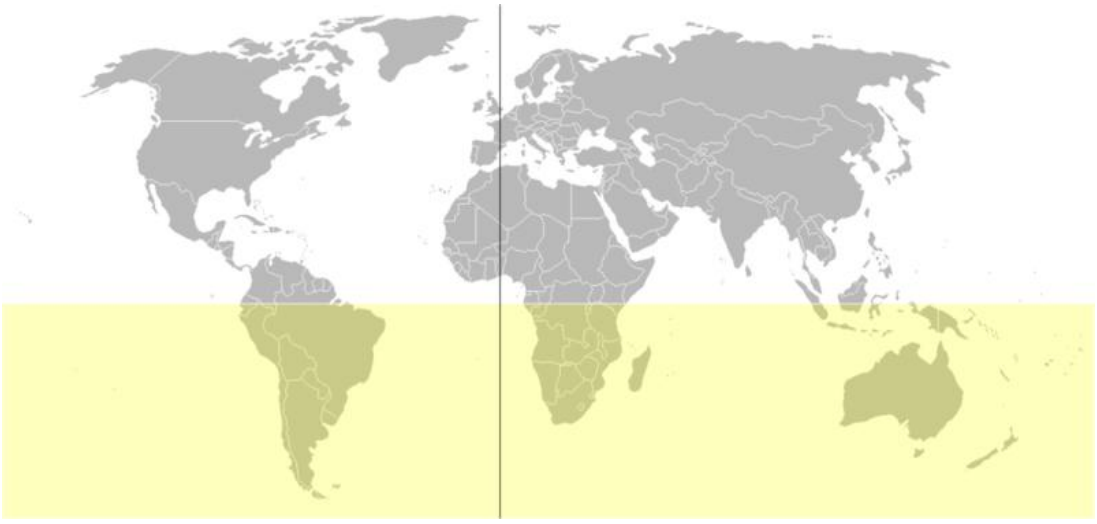
Assessment of the 2009 Influenza A (H1N1) Pandemic on Selected Countries in the Southern Hemisphere: Argentina, Australia, Chile, New Zealand and Uruguay



Developed by the Department of Health and Human Services in collaboration with other U.S. Government (USG) Departments for the White House National Security Council
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I. Executive Summary

On August 9, 2009, the White House charged the Department of Health and Human Services (HHS) in coordination with the Office of the Director for National Intelligence (ODNI) and the Department of State (DoS) to study characteristics and impact of the 2009 Influenza A (H1N1) (refer to as 2009 H1N1) outbreak in the Southern Hemisphere. This assessment explores the characteristics and impact of the disease in select southern hemisphere countries that have been experiencing the 2009 H1N1 outbreak in May to August, coincidently with their normal influenza season. Countries assessed include Argentina, Australia, Chile, New Zealand, and Uruguay as they more closely resemble the U.S. with respect to demographics and economic development.

The information in this report comes mainly from reports of the Ministries of Health of the selected countries, press releases, government publications, and U.S. embassies abroad covering the period from May 1 to August 24, 2009. From this assessment, it was possible to make the following general observations:

All countries report that after mid July, disease activity in most parts of the country decreased. This indicates that the duration of the current influenza season in the Southern Hemisphere, in which the 2009 H1N1 virus is the predominate strain, may be similar in length to an average seasonal influenza season.

Virologic data indicates that the H1N1 virus strains currently circulating in the Southern Hemisphere are similar to those detected in the U.S. Data suggest that the 2009 H1N1 virus remains antigenically stable. Thus, the H1N1 virus strain selected by the U.S. for vaccine manufacturing should closely match the currently circulating 2009 H1N1 strains. Moreover, almost all H1N1 viruses tested remain sensitive to neuraminidase inhibitors (oseltamivir and zanamivir). In all five countries, antiviral drugs were used to treat individuals with confirmed and severe cases, for individuals suspected of having the virus, and for individuals with risk factors for complications who were in contact with people having or suspected of having the virus. However, comprehensive studies of the effectiveness of antiviral treatment to reduce disease severity or mortality in infected patients are not currently available.

The most at-risk populations in the Southern Hemisphere are similar to those observed in the U.S. Similar to situation in the U.S. this past spring, H1N1 infections generally caused mild disease. H1N1 infections predominantly occurred in school-aged children and adults under 65 years of age. Only a small proportion of cases were fatal. Pregnant women or individuals with other existing conditions made them at higher risk for influenza complications. Australia and New Zealand reported higher rates of hospitalization of cases in their indigenous population (5 and 3 times higher, respectively) when compared to cases in the non-indigenous population.

Commonly used community mitigation measures included school closures, cancellation of mass gatherings, isolation and quarantine, and other social distancing measures. All countries inconsistently implemented some form of community mitigation measures including temporary and local school closures, cancellation of mass gatherings, isolation or quarantine of sick or exposed individuals, and other social distancing measures as well as border screening and temporary flight cancellations.

Health care systems experienced stress, but it was generally geographically isolated and relatively short lived. All five countries reported early regional surges in hospital, emergency department and outpatient visits. Some countries reported transient hospital bed, equipment or medication shortages.

Available data suggest that all countries experienced some time-limited and/or geographically-isolated socio/economic effects and a temporary decrease in tourism. Although it is too early to determine whether the 2009 H1N1 pandemic has caused a long-term economic impact in Australia, Argentina, Chile, New Zealand, and Uruguay, some of these countries reported limited social and economic effects from implementation of social distancing measures and decreased tourism.

In considering the implications of the Southern Hemisphere experience for the U.S. this coming fall, readers should consider that all the countries profiled differ from the U.S. in terms of their public health and surveillance systems, the organization of their health care systems, their customs and traditions, and care-seeking behavior. In addition, these countries did not have a 2009 H1N1 outbreak prior to enter in their normal influenza season, as in Mexico and the U.S.. How and whether 2009 H1N1 virus will behave in the Southern Hemisphere, after their normal flu season ends, remains to be seen.

II. Purpose

This assessment explores the characteristics and impact of the 2009 H1N1 virus in selected southern hemisphere countries during the period of May to August, which coincides with their normal influenza season. This assessment is intended to assist the U.S. Government in its preparedness efforts. The selected countries include Argentina, Australia, Chile, New Zealand, and Uruguay as they more closely resemble the U.S. with respect to demographics and economic development.

III. Introduction

This assessment contains information derived mainly from reports of the Ministries of Health of the selected countries covering the period from May 1 to August 24, 2009. Additional sources of information include official government publications, press releases, and reports from U.S. embassies abroad. The document is organized as follows: first, a narrative summary of the Southern Hemisphere experience is presented, along with a table comparing 2009 H1N1 outbreak characteristics, timelines and geographic distribution, virology, epidemiology, control measures implemented, and healthcare system and socioeconomic impacts (Table 1); second, an annex contains a more detailed analysis of these parameters by individual country.

The detection of the 2009 H1N1 virus in Mexico in April 2009 was followed immediately by the identification of laboratory confirmed cases in the U.S. and Canada. By May, widespread infection was occurring in North America, prompting the World Health Organization (WHO) to declare the first public health emergency of international concern under the revised 2005 International Health Regulations. The virus spread rapidly around the world, and on June 11, 2009, WHO raised the pandemic alert to Phase 6, indicating sustained spread globally. As of August 2009, the 2009 H1N1 virus is the predominant influenza A virus subtype reported in the world.

The virus spread to the Southern Hemisphere's temperate countries concurrent with the beginning of their annual influenza season, which typically occurs from May to October. The assessment of the epidemiological data, viral characteristics, morbidity and mortality, disease trends, health care and community mitigation practices and socio-economic impacts in Argentina, Australia, Chile, New Zealand, and Uruguay provides information that may be used for planning purposes for the upcoming influenza season in the Northern Hemisphere.

Implications drawn from this comparison of the characteristics and severity of the 2009 H1N1 outbreak in the selected countries to that in the U.S. may be limited. Surveillance systems and categories of data collected and reported differ substantially among countries. For example, some countries focus surveillance on patients with influenza-like illness (ILI) and perform laboratory diagnostic testing on a high percentage of suspect cases whereas other countries primarily test only the most severe cases. Some countries track the percentage of 2009 H1N1 virus with respect to influenza viruses while others calculate the percentage of 2009 H1N1 with respect to all respiratory viruses. With respect to affected age groups and hospitalization rates, Australia, Chile, New Zealand, and Uruguay report information based on laboratory confirmed 2009 H1N1 data while Argentina reports data on Acute Respiratory Infections. In addition, during the course

of the pandemic, access to medical care and approaches to antiviral treatment varied with location and evolved over the course of the event. Therefore only limited inferences or limited conclusions can be made regarding effectiveness of treatment are limited as are precise assessments of morbidity and mortality data. Thus, the data and observations included in this report should not be considered definitive but as a preliminary assessment to help guide the decision making in the U.S.

IV. Comparative Assessment Summary: The 2009 H1N1 Pandemic in Southern Hemisphere Countries

2009 H1N1 outbreak timelines and geographic distribution

All five countries included in this report detected their first cases of 2009 H1N1 in late April (New Zealand) or May (Argentina, Australia, Chile and Uruguay). Similar to the U.S., soon after confirmation of the first case, the virus spread throughout each country, with the highest number of cases of ILI reported in late June or early July. All countries report that after mid July, disease activity in most parts of the country decreased (generally, a range of 6-7 weeks from first reports to peak event). This indicates that the duration of the current influenza season in the Southern Hemisphere, in which the 2009 H1N1 virus was the predominate strain, may be similar in length to an average seasonal influenza season.[1]

Virology

Virologic surveillance data indicates that the 2009 H1N1 virus has become the dominant influenza virus in all countries where it has been circulating. According to the WHO Global Influenza Surveillance Network (GISN), as of August 8, 79% of all influenza viruses currently detected globally was 2009 H1N1 (66% in the Northern Hemisphere and 89% in the Southern Hemisphere).

The 2009 H1N1 virus remains antigenically unchanged since it was first identified in April 2009. This indicates that the currently circulating 2009 H1N1 virus strains are similar to the strains being used for manufacturing the pandemic vaccine. Sequencing data indicate that the virus has been genetically and antigenically stable. The HHS Centers for Disease Control and Prevention (CDC) has performed genetic sequencing on over 1,484 genes from over 415 viral isolates from 331 cases including 256 cases from North America, 30 cases of 2009 H1N1 viruses from South American countries in the Southern Hemisphere (including Argentina, Brazil, Chile, Bolivia, Ecuador, Uruguay, and Paraguay) as well as from Colombia and Surinam, 19 cases from more than 12 countries in Central America and the Caribbean, 10 cases from Asia, 4 cases from Europe, 8 cases from Africa, and 2 cases from Oceania (specifically 2 cases from New Zealand). All 2009 H1N1 viral genes have a high degree of similarity, and show no differences over time or geographic location. Nearly all viruses tested have been sensitive to neuraminidase inhibitors

[1] Disease associated with 2009 H1N1 influenza is increasing in South Africa, which experienced a normal, two and half month season of seasonal influenza where influenza A (H3N2) virus predominated. Close monitoring of the situation in southern Africa will be critical in understanding how 2009 H1N1 may affect Africa, particularly given the higher prevalence of poverty, HIV/AIDS and malnutrition and limited access to health care.

(oseltamivir and zanamivir), the main antiviral drugs stockpiled and deployed by the U.S. Government for pandemic response.

Epidemiology

The overall number of illnesses, hospitalizations and deaths attributed to 2009 H1N1 virus is difficult to ascertain based on the information available. The clinical characteristics and basic epidemiology of 2009 H1N1 virus in the selected countries in the Southern Hemisphere during their fall/winter influenza season are, so far, similar to the 2009 H1N1 disease experienced in the U.S. in the spring/summer.

Most mild cases occurred in children older than 5 years of age and adults younger than 65. Overall, rates of severe illness, hospitalizations and death attributed to 2009 H1N1 virus are similar to those observed in the U.S. Both in the Northern and Southern Hemispheres, age distribution of cases differs from what is usually observed during seasonal influenza epidemics, when hospitalizations rates are highest among persons younger than two years and persons 65 years and older. Of note, Argentina and Chile reported that among the hospitalized cases of acute respiratory syndrome, children up to 4 years of age are the most affected. However, both countries report that only a low percentage of cases (less than 20-30%) in this age group represent 2009 H1N1 infection, whereas more than 70-80% represent Respiratory Syncytial Virus (RSV).

Like the U.S., where 71% of the reported deaths have occurred in persons 25-64 yrs old, countries in the Southern hemisphere have also observed the highest number of deaths in adults. A high proportion of cases (47%-60% in different countries) had known risk factors for severe influenza complications, such as chronic lung or cardiovascular disease. Similarly, most countries confirm an increased risk of complications in pregnant women infected with the 2009 H1N1 virus. In Australia and New Zealand, indigenous populations also seemed to be at greater risk of severe complications than non-indigenous persons.

Community Mitigation Measures

Antivirals

All five assessed countries have used oseltamivir to treat individuals with confirmed and severe cases, those with ILI and those at high risk of complications who have been in contact with individuals with confirmed or suspected cases. Studies and data about the effectiveness of treatment to reduce disease severity or mortality in infected patients in the five countries are not currently available.

Non-pharmaceutical Measures

All five countries sporadically implemented non-pharmaceutical community mitigation measures in some locations. Measures included temporary and local school closures, cancellation of mass gatherings, isolation and quarantine of sick individuals and contacts and other social distancing measures. Due to variable implementation, the effectiveness of community mitigation measures is difficult to ascertain and no definitive conclusions can be drawn.

For example, Argentina closed schools nationwide for much of the month of July, and observed a concurrent decrease in the incidence of disease. However, the contribution of school closures

to this decrease is not known and it is coincidental with the period in which the incidence of 2009 H1N1 virus started to decrease in the other countries. Schools reopened in August with early indications of resurgence in ILI detected in a few outpatient settings in Buenos Aires.

Regarding border measures, Australia and Chile implemented thermal screening at the beginning of the 2009 H1N1 outbreak and before the disease spread in their territories. At on onset of the outbreak, Chile recommended against non-essential travel to the U.S. or Mexico. The government also required that passengers on cruise ships stopping in Chile and flights to Chile from countries other than the U.S. and Mexico complete health questionnaires and distributed informational pamphlets at land border crossings. Thermal screening ceased when the virus spread and governments transitioned from a containment to a mitigation phase. Subsequently, Chile ceased the screening and Australian border measures were geared to managing sick travelers identified at international borders and providing information to healthy travelers about how to best protect themselves from becoming sick. Uruguay did not implement any travel restrictions but provided passengers with information about the 2009 H1N1 virus. Argentina cancelled flights from Mexico before cases were detected in Argentina, but the measure was lifted once infections were confirmed in the country. New Zealand initially adopted a containment approach consisting of both border management (keep it out) and cluster control (stamp it out). The New Zealand Government began screening all passengers (through self-reporting of symptoms) arriving from countries of concern on April 28, shortly after presentation of the first case. Given the wide distribution of 2009 H1N1 virus in these countries, restrictive border measures applied during the initial period did not prevent the disease from spreading.

Impact on Healthcare Systems

According to the World Health Organization, the impact of a pandemic on a health care system is classified as low (demands on health-care services are not above usual levels), moderate (demands on health-care services are above the usual demand levels but still below the maximum capacity of those services), and severe (demands on health care services exceed the capacity of those services). All countries reported a short-term impact on their health care systems, despite some initial surge in visits to hospitals and a shortage in beds during the peak of the outbreak. Argentina and Chile were proactive and hired more health care workers, and purchased additional equipment, antivirals, etc. Some countries reported that a substantial proportion of intensive care unit patients had H1N1 and required very aggressive care, and some countries cancelled elective admissions for a short time. Argentina deployed 28 mobile hospitals during the peak of the epidemic to help cover health care needs in Buenos Aires. Based on reported information, the annual influenza season coupled with the 2009 H1N1 pandemic did not cause an undue burden on healthcare systems in any of the countries described in this document, although local spikes in demand were identified. As an example, Figure 1 depicts the impact of acute respiratory disease in health care services in the Americas Region (August 2-8), which includes Argentina, Chile and Uruguay in the South Cone, according to the Pan American Health Organization.[2]

Social and Economic Impact of the 2009 H1N1 outbreak and/or Control Measures

[2] http://new.paho.org/hq/index.php?option=com_content&task=view&id=1725&Itemid=1167

Although it is too early to determine whether the 2009 H1N1 pandemic has caused a long-term economic impact in Australia, Argentina, Chile, New Zealand, and Uruguay, currently available data suggest that all countries experienced some time-limited and/or geographically-isolated socio/economic effects and a temporary decrease in tourism most likely mostly to fear of 2009 H1N1 disease. For example, the Australian Bureau of Statistics in August reported a steep decline in June 2009 tourism arrivals. In Argentina, according to press reports in July 2009, ski resorts, hotels, and restaurants estimated losing approximately US$150 million a week. However, it is difficult to determine if these changes were due to the impact of the 2009 H1N1 pandemics or the overall world-wide economic recession.

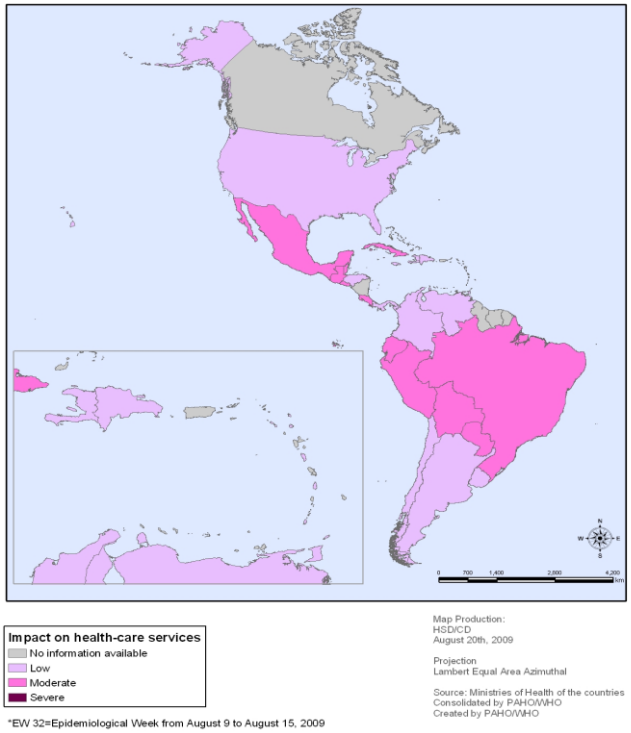

Figure 1. ***Impact of Acute Respiratory Disease in Health Care Services in the Americas Region (August 2-8).*** Regional Update. Pandemic (H1N1) 2009, August 21, 2009, Pan American Health Organization.[3]

In July 2009, Argentina saw a decline in both tourism and retail sales as deaths from the 2009 H1N1 virus increased and as people avoided public gatherings. Retail sales declined 16% from the same time last year and the small-business association estimated losses in Buenos Aires alone at $1 billion, with restaurant, club, and theater attendance falling off sharply. In July 2009, the New Zealand Treasury reported an overall 5% decline in tourist arrivals for the month of June 2009 but no significant change in consumer behavior[4]. Chile experienced limited social disruption and economic impact, although foreign tourism was strongly affected during the peak of the outbreak. No information is available from Uruguay on the social or economic impact of the 2009 H1N1 pandemic.

[3] http://new.paho.org/hq/index.php?option=com_content&task=view&id=1725&Itemid=1167
[4] http://www.treasury.govt.nz/releases/2009-07-14p

Absenteeism probably contributed to socio/economic impacts in certain countries. In some regions of Argentina, as many as 40% of health-care workers stayed away from work during the peak of the disease. Absenteeism was due in part to a national furlough of government employees who were at higher risk for infection or severe disease (e.g., pregnant women, parents with young children and persons with underlying conditions). In Australia, rates of work absenteeism during the current season are higher than those observed during the 2007 and 2008 influenza seasons. In Chile only one school was closed by authorities early in the outbreak, but several other schools closed voluntarily and authorizes cancelled some classes due to high infection rates. There was also a general teacher's strike that closed public schools for several weeks and some schools reported significant rates of absenteeism due to ILI or respiratory illnesses. Elevated school absenteeism was also reported in Uruguay during the peak of the epidemic but attendance levels were back to normal by August.

V. Conclusions

The 2009 H1N1 virus isolated from persons in the Southern Hemisphere, its behavior and its impacts, was similar to that seen in persons from the Northern Hemisphere this past spring. The highest rates of illness occurred in school-aged children and many deaths from 2009 H1N1 have occurred in persons with underlying high-risk conditions, such as heart or lung disease or pregnancy. This observation reinforces the need to prioritize initial doses of vaccine for these groups and the need to ensure early antiviral treatment of these groups during the upcoming fall influenza season in the United States. The kinetics of infection in each country appeared to have a 6-7 week ascent to peak involvement with fairly rapid decline thereafter and this may be similar to what is seen during an average seasonal influenza season. Although health care systems were locally affected, the influenza season and 2009 H1N1 virus experience in Southern Hemisphere countries does not appear to have caused undue burden on healthcare systems. Whether the behavior of the virus will remain constant as schools reopen this fall and the U.S. experiences its annual influenza season is not known. However, the experience in the Southern Hemisphere provides some preliminary information that can be used to develop initial planning to prepare the U.S. health system for the upcoming influenza season.

Table I. Comparative Assessment Table: The 2009 H1N1 Outbreak in Five Southern Hemisphere Countries (N/A: Information not available)

	Argentina	Australia	Chile	New Zealand	Uruguay	U.S.
H1N1 OUTBREAK TIMELINES AND GEOGRAPHIC DISTRIBUTION						
Regular Influenza Season	May to September (Seasonal flu kills an estimated 3,500 to 4,000 people a year).	June to October	May to September	May to October (seasonal flu kills approximately 400 persons a year)	May to September	October to May (seasonal flu kills an estimated 36,000 people a year)
First Confirmed Case of H1N1	May 16	May 7	May 17	April 28	May 27	April 17
Geographic Distribution	Country-wide	Country-wide	Country-wide	Country-wide	Country-wide	Country-wide
H1N1 Influenza Peak	Late June in Buenos Aires, early July in the rest of the country.	Early July	Late May to early July	Early to Mid June	Early July	Mid June
Disease Trend (ILI reported cases, hospital occupancy, etc.)	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing overall but small increases in some locations.
VIROLOGY						
Sequence similarity to US isolates	Yes (5 isolates sequenced)	N/A	Yes (11 isolates sequenced)	Yes (2 isolates sequenced)	Yes (1 isolate sequenced)	Not applicable
Neuraminidase Inhibitors Sensitivity	Yes	Yes	Yes	Yes	Yes	Yes (99.5% of isolates tested)
Percentage of 2009 H1N1 Virus positive specimens	Percentage of Respiratory Viruses: H1N1 and non-	Percentage of Influenza A Viruses H1N1: 96% of	Percentage of Respiratory Viruses: Influenza A non-	Percentage of Influenza Viruses: 82% in July	Percentage of Influenza Viruses: 99% in July	Percentage of Influenza viruses: 98% on August 9-15

	Argentina	Australia	Chile	New Zealand	Uruguay	U.S.
	typeable influenza A: 92.43 % of the cases in persons older than 5 years. In children under 5 years, the percentage is 23,47% with 70.35% RSV.	influenza isolates in Victoria region and 82% in New South Wales region.	typeable and H1N1: 48.4% (19% non-typeable Influenza A, 29% H1N1, 0.5% seasonal influenza (H3 or H1)). Percentages vary per age group. During July, H1N1 constituted nearly 64% of all circulating viruses. In the week of August 15, the percentage decreased to 11%.			
EPIDEMIOLOGY						
Country Population	40,913,584	21,180,632	16,601,707	4,213,418	3,494,382	307,261,236
Number of Laboratory Confirmed Cases	7,173	33,228	12,104	3,086	343	35,829
Total Reported ILI cases	811,940 (May-August)	N/A	353,525	N/A	N/A	N/A
Total Hospitalizations	6,346 (severe acute respiratory infections)	4,122 (H1N1)	1,325 (severe acute respiratory infections)	915 (H1N1)	N/A	7,983 (H1N1)
Hospitalizations/ 100,000 population	15.66	19.38	7.8	21.71	N/A	2.6

	Argentina	Australia	Chile	New Zealand	Uruguay	U.S.
Total Deaths	439	132	128	16	34	522
Affected Population Groups	Among hospitalized cases, there are no differences among sexes except for the age group 20-29, where women were affected 127% more than men. The most affected group is children under 5 years (39.09 cases/100,000 persons)	Among hospitalized cases, the most affected group is children under 5 years; 80% ICU admission in age group 30-59; 4% of cases are pregnant women; 35% of hospitalized pregnant women within the age group 25-35; 15-20% of hospitalized persons with H1N1 admitted to ICU.	Among hospitalized cases, the median age was 43 years (range 11 days-94 years); Women represented 51% of the cases; Higher rates in children under 1 year of age (62.6/100,000) and in the age group 1-4 (15.9/100,000); 48% of the severe cases had co-morbidities.	Among hospitalized cases, 1/3 of cases admitted to ICU; Majority of cases with co-morbidities; Rates 3 times higher in indigenous people.	The majority of H1N1 cases is in the age group 15-44; 76% of cases under 20 years of age; 48% of confirmed cases with co-morbidities.	Among hospitalized cases, the rate is higher among children 0-4 years (6.5/100,000 persons) followed by children 5-24 years of age (3.0/100,000) and adults age 65 and older (2.9/100,000).
			Among ambulatory cases, the most affected age groups are between 5-14 years followed by those younger than 5 and by 15-59 years.			Among ambulatory cases, the most affected groups are children 0- 4 years of age. At the peak of H1N1 activity in the US, the % was highest among person 5-24 years of age.

	Argentina	Australia	Chile	New Zealand	Uruguay	U.S.
	Among fatal cases, death occurred most frequently in the 50-59 age group; 47% of fatal cases had co-morbidities	Among fatal cases, the median Age: 51 (3-86 range) 73% deaths in people younger than 65	Among fatal cases, the median age was 49 years (4 mo-89 y) 60.1% of fatal cases had co-morbidities; 52.3% deaths in men			Among fatal cases, the largest number has occurred among person age 25-49 years. The highest rate is among persons age 50-64 (0.26/100,000), followed by persons 25-49 years of age (0.21/100,000).
CONTROL MEASURES						
Antiviral Treatment and Prophylaxis	In July, oseltamivir was given to persons with ILI. Currently, oseltamivir is for persons with high risk conditions and those hospitalized.	7,500 doses of pediatric oseltamivir were released in the Victoria and Western Australia states, and 10,000 packets to Victoria. Oseltamivir was used for persons with moderate to severe illness, persons with conditions conferring a higher risk for severe illness, and members of special populations.	647,294 treatment courses of oseltamivir were released from the national strategic reserve for patients with ILI.	Enough oseltamivir for 30% of population held by government. 1.4 million doses of oseltamivir was released to regional health authorities for treatment of persons with ILI and their contacts. Additional 125,000 doses of zanamivir purchased	Strategic reserve of antivirals for use of cases of ILI, contacts of cases with co-morbidities, and for pregnant women. Oseltamivir available in all health care centers	Distribution of 15M treatments of oseltamivir to States for high-risk populations and those with ILI.
Community Mitigation Measures	School closures in July. Dissemination of recommendations to	In late May, five schools were closed in Victoria and South	Schools were not closed before the scheduled winter	Some schools closed for brief periods.	Government did not institute national closures or extend	Some schools with cases closed for brief periods.

	Argentina	Australia	Chile	New Zealand	Uruguay	U.S.
	avoid transmission before school re-opening after winter break. Dissemination of guidance on personal hygiene. Work furloughs for pregnant women and others in at-risk groups in July and August. Flight cancellations from Mexico in May. Restriction of swine trade in some provinces in July Social Distancing Measures (e.g. theater closures) recommended in July	Australia following confirmation of cases among students. Schools re-opened on June 17 Initially, thermal scanners were deployed and activated at eight international airports. On June 17, initial border screening measures adjusted and focused on managing sick passengers identified at international borders and providing information to healthy travelers.	break, July 13-24. At on onset of the outbreak, the government recommended against non-essential travel to the U.S. or Mexico. The government also required that passengers on cruise ships stopping in Chile and flights to Chile from countries other than the U.S. and Mexico complete health questionnaires and distributed informational pamphlets at land border crossings.	Public health messages emphasized home isolation of less severe cases.	winter school break. Government took tempered approach and emphasized prevention via personal hygiene. No travel restrictions or border screening measures implemented.	Dissemination of guidance on personal hygiene, use of antivirals, facemasks, and respirators. No travel restrictions or border screening measures implemented
IMPACT OF THE H1N1 OUTBREAK ON THE HEALTH CARE SYSTEM						
Impact on the Healthcare System	Anecdotal reports of hospital diversions and medication shortages during the peak in late June in Buenos Aires.	Some hospitals in Victoria, New South Wales and Queensland reported inpatient wards and ICUs were	Occasional patient wait times of up to 7 hours An additional $4M to public facilities for	Surge in cases had greater impact on resources in ICU than in EDs. At H1N1 peak, half of	Occupation of hospital beds by patients with severe acute respiratory illness has not exceeded 80%.	Total influenza hospitalization rates for adults and children remain low and are well below the seasonal winter-time

	Argentina	Australia	Chile	New Zealand	Uruguay	U.S.
	On July 9, the Ministry of Health announced the deployment of 28 mobile hospital units in Buenos Aires and hired 600 health care workers to run these units. As many as 40% of health-care workers in some regions stayed away from work during the peak of the disease, due in part to a national furlough of government employees at higher risk of infections or severe disease (e.g., pregnant women, parents with young children and persons with co-morbidities).	intermittently full. Additional respirators and extracorporeal membrane oxygenation machines ordered.	personnel and equipment; Presidential decree to give Ministry of Health additional authority to redirect medical personnel, control antiviral prescriptions, cancel public events, suspend elective procedures and coordinate health authorities.	ICU beds occupied. Calls to Healthline reached 2000 per day and remain 20% above normal levels.	Use of respirators did not exceed 60% of all available equipment. Greatest strain on network of laboratories which did not have capacity to keep up with testing despite donations of equipment from CDC.	average of the last four years. Supplemental funding through the Hospital Preparedness Program to support additional public health and medical care planning.
SOCIAL/ECONOMIC IMPACT OF THE H1N1 OUTBREAK AND/OR CONTROL MEASURES						
Workplace Absenteeism	40% of healthcare workers in some areas	Higher than 2007 and 2008 influenza seasons; Rates currently declining	General teacher's strike closed public schools for several weeks. Some schools reported significant rates of absenteeism due to ILI .	Hospital staff absenteeism stressed hospitals temporarily during the peak of the disease	School absenteeism higher in July during the peak of disease, normal levels in August	There are no data to suggest increased absenteeism in the workplace.

VI. Annex I
Assessment of the 2009 H1N1 Pandemic on Individual Countries: Argentina, Australia, Chile, New Zealand and Uruguay

I. ARGENTINA

2009 H1N1 outbreak timelines and geographic distribution

The influenza season in Argentina typically occurs between May and September with 3,500-4,000 deaths per year. Coincidently with this, the 2009 epidemic began in Argentina in early May, with the first case confirmed on May 16 in Buenos Aires. The peak of 2009 H1N1 virus transmission occurred between June 22-25 with general spreading to the 24 provinces in the country. Starting the week of July 5-11, except in the Buenos Aires Province (where approximately 25% of the total population resides), all other provinces showed a decrease in the number of people with ILI.

Surveillance System

Argentina has an ILI sentinel surveillance system in centers throughout the country with laboratory support that expanded recently from 5 to 18 laboratories in 4 out of 24 provinces.

Virology

From the detection of the first case in May 16 until the week of August 2-8, the 2009 H1N1 virus and non-typeable influenza A virus were found in average in 92.43 % of specimens positive for respiratory viruses from persons older than 5 years. In children under 5 years of age, the percentage was 23.47% with an elevated percentage of Respiratory Syncytial Virus (70.35%). Figure 1 represents the percentage of distribution of respiratory viruses per age group.

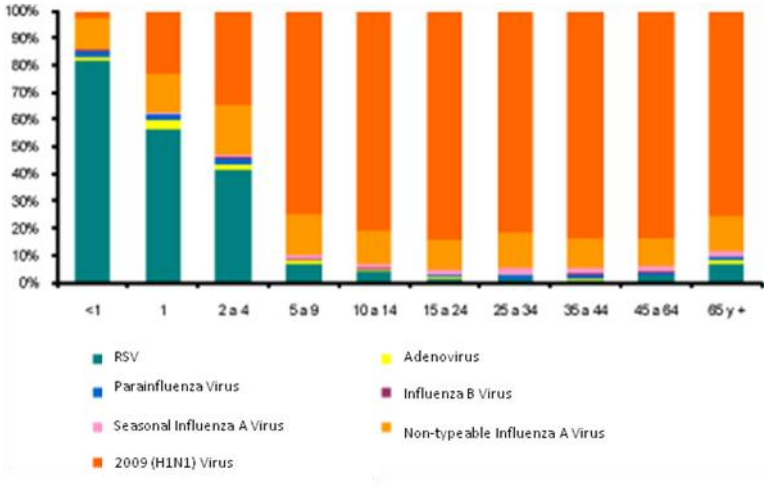

Figure 1: ***Percentage of Distribution of Respiratory Viruses per age group***. Ministry of Health, Argentina, 2009 H1N1 report, week of August 2-8[5]

Epidemiology

With a population of 40,913,584 persons, there were 811,940 reported cases with ILI accumulated from May until August 21, which represents a cumulative rate of 202.3 cases for every 10,000 people. From the 17,757 samples received, 7,173 cases have been positive for 2009 H1N1 virus as confirmed by laboratory diagnostics. The total number of hospitalizations related

[5] http://www.msal.gov.ar/archivos/Parte_nueva_influenza_8-06.pdf

to severa acute respiratory illness (SARI) was 6,346 with children under 5 years of age the most affected (39.09 cases/100,000 people). From a total of 268 reported cases of ARI in pregnant women, 61% (162) were hospitalized. There were 439 cumulative deaths related to 2009 H1N1 virus in 20 provinces. The most affected age group was 50 to 59 years. The epidemiological report of August 5[6] indicates that 47% of cases had risk factors or co-morbidities such as obesity (18%), heart disease (8%) and chronic obstructive pulmonary disease (7%). From 82 deceased women that presented with risk factors, women who were pregnant or post partum represented 19.5% of the cases. The greatest number of fatalities occurred during the week of June 26 to July 4, with the number decreasing thereafter. The last confirmed death was on August 6. When adjusted for population size, the mortality associated with the 2009 H1N1 virus in Argentina is ~10 per million persons. Figure 2 represents the distribution of cases with severe Acute Respiratory Infection per age group (n=6,141).

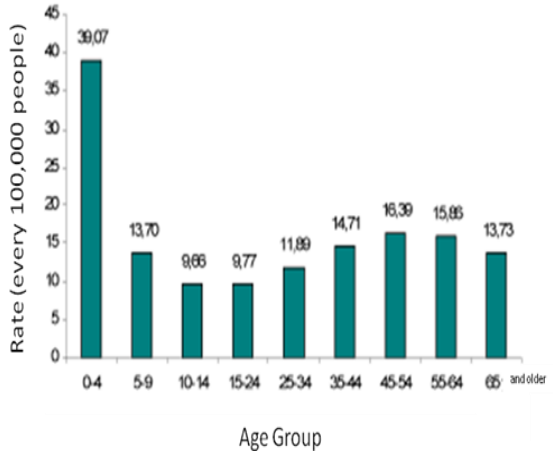

Figure 2. ***Distribution of cases with Severe Acute Respiratory Infection per age group (n=6,141).*** Ministry of Health, Argentina, 2009 H1N1 report, week of August 2-8[7]

Control Measures

Antivirals

During the early phase of the national response, called "containment", all cases were investigated and treated with antivirals. Contacts also received antivirals as prophylaxis. As cases increased in a region to the point where containment was no longer possible, there was a change in strategy to "mitigation" which included treatment only of persons with high risk conditions and those hospitalized. Buenos Aires was the first region of the country to change to mitigation. The use of oseltamivir for treatment of influenza was widespread throughout the epidemic, with medication shortages anecdotally reported from some private hospitals and pharmacies. The overall impact of this mitigation strategy on transmission or hospitalization indices is not known.

Non-pharmaceutical mitigation measures

Early in the outbreak some provinces conducted screening at the border with Chile and cancelled flights originating in Mexico. Restriction of swine trade occurred in some provinces in July. Also early in the outbreak, non-pharmaceutical interventions included early and sporadic reactive school closures, followed by school closures nationwide by July 13. Schools re-opened on

[6] http://municipios.msal.gov.ar/2009 H1N1/parte_influenza/parte-65-fecha-05-08-09.pdf
[7] http://www.msal.gov.ar/archivos/Parte_nueva_influenza_8-06.pdf

August 3 after the normal winter break. Social distancing measures and sporadic theater closures in Buenos Aires Province (where approximately 25% of the total population resides) were recommended during the second and third weeks of July, during a period corresponding to increased levels of ILI.

The government also implemented a liberal leave policy for government employees who had high-risk conditions (e.g., diabetes, cardiac disease, pulmonary disease and immuno-compromised conditions and pregnancy) and significant contact with the public as part of their duties. These employees were allowed to be reassigned or on paid leave for the month of July and the first week of August. By August 18, the policy was discontinued in all provinces. This policy was implemented for government workers and recommended for private sector workers, though the total number of employees furloughed and the impact of this policy is currently unknown.

Impact on Healthcare System

In early July, the local media reported that hospitals in Buenos Aires were struggling to accommodate the number of people seeking treatment. On July 9, the Ministry of Health announced the deployment of 28 mobile hospital units in Buenos Aires and hired 600 health care workers to run these units. According to at least one local news report, as many as 40% of health-care workers in some regions stayed away from work during the peak of the disease, due in part to a national furlough of government employees at higher risk of infection or severe disease (e.g., pregnant women, parents with young children and persons with co-morbidities). Although there have been anecdotal reports of hospital diversions and medication shortages, the overall indication is that the demand on healthcare services has not exceeded capacity. The most recent report from the Ministry of Health indicates that during the week of August 2-8, demands for health-care services are low, which according to the indicators established by the Pan American Health Organization means that services are not above usual levels.

Social and Economic Impact of the 2009 H1N1 outbreak and/or of the Control Measures

According to press reports in July 2009, it was estimated that ski resorts, hotels, and restaurants were losing approximately $150 million a week. Argentina saw a decline in tourism and retail sales as deaths from the 2009 H1N1 virus increased in July 2009 and as people avoided public gatherings. Retail sales were down 16% from the same time last year. The number of passengers traveling from Brazil to Argentina dropped by half. Argentina has likely suffered indirect economic and social costs from the 2009 H1N1 influenza pandemic, some of which may have be due to local social distancing measures, such as school closures, theater closures, and work furloughs. In mid-July 2009, many districts in Argentina declared health emergencies prompting many people to stay at home after which the Small-business Association estimated losses in Buenos Aires alone at $1 billion, with restaurants, clubs, and theater attendance falling sharply.

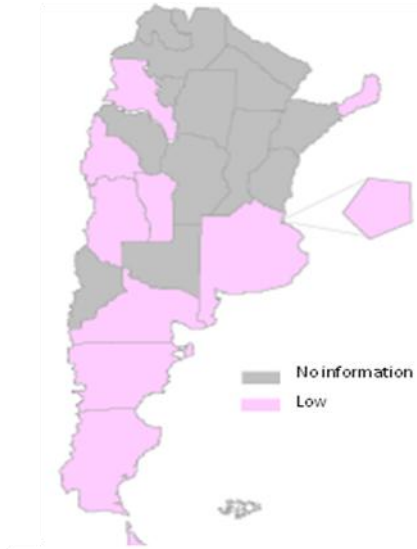

Figure 3. ***Impact of the Health Care Services by Province.*** Ministry of Health, Argentina, 2009 H1N1 report, week of August 2-8[8]

II. AUSTRALIA

2009 H1N1 outbreak timelines and geographic distribution

The Australian influenza season typically extends from June through October. The timing of peak influenza activity varies by region, but generally occurs earlier in the southern than the northern part of the country. On May 7, 2009, the first confirmed case of 2009 H1N1 virus infection in Australia was reported. Since May 7, 2009, there have been outbreaks among Australian citizens aboard a cruise ship and in schools in the Australian territories of Victoria and New South Wales. Victoria experienced the earliest surge in influenza activity, during May through mid July, followed by New South Wales during late June through the end of July. As of the third week of August, 2009 H1N1 virus continues to circulate throughout the country with the greatest activity in areas unaffected by 2009 H1N1 virus earlier in the season.

Surveillance System

Australia has implemented a surveillance system with the following components:

- Clinical surveillance - identification and monitoring of hospital admissions, ICU admissions, death, and monitoring of clinical outcomes throughout the influenza season.
- Laboratory surveillance - increased testing for influenza virus at sentinel sites in the community to identify levels of community transmission and the strain of circulating influenza viruses. Patients with mild clinical disease were not tested routinely. Testing prioritized people with ILI who were hospitalized or who died.
- Ongoing monitoring of the virus for the emergence of antiviral resistance, antigenic drift, gene sequence changes, and reassortment.

[8] http://www.msal.gov.ar/archivos/Parte_nueva_influenza_8-06.pdf

Virology

Type A influenza virus is the predominant seasonal influenza type reported by all jurisdictions. Influenza A (H3N2) and 2009 H1N1 viruses have co-circulated during the current influenza season, and the prevalence of 2009 H1N1 virus has varied by region. However, over the season the 2009 H1N1 virus became the predominant circulating influenza subtype in Australia. As reported for the week of August 16-22, surveillance data from Victoria and New South Wales indicate that 2009 H1N1 accounts for 96% and 82% of all influenza A isolates tested, respectively. Of seasonal influenza A notifications, A/H3N2 virus is the predominant subtype reported by most jurisdictions. All 2009 H1N1 virus isolates tested for antiviral resistance in Australia have been sensitive to the neuraminidase inhibitors oseltamivir and zanamivir.

Epidemiology

Australia has a population of 21,180,632 persons. As of August 22, 2009, there were 33,228 confirmed cases of pandemic 2009 H1N1 influenza. Most cases of 2009 H1N1 virus in Australia have been moderate. However, there have been some severe cases and there is risk of serious health complications for people with existing respiratory disease, diabetes, obesity, immune suppression and pregnant women who contract the disease. The total number of Australian deaths associated with the 2009 H1N1 virus is currently 132.

The total cumulative number of hospitalizations in Australia since the 2009 H1N1 pandemic started is 4122. As of August 22, there are 458 people in the hospital around Australia infected with 2009 H1N1 virus and 102 of these are in ICU. Figure 4 below shows the age distribution of cases admitted to hospital with the 2009 H1N1 virus, compared to the average age distribution of cases admitted to hospital in 2004-08 with "normal" seasonal influenza. The data confirms a shift towards young and middle-aged adults in those admitted to hospital with the 2009 H1N1 virus, compared to those admitted to hospital with normal seasonal influenza over the previous 5 years. Teenagers and young adults are being disproportionately seriously affected by 2009 H1N1 virus, compared to the normal seasonal influenza. Although children under 5 are at higher risk of hospital admission they do not tend to require High Dependency Unit/ Intensive Care Unit (HDU/ICU) admission. Around 80% of ICU/HDU admissions are in the age group of 30-59 years. The majority (73%) of 2009 H1N1-associated deaths has occurred in persons less than 65 years and most of the persons who died had underlying medical conditions. The median age of persons who died is 51 years (range, 3-86 years).

As for potential risk groups, compared to non--Indigenous Australians, Indigenous Australians (who make up 2% of the Australian population) are reported to have five-fold higher rates of hospitalization than non-indigenous cases and they account for 10% of hospitalized cases. Four percent of all hospitalized cases were in pregnant women, providing additional confirmation that pregnancy, particularly in the second and third trimesters, is a risk factor for 2009 H1N1 infection. For the month of July, pregnant women accounted for 35% of hospitalized confirmed cases for women aged between 25 to 35 years.

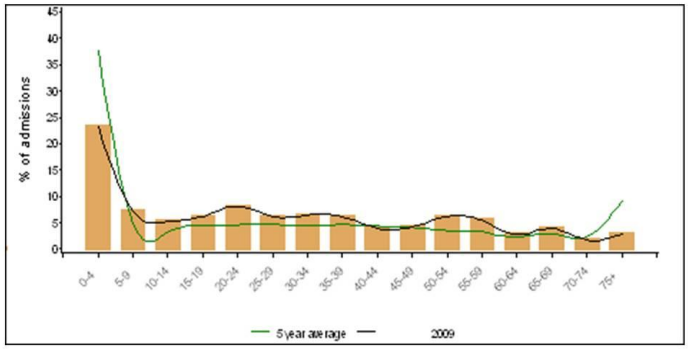

Figure 4. ***New South Wales Government - July 15 Epidemiological Weekly Report***[9]. 2009 H1N1 age-specific influenza-associated hospitalization rates have remained below 2004-2008 rates among children aged less than five years and persons 70 years and older, but have met or exceeded 2004-2007 rates among persons aged 5-59 years.

Control Measures

The Australian Health Management Plan for Pandemic Influenza describe a series of Australian pandemic phases, not always aligned with the WHO phases, designed to describe the situation in Australia and to guide Australia's response[10]. There are 6 Australian phases: ALERT, DELAY, CONTAIN, SUSTAIN, CONTROL, and RECOVER. On June 17, the Australian Government shifted their pandemic phase to "PROTECT", which sits alongside CONTAIN and SUSTAIN phases focusing on treating and caring at-risk patients. Under this phase, the mitigation measures employed at earlier stages of the national response were adjusted

Antivirals

Under the PROTECT phase, use of antivirals from the National Medical Stockpile is limited to those people with moderate or severe symptoms from 2009 H1N1 Influenza, particularly those who are deteriorating, or experiencing respiratory difficulty and people with infection who are more vulnerable to severe influenza.

All healthcare workers could receive antiviral treatment if they are infected and either have moderate or severe disease or were more vulnerable to severe outcomes on clinical assessment.

Non-Pharmaceutical Measures

On April 28, 2009, the Australian Government determined that 2009 H1N1 infections were a quarantinable disease in humans and imposed aggressive border surveillance measures to delay the introduction of this novel virus into Australia. All planes arriving from the Americas had to report to ground staff the health status of passengers before landing. Any identified person with flu-like symptoms was assessed by an officer of the Australian Quarantine and Inspection Service (AQIS) to determine if medical attention was required. The Government also deployed mandatory health declaration cards for all incoming passengers to identify those who were not feeling well. Thermal scanners were deployed and activated at eight international airports: Sydney, Melbourne, Adelaide, Perth, Brisbane, Cairns, Gold Coast, and Darwin. Passengers with elevated temperatures were evaluated by medical staff and nose and/or throat swabs were obtained if indicated. Passengers refusing to comply could be quarantined until given a clean bill

[9] http://www.emergency.health.nsw.gov.au/swineflu/resources/pdf/case_statistics_150709.pdf
[10] http://www.health.gov.au/internet/panflu/publishing.nsf/Content/current-status-1

of health by health authorities. Despite these measures, the first 2009 H1N1 influenza case was detected in Australia on May 7, 2009 and by May 31, 2009, all territories had at least one confirmed case. On May 22, 2009, Australia's pandemic alert level was raised to CONTAIN. Select schools and child care centers in certain territories were closed for short periods of time. For example, in Queensland, a child care center closed for the week of June 8.

On June 17, with the shift to the PROTECT phase, border measures were geared to managing sick passengers identified at international borders and providing information to healthy travelers about how best to protect themselves from becoming sick. PROTECT phase guidance also recommends identifying vulnerable subsets of the population, for whom 2009 H1N1 virus may have severe outcomes, noting that for this disease the vulnerable groups may differ from those groups usually considered vulnerable with seasonal flu strains. Under PROTECT, pathology testing of all potential cases will not be required or desirable. This is because most cases are mild and do not require treatment and confirmation is no longer required to inform clinical decisions about quarantine or use of antivirals. In addition, PROTECT guidance provides for:

- A focus on early treatment of those identified as vulnerable, and those with moderate or severe disease, especially those with respiratory difficulty.
- Voluntary home isolation for those who are sick. (Antiviral therapy from the national or state medical stockpiles was not provided to patients with mild disease unless they belong to a vulnerable group or high risk setting. Contacts were not placed into quarantine).
- Laboratory testing focused on identification of 2009 H1N1 virus in people with moderate or severe illness, people more vulnerable to severe illness, those in institutional settings and Indigenous Australians.
- Increased identification and monitoring of 2009 H1N1 hospital admissions, ICU admissions and levels of morbidity and monitoring of clinical outcomes throughout the influenza season.
- Increased sentinel testing to identify levels of community transmission and the strain of circulating influenza viruses.
- Ongoing monitoring of the virus for the emergence of antiviral resistance, genomic drift or reassortment that could herald a change to greater virulence.
- Additional border measures such as thermal screening and Health Declaration Cards will cease.
- Diagnosis and treatment of vulnerable people according to clinical judgment.

Impact on Healthcare System

Some hospitals in Victoria, New South Wales, and Queensland reported that inpatient wards and ICUs were intermittently full during the current influenza season, but to date, demand on the Australian healthcare system has not exceeded its capacity. Hospitals have ordered additional respirators and equipment for extracorporeal membrane oxygenation (ECMO) in preparation for potential additional demands on healthcare resources, especially in rural areas.

Social and Economic Impact of the 2009 H1N1 outbreak and/or of the Control Measures

The Australian Bureau of Statistics in August reported a steep decline in June 2009 tourism arrivals, which may be related to fears about the 2009 H1N1 pandemic. Rates of work absenteeism during the current season have been higher than those observed during the 2007 and 2008 influenza seasons but there are no data to suggest that major social disruption occurred. For example, the New South Wales Government Epidemiological Weekly Report[9] indicates that

during the week ending July 22 2009, 1.4% of their NSW employees took sick leave of more than three consecutive days. This was the highest level so far this year and higher than the level of around 0.7% in autumn during regular influenza season. In the following two weeks, absenteeism was lower, at 1.1% in the week ending July 29, and 1.2% in the week ending August 5. No known information is available from Australia on the economic impact of community mitigation measures.

III. CHILE

2009 H1N1 outbreak timelines and geographic distribution

The influenza season in Chile generally occurs from May to September. The first confirmed case of 2009 H1N1 virus was reported on May 17 in the city of Santiago. Within 10 days, focal outbreaks and sporadic illness were reported throughout the country. After a slightly slower start relative to previous influenza seasons, the number of cases of ILI rose sharply and peaked in early July. The number of cases substantially exceeded the number of cases from previous seasons and dropped rapidly in late July and early August, although the height of the ILI peak varied in different regions of the country.

Surveillance System

Chile had a robust sentinel surveillance system in 441 centers in the country in place prior to circulation of 2009 H1N1 virus[11]. ILI was reported throughout the country to public health authorities. 2009 H1N1 cases are confirmed by Real-Time Polymerase Chain Reaction in the Public Health Institute, Valdivia Hospital, San Camilo Hospital and in some private health care centers.

Virology

From 34,469 samples processed as of August 15, 2009, 13,457 samples were positive for respiratory viruses. Among them 48.4% were positive to Influenza A virus and of these 29% were positive for 2009 H1N1 virus, 19% for non-typeable Influenza A virus and only 0.5% corresponded to seasonal influenza (H3 or H1) virus. The percentages vary by age group: in children older than 5 years the non-typeable Influenza A virus and the 2009 H1N1 virus represented 88% of the samples. The number of samples positive for RSV increased from 65% the week of August 2-8 to 75% the week of August 9-15, whereas the identification of samples positive for 2009 H1N1 virus decreased from 20% to 11%.

[11] http://www.pandemia.cl/docs/sist-vig-influ.pdf

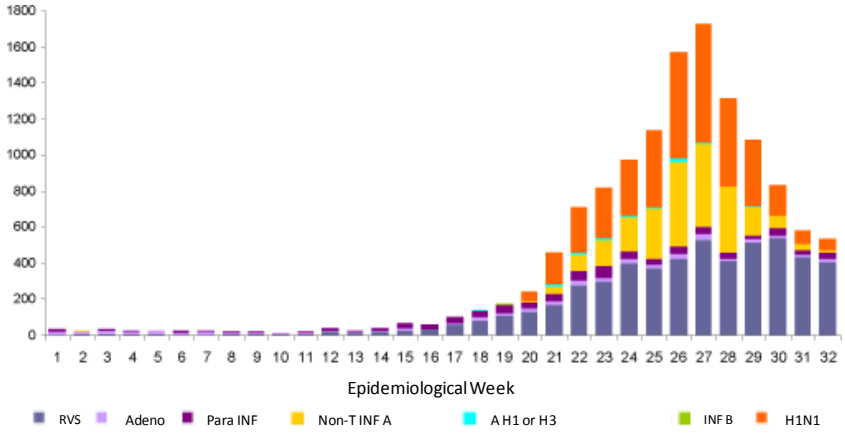

Figure 5: ***Distribution of Respiratory Viruses by Epidemiological Week.*** Ministry of Health of Chile, 2009 H1N1 weekly report[12]**.** The Epidemiological week 20 corresponds to the period of May 17-23. Week 32 corresponds to August 9-15.

Starting on May 17 (epidemiological week 20), 2009 H1N1 virus began to circulate in Chile. In early July (Epidemiological weeks 26 and 27), 2009 H1N1 virus constituted 64% of the circulating respiratory viruses (Figure 5). After that, the proportion attributed to the 2009 H1N1 virus started to decrease in accordance with a decrease in reported ILI cases and confirmed cases. In the last week of July (Epidemiological week 30), the proportion of RSV increased in children younger than 14 years. In people older than 65 years, the pandemic virus re-surged. Figure 6 shows the distribution of respiratory viruses by age group during the week of June 28-July 4 (Epidemiological week 26).

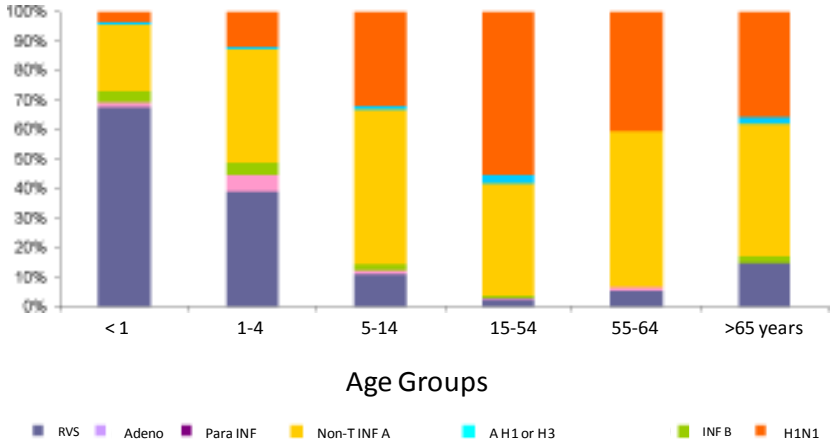

Figure 6: ***Distribution of respiratory Viruses by Age Group during the week of June 28-July 4 (Epidemiological week 26).*** Ministry of Health of Chile, 2009 H1N1 weekly report**.**

Epidemiology

Chile has a population of 16,601,707. As of August 19, there were 353,525 ambulatory clinical cases of ILI reported. 2009 H1N1 infection was confirmed in 12,104 cases. As shown in Figure 7, the analysis of these cases shows that the most affected age groups were between 5-14 years followed by children of less than 5 years and by persons of 15-59 years.

[12] http://www.minsal.cl/

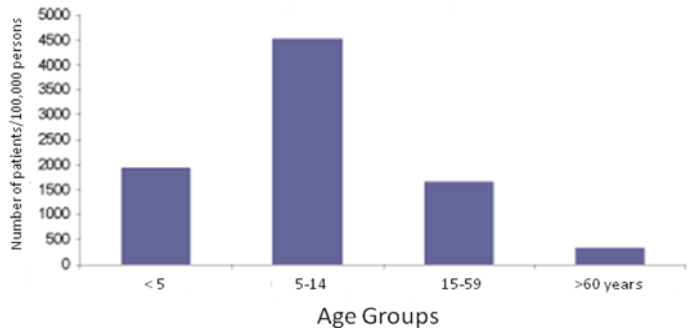

Figure 7: ***Rate of ambulatory clinical cases by Age Group during the weeks of June 14-August 15 (Epidemiological weeks 24-32).*** Ministry of Health of Chile, 2009 H1N1 weekly report[13].

The total number of Severe Acute Respiratory Infections that required hospitalization was 1,325 (average hospitalization rate of 7.8/100,000 persons across the country).

- Women represented 51% of the cases.
- Median age was 43 years (range 11 days-94 years)
- The rate of severe cases was higher in children under 1 year of age (62.6/100,000) and in the age group 1-4 (15.9/100,000).
- 48% of the severe cases had co-morbidities
- The highest rate was during the week of June 28-July 4 (1.36/100,000) and decreased as of the week of August 2-8 to 0.06/100,000. Currently, there is only one hospitalized cases

There were 128 deaths associated with 2009 H1N1 virus (with a rate of 0.78 persons for every 100,000 persons).

- 67 deaths were in men (52.3%)
- Median age was 49 years (range: 4 months-89 years).
- 60.1% of the cases had co-morbidities.

Control Measures

Antivirals

According to the August 19 weekly report of the Ministry of Health, 647,294 treatment courses of antivirals from the national strategic reserve were distributed as of August 16 and the demand for treatment courses is decreasing. On June 17, the Ministry of Health announced that antiviral treatments would be provide free of charge to both confirmed and suspected 2009 H1N1 cases diagnosed by a physician focusing treatment on more severe cases and groups with risk factors, i.e., chronic or immune diseases, pregnant women and children under 15 years old.

Non-pharmaceutical measures

Starting on April 23, 2009, the Chilean government publicized personal hygiene measures to prevent the spread of the disease and signed a decree establishing that all travelers from Mexico and the U.S were to be evaluated by thermal scanning at the international airport Arturo Merino Benitez. All passengers with respiratory disease symptoms were to be transported and evaluated at the National Center of Reference (Hospital Nacional del Tórax). Airport screening ceased on/about May 30 once it became clear that the 2009 H1N1 virus was established in Chile (over 220 confirmed cases at that time).

[13] http://www.minsal.cl/

At the onset of the outbreak, the government recommended against non-essential travel to the U.S. or Mexico. The government also required that passengers on cruise ships stopping in Chile and flights to Chile from countries other than the U.S. and Mexico complete health questionnaires and distributed informational pamphlets at land border crossings.

On June 11, the government established that all 2009 H1N1 infected patients, prior to medical evaluation, could stay at home and receive all corresponding job benefits. Chilean authorities did not close schools before the scheduled winter vacation, July 13-24, which was past the peak of the epidemic. There has been no obvious increase in ILI since reopening of public schools in late July[14].

Impact on Healthcare System

The Chilean authorities were proactive to ensure adequate healthcare surge capacity. In addition to the June 17 decree, in mid-June, the Ministry of Health announced an additional $4 million to help public facilities address the 2009 H1N1 outbreak by providing more personnel and equipment. On July 7, Chile issued a second presidential decree providing additional authority to redirect medical personnel, control anti-viral prescriptions, cancel public events, suspend elective medical procedures and coordinate health authorities, including military medical facilities. Although patients experienced waits of up to 7 hours at public healthcare service providers, the country's healthcare system was not overwhelmed during the outbreak. According to reports from the Ministry of Health, the impact on the health care system was low. The demand for general and critical beds was not higher than bed availability.

Social and Economic Impact of the 2009 H1N1 outbreak and/or of the Control Measures

Although foreign tourism in the main parts of the country was strongly affected during the peak of the outbreak, limited social impacts and economic disruption appear to have occurred as a result of the response to the 2009 H1N1 outbreak.

IV. NEW ZEALAND

2009 H1N1 outbreak and geographic distribution

The influenza season in New Zealand lasts from May to October and typically peaks in July and August. Deaths due to seasonal influenza approximate 400 persons a year. The first confirmed 2009 H1N1 case was detected on April 28 in an individual who had returned from a school trip to Mexico. Additional initial confirmed cases were all related to international travel from countries of concern. There was no evidence of widespread transmission until 6 weeks after the initial case (June 8-14), when ILI activity rose above baseline levels. By early June, the first evidence of community spread was seen in Greater Auckland, Wellington, the Bay of Plenty and Canterbury. From there, the virus spread gradually into neighboring regions, although, as of early August, some areas have shown little evidence of cases to date. ILI activity peaked

[14] Communication from U.S. Embassy in Chile

nationally in early-to-mid July, at which point it was twofold to threefold higher than that of previous seasons. ICU admissions for 2009 H1N1 cases peaked later, at the end of July.

Surveillance System

New Zealand has a surveillance system to monitor influenza. This has been in place for two and a half years, and provides a 'safety net' for the community, as it gives a clear picture of viruses which are currently circulating. Surveillance of ILI in the community is operated by the Ministry of Health and the Environmental and Science Research (ESR). It has two primary components and spans the traditional flu season:

- Calls to Healthline (total calls meeting a case definition of ILI)
- Patient consultations at 81 sentinel general practitioner (GP) practices around the country that meet the case definition for ILI.

A further component is the surveillance of individual cases and contacts carried out by local public health units on the basis of reports from schools, GPs and other sources. In addition, ESR operates sentinel surveillance on behalf of Ministry of Health via a general practice network of 70 practices which undertakes systematic weekly sampling of patients with symptoms of influenza for laboratory testing to determine which flu viruses are circulating in the community, throughout New Zealand. In response to the presence of the 2009 H1N1 virus in New Zealand, ESR prioritized the testing required and augmented the capacity and capability of its virology services by bringing in trained staff from other areas of work. ESR performed a range of molecular biological tests including PCR and sequencing, to identify Influenza A viruses and confirm 2009 H1N1 strains. In its role as the National Influenza Centre for New Zealand, ESR confirms sequencing results with the WHO Collaborating Centre in Melbourne.

Virology

The 2009 H1N1 virus comprised the majority (82%) of influenza viruses detected in the month of July. Prior to dominance of the 2009 H1N1 virus, seasonal H1N1 influenza was the predominantly circulating virus.

Epidemiology

New Zealand has a population of 4,213,418. In the month of July, sentinel outpatient surveillance indicated widespread transmission with large numbers of ILI visits in all areas of the country. As of August 20, 2009, there were a total of 3086 confirmed cases and 16 deaths due to the 2009 H1N1 pandemic. The actual number of cases may be significantly higher since only a small proportion of people with symptoms are being tested. Most persons have mild disease and recover at home without medical treatment. As of the first week of August, the cumulative number of hospitalized cases reported was 915 cases. Among these, 225 cases had pneumonia and 35 had acute respiratory distress syndrome. One-third of hospitalizations were admitted to the ICU. All deaths and a majority of those hospitalized have had underlying risk factors; the most frequently reported included chronic respiratory illness, compromised immune systems, morbid obesity, and pregnancy. Hospitalization rates were three times higher among people of Pacific and Maori descent than among those of European descent. The highest cumulative numbers of hospitalizations have taken place in the Canterbury region, the most populated region

of the south island. At the peak of activity, the weekly ILI GP consultation rates this year were nearly three times higher than the winter peak experienced in the last two years (Figure 8). Currently, the number of people presenting to GPs with ILI continues to fall, suggesting that the current pandemic appears to be abating.

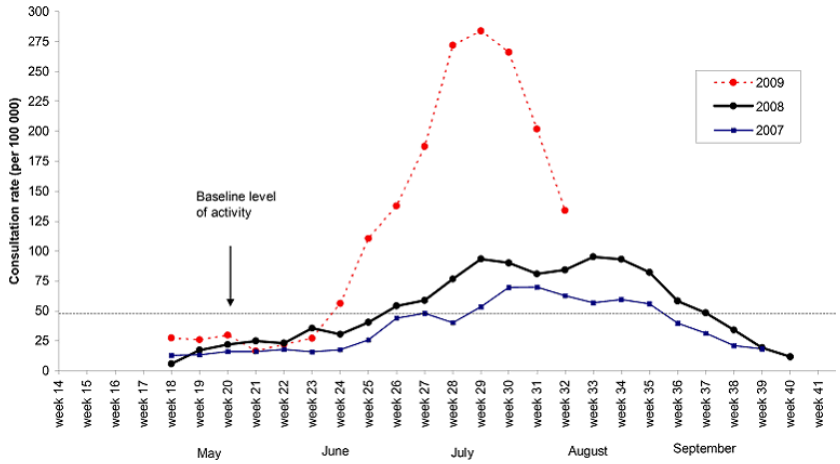

Figure 8. ***Comparative GP Consultation Rate During Epidemiological Weeks 18-32 (April 17-August 15).*** Report from the Ministry of Health of New Zealand, August 18.

Control Measures

Antivirals

In early May, New Zealand had enough oseltamivir to provide coverage for 30% of the population. An additional 125,000 doses of Relenza were ordered which increased the national stockpile of antiviral drugs by 10%. Initially, the Medicines Classification Committee (MCC) 2006 guidelines, recommended that pharmacists sell oseltamivir only after direct face-to-face consultation to minimize the inappropriate use of the drug. The Ministry of Health advised New Zealanders not to purchase oseltamivir over the internet since there were no guarantees of its safety, efficacy or authenticity. Oseltamivir was recommended and provided free of charge through public health services for confirmed cases of 2009 H1N1 or persons with symptoms and a history of travel to affected areas or close contacts of cases. In early May, New Zealand also noted a significant increase in the demand for seasonal influenza vaccine and, thus, increased the national stock of seasonal influenza vaccine by 125,000 doses.

Non-pharmaceutical measures

Although the first confirmed case of 2009 H1N1 infection was detected in late April, the spread of 2009 H1N1 virus into the wider community was delayed for more than six weeks through an effective health and border containment operation, assisted by school closures and the voluntary home isolation of suspected cases. New Zealand initially adopted a containment approach consisting of both border management (keep it out) and cluster control (stamp it out). The New Zealand Government began screening all passengers (self-reporting of symptoms) arriving into the country from the Americas (countries of concern) on April 28, shortly after presentation of the first case. Where passengers showed symptoms, they and their close contacts were medically assessed, treated and cared for in isolation or quarantine. Public Health officials also performed contact tracing of passengers who arrived on the same flight as the index case. Contacts were offered oseltamivir. The government also began distributing to passengers arriving from

countries of concern public health messages and advice on 2009 H1N1 infection. Passengers were required to complete passenger locator cards so they could be easily contacted as required. At the request of the Niuean Government, New Zealand agreed to exit screening of passengers on the weekly flight from Auckland to Niue.

The New Zealand government closed some schools to help limit 2009 H1N1 virus transmission, and transmission may have also been diminished by the school's winter recess in July 2009. Public health messages have emphasized keeping less severe cases at home. As of August 18th, schools reported usual levels of absenteeism for this time of the year, while only a minority of schools reported either lower or higher levels. Public gatherings have not been restricted.

Impact on the Healthcare System

As community transmission increased in mid-to-late June, New Zealand moved from a containment approach to one of disease management to enable community based health services to manage large numbers of people with influenza as well as maintain services for patients with other illnesses. The surge in cases had a greater impact on resources in ICUs than in emergency departments. At the peak of the epidemic, 2009 H1N1 cases occupied approximately half of the beds in the ICUs. Hospital staff absenteeism temporarily stressed hospitals in their response to the epidemic. Currently, most District Health Boards continue to manage demand, with fewer influenza admissions, and less need for intensive care beds than in July. As of August 18, 2009, Healthline continued to receive a high number of influenza related calls, although numbers of calls have decreased since mid-June and early-July when the number of calls reached 2000 or more per day. The total number of calls answered by Healthline nurses continues to be 20 percent above normal levels.

Social and Economic Impact of the 2009 H1N1 outbreak and/or Control Measures

As noted above, the New Zealand government closed some schools to help limit disease transmission. There are no data to suggest that major social disruption occurred. The Ministry of Health did not advise people to cancel social gatherings, sporting events and travel. In July 2009, the New Zealand Treasury reported an overall 5% decline in tourist arrivals for the month of June 2009. In July 2009, the New Zealand Treasury reported that consumer behavior had not changed significantly and estimated that the economic impact of the 2009 H1N1 pandemic would be less than 0.7 percent GDP, indistinguishable from the overall downward trend because of the global economic slowdown[15].

V. URUGUAY

2009 H1N1 outbreak and geographic distribution

The influenza season in Uruguay usually runs from May through September. The first case of 2009 H1N1 infection in Uruguay was reported on 27 May in Montevideo, and additional cases

[15] http://www.treasury.govt.nz/releases/2009-07-14p

were detected in every region of this small nation. A large number of reported cases were clustered in school and office outbreaks, followed by sustained spread in the community during the month of July. Recent reports from the Ministry of Health indicate that ambulatory visits, hospitalizations and ICU admissions are decreasing since the last week of July.

Surveillance System

Uruguay has an existing surveillance system for hospitalized cases of severe acute respiratory illness. After the WHO declaration of pandemic phase 6, the country worked towards implemented a sentinel surveillance system for ILI. As such, it is difficult to compare the range of illness severity of the 2009 H1N1 outbreak with prior seasonal influenza outbreaks. After the first case in the country, Uruguay executed an agreement with the Faculty of Medicine to have access to one additional PCR machine in order to double laboratory diagnostic capacity for the 2009 H1N1 virus[16].

Virology

Seasonal influenza was replaced almost entirely by the 2009 H1N1 virus in this country, accounting for approximately 99% of influenza viruses isolated through July 31. Figure 9 below shows the proportion of all viruses tested from May 17 to August 8.

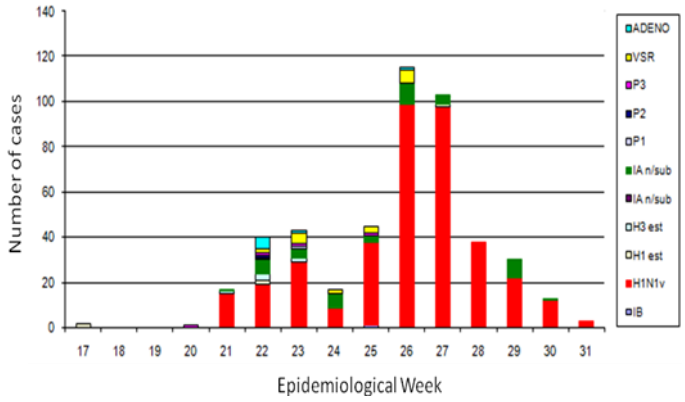

Figure 9. Proportion of Respiratory Viruses per Epidemiological weeks 20-31 (May 17-August 8). Ministry of Health, Uruguay-2009 H1N1 report, week of August 2-8. Adeno: adenovirus, VSR: Respiratory Syncytial Virus; P1-P3: parainfluenza; IA n/sub: Influenza A non-subtypeable; H1 and H3 est: Influenza A H1 and H3; IB: Influenza B;

Epidemiology

Uruguay has a population of 3,494,382. As of August 8, a total of 343 cases of 2009 H1N1 infection have been confirmed in Uruguay, with an associated 34 deaths. 101 ambulatory cases were confirmed by laboratory diagnostic testing and 125 cases by epidemiological investigation of affected cases. 2009 H1N1 virus infected mainly younger people between ages 15-44 (Figure 10) with 76% of cases under 20 years. Forty-eight percent of confirmed cases presented with co-morbidities or risk factors (e.g. chronic respiratory disease, cardiovascular disease, pregnancy, diabetes, etc.). The Uruguayan Ministry of Health has characterized 2009 H1N1 activity as light to moderate, without many complications.

[16] http://www.msp.gub.uy/homepidemiologia_198_1.html

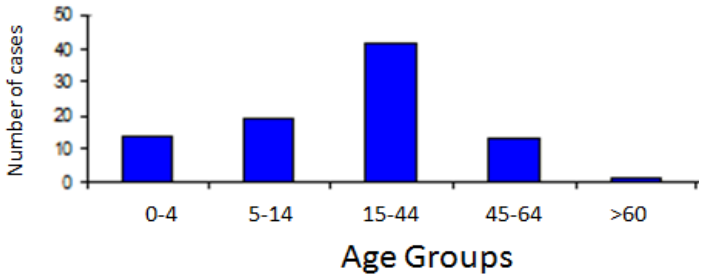

Figure 10. ***Distribution of cases with 2009 H1N1 per age group (n=6,141).*** Ministry of Health, Uruguay, 2009 H1N1 report, August 8, 2009.

Control Measures

Antivirals

Uruguay created a strategic reserve of antivirals. The use of oseltamivir was authorized for cases of ILI[17], for contacts of cases with co-morbidities, and for pregnant women.

Non-pharmacological measures

Uruguay followed the recommendations of WHO and did not close borders or promulgate travel restrictions. However, every traveler coming to Uruguay received information about 2009 H1N1 infection and a phone number to call should they develop symptoms. After detection of the 2009 H1N1 outbreak, the government created a Technical Advisory Committee that developed contingency plans for phase 5 and 6 based on the Integrated National Pandemic Influenza Plan[18]and hosted five workshops in collaboration with PAHO targeted to health care workers. The government also published personal hygiene measures and recommended sick people to stay home.

Impact on the Healthcare System

The healthcare impact in Uruguay has been light, not exceeding the usual demand on healthcare services, and never exceeding the maximum capacity. On average across the country, occupation of hospital beds by patients with severe acute respiratory illness has not exceeded 80% (Figure 11), nor has utilization of beds in the ICU been unusually impacted. The use of respirators did not exceed 60% of all available equipment. The greatest strain was put on the network of laboratories in Uruguay, which did not have the capacity to keep up with testing. Labs were overwhelmed by the 2009 H1N1 crisis despite donations of equipment from CDC.

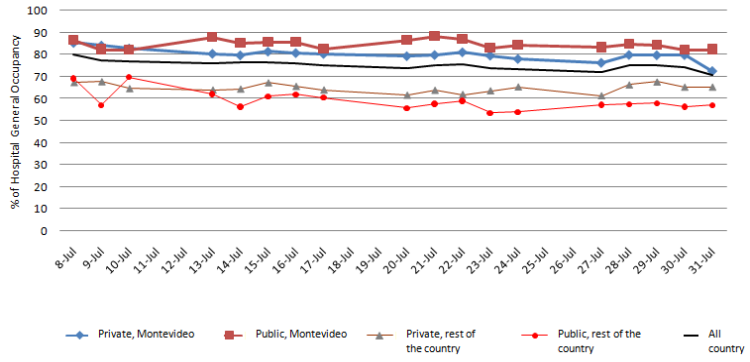

Figure 11. ***General Occupancy of Hospitals in the Private and Public Sector in Uruguay during July 8-31 (In Montevideo, capital city and in the rest of the country).*** Ministry of Health, Uruguay, 2009 H1N1 report, August 8, 2009.

[17] http://www.msp.gub.uy/uc_3204_1.html
[18] http://www.bvsops.org.uy/pdf/influenza.pdf

Social and Economic Impact of the 2009 H1N1 outbreak and/or Control Measures

When compared to the flu seasons of 2007 and 2008, school absenteeism rates increased from nearly 2-4% in those years to more than 12% in 2009 during the peak of the epidemic occurring the week of June 21-27. After these dates, absenteeism fell back to levels comparable to previous years (Figure 12). No known information is available from Uruguay on the social or economic impact of community mitigation measures.

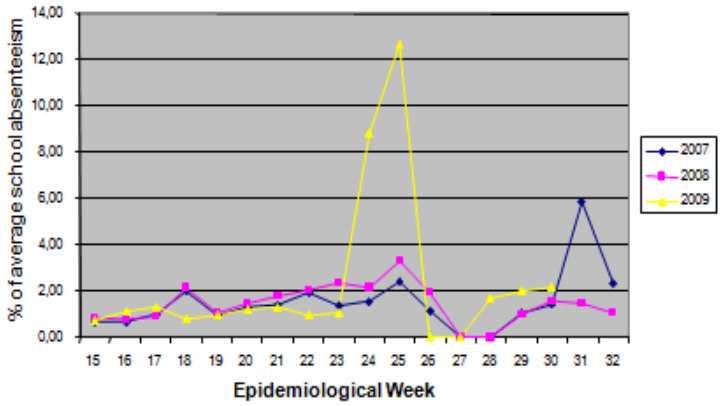

Figure 12. ***Comparative absenteeism in sentinel schools in Uruguay during the flu seasons of 2007-2009.*** Ministry of Health, Uruguay, 2009 H1N1 report, August 8, 2009.