

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 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.<sup>1</sup>

### ***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

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<sup>1</sup> 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 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***

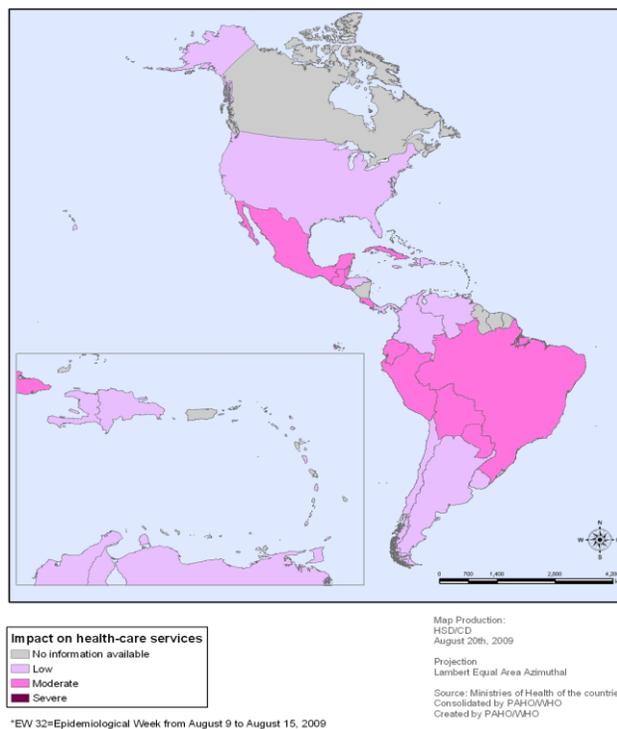
According to the World Health Organization, the impact of a pandemic on a health care system is classified as low (demands on health-care services are not above usual levels), moderate (demands on health-care services are above the usual demand levels but still below the maximum capacity of those services), 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.<sup>2</sup>

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

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<sup>2</sup> [http://new.paho.org/hq/index.php?option=com\\_content&task=view&id=1725&Itemid=1167](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.<sup>3</sup>**

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<sup>4</sup>. 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.

<sup>3</sup> [http://new.paho.org/hq/index.php?option=com\\_content&task=view&id=1725&Itemid=1167](http://new.paho.org/hq/index.php?option=com_content&task=view&id=1725&Itemid=1167)

<sup>4</sup> <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 authorized 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.