Epidemiological aspects of pandemic influenza A(H1N1) virus from 2009 to 2011 in Iran

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To the editor:

As the world was preparing for a pandemic influenza of avian origin, in April 2009 a novel influenza A virus H1N1 strain of swine origin, now known as pandemic A(H1N1) 2009 virus (abbreviated as pH1N1), emerged in Mexico and spread quickly worldwide.1–3 On April 24, 2009, the World Health Organization announced a Public Health Emergency of International Concern caused by this new influenza virus variant.4 Approximately 8 weeks later on June 20, 2009, the first case of pH1N1 in Iran was reported in a traveler from the United States.

Following the detection of the first imported confirmed pH1N1 infection in Iran, the National Influenza Center in collaboration with the Ministry of Health enhanced surveillance for pH1N1 virus infection in addition to the existing sentinel surveillance system for seasonal influenza and imposed entry screening on travelers from affected areas. Specimens were collected for laboratory testing from suspected cases with influenza-like illness (ILI) symptoms, fever with history of recent traveling, or having a contact with a confirmed case of pH1N1.

The population of Iran is around 75 million. This letter reports the available epidemiological characteristics of 40 169 suspected cases of pH1N1 infection between June 20, 2009 and November 21, 2011.

During July through September 2009, Iran experienced some transmission of pH1N1; a stronger wave began in October, and a peak occurred in November and then declined steadily. There was a small second wave in early 2011. Among the total of 40 169 suspected cases, 5214 (12.9%) were confirmed cases with real-time RT-PCR (using the Invitrogen SuperScript III Platinum with specific primers obtained from the United States Centers for Disease Control and Prevention real time RT-PCR Protocol5) of whom 230 (4.4%) were classified as imported, travel-associated cases.

As shown in Figure 1, the highest incidence of confirmed cases occurred in October and November 2009, after schools had reopened in September. School children are known to be important in transmission of influenza. During this outbreak, an increase in the number of absenteeism owing to ILI symptoms led schools to close in some parts of the country especially in the central and south-east regions of Iran.

Figure 1. Number of laboratory confirmed cases of 2009 pandemic A(H1N1) virus infection, by month in Iran, 20 June 2009–21 November 2011.
The greatest number of confirmed cases occurred in the age group of 20–49 years, accounting for 2710 (51.9%) of all confirmed cases, followed by 919 (17.6%) in children aged 5–14 years and the lowest number was in elderly aged 65 years and older, with 159 (3%) confirmed cases. Among the total cases, 26133 (65%) were hospitalized of which 3198 (61.3%) were confirmed cases of pH1N1. From a total of 40169 suspected cases, 450 (1.12%) were pregnant women including 169 (3.24%) confirmed cases and three (0.07%) deaths. Meanwhile, two of the 281 pregnant women with negative laboratory tests for A(H1N1) died because of pregnancy complications. Among the 40169 suspected cases, male cases accounted for 20282 (50.5%) and female cases for 15646 (49.5%) with an overall male-to-female ratio of 1:1.02. The same ratio of 1:1.02 was also observed among the confirmed cases.

From the 40169 suspected cases, 213 died, of which 156 were confirmed pH1N1 cases and 57 were negative for pandemic virus. There were no data about the causes of deaths in negative ones. The highest numbers of deaths occurred in October and November.

Of the 156 confirmed pH1N1 cases who died, the male-to-female ratio was 1:1.1, and 87 (55%) were aged between 20–49 years. 115 (73.7%) had at least one underlying medical condition. The most commonly reported underlying medical conditions among those who died were asthma (11, 7%), diabetes (7, 4.4%), and cardiovascular disease (7, 4.4%). Other underlying conditions such as renal disease, thalassemia, convulsion, addiction, and malignancies were present in some patients. 31 (19.8%) of deaths occurred in patients without known underlying conditions.

It is important to mention that the number of affected persons underestimates real incidence because many infected individuals do not present for testing. Meanwhile, another important underestimation is death reports. We did not have direct contact with hospitals and state health care centers, and some of them did not report death numbers every day, while the authors did not have access to patients to obtain the detailed clinical information and verify them. Finally, the data from private laboratories conducting a small number of influenza tests in Iran were not included in this study.

In conclusion, this letter was the report of epidemiological and demographic features of a large number of patients affected in the 2009 A(H1N1) pandemic in Iran. The observations were comparable to the epidemiological situation in other parts of the world. Various studies have described clinical characteristics and outcomes of patients with pandemic A(H1N1) in different countries. Infected patients usually present with respiratory symptoms. However, some studies have demonstrated that patients with other medical conditions such as cardiovascular disease, diabetes, and obesity may have more severe outcomes. The highest number of confirmed cases occurred in the age group of 20–49 years, accounting for 51.9% of all confirmed cases, followed by 17.6% in children aged 5–14 years and the lowest number was in elderly aged 65 years and older, with 3% confirmed cases. Among the total cases, 65% were hospitalized of which 61.3% were confirmed cases of pH1N1. From a total of 40169 suspected cases, 1.12% were pregnant women including 3.24% confirmed cases and three (0.07%) deaths. Two of the 281 pregnant women with negative laboratory tests for A(H1N1) died because of pregnancy complications. Among the 40169 suspected cases, male cases accounted for 50.5% and female cases for 49.5% with an overall male-to-female ratio of 1:1.02. The same ratio of 1:1.02 was also observed among the confirmed cases.

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In conclusion, this letter was the report of epidemiological and demographic features of a large number of patients affected in the 2009 A(H1N1) pandemic in Iran. The observations were comparable to the epidemiological situation in other parts of the world. Males and females were equally affected, high rates of morbidity and mortality were observed among young adults, and pH1N1 infections were uncommon in persons older than 65 years, possibly as a result of preexisting immunity against antigenically similar influenza viruses that circulated prior to 1957. This virus continues to circulate globally and has become one of the annually circulating seasonal influenza viruses. It is important to continue to monitor it for any signs of enhanced transmissibility and pathogenesis.

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References

1 Centers for Disease Control and Prevention. Update: novel influenza A (H1N1) virus infections-worldwide, May 6, 2009. MMWR Morb Mortal Wkly Rep 2009; 58:453–458.
2 Gómez-Gómez A et al. Severe pneumonia associated with pandemic (H1N1) 2009 outbreak, San Luis Potosí, Mexico. Emerg Infect Dis 2010; 6:27–34.
3 Subramony H et al. An Epidemiological study of 1348 cases of pandemic H1N1 influenza admitted to Singapore hospitals from July to September 2009. Ann Acad Med Singapore 2010; 39:283–290.
4 Poggensee G et al. The first wave of pandemic influenza (H1N1) 2009 in Germany: from initiation to acceleration. BMC Infect Dis 2010; 10:155.
5 CDC, Influenza Division, CDC Real time RT-PCR(rRT-PCR) Protocol for Detection and Characterization of influenza 2009 A/H1N1)pdm Virus.
6 Deaths and Hospitalizations Related to 2009 Pandemic Influenza A (H1N1) – Greece, May 2009–February 2010. MMWR/June 11, 2010/Vol. 59/No. 22. 682–686.
7 Cullen G et al. Surveillance of the first 205 confirmed hospitalized cases of pandemic H1N1 influenza in Ireland, 28 April-3 October 2009. Eurosurveillance 2009; 14:pii: 19389.
8 Turbelin C et al. Early estimates of 2009 pandemic influenza A(H1N1) virus activity in general practice in France: incidence of influenza-like illness and age distribution of reported cases. Eurosurveillance 2009; 14:pii: 19342.
9 Munayco CV et al. Epidemiological and transmissibility analysis of influenza A (H1N1)v in a southern hemisphere setting: Peru. Eurosurveillance 2009; 14:pii: 19299.
10 ECDC Working Group on Influenza A (H1N1)v. Collaborators (8). Preliminary analysis of influenza A(H1N1)v individual and aggregated case reports from EU and EFTA countries. Eurosurveillance 2009; 14:pii: 19238.
11 Centers for Disease Control and Prevention. Update: novel influenza A (H1N1) virus infection – Mexico, March–May, 2009. MMWR Morb Mortal Wkly Rep 2009; 58:585–589.
12 Perez-Padilla R et al. Pneumonia and respiratory failure from swine-origin influenza A (H1N1) in Mexico. N Engl J Med 2009; 361: 680–689.
13 Yinzhong SH, Hongzhou L. Pandemic (H1N1) 2009, Shanghai, China. Emerg Infect Dis 2010; 16:1011–1013.

Appendix

A suspected case of pandemic A(H1N1) 2009 was defined as a patient having ILI (temperature >37.8°C, cough, sore
throat, rhinorrhea, or myalgia) or at least one of the following criteria with high fever (>37.8°C):

1. had close contact with a confirmed case within the past week;
2. returned from a country with an epidemic of pandemic A(H1N1); and
3. handled samples suspected of containing pandemic A(H1N1) virus in a laboratory within the past week. A confirmed case was a laboratory confirmed 2009 pandemic influenza A(H1N1) infection by real-time reverse transcription–PCR performed on respiratory samples collected from suspected patients.

An imported, travel-associated case was defined as a suspected case in a person with recent travel outside the country who had arrived in Iran during the pandemic and had illness onset within 10 days of arrival.