Local Ontario context: Older adults with complex conditions

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Leveraging the Culture of Performance Excellence in Ontario’s Health System

HSPRN is an inter-organization Network funded by the Ontario Ministry of Health and Long Term Care
Older adults with complex conditions

Three messages:

1. Epidemiological and economic burden

2. Identifying target populations for intervention – predicting risk

3. It’s all very complicated and evaluating interventions is key
Older adults with complex conditions

Three research studies:

HSPRN:
1. Target populations for health system improvement
   W.Wodchis, X.Camacho, I. Dhalla, A. Guttman, E.Lin, G.Anderson

2. Older adults with multi-morbidity
   A. Bierman, G. Mery, E. Adler, N. Nanwa, W.Wodchis

ICES:
3. Frail Ontario Seniors Atlas: A high needs population
   S.Bronskill, X. Camacho, S.Gill, A.Grunier, J.Poss, W.Wodchis
Older adults with complex conditions

A. Some Canadian statistics

B. Some Ontario data
   - Health system impact
   - Risk Profiles

C. Co-morbidity compared to multi-morbidity
   - Complexity of care management
   - Differences in needs to care for multi-morbidity

D. Generating ideas for innovative strategies for care of older adults with complex conditions
A. Some Canadian Statistics

Focus is on chronic disease

Figure 3: Percentage of Adults Who Reported Having at Least 1 of 11 Chronic Conditions, by Age Group, Canada (Crude Estimates)

- Source: Canadian Institute for Health Information: Seniors and the Health Care System: What Is the Impact of Multiple Chronic Conditions? July 2001
B. Some Ontario Data

What we’ve done:

1. Identify community-based cohort of clients aged 66+ admitted and discharged from Acute care between April 2007–March 2008 with:
   1. 2 or more ACSC conditions (Angina, Asthma, COPD, Diabetes, Grand Mal Seizure, Heart Failure, Hypertension)
   or any one of the following ‘tracer’ chronic conditions: Stroke, Cardiac Arrhythmia, Hip Fracture, Spinal Stenosis, PVD, DVT/PE

Follow for 365 days (until March 2009)

2. Link all administrative clinical databases and incorporate costs to understand system utilization and costs

3. Subset patients admitted to acute who were receiving home care prior to acute admission to identify risk groups for acute and LTC admissions after discharge.
Target Populations for System Improvement

Summarize Utilization and Costs in 365 days following acute discharge:

- Total Population: 38,978 (0.3% population)
- Average Annual Cost: $35,935
- System Cost: $1,400,689,862 (3% system cost)
Target Populations for System Improvement

Total health system cost 1 year following index
Average cost = $35,935; Total System Cost: $1,400,689,862

- **Index hospitalization**
  - AC cost (36.1%): $12,517.29 (100% users)

- **Acute care** cost (20.9%): $17,961.13 (40.3% users)

- **Rehab** cost (10.5%): $21,230.81 (17.2% users)

- **CCC** cost (10.3%): $33,296.85 (10.7% users)

- **HC** cost (6.1%): $3,732.60 (56.9% users)

- **LTC** cost (7.1%): $19,700.03 (12.4% users)

- **Pharma** cost (3.5%): $1,454.29 (82.9% users)

- **ED** cost (0.3%): $201.49 (55.1% users)

- **Physician** cost (5.2%): $1,909.62 (94.3% users)
B. Some Ontario Data

Average System Cost in 365 Days Following Acute Discharge (2008 $)

- ACSC
- STROKE
- ARRHYTHMIA
- STENOSIS
- HIPFRACT
- PVD
- DVT_PE

- Pharma
- MD
- HC
- LTC
- CCC
- Rehab
- ED
- Acute care
B. Some Ontario Data

Total System Cost in 365 Days Following Acute Discharge (2008 $1,000,000's)

- ACSC
- STROKE
- ARRHYTHMIA
- STENOSIS
- HIPFRONT
- PVD
- DVT_PE

- Pharma
- MD
- HC
- LTC
- CCC
- Rehab
- ED
- Acute care
B. Some Ontario Data

- Individuals with complex conditions are costly:

- System burden is a combination of prevalence and cost.

- Some cohorts (ACSC, Arrhythmias) use more acute, primary care and pharmacy.

- Some cohorts (Stroke, Hip Fracture) use Rehabilitation and Complex Continuing Care and are at higher risk for LTC admission.
## B. Risk for Acute and LTC

### Risk for LTC

**MAPLe [5 levels: Low–Very High]**  
(Method for Assigning Priority Levels)

- Activities of Daily Living
- Cognitive Performance
- Behaviour
- Wandering
- Decision-making decline
- Environment or medication mgmt
- Ulcers
- Self-reliance (Geriatric screen)
- Meal preparation assistance
- Few meals or swallowing problem
- Falls

### Risk for Acute

**LACE [0–18]**  
(Length of stay, Acuity, Charlson comorbidity, Emergency Use)

- Acute length of stay
- Acuity on admission (admit via ED)
- Charlson comorbidity (AMI, CVA, PVD, diabetes, CHF, COPD, liver, tumor, renal, AIDS)
- Number of emergency visits in 6 months prior to admission
B. Risk for Acute and LTC

M-Low is MAPLe Low, Mild & Moderate; L-low is LACE < 10
LTC Admission within 365 days after acute discharge
B. Risk for Acute and LTC

Prevalence of Risk Profile all Acute Discharges among clients in cohort by LHIN 2007/08

M-Low is MAPLE Low, Mild & Moderate; L-low is LACE < 10
C. Co-morbidity vs Multi-morbidity

Single-disease Chronic Disease Management model
C. Co-morbidity vs Multi-morbidity

Focus is on multi-morbidity (e.g. ACSC)
C. Co-morbidity vs Multi-morbidity

Focus is on multi-morbidity

- Source: The Chief Public Health Officer’s Report on the State of Public Health in Canada. 2010: Growing Older – Adding Life to Years
C. Co-morbidity vs Multi-morbidity

One aspect is medication management

Figure 6: Percentage of Seniors Who Reported 1 or More of 11 Chronic Conditions Who Also Reported Experiencing a Side Effect From a Prescription Medication That Required a Visit to a Medical Doctor in the Past 12 Months, by Number of Prescribed Medications, Canada (Crude Estimates)

Source: Canadian Institute for Health Information: Seniors and the Health Care System: What Is the Impact of Multiple Chronic Conditions? July 2001
D. Patients’ experience is sub-optimal

There are many older adults with multi-morbidity in Canada:

- Seniors with three or more reported chronic conditions accounted for 40% of reported health care use among seniors

- Gaps exist in preventive and collaborative care for seniors

- Though most seniors have access to PHC:
  - fewer than half (48%) reported talking at least some of the time to a health professional about their treatment goals.

D. Ontario patients’ current experience (during 365 days after acute discharge)

<table>
<thead>
<tr>
<th>Number of Different Pharmacies Used</th>
<th>ACSC</th>
<th>Arrhythmia</th>
<th>Hip Fracture</th>
<th>Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>1–3</td>
<td>87%</td>
<td>87%</td>
<td>87%</td>
<td>87%</td>
</tr>
<tr>
<td>4+</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td>10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of different non-institutional physicians</th>
<th>ACSC</th>
<th>Arrhythmia</th>
<th>Hip Fracture</th>
<th>Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12%</td>
<td>10%</td>
<td>12%</td>
<td>24%</td>
</tr>
<tr>
<td>1–5</td>
<td>44%</td>
<td>44%</td>
<td>58%</td>
<td>47%</td>
</tr>
<tr>
<td>6–15</td>
<td>40%</td>
<td>43%</td>
<td>29%</td>
<td>28%</td>
</tr>
<tr>
<td>16+</td>
<td>4%</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Total all non-institutional provider visits (physician, pharmacy, home care) | 67±105 | 55±87 | 69±115 | 49±96 |
D. Multi-morbidity is a complex issue

- Very few Clinical Practice Guidelines address multi-morbidity (many are impractical & may be harmful in some cases of multi-morbidity)

- Trial-based evidence gap: multi-morbid groups are excluded

- Some co-occurring conditions may be managed synergistically (e.g. ace inhibitors in diabetes and hypertension)

- Chances of adverse effects from medications may be related to severity of other diseases (e.g. Cox-2 inhibitors in individuals with severe diabetes or hypertension).

A few key authors: Elizabeth Bayliss, Chad Boult, Cynthia Boyd, Martin Fortier, Alex Jadad, Andres Cabrera, Renee Lyons, etc
D. Strategies that balance safety and patient-centeredness

Goals of care:

• Avoidance of adverse events including stroke, falls and fractures, acute admissions and death.

• Patient-centered care involves patient preferences and involvement of caregivers

• Maintenance of independence / function

• Goals of care for progressively older persons may focus more on function (and less on secondary prevention?)
D. Ideas for innovative strategies

Innovative strategies to:

• How can we improve consultation and referrals between primary and specialist services

• Should we increase use of geriatricians in care planning

• Could we develop hospital-based multi-specialty clinics with interdisciplinary teams (using organizational model of community health centers)

• How to share clinical records and patient-centered care goals among and between medical and home care to maintain and improve function
Older adults with complex conditions

Summary
1. Older adults with complex conditions are costly and have complex transitions through the health system

2. Improved patient and caregiver support and better coordination and information flow in the community: physician – homecare – pharmacy.

3. Targeting enhanced care to those at highest modifiable risk offers the greatest value for money.

Research in Progress:
1. Measurement of modifiable risk (relative effectiveness of known strategies among target populations, e.g. follow-up care, medication reconciliation).

2. Development of innovative strategies
Older adults with complex conditions

• Discussion...

what are your thoughts?

a dialogue – Ontario and Europe
D. Patient-centered strategies

Acute (ED, IP, SDS) → CCAC → Home Care → Specialist Care

Community Support Services

Pharmacy

Primary Care

Shared Patient-Centered Care Plan
D. Patient-centered strategies

I would like to:
1. Know who to call when I have a question about my medication
2. Have fewer medication side-effects
3. Have the same person check on me

How do I get support to help me and my dad when his dementia acts up.
D. Measurement that follow patients

Acute (ED, IP, SDS) → CCAC → LTC → Rehab / CCC / Sub-acute Care

Patient Flow

Patient Rebound
# Most Prevalent Index Diagnoses with Readmission within 90 days

<table>
<thead>
<tr>
<th>MRD* (ICD-10) and description</th>
<th>Patients</th>
<th>Readmitted (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I48. Atrial fibrillation and flutter</td>
<td>4,398</td>
<td>1,078 (25%)</td>
</tr>
<tr>
<td>I50. Heart failure</td>
<td>2,867</td>
<td>1,048 (37%)</td>
</tr>
<tr>
<td>J44. Other chronic obstructive pulmonary disease</td>
<td>2,200</td>
<td>823 (37%)</td>
</tr>
<tr>
<td>I21. Acute myocardial infarction</td>
<td>1,103</td>
<td>373 (34%)</td>
</tr>
<tr>
<td>I20. Angina pectoris</td>
<td>787</td>
<td>249 (32%)</td>
</tr>
<tr>
<td>E11. Type 2 Diabetes mellitus</td>
<td>525</td>
<td>187 (36%)</td>
</tr>
<tr>
<td>Z54. Convalescence</td>
<td>283</td>
<td>83 (29%)</td>
</tr>
<tr>
<td>I80. Phlebitis and thrombophlebitis</td>
<td>260</td>
<td>80 (31%)</td>
</tr>
<tr>
<td>I24. Other acute ischaemic heart diseases</td>
<td>219</td>
<td>76 (35%)</td>
</tr>
<tr>
<td>N39. Other disorders of urinary system</td>
<td>140</td>
<td>42 (30%)</td>
</tr>
<tr>
<td>T82. Complications of cardiac and vascular prosthetic devices, implants and grafts</td>
<td>136</td>
<td>45 (33%)</td>
</tr>
<tr>
<td>N17. Acute renal failure</td>
<td>115</td>
<td>41 (36%)</td>
</tr>
</tbody>
</table>

* MRD is Most Responsible Diagnosis defined as the diagnosis most responsible for the total length of stay in hospital
### Most Prevalent Readmission MRD for I48. Atrial Fibrillation Initial Discharge (n=1078)

<table>
<thead>
<tr>
<th>MRD* (ICD10) and description</th>
<th>Readmitted (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I48. Atrial fibrillation and flutter</td>
<td>274 (25.4%)</td>
</tr>
<tr>
<td>I50. Heart failure</td>
<td>129 (12.0%)</td>
</tr>
<tr>
<td>J44. Other chronic obstructive pulmonary disease</td>
<td>42 (3.9%)</td>
</tr>
<tr>
<td>I29. Other cardiac arrhythmias</td>
<td>34 (3.2%)</td>
</tr>
<tr>
<td>J18. Pneumonia, organism unspecified</td>
<td>28 (2.6%)</td>
</tr>
<tr>
<td>I21. Acute myocardial infarction</td>
<td>27 (2.5%)</td>
</tr>
<tr>
<td>R07. Pain in throat and neck</td>
<td>26 (2.4%)</td>
</tr>
<tr>
<td>I63. Cerebral Infarction</td>
<td>20 (1.9%)</td>
</tr>
<tr>
<td>I20. Angina pectoris</td>
<td>18 (1.7%)</td>
</tr>
<tr>
<td>I24. Chronic ischaemic heart diseases</td>
<td>18 (1.7%)</td>
</tr>
</tbody>
</table>

* MRD is Most Responsible Diagnosis defined as the diagnosis most responsible for the total length of stay in hospital
### Overlap among 2+ ACSC Diagnoses

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>% of Total (N=7,315)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Failure &amp; COPD</td>
<td>39.8%</td>
</tr>
<tr>
<td>Heart Failure &amp; Angina</td>
<td>10.4%</td>
</tr>
<tr>
<td>Heart Failure &amp; Hypertension</td>
<td>9.0%</td>
</tr>
<tr>
<td>Heart Failure and Diabetes</td>
<td>5.5%</td>
</tr>
<tr>
<td>Diabetes and COPD</td>
<td>7.3%</td>
</tr>
<tr>
<td>Diabetes and Hypertension</td>
<td>4.9%</td>
</tr>
<tr>
<td>Hypertension and Angina</td>
<td>4.5%</td>
</tr>
<tr>
<td>Hypertension and COPD</td>
<td>4.5%</td>
</tr>
<tr>
<td>Total (in this set)</td>
<td>85%</td>
</tr>
</tbody>
</table>
B. Risk for Acute and LTC

MAPLe

- No ADL impairment
- CPS > 2
- No Behav Dec'n making worse
- Env't OR med. mgmt.
- Ulcers
- Ger. Screen self-reliant
- Meal prep.
- No meal prep
- Not many meals
- Not swallowing
- Not falls
- Not very high
- Falls
- Very high
- Mod.
- High
- Very high
- Low
- Mod.
B. Risk for Acute and LTC

LACE index scoring tool

Step 1. Length of Stay
Length of stay (including day of admission and discharge): ___ days

<table>
<thead>
<tr>
<th>Length of stay (days)</th>
<th>Score (circle as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4-6</td>
<td>4</td>
</tr>
<tr>
<td>7-13</td>
<td>5</td>
</tr>
<tr>
<td>14 or more</td>
<td>7</td>
</tr>
</tbody>
</table>

Step 2. Acuity of Admission
Was the patient admitted to hospital via the emergency department?
If yes, enter "1" in Box A, otherwise enter "0" in Box A

Step 3. Comorbidities

<table>
<thead>
<tr>
<th>Condition</th>
<th>Score (circle as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous myocardial infarction</td>
<td>+1</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td></td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>+1</td>
</tr>
<tr>
<td>Diabetes without complications</td>
<td>+1</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>+1</td>
</tr>
<tr>
<td>Diabetes with end organ damage</td>
<td>+1</td>
</tr>
<tr>
<td>Chronic pulmonary disease</td>
<td>+1</td>
</tr>
<tr>
<td>Mild liver disease</td>
<td>+1</td>
</tr>
<tr>
<td>Any tumor (including lymphoma or leukemia)</td>
<td>+1</td>
</tr>
<tr>
<td>Dementia</td>
<td>+1</td>
</tr>
<tr>
<td>Moderate or severe renal disease</td>
<td>+1</td>
</tr>
<tr>
<td>AIDS</td>
<td>+1</td>
</tr>
<tr>
<td>Moderate or severe liver disease</td>
<td>+1</td>
</tr>
<tr>
<td>Metastatic solid tumor</td>
<td>+1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>+1</td>
</tr>
</tbody>
</table>

If the TOTAL score is between 0 and 3 enter the score into Box B. If the score is 4 or higher, enter 5 into Box C

Step 4. Emergency department visits
How many times has the patient visited an emergency department in the six months prior to admission (not including the emergency department visit immediately preceding the current admission)?
Enter this number or 4 (whichever is smaller) in Box D

Add numbers in Box L, Box A, Box C, Box D to generate LACE score and enter into box below. If the patient has a LACE score is greater than or equal to 10 the patient can be referred to the virtual ward

If you have questions about the use of this tool, please contact Dr. Irfan Challa at d.challa@amh.bc.ca or by paper through St. Michael’s Hospital locating (416-864-5431)