



***Registered Nurse Staffing and Health
Outcomes of Patients with Type 2
Diabetes within Primary Care in South
Eastern Ontario***

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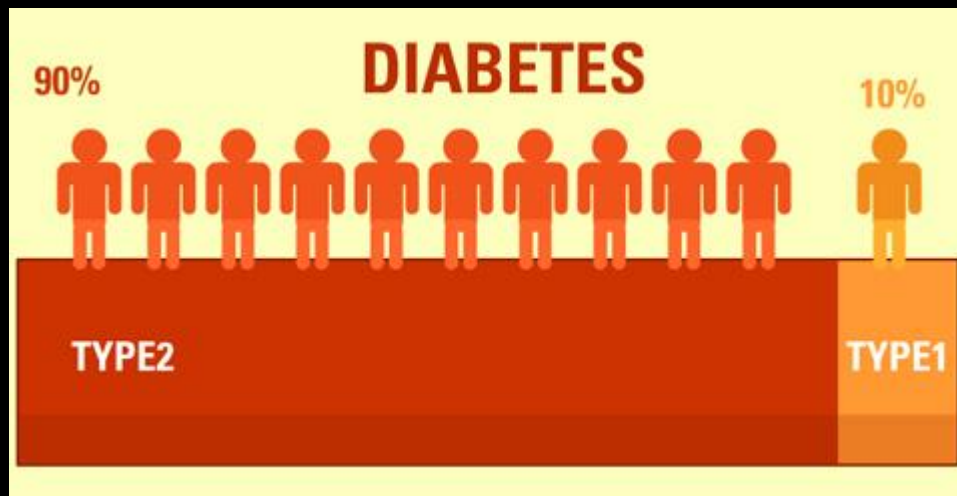
Chronic Diseases in Canada

- Leading cause of death
- Account for 40% - 70% of total healthcare costs
- Prevalence and costs predicted to increase

! Effectiveness and efficiency of Canadian healthcare systems should be optimized to meet the demands of this growing patient population

Diabetes Mellitus

- Chronic metabolic disease characterized by elevated blood glucose levels
 - Type 1 diabetes
 - Type 2 diabetes



Chronic Disease Management

Most effectively managed within the
primary care setting

(Bodenheimer et al., 2002; Canadian Diabetes Association, 2008; Grumbach & Bodenheimer, 2002; Renders et al., 2009; Wagner et al., 1996)

Primary Care:

- first point of access
- comprehensive and patient-centered care
- focuses on health promotion and disease prevention
- element within primary healthcare

(Health Canada, 2006b; Starfield, 2009; World Health Organization, 1978)

Nurses within Primary Care

- Integral component of primary care
- Form the core of interdisciplinary teams
- Important role in management of chronic diseases
 - Roles routinely performed by nurses that relate to chronic disease management are not fully understood

Nurses within Primary Care

- Within Canada, literature exploring nurses unique contributions to patient health outcomes in primary care is sparse:
 - Does not make clear distinctions between regulatory designations OR focuses on Nurse Practitioners alone
- In other countries, positive relationships between nurse staffing and patient outcomes have been documented in the primary care setting
 - E.g. United Kingdom – Griffiths et al. 2010
- **Acute care** - positive associations between nurse staffing and quality of care have been established

Study Goal

To explore the relationship between the presence of Registered Nurses (RNs) in primary care practices and health outcomes of patients with Type 2 diabetes

Study Overview

- Cross-sectional linkage design
- Data sources:
 1. Organizational-level survey
 - “Measuring Organizational Attributes within Primary Health Care” (CIHI, 2013)
 - Primary care practices in Eastern Ontario affiliated with the Canadian Primary Care Sentinel Surveillance Network (CPCSSN)

2. CPCSSN database



CPCSSN Database Linkage



- Family Health Teams (n=15)
 - Study Cohort Year: April 1st, 2013 - March 31st, 2014
 - [Organizational survey: June-November, 2014]
 - Patient Inclusion Criteria:
 - Patients with diabetes
 - Patients who had ≥ 1 encounter in study cohort year
 - Patients 18-100 years of age
- n=6673 patients**

Study Variables

- Organizational Attribute (organizational-level survey):
 - ≥ 1 RN in practice (Yes/No)
- Diabetes Outcomes (CPCSSN database):
 - Blood pressure (BP)
 - Hemoglobin A1C (HbA1c)
 - Fasting Plasma Glucose (FPG)
 - Low-Density Lipoprotein Cholesterol (LDL-C)
 - Urine Albumin Creatinine Ratio (UACR)
(Canadian Diabetes Association, 2013)
- Diabetes outcomes were coded into new variables:
 1. Completed (Yes/No)
 2. On-target (Yes/No)

Results

Presence of Registered Nurses in Primary Care Practices

- ~87% of FHT practices had ≥ 1 RN
 - Average of 2.5 RNs per practice

CPCSSN Database Linkage

- **Patient Characteristics:**

- Sex:

- Female: 49% (n=3258)

- Male: 51% (n=3415)

- Mean Age:

- 65.1 years

- 55% (n=3690) were \geq 65 years

- Comorbidities:

- 71% (n=4734) had \geq 1 additional chronic condition



Diabetes Management Test Completion

(n=6673)

	Mean	Range (across practice locations)
Blood Pressure	84.6%	47.7 – 96.6%
HbA1c	68.8%	11.9 – 89.0%
LDL-C	58.3%	9.5 – 78.8%
FPG	48.6%	10.4 – 80.0%
UACR	31.1%	3.6 – 49.5%

Diabetes Management Tests On-Target

	Mean	Range (across practice locations)
Blood Pressure <130/80mmHg	37.4%	18.3 – 63.4%
HbA1c <7.0%	58.3%	44.6 – 69.7%
LDL-C <2.0mmol/L	57.6%	32.3 – 70.8%
FPG <7.0mmol/L	47.0%	31.2 – 71.2%
UACR <2.0mg/mmol	45.3%	27.7 – 65.5%

Logistic Regression Analysis: Relationship between Presence of ≥ 1 RN and Patients with Diabetes Outcomes On-Target

	On-Target, % (n)				
	HbA1c	FPG	BP	LDL-C	UACR
Registered Nurse					
Yes, ≥ 1	59.4 (2372)	47.8 (1378)	38.4 (1916)	58.6 (2036)	44.7 (826)
No	50.7 (304)	40.4 (146)	29.2 (193)	49.3 (204)	49.8 (113)
OR	1.43	1.35	1.51	1.46	0.815
95% CI	1.20, 1.69	1.08, 1.68	1.27, 1.81	1.19, 1.79	0.62, 1.07
P Value	≤ 0.001	< 0.01	≤ 0.001	≤ 0.001	0.15

- Presence of ≥ 1 RN in a practice significantly **increased** odds of patients having HbA1c, FPG, BP, and LDL-C levels **on-target**

Comparison of on-target diabetes management indicators across quartiles of diabetic patients-per-RN

- Practices with lowest ratio (Q1) had a significantly **greater** percentage of patients with HbA1c and FPG measurements on-target compared to practices with the highest ratio (Q4)

Summary

- Considerable variations across FHTs in terms of the percentage of patients who had recommended diabetes management tests:
 - (1) completed
 - (2) on-target
- Observed variability in the percentage of patients with diabetes measurements on-target across FHTs was associated with the presence of RN providers
- Study demonstrated the ability of linking primary care nurse staffing data acquired through an organizational survey to patient data within the CPCSSN

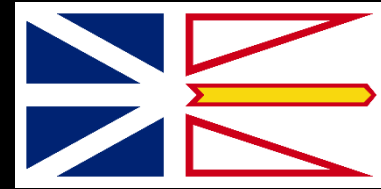
Overall Conclusions

Addressed gap in literature with respect to understanding nursing contributions in primary care and **sets groundwork** for further exploration of organizational attributes and nursing contributions in primary care settings

Next Steps in Ontario...

- Conduct similar study across all primary care practices affiliated with CPCSSN
 - Use modified/shortened version of CIHI survey
 - Purpose: To determine associations between nursing human resources and chronic disease management quality indicators and health service utilization
 - diabetes, hypertension and depression
 - Important to determine whether relationships observed are attenuated when other factors are taken into consideration
 - organizational and provider variables

Next Steps in NL...



- Utilize existing data sources to create a profile of diabetes management within NL, focusing specifically on data related to team composition and nursing care
 - Identify opportunities to better integrate nursing services/resources within primary care
 - Explore health service utilization across different team-based practice structures
 - Data sources:
 - NLCHI
 - Provincial Diabetes Database, Primary Healthcare Survey, HR information
 - QualiCoPC study in NL
 - CPCSSN database
- Explore opportunities to link datasets
- Consider collecting new data from primary care practices that related specifically to nursing care

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Key References

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