

Supplementary Online Content

Chang H-Y, Singh S, Mansour O, Baksh S, Alexander GC. Association between sodium-glucose cotransporter 2 inhibitors and lower extremity amputation among patients with type 2 diabetes. *JAMA Intern Med*. Published online August 13, 2018. doi:10.1001/jamainternmed.2018.3034

eAppendix 1. Outcomes

eAppendix 2. Control Variable – Comorbidities

eTable 1. Distribution of Reasons for Exiting the Cohort

eTable 2. Diabetes Medications – Main Exposure

eTable 3. Insulin And Control Variable – Medications

eTable 4. Standardized Differences (SD) - First Cohort / Before Propensity Score Weighting

eTable 5. Standardized Differences (SD) - First Cohort / After Propensity Score Weighting

eTable 6. Standardized Differences (SD) – Second Cohort / Before Propensity Score Weighting

eTable 7. Standardized Differences (SD) - Second Cohort / After Propensity Score Weighting

eTable 8. Variables With the Proportional Hazard Assumption Violation for Each Outcome and the Comparison Drug (Relative to SGLT-2)

eTable 9. Characteristics of the Study Sample - the Second Cohort

eTable 10. Adjusted Association Between SGLT2 Use, Amputation and Other Vascular Outcomes – Different Methods of Control Variables Inclusion (Regression Covariates With and Without ATT Weighting)

eTable 11. Adjusted Association Between SGLT2 Use, Amputation and Other Vascular Outcomes After Combining DPP4 Inhibitors and GLP1 Agonists as Single Reference Group

eTable 12. Adjusted Association Between SGLT2 Use, Amputation and Other Vascular Outcomes Accounting for Use of Sulfonylureas, Metformin and TZDs During Baseline Period

eTable 13. Adjusted Association Between SGLT2 Use and Amputation – Including Patients With Amputation in The Baseline

This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix 1. Outcomes

Ulcer:

Definition

ICD-9-CM:

707.1x

Performance Measure

Sensitivity: 74.2

Specificity: 98.3

Predictive Positive Value: 88.5

Source

Newton KM, Wagner EH, Ramsey SD, McCulloch D, Evans R, Sandhu N, Davis C. The use of automated data to identify complications and comorbidities of diabetes: a validation study. J Clin Epidemiol. 1999;52(3):199–207.

Osteomyelitis

Definition

ICD-9-CM:

730.xx

Performance Measure

Sensitivity: 82.1

Specificity: 96.9

Predictive Positive Value: 63.9

Source

Newton KM, Wagner EH, Ramsey SD, McCulloch D, Evans R, Sandhu N, Davis C. The use of automated data to identify complications and comorbidities of diabetes: a validation study. J Clin Epidemiol. 1999;52(3):199–207.

Amputation

Definition

ICD-9-CM procedure code:

84.11

84.12

84.13

84.14

84.15

84.16

84.17

CPT:

28800

28805

28810

28820

28825

Performance Measure

Sensitivity: 94.6

Specificity: 96.8

Predictive Positive Value: 85.4

Source

Newton KM, Wagner EH, Ramsey SD, McCulloch D, Evans R, Sandhu N, Davis C. The use of automated data to identify complications and comorbidities of diabetes: a validation study. *J Clin Epidemiol.* 1999;52(3):199–207.

Peripheral vascular disease

Definition

ICD-9-CM:

250.7x440.xx441.xx442.3x443.9x444.22443.81785.4x

Performance Measure

Sensitivity: 71.8

Specificity: 86.6

Predictive Positive Value: 63.8

Source

Newton KM, Wagner EH, Ramsey SD, McCulloch D, Evans R, Sandhu N, Davis C. The use of automated data to identify complications and comorbidities of diabetes: a validation study. *J Clin Epidemiol.* 1999;52(3):199–207.

Critical limb ischemia

Definition

ICD-9-CM:

440.22

440.23

440.24

443.9x

Performance Measure

Sensitivity: 75

Kappa: 80

Source

Bekwelem W, Bengtson LG, Oldenburg NC, Winden TJ, Keo HH, Hirsch AT, Duval S. Development of administrative data algorithms to identify patients with critical limb ischemia. *Vasc Med.* 2014;19:483–490.

eAppendix 2. Control Variable – Comorbidities

Macrovascular and Microvascular Disease

Definition

Cerebrovascular Disease

ICD-9-CM: 430.xx, 431.xx, 432.xx, 433.xx, 434.xx, 435.xx, 436.xx, 437.xx, 438.xx

Congestive Heart Failure

ICD-9-CM: 426.xx, 427.xx, 428.xx

Ischemic Heart Disease

ICD-9-CM: 410.xx, 411.xx, 412.xx, 413.xx, 414.xx

Hypertension

ICD-9-CM: 401.xx, 402.xx, 403.xx, 404.xx, 405.xx

Retinopathy

ICD-9-CM: 362.xx, 250.5x, 379.23

Nephropathy

ICD-9-CM: 581.xx, 585.xx, 586.xx

Neuropathy

ICD-9-CM: 337.xx, 357.xx

Source

Erkens JA, Klungel OH, Stolk RP, Spoelstra JA, Grobbee DE, Leufkens HG. Antihypertensive drug therapy and the risk of lower extremity amputations in pharmacologically treated type 2 diabetes patients. *Pharmacoepidemiol Drug Safety*. 2004;13(3):139–46

Atrial fibrillation

Definition

ICD-9-CM: 427.31 / First or Second position

Source

Abraham NS, Singh S, Alexander GC, et al. Comparative risk of gastrointestinal bleeding with dabigatran, rivaroxaban, and warfarin: population based cohort study. *BMJ*. 2015;350:h1857.

Renal Disease

Definition

CPT: 90935-90999

ICD-9-CM: 584.xx, 585.xx, 586.xx

ICD-9-CM procedure code: 55.6

Source

Newton KM, Wagner EH, Ramsey SD, McCulloch D, Evans R, Sandhu N, Davis C. The use of automated data to identify complications and comorbidities of diabetes: a validation study. *J Clin Epidemiol*. 1999;52(3):199–207.

Eye Disease

Definition

ICD-9-CM: 361.9x, 362.01, 362.02, 362.8x, 379.23

ICD-9-CM procedure code: 14.7

Source

Newton KM, Wagner EH, Ramsey SD, McCulloch D, Evans R, Sandhu N, Davis C. The use of automated data to identify complications and comorbidities of diabetes: a validation study. *J Clin Epidemiol*. 1999;52(3):199–207.

eTable 1. Distribution of Reasons for Exiting the Cohort

Type of medication	SGLT2	DPP4	GLP1	Other ¹
<i>Amputation**</i>				
Loss of medical or pharmacy enrollment	5,931 14.88%	18,949 18.04%	5,563 14.22%	184,079 23.91%
Hospitalization	1,091 2.74%	3,499 3.33%	1,073 2.74%	41,503 5.39%
Loss of continuous drug at hand	13,801 34.62%	48,362 46.05%	20,243 51.75%	416,664 54.12%
Addition of other newer agents	4,055 10.17%	7,823 7.45%	2,566 6.56%	0 0.00%
Study end: Sep 30, 2015	14,973 37.56%	26,349 25.09%	9,664 24.70%	127,417 16.55%
Uncensored outcome	18 0.05%	41 0.04%	11 0.03%	231 0.03%
<i>Ulcer**</i>				
Loss of medical or pharmacy enrollment	5,720 14.78%	18,200 17.95%	5,357 14.12%	179,229 23.74%
Hospitalization	1,007 2.60%	3,187 3.14%	986 2.60%	39,574 5.24%
Loss of continuous drug at hand	13,392 34.61%	46,707 46.06%	19,634 51.76%	409,023 54.17%
Addition of other newer agents	3,895 10.07%	7,548 7.44%	2,461 6.49%	0 0.00%
Study end: Sep 30, 2015	14,553 37.61%	25,435 25.08%	9,384 24.74%	124,808 16.53%
Uncensored outcome	125 0.32%	331 0.33%	110 0.29%	2,407 0.32%
<i>Osteomyelitis**</i>				
Loss of medical or pharmacy enrollment	5,734 14.82%	18,240 17.99%	5,374 14.17%	179,710 23.80%
Hospitalization	1,011 2.61%	3,209 3.16%	1,001 2.64%	39,728 5.26%
Loss of continuous drug at hand	13,413 34.67%	46,792 46.14%	19,671 51.86%	409,625 54.25%
Addition of other newer agents	3,905 10.09%	7,568 7.46%	2,466 6.50%	0 0.00%
Study end: Sep 30, 2015	14,592 37.7%	25,523 25.17%	9,400 24.78%	125,288 16.59%

Uncensored outcome	37 0.10%	76 0.07%	20 0.05%	690 0.09%
<i>Peripheral Vascular Disease**</i>				
Loss of medical or pharmacy enrollment	5,676 14.67%	17,968 17.72%	5,309 14.00%	177,037 23.45%
Hospitalization	969 2.50%	3,077 3.03%	952 2.51%	38,527 5.10%
Loss of continuous drug at hand	13,274 34.31%	46,100 45.46%	19,454 51.29%	405,593 53.72%
Addition of other newer agents	3,844 9.93%	7,459 7.36%	2,433 6.41%	0 0.00%
Study end: Sep 30, 2015	14,384 37.18%	24,960 24.61%	9,275 24.45%	122,701 16.25%
Uncensored outcome	545 1.41%	1,844 1.82%	509 1.34%	11,183 1.47%
<i>Critical Limb Ischemia**</i>				
Loss of medical or pharmacy enrollment	5,715 14.77%	18,127 17.88%	5,349 14.10%	178,777 23.68%
Hospitalization	1,001 2.59%	3,164 3.12%	976 2.57%	39,301 5.21%
Loss of continuous drug at hand	13,375 34.57%	46,537 45.89%	19,592 51.65%	408,139 54.06%
Addition of other newer agents	3,877 10.02%	7,533 7.43%	2,456 6.47%	0 0.00%
Study end: Sep 30, 2015	14,532 37.56%	25,299 24.95%	9,343 24.63%	124,303 16.46%
Uncensored outcome	192 0.50%	748 0.74%	216 0.57%	4,521 0.60%

¹ Includes any combination of metformin, sulfonylureas and glitazones.

eTable 2. Diabetes Medications – Main Exposure

DM Drug Category	Non-Proprietary Name
SGLT-2	canagliflozin canagliflozin and metformin hydrochloride dapagliflozin dapagliflozin and metformin hydrochloride empagliflozin empagliflozin and linagliptin empagliflozin and metformin hydrochloride
DPP-4	alogliptin alogliptin and metformin hydrochloride alogliptin and pioglitazone empagliflozin and linagliptin linagliptin linagliptin and metformin hydrochloride saxagliptin saxagliptin and metformin hydrochloride sitagliptin sitagliptin and metformin hydrochloride
GLP-1	albiglutide dulaglutide exenatide liraglutide
Sulfonylureas	chlorpropamide glimepiride glipizide glipizide and metformin hydrochloride glipizide ER glyburide glyburide and metformin glyburide and metformin hydrochloride pioglitazone and glimepiride pioglitazone hydrochloride and glimepiride tolazamide tolbutamide

Metformin	<p>alogliptin and metformin hydrochloride canagliflozin and metformin hydrochloride dapagliflozin and metformin hydrochloride empagliflozin and metformin hydrochloride glipizide and metformin hydrochloride glyburide and metformin glyburide and metformin hydrochloride linagliptin and metformin hydrochloride metformin metformin hydrochloride metformin hydrochloride ER pioglitazone and metformin hydrochloride rosiglitazone maleate and metformin hydrochloride saxagliptin and metformin hydrochloride sitagliptin and metformin hydrochloride</p>
Thiazolidinediones	<p>alogliptin and pioglitazone pioglitazone and glimepiride pioglitazone and metformin hydrochloride pioglitazone hydrochloride and glimepiride rosiglitazone maleate and metformin hydrochloride</p>

eTable 3. Insulin And Control Variable – Medications

Drug Category	Non-Proprietary Name
Insulin	insulin degludec and liraglutide insulin aspart insulin degludec injection insulin detemir insulin glargine insulin glargine and lixisenatide insulin glulisine insulin human insulin lispro
ACE inhibitors	benazepril captopril enalapril enalaprilat fosinopril lisinopril moexipril perindopril quinapril ramipril trandolapril
Anticoagulants	apixaban ardeparin argatroban betrixaban bivalirudin dabigatran dalteparin danaparoid desirudin edoxaban enoxaparin fondaparinux heparin heparin flush lepirudin rivaroxaban tinzaparin warfarin
Angiotensin receptor blockers (ARBs)	azilsartan azilsartan kamedoxomil candesartan candesartan cilexetil eprosartan olmesartan medoxomil eprosartan mesylate irbesartan losartan

	olmesartan medoxomil sacubitril valsartan telmisartan valsartan
Aspirin	acetylsalicylic acid aspirin
Asthma	albuterol aminophylline beclomethasone budesonide budesonide/formoterol ciclesonide cromolyn dexamethasone dyphylline dyphylline/guaifenesin ephedrine epinephrine flunisolide fluticasone fluticasone/salmeterol fluticasone/vilanterol formoterol formoterol/mometasone guaifenesin/theophylline hydrocortisone ipratropium levalbuterol mepolizumab metaproterenol methylprednisolone mometasone montelukast omalizumab prednisolone prednisone racepinephrine reslizumab salmeterol terbutaline theophylline tiotropium triamcinolone zafirlukast zileuton
Bile acid sequestrants	cholestyramine colesevelam colestipol
Carbonic anhydrase	acetazolamide

inhibitors	dichlorphenamide methazolamide
Cardioselective beta blocker	acebutolol atenolol betaxolol bisoprolol esmolol metoprolol nebivolol
Calcium Channel Blockers	amlodipine clevidipine diltiazem felodipine isradipine nicardipine nifedipine nimodipine nisoldipine verapamil
Fibrates	clofibrate fenofibrate fenofibric acid gemfibrozil
Glycoprotein platelet inhibitors	abciximab eptifibatide tirofiban
Hormone Replacement Therapy	conjugated estrogen estradiol estradiol/norethisterone acetate estrogen medroxyprogesterone acetate norethisterone acetate testosterone testosterone undecanoate
Loop diuretic	bumetanide ethacrynic acid furosemide torsemide
Niacin	niacin nicotinic acid
Beta blocker	carvedilol labetalol nadolol nebivolol penbutolol pindolol propranolol sotalol timolol

Platelet aggregation inhibitors	aspirin aspirin/dipyridamole aspirin/omeprazole cangrelor cilostazol clopidogrel dipyridamole prasugrel ticagrelor ticlopidine
Potassium sparing diuretic	amiloride eplerenone spironolactone triamterene
Statin	atorvastatin fluvastatin lovastatin pitavastatin pravastatin red yeast rice rosuvastatin simvastatin
Thiazide	bendroflumethiazide chlorthalidone eprosartan mesylate hydrochlorothiazide hydrochlorothiazide indapamide irbesartan hydrochlorothiazide methyclothiazide metolazone telmisartan hydrochlorothiazide thiazide

eTable 4. Standardized Differences (SD) - First Cohort / Before Propensity Score Weighting

Type of Drugs	SGLT-2	DPP-4	SD	SGLT-2	GLP-1	SD	SGLT-2	Other	SD
Demographics									
Female, %	47.26%	43.34%	-0.079	47.26%	60.95%	0.277	47.26%	55.57%	0.167
Mean age, years	53.54	54.54	0.118	53.54	51.87	-0.184	53.54	51.37	-0.056
Age 18 – 34 years, %	2.70%	2.26%	-0.028	2.70%	5.20%	0.129	2.70%	10.48%	0.318
Age 35 - 44 years, %	12.64%	10.71%	-0.060	12.64%	16.83%	0.118	12.64%	14.67%	0.059
Age 45 - 54 years, %	32.99%	30.24%	-0.059	32.99%	32.36%	-0.013	32.99%	26.30%	-0.147
Age 55 - 64 years, %	45.84%	48.88%	0.061	45.84%	40.37%	-0.111	45.84%	41.10%	-0.096
Age 65 or older years, %	5.84%	7.91%	0.082	5.84%	5.24%	-0.026	5.84%	7.45%	0.065
Diabetes Severity									
Mean aDCSI score	0.14	0.17	0.054	0.14	0.15	0.011	0.14	0.10	-0.141
aDCSI 0, %	89.13%	88.08%	-0.033	89.13%	88.73%	-0.013	89.13%	92.69%	0.124
aDCSI 1, %	8.06%	8.01%	-0.002	8.06%	8.40%	0.012	8.06%	5.05%	-0.122
aDCSI 2, %	2.38%	3.16%	0.048	2.38%	2.33%	-0.003	2.38%	1.90%	-0.033
aDCSI 3 or higher, %	0.43%	0.76%	0.042	0.43%	0.54%	0.015	0.43%	0.36%	-0.012
Diagnosis-based Conditions in the baseline									
Cerebrovascular Disease	1.83%	2.32%	0.034	1.83%	1.82%	-0.001	1.83%	1.63%	-0.016
Congestive Heart Failure	4.02%	4.91%	0.043	4.02%	4.25%	0.012	4.02%	3.75%	-0.014
Ischemic Heart Disease	5.79%	6.69%	0.037	5.79%	5.42%	-0.016	5.79%	4.47%	-0.060
Hypertension	59.76%	55.92%	-0.078	59.76%	52.01%	-0.156	59.76%	39.69%	-0.410
Retinopathy	4.53%	4.92%	0.019	4.53%	4.07%	-0.022	4.53%	2.55%	-0.107
Nephropathy	1.36%	2.93%	0.109	1.36%	2.00%	0.050	1.36%	1.20%	-0.014
Neuropathy	2.02%	1.86%	-0.011	2.02%	2.00%	-0.001	2.02%	0.86%	-0.097
Atrial fibrillation	1.14%	1.31%	0.015	1.14%	1.15%	0.001	1.14%	1.01%	-0.012
Renal Disease	1.57%	3.36%	0.116	1.57%	2.21%	0.047	1.57%	1.44%	-0.010
Eye Disease	1.63%	1.66%	0.002	1.63%	1.38%	-0.021	1.63%	0.73%	-0.083
Medications in the baseline									

ACE inhibitors	37.45%	36.76%	-0.014	37.45%	32.73%	-0.099	37.45%	27.31%	-0.218
Anticoagulants	1.93%	2.15%	0.016	1.93%	2.08%	0.010	1.93%	1.88%	-0.004
Angiotensin receptor blockers	22.85%	22.19%	-0.016	22.85%	21.69%	-0.028	22.85%	14.61%	-0.212
Aspirin	0.82%	0.95%	0.014	0.82%	0.65%	-0.019	0.82%	0.48%	-0.042
Asthma	27.25%	25.54%	-0.039	27.25%	30.59%	0.074	27.25%	26.04%	-0.027
Bile Acid Sequestrants	1.22%	1.07%	-0.014	1.22%	1.29%	0.006	1.22%	0.65%	-0.059
Carbonic Anhydrase Inhibitors	0.07%	0.07%	0.002	0.07%	0.13%	0.022	0.07%	0.10%	0.011
Cardioselective Beta Blockers	12.79%	13.50%	0.021	12.79%	12.13%	-0.020	12.79%	11.85%	-0.029
Calcium Channel Blockers	17.02%	17.41%	0.010	17.02%	15.07%	-0.053	17.02%	13.29%	-0.104
Fibrates	9.03%	8.92%	-0.004	9.03%	8.08%	-0.034	9.03%	5.60%	-0.132
Hormone Replacement Therapy	7.97%	6.02%	-0.076	7.97%	11.72%	0.126	7.97%	9.55%	0.056
Loop Diuretic	4.10%	4.09%	0.000	4.10%	5.37%	0.060	4.10%	3.20%	-0.048
Niacin	1.27%	1.26%	-0.001	1.27%	1.45%	0.016	1.27%	1.50%	0.020
Beta-blockers	5.29%	5.50%	0.009	5.29%	5.69%	0.018	5.29%	4.37%	-0.043
Platelet Aggregation Inhibitors	1.46%	1.61%	0.013	1.46%	1.12%	-0.030	1.46%	0.86%	-0.056
Potassium Sparing Diuretic	4.00%	3.88%	-0.006	4.00%	5.51%	0.071	4.00%	4.43%	0.021
Statin	36.08%	34.07%	-0.042	36.08%	31.49%	-0.097	36.08%	21.79%	-0.319
Thiazide	36.23%	35.86%	-0.008	36.23%	35.45%	-0.016	36.23%	31.33%	-0.104

eTable 5. Standardized Differences (SD) - First Cohort / After Propensity Score Weighting

Type of Drugs	SGLT-2	DPP-4	SD	SGLT-2	GLP-1	SD	SGLT-2	Other	SD
Demographics									
Female, %	47.26%	47.26%	0.000	47.26%	47.08%	-0.004	47.26%	47.15%	-0.002
Mean age, years	53.54	53.53	-0.001	53.54	53.62	0.010	53.54	53.60	0.002
Age 18 – 34 years, %	2.70%	3.15%	0.027	2.70%	2.92%	0.014	2.70%	6.05%	0.165
Age 35 - 44 years, %	12.64%	12.79%	0.004	12.64%	13.10%	0.014	12.64%	11.45%	-0.037
Age 45 - 54 years, %	32.99%	32.02%	-0.021	32.99%	31.10%	-0.040	32.99%	26.48%	-0.143
Age 55 - 64 years, %	45.84%	45.36%	-0.010	45.84%	46.34%	0.010	45.84%	46.96%	0.022
Age 65 or older years, %	5.84%	6.69%	0.035	5.84%	6.54%	0.029	5.84%	9.06%	0.123
Diabetes Severity									
Mean aDCSI score	0.14	0.14	-0.001	0.14	0.14	0.005	0.14	0.14	0.007
aDCSI 0, %	89.13%	89.35%	0.007	89.13%	88.81%	-0.010	89.13%	89.67%	0.017
aDCSI 1, %	8.06%	7.73%	-0.012	8.06%	8.44%	0.014	8.06%	7.13%	-0.035
aDCSI 2, %	2.38%	2.45%	0.005	2.38%	2.29%	-0.006	2.38%	2.61%	0.015
aDCSI 3 or higher, %	0.43%	0.48%	0.008	0.43%	0.46%	0.004	0.43%	0.59%	0.023
Diagnosis-based Conditions in the baseline									
Cerebrovascular Disease	1.83%	1.83%	0.000	1.83%	1.84%	0.001	1.83%	1.84%	0.001
Congestive Heart Failure	4.02%	4.01%	-0.001	4.02%	4.06%	0.002	4.02%	4.04%	0.001
Ischemic Heart Disease	5.79%	5.79%	0.000	5.79%	5.81%	0.001	5.79%	5.81%	0.001
Hypertension	59.76%	59.78%	0.000	59.76%	60.09%	0.007	59.76%	59.84%	0.002
Retinopathy	4.53%	4.53%	0.000	4.53%	4.57%	0.002	4.53%	4.56%	0.002
Nephropathy	1.36%	1.36%	0.000	1.36%	1.39%	0.003	1.36%	1.37%	0.001
Neuropathy	2.02%	2.02%	0.000	2.02%	2.07%	0.004	2.02%	2.04%	0.002
Atrial fibrillation	1.14%	1.14%	0.000	1.14%	1.14%	0.000	1.14%	1.15%	0.000
Renal Disease	1.57%	1.56%	0.000	1.57%	1.61%	0.003	1.57%	1.58%	0.001
Eye Disease	1.63%	1.62%	-0.001	1.63%	1.65%	0.002	1.63%	1.64%	0.001
Medications in the baseline									

ACE inhibitors	37.45%	37.49%	0.001	37.45%	37.76%	0.006	37.45%	37.53%	0.002
Anticoagulants	1.93%	1.93%	0.000	1.93%	1.95%	0.001	1.93%	1.94%	0.001
Angiotensin receptor blockers	22.85%	22.87%	0.001	22.85%	23.00%	0.004	22.85%	22.90%	0.001
Aspirin	0.82%	0.82%	0.000	0.82%	0.81%	-0.001	0.82%	0.82%	0.001
Asthma	27.25%	27.27%	0.000	27.25%	27.19%	-0.001	27.25%	27.30%	0.001
Bile Acid Sequestrants	1.22%	1.22%	0.001	1.22%	1.24%	0.002	1.22%	1.23%	0.001
Carbonic Anhydrase Inhibitors	0.07%	0.07%	0.000	0.07%	0.06%	0.000	0.07%	0.07%	0.001
Cardioselective Beta Blockers	12.79%	12.79%	0.000	12.79%	12.93%	0.004	12.79%	12.81%	0.001
Calcium Channel Blockers	17.02%	17.02%	0.000	17.02%	17.17%	0.004	17.02%	17.02%	0.000
Fibrates	9.03%	9.06%	0.001	9.03%	9.14%	0.004	9.03%	9.09%	0.002
Hormone Replacement Therapy	7.97%	8.01%	0.002	7.97%	7.98%	0.001	7.97%	7.92%	-0.002
Loop Diuretic	4.10%	4.06%	-0.002	4.10%	4.19%	0.005	4.10%	4.12%	0.001
Niacin	1.27%	1.27%	0.000	1.27%	1.28%	0.001	1.27%	1.27%	0.000
Beta-blockers	5.29%	5.28%	0.000	5.29%	5.39%	0.005	5.29%	5.30%	0.001
Platelet Aggregation Inhibitors	1.46%	1.46%	0.000	1.46%	1.47%	0.000	1.46%	1.46%	0.000
Potassium Sparing Diuretic	4.00%	3.97%	-0.001	4.00%	4.03%	0.002	4.00%	4.00%	0.000
Statin	36.08%	36.12%	0.001	36.08%	36.48%	0.008	36.08%	36.17%	0.002
Thiazide	36.23%	36.22%	0.000	36.23%	36.49%	0.005	36.23%	36.27%	0.001

eTable 6. Standardized Differences (SD) – Second Cohort / Before Propensity Score Weighting

Type of Drugs	SGLT-2	DPP-4	SD	SGLT-2	GLP-1	SD	SGLT-2	Other	SD
Demographics									
Female, %	47.52%	43.58%	-0.079	47.52%	61.36%	0.281	47.52%	55.84%	0.167
Mean age, years	53.44	54.43	0.118	53.44	51.74	-0.187	53.44	51.25	-0.057
Age 18 – 34 years, %	2.76%	2.31%	-0.028	2.76%	5.33%	0.131	2.76%	10.65%	0.320
Age 35 - 44 years, %	12.84%	10.93%	-0.059	12.84%	17.16%	0.121	12.84%	14.86%	0.059
Age 45 - 54 years, %	33.31%	30.51%	-0.060	33.31%	32.51%	-0.017	33.31%	26.44%	-0.151
Age 55 - 64 years, %	45.41%	48.51%	0.062	45.41%	39.91%	-0.111	45.41%	40.76%	-0.094
Age 65 or older years, %	5.68%	7.74%	0.083	5.68%	5.10%	-0.026	5.68%	7.28%	0.065
Diabetes Severity									
Mean aDCSI score	0.12	0.14	0.040	0.12	0.12	0.009	0.12	0.08	-0.135
aDCSI 0, %	90.78%	90.10%	-0.023	90.78%	90.50%	-0.009	90.78%	93.88%	0.117
aDCSI 1, %	7.02%	6.81%	-0.008	7.02%	7.26%	0.009	7.02%	4.29%	-0.118
aDCSI 2, %	1.95%	2.66%	0.047	1.95%	1.92%	-0.002	1.95%	1.63%	-0.025
aDCSI 3 or higher, %	0.25%	0.43%	0.031	0.25%	0.31%	0.012	0.25%	0.20%	-0.011
Diagnosis-based Conditions in the baseline									
Cerebrovascular Disease	1.60%	1.97%	0.028	1.60%	1.57%	-0.003	1.60%	1.42%	-0.014
Congestive Heart Failure	3.77%	4.54%	0.038	3.77%	4.02%	0.013	3.77%	3.53%	-0.013
Ischemic Heart Disease	5.32%	6.07%	0.033	5.32%	4.93%	-0.018	5.32%	4.11%	-0.057
Hypertension	59.29%	55.25%	-0.082	59.29%	51.34%	-0.160	59.29%	39.16%	-0.411
Retinopathy	4.34%	4.77%	0.020	4.34%	3.95%	-0.020	4.34%	2.48%	-0.103
Nephropathy	1.30%	2.73%	0.102	1.30%	1.86%	0.044	1.30%	1.12%	-0.016
Neuropathy	1.76%	1.61%	-0.012	1.76%	1.73%	-0.002	1.76%	0.76%	-0.090
Atrial fibrillation	1.08%	1.21%	0.013	1.08%	1.09%	0.001	1.08%	0.95%	-0.013
Renal Disease	1.50%	3.12%	0.108	1.50%	2.05%	0.042	1.50%	1.34%	-0.013
Eye Disease	1.56%	1.60%	0.003	1.56%	1.32%	-0.020	1.56%	0.70%	-0.082
Medications in the baseline									

ACE inhibitors	37.29%	36.66%	-0.013	37.29%	32.56%	-0.099	37.29%	27.12%	-0.219
Anticoagulants	1.84%	1.98%	0.011	1.84%	1.97%	0.010	1.84%	1.76%	-0.006
Angiotensin receptor blockers	22.70%	22.04%	-0.016	22.70%	21.53%	-0.028	22.70%	14.49%	-0.212
Aspirin	0.78%	0.91%	0.015	0.78%	0.64%	-0.017	0.78%	0.46%	-0.040
Asthma	27.16%	25.31%	-0.042	27.16%	30.52%	0.074	27.16%	25.92%	-0.028
Bile Acid Sequestrants	1.21%	1.06%	-0.014	1.21%	1.27%	0.005	1.21%	0.64%	-0.060
Carbonic Anhydrase Inhibitors	0.06%	0.07%	0.002	0.06%	0.14%	0.023	0.06%	0.10%	0.011
Cardioselective Beta Blockers	12.58%	13.20%	0.019	12.58%	11.82%	-0.023	12.58%	11.62%	-0.029
Calcium Channel Blockers	16.89%	17.17%	0.007	16.89%	14.83%	-0.057	16.89%	13.10%	-0.106
Fibrates	8.99%	8.87%	-0.004	8.99%	8.00%	-0.036	8.99%	5.55%	-0.133
Hormone Replacement Therapy	8.02%	6.07%	-0.076	8.02%	11.81%	0.127	8.02%	9.63%	0.057
Loop Diuretic	3.95%	3.85%	-0.005	3.95%	5.14%	0.057	3.95%	3.04%	-0.049
Niacin	1.25%	1.23%	-0.001	1.25%	1.41%	0.015	1.25%	1.48%	0.020
Beta-blockers	5.11%	5.30%	0.009	5.11%	5.53%	0.019	5.11%	4.27%	-0.040
Platelet Aggregation Inhibitors	1.33%	1.49%	0.013	1.33%	1.04%	-0.027	1.33%	0.78%	-0.054
Potassium Sparing Diuretic	3.96%	3.82%	-0.007	3.96%	5.48%	0.072	3.96%	4.40%	0.022
Statin	35.88%	33.78%	-0.044	35.88%	31.21%	-0.099	35.88%	21.54%	-0.321
Thiazide	36.18%	35.81%	-0.008	36.18%	35.29%	-0.019	36.18%	31.19%	-0.106

eTable 7. Standardized Differences (SD) - Second Cohort / After Propensity Score Weighting

Type of Drugs	SGLT-2	DPP-4	SD	SGLT-2	GLP-1	SD	SGLT-2	Other	SD
Demographics									
Female, %	47.52%	47.52%	0.000	47.52%	47.32%	-0.004	47.52%	47.41%	-0.002
Mean age, years	53.44	53.43	-0.001	53.44	53.53	0.010	53.44	53.50	0.002
Age 18 – 34 years, %	2.76%	3.22%	0.027	2.76%	2.98%	0.013	2.76%	6.15%	0.165
Age 35 - 44 years, %	12.84%	13.02%	0.005	12.84%	13.36%	0.015	12.84%	11.62%	-0.037
Age 45 - 54 years, %	33.31%	32.22%	-0.023	33.31%	31.27%	-0.044	33.31%	26.67%	-0.145
Age 55 - 64 years, %	45.41%	44.99%	-0.009	45.41%	46.00%	0.012	45.41%	46.68%	0.025
Age 65 or older years, %	5.68%	6.56%	0.037	5.68%	6.40%	0.030	5.68%	8.88%	0.124
Diabetes Severity									
Mean aDCSI score	0.12	0.12	-0.001	0.12	0.12	0.005	0.12	0.12	0.008
aDCSI 0, %	90.78%	91.01%	0.008	90.78%	90.56%	-0.008	90.78%	91.21%	0.015
aDCSI 1, %	7.02%	6.64%	-0.015	7.02%	7.27%	0.010	7.02%	6.20%	-0.033
aDCSI 2, %	1.95%	2.06%	0.008	1.95%	1.90%	-0.004	1.95%	2.25%	0.021
aDCSI 3 or higher, %	0.25%	0.29%	0.007	0.25%	0.27%	0.005	0.25%	0.34%	0.017
Diagnosis-based Conditions in the baseline									
Cerebrovascular Disease	1.60%	1.59%	0.000	1.60%	1.61%	0.001	1.60%	1.61%	0.001
Congestive Heart Failure	3.77%	3.76%	0.000	3.77%	3.81%	0.002	3.77%	3.78%	0.001
Ischemic Heart Disease	5.32%	5.32%	0.000	5.32%	5.34%	0.001	5.32%	5.34%	0.001
Hypertension	59.29%	59.32%	0.001	59.29%	59.62%	0.007	59.29%	59.37%	0.002
Retinopathy	4.34%	4.34%	0.000	4.34%	4.39%	0.002	4.34%	4.38%	0.002
Nephropathy	1.30%	1.30%	0.000	1.30%	1.34%	0.003	1.30%	1.32%	0.001
Neuropathy	1.76%	1.76%	0.000	1.76%	1.79%	0.003	1.76%	1.78%	0.002
Atrial fibrillation	1.08%	1.08%	0.000	1.08%	1.07%	-0.001	1.08%	1.08%	0.000
Renal Disease	1.50%	1.50%	0.000	1.50%	1.53%	0.003	1.50%	1.51%	0.001
Eye Disease	1.56%	1.55%	-0.001	1.56%	1.58%	0.002	1.56%	1.57%	0.001
Medications in the baseline									

ACE inhibitors	37.29%	37.32%	0.001	37.29%	37.63%	0.007	37.29%	37.36%	0.001
Anticoagulants	1.84%	1.84%	0.000	1.84%	1.85%	0.001	1.84%	1.84%	0.000
Angiotensin receptor blockers	22.70%	22.73%	0.001	22.70%	22.84%	0.003	22.70%	22.76%	0.001
Aspirin	0.78%	0.78%	0.000	0.78%	0.77%	0.000	0.78%	0.78%	0.000
Asthma	27.16%	27.19%	0.001	27.16%	27.09%	-0.002	27.16%	27.21%	0.001
Bile Acid Sequestrants	1.21%	1.22%	0.001	1.21%	1.24%	0.002	1.21%	1.22%	0.001
Carbonic Anhydrase Inhibitors	0.06%	0.07%	0.000	0.06%	0.06%	0.000	0.06%	0.07%	0.001
Cardioselective Beta Blockers	12.58%	12.58%	0.000	12.58%	12.71%	0.004	12.58%	12.60%	0.001
Calcium Channel Blockers	16.89%	16.90%	0.000	16.89%	17.05%	0.004	16.89%	16.90%	0.000
Fibrates	8.99%	9.02%	0.001	8.99%	9.11%	0.004	8.99%	9.05%	0.002
Hormone Replacement Therapy	8.02%	8.07%	0.002	8.02%	8.03%	0.000	8.02%	7.98%	-0.001
Loop Diuretic	3.95%	3.92%	-0.002	3.95%	4.03%	0.005	3.95%	3.97%	0.001
Niacin	1.25%	1.25%	0.000	1.25%	1.26%	0.001	1.25%	1.25%	0.000
Beta-blockers	5.11%	5.10%	-0.001	5.11%	5.21%	0.005	5.11%	5.13%	0.001
Platelet Aggregation Inhibitors	1.33%	1.33%	0.000	1.33%	1.34%	0.001	1.33%	1.34%	0.000
Potassium Sparing Diuretic	3.96%	3.94%	-0.001	3.96%	3.98%	0.001	3.96%	3.97%	0.000
Statin	35.88%	35.92%	0.001	35.88%	36.31%	0.009	35.88%	35.97%	0.002
Thiazide	36.18%	36.18%	0.000	36.18%	36.43%	0.005	36.18%	36.22%	0.001

eTable 8. Variables With the Proportional Hazard Assumption Violation for Each Outcome and the Comparison Drug (Relative to SGLT-2)

Outcome Studied	Amputation			Ulcer			Osteomyelitis		
	DPP-4	GLP-1	other	DPP-4	GLP-1	other	DPP-4	GLP-1	other
Demographics									
Female			x	x		x			
Age Groups	x						x	x	
Diabetes Severity									
aDCSI Groups									
Diagnosis-based Conditions in the baseline									
Cerebrovascular Disease									
Congestive Heart Failure					x				
Ischemic Heart Disease					x				
Hypertension								x	
Retinopathy									
Nephropathy		x							
Neuropathy									
Atrial fibrillation									
Renal Disease									
Eye Disease									
Medications									
ACE inhibitors						x			
Anticoagulants									
Angiotensin receptor blockers									x
Aspirin									
Asthma				x		x			
Bile Acid Sequestrants									
Carbonic Anhydrase Inhibitors	x	x		x	x		x	x	

Cardioselective Beta Blockers						×			
Calcium Channel Blockers	×								
Fibrates		×							
Hormone Replacement Therapy									
Loop Diuretic									
Niacin	×	×		×				×	
Beta-blockers									
Platelet Aggregation Inhibitors									
Potassium Sparing Diuretic					×				
Statin						×			
Thiazide						×			

×: represents violation and hence was included in the model as a stratifying factor

eTable 8 (CON'T).

Outcome Studied	Peripheral Vascular Disease			Critical Limb Ischemia		
	DPP-4	GLP-1	other	DPP-4	GLP-1	other
Demographics						
Female			×			×
Age Groups		×	×		×	×
Diabetes Severity						
aDCSI Groups			×	×		
Diagnosis-based Conditions in the baseline						
Cerebrovascular Disease			×			
Congestive Heart Failure				×		
Ischemic Heart Disease				×		
Hypertension			×	×		
Retinopathy						
Nephropathy						
Neuropathy			×			
Atrial fibrillation				×		
Renal Disease						
Eye Disease				×		
Medications						
ACE inhibitors			×			×
Anticoagulants				×		
Angiotensin receptor blockers				×	×	
Aspirin						
Asthma		×	×			×
Bile Acid Sequestrants						
Carbonic Anhydrase Inhibitors						
Cardioselective Beta Blockers						×

Calcium Channel Blockers						×
Fibrates			×			×
Hormone Replacement Therapy	×	×	×			
Loop Diuretic						
Niacin			×			×
Beta-blockers			×		×	×
Platelet Aggregation Inhibitors	×					
Potassium Sparing Diuretic						
Statin	×		×			×
Thiazide	×		×			×

×: represents violation and hence was included in the model as a stratifying factor

eTable 9. Characteristics of the Study Sample - the Second Cohort

	SGLT2	DPP4	GLP1	Other ¹
	(N=38,692)	(N=101,408)	(N=37,932)	(N=755,041)
Demographic characteristics				
Female**, %	47.52	43.58	61.36	55.84
Mean age**, years	53.44	54.43	51.74	51.25
Age 18 – 34 years**, %	2.76	2.31	5.33	10.65
Age 35 - 44 years**, %	12.84	10.93	17.16	14.86
Age 45 - 54 years**, %	33.31	30.51	32.51	26.44
Age 55 - 64 years**, %	45.41	48.51	39.91	40.76
Age 65 or older years**, %	5.68	7.74	5.10	7.28
Mean adapted diabetes severity index**	0.12	0.14	0.12	0.08
aDCSI 0**, %	90.78	90.10	90.50	93.88
aDCSI 1**, %	7.02	6.81	7.26	4.29
aDCSI 2**, %	1.95	2.66	1.92	1.63
aDCSI 3 or higher**, %	0.25	0.43	0.31	0.20
Baseline comorbidities, %				
Cerebrovascular Disease**	1.60	1.97	1.57	1.42
Congestive Heart Failure**	3.77	4.54	4.02	3.53
Ischemic Heart Disease**	5.32	6.07	4.93	4.11
Hypertension**	59.29	55.25	51.34	39.16
Retinopathy**	4.34	4.77	3.95	2.48
Nephropathy**	1.30	2.73	1.86	1.12
Neuropathy**	1.76	1.61	1.73	0.76
Atrial fibrillation**	1.08	1.21	1.09	0.95
Renal Disease**	1.50	3.12	2.05	1.34
Eye Disease**	1.56	1.60	1.32	0.70
Baseline medications, %				
ACE inhibitors**	37.29	36.66	32.56	27.12
Anticoagulants**	1.84	1.98	1.97	1.76
Angiotensin receptor blockers**	22.70	22.04	21.53	14.49
Aspirin**	0.7	0.91	0.64	0.46
Asthma**	27.16	25.31	30.52	25.92
Bile Acid Sequestrants**	1.21	1.06	1.27	0.64
Carbonic Anhydrase Inhibitors**	0.06	0.07	0.14	0.10
Cardioselective Beta Blockers**	12.58	13.20	11.82	11.62

Calcium Channel Blockers**	16.89	17.17	14.83	13.10
Fibrates**	8.99	8.87	8.00	5.55
Hormone Replacement Therapy**	8.02	6.07	11.81	9.63
Loop Diuretic**	3.95	3.85	5.14	3.04
Niacin**	1.25	1.23	1.41	1.48
Beta-blockers**	5.11	5.30	5.53	4.27
Platelet Aggregation Inhibitors**	1.33	1.49	1.04	0.78
Potassium Sparing Diuretic**	3.96	3.82	5.48	4.40
Statin**	35.88	33.78	31.21	21.54
Thiazide**	36.18	35.81	35.29	31.19

¹ Includes any combination of metformin, sulfonylureas and glitazones

* p<0.05; ** p<0.01

eTable 10. Adjusted Association Between SGLT2 Use, Amputation and Other Vascular Outcomes – Different Methods of Control Variables Inclusion (Regression Covariates With and Without ATT Weighting)

	First Cohort (Excluding amputation during baseline)		
	DPP4 inhibitors (N=144,892)	GLP1 inhibitors (N=78,989)	Other Drugs ¹ (N=809,763)
Amputation			
Adjusted Hazard Ratio ²	1.46 (0.83-2.57)	1.36 (0.62-3.00)	1.85* (1.14-3.00)
Adjusted Hazard Ratio ³	1.50 (0.84-2.67)	1.47 (0.64-3.36)	2.12* (1.19-3.78)
	Second Cohort (Excluding any outcome during baseline)		
	DPP4 inhibitors (N=140,100)	GLP1 inhibitors (N=76,624)	Other Drugs ¹ (N=793,733)
Ulcer			
Adjusted Hazard Ratio ²	1.12 (0.91-1.39)	0.96 (0.74-1.24)	1.29** (1.07-1.54)
Adjusted Hazard Ratio ³	1.12 (0.91-1.38)	0.97 (0.75-1.26)	1.32** (1.09-1.60)
Osteomyelitis			
Adjusted Hazard Ratio ²	1.47 (0.99-2.18)	1.59 (0.92-2.78)	1.35 (0.97-1.89)
Adjusted Hazard Ratio ³	1.48 (0.99-2.20)	1.53 (0.87-2.70)	1.44* (1.02-2.05)
Peripheral Vascular Disease			
Adjusted Hazard Ratio ²	0.87** (0.79-0.96)	0.95 (0.84-1.08)	1.13** (1.03-1.23)
Adjusted Hazard Ratio ³	0.87** (0.79-0.96)	0.95 (0.84-1.07)	1.11* (1.03-1.23)
Critical Limb Ischemia			
Adjusted Hazard Ratio ²	0.75** (0.64-0.88)	0.80* (0.65-0.97)	1.00 (0.86-1.16)

Adjusted Hazard Ratio ³	0.76** (0.65-0.89)	0.79* (0.65-0.97)	0.99 (0.85-1.15)
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¹ Includes any combination of metformin, sulfonylureas and glitazones

² All control variables as regression covariates only

³ All control variables as regression covariates with propensity score weighting

* p<0.05; ** p<0.0

eTable 11. Adjusted Association Between SGLT2 Use, Amputation and Other Vascular Outcomes After Combining DPP4 Inhibitors and GLP1 Agonists as Single Reference Group

	Reference Group DPP4 Inhibitors + GLP1 Agonists
Amputation (N: 184,012)	
Crude Hazard Ratio ¹	1.49 (0.86-2.60)
Adjusted Hazard Ratio ²	1.51 (0.86-2.63)
Other Vascular Outcomes (N: 178,032)	
Ulcer	
Crude Hazard Ratio ¹	1.09 (0.89-1.33)
Adjusted Hazard Ratio ²	1.10 (0.90-1.34)
Osteomyelitis	
Crude Hazard Ratio ¹	1.53* (1.04-2.24)
Adjusted Hazard Ratio ²	1.51* (1.03-2.22)
Peripheral Vascular Disease	
Crude Hazard Ratio ¹	0.88** (0.80-0.97)
Adjusted Hazard Ratio ²	0.89* (0.81-0.98)
Critical Limb Ischemia	
Crude Hazard Ratio ¹	0.75** (0.65-0.88)
Adjusted Hazard Ratio ²	0.76** (0.65-0.89)

¹ With propensity score weighting only

² With propensity score weighting and covariates as regressors and stratifiers
* $p < 0.05$; ** $p < 0.01$

eTable 12. Adjusted Association Between SGLT2 Use, Amputation and Other Vascular Outcomes Accounting for Use of Sulfonylureas, Metformin and TZDs During Baseline Period

	First Cohort (Excluding amputation during baseline)		
	DPP4 inhibitors (N=144,892)	GLP1 inhibitors (N=78,989)	Other Drugs ¹ (N=809,763)
Adjusted Hazard Ratio ²	1.46 (0.83-2.57)	1.36 (0.62-3.00)	1.85* (1.14-3.00)
Adjusted Hazard Ratio ³	1.50 (0.84-2.69)	1.35 (0.62-2.92)	1.69* (1.02-2.80)
	Second Cohort (Excluding any outcome during baseline)		
	DPP4 inhibitors (N=140,100)	GLP1 inhibitors (N=76,624)	Other Drugs ¹ (N=793,733)
Ulcer			
Adjusted Hazard Ratio ²	1.12 (0.91-1.39)	0.96 (0.74-1.24)	1.29** (1.07-1.54)
Adjusted Hazard Ratio ³	1.10 (0.89-1.35)	0.94 (0.73-1.22)	1.19 (0.99-1.43)
Osteomyelitis			
Adjusted Hazard Ratio ²	1.47 (0.99-2.18)	1.59 (0.92-2.78)	1.35 (0.97-1.89)
Adjusted Hazard Ratio ³	1.49 (0.99-2.22)	1.58 (0.91-2.75)	1.30 (0.93-1.82)
Peripheral Vascular Disease			
Adjusted Hazard Ratio ²	0.87** (0.79-0.96)	0.95 (0.84-1.08)	1.13** (1.03-1.23)
Adjusted Hazard Ratio ³	0.87** (0.79-0.96)	0.95 (0.84-1.07)	1.16** (1.06-1.27)
Critical Limb Ischemia			

Adjusted Hazard Ratio ²	0.75** (0.64-0.88)	0.80* (0.65-0.97)	1.00 (0.86-1.16)
Adjusted Hazard Ratio ³	0.76** (0.65-0.90)	0.79* (0.65-0.97)	1.01 (0.87-1.17)

¹ Includes any combination of metformin, sulfonylureas and glitazones

² All control variables (**without** three indicators of older agents use) as regression covariates only

³ All control variables (**with** three indicators of older agents use) as regression covariates only

* p<0.05; ** p<0.01

eTable 13. Adjusted Association Between SGLT2 Use and Amputation – Including Patients With Amputation in The Baseline

	DPP4 inhibitors (N=144,985)	GLP1 inhibitors (N=79,027)	Other Drugs ¹ (N=810,101)
Adjusted Hazard Ratio ²	1.69 (0.99-2.90)	1.43 (0.68-3.00)	1.91** (1.21-3.00)
Adjusted Hazard Ratio ³	1.73* (1.01-2.98)	1.53 (0.70-3.34)	2.19** (1.27-3.77)

¹ Includes any combination of metformin, sulfonylureas and glitazones.

² With covariates as regressors and stratifiers.

³ With propensity score weighting and covariates as regressors and stratifiers.

* p<0.05; ** p<0.0