

# Clinical and Functional Risk Factors for Acute and LTC Admission among older adults with complex care needs

Walter P Wodchis

A. Gruneir, X. Camacho, S. Bronskill, G. Poss, S.Gill

CAHSPR

Montreal. May 31, 2012



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*

# Improving Care, Outcome and Cost

- A focus for improving health system performance is naturally on substituting (lower cost) community care for (higher cost) institutional care.
- One focus has been on integrated care in the community. The challenge here is identifying those individuals who might be at risk for institutional care. (e.g. SIPA: Beland et al, CJA, 2006; GRACE: Counsell, JAMA 2007)
- Another focus has been on preventing acute care readmissions by improving care transitions from acute care to home. An advantage here is that patients admitted to acute care are easily identified (the disadvantage is that they have already had an acute exacerbation and admission). (e.g. Coleman et al., AIM 2006; Naylor et al., JAMA 2004)

# Evidence about the Interventions

- Integrated care models have generally been shown to be effective in substituting community based care for acute inpatient care but only cost-effective among sub-populations at high risk for institutional care (risks that were not included in RCT eligibility criteria). (Beland et al, CJA, 2006; Counsell, JAMA 2007)
- Care transition interventions from acute to home include a heterogeneous set of programs with varying components and varying success. (Hansen et al., AIM 2011)

# Targeting Interventions

- We reviewed 42 studies reported in Hansen et al's review:
  - ◆ 16 studies had no eligibility criteria other than discharge destination
  - ◆ 21 studies based eligibility on diagnosis - usually CHF (sometimes age)
  - ◆ 5 studies included risk factors other than diagnoses
  - ◆ Respectively 2/16, 10/21 and 3/5 showed a significant positive effect
- Overall, people struggle with the concept of risk, relying on clinician judgement. Various perspectives emphasize different risk factors: medical, social, individual, community...
- An empirical basis can improve effectiveness and appropriateness by identifying those individuals most at risk for an event.

# Older adults with complex care needs

- Older adults with medical and functional care needs are cared for by community-based primary care inclusive of home care and primary and specialty medical care services.
- About 1/6 of long-stay home care clients in Ontario are admitted to LTC in each year.
- About 1/3 are admitted to acute care each year.
- Most function fine without additional intervention.

# Older adults with complex care needs

- Older adults receiving home care represent an important target population who could benefit from integrated care and care transition interventions.
- There is an opportunity for improvement in care coordination through the transition from acute to home (based on published RCTs and observational studies).
- The appropriate targeting of enhanced care and coordination to prevent acute readmission and LTC institutionalization should be emphasized to ensure an adequate and cost-effective allocation of scarce health care resources.

# Purpose

- Examine risk screening tools to determine the contribution of clinical and functional risk factors for acute care hospitalization and long term care admission to evaluate the predictive strength of two tools in current use:
    - ◆ LACE (Length of Stay, Acuity, Comorbidity, Emergency dept. use) VanWalraven et al., CMAJ 2010.
    - ◆ MAPLe (Method for Assigning Priority Levels) Hirdes et al., BMC Med, 2008.
- ...to assist with the identification of patients for  
are transition interventions

# Methods – Data Sources

A wide range of data sources were used to identify the population, measure risk and outcomes :

- Registered Persons Data Base (RPDB)
- Ontario Health Insurance Plan (OHIP)
- Discharge Abstract Databases (DAD)
- National Ambulatory Care Reporting System (NACRS)
- Statistics Canada Postcensal Population Files
- Home Care Database (HCD)
- Ontario Resident Assessment Instrument for Home Care Database (RAI-HC)
- Client Profile Database (CPRO)



# Methods – Study Population

- Long-stay home care clients with RAI-HC assessments admitted to acute care in 2007/08 with conditions that were identified in past trials of care transition interventions:

## Acute Diagnoses:

- ◆ 2 or more chronic ACSC diagnoses (angina, heart failure, hypertension, asthma, COPD, diabetes, grand mal or epileptic convulsions, pulmonary edema)
- ◆ Or any one of: Cardiac arrhythmias, stroke, hip fracture, spinal stenosis, deep vein thrombosis/pulmonary embolism, peripheral vascular disease.

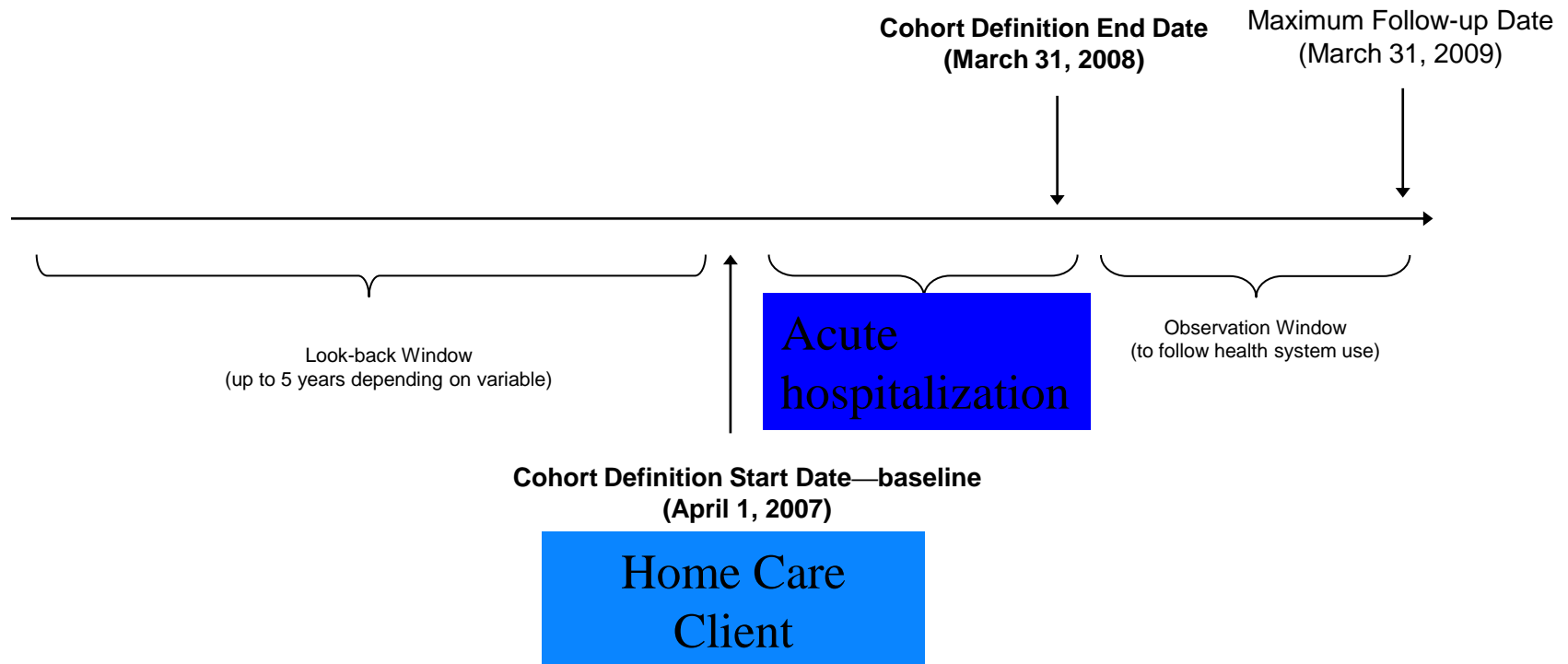
# Methods – Analysis

- Examined 1-year post-acute treatment and outcomes
- Examined risk scores -  
Defined high risk as LACE  $\geq 10$   
and  
MAPLe High or Very High  
(n.b. LACE ranges 1-18; MAPLe has 5 levels)
- Examined outcomes by risk score.

# Methods: Risk Tools

<p style="text-align: center;"><u>Risk for LTC</u>  <b>MAPLe [5 levels: Low-Very High]</b>  <b>(Method for Assigning Priority Levels)</b></p>	<p style="text-align: center;"><u>Risk for Acute</u>  <b>LACE [1-18]</b>  <b>(Length of stay, Acuity, Charlson comorbidity, Emergency Use)</b></p>
<p>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</p>	<p>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</p>

# Methods: Cohort Definition



# Population Characteristics

- N = 5,122
- Largely (62.6%) women, 62.3% are 80 years or older
- 67.4% had 10 or more ADG comorbidities
- 10.5% lived alone; 12.6% reported caregiver distress (these are relatively low levels)
- Functional Scales: Activities of Daily Living (ADL), Instrumental ADL (IADL), Cognition (Cognitive Performance Scale), Changes in health end-stage disease and signs and symptoms (CHESS) all showed that on average, the population was moderately impaired.

See *Health System Use by Frail Ontario Seniors*, November 2011 at [www.ices.on.ca](http://www.ices.on.ca) for more details.

# Results: Follow-up care

	Year prior to acute admission N=5,122	Year following acute admission N=5,122
Average # GP Visits	19.84 ± 15.84	23.56 ± 21.51
Average # Specialist Visits	19.03 ± 19.14	20.58 ± 22.2
Avg. Monthly HC Visits	11.87 ± 11.83	15.48 ± 14.33
Avg. Monthly HC-Nursing	6.80 ± 6.73	7.06 ± 6.08
Avg. Monthly HC-Support	11.52 ± 11.48	13.92 ± 12.94
# Drugs Prescribed	15.37 ± 6.79	15.46 ± 7.25

# Results: Outcomes

	<b>Year prior to acute admission N=5,122</b>	<b>Year following acute admission N=5,122</b>
Any ED Visits	4,184 (81.7%)	3,956 (77.2%)
ACSC ED Visits	2,105 (41.1%)	2,030 (39.6%)
Any Acute Admit.	2,875 (56.1%)	3,249(63.4%)
LTC Placement		431 (8.4%)

# Results: LTC MAPLe scores

- Most clients were at low to moderate risk of LTC admission according to their MAPLe scores (71% low risk; 29% high risk)
- Only 8.4% of individuals admitted to LTC within 1 year
- Individuals with higher MAPLe scores were more likely to be admitted to LTC:
  - ◆ 4.7% with low MAPLe were admitted to LTC within 1 year
  - ◆ 20.6% with very high MAPLe were admitted to LTC within 1 year

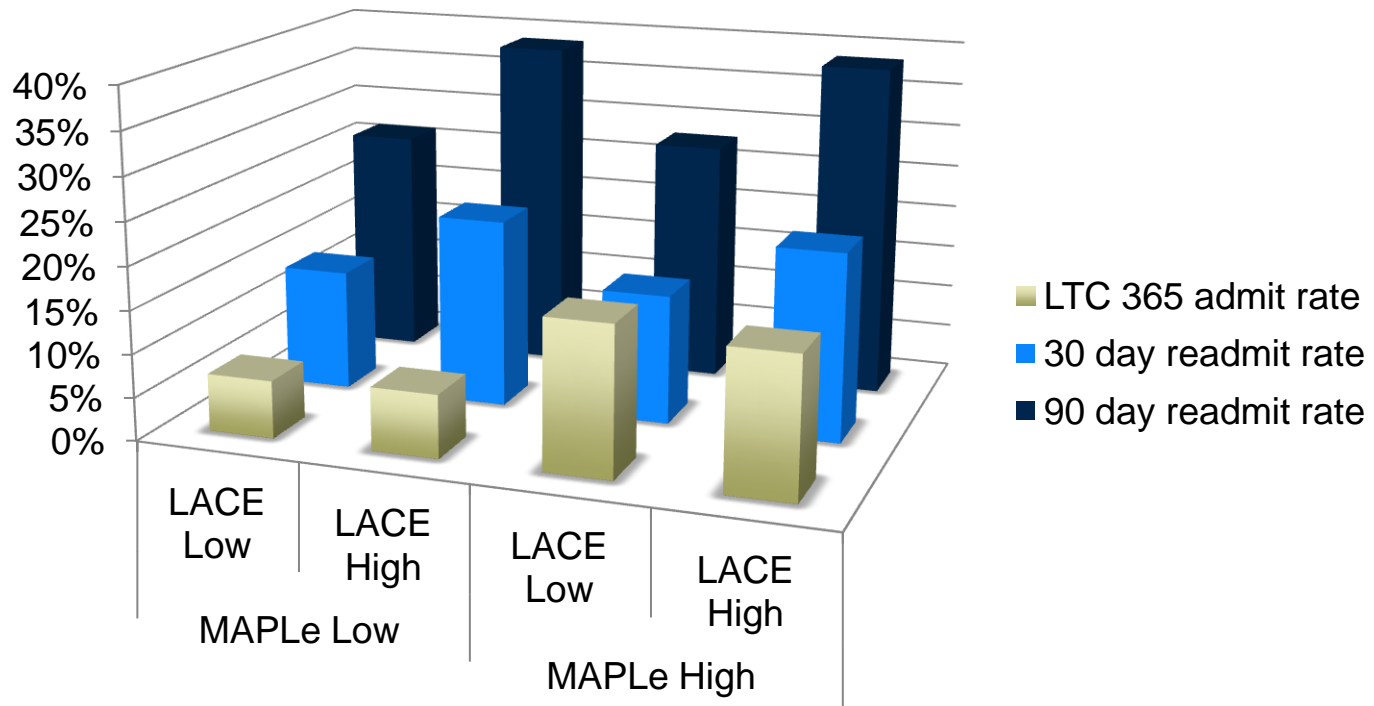


# Results: Acute Admission & LACE scores

- Most clients were at high risk of acute care admission according to their LACE scores (38% low risk; 62% high risk)
- 17% of patients readmitted to acute care within 30 days
- 34% within 90 days
- 63% within 1 year
- Readmission was strongly related to LACE score (range 0-18)
  - ◆ 1.3% and 1.4% of patients readmitted to Acute within 30 and 90 days had LACE 0-4
  - ◆ 90 day readmission rate was 24% with LACE < 10
  - ◆ 90 day readmission rate was 38% with LACE 10+

# Results: Outcomes by MAPLe and LACE

## Acute and LTC Admission for Homecare Clients Discharged Home from Acute



MAPLe Low is MAPLe Low, Mild & Moderate; LACE low is LACE < 10  
LTC Admission within 365 days after acute discharge

# Results: Outcomes by MAPLe and LACE

Risk Tool	Odds Ratio		
	Acute Readmission 30 day	90-day	LTC Admit 365 day
MAPLe High (c-statistic)	1.04 (0.50)	1.04 (0.50)	*2.57 (0.61)
LACE High (c-statistic)	*1.68 (0.55)	*1.72 (0.56)	1.07 (0.51)
Combined			
MAPLe High	1.01	1.01	*2.58
LACE High (c-statistic)	*1.67 (0.55)	*1.72 (0.56)	1.02 (0.61)

\* indicates  $p < 0.001$

# Conclusions

- Medically complex home care clients discharged from acute care had high rates of readmission to acute care.
- The LACE tool was only discriminating for acute care readmissions while the MAPLe score only discriminated risk of LTC admission.
- The current thresholds are better than chance but not terribly good at discriminating everyone at high risk. Particularly the LACE threshold of 10 seems rather low.
- Further investigation of thresholds and interactions are warranted.

# Summative comments

- Many good intervention ideas
- How to identify “service package” for different clients
- Targeting may be key:
  - ◆ Who is at risk for what outcome ?
  - ◆ What is the best intervention to avoid that outcome ?
- For example: risk of acute readmission and LTC placement among home care clients who were admitted to acute...