DOI:10.1111/irv.12060
www.influenzajournal.com

Short Article

Pandemic H1N1 influenza surveillance in Haiti, July–December 2009

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Accepted 14 October 2012. Published Online 30 November 2012.

From June 2009 through December 2009, Haiti conducted sentinel surveillance for influenza. 499 samples were collected and tested using real-time RT-PCR. 197 (39.5%) were positive for influenza, including 95 (48%) pandemic (H1N1) 2009, 57 (29%) seasonal influenza A and 45 (23%) influenza B. The median age of pandemic (H1N1) 2009 cases was 21.7; two-thirds of pandemic (H1N1) 2009 cases were in patients aged 6 years – 35 years. Pandemic activity peaked in September and co-circulated with other influenza subtypes. The age distribution and seasonality of pandemic (H1N1) 2009 in Haiti were similar to other countries in the Caribbean region.

Keywords Haiti, influenza, surveillance.

Please cite this paper as: Fitter *et al.* (2013) Pandemic H1N1 influenza surveillance in Haiti, July–December 2009. Influenza and Other Respiratory Viruses 7(4), 772–775.

Influenza is a significant cause of morbidity worldwide.[1] While seasonal and pandemic influenza have been characterized in many temperate climates throughout the world, less is known about influenza in the tropics, in particular the Caribbean region.

Haiti covers 10 714 square miles, has nearly 10 million inhabitants, and shares the island of Hispaniola with the Dominican Republic.[2,3] In June 2009, following the World Health Organization (WHO)'s declaration of the influenza A (H1N1) pandemic,[4] Haiti established a sentinel surveillance system for influenza in order to identify cases of pandemic influenza and characterize other circulating strains of influenza. Surveillance continued through January 12, 2010, when the earthquake disrupted the surveillance system. We examined sentinel surveillance data collected between July and December 2009.

The study

The Haiti Ministry of Public Health and Population, the National Public Health Laboratory (LNSP), the United Nations Stabilization Mission in Haiti (MINUSTAH), the Pan American Health Organization, and other organizations collaborated to create the influenza sentinel surveillance system. Sites were chosen in all 10 departments of the country and included government-run departmental hospitals and clinics, as well as clinics run by MINUSTAH, the Cuban Medical Brigade, Doctors Without Borders, and Doctors of the World. Patients presenting to MINUSTAH sites were from around the country; their departmental location was not specified. Medical providers were instructed to identify patients with influenza-like illness (ILI), which was defined according to WHO guidelines as a person with sudden onset of fever >38°C and cough or sore throat in the absence of other diagnoses.[5] Providers were instructed to use Dacron swabs to collect nasopharyngeal specimens from ILI patients and were asked to collect demographic information.

Specimens were first sent to the closest departmental hospital and were then transported to the LNSP at least three times a week either by MINUSTAH helicopter or by road. Specimens from Hopital de La Paix, in Port-au-Prince, were hand-carried to LNSP daily.

For influenza, real-time reverse transcriptase polymerase chain (rRT-PCR) testing was conducted according to WHO protocol.[6] Samples were tested by rRT-PCR for influenza A and influenza B; specimens positive for influenza A were then subtyped for H3N2, seasonal H1, and pandemic (H1N1) 2009. A subset of rRT-PCR-positive specimens was sent to the WHO Collaborating Center for influenza, the Centers for Disease Control and Prevention (CDC) in Georgia, USA, for confirmatory testing by rRT-PCR, as well as antiviral resistance testing using

pyrosequencing and neuraminidase inhibition assays. LNSP also sent a random allotment of negative samples to CDC-Atlanta for quality control. Direct fluorescent antibody (DFA) testing was conducted for respiratory syncytial virus (RSV). rRT-PCR and DFA results were compiled in two databases at LNSP, and antiviral resistance data were compiled at CDC. Data were analyzed with EXCEL and JMP (SAS Institute Inc, Cary, NC, USA).

For this analysis, we included specimens that underwent rRT-PCR testing for influenza and DFA testing for RSV between July and December 2009. Specimens with discordant laboratory results in the two databases used by LNSP were excluded from the analysis because we were not able to determine definitively the true result retrospectively.

Between July 1 and December 29, 2009, 509 specimens were collected from patients in all 10 departments in the country. We excluded 10 specimens because of discordance between databases. The vast majority of samples were from sites in the Ouest department (which includes the capital, Port-au-Prince) (72·8%) and MINUSTAH sites (15·8%). The mean age was 25·5 years (standard deviation ± 17·84; range 1 month–94 years), and 213 (42·7%) were females (Table 1).

Of the 499 specimens, 197 (39·5%) tested positive for influenza; of these, 95 (48%) were pandemic (H1N1) 2009, 57 (29%) were seasonal influenza A/H3N2, and 45 (23%) were influenza B. No samples tested positive for seasonal influenza A/H1N1. 25/499 (5%) tested positive for RSV by DFA. Two patients were co-infected with RSV and pandemic influenza, while one patient was co-infected with RSV and influenza B.

Among the 95 pandemic (H1N1) 2009 patients, 36 (38%) were females. The mean age was 21·7 years (standard deviation ± 15·42 years; range 6 months–67 years). Two-thirds of pandemic (H1N1) 2009 cases were in patients aged 6–35 years (Table 1). There was no significant difference in the mean ages of patients who had pandemic (H1N1) 2009 compared to those with seasonal influenza and influenza B ($P = 0·13$).

Pandemic (H1N1) 2009 was detected in 6/10 departments. Pandemic (H1N1) 2009 activity peaked in September and then declined through November. No cases of pandemic (H1N1) 2009 were identified in December. Seasonal influenza also peaked in September. Most seasonal influenza cases were influenza A/H3N2 during July–September and influenza B during September–October (Fig. 1).

Table 1. Characteristics of patients tested for influenza, Haiti, July–December 2009

	Tested N = 499 (%)	Pandemic n = 95 (%)	Seasonal A/H3 n = 57 (%)	Influenza B n = 45 (%)	RSV n = 25 (%)
Mean age (years)	25·5	21·7	29·6	20·3	21·4
Gender					
Male	283 (56·7)	58 (61)	31 (54)	20 (44)	17 (68)
Female	213 (42·7)	36 (38)	26 (46)	25 (56)	8 (32)
Unknown	3 (0·6)	1 (1)			
Age groups					
≤5	86 (17)	13 (14)	10 (17)	11 (24)	9 (36)
6–18	97 (20)	31 (33)	5 (9)	16 (36)	1 (4)
19–35	166 (33)	31 (33)	18 (32)	9 (20)	10 (40)
36–60	130 (26)	19 (20)	23 (40)	8 (18)	2 (8)
60+	14 (3)	1 (1)	1 (2)	1 (2)	2 (8)
Unknown	6 (1)	0	0	0	1 (4)
Departments/Sites					
Artibonite	6 (1·2)	2 (2·1)	0	0	3 (12)
Center	2 (0·4)	1 (1)	1 (1·8)	0	0
Grande Anse	5 (1)	1 (1)	0	0	0
Nippes	3 (0·6)	0	0	1 (2·2)	0
Nord	3 (0·6)	0	1 (1·8)	1 (2·2)	0
Nord Est	3 (0·6)	0	3 (5·3)	0	1 (4)
Nord Ouest	15 (3)	2 (2·1)	2 (3·5)	3 (6·7)	0
Ouest	363 (72·8)	76 (80)	37 (64·9)	36 (80)	16 (64)
Sud	11 (2·2)	0	0	0	0
Sud Est	9 (1·8)	2 (2·1)	1 (1·8)	2 (4·4)	1 (4)
MINUSTAH	79 (15·8)	11 (11·6)	12 (21)	2 (4·4)	4 (16)

RSV, respiratory syncytial virus.

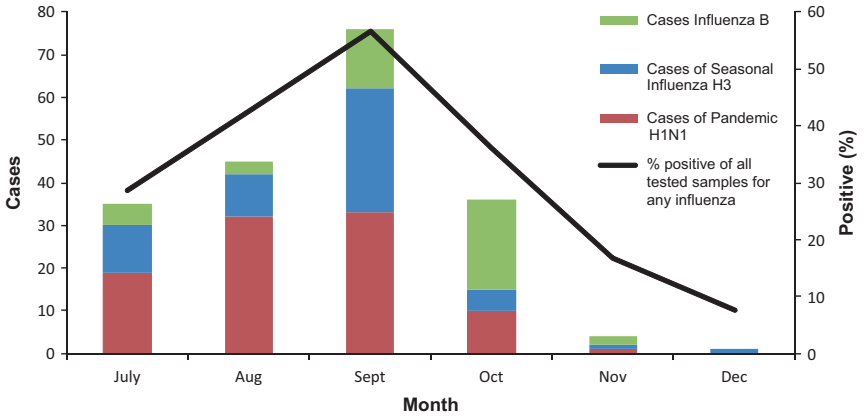

Figure 1. Seasonality of influenza in Haiti, July–December 2009.

Eighty specimens were isolated and antigenically characterized at CDC-Atlanta between July and December 2009. Eight samples (10%) had discordant results when compared with those from LNSP. Seventeen samples, including 11 pandemic (H1N1), four influenza A/H3N2, and two influenza B specimens, underwent antiviral testing, and all were susceptible to neuraminidase inhibitors; all influenza A subtypes were resistant to M2 inhibitors.

Conclusions

We report for the first time influenza data from Haiti, including H1N1 pandemic findings. We found that in Haiti young adults and children were the predominant age groups affected by pandemic influenza. This finding is consistent with demographic data reported in other countries in the region, including the United States and Barbados, where most cases of pandemic (H1N1) 2009 were found in children and young adults.[7,8]

Like in neighboring Cuba and Barbados, pandemic influenza in Haiti peaked in September–October 2009.[8–10] Seasonal influenza activity in Haiti also peaked in September. This finding was similar to Cuba, where pandemic (H1N1) 2009 and influenza A/H3N2 co-circulated, peaking in early October.[9] Co-circulation of pandemic (H1N1) 2009 and seasonal influenza A was also reported in tropical regions of Asia and Africa.[11–13] In the United States, although pandemic (H1N1) 2009 peaked during October, there was minimal seasonal influenza activity.[14] Like Cuba, no seasonal influenza A/H1N1 was reported in Haiti during July–December 2009.[9]

No evidence of resistance to neuraminidase inhibitors was seen in the Haiti pandemic specimens, a finding consistent with the low antiviral resistance (around 1%) that was observed worldwide for pandemic (H1N1) 2009.[10,15] However, pandemic (H1N1) 2009 influenza specimens from Haiti were resistant to M2 inhibitors, as was seen in other areas.[16]

Our findings have several limitations. First, we do not know what percentage of patients presenting with ILI was sampled, or to what extent the sampled population was representative of the population of Haiti in general. While nearly 1/3 of the population in Haiti lives in Ouest department, 80% of our samples were from Ouest. This finding likely reflects the challenges of specimen transport; LNSP is located in the Ouest department, and it was much easier for nearby healthcare facilities to transport specimens to the laboratory. Twelve percent of our samples were from UN peacekeepers. In addition, we do not know whether variability in health utilization may have made our sampled population less representative of the overall population; very few patients >60 years old were sampled, which may be a result of less health utilization in this population. Finally, we did not collect information on hospitalizations and deaths, so we could not comment on the severity of pandemic influenza in Haiti.

Despite these potential limitations, this report represents the first description of pandemic in Haiti. While the surveillance system was only operational for 6 months, it provided an indication of the population affected and the evolution of influenza in the country, both of which were consistent with patterns seen elsewhere in the Caribbean. Respiratory surveillance should be resumed in Haiti in order to better understand the epidemiology, disease burden, and seasonality of influenza.

Acknowledgements

We appreciate the contributions of the many individuals who assisted with collecting and processing the samples in Haiti.

Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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