

The Impact of Comorbid Conditions on the Quality of Diabetes Care in Ontario

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OBJECTIVES

Health care providers face difficulties in addressing multiple treatment needs in diabetes (DM) patients with comorbid conditions (CC). This study aims:

1. To assess the quality of diabetes care for DM alone compared to DM in the presence of comorbid conditions in Ontario
2. To study the association between the quality of diabetes care and DM-related hospital admissions in diabetes patients in Ontario;
3. To study the association between the quality of diabetes care and DM-related hospital admissions in patients with concordant vs. discordant comorbid conditions in Ontario.

DATA SOURCES & STUDY POPULATION

Data sources included but were not limited to:

- CIHI Discharge Abstract Database: (hospitalizations)
- Ontario Health Insurance Plan claims (physician billings)
- Registered Persons Database: for basic demographics
- ICES validated disease cohorts derived from administrative record

The study population included:

- all Ontarians aged 18 and older alive on April 1, 2007
- with physician-confirmed diagnosis of diabetes prior to April 1, 2009.

Cohort size: 861,354.

MEASURES & ANALYSES

Outcome

- Number of diabetes-related hospital admissions in the period 2009-2011.

Process indicators

- HbA1c testing: DM patients who received at least 4 HbA1c tests in the period 2007-2009.
- LDL-C testing: DM patients who received at least 2 LDL-C tests in the period 2007-2009.
- Eye exam: DM patients who received at least one dilated eye exam by an eye care professional in the period 2007-2009.
- Composite quality indicator: the presence of all 3 process quality indicators in the period 2007-2009.

Independent variables

- Age, sex, duration of diabetes, rurality index, income quintile, primary care model, Diabetes-related comorbid conditions (concordant) – cardiovascular conditions and stroke; and non-diabetes-related comorbid conditions – musculoskeletal and respiratory conditions, mental conditions, renal failure and cancer.

Analyses

- Descriptive analyses - to assess process and outcome indicators for DM alone vs. DM with comorbidities.
- Multiple logistic regression analyses separately for composite and individual process quality indicators.

References:

1. Canadian Diabetes Association. Canadian Diabetes Association 2008 clinical practice guidelines for the prevention and management of diabetes in Canada. Can J Diabetes 2008;32(Suppl 1):S1-201.).
2. Majumdar SR, Johnson JA, Bowker S, et al. Canadian Consensus for the standardized evaluation of quality improvement interventions in Type 2 Diabetes. Canadian Journal of Diabetes 2005;29(3):220-29.

RESULTS

Figure 1: Distribution of DM patients, by number of CC

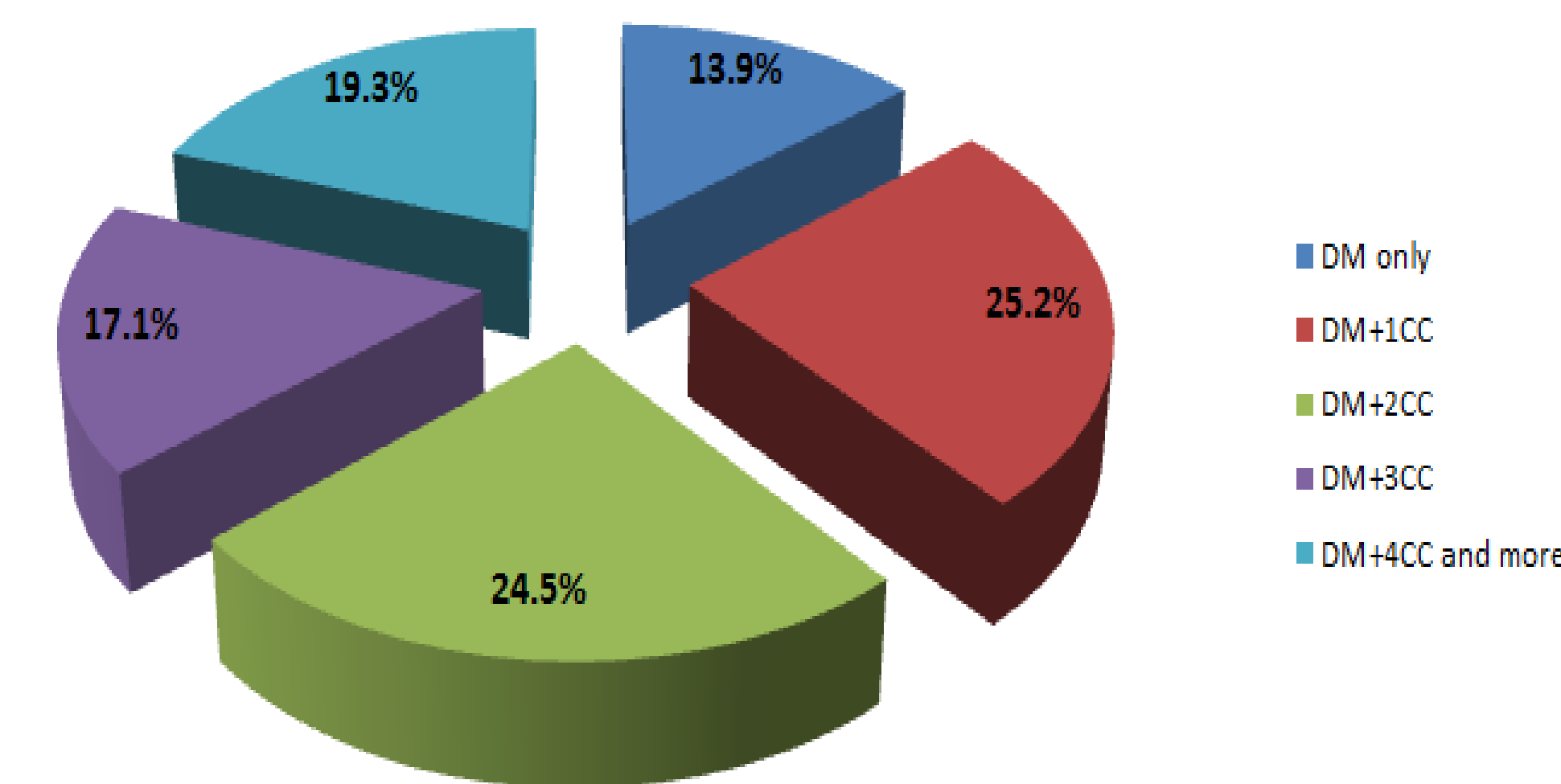


Figure 3: Quality of care and DM-related hospital admissions, by DM and number of CC

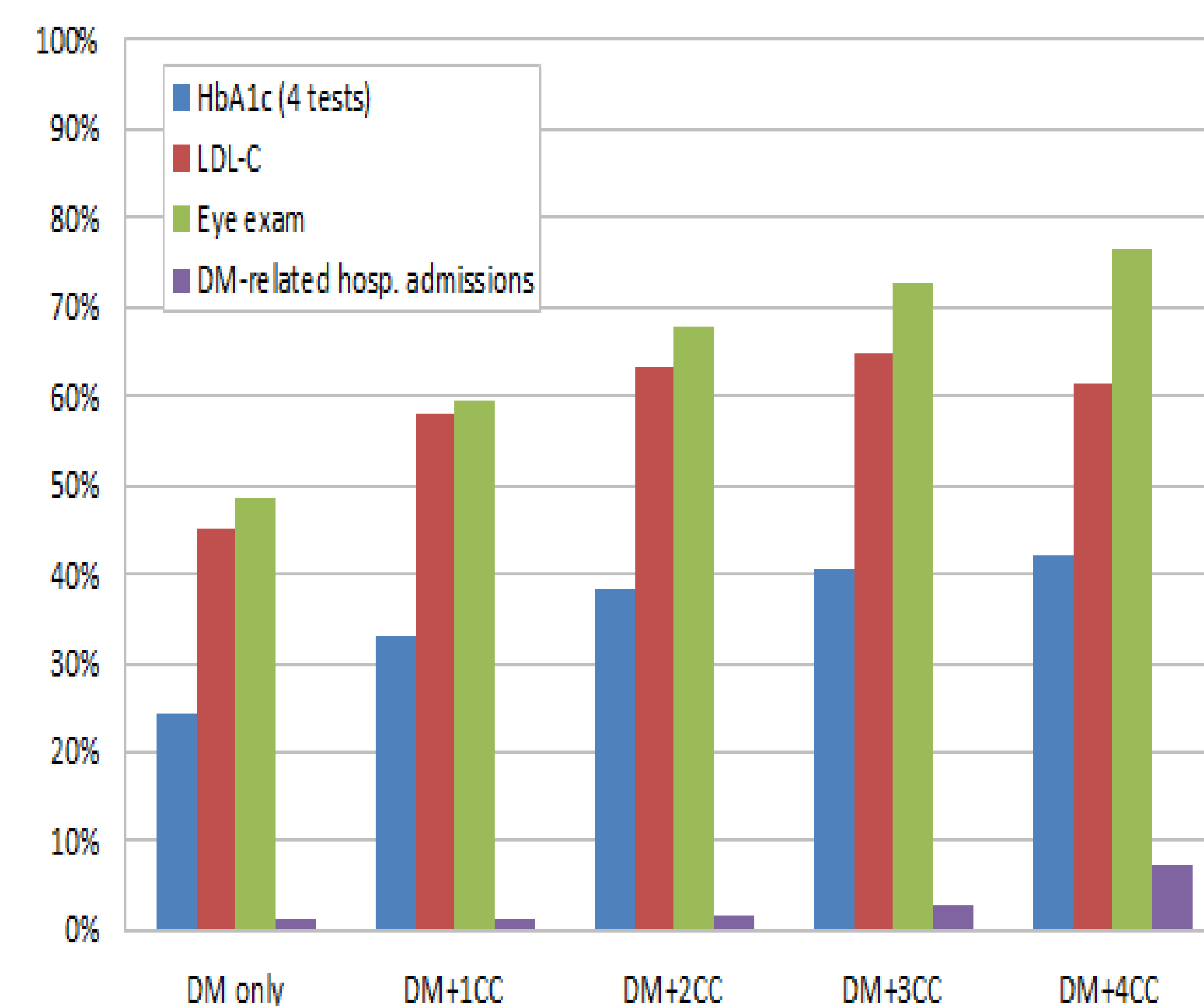


Figure 2: Types of comorbid conditions in DM patients

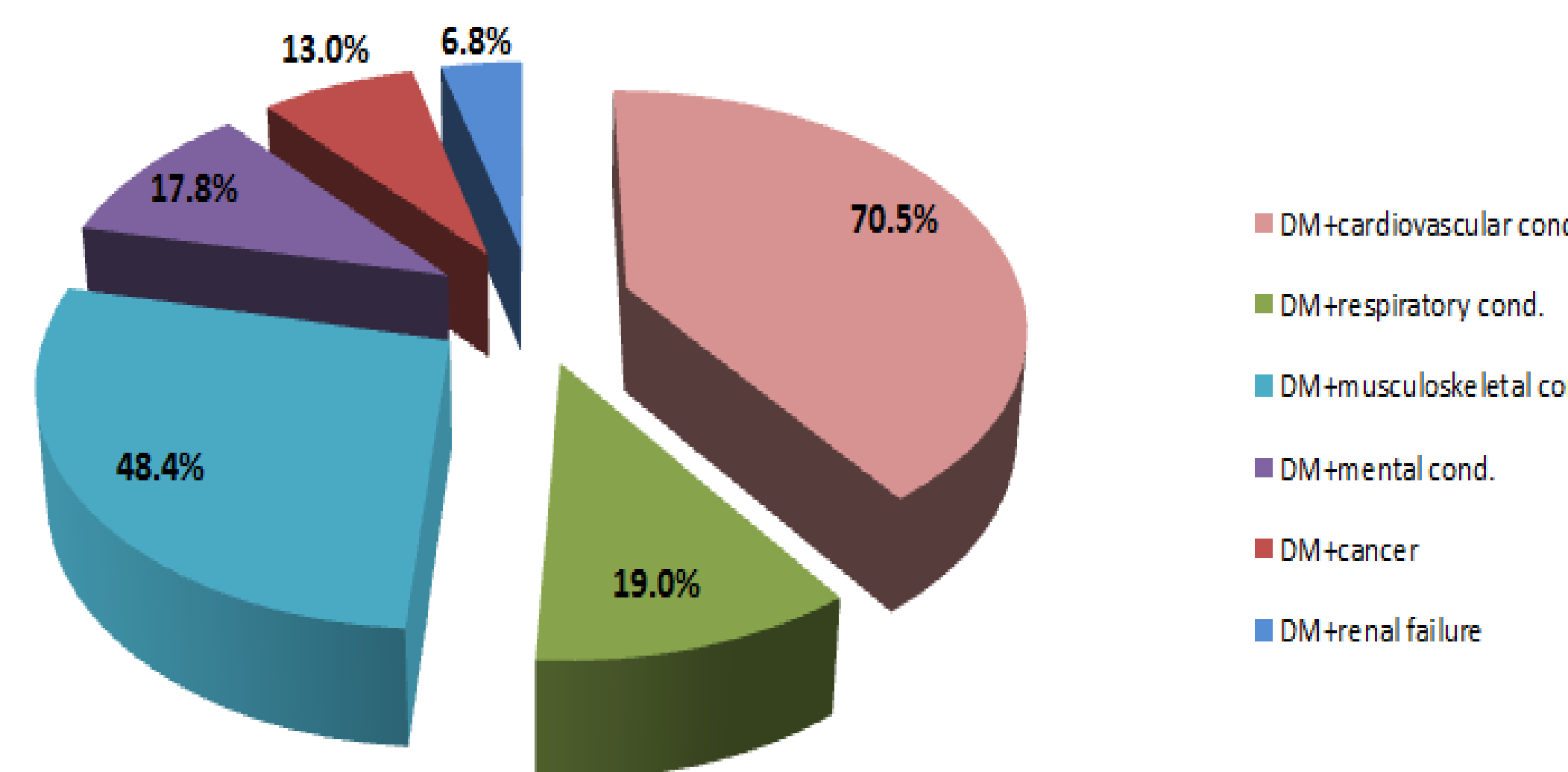


Figure 4: Quality of care and DM-related hospital admission, by comorbidity status

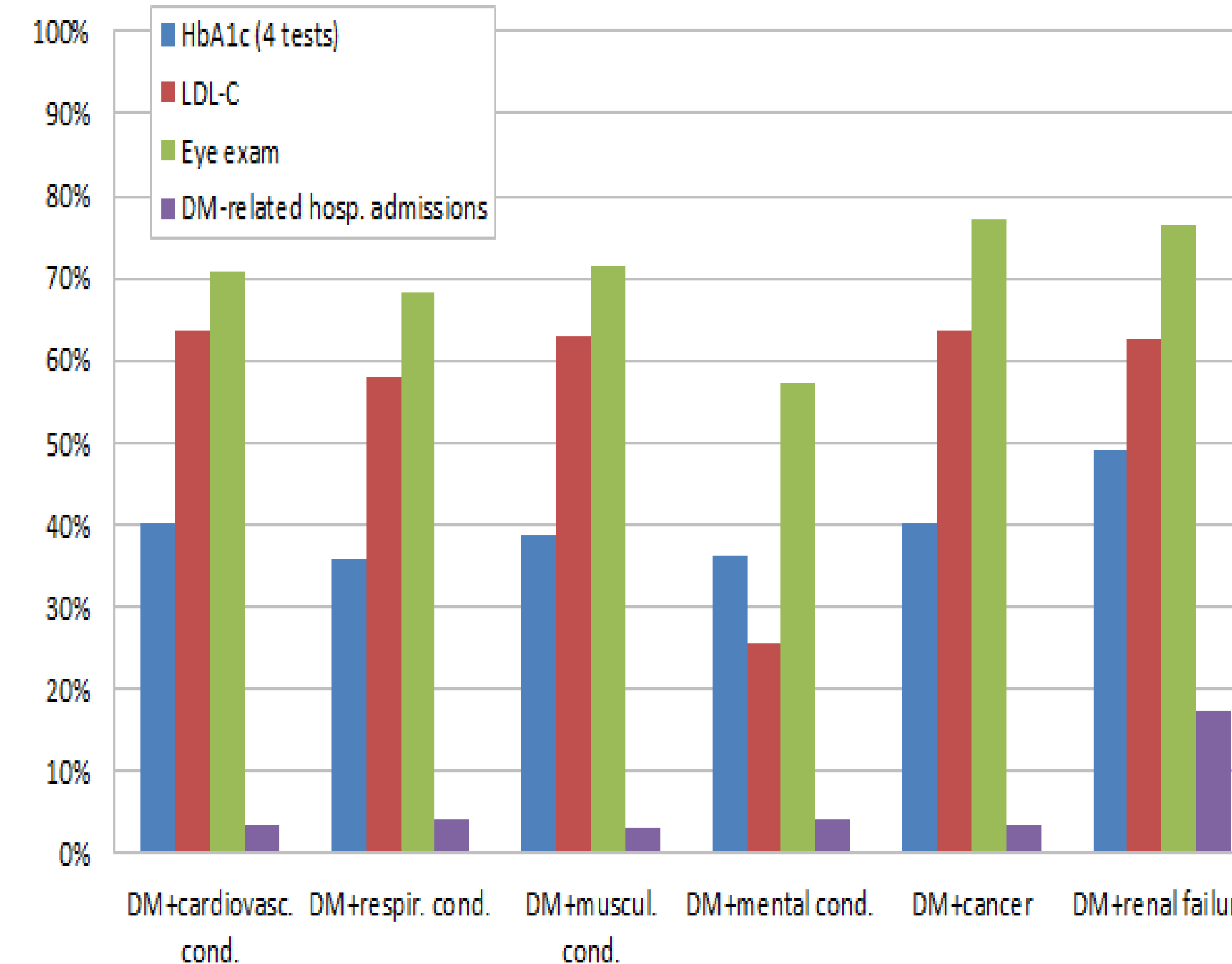


Table 1: Association between the quality of diabetes care and DM-related hospital admissions

	Individual Process Indicators	Composite Process Indicator
Parameter	Odds Ratio (95% CI)	Odds Ratio (95% CI)
HbA1c test (4 tests)	1.28 (1.18, 1.39)	-
LDL-C test (2 tests)	0.63 (0.59, 0.68)	-
Eye exam (1 exam)	1.19 (1.15, 1.22)	-
HbA1c test *concordant conditions	1.00 (0.92, 1.09)	-
LDL-C test * concordant conditions	1.14 (1.05, 1.23)	-
Composite measure	-	0.98 (0.90, 1.06)
Composite * concordant conditions`	-	1.07 (0.98, 1.16)
Continuity of care (UPS index)	0.79 (0.74, 0.84)	0.80 (0.75, 0.86)
Diabetes for more than 5 years	2.58 (2.49, 2.68)	2.65 (2.55, 2.75)
Diabetes-related hospitalization, 2007-2009	2.95 (2.86, 3.04)	2.19 (2.15, 2.24)

*Controlling for Health team model, age, gender, rurality index, primary care model, income quintile, comorbid conditions (cardiovascular, musculoskeletal, mental conditions, respiratory conditions, cancer, and renal failure).

KEY FINDINGS

Overall quality of diabetes care in Ontario was low in the period 2007-2009 (target being 90% and above).

- The lowest quality of diabetes care was observed in DM patients without CC.
- The quality of diabetes care increased with the number of CC.

DM patients with better quality of care showed higher risk of DM-related hospitalization

- Diabetes patients receiving guideline recommended HbA1c tests and eye exam were significantly more likely to be hospitalized for DM-related reasons.
- DM patients who received LDL-C tests were significantly less likely to be hospitalized due to DM-related conditions compared to those who did not receive.

The presence of concordant (DM-related) or non-diabetes related comorbidities had mixed effect.

- The association between HbA1c testing and DM-related hospitalization rate was the same in diabetes patients with both concordant and non-diabetes-related comorbid conditions.
- DM patients with concordant conditions who received LDL-C tests were significantly more likely to be hospitalized due to DM-related conditions compared to those with non-diabetes-related comorbid conditions.

IMPLICATIONS

This study results confirmed the high prevalence of comorbid conditions in Ontarians with diabetes that will create challenges to address complex needs in diabetes patients.

Policy makers need to develop patient-centered evidence-based guidelines for diabetes care for patients with comorbid conditions that will help clinicians and patients set management priorities.

Future studies are required to evaluate how to best organize care for diabetes patients with comorbid conditions to maximize patients' quality of life, and clinical and functional outcomes.

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