

SUPPLEMENTARY MATERIALS

Cardiovascular risk prediction model and stratification in patients with type 2 diabetes enrolled in a Medicare Advantage plan

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Supplementary Table 1. Cardiovascular Event Codes

Variable	ICD-9	ICD-10	HCPCS/CPT
Cardiovascular events			
Myocardial Infarction	410 410.01 410.02 410.1 410.11 410.12 410.2 410.21 410.22 410.3 410.31 410.32 410.4 410.41 410.42 410.5 410.51 410.52 410.6 410.61 410.62 410.7 410.71 410.72 410.8 410.81 410.82 410.9 410.91 410.92	I2101 I2102 I2109 I2111 I2119 I2121 I2129 I213 I214 I220 I221 I222 I228	
Ischemic stroke	434.01 434.91 433.01 433.11 433.21	I6300 I63011 I63012 I63013 I63019	

Variable	ICD-9	ICD-10	HCPCS/CPT
	433.31	I6302	
	433.81	I63031	
	433.91	I63032	
		I63033	
		I63039	
		I6309	
		I6320	
		I63211	
		I63212	
		I63213	
		I63219	
		I6322	
		I63231	
		I63232	
		I63233	
		I63239	
		I6329	
		I6330	
		I63311	
		I63312	
		I63313	
		I63319	
		I63321	
		I63322	
		I63323	
		I63329	
		I63331	
		I63332	
		I63333	
		I63339	
		I63341	
		I63342	
		I63343	
		I63349	
		I6339	
		I6350	
		I63511	
		I63512	
		I63513	

Variable	ICD-9	ICD-10	HCPCS/CPT
		I63519 I63521 I63522 I63523 I63529 I63531 I63532 I63533 I63539 I63541 I63542 I63543 I63549 I6359 I636 I638 I639	
Unstable Angina	411.1 411.81 411.89	I20.0 I24.0 I24.8 I25110 I25700 I25710 I25720 I25730 I25750 I25760 I25790	
Heart Failure	428.** 402.11 402.91 404.01 404.91 404.03 404.13 404.93	I50.* I11.0* I13.0* I13.2*	
Revascularization			
PCI	0.66 1755	270346 027034Z	92973 C9600

Variable	ICD-9	ICD-10	HCPCS/CPT
	36.06	270356	C9601
	36.07	027035Z	92920
	40	270366	92921
	41	027036Z	92928
	42	270376	92929
	43	027037Z	92924
	44	02703D6	92925
	45	02703DZ	92933
	46	2.70E+09	92934
	47	02703EZ	92937
	48	02703F6	92938
		02703FZ	92941
		02703G6	92943
		02703GZ	92944
		02703T6	C9602
		02703TZ	C9603
		02703Z6	C9604
		02703ZZ	C9605
		270446	C9606
		027044Z	C9607
		270456	C9608
		027045Z	92975
		270466	92977
		027046Z	92980
		270476	92981
		027047Z	92982
		02704D6	92984
		02704DZ	92995
		2.70E+09	92996
		02704EZ	G0290
		02704F6	G0291
		02704FZ	
		02704G6	
		02704GZ	
		02704T6	
		02704TZ	
		02704Z6	
		02704ZZ	
		271346	

Variable	ICD-9	ICD-10	HCPCS/CPT
		027134Z	
		271356	
		027135Z	
		271366	
		027136Z	
		271376	
		027137Z	
		02713D6	
		02713DZ	
		2.71E+09	
		02713EZ	
		02713F6	
		02713FZ	
		02713G6	
		02713GZ	
		02713T6	
		02713TZ	
		02713Z6	
		02713ZZ	
		271446	
		027144Z	
		271456	
		027145Z	
		271466	
		027146Z	
		271476	
		027147Z	
		02714D6	
		02714DZ	
		2.71E+09	
		02714EZ	
		02714F6	
		02714FZ	
		02714G6	
		02714GZ	
		02714T6	
		02714TZ	
		02714Z6	
		02714ZZ	

Variable	ICD-9	ICD-10	HCPCS/CPT
		272346	
		027234Z	
		272356	
		027235Z	
		272366	
		027236Z	
		272376	
		027237Z	
		02723D6	
		02723DZ	
		2.72E+09	
		02723EZ	
		02723F6	
		02723FZ	
		02723G6	
		02723GZ	
		02723T6	
		02723TZ	
		02723Z6	
		02723ZZ	
		272446	
		027244Z	
		272456	
		027245Z	
		272466	
		027246Z	
		272476	
		027247Z	
		02724D6	
		02724DZ	
		2.72E+09	
		02724EZ	
		02724F6	
		02724FZ	
		02724G6	
		02724GZ	
		02724T6	
		02724TZ	
		02724Z6	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02724ZZ	
		273346	
		027334Z	
		273356	
		027335Z	
		273366	
		027336Z	
		273376	
		027337Z	
		02733D6	
		02733DZ	
		2.73E+09	
		02733EZ	
		02733F6	
		02733FZ	
		02733G6	
		02733GZ	
		02733T6	
		02733TZ	
		02733Z6	
		02733ZZ	
		273446	
		027344Z	
		273456	
		027345Z	
		273466	
		027346Z	
		273476	
		027347Z	
		02734D6	
		02734DZ	
		2.73E+09	
		02734EZ	
		02734F6	
		02734FZ	
		02734G6	
		02734GZ	
		02734T6	
		02734TZ	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02734Z6 02734ZZ 02C03ZZ 02C04ZZ 02C13ZZ 02C14ZZ 02C23ZZ 02C24ZZ 02C33ZZ 02C34ZZ X2C0361 X2C1361 X2C2361 X2C3361	
CABG	361 3610 3611 3612 3613 3614 3615 3616 3617 3619 362 363 3631 3632 3633 3634 3639	210083 210088 210089 021008C 021008F 021008W 210093 210098 210099 021009C 021009F 021009W 02100A3 02100A8 02100A9 02100AC 02100AF 02100AW 02100J3 02100J8 02100J9 02100JC 02100JF 02100JW	33510 33511 33512 33513 33514 33516 33517 33518 33519 33521 33522 33523 33533 33534 33535 33536 33508 S2205 S2206 S2207 S2208 S2209

Variable	ICD-9	ICD-10	HCPCS/CPT
		02100K3	
		02100K8	
		02100K9	
		02100KC	
		02100KF	
		02100KW	
		02100Z3	
		02100Z8	
		02100Z9	
		02100ZC	
		02100ZF	
		210344	
		02103D4	
		210444	
		210483	
		210488	
		210489	
		021048C	
		021048F	
		021048W	
		210493	
		210498	
		210499	
		021049C	
		021049F	
		021049W	
		02104A3	
		02104A8	
		02104A9	
		02104AC	
		02104AF	
		02104AW	
		02104D4	
		02104J3	
		02104J8	
		02104J9	
		02104JC	
		02104JF	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02104JW	
		02104K3	
		02104K8	
		02104K9	
		02104KC	
		02104KF	
		02104KW	
		02104Z3	
		02104Z8	
		02104Z9	
		02104ZC	
		02104ZF	
		211083	
		211088	
		211089	
		021108C	
		021108F	
		021108W	
		211093	
		211098	
		211099	
		021109C	
		021109F	
		021109W	
		02110A3	
		02110A8	
		02110A9	
		02110AC	
		02110AF	
		02110AW	
		02110J3	
		02110J8	
		02110J9	
		02110JC	
		02110JF	
		02110JW	
		02110K3	
		02110K8	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02110K9	
		02110KC	
		02110KF	
		02110KW	
		02110Z3	
		02110Z8	
		02110Z9	
		02110ZC	
		02110ZF	
		211344	
		02113D4	
		211444	
		211483	
		211488	
		211489	
		021148C	
		021148F	
		021148W	
		211493	
		211498	
		211499	
		021149C	
		021149F	
		021149W	
		02114A3	
		02114A8	
		02114A9	
		02114AC	
		02114AF	
		02114AW	
		02114D4	
		02114J3	
		02114J8	
		02114J9	
		02114JC	
		02114JF	
		02114JW	
		02114K3	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02114K8	
		02114K9	
		02114KC	
		02114KF	
		02114KW	
		02114Z3	
		02114Z8	
		02114Z9	
		02114ZC	
		02114ZF	
		212083	
		212088	
		212089	
		021208C	
		021208F	
		021208W	
		212093	
		212098	
		212099	
		021209C	
		021209F	
		021209W	
		02120A3	
		02120A8	
		02120A9	
		02120AC	
		02120AF	
		02120AW	
		02120J3	
		02120J8	
		02120J9	
		02120JC	
		02120JF	
		02120JW	
		02120K3	
		02120K8	
		02120K9	
		02120KC	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02120KF	
		02120KW	
		02120Z3	
		02120Z8	
		02120Z9	
		02120ZC	
		02120ZF	
		212344	
		02123D4	
		212444	
		212483	
		212488	
		212489	
		021248C	
		021248F	
		021248W	
		212493	
		212498	
		212499	
		021249C	
		021249F	
		021249W	
		02124A3	
		02124A8	
		02124A9	
		02124AC	
		02124AF	
		02124AW	
		02124D4	
		02124J3	
		02124J8	
		02124J9	
		02124JC	
		02124JF	
		02124JW	
		02124K3	
		02124K8	
		02124K9	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02124KC	
		02124KF	
		02124KW	
		02124Z3	
		02124Z8	
		02124Z9	
		02124ZC	
		02124ZF	
		213083	
		213088	
		213089	
		021308C	
		021308F	
		021308W	
		213093	
		213098	
		213099	
		021309C	
		021309F	
		021309W	
		02130A3	
		02130A8	
		02130A9	
		02130AC	
		02130AF	
		02130AW	
		02130J3	
		02130J8	
		02130J9	
		02130JC	
		02130JF	
		02130JW	
		02130K3	
		02130K8	
		02130K9	
		02130KC	
		02130KF	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02130KW	
		02130Z3	
		02130Z8	
		02130Z9	
		02130ZC	
		02130ZF	
		213344	
		02133D4	
		213444	
		213483	
		213488	
		213489	
		021348C	
		021348F	
		021348W	
		213493	
		213498	
		213499	
		021349C	
		021349F	
		021349W	
		02134A3	
		02134A8	
		02134A9	
		02134AC	
		02134AF	
		02134AW	
		02134D4	
		02134J3	
		02134J8	
		02134J9	
		02134JC	
		02134JF	
		02134JW	
		02134K3	
		02134K8	
		02134K9	
		02134KC	

Variable	ICD-9	ICD-10	HCPCS/CPT
		02134KF 02134KW 02134Z3 02134Z8 02134Z9 02134ZC 02134ZF	

Supplementary Table 2. Complete case vs. imputed

Study Variables	Imputations			Complete Case
	<i>Imputation 1</i>	<i>Imputation 2</i>	<i>Imputation 3</i>	
Serum Creatinine*, mean (SD)	1.044 (± 0.5168)	1.045 (± 0.5142)	1.046 (± 0.5173)	1.096 (± 0.5566)
Calculated eGFR	70.396 (± 23.7673)	70.335 (± 23.7376)	70.317 (± 23.7839)	64.610 (± 20.7015)
<i>Race, n (%)</i>				
White	289958 (79.92%)	289950 (79.92%)	289968 (79.93%)	288384 (79.93%)
Black	55082 (15.18%)	55065 (15.18%)	55060 (15.18%)	54757 (15.18%)
Other	17751 (4.89%)	17776 (4.90%)	17763 (4.90%)	17660 (4.89%)
<i>Population Density, n (%)</i>				
Urban	230038 (63.41%)	229918 (63.37%)	229939 (63.38%)	224359 (63.37%)
Suburban	91087 (25.11%)	91195 (25.14%)	91205 (25.14%)	88991 (25.14%)
Rural	41666 (11.48%)	41678 (11.49%)	41647 (11.48%)	40671 (11.49%)

Supplementary Table 3. Test versus holdout dataset

12 month pre-index period	<i>Study Population with T2D</i>		
	<i>Overall</i> n=114,649	<i>TEST Dataset</i> n=106,346	<i>Holdout Dataset*</i> n=8,303
<i>Demographic</i>			
Age in years			
Mean (SD)	74.1 (±6.01)	74.0 (±5.99)	74.7 (±6.26)
Median [25-75%]	73 (69-78)	73 (69-78)	74 (69-79)
Min, Max	65 , 89	65 , 89	65 , 89
Age Category, n (%)			
65-69	31,460 (27.4%)	29,306 (27.6%)	2,154 (25.9%)
70-74	35,269 (30.8%)	32,911 (30.9%)	2,358 (28.4%)
75-79	24,289 (21.2%)	22,520 (21.2%)	1,769 (21.3%)
80-84	15665 (13.7%)	14,368 (13.5%)	1,297 (15.6%)
85-89	7,966 (6.9%)	7,241 (6.8%)	725 (8.7%)
Female, n (%)	58,695 (51.2%)	54,438 (51.2%)	4,257 (51.3%)
Race/Ethnicity, n (%)			
White	91,841 (80.1%)	84,384 (79.3%)	7,457 (89.8%)
Black	16,715 (14.6%)	16,166 (15.2%)	549 (6.6%)
Other	5,475 (4.8%)	5,214 (4.9%)	261 (3.1%)
Unknown/Missing	618 (0.5%)	582 (0.5%)	36 (0.4%)
Geographic region, n (%)			
Northeast	8,303 (7.2%)	0 (0.0%)	8,303 (100.0%)
Midwest	25,526 (22.3%)	25,526 (24.0%)	0 (0.0%)
South	70,471 (61.5%)	70,471 (66.3%)	0 (0.0%)
West	10,349 (9.0%)	10,349 (9.7%)	0 (0.0%)
Unknown/Missing	0 (0.0%)	0 (0.0%)	0 (0.0%)

12 month pre-index period	<i>Study Population with T2D</i>		
	<i>Overall</i> n=114,649	<i>TEST Dataset</i> n=106,346	<i>Holdout Dataset*</i> n=8,303
Population density (member residence), n (%)			
Urban	12,961 (11.3%)	12,097 (11.4%)	0,864 (10.4%)
Suburban	28,520 (24.9%)	26,077 (24.5%)	2,443 (29.4%)
Rural	70,395 (61.4%)	65,514 (61.6%)	4,881 (58.8%)
Unknown/Missing	2,773 (2.4%)	2,658 (2.5%)	115 (1.4%)
Low Income/Dual Status, n (%)			
Low income subsidy (LIS) Only	7,399 (6.5%)	6,905 (6.5%)	494 (6.0%)
Dual eligibility (DE) Only	1,012 (0.9%)	880 (0.8%)	132 (1.6%)
LIS and DE	15,552 (13.6%)	14,592 (13.7%)	960 (11.6%)
<i>Baseline clinical characteristics</i>			
Deyo Charlson Score			
Mean (SD)	1.2 (\pm 1.78)	1.2 (\pm 1.78)	1.2 (\pm 1.75)
Median [IQR]	0 (0-2)	0 (0-2)	0 (0-2)
Min, Max	0 , 18	0 , 18	0 , 16
[Deyo Charlson categories, n (%)]			
Myocardial infarction (MI)	6,068 (5.3%)	5,618 (5.3%)	450 (5.4%)
Congestive heart failure (CHF)	13,562 (11.8%)	12,568 (11.8%)	994 (12.0%)
Peripheral vascular disease (PVD)	15,387 (13.4%)	14,264 (13.4%)	1,123 (13.5%)
Cerebrovascular disease (CVD)	9,760 (8.5%)	9,054 (8.5%)	706 (8.5%)
Dementia	1,956 (1.7%)	1,815 (1.7%)	141 (1.7%)
Chronic obstructive pulmonary disease (COPD)	19,251 (16.8%)	17,913 (16.8%)	1,338 (16.1%)
Connective Tissue Disease	2,451 (2.1%)	2,281 (2.1%)	170 (2.0%)
Peptic ulcer disease (PUD)	881 (0.8%)	831 (0.8%)	50 (0.6%)
Mild Liver Disease	2,307 (2.0%)	2,148 (2.0%)	159 (1.9%)

12 month pre-index period	<i>Study Population with T2D</i>		
	<i>Overall</i> n=114,649	<i>TEST Dataset</i> n=106,346	<i>Holdout Dataset*</i> n=8,303
Para- or hemiplegia	838 (0.7%)	778 (0.7%)	60 (0.7%)
Renal Disease	21,010 (18.3%)	19,680 (18.5%)	1,330 (16.0%)
Cancer	9,561 (8.3%)	8,880 (8.4%)	681 (8.2%)
Moderate or severe liver disease	277 (0.2%)	260 (0.2%)	17 (0.2%)
Metastatic carcinoma	981 (0.9%)	917 (0.9%)	64 (0.8%)
Human Immunodeficiency Virus (HIV)/ Acquired Immunodeficiency Syndrome (AIDS)	53 (0.0%)	<50	<10
Diabetes Complications and Severity Index (DCSI) Score			
Mean (SD)	1.7 (\pm 1.79)	1.7 (\pm 1.79)	1.6 (\pm 1.74)
Median [IQR]	1 (0-3)	1 (0-3)	1 (0-2)
Min, Max	0 , 11	0 , 11	0 , 10
[DCSI categories, n (%)]			
Retinopathy	6,550 (5.7%)	6,037 (5.7%)	0,513 (6.2%)
Nephropathy	48,773 (42.5%)	46,104 (43.4%)	2,669 (32.1%)
Neuropathy	17,803 (15.5%)	16,624 (15.6%)	1,179 (14.2%)
Cerebrovascular	39,888 (34.8%)	36,880 (34.7%)	3,008 (36.2%)
Cardiovascular	7,672 (6.7%)	7,099 (6.7%)	0,573 (6.9%)
Peripheral vascular disease	12,819 (11.2%)	11,744 (11.0%)	1,075 (12.9%)
Metabolic	408 (0.4%)	378 (0.4%)	30 (0.4%)
Body mass index (BMI), n (%)			
<19	284 (0.2%)	273 (0.3%)	11 (0.1%)
19-24	2,213 (1.9%)	2,105 (2.0%)	108 (1.3%)
25-29	5,014 (4.4%)	4,813 (4.5%)	201 (2.4%)
30-39	5,881 (5.1%)	5,590 (5.3%)	291 (3.5%)

12 month pre-index period	<i>Study Population with T2D</i>		
	<i>Overall</i> n=114,649	<i>TEST Dataset</i> n=106,346	<i>Holdout Dataset*</i> n=8,303
≥40	2,379 (2.1%)	2,208 (2.1%)	171 (2.1%)
Unknown/Missing	98,878 (86.2%)	91,357 (85.9%)	7,521 (90.6%)
Obesity, n (%)	18,811 (16.4%)	17,548 (16.5%)	1,263 (15.2%)
<i>Medications of interest</i>			
Number of unique medications			
Mean (SD)	10.4 (±6.44)	10.5 (±6.45)	9.4 (±6.21)
Median [IQR]	10 (6-14)	10 (6-14)	9 (5-13)
Min, Max	0 , 57	0 , 57	0 , 43
Anti-hyperglycemic medications, n (%)			
Biguanides	49,630 (43.3%)	46,149 (43.4%)	3,481 (41.9%)
Sulfonylureas	35,079 (30.6%)	32,553 (30.6%)	2,526 (30.4%)
Thiazolidinediones	8,017 (7.0%)	7,394 (7.0%)	0,623 (7.5%)
DPP-4 inhibitors	635 (0.6%)	584 (0.5%)	51 (0.6%)
SGLT2 inhibitors	966 (0.8%)	897 (0.8%)	69 (0.8%)
GLP-1	0 (0.0%)	0 (0.0%)	0 (0.0%)
Insulin	18,676 (16.3%)	17,302 (16.3%)	1,374 (16.5%)
Fixed dose combinations	5,382 (4.7%)	5,029 (4.7%)	353 (4.3%)
Other (amylin agonists, meglitinides, alpha-glucosidase inhibitors)	1,184 (1.0%)	1,052 (1.0%)	132 (1.6%)
Cardiovascular Medications, n (%)			
ACE, ARB, Renin inhibitors	59,800 (52.2%)	55,583 (52.3%)	4,217 (50.8%)
Antianginal agents	10,361 (9.0%)	9,568 (9.0%)	793 (9.6%)
Antiarrhythmics	2,769 (2.4%)	2,555 (2.4%)	214 (2.6%)
Anticoagulants	11,011 (9.6%)	10,138 (9.5%)	0,873 (10.5%)
Antihyperlipidemics (e.g., statins, fibrates)	75,728 (66.1%)	70,351 (66.2%)	5,377 (64.8%)

12 month pre-index period	<i>Study Population with T2D</i>		
	<i>Overall</i> n=114,649	<i>TEST Dataset</i> n=106,346	<i>Holdout Dataset*</i> n=8,303
Beta blockers	47,966 (41.8%)	44,437 (41.8%)	3,529 (42.5%)
Calcium channel blockers	34,390 (30.0%)	32,204 (30.3%)	2,186 (26.3%)
Cardiotonics	4,328 (3.8%)	4,013 (3.8%)	315 (3.8%)
Diuretics	42,604 (37.2%)	39,681 (37.3%)	2,923 (35.2%)
Other antihypertensives	30,579 (26.7%)	28,727 (27.0%)	1,852 (22.3%)
Vasopressors	470 (0.4%)	436 (0.4%)	34 (0.4%)
Cardiovascular Agents-Misc	2,508 (2.2%)	2,374 (2.2%)	134 (1.6%)
Smoking, n (%)	10,964 (9.6%)	10,248 (9.6%)	716 (8.6%)
Laboratory Values of Interest, n (%)			
Hemoglobin A1c (HbA1c), n (%)	52,234 (45.6%)	49,569 (46.6%)	2,665 (32.1%)
Low-density lipoprotein cholesterol (LDL-C), n (%)	53,549 (46.7%)	50,931 (47.9%)	2,618 (31.5%)
High-density lipoprotein cholesterol (HDL-C), n (%)	53,612 (46.8%)	50,965 (47.9%)	2,647 (31.9%)
Triglycerides, n (%)	53,311 (46.5%)	50,661 (47.6%)	2,650 (31.9%)
Total cholesterol, n (%)	53,867 (47.0%)	51,210 (48.2%)	2,657 (32.0%)
Estimated glomerular filtration rate (eGFR), n (%)	59,995 (52.3%)	57,071 (53.7%)	2,924 (35.2%)
Systolic blood pressure, n (%)	147 (0.1%)	<150	<10
Diastolic blood pressure, n (%)	147 (0.1%)	<150	<10
Laboratory Values of Interest, Mean (SD)			
Hemoglobin A1c (HbA1c), Mean (SD)	6.9 (±1.22)	6.9 (±1.22)	6.9 (±1.24)
Low density lipoprotein cholesterol (LDL-C), Mean (SD)	91.3 (±32.98)	91.4 (±32.95)	91.2 (±33.57)
High density lipoprotein cholesterol (HDL-C), Mean (SD)	49.0 (±14.57)	49.0 (±14.57)	49.6 (±14.60)
Triglycerides, Mean (SD)	148.9 (±85.71)	148.8 (±85.79)	151.0 (±84.24)

12 month pre-index period	<i>Study Population with T2D</i>		
	<i>Overall</i> n=114,649	<i>TEST Dataset</i> n=106,346	<i>Holdout Dataset*</i> n=8,303
Total cholesterol, Mean (SD)	169.8 (±40.26)	169.8 (±40.22)	170.6 (±40.95)
Estimated glomerular filtration rate (eGFR), Mean (SD)	66.7 (±21.43)	66.7 (±21.47)	65.2 (±20.63)
Systolic blood pressure, Mean (SD)	133.8 (±21.29)	133.6 (±21.32)	150.0 (±14.14)
Diastolic blood pressure, Mean (SD)	73.6 (±13.52)	73.5 (±13.51)	76.5 (±19.09)
<i>All-cause Healthcare Resource Utilization</i>			
Inpatient Hospitalization, n (%)	21,608 (18.8%)	19,995 (18.8%)	1,613 (19.4%)
<i>Inpatient Hospitalization</i>			
Mean (SD)	0.3 (±0.75)	0.3 (±0.75)	0.3 (±0.76)
Median [IQR]	0 (0-0)	0 (0-0)	0 (0-0)
Min, Max	0 , 27	0 , 27	0 , 9
<i>ED visits</i>			
Mean (SD)	0.7 (±1.59)	0.7 (±1.60)	0.7 (±1.56)
Median [IQR]	0 (0-1)	0 (0-1)	0 (0-1)
Min, Max	0 , 85	0 , 85	0 , 33
<i>Physician encounters</i>			
Mean (SD)	8.4 (±6.86)	8.5 (±6.91)	7.9 (±6.22)
Median [IQR]	7 (4-11)	7 (4-11)	6 (4-11)
Min, Max	0 , 153	0 , 153	0 , 63
<i>Outpatient visits</i>			
Mean (SD)	15.5 (±14.04)	15.5 (±14.02)	15.9 (±14.30)
Median [IQR]	12 (7-20)	12 (7-20)	12 (7-21)
Min, Max	0 , 357	0 , 357	0 , 262

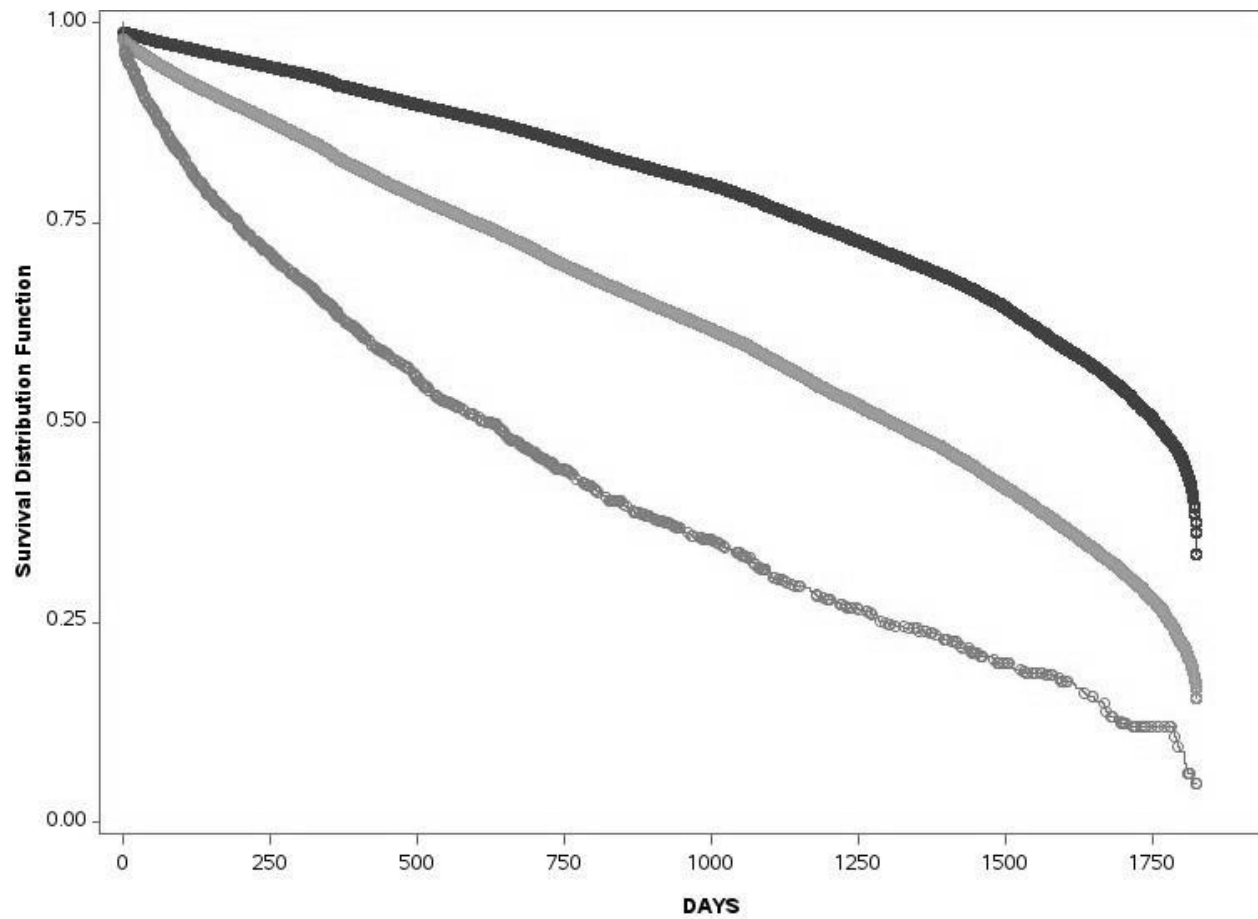
ACE, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; DCI, Deyo-Charlson Comorbidity Index; DCSI, Diabetes Complications and Severity Index; DPP-4, Dipeptidyl peptidase-4; ED, emergency department; GLP-1, glucagon like peptide 1; HbA1c, hemoglobin A1c; IQR, interquartile range; LDL, low density lipoprotein cholesterol; SD, standard deviation; SGLT2, sodium glucose cotransporter-2

*Holdout dataset were patients from the Northeast

Supplementary Table 4. Model performance statistics

Measure	Train (N=248,142)	Test (n=106,346)	Holdout (n=8,303)
Sensitivity	0.6290	0.6243	0.6281
Specificity	0.6290	0.6234	0.6258
Accuracy	0.6290	0.6235	0.6263
Misclassification Rate	0.3710	0.3765	0.3737

Supplementary Figure 1. Kaplan-Meier Survival Curves for CV Events Occurring up to 5 Years



Bottom=high-risk, middle=moderate-risk, top=low-risk

CV, cardiovascular