A national model for measuring and benchmarking rehabilitation outcomes: the Australian story

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Abstract
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A National Model for Measuring and Benchmarking Rehabilitation Outcomes: the Australian Story

Frances Simmonds, AROC Director
Australasian Rehabilitation Outcomes Centre

A National Clinical Rehabilitation Registry
But first a bit about Australia
Australia

• A young country:
  – New South Wales became a (penal) colony in 1788, followed progressively by the other Australian States.
  – Australia didn’t became a country until 1901

• A sparse country
  – 22.7 million people, 7,682,300 square kilometres
    • China 1.4 billion people, 9,640,821 square kilometres
  – 3 people per square kilometre (China = 140)

• A rich country:
  – GDP per person: $38,800 (2009 est.)

• A healthy country:
  – Life expectancy at birth: 81.8 years
    • male: 79.4 years, female: 84.4 years
Wollongong

- Part of the Greater Sydney region
- Population of about 300,000
- 90 minutes by car or train from Sydney
A bit about Wollongong
Australian Health Services Research Centre (AHSRI)

- Based at Innovation Campus, University of Wollongong
- Established 1993
- Self-funded health services R&D centre
- 100+ R&D projects - mix of national, state and local projects
- 40 staff:
  - Most with practical experience working as clinicians and managers in the health sector
  - Multi-disciplinary - psychology, statistics, economics, public health, management, health planning, informatics, education, pharmacy and several others
Rehabilitation Medicine

• Development as a medical specialty mostly in response to the needs of those injured in wartime, particularly following the Second World War
  – Development in Australia very rapid from the 1950s onwards
    • now one rehabilitation physician per 70,000 people
  – Has a role in:
    • Disability prevention
    • Community-based models that substitute for inpatient care or prevent the need for hospital care
    • Chronic disease management
    • Preventing or delaying long term residential care
4 target groups for rehabilitation

• Patients who cannot go home from hospital without a return of, or improvement in, function.
• Patients discharged after an acute admission requiring continuing care as an outpatient.
• People living with congenital or acquired disability or chronic illness with the goal of preventing the need for hospitalisation.
• People who are ageing and experiencing the functional losses associated with multiple chronic diseases.
Rehabilitation population

• About 20% of Australians have a disability and 6% of the population has a profound or severe activity limitation.

• An increasing percentage of older people live alone - the ability to live in the community is often more dependent on functional independence than on medical factors.
Specialist rehabilitation services

• The number of specialist rehabilitation services in Australia has grown rapidly over the last 20 years.

• Key features of a Specialist Rehabilitation Medicine Service
  1. Rehabilitation physician directs each patient’s care
  2. Clear admission criteria
  3. Rehabilitation program is goal directed
  4. Multi-disciplinary
  5. Time limited
  6. Assessment of function
“Acute care saves lives….

Rehabilitation makes the saved life worth living.”

The Australian National Rehabilitation Strategy
Working Party
History of AROC

• No specific way of classifying rehabilitation outside of acute system
• Diagnostic Related Groups (DRG’s) have 3 rehab codes; not specific
• Only one ICD-10 code for rehab, gives limited insight into rehabilitation
AN-SNAP classification study

• The Australian National Sub-Acute and Non-Acute Case-mix Classification (AN-SNAP) developed by AHSRI, University of Wollongong in 1997
• Involved 99 Australian and 5 NZ rehab units
• Collected detailed clinical, service utilisation and cost profile on over 30,000 sub-acute and non-acute episodes of care over a 3 month period
• Identified the drivers in rehabilitation
  – Sub-acute care - enhancement of quality of life and/or functional status
  – Non-acute care - maintenance of current health status if possible
History of AROC

- Rehabilitation doctors very involved in AN-SNAP project
- Wanted to use classification to begin to compare outcomes between different services
- Facilitated meeting of rehab sector stakeholders with objective of developing a national benchmarking system
- Outcome was business plan for development of AROC
AROC born in 2002

• AROC began as a joint initiative of the whole Australian rehabilitation sector (providers, payers, regulators and consumers) with support from key New Zealand providers

• Established 1 July 2002 as a not-for-profit Centre

• The Australasian Faculty of Rehabilitation Medicine (AFRM) is the auspice body and data custodian

• The Australian Health Services Research Institute (AHSRI) at the University of Wollongong is the data manager and responsible for AROC’s day to day operations
Purpose & Aims of AROC

• To provide a national benchmarking system to facilitate the improvement of clinical rehabilitation outcomes for patients
• To produce information on the efficacy of interventions through the systematic collection of outcomes information in both the inpatient and ambulatory settings
• To report on functional outcomes
  – Six monthly benchmarking reports for each member facility
  – Annual in-patient report summarising the Australian data
  – Inaugural ambulatory report
AROC has 5 roles

1. **Management of data** - AROC is the national data bureau that receives and manages data on rehabilitation services in Australia and New Zealand.

2. **National benchmarking centre** providing for rehabilitation services.

3. **National certification** for the Functional Independence Measure (FIM).

4. **Education and training and research** for the FIM and other rehabilitation outcome measures.

5. **Research and development** - AROC develops research and development proposals and seeks external funding for its research agenda.
AROC Coverage in Australia

• There are approximately 180 inpatient rehabilitation units in Australia
• More than 170 submitted data to AROC in the 2010 calendar year
• In 2010 data describing more than 64,000 episodes was submitted to AROC
• More than 500,000 episodes of data have been submitted to AROC since it was established
Why measure outcomes?

- For research and clinical learning
  - What works in which patients
- To support communication
  - Between clinicians
    - Common language
    - Between clinicians and patient
- Important in clinical practice
  - To convince purchasers
    - treatment is effective and value for money
What is benchmarking?

- **Benchmarking** is the process of comparing one's own performance and processes to those of peer providers and/or to industry best practice ...
How does your team operate?

We have always done things this way, it works well.

We do things according to best practice standards, and available industry standards ... it causes us to challenge ourselves.
Benchmarking Reports

• AROC provides analysis of each individual member’s data, and also compares that data to:
  – themselves over time
  – analysis of peer providers
  – the national data
  – industry developed impairment specific target outcomes

• Facility LOS and FIM change adjusted for casemix to compare with sector data
Benchmarking reports

- AROC Benchmarking Reports are distributed to facility members electronically twice yearly.
At a glance ... 

- Provided as a quick reference for how provider is doing overall

**Casemix-adjusted relative means**

<table>
<thead>
<tr>
<th>Casemix adjustment *</th>
<th>Facility</th>
<th>Relative mean</th>
<th>95% CI</th>
<th>Benchmark Group IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean length of stay</td>
<td></td>
<td>2.8</td>
<td>0.2 to 5.5</td>
<td>-1.0 to 49.3</td>
</tr>
<tr>
<td>Mean FIM change</td>
<td></td>
<td>-5.5</td>
<td>-7.3 to -3.7</td>
<td>-1.5 to 3.0</td>
</tr>
</tbody>
</table>

* Incomplete episodes are excluded from casemix analysis

AROC report — Anywhere Hospital from July 2009 to June 2010
Each facility report has detail about top three “buckets” of patients

Outcome measures — Orthopaedic fractures
Some data .....
Episodes by impairment group, 2010
Episodes by impairment group, by sector, 2010
<table>
<thead>
<tr>
<th>Impairment group</th>
<th>Length of stay No.</th>
<th>Mean (95% CI)</th>
<th>FIM change Mean (95% CI)</th>
<th>FIM gain per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>5,288</td>
<td>30.8 (30.0–31.5)</td>
<td>22.8 (22.4–23.3)</td>
<td>5.2</td>
</tr>
<tr>
<td>Brain</td>
<td>1,647</td>
<td>91.7 (0.0–210.6)</td>
<td>23.6 (22.6–24.5)</td>
<td>1.8</td>
</tr>
<tr>
<td>Neurological</td>
<td>2,168</td>
<td>20.8 (20.0–21.6)</td>
<td>15.7 (15.1–16.3)</td>
<td>5.3</td>
</tr>
<tr>
<td>Spinal cord</td>
<td>581</td>
<td>60.1 (54.4–65.8)</td>
<td>22.5 (21.1–23.9)</td>
<td>2.6</td>
</tr>
<tr>
<td>Amputee</td>
<td>815</td>
<td>37.6 (35.6–39.5)</td>
<td>15.9 (15.0–16.7)</td>
<td>3.0</td>
</tr>
<tr>
<td>Arthritis</td>
<td>578</td>
<td>14.2 (13.5–14.9)</td>
<td>12.6 (11.8–13.3)</td>
<td>6.2</td>
</tr>
<tr>
<td>Pain</td>
<td>2,883</td>
<td>50.1 (0.0–118.0)</td>
<td>14.0 (13.6–14.4)</td>
<td>2.0</td>
</tr>
<tr>
<td>Ortho - fractures</td>
<td>10,822</td>
<td>22.8 (22.6–23.1)</td>
<td>20.2 (20.0–20.4)</td>
<td>6.2</td>
</tr>
<tr>
<td>Ortho - replacements</td>
<td>16,887</td>
<td>24.5 (8.0–40.9)</td>
<td>16.1 (15.9–16.2)</td>
<td>4.6</td>
</tr>
<tr>
<td>Ortho - others</td>
<td>4,718</td>
<td>34.9 (0.0–76.5)</td>
<td>16.7 (16.4–17.0)</td>
<td>3.3</td>
</tr>
<tr>
<td>Cardiac</td>
<td>2,145</td>
<td>14.1 (13.8–14.5)</td>
<td>16.9 (16.4–17.4)</td>
<td>8.4</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>1,304</td>
<td>14.6 (14.2–15.1)</td>
<td>16.1 (15.5–16.6)</td>
<td>7.7</td>
</tr>
<tr>
<td>Burns</td>
<td>41</td>
<td>31.6 (23.0–40.2)</td>
<td>23.2 (18.7–27.8)</td>
<td>5.1</td>
</tr>
<tr>
<td>Congenital deformity</td>
<td>12</td>
<td>36.0 (21.2–50.8)</td>
<td>20.4 (10.3–30.5)</td>
<td>4.0</td>
</tr>
<tr>
<td>Other disabling imp.</td>
<td>556</td>
<td>20.4 (19.2–21.6)</td>
<td>16.5 (15.5–17.6)</td>
<td>5.7</td>
</tr>
<tr>
<td>Multiple trauma</td>
<td>446</td>
<td>43.5 (39.0–47.9)</td>
<td>32.5 (30.5–34.5)</td>
<td>5.2</td>
</tr>
<tr>
<td>Developmental disabilitie</td>
<td>8</td>
<td>16.6 (10.6–22.7)</td>
<td>14.8 (5.4–24.1)</td>
<td>6.2</td>
</tr>
<tr>
<td>Re-conditioning</td>
<td>13,811</td>
<td>25.1 (10.9–39.3)</td>
<td>16.5 (16.3–16.7)</td>
<td>4.6</td>
</tr>
<tr>
<td>Missing or excluded</td>
<td>8,562</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>All episodes</strong></td>
<td><strong>73,272</strong></td>
<td><strong>28.3 (20.9–35.7)</strong></td>
<td><strong>17.7 (17.6–17.8)</strong></td>
<td><strong>4.4</strong></td>
</tr>
</tbody>
</table>

**NOTE:** Where the number of completed episodes (separations) < 5 details are not given for reasons of privacy and accuracy.
Outcomes in Rehabilitation

• The Functional Independence Measure (FIM) is the most commonly used tool for the assessment of function in rehabilitation
• Function of a patient is assessed at admission and at discharge
• The difference between these two scores is called the FIM change and measures the degree of functional improvement achieved by the rehabilitation program
• FIM Change can then be divided by LOS to give FIM efficiency
• Discharge destination is another important outcome – ideally a patient should be able to return to their previous form of accommodation, most often home
Overall Rehabilitation Outcomes
Summary - change in measures 2000-2010

<table>
<thead>
<tr>
<th>Measure</th>
<th>2000</th>
<th>Difference from 2000 data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>72.3</td>
<td></td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>21.8</td>
<td></td>
</tr>
<tr>
<td>FIM admission score</td>
<td>86.7</td>
<td></td>
</tr>
<tr>
<td>FIM discharge score</td>
<td>101.3</td>
<td></td>
</tr>
<tr>
<td>FIM change (adm to disch)</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>FIM efficiency (per week)</td>
<td>4.7</td>
<td></td>
</tr>
</tbody>
</table>
Overall Rehabilitation Outcomes Summary - change in measures 2009-2010

- Age (years): 73.9
- Length of stay (days): 18.9
- FIM admission score: 91.1
- FIM discharge score: 108.5
- FIM change (admission to discharge): 17.4
- FIM efficiency (per week): 6.5
- Disch to community (%): 89.5
ALOS & FIM change over time

![Graph showing ALOS & FIM change over time from 2005 to 2010. The graph displays the average FIM score change and average LOS.](image)

**Average FIM score change**

**Average LOS**
Impairment Specific Outcome Targets

• Benchmarking workshop & development of impairment specific outcome targets driven by desire to:
  – evolve benchmarking beyond comparison of actual to aspiration for an (evidence based) target
  – focus benchmarking at the impairment level
  – identify and collect impairment specific adjunct datasets ... which may include additional outcome measures especially relevant to a given impairment
Casemix Adjusted Facility Comparison: Example

![Graph showing casemix adjusted facility comparison example with data points for Fern, Orchid, Daisy, Peony, Fir, and Pansy. The x-axis represents the categories, while the y-axis represents the expected/actual FIM change score and casemix adjusted relative mean improvement. The graph compares expected, actual, and CARMI data points.](image-url)
# AROC Stroke Targets

<table>
<thead>
<tr>
<th>No.</th>
<th>Stroke Target</th>
<th>AN-SNAP Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>S2-204</td>
</tr>
<tr>
<td>1</td>
<td>Time Since Onset to Rehabilitation</td>
<td>50% of all stroke episodes to be admitted to rehabilitation within 7 days, 75% to be admitted within 19 days.</td>
</tr>
<tr>
<td>2</td>
<td>Length of Stay</td>
<td>50% of all stroke episodes to achieve a length of stay of…</td>
</tr>
<tr>
<td>3</td>
<td>Average FIM Change</td>
<td>50% of all stroke episodes to achieve a FIM change score of…</td>
</tr>
<tr>
<td>4</td>
<td>Discharge Destination</td>
<td>Percentage of all stroke episodes to be discharged to accommodation that allows for same or greater independence…</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>14 days or less</th>
<th>22 days or less</th>
<th>20 days or less</th>
<th>28 days or less</th>
<th>29 days or less</th>
<th>38 days or less</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50%</td>
<td>75%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14 points or more</td>
<td>18 points or more</td>
<td>25 points or more</td>
<td>29 points or more</td>
<td>27 points or more</td>
<td>37 points or more</td>
</tr>
<tr>
<td>3</td>
<td>80%</td>
<td>70%</td>
<td>76%</td>
<td>52%</td>
<td>40%</td>
<td>55%</td>
</tr>
</tbody>
</table>


Stroke Targets FY 2009/2010
Aus & NZ Actual vs. Target

Target 1: Time Since Onset to Rehabilitation

<table>
<thead>
<tr>
<th>AN-SNAP Class</th>
<th>Target</th>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2-204</td>
<td>50% within 7 days</td>
<td>40.9%</td>
<td>67.6%</td>
</tr>
<tr>
<td></td>
<td>75% within 19 days</td>
<td>79.3%</td>
<td>93.3%</td>
</tr>
<tr>
<td>S2-205</td>
<td>50% within 7 days</td>
<td>36%</td>
<td>50.0%</td>
</tr>
<tr>
<td></td>
<td>75% within 19 days</td>
<td>66.0%</td>
<td>81.8%</td>
</tr>
<tr>
<td>S2-206</td>
<td>50% within 7 days</td>
<td>36.4%</td>
<td>57.7%</td>
</tr>
<tr>
<td></td>
<td>75% within 19 days</td>
<td>78.3%</td>
<td>90.2%</td>
</tr>
<tr>
<td>S2-207</td>
<td>50% within 7 days</td>
<td>25.4%</td>
<td>62.5%</td>
</tr>
<tr>
<td></td>
<td>75% within 19 days</td>
<td>76.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>S2-208</td>
<td>50% within 7 days</td>
<td>27.9%</td>
<td>70.4%</td>
</tr>
<tr>
<td></td>
<td>75% within 19 days</td>
<td>69.2%</td>
<td>96.3%</td>
</tr>
<tr>
<td>S2-209</td>
<td>50% within 7 days</td>
<td>23.3%</td>
<td>44.7%</td>
</tr>
<tr>
<td></td>
<td>75% within 19 days</td>
<td>58.8%</td>
<td>73.6%</td>
</tr>
</tbody>
</table>
Stroke Targets FY 2009/2010
Aus & NZ Actual vs. Target

Target 2: 50% of all Stroke episodes to achieve a length of stay of...

<table>
<thead>
<tr>
<th>AN-SNAP Class</th>
<th>Target</th>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2-204</td>
<td>14 days or less</td>
<td>54.4%</td>
<td>66.5%</td>
</tr>
<tr>
<td>S2-205</td>
<td>22 days or less</td>
<td>51.1%</td>
<td>63.6%</td>
</tr>
<tr>
<td>S2-206</td>
<td>20 days or less</td>
<td>44.3%</td>
<td>52.5%</td>
</tr>
<tr>
<td>S2-207</td>
<td>28 days or less</td>
<td>62.6%</td>
<td>62.5%</td>
</tr>
<tr>
<td>S2-208</td>
<td>29 days or less</td>
<td>43.3%</td>
<td>62.7%</td>
</tr>
<tr>
<td>S2-209</td>
<td>38 days or less</td>
<td>36.5%</td>
<td>48.5%</td>
</tr>
</tbody>
</table>
Stroke Targets FY 2009/2010
Aus & NZ Actual vs. Target

Target 3: 50% of all Stroke episodes to achieve a FIM Change score of...

<table>
<thead>
<tr>
<th>AN-SNAP Class</th>
<th>Target</th>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2-204</td>
<td>14 points or more</td>
<td>41.7%</td>
<td>32.6%</td>
</tr>
<tr>
<td>S2-205</td>
<td>18 points or more</td>
<td>45%</td>
<td>40.9%</td>
</tr>
<tr>
<td>S2-206</td>
<td>25 points or more</td>
<td>45.6%</td>
<td>53.7%</td>
</tr>
<tr>
<td>S2-207</td>
<td>29 points or more</td>
<td>43.6%</td>
<td>37.5%</td>
</tr>
<tr>
<td>S2-208</td>
<td>27 points or more</td>
<td>42.7%</td>
<td>47.2%</td>
</tr>
<tr>
<td>S2-209</td>
<td>37 points or more</td>
<td>46.3%</td>
<td>53.2%</td>
</tr>
</tbody>
</table>
AROC Contact Details

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iC Enterprise 1, Innovation Campus
University of Wollongong NSW 2522
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