MI Flu Focus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories

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Current Influenza Activity Levels:

- **Michigan:** Sporadic activity
- **National:** During April 21-27, influenza activity decreased in the United States

Updates of Interest

- **International:** As of May 8, WHO is reporting 31 human nCoV cases, including 18 deaths
- **International:** As of May 8, WHO is reporting 131 human avian influenza A(H7N9) cases

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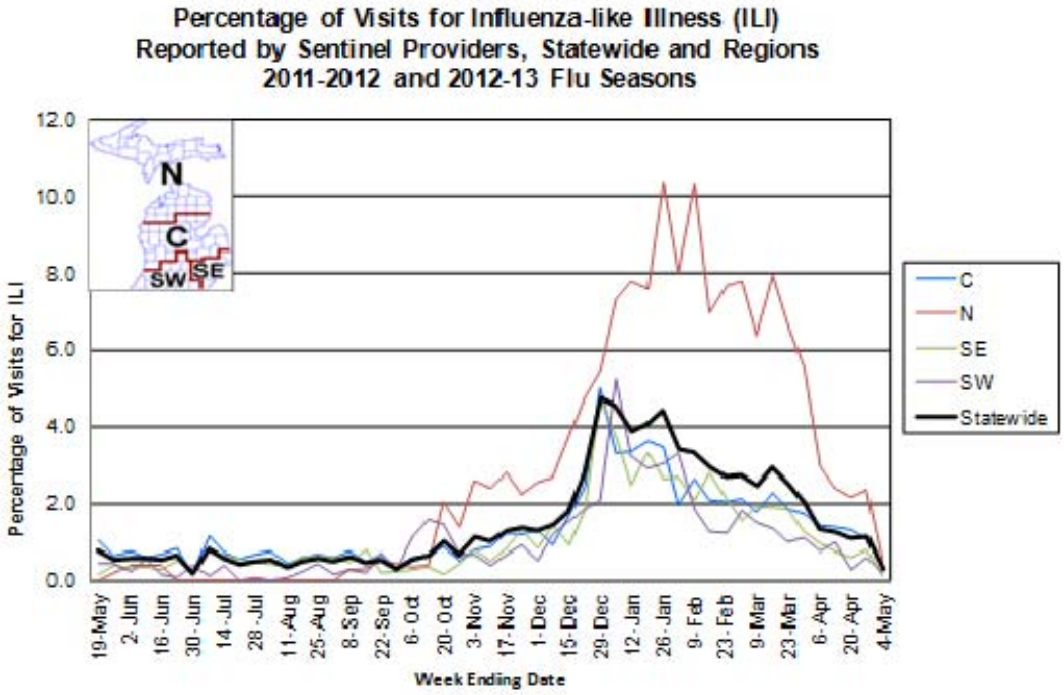
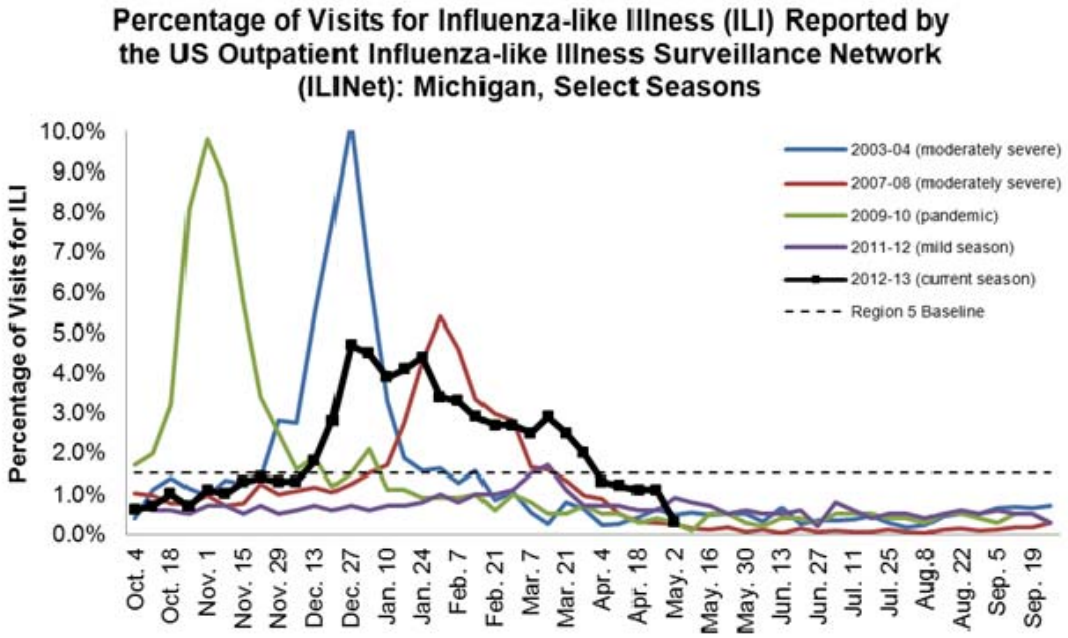
Influenza Surveillance Reports

Michigan Disease Surveillance System (as of May 9): MDSS data for the week ending May 4th indicated that compared to levels from the previous week, individual reports slightly increased, while aggregate influenza reports slightly decreased. Aggregate reports are slightly lower than levels seen during the same time period last year, while individual reports are slightly higher.

Emergency Department Surveillance (as of May 9): Compared to levels from the week prior, emergency department visits from both constitutional and respiratory complaints remained steady. Constitutional complaints are similar to levels reported during the same time period last year, while respiratory complaints are slightly lower. In the past week, there were 4 constitutional alerts in the SW(1) and C(3) Influenza Surveillance Regions and 3 respiratory alerts in the C(3) Region.

Sentinel Provider Surveillance (as of May 9): During the week ending May 4, 2013, the proportion of visits due to influenza-like illness (ILI) decreased to 0.3% overall; this is below the regional baseline (1.5%). A total of 17 patient visits due to ILI were reported out of 5,858 office visits. Data were provided by 24 sentinel sites from the following regions: Central (10), North (3), Southeast (7) and Southwest (4). ILI activity decreased in all four regions: C (0.4%), N (0.5%), SE (0.1%), and SW (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 Stefanie DeVita at 517-335-3385 or DeVitaS1@michigan.gov for more information.

Hospital Surveillance (as of May 4): The CDC Influenza Hospitalization Surveillance Project provides population-based rates of severe influenza illness through active surveillance and chart review of lab-confirmed cases, starting on October 1, 2012, in the Clinton, Eaton, Genesee, and Ingham counties. No new cases were identified during the past week. As of May 4th, there have been 258 influenza hospitalizations (168 adult, 90 pediatric) within the catchment area. The incidence rate for adults is 24.7 hospitalizations per 100,000 population and for children is 43.0 hospitalizations per 100,000.

The MDCH Influenza Sentinel Hospital Network monitors influenza hospitalizations reported voluntarily by hospitals statewide. Reporting for the 2012-13 influenza season has concluded. 437 hospitalizations (278SE, 21SW, 64C, 74N) were reported by 12 hospitals during the 2012-13 season.

Laboratory Surveillance (as of May 4): During April 28-May 4, 2 A(H1N1)pdm09 (2SE) and 1 influenza B (1SW) results were reported by MDCH. For the 2012-13 season (starting Sept. 30, 2012), MDCH has identified 679 influenza results:

- Influenza A(H3): 500 (124SE, 169SW, 169C, 38N)
- Influenza A(H1N1)pdm09: 35 (19SE, 4SW, 9C, 3N)
- Influenza B: 152 (30SE, 31SW, 74C, 18N)
- Parainfluenza: 8 (3SW, 1C, 4N)
- RSV: 1 (1N)
- hMPV: 2 (2SW)

8 sentinel labs (SE, SW, C) reported for the week ending May 4, 2013. 2 labs (SE, SW) reported sporadic flu A activity. 1 lab (SE) reported low flu B activity. 1 lab (SE) had sporadic parainfluenza activity. 6 labs (SE, SW, C) reported low or sporadic RSV activity. 2 labs (SE, SW) had low HMPV activity. Testing volumes are low except for a few SE sites.

Michigan Influenza Antigenic Characterization (as of May 9): For the 2012-13 season, 113 Michigan influenza B specimens have been characterized at MDCH BOL. 94 specimens are B/Wisconsin/01/2010-like, matching the B component of the 2012-13 influenza vaccine. 19 influenza B specimens were characterized as B/Brisbane/60/2008-like, which is not included in the 2012-13 vaccine.

Michigan Influenza Antiviral Resistance Data (as of May 9): For the 2012-13 season, 32 influenza A/H3 specimens and 25 influenza A(H1N1)pdm09 specimens have been tested at the MDCH BOL for antiviral resistance. None of the influenza isolates tested have been resistant.

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.

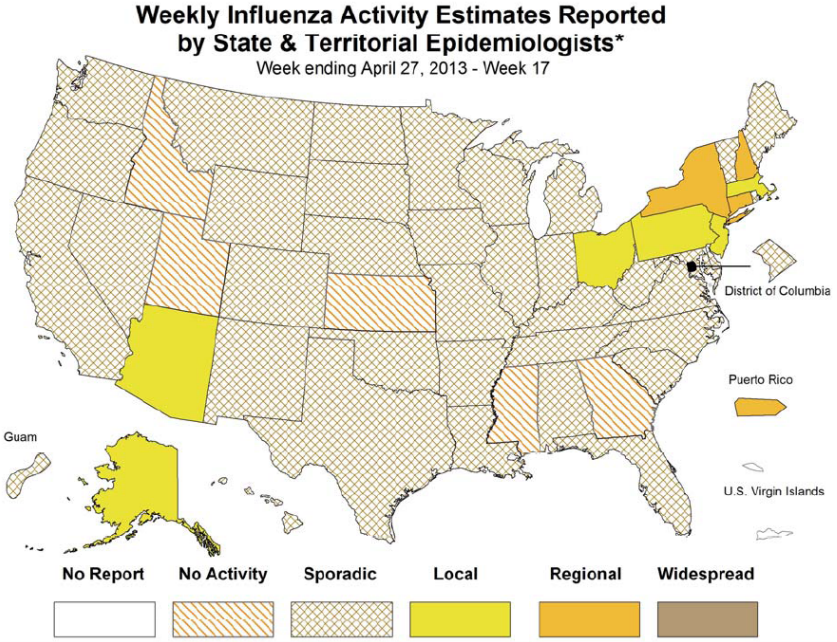
Influenza-associated Pediatric Mortality (as of May 9): 6 pediatric influenza-associated influenza mortalities (2 A/H3, 4B) have been reported for the 2012-13 season.

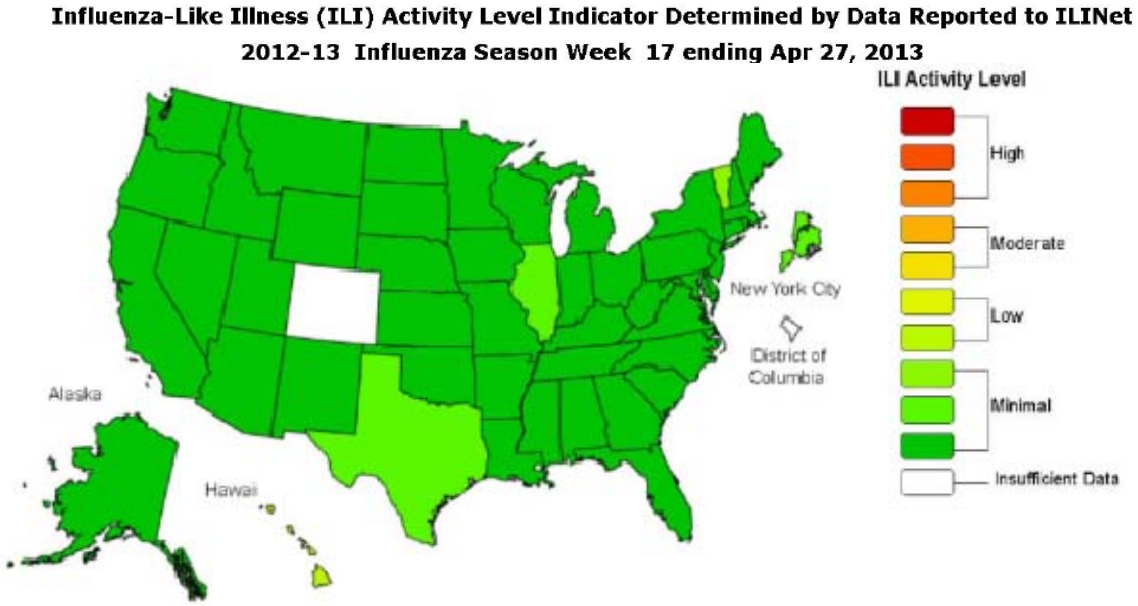
CDC requires reporting of flu-associated pediatric deaths (<18 yrs), including pediatric deaths due to an influenza-like illness with lab confirmation of influenza or any unexplained pediatric death with evidence of an infectious process. Contact MDCH immediately for proper specimen collection. The MDCH protocol is at www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf.

Influenza Congregate Settings Outbreaks (as of May 9): 111 respiratory outbreaks (22SE, 29SW, 41C, 19N) have been reported to MDCH during the 2012-13 season; testing results are listed below.

- Influenza A/H3: 16 (7SW, 9C)
- Influenza A: 55 (10SE, 13SW, 20C, 12N)
- Influenza B: 8 (1SE, 3SW, 2C, 2N)
- Influenza A and B: 2 (1SE, 1SW)
- Influenza A/H3 and B: 1 (1C)
- Influenza positive: 4 (1SE, 1SW, 2C)
- Influenza and RSV positive: 1 (1C)
- Influenza B and RSV positive: 1 (1SE)
- Negative/no testing: 23 (8SE, 4SW, 6C, 5N)

National (CDC [edited], May 3): During week 17 (April 21-27, 2013), influenza activity decreased in the United States. Of 2,746 specimens tested and reported by collaborating labs, 177 (6.5%) were positive for influenza. The proportion of deaths attributed to pneumonia and influenza was below the epidemic threshold. 7 pediatric deaths were reported. A cumulative rate for the season of 44.2 laboratory-confirmed influenza-associated hospitalizations per 100,000 population was reported. Of reported hospitalizations, 50% were among adults 65 years and older. The proportion of outpatient visits for influenza-like illness (ILI) was 1.0%. This is below the national baseline of 2.2%. All 10 regions reported ILI below region-specific baseline levels. One state experienced low activity; 48 states and New York City experienced minimal activity, and the District of Columbia and 1 state had insufficient data. Puerto Rico and 3 states reported regional influenza activity; 6 states reported local activity; the District of Columbia, Guam, and 36 states reported sporadic activity; 5 states reported no activity, and the U.S. Virgin Islands did not report.





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 epidemiologists.

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

International (WHO [edited], April 26): Influenza activity across the northern temperate regions have continued to decline to near inter-seasonal levels in much of North America, Europe, and northern Asia though low level persistent transmission was still noted in many countries. The persistence of transmission in the northern hemisphere temperate regions has been associated with increasing numbers of influenza type B virus appearing late in the season in a number of countries of North America and Europe. Prior to this, influenza A(H3N2) was the most commonly detected virus in North America, A(H1N1)pdm09 in Europe, and both in varying proportions in different countries of northern Asia. Low levels of influenza activity continued to be reported across the tropical regions of the world and activity in countries of the southern hemisphere remained at inter-seasonal levels. Nearly all influenza A viruses characterized this season have been antigenically related to those contained in the current trivalent vaccine. Among the B viruses characterized, those that were of the Yamagata lineage were antigenically related to the viruses recommended for the trivalent vaccine but a sizable number of B viruses were also of the Victoria lineage. Only very low numbers of oseltamivir and zanamivir resistant viruses have been detected. In China, new cases of H7N9 have been reported with over 100 cases to date; for more information see link below.

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

MDCH reported SPORADIC INFLUENZA ACTIVITY to CDC for the week ending May 4, 2013.

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.

International, Human (WHO [edited], May 2): The Ministry of Health in Saudi Arabia has informed WHO of seven new laboratory confirmed cases of infection with the novel coronavirus (nCoV), including five deaths. Two patients are currently in critical condition. The government is conducting ongoing investigation into this outbreak. Preliminary investigation shows no indication of recent travel or animal contact of any of the confirmed cases. The confirmed cases are not from the same family.

From September 2012 to date, WHO has been informed of a global total of 24 laboratory confirmed cases of human infection with nCoV, including 16 deaths.

The full report is available online at http://www.who.int/csr/don/2013_05_02_ncov/en/index.html.

International, Human (WHO [edited], May 3): The Ministry of Health in Saudi Arabia has informed WHO of an additional three laboratory confirmed cases of infection with the novel coronavirus (nCoV). The three patients are from the same location as reported in the Disease Outbreak News published on 2 May 2013. They are currently in critical condition. According to preliminary information, at least two confirmed cases are from the same family.

From September 2012 to date, WHO has been informed of a global total of 27 laboratory confirmed cases of human infection with nCoV, including 16 deaths.

The full report is available online at http://www.who.int/csr/don/2013_05_03_ncov/en/index.html.

International, Human (WHO [edited], May 6): The Ministry of Health in Saudi Arabia has informed WHO of an additional three laboratory confirmed cases of infection with the novel coronavirus (nCoV). Two of

the patients died on 3 May 2013 and one is currently in critical condition. The government is conducting ongoing investigation into this outbreak which is linked to one health care facility. Since the beginning of May 2013, a total of 13 patients have been reported from this outbreak, of which seven have died. Of the 13 patients, 10 are men and three women. The age range of the patients are from 24 to 94 years old.

From September 2012 to date, WHO has been informed of a global total of 30 laboratory confirmed cases of human infection with nCoV, including 18 deaths.

The full report is available online at http://www.who.int/csr/don/2013_05_06_ncov/en/index.html.

International, Human (WHO [edited], May 8): The Ministry of Social Affairs and Health in France has informed WHO of one confirmed case with infection of the novel coronavirus (NCoV). The patient had an underlying medical condition, including an immunocompromised state. The patient became ill on 23 April 2013 and later developed respiratory symptoms. Laboratory confirmation with nCoV was confirmed on 7 May 2013 by Institut Pasteur. The laboratory confirmation was obtained from a bronchoalveolar lavage specimen (a medical procedure in which bronchoscope is passed through the mouth or nose into the lungs to obtain fluid for examination) after a nasopharyngeal specimen (secretion from the uppermost part of the throat) tested negative. The patient is currently hospitalized. Preliminary investigation reveals that the patient had a history of travel to Dubai, United Arab Emirates. Further investigation is ongoing.

From September 2012 to date, WHO has been informed of a global total of 31 laboratory confirmed cases of human infection with nCoV, including 18 deaths.

The full report is available online at http://www.who.int/csr/don/2013_05_08_ncov/en/index.html.

International, Human (WHO [edited], May 8): Novel coronavirus summary and literature update

As of 8 May 2013, 30 laboratory-confirmed cases of human infection with novel coronavirus (nCoV) have been reported to WHO: two from Jordan, two from Qatar, 23 cases from Saudi Arabia, two from the United Kingdom (UK), and one from the United Arab Emirates. Most patients are male (79.3%; 23 of 29 cases with sex reported) and range in age from 24 to 94 years (median 56 years). The first cases had onset of illness in late March or early April 2012; the most recent cases reported had onset on 1 May 2013 (13 cases with onset 14 April - 1 May 2013). Most patients presented with severe acute respiratory disease requiring hospitalization and eventually required mechanical ventilation or other advanced respiratory support. Eighteen patients have died.

Several cases have occurred in clusters, including in a health care setting in Jordan in April 2012 (of 2 confirmed and 11 probable cases, 10 were health care workers) and in the UK among family members of an infected patient who had recently arrived from Saudi Arabia. The Jordanian outbreak illustrated the potential of this virus to spread through health care facilities and the UK outbreak confirmed the potential of the virus to transmit between humans with close contact. In neither instance did transmission appear to go beyond the immediate outbreak into the community.

Since 14 April 2013, 13 new cases of infection have been confirmed and reported in Saudi Arabia (10 males and 3 females, median age 58 years). Seven of these have died, four remain critically ill in intensive care and two are hospitalized but clinically improved. All patients were reported to have at least one comorbid medical condition and most had more than one. Most of the cases were patients at a single health care facility. Two were family members of two patients from that facility; no health care workers have been affected. Although investigations are still ongoing into the source of this outbreak, early information indicated that only a small minority of these cases had contact with animals in the time leading up to their illness.

Summary: The reappearance of this virus and the pattern of transmission currently being observed in Saudi Arabia increase the level of concern regarding this novel pathogen. The questions of the exposures that result in human infection, the mode of transmission, the source of the virus, and the extent of infection in the community urgently need to be answered and are being actively pursued by the Ministry of Health of Saudi Arabia. The association of this outbreak with a single health care facility suggests nosocomial transmission. The patients may have had increased susceptibility to infection or severe disease because of their multiple comorbidities. However, the presence of infection in two family members not associated with the facility itself raises a concern about potential broader transmission in the community. Some features of the cases, such as the predominance of males and the age distribution among confirmed cases, may provide important clues to exposures. In addition to the key epidemiological

questions, more work is needed to determine the optimal management strategy for patients infected with nCoV and to evaluate potential pharmaceutical interventions.

Evidence suggests that the virus may have its origin in bat species, though the evidence is largely circumstantial and will remain so until the virus is demonstrated in an animal species. However, experience with Nipah virus in Malaysia and Severe Acute Respiratory Syndrome (SARS) in China both illustrate that intermediate hosts may sometimes play an important role in transmission to humans and that direct exposure to reservoir specie(s) is not needed for infection. Therefore, the work to identify the source, the exposure and the mode of transmission should be multisectoral and involve veterinary services, food safety authorities, environmental health agencies in addition to public health authorities.

The full update is at www.who.int/csr/disease/coronavirus_infections/update_20130508/en/index.html.

International, Human (WHO [edited], May 8): As of 8 May 2013 (11:00 CET), the National Health and Family Planning Commission, China notified WHO of an additional laboratory-confirmed case of human infection with avian influenza A(H7N9) virus. The patient is a 79-year-old woman from Jiangxi province who became ill on 3 May 2013. Additionally, a patient earlier reported has died.

To date, 131 laboratory-confirmed cases of human infection with avian influenza A(H7N9) virus including 32 deaths have been reported to WHO. Contacts of the confirmed cases are being closely monitored.

May 6 WHO update: http://www.wpro.who.int/outbreaks_emergencies/H7N9/en/index.html.
May 7 WHO update: http://www.who.int/csr/don/2013_05_07/en/index.html
The full report is available online at http://www.who.int/csr/don/2013_05_08/en/index.html.

International, Research (The Lancet abstract, May 1): Origin and diversity of novel avian influenza A H7N9 viruses causing human infection: phylogenetic, structural, and coalescent analyses. Di Liu et al. Lancet 1 May 2013 [Epub]. DOI: 10.1016/S0140-6736(13)60938-1

Background: On March 30, 2013, a novel avian influenza A H7N9 virus that infects human beings was identified. This virus had been detected in six provinces and municipal cities in China as of April 18, 2013. We correlated genomic sequences from avian influenza viruses with ecological information and did phylogenetic and coalescent analyses to extrapolate the potential origins of the virus and possible routes of reassortment events.

Methods: We downloaded H7N9 virus genome sequences from the Global Initiative on Sharing Avian Influenza Data (GISAID) database and public sequences used from the Influenza Virus Resource. We constructed phylogenetic trees and did 1000 bootstrap replicates for each tree. Two rounds of phylogenetic analyses were done. We used at least 100 closely related sequences for each gene to infer the overall topology, removed suspicious sequences from the trees, and focused on the closest clades to the novel H7N9 viruses. We compared our tree topologies with those from a bayesian evolutionary analysis by sampling trees (BEAST) analysis. We used the bayesian Markov chain Monte Carlo method to jointly estimate phylogenies, divergence times, and other evolutionary parameters for all eight gene fragments. We used sequence alignment and homology-modeling methods to study specific mutations regarding phenotypes, specifically addressing the human receptor binding properties.

Findings: The novel avian influenza A H7N9 virus originated from multiple reassortment events. The HA gene might have originated from avian influenza viruses of duck origin, and the NA gene might have transferred from migratory birds infected with avian influenza viruses along the east Asian flyway. The six internal genes of this virus probably originated from two different groups of H9N2 avian influenza viruses, which were isolated from chickens. Detailed analyses also showed that ducks and chickens probably acted as the intermediate hosts leading to the emergence of this virulent H7N9 virus. Genotypic and potential phenotypic differences imply that the isolates causing this outbreak form 2 separate subclades.

Interpretation: The novel avian influenza A H7N9 virus might have evolved from at least four origins. Diversity among isolates implies that the H7N9 virus has evolved into at least two different lineages. Unknown intermediate hosts involved might be implicated, extensive global surveillance is needed, and domestic-poultry-to-person transmission should be closely watched in the future.

The abstract is available online at http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)60938-1/fulltext#article_upsell.

International, Research (Journal of Virology abstract, May 1): The highly pathogenic H7N3 avian influenza strain from July 2012 in Mexico acquired an extended cleavage site through recombination with host 28S rRNA. S. Maurer-Stroh et al. Virology Journal 2013, 10:139 doi:10.1186/1743-422X-10-139

Background: A characteristic difference between highly and non-highly pathogenic avian influenza strains is the presence of an extended, often multibasic, cleavage motif insertion in the hemagglutinin protein. Such motif is found in H7N3 strains from chicken farm outbreaks in 2012 in Mexico.

Methods: Through phylogenetic, sequence and structural analysis, we try to shed light on the role, prevalence, likelihood of appearance and origin of the inserted cleavage motifs in these H7N3 avian influenza strains.

Results: The H7N3 avian influenza strain which caused outbreaks in chicken farms in June/July 2012 in Mexico has a new extended cleavage site which is the likely reason for its high pathogenicity in these birds. This cleavage site appears to have been naturally acquired and was not present in the closest low pathogenic precursors. Structural modeling shows that insertion of a productive cleavage site is quite flexible to accept insertions of different length and with sequences from different possible origins. Different from recent cleavage site insertions, the origin of the insert here is not from the viral genome but from host 28S ribosomal RNA (rRNA) instead. This is a novelty for a natural acquisition as a similar insertion has so far only been observed in a laboratory strain before. Given the abundance of viral and host RNA in infected cells, the acquisition of a pathogenicity-enhancing extended cleavage site through a similar route by other low-pathogenic avian strains in future does not seem unlikely. Important for surveillance of these H7N3 strains, the structural sites known to enhance mammalian airborne transmission are dominated by the characteristic avian residues and the risk of human to human transmission should currently be low but should be monitored for future changes accordingly.

Conclusions: This highly pathogenic H7N3 avian influenza strain acquired a novel extended cleavage site which likely originated from recombination with 28S rRNA from the avian host. Notably, this new virus can infect humans.

The full article is available online at http://www.virologyj.com/content/pdf/1743-422X-10-139.pdf.

International, Research (CIDRAP, May 8): A study published today in JAMA Psychiatry suggests that maternal influenza during pregnancy may increase the risk of bipolar disorder (BD) in her child. The finding comes from a case-control study of a birth cohort from the Child Health and Development Study (CHDS), which involved nearly all pregnant women who received obstetric care from the Kaiser Permanente Medical Care plan, Northern California Region, from 1959 through 1966. The researchers gathered data on treated maternal flu cases from the CHDS. They used several approaches to look for potential BD cases in the cohort, including searching databases of the CHDS, Kaiser Permanente, and a large county healthcare system; mailing a questionnaire to the CHDS cohort; and using an earlier psychiatric follow-up study on the cohort. The team identified 92 BD case-patients and 722 matched controls. Eight of the 92 BD case-patients (8.7%) were exposed to flu at any time during gestation, versus 19 of 722 controls (2.6%), which signaled an odds ratio of 3.82 (95% confidence interval, 1.58 to 9.24; P = .003). Adjustment for several potential confounders, including maternal age, race, and education, made little difference. The authors also found that exposure to maternal respiratory infections other than influenza was not linked to an increase in BD risk. "Although replication is required, the findings suggest that prevention of maternal influenza during pregnancy may reduce the risk of BD," the authors conclude.

The abstract is available online at http://archpsyc.jamanetwork.com/article.aspx?articleid=1686037.

International, Poultry (OIE [edited], May 5): Low pathogenic avian influenza H7N9; China
Outbreak 1: Xiangtang market, Nanchang, Nanchang, JIANGXI
Date of start of the outbreak: 04/04/2013; Outbreak status: Continuing
Species: Birds; Cases: 1; Deaths: 0; Destroyed: 0; Affected population: 1 sample from chicken

Outbreak 2: Sanniao live bird wholesale market, Dongcheng, Dongguan, GUANGDONG
Date of start of the outbreak: 04/04/2013; Outbreak status: Continuing
Species: Birds; Cases: 1; Deaths: 0; Destroyed: 89864; Affected population: 1 sample from chicken

Outbreak 3: Xinfulu live bird market, Shizhong, Zaozhuang, SHANDONG
Date of start of the outbreak: 04/04/2013; Outbreak status: Continuing
Species: Birds; Cases: 3; Deaths: 0; Destroyed: 0; Affected population: 3 samples from environment

International, Poultry (OIE [edited], May 8): Highly pathogenic avian influenza H7N3; Mexico
Outbreak 1: San Diego de Alejandría, San Diego de Alejandría, JALISCO
Date of start of the outbreak: 01/03/2013; Outbreak status: Resolved; Epidemiological unit: Village
Species: Birds; Susceptible: 16; Cases: 11; Deaths: 10; Destroyed: 6

Outbreak 2: San José Iturbide, San José Iturbide, GUANAJUATO
Date of start of the outbreak: 03/04/2013; Outbreak status: Resolved; Epidemiological unit: Farm
Species: Birds; Susceptible: 319398; Deaths: 0; Destroyed: 319398

Outbreak 3: Dolores Hidalgo, Dolores Hidalgo, GUANAJUATO
Date of start of the outbreak: 10/04/2013; Outbreak status: Resolved; Epidemiological unit: Farm
Species: Birds; Susceptible: 100601; Deaths: 0; Destroyed: 100601

Outbreak 4: Tepatitlán de Morelos, Tepatitlán de Morelos, JALISCO
Date of start of the outbreak: 29/04/2013; Outbreak status: Resolved; Epidemiological unit: Farm
Species: Birds; Susceptible: 320000; Deaths: 0; Destroyed: 320000

Outbreak 5: Palmar de Bravo, Palmar de Bravo, PUEBLA
Date of start of the outbreak: 01/05/2013; Outbreak status: Resolved; Epidemiological unit: Farm
Species: Birds; Susceptible: 150000; Cases: 75000; Deaths: 40000; Destroyed: 11000

Michigan and National Wild Bird Surveillance (USDA, as of May 9): For the 2012 season (April 1, 2012-March 31, 2013), highly pathogenic avian influenza H5N1 has not been recovered from the 213 samples tested nationwide. For more information, visit http://www.nwhc.usgs.gov/ai/. To learn about avian influenza surveillance in wild birds or to report dead waterfowl, go to the 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 April 26, 2013. http://www.who.int/influenza/human_animal_interface/EN_GIP_20130426 CumulativeNumberH5N1cases.pdf. Downloaded 4/29/2013. Cumulative lab-confirmed cases reported to WHO. Total cases include deaths.

Country	2003-2006		2007		2008		2009		2010		2011		2012		2013		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Azerbaijan	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	5
Bangladesh	0	0	0	0	1	0	0	0	0	0	2	0	3	0	1	1	7	1
Cambodia	6	6	1	1	1	0	1	0	1	1	8	8	3	3	10	8	31	27
China	22	14	5	3	4	4	7	4	2	1	1	1	2	1	2	2	45	30
Djibouti	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Egypt	18	10	25	9	8	4	39	4	29	13	39	15	11	5	3	2	172	62
Indonesia	75	58	42	37	24	20	21	19	9	7	12	10	9	9	0	0	192	160
Iraq	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2
Lao PDR	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Myanmar	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Nigeria	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Pakistan	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	3	1
Thailand	25	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	17
Turkey	12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	4
Vietnam	93	42	8	5	6	5	5	5	7	2	0	0	4	2	2	1	125	62
Total	263	158	88	59	44	33	73	32	48	24	62	34	32	20	18	14	628	374