



Pandemic Influenza Surveillance in New York City, 2009-10

On April 23, 2009, the first cases of the 2009 pandemic H1N1 influenza A strain were detected in NYC. To guide the public health response, the New York City Department of Health and Mental Hygiene used several surveillance methods to track the burden and spread of the disease. As knowledge about H1N1 increased locally and nationally, the Health Department's surveillance evolved to balance information-gathering with available resources, resulting in three distinct surveillance periods. The differences in surveillance methodology must be considered when comparing and interpreting the data on known cases, hospitalizations, and deaths. Variability in patient healthcare utilization, provider testing practices, and viral activity also could have affected surveillance data.

A Guide to Influenza

- Influenza A and B are the main virus types.
- Influenza A can be further subtyped:
 - **(p)H1N1** refers to the 2009 H1N1 influenza.
 - **(s)influenza A** refers to other seasonal influenza A strains, including influenza A H3N2 and non-pandemic influenza H1N1.

First Wave: Active Hospital-Based Surveillance and Enhanced Passive Surveillance (April 24, 2009 – June 19, 2009)

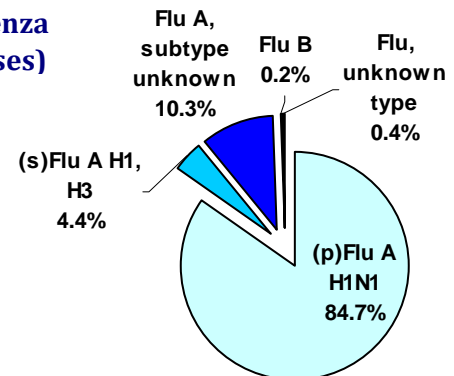
Because (p)H1N1 was a novel infectious agent during this period, the Health Department conducted active surveillance to identify all cases of influenza. Routine passive surveillance of health care provider and laboratory reports of patients diagnosed with influenza was enhanced with attempts to contact all reported cases to collect additional demographic and clinical information. The Health Department facilitated the subtyping of most, but not all, influenza specimens to identify circulating strains.

- A total of 1,967 cases was identified or reported, nearly all of which (1,956 cases, 99%) were influenza A.
 - Of the 1,956 influenza A cases, 1,666 were (p)H1N1, 87 were (s)influenza A, and 203 had no subtype information.
- 35% of (p)H1N1 cases and 27% of all other influenza A cases were aged 5 to 18.
- Among (p)H1N1 cases, most lived in the borough of Queens (824 cases, 49%).

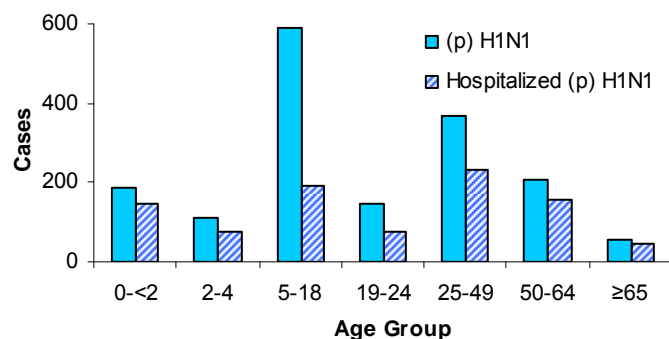
Hospitalizations and Deaths

- Of the 1,967 influenza cases, 1,178 (60%) were hospitalized due to their illness.
 - 930 (79%) of the hospitalized cases had confirmed (p)H1N1, 25% of whom were aged 25 to 49 (n=232).
- Of the total 1,967 known influenza cases, 60 (3%) died within 0 and 71 days from the date of symptom onset (median = 13 days).
 - Most (57 deaths) had (p)H1N1.
 - About half of deaths (49%) among those with (p)H1N1 were aged 25 to 49.

Reported influenza cases (1,967 cases)



Comparison of total (p)H1N1 cases and subgroup of hospitalized cases, by age group



Source: New York City Department of Health and Mental Hygiene, Bureau of Communicable Disease, 2009-10

Second Wave: Enhanced Passive Surveillance (June 20, 2009 – August 31, 2009)

As the outbreak continued and more was known about (p)H1N1, the Health Department altered its surveillance to reduce staff burden while still collecting sufficient information to monitor the disease in the City. The second surveillance period relied primarily on enhanced passive surveillance (described above).

- A total of 153 cases of influenza was reported, nearly all of which (152 cases, 99%) were influenza A.
 - 122 of the influenza A cases were (p)H1N1, 7 were (s)influenza A and 23 had no subtype information.
- The (p)H1N1 cases were most likely to be aged 25 to 49 (40%) or 5 to 18 (16%).
- Queens and Manhattan reported the most (p)H1N1 cases (33 each), as well as the most other influenza A cases (9 in Queens; 8 in Manhattan).

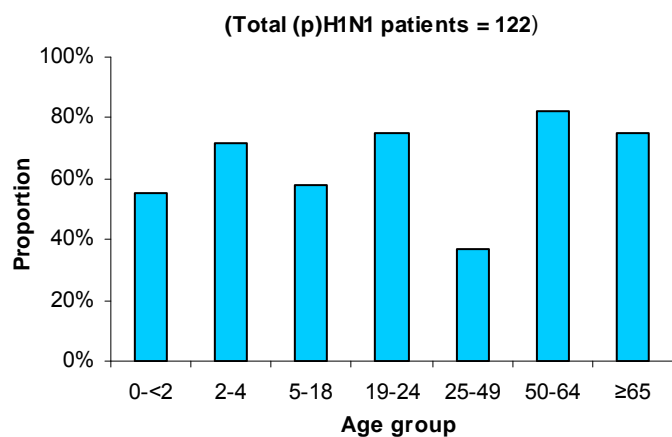
Hospitalizations and Deaths

- The same proportion of influenza A cases was hospitalized as during the first surveillance period. 56% (68 cases) of the 122 (p)H1N1 cases and 80% of the 30 other influenza A cases were hospitalized.
- There was a total of 10 deaths during this period, 9 among the (p)H1N1 cases and 1 influenza patient with an unknown type.

Decreased subtyping of influenza cases

By this time, (p)H1N1 was known to be the predominantly circulating strain. Therefore, less subtyping of influenza A was conducted because the subtype information would not change surveillance plans or treatment recommendations.

Proportion of (p)H1N1 cases who were hospitalized by age group



Source: New York City Department of Health and Mental Hygiene, Bureau of Communicable Disease, 2009-10

Data Sources

Data presented are based on influenza case information for NYC residents from electronic influenza-positive reports from laboratories, provider reports of hospitalized cases of laboratory-confirmed influenza A, or hospitalization records of influenza patients reported to or identified by Health Department surveillance staff. Influenza-associated deaths were identified either through provider reports to the Office of Chief Medical Examiner or by a data match of cases with the death certificate registry maintained by the Office of Vital Statistics (where influenza was included as a suspected or confirmed cause of death on the death certificate). For the first and second surveillance period, deaths that occurred any time after symptom onset were defined as an influenza-related death, as long as there was no period of recovery to baseline health status before death. During the third surveillance period, deaths were defined as influenza-related only if patients died within 30 days of symptom onset. As noted above, there was an increasing number of influenza cases of unknown subtype because (p)H1N1 was known to be the predominant strain so subtyping was not conducted. Additional subtype information after the initial wave of the pandemic was not needed because the information would not change treatment or prevention guidelines.

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Related References:

Balter et al. Pandemic (H1N1) 2009 surveillance for severe illness and response, New York, New York, USA, April–July 2009. EID 2010. 16(8):1259-64.

Lee et al. Fatalities associated with the 2009 H1N1 influenza A virus in New York City. CID 2010. 50(11):1498-504.

Third Wave: Sentinel Hospital-Based Surveillance and Passive Surveillance (October 1, 2009 – March 31, 2010)

The beginning of the final surveillance period corresponded with the official start of the 2009-2010 influenza season. The Health Department continued passive surveillance of (p)H1N1 through health care provider and laboratory reports to monitor citywide trends. Also, a different form of active surveillance was implemented by selecting one sentinel hospital in each borough and conducting comprehensive, resource-heavy surveillance in only these five hospitals to monitor the clinical and epidemiologic characteristics of the virus. Although influenza season officially ended in mid-May, pandemic surveillance ended in March because influenza activity had diminished.

A Guide to Sentinel Surveillance

- A nurse in each hospital was tasked with daily review of the hospital admissions for cases that had fever and respiratory illness.
- Patients meeting surveillance criteria were tested for influenza and subtyped. Detailed demographic and clinical information were collected.
- Most sentinel cases were reported from the Bronx hospital, possibly because of more comprehensive case ascertainment and not necessarily related to higher rates of influenza in the Bronx.

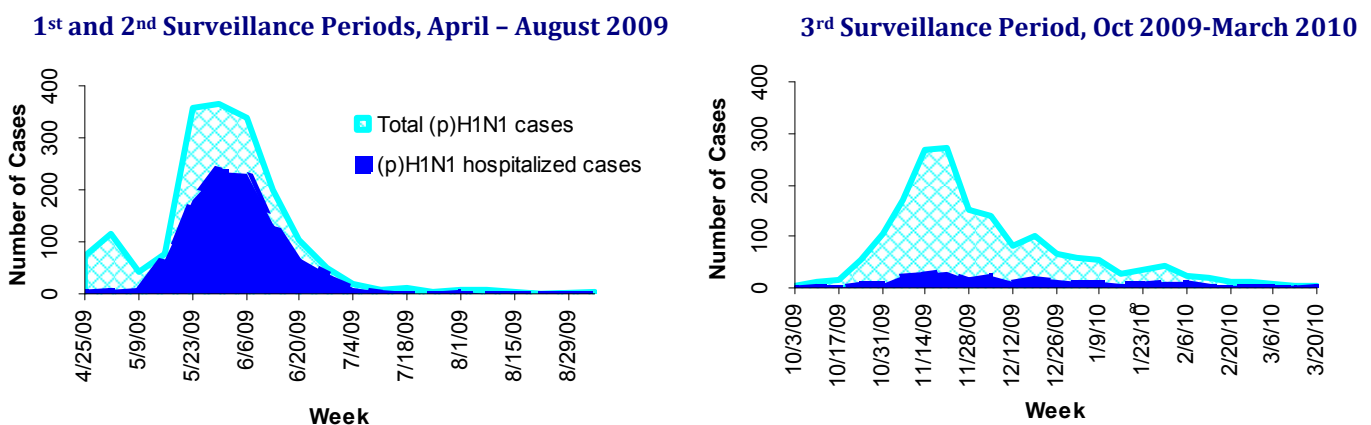
- In total, 5,152 cases were identified or reported, nearly all of whom (5,086 cases, 99%) had influenza A.
 - Among the one third (34%) of influenza A cases that were subtyped, 1,738 (99%) were (p)H1N1 and 3 were (s)influenza A.

Hospitalizations and Deaths

- Of the 5,086 influenza A cases, 802 (16%) were hospitalized due to their illness.
 - 16% (272) of 1,738 identified (p)H1N1 cases were hospitalized.
- Of the 57 influenza-related deaths during this period, 32 (56%) were positive for (p)H1N1, 23 (40%) an unspecified subtype of influenza A, 1 for influenza B, and 1 for an influenza of unknown type.
 - Of the (p)H1N1 deaths, 13 (41%) were between 25 and 49 years of age and 10 (31%) were between 50 and 64 years of age.
 - Of the 23 deaths among nonsubtyped influenza A cases, 9 (39%) were between 25 and 49 years of age.

Although disease surveillance generally underestimates the magnitude of any illness due to multiple factors that can affect surveillance data, the Health Department was able to effectively monitor trends during the 2009-2010 H1N1 pandemic to describe the burden and severity of illness throughout the City.

Number of total and hospitalized (p)H1N1 cases, by week during the total pandemic period



Source: New York City Department of Health and Mental Hygiene, Bureau of Communicable Disease, 2009-10

MORE New York City Health Data and Publications

- For complete tables of data presented in this Brief, visit www.nyc.gov/html/doh/downloads/pdf/epi/datatable5.pdf
- Visit EpiQuery – the Health Department’s online, interactive health data system at www.nyc.gov/health/EpiQuery
 - Communicable disease surveillance data: a816-healthpsi.nyc.gov/epiquery/EpiQuery/CDSS/index.html

My Community’s Health: Data and Statistics at www.nyc.gov/health/mycommunityhealth