Horizon scanning in NZ
Outbreaks and existing, emerging (and re-emerging) infectious disease patterns

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Overview

• Scope
Threats to NZ health
• Vulnerability to infectious diseases (IDs)
• ‘Unusual’ outbreaks
• Emerging or re-emerging local trends
• Diseases specifically linked to importations
• Main agencies involved in the prevention and control policies of IDs
• Conclusions
Scope

• Local vs global
  – diseases travel with humans and animals
• Existing/potential vulnerability
• IDs that caused unusual outbreaks (unusual because of the high numbers of cases, the pathogen involved or the time of the outbreak) or an unusual increase in number of cases over the last 20 years in NZ
• Emerging trends
Threats to NZ health Vulnerability to IDs

• Overall trends and vulnerability patterns in NZ
• Close contact IDs & crowding
• Examples: RF, skin infections, IPD, GE, Influenza, meningococcal disease
Annual rate of infectious and non-infectious diseases and all-cause hospital admissions in NZ (1989–2008)

[Baker M et al, 2012]
Annual rates of acute hospital admission for major categories of IDs in NZ (1989–2008)

URTI=upper respiratory tract infection. STI=sexually transmitted infection. *Including liver; †including ear; ‡and eye; §bone, joint, and connective tissue; ¶and circulation.

[Baker M et al, 2012]
ID hospitalisation rates by ethnic group, NZ 1989–2008 (age-standardised to 2006 Census)
ID hospitalisation rates by deprivation level (NZDep quintile), NZ 1989–2008 (age-standardised to 2006 Census)

[Baker M et al, 2012]
Annual rates of hospital admission for ID for Māori, Pacific peoples, and European and other ethnic groups according to level of deprivation (NZDep quintiles) in NZ (2004–08)

[Baker M et al, 2012]
ID hospitalisation rates by age group, NZ 1989–2008

[Baker M et al, 2012]
Crowding and IDs

• Meta-analysis reveals a consistent association between crowding and a range of close contact IDs (CCIDs)

• Very large ethnic inequalities within the disease burden.
  
  European/Others < Asian peoples < Māori < Pacific peoples

[Baker M et al, 2013]
Notified cases of meningococcal disease, 1975–2013

Group A

Group B: P1.7-2,4 strain

Group C: P1.5-1,10-8 strain

[ESR, 2014]
Age standardised rates for total meningococcal disease cases by ethnicity, 2001-2008

[ESR, 2009]
Meningococcal disease rates by age group, 2001-2008

[Graph showing meningococcal disease rates by age group from 2001 to 2008.]

[ESR, 2009]
Influenza

Cumulative SARI associated influenza hospitalisation rate by age group
29 Apr to 29 Sep 2013

[ESR, 2014]
Influenza

SARI associated influenza hospitalisation rate by ethnic group
29 Apr to 29 Sep 2013

![Bar chart showing SARI associated influenza hospitalisation rate by ethnic group from 29 Apr to 29 Sep 2013. The chart indicates that the highest rate is among Pacific Peoples with 50.6 cases per 100,000, followed by Māori with 26.8 cases per 100,000, Asian with 10.5 cases per 100,000, and European or Other with 17.3 cases per 100,000.]

[ESR, 2014]
Influenza
SARI-associated influenza hospitalisation rate by socioeconomic status
29 Apr to 29 Sep 2013

[ESR, 2014]
Influenza
ILI associated influenza incidence by socioeconomic status
29 Apr to 3 Nov 2013

<table>
<thead>
<tr>
<th>NZDep1–2</th>
<th>NZDep3–4</th>
<th>NZDep5–6</th>
<th>NZDep7–8</th>
<th>NZDep9–10</th>
</tr>
</thead>
<tbody>
<tr>
<td>493.7</td>
<td>449.4</td>
<td>454.2</td>
<td>450.9</td>
<td>220.7</td>
</tr>
</tbody>
</table>

[ESR, 2014]
Threats to NZ health
‘Unusual’ outbreaks

• Overview of outbreaks
• ‘Unusual’ outbreaks
Outbreak rates and associated cases by year, 2004–2013

[ESR, 2014]
Outbreaks - Trends

Since 2001

• About 90-95% enteric
• Causal agent identified about 70% (66.3–78.7%)
Percentage of outbreaks by pathogen or condition and year, 2004–2013
‘Unusual’ outbreaks

- **Norovirus**—new strains e.g. GII.4 Sydney
- *Clostridium difficile*
- Meningococcal disease B & C
- **Yersiniosis**
- Salmonellosis
  - e.g. Mbandaka, Typhimurium (DT160, 135), Brandenburg....
- **Children**: *enteroviruses* (HFM)
Norovirus Reference Laboratory-confirmed norovirus outbreak typing by month, 2012

[ESR, 2013]
Yersinia pseudotuberculosis outbreak

Number of *Yersinia pseudotuberculosis* and unknown *Yersinia* species notifications reported to EpiSurv since 01 September 2014, by status and onset date (as of 1145 hours 26 November 2014, n=221)

NOTE: Excludes 38 cases with no onset date recorded [YPTB ERL (10), YPTB probable (15), YPTB presumptive (1), Unknown (11)] and 1 case with unknown species with an onset date recorded as 15 Oct 2013
Yersinia pseudotuberculosis outbreak (ctd)

- 1/3 of cases hospitalised
- Associated with lettuce and carrots, particularly some specific brands, types and sources
- Given the widespread nature of the outbreak, it was assessed that contamination by Y. pseudotuberculosis was likely to have occurred at the grower or processor stage rather than the broker or retailer/consumer stage.
- Source was not found
Enteroviruses

• Affect mostly children <5
• HFMD outbreaks – summer-autumn 2013
  – Auckland: coxsackievirus A6 (CVA6)
    atypical illness that is more severe, and affects more frequently adults
  – Australia (Sydney): enterovirus 71 (EV71)
    30 children with severe neurological disease
Threats to NZ health

Emerging or re-emerging local trends

• Invasive GAS
• AB resistance
• STIs
  – gonorrhoea & chlamydia
  – MSM as a risk factor
• Legionellosis
• Foodborne
  – Campylobacteriosis
  – Unpasteurised milk
  – TSP
• VPDs
  – Measles
  – Whooping cough
  – IPD
  – New vaccines
  – Immunisation coverage
STIs

Gonorrhoea rates by DHB, 2009–2013

[ESR, 2014]

* Data incomplete.
Notes: Auckland region includes Waitemata, Auckland and Counties Manukau DHBs. Wellington region includes Hutt Valley and Capital & Coast DHBs.
✓ Introduction of NAAT testing
# STIs (ctd)

**Confirmed cases by ethnicity and clinic setting, 2013**

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Clinic type</th>
<th>Chlamydia</th>
<th></th>
<th>Gonorrhoea</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SHC</td>
<td>FPC</td>
<td>SHC</td>
<td>FPC</td>
</tr>
<tr>
<td>European</td>
<td></td>
<td>2193</td>
<td>1277</td>
<td>278</td>
<td>64</td>
</tr>
<tr>
<td>Māori</td>
<td></td>
<td>1838</td>
<td>974</td>
<td>357</td>
<td>129</td>
</tr>
<tr>
<td>Pacific Peoples</td>
<td></td>
<td>502</td>
<td>270</td>
<td>90</td>
<td>34</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>393</td>
<td>113</td>
<td>77</td>
<td>7</td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
<td>61</td>
<td>111</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>4987</strong></td>
<td><strong>2745</strong></td>
<td><strong>820</strong></td>
<td><strong>247</strong></td>
</tr>
</tbody>
</table>
STIs – At risk behaviour: MSM

• Internationally, examples of increase STIs transmission among MSM due to unprotected sex

• NZ GAPSS & GOSS surveys [AEG, Nov 2012]
  Overall, attitudes towards condoms were highly favourable

*However*

• Close to half agreed they don’t like wearing condoms as they reduce sensitivity, and a third agreed that they sometimes feel pressure not to use condoms

• Minority of MSM do not perceive HIV to be an immediate personal threat and this minority is growing

• Having tested positive for HIV was independently associated with holding a number of unfavourable attitudes towards condoms and safe sex
Legionellosis cases (confirmed and probable) by DHB, NZ, 2005-2014
Campylobacteriosis notifications by year, 1997–2013

Monitoring of contamination levels on fresh chicken (Apr 2007)
& regulatory limit set (Apr 2008)
Threats to NZ Health
Diseases specifically linked to importations

Vector-borne diseases
- Mosquitoes
- Ticks
  Brown dog tick (*Rhipicephalus sanguineus*) detected in NZ (Christchurch)
  The risk to human health is very low.
  Overseas, *R. sanguineus* has been shown to transmit two of the spotted fever group rickettsial infections.
  MPI – incident response

Outbreak-prone (H-H)
- Measles
- Typhoid
- Hep A
- TB
# Tuberculosis notifications (new cases) by region of birth, 2013

<table>
<thead>
<tr>
<th>Region of birth</th>
<th>Cases</th>
<th>Rate&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Born in New Zealand</td>
<td>54</td>
<td>1.8</td>
</tr>
<tr>
<td>Born outside New Zealand</td>
<td>210</td>
<td>23.9</td>
</tr>
<tr>
<td>Australia</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Pacific Islands</td>
<td>33</td>
<td>24.3</td>
</tr>
<tr>
<td>North Africa and the Middle East</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>16</td>
<td>27.1</td>
</tr>
<tr>
<td>North-East Asia</td>
<td>17</td>
<td>12.6</td>
</tr>
<tr>
<td>South-East Asia</td>
<td>34</td>
<td>58.4</td>
</tr>
<tr>
<td>Southern and Central Asia</td>
<td>97</td>
<td>168.1</td>
</tr>
<tr>
<td>Europe</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Southern and Central America</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Unknown</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>264</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

<sup>a</sup> Rate per 100 000 population. Population data used for the denominator was derived from the 2006 census usually resident population count by birthplace, published by Statistics New Zealand.
Main agencies involved in the prevention and control policies of IDs, by ID category

<table>
<thead>
<tr>
<th>ID category</th>
<th>Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPDs</td>
<td>MoH, PHARMAC</td>
</tr>
<tr>
<td>CCID</td>
<td>MoH, MSD, HNZCo</td>
</tr>
<tr>
<td>HAI</td>
<td>MoH, HQSC (IPC), WorkSafe, DHBs</td>
</tr>
<tr>
<td>Bloodborne</td>
<td>MoH, HFNZ, NZBS, WorkSafe</td>
</tr>
<tr>
<td>AMR</td>
<td>MoH, PHARMAC, MPI, HQSC</td>
</tr>
<tr>
<td>Zoonosis, foodborne</td>
<td>MoH, MPI, WorkSafe, DHBs</td>
</tr>
<tr>
<td>Environmental</td>
<td>MoH &amp; MfE (water), MoH &amp; MPI (vectors)</td>
</tr>
<tr>
<td>STIs</td>
<td>MoH, DHBs, WorkSafe</td>
</tr>
<tr>
<td>Pandemic preparedness</td>
<td>MoH, Whole-of-Government</td>
</tr>
</tbody>
</table>
Conclusion

• Population groups more vulnerable to IDs
  – Pacific and Māori
  – Deprived
  – Very young and old
• IDs with specific vulnerability profiles
  – Meningococcal disease, TB, measles
• Prevention & control measures necessary to avoid or minimise local transmission
  – Multi-agency collaboration
• Are we able to change some of the trends?
  – Positive experiences
    VPDs, meningococcal disease B, TB, campylobacteriosis, HIV...
  – addressing some of the vulnerability factors
    RFPP: housing-related CCIDs