop, at a minimum, and would require considerable R & D expertise and technology," said Dr. Christopher W. Olsen, a swine flu expert at the University of Wisconsin's veterinary medical school.

The governor of Veracruz has asked the National Autonomous University of Mexico to do its own investigation of industrial hog farming in his state; the work is expected to take months. Carlos Arias, the biochemist leading the team, said he hoped to test all the swab and tissue samples stored by the farms and the national veterinary laboratory.

International, Poultry (Vietnam News [edited], June 24): Bird flu has resurfaced in the country on the northeastern border of Quang Ninh Province's Yen Hung District and infected more than 500 poultry.

An additional 1300 birds have been killed and disposed of to prevent the spread of the disease in accordance with the regulations on epidemic disease prevention, said Hoang Van Nam, head of the Veterinary Department.

Deputy minister of Agriculture and Rural Development Diep Kinh Tan said the reason for the problem was the lack of disease prevention measures taken by some localities.

Tan directed the Veterinary Department to thoroughly handle the disease in Quang Ninh and to soon build a centre for quarantining poultry and cattle. He also asked localities nationwide to concentrate on vaccinating duck flocks, as they were highly susceptible to the spread of the flu.

Michigan Wild Bird Surveillance (USDA, as of June 25): 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 379 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 with any questions regarding this newsletter or to be added to the weekly electronic mailing list.

Contributors

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Table 1. H5N1 Influenza in Poultry (Outbreaks up to June 17, 2009)

(Source: http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm Downloaded 6/18/09)

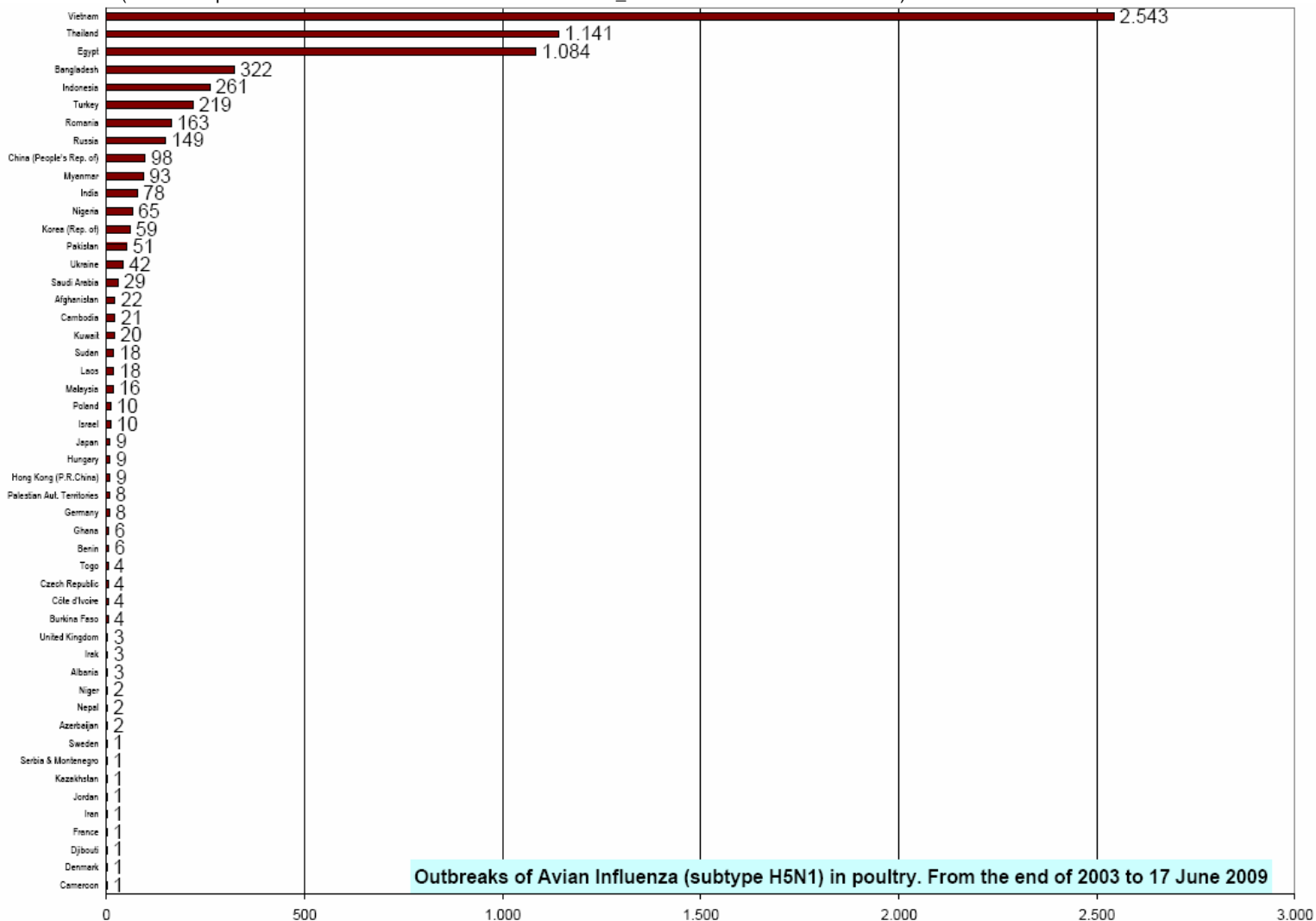


Table 2. H5N1 Influenza in Humans (Cases up to June 2, 2009)

(http://www.who.int/csr/disease/avian_influenza/country/cases_table_2009_05_28/en/index.html 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
Total	4	4	46	32	98	43	115	79	88	59	44	33	36	12	431	262