

Impact of an interprofessional team-based care program on the health care utilization of patients with complex health and social needs

BACKGROUND

Interprofessional team-based primary care (IP-TBC) has become an integral part of health care reforms in many countries aiming to achieve high-quality, equitable, accessible, and comprehensive primary health care.

An interprofessional team approach has been shown to improve health outcomes, quality of care, and reduce health services utilization^{1,2,3}.

IP-TBC is particularly effective in the management and delivery of care for individuals with chronic illnesses, significant medical complexities, and/or social vulnerabilities^{1,4,5,6}.

Following the Ontario primary care reforms of the 2000s, approximately ¼ of the population – including many with complex health and social needs who could most benefit from team-based care – remained without access to interprofessional primary care teams^{8,9}.

INTERVENTION

To address this access gap, the Teamcare initiative has been implemented in Ontario through three programs:

1. Primary Care Outreach (PCO)
2. Solo Practitioners in Need (SPiN)
3. Advancing Access to Team-Based Care (AA-TBC)

The program allows primary care physicians to refer their patients to a Community Health Centre (CHC) to enable access to interprofessional team-based care. Once referred, patients receive support and care from allied health professionals at the CHC while maintaining their relationship with their primary care physician.



RESEARCH QUESTION

- Does participation in a Teamcare program affect the rate and risk of non-urgent emergency department visits for Teamcare patients over time, compared to a propensity score-matched control group?

METHODS

- **Study Design:** Quasi-experimental, retrospective longitudinal matched cohort study
- **Study Period:** April 1, 2013 – March 31, 2017.
 - Accrual period: April 1, 2015 – March 31, 2016, with a two-year lookback for outcomes and follow-up until March 31, 2017.
- **Study Population:** Treatment group included all adults (>18) flagged as a Teamcare patient with a date of first encounter at a CHC in the accrual period (March 31, 2015 – March 31, 2016).
 - Control group: Individuals from a 20% random sample of the Ontario population matched on a propensity score to individuals in the treatment group
- **Study Setting:** Ontario, Canada
- **Data Sources:** ICES patient-level administrative databases linked to CHC admin data, which contain a unique program identifier for Teamcare participants

METHODS, CONT'D

- Linked ICES databases: RPDB, CPDB, CAPE, OHIP, DIN, DAD, NACRS, OMHRS, and condition-specific datasets
- **Primary Outcome:** Non-Urgent Emergency Department Visits
- **Matching:**
 - Hard match on age (+/- 90 days) and sex
 - Propensity Score (PS): Rurality Index of Ontario (RIO) score, income quintile, recent immigrant to Ontario status (Y/N), collapsed ADGs, Resource Utilization Bands, Ontario Marginalization Index (dependency, deprivation, ethnic concentration, instability), health care utilization in previous two years.
 - One-to-one matching without replacement; greedy nearest neighbour matching within caliper width = 0.2 of standard deviation of logit of the PS
- **Analytic Plan:** Modified Difference-in-Difference analysis using a hybrid random/fixed effects model.
 - Estimates the within-person treatment effect over time for patients who participated in the program compared to similar individuals who did not (i.e. control group).
 - Time period (before/after intervention) centered at date of first encounter at a CHC with quarterly time points.
- **Econometric Model:**

$$y_{it} = \beta_0 + \beta_1 W_i + \sum_{t=1}^{T-1} \beta_{2t} T_t + \beta_3 D_{it} + \beta_4 \bar{X}_i + \beta_5 (X_{it} - \bar{X}_i) + u_i + \varepsilon_{it}$$

PRELIMINARY RESULTS

Table 1. Descriptive characteristics by cohort with balance diagnostics

Variable	Teamcare Patient Group (N=683)	PS-Matched Control Group (N=683)	Std Diff*	P-value
Sociodemographic Characteristics				
Patient Age				
% <20	1.02	1.02	0.000	1.000
% 20-39	7.91	7.91	0.000	1.000
% 40-59	13.90	13.76	0.004	0.938
% 60-79	42.17	42.17	0.000	1.000
% >80	34.99	35.13	-0.003	0.955
% Female	63.54	63.54	0.000	1.000
% Rural	33.53	18.16	0.357	0.000
Income Quintiles				
% Q1 (lowest)	26.50	26.94	-0.010	0.854
% Q2	32.21	27.38	0.106	0.051
% Q3	19.91	18.45	0.037	0.492
% Q4	11.71	14.79	-0.091	0.094
% Q5 (highest)	9.66	12.45	-0.089	0.102
Comorbidity				
# ADGs [†] , mean (SD ^{**})	7.96 (4.44)	8.28 (4.15)	0.051	0.350
RUBs[‡]				
% 0-1 (lowest use)	3.37	2.35	0.062	0.258
% 2	4.10	1.76	0.139	0.013
% 3	41.43	40.56	0.018	0.741
% 4	23.28	23.13	0.003	0.949
% 5 (highest use)	27.82	32.21	-0.096	0.077
Primary Care Enrolment				
% Rostered	69.25	85.65	-0.254	0.000
% In FHT	12.88	28.7	-0.367	0.000

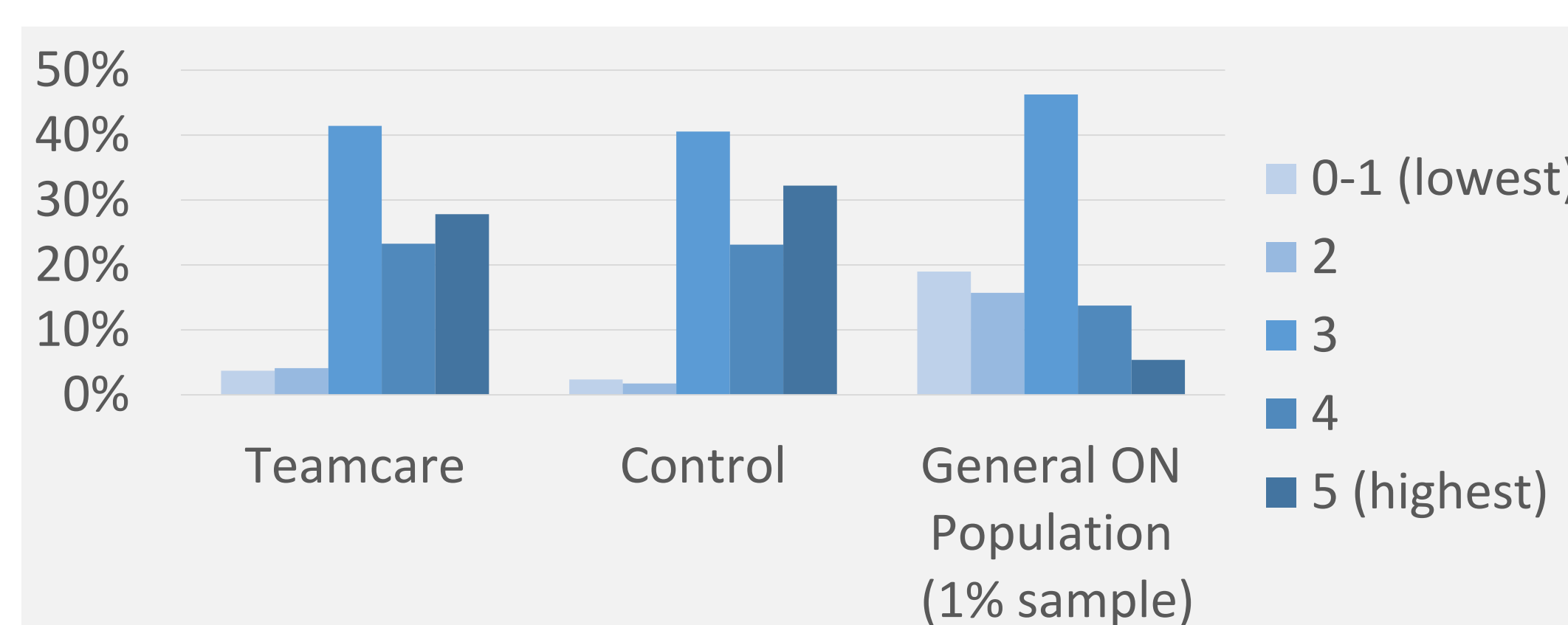
* Standardized Difference; ** Standard Deviation

† Johns Hopkins' Aggregated Diagnosis Groups¹⁰; ‡ Johns Hopkins' Resource Utilization Bands¹⁰

Table 2. Distribution of Teamcare patients by program

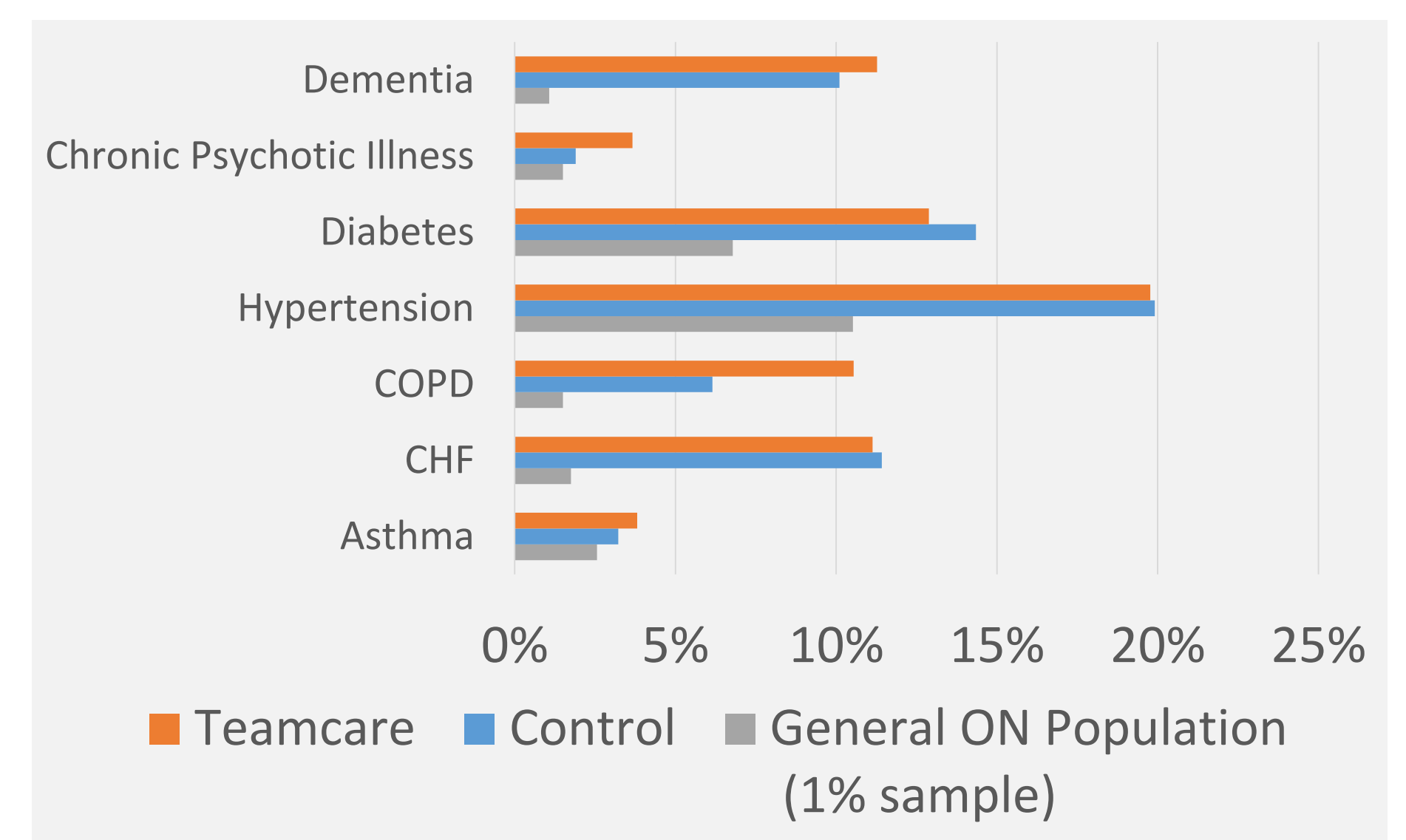
Teamcare Program	PCO	SPiN	AA-TBC
Patients, N (%)	415 (60.76)	30 (4.39)	238 (34.85)

Figure 1. Distribution of Resource Utilization Bands by cohort, compared to a 1% random sample of the general population



PRELIMINARY RESULTS, CONT'D

Figure 2. Prevalence of chronic conditions by cohort, compared to a 1% random sample of the general population



DISCUSSION

The Teamcare patient sample was mostly female (63.54%), urban (66.47%), over the age of 60 (77.19%), living in neighborhoods in the two lowest income quintiles (58.71%), and has high expected resource use (51.10% RUB 4-5).

Balance diagnostics indicate that the Teamcare and PS-matched control groups were well-balanced, with some exceptions (e.g. rurality, primary care practice characteristics).

Strengths:

- This study employs a robust methodology involving the use of panel data with pre- and post-intervention quarterly outcome measures and a propensity score-matched control group.

Limitations:

- The distribution of patients by Teamcare program is not balanced, risking bias in the aggregated results. Sensitivity analyses will stratify by program.

IMPLICATIONS & FUTURE RESEARCH

Implications:

- The results of this study have the potential to inform current and future work involving the spread and scale of the Teamcare initiative and will contribute to the literature on the effectiveness of interprofessional team-based primary care models for patients with complex needs.

Future Research:

- Dr. Walter Wodchis is currently leading an evaluation of the AA-TBC program examining its impact from various perspectives, including measuring patient and caregiver experience.

REFERENCES

1. Adam, P. et al. 2010. 'Effects of team care of frequent attenders on patients and physicians', *Fam Syst Health*, 28: 247-57.
2. Dahrouge, S., L. et al. 2014. 'Roles of nurse practitioners and family physicians in community health centres', *Can Fam Physician*, 60: 1020-7.
3. Ritchie, C., R. et al. 2016. 'Implementation of an Interdisciplinary, Team-Based Complex Care Support Health Care Model at an Academic Medical Center: Impact on Health Care Utilization and Quality of Life', *PLoS One*, 11: e0148096.
4. Bodenheimer, T., E. H. Wagner, and K. Grumbach. 2002. 'Improving primary care for patients with chronic illness', *JAMA*, 288.
5. Edwards, S. T. et al. 2017. 'Effectiveness of Intensive Primary Care Interventions: A Systematic Review', *J Gen Intern Med*;32(12):1377-1386.
6. Saint-Pierre, C., V. Herskovic, and M. Sepulveda. 2017. 'Multidisciplinary collaboration in primary care: a systematic review', *Fam Pract*; 35(2):132-141
7. Sweetman, A., and Buckley, G. 2014. 'Ontario's Experiment with Primary Care Reform', *The School of Public Policy SPP Research Papers*, 7.
8. Glazier, R. H. et al. 2009. 'Capitation and enhanced fee-for-service models for primary care reform: a population-based evaluation', *CMAJ*, 180.
9. Kiran, T., A. Kopp, and R. H. Glazier. 2016. 'Those Left Behind From Voluntary Medical Home Reforms in Ontario, Canada', *Ann Fam Med*, 14: 517-25.
10. Johns Hopkins University. The Johns Hopkins ACG® System: Technical Reference Guide Version 9.0. December 2009.