Hospital Surveillance
SARI, Influenza and Respiratory Pathogens
Monthly Report, April 2014

SUMMARY

This report includes data for severe acute respiratory infections (SARI) for April, weeks 14 - 17 (31 March – 27 April 2014) and cumulative data since 29 April 2013. Influenza activity was at a very low level during April in Auckland’s ADHB and CMDHB.

- **SARI surveillance**
  
  **SARI surveillance:** 256 suspected respiratory infections were assessed and 86 (33.6%) met the SARI case definition. Of these SARI cases, 17.4% were children aged less than 5 years and 23.3% were adults 65 years and older. The monthly SARI proportion was 8.4 per 1000 acute hospitalisations. Of these SARI cases, 73 were residents of ADHB and CMDHB, giving a monthly SARI incidence rate of 8.7 per 100 000 population. Two ICU admissions and no deaths were reported this month.

- **Respiratory pathogen surveillance**

  **Influenza virus:** During April 54 SARI specimens were tested, two were positive for influenza viruses.

  **Non-influenza respiratory viruses:** Since 29 April 2013, a total of 1462 SARI specimens have been tested for non-influenza viruses, 649 (44.4%) were positive with the following viruses: rhinovirus (293), RSV (245), adenovirus (102), parainfluenza 1 (9), parainfluenza 2 (25), parainfluenza 3 (58) and hMPV (82). 513 SARI specimens had single virus detection and 136 (21.0%) had co-detection.
The surveillance for community-based influenza-like illness (ILI) and hospital-based severe acute respiratory infections (SARI) provides evidence to inform public health and clinical practice to reduce the impact of influenza virus infection and other important respiratory pathogens. As part of the Southern Hemisphere Influenza and Vaccine Effectiveness Research & Surveillance (SHIVERS) project, this monthly report summarises data obtained from the Auckland and Counties Manukau District Health Boards (ADHB and CMDHB) of New Zealand with a population of 838,000 people. The report includes incidence, demographic characteristics, clinical outcomes and aetiologies for hospital SARI cases including ICU admissions and deaths for the past month as well as the cumulative period since 29 April 2013.

Note: Data in this report are provisional and may change as more cases are assessed and information is updated. Data were extracted on 13 May 2014.

SEVERE ACUTE RESPIRATORY INFECTION

Severe acute respiratory infection (SARI)

There were 10283 acute admissions to ADHB and CMDHB hospitals during April (weeks 14 – 17), 31 March – 27 April 2014. A total of 256 patients with suspected respiratory infections were assessed in these hospitals. Of these, 86 (33.6%) patients met the SARI case definition. The monthly SARI proportion was 8.4 per 1000 acute hospitalisations. Two ICU admissions and no deaths were reported this month. Table 1 shows the admission diagnoses/syndromes of the suspected respiratory infections and SARI cases in April and since start of the SARI surveillance.

Table 1 Admission diagnoses/syndromes of suspected respiratory infections and SARI cases, weeks 14 – 17, ending 27 April 2014

<table>
<thead>
<tr>
<th>Admission diagnoses/syndrome</th>
<th>Weeks 14 - 17, (April 2014)</th>
<th>Cumulative since 29 April 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall (%)</td>
<td>SARI cases</td>
</tr>
<tr>
<td>Suspected acute upper respiratory infection (including coryza, pharyngitis)</td>
<td>10 (3.9)</td>
<td>2</td>
</tr>
<tr>
<td>Suspected croup</td>
<td>2 (0.8)</td>
<td>1</td>
</tr>
<tr>
<td>Suspected bronchiolitis (in children)</td>
<td>31 (12.1)</td>
<td>11</td>
</tr>
<tr>
<td>Suspected pneumonia</td>
<td>69 (27.0)</td>
<td>33</td>
</tr>
<tr>
<td>Exacerbation of asthma</td>
<td>26 (10.2)</td>
<td>3</td>
</tr>
<tr>
<td>Exacerbation of childhood chronic lung disease (including bronchiectasis, cystic fibrosis)</td>
<td>4 (1.6)</td>
<td>0</td>
</tr>
<tr>
<td>Exacerbation of adult chronic lung disease (including COPD, emphysema, bronchitis)</td>
<td>48 (18.8)</td>
<td>10</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>2 (0.8)</td>
<td>1</td>
</tr>
<tr>
<td>Febrile illness with respiratory symptoms (including shortness of breath)</td>
<td>25 (9.8)</td>
<td>18</td>
</tr>
<tr>
<td>Other suspected acute respiratory infection</td>
<td>32 (12.5)</td>
<td>6</td>
</tr>
<tr>
<td>Not provided</td>
<td>7 (2.7)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>256 (100.0)</td>
<td>86</td>
</tr>
</tbody>
</table>

Of the 86 SARI cases, 73 were residents of ADHB and CMDHB. This gives a monthly SARI incidence rate of 8.7 per 100 000 population. 50 SARI cases had specimens tested for influenza viruses, two were positive for influenza viruses.
Since 29 April 2013, a total of 2425 SARI cases were identified. This gives a SARI proportion of 17.6 per 1000 acute hospitalisations (Table 2). Of these SARI cases, 30.8% were children aged less than 5 years and 24.6% were adults 65 years and older. 102 cases have been admitted to ICU (84 SARI (12 positive for influenza) and 18 non-SARI (3 positive for influenza)). 19 deaths were reported during this period (14 SARI (3 positive for influenza) and 5 non-SARI (1 positive for influenza)).

Of the 2425 SARI cases, 2052 were ADHB and CMDHB residents, giving the SARI incidence rate of 245.0 per 100 000 population. Among the 1704 tested SARI cases who were ADHB and CMDHB residents, 258 (15.1%) had positive influenza virus results. This gives a SARI related influenza incidence of 30.8 per 100 000 population.
Table 2 Demographic characteristics of SARI cases and related influenza cases, since 29 April 2013

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Admissions</th>
<th>Assessed</th>
<th>SARI &amp; influenza cases among all hospital patients</th>
<th>SARI &amp; influenza cases among ADHB &amp; CMDHB residents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>SARI Cases (%)</td>
<td>Cases per 1000 hospitalisations</td>
</tr>
<tr>
<td>Overall</td>
<td>137712</td>
<td>5783</td>
<td>2425 (41.9)</td>
<td>17.6</td>
</tr>
<tr>
<td>Age group (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>4985</td>
<td></td>
<td>395</td>
<td>79.2</td>
</tr>
<tr>
<td>1 to 4</td>
<td>9969</td>
<td></td>
<td>351</td>
<td>35.2</td>
</tr>
<tr>
<td>5 to 19</td>
<td>16525</td>
<td></td>
<td>134</td>
<td>8.1</td>
</tr>
<tr>
<td>20 to 34</td>
<td>25901</td>
<td></td>
<td>162</td>
<td>6.3</td>
</tr>
<tr>
<td>35 to 49</td>
<td>21780</td>
<td></td>
<td>224</td>
<td>10.3</td>
</tr>
<tr>
<td>50 to 64</td>
<td>23453</td>
<td></td>
<td>352</td>
<td>15</td>
</tr>
<tr>
<td>65 to 79</td>
<td>21170</td>
<td></td>
<td>369</td>
<td>17.4</td>
</tr>
<tr>
<td>80 and over</td>
<td>13924</td>
<td></td>
<td>227</td>
<td>16.3</td>
</tr>
<tr>
<td>Unknown</td>
<td>5</td>
<td>211</td>
<td>3</td>
<td>13 (10.6)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maori</td>
<td>18522</td>
<td></td>
<td>370</td>
<td>20</td>
</tr>
<tr>
<td>Pacific Peoples</td>
<td>28401</td>
<td></td>
<td>649</td>
<td>22.9</td>
</tr>
<tr>
<td>Asians</td>
<td>19817</td>
<td></td>
<td>165</td>
<td>8.3</td>
</tr>
<tr>
<td>European and others</td>
<td>69886</td>
<td></td>
<td>741</td>
<td>10.6</td>
</tr>
<tr>
<td>Unknown</td>
<td>1050</td>
<td></td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td>Hospitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHB</td>
<td>76113</td>
<td>2583</td>
<td>1054</td>
<td>13.8</td>
</tr>
<tr>
<td>CMDHB</td>
<td>61599</td>
<td>3200</td>
<td>1371</td>
<td>22.3</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>72806</td>
<td></td>
<td>1089</td>
<td>15.0</td>
</tr>
<tr>
<td>Male</td>
<td>64900</td>
<td></td>
<td>1129</td>
<td>17.4</td>
</tr>
<tr>
<td>Unknown</td>
<td>6</td>
<td>207</td>
<td>3</td>
<td>13 (10.6)</td>
</tr>
</tbody>
</table>
RESPIRATORY PATHOGEN SURVEILLANCE

Influenza virus
During April, weeks 14 – 17, 54 SARI specimens were tested; two were positive for influenza viruses.

Since 29 April 2013, a total of 2118 SARI specimens were tested for influenza viruses and 315 (14.9%) were positive for influenza with the following viruses (see Table 3).

109 specimens were associated with ICU cases (94 SARI (13 positive for influenza) and 15 non-SARI (3 positive for influenza)). 20 specimens were associated with cases who died during this period (17 SARI (3 positive for influenza) and 3 non-SARI (1 positive for influenza)).

Table 3 Influenza viruses among SARI cases since 29 April 2013

<table>
<thead>
<tr>
<th>Influenza viruses</th>
<th>SARI</th>
<th>Cases</th>
<th>ICU</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of specimens tested</td>
<td>2118</td>
<td>94</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>No. of positive specimens (%)</td>
<td>315 (14.9)</td>
<td>13 (13.8)</td>
<td>3 (17.6)</td>
<td></td>
</tr>
<tr>
<td>Influenza A</td>
<td>229</td>
<td>9</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>A (not subtyped)</td>
<td>41</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>A (H1N1)pdm09</td>
<td>25</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>A(H1N1)pdm09 by PCR</td>
<td>16</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>A/California/7/2009 (H1N1)-like</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>A(H3N2)</td>
<td>163</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>A(H3N2) by PCR</td>
<td>102</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A/Victoria/361/2011 (H3N2)-like</td>
<td>61</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Influenza B</td>
<td>87</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>B (lineage not determined)</td>
<td>50</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>B (Yamagata lineage-B/Wisconsin/1/2010-like)</td>
<td>36</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>B (Victoria lineage-B/Brisbane/60/2008-like)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Influenza and non-influenza co-detection (% +ve)</td>
<td>37 (11.7)</td>
<td>2 (15.4)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
</tbody>
</table>

1Number of specimens positive for at least one of the listed viruses; note a specimen may be positive for more than one virus
Non-influenza respiratory pathogens
Since 29 April 2013, a total of 1462 SARI specimens were tested for non-influenza viruses, 649 (44.4%) were positive with the following viruses (see Table 4).

Table 4 Non-influenza respiratory viruses among SARI cases, since 29 April 2013

<table>
<thead>
<tr>
<th>Non-influenza respiratory viruses</th>
<th>SARI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cases</td>
</tr>
<tr>
<td>No. of specimens tested</td>
<td>1462</td>
</tr>
<tr>
<td>No. of positive specimens (%)</td>
<td>649 (44.4)</td>
</tr>
<tr>
<td>Respiratory syncytial virus (RSV)</td>
<td>245</td>
</tr>
<tr>
<td>Parainfluenza 1 (PIV1)</td>
<td>9</td>
</tr>
<tr>
<td>Parainfluenza 2 (PIV2)</td>
<td>25</td>
</tr>
<tr>
<td>Parainfluenza 3 (PIV3)</td>
<td>58</td>
</tr>
<tr>
<td>Rhinovirus (RV)</td>
<td>293</td>
</tr>
<tr>
<td>Adenovirus (AdV)</td>
<td>102</td>
</tr>
<tr>
<td>Human metapneumovirus (hMPV)</td>
<td>82</td>
</tr>
<tr>
<td>Single virus detection (% of positives)</td>
<td>513 (79.0)</td>
</tr>
<tr>
<td>Multiple virus detection (% of positives)</td>
<td>136 (21.0)</td>
</tr>
</tbody>
</table>

Number of specimens positive for at least one of the listed viruses; note a specimen may be positive for more than one virus.
Figure 2  Temporal distribution of the number and proportion of influenza viruses from SARI specimens by type and week

![Temporal distribution of influenza viruses](image)

Figure 3  Temporal distribution of the number and proportion of non-influenza viruses from SARI specimens by type and week

![Temporal distribution of non-influenza viruses](image)

1 Figures for recent weeks will be underestimates due to time lag in receiving laboratory test results.
APPENDIX

Recent global experience with pandemic influenza A(H1N1)pdm09 highlights the importance of monitoring severe and mild respiratory disease to support pandemic preparedness as well as seasonal influenza prevention and control. An enhanced, active, population-based surveillance has been established for hospital-based severe acute respiratory infection (SARI) cases as well as for community-based influenza-like illness cases in Auckland Counties Manukau District Health Boards (ADHB and CMDHB), which together provide healthcare for 838,000 people.

The aims of ILI and SARI surveillance are: 1) to measure the burden of severe and mild disease caused by influenza and other respiratory pathogens; 2) to monitor trends in severe and mild disease caused by influenza and other respiratory pathogens; 3) to identify high risk groups that should be prioritized for prevention and treatment; 4) to monitor antigenic, genetic and antiviral characteristics of influenza viruses associated with severe and mild disease. 5) to provide a study base to estimate the effectiveness of influenza vaccine.

ACKNOWLEDGEMENT

The ILI and SARI surveillance is funded by US Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) (1U01IP000480-01). It is a key component of the Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance (SHIVERS) project. The project is a five year research cooperative agreement between the Institute of Environmental Science and Research (ESR) in New Zealand and US CDC’s National Center for Immunization and Respiratory Diseases (NCIRD) Influenza Division.

The SHIVERS project is a multi-centre and multi-disciplinary collaboration between ESR, Auckland District Health Board, Counties Manukau District Health Board, University of Otago, University of Auckland, participating sentinel general practices, Primary Health Organisations (Procare, Auckland and East Tamaki Healthcare), Auckland Regional Public Health Service, the US Centres for Disease Control and Prevention and WHO Collaborating Centre at St Jude Children’s Hospital in Memphis, USA.

The SARI surveillance protocol was developed by: Sue Huang, Sally Roberts, Colin McArthur, Michael Baker, Cameron Grant, Deborah Williamson, Adrian Trenholme, Conroy Wong, Susan Taylor, Lyndsay LeComte, Graham Mackereth, Don Bandaranayake, Tim Wood, Ange Bissielo, Ruth Seeds, Nikki Turner, Nevil Pierse, Paul Thomas, Richard Webby, Diane Gross, Jazmin Duque, Mark Thompson and Marc-Alain Widdowson.

The ILI surveillance protocol was developed by: Sue Huang, Nikki Turner, John Cameron, Michael Baker, Bruce Adlam, Graham Mackereth, Don Bandaranayake, Ange Bissielo, Tim Wood, Ruth Seeds, Barbara McArdle, Tracey Poole, Rosemary Gordon, Sam Wong, Leane Els, Marion Howie, Gillian Davies, Paul Thomas, Richard Webby, Diane Gross, Jazmin Duque and Marc-Alain Widdowson.
NOTES ON INTERPRETATION

- SARI case definition: “An acute respiratory illness with a history of fever or measured fever of ≥38°C, AND cough, AND onset within the past 10 days, AND requiring inpatient hospitalisation (defined as a patient who is admitted under a medical team and to a hospital ward or assessment unit).

- ILI case definition: “An acute respiratory illness with a history of fever or measured fever of ≥38°C, AND cough, AND onset within the past 10 days, AND requiring GP consultation”.

- ILI sentinel general practices: so far, a total of 18 sentinel general practices have agreed to participate in community ILI surveillance. These practices have 103 884 enrolled patients, covering roughly 14% of the ADHB and CMDHB population.

- PCR method for influenza virus: ADHB Laboratory and ESR’s National Influenza Centre (NIC) use CDC’s real-time PCR protocol (http://www.accessdata.fda.gov/cdrh_docs/pdf8/k080570.pdf); CMDHB laboratory uses commercially available multiplex real-time PCR assay from AusDiagnostics. Ongoing validation between the AusDiagnostic assays and CDC’s influenza assay will be conducted on a weekly basis.

- The real-time PCR assay for non-influenza respiratory viruses (respiratory syncytial virus, parainfluenza virus types 1-3, human metapneumovirus, rhinovirus and adenovirus) was obtained from the U.S. Centers for Disease Control and Prevention and are available on request. Note: The rhinovirus PCR detects mostly rhinovirus with slight cross-reactivity against enterovirus.

- The surveillance week is Monday to Sunday inclusive, and data are extracted on the subsequent Tuesday. Results from previous weeks will be revised as data are updated (laboratory test results in particular may be delayed).

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