

SUPPLEMENTAL MATERIAL

Supplemental Tables

Table S1. Sources of data for the current population-level study.

Database	Description
Canadian Institute for Health Information Discharge Abstract Database	Records all hospitalizations in Ontario acute care hospitals
Ontario Health Insurance Plan Claims Database	Records data on physician and healthcare provider billing claims
Registered Persons Database	Records demographic and vital statistics data
National Ambulatory Care Reporting System	Records data on ambulatory and emergency department visits
Ontario Drug Benefit Claims	Records medication prescription claims data for Ontario residents aged 65 years or older
Ontario Diabetes Database	Disease-specific Institute for Clinical Evaluative Sciences-derived cohort
Ontario Hypertension Database	Disease-specific Institute for Clinical Evaluative Sciences-derived cohort

Table S2. Classification of statin intensity based on the 2013 American College of Cardiology/
American Heart Association Guidelines on the Treatment of Blood Cholesterol (1).

High Intensity Statin	Moderate Intensity Statin*	Low Intensity Statin
Atorvastatin 40-80 mg	Atorvastatin 10-20 mg	Pravastatin 10-20 mg
Rosuvastatin 20-40 mg	Rosuvastatin 5-10 mg	Lovastatin 20 mg
	Simvastatin 20-40 mg	
	Pravastatin 40-80 mg	
	Lovastatin 40-80 mg	
	Fluvastatin 40 mg BID	

* All patients on moderate dose statin therapy were first identified based on this list. Patients on doses higher than moderate intensity were classified as high dose statin. Patients on doses lower than moderate intensity were classified as low dose statin.

Table S3. Coding definitions for identifying patients, comorbid conditions and outcomes.

	Database	Codes	Validity
Carotid Revascularization Procedure			
Carotid endarterectomy	CIHI-DAD	CCI 1JE57Lx	99% PPV, 90% sensitivity (2)
Carotid-artery stenting	CIHI-DAD	CCI 1JE50x	87% PPV, 93% sensitivity (2)
Outcomes			
Any stroke	CIHI-DAD	ICD-10 I60.x I61.x I62.x I63.x, I64.x, H34.1 (excluding I63.6)	92% accurate (3)
Myocardial infarction	CIHI-DAD	ICD-10 I21.x, I22.x	87% PPV, 89% sensitivity (4) 89% PPV, 89% sensitivity, 93% specificity (5)
Comorbid Conditions			
Symptomatic carotid stenosis*	CIHI-DAD	ICD-10 I63, I64, G45, H34.1 (excluding I63.6 and G45.4) ICD-9 362.3, 433.x1, 434.x1, 436, 435.x	85% PPV (ischemic stroke diagnosis) (3) 97% PPV (TIA diagnosis) (3) 85% PPV (ischemic stroke diagnosis) (3) 70% PPV (TIA diagnosis) (3)
Coronary artery disease	CIHI-DAD	ICD-10 I21.x, I22.x, I23.x, I24.x, I25.x, Z95.5, Z95.8, Z95.9, R93.1, T82.2 ICD-9 410.x, 412.x, 414.x, 429.2, 429.5, 429.6, 429.7 CCI 1IJ26x, 1IJ27x, 1IJ54x, 1IJ57x, 1IJ50x, 1IJ76x CCP 48.01, 48.02, 48.03, 48.04, 48.05, 48.1, 48.2, 48.3	Codes based on previous study (6)
	OHIP	R741, R742, R743, G298, E646, E651, E652, E654, E655, G262, Z434, Z448	
Myocardial infarction	CIHI-DAD	ICD-10 I21.x, I22.x ICD-9 410.x	87% PPV, 89% sensitivity (4) 89% PPV, 89% sensitivity, 93% specificity (5)
Congestive heart failure	CIHI-DAD	ICD-10 I50.x ICD-9 428.x	85% PPV, 79% sensitivity (4)
Peripheral arterial	CIHI-DAD	ICD-10 I70.2, I73.9, I74.3, I74.4	Codes suggested by Cardiovascular

disease		ICD-9 440.2, 443.9, 444.2	Health in Ambulatory Care Research Team (CANHEART) investigators (7)
Diabetes mellitus	Ontario Diabetes Database	Diagnosis date in Ontario Diabetes Database that precedes the index date	80% PPV, 86% sensitivity, 97% specificity (8)
Hypertension	Ontario Hypertension Database	Diagnosis date in Ontario Hypertension Database that precedes the index date	87% PPV, 73% sensitivity, 95% specificity, 88% NPV (9)
Chronic obstructive pulmonary disease	Ontario COPD Database	Diagnosis date in Ontario COPD Database that precedes the index date	85% sensitivity, 78% specificity, 94% NPV (10)
Chronic kidney disease	CIHI-DAD	ICD-10: N032-N037, N052-N057, N18, N19, N250, Z490-Z492, Z940, Z992 ICD-9: 4030, 4031, 4039, 4040, 4041, 4049, 582, 5830-5837, 585, 586, 5880, V420, V451, V56	As defined in the calculation of Charlson Comorbidity Index by the Institute of Clinical Evaluative Sciences
Coronary revascularization	CIHI-DAD	CCI 11J50x, 11J54x, 11J57GQ, 11J76x CCP 48.02, 48.03, 48.1x	94-96% PPV (11)
Peripheral revascularization	CIHI-DAD OHIP	CCI 1KG76 CCP 51.29 J025 (excluding records with the following associated OHIP diagnosis codes: 435 436 437 584 585 403)	88% PPV, 87% sensitivity (4) 91% PPV (12)

* Symptomatic carotid stenosis defined as a prior admission or emergency department visit within the last 6 months with ischemic stroke or transient ischemic attack.

CIHI-DAD, Canadian Institute for Health Information Discharge Abstract Database; CCI, Canadian Classification of Health Interventions; PPV, positive predicative value; ICD, International Statistical Classification of Diseases; CCP, Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures; OHIP, Ontario Health Insurance Plan; NPV, negative predictive value; TIA, transient ischemic attack; COPD, chronic obstructive pulmonary disease.

Figure S1. Overview of Ontario healthcare administrative databases.

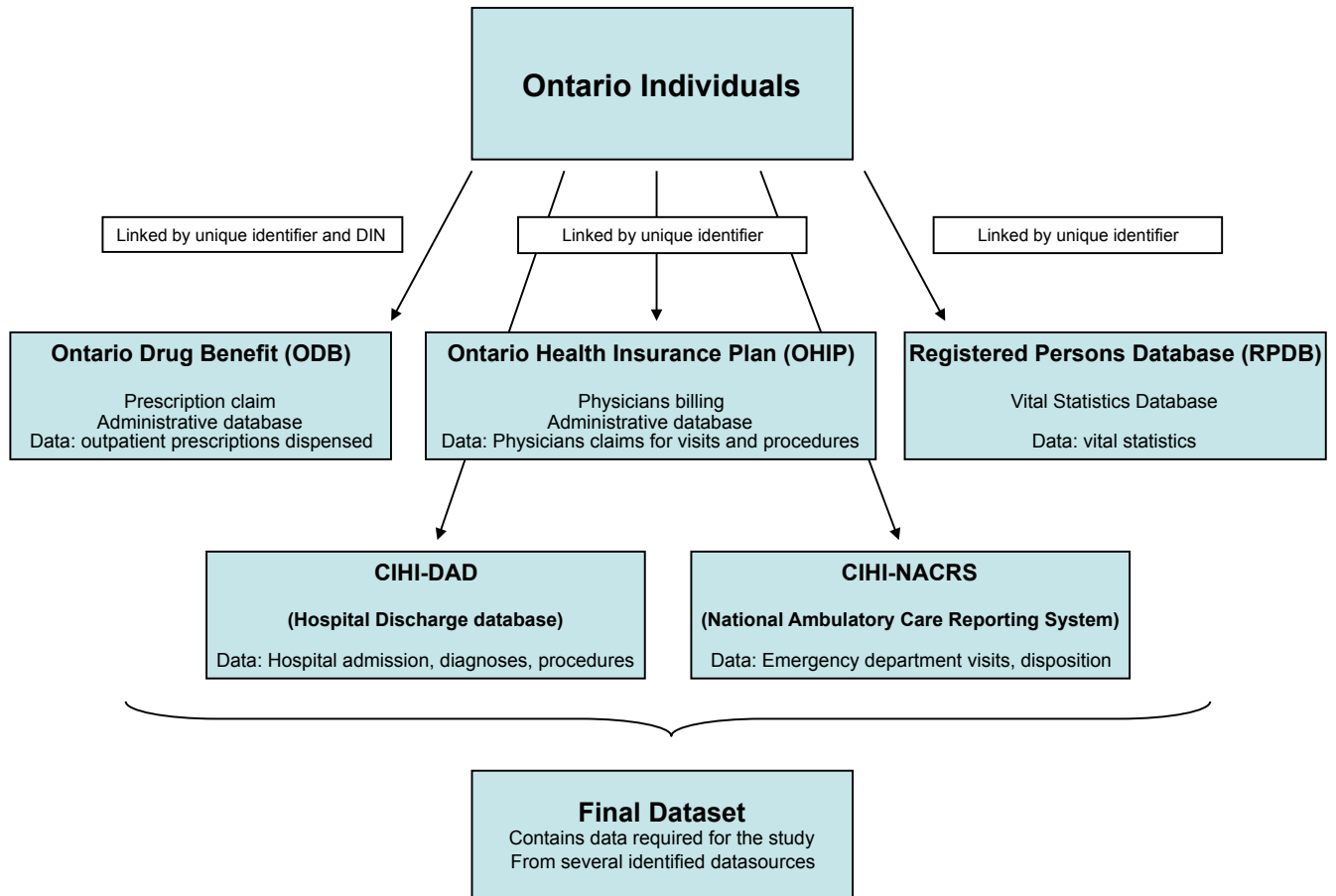


Figure S2. Types of statins prescribed to patients at baseline who underwent carotid artery revascularization (n=7893).

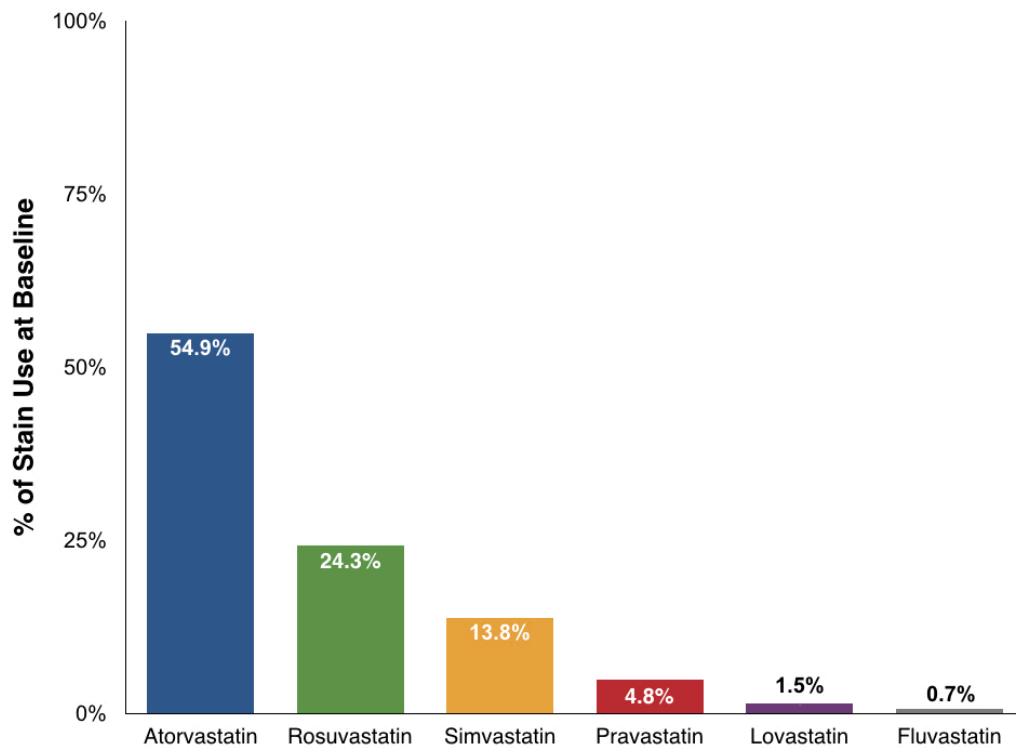
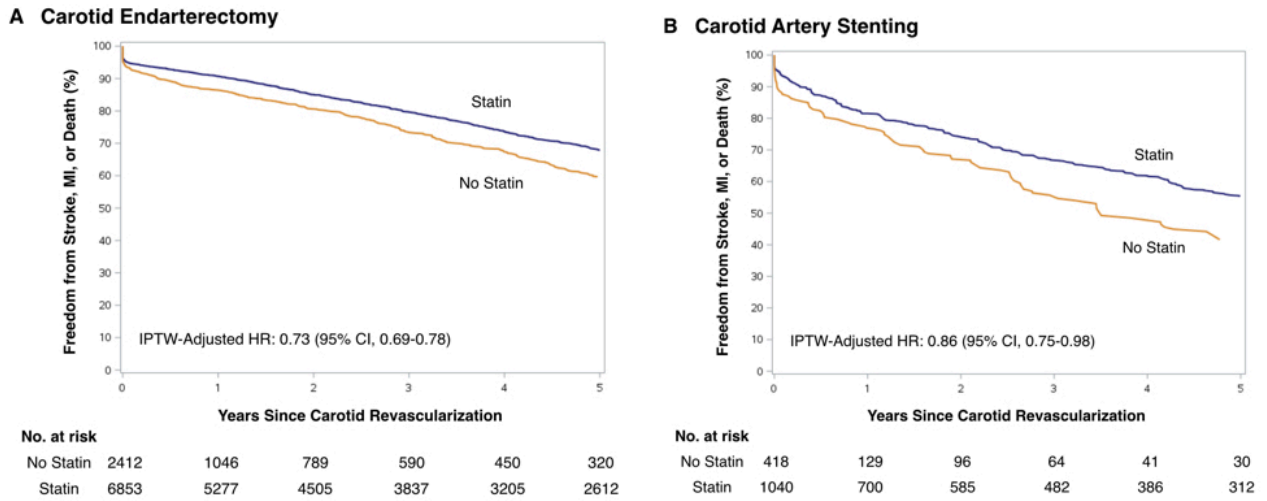


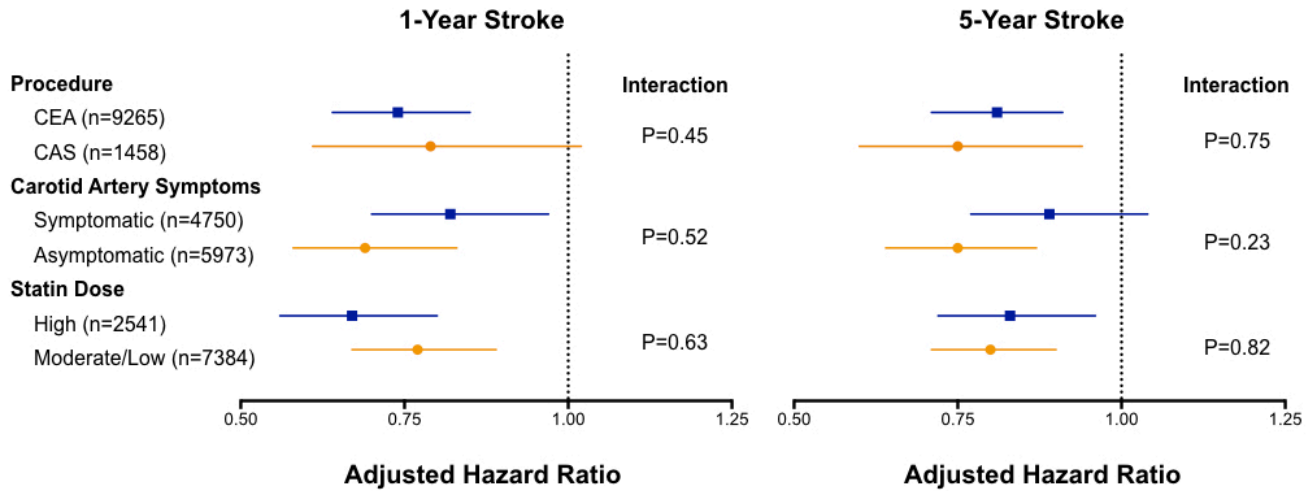
Figure S3. Adjusted Kaplan-Meier curves of 5-year outcomes after carotid endarterectomy (A) and stenting (B) by statin therapy.



Shown are the 5-year adjusted Kaplan-Meier curves for freedom from any stroke, myocardial infarction, or death after (A) carotid endarterectomy, and (B) carotid artery stenting.

MI, myocardial infarction; IPTW, inverse probability of treatment weighting; HR, hazard ratio; CI, confidence interval.

Figure S4. Risk of stroke after carotid revascularization among subgroups by statin therapy.



CEA, carotid endarterectomy; CAS, carotid artery stenting.

Supplemental References

1. Stone NJ, Robinson JG, Lichtenstein AH, Bairey Merz CN, Blum CB, Eckel RH, et al Stone NJ, Robinson JG, Lichtenstein AH, Bairey Merz CN, Blum CB, Eckel RH, Goldberg AC, Gordon D, Levy D, Lloyd-Jones DM, McBride P, Schwartz JS, Shero ST, Smith SC Jr, Watson K, Wilson PW, Eddleman KM, Jarrett NM, LaBresh K, Nevo L, Wnek J, Anderson JL, Halperin JL, Albert NM, Bozkurt B, Brindis RG, Curtis LH, DeMets D, Hochman JS, Kovacs RJ, Ohman EM, Pressler SJ, Sellke FW, Shen WK, Smith SC Jr, Tomaselli GF; American College of Cardiology/American Heart Association Task Force on Practice Guidelines. ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2014;129(25 Suppl 2):S1-45.
2. Hussain MA, Mamdani M, Saposnik G, Tu JV, Turkel-Parrella D, Spears J, Al-Omran M. Validation of Carotid Artery Revascularization Coding in Ontario Health Administrative Databases. *Clin Invest Med*. 2016;39:73–8.
3. Kokotailo RA, Hill MD. Coding of stroke and stroke risk factors using international classification of diseases, revisions 9 and 10. *Stroke*. 2005;36:1776–81.
4. Juurlink D, Preyra C, Croxford R, Chong A, Austin P, Tu J, Laupacis A. Canadian Institute for Health Information discharge abstract database: a validation study. Toronto (ON): Institute for Clinical Evaluative Sciences; 2006.
5. Austin PC, Daly PA, Tu JV. A multicenter study of the coding accuracy of hospital discharge administrative data for patients admitted to cardiac care units in Ontario. *Am Heart J*. 2002;144:290–6.
6. Li DQ, Kim R, McArthur E, Fleet JL, Bailey DG, Juurlink D, Shariff SZ, Gomes T, Mamdani M, Gandhi S, Dixon S, Garg AX. Risk of adverse events among older adults following co-prescription of clarithromycin and statins not metabolized by cytochrome P450 3A4. *CMAJ*. 2015;187:174–80.

7. Tu JV, Chu A, Donovan LR, Ko DT, Booth GL, Tu K, Maclagan LC, Guo H, Austin PC, Hogg W, Kapral MK, Wijeyesundera HC, Atzema CL, Gershon AS, Alter DA, Lee DS, Jackevicius CA, Bhatia RS, Udell JA, Rezai MR, Stukel TA. The Cardiovascular Health in Ambulatory Care Research Team (CANHEART): using big data to measure and improve cardiovascular health and healthcare services. *Circ Cardiovasc Qual Outcomes*. 2015;8:204–12.
8. Hux JE, Ivis F, Flintoft V, Bica A. Diabetes in Ontario: determination of prevalence and incidence using a validated administrative data algorithm. *Diabetes Care*. 2002;25:512–6.
9. Tu K, Campbell NR, Chen Z-L, Cauch-Dudek KJ, McAlister FA. Accuracy of administrative databases in identifying patients with hypertension. *Open Med Peer-Rev Indep Open-Access J*. 2007;1:e18-26.
10. Gershon AS, Wang C, Guan J, Vasilevska-Ristovska J, Cicutto L, To T. Identifying individuals with physician diagnosed COPD in health administrative databases. *COPD*. 2009;6:388–94.
11. Lee DS, Stitt A, Wang X, Yu JS, Gurevich Y, Kingsbury KJ, Austin PC, Tu JV. Administrative hospitalization database validation of cardiac procedure codes. *Med Care*. 2013;51:e22-26.
12. Al-Omran M, Tu JV, Johnston KW, Mamdani MM, Kucey DS. Use of interventional procedures for peripheral arterial occlusive disease in Ontario between 1991 and 1998: a population-based study. *J Vasc Surg*. 2003;38:289–95.