Rapid communications

Modified surveillance of influenza A(H1N1)v virus infections in France

Influenza A(H1N1)v investigation teams[1,2]
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Up to early July 2009, surveillance of H1N1 cases in France was based on the identification of all possible cases in order to implement, around each of them, control measures aimed at delaying the spread of the virus. The global dissemination of the virus and the starting community transmission in France led us to shift to a population-based surveillance relying mainly on the identification and investigation of clusters of influenza-like illness, on the identification and individual follow-up of confirmed hospitalised cases as well as on the monitoring, through various sentinel systems, of the use of ambulatory and hospital care for influenza-like symptoms.

Introduction

As soon as the first human cases due to infection with the novel influenza A(H1N1)v virus had been reported to the international community at the end of April, the influenza surveillance in France was adapted in order to actively detect cases. The main objectives of this strengthened surveillance and of the accompanying control measures were to delay the spread of the virus in the country. The first cases were identified in France on 1 May in two travellers returning from Mexico. As of 6 July, 358 cases have been notified. This article describes the clinical and epidemiological characteristics of those cases and the recent changes in the surveillance system made on the basis of this analysis.

Methods

In the initial phase, the surveillance aimed at identifying cases in travellers returning from affected areas in order to promptly implement control measures around each case and to contain the virus spread. A case definition and recommendations for management of the cases and their close contacts were released as early as 26 April and described in a previous paper [1]. Briefly, a possible case was defined as a person with an acute respiratory illness and a history, in the seven days preceding the onset of symptoms, of either travel in an affected area or contact with a possible, probable or confirmed case. In order to capture cases from previously undetected chains of transmission, clusters of acute respiratory illnesses defined as at least three cases in less than a week in close communities were also to be notified.

All symptomatic persons returning from affected areas were advised to call the local hospital-based emergency unit (Centre 15). If the patient was assessed as fulfilling the case definition, the Centre 15 had to call the National Institute for Public Health Surveillance (Institut de veille sanitaire, InVS) for case validation, which triggered the implementation of the specific A(H1N1)v case management protocol (nasal sampling of the case, systematic hospital-based isolation, antiviral treatment by a neuraminidase inhibitor). Antiviral prophylaxis was recommended for close contacts of probable or confirmed cases, which were asked to observe a home quarantine. Nasal samples had to be sent to one of the 24 and then 31 laboratories which had been authorised by the Ministry of Health to run, in a bio safety level 3 environment, the A(H1N1)v RT-PCR developed by the two National Influenza Reference Centres (CNR). Positive samples were sent to the CNR for confirmation and further investigations.

This case management protocol has evolved over time. Since 26 June, only severe cases, based on the judgment of the treating physician, have to be hospitalised. The antiviral indications have been restricted to severe cases or to cases with an underlying condition that could increase their risk of complication and, as prophylaxis, recommended for their household contacts with an underlying condition. The indications for sampling of possible cases have also been restricted to severe cases, to patients under antiviral

Figure 1

Geographical distribution of confirmed cases of influenza A(H1N1)v, France, 26 April – 6 July 2009 (n=358)
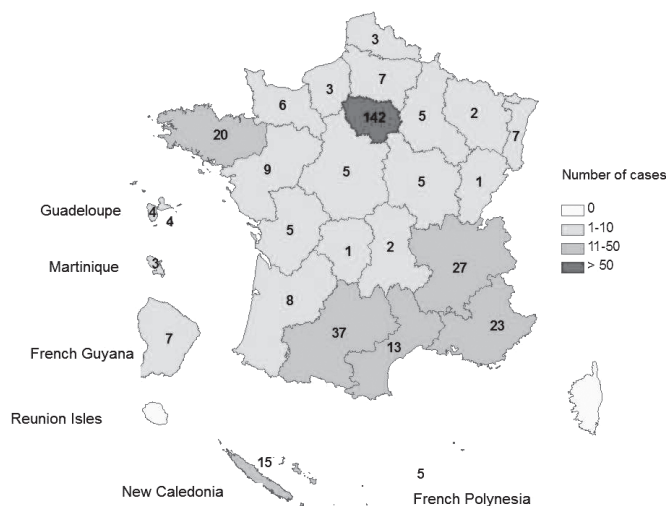
treatment whose condition is not improving, to contacts under antiviral prophylaxis developing an influenza-like illness, to cases returning from the southern hemisphere and to at least three cases in each suspected A(H1N1)v cluster.

Case-based epidemiological and virological data have been collected by InVS and its regional epidemiological units (CIRE) through an interactive application (adapted from Voozano®, Epiconcept®), allowing real time exchange of information between InVS, the 16 CIRE, the CNR and the local public health offices in charge of the case management [2]. A clinical follow-up of the confirmed cases has been set up in collaboration with the clinicians in charge of the cases. Daily feedbacks have been posted on the InVS website (http://www.invs.sante.fr) since the 26 April. Several syntheses of the influenza A(H1N1)v epidemiological situation in France have already been published [3,4].

Results

As of 6 July, InVS received 4,867 notifications of possible cases, of whom 4,744 were from mainland France, 66 from the French Caribbean islands, 13 from French Guiana, 22 from the Reunion Island, one from Mayotte, 16 from New Caledonia and five from French Polynesia. All these possible cases were tested and 358 cases were confirmed as due to the A(H1N1)v virus. Twenty six cases were diagnosed as infected by a seasonal influenza virus (12 with H1N1, 14 with H3N2), one as co-infected with (H1N1) and (H1N1)v.
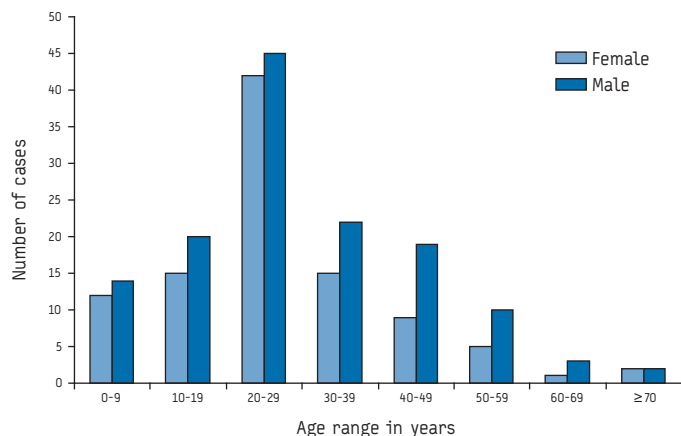
Distribution of confirmed cases of influenza A(H1N1)v, by date of onset of symptoms and travel history, France, 26 April – 6 July 2009 (data available for 315 cases)
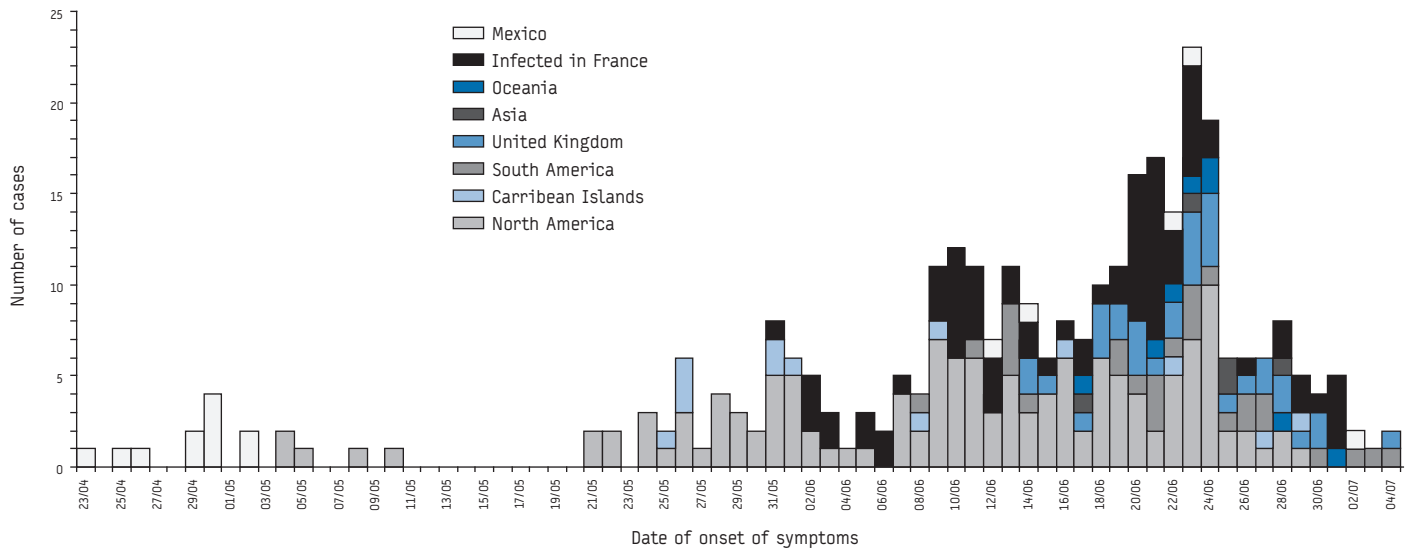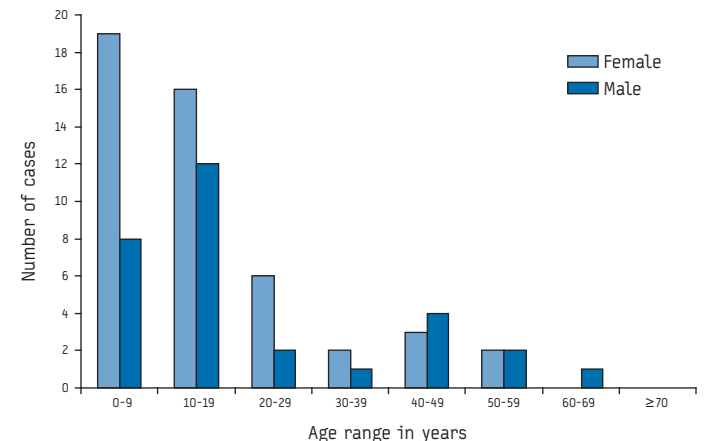
Distribution of confirmed cases of influenza A(H1N1)v, by age, sex and travel history, France, 26 April – 6 July 2009 (data available for 335 cases)

3a. Imported cases (n=245)

3b. Indigenous cases (n=90)

Geographical distribution

Of the 358 confirmed cases, 40% came from the Ile-de-France region which includes Paris. Twenty seven cases were from the French overseas territories (Figure 1).

Imported and indigenous cases

The first cases were detected in travellers returning from Mexico, then the United States (US) and Canada (Figure 2). Among the 261 cases in travellers, 16 were from Mexico, 121 from the US, 21 from Canada, 27 from South America, 13 from the non-French Caribbean islands, five from Asia, 24 from Oceania and 33 from the United Kingdom (UK). Data on country of travel was unavailable for one case.

For 92 cases, there was no history of recent travel. For 30 among these, belonging to six clusters, no link, even indirect, to any person travelling abroad was found.

For five cases, the information about a recent travel history was missing.

Clusters

In total, 18 clusters were identified. Eight occurred in schools and eight in households. One episode of domestic transmission occurred in the working environment and one in a rugby team. The size of the clusters includes both confirmed cases and probable cases, defined as cases with an epidemiological link with a confirm case. Within the eight household clusters, two, initiated by travellers, extended to the work place. They involved respectively seven and eight cases. The number of cases in the school clusters varied from three to 67, with an average of 14 cases per cluster. Three large clusters of respectively 17, 32 and 67 cases occurred in one secondary and two primary schools. For only one of these three clusters, a link with travel abroad has been identified. In the rugby team cluster, seven out of 38 persons who had travelled from an affected area were affected.

Symptoms	Number of cases with the symptom / number of cases with this data available	Proportion of cases (%)
Cough	294 / 336	88%
Fever (≥ 38°C)	286 / 333	86%
Myalgia	158 / 330	48%
Asthenia	131 / 326	40%
Headache	86 / 223	27%
Runing nose	83 / 325	26%
Sore throat	72 / 323	22%
Shiver	57 / 319	18%
Joint pain	23 / 324	7%
Conjunctivitis	18 / 326	6%
Shortness of breath	20 / 332	6%
Vomiting	18 / 328	5%
Diarrhoea	14 / 324	4%
Nausea	11 / 326	4%

Demographic characteristics

There were 183 male and 155 female cases (data on sex was not available for 20 cases). The sex ratio male to female was 1.2. Age of the cases ranged from 7 months to 77 years, with a mean of 25 years and a median of 23 years. Domestic cases were younger (mean 17 years) than imported ones (mean 28 years) ($p<0.0001$) (Figure 3).

Clinical characteristics

The clinical characteristics of the cases are shown in the Table. They appear to be similar to those observed in seasonal flu cases.

Two patients were admitted to hospital with bacterial pneumonia, one of them had asthma and required ventilation, but both recovered. No death due to this virus has been identified in France.

Case management

For imported cases who were not symptomatic on their return, the onset of disease occurred on average 1.4 days after their return (range 0 to 6 days). On average, these and the domestic cases notified the relevant healthcare units 1.8 days after the onset of symptoms. The length of stay in hospital for the 96 cases admitted for isolation purpose and for whom this information was available varied between 0 and 7 days (mean and median of 3 days). The two patients hospitalised for pneumonia stayed in hospital 6 and 10 days respectively.

Discussion

The intensive mobilisation of multiple public health stakeholders and health professionals made it possible to set up in a very reactive way a system of surveillance of the first influenza A(H1N1)v cases at the national level. This surveillance allowed the collection of clinical and epidemiological information on cases and the implementation, around each case, of control measures in order to slow down the spread of the virus.

It is not possible to estimate the exhaustiveness of this surveillance. It is likely that mild cases have not been systematically identified. However, the absence of large clusters, up to early July, suggests that the system was capable of preventing sustained chains of transmission from the initial imported cases.

The follow-up of imported and secondary cases and the results of the cluster investigations were essential indicators of the level of indigenous transmission, allowing the adaptation of the control measures to the evolving epidemiological situation. Similarly, the decreasing average age over time reflects the change over time of the main pattern of transmission from sporadic cases in travelling young adults to secondary transmission in families and schools

The identification, at the beginning of July, of several clusters of significant size, some of them without any identified link with a travel abroad, indicated the occurrence, at least in some French regions, of a, though still limited, transmission in the population. This, together with the global spread of the virus, which made it superfluous to update the list of affected countries, led to the decision, released on 8 July, to modify the definition of a possible case by removing any reference to a return from an affected area. At the same time the case-based surveillance was replaced by a population-based surveillance relying mainly on the identification and investigation of clusters of influenza-like illness, on the identification and individual follow-up of confirmed hospitalised

cases as well as on the monitoring, through various sentinel systems, of the use of ambulatory and hospital care for influenza-like symptoms.

Regarding the overall response to the pandemic, these important changes in surveillance methods signed the transition from a delaying to a mitigation strategy. Indeed, between 7 and 23 July, 22 new clusters were identified, including 193 cases of whom 59 were confirmed. For 16 of these 22 episodes, no link with a travel abroad has been identified.

Our data show that the spread of the virus in the community occurred later than in neighbouring countries such as Spain or the UK [4,5]. Comparative analysis of surveillance data between countries, in connection with the respective methods of case management, could help to investigate this difference.

The new surveillance procedures, which include the detection and investigation of clusters, will contribute to further characterisation of the dynamic of the virus spread in France and will be used to better describe mechanisms and parameters of transmission.

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