



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

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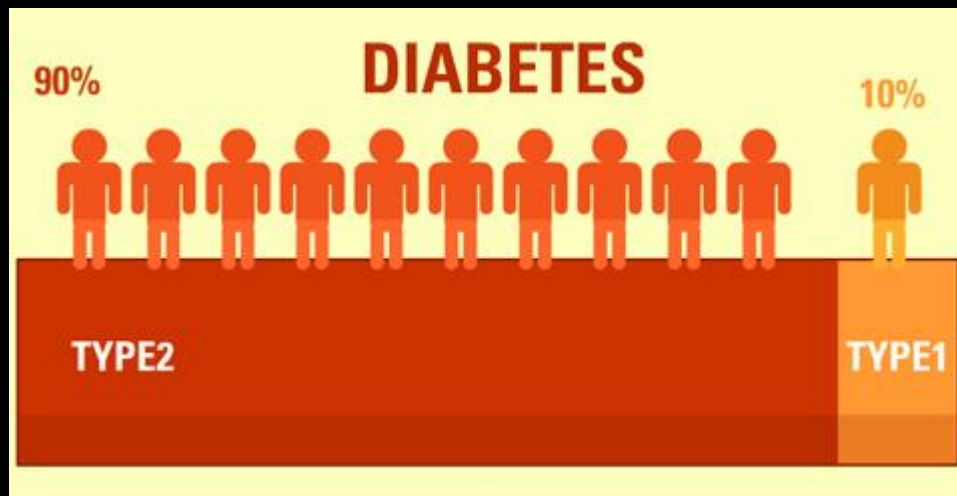
# Chronic Diseases in Canada

- 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 1<sup>st</sup>, 2013 - March 31<sup>st</sup>, 2014
    - [Organizational survey: June-November, 2014]
  - Patient Inclusion Criteria:
    - Patients with diabetes
    - Patients who had  $\geq 1$  encounter in study cohort year
    - Patients 18-100 years of age
- n=6673 patients**

# Study Variables

- Organizational Attribute (organizational-level survey):
  - $\geq 1$  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  $\geq 1$  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 $\geq 1$ RN and Patients with Diabetes Outcomes On-Target

	On-Target, % (n)				
	HbA1c	FPG	BP	LDL-C	UACR
<b>Registered Nurse</b>					
Yes, $\geq 1$	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	$\leq 0.001$	$< 0.01$	$\leq 0.001$	$\leq 0.001$	0.15

- Presence of  $\geq 1$  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

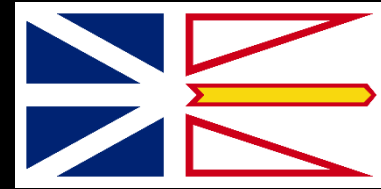
# Overall Conclusions

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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