Data to inform influenza vaccine policy in New Zealand

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Specialist Science Solutions
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protecting people and their environment through science
Outline

• 1996 surveillance data - impact on vaccination policy
• 2005 surveillance data – potential impact on vaccination policy
• 2009 pandemic serosurvey - impact on vaccination policy
• Future directions
Influenza Surveillance & Research in New Zealand

- **Inter-pandemic period**
  - Sentinel GP based surveillance
  - Laboratory based surveillance
  - ICD code based morbidity and mortality surveillance

- **Pandemic period**
  - National notification
  - Public health surveillance for arriving travellers
  - ICU utilisation
  - Pandemic serosurvey
  - Transmission dynamic study

- **SHIVERS project**: 5 years 2011-2016
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Vaccine update, 1990-2011

- Policy extended to at-risk groups < 65 years old
- Free vaccination to persons aged 65 years and over
- Pandemic
Mortality rates and vaccine uptake, 1990-2010

- **Total Mortality Rate**
- **Vaccine Uptake**
Comparison of the average mortality rates between 1997-2003 and 1990-1996 by age group

![Graph showing mortality rates by age group between 1990-1996 and 1997-2003. The graph indicates a significant increase in mortality rates for the 65+ age group, with a p-value of p<0.0001.]

- **Average Rate 1990 - 1996**
- **Average Rate 1997 - 2003**
Routine surveillance data

- Provide the information resulting in vaccination policy change:
  - Free vaccination to all elderly over 65+ years since 1997
  - Free vaccination to all ages with chronic medical condition since 1999

- Evaluate the policy change
  - Limitation of the surveillance data
  - Other data needed:
    - Vaccine effectiveness
    - Better mortality estimate
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Influenza B circulation in New Zealand, 1990-2011
Influenza B isolates by age group, 1992-2005

Number of Isolates

Year

0 50 100 150 200 250 300 350 400 450

92 93 94 95 96 98 99 00 01 02 03 04 05

* data from May-Sept only
** data from May-Dec only
Influenza hospitalisations, 1990-2005
Hospitalisation rate comparison, 2005 vs 1995-2004

* Statistically significant difference (P<0.0001)
Other data & discussion

- Mortality: 3 children died – headline news
- School closure
- Vaccination for school-age children raised but no decision was made
  - Financial consideration?
  - Overall low hospitalisations/mortality
  - Not a priority group by SAGE recommendation
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Baseline vs Serosurvey immunity

• Largest increase in younger age groups (1-4, 5-19 years)

• No increase in oldest age group, but highest pre-existing immunity
Hospitalisation rates by age group

• Very young children (0-4 years) had much higher hospitalization rate than children aged 5-19 years.

• Eligibility policy for pandemic vaccine in 2010: extend to include all children aged < 5 years.
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Southern hemisphere influenza and vaccine effectiveness research and surveillance (SHIVERS)

- Hospital-based surveillance: enhanced, active, year-round (5 years), population based surveillance for hospital SARI cases including ICU admissions and death caused by influenza and other respiratory pathogens in Auckland.

- Community-based surveillance: enhanced, active, year-round (4 years), population based surveillance for community influenza-like illness cases caused by influenza and other respiratory pathogens in Auckland.
  - Serosurvey by cluster stratified random sampling: 2014 (a pair of pre- & post-season blood samples)
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, 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