

Effects of community-based primary care visits and medication reconciliation after discharge on risk of 30-day hospital readmissions in Ontario



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Research Team & Acknowledgements

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Background & Motivation

- 30-day readmissions are common, costly and potentially preventable
- Those occurring within 30 days after discharge may be attributable, in part, to gaps in coordination of care or communication between healthcare providers as a patient transitions away from acute care
- Early physician follow-up (within 7 days) can improve care transitions and reduce potentially preventable hospital readmissions
 - Heart failure (HF)
- Research has been narrowly-focused (i.e., condition-specific, generally older patients) and less is known about post-discharge strategies that can be implemented more broadly

Research Objective

To examine the effectiveness of early community-based follow-up care on 30-day hospital readmissions, including

- Primary care physician visits,
- Usual provider of care (UPC) visits, and
- Receipt of medication reconciliation from a community pharmacist

...among patients discharged from acute care in Ontario to home after hospitalization for a broad set of clinical conditions

Methods

- Data sources: population-based health administrative data in Ontario
- Study design: cohort study
- Population: patients discharged from acute care to home from 2008 to 2012 with cardiac conditions other than heart attack, CHF, COPD, pneumonia, diabetes, stroke, or GI disease (25 Case Mix Groups)
- Outcome: 30-day all-cause (unplanned) hospital readmission
- Exposure: (exogenous) annual hospital-specific rate of community-based follow-up care
 1. Primary care physician – incl. GP/FP, Geriatrician, or Pediatrician visits (OHIP)
 2. Usual provider of care (UPC) - based on (A) patient rostering, or (B) volume of physician services prior to acute care
 3. Medication reconciliation – incl. claims for the MedsCheck program (ODB)

Hospitals assigned a quartile ranking – used for analysis

Statistical Analysis

- Cox proportional hazards models
 - Adjusting for patient-level factors:
 - Age
 - Sex
 - Residence (Urban/Rural)
 - Income quintile
 - Discharge year & day
 - Charlson score
 - Prior hospitalizations
 - Length of stay
 - Robust standard errors to account for clustering
- Sensitivity analysis (selected)
 - Among patients at high risk of readmission (LACE Index>10)

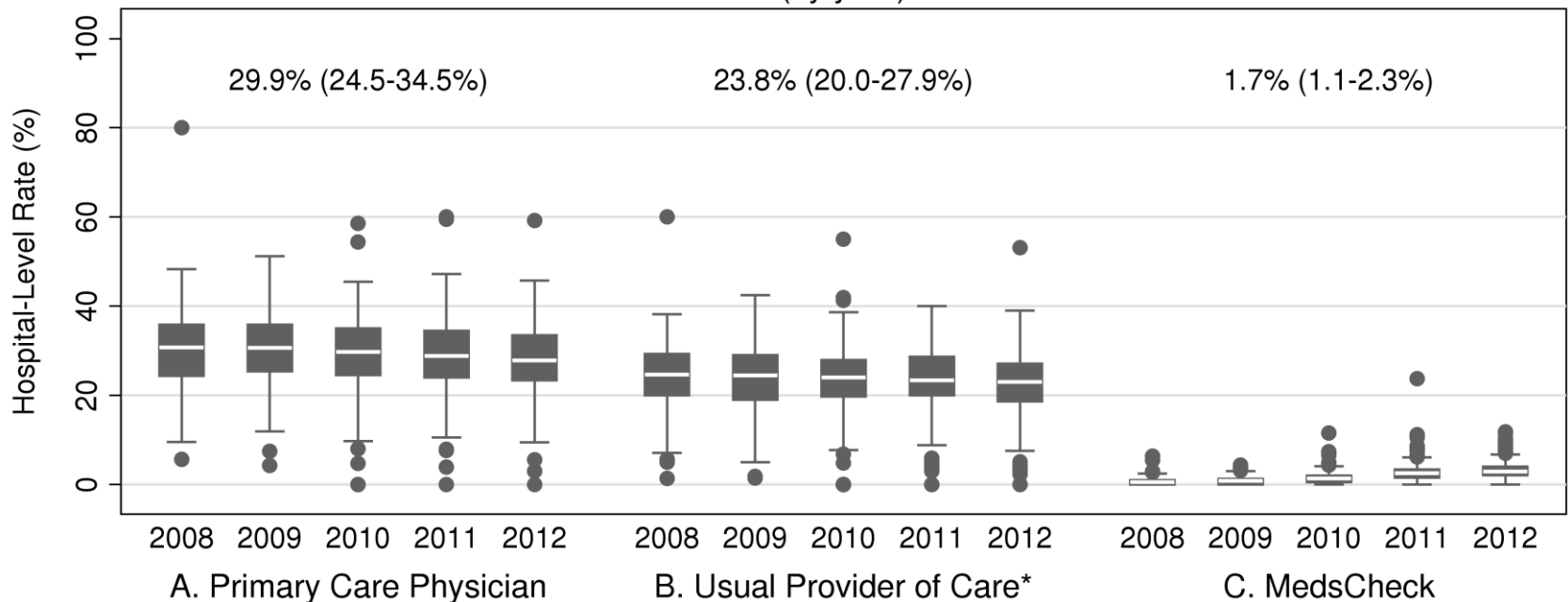
Results: Patient characteristics at discharge

Characteristic	TOTAL N=488,442	Not Readmitted N=436,587 (89.4%)	Readmitted N=51,855 (10.6%)	p-value
Age (years), Mean \pm SD	62.69 \pm 22.87	62.05 \pm 23.14	68.02 \pm 19.63	<.001
Male, n (%)	240,041 (49.1%)	213,997 (49.0%)	26,044 (50.2%)	<.001
Clinical Condition, n (%)				
Cardiac Conditions	83,949 (17.2%)	77,301 (17.7%)	6,648 (12.8%)	<.001
Congestive Heart Failure	40,432 (8.3%)	33,467 (7.7%)	6,965 (13.4%)	
COPD	48,517 (9.9%)	42,272 (9.7%)	6,245 (12.0%)	
Diabetes	21,671 (4.4%)	19,891 (4.6%)	1,780 (3.4%)	
Gastrointestinal Disease	189,795 (38.9%)	168,717 (38.6%)	21,078 (40.6%)	
Pneumonia	70,183 (14.4%)	63,397 (14.5%)	6,786 (13.1%)	
Stroke	33,895 (6.9%)	31,542 (7.2%)	2,353 (4.5%)	
Prior Hospitalization, n(%)				
No hospitalization	400,440 (82.0%)	365,737 (83.8%)	34,703 (66.9%)	<.001
0-30 days	50,553 (10.3%)	39,954 (9.2%)	10,599 (20.4%)	
31-60 days	22,025 (4.5%)	17,988 (4.1%)	4,037 (7.8%)	
61-90 days	15,424 (3.2%)	12,908 (3.0%)	2,516 (4.9%)	
Charlson Score, n (%)				
0 score	288,872 (59.1%)	265,782 (60.9%)	23,090 (44.5%)	<.001
1-2 score	147,305 (30.2%)	128,949 (29.5%)	18,356 (35.4%)	
3+ score	52,265 (10.7%)	41,856 (9.6%)	10,409 (20.1%)	
LOS (days), Mean \pm SD	5.54 \pm 7.64	5.37 \pm 7.49	6.99 \pm 8.64	<.001
High Risk, n (%)	122,945 (25.2%)	101,274 (23.2%)	21,671 (41.8%)	<.001

Abbreviations: LOS = length of stay; High Risk = LACE score \geq 10

Figure

Hospital-Level Rate of Early (7-day) Follow-up to any Primary Care Physician, a Usual Provider of Care (UPC), or Receipt of Medication Reconciliation (by year)



*Among patients enrolled in a primary care model, or assigned to physician based on volume of services 2 years prior to index admission (n=472,375)
Median and Interquartile Range (IQR) over all years shown

Findings: Effect of follow-up care on readmission

Quartile	<u>7-Day Early Follow-Up, All Patients (n=488,442)</u>		<u>7-Day Early Follow-Up, High Risk Patients (n=122,945)</u>	
	Adj. Hazard Ratio*	<i>p</i>	Adj. Hazard Ratio*	<i>p</i>
Any Primary Care Physician Visit				
Q1 (lowest)	1 (Reference)		1 (Reference)	
Q2	0.997 (0.950-1.046)	0.896	0.985 (0.944-1.028)	0.488
Q3	1.006 (0.960-1.055)	0.794	0.965 (0.921-1.012)	0.139
Q4 (highest)	0.951 (0.904-1.000)	0.052	0.961 (0.910-1.014)	0.148
Any Usual Provider of Care Visit ¹				
Q1 (lowest)	1 (Reference)		1 (Reference)	
Q2	1.004 (0.965-1.044)	0.855	0.962 (0.911-1.015)	0.156
Q3	0.981 (0.935-1.028)	0.416	0.945 (0.892-1.002)	0.057
Q4 (highest)	0.930 (0.884-0.980)**	0.006	0.929 (0.873-0.989)**	0.021
Medication Reconciliation				
Q1 (lowest)	1 (Reference)		1 (Reference)	
Q2	0.957 (0.903-1.015)	0.142	1.024 (0.959-1.093)	0.483
Q3	0.937 (0.879-0.997)**	0.041	0.991 (0.931-1.055)	0.779
Q4 (highest)	0.908 (0.851-0.968)**	0.003	0.993 (0.929-1.062)	0.842

*Multivariable models adjust for age (5-year categories), sex, urban/rural residence, income quintile, clinical condition at discharge (case mix group), year of discharge, weekday of discharge, prior hospitalizations in last 30, 60 and 90 days, Charlson score (ordinal variable, 0,1-2, 3 or more diagnoses), and index hospitalization length of stay 7 days or more

¹Among patients enrolled on a physician roster or affiliated with a physician based on volume of outpatient services (n=472,375 in full population, and n= 118,882 in high risk population)

Summary & Interpretation

- Primary care follow-up visits:
 - Large hospital-level variability
 - Highest rates of early follow-up to a patient's UPC associated with lower risk of 30-day readmission
 - Continuity of care
- Medication reconciliation after discharge:
 - Very low follow-up rates and little variability
 - Highest rates of early follow-up associated with lower risk of readmission
- Among those at high risk of readmission:
 - Only early follow-up to UPC remained statistically significant
- Most significance requires achieving highest levels of early follow-up

Strengths & Limitations

- Large database
- Exogenous exposure

But...

- Findings are subject to residual and unmeasured confounding
- Quartile approach: loss of information and power

Conclusions

- Timely primary care visits with a familiar physician and medication reconciliation with a community pharmacist are key activities and could be encouraged by hospitals and policy-makers to reduce 30-day unplanned readmissions
- But, need to reach high-levels of compliance to achieve desirable effect

Thank You



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Supplemental Information: Codes for Selected CMGs and MedsCheck

DIN	Description
93899979	Annual medication review
93899981	Hospital discharge medication review
93899982	Pharmacist decision medication review
93899983	Physician or registered nurse referral medication review
93899984	Planned hospital admission medication review
93899985	Annual Long-Term Care medication review
93899986	Quarterly Long-Term Care medication review
93899987	Annual at home medication review
93899988	Diabetes annual medication review
93899989	Diabetes follow-up medication review

CMG	Description
Stroke (Age ≥ 45)	
25	Hemorrhagic Event of Central Nervous System
26	Ischemic Event of Central Nervous System
28	Unspecified Stroke
COPD (Age ≥ 45)	
139	Chronic Obstructive Pulmonary Disease
Pneumonia (All ages)	
136	Bacterial Pneumonia
138	Viral/Unspecified Pneumonia
143	Disease of Pleura
Congestive Heart Failure (Age ≥ 45)	
196	Heart Failure without Cardiac Catheter
Diabetes (All ages)	
437	Diabetes
Cardiac CMGs (Age ≥ 40)	
202	Arrhythmia without Cardiac Catheter
204	Unstable Angina/Atherosclerotic Heart Disease without Cardiac Catheter
208	Angina (except Unstable)/Chest Pain without Cardiac Catheter
Gastrointestinal CMGs (All ages)	
288	Disorder of Biliary Tract
231	Minor Upper Gastrointestinal Intervention
248	Severe Enteritis
251	Complicated Ulcer
253	Inflammatory Bowel Disease
254	Gastrointestinal Hemorrhage
255	Gastrointestinal Obstruction
256	Esophagitis/Gastritis/Miscellaneous Digestive Disease
257	Symptom/Sign of Digestive System
258	Other Gastrointestinal Disorder
285	Cirrhosis/Alcoholic Hepatitis
286	Liver Disease except Cirrhosis/Malignancy
287	Disorder of Pancreas except Malignancy
288	Disorder of Biliary Tract