# Diabetes Is Not Treated as a Coronary Artery Disease Risk Equivalent

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Observational studies (1–3) have suggested that the risk of mortality is equivalent for patients with myocardial infarction (MI) without previous diabetes and for diabetic patients without previous MI. Because vascular risk-reduction targets are based on a patient's future risk, clinical practice guidelines (4–9) recommend that the same or lower blood pressure and lipid targets be applied to diabetic patients as would be applied for secondary prevention following MI. Patients newly diagnosed with diabetes and those with first MIs enter a high-risk category for subsequent coronary events. Therefore, if diabetes were treated as a coronary artery disease risk equivalent, we would expect that both groups of patients should have similar increases in utilization of antihypertensive and lipid-lowering medications following their index events.

## RESEARCH DESIGN AND METHODS

The study used administrative health databases from Ontario, Canada, including hospital discharge abstracts, physician service claims, and records from the government drug insurance program, which covers all prescriptions filled for individuals aged ≥65 years. Individuals are linked between databases via an anonymous identification number. The study also used the Ontario Diabetes Database, a validated registry of all individuals with diabetes, derived from these administrative databases (10).

All individuals with no history of MI or diabetes were identified, and two cohorts were assembled: those who either had a first MI or were first diagnosed with diabetes between 1 January 2000 and 31 December 2002, with a 5-year look-back window. Diabetes was determined from the Ontario Diabetes Database (11), while MI was determined from hospital discharge abstracts (12). The observation period for drug utilization for each patient was 800 days before and after the index event. Because the drug benefits program only covered individuals aged ≥65 years, those aged <65 at the start of their observation period were excluded. The very elderly (patients ≥80 years) were also excluded, as were patients who died before the end of their observation period.

In each of eight 100-day intervals before and after each patient's index date, we determined whether the patient received at least one prescription for antihypertensive and for lipid-lowering drugs. Prescriptions were counted regardless of indication. For each interval, the proportions of patients in each cohort who received antihypertensive and lipid-lowering drugs were directly standardized for age, sex, and specialist physician care after the index event. To determine whether changes after the index event were different between cohorts, the ratio of drug utilization between each postevent interval and the first pre-event interval was compared between cohorts using bootstrap methods to establish 99% CIs. The research ethics board of Sunnybrook Health Sciences Centre approved the study.

## RESULTS

There were 9,742 individuals with incident MI and 38,947 with incident diabetes. Before the index event, patients who subsequently developed diabetes had greater antihypertensive and lipid-lowering drug utilization than patients who subsequently had an MI (Fig. 1). Following the event, antihypertensive drug utilization rose to 96% of individuals with incident MI compared with 75% of those with incident diabetes, while lipid-lowering drug utilization rose to 70 vs. 41%, respectively. These changes in utilization for both drug classes were significantly different between cohorts ($P < 0.01$) and remained different through all subsequent time intervals ($P < 0.01$).

## CONCLUSIONS

Although patients with MIs and with diabetes are at similarly high risk for mortality, utilization of medications to control hypertension and dyslipidemia increased more dramatically following incident MI than following incident diabetes. This difference persisted, although it narrowed over subsequent time intervals.

Several possible explanations can be postulated. The two conditions may be perceived differently: An MI may be viewed as an acute life-changing event, whereas diabetes may be seen as a manageable chronic disease. Since coronary disease risk reduction may have greater relevance for patients who have undergone a coronary event, MI patients and their physicians may be more motivated to initiate and adhere to risk reduction (13). Furthermore, in-hospital MI care is often driven by pathways that may improve prescribing practices (14,15), while diabetes care is usually delivered in the less-structured ambulatory setting. Finally, ongoing acute management issues in diabetes (like glycemic control) may distract patients and physicians from addressing longer-term risk reduction (16).

Other studies have also demonstrated that utilization of cardiovascular therapies in actual clinical practice is not proportional to future risk. For example, lower-risk patients with an acute MI were more likely to receive primary angioplasty (17). Other studies (18–20) have shown that the use of aspirin and statins in the ambulatory setting is associated with predictors of better prognosis. Seniors, who are at particularly high risk following an MI, are less likely to receive thrombolyt-

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A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.
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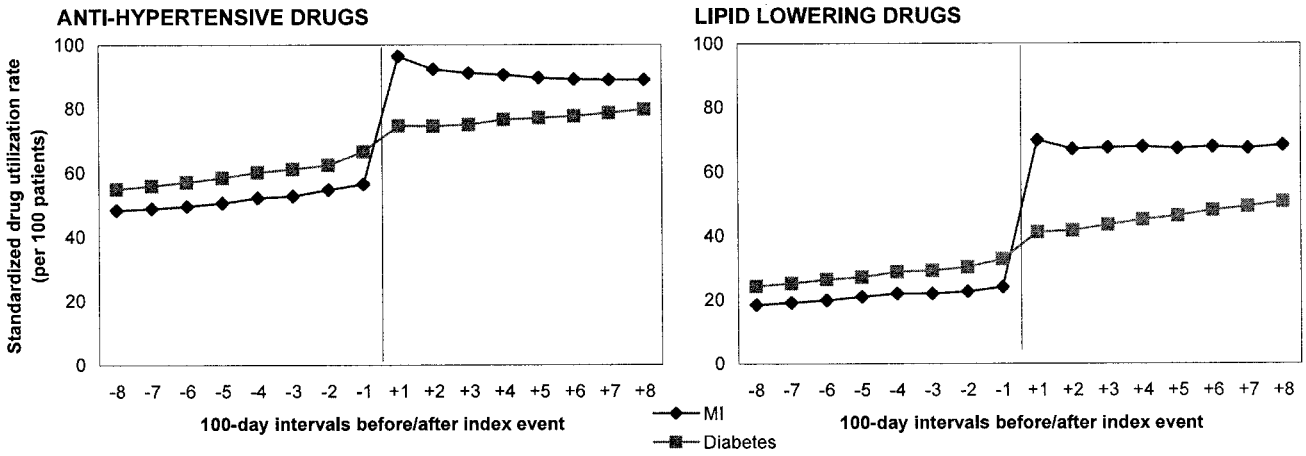


**Figure 1—***Standardized utilization of antihypertensive and lipid-lowering drugs by patients with incident MI versus incident diabetes at 100-day intervals before and after the index event.*

ics, cardiac catheterization, or statins (20–23).

An important limitation of the study is that we did not have patients' actual blood pressure and lipid measurements, so we could not assess the appropriateness of therapy. However, antihypertensive and lipid-lowering drug utilization before the index event (when all patients were free of both MI and diabetes) was greater among patients who went on to develop diabetes than among those who subsequently had an MI, suggesting that, to begin with, their blood pressure and lipid levels were actually higher. Since treatment targets after the diagnosis of diabetes are at least as aggressive as targets after an MI, any potential differences in the unmeasured clinical variables would, if anything, bias the results in the opposite direction to the observed findings.

The use of coronary disease risk-modifying medications by individuals with incident diabetes is reduced compared with those with incident MI, despite having similar or stricter blood pressure and lipid targets. In clinical practice, diabetes is not treated as a coronary artery disease risk equivalent. The undertreatment of coronary risk factors for diabetic patients is an important gap in the quality of care of these high-risk patients.

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