Influenza burden in Thailand

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Abstract

Background: Data on the incidence, seasonality and mortality associated with influenza in subtropical low and middle income countries are limited. Prospective data from multiple years are needed to develop vaccine policy and treatment guidelines, and improve pandemic preparedness.

Methods: During January 2005 through December 2008, we used an active, population-based surveillance system to prospectively identify hospitalized pneumonia cases with influenza confirmed by reverse transcriptase–polymerase chain reaction or cell culture in 20 hospitals in two provinces in Thailand. Age-specific incidence was calculated and extrapolated to estimate national annual influenza pneumonia hospital admissions and in-hospital deaths.

Results: Influenza was identified in 1,346 (10.4%) of pneumonia patients of all ages, and 10 influenza pneumonia patients died while in the hospital. 702 (52%) influenza pneumonia patients were less than 15 years of age. The average annual incidence of influenza pneumonia was greatest in children less than 5 years of age (236 per 100,000) and in those age 75 or older (375 per 100,000). During 2005, 2006 and 2008 influenza A virus detection among pneumonia cases peaked during June through October. In 2007 a sharp increase was observed during the months of January through April. Influenza B virus infections did not demonstrate a consistent seasonal pattern. Influenza pneumonia incidence was high in 2005, a year when influenza A(H3N2) subtype virus strains predominated, low in 2006 when A(H1N1) viruses were more common, moderate in 2007 when H3N2 and influenza B co-predominated, and high again in 2008 when influenza B viruses were most common. During 2005–2008, influenza pneumonia resulted in an estimated annual average 36,413 hospital admissions and 322 in-hospital pneumonia deaths in Thailand.

Conclusion: Influenza virus infection is an important cause of hospitalized pneumonia in Thailand. Young children and the elderly are most affected and in-hospital deaths are more common than previously appreciated. Influenza occurs year-round and tends to follow a bimodal seasonal pattern with substantial variability. The disease burden varies significantly from year to year. Our findings support a recent Thailand Ministry of Public Health (MOPH) decision to extend annual influenza vaccination to older adults and suggest that children should also be targeted for routine vaccination.

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Influenza viruses in Thailand: 7 years of sentinel surveillance data, 2004–2010

Background
The re-emergence of avian influenza A (H5N1) in 2004 and the pandemic of influenza A (H1N1) in 2009 highlight the need for routine surveillance systems to monitor influenza viruses, particularly in Southeast Asia where H5N1 is endemic in poultry. In 2004, the Thai National Institute of Health, in collaboration with the US Centers for Disease Control and Prevention, established influenza sentinel surveillance throughout Thailand.

Objectives
To review routine epidemiologic and virologic surveillance for influenza viruses for public health action.

Methods
Throat swabs from persons with influenza-like illness and severe acute respiratory illness were collected at 11 sentinel sites during 2004–2010. Influenza viruses were identified using the standard protocol for polymerase chain reaction. Viruses were cultured and identified by immunofluorescence assay; strains were identified by hemagglutination inhibition assay. Data were analyzed to describe frequency, seasonality, and distribution of circulating strains.

Results
Of the 19 457 throat swabs, 3967 (20%) were positive for influenza viruses: 2663 (67%) were influenza A and able to be subtyped [21% H1N1, 25% H3N2, 21% pandemic (pdm) H1N1] and 1304 (33%) were influenza B. During 2009–2010, the surveillance system detected three waves of pdm H1N1. Influenza annually presents two peaks, a major peak during the rainy season (June–August) and a minor peak in winter (October–February).

Conclusions
These data suggest that March–April may be the most appropriate months for seasonal influenza vaccination in Thailand. This system provides a robust profile of the epidemiology of influenza viruses in Thailand and has proven useful for public health planning.

Keywords
Influenza, inpatients, outpatients, surveillance, Thailand.

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Figure 1. Number of influenza cases and percentage of influenza-like illness and severe acute respiratory infection cases positive for influenza virus by type/subtype and month, Thailand, September 2004–December 2010.

Figure 2. Percent positive of influenza cases by region (North, Northeast, East, South, and Central), September 2004–July 2010
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A HOUSEHOLD SURVEY TO ASSESS THE BURDEN OF INFLUENZA IN RURAL THAILAND

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Abstract. Little is known about the disease burden of influenza in middle-income tropical countries like Thailand. The recent outbreak of avian influenza (H5N1) and studies on influenza from neighboring countries highlight the need for data on incidence, access to care, and health care cost. In May/June 2003, we conducted a province-wide household survey using two-stage cluster sampling to determine the burden of influenza-like illness in Sa Kaeo Province. We used the total number of reported influenza that occurred in May 2003 and a prospective study of outpatient influenza in clinic patients to develop an estimate of the annualized incidence of influenza. Of 718 subjects, 16 (2.2%) suffered an episode of influenza-like illness in the preceding month; 14 sought care, of whom 7 went to a hospital facility. Fifty percent reported missing on average 3 days of work or school. The total individual cost per illness episode was 663 baht (US$15.78). The proportion of outpatients with influenza-like illness caused by an influenza virus in May was 16% and the annualized influenza incidence was estimated to be 5,941/100,000 in Sa Kaeo Province. This survey adds to information indicating that in rural Thailand, the burden of influenza is substantial and costs associated with an illness episode are up to 20% of an average monthly income.
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Who gets hospitalized for influenza pneumonia in Thailand? Implications for vaccine policy

Fig. Relative risk of hospitalized influenza pneumonia cases by age group compared to the general population of Sa Kaeo Province between September 2003 and August 2004.

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Table. Number and proportion of pneumonia influenza cases that were hospitalized within the previous year compared to the general population.

<table>
<thead>
<tr>
<th>Age</th>
<th>Influenza pneumonia cases that were hospitalized in the previous year, N (%)</th>
<th>Total population that was hospitalized in the previous year, N (%)</th>
<th>Risk ratio (99% confidence intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>8/14 (57.1)</td>
<td>410,544/5,111,697 (8.0)</td>
<td>8.3 (4.5–15.6)</td>
</tr>
<tr>
<td>5–59</td>
<td>8/34 (23.5)</td>
<td>3,230,374/53,599,551 (6.0)</td>
<td>3.8 (1.7–8.5)</td>
</tr>
<tr>
<td>&gt;60</td>
<td>11/31 (35.5)</td>
<td>859,263/6,401,404 (13.4)</td>
<td>2.6 (1.4–4.9)</td>
</tr>
<tr>
<td>Total</td>
<td>27/79 (34.1)</td>
<td>4,500,181/65,112,652 (6.9)</td>
<td>3.7 (2.5–5.6)</td>
</tr>
</tbody>
</table>

Age group 0–4, 5–59 and total are adjusted for age; reported odds ratio is Mantel–Hansel.

- Influenza pneumonia cases were significantly more likely to have been hospitalized compared with the general Thai population.
- This difference was further magnified in children <5 years old.

THANK YOU FOR YOUR ATTENTION