out involvement of the central nervous system, whether CRAG titers can be used to guide treatment decisions, and whether high-dose fluconazole alone will be sufficient to prevent disease in all patients. Optimal timing of ART also needs to be defined for such patients. Studies are underway to answer these questions in South Africa. In the meantime, any programmatic screening intervention must be closely monitored, and data should be reported to help formulate optimal strategies for this important intervention.

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References


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Preexisting Antibodies against Pandemic 2009 Influenza A (H1N1) Virus in Taiwan

To the Editor—In April 2009, a new swine-origin influenza A (H1N1) virus, the pandemic 2009 influenza A (H1N1) virus, that efficiently transmitted among humans emerged in Mexico and the United States [1, 2] and spread worldwide. This new 2009 H1N1 virus was probably a “quadruple” reassortant containing the HA (H1) gene of classical swine virus origin [3]. Most individuals were expected to lack immunity to this new virus. However, an early study in the United States revealed that the 2009 influenza A (H1N1) virus caused less morbidity and mortality from severe pneumonia in patients aged ≥60 years [4]. Serological studies from England and the United States also indicated that 23%–33% of older persons had moderate levels of cross-reactive antibodies to this virus [5, 6]. Therefore, individuals aged ≥65 years were not included in the initial target groups for 2009 H1N1 vaccination [7].

In contrast, recent data from China revealed that 0%–10% of serum samples from older individuals were positive for 2009 influenza A (H1N1) [8–10]. In Japan, preexisting antibodies were found only in individuals born before 1920 [11]. In Finland, the antibody prevalence was approximately 96% in individuals born during the period 1909–1919 but varied from 77% to 14% in those born during the period 1920–1944 [12]. This discrepancy in immune status may be attributed to geographic variability [13].

To evaluate the preexisting antibody titers to 2009 influenza A (H1N1) in the elderly and to formulate vaccination strategies for 2009 influenza A (H1N1), we measured the prevalence of preexisting antibodies to this virus in 79 persons aged ≥60 years in Taoyuan County, Taiwan, during the period February–March 2009, before the current pandemic. In addition, 169 health care workers aged 22–60 years at Chang Gung Memorial Hospital in Taoyuan, Taiwan, were evaluated during the period October–November 2009, after the first wave of infection in Taiwan, before they received monovalent vaccination against 2009 influenza A (H1N1). Reference serum samples collected from 20 patients 3–4 months after laboratory-confirmed 2009 influenza A (H1N1) infections were used as positive controls. Antibody responses to 2009 H1N1 (A/Taiwan/126/09) and seasonal H1N1 (A/Brisbane/59/07 [H1N1]–like) virus were detected by means of hemagglutination inhibition assay in accordance with standard methods [14].

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Table 1. Cross-Reactive Antibody Responses to Pandemic 2009 Influenza A (H1N1) Virus and 2008–2009 Seasonal H1N1 Influenza Virus in Taiwan

<table>
<thead>
<tr>
<th>Antibody type</th>
<th>Proportion (%) with HI titer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/Taiwan/126/09(H1N1)–A/California/04/2009(H1N1)-like</td>
<td>1.00 (100)</td>
</tr>
<tr>
<td>Health care workers aged 22–60 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.00 (100)</td>
</tr>
<tr>
<td>Individuals aged &gt;60 years&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.37 (37)</td>
</tr>
<tr>
<td>60–69 years</td>
<td>0.42 (22)</td>
</tr>
<tr>
<td>&gt;70 years</td>
<td>0.27 (7)</td>
</tr>
<tr>
<td>Laboratory-confirmed cases</td>
<td>1.00 (100)</td>
</tr>
<tr>
<td>A/Brisbane/59/07(H1N1)-like</td>
<td>1.00 (100)</td>
</tr>
<tr>
<td>Health care workers aged 22–60 years&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.95 (75)</td>
</tr>
<tr>
<td>Individuals aged &gt;60 years&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.52 (41)</td>
</tr>
</tbody>
</table>

**NOTE.** All participants had received seasonal influenza vaccine at least once during the past 4 years. HI, hemagglutination inhibition.

<sup>a</sup> Serum samples were obtained in October–November 2009.

<sup>b</sup> Serum samples were obtained in February–March 2009.

<sup>c</sup> Only 79 serum samples from persons aged 22–60 years were available for detecting antibody titer to seasonal H1N1 during February–March 2009.

Antibody titers of $\geq 1:40$ to 2009 influenza A (H1N1) were found in samples from 29 (37%) of 79 individuals aged $\geq 60$ years and in samples from 22 (42%) of 53 individuals aged 60–69 years (Table 1). In contrast, samples from only 14 (8%) of 169 health care workers aged 22–60 years showed titers of $\geq 1:40$. Among samples from naturally infected patients, 20 (100%) of 20 had titers of $\geq 1:40$. An antibody titer of $\geq 1:40$ indicates a reduced risk of influenza infection or disease [15]; the high prevalence of preexisting antibodies in elderly people may have played a substantial role in humoral immunity against 2009 influenza A (H1N1). We found that 75 (95%) of health care workers aged 22–60 years had titers of $\geq 1:40$ to seasonal H1N1 influenza virus, whereas 41 (52%) of 79 individuals aged $\geq 60$ years had titers of $\geq 1:40$ to seasonal H1N1. It is possible that, rather than seasonal influenza vaccination, prior exposure or infection with an influenza virus similar to 2009 influenza A (H1N1) induced cross-reactive antibodies in elderly individuals [5]. Recent findings indicate that antibodies against 1918-like viruses can protect mice from a 2009 influenza A (H1N1) lethal challenge, probably by means of binding to a shared cross-protective epitope, the antigenic site Sa, in HA [16, 17]. Our serological findings in Taiwan are thus consistent with those of studies in the United States and the United Kingdom but contradictory to those in other Asian countries and support the importance of vaccinating individuals aged $<60$ years.

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