Muswellbrook Hospital

30-day mortality following hospitalisation for seven conditions

Measures that assess how healthcare affects patient outcomes, such as risk-standardised mortality ratios (RSMRs), make a crucial contribution to informing efforts to improve care. They should be looked at alongside other measures and used by clinicians as a tool to prompt discussion and inform the development of quality improvement initiatives.

For each hospital, the RSMR compares the ‘observed’ number of deaths within 30 days of admission for a specific clinical condition, with the ‘expected’ number of deaths, which is calculated based on all patients admitted with that condition to any NSW hospital.

The RSMR calculation takes into account the volume and types of patients treated in each hospital (known as the case mix), as different hospitals provide care to patients who may be more or less likely, on admission, to die within 30 days.

The RSMR is a ratio. A ratio of less than 1.0 indicates that mortality is lower than expected in the hospital, while a ratio of greater than 1.0 indicates that mortality is higher than expected in the hospital. Small deviations from 1.0 are not considered meaningful.

When the ratio is statistically significantly lower than 1.0 it is shaded green, and this indicates that mortality is lower than expected in the hospital. When the ratio is statistically significantly higher than 1.0 it is shaded red, and this indicates that mortality is higher than expected in the hospital.

Funnel plots with 95% and 99.8% control limits around the NSW ratio of 1.0 are used to identify outlier hospitals, which are shaded green or red.

The RSMR is not designed to compare hospitals to each other. Rather it compares each hospital’s outcomes with what may have been expected given its particular case mix.

### Risk-standardised mortality ratios (RSMRs) for seven conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>RSMR</th>
<th>July 2015 – June 2018</th>
<th>RSMRs for three-year periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute myocardial infarction</td>
<td>&lt; 50 index hospitalisations, results not shown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischaemic stroke</td>
<td>&lt; 50 index hospitalisations, results not shown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemorrhagic stroke</td>
<td>&lt; 50 index hospitalisations, results not shown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>&lt; 50 index hospitalisations, results not shown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1.47</td>
<td>July 03 – June 06</td>
<td>July 06 – June 09</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>0.94</td>
<td>July 09 – June 12</td>
<td>July 12 – June 15</td>
</tr>
<tr>
<td>Hip fracture surgery</td>
<td>&lt; 50 index hospitalisations, results not shown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data refer to patients who were discharged between July 2015 and June 2018 who were initially admitted to this hospital (regardless of whether they were subsequently transferred) in their last period of care, for an acute and emergency hospitalisation for the relevant condition. Deaths are from any cause, in or out of hospital, within 30 days of the hospitalisation admission date. The ‘expected’ number of deaths is calculated using a statistical model. Details of analyses are available in Spotlight on Measurement: Measuring 30-day mortality following hospitalisation, 2nd edition and the Technical Supplement to Mortality following hospitalisation for seven clinical conditions, July 2015–June 2018.

1 RSMR outliers between July 2012 – June 2018 used control limits of 95% and 99.8%. Periods between July 2000 and June 2012 used control limits of 90% and 99%. Historical results that were outside the 90% control limits but did not reach significance at the 95% level are categorised as ‘intermediate’ results.

Notes: In June 2017, the NSW Health Admission Policy was released, stating that a patient treated in and discharged from an emergency department (ED) only, should not be recorded as an admitted patient. As a result, ED-only attendances were not included in BHI mortality analyses for the July 2015–June 2019 period, and comparison of results before and after this time should be made with caution. For more information, see the Technical Supplement to Mortality following hospitalisation for seven clinical conditions, July 2015–June 2018.

Data source: BHI analyses of Hospital Performance Dataset, NSW Ministry of Health Secure Analytics for Population Health Research and Intelligence.
How to interpret the dashboard

If a hospital’s RSIR lies on the grey bar, its mortality is within the range of values expected for a NSW hospital within the control limit.

Mortality is lower than expected

The length of the bar for each condition reflects the tolerance for variation. It is wider for hospitals admitting a small number of patients.

Mortality is higher than expected

How to interpret a funnel plot

Hospital within the range of values expected for a NSW hospital within the control limit (inside the funnel)

Hospital with higher mortality

Hospital with higher mortality (between 95% and 99.8% control limits)

Hospital with lower mortality

This hospital’s result

Greater tolerance for variation for hospitals with fewer expected deaths

Reflects patient volume and case mix at the hospital

Expected number of deaths within 30 days

95% limits

99.8% limits

This hospital

Peer hospitals

Other hospitals

Higher than expected:

No different than expected:

Lower than expected:
Muswellbrook Hospital

30-day mortality following hospitalisation for acute myocardial infarction, July 2015 – June 2018

<50 index hospitalisations, results not shown
Muswellbrook Hospital

30-day mortality following hospitalisation for ischaemic stroke, July 2015 – June 2018

<50 index hospitalisations, results not shown
Muswellbrook Hospital

30-day mortality following hospitalisation for haemorrhagic stroke, July 2015 – June 2018

<50 index hospitalisations, results not shown
Muswellbrook Hospital

30-day mortality following hospitalisation for congestive heart failure, July 2015 – June 2018

<50 index hospitalisations, results not shown
Muswellbrook Hospital

30-day mortality following hospitalisation for pneumonia, July 2015 – June 2018

<table>
<thead>
<tr>
<th></th>
<th>This hospital</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total pneumonia hospitalisations</td>
<td>183</td>
<td>56,247</td>
</tr>
<tr>
<td>Pneumonia patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presenting patients (index cases)</td>
<td>159</td>
<td>49,810</td>
</tr>
<tr>
<td>Patients transferred to another hospital within 30 days</td>
<td>23</td>
<td>5,260</td>
</tr>
<tr>
<td>Percentage of patients aged 65+ years</td>
<td>56.0%</td>
<td>69.4%</td>
</tr>
<tr>
<td>Percentage of patients aged 75+ years</td>
<td>41.5%</td>
<td>50.1%</td>
</tr>
</tbody>
</table>

Significant patient factors and comorbidities, this hospital, index cases

<table>
<thead>
<tr>
<th>Condition</th>
<th>% difference from NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock</td>
<td>-0.6</td>
</tr>
<tr>
<td>Liver disease</td>
<td>-0.7</td>
</tr>
<tr>
<td>Other COPD</td>
<td>-1.7</td>
</tr>
<tr>
<td>Malignancy</td>
<td>-3.7</td>
</tr>
<tr>
<td>Dementia</td>
<td>-3.7</td>
</tr>
<tr>
<td>Renal failure</td>
<td>-7.4</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>-10.0</td>
</tr>
<tr>
<td>Dysrhythmia</td>
<td>-11.1</td>
</tr>
<tr>
<td>Hypotension</td>
<td>-14.6</td>
</tr>
</tbody>
</table>

* Data refer to patients who were discharged between July 2015 and June 2018 who were initially admitted to this hospital (regardless of whether they were subsequently transferred) in their last period of care, for an acute and emergency hospitalisation with pneumonia as principal diagnosis (ICD-10-AM codes J13, J14, J15, J16, J18). Deaths are from any cause, in or out of hospital within 30 days of the hospitalisation admission date.

† Includes transfers for diagnostic tests, procedures and ongoing care.

‡ Age at admission date. Age was a statistical factor in the final model of 30-day mortality following hospitalisation for pneumonia.

§ Comorbidities as recorded on patient record, with one-year look-back from the admission date of the index case. The AustralianCommission on Safety and Quality in Healthcare comorbidity list was used for acute myocardial infarction, ischaemic stroke, haemorrhagic stroke, pneumonia and hip fracture surgery. The Elixhauser comorbidity list was used for congestive heart failure and chronic obstructive pulmonary disease. STEMI refers to ST-elevation myocardial infarction. Only those conditions that were shown to have a significant impact on mortality (P<0.05) are shown.
# Muswellbrook Hospital

## 30-day mortality following hospitalisation for pneumonia, July 2015 – June 2018

<table>
<thead>
<tr>
<th></th>
<th>This hospital</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality (all causes) among 159 pneumonia index cases</td>
<td>13 (8.2%)</td>
<td>4,538 (9.1%)</td>
</tr>
<tr>
<td>Percentages: index cases who died within 30 days of hospitalisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where deaths occurred:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage in this hospital</td>
<td>46.2%</td>
<td>53.9%</td>
</tr>
<tr>
<td>Percentage in another hospital following transfer</td>
<td>0.0%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Percentage after discharge</td>
<td>53.8%</td>
<td>45.5%</td>
</tr>
<tr>
<td>When deaths occurred:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage on day of admission</td>
<td>0.0%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Percentage within seven days</td>
<td>46.2%</td>
<td>48.4%</td>
</tr>
</tbody>
</table>

### Cumulative mortality following hospitalisation for pneumonia, this hospital and NSW

![Cumulative mortality graph](image)

<table>
<thead>
<tr>
<th>Days since hospitalisation</th>
<th>This hospital</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td>8</td>
<td>18</td>
<td>29</td>
</tr>
<tr>
<td>9</td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>10</td>
<td>22</td>
<td>35</td>
</tr>
<tr>
<td>11</td>
<td>24</td>
<td>38</td>
</tr>
<tr>
<td>12</td>
<td>26</td>
<td>41</td>
</tr>
<tr>
<td>13</td>
<td>28</td>
<td>44</td>
</tr>
<tr>
<td>14</td>
<td>30</td>
<td>47</td>
</tr>
<tr>
<td>15</td>
<td>32</td>
<td>50</td>
</tr>
</tbody>
</table>

**This hospital**

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 7</th>
<th>Day 14</th>
<th>Day 21</th>
<th>Day 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
<td>9</td>
<td>11</td>
<td>13</td>
</tr>
</tbody>
</table>

**Cumulative number of deaths**

<table>
<thead>
<tr>
<th>Patients still alive</th>
<th>157</th>
<th>153</th>
<th>150</th>
<th>148</th>
<th>146</th>
</tr>
</thead>
</table>

* Cumulative percentage of deaths over the 30 days following admission to hospital for the relevant condition.
Muswellbrook Hospital

30-day mortality following hospitalisation for pneumonia, July 2015 – June 2018

Pneumonia risk-standardised mortality ratio by number of expected deaths, NSW public hospitals

Pneumonia, observed (unadjusted) mortality rates, this hospital and NSW, July 2003 – June 2018

* Results for hospitals with expected deaths < 1 are not shown. Peer hospitals are identified according to the NSW Ministry of Health’s peer grouping as of January 2018.

† In June 2017, the NSW Health Admission Policy was released, stating that a patient treated in and discharged from an emergency department only, should not be recorded as an admitted patient. As a result, ED-only attendances were not included in BHI mortality analyses from July 2015 onwards and comparison of results before and after this time should be made with caution. For more information, see the Technical Supplement to Mortality following hospitalisation for seven clinical conditions, July 2015 – June 2018.
Muswellbrook Hospital

30-day mortality following hospitalisation for chronic obstructive pulmonary disease, July 2015 – June 2018

<table>
<thead>
<tr>
<th></th>
<th>This hospital</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total chronic obstructive pulmonary disease hospitalisations</td>
<td>212</td>
<td>59,309</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presenting patients (index cases)</td>
<td>121</td>
<td>32,605</td>
</tr>
<tr>
<td>Patients transferred to another hospital within 30 days</td>
<td>12</td>
<td>2,717</td>
</tr>
<tr>
<td>Percentage of patients aged 65+ years</td>
<td>77.7%</td>
<td>80.2%</td>
</tr>
<tr>
<td>Percentage of patients aged 75+ years</td>
<td>45.5%</td>
<td>50.7%</td>
</tr>
</tbody>
</table>

Significant patient factors and comorbidities, this hospital, index cases

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>% difference from NSW (index cases with factor recorded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute related admission twice</td>
<td>-0.1</td>
</tr>
<tr>
<td>Diabetes, complicated</td>
<td>-0.4</td>
</tr>
<tr>
<td>Female</td>
<td>-0.6</td>
</tr>
<tr>
<td>Three or more previous acute related admissions</td>
<td>-0.8</td>
</tr>
<tr>
<td>Acute related admission once</td>
<td>-1.0</td>
</tr>
<tr>
<td>Metastatic cancer</td>
<td>-1.6</td>
</tr>
<tr>
<td>Dementia</td>
<td>-2.0</td>
</tr>
<tr>
<td>Pulmonary circulation disorders</td>
<td>-3.1</td>
</tr>
<tr>
<td>Solid tumour without metastasis</td>
<td>-3.3</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>-4.1</td>
</tr>
<tr>
<td>Cardiac arrhythmia</td>
<td>-7.0</td>
</tr>
<tr>
<td>Weight loss</td>
<td>-9.8</td>
</tr>
<tr>
<td>Fluid and electrolyte disorders</td>
<td>-19.1</td>
</tr>
</tbody>
</table>

* Data refer to patients who were discharged between July 2015 and June 2018 who were initially admitted to this hospital (regardless of whether they were subsequently transferred) in their last period of care, for an acute and emergency hospitalisation with chronic obstructive pulmonary disease as principal diagnosis (ICD-10-AM code J41, J42, J43, J44, J47, and J30 and J40 if accompanied by J41, J42, J43, J44 and J47 in any secondary diagnosis). Deaths are from any cause, in or out of hospital within 30 days of the hospitalisation admission date.

† Includes transfers for diagnostic tests, procedures and ongoing care.

‡ Age at admission date. Age was a statistical factor in the final model of 30-day mortality following hospitalisation for chronic obstructive pulmonary disease.

§ Comorbidities as recorded on patient record, with one-year look-back from the admission date of the index case. The Australian Commission on Safety and Quality in Healthcare comorbidity list was used for acute myocardial infarction, ischaemic stroke, haemorrhagic stroke, pneumonia and hip fracture surgery. The Elixhauser comorbidity list was used for congestive heart failure and chronic obstructive pulmonary disease. STEMI refers to ST-elevation myocardial infarction. Only those conditions that were shown to have a significant impact on mortality (P<0.05) are shown.
Muswellbrook Hospital

30-day mortality following hospitalisation for chronic obstructive pulmonary disease, July 2015 – June 2018

<table>
<thead>
<tr>
<th>Where deaths occurred:</th>
<th>This hospital</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage in this hospital</td>
<td>8 (6.6%)</td>
<td>3,084 (9.5%)</td>
</tr>
<tr>
<td>Percentage in another hospital following transfer</td>
<td>&lt;10 deaths</td>
<td>Detailed results not shown</td>
</tr>
<tr>
<td>Percentage after discharge</td>
<td>&lt;10 deaths</td>
<td>Detailed results not shown</td>
</tr>
<tr>
<td>When deaths occurred:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage on day of admission</td>
<td>&lt;10 deaths</td>
<td>Detailed results not shown</td>
</tr>
<tr>
<td>Percentage within seven days</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cumulative mortality following hospitalisation for chronic obstructive pulmonary disease, this hospital and NSW*

* Cumulative percentage of deaths over the 30 days following admission to hospital for the relevant condition.
Muswellbrook Hospital

30-day mortality following hospitalisation for chronic obstructive pulmonary disease, July 2015 – June 2018

Chronic obstructive pulmonary disease risk-standardised mortality ratio by number of expected deaths, NSW public hospitals

Chronic obstructive pulmonary disease, observed (unadjusted) mortality rates, this hospital and NSW, July 2003 – June 2018

* Results for hospitals with expected deaths <1 are not shown. Peer hospitals are identified according to the NSW Ministry of Health’s peer grouping as of January 2018.

† In June 2017, the NSW Health Admission Policy was released, stating that a patient treated in and discharged from an emergency department only, should not be recorded as an admitted patient. As a result, ED-only attendances were not included in BHI mortality analyses from July 2015 onwards and comparison of results before and after this time should be made with caution. For more information, see the Technical Supplement to Mortality following hospitalisation for seven clinical conditions, July 2015 – June 2018.
Muswellbrook Hospital

30-day mortality following hospitalisation for hip fracture surgery, July 2015 – June 2018

<50 index hospitalisations, results not shown