



# Georeferencing Swine Flu in Buenos Aires, Argentina

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## Abstract

On July 16th, W.H.O. recommends a weekly report of a qualitative assessment of the geographical spread, trend of cases, intensity of A/H1N1 Influenza and its impact on the health care system. In this study we describe the geographical spread during the onset of the southern winter in 150.000 middle class Argentinean living in Buenos Aires and its surroundings.

The process of georeferencing swine flu cases was carried out using our local Geographical Information Systems. This allowed us to understand the swine flu pattern to define the appropriateness of contingency policies adopted at the onset of the epidemic.

## Materials and Methods

In April 2009, the Mexican Ministry of Health (MoH) reported an outbreak of respiratory illness: In affected patients, a new strain of influenza A (H1N1) virus of swine origin had been isolated. After documentation of human to human transmission of the virus in at least three countries, the WHO raised the alert to pandemic level 6. All suspected cases cared at the Hospital Italiano de Buenos Aires (HIBA), a 750-bed tertiary center with high standards in quality of health care and an advanced information system, were georeferenced and also were reported to the National Surveillance System.

The time period analyzed spans from epidemiological week number 21 through 23 (May 24th to June 16th) for year 2009

## Technological Model

The client/Server application was developed in VB 6.0 and the Web application in ASP.NET. As database engine it was deployed over Oracle 11G.

The service is installed in a clustered Windows 2003 Server running in two en IBM System X3850 DUAL XEON 5160 servers. These servers are connected to an IBM System i 570 through iSCSI connections. This connection ensures 4GB of bandwidth between the System i server and each Intel server from the Cluster.

Confirmed H1N1 patients: Real-time PCR test was used. Virological specimens were collected in suspected cases until epidemiological week (EW) number 24. After that week only inpatients were swabbed.

Suspected and confirmed cases of swine flu, including personal data, were reported to the national surveillance system from the onset of the epidemic. HIBA also began an on-going epidemiological and virological monitoring process and submitted the mandated forms electronically. It has continued this over-sight throughout the influenza pandemic. Characteristics of those patients are described elsewhere

## Data source

Data was obtained from the Health Information System of the Hospital Italiano. Most of the HMO health care system is based on primary care. Patients who require hospitalization are admitted to the Hospital Italiano; laboratory tests are also centralised. The HMO electronic information system requires clinical entries of pharmacological prescriptions and physical examinations. These data entries are attached to a specific medical problem controlled by the Spanish version of SNOMED CT.

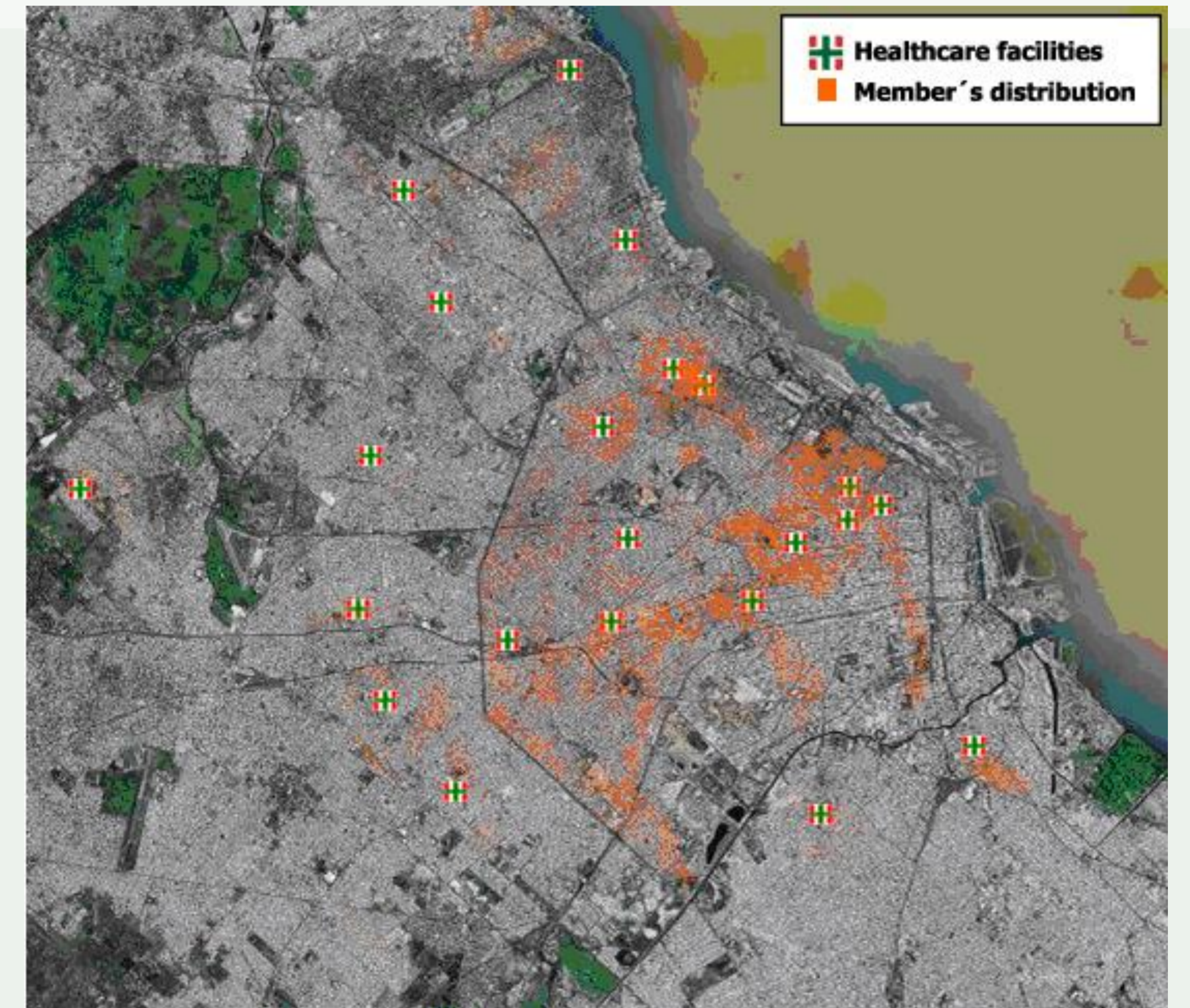


Figure 1 – Healthcare facilities and member's distribution

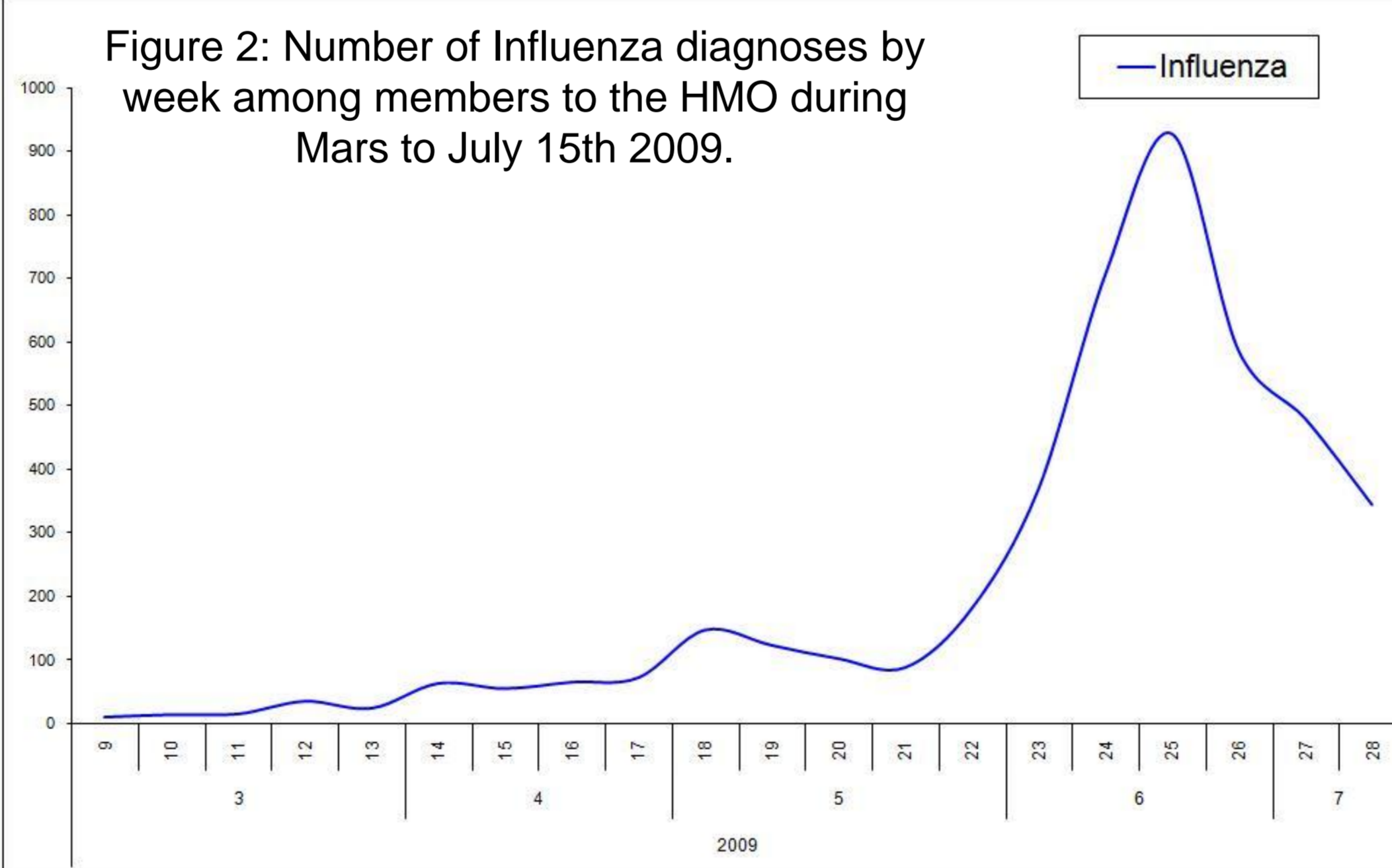
## Results

Among this HMO population the outbreak started on June 5th.

The distribution of people that sought care to the emergency room due to flu like symptoms during the earlier weeks of the epidemic (EW 21-23) showed that possible cases had spread throughout the entire Buenos Aires city

The number of possible cases was high and all over distributed at the time that the MoH still recommended contingency plans.

A/H1N1 laboratory confirmation was obtained according to the MoH's definition of who should be swabbed and only few people could be swabbed as the recommendation only included travelers to Mexico or USA. We can see that although they were few cases, the distribution of them was also throughout the entire Buenos Aires city. No aggregation of cases was found for any geographical zone.



In 150000 middle class Argentinean HMO members the A/H1N1 epidemic sharply dispersed over these three weeks analyzed. The quick dispersion of this virus had let behind the health public policies adopted to contain it.

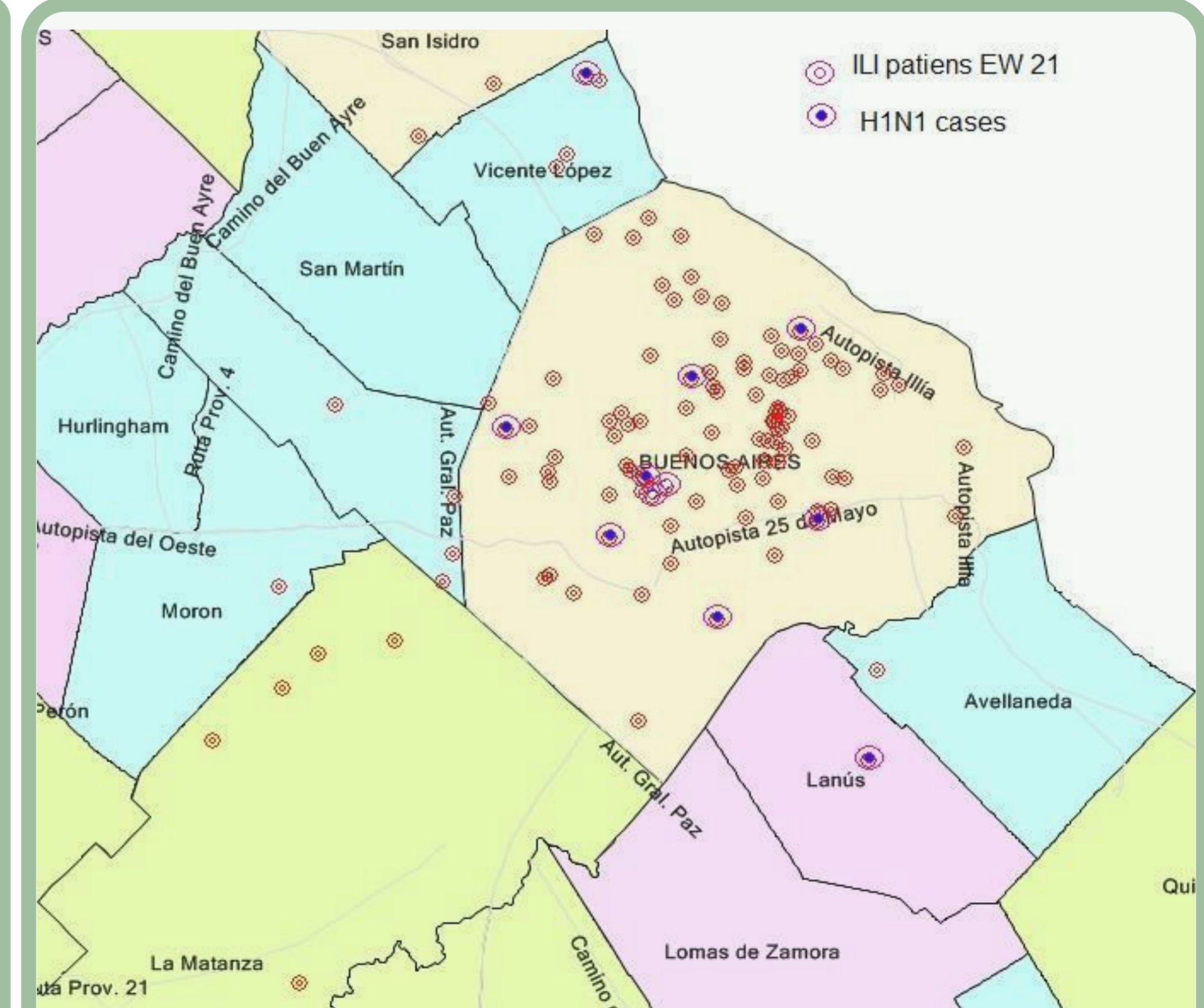


Figure 3: A/H1N1 cases during EP 21 to 23.

This study showed that in Argentina during the period in which contingency measure were been adopted, possible swine flu cases were being distributed through Buenos Aires city. Laboratory case confirmation was not allowed to be done in those patients that sought care at the emergency room due to influenza like symptoms. The geographical georeference of this disease allowed us to understand that A/H1N1 influenza virus had a high attack rate as the cumulative incidence of influenza like illness observed over this epidemic period of time raised very quickly.