MI Flu Focus

Influenza Surveillance Updates
Bureaus of Epidemiology and Laboratories

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Current Influenza Activity Levels:

- **Michigan:** Local activity
- **National:** During April 7-13, influenza activity decreased in the United States

Updates of Interest

- **International:** As of April , WHO is reporting 109 human cases of avian influenza H7N9
- **International:** WHO publishes a summary of the 17 novel coronavirus cases to date

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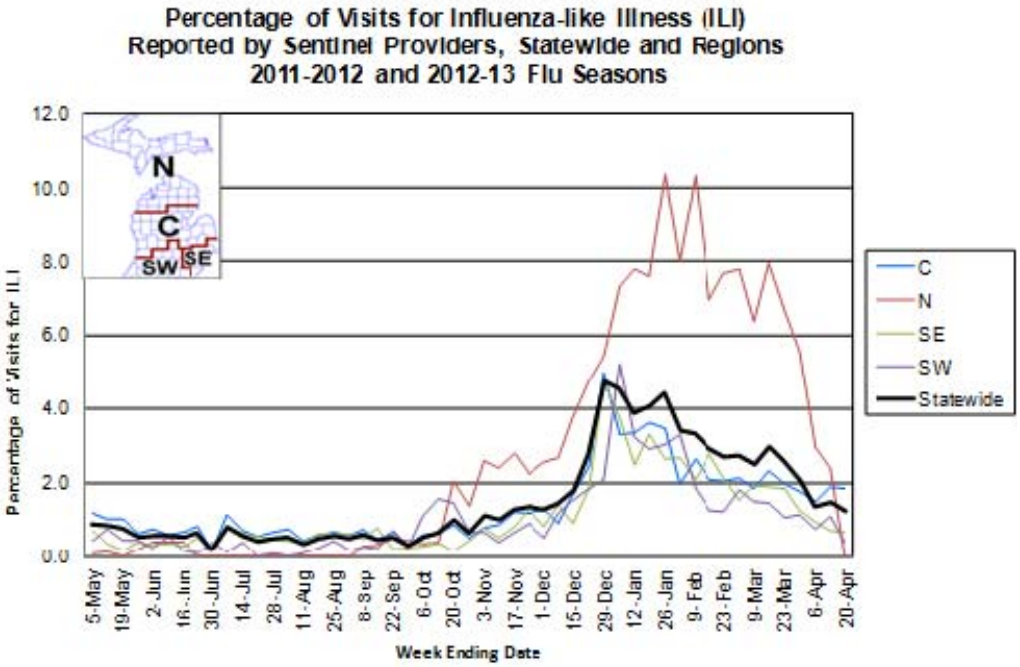
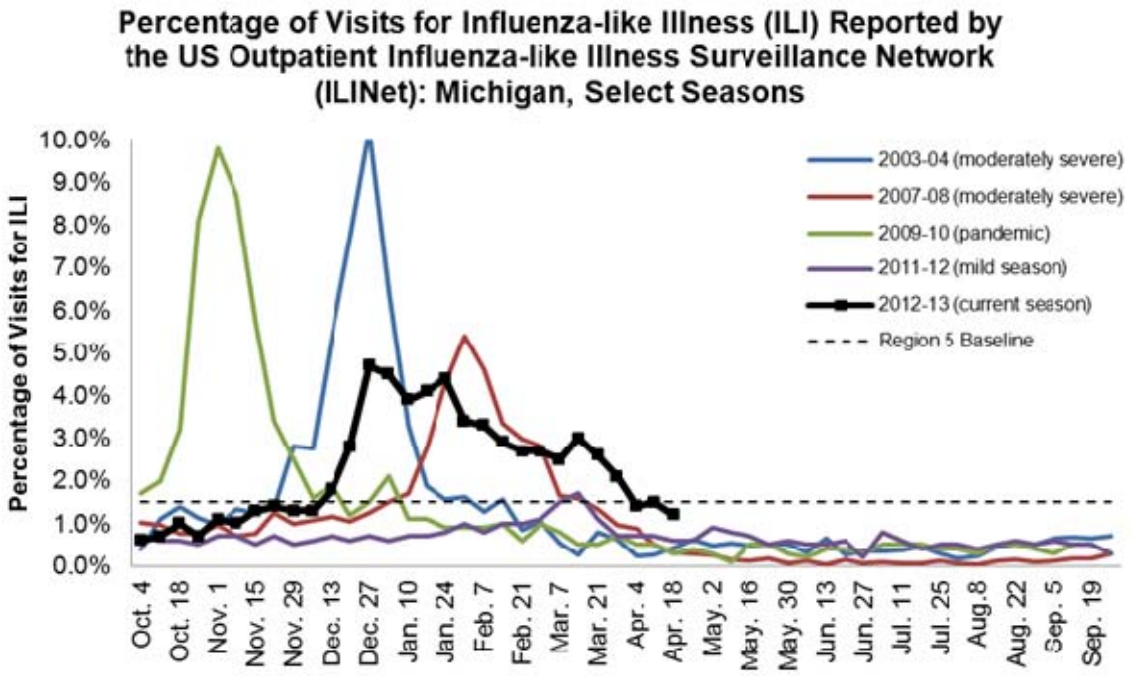
Influenza Surveillance Reports

Michigan Disease Surveillance System (as of April 25): MDSS data for the week ending April 20th indicated that compared to levels from the previous week, individual reports increased, while aggregate influenza reports remained steady. Individual reports are slightly higher than levels seen during the same time period last year, while aggregate reports are similar.

Emergency Department Surveillance (as of April 25): Compared to levels from the week prior, emergency department visits from constitutional and respiratory complaints decreased. Both constitutional and respiratory complaints are similar to levels reported during the same time period last year, with constitutional visits reaching baseline levels in between influenza seasons. In the past week, there was 1 constitutional alert in the SW Influenza Surveillance Region and 2 respiratory alerts in the C(1) and N(1) Regions.

Sentinel Provider Surveillance (as of April 25): During the week ending April 20, 2013, the proportion of visits due to influenza-like illness (ILI) decreased to 1.2% overall; this is below the regional baseline (1.5%). A total of 99 patient visits due to ILI were reported out of 8,027 office visits. Data were provided by 19 sentinel sites from the following regions: Central (6), North (1), Southeast (9) and Southwest (3). ILI activity decreased in two regions: N (0.0%) and SW (0.4%). ILI activity remained the same in two regions: C (1.9%) and SE (0.7%). 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 Stephanie DeVita at 517-335-8159 or DeVitaS1@michigan.gov for more information.

Hospital Surveillance (as of April 20): 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. 4 new cases were identified during the past week. As of April 20th, there have been 257 influenza hospitalizations (168 adult, 89 pediatric) within the catchment area. The incidence rate for adults is 24.7 hospitalizations per 100,000 population and for children is 42.6 hospitalizations per 100,000.

The MDCH Influenza Sentinel Hospital Network monitors influenza hospitalizations reported voluntarily by hospitals statewide. 8 hospitals (SE, C) reported for the week ending April 20, 2013. Results are listed in the table below.

Age Group	Hospitalizations Reported During Current Week	Total Hospitalizations 2012-13 Season
0-4 years	2 (2C)	34 (6SE, 23C, 5N)
5-17 years	1 (1SE)	15 (3SE, 1SW, 9C, 2N)
18-49 years	1 (1SE)	52 (35SE, 2SW, 10C, 5N)
50-64 years	4 (4SE)	86 (63SE, 4SW, 7C, 12N)
≥65 years	11 (11SE)	237 (171SE, 14SW, 15C, 48N)
Total	18 (16SE, 2C)	435 (278SE, 21SW, 64C, 72N)

Laboratory Surveillance (as of April 20): During April 14-20, 3 influenza A(H3) (3C), 1 A(H1N1)pdm09 (1C) and 7 influenza B (4C, 3N) results were reported by MDCH. For the 2012-13 season (starting Sept. 30, 2012), MDCH has identified 668 influenza results:

- Influenza A(H3): 499 (124SE, 169SW, 169C, 37N)
- Influenza A(H1N1)pdm09: 30 (16SE, 2SW, 9C, 3N)
- Influenza B: 147 (30SE, 28SW, 73C, 17N)
- Parainfluenza: 8 (3SW, 1C, 4N)
- RSV: 1 (1N)

11 sentinel labs (SE, SW, C) reported for the week ending April 20, 2013. 7 labs (SE, SW, C) reported low or sporadic flu A activity. 7 labs (SE, SW, C) reported declining or low levels of flu B activity. At most labs, flu B activity remains higher than flu A activity. 4 labs (SE, SW, C) had sporadic parainfluenza activity. 8 labs (SE, SW, C) reported low or decreasing RSV activity. 3 labs (SE, SW) had low HMPV activity. Testing volumes are low except for a few SE sites that remain at higher testing volumes.

Michigan Influenza Antigenic Characterization (as of April 25): 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 April 25): For the 2012-13 season, 30 influenza A/H3 specimens and 19 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 April 25): 6 pediatric influenza-associated influenza mortalities (2 A/H3, 4B) have been reported for the 2012-13 season.

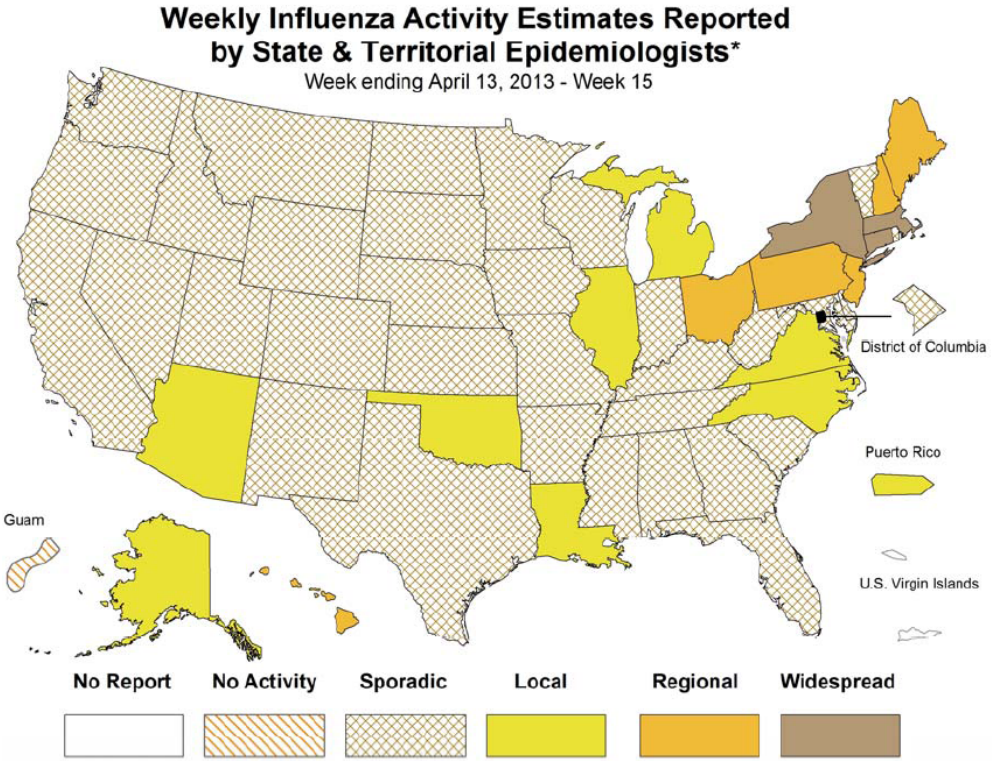
CDC requires reporting of flu-associated pediatric deaths (<18 yrs), including pediatric deaths due to an influenza-like illness with lab confirmation of influenza or any unexplained pediatric death with evidence of an infectious process. Contact MDCH immediately for proper specimen collection. The MDCH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

Influenza Congregate Settings Outbreaks (as of April 25): 111 respiratory outbreaks (22SE, 29SW, 41C, 19N) have been reported to MDCH during the 2012-13 season; testing results are listed below.

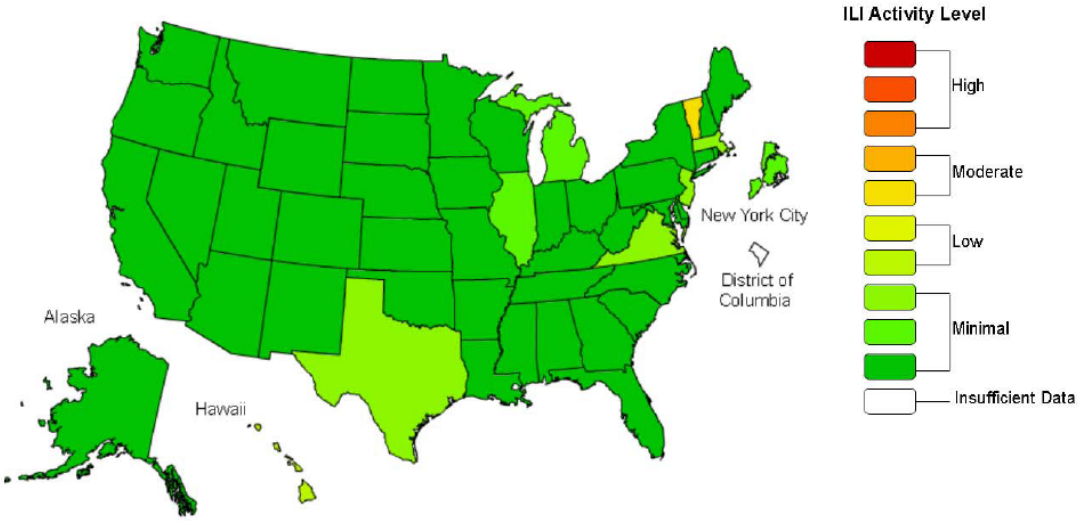
- Influenza A/H3: 16 (7SW, 9C)
- Influenza A: 55 (10SE, 13SW, 20C, 12N)
- Influenza B: 8 (1SE, 3SW, 2C, 2N)
- Influenza A and B: 2 (1SE, 1SW)
- Influenza A/H3 and B: 1 (1C)
- Influenza positive: 4 (1SE, 1SW, 2C)
- Influenza and RSV positive: 1 (1C)
- Influenza B and RSV positive: 1 (1SE)
- Negative/no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

National (CDC [edited], April 19): During week 15 (April 7-13, 2013), influenza activity decreased in the United States. Of 3,802 specimens tested and reported by collaborating labs, 354 (9.3%) were positive for influenza. The proportion of deaths attributed to pneumonia and influenza was below the epidemic threshold. Ten pediatric deaths were reported. A cumulative rate for the season of 43.7 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 1.3%. This is below the national baseline of 2.2%. One of 10 regions reported ILI at or above region-specific baseline levels. One state experienced moderate activity; one state experienced low activity; 48 states and New York City experienced minimal activity, and the District of Columbia had insufficient data. Three states reported widespread influenza activity; 6 states reported regional activity; Puerto Rico and 8 states reported local activity; the District of Columbia and 33 states reported sporadic activity; Guam reported no activity, and the U.S. Virgin Islands did not report.

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



Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILINet
2012-13 Influenza Season Week 15 ending Apr 13, 2013



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.

International (WHO [edited], April 12): Influenza activity in North America appears to have declined during the last week of March since peaking in early January in Canada and the United States and approximately two weeks later in Mexico. Proportionally influenza B increased although A(H3N2) was the most commonly detected virus in North America overall for this season. Activity continued to decline in Europe in general but in most parts of Eastern Europe where elevated levels of activity remained. The proportion of subtypes of viruses circulating was not uniform across the continent and has changed through the season. Influenza B mainly reported in western and northern countries and influenza A in eastern and central Europe. So far this season, excess mortality in most countries has been moderate and most deaths occurred among people aged 65 and older with no excess mortality in younger age groups. Influenza activity throughout the temperate region of Asia decreased overall with the exception of China and the Republic of Korea, which have reported sustained activity. Low levels of 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. Since the start of the season a few viruses with reduced susceptibility to neuraminidase inhibitors have been detected in the countries performing antiviral resistance testing. The majority of characterized influenza viruses were antigenically similar to the 2012-13 northern hemisphere vaccine viruses. In China, as of April 12, 2013, 43 cases of influenza A(H7N9) have been identified, of which eleven have died, please see details and more updated information at the 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 LOCAL INFLUENZA ACTIVITY to CDC for the week ending April 20, 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, April 25): As of 25 April 2013 (16:30 CET), one laboratory-confirmed case of human infection with the virus has been reported by the Taipei Centres for Disease Control (CDC).

The patient is a 53-year-old man who had been working in Jiangsu province from 28 March to 9 April 2013. He returned from Jiangsu via Shanghai on 9 April 2013, and became ill on 12 April 2013. The patient was laboratory confirmed with the virus on 24 April 2013.

To date, a total of 109 laboratory-confirmed cases of human infection with avian influenza A(H7N9) virus including 22 deaths have been reported to WHO. Contacts of the confirmed cases are being closely monitored.

The full report is available online at http://www.who.int/csr/don/2013_04_25/en/index.html.

April 19 WHO update: http://www.who.int/csr/don/2013_04_19/en/index.html
April 20 WHO update: http://www.who.int/csr/don/2013_04_20/en/index.html
April 21 WHO update: http://www.who.int/csr/don/2013_04_21/en/index.html
April 22 WHO update: http://www.who.int/csr/don/2013_04_22/en/index.html
April 23 WHO update: http://www.who.int/csr/don/2013_04_23/en/index.html

International, Human (WHO [introduction only], April 22): Arima Y et al. Human infections with avian influenza A(H7N9) virus in China: preliminary assessments of the age and sex distribution. Western Pacific Surveillance and Response Journal, 2013, 4(2). doi:10.5365/wpsar.2013.4.2.005

Since 31 March 2013, the government of China has been notifying the WHO of human infections with the avian influenza A(H7N9) virus, as mandated by the International Health Regulations (2005). While human infections with other subgroups of H7 influenza viruses (e.g. H7N2, H7N3, and H7N7) have previously been reported, the current event in China is of historical significance as it is the first time that A(H7N9) viruses have been detected among humans and the first time that a low pathogenic avian influenza virus is being associated with human fatalities. In this rapidly evolving situation, detailed epidemiologic and clinical data from reported cases are limited—making assessments challenging—however, some key questions have arisen from the available data. Age and sex data, as one of the first and most readily available data, may be an important proxy for gender-specific behaviours/conditions and an entry point for response. Here, we describe the age and sex distribution of the human cases of avian influenza A(H7N9) to better inform risk assessments and potential next steps.

Between 31 March and 16 April 2013, there were 63 reported cases of avian influenza A(H7N9). The median age was 64 years (range 4–87), and 45 cases (71%) were male. Notably, 39 of the 63 cases (62%) were ≥ 60 years of age. When stratified by age and sex, elderly men were the most affected demographic group. This is different to the Chinese population which has a large proportion of young and middle-aged adults and a greater number of women among the elderly. Although the case fatality rate (CFR) in all males at 22% (10/45) was similar to females at 22% (4/18), when restricted to elderly cases ≥ 60 years of age, the CFR in males was 20% (6/30) compared to no deaths in females (0/9). The case distribution of current avian influenza A(H7N9) cases is also different to reported avian influenza A(H5N1) cases in China (N=45), where the majority were young working age adults (median: 26 years; range 2–62), with no difference in gender. Hence, the question naturally arises – why are we seeing the current age and sex distribution, and what key questions can we ask to allow public health practitioners to respond in an efficient and effective manner?

The full article is available at www.wpro.who.int/wpsar/volumes/04/2/2013_PE_EMT_Arima/en/index.html.

International, Human (CIDRAP [edited], April 24): Chinese health professionals said in a detailed account today of H7N9 flu cases that about three fourths of patients had underlying medical conditions, and the same percentage had been exposed to animals, including chickens.

Their report, in the New England Journal of Medicine, also included new information about the reported family clusters of cases. The authors include numerous local- to federal-level health professionals, and their review includes data from 82 cases that were reported as of Apr 17. Since then, the outbreak total has grown to 109 illnesses, including 22 deaths.

The country enhanced its surveillance for the disease after it identified the new virus in March. Among 664 hospitalized patients with unexplained pneumonia, 81 (12.2%) were infected with the new virus. Of 5,551 respiratory specimens from outpatient surveillance for flulike illness, only 1 (0.02%) was positive for H7N9.

Most of the patients who had confirmed infections were men (73%), and most lived in urban settings (84%). Of 71 patients with available information, 54 (76%) had underlying medical conditions. Among 46 of that group with available data, 40 (87%) were at increased risk due to their age—either younger than 5 years or 65 or older. Four of the patients were poultry workers: Three slaughtered live-market poultry, and one transported poultry. All but one of the patients was hospitalized. As of the study cut-off date, 17 confirmed case-patients and 1 suspected case-patient had died of acute respiratory distress syndrome or multiorgan failure.

Details about animal exposure were available for 77 of the patients, and 59 (77%) said they had recent exposure to animals while working at or visiting a live-animal market: 45 to chickens, 12 to ducks, and 4 to swine. Other animals included pigeons, geese, quail, wild birds, pet birds, cats, and dogs. A history of animal exposure is unclear for five patients, and investigations are ongoing into their exposures.

The report also sheds new light on the type of contact and exposures that occurred in some of the family clusters, one of which involved some of the first patients who were reported in the outbreak, an 87-year-old man from Shanghai and his two sons.

The report said the index case in the cluster was a 57-year-old brother whose fatal infection was suspected but not confirmed. Within 2 weeks before he got sick, he had visited a live-poultry market where he bought a chicken, observed the slaughtering, brought it home, and cooked it. After he got sick, his father who lived with him and his 69-year-old brother who lived nearby cared for him, having prolonged unprotected contact before his hospitalization. The father and the brother got sick, and both had lab-confirmed H7N9 infections. The father died from his infection.

The report described another family cluster, a 60-year old man with a suspected infection and his 32-year-old daughter who lived in the same house with other family members. The father got sick, and his daughter cared for him at home and in the hospital before she got sick. Both of the patients are still critically ill. Tests confirmed H7N9 in the daughter and are still under way on the father. The woman did not raise poultry and had not had any animal exposures.

Today's report also fleshes out more details about contact tracing. Of 1,689 close contacts, excluding the cluster cases, 19 had respiratory symptoms during the 7-day surveillance period. Fifteen were healthcare workers, 1 was a patient in the same ward, 2 were household members, and 1 was a medical intern.

The investigators wrote that the current mortality rate is 21%, but they expect it to increase, given that many of the patients are still critically ill.

So far the H7N9 virus appears more virulent to humans than are other H7 viruses, the group noted.

Though extensive testing is needed to verify the source of H7N9, the Chinese authors strongly suspect poultry that don't show signs of disease. Until the source is confirmed, they said, control measures—such as banning the sale of live birds at markets—could help control the spread of the virus to humans.

Limited human-to-human contact remains a possibility, the scientists wrote, especially in blood relatives. Paired serum samples are being collected from contacts during the case-patients' acute and convalescent illness stages, they added.

They recommend enhanced surveillance to clarify the clinical spectrum of the disease and the extent of asymptomatic infection, along with case-control studies to reveal more about the possible animal and environmental source.

The full NEJM article is available online at www.nejm.org/doi/full/10.1056/NEJMoa1304617#t=article.

International, Human (Taiwan Centers for Disease Control press release [edited], April 24): In the late afternoon of April 24, 2013, the Central Epidemic Command Center (CECC) confirmed the first imported case of H7N9 avian influenza in a 53-year-old male Taiwanese citizen who worked in Suzhou, Jiangsu Province, China prior to illness onset. He developed his illness three days after returning to Taiwan. Infection with avian influenza A (H7N9) was confirmed on April 24, 2013. The patient is currently in a severe condition and being treated in a negative-pressure isolation room.

CECC indicated that the case is a hepatitis B carrier with history of hypertension. Due to the fact that he worked in Suzhou, Jiangsu Province before his illness, he had been traveling back and forth regularly

between Suzhou and Taiwan for a long time. During March 28 and April 9, 2013, the patient traveled to Suzhou. On April 9, he returned to Taiwan from Shanghai. According to the case, he had not been exposed to birds and poultry during his stay in Suzhou and had not consumed undercooked poultry or eggs. On April 12, he developed fever, sweating, and fatigue, but no respiratory or gastrointestinal symptoms. On April 16, he sought medical attention at a clinic when he developed high fever and was transferred to a hospital by the physician. He was then hospitalized in a single-patient room for further treatment. On April 16, he was administered Tamiflu. On April 18, his chest x-ray showed interstitial infiltrate in the right lower lung. On the night of April 19, his conditions worsened. On April 20, he was transferred to a medical center for further treatment. He was then intubated due to respiratory failure and placed in the negative-pressure isolation room in the intensive care unit. During his stay in the hospitals, two throat swab specimens were collected and both tested negative for avian influenza A (H7N9) virus by real-time RT-PCR. On April 22, the medical center collected a sputum specimen from the patient and the specimen was tested positive for influenza A. In the morning of April 24, avian influenza A (H7N9) virus was detected in the sputum specimen using real-time RT-PCR. In the later afternoon of April 24, the National Influenza Center in Taiwan confirmed the identification and completed the genome sequencing of the virus.

At the time of writing, CECC has obtained the list of 139 people who have come into contact with the confirmed case, including 3 close contacts, 26 regular contacts (past the 7-day incubation period), and 110 healthcare workers, for investigation and follow-up activities. Of the 110 healthcare workers, 4 have passed the 7-day incubation period and shown no symptoms. Only three contacts failed to put on appropriate personal protective equipment when the contact occurred. Thus far, the three have not developed symptoms, but they will be followed up until April 27, 2013. On the other hand, while delivering healthcare services, three healthcare workers who were geared with appropriate personal protective equipment developed symptoms of upper respiratory infection. The public health authority have conducted thorough health education activities for all contacts, issued them with “Self-Health Management Advice for H7N9 Influenza”, and will be following up with them closely until the period of voluntary contact tracing is lifted. When a contact develops influenza-like illness symptoms such as fever and cough, the public health authority will voluntarily assist the individual in seeking medical attention.

The full press release is available online at http://www.cdc.gov.tw/english/info.aspx?treeid=BC2D4E89B154059B&nowtreeid=EE0A2987CFBA3222&tid=DCD2943FEE3FCB75.

International, Human (WHO [edited], April 24): As of 24 April 2013, 17 cases of human infection with novel coronavirus (nCoV) have been reported to WHO: two from Jordan, two from Qatar, 10 cases from Saudi Arabia, two from the United Kingdom (UK), and one from the United Arab Emirates. Most patients are male (81.3%; 13 of 16 cases with gender reported) and range in age from 25 to 73 years old (median 45 years old). The first cases had onset of illness in late March or early April 2012, the most recent case reported had onset on 8 March 2013. Most patients presented with severe acute respiratory disease requiring hospitalization, and at least 11 have required mechanical ventilation or other advanced respiratory support. Only 2 of the 17 presented with mild disease. Twelve patients have died. One was co-infected with influenza A virus.

Four clusters of cases have been identified. The first occurred in April 2012 in a health care setting in Jordan, with 2 confirmed cases, and 11 probable cases. Both of the confirmed cases died. Ten of the 13 persons in this cluster were health care workers. Two additional clusters occurred among family contacts of cases in Saudi Arabia and one among family members of a resident of the United Kingdom who had recently visited Saudi Arabia. Human-to-human transmission can be confirmed only in the latter as none of the family members who were infected had recently been outside of the United Kingdom and their only known exposure was to the first case (see UKHPA reference below). No sustained community transmission was observed in any of the clusters.

Although some of the cases may have become infected from animal exposures and zoonotic transmission, information on animal exposures is limited. An animal reservoir has not been identified. Investigations into animal sources are on-going.

Four viruses from the United Kingdom (n=2), Saudi Arabia (n=1) and Jordan (n=1) have been cultured and complete genome sequences have been posted to GenBank, a public database. All four of the viruses have a high degree of genetic similarity. Analyses show that the viruses are similar to a bat virus. It should be noted, however, that the similarity of the human virus to the bat virus does not necessarily

imply that bats are the reservoir for the human virus. Given the living environment of most of the patients, direct exposure to bats appears unlikely.

Recent publications *[Ed. note: Some articles have been removed and are available in the online version]*

- An investigation of 123 hospital and out-of-hospital contacts of the first nCoV case identified in Germany was conducted to evaluate human-to-human transmission. 86 contacts provided a blood sample. Analysis was performed using a two-stage serologic testing approach. None of the contacts tested positive for antibodies of the nCoV, indicating that no transmission had occurred. Reference: Buchholz U et al. Contact investigation of a case of human novel coronavirus infection treated in a German hospital, October-November 2012. Eurosurveillance, Feb 2013, 18(8):pii=20406. Available online at: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20406
- The UK Health Protection Agency (now known as Public Health England) investigated contacts of a nCoV case returning from Pakistan and Saudi Arabia. The investigation found two secondary cases (of 135 contacts tested) among family members, one of whom died, and one of which was mild. As the secondary cases had not travelled outside of the United Kingdom, this cluster provides the first definitive evidence of human-to-human transmission. It is also the first report of a co-infection, as the first case in the cluster was also infected with influenza type A. Reference: The Health Protection Agency (HPA) UK Novel Coronavirus Investigation team. Evidence of person-to-person transmission within a family cluster of novel coronavirus infections, United Kingdom, February 2013. Eurosurveillance, March 2013, 18(11). www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20427
- A study at the University of Bonn found that the cellular receptor for novel coronavirus is different from that used by the coronavirus SARS-CoV, which causes Severe Acute Respiratory Syndrome. In addition, the investigators found that the virus is capable of infecting human, pig, and bat cells. Reference: Müller MA et al. Human coronavirus EMC does not require the SARS-coronavirus receptor and maintains broad replicative capability in mammalian cell lines. mBio 2012, 3(6):e00515-12.

Summary: The available evidence related to novel coronavirus continues to suggest a zoonotic origin for the virus. However, the cluster of cases reported by the United Kingdom provides strong evidence of human-to-human transmission, confirming suspicions that were raised in the previously reported clusters. Investigations around cases have not thus far uncovered evidence of sustained transmission in the community, and transmission between humans appears to be relatively uncommon. The availability of serological tests and the recently acquired capacity to test for the virus using sensitive PCR techniques provide an opportunity to expand our knowledge of the occurrence of the virus in the community.

Many questions remain to be answered. The most important are the source of the virus, the exposures that result in human infection, and the mode of transmission. Some features of the cases such as the predominance of males among the confirmed cases may provide important clues to relevant exposures. In addition, although all cases to date have had some connection with the Arabian peninsula, more information is needed about the true geographic extent of the virus. Available evidence suggests that the virus may have its origin in bat species. However, experience with Nipah virus in Malaysia and SARS in China both illustrate that intermediate hosts may sometimes play an important role in transmission to humans and that direct exposure to reservoir species is not needed for infection. The experience of Nipah virus in Bangladesh, in which consumption of raw palm sap contaminated by bat feces has been identified as the mode of transmission, also illustrates the sometimes complex route by which virus may be transmitted from source to human. Finally, if more cases occur, it will be important to study clinical management methods in light of new research demonstrating the effect of certain antiviral agents on laboratory growth of the virus. Protocols for clinical management trials should be developed in anticipation of future cases.

In addition to the kinds of investigations described above, there continues to be a need for vigilance and surveillance, both within the affected area and for unusual clusters of respiratory disease in other parts of the world.

View the full article at www.who.int/csr/disease/coronavirus_infections/update_20130424/en/index.html.

International, Poultry (OIE [edited], April 19): Low pathogenic avian influenza H5N1; Germany
Outbreak 1 (13-614-00003): Badbergen, Badbergen (Wehdel), Osnabrück, NIEDERSACHSEN
Date of start of the outbreak: 18/04/2013; Outbreak status: Continuing; Epidemiological unit: Farm
Species: Birds; Susceptible: 7920; Cases: 10; Deaths: 0; Destroyed: 7920
Affected population: Fattening turkeys

Outbreak 2 (13-614-00004): Menslage, Halen (bei Berge), Osnabrück, NIEDERSACHSEN

Date of start of the outbreak: 18/04/2013; Outbreak status: Continuing; Epidemiological unit: Farm
Species: Birds; Susceptible: 17150; Cases: 10; Deaths: 0; Destroyed: 17150
Affected population: Fattening turkeys

International, Poultry (OIE [edited], April 22): Low pathogenic avian influenza H7N9; China
Outbreak 1: Haian, Nantong, JIANGSU; Affected population: One sample from pigeon
Date of start of the outbreak: 22/04/2013; Outbreak status: Continuing; Epidemiological unit: Farm
Species: Birds; Susceptible: 340; Cases: 1; Deaths: 0; Destroyed: 340

International, Poultry (OIE [edited], April 24): Low pathogenic avian influenza H7N9; China
Outbreak 1: Jianshe road agricultural products market, Zhoukou , HENAN
Date of start of the outbreak: 04/04/2013; Outbreak status: Continuing
Affected population: 1 environment sample from a live bird market.

Outbreak 2: Chi'an market, Yiwu, Jinghua, ZHEJIANG
Date of start of the outbreak: 04/04/2013; Outbreak status: Continuing
Species: Birds; Cases: 1; Deaths: 0; Destroyed: 2

Outbreak 3: Xiaotai agricultural products market, Weishi, Kaifeng, HENAN
Date of start of the outbreak: 04/04/2013; Outbreak status: Continuing
Affected population: 1 environment sample from a live bird market.

Michigan and National Wild Bird Surveillance (USDA, as of April 25): 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 March 12, 2013. http://www.who.int/influenza/human_animal_interface/EN_GIP_20130312 CumulativeNumberH5N1cases.pdf. Downloaded 3/20/2013. 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	0	0	6	0
Cambodia	6	6	1	1	1	0	1	0	1	1	8	8	3	3	9	8	30	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	1	1	170	61
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	0	0	123	61
Total	263	158	88	59	44	33	73	32	48	24	62	34	32	20	12	11	622	371