Alberta Continuing Care
What the RAI data can tell us

Jeff Poss, PhD
Associate Adjunct Professor
School of Public Health and Health Systems
University of Waterloo
and
Health Services Research Consultant
Vancouver
Perhaps, *some* of the things the data can tell us:

1. Alberta Continuing Care
   - Descriptive, drawn from RAI

2. Quality Indicators
   - Home care and residential care indicators

3. Hospitalization rates
   - RAI measures to adjust for risk
Acknowledgements

- Alberta Health Services, for making the data available, and for supporting my work with them.
Applications of interRAI Instruments

Assessment

- Care Plan
- Resource Allocation
- Outcome Measures
- Quality Indicators
1) Alberta Continuing Care
Who are the clients being served in Continuing Care?

- Home Living
- Non-Designated Supportive Living
- Designated Supportive Living 3
- Designated Supportive Living 4
- Designated Supportive Living 4 Dementia
- Long-Term Care

Home Care Program
AHS Case Management
RAI-HC

LTC – Site Case Management
RAI 2.0

- Barb Proudfoot, AHS
How many and where? And with a recent RAI?

Cross-section of active/served individuals

- Index date: April 1, 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>AHS annual report (beds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Living</td>
<td></td>
</tr>
<tr>
<td>Non-Designated SL</td>
<td></td>
</tr>
<tr>
<td>Designated SL3</td>
<td>1,565</td>
</tr>
<tr>
<td>Designated SL4</td>
<td>4,889</td>
</tr>
<tr>
<td>Designated SL4D</td>
<td>2,043</td>
</tr>
<tr>
<td>Long-term care</td>
<td>14,370</td>
</tr>
</tbody>
</table>

AHS annual report (52,095 beds)

- Home Living 44%
- Long-term care 27%
- DSL4 9%
- DSL3 2%
- DSL4D 4%
- NDSS 14%
- DSL4 2%

52,095 beds
Served/Active Individuals, by setting, by zone: April 1, 2014

<table>
<thead>
<tr>
<th>Zone</th>
<th>LTC</th>
<th>SL4D</th>
<th>SL4</th>
<th>SL3</th>
<th>NDSL</th>
<th>HL</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>15%</td>
<td>6%</td>
<td>27%</td>
<td>47%</td>
<td>5%</td>
<td>51%</td>
<td>51%</td>
</tr>
<tr>
<td>Calgary</td>
<td>31%</td>
<td>10%</td>
<td>32%</td>
<td>32%</td>
<td>3%</td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td>Central</td>
<td>29%</td>
<td>9%</td>
<td>29%</td>
<td>38%</td>
<td>3%</td>
<td>47%</td>
<td>47%</td>
</tr>
<tr>
<td>Edmonton</td>
<td>27%</td>
<td>8%</td>
<td>27%</td>
<td>39%</td>
<td>2%</td>
<td>37%</td>
<td>37%</td>
</tr>
<tr>
<td>North</td>
<td>24%</td>
<td>7%</td>
<td>24%</td>
<td>37%</td>
<td>3%</td>
<td>36%</td>
<td>36%</td>
</tr>
</tbody>
</table>

per 1000 75+ | 240 | 167 | 193 | 205 | 230 | 196 |
Age & Sex

<table>
<thead>
<tr>
<th></th>
<th>Average Age</th>
<th>Average Age</th>
<th>SL3</th>
<th>SL4</th>
<th>SL4D</th>
<th>LTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL</td>
<td>78</td>
<td>85</td>
<td>78 (64%)</td>
<td>85 (72%)</td>
<td>85 (72%)</td>
<td>85 (72%)</td>
</tr>
<tr>
<td>NDSL</td>
<td>85</td>
<td>78</td>
<td>85 (72%)</td>
<td>81 (67%)</td>
<td>83 (70%)</td>
<td>83 (65%)</td>
</tr>
<tr>
<td>SL3</td>
<td>72</td>
<td>72</td>
<td>72 (57%)</td>
<td>72 (57%)</td>
<td>72 (57%)</td>
<td>72 (57%)</td>
</tr>
<tr>
<td>SL4</td>
<td>81</td>
<td>81</td>
<td>81 (67%)</td>
<td>83 (70%)</td>
<td>83 (70%)</td>
<td>83 (65%)</td>
</tr>
<tr>
<td>SL4D</td>
<td>83</td>
<td>83</td>
<td>83 (70%)</td>
<td>83 (70%)</td>
<td>83 (70%)</td>
<td>83 (65%)</td>
</tr>
<tr>
<td>LTC</td>
<td>83</td>
<td>83</td>
<td>83 (65%)</td>
<td>83 (65%)</td>
<td>83 (65%)</td>
<td>83 (65%)</td>
</tr>
</tbody>
</table>

- **Average Age**: The average age for each group is indicated.
- **% Female**: The percentage of females in each group is shown.

Legend:
- **Average Age**:
- **% Female**:
Age & Sex: DSL3 only, by zone

- South: 86, 78%
- Central: 84, 67%
- Edmonton: 53, 38%
- North: 80, 65%
- All: 72, 57%

Average Age:
- South: 86
- Central: 84
- Edmonton: 53
- North: 80
- All: 72

% Female:
- South: 78%
- Central: 67%
- Edmonton: 38%
- North: 65%
- All: 57%
Some diagnoses

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>HL</th>
<th>NDSL</th>
<th>SL3</th>
<th>SL4</th>
<th>SL4D</th>
<th>LTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia</td>
<td>21%</td>
<td>28%</td>
<td>30%</td>
<td>46%</td>
<td>95%</td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>13%</td>
<td>14%</td>
<td>16%</td>
<td>20%</td>
<td>11%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Some diagnoses

- Heart failure:
  - HL: 13%
  - NDSL: 15%
  - SL3: 17%
  - SL4: 13%
  - SL4D: 6%
  - LTC: 11%

- COPD/asthma/emphysema:
  - HL: 20%
  - NDSL: 20%
  - SL3: 20%
  - SL4: 23%
  - SL4D: 16%

- Diabetes:
  - HL: 25%
  - NDSL: 22%
  - SL3: 21%
  - SL4: 18%
  - SL4D: 23%
Physical, cognitive impairment
ADL hierarchy scale, distribution among settings
CPS scale, distribution among settings
Some scale measures
Other

- Daily pain: 50% (HL), 34% (NDSL), 38% (SL3), 42% (SL4), 20% (SL4D), 12% (LTC)
- Bladder incontinence: 39% (HL), 42% (NDSL), 39% (SL3), 51% (SL4), 61% (SL4D)
- Recent fall*: 27% (HL), 26% (NDSL), 24% (SL3), 29% (SL4), 27% (SL4D), 34% (LTC)

*HC: last 90 days
MDS 2.0: last 180 days
Behaviours, social

- Any aggressive: 9% (HL), 8% (NDSL), 22% (SL3), 51% (SL4), 52% (SL4D), 17% (LTC)
- Wandering: 3% (HL), 2% (NDSL), 4% (SL3), 5% (SL4), 21% (SL4D), 37% (LTC)
- Not at ease interacting with others: 6% (HL), 6% (NDSL), 10% (SL3), 11% (SL4), 15% (SL4D), 22% (LTC)
Medications

- 9+ meds:
  - HL: 55%
  - NDSL: 58%
  - SL3: 61%
  - SL4: 57%
  - SL4D: 67%

- Antipsychotic/neuroleptic:
  - HL: 11%
  - NDSL: 10%
  - SL3: 29%
  - SL4: 46%
  - SL4D: 28%

- Antidepressant:
  - HL: 28%
  - NDSL: 29%
  - SL3: 53%
  - SL4: 53%
  - SL4D: 50%
The National Picture
2) Quality Indicators
Quality Indicators

• Wish to understand quality of care in health services delivery
  – Very difficult to assess it directly
• Look for events or measures that we believe are related to quality of care
  – Desired (good outcomes), or undesired (bad)
At the heart of a Quality Indicator

• A QI is expressed as a ratio or percentage

• Example:
  – Among 120 assessed individuals, 32 fell in the last 90 days
  QI rate: \( \frac{32}{120} = 26.7\% \)

  – Are some of the 120 more likely to fall than others?
    • Is this risk the same as it was a year ago?
    • Is this risk the same for a comparison group?
Why risk adjust?

- Underlying factors associated with higher rates of the QI outcome
  - beyond the control of the care providers
  - unevenly distributed

- Wish to put all on the same ‘scale’ so comparisons can be made more fairly
  - With others, or over time
Uses of Quality Indicators

• System monitoring/review
• Quality improvement initiative monitoring
  – Requires timely data
• Public Reporting
  – US: CMS nursing homes
  – Health Quality Ontario: home care & LTC
  – CIHI Health System Performance initiative
    • 10 MDS 2.0 indicators, facility level, May 2015(?)
Quality Indicators: RAI-HC and MDS 2.0 and risk adjustment

<table>
<thead>
<tr>
<th>RAI-HC</th>
<th>MDS 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; generation</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; generation</td>
</tr>
<tr>
<td>• stratification/exclusion</td>
<td>• stratification/exclusion</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; generation</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; generation</td>
</tr>
<tr>
<td>• covariate adjustment</td>
<td>• covariate adjustment</td>
</tr>
<tr>
<td>• covariate adjustment</td>
<td>• direct adjustment: stratified, weighted with covariate adjustment</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; generation</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; generation</td>
</tr>
<tr>
<td>New interRAI HCQIs (2014)</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; generation</td>
</tr>
<tr>
<td>• direct adjustment: stratified, weighted with covariate adjustment</td>
<td>• direct adjustment: stratified, weighted with covariate adjustment</td>
</tr>
</tbody>
</table>
Risk adjustment: age 55+, stamina (<2 hrs activity last 3 days), unsteady gait, arthritis, CPS 3+
New HCQI: Falls (province, fiscal 13/14)

Risk adjustment: age 65, age 85, time between assessments, locomotion, unsteady gait, walking device, institutional risk CAP, CPS 4+, ADLh 2+, DRS3+

Stratification: clinical risk (similar to CHESS)
Original HCQI: Falls (by zone) – adjusted rates only
New HCQI: Falls
(by zone) – adjusted rates only
Long-term Care: Fall in the last 30 days
166 AB facilities with 20 or more in 4 rolling quarters

- Adjusted for locomotion, transfer, unsteady gait & CPS 2+, wandering, severity index, age 65
- Stratified by RUG-III CMI

Within zone, sorted low to high by adjusted rate
3) Hospitalization rates
Hospitalization Rates

2006-2008 study
Compared samples of residents of Designated Assistive Living (now DSL) to long-term care
Reported, after adjusting for risk, hospitalization rates much lower in LTC (14%, compared to 39%)

Q1: Is this finding still evident in more recent data?
Q2: What about other continuing care populations?
Methods

• Active continuing care clients/residents as of April 1, 2013 (not currently in hospital)
  – HL, NDSL, SL3, SL4, SL4D, LTC
  – With a RAI-HC/MDS 2.0 in last 12 months or the next month
  – Linked to DAD

• Time to first hospitalization, while in this setting, up to March 31, 2014

• Cumulative Incidence Competing Risk (CICR)

• Proportional hazards regression
Hospitalization Incidence (CICR)
April 1, 2013 cohort

Cumulative Incidence Competing Risk (CICR), Hospitalization

Time to admission, days

- HL
- NDSL
- SL3
- SL4
- SL4D
- LTC
<table>
<thead>
<tr>
<th></th>
<th>6 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hogan et al, DAL</td>
<td>25.2 (22.6 – 27.8)</td>
<td>38.9 (35.9 – 41.9)</td>
</tr>
<tr>
<td>Hogan et al, LTC</td>
<td>8.0 (6.3 – 9.7)</td>
<td>13.7 (11.5 – 15.8)</td>
</tr>
<tr>
<td>HL</td>
<td>22.3 (21.6 – 22.9)</td>
<td>41.6 (40.8 – 42.4)</td>
</tr>
<tr>
<td>NDSL</td>
<td>23.3 (22.1 – 24.5)</td>
<td>42.6 (41.3 – 44.0)</td>
</tr>
<tr>
<td>SL3</td>
<td>18.0 (15.8 – 20.3)</td>
<td>36.5 (33.7 – 39.4)</td>
</tr>
<tr>
<td>SL4</td>
<td>19.6 (18.3 – 21.0)</td>
<td>37.8 (36.1 – 39.4)</td>
</tr>
<tr>
<td>SL4D</td>
<td>16.7 (14.9 – 18.7)</td>
<td>29.9 (27.5 – 32.3)</td>
</tr>
<tr>
<td>LTC</td>
<td>11.1 (10.5 – 11.6)</td>
<td>19.6 (18.9 – 20.3)</td>
</tr>
</tbody>
</table>

CICR (95% confidence interval)
# Proportional Hazard Model

## Time to first hospitalization, April 1, 2013 cohort

<table>
<thead>
<tr>
<th>Time to first hospitalization</th>
<th>hazard ratio</th>
<th>95% confidence limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>female</td>
<td>0.79</td>
<td>0.76</td>
</tr>
<tr>
<td>age (ref=18 to 64)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65-74</td>
<td>1.37</td>
<td>1.25</td>
</tr>
<tr>
<td>75-84</td>
<td>1.37</td>
<td>1.21</td>
</tr>
<tr>
<td>85+</td>
<td>1.40</td>
<td>1.20</td>
</tr>
<tr>
<td>CHESS score(ref=0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.22</td>
<td>1.18</td>
</tr>
<tr>
<td>2</td>
<td>1.42</td>
<td>1.36</td>
</tr>
<tr>
<td>3</td>
<td>1.54</td>
<td>1.45</td>
</tr>
<tr>
<td>4</td>
<td>2.03</td>
<td>1.78</td>
</tr>
<tr>
<td>5</td>
<td>3.06</td>
<td>1.95</td>
</tr>
<tr>
<td>level of care on Apr 1, 2013 (ref=long term care)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HL</td>
<td>2.32</td>
<td>2.14</td>
</tr>
<tr>
<td>NDSL</td>
<td>2.45</td>
<td>2.23</td>
</tr>
<tr>
<td>SL3</td>
<td>2.14</td>
<td>1.85</td>
</tr>
<tr>
<td>SL4</td>
<td>2.15</td>
<td>1.95</td>
</tr>
<tr>
<td>SL4D</td>
<td>1.62</td>
<td>1.43</td>
</tr>
<tr>
<td>Zone (ref=Edmonton)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>0.93</td>
<td>0.86</td>
</tr>
<tr>
<td>Calgary</td>
<td>1.04</td>
<td>0.98</td>
</tr>
<tr>
<td>Central</td>
<td>1.09</td>
<td>0.97</td>
</tr>
<tr>
<td>North</td>
<td>1.02</td>
<td>0.91</td>
</tr>
</tbody>
</table>
Adjusting for risk and other factors

• Long-term care residents least likely to be hospitalized
• SL4D about 60% more likely
• HL, NDSL, SL3, SL4 settings similar to each other, over twice as likely as LTC
Thank you!

jwposs@uwaterloo.ca