

Influenza A(H1N1)2009 in the French Pacific territories: assessment of the epidemic wave during the austral winter

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Abstract

The three French territories in the Pacific (New Caledonia [NC], French Polynesia [FP] and Wallis and Futuna [WF]) have been affected by an outbreak of influenza A(H1N1)2009 during the austral winter of 2009. This wave of influenza-like illness was characterized by a short duration (approximately 8 weeks) and high attack rates: 16–18% in NC and FP, 28% in Wallis and 38% in Futuna. The number of infected patients requiring hospitalization in critical care services and the number of deaths were, respectively, 21 and 10 in NC and 13 and 7 in FP (none in WF). Diabetes, cardiac and pulmonary diseases, obesity in adults, neuromuscular diseases in children, and Oceanic origin were frequently observed among severe cases and deaths. A significant proportion of the population remains susceptible to A(H1N1)2009, making the occurrence of a second wave likely. A state of preparedness and control efforts must be implemented, based on preventive measures (immunization), as well as combined clinical and virological surveillance and health organization.

Keywords: French Pacific territories, influenza A(H1N1) 2009, risk factors

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New Caledonia (NC) and French Polynesia (FP) are autonomous for public health and health care delivery, unlike Wallis and Futuna (WF). There are strong disparities between health surveillance systems and capacities for diagnosis and medical care among the three territories.

Health care is provided by the public and private sectors in NC and in FP; in WF, only the public sector is present. Demographic data and population density are very different: there are 13 400 inhabitants on two islands in WF; 249 000 on eight islands in NC; and 260 000 on 76 islands and atolls in FP.

This article describes the overall dynamics of the epidemic, the main indicators, and the risk factors observed in these territories.

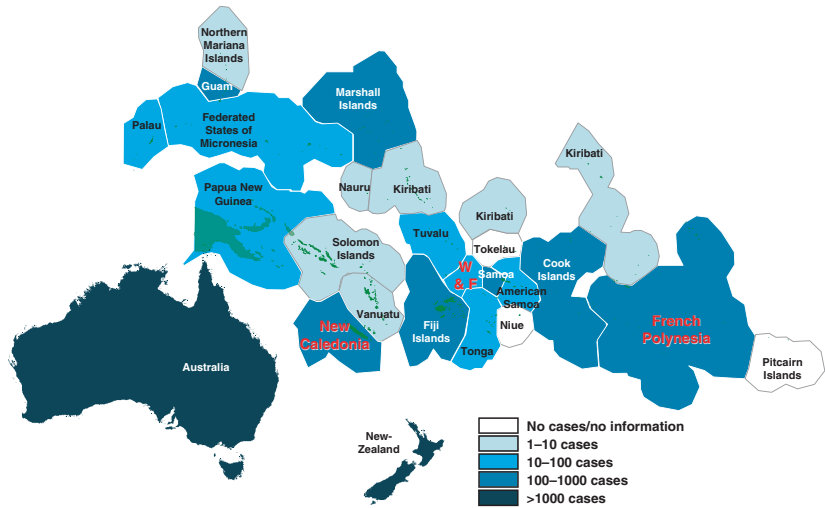
Materials and Methods

Introduction

As has occurred in other countries and territories in the Pacific, the three French territories (Fig. 1) were hit by an epidemic of influenza A(H1N1)2009. It began to circulate in the population during the austral winter in July or August 2009, depending on the territories, with an epidemic peak observed in mid-August.

The available data are generated from different sources depending on the territory. Data may be composed of information submitted by syndromic sentinel systems (general practitioners and pediatricians), from consultations in influenza clinics, educational health services, emergency admissions, hospitalizations and from laboratories. The definitions of influenza-like symptoms (Table 1) and of severe cases of influenza syndrome may differ from one territory to another.

FIG. I. Number of confirmed cases of A(H1N1)2009 in the Pacific countries and territories, 13 October 2009. Source: Data reported by the Pacific countries and territories to WHO South Pacific. W & F: Wallis and Futuna.



The following indicators are presented for each territory for the epidemic period:

- Number of consultations for influenza-like illness (ILI). This included the number of consultations reported by the public sector to which an estimate for the private sector was added (NC and FP), or the total number of consultations (WF).
- Number of cases of ILI. This number was estimated by the local health authorities from the number of consultations, taking into account under-reporting and the consultation rate among symptomatic cases. Low and high assumptions were used as a sensitivity analysis: +30% and +40% in NC and +20% and +30% in FP.
- Number of confirmed hospitalized cases and number of severe cases needing resuscitation or intensive care.
- Number of reported deaths associated with the virus A(H1N1)2009 during the acute phase of infection.
- Distribution of risk factors for severe cases and deaths (co-morbidities, pregnancy, age <1 or >75 years), as collected from clinical records.

- Proportion of tests positive for influenza virus A(H1N1)2009 among patients tested. This was an estimate based on a selected series of specimens from a range of patients (consultations at influenza clinics, hospitalizations, severe cases, etc.).

Results

New Caledonia

Dynamics of the epidemic (Table 2 and Fig. 2). The first case of confirmed influenza A(H1N1)2009 in NC, imported from Australia, was reported on 25 June (week 26). In July, school exchanges (with Australia and New Zealand, where community circulation was at its peak) and the return of students from school vacation (18–26 July) contributed to virus circulation in NC. The first case without any documented link to an imported case was reported in week 29. The peak of the epidemic took place in week 33, 4 weeks after recognized community transmission. The decrease in the number of cases occurred rapidly and the end of the epidemic wave was reported in week 37. The epidemic wave lasted for approximately 8 weeks.

Main characteristics (Table 2). During the epidemic wave, approximately 30 000 consultations for ILI were reported, corresponding to an estimate of 40 000–45 000 cumulative cases of ILI that occurred in the population. The overall positivity rate of virus A(H1N1)2009 in the specimens studied was 48%, with a maximum of 80% during week 33.

Thirty patients were hospitalized for intensive care, including 21 who were laboratory confirmed (19 adults, two children), with a maximum of new hospitalizations in week 34.

TABLE I. Case definition of influenza-like illness by French Pacific territory, 2009

Territory	Case definition
New Caledonia and Wallis and Futuna	Sudden onset and at least three of the following signs: Temperature $\geq 37.8^{\circ}\text{C}$ Myalgia Rhinitis Cough Dyspnea
French Polynesia	Acute respiratory symptoms: General sign: fever $> 38^{\circ}\text{C}$ or myalgia or asthenia and Respiratory signs: cough or dyspnea

Ten deaths were reported (including seven that were laboratory confirmed): these included seven adults (27–86 years, mean age 50 years), and three children (including one under 1 year of age).

Risk factors. Among the 21 patients infected by A(H1N1)2009 who required intensive care, co-morbidities and risk factors were: obesity (38%), chronic respiratory disease (19%), diabetes (10%), chronic renal disease (10%), prematurity (10%), heart disease (5%), recent corticosteroid therapy (5%), leptospirosis (5%). No co-morbidity was reported for 24% of intensive care cases.

Among the ten deceased patients, obesity was reported in three adults, extremes of age (<1 and >75 years) in two, neuromuscular pathology associated with mitochondrial disease was present in two children; two deaths occurred in persons without known risk factors. In addition, eight of the ten deaths occurred in persons of Oceanian origin.

In Noumea, capital city of NC, among children hospitalized in paediatric wards with influenza A(H1N1)2009 from 27 July to 13 September, and for whom the following data are available ($n = 62$), the frequency of risk factors were: age <1 year (42%); co-morbidity: respiratory (20%), neuromuscular (16%), immunodeficiency (6%), heart diseases (8%); no co-morbidity, 25%. Among the 17 children 5–15 years of age, neuromuscular pathology was the highest reported risk factor (47%). Ethnicity may also be a risk factor since 74% of the children were of Melanesian origin (44% of the general population), a percentage greater than the ethnic distribution expected in paediatric wards.

French Polynesia

Dynamics of the epidemic (Table 2 and Fig. 2). The first confirmed case of influenza A(H1N1)2009 in FP, imported

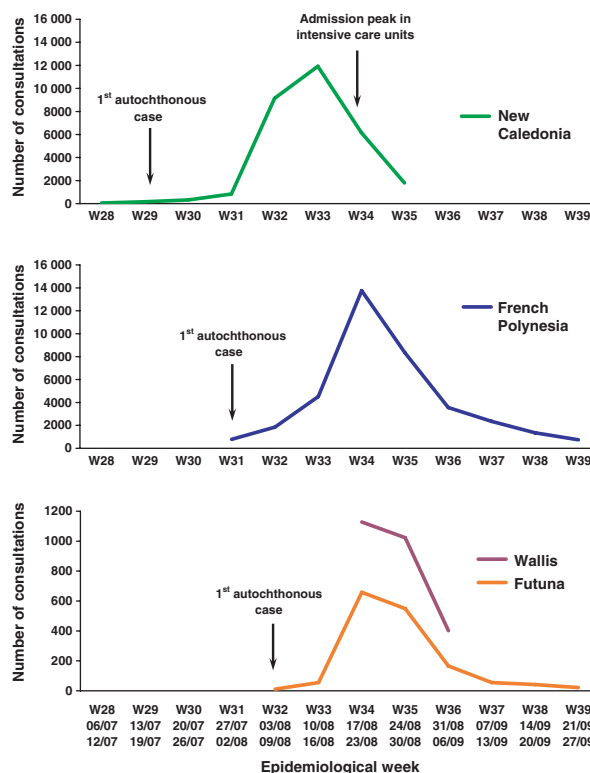


FIG. 2. Number of consultations for influenza-like illness by epidemiological week in the three French territories of the Pacific, 2009.

from the United States, was reported on June 2 (fever detected by thermal imaging camera at the airport). The first clusters of cases were detected among young persons who returned from study abroad, namely from New Zealand. The epidemic peak was reached in week 34, 3 weeks after the onset of community circulation of the virus in week 31, and one week after the return to school. A rapid decrease in the

	New Caledonia	French Polynesia	Wallis	Futuna
Dynamic of the epidemic				
First case confirmed	Week 26	Week 23	Week 31	
First autochthonous case	Week 29	Week 31	Week 32	
Epidemic peak	Week 33	Week 34	Week 34	
End of the epidemic wave	Week 37	Week 39	Week 37	
Main indicators				
Population	249 000	260 000	9200	4200
Number of consultations for influenza syndrome (A)	30 000	35 000	2550	1600
Number of extrapolated influenza syndromes (B)	40 000–45 000	42 000–48 000	–	–
Attack rate of influenza syndrome calculated by utilizing				
The raw number A	12%	13%	28%	38%
The estimated number B	16–18%	16–18%	–	–
Number of confirmed hospitalized cases	114	124	6	1
Number of confirmed cases hospitalized in intensive care	21	13	0	0
Number of deaths	10	7	0	0

Week = epidemiological week (see Fig. 2).

TABLE 2. Dynamic of the epidemics and main indicators of the A(H1N1)2009 pandemic in the three French Pacific territories, 2009

number of cases was observed over the course of the 4 following weeks, and the end of the epidemic wave was confirmed in week 39.

Main characteristics (Table 2). Over the course of the epidemic wave, approximately 35 000 consultations for ILI were reported, corresponding to an estimated 42 000–48 000 cumulative cases of ILI. Strong geographical disparities were observed, with an attack rate for ILI consultations ranging from 6% (archipelagos of Tuamotu-Gambier) to more than 20% (Austral Islands and Moorea Island).

Overall, the viral positivity rate for A(H1N1)2009 based on the studied specimens from weeks 31–39 was 49%, with a maximum of 66% in week 33 (corresponding to 96% of all the samples taken for the influenza A virus).

Thirteen infected patients were hospitalized in intensive care units. The number of deaths reported was seven, with a mean age of 37 years (extremes: 1.5 months to 73 years).

Risk factors. Among the 13 adult patients who required intensive care, the risk factors were the following: pregnancy (8%), co-morbidity: chronic respiratory disease (46%), obesity (38%), cardiovascular disease (31%), diabetes (31%), and chronic renal disease (8%).

Among the seven deceased patients, two suffered from chronic respiratory disease, two from heart disease, one was pregnant, one had immune deficiency; one deceased patient had no known risk factors. Two patients had associated morbid obesity.

Wallis and Futuna

Dynamics of the epidemic (Table 2 and Fig. 2). The first confirmed case of influenza A(H1N1)2009 in WF, imported from metropolitan France, was reported in week 31. The epidemic peak was reached in week 34, 2 weeks after viral circulation started in the population.

Main characteristics (Table 2). Over the course of the epidemic, approximately 2550 cases of ILI were reported in Wallis and 1600 in Futuna for an estimated attack rate of 28% and 38%, respectively.

Overall, the positivity rate for the virus A(H1N1)2009 in studied specimens was 50%. The samples were mainly analysed in Wallis, with on-site rapid testing and delivery to Noumea or Melbourne (Australia) for confirmation and typing by PCR.

There were no severe cases linked to A(H1N1)2009 in Wallis and Futuna; no patient required medical evacuation and no deaths were reported.

Discussion – Conclusion

The three French Pacific territories experienced an early epidemic wave of A(H1N1)2009 infection with attack rates of ILI ranging from 16% to 38%. However, interpretation and comparison between territories should be cautious; because of some heterogeneity in case definitions (Table 1) and indicators used (Table 2), several similarities can be seen. In all three territories, the epidemic wave of ILI lasted approximately 8 weeks, with an elevated and narrow peak (3 weeks). Attack rates were high: 16–18% in NC and in FP, 28–38% in WF.

The proportion of non-consulting cases is difficult to estimate, varying from one territory to another, and depending on a number of factors that affect access to care (geographical, social, behavioral, etc.). This was taken into account in estimating the attack rate in NC and in FP.

To estimate the percentage of ILI attributable to the A(H1N1)2009 virus, virological surveillance is necessary to allow for the distribution of other respiratory viruses. In the three territories, viral positivity rates for A(H1N1)2009, close to 50%, were estimated based on all samples collected. Because the analyses were performed most often in the context of medical care rather than surveillance, samples were mainly collected from severe and hospitalized cases and within a context of limited testing capacity. This sampling bias may have caused an overestimate of the positivity rate of A(H1N1)2009.

Risk factors must be interpreted with some caution, taking into account the limited number of severe cases and deaths. Risk factors vary from one territory to another. Some are observed frequently: diabetes, heart and lung diseases (in NC and FP) [1]. Others are specifically linked to this pandemic:

- Morbid obesity (NC and FP) [1–3];
- Neuromuscular diseases among children > 5 years (NC). Similar findings have been described among children who died of A(H1N1)2009 in the United States [4,5];
- Oceanic origin (NC). The prevalence of co-morbidities, lifestyle, difficulties in accessing health care, and potential genetic factors may have contributed to this increased risk [6].

The first epidemic wave observed from July to September has now ended in the three territories. Although attack rates have been quite high, an unknown proportion of the population remains susceptible to the virus since the proportion of asymptomatic cases may be greater than 30%. The possibility of a second wave cannot be ruled out. It could coincide with the second wave frequently described during the boreal win-

ter, linked to the importation of cases from metropolitan areas during the Christmas holidays.

Dengue and influenza outbreaks can occur simultaneously, as was the case in FP, complicating the medical diagnosis (the clinical distinction between influenza-like symptoms and dengue-like symptoms is challenging), treatment and the management of both epidemic waves.

In order to prepare for a potential second wave, prevention measures and remedial actions should be planned, and the risk of co-epidemics should be anticipated by setting up syndromic and virological surveillance systems that encompass both dengue and influenza. These measures will provide reference data that will contribute to better estimates of the rate and public health burden of ILI attributable to the different respiratory viruses.

Transparency Declaration

All authors declare no potential conflicts of interest.

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