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A review of the dynamics and severity of the pandemic A(H1N1) influenza virus on Réunion Island, 2009

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Abstract

On Reunion Island, in response to the threat of emergence of the pandemic influenza A(H1N1)2009 virus, we implemented enhanced influenza surveillance from May 2009 onwards in order to detect the introduction of pandemic H1N1 influenza and to monitor its spread and impact on public health. The first 2009 pandemic influenza A(H1N1) virus was identified in Réunion on July 5, 2009, in a traveller returning from Australia; seasonal influenza B virus activity had already been detected. By the end of July, a sustained community pandemic virus transmission had been established. Pandemic H1N1 influenza activity peaked during week 35 (24–30 August 2009), 4 weeks after the beginning of the epidemic. The epidemic ended on week 38 and had lasted 9 weeks. During these 9 weeks, an estimated 66 915 persons who consulted a physician could have been infected by the influenza A(H1N1)2009 virus, giving a cumulative attack rate for consultants of 8.26%. Taking into account the people who did not consult, the total number of infected persons reached 104 067, giving a cumulative attack rate for symptomatics of 12.85%. The crude fatality rate (CFR) for influenza A(H1N1)2009 and the CFR for acute respiratory infection was 0.7/10 000 cases. Our data show that influenza pandemic did not have a health impact on overall mortality on Réunion Island. These findings demonstrate the value of an integrated epidemiological, virological and hospital surveillance programme to monitor the scope of an epidemic, identify circulating strains and provide some guidance to public health control measures.

Keywords: A(HINI) 2009, emergence, epidemiological surveillance, estimation, influenza, lethality, pandemic, Reunion Island, virus
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Introduction

Following its emergence in March 2009 [1], the pandemic A(H1N1) virus spread rapidly throughout the world, leading to the declaration of an influenza pandemic by the World Health Organization (WHO) on 11 June 2009 [2]. The pandemic A(H1N1) virus was first detected in April in the USA [3] and was shown to be responsible for outbreaks in Mexico in March and April [4,5]. As of 27 November 2009, worldwide more than 207 countries and overseas territories or communities had reported laboratory confirmed cases of pandemic influenza H1N1 2009, including over 7820 deaths [6]. In the Southern hemisphere, the emergence of pandemic H1N1 influenza coincided with the winter seasonal influenza activity which began to increase in June 2009. Pandemic

A(H1N1) activity increased rapidly in many of these countries and activity peaked in July in some regions, falling to low levels by August or September in South Africa, Brazil, Peru, Australia, and New Zealand [7–11]. In some other southern hemisphere tropical areas in the Americas and Asia, the pandemic A(H1N1) influenza virus was still circulating in September in some places.

Réunion island, a French overseas territory with 810 000 inhabitants (2009 estimate), is located in the southern hemisphere in the South-Western Indian Ocean. It is 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. Réunion has a health care system similar to continental France. Although acute respiratory illness activity has been monitored continuously since 1996, the circulation of influenza virus strains remains poorly documented. However, results of past monitoring suggest that influenza activity increases annually in June–July. The last reported influenza epidemic occurred in August–October 2007. Although the island is mainly exposed to seasonal influenza from the Southern hemisphere, one-third of the annual cases of influenza are reported during the northern hemisphere's influenza season between October and May. This could be explained by the links with continental France as approximately 2000 people travel each day between France and Réunion.

In response to the threat of emergence and spread of the pandemic influenza A(H1N1)2009 virus, the Regional Office (Cire Réunion-Mayotte) of the French Institute for Public Health Surveillance (Institut de veille sanitaire, InVS) on Réunion Island implemented an enhanced influenza surveillance from May 2009 onwards in order to detect the introduction of the pandemic H1N1 influenza and to monitor its spread and impact on public health [12,13]. This report summarizes the results of this surveillance and describes the dynamics and impact of the influenza pandemic on Réunion Island and the characteristics of laboratory-confirmed cases, including hospitalized, severe and fatal cases.

Methods

On Réunion Island, the enhanced influenza surveillance programme, set up in May 2009 [12], was modified after evidence of local transmission and rapid spread of the 2009 pandemic H1N1 influenza virus. We describe the new surveillance procedure started on 23 July which was based on a range of indicators available from the surveillance systems implemented before the emergence of the epidemic.

Virological surveillance

Virological surveillance was implemented in order to identify and characterize circulating influenza viruses during the winter season in Réunion Island. Specimens were collected by sentinel and emergency department practitioners. Nasal swabs were performed weekly by sentinel practitioners and daily on every first adult and paediatric patient attendance in the hospital emergency departments. In-patients with acute respiratory infections (ARIs) were also surveyed. Specimens were tested for both influenza virus A and B by a reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assay. The 2009 pandemic influenza A (H1N1) was confirmed by means of a RT-PCR assay performed according to published guidelines from the US CDC. The 2009 H1N1 virus testing was conducted in local laboratories and confirmed by the National Reference Centre for Influenza (Institut Pasteur, Paris). The RT-PCR assay was performed using a Superscript™ One-Step RT-PCR with a Platinum Taq kit. (Invitrogen, Carlsbad, CA, USA). A specific RT-PCR for novel influenza A(H1N1) was performed when positive virus A specimens were identified.

Surveillance of ARI by the sentinel practitioner network

A sentinel practitioner network, comprising 23 general practitioners and three paediatricians, covering all the island and representing respectively, 3% and 10% of all private physicians for each speciality, was in charge of the prospective influenza surveillance. These physicians reported weekly the number of ARIs and the total number of consultations. They reported the percentage of consultations for ARI symptoms with the following case definition: sudden onset of fever >38°C AND (cough OR breathing difficulty). Every physician was expected to perform a nasal swab on the first two patients of the week presenting with ARI symptoms with an onset of <48 h. Weekly ARI consultation rates were compared with rates for the same periods in the past 5 years (2004–2008).

Surveillance of hospitalized patients and those with severe disease

Hospitalized patients with laboratory confirmed A(H1N1)2009 virus were reported by clinicians to the Regional Office of InVS. A standardized form was used for collecting epidemiologic, demographic and clinical data. A hospitalized patient was defined as one with a laboratory-confirmed influenza A(H1N1)2009 virus infection admitted for more than 24 h to a medical ward. A severe case was defined as a person with a laboratory-confirmed influenza A(H1N1) 2009 virus infection who was admitted to an intensive care unit (ICU) or who died.