

Rapid communications

Enhanced influenza surveillance on Réunion Island (southern hemisphere) in the context of the emergence of influenza A(H1N1)v

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With the winter season on the southern hemisphere that starts in Réunion Island in June seasonal influenza activity usually increases shortly afterwards. The new influenza A(H1N1)v virus is rapidly spreading worldwide and may reach the island during the coming winter season. We have therefore enhanced influenza surveillance to detect the introduction of influenza A(H1N1)v, monitor its spread and impact on public health and characterise potential viral changes, particularly if seasonal influenza A(H1N1), resistant to oseltamivir, co-circulates with A(H1N1)v.

Background

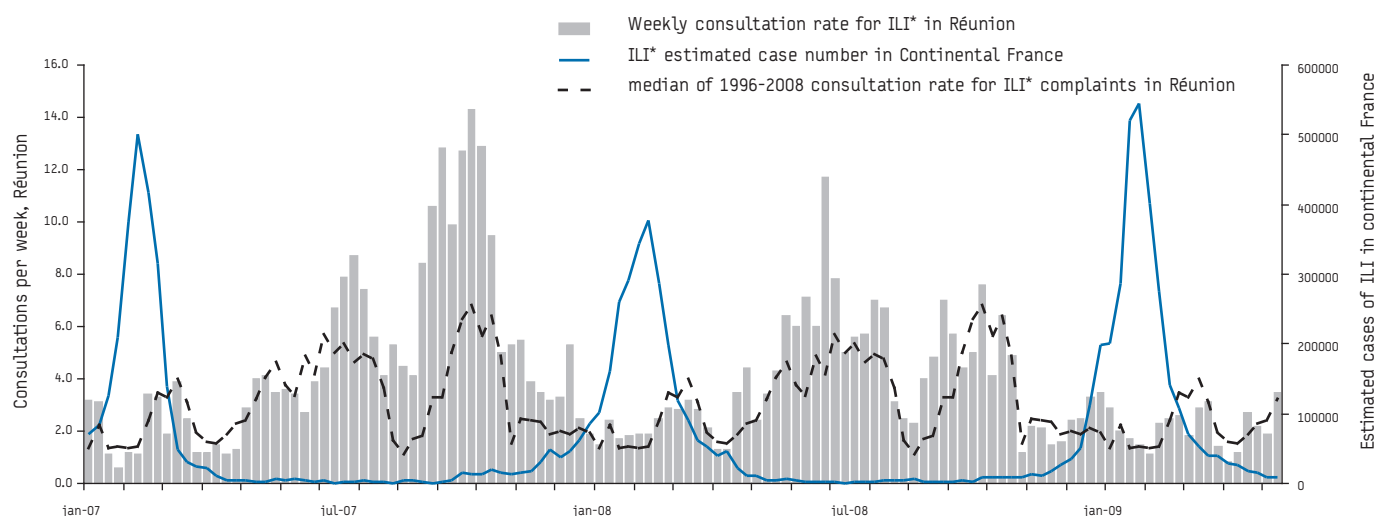
Influenza virus type A is associated with annual epidemics and occasional large-scale global pandemics. Both are characterised by increased morbidity and mortality [1]. In temperate regions, a clear seasonality exists in the influenza activity with a marked peak in cold winter months. In tropical regions however, where there is

less fluctuation in seasonal temperature this is not noticeable to the same extent [2].

Réunion Island, a French overseas administrated territory with 800,000 inhabitants, is located in the southern hemisphere in the south-western Indian Ocean, 700 km east of Madagascar and 200 km south-west of Mauritius, at a longitude of 55°3 east and latitude of 21°5 south, above the Tropic of Capricorn. In Réunion Island, influenza activity has been monitored since 1996 [3], but influenza virus circulation remains poorly documented. Results of past monitoring suggest that annual influenza activity increases in June-July [4] and the last reported seasonal influenza epidemic occurred in August-October 2007 [5]. The island is presumed to have a double exposure to seasonal influenza, one from the southern hemisphere and the other one from the intense link with metropolitan France [4,6] (Figure 1).

FIGURE 1

Seasonal influenza activity on Réunion Island and in continental France, 2007-2009



*Influenza like illnesses

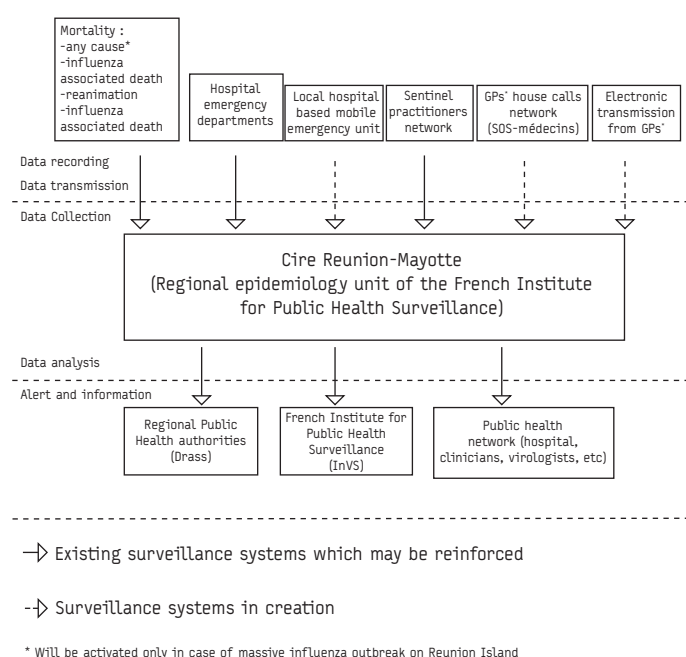
Source for continental France data: Réseau Sentinelle, France ; Source for Réunion Island data: Observatoire Régional de la Santé and réseau sentinelle, Réunion

In April 2009, a new strain of human influenza A(H1N1) virus, the influenza A(H1N1)v virus, was identified in USA and Mexico [7]. As of 10 June 2009, a total of 74 countries reported 27,737 cases and 141 associated deaths to the World Health Organization (WHO) demonstrating the pandemic potential of the virus [8]. Anticipating the start of the influenza season in Réunion Island sometime in June (Figure 1), the Regional epidemiology unit of Réunion-Mayotte (Cellule interrégionale d'épidémiologie, Cire) of the French Institute for Public Health Surveillance (Institut de Veille Sanitaire, InVS) is implementing an enhanced surveillance system to face the likely

introduction and spread of influenza A(H1N1)v during the coming winter months in Réunion. The aim of this system is to detect the introduction of influenza A(H1N1)v timely on the island, monitor its spread and impact on public health and characterise potential viral changes, particularly if seasonal A(H1N1) resistant to oseltamivir co-circulates with A(H1N1)v. Furthermore, the surveillance we describe here is an attempt to include the specific surveillance of influenza A(H1N1)v virus into the global influenza surveillance system. It could be an example for other countries in the tropics and results will provide useful data about the effectiveness and limits of such system. Our experience might guide northern hemisphere countries in how to adapt their surveillance system before the upcoming influenza season in the winter.

FIGURE 2

Organisation of the influenza surveillance on Réunion Island, 2009



Organisation of the influenza surveillance on Réunion Island, 2009

Figure 2 shows the organisation of the enhanced surveillance for imported cases of influenza A(H1N1)v. Timely detection of the introduction of cases by travellers coming or returning from affected areas is crucial to implement control measures around each case and limit the indigenous spread of the virus. Our enhanced surveillance is based on the national protocol set up by InVS [9] and the management of patients follows recommendations of the French pandemic plan [10]. Case definitions of possible, probable, confirmed, excluded and close contacts of cases are shown in the Table.

Community surveillance

Sentinel practitioners network

A sentinel network, consisting of 40 general practitioners (GP) and two paediatricians, scattered across the island conducts prospective influenza surveillance on Réunion Island [3,4]. On a weekly basis, they report the percentage of consultations for influenza-like illness (ILI) using the following case definition: sudden onset of fever > 38°C AND cough OR breathing difficulty. Every physician is expected to perform a nasal swab for each first patient of the week presenting with ILI symptoms that started within less than 48 hours.

TABLE

Case definition and classification, influenza A(H1N1)v infection, France, 10 June, 2009

Clinical criteria	Any person with an acute respiratory illness: -Fever (>38°C) OR myalgia OR asthenia -AND respiratory symptoms: cough OR dyspnoea
Epidemiological criteria	At least ONE of the following in the seven days prior to disease onset: -travel to an area where sustained human-to-human transmission of influenza A(H1N1)v is documented (as of 10 June 2009: Argentina, Australia, Canada, Chile, Dominican Republic, Japan, Mexico, Panama, United Kingdom, United States). -close contact to a possible, probable or confirmed case of influenza A(H1N1)v infection while the case was contagious (24h prior to symptom onset until seven days after).
Close contact definition	At least one of the following: -a person living with a case: family, roommate etc. -a person who had direct contact with a case, within 1 m while the case was coughing, sneezing or talking; flirt; close friends; classmate, working neighbour; plane or train neighbour
Case classification	1- Possible case: Any person meeting the clinical and epidemiological criteria. 2- Probable case: At least one of the following: -Any possible case with a positive RT-PCR for influenza A virus -Any possible case with a severe symptomatology (acute respiratory distress syndrome or death with an acute respiratory infection) -Any possible case which was a close contact to a probable or confirmed case while the case was contagious. 3-Confirmed case: Any possible case with a positive RT-PCR for influenza A(H1N1)v virus. 4-excluded case: At least one of the following: -Any person who does not meet possible case criteria. -Any possible case with a negative influenza A virus RT-PCR

Hospital emergency departments

Data are collected daily directly from patients' computerised medical files that are filled in during medical consultations regardless of the diagnosis. All data are extracted automatically and transmitted electronically in real-time to the InVS. Items collected include diagnosis, coded according to ICD-10, with a severity score ranked from 1 to 5 after medical examination, date of admission to emergency department, orientation (hospitalisation or discharge), age, sex, postal code, and main symptoms. Each patient corresponds to a single record, including all variables [11]. Moreover, data concerning ILI patients will be extracted using influenza associated ICD-10 diagnosis codes (codes for influenza and more acute respiratory tract infections). On Réunion Island three out of the four existing hospitals participate in the network. The fourth one is being integrated and should participate starting in July 2009. Nasal swabs will be performed daily for every first adult and paediatric patient seen in emergency departments.

General practitioner house calls network (SOS Médecins)

In the western coast of Réunion Island, SOS Médecins is composed of eight GPs that are involved in more than 100 interventions per day for a population of about 100,000 inhabitants (one eighth of the population). Telephone calls are handled by a call center and logged in a local database. This database is linked via internet to electronic notebooks held by GPs who can update the database with additional information following the visit of a patient. The data collected include: date of the visit, postal code, age, sex, symptoms of the patient and the medical diagnosis. Each morning, data for all visits logged during the previous 24-hour period (midnight to midnight) are downloaded [12].

Local hospital based Mobile Emergency Unit (Samu Centre 15)

On Réunion Island, a single 'Samu Centre 15' operates for the entire island. This mobile unit receives emergency calls and provides emergency healthcare and medical transport of patients. Total phone calls (regardless of diagnosis), phone calls for ILI and for advice on influenza will be analysed weekly.

Hospital surveillance

To monitor and describe severity, cases hospitalised for ILI will have a nasal swab for viral testing. Clinical and epidemiological information will be collected by Cire in collaboration with a clinical research project for hospitalised cases currently under preparation.

Mortality surveillance

The National Institute for Statistics (Institut National de la Statistique et des Etudes Économiques, Insee) conducts the administrative recording of deaths from all causes in France. For several years, Insee has been monitoring and centralising daily mortality in France including Réunion Island. In case of an influenza epidemic on the island, we will analyse this total number and excess of deaths from all causes. This system will be completed by analysis of all death certificates received by the regional public health authority that mention 'influenza'. These certificates will be recorded as influenza-associated deaths. Electronic death certification which is being implemented in France will be used by the Intensive Care Department of Saint-Denis Hospital, and be analysed in real-time by the Cire.

Cluster identification

Despite a well functioning surveillance system, imported cases of influenza A(H1N1)v might be missed and result in outbreaks of ILI in closed communities (schools, children, workers, elderly). In order to prevent this from happening, reporting of outbreaks in such

communities, particularly in the early phase of the influenza season, has been fostered and will lead to prompt investigation including virological testing. Furthermore, to improve self-notification of clusters, healthcare professionals have been informed on the relevance of such measures.

Virological surveillance

An enhanced virological surveillance will be implemented in order to identify and characterise circulating influenza viruses during the coming winter season in Réunion Island. Specimens will be collected by members of the sentinel network and hospitalised patients with ILI symptoms will also be tested. We estimate an average of 80 specimens to be tested weekly at the Laboratory of Virology of Saint-Denis Hospital, one of the 24 laboratories approved by the French Ministry of Health. Specimens will be tested for influenza A and B virus by RT-PCR. For positive influenza A specimens, specific RT-PCR for influenza A(H1N1)v will be performed. All positive influenza specimens (A(H1N1)v and others) will be sent for further viral isolation and complementary analysis, including oseltamivir resistance monitoring, to one of the two French National Reference Centres (NRC) for influenza.

Discussion

The beginning of the winter season in Réunion Island in June is usually followed by an increase of seasonal influenza activity shortly afterwards. As influenza A(H1N1)v is rapidly spreading worldwide, it can be expected that it emerges very soon in the upcoming winter season in the southern hemisphere (as it already has for example in Australia), including Réunion Island. Therefore, the surveillance of influenza on the island has been enhanced to be able to detect the introduction of influenza at an early stage and to monitor the spread and impact of the infections in order to guide the implementation of control measures foreseen in the French national pandemic plan. The usefulness of our enhanced surveillance will be guaranteed by a good collaboration between clinicians, virologists, epidemiologists and public health authorities. Close viral monitoring is of paramount importance since the circulation of seasonal influenza A(H1N1) resistant to oseltamivir with the A(H1N1)v virus is possible during the winter in the southern hemisphere. Such virological approach combined with epidemiologic description of a potential outbreak will assist local public health authorities to adapt control measures to limit the spread of the infection and mitigate the epidemic including use of information on the effectiveness of antivirals. Results of our enhanced surveillance, if an influenza epidemic occurs in Réunion Island, could provide relevant information for continental France or other European countries in preparation for the coming influenza season in the northern hemisphere.

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* Erratum: On 12 June 2009 Figure 2 was replaced and the titles in the References were translated into English.

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