MI Flu Focus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories

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Current Influenza Activity Levels:

- **Michigan:** No activity
- **National:** During November 20-26, influenza activity remained low in the United States

Updates of Interest

- **International:** South Korean scientists find a novel canine H3N1 virus that is a reassortant of 2009 H1N1 and canine H3N2 viruses

Table of Contents

Influenza Surveillance Reports
Michigan……1-3
National……..3-4
International……4-5
Novel Influenza and Other News
WHO Pandemic Phase……...5
Avian Influenza Surveillance……..7
Avian Influenza H5N1 in Humans……8

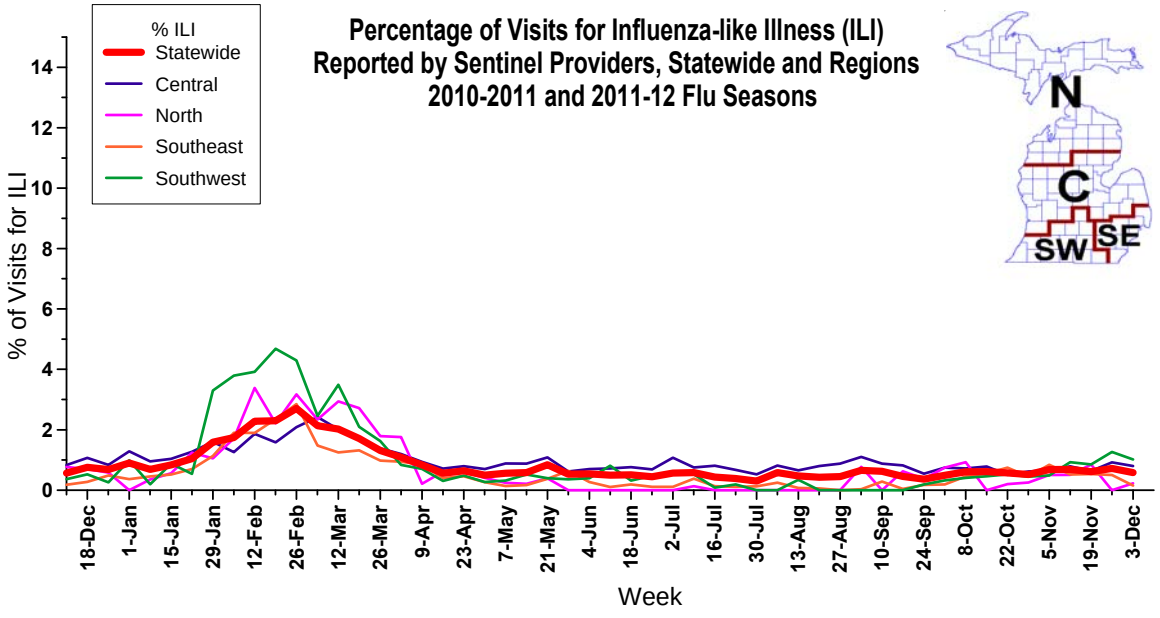
Influenza Surveillance Reports

Michigan Disease Surveillance System: MDSS data for the week ending December 3rd indicated that individual influenza cases remained at levels similar to the previous week, while aggregate reports increased slightly compared to the decreased levels reported during the holiday week. Individual reports are similar to levels seen during the same time last year, while aggregate reports are lower.

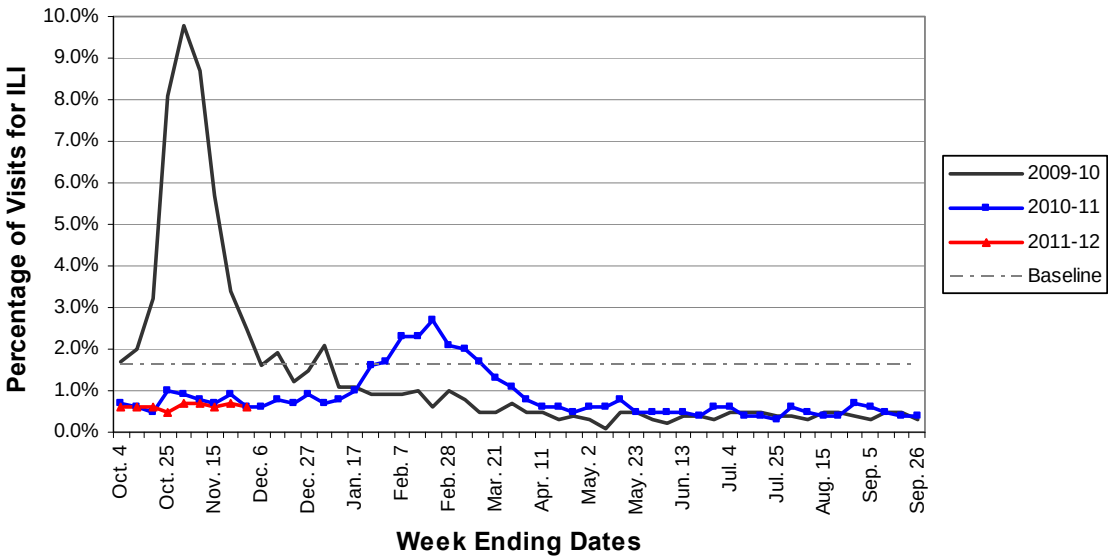
Emergency Department Surveillance: Compared to levels from the prior week, emergency department visits from both constitutional and respiratory complaints experienced a slight decline. Constitutional complaints are similar, while respiratory complaints are slightly higher, than levels reported during the same time period last year. In the past week, there were three constitutional alerts in the SW(2) and C(1) Influenza Surveillance Regions and four respiratory alerts in the C Region.

Sentinel Provider Surveillance (as of December 8): During the week ending December 3, 2011, the proportion of visits due to influenza-like illness (ILI) slightly decreased to 0.6% overall; this is below the regional baseline of 1.6%. A total of 60 patient visits due to ILI were reported out of 10,266 office visits. Thirty-three sentinel sites provided data for this report. Activity increased in one surveillance region: North (0.2%); and decreased in the remaining three surveillance regions: Central (0.8%), Southwest (1.0%) and Southeast (0.2%). Please note 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.



Percentage of Visits for Influenza-like Illness (ILI) Reported by the US Outpatient Influenza-like Illness Surveillance Network (ILINet): Michigan 2009-2011



Hospital Surveillance (as of December 3): The Influenza Hospitalization Surveillance Project provides population-based rates of severe influenza illness in Clinton, Eaton and Ingham counties. No influenza hospitalizations were reported during the week ending December 3, 2011. For the 2011-12 season, there has been one adult lab-confirmed influenza hospitalization in the catchment area.

The MDCH Influenza Sentinel Hospital Network monitors influenza-associated hospitalizations reported voluntarily by hospitals statewide. Seven hospitals (SE, SW, C, N) reported for the week ending December 3, 2011. Results are listed in the table below.

Age Group	Hospitalizations Current Week	Total Hospitalizations 2011-12 Season
0-4 years	0	1
5-17 years	0	0
18-49 years	0	2
50-64 years	0	0
≥65 years	0	0
Total	0	3

Laboratory Surveillance (as of December 3): During November 27-December 3, no influenza positive results were reported by the MDCH Bureau of Laboratories. For the 2011-12 influenza season (starting October 2, 2011), MDCH has identified 2 influenza results:

- Influenza A/H3: 1 (SE)
- Parainfluenza: 2 (1SE, 1C)
- Influenza B: 1 (SE)
- Adenovirus: 1 (SE)

12 sentinel labs (SE, SW, C, N) reported for the week ending December 3, 2011. No influenza positive results were reported. Three labs (SW, C) reported sporadic parainfluenza activity. Two labs (C, N) reported sporadic RSV positives. Testing volumes remained low to moderate.

Michigan Influenza Antigenic Characterization (as of December 8): For the 2011-12 season, one Michigan influenza B specimen has been characterized as B/Brisbane/60/2008-like at MDCH BOL; this strain matches the influenza B component for the 2011-12 Northern Hemisphere influenza vaccine.

Michigan Influenza Antiviral Resistance Data (as of December 8): No Michigan influenza specimens have been tested for antiviral resistance at this time for the 2011-12 season.

CDC has made recommendations regarding the use of antivirals for treatment and prophylaxis of influenza, which are available at http://www.cdc.gov/flu/professionals/antivirals/index.htm.

Influenza-associated Pediatric Mortality (as of December 8): No pediatric influenza-associated influenza mortalities have been reported to MDCH for the 2011-12 season.

**CDC has asked states for information on any pediatric death associated with influenza. This includes not only any pediatric death (<18 years) resulting from a compatible illness with laboratory confirmation of influenza, but also any unexplained pediatric death with evidence of an infectious process. Please immediately call MDCH to ensure proper specimens are obtained. View the complete MDCH protocol online at http://www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf.

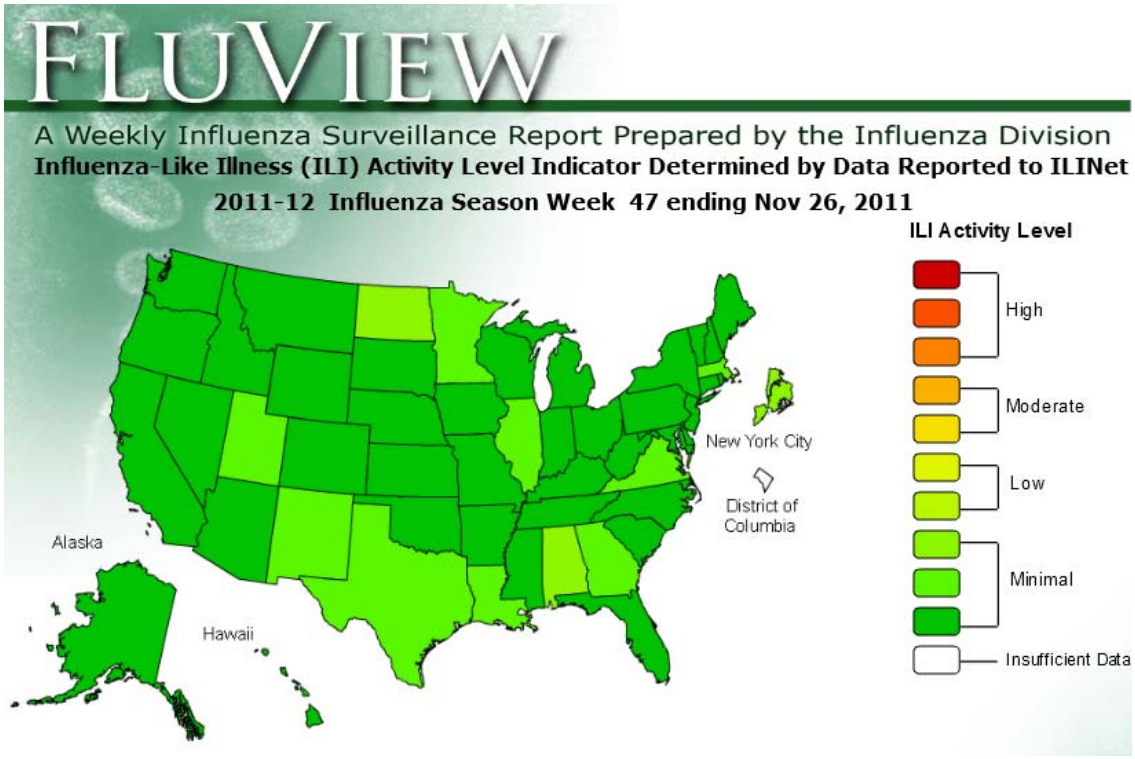
Influenza Congregate Settings Outbreaks (as of December 8): No outbreaks were reported during the previous week. No respiratory outbreaks have been reported to MDCH during the 2011-12 season.

National (MMWR, December 8): An update on national influenza activity and surveillance has been published in an MMWR article "Update: Influenza Activity-United States, October 2-November 26, 2011."

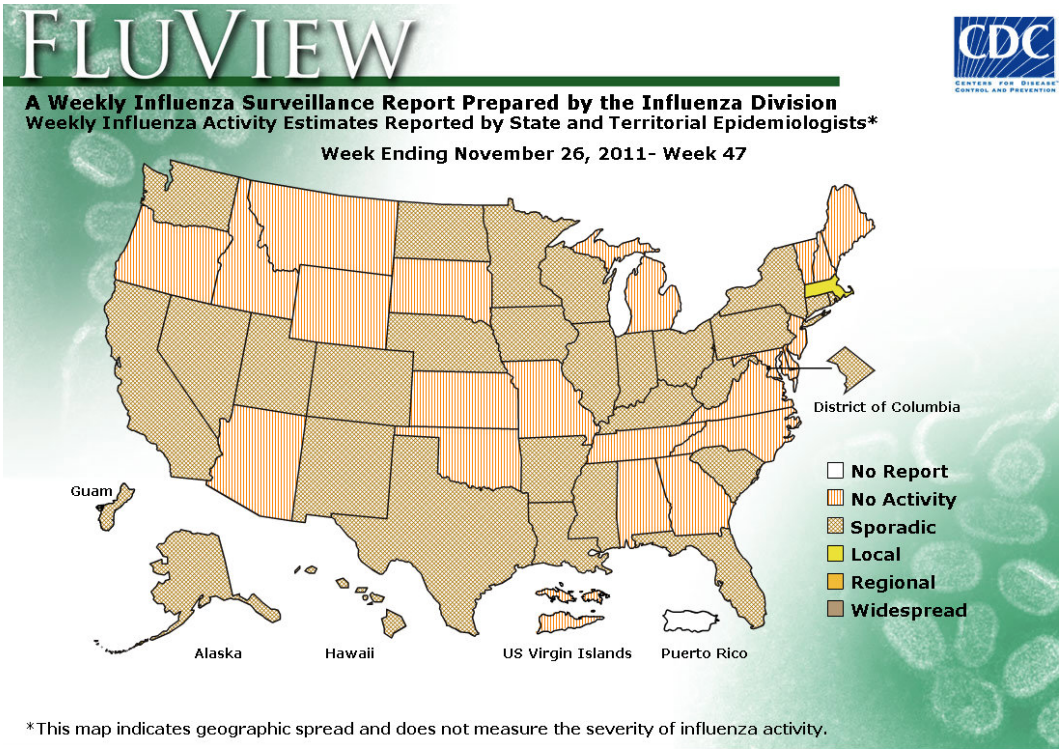
The article is available online at
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6048a2.htm?s_cid=mm6048a2_e&source=govdelivery

National (CDC [edited], as of December 2): During week 47 (November 20-26, 2011), influenza activity remained low in the United States. Of the 2,130 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, 40 (1.9%) were positive for influenza. The proportion of deaths attributed to P&I was below the epidemic threshold. Two influenza-associated pediatric deaths were reported. These deaths occurred during the 2010-11 influenza season. The proportion of outpatient visits for influenza-like illness (ILI) was 1.4%, which is below the national baseline of 2.4%. All 10 regions reported ILI below region-specific baseline levels. All 50 states and New York City experienced minimal ILI activity and the District of Columbia had insufficient data. The geographic spread of influenza in one state was reported as local; the District of Columbia, Guam, and 29 states reported sporadic activity; the U.S. Virgin Islands and 21 states reported no influenza activity, and Puerto Rico did not report.

The entire weekly report is available online at http://www.cdc.gov/flu/weekly/fluactivity.htm.



This map uses the proportion of outpatient visits to healthcare providers for influenza-like illness to measure the ILI activity level within a state. Therefore, outbreaks occurring in a single city could cause the state to display high activity levels. Data collected in ILINet may disproportionately represent certain populations within a state, and therefore, may not accurately depict the full picture of influenza activity for the whole state. Data displayed on this map are based on data collected in ILINet, whereas the State and Territorial flu activity map are based on reports from state and territorial epidemiologist.



International (WHO [edited], December 2): Influenza activity in the temperate regions of the northern hemisphere remains at low levels, with sporadic influenza activity reported in Canada and some European countries. Significant influenza activity was reported in only a few countries of the tropical zone including Nicaragua, Costa Rica, and Brazil in the Americas, Cameroon in central Africa, and Cambodia and Lao People's Democratic Republic in South East Asia. Transmission in the temperate countries of the southern hemisphere has returned to inter seasonal levels, with some persistence of influenza A(H3N2) in Australia. In the United States of America limited human-to-human transmission of a novel influenza A(H3N2) virus was detected with no further reported spread to date.

Countries in the temperate zone of the northern hemisphere
The influenza season has not yet begun in the northern hemisphere temperate zone, though some sporadic influenza activity has been reported in Canada. The majority of the countries in this zone reported low or no influenza activity in recent weeks. Influenza activity in Europe remains low overall; the Czech Republic, France, Ireland, Norway, the Russian Federation, Spain and Sweden have reported sporadic influenza activity.

Countries in the tropical zone
Influenza activity in the tropical countries of the Americas is generally low or decreasing with the exception of Costa Rica where influenza A(H3N2) activity is increasing. In Nicaragua, transmission of the influenza A(H1N1)pmd09 virus that increased late September has been decreasing for the third consecutive week since its peak in week 42. Much lower numbers of influenza A(H3N2) have also been detected in the country. Low-level transmission of influenza A(H3N2) continues in El Salvador and Honduras after peaking in September. In the tropical area of Brazil an outbreak with influenza A(H1N1)pdm09 was reported in the city of Pedra Branca, Ceará.

In sub-saharan Africa, influenza transmission continues at low levels with exception of Cameroon. Influenza type B transmission began in June in Cameroon and appears to be declining overall since peaking in early September. Transmission of influenza A(H1N1)pdm09, which began about six weeks after influenza type B, appears to have peaked in early November, coincident with a rise in A(H3N2) detections. Sierra Leone has reported low level transmission of influenza A(H3N2), and Senegal has reported low level transmission of influenza type B after peaking in early November.

Influenza transmission in tropical Asia is active in localized areas. The high level transmission of a mixture of influenza A(H1N1)pdm09 and influenza type B in Cambodia and influenza A(H1N1)pdm09 in Lao People's Democratic Republic reported in the end of October continues, but seems to be decreasing. Viet

Nam has continued to report sustained transmission of mainly influenza A(H1N1)pdm09 for most of the year, which seems now to be declining. Other countries of southern Asia continue to report small numbers of both influenza A(H3N2) and influenza type B.

Countries in the temperate zone of the southern hemisphere
In the temperate regions of South America influenza transmission has declined to inter- seasonal levels and the season appears to be largely over. Low or no influenza transmission is reported in all countries.

South Africa experienced a second peak of influenza transmission this season between late August and late October of influenza type B and A(H3N2), which followed an earlier peak of influenza A(H1N1)pdm09 in June. Transmission of all influenza viruses has declined to low levels.

In Australia and New Zealand, activity is now at inter-seasonal levels. As was seen in the last year, inter-seasonal low level activity persists in Australia with low detection of influenza type B, influenza A (unsubtyped) and A(H3N2).

The entire WHO report is available online at
www.who.int/influenza/surveillance_monitoring/updates/latest_update_GIP_surveillance/en/index.html.

MDCH reported **NO INFLUENZA ACTIVITY** to CDC for the week ending December 3, 2011.

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

Novel Influenza Activity and Other News

WHO Pandemic Phase: Post-pandemic – Influenza disease activity has returned to levels normally seen for seasonal influenza. It is expected that the pandemic virus will behave as a seasonal influenza A virus. It is important to maintain surveillance and update pandemic preparedness/response plans accordingly.

National, Vaccine (CIDRAP, December 2): The Centers for Disease Control and Prevention (CDC) got a head start on preparing a vaccine against the novel swine-origin influenza strain recently found in four states by using a slightly different swine-origin strain that cropped up last year, CDC officials said today.

Since early September, the CDC has reported 10 infections with a swine-origin H3N2 reassortant strain that includes the M gene from the 2009 pandemic H1N1 (pH1N1) virus. On Nov 22 the CDC reported that it had prepared a vaccine virus and was providing it to vaccine manufacturers as a precaution in case the novel virus spreads.

A flu update from the World Health Organization (WHO) today revealed that the vaccine virus is based on an isolate that was collected in Minnesota in 2010. A CDC official told CIDRAP News that the isolate is from a pair of swine-origin H3N2 infections that occurred in Minnesota in November 2010. Those cases were among five swine-origin H3N2 cases reported in three states during the 2010-11 flu season.

The 2010 strain is not an exact match for the recent novel H3N2 isolates, but it is close enough to be the basis for a vaccine, said Michael Shaw, PhD, associate director for laboratory science in the CDC's Influenza Division.

"Since we were seeing these cases popping up sporadically, over the summer the decision was made to go ahead and try to make a high-yield reassortant [for a vaccine], and it turned out to be a good decision, to have it in reserve," Shaw said.

He said it takes several weeks to prepare a flu vaccine virus. In the case of the 2009 pandemic, the task took about 6 weeks, from Apr 15 to the end of May, which was considered fast, he noted.

The reason the Minnesota isolate was chosen was that it was the only one available at the time that grew in eggs, Shaw explained. "Vaccine strains need to be egg-derived, because inactivated vaccines are grown in eggs," he said. "This one from November 2010 is not like the new reassortant in that it doesn't

have that M gene from the H1N1 strain. But the HA [hemagglutinin] is close enough to be a good vaccine match."

Hemagglutinin is the viral surface protein that is recognized and targeted by the human immune system. The protein often mutates, making it necessary to formulate new vaccines.

Shaw said the hemagglutinin of the 2010 isolate is very closely related to the version found on the recent swine-origin viruses. "We've characterized it genetically and antigenically, so it would be an acceptable vaccine strain, which is why we decided to distribute it to the manufacturers, so they can get some experience with it and grow it, in case they have to scale up."

"All the major manufacturers are looking at it," he said. The CDC provides the virus to any US or foreign manufacturer that wants it.

To make a vaccine virus, the CDC first takes clinical isolates and puts them in eggs to see if they will grow, Shaw explained. Once an isolate that grows in eggs is identified, it is recombined with a laboratory strain that grows well in eggs. That task is handled by a separate lab at New York Medical College. The desired product is a "high-yield reassortant": a virus with internal genes from the lab strain and surface genes from the clinical isolate.

After a high-yield reassortant is obtained, it must be characterized to make sure it hasn't changed too much in the course of the lab manipulations, Shaw said. "There's a great deal of consultation with the FDA [Food and Drug Administration] and the WHO to reach the conclusion that it is the best one for its purposes," he added. "So about 6 weeks for the pandemic one, that's a very good timeline."

Since the creation of the vaccine virus from the 2010 isolate, the CDC has succeeded in growing one of the more recent novel H3N2 viruses, from an Indiana case, in eggs, but "we don't have a high-yield reassortant available for it," Shaw said. "For now the Minnesota one is the only one that's egg-derived and for which we have a high-yield reassortant."

Shaw said no more infections with the novel H3N2 strain have been reported since the three that were cited in Iowa children on Nov 22. Those cases were believed to involve person-to-person transmission, since the children attended the same daycare center and none of them had any exposure to pigs.

Nine of the 10 recent cases have been in children; all the patients recovered. Besides the Iowa illnesses, the cases include 2 in Indiana, 3 in Pennsylvania, and 2 in Maine.

International, Research (Lancet abstract, December 3): Global burden of respiratory infections due to seasonal influenza in young children: a systematic review and meta-analysis. H Nair, et al. Lancet 2011; 378:1917–30.

Background: The global burden of disease attributable to seasonal influenza virus in children is unknown. We aimed to estimate the global incidence of and mortality from lower respiratory infections associated with influenza in children younger than 5 years.

Methods: We estimated the incidence of influenza episodes, influenza-associated acute lower respiratory infections (ALRI), and influenza-associated severe ALRI in children younger than 5 years, stratified by age, with data from a systematic review of studies published between Jan 1, 1995, and Oct 31, 2010, and 16 unpublished population-based studies. We applied these incidence estimates to global population estimates for 2008 to calculate estimates for that year. We estimated possible bounds for influenza-associated ALRI mortality by combining incidence estimates with case fatality ratios from hospital-based reports and identifying studies with population-based data for influenza seasonality and monthly ALRI mortality.

Findings: We identified 43 suitable studies, with data for around 8 million children. We estimated that, in 2008, 90 million (95% CI 49–162 million) new cases of influenza (data from nine studies), 20 million (13–32 million) cases of influenza associated ALRI (13% of all cases of paediatric ALRI; data from six studies), and 1 million (1–2 million) cases of influenza associated severe ALRI (7% of cases of all severe paediatric ALRI; data from 39 studies) occurred worldwide in children younger than 5 years. We estimated there were 28 000–111 500 deaths in children younger than 5 years attributable to influenza-associated ALRI in 2008, with 99% of these deaths occurring in developing countries. Incidence and mortality varied substantially from year to year in any one setting.

Interpretation: Influenza is a common pathogen identified in children with ALRI and results in a substantial burden on health services worldwide. Sufficient data to precisely estimate the role of influenza in childhood mortality from ALRI are not available.

International, Research (EID abstract, early release January 2012): Hurt AC, et al. Mutations I117V and I117M and oseltamivir sensitivity of pandemic (H1N1) 2009 viruses. Emerg Infect Dis. 2012 Jan.

Analysis of mutations I117V and I117M in the neuraminidase of influenza A pandemic (H1N1) 2009 viruses showed that I117V confers a mild reduction in oseltamivir sensitivity and has a synergistic effect of further increasing resistance when combined with H275Y. Contrary to recent reports, the I117M mutation does not alter oseltamivir sensitivity.

The entire article is available online at http://wwwnc.cdc.gov/eid/pdfs/11-1079-ahead_of_print.pdf.

International, Canine (CIDRAP, December 5): South Korean researchers recently reported that they identified an H3N1 novel flu virus from a dog that represents a reassortant between the 2009 H1N1 virus and a canine H3N2 subtype. The isolate turned up in a surveillance program designed to monitor canine flu in animal shelters and kennels. Of 50 influenza A samples from May 2007 through Dec 2010, all were H3N2 subtypes, except for one H3N1. When researchers examined its genetic characteristics, they found that its hemagglutinin (HA) gene was similar to that of H3N2 circulating in South Korean dogs, but the other segments were closely related to the 2009 H1N1 virus. They compared the pathogenicity of the new virus by experimentally infecting dogs with it and the two parent viruses. Dogs infected with H3N2 showed typical canine flu symptoms, but those exposed to the novel H3N1 subtype and the 2009 H1N1 virus didn't show any symptoms. The team did find, though, that the H3N1 virus could be shed via the respiratory tract and cause moderate lung lesions. The researchers wrote that the reassortment event in dogs could suggest that companion animal behavior may determine the animals' ability to serve as intermediate hosts for flu viruses.

The abstract is available at http://vir.sgmjournals.org/content/early/2011/11/24/vir.0.037739-0.abstract.

International, Poultry (OIE [edited], December 5): High path avian influenza H5N2; South Africa
Epidemiological comments: Commercial ostrich farms. Initially no clinical signs or mortalities were seen. Stamping out of ostriches on positive farms is taking place.

Outbreak 1: AI_WCP2011_44, Oudtshoorn, WESTERN CAPE PROVINCE
Date of start of the outbreak: 21/10/2011; Outbreak status: resolved; Epidemiological unit: Farm
Species: Birds; Susceptible: 418; Cases: 29; Deaths: 0; Destroyed: 0; Slaughtered: 418

Outbreak 2: AI_WCP2011_45, Oudtshoorn, WESTERN CAPE PROVINCE
Date of start of the outbreak: 03/10/2011; Outbreak status: resolved; Epidemiological unit: Farm
Species: Birds; Susceptible: 259; Cases: 35; Deaths; 0; Destroyed: 0; Slaughtered: 259

Outbreak 3: AI_WCP2011_43, Oudtshoorn, WESTERN CAPE PROVINCE
Date of start of the outbreak: 04/10/2011; Outbreak status: resolved; Epidemiological unit: Farm
Species: Birds; Susceptible: 884; Cases: 15; Deaths: 0; Destroyed: 0; Slaughtered: 884

Outbreak 4: AI_WCP2011_46, Kannaland, WESTERN CAPE PROVINCE
Date of start of the outbreak: 17/10/2011; Outbreak status: continuing; Epidemiological unit: Farm
Species: Birds; Susceptible: 1370; Cases: 411; Deaths: 0; Destroyed: 0; Slaughtered: 0

Michigan Wild Bird Surveillance (USDA, as of December 8): For the 2011 season (April 1, 2011-March 31, 2012), highly pathogenic avian influenza H5N1 has not been recovered from 7 Michigan samples or 408 samples tested nationwide. For more information, visit http://wildlifedisease.nbii.gov/ai/.

To learn about avian influenza surveillance in Michigan wild birds or to report dead waterfowl, go to Michigan's Emerging Disease website at http://www.michigan.gov/emergingdiseases.

International Poultry and Wild Bird Surveillance (OIE): Reports of avian influenza activity, including summary graphs of avian influenza H5N1 outbreaks in poultry, can be found at the following website: http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm.

For questions or to be added to the distribution list, please contact Susan Peters at peterss1@michigan.gov

Contributors

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Table. H5N1 Influenza in Humans – As of November 29, 2011. http://www.who.int/influenza/human_animal_interface/EN_GIP_20111129CumulativeNumberH5N1casesN.pdf. Downloaded 11/29/2011. Cumulative lab-confirmed cases reported to WHO. Total cases includes deaths.

Country	2003-2004		2005		2006		2007		2008		2009		2010		2011		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Azerbaijan	0	0	0	0	8	5	0	0	0	0	0	0	0	0	0	0	8	5
Bangladesh	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	3	0
Cambodia	0	0	4	4	2	2	1	1	1	0	1	0	1	1	8	8	18	16
China	1	1	8	5	13	8	5	3	4	4	7	4	2	1	0	0	40	26
Djibouti	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Egypt	0	0	0	0	18	10	25	9	8	4	39	4	29	13	34	12	153	52
Indonesia	0	0	20	13	55	45	42	37	24	20	21	19	9	7	11	9	182	150
Iraq	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	3	2
Lao PDR	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	2
Myanmar	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
Nigeria	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
Pakistan	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	3	1
Thailand	17	12	5	2	3	3	0	0	0	0	0	0	0	0	0	0	25	17
Turkey	0	0	0	0	12	4	0	0	0	0	0	0	0	0	0	0	12	4
Vietnam	32	23	61	19	0	0	8	5	6	5	5	5	7	2	0	0	119	59
Total	50	36	98	43	115	79	88	59	44	33	73	32	48	24	55	29	571	335