Seasonal influenza and its impact on public health practice in New Zealand

Dr. Sue Huang
Director, WHO National Influenza Centre
Institute of Environmental Science and Research
Wellington, New Zealand

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Specialist Science Solutions
Manaaki Tangata Taiao Hoki
protecting people and their environment through science
Outline

• Background on seasonal influenza in NZ
• Impact of disease burden on vaccination policy
• Impact of oseltamivir-resistant viruses on antiviral intervention
• Impact of surveillance infrastructure on pandemic response
  - border control (case isolation & quarantine)
• Future direction of the seasonal influenza study
National Influenza Surveillance in New Zealand

• Disease Surveillance
  - describe incidence and distribution of influenza
  - detect influenza epidemics to assist public health intervention

• Strain Surveillance
  - identify the predominant strains to help plan for effective influenza vaccines.
Influenza Surveillance 2006

Percentage of population covered by sentinel surveillance for health districts in NZ

National coverage: 10.2% of 2006 census population

Population Coverage (%)
- 0
- 1 - 5
- 6 - 10
- 11 - 15
- 16 +
Sentinel General Practice Surveillance

Weekly, Monthly, Annual reports to Ministry of Health, WHO, AIVC

WHO National Influenza Centre (ESR)

Disease incidence

Predominant strain

National Coordinator (ESR)

Local Coordinators (24x Public Health Units)

ILI Consultation rate

Hospital Virology Labs (Auckland, Waikato, Christchurch)

Swabs

General Practices (~90x) (~1:50,000 population)
Weekly ILI consultation rates in 1992-2010

Laboratory-based Surveillance

Weekly, Monthly, Annual reports to Ministry of Health, WHO, AIVC

WHO National Influenza Centre (ESR)

Predominant strain

Hospital Labs
(AK, WK, CH, WN)

Diagnostic specimens mainly from hospital patients
Predominant Influenza Strains, 1990-2010

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Mortality rates during 1990-2010

Comparison of the average mortality rates between 1997-2003 and 1990-1996 by age group

Huang et al, Influenza and other respiratory viruses 2008; 2:139-145
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Oseltamivir resistance monitoring

<table>
<thead>
<tr>
<th>Influenza Virus</th>
<th>Seasonal A(H1N1)</th>
<th></th>
<th>Pandemic A(H1N1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td>2006 2007 2008 2009</td>
<td>2009 2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of viruses</strong></td>
<td>17 138 4 25</td>
<td>483 334</td>
<td></td>
<td></td>
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<tr>
<td><strong>Mean IC50</strong></td>
<td>1.84 0.83 728 1399</td>
<td>0.392 0.68</td>
<td></td>
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<tr>
<td><strong>Std. dev.</strong></td>
<td>0.71 0.63 136 2690</td>
<td>0.231 0.41</td>
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<tr>
<td><strong>Min IC50</strong></td>
<td>0.25 0.01 547 305</td>
<td>0.092 0.01</td>
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<tr>
<td><strong>Max IC50</strong></td>
<td>3.099 4.226 870 7912</td>
<td>1.402 2.05</td>
<td></td>
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</tr>
</tbody>
</table>
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• Measures: screen arriving passengers, isolate a suspected case, isolation, quarantine of contacts, test for each suspected case, offer oseltamivir treatment and prophylaxis
• 6 weeks delay for the virus to establish sustained transmission
Southern hemisphere influenza and vaccine effectiveness research and surveillance (SHIVERS)

1. Understand severe respiratory diseases caused by influenza & other pathogens
2. Assess influenza vaccine effectiveness
3. Investigate interaction between influenza & other pathogens
4. Understand causes of respiratory mortality
5. Understand non-severe respiratory diseases caused by influenza & other pathogens
6. Estimate influenza infection by conducting serosurvey
7. Identify & quantify risk factors (age, ethnicity, SES etc) for getting influenza
8. Assess immune response among individuals with varying disease spectrum
9. Estimate healthcare, societal economic burden caused by influenza and vaccine cost-effectiveness
Outcomes of the study

Comprehensive investigation of influenza epidemiology, aetiology and immunology and vaccine effectiveness.

The desired outcomes:

- Guide improved methods for disease surveillance
- Assist early detection and prediction
- Optimize clinical case management
- Optimize laboratory diagnosis
- Guide better vaccine design
- Guide targeted vaccination strategies for population and subgroups
- Understand host immune response
- Identify better immune diagnostic markers
Thank you