

Replication of the EINSTEIN PE Anticoagulant Trial in

Healthcare Claims Data

NCT04879407

September 14, 2021

1. RCT Details

This section provides a high-level overview of a **published** RCT that the described real-world evidence study is trying to replicate as closely as possible given the remaining limitations inherent in the healthcare databases.

1.1 Title

Oral Rivaroxaban for the Treatment of Symptomatic Venous Thromboembolism ([EINSTEIN PE](#))

1.2 Intended aim(s)

To compare the risk of symptomatic, recurrent venous thromboembolism (VTE) in patients with acute, symptomatic pulmonary embolism (PE) with or without deep vein thrombosis for rivaroxaban versus standard therapy of warfarin.

1.3 Primary endpoint for replication

The primary outcome of the study was symptomatic, recurrent VTE

1.4 Required power for primary endpoint and noninferiority margin (if applicable)

Assuming a noninferiority margin of 2.0, it was determined that about 3,000 patients would be needed to achieve 90% power to conclude noninferiority of rivaroxaban over standard therapy at two-sided alpha of 0.05.

1.5 Secondary endpoint for replication (assay sensitivity) and RCT finding

Major bleeding; RR = 0.90 (95% CI 0.76–1.07)

1.6 Trial estimate

RR = 1.12 (95% CI 0.75-1.58) comparing rivaroxaban vs standard therapy (Agnelli et al., 2012)

2. Person responsible for implementation of replication in Aetion

Dureshahwar Jawaid, MPH implemented the study design in the Aetion Evidence Platform. She is not responsible for the validity of the design and analytic choices. All implementation steps are recorded and the implementation history is archived in the platform.

3. Data Source(s)

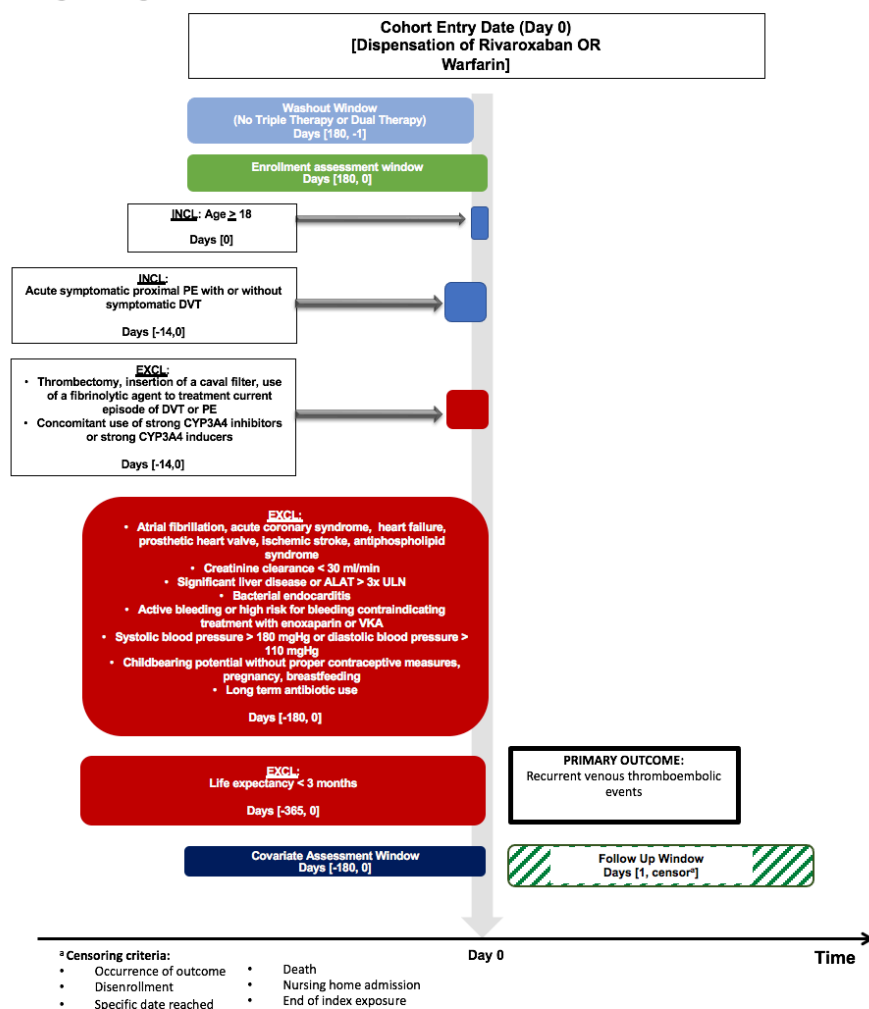
Optum, MarketScan, Medicare

4. Study Design Diagram

The study design diagram visualizes key aspects of the longitudinal study design for expedited review.

Figure 1

Design Diagram – EINSTEIN PE TRIAL REPLICATION



5. Cohort Identification

5.1 Cohort Summary

This study will involve a new user, parallel group, propensity score-matched, retrospective cohort study design comparing rivaroxaban to warfarin users. The patients will be required to have continuous enrollment during a baseline period of 180 days before initiation of rivaroxaban or warfarin (index date). We will restrict the analyses to patients with a diagnosis of PE.

5.2 Important steps for cohort formation

New use of rivaroxaban, exposure, and warfarin, comparator, is defined as no use of either therapy in 180 days prior to index date.

5.2.1 Eligible cohort entry dates

Market availability of rivaroxaban in the U.S. prevention of venous thromboembolism after orthopedic surgery started on July 01, 2011

- For Medicare: July 01, 2011– December 31, 2017 (end of available data)
- For Marketscan: July 01, 2011 – December 31, 2018 (end of available data)
- For Optum: July 01, 2011 – March 31, 2020 (end of available data)

5.2.2 Specify inclusion/exclusion criteria for cohort entry and define the index date.

Inclusion and exclusion criteria were adapted from the trial as closely as possible. Definitions for all inclusion/exclusion are provided in **Appendix A** and are summarized in the flowcharts below.

5.3 Flowchart of the study cohort assembly

	Optum		Truven		Medicare	
	Less Excluded Patients	Remaining Patients	Less Excluded Patients	Remaining Patients	Less Excluded Patients	Remaining Patients
All patients		78,202,636		200,203,908		6,886,908
Did not meet cohort entry criteria	-77,207,180	995,456	-199,008,369	1,195,539	-1,964,276	4,922,632

Effectiveness research with Real World Data to support FDA's regulatory decision making

Excluded due to insufficient enrollment	-127,407	868,049	-98,795	1,096,744	-1,580,438	3,342,194
Excluded due to prior use of referent	-508,219	359,830	-676,683	420,061	-2,158,638	1,183,556
Excluded due to prior use of exposure and because patient qualified in >1 exposure category	-216,850	142,980	-210,419	209,642	-680,443	503,113
Excluded based on Age < 65 (Medicare only)	-	-	-	-	-55358	447,755
Excluded based on Age, Gender, and Use of other NOACs (dabigatran, apixaban, edoxaban)	-5393	137,587	-4262	205,380	-17641	430,114
Excluded based on Inclusion 1 - Pulmonary embolism	-117,221	20,366	-169,963	35,417	-372,047	58,067
Excluded based on Exclusion 1 - Age and Exclusion 2 - Thrombectomy or insertion of a caval filter	-196	20,170	-274	35,143	-546	57,521
Excluded based on Exclusion 3 - Other Indications for VKA	-1836	18,334	-1,617	33,526	-6,213	51,308
Excluded based on Exclusion 6 - KD stage 4/5/ESRD	-56	18,278	-42	33,484	-136	51,172
Excluded based on Exclusion 7 - Significant liver disease	-426	17,852	-505	32,979	-900	50,272
Excluded based on Exclusion 8 - Bacterial endocarditis and Exclusion 9 - CCI >= 10	-154	17,698	-114	32,865	-398	49,874
Excluded based on Exclusion 10 - Active bleeding or high risk for bleeding	-262	17,436	-334	32,531	-670	49,204
Excluded based on Exclusion 11 - malignant hypertension	-33	17,403	-42	32,489	-57	49,147
Excluded based on Exclusion 12 - Pregnancy and Exclusion 14 - strong CYP3A4 inhibitors or strong CYP3A4 inducers	-19	17,384	-44	32,445	-29	49,118
Final cohort		17,384		32,445		49,118

6. Variables

6.1 Exposure-related variables:

Study drug:

The study exposure of interest is initiation of rivaroxaban. New initiation will be defined by no use of rivaroxaban or warfarin in the prior 6 months before treatment initiation (washout period).

Comparator:

New initiators of warfarin, defined by no use of rivaroxaban or warfarin in the prior 6 months.

6.2 Covariates:

- Age
- Sex
- Combined Comorbidity Index (CCI), measured over the baseline covariate assessment period, defined as 180 days prior to and including index date

Covariates listed above represent only a small subset of covariates that will ultimately be controlled for in the design and analysis. We use the covariates above only for initial feasibility analyses to judge whether there is likely to be sufficient overlap between treatment groups to proceed with the study. Remaining covariates are defined only after the study has passed the initial feasibility analysis and the initial power assessment and are listed in Table 1 (**Appendix B**).

6.3 Outcome variables and study follow-up:

6.3.1 Outcome variables

Primary Effectiveness outcomes of interest: (definitions provided in **Appendix A**):

- **Primary Outcome:** VTE

Safety outcomes of interest:

1. Major bleeding

6.3.2 Study follow-up

Both as-treated (AT) and intention-to-treat (ITT) analyses will be conducted with treatment defined as the index drug on the day of cohort entry. Because adherence in the real-world databases is expected to be much worse than in the trial, the AT analysis is the **primary** analysis, as it targets the relative hazard of outcomes on treatment.

For the AT analyses, the follow-up will start the day after initiation of rivaroxaban and comparator and will continue until the earliest date of the following events:

- The first occurrence of the outcome of interest, unless otherwise specified for selected outcomes,
- The date of end of continuous registration in the database,
- End of the study period,
- Measured death event occurs,
- Nursing home admission
 - Nursing home admissions are considered a censoring event because the data sources utilized typically provide little to no data on a patient, particularly on drug utilization, after admission. We will utilize this as an exclusion reason for cohorts for the same reason.
- The date of drug discontinuation, defined as the date of the last continuous treatment episode of the index drug (rivaroxaban and comparator) plus a defined grace period (i.e., 10 days after the end of the last prescription's days' supply in main analyses).
- The date of augmentation or switching from exposure to comparator or vice versa or augmentation/switching to any other NOAC (e.g. switching from rivaroxaban to apixaban would be a censoring event);
 - A dosage change on the index treatment does not fulfill this criterion
 - An added treatment that is not part of the exposure or comparator group does not fulfill this criterion

For the intention-to-treat (ITT) analyses, the censoring based on the augmentation/switching and treatment discontinuation will be replaced with a maximum allowed follow-up time of 365 days.

7. Initial Feasibility Analysis

Aetion report name:

Optum- <https://bwh-dope.aetion.com/projects/details/1527/rwrs/66276>

MarketScan- <https://bwh-dope.aetion.com/projects/details/1653/rwrs/66277>

Medicare- <https://bwh-dope.aetion.com/projects/details/1525/rwrs/67892>

Date conducted: 02/24/2021

Complete Aetion feasibility analysis using age, sex, and CCI as the only covariates and the primary endpoint (Section 6.3.1) as the outcome. No measures of association will be computed nor will incidence rates stratified by treatment group.

- Report patient characteristics by treatment group

	Optum			Truven			Medicare		
Variable	Reference-warfarin	Exposure - rivaroxaban	Difference	Reference-warfarin	Exposure - rivaroxaban	Difference	Reference-warfarin	Exposure - rivaroxaban	Difference
Number of patients	10,916	6,439	- (-, -)	22,999	9,389	- (-, -)	32,895	16,223	- (-, -)
Age									
...mean (sd)	62.06 (15.66)	60.27 (15.41)	1.79 (1.31, 2.27)	55.59 (15.02)	53.62 (14.45)	1.98 (1.63, 2.33)	75.46 (7.25)	74.46 (6.75)	1.00 (0.87, 1.13)
...median [IQR]	65.00 [51.00, 74.00]	62.00 [50.00, 72.00]	- (-, -)	56.00 [46.00, 64.00]	54.00 [44.00, 63.00]	- (-, -)	74.00 [69.00, 80.00]	73.00 [69.00, 79.00]	- (-, -)
Gender without unknown									
...Male; n (%)	4,950 (45.3%)	3,030 (47.1%)	-1.7% (-3.3%, -0.2%)	11,058 (48.1%)	4,685 (49.9%)	-1.8% (-3.0%, -0.6%)	12,293 (37.4%)	6,712 (41.4%)	-4.0% (-4.9%, -3.1%)
...Female; n (%)	5,965 (54.6%)	3,408 (52.9%)	1.7% (0.2%, 3.3%)	11,941 (51.9%)	4,704 (50.1%)	1.8% (0.6%, 3.0%)	20,602 (62.6%)	9,511 (58.6%)	4.0% (3.1%, 4.9%)
CCI (180 days)- ICD9 and ICD10 v2									
...mean (sd)	3.04 (2.20)	3.21 (2.00)	-0.18 (-0.24, -0.11)	2.11 (1.91)	2.43 (1.82)	-0.32 (-0.36, -0.28)	6.33 (3.30)	6.24 (3.08)	0.09 (0.03, 0.15)
...median [IQR]	3.00 [1.00, 4.00]	3.00 [2.00, 4.00]	- (-, -)	2.00 [1.00, 3.00]	2.00 [1.00, 3.00]	- (-, -)	6.00 [4.00, 8.00]	6.00 [4.00, 8.00]	- (-, -)

- Report summary parameters of study population **FEASIBILITY- FOR STUDY OUTCOME**

FEASIBILITY- FOR STUDY OUTCOME			
	Optum	Truven	Medicare
Variable	Value	Value	Value
Number of patients in full cohort	17,384	32,445	49,118
Number of patients dropped as incomplete cases	0	0	0
Number of patients that did not begin follow-up	29	57	77
Number of patients in analytic cohort	17,355	32,388	49,041
Number of events	232	482	669
Number of person-years	6,152.63	12,258.57	20,258.62
Number of patients in group: Reference- warfarin	10,916	22,999	32,848
Number of patients in group: Exposure - rivaroxaban	6,439	9,389	16,193
Risk per 1,000 patients	13.37	14.88	13.64
Rate per 1,000 person-years	37.71	39.32	33.02

- Report median follow-up time by treatment group

MEDIAN FOLLOW-UP TIME FOR STUDY OUTCOME			
Median Follow-Up Time (Days) [IQR]			
	Optum	Truven	Medicare

Patient Group	Median Follow-Up Time (Days) [IQR]	Median Follow-Up Time (Days) [IQR]	Median Follow-Up Time (Days) [IQR]
Overall Patient Population	76 [38, 174]	93 [38, 183]	98 [38, 196]
Referent	82 [38, 177]	96 [43, 184]	103 [43, 201]
Exposure	65 [38, 171]	84 [38, 180]	82 [38, 185]

- Report reasons for censoring in the overall study population

CENSORING REASONS FOR STUDY OUTCOME			
	Optum	Truven	Medicare
Outcome	232 (1.3%)	482 (1.5%)	669 (1.4%)
Death	118 (0.7%)	63 (0.2%)	1,199 (2.4%)
Start of an additional exposure	606 (3.5%)	1,277 (3.9%)	2,077 (4.2%)
End of index exposure	12,371 (71.3%)	25,197 (77.8%)	37,423 (76.3%)
Specified date reached	476 (2.7%)	709 (2.2%)	3,194 (6.5%)
End of patient data	0 (0.0%)	0 (0.0%)	0 (0.0%)
End of patient enrollment	1,340 (7.7%)	4,035 (12.5%)	833 (1.7%)
Censoring - Switch to other NOAC + nursing home Occurred	2,212 (12.7%)	625 (1.9%)	3,646 (7.4%)

- Report overall risk of the primary outcome.

	Optum	Marketscan	Medicare	Pooled
Risk per 1,000 patients	13.37	14.88	13.64	13.98

8. Initial Power Assessment

Action report name:

For rivaroxaban vs. warfarin

Optum- <https://bwh-dope.aetion.com/projects/details/1527/rwrs/66281>

MarketScan- <https://bwh-dope.aetion.com/projects/details/1653/rwrs/66280>

Mediare- <https://bwh-dope.aetion.com/projects/details/1525/rwrs/67893>

Date conducted: 02/24/2021

In order to complete the initial power analysis, the dummy outcome of a 90-day gap in database enrollment will be used. This outcome is used to ensure that no information on the comparative risks of the outcomes of interest are available at this stage. Complete a 1:1 PS-matched comparative analysis using this outcome. PS should include only 2 covariates: age and combined comorbidity index. Power calculations are based on the formulas from Chow et al. (2008).

- Stop analyses until feasibility and power are reviewed by primary investigators and FDA. Reviewers evaluate the results of the analyses described above in Sections 7 and 8, including numbers of patients, patient characteristics, follow-up time, and reasons for censoring by treatment group, as well as overall rates of outcomes and study power. These parameters are re-evaluated and reported in the subsequent sections, after incorporating feedback and refining the protocol.

- Pooled

Effectiveness research with Real World Data to support FDA's regulatory decision making

Non-inferiority Analysis	
Number of patients matched	64,038
Reference	32,019
Exposed	32,019
Risk per 1,000 patients	13.98
Assumed HR from RCT	1.12
Alpha (2-sided)	0.05
Non-inferiority margin	2
Number of events expected	895.25124
Power	1

○ Optum

Non-inferiority Analysis	
Number of patients matched	12,876
Reference	6,438
Exposed	6,438
Risk per 1,000 patients	13.37
Assumed HR from RCT	1.12
Alpha (2-sided)	0.05
Non-inferiority margin	2
Number of events expected	172.15212
Power	0.967396851

○ MarketScan

Effectiveness research with Real World Data to support FDA's regulatory decision making

Non-inferiority Analysis	
Number of patients matched	18,776
Reference	9,388
Exposed	9,388
Risk per 1,000 patients	14.88
Assumed HR from RCT	1.12
Alpha (2-sided)	0.05
Non-inferiority margin	2
Number of events expected	279.38688
Power	0.998048094

○ Medicare

Non-inferiority Analysis	
Number of patients matched	32,386
Reference	16,193
Exposed	16,193
Risk per 1,000 patients	13.64
Assumed HR from RCT	1.12
Alpha (2-sided)	0.05
Non-inferiority margin	2
Number of events expected	441.74504
Power	0.999982118

- Stop analyses until balance and final power assessment are reviewed by primary investigators, FDA, and assigned members of advisory board.

Reviewed by PI:		Date reviewed:	
Reviewed by FDA:		Date reviewed:	
Reasons for stopping analysis (if required):			

9. Balance Assessment

Action report links:

Optum: <https://bwh-dope.aetion.com/projects/details/1527/rwrs/67705>

Marketscan: <https://bwh-dope.aetion.com/projects/details/1653/rwrs/67706>

Medicare: <https://bwh-dope.aetion.com/projects/details/1525/rwrs/67894>

Date conducted: 3/28/2021

After review of initial feasibility and power analyses, complete creation of the remaining covariates from Section 6.2. Again, using the dummy outcome of a 90-day gap in database enrollment, complete a 1:1 PS-matched analysis. The PS should include the complete list of covariates.

- Provide plot of PS distributions stratified by treatment group.

Note- Please refer to **Appendix B**.

- Report covariate balance after matching.

Note- Please refer to **Appendix B**.

- Report reasons for censoring by treatment group.

	Overall	Referent	Exposure
Dummy outcome	0 (0.0%)	0 (0.0%)	0 (0.0%)
Death	477 (1.50%)	218 (1.37%)	259 (1.63%)
Start of an additional exposure	1,584 (4.98%)	1,023 (6.44 %)	561 (3.53%)
End of index exposure	23,632 (74.35%)	11,350 (71.42%)	12,282 (77.28%)
Specified date reached	1,617 (5.09%)	875 (5.51%)	742 (4.67%)
End of patient enrollment	2,079 (6.54%)	1,046 (6.58%)	1,033 (6.50%)
Switch to other NOACs (for censoring) + nursing home admission	2,397 (7.54%)	1,381 (8.69%)	1,016 (6.39%)

- Report follow-up time by treatment group.

Median Follow-Up Time (Days) [IQR]			
Patient Group	Optum	Marketscan	Medicare
Overall Patient Population	70 [36-174]	91 [38-184]	97 [38-195]
Referent	75 [38-173]	92 [40-178]	100 [41-199]
Exposure	65 [33-175]	91 [38-188]	88 [38-190]

10. Final Power Assessment

Date conducted: 03/28/2021

- Re-calculate power in the appropriate excel table, using the revised number of matched patients from the PS-match in Section 9. All other parameters in the table should be the same as in Section 8.

Effectiveness research with Real World Data to support FDA's regulatory decision making

Pooled

Non-inferiority Analysis	
Number of patients matched	32,998
Reference	16,499
Exposed	16,499
Risk per 1,000 patients	13.87
Assumed HR from RCT	1.12
Alpha (2-sided)	0.05
Non-inferiority margin	2
Number of events expected	457.68226
Power	0.999988934

Optum

Non-inferiority Analysis	
Number of patients matched	4,306
Reference	2,153
Exposed	2,153
Risk per 1,000 patients	13.37
Assumed HR from RCT	1.12
Alpha (2-sided)	0.05
Non-inferiority margin	2
Number of events expected	57.57122
Power	0.594735156

Effectiveness research with Real World Data to support FDA's regulatory decision making

Marketscan

Non-inferiority Analysis	
Number of patients matched	11,350
Reference	5,675
Exposed	5,675
Risk per 1,000 patients	14.88
Assumed HR from RCT	1.12
Alpha (2-sided)	0.05
Non-inferiority margin	2
Number of events expected	168.888
Power	0.964666171

Medicare

Non-inferiority Analysis	
Number of patients matched	17,342
Reference	8,671
Exposed	8,671
Risk per 1,000 patients	13.46
Assumed HR from RCT	1.12
Alpha (2-sided)	0.05
Non-inferiority margin	2
Number of events expected	233.42332
Power	0.993231623

- Stop analyses until balance and final power assessment are reviewed by primary investigators, FDA, and assigned members of advisory board.

Reviewed by PI:		Date reviewed:	
Reviewed by FDA:		Date reviewed:	
Reasons for stopping analysis (if required):			

11. Study Confidence and Concerns

Deadline for voting on study confidence and listing concerns:

Date votes and concerns are summarized:

- If final feasibility and power analyses are reviewed and approved, proceed to the remaining protocol steps.
- All study team and advisory board members that review this protocol should at this stage provide their level of confidence for the success of the RWD study in the [Google Form](#). This form also provides space for reviewers to list any concerns that they feel may contribute to a failure to replicate the findings of the RCT, including differences in study populations, poor measurement of study variables, or residual confounding. All responses will be kept confidential and individual-level results will only be shared with the individual respondent.
- After the deadline for voting has passed, provide the distribution of responses and summarize all concerns here.

12. Register study protocol on clinicalTrials.gov

Date conducted:

- Register the study on [clinicalTrials.gov](#) and upload this document.

13. Comparative Analyses

Action report name:

Date conducted:

13.1 For primary analysis:

13.2 For sensitivity analyses:

14. Requested Results

14.1 Table 1: Baseline characteristics before and after adjustment

Variable	Before adjustment			After adjustment		
	Referent	Exposure	Std. diff.	Referent	Exposure	Std. diff.
Number of patients			-			-
Age categories						
...						

14.2 Table 2: Follow-up time

Patient Group	Median Follow-Up Time (Days) [IQR]
Overall Patient Population	
Referent	
Exposure	

14.3 Table 3: Censoring events

	Overall	Referent	Exposure
--	---------	----------	----------

Outcome			
Death			
Start of an additional exposure			
End of index exposure			
Specified date reached			
End of patient data			
End of patient enrollment			
...			

14.4 Table 4: Results from primary analyses;

Analysis	No. exposed events	No. referent events	Exposed rate	Referent rate	HR (95% CI)
Crude					
Analysis 1					
Analysis 2					
...					

HR, Hazard Ratio; CI, Confidence Interval.

14.5 Table 5: Results from secondary analyses;

15. References

Agnelli G, Berkowitz S, Bounameaux H, et al. Oral Rivaroxaban for the Treatment of Symptomatic Venous Thromboembolism. *N Engl J Med.* 2012; 366:1287-97

Chow S, Shao J, Wang H. 2008. *Sample Size Calculations in Clinical Research*. 2nd Ed. Chapman & Hall/CRC Biostatistics Series. page 177

Appendix A

<u>Trial Name (with web links)</u>	EINSTEIN PE
<u>Trial Name (with pdf links)</u>	EINSTEIN PE
<u>NCT</u>	NCT00439777
<u>Therapeutic Area</u>	Cardiology/Vascular Diseases
<u>Study batch</u>	NOACs
<u>Brand Name</u>	Xarelto
<u>Generic Name</u>	Rivaroxaban
<u>Sponsor</u>	Bayer Johnson & Johnson Pharmaceutical Research & Development, L.L.C
<u>Year</u>	2012
<u>Measurable endpoint</u>	Percentage of Participants With Symptomatic Recurrent Venous Thromboembolism [VTE] (i.e. the Composite of Recurrent Deep Vein Thrombosis [DVT] or Fatal or Non-fatal Pulmonary Embolism [PE]) Until the Intended End of Study Treatment
<u>Exposure</u>	Rivaroxaban
<u>Comparator</u>	Enoxaparin/VKA
<u>Population</u>	Patients of legal age who had acute symptomatic pulmonary embolism with or without deep-vein thrombosis
<u>Trial finding</u>	HR = 1.12 (95% CI 0.75 to 1.68)
<u>No. of Patients</u>	4,832 (2,419 in exposed arm)
<u>Non-inferiority margin</u>	HR = 2.0
<u>Assay Sens. Endpoint (from trial)</u>	Percentage of Participants With the Composite Variable Comprising Recurrent DVT, Non-fatal PE and All Cause Mortality Until the Intended End of Study Treatment
<u>Finding for potential Assay Sens. Outcome from trial-</u>	HR = 0.85 (95% CI 0.63 to 1.14)
<u>Power</u>	0.90. Assuming equal efficacy, a total of 88 events was calculated to give a power of 90% to prove that rivaroxaban is at least as effective as the comparator, considering a non-inferiority upper CI margin for the hazard ratio of 2.0 (two-sided $\alpha=0.05$). A mean incidence for the primary efficacy outcome of 3% was expected and an enrollment of at least 3000 patients was necessary

Appendix A

Title

Venous Thromboembolism (VTE)

ICD-9 Dx inpatient primary position

PE

415.1	PULMONARY EMBOLISM AND INFARCTION
415.11	IATROGENIC PULMONARY EMBOLISM AND INFARCTION
415.19	OTHER PULMONARY EMBOLISM AND INFARCTION

DVT

451.1	PHLEBITIS AND THROMBOPHLEBITIS OF DEEP VEINS OF LOWER EXTREMITIES
451.11	PHLEBITIS AND THROMBOPHLEBITIS OF FEMORAL VEIN (DEEP) (SUPERFICIAL)
451.19	PHLEBITIS AND THROMBOPHLEBITIS OF OTHER
451.2	PHLEBITIS AND THROMBOPHLEBITIS OF LOWER EXTREMITIES UNSPECIFIED
451.81	PHLEBITIS AND THROMBOPHLEBITIS OF ILIAC VEIN
451.9	PHLEBITIS AND THROMBOPHLEBITIS OF UNSPECIFIED SITE
453	BUDD-CHIARI SYNDROME
453.1	THROMBOPHLEBITIS MIGRANS
453.2	EMBOLISM AND THROMBOSIS OF INFERIOR VENA CAVA
453.4	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF DEEP VESSELS OF LOWER EXTREMITY
453.4	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF UNSPECIFIED DEEP VESSELS OF LOWER EXTREMITY
453.41	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF DEEP VESSELS OF PROXIMAL LOWER EXTREMITY
453.42	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF DEEP VESSELS OF DISTAL LOWER EXTREMITY
453.5	CHRONIC VENOUS EMBOLISM AND THROMBOSIS OF DEEP VESSELS OF LOWER EXTREMITY
453.5	CHRONIC VENOUS EMBOLISM AND THROMBOSIS OF UNSPECIFIED DEEP VESSELS OF LOWER EXTREMITY
453.51	CHRONIC VENOUS EMBOLISM AND THROMBOSIS OF DEEP VESSELS OF PROXIMAL LOWER EXTREMITY
453.52	CHRONIC VENOUS EMBOLISM AND THROMBOSIS OF DEEP VESSELS OF DISTAL LOWER EXTREMITY
453.8	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF OTHER SPECIFIED VEINS
453.82	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF DEEP VEINS OF UPPER EXTREMITY
453.83	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF UPPER EXTREMITY UNSPECIFIED
453.84	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF AXILLARY VEINS
453.85	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF SUBCLAVIAN VEINS
453.86	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF INTERNAL JUGULAR VEINS
453.87	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF OTHER THORACIC VEINS
453.89	ACUTE VENOUS EMBOLISM AND THROMBOSIS OF OTHER SPECIFIED VEINS

Appendix A

453.9 EMBOLISM AND THROMBOSIS OF UNSPECIFIED SITE

ICD-10 Dx inpatient primary position

PE

I26.0	Pulmonary embolism with acute cor pulmonale
I26.01	Septic pulmonary embolism with acute cor pulmonale
I26.02	Saddle embolus of pulmonary artery with acute cor pulmonale
I26.09	Other pulmonary embolism with acute cor pulmonale
I26.9	Pulmonary embolism without acute cor pulmonale
I26.99	Other pulmonary embolism without acute cor pulmonale

DVT

I80.1	Phlebitis and thrombophlebitis of femoral vein
I80.10	Phlebitis and thrombophlebitis of unspecified femoral vein
I80.11	Phlebitis and thrombophlebitis of right femoral vein
I80.12	Phlebitis and thrombophlebitis of left femoral vein
I80.13	Phlebitis and thrombophlebitis of femoral vein, bilateral
I80.2	Phlebitis and thrombophlebitis of other and unspecified deep vessels of lower extremities
I80.20	Phlebitis and thrombophlebitis of unspecified deep vessels of lower extremities
I80.201	Phlebitis and thrombophlebitis of unspecified deep vessels of right lower extremity
I80.202	Phlebitis and thrombophlebitis of unspecified deep vessels of left lower extremity
I80.203	Phlebitis and thrombophlebitis of unspecified deep vessels of lower extremities, bilateral
I80.209	Phlebitis and thrombophlebitis of unspecified deep vessels of unspecified lower extremity
I80.21	Phlebitis and thrombophlebitis of iliac vein
I80.211	Phlebitis and thrombophlebitis of right iliac vein
I80.212	Phlebitis and thrombophlebitis of left iliac vein
I80.213	Phlebitis and thrombophlebitis of iliac vein, bilateral
I80.219	Phlebitis and thrombophlebitis of unspecified iliac vein
I80.22	Phlebitis and thrombophlebitis of popliteal vein
I80.221	Phlebitis and thrombophlebitis of right popliteal vein
I80.222	Phlebitis and thrombophlebitis of left popliteal vein
I80.223	Phlebitis and thrombophlebitis of popliteal vein, bilateral
I80.229	Phlebitis and thrombophlebitis of unspecified popliteal vein
I80.23	Phlebitis and thrombophlebitis of tibial vein
I80.231	Phlebitis and thrombophlebitis of right tibial vein

Appendix A

I80.232	Phlebitis and thrombophlebitis of left tibial vein
I80.233	Phlebitis and thrombophlebitis of tibial vein, bilateral
I80.239	Phlebitis and thrombophlebitis of unspecified tibial vein
I80.29	Phlebitis and thrombophlebitis of other deep vessels of lower extremities
I80.291	Phlebitis and thrombophlebitis of other deep vessels of right lower extremity
I80.292	Phlebitis and thrombophlebitis of other deep vessels of left lower extremity
I80.293	Phlebitis and thrombophlebitis of other deep vessels of lower extremity, bilateral
I80.299	Phlebitis and thrombophlebitis of other deep vessels of unspecified lower extremity
I80.3	Phlebitis and thrombophlebitis of lower extremities, unspecified
I80.9	Phlebitis and thrombophlebitis of unspecified site
I82.0	Budd-Chiari syndrome
I82.1	Thrombophlebitis migrans
I80.3	Phlebitis and thrombophlebitis of lower extremities, unspecified
I82.4	Acute embolism and thrombosis of deep veins of lower extremity
I82.40	Acute embolism and thrombosis of unspecified deep veins of lower extremity
I82.401	Acute embolism and thrombosis of unspecified deep veins of right lower extremity
I82.402	Acute embolism and thrombosis of unspecified deep veins of left lower extremity
I82.403	Acute embolism and thrombosis of unspecified deep veins of lower extremity, bilateral
I82.409	Acute embolism and thrombosis of unspecified deep veins of unspecified lower extremity
I82.41	Acute embolism and thrombosis of femoral vein
I82.411	Acute embolism and thrombosis of right femoral vein
I82.412	Acute embolism and thrombosis of left femoral vein
I82.413	Acute embolism and thrombosis of femoral vein, bilateral
I82.419	Acute embolism and thrombosis of unspecified femoral vein
I82.42	Acute embolism and thrombosis of iliac vein
I82.421	Acute embolism and thrombosis of right iliac vein
I82.422	Acute embolism and thrombosis of left iliac vein
I82.423	Acute embolism and thrombosis of iliac vein, bilateral
I82.429	Acute embolism and thrombosis of unspecified iliac vein
I82.43	Acute embolism and thrombosis of popliteal vein
I82.431	Acute embolism and thrombosis of right popliteal vein
I82.432	Acute embolism and thrombosis of left popliteal vein
I82.433	Acute embolism and thrombosis of popliteal vein, bilateral
I82.439	Acute embolism and thrombosis of unspecified popliteal vein
I82.44	Acute embolism and thrombosis of tibial vein

Appendix A

I82.441	Acute embolism and thrombosis of right tibial vein
I82.442	Acute embolism and thrombosis of left tibial vein
I82.443	Acute embolism and thrombosis of tibial vein, bilateral
I82.449	Acute embolism and thrombosis of unspecified tibial vein
I82.49	Acute embolism and thrombosis of other specified deep vein of lower extremity
I82.491	Acute embolism and thrombosis of other specified deep vein of right lower extremity
I82.492	Acute embolism and thrombosis of other specified deep vein of left lower extremity
I82.493	Acute embolism and thrombosis of other specified deep vein of lower extremity, bilateral
I82.499	Acute embolism and thrombosis of other specified deep vein of unspecified lower extremity
I82.4Y	Acute embolism and thrombosis of unspecified deep veins of proximal lower extremity
I82.4Y1	Acute embolism and thrombosis of unspecified deep veins of right proximal lower extremity
I82.4Y2	Acute embolism and thrombosis of unspecified deep veins of left proximal lower extremity
I82.4Y3	Acute embolism and thrombosis of unspecified deep veins of proximal lower extremity, bilateral
I82.4Y9	Acute embolism and thrombosis of unspecified deep veins of unspecified proximal lower extremity
I82.4Z	Acute embolism and thrombosis of unspecified deep veins of distal lower extremity
I82.4Z1	Acute embolism and thrombosis of unspecified deep veins of right distal lower extremity
I82.4Z2	Acute embolism and thrombosis of unspecified deep veins of left distal lower extremity
I82.4Z3	Acute embolism and thrombosis of unspecified deep veins of distal lower extremity, bilateral
I82.4Z9	Acute embolism and thrombosis of unspecified deep veins of unspecified distal lower extremity
I82.5	Chronic embolism and thrombosis of deep veins of lower extremity
I82.50	Chronic embolism and thrombosis of unspecified deep veins of lower extremity
I82.501	Chronic embolism and thrombosis of unspecified deep veins of right lower extremity
I82.502	Chronic embolism and thrombosis of unspecified deep veins of left lower extremity
I82.503	Chronic embolism and thrombosis of unspecified deep veins of lower extremity, bilateral
I82.509	Chronic embolism and thrombosis of unspecified deep veins of unspecified lower extremity
I82.51	Chronic embolism and thrombosis of femoral vein
I82.511	Chronic embolism and thrombosis of right femoral vein
I82.512	Chronic embolism and thrombosis of left femoral vein
I82.513	Chronic embolism and thrombosis of femoral vein, bilateral
I82.519	Chronic embolism and thrombosis of unspecified femoral vein
I82.52	Chronic embolism and thrombosis of iliac vein
I82.521	Chronic embolism and thrombosis of right iliac vein
I82.522	Chronic embolism and thrombosis of left iliac vein
I82.523	Chronic embolism and thrombosis of iliac vein, bilateral
I82.529	Chronic embolism and thrombosis of unspecified iliac vein

Appendix A

I82.53	Chronic embolism and thrombosis of popliteal vein
I82.531	Chronic embolism and thrombosis of right popliteal vein
I82.532	Chronic embolism and thrombosis of left popliteal vein
I82.533	Chronic embolism and thrombosis of popliteal vein, bilateral
I82.539	Chronic embolism and thrombosis of unspecified popliteal vein
I82.54	Chronic embolism and thrombosis of tibial vein
I82.541	Chronic embolism and thrombosis of right tibial vein
I82.542	Chronic embolism and thrombosis of left tibial vein
I82.543	Chronic embolism and thrombosis of tibial vein, bilateral
I82.549	Chronic embolism and thrombosis of unspecified tibial vein
I82.59	Chronic embolism and thrombosis of other specified deep vein of lower extremity
I82.591	Chronic embolism and thrombosis of other specified deep vein of right lower extremity
I82.592	Chronic embolism and thrombosis of other specified deep vein of left lower extremity
I82.593	Chronic embolism and thrombosis of other specified deep vein of lower extremity, bilateral
I82.599	Chronic embolism and thrombosis of other specified deep vein of unspecified lower extremity
I82.5Y	Chronic embolism and thrombosis of unspecified deep veins of proximal lower extremity
I82.5Y1	Chronic embolism and thrombosis of unspecified deep veins of right proximal lower extremity
I82.5Y2	Chronic embolism and thrombosis of unspecified deep veins of left proximal lower extremity
I82.5Y3	Chronic embolism and thrombosis of unspecified deep veins of proximal lower extremity, bilateral
I82.5Y9	Chronic embolism and thrombosis of unspecified deep veins of unspecified proximal lower extremity
I82.5Z	Chronic embolism and thrombosis of unspecified deep veins of distal lower extremity
I82.5Z1	Chronic embolism and thrombosis of unspecified deep veins of right distal lower extremity
I82.5Z2	Chronic embolism and thrombosis of unspecified deep veins of left distal lower extremity
I82.5Z3	Chronic embolism and thrombosis of unspecified deep veins of distal lower extremity, bilateral
I82.5Z9	Chronic embolism and thrombosis of unspecified deep veins of unspecified distal lower extremity
I82.6	Acute embolism and thrombosis of veins of upper extremity
I82.60	Acute embolism and thrombosis of unspecified veins of upper extremity
I82.601	Acute embolism and thrombosis of unspecified veins of right upper extremity
I82.602	Acute embolism and thrombosis of unspecified veins of left upper extremity
I82.603	Acute embolism and thrombosis of unspecified veins of upper extremity, bilateral
I82.609	Acute embolism and thrombosis of unspecified veins of unspecified upper extremity
I82.62	Acute embolism and thrombosis of deep veins of upper extremity
I82.621	Acute embolism and thrombosis of deep veins of right upper extremity
I82.622	Acute embolism and thrombosis of deep veins of left upper extremity
I82.623	Acute embolism and thrombosis of deep veins of upper extremity, bilateral

Appendix A

I82.629	Acute embolism and thrombosis of deep veins of unspecified upper extremity
I82.890	Acute embolism and thrombosis of other specified veins
I82.90	Acute embolism and thrombosis of unspecified vein
I82.A1	Acute embolism and thrombosis of axillary vein
I82.A11	Acute embolism and thrombosis of right axillary vein
I82.A12	Acute embolism and thrombosis of left axillary vein
I82.A13	Acute embolism and thrombosis of axillary vein, bilateral
I82.A19	Acute embolism and thrombosis of unspecified axillary vein
I82.B1	Acute embolism and thrombosis of subclavian vein
I82.B11	Acute embolism and thrombosis of right subclavian vein
I82.B12	Acute embolism and thrombosis of left subclavian vein
I82.B13	Acute embolism and thrombosis of subclavian vein, bilateral
I82.B19	Acute embolism and thrombosis of unspecified subclavian vein
I82.C1	Acute embolism and thrombosis of internal jugular vein
I82.C11	Acute embolism and thrombosis of right internal jugular vein
I82.C12	Acute embolism and thrombosis of left internal jugular vein
I82.C13	Acute embolism and thrombosis of internal jugular vein, bilateral
I82.C19	Acute embolism and thrombosis of unspecified internal jugular vein

Appendix A

Title

Major Bleeding

ICD-9 Dx inpatient any position

423	(ICD9) HEMOPERICARDIUM
430	(ICD9) SUBARACHNOID HEMORRHAGE
431	(ICD9) INTRACEREBRAL HEMORRHAGE
432	(ICD9) NONTRAUMATIC EXTRADURAL HEMORRHAGE
432.1	(ICD9) SUBDURAL HEMORRHAGE
432.9	(ICD9) UNSPECIFIED INTRACRANIAL HEMORRHAGE
459	(ICD9) HEMORRHAGE UNSPECIFIED
531	(ICD9) ACUTE GASTRIC ULCER WITH HEMORRHAGE
531	(ICD9) ACUTE GASTRIC ULCER WITH HEMORRHAGE WITHOUT OBSTRUCTION
531.01	(ICD9) ACUTE GASTRIC ULCER WITH HEMORRHAGE WITH OBSTRUCTION
531.2	(ICD9) ACUTE GASTRIC ULCER WITH HEMORRHAGE AND PERFORATION
531.2	(ICD9) ACUTE GASTRIC ULCER WITH HEMORRHAGE AND PERFORATION WITHOUT OBSTRUCTION
531.21	(ICD9) ACUTE GASTRIC ULCER WITH HEMORRHAGE AND PERFORATION WITH OBSTRUCTION
531.4	(ICD9) CHRONIC OR UNSPECIFIED GASTRIC ULCER WITH HEMORRHAGE
531.4	(ICD9) CHRONIC OR UNSPECIFIED GASTRIC ULCER WITH HEMORRHAGE WITHOUT OBSTRUCTION
531.41	(ICD9) CHRONIC OR UNSPECIFIED GASTRIC ULCER WITH HEMORRHAGE WITH OBSTRUCTION
531.6	(ICD9) CHRONIC OR UNSPECIFIED GASTRIC ULCER WITH HEMORRHAGE AND PERFORATION
531.6	(ICD9) CHRONIC OR UNSPECIFIED GASTRIC ULCER WITH HEMORRHAGE AND PERFORATION WITHOUT OBSTRUCTION
531.61	(ICD9) CHRONIC OR UNSPECIFIED GASTRIC ULCER WITH HEMORRHAGE AND PERFORATION WITH OBSTRUCTION
532	(ICD9) ACUTE DUODENAL ULCER WITH HEMORRHAGE
532	(ICD9) ACUTE DUODENAL ULCER WITH HEMORRHAGE WITHOUT OBSTRUCTION
532.01	(ICD9) ACUTE DUODENAL ULCER WITH HEMORRHAGE WITH OBSTRUCTION
532.2	(ICD9) ACUTE DUODENAL ULCER WITH HEMORRHAGE AND PERFORATION
532.2	(ICD9) ACUTE DUODENAL ULCER WITH HEMORRHAGE AND PERFORATION WITHOUT OBSTRUCTION
532.21	(ICD9) ACUTE DUODENAL ULCER WITH HEMORRHAGE AND PERFORATION WITH OBSTRUCTION
532.4	(ICD9) CHRONIC OR UNSPECIFIED DUODENAL ULCER WITH HEMORRHAGE
532.4	(ICD9) CHRONIC OR UNSPECIFIED DUODENAL ULCER WITH HEMORRHAGE WITHOUT OBSTRUCTION

Appendix A

532.41	(ICD9) CHRONIC OR UNSPECIFIED DUODENAL ULCER WITH HEMORRHAGE WITH OBSTRUCTION
532.6	(ICD9) CHRONIC OR UNSPECIFIED DUODENAL ULCER WITH HEMORRHAGE AND PERFORATION
532.6	(ICD9) CHRONIC OR UNSPECIFIED DUODENAL ULCER WITH HEMORRHAGE AND PERFORATION WITHOUT OBSTRUCTION
532.61	(ICD9) CHRONIC OR UNSPECIFIED DUODENAL ULCER WITH HEMORRHAGE AND PERFORATION WITH OBSTRUCTION
533	(ICD9) ACUTE PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE
533	(ICD9) ACUTE PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE WITHOUT OBSTRUCTION
533.01	(ICD9) ACUTE PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE WITH OBSTRUCTION
533.2	(ICD9) ACUTE PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE AND PERFORATION
533.2	(ICD9) ACUTE PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE AND PERFORATION WITHOUT OBSTRUCTION
533.21	(ICD9) ACUTE PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE AND PERFORATION WITH OBSTRUCTION
533.4	(ICD9) CHRONIC OR UNSPECIFIED PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE
533.4	(ICD9) CHRONIC OR UNSPECIFIED PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE WITHOUT OBSTRUCTION
533.41	(ICD9) CHRONIC OR UNSPECIFIED PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE WITH OBSTRUCTION
533.6	(ICD9) CHRONIC OR UNSPECIFIED PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE AND PERFORATION
533.6	(ICD9) CHRONIC OR UNSPECIFIED PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE AND PERFORATION WITHOUT OBSTRUCTION
533.61	(ICD9) CHRONIC OR UNSPECIFIED PEPTIC ULCER OF UNSPECIFIED SITE WITH HEMORRHAGE AND PERFORATION WITH OBSTRUCTION
534	(ICD9) ACUTE GASTROJEJUNAL ULCER WITH HEMORRHAGE
534	(ICD9) ACUTE GASTROJEJUNAL ULCER WITH HEMORRHAGE WITHOUT OBSTRUCTION
534.01	(ICD9) ACUTE GASTROJEJUNAL ULCER WITH HEMORRHAGE WITH OBSTRUCTION
534.2	(ICD9) ACUTE GASTROJEJUNAL ULCER WITH HEMORRHAGE AND PERFORATION
534.2	(ICD9) ACUTE GASTROJEJUNAL ULCER WITH HEMORRHAGE AND PERFORATION WITHOUT OBSTRUCTION
534.21	(ICD9) ACUTE GASTROJEJUNAL ULCER WITH HEMORRHAGE AND PERFORATION WITH OBSTRUCTION
534.4	(ICD9) CHRONIC OR UNSPECIFIED GASTROJEJUNAL ULCER WITH HEMORRHAGE

Appendix A

534.4	(ICD9) CHRONIC OR UNSPECIFIED GASTROJEJUNAL ULCER WITH HEMORRHAGE WITHOUT OBSTRUCTION
534.41	(ICD9) CHRONIC OR UNSPECIFIED GASTROJEJUNAL ULCER WITH HEMORRHAGE WITH OBSTRUCTION
534.6	(ICD9) CHRONIC OR UNSPECIFIED GASTROJEJUNAL ULCER WITH HEMORRHAGE AND PERFORATION
534.6	(ICD9) CHRONIC OR UNSPECIFIED GASTROJEJUNAL ULCER WITH HEMORRHAGE AND PERFORATION WITHOUT OBSTRUCTION
534.61	(ICD9) CHRONIC OR UNSPECIFIED GASTROJEJUNAL ULCER WITH HEMORRHAGE AND PERFORATION WITH OBSTRUCTION
562.02	(ICD9) DIVERTICULOSIS OF SMALL INTESTINE WITH HEMORRHAGE
562.03	(ICD9) DIVERTICULITIS OF SMALL INTESTINE WITH HEMORRHAGE
562.12	(ICD9) DIVERTICULOSIS OF COLON WITH HEMORRHAGE
562.13	(ICD9) DIVERTICULITIS OF COLON WITH HEMORRHAGE
568.81	(ICD9) HEMOPERITONEUM (NONTRAUMATIC)
569.3	(ICD9) HEMORRHAGE OF RECTUM AND ANUS
569.83	(ICD9) PERFORATION OF INTESTINE
569.85	(ICD9) ANGIODYSPLASIA OF INTESTINE WITH HEMORRHAGE
569.86	(ICD9) DIEULAFOY LESION (HEMORRHAGIC) OF INTESTINE
578	(ICD9) HEMATEMESIS
578.1	(ICD9) BLOOD IN STOOL
578.9	(ICD9) HEMORRHAGE OF GASTROINTESTINAL TRACT UNSPECIFIED
719.1	(ICD9) HEMARTHROSIS
719.1	(ICD9) HEMARTHROSIS SITE UNSPECIFIED
719.11	(ICD9) HERARTHROSIS INVOLVING SHOULDER REGION
719.12	(ICD9) HEMARTHORSIS INVOLVING UPPER ARM
719.13	(ICD9) HEMARTHROSIS INVOLVING FOREARM
719.14	(ICD9) HEMARTHROSIS INVOLVING HAND
719.15	(ICD9) HEMARTHROSIS INVOLVING PELVIC REGION AND THIGH
719.16	(ICD9) HEMARTHROSIS INVOLVING LOWER LEG
719.17	(ICD9) HEMARTHROSIS INVOLVING ANKLE AND FOOT
719.18	(ICD9) HEMARTHROSIS INVOLVING OTHER SPECIFIED SITES
719.19	(ICD9) HEMARTHROSIS INVOLVING MULTIPLE SITES
784.7	(ICD9) EPISTAXIS
784.8	(ICD9) HEMORRHAGE FROM THROAT

Appendix A

599.7	(ICD9) HEMATURIA
599.7	(ICD9) HEMATURIA UNSPECIFIED
599.71	(ICD9) GROSS HEMATURIA
599.72	(ICD9) MICROSCOPIC HEMATURIA
786.3	(ICD9) HEMOPTYSIS
786.3	(ICD9) HEMOPTYSIS UNSPECIFIED
786.31	(ICD9) ACUTE IDIOPATHIC PULMONARY HEMORRHAGE IN INFANTS
786.39	(ICD9) OTHER HEMOPTYSIS

ICD-10 Dx inpatient any position

I31.2	(ICD10) Hemopericardium, not elsewhere classified
I60.00	(ICD10) Nontraumatic subarachnoid hemorrhage from unspecified carotid siphon and bifurcation
I60.01	(ICD10) Nontraumatic subarachnoid hemorrhage from right carotid siphon and bifurcation
I60.02	(ICD10) Nontraumatic subarachnoid hemorrhage from left carotid siphon and bifurcation
I60.10	(ICD10) Nontraumatic subarachnoid hemorrhage from unspecified middle cerebral artery
I60.11	(ICD10) Nontraumatic subarachnoid hemorrhage from right middle cerebral artery
I60.12	(ICD10) Nontraumatic subarachnoid hemorrhage from left middle cerebral artery
I60.2	(ICD10) Nontraumatic subarachnoid hemorrhage from anterior communicating artery
I60.30	(ICD10) Nontraumatic subarachnoid hemorrhage from unspecified posterior communicating artery
I60.31	(ICD10) Nontraumatic subarachnoid hemorrhage from right posterior communicating artery
I60.32	(ICD10) Nontraumatic subarachnoid hemorrhage from left posterior communicating artery
I60.4	(ICD10) Nontraumatic subarachnoid hemorrhage from basilar artery
I60.50	(ICD10) Nontraumatic subarachnoid hemorrhage from unspecified vertebral artery
I60.51	(ICD10) Nontraumatic subarachnoid hemorrhage from right vertebral artery
I60.52	(ICD10) Nontraumatic subarachnoid hemorrhage from left vertebral artery
I60.6	(ICD10) Nontraumatic subarachnoid hemorrhage from other intracranial arteries
I60.7	(ICD10) Nontraumatic subarachnoid hemorrhage from unspecified intracranial artery
I60.8	(ICD10) Other nontraumatic subarachnoid hemorrhage
I60.9	(ICD10) Nontraumatic subarachnoid hemorrhage, unspecified
I61.0	(ICD10) Nontraumatic intracerebral hemorrhage in hemisphere, subcortical
I61.1	(ICD10) Nontraumatic intracerebral hemorrhage in hemisphere, cortical
I61.2	(ICD10) Nontraumatic intracerebral hemorrhage in hemisphere, unspecified
I61.3	(ICD10) Nontraumatic intracerebral hemorrhage in brain stem

Appendix A

I61.4	(ICD10) Nontraumatic intracerebral hemorrhage in cerebellum
I61.5	(ICD10) Nontraumatic intracerebral hemorrhage, intraventricular
I61.6	(ICD10) Nontraumatic intracerebral hemorrhage, multiple localized
I61.8	(ICD10) Other nontraumatic intracerebral hemorrhage
I61.9	(ICD10) Nontraumatic intracerebral hemorrhage, unspecified
I62.00	(ICD10) Nontraumatic subdural hemorrhage, unspecified
I62.01	(ICD10) Nontraumatic acute subdural hemorrhage
I62.02	(ICD10) Nontraumatic subacute subdural hemorrhage
I62.03	(ICD10) Nontraumatic chronic subdural hemorrhage
I62.1	(ICD10) Nontraumatic extradural hemorrhage
I62.9	(ICD10) Nontraumatic intracranial hemorrhage, unspecified
K25.0	(ICD10) Acute gastric ulcer with hemorrhage
K25.2	(ICD10) Acute gastric ulcer with both hemorrhage and perforation
K25.4	(ICD10) Chronic or unspecified gastric ulcer with hemorrhage
K25.6	(ICD10) Chronic or unspecified gastric ulcer with both hemorrhage and perforation
K26.0	(ICD10) Acute duodenal ulcer with hemorrhage
K26.2	(ICD10) Acute duodenal ulcer with both hemorrhage and perforation
K26.4	(ICD10) Chronic or unspecified duodenal ulcer with hemorrhage
K26.6	(ICD10) Chronic or unspecified duodenal ulcer with both hemorrhage and perforation
K27.0	(ICD10) Acute peptic ulcer, site unspecified, with hemorrhage
K27.2	(ICD10) Acute peptic ulcer, site unspecified, with both hemorrhage and perforation
K27.4	(ICD10) Chronic or unspecified peptic ulcer, site unspecified, with hemorrhage
K27.6	(ICD10) Chronic or unspecified peptic ulcer, site unspecified, with both hemorrhage and perforation
K28.0	(ICD10) Acute gastrojejunal ulcer with hemorrhage
K28.2	(ICD10) Acute gastrojejunal ulcer with both hemorrhage and perforation
K28.4	(ICD10) Chronic or unspecified gastrojejunal ulcer with hemorrhage
K28.6	(ICD10) Chronic or unspecified gastrojejunal ulcer with both hemorrhage and perforation
K55.21	(ICD10) Angiodysplasia of colon with hemorrhage
K56.60	(ICD10) Unspecified intestinal obstruction
K57.01	(ICD10) Diverticulitis of small intestine with perforation and abscess with bleeding
K57.11	(ICD10) Diverticulosis of small intestine without perforation or abscess with bleeding
K57.13	(ICD10) Diverticulitis of small intestine without perforation or abscess with bleeding
K57.21	(ICD10) Diverticulitis of large intestine with perforation and abscess with bleeding

Appendix A

K57.31	(ICD10) Diverticulosis of large intestine without perforation or abscess with bleeding
K57.33	(ICD10) Diverticulitis of large intestine without perforation or abscess with bleeding
K57.41	(ICD10) Diverticulitis of both small and large intestine with perforation and abscess with bleeding
K57.51	(ICD10) Diverticulosis of both small and large intestine without perforation or abscess with bleeding
K57.53	(ICD10) Diverticulitis of both small and large intestine without perforation or abscess with bleeding
K57.81	(ICD10) Diverticulitis of intestine, part unspecified, with perforation and abscess with bleeding
K57.91	(ICD10) Diverticulosis of intestine, part unspecified, without perforation or abscess with bleeding
K57.93	(ICD10) Diverticulitis of intestine, part unspecified, without perforation or abscess with bleeding
K62.5	(ICD10) Hemorrhage of anus and rectum
K63.1	(ICD10) Perforation of intestine (nontraumatic)
K63.81	(ICD10) Dieulafoy lesion of intestine
K66.1	(ICD10) Hemoperitoneum
K92.0	(ICD10) Hematemesis
K92.1	(ICD10) Melena
K92.2	(ICD10) Gastrointestinal hemorrhage, unspecified
M25.00	(ICD10) Hemarthrosis, unspecified joint
M25.011	(ICD10) Hemarthrosis, right shoulder
M25.012	(ICD10) Hemarthrosis, left shoulder
M25.019	(ICD10) Hemarthrosis, unspecified shoulder
M25.021	(ICD10) Hemarthrosis, right elbow
M25.022	(ICD10) Hemarthrosis, left elbow
M25.029	(ICD10) Hemarthrosis, unspecified elbow
M25.031	(ICD10) Hemarthrosis, right wrist
M25.032	(ICD10) Hemarthrosis, left wrist
M25.039	(ICD10) Hemarthrosis, unspecified wrist
M25.041	(ICD10) Hemarthrosis, right hand
M25.042	(ICD10) Hemarthrosis, left hand
M25.049	(ICD10) Hemarthrosis, unspecified hand
M25.051	(ICD10) Hemarthrosis, right hip
M25.052	(ICD10) Hemarthrosis, left hip
M25.059	(ICD10) Hemarthrosis, unspecified hip
M25.061	(ICD10) Hemarthrosis, right knee
M25.062	(ICD10) Hemarthrosis, left knee

Appendix A

M25.069	(ICD10) Hemarthrosis, unspecified knee
M25.071	(ICD10) Hemarthrosis, right ankle
M25.072	(ICD10) Hemarthrosis, left ankle
M25.073	(ICD10) Hemarthrosis, unspecified ankle
M25.074	(ICD10) Hemarthrosis, right foot
M25.075	(ICD10) Hemarthrosis, left foot
M25.076	(ICD10) Hemarthrosis, unspecified foot
M25.08	(ICD10) Hemarthrosis, other specified site
R58	(ICD10) Hemorrhage, not elsewhere classified
R04	(ICD10) Hemorrhage from respiratory passages
R04.0	(ICD10) Epistaxis
R04.1	(ICD10) Hemorrhage from throat
R04.2	(ICD10) Hemoptysis
R04.8	(ICD10) Hemorrhage from other sites in respiratory passages
R04.81	(ICD10) Acute idiopathic pulmonary hemorrhage in infants
R04.89	(ICD10) Hemorrhage from other sites in respiratory passages
R04.9	(ICD10) Hemorrhage from respiratory passages, unspecified
R31	(ICD10) Hematuria
R31.0	(ICD10) Gross hematuria
R31.1	(ICD10) Benign essential microscopic hematuria
R31.2	(ICD10) Other microscopic hematuria
R31.21	(ICD10) Asymptomatic microscopic hematuria
R31.29	(ICD10) Other microscopic hematuria
R31.9	(ICD10) Hematuria, unspecified
Px inpatient any position	
44.43	(ICD9) ENDOSCOPIC CONTROL OF GASTRIC OR DUODENAL BLEEDING
0W3P8ZZ	(ICD10) Control Bleeding in Gastrointestinal Tract, Via Natural or Artificial Opening Endoscopic
43255	(HCPCS) Esophagogastroduodenoscopy, flexible, transoral; with control of bleeding, any method / Upper gastrointestinal endoscopy including esophagus, stomach, and either the duodenum and/or jejunum as appropriate; with control of bleeding, any method

Appendix A

Title

Pregnancy

ICD-9 Dx inpatient any position

650	Normal delivery
660	Obstructed labor
661	Abnormality of forces of labor
662	Long labor
663	Umbilical cord complications during labor and delivery
664	Trauma to perineum and vulva during delivery
665	Other obstetrical trauma
667	Retained placenta or membranes without hemorrhage
668	Complications of the administration of anesthetic or other sedation in labor and delivery
669.94	Unspecified complication of labor and delivery postpartum condition or complication
V24	Postpartum care and examination
V24.0	Postpartum care and examination immediately after delivery
V24.1	Postpartum care and examination of lactating mother
V24.2	Routine postpartum follow
V27	Outcome of delivery
V27.0	Mother with single liveborn
V27.1	Mother with single stillborn
V27.2	Mother with twins both liveborn
V27.3	Mother with twins one liveborn and one stillborn
V27.4	Mother with twins both stillborn
V27.5	Mother with other multiple birth all liveborn
V27.6	Mother with other multiple birth some liveborn
V27.7	Mother with other multiple birth all stillborn
V27.9	Mother with unspecified outcome of delivery

ICD-9 Px inpatient any position

72.0	Low forceps operation
72.1	Low forceps operation with episiotomy
72.2	Mid forceps operation
72.21	Mid forceps operation with episiotomy
72.29	Other mid forceps operation

Appendix A

72.3	High forceps operation
72.31	High forceps operation with episiotomy
72.39	Other high forceps operation
72.4	Forceps rotation of fetal head
72.5	Breech extraction
72.51	Partial breech extraction with forceps to aftercoming head
72.52	Other partial breech extraction
72.53	Total breech extraction with forceps to aftercoming head
72.54	Other total breech extraction
72.6	Forceps application to aftercoming head
72.7	Vacuum extraction
72.71	Vacuum extraction with episiotomy
72.79	Other vacuum extraction
72.8	Other specified instrumental delivery
72.9	Unspecified instrumental delivery
73.0	Artificial rupture of membranes
73.01	Induction of labor by artificial rupture of membranes
73.09	Other artificial rupture of membranes
73.1	Other surgical induction of labor
73.2	Internal and combined version and extraction
73.21	Internal and combined version without extraction
73.22	Internal and combined version with extraction
73.3	Failed forceps
73.4	Medical induction of labor
73.5	Manually assisted delivery
73.51	Manual rotation of fetal head
73.59	Other manually assisted delivery
73.6	Episiotomy
73.8	Operations on fetus to facilitate delivery
73.9	Other operations assisting delivery
73.91	External version assisting delivery
73.92	Replacement of prolapsed umbilical cord
73.93	Incision of cervix to assist delivery
73.94	Pubiotomy to assist delivery
73.99	Other operations assisting delivery

Appendix A

74.0	Classical cesarean section
74.1	Low cervical cesarean section
74.2	Extraperitoneal cesarean section
74.3	Removal of extratubal ectopic pregnancy
74.4	Cesarean section of other specified type
74.9	Cesarean section of unspecified type
74.91	Hysterotomy to terminate pregnancy
74.99	Other cesarean section of unspecified type
75.4	Manual removal of retained placenta
75.5	Repair of current obstetric laceration of uterus
75.6	Repair of other current obstetric laceration
75.7	Manual exploration of uterine cavity, postpartum
75.9	Other obstetric operations

Optum

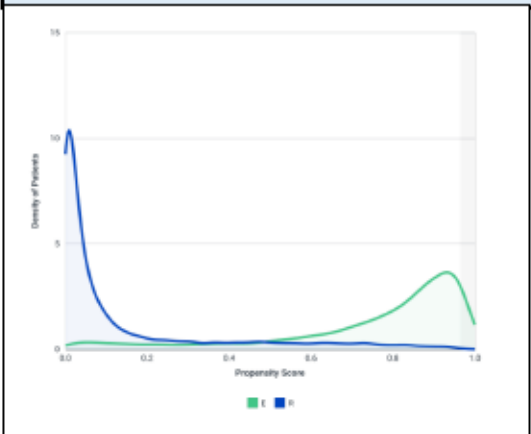


Figure 68: Pre-matching propensity score overlap

The c-statistic for the propensity score model, pre-matching was 0.94. The post-matching c-statistic was 0.575.

MarketScan

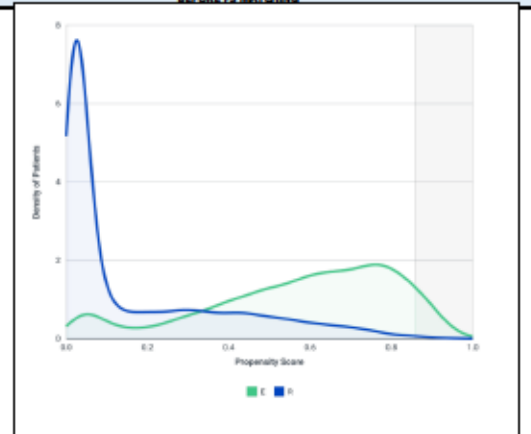


Figure 67: Pre-matching propensity score overlap

The c-statistic for the propensity score model, pre-matching was 0.885. The post-matching c-statistic was 0.557.

Medicare

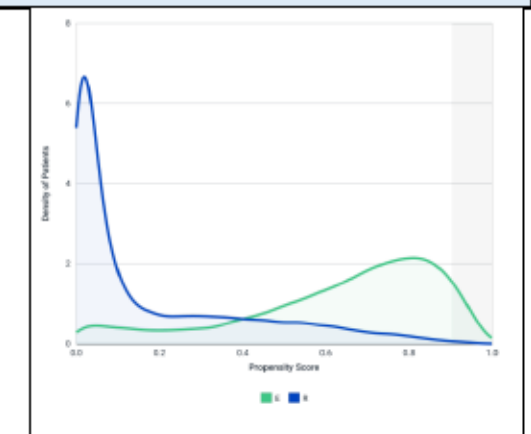


Figure 43: Pre-matching propensity score overlap

The c-statistic for the propensity score model, pre-matching was 0.896. The post-matching c-statistic was 0.584.

Optum

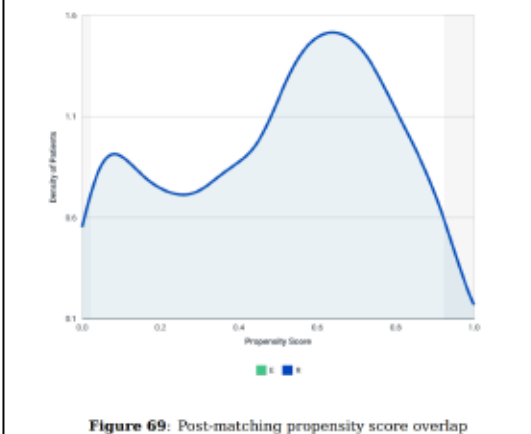


Figure 69: Post-matching propensity score overlap

MarketScan

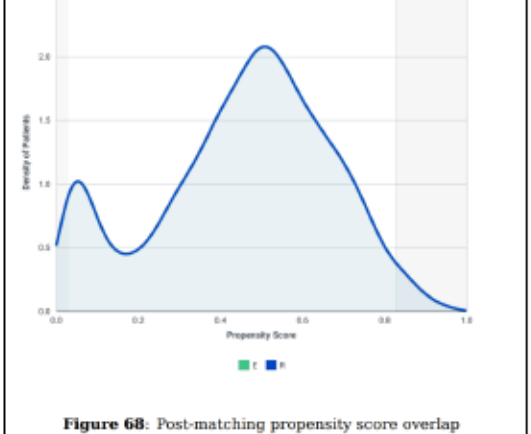


Figure 68: Post-matching propensity score overlap

Medicare

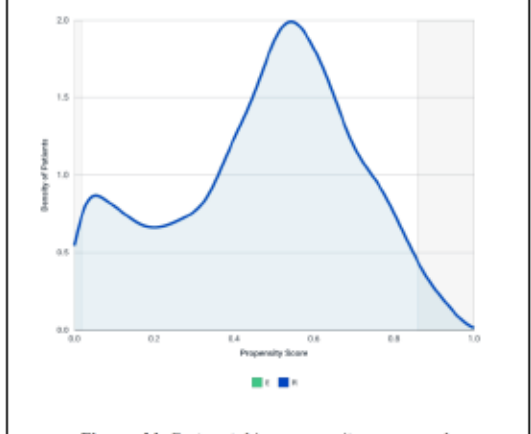


Figure 44: Post-matching propensity score overlap

Appendix B

Unmatched												
	Optum			MarketScan			Medicare			POOLED		
Variable	Reference-warfarin Copy	Exposure-rivaroxaban (15 or 20 mg) Copy	St. Diff.	Reference-warfarin Copy	Exposure-rivaroxaban (15 or 20 mg) Copy	St. Diff.	Reference-warfarin Copy	Exposure-rivaroxaban (15 or 20 mg) Copy	St. Diff.	Reference-warfarin Copy	Exposure-rivaroxaban (15 or 20 mg) Copy	St. Diff.
Number of patients	10,936	6,448		23,040	9,405		32,895	16,223		66,871	32,076	
Age												
...mean (sd)	62.06 (15.66)	60.27 (15.40)	0.12	55.59 (15.02)	53.61 (14.45)	0.13	75.46 (7.25)	74.46 (6.75)	0.14	66.42 (11.99)	65.49 (11.49)	0.08
...median [IQR]	65.00 [51.00, 74.00]	62.00 [50.00, 72.00]	0.19	56.00 [46.00, 64.00]	54.00 [44.00, 63.00]	0.14	74.00 [69.00, 80.00]	73.00 [69.00, 79.00]	0.14	66.33 (11.99)	65.22 (11.49)	0.09
Age categories without zero category												
...18-54; n (%)	3,304 (30.2%)	2,172 (33.7%)	-0.08	10,427 (45.3%)	4,739 (50.4%)	-0.10	0 (0.0%)	0 (0.0%)	#DIV/0!	13,731 (20.5%)	6911 (21.5%)	-0.02
...55-64; n (%)	2,163 (19.8%)	1,354 (21.0%)	-0.03	7,017 (30.5%)	2,874 (30.6%)	0.00	0 (0.0%)	0 (0.0%)	#DIV/0!	9,180 (13.7%)	4,228 (13.2%)	0.01
...65-74; n (%)	2,869 (26.2%)	1,739 (27.0%)	-0.02	2,972 (12.9%)	1,055 (11.2%)	0.05	16,795 (51.1%)	9,117 (56.2%)	-0.10	22,636 (33.9%)	11,911 (37.1%)	-0.07
...≥75; n (%)	2,600 (23.8%)	1,183 (18.3%)	0.14	2,624 (11.4%)	737 (7.8%)	0.12	16,100 (48.9%)	7,106 (43.8%)	0.10	21,324 (31.9%)	9,026 (28.1%)	0.08
Gender without zero category-United												
...Males; n (%)	4,959 (45.3%)	3,037 (47.1%)	-0.04	11,080 (48.1%)	4,697 (49.9%)	-0.04	12,293 (37.4%)	6,712 (41.4%)	-0.08	28,332 (42.4%)	14,446 (45.0%)	-0.05
...Females; n (%)	5,976 (54.6%)	3,410 (52.9%)	0.03	11,960 (51.9%)	4,708 (50.1%)	0.04	20,602 (62.6%)	9,511 (58.6%)	0.08	38,538 (57.6%)	17,629 (55.0%)	0.05
Race												
...White; n (%)							28,783 (87.5%)	14,127 (87.1%)	0.01	28,783 (87.5%)	14,127 (87.1%)	0.01
...Black; n (%)							2,966 (9.0%)	1,433 (8.8%)	0.01	2,966 (9.0%)	1,433 (8.8%)	0.01
...Asian; n (%)							194 (0.6%)	121 (0.7%)	-0.01	194 (0.6%)	121 (0.7%)	-0.01
...Hispanic; n (%)							394 (1.2%)	177 (1.1%)	0.01	394 (1.2%)	177 (1.1%)	0.01
...North American Native; n (%)							97 (0.3%)	46 (0.3%)	0.00	97 (0.3%)	46 (0.3%)	0.00
...Other/Unknown; n (%)							461 (1.4%)	319 (2.0%)	-0.05	461 (1.4%)	319 (2.0%)	-0.05
Region without zero category												
...Northeast; n (%)	1,069 (9.8%)	661 (10.3%)	-0.02	4,222 (18.3%)	1,713 (18.2%)	0.00	5,743 (17.5%)	2,841 (17.5%)	0.00	11034 (16.5%)	5,215 (16.3%)	0.01
...South; n (%)	3,790 (34.7%)	2,716 (42.1%)	-0.15	6,557 (28.5%)	2,460 (26.2%)	0.05	11,036 (33.5%)	6,415 (39.5%)	-0.12	21,383 (32.0%)	11,591 (36.1%)	-0.09
...Midwest; n (%)	3,255 (29.8%)	1,713 (26.6%)	0.07	7,804 (33.9%)	4,013 (42.7%)	-0.18	9,920 (30.2%)	4,033 (24.9%)	0.12	20,979 (31.4%)	9,759 (30.4%)	0.02
...West; n (%)	2,822 (25.8%)	1,358 (21.1%)	0.11	4,149 (18.0%)	1,125 (12.0%)	0.17	6,157 (18.7%)	2,922 (18.0%)	0.02	13,128 (19.6%)	5,405 (16.9%)	0.07
...Unknown+missing; n (%)	N/A	N/A	#VALUE!	308 (1.3%)	94 (1.0%)	0.03	N/A	N/A	#VALUE!	308 (1.3%)	94 (1.0%)	0.03
CV Covariates												
Ischemic heart disease; n (%)	1,887 (17.3%)	1,101 (17.1%)	0.01	2,748 (11.9%)	1,139 (12.1%)	-0.01	8,409 (25.6%)	3,988 (24.6%)	0.02	13,044 (19.5%)	6,228 (19.4%)	0.00
Acute MI; n (%)	396 (3.6%)	245 (3.8%)	-0.01	680 (3.0%)	297 (3.2%)	-0.01	1,323 (4.0%)	646 (4.0%)	0.00	2399 (3.6%)	1188 (3.7%)	-0.01
ACS/unstable angina; n (%)	90 (0.8%)	112 (1.7%)	-0.08	73 (0.3%)	105 (1.1%)	-0.10	308 (0.9%)	272 (1.7%)	-0.07	471 (0.7%)	489 (1.5%)	-0.08
Old MI; n (%)	320 (2.9%)	185 (2.9%)	0.00	338 (1.5%)	166 (1.8%)	-0.02	1,793 (5.5%)	751 (4.6%)	0.04	2451 (3.7%)	1102 (3.4%)	0.02
Stable angina; n (%)	216 (2.0%)	137 (2.1%)	-0.01	333 (1.4%)	160 (1.7%)	-0.02	801 (2.4%)	409 (2.5%)	-0.01	1350 (2.0%)	706 (2.2%)	-0.01
Coronary atherosclerosis and other forms of chronic ischemic heart disease; n (%)	1,447 (13.2%)	768 (11.9%)	0.04	1,990 (8.6%)	747 (7.9%)	0.03	7,049 (21.4%)	3,254 (20.1%)	0.03	10,486 (15.7%)	4,769 (14.9%)	0.02
Other atherosclerosis with ICD10 v2 Copy; n (%)	106 (1.0%)	43 (0.7%)	0.03	134 (0.6%)	43 (0.5%)	0.01	418 (1.3%)	163 (1.0%)	0.03	658 (1.0%)	249 (0.8%)	0.02
Previous cardiac procedure (CABG or PTCA or Stent) v4; n (%)	54 (0.5%)	14 (0.2%)	0.05	98 (0.4%)	27 (0.3%)	0.02	184 (0.6%)	77 (0.5%)	0.01	336 (0.5%)	118 (0.4%)	0.01
History of CABG or PTCA; n (%)	418 (3.8%)	252 (3.9%)	-0.01	312 (1.4%)	118 (1.3%)	0.01	2,843 (8.6%)	1,333 (8.2%)	0.01	3,573 (5.3%)	1,703 (5.3%)	0.00
Any stroke; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	000 (0.0%)	#DIV/0!
Ischemic stroke (w and w/o mention of cerebral infarction); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	000 (0.0%)	#DIV/0!
Hemorrhagic stroke; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	000 (0.0%)	0 (0.0%)	#DIV/0!
TIA; n (%)	96 (0.9%)	61 (0.9%)	0.00	137 (0.6%)	57 (0.6%)	0.00	350 (1.1%)	153 (0.9%)	0.02	583 (0.9%)	271 (0.8%)	0.01
Other cerebrovascular disease; n (%)	173 (1.6%)	60 (0.9%)	0.06	180 (0.8%)	61 (0.6%)	0.02	748 (2.3%)	273 (1.7%)	0.04	1101 (1.6%)	394 (1.2%)	0.03
Cerebrovascular procedure; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	** (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	#VALUE!	0 (0.0%)	#VALUE!
Heart failure (CHF); n (%)	** (0.1%)	** (0.0%)	0.04	** (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	#VALUE!	#VALUE!	#VALUE!
Peripheral Vascular Disease (PVD) or PVD Surgery v2; n (%)	513 (4.7%)	289 (4.5%)	0.01	690 (3.0%)	266 (2.8%)	0.01	2,261 (6.9%)	996 (6.1%)	0.03	3,464 (5.2%)	1,551 (4.8%)	0.02
Atrial fibrillation; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	000 (0.0%)	#DIV/0!
Other cardiac dysrhythmia; n (%)	1,679 (15.4%)	849 (13.2%)	0.06	3,124 (13.6%)	1,204 (12.8%)	0.02	5,727 (17.4%)	2,406 (14.8%)	0.07	10,530 (15.7%)	4,459 (13.9%)	0.05
Cardiac conduction disorders; n (%)	714 (6.5%)	411 (6.4%)	0.00	857 (3.7%)	389 (4.1%)	-0.02	2,701 (8.2%)	1,281 (7.9%)	0.01	4272 (6.4%)	2081 (6.5%)	0.00
Other CVD; n (%)	2,738 (25.0%)	1,629 (25.3%)	-0.01	4,454 (19.3%)	1,993 (21.2%)	-0.05	7,925 (24.1%)	4,007 (24.7%)	-0.01	15,117 (22.6%)	7,629 (23.8%)	-0.03
Diabetes-related complications												
Occurrence of Diabetic Neuropathy v2 Copy; n (%)	438 (4.0%)	259 (4.0%)	0.00	465 (2.0%)	200 (2.1%)	-0.01	1,258 (3.8%)	573 (3.5%)	0.02	2161 (3.2%)	1032 (3.2%)	0.00
Occurrence of diabetic nephropathy V3 with ICD10 Copy; n (%)	235 (2.1%)	147 (2.3%)	-0.01	236 (1.0%)	95 (1.0%)	0.00	635 (1.9%)	292 (1.8%)	0.01	1,106 (1.7%)	534 (1.7%)	0.00
Hypoglycemia v2; n (%)	129 (1.2%)	27 (0.4%)	0.09	210 (0.9%)	51 (0.5%)	0.05	589 (1.8%)	278 (1.7%)	0.01	928 (1.4%)	356 (1.1%)	0.03
Hyperglycemia; n (%)	777 (7.1%)	496 (7.7%)	-0.02	938 (4.1%)	451 (4.8%)	-0.03	2,693 (8.2%)	1,480 (9.1%)	-0.03	4408 (6.6%)	2427 (7.6%)	-0.04
Diabetic ketoacidosis; n (%)	33 (0.3%)	21 (0.3%)	0.00	67 (0.3%)	26 (0.3%)	0.00	78 (0.2%)	25 (0.2%)	0.00	178 (0.3%)	72 (0.2%)	0.02
Hypertension: 1 inpatient or 2 outpatient claims within 365 days; n (%)	6,750 (61.7%)	3,702 (57.4%)	0.09	11,057 (48.0%)	4,458 (47.4%)	0.01	26,870 (81.7%)	12,798 (78.9%)	0.07	44,677 (66.8%)	20,958 (65.3%)	0.03
Hyperlipidemia v2; n (%)	5,170 (47.3%)	2,834 (44.0%)	0.07	7,362 (32.0%)	3,147 (33.5%)	-0.03	20,106 (61.1%)	9,762 (60.2%)	0.02	32,638 (48.8%)	15,743 (49.1%)	-0.01
Edema; n (%)	1,721 (15.7%)	1,080 (16.7%)	-0.03	2,586 (11.2%)	1,243 (13.2%)	-0.06	4,315 (13.1%)	1,982 (12.2%)	0.03	8622 (12.9%)	4305 (13.4%)	-0.01
Renal Dysfunction (non-diabetic) v2; n (%)	2,375 (21.7%)	1,172 (18.2%)	0.09	3,055 (13.3%)	1,084 (11.5%)	0.05	8,504 (25.9%)	3,405 (21.0%)	0.12	13,934 (20.8%)	5,661 (17.6%)	0.08
Occurrence of acute renal disease v2; n (%)	1,071 (9.8%)	496 (7.7%)	0.07	1,396 (6.1%)	536 (5.7%)	0.02	3,560 (10.8%)	1,440 (8.9%)	0.06	6027 (9.0%)	2472 (7.7%)	0.05
Occurrence of chronic renal insufficiency; n (%)	1,209 (11.1%)	537 (8.3%)	0.09	1,164 (5.1%)	349 (3.7%)	0.07	4,943 (15.0%)	1,729 (10.7%)	0.13	7,316 (10.9%)	2,615 (8.2%)	0.09
Chronic kidney disease v2; n (%)	1,170 (10.7%)	512 (7.9%)	0.10	1,088 (4.7%)	323 (3.4%)	0.07	4,739 (14.4%)	1,645 (10.1%)	0.13	6,997 (10.5%)	2,480 (7.7%)	0.10
CKD Stage 3-4; n (%)	714 (6.5%)	311 (4.8%)	0.07	599 (2.6%)	178 (1.9%)	0.05	2,836 (8.6%)	999 (6.2%)	0.09	4,149 (6.2%)	1,488 (4.6%)	0.07
Occurrence of hypertensive nephropathy; n (%)	792 (7.2%)	325 (5.0%)	0.09	706 (3.1%)	213 (2.3%)	0.05	3,862 (11.7%)	1,288 (7.9%)	0.13	5,360 (8.0%)	1,826 (5.7%)	0.09
Occurrence of miscellaneous renal insufficiency v2; n (%)	927 (8.5%)	463 (7.2%)	0.05	1,292 (5.6%)	439 (4.7%)	0.04	3,000 (9.1%)	1,209 (7.5%)	0.06	5,219 (7.8%)	2,111 (6.6%)	0.05
Other Covariates												

Appendix B

Liver disease; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!
Osteoarthritis; n (%)	2,875 (26.3%)	1,680 (26.1%)	0.00	4,249 (18.4%)	1,779 (18.9%)	-0.01	11,602 (35.3%)	5,806 (35.8%)	-0.01	18726 (28.0%)	9265 (28.9%)	-0.02
Other arthritis, arthropathies and musculoskeletal pain; n (%)	7,107 (65.0%)	4,067 (63.1%)	0.04	13,537 (58.8%)	5,724 (60.9%)	-0.04	19,911 (60.5%)	9,597 (59.2%)	0.03	40555 (60.6%)	19388 (60.4%)	0.00
Dorsopathies; n (%)	3,652 (33.4%)	2,195 (34.0%)	-0.01	6,396 (27.8%)	2,672 (28.4%)	-0.01	11,170 (34.0%)	5,322 (32.8%)	0.03	21218 (31.7%)	10189 (31.8%)	0.00
Fractures; n (%)	962 (8.8%)	558 (8.7%)	0.00	1,761 (7.6%)	632 (6.7%)	0.03	3,146 (9.6%)	1,424 (8.8%)	0.03	5869 (8.8%)	2614 (8.1%)	0.03
Falls v2; n (%)	771 (7.1%)	477 (7.4%)	-0.01	434 (1.9%)	267 (2.8%)	-0.06	1,170 (3.6%)	542 (3.3%)	0.02	2375 (3.6%)	1286 (4.0%)	-0.02
Osteoporosis; n (%)	857 (7.8%)	380 (5.9%)	0.08	787 (3.4%)	246 (2.6%)	0.05	4,514 (13.7%)	1,960 (12.1%)	0.05	6158 (9.2%)	2586 (8.1%)	0.04
Depression; n (%)	2,091 (19.1%)	1,156 (17.9%)	0.03	3,206 (13.9%)	1,262 (13.4%)	0.01	6,138 (18.7%)	2,809 (17.3%)	0.04	11435 (17.1%)	5227 (16.3%)	0.02
Anxiety; n (%)	1,816 (16.6%)	1,276 (19.8%)	-0.08	2,689 (11.7%)	1,354 (14.4%)	-0.08	5,310 (16.1%)	2,627 (16.2%)	0.00	9815 (14.7%)	5257 (16.4%)	-0.05
Sleep_Disorder; n (%)	1,580 (14.4%)	476 (7.4%)	0.23	2,974 (12.9%)	935 (9.9%)	0.09	4,052 (12.3%)	1,350 (8.3%)	0.13	8606 (12.9%)	2761 (8.6%)	0.14
Dementia; n (%)	660 (6.0%)	344 (5.3%)	0.03	481 (2.1%)	195 (2.1%)	0.00	3,564 (10.8%)	1,522 (9.4%)	0.05	4705 (7.0%)	2061 (6.4%)	0.02
Delirium; n (%)	341 (3.1%)	154 (2.4%)	0.04	378 (1.6%)	152 (1.6%)	0.00	1,162 (3.5%)	469 (2.9%)	0.03	1881 (2.8%)	775 (2.4%)	0.03
Psychosis; n (%)	264 (2.4%)	120 (1.9%)	0.03	262 (1.1%)	94 (1.0%)	0.01	893 (2.7%)	364 (2.2%)	0.03	1419 (2.1%)	578 (1.8%)	0.02
Obesity; n (%)	3,062 (28.0%)	2,069 (32.1%)	-0.09	5,195 (22.5%)	2,601 (27.7%)	-0.12	7,385 (22.5%)	3,582 (22.1%)	0.01	15642 (23.4%)	8252 (25.7%)	-0.05
Overweight; n (%)	338 (3.1%)	375 (5.8%)	-0.13	319 (1.4%)	336 (3.6%)	-0.14	1,166 (3.5%)	748 (4.6%)	-0.06	1823 (2.7%)	1459 (4.5%)	-0.10
Smoking; n (%)	2,998 (27.4%)	2,157 (33.5%)	-0.13	3,459 (15.0%)	1,640 (17.4%)	-0.07	11,425 (34.7%)	6,267 (38.6%)	-0.08	17882 (26.7%)	10064 (31.4%)	-0.10
Alcohol abuse or dependence; n (%)	259 (2.4%)	151 (2.3%)	0.01	423 (1.8%)	199 (2.1%)	-0.02	283 (0.9%)	270 (1.7%)	-0.07	965 (1.4%)	620 (1.9%)	-0.04
Drug abuse or dependence; n (%)	311 (2.8%)	223 (3.5%)	-0.04	410 (1.8%)	187 (2.0%)	-0.01	276 (0.8%)	187 (1.2%)	-0.04	997 (1.5%)	597 (1.9%)	-0.03
COPD; n (%)	1,833 (16.8%)	973 (15.1%)	0.05	2,312 (10.0%)	894 (9.5%)	0.02	7,353 (22.4%)	3,421 (21.1%)	0.03	11498 (17.2%)	5288 (16.5%)	0.02
Asthma; n (%)	1,395 (12.8%)	775 (12.0%)	0.02	2,390 (10.4%)	1,048 (11.1%)	-0.02	3,700 (11.2%)	1,853 (11.4%)	-0.01	7485 (11.2%)	3676 (11.5%)	-0.01
Obstructive sleep apnea; n (%)	1,392 (12.7%)	846 (13.1%)	-0.01	2,397 (10.4%)	1,187 (12.6%)	-0.07	3,411 (10.4%)	1,712 (10.6%)	-0.01	7200 (10.8%)	3745 (11.7%)	-0.03
Pneumonia; n (%)	1,796 (16.4%)	1,939 (15.3%)	0.03	3,434 (14.9%)	1,343 (14.3%)	0.02	5,572 (16.9%)	2,941 (15.4%)	0.04	10802 (16.2%)	5291 (15.0%)	0.03
Other Medications												
Use of ACE inhibitors; n (%)	2,648 (24.2%)	1,294 (20.1%)	0.10	4,813 (20.9%)	1,698 (18.1%)	0.07	10,148 (30.8%)	4,664 (28.7%)	0.05	17609 (26.3%)	7656 (23.9%)	0.06
Use of ARBs; n (%)	1,386 (12.7%)	923 (14.3%)	-0.05	2,855 (12.4%)	1,146 (12.2%)	0.01	6,221 (18.9%)	3,261 (20.1%)	-0.03	10462 (15.6%)	5330 (16.6%)	-0.03
Use of Loop Diuretics - United; n (%)	917 (8.4%)	405 (6.3%)	0.08	1,580 (6.9%)	503 (5.3%)	0.07	4,381 (13.3%)	1,780 (11.0%)	0.07	6878 (10.3%)	2688 (8.4%)	0.07
Use of other diuretics-United; n (%)	140 (1.3%)	82 (1.3%)	0.00	316 (1.4%)	119 (1.3%)	0.01	625 (1.9%)	279 (1.7%)	0.02	1081 (1.6%)	480 (1.5%)	0.01
Use of nitrates-United; n (%)	291 (2.7%)	128 (2.0%)	0.05	471 (2.0%)	141 (1.5%)	0.04	1,680 (5.1%)	709 (4.4%)	0.03	2442 (3.7%)	978 (3.0%)	0.04
Use of other hypertension drugs; n (%)	467 (4.3%)	203 (3.1%)	0.06	755 (3.3%)	242 (2.6%)	0.04	1,947 (5.9%)	854 (5.3%)	0.03	3169 (4.7%)	1299 (4.0%)	0.03
Use of Anti-arrhythmics; n (%)	24 (0.2%)	13 (0.2%)	0.00	70 (0.3%)	19 (0.2%)	0.02	118 (0.4%)	49 (0.3%)	0.02	212 (0.3%)	81 (0.3%)	0.00
Use of COPD/asthma meds-United; n (%)	1,985 (18.2%)	1,117 (17.3%)	0.02	4,137 (18.0%)	1,708 (18.2%)	-0.01	7,383 (22.4%)	3,707 (22.9%)	-0.01	13505 (20.2%)	6532 (20.4%)	0.00
Use of statins; n (%)	3,339 (30.5%)	1,881 (29.2%)	0.03	5,891 (25.6%)	2,195 (23.3%)	0.05	14,704 (44.7%)	7,286 (44.9%)	0.00	23934 (35.8%)	11362 (35.4%)	0.01
Use of other lipid-lowering drugs; n (%)	650 (5.9%)	305 (4.7%)	0.05	1,443 (6.3%)	464 (4.9%)	0.06	2,506 (7.6%)	1,182 (7.3%)	0.01	4599 (6.9%)	1951 (6.1%)	0.03
Use of antiplatelet agents; n (%)	402 (3.7%)	251 (3.9%)	-0.01	974 (4.2%)	341 (3.6%)	0.03	2,429 (7.4%)	1,076 (6.6%)	0.03	3805 (5.7%)	1668 (5.2%)	0.02
Use of heparin and other low-molecular weight heparins; n (%)	5,843 (53.4%)	209 (3.2%)	1.34	19 (0.1%)	** (0.0%)	0.04	15,058 (45.8%)	487 (3.0%)	1.15	20920 (31.3%)	#VALUE!	#VALUE!
Use of NSAIDs; n (%)	2,235 (20.4%)	1,367 (21.2%)	-0.02	4,992 (21.7%)	2,348 (25.0%)	-0.08	6,301 (19.2%)	3,269 (20.2%)	-0.03	13528 (20.2%)	6984 (21.8%)	-0.04
Use of oral corticosteroids; n (%)	2,937 (26.9%)	1,838 (28.5%)	-0.04	6,039 (26.2%)	2,595 (27.6%)	-0.03	10,634 (32.3%)	5,310 (32.7%)	-0.01	19610 (29.3%)	9743 (30.4%)	-0.02
Use of bisphosphonate (United); n (%)	377 (3.4%)	131 (2.0%)	0.09	396 (1.7%)	101 (1.1%)	0.05	1,572 (4.8%)	625 (3.9%)	0.04	2345 (3.5%)	857 (2.7%)	0.05
Use of opioids-United; n (%)	5,636 (51.5%)	3,020 (46.8%)	0.09	12,644 (54.9%)	4,824 (51.3%)	0.07	15,530 (47.2%)	7,363 (45.4%)	0.04	33810 (50.6%)	15207 (47.4%)	0.06
Use of antidepressants; n (%)	2,945 (26.9%)	1,722 (26.7%)	0.00	5,760 (25.0%)	2,242 (23.8%)	0.03	9,959 (30.3%)	4,877 (30.1%)	0.00	18664 (27.9%)	8841 (27.6%)	0.01
Use of antipsychotics; n (%)	480 (4.4%)	309 (4.8%)	-0.02	807 (3.5%)	331 (3.5%)	0.00	1,719 (5.2%)	842 (5.2%)	0.00	3006 (4.5%)	1482 (4.6%)	0.00
Labs												
Lab values-HbA1c (%) v3; n (%)	881 (8.1%)	779 (12.1%)	-0.13	205 (0.9%)	83 (0.9%)	0.00	N/A	N/A	#VALUE!	1,086 (3.2%)	862 (5.4%)	-0.11
Lab values-HbA1c (%) (within 3 months) v3; n (%)	565 (5.2%)	499 (7.7%)	-0.10	150 (0.7%)	64 (0.7%)	0.00	N/A	N/A	#VALUE!	715 (2.1%)	563 (3.6%)	-0.09
Lab values-HbA1c (%) (within 6 months) v3; n (%)	881 (8.1%)	779 (12.1%)	-0.13	205 (0.9%)	83 (0.9%)	0.00	N/A	N/A	#VALUE!	1,086 (3.2%)	862 (5.4%)	-0.11
Lab values-BNP; n (%)	96 (0.9%)	85 (1.3%)	-0.04	** (0.0%)	** (0.1%)	-0.04	N/A	N/A	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Lab values-BNP (within 3 months); n (%)	89 (0.8%)	79 (1.2%)	-0.04	** (0.0%)	** (0.0%)	#DIV/0!	N/A	N/A	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Lab values-BNP (within 6 months); n (%)	96 (0.9%)	85 (1.3%)	-0.04	** (0.0%)	** (0.1%)	-0.04	N/A	N/A	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Lab values-BUN (mg/dl); n (%)	2,195 (20.1%)	1,688 (26.2%)	-0.15	208 (0.9%)	118 (1.3%)	-0.04	N/A	N/A	#VALUE!	2,403 (7.1%)	1,806 (11.4%)	-0.15
Lab values-BUN (mg/dl) (within 3 months); n (%)	1,542 (14.1%)	1,182 (18.3%)	-0.11	153 (0.7%)	85 (0.9%)	-0.02	N/A	N/A	#VALUE!	1,695 (5.0%)	1,267 (8.0%)	-0.12
Lab values-BUN (mg/dl) (within 6 months); n (%)	2,195 (20.1%)	1,688 (26.2%)	-0.15	208 (0.9%)	118 (1.3%)	-0.04	N/A	N/A	#VALUE!	2,403 (7.1%)	1,806 (11.4%)	-0.15
Lab values-Creatinine (mg/dl) v2; n (%)	2,220 (20.3%)	1,758 (27.3%)	-0.16	216 (0.9%)	131 (1.4%)	-0.05	N/A	N/A	#VALUE!	2,436 (7.2%)	1,889 (11.9%)	-0.16
Lab values-Creatinine (mg/dl) (within 3 months) v2; n (%)	1,561 (14.3%)	1,238 (19.3%)	-0.13	157 (0.7%)	92 (1.0%)	-0.03	N/A	N/A	#VALUE!	1,718 (5.1%)	1,330 (8.4%)	-0.13
Lab values-Creatinine (mg/dl) (within 6 months) v2; n (%)	2,220 (20.3%)	1,758 (27.3%)	-0.16	216 (0.9%)	131 (1.4%)	-0.05	N/A	N/A	#VALUE!	2,436 (7.2%)	1,889 (11.9%)	-0.16
Lab values-HDL level (mg/dl); n (%)	1,327 (12.1%)	1,026 (15.9%)	-0.11	186 (0.8%)	81 (0.9%)	-0.01	N/A	N/A	#VALUE!	1,513 (4.5%)	1,107 (7.0%)	-0.11
Lab values-HDL level (mg/dl) (within 3 months); n (%)	741 (6.8%)	580 (9.0%)	-0.08	117 (0.5%)	49 (0.5%)	0.00	N/A	N/A	#VALUE!	858 (2.5%)	629 (4.0%)	-0.08
Lab values-HDL level (mg/dl) (within 6 months); n (%)	1,327 (12.1%)	1,026 (15.9%)	-0.11	186 (0.8%)	81 (0.9%)	-0.01	N/A	N/A	#VALUE!	1,513 (4.5%)	1,107 (7.0%)	-0.11
Lab values-LDL level (mg/dl) v2; n (%)	1,373 (12.6%)	1,055 (16.4%)	-0.11	200 (0.9%)	81 (0.9%)	0.00	N/A	N/A	#VALUE!	1,573 (4.6%)	1,136 (7.2%)	-0.11
Lab values-LDL level (mg/dl) (within 3 months) v2; n (%)	762 (7.0%)	599 (9.3%)	-0.08	127 (0.6%)	49 (0.5%)	0.01	N/A	N/A	#VALUE!	889 (2.6%)	648 (4.1%)	-0.08
Lab values-LDL level (mg/dl) (within 6 months) v2; n (%)	1,373 (12.6%)	1,055 (16.4%)	-0.11	200 (0.9%)	81 (0.9%)	0.00	N/A	N/A	#VALUE!	1,573 (4.6%)	1,136 (7.2%)	-0.11
Lab values-NT-proBNP; n (%)	29 (0.3%)	20 (0.3%)	0.00	0 (0.0%)	0 (0.0%)	#DIV/0!	N/A	N/A	#VALUE!	29 (0.1%)	22 (0.1%)	0.00
Lab values-NT-proBNP (within 3 months); n (%)	29 (0.3%)	22 (0.3%)	0.00	0 (0.0%)	0 (0.0%)	#DIV/0!	N/A	N/A	#VALUE!	29 (0.1%)	22 (0.1%)	-
Lab values-NT-proBNP (within 6 months); n (%)	29 (0.3%)	22 (0.3%)	0.00	0 (0.0%)	0 (0.0%)	#DIV/0!	N/A	N/A	#VALUE!	29 (0.1%)	22 (0.1%)	-
Lab values-Total cholesterol (mg/dl) v2; n (%)	1,352 (12.4%)	1,044 (16.2%)	-0.11	184 (0.8%)	82 (0.9%)	-0.01	N/A	N/A	#VALUE!	1,536 (4.5%)	1,126 (7.1%)	-0.11
Lab values-Total cholesterol (mg/dl) (within 3 months) v2; n (%)	762 (7.0%)	595 (9.2%)	-0.08	119 (0.5%)	50 (0.5%)	0.00	N/A	N/A	#VALUE!	881 (2.6%)	645 (4.1%)	-0.08
Lab values-Total cholesterol (mg/dl) (within 6 months) v2; n (%)	1,352 (12.4%)	1,044 (16.2%)	-0.11	184 (0.8%)	82 (0.9%)	-0.01	N/A	N/A	#VALUE!	1,536 (4.5%)	1,126 (7.1%)	-0.11
Lab values-Triglyceride level (mg/dl); n (%)	1,335 (12.2%)	1,038 (16.1%)	-0.11	177 (0.8%)	80 (0.9%)	-0.01	N/A	N/A	#VALUE!	1,512 (4.5%)	1,118 (7.1%)	-0.11

Appendix B

Lab values- Triglyceride level (mg/dl) (within 3 months); n (%)	753 (6.9%)	590 (9.2%)	-0.08	110 (0.5%)	49 (0.5%)	0.00	N/A	N/A	#VALUE!	863 (2.5%)	639 (4.0%)	-0.08
Lab values- Triglyceride level (mg/dl) (within 6 months); n (%)	1,335 (12.2%)	1,038 (16.1%)	-0.11	177 (0.8%)	80 (0.9%)	-0.01	N/A	N/A	#VALUE!	1,512 (4.5%)	1,118 (7.1%)	-0.11
Lab result number- HbA1c (%) mean (only 2 to 20 included) v4	876	776		164	80		N/A	N/A		1,040	856	
...mean (sd)	6.67 (1.48)	6.52 (1.50)	0.10	7.09 (1.41)	7.06 (1.75)	0.02	N/A	N/A	#VALUE!	6.74 (1.47)	6.57 (1.53)	0.11
...Missing; n (%)	10,060 (92.0%)	5,672 (88.0%)	0.13	22,876 (99.3%)	9,325 (99.1%)	0.02	N/A	N/A	#VALUE!	32,936 (96.9%)	14,997 (94.6%)	0.11
Lab result number- BNP mean v2	96	85		8	6		N/A	N/A		104	91	
...mean (sd)	83.18 (129.35)	114.60 (175.32)	-0.20	70.15 (59.71)	47.52 (53.77)	0.40	N/A	N/A	#VALUE!	82.18 (126.43)	110.18 (171.77)	-0.19
...Missing; n (%)	10,840 (99.1%)	6,363 (98.7%)	0.04	23,032 (100.0%)	9,399 (99.9%)	0.04	N/A	N/A	#VALUE!	33,872 (99.7%)	15,762 (99.4%)	0.04
Lab result number- BUN (mg/dl) mean v2	2,195	1,688		208	118		N/A	N/A		2,403	1,806	
...mean (sd)	17.31 (6.76)	16.03 (5.52)	0.21	1,651.89 (16,887.31)	1,033.14 (11,045.39)	0.04	N/A	N/A	#VALUE!	158.80 (4959.53)	82.49 (2813.69)	0.02
...Missing; n (%)	8,741 (79.9%)	4,760 (73.8%)	0.15	22,832 (99.1%)	9,287 (98.7%)	0.04	N/A	N/A	#VALUE!	31,573 (92.9%)	14,047 (88.6%)	0.15
Lab result number- Creatinine (mg/dl) mean (only 0.1 to 15 included) v3	2,195	1,735		206	129		N/A	N/A		2,401	1,864	
...mean (sd)	0.97 (0.30)	0.94 (0.23)	0.11	1.00 (0.33)	0.95 (0.24)	0.17	N/A	N/A	#VALUE!	0.97 (0.30)	0.94 (0.23)	0.11
...Missing; n (%)	8,741 (79.9%)	4,713 (73.1%)	0.16	22,834 (99.1%)	9,276 (98.6%)	0.05	N/A	N/A	#VALUE!	31,575 (92.9%)	13,989 (88.2%)	0.16
Lab result number- HDL level (mg/dl) mean (only <=5000 included) v2	1,327	1,026		185	80		N/A	N/A		1,512	1,106	
...mean (sd)	53.56 (16.61)	52.84 (16.18)	0.04	47.72 (21.06)	49.04 (15.24)	-0.07	N/A	N/A	#VALUE!	52.85 (17.22)	52.57 (16.12)	0.02
...Missing; n (%)	9,609 (87.9%)	5,422 (84.1%)	0.11	22,855 (99.2%)	9,325 (99.1%)	0.01	N/A	N/A	#VALUE!	32,464 (95.5%)	14,747 (93.0%)	0.11
Lab result number- LDL level (mg/dl) mean (only <=5000 included) v2	1,353	1,033		176	76		N/A	N/A		1,529	1,109	
...mean (sd)	102.31 (36.16)	106.34 (37.86)	-0.11	94.29 (41.51)	103.08 (42.40)	-0.21	N/A	N/A	#VALUE!	101.39 (36.82)	106.12 (38.20)	-0.13
...Missing; n (%)	9,583 (87.6%)	5,415 (84.0%)	0.10	22,864 (99.2%)	9,329 (99.2%)	0.00	N/A	N/A	#VALUE!	32,447 (95.5%)	14,744 (93.0%)	0.11
Lab result number- Total cholesterol (mg/dl) mean (only <=5000 included) v2	1,349	1,042		183	81		N/A	N/A		1,532	1,123	
...mean (sd)	185.42 (39.77)	188.13 (42.80)	-0.07	178.14 (56.57)	184.42 (43.66)	-0.12	N/A	N/A	#VALUE!	184.55 (42.13)	187.86 (42.88)	-0.08
...Missing; n (%)	9,587 (87.7%)	5,406 (83.8%)	0.11	22,857 (99.2%)	9,324 (99.1%)	0.01	N/A	N/A	#VALUE!	32,444 (95.5%)	14,730 (92.9%)	0.11
Lab result number- Triglyceride level (mg/dl) mean (only <=5000 included) v2	1,335	1,038		176	79		N/A	N/A		1,511	1,117	
...mean (sd)	140.09 (77.34)	141.14 (97.23)	-0.01	160.11 (109.08)	146.12 (89.21)	0.14	N/A	N/A	#VALUE!	142.42 (81.68)	141.49 (96.73)	0.01
...Missing; n (%)	9,601 (87.8%)	5,410 (83.9%)	0.11	22,864 (99.2%)	9,326 (99.2%)	0.00	N/A	N/A	#VALUE!	32,465 (95.6%)	14,736 (93.0%)	0.11
Lab result number- Hemoglobin mean (only >0 included)	1,839	1,402		151	100		N/A	N/A		1,990	1,502	
...mean (sd)	13.53 (1.77)	13.58 (1.78)	-0.03	1,820.49 (15,673.46)	1,503.13 (14,898.67)	0.02	N/A	N/A	#VALUE!	150.64 (4306.37)	112.75 (3828.81)	0.01
...Missing; n (%)	9,097 (83.2%)	5,046 (78.3%)	0.12	22,889 (99.3%)	9,305 (98.9%)	0.04	N/A	N/A	#VALUE!	31,986 (94.1%)	14,351 (90.5%)	0.14
Lab result number- Serum sodium mean (only >90 and <190 included)	2,155	1,663		179	121		N/A	N/A		2,334	1,784	
...mean (sd)	139.90 (2.72)	140.21 (2.61)	-0.12	139.33 (2.67)	139.44 (2.48)	-0.04	N/A	N/A	#VALUE!	139.86 (2.72)	140.16 (2.60)	-0.11
...Missing; n (%)	8,781 (80.3%)	4,785 (74.2%)	0.15	22,861 (99.2%)	9,284 (98.7%)	0.05	N/A	N/A	#VALUE!	31,642 (93.1%)	14,069 (88.7%)	0.15
Lab result number- Albumin mean (only >0 and <=10 included)	1,961	1,522		153	97		N/A	N/A		2,114	1,619	
...mean (sd)	4.09 (0.37)	4.14 (0.37)	-0.14	3.86 (0.90)	4.11 (0.56)	-0.33	N/A	N/A	#VALUE!	4.07 (0.43)	4.14 (0.38)	-0.17
...Missing; n (%)	8,975 (82.1%)	4,926 (76.4%)	0.14	22,887 (99.3%)	9,308 (99.0%)	0.03	N/A	N/A	#VALUE!	31,862 (93.8%)	14,234 (89.8%)	0.15
Lab result number- Glucose (fasting or random) mean (only 10-1000 included)	2,115	1,640		168	125		N/A	N/A		2,283	1,765	
...mean (sd)	111.04 (41.01)	110.68 (40.33)	0.01	134.34 (55.53)	141.41 (91.92)	-0.09	N/A	N/A	#VALUE!	112.75 (42.25)	112.86 (45.91)	0.00
...Missing; n (%)	8,821 (80.7%)	4,808 (74.6%)	0.15	22,872 (99.3%)	9,280 (98.7%)	0.06	N/A	N/A	#VALUE!	31,693 (93.3%)	14,088 (88.9%)	0.15
Lab result number- Potassium mean (only 1-7 included)	2,197	1,722		198	114		N/A	N/A		2,395	1,836	
...mean (sd)	4.30 (0.42)	4.35 (0.41)	-0.12	4.30 (0.36)	4.28 (0.38)	0.05	N/A	N/A	#VALUE!	4.30 (0.42)	4.35 (0.41)	-0.12
...Missing; n (%)	8,739 (79.9%)	4,726 (73.3%)	0.16	22,842 (99.1%)	9,291 (98.8%)	0.03	N/A	N/A	#VALUE!	31,581 (93.0%)	14,017 (88.4%)	0.16
Comorbidity Scores												
Combined comorbidity score, 365 days Copy												
...mean (sd)	2.25 (2.33)	2.73 (2.22)	-0.21	1.41 (1.99)	1.88 (1.99)	-0.24	2.36 (2.34)	2.51 (2.28)	-0.06	2.01 (2.22)	2.37 (2.19)	-0.16
Non-Frailty; n (%)	5,267 (48.2%)	3,125 (48.5%)	-0.01	9,522 (41.3%)	4,016 (42.7%)	-0.03	1,353 (4.1%)	507 (3.1%)	0.05	16,142 (24.1%)	7,648 (23.8%)	0.01
Frailty Score (mean): Empirical Version 365 days, v2												
...mean (sd)	0.18 (0.06)	0.17 (0.06)	0.17	0.16 (0.05)	0.16 (0.05)	0.00	0.10 (0.07)	0.08 (0.06)	0.31	0.13 (0.06)	0.12 (0.06)	0.17
Healthcare Utilization												
Any hospitalization; n (%)	10,386 (95.0%)	5,867 (91.0%)	0.16	23,039 (100.0%)	9,405 (100.0%)	#DIV/0!	31,398 (95.4%)	14,394 (88.7%)	0.25	64,823 (96.9%)	29,666 (92.5%)	0.20
Any hospitalization within prior 30 days; n (%)	10,182 (93.1%)	5,761 (89.3%)	0.13	22,949 (99.6%)	9,381 (99.7%)	-0.02	31,156 (94.7%)	14,174 (87.4%)	0.26	64287 (96.1%)	29316 (91.4%)	0.20
Any hospitalization during prior 31-180 days; n (%)	1,130 (10.3%)	570 (8.8%)	0.05	2,018 (8.8%)	685 (7.3%)	0.06	4,474 (13.6%)	1,925 (11.9%)	0.05	7622 (11.4%)	3180 (9.9%)	0.05
Internal medicine/family medicine visits; n (%)	9,617 (87.9%)	5,557 (86.2%)	0.05	17,146 (74.4%)	7,369 (78.4%)	-0.09	31,976 (97.2%)	15,692 (96.7%)	0.03	58739 (87.8%)	28618 (89.2%)	-0.04
Internal medicine/family medicine visits (30 days prior) v2; n (%)	8,754 (80.0%)	4,965 (77.0%)	0.07	12,150 (52.7%)	5,278 (56.1%)	-0.07	30,917 (94.0%)	15,037 (92.7%)	0.05	51821 (77.5%)	25280 (78.8%)	-0.03
Internal medicine/family medicine visits (31 to 180 days prior) v2; n (%)	6,709 (61.3%)	3,740 (58.0%)	0.07	13,848 (60.1%)	5,879 (62.5%)	-0.05	23,994 (72.9%)	11,647 (71.8%)	0.02	44551 (66.6%)	21266 (66.3%)	0.01
Cardiologist visit; n (%)	7,333 (67.1%)	4,602 (71.4%)	-0.09	5,677 (24.6%)	2,412 (25.6%)	-0.02	23,928 (72.7%)	11,816 (72.8%)	0.00	36938 (55.2%)	18830 (58.7%)	-0.07
Number of Cardiologist visits (30 days prior); n (%)	6,782 (62.0%)	4,321 (67.0%)	-0.10	3,914 (17.0%)	1,712 (18.2%)	-0.03	21,746 (66.1%)	10,824 (66.7%)	-0.01	32442 (48.5%)	16857 (52.6%)	-0.08
Number of Cardiologist visits (31 to 180 days prior); n (%)	1,801 (16.5%)	1,015 (15.7%)	0.02	2,586 (11.2%)	1,016 (10.8%)	0.01	8,054 (24.5%)	3,822 (23.6%)	0.02	12441 (18.6%)	5853 (18.2%)	0.01
Electrocardiogram v2; n (%)	9,068 (82.9%)	5,511 (85.5%)	-0.07	11,511 (50.0%)	4,535 (48.2%)	0.04	28,595 (86.9%)	14,289 (88.1%)	-0.04	49174 (73.5%)	24335 (75.9%)	-0.06
Use of glucose test strips; n (%)	137 (1.3%)	75 (1.2%)	0.01	213 (0.9%)	65 (0.7%)	0.02	393 (1.2%)	196 (1.2%)	0.00	743 (1.1%)	336 (1.0%)	0.01
Dialysis; n (%)	** (0.1%)	0 (0.0%)	0.04	15 (0.1%)	** (0.0%)	0.04	15 (0.0%)	** (0.0%)	#DIV/0!	#VALUE!	#VALUE!	#VALUE!

Appendix B

number of different/distinct medication prescriptions												
...mean (sd)	8.99 (5.19)	8.21 (5.39)	0.15	8.84 (5.26)	8.08 (5.41)	0.14	10.02 (4.85)	9.34 (4.92)	0.14	9.44 (5.05)	8.74 (5.16)	0.00
Number of Hospitalizations												
...mean (sd)	1.15 (0.58)	1.08 (0.60)	0.12	1.20 (0.54)	1.17 (0.49)	0.06	1.25 (0.69)	1.13 (0.69)	0.17	1.22 (0.62)	1.13 (0.62)	0.00
Number of hospital days												
...mean (sd)	5.90 (4.96)	4.14 (4.04)	0.39	6.36 (5.37)	4.38 (4.12)	0.41	6.79 (5.61)	4.71 (4.84)	0.40	6.50 (5.43)	4.50 (4.48)	0.00
Number of Emergency Department (ED) visits v3												
...mean (sd)	1.48 (2.03)	1.64 (2.60)	-0.07	2.38 (4.05)	3.03 (4.79)	-0.15	1.67 (1.89)	1.72 (1.95)	-0.03	1.88 (2.84)	2.09 (3.16)	0.00
Number of Office visits												
...mean (sd)	5.09 (4.63)	5.06 (4.50)	0.01	4.91 (4.57)	4.81 (4.49)	0.02	12.87 (13.58)	13.50 (14.24)	-0.05	8.86 (10.07)	9.26 (10.61)	0.00
Number of internal medicine/family medicine visits												
...mean (sd)	10.30 (14.53)	8.38 (11.56)	0.15	5.49 (9.54)	5.56 (8.69)	-0.01	12.43 (10.76)	10.74 (10.42)	0.16	9.69 (11.08)	8.75 (10.19)	0.00
Number of Cardiologist visits												
...mean (sd)	2.16 (3.37)	2.17 (3.04)	0.00	0.62 (1.75)	0.62 (1.88)	0.00	2.70 (3.86)	2.65 (4.01)	0.01	1.90 (3.20)	1.96 (3.32)	0.00
Number electrocardiograms received v2												
...mean (sd)	1.86 (1.92)	1.94 (1.89)	-0.04	0.85 (1.16)	0.84 (1.31)	0.01	1.98 (1.70)	2.07 (1.69)	-0.05	1.57 (1.58)	1.68 (1.63)	0.00
Number of HbA1c tests ordered												
...mean (sd)	0.27 (0.59)	0.31 (0.63)	-0.07	0.18 (0.49)	0.21 (0.51)	-0.06	0.34 (0.66)	0.36 (0.67)	-0.03	0.27 (0.59)	0.31 (0.62)	0.00
Number of glucose tests ordered												
...mean (sd)	0.17 (0.96)	0.20 (1.71)	-0.02	0.12 (0.65)	0.10 (0.70)	0.03	0.14 (0.57)	0.14 (0.55)	0.00	0.14 (0.68)	0.14 (0.94)	0.00
Number of lipid tests ordered												
...mean (sd)	0.46 (0.71)	0.45 (0.88)	0.01	0.34 (0.71)	0.36 (0.78)	-0.03	0.54 (0.69)	0.56 (0.73)	-0.03	0.46 (0.70)	0.48 (0.78)	0.00
Total N distinct ICD9/ICD10 diagnoses at the 3rd digit level Copy												
...mean (sd)	7.42 (9.86)	11.16 (11.73)	-0.35	5.13 (8.66)	7.50 (9.39)	-0.26	11.08 (11.96)	13.57 (12.42)	-0.20	8.43 (10.59)	11.31 (11.47)	0.00
For PS												
Hemorrhagic stroke+Other cerebrovascular disease+Cerebrovascular procedure (for PS); n (%)	173 (1.6%)	60 (0.9%)	0.06	180 (0.8%)	61 (0.6%)	0.02	748 (2.3%)	273 (1.7%)	0.04	1101 (1.6%)	394 (1.2%)	0.03
immobilization; n (%)	780 (7.1%)	455 (7.1%)	#DIV/0!	1,525 (6.6%)	567 (6.0%)	#DIV/0!	2,026 (6.2%)	982 (6.1%)	#DIV/0!	1,525 (6.6%)	567 (6.0%)	0.02
Occurrence of creatinine tests ordered (for PS); n (%)	840 (7.7%)	422 (6.5%)	0.05	1,609 (7.0%)	497 (5.3%)	0.07	3,658 (11.1%)	1,608 (9.9%)	0.04	6107 (9.1%)	2527 (7.9%)	0.04
Occurrence of BUN tests ordered (for PS); n (%)	426 (3.9%)	179 (2.8%)	0.06	852 (3.7%)	261 (2.8%)	0.05	1,920 (5.8%)	811 (5.0%)	0.04	3198 (4.8%)	1251 (3.9%)	0.04
Occurrence of chronic renal insufficiency w/o CKD (for PS) v2; n (%)	635 (5.8%)	227 (3.5%)	0.11	613 (2.7%)	177 (1.9%)	0.05	2,501 (7.6%)	749 (4.6%)	0.13	3749 (5.6%)	1153 (3.6%)	0.10
Chronic kidney disease Stage 1-2 (for PS); n (%)	204 (1.9%)	124 (1.9%)	0.00	181 (0.8%)	65 (0.7%)	0.01	560 (1.7%)	260 (1.6%)	0.01	945 (1.4%)	449 (1.4%)	0.00
Chronic kidney disease Stage 3-6 (for PS); n (%)	714 (6.5%)	311 (4.8%)	0.07	599 (2.6%)	178 (1.9%)	0.05	2,836 (8.6%)	999 (6.2%)	0.09	4149 (6.2%)	1488 (4.6%)	0.07
Acute kidney injury; n (%)	1,115 (10.2%)	505 (7.8%)	#DIV/0!	1,462 (6.3%)	549 (5.8%)	#DIV/0!	3,684 (11.2%)	1,487 (9.2%)	#DIV/0!	1,462 (6.3%)	549 (5.8%)	0.02
Bladder stones+Kidney stones (for PS); n (%)	374 (3.4%)	185 (2.9%)	0.03	645 (2.8%)	281 (3.0%)	-0.01	1,094 (3.3%)	554 (3.4%)	-0.01	2113 (3.2%)	1020 (3.2%)	0.00
Alcohol abuse or dependence+Drug abuse or dependence (for PS); n (%)	531 (4.9%)	350 (5.4%)	-0.02	759 (3.3%)	358 (3.8%)	-0.03	534 (1.6%)	442 (2.7%)	-0.08	1824 (2.7%)	1150 (3.6%)	-0.05
Other atherosclerosis+Cardiac conduction disorders+Other CVD (for PS) v2 Copy; n (%)	3,257 (29.8%)	1,919 (29.8%)	0.00	5,127 (22.3%)	2,292 (24.4%)	-0.05	9,987 (30.4%)	4,973 (30.7%)	-0.01	18371 (27.5%)	9184 (28.6%)	-0.02
Previous cardiac procedure (CABG or PTCA or Stent) + History of CABG or PTCA (for PS) v3; n (%)	430 (3.9%)	255 (4.0%)	-0.01	372 (1.6%)	131 (1.4%)	0.02	2,889 (8.8%)	1,360 (8.4%)	0.01	3691 (5.5%)	1746 (5.4%)	0.00
Diabetes with complication; n (%)	763 (7.0%)	462 (7.2%)	#DIV/0!	960 (4.2%)	391 (4.2%)	#DIV/0!	2,595 (7.9%)	1,165 (7.2%)	#DIV/0!	960 (4.2%)	391 (4.2%)	0.00
Delirium + Psychosis (for PS); n (%)	519 (4.7%)	244 (3.8%)	0.04	578 (2.5%)	219 (2.3%)	0.01	1,846 (5.6%)	744 (4.6%)	0.05	2943 (4.4%)	1207 (3.8%)	0.03
Any use of Meglitinides (for PS); n (%)	** (0.1%)	** (0.1%)	0.00	26 (0.1%)	** (0.1%)	0.00	92 (0.3%)	46 (0.3%)	0.00	#VALUE!	#VALUE!	#VALUE!
Any use of AGIs (for PS); n (%)	** (0.1%)	** (0.0%)	0.04	** (0.0%)	** (0.0%)	#DIV/0!	12 (0.0%)	** (0.0%)	#DIV/0!	#VALUE!	#VALUE!	#VALUE!
CKD stage 3-6 + dialysis (for PS); n (%)	725 (6.6%)	313 (4.9%)	0.07	612 (2.7%)	179 (1.9%)	0.05	2,844 (8.6%)	1,001 (6.2%)	0.09	4181 (6.3%)	1493 (4.7%)	0.07
Use of thiazide- United; n (%)	1,000 (9.1%)	520 (8.1%)	0.04	1,829 (7.9%)	626 (6.7%)	0.05	4,263 (13.0%)	1,863 (11.5%)	0.05	7092 (10.6%)	3009 (9.4%)	0.04
Use of beta blockers; n (%)	2,546 (23.3%)	1,195 (18.5%)	0.12	4,775 (20.7%)	1,650 (17.5%)	0.08	11,795 (35.9%)	5,207 (32.1%)	0.08	19116 (28.6%)	8052 (25.1%)	0.08
Use of calcium channel blockers; n (%)	1,956 (17.9%)	1,041 (16.1%)	0.05	3,644 (15.8%)	1,257 (13.4%)	0.07	8,899 (27.1%)	4,117 (25.4%)	0.04	14499 (21.7%)	6415 (20.0%)	0.04
All antidiabetic medications except insulin; n (%)	1,455 (13.3%)	785 (12.2%)	0.03	2,636 (11.4%)	1,060 (11.3%)	0.00	5,181 (15.8%)	2,409 (14.8%)	0.03	9272 (13.9%)	4254 (13.3%)	0.02
DM Medications - Insulin Copy; n (%)	492 (4.5%)	257 (4.0%)	0.02	963 (4.2%)	323 (3.4%)	0.04	1,236 (3.8%)	539 (3.3%)	0.03	2691 (4.0%)	1119 (3.5%)	0.03
Use of Low Intensity Statins; n (%)	2,224 (20.3%)	1,095 (17.0%)	0.08	3,726 (16.2%)	1,295 (13.8%)	0.07	10,072 (30.6%)	4,682 (28.9%)	0.04	16022 (24.0%)	7072 (22.0%)	0.05
Use of High Intensity Statins; n (%)	1,150 (10.5%)	813 (12.6%)	-0.07	2,135 (9.3%)	897 (9.5%)	-0.01	4,789 (14.6%)	2,689 (16.6%)	-0.06	8074 (12.1%)	4399 (13.7%)	-0.05
Malignant hypertension; n (%)	730 (6.7%)	162 (2.5%)	0.20	9,082 (39.4%)	2,310 (24.6%)	0.32	15,204 (46.2%)	4,630 (28.5%)	0.37	25016 (37.4%)	7102 (22.1%)	0.34
Cardiovascular stress test; n (%)	78 (0.7%)	29 (0.4%)	0.04	135 (0.6%)	44 (0.5%)	0.01	350 (1.1%)	201 (1.2%)	-0.01	563 (0.8%)	274 (0.9%)	-0.01
Echocardiogram; n (%)	5,787 (52.9%)	3,803 (59.0%)	-0.12	11,855 (51.5%)	5,539 (58.9%)	-0.15	18,098 (55.0%)	9,340 (57.6%)	-0.05	35740 (53.4%)	18682 (58.2%)	-0.10
Number of BNP tests												
...mean (sd)	0.10 (0.35)	0.15 (0.44)	-0.13	0.09 (0.34)	0.11 (0.36)	-0.06	0.14 (0.40)	0.17 (0.44)	-0.07	0.12 (0.37)	0.15 (0.42)	-0.08
Number of Cardiac biomarkers tests (troponin , CK-MBs, Myoglobin, CPK)												
...mean (sd)	0.42 (1.41)	0.52 (1.28)	-0.07	0.35 (1.09)	0.40 (1.24)	-0.04	0.30 (0.61)	0.37 (0.67)	-0.11	0.34 (0.96)	0.41 (1.00)	0.00
Number of Ambulatory Blood pressure monitoring tests												
...mean (sd)	0.00 (0.04)	0.00 (0.03)	0.00	0.00 (0.04)	0.00 (0.03)	0.00	0.00 (0.02)	0.00 (0.00)	0.00	0.00 (0.03)	0.00 (0.02)	0.00
N of days on antihypertensive medications during baseline												
...mean (sd)	74.82 (79.61)	70.24 (79.86)	0.06	65.26 (78.27)	58.82 (76.61)	0.08	111.76 (76.90)	108.30 (78.35)	0.04	89.70 (77.82)	86.14 (78.15)	0.00
N of days in database anytime prior												
...mean (sd)	1,672.96 (1,192.85)	1,774.82 (1,375.50)	-0.08	1,771.15 (1,221.31)	2,056.97 (1,425.75)	-0.22	637.26 (351.73)	659.79 (336.35)	-0.07	1197.31 (898.59)	1293.60 (1016.64)	0.00
Mean Copay for per prescription cost (charges in U.S. \$) (180-1 day prior)												
...mean (sd)	23.14 (33.19)	20.04 (30.76)	0.10	16.79 (25.44)	13.74 (31.23)	0.11	110.77 (126.57)	109.04 (134.46)	0.01	64.06 (91.02)	63.21 (98.08)	0.00
...Missing; n (%)	801 (7.3%)	538 (8.3%)	-0.04	1,853 (8.0%)	874 (9.3%)	-0.05	996 (3.0%)	523 (3.2%)	-0.01	3650 (5.5%)	1935 (6.0%)	-0.02

Appendix B

Colonoscopy; n (%)	409 (3.7%)	230 (3.6%)	0.01	966 (4.2%)	347 (3.7%)	0.03	1,620 (4.9%)	772 (4.8%)	0.00	2995 (4.5%)	1349 (4.2%)	0.01
Fecal occult blood (FOB) test; n (%)	340 (3.1%)	183 (2.8%)	0.02	886 (3.8%)	308 (3.3%)	0.03	937 (2.8%)	436 (2.7%)	0.01	2163 (3.2%)	927 (2.9%)	0.02
Flu vaccine; n (%)	1,631 (14.9%)	967 (15.0%)	0.00	2,149 (9.3%)	1,007 (10.7%)	-0.05	10,466 (31.8%)	5,207 (32.1%)	-0.01	14246 (21.3%)	7181 (22.4%)	-0.03
Mammogram; n (%)	1,237 (11.3%)	704 (10.9%)	0.01	2,232 (9.7%)	938 (10.0%)	-0.01	4,385 (13.3%)	2,227 (13.7%)	-0.01	7854 (11.7%)	3869 (12.1%)	-0.01
Pap smear; n (%)	651 (6.0%)	384 (6.0%)	0.00	1,873 (8.1%)	773 (8.2%)	0.00	963 (2.9%)	514 (3.2%)	-0.02	3487 (5.2%)	1671 (5.2%)	0.00
Pneumonia vaccine; n (%)	1,134 (10.4%)	1,158 (18.0%)	-0.22	988 (4.3%)	793 (8.4%)	-0.17	6,053 (18.4%)	4,358 (26.9%)	-0.20	8175 (12.2%)	6309 (19.7%)	-0.21
PSA test or Prostate exam for DRE; n (%)	1,083 (9.9%)	690 (10.7%)	-0.03	1,944 (8.4%)	818 (8.7%)	-0.01	3,705 (11.3%)	2,058 (12.7%)	-0.04	6732 (10.1%)	3566 (11.1%)	-0.03
Bone mineral density; n (%)	317 (2.9%)	200 (3.1%)	-0.01	396 (1.7%)	143 (1.5%)	0.02	1,608 (4.9%)	809 (5.0%)	0.00	2321 (3.5%)	1152 (3.6%)	-0.01
Use of CNS stimulants; n (%)	85 (0.8%)	70 (1.1%)	-0.03	335 (1.5%)	129 (1.4%)	0.01	133 (0.4%)	72 (0.4%)	0.00	553 (0.8%)	271 (0.8%)	0.00
Use of estrogens, progestins, androgens; n (%)	1,084 (9.9%)	683 (10.6%)	-0.02	3,192 (13.9%)	1,414 (15.0%)	-0.03	1,380 (4.2%)	655 (4.0%)	0.01	5656 (8.5%)	2752 (8.6%)	0.00
Use of Angiogenesis inhibitors; n (%)	** (0.1%)	** (0.0%)	0.04	18 (0.1%)	** (0.0%)	0.04	21 (0.1%)	** (0.0%)	0.04	#VALUE!	#VALUE!	#VALUE!
Use of Oral Immunosuppressants; n (%)	24 (0.2%)	** (0.2%)	0.00	75 (0.3%)	18 (0.2%)	0.02	20 (0.1%)	** (0.1%)	0.00	119 (0.2%)	#VALUE!	#VALUE!
Use of fondaparinux or Bivalirudin; n (%)	137 (1.3%)	** (0.1%)	0.14	430 (1.9%)	15 (0.2%)	0.17	250 (0.8%)	** (0.1%)	0.10	817 (1.2%)	#VALUE!	#VALUE!
Use of other direct thrombin inhibitors (lepirudin, desirudin, argatroban); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!
Use of Ticagrelor ON CED; n (%)	** (0.0%)	** (0.1%)	-0.04	** (0.0%)	** (0.0%)	#DIV/0!	0 (0.0%)	** (0.0%)	#DIV/0!	#VALUE!	#VALUE!	#VALUE!
Use of Ticagrelor; n (%)	** (0.0%)	** (0.1%)	-0.04	** (0.0%)	** (0.1%)	-0.04	22 (0.1%)	19 (0.1%)	0.00	#VALUE!	#VALUE!	#VALUE!
Number of D-dimer tests												
...mean (sd)	0.12 (0.36)	0.16 (0.42)	-0.10	0.13 (0.38)	0.14 (0.39)	-0.03	0.14 (0.36)	0.17 (0.40)	-0.08	0.13 (0.37)	0.16 (0.40)	0.00
Numbe of CRP, high-sensitivity CRP tests												
...mean (sd)	0.10 (0.47)	0.12 (0.53)	-0.04	0.09 (0.48)	0.09 (0.45)	0.00	0.13 (0.55)	0.14 (0.57)	-0.02	0.11 (0.51)	0.12 (0.53)	0.00
Number of PT or aPTT tests												
...mean (sd)	0.66 (1.77)	0.58 (1.39)	0.05	0.58 (1.48)	0.47 (1.22)	0.08	0.38 (0.91)	0.35 (0.74)	0.04	0.49 (1.29)	0.43 (1.05)	0.00
Number of Bleeding time tests												
...mean (sd)	0.00 (0.02)	0.00 (0.01)	0.00	0.00 (0.02)	0.00 (0.01)	0.00	0.00 (0.03)	0.00 (0.02)	0.00	0.00 (0.03)	0.00 (0.02)	0.00
HAS-BLED Score (ICD-9 and ICD-10), 180 days												
...mean (sd)	2.68 (1.05)	2.55 (1.03)	0.12	2.28 (0.98)	2.21 (0.95)	0.07	3.43 (0.79)	3.39 (0.80)	0.05	2.91 (0.90)	2.88 (0.90)	0.00
N of Generic name drugs												
...mean (sd)	15.36 (13.41)	13.47 (14.05)	0.14	13.18 (11.45)	11.66 (11.95)	0.13	18.30 (13.64)	16.35 (14.30)	0.14	16.06 (12.89)	14.40 (13.60)	0.00
N of Brand name drugs												
...mean (sd)	2.98 (4.53)	3.58 (3.90)	-0.14	3.30 (4.45)	3.75 (3.79)	-0.11	3.22 (4.77)	3.92 (4.27)	-0.15	3.21 (4.62)	3.80 (4.06)	0.00
Use of clopidogrel ; n (%)	259 (2.4%)	122 (1.9%)	0.03	499 (2.2%)	145 (1.5%)	0.05	1,670 (5.1%)	716 (4.4%)	0.03	2428 (3.6%)	983 (3.1%)	0.03
Systemic embolism; n (%)	221 (2.0%)	112 (1.7%)	0.02	404 (1.8%)	141 (1.5%)	0.02	462 (1.4%)	200 (1.2%)	0.02	1087 (1.6%)	453 (1.4%)	0.02
DVT; n (%)	5,150 (47.1%)	3,078 (47.7%)	-0.01	10,806 (46.9%)	4,578 (48.7%)	-0.04	14,349 (43.6%)	6,958 (42.9%)	0.01	30305 (45.3%)	14614 (45.6%)	-0.01
Post-thrombotic syndrome; n (%)	** (0.1%)	** (0.1%)	#DIV/0!	14 (0.1%)	** (0.1%)	#DIV/0!	21 (0.1%)	12 (0.1%)	#DIV/0!	14 (0.1%)	** (0.1%)	0.00
PE; n (%)	10,931 (100.0%)	6,448 (100.0%)	#DIV/0!	23,030 (100.0%)	9,398 (99.9%)	0.04	32,865 (99.9%)	16,217 (100.0%)	-0.04	66826 (99.9%)	32063 (100.0%)	-0.04
Coagulation defects; n (%)	285 (2.6%)	123 (1.9%)	#DIV/0!	654 (2.8%)	211 (2.2%)	#DIV/0!	579 (1.8%)	213 (1.3%)	#DIV/0!	654 (2.8%)	211 (2.2%)	0.04
Diabetes: 1 inpatient or 2 outpatient claims within 183 days; n (%)	2,243 (20.5%)	1,185 (18.4%)	0.05	3,626 (15.7%)	1,408 (15.0%)	0.02	8,179 (24.9%)	3,686 (22.7%)	0.05	14048 (21.0%)	6279 (19.6%)	0.03
Intracranial or retroperitoneal hemorrhage: 1 inpatient or 2 outpatient claims within 183 days; n (%)	** (0.0%)	** (0.0%)	#DIV/0!	** (0.0%)	** (0.0%)	#DIV/0!	15 (0.0%)	** (0.0%)	#DIV/0!	#VALUE!	#VALUE!	#VALUE!
Peptic Ulcer Disease; n (%)	2,932 (26.8%)	1,734 (26.9%)	0.00	4,029 (17.5%)	1,736 (18.5%)	-0.03	11,261 (34.2%)	5,399 (33.3%)	0.02	18222 (27.2%)	8869 (27.6%)	-0.01
Major Surgery ; n (%)	739 (6.8%)	491 (7.6%)	#DIV/0!	1,391 (6.0%)	507 (5.4%)	#DIV/0!	2,747 (8.4%)	1,625 (10.0%)	#DIV/0!	1,391 (6.0%)	507 (5.4%)	0.03
Upper GI bleed; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!
Lower/ unspecified GI bleed; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!
Urogenital bleed; n (%)	73 (0.7%)	49 (0.8%)	-0.01	171 (0.7%)	81 (0.9%)	-0.02	** (0.0%)	** (0.0%)	#DIV/0!	#VALUE!	#VALUE!	#VALUE!
Other bleeds; n (%)	504 (4.6%)	232 (3.6%)	0.05	819 (3.6%)	301 (3.2%)	0.02	1,521 (4.6%)	607 (3.7%)	0.05	2844 (4.3%)	1140 (3.6%)	0.04
Prior cancer; n (%)	1,356 (12.4%)	1,060 (16.4%)	-0.11	1,964 (8.5%)	1,011 (10.7%)	-0.07	5,398 (16.4%)	3,537 (21.8%)	-0.14	8718 (13.0%)	5608 (17.5%)	-0.13
Antibiotics; n (%)	5,272 (48.2%)	3,095 (48.0%)	#DIV/0!	11,518 (50.0%)	4,633 (49.3%)	#DIV/0!	17,994 (54.7%)	8,891 (54.8%)	#DIV/0!	11,518 (50.0%)	4,633 (49.3%)	0.01
Aspirin; n (%)	63 (0.6%)	71 (1.1%)	-0.05	254 (1.1%)	137 (1.5%)	-0.04	158 (0.5%)	46 (0.3%)	0.03	475 (0.7%)	254 (0.8%)	-0.01
Aspirin/dipyridamole; n (%)	** (0.1%)	** (0.1%)	0.00	36 (0.2%)	** (0.1%)	0.03	109 (0.3%)	33 (0.2%)	0.02	#VALUE!	#VALUE!	#VALUE!
Other antiplatelet agents; n (%)	22 (0.2%)	13 (0.2%)	0.00	36 (0.2%)	** (0.1%)	0.03	139 (0.4%)	57 (0.4%)	0.00	197 (0.3%)	#VALUE!	#VALUE!
PGP inhibitors; n (%)	2,367 (21.6%)	1,341 (20.8%)	0.02	5,284 (22.9%)	1,997 (21.2%)	0.04	8,671 (26.4%)	4,164 (25.7%)	0.02	16322 (24.4%)	7502 (23.4%)	0.02
Other gastroprotective agents; n (%)	128 (1.2%)	85 (1.3%)	-0.01	287 (1.2%)	101 (1.1%)	0.01	581 (1.8%)	248 (1.5%)	0.02	996 (1.5%)	434 (1.4%)	0.01
Number of lipid tests ordered												
...mean (sd)	0.46 (0.71)	0.45 (0.88)	0.01	0.34 (0.71)	0.36 (0.78)	-0.03	0.56 (0.76)	0.58 (0.82)	-0.03	0.47 (0.74)	0.49 (0.82)	0.00
Proton pump inhibitor; n (%)	2,563 (23.4%)	1,362 (21.1%)	0.06	5,093 (22.1%)	1,943 (20.7%)	0.03	10,854 (33.0%)	4,940 (30.5%)	0.05	18510 (27.7%)	8245 (25.7%)	0.05
H2 receptor antagonist; n (%)	385 (3.5%)	201 (3.1%)	0.02	774 (3.4%)	305 (3.2%)	0.01	2,080 (6.3%)	891 (5.5%)	0.03	3239 (4.8%)	1397 (4.4%)	0.02
Vitamin K therapy; n (%)	** (0.0%)	0 (0.0%)	#DIV/0!	24 (0.1%)	0 (0.0%)	0.04	** (0.0%)	0 (0.0%)	#DIV/0!	#VALUE!	0 (0.0%)	#VALUE!
Number of INR (prothrombin) tests ordered												
...mean (sd)	0.45 (1.24)	0.31 (0.75)	0.14	0.43 (1.02)	0.31 (0.74)	0.13	0.35 (0.77)	0.31 (0.63)	0.06	0.39 (0.95)	0.31 (0.69)	0.00
Treating prescriber - Cardiologist; n (%)	6,854 (62.7%)	4,359 (67.6%)	-0.10	12,270 (53.3%)	5,766 (61.3%)	-0.16	21,746 (66.1%)	10,824 (66.7%)	-0.01	40870 (61.1%)	20949 (65.3%)	-0.09
Treating prescriber - Primary Care Physician; n (%)	9,965 (91.1%)	5,708 (88.5%)	0.09	9,641 (41.8%)	4,170 (44.3%)	-0.05	14,127 (42.9%)	6,722 (41.4%)	0.03	33733 (50.4%)	16600 (51.8%)	-0.03
Treating prescriber - Other; n (%)	10,881 (99.5%)	6,428 (99.7%)	-0.03	21,748 (94.4%)	8,758 (93.1%)	0.05	32,848 (99.9%)	16,207 (99.9%)	0.00	65477 (97.9%)	31393 (97.9%)	0.00
Alpha blockers; n (%)	747 (6.8%)	400 (6.2%)	0.02	1,170 (5.1%)	438 (4.7%)	0.02	3,271 (9.9%)	1,719 (10.6%)	-0.02	5188 (7.8%)	2557 (8.0%)	-0.01
CHA2DS2 VASc score, 180 days, V												
...mean (sd)	3.62 (1.72)	2.28 (1.64)	0.80	3.42 (1.47)	2.40 (1.69)	0.64	4.52 (1.74)	3.51 (1.84)	0.56	3.99 (1.65)	2.94 (1.76)	0.01
Use of Prasugrel; n (%)	** (0.1%)	** (0.2%)	-0.03	30 (0.1%)	** (0.1%)	0.00	** (0.0%)	** (0.0%)	#DIV/0!	#VALUE!	#VALUE!	#VALUE!
Use of Loop Diuretics+other diuretics+other hypertension drugs; n (%)	1,387 (12.7%)	633 (9.8%)	0.09	2,381 (10.3%)	795 (8.5%)	0.06	6,233 (18.9%)	2,624 (16.2%)	0.07	10001 (15.0%)	4052 (12.6%)	0.07
Commercial vs Medicare Advantage- Business Type Code - CORRECT ONE - OPTUM												
...Commercial; n (%)	5,252 (48.0%)	3352 (52.0%)	-0.08	5,642 (24.5%)	1822 (19.4%)	0.12	-	-	#VALUE!	10,894 (32.1%)	5174 (32.6%)	-0.01
...Medicare Advantage; n (%)	5,684 (52.0%)	3096 (48.0%)	0.08	17,398 (75.5%)	7583 (80.6%)	-0.12	-	-	#VALUE!	23,082 (67.9%)	10679 (67.4%)	0.01

Appendix B

Commercial vs Medicare Advantage- Business Type

Code												
...COM = COMMERCIAL; n (%)	5,252 (48.0%)	3,352 (52.0%)	-0.08	-	-	-	-	-	#VALUE!	5,252 (48.0%)	3,352 (52.0%)	-0.08
...MCR = MEDICARE; n (%)	5,684 (52.0%)	3,096 (48.0%)	0.08	-	-	-	-	-	#VALUE!	5,684 (52.0%)	3,096 (48.0%)	0.08
...MCD = MEDICAID; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	-	-	-	-	-	#VALUE!	0 (0.0%)	0 (0.0%)	#DIV/0!
...NONE = NO BUSINESS LINE CODE (added in 2015); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	-	-	-	-	-	#VALUE!	0 (0.0%)	0 (0.0%)	#DIV/0!
...UNK = UNKNOWN (added in 2015); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	-	-	-	-	-	#VALUE!	0 (0.0%)	0 (0.0%)	#DIV/0!
Commercial vs Medicare Advantage- Data Type												
...1 - Fee For Service; n (%)	-	-		15,188 (65.9%)	6,798 (72.3%)	-0.14	-	-		15,188 (65.9%)	6,798 (72.3%)	-0.14
...2 - Encounter; n (%)	-	-		2,210 (9.6%)	785 (8.3%)	0.05	-	-		2,210 (9.6%)	785 (8.3%)	0.05
...3 - Medicare; n (%)	-	-		4,938 (21.4%)	1,622 (17.2%)	0.11	-	-		4,938 (21.4%)	1,622 (17.2%)	0.11
...4 - Medicare Encounter; n (%)	-	-		704 (3.1%)	200 (2.1%)	0.06	-	-		704 (3.1%)	200 (2.1%)	0.06
Metropolitan Statistical Area - Urban (any MSA) vs Rural (non-MSA)												
...Urban; n (%)	-	-		18,451 (80.1%)	6,998 (74.4%)	0.14	-	-		18,451 (80.1%)	6,998 (74.4%)	0.14
...Rural; n (%)	-	-		290 (1.3%)	433 (4.6%)	-0.20	-	-		290 (1.3%)	433 (4.6%)	-0.20
...Unknown/Missing; n (%)	-	-		4,299 (18.7%)	1,974 (21.0%)	-0.06	-	-		4,299 (18.7%)	1,974 (21.0%)	-0.06

Due to CMS cell suppression policy, all values less than 11 are denoted with **

Appendix B

PS-matched														
	Optum			MarketScan			Medicare			POOLED				
Variable	Reference-warfarin	Copx oxaban (15 or 20 mg)	St. Diff.	Reference-warfarin	Copx oxaban (15 or 20 mg)	St. Diff.	Reference-warfarin	Copx oxaban (15 or 20 mg)	St. Diff.	Reference-warfarin	Copx oxaban (15 or 20 mg)	St. Diff.		
Number of patients	2,153	2,153		5,675	5,675		8,065	8,065		15,893	15,893			
Age														
...mean (sd)	62.79 (15.74)	63.58 (14.79)	-0.05	54.36 (14.93)	54.95 (14.55)	-0.04	75.04 (7.11)	75.35 (7.03)	-0.04	66.00 (11.78)	66.47 (11.41)	-0.04		
...median [IQR]	65.00 [53.00, 75.00]	66.00 [54.00, 74.00]	-0.07	55.00 [45.00, 63.00]	56.00 [45.00, 64.00]	-0.07	74.00 [69.00, 80.00]	74.00 [70.00, 80.00]	-0.07	66.00 (11.78)	66.49 (11.41)	-0.04		
Age categories without zero category														
...18 - 54; n (%)	601 (27.9%)	564 (26.2%)	0.04	2,732 (48.1%)	2,665 (47.0%)	0.02	0 (0.0%)	0 (0.0%)	0.00	3333 (21.0%)	3229 (20.3%)	0.02		
...55 - 64; n (%)	445 (20.7%)	406 (18.9%)	0.05	1,749 (30.8%)	1,755 (30.9%)	0.00	0 (0.0%)	0 (0.0%)	0.00	2,194 (13.8%)	2,161 (13.6%)	0.01		
...65 - 74; n (%)	558 (25.9%)	649 (30.1%)	-0.09	666 (11.7%)	709 (12.5%)	-0.02	4,295 (53.3%)	4,133 (51.2%)	-0.02	5,519 (34.7%)	5,491 (34.5%)	0.00		
...≥ 75; n (%)	549 (25.5%)	534 (24.8%)	0.02	528 (9.3%)	546 (9.6%)	-0.01	3,770 (46.7%)	3,932 (48.8%)	-0.01	4,847 (30.5%)	5,012 (31.5%)	-0.02		
Gender without zero category- United														
...Males; n (%)	938 (43.6%)	900 (41.8%)	0.04	2,751 (48.5%)	2,745 (48.4%)	0.00	3,089 (38.3%)	2,987 (37.0%)	0.00	6,778 (42.6%)	6,632 (41.7%)	0.02		
...Females; n (%)	1,215 (56.4%)	1,253 (58.2%)	-0.04	2,924 (51.5%)	2,930 (51.6%)	0.00	4,976 (61.7%)	5,078 (63.0%)	0.00	9,115 (57.4%)	9,261 (58.3%)	-0.02		
Race														
...White; n (%)							7,031 (87.2%)	7,010 (86.9%)		7,031 (87.2%)	7,010 (86.9%)	0.01		
...Black; n (%)							726 (9.0%)	767 (9.5%)		726 (9.0%)	767 (9.5%)	-0.02		
...Asian; n (%)							58 (0.7%)	53 (0.7%)		58 (0.7%)	53 (0.7%)	0.00		
...Hispanic; n (%)							95 (1.2%)	101 (1.3%)		95 (1.2%)	101 (1.3%)	-0.01		
...North American Native; n (%)							29 (0.4%)	24 (0.3%)		29 (0.4%)	24 (0.3%)	0.02		
...Other/Unknown; n (%)							126 (1.6%)	110 (1.4%)		126 (1.6%)	110 (1.4%)	0.02		
Region without zero category														
...Northeast; n (%)	226 (10.5%)	223 (10.4%)	0.00	1,034 (18.2%)	1,037 (18.3%)	0.00	1,407 (17.4%)	1,427 (17.7%)	0.00	2,667 (16.8%)	2,687 (16.9%)	0.00		
...South; n (%)	885 (41.1%)	881 (40.9%)	0.00	1,616 (28.5%)	1,653 (29.1%)	-0.01	3,171 (39.3%)	3,105 (38.5%)	-0.01	5,672 (35.7%)	5,639 (35.5%)	0.00		
...Midwest; n (%)	587 (27.3%)	582 (27.0%)	0.01	2,148 (37.9%)	2,057 (36.2%)	0.04	2,171 (26.9%)	2,267 (28.1%)	0.04	4,906 (30.9%)	4,906 (30.9%)	0.00		
...West; n (%)	455 (21.1%)	467 (21.7%)	-0.01	794 (14.0%)	853 (15.0%)	-0.03	1,316 (16.3%)	1,266 (15.7%)	-0.03	2,565 (16.1%)	2,586 (16.3%)	-0.01		
...Unknown-missing; n (%)	N/A	N/A	#VALUE!	83 (1.5%)	75 (1.3%)	0.02	N/A	N/A	0.00	83 (1.5%)	75 (1.3%)	0.02		
CV Covariates														
Ischemic heart disease; n (%)	416 (19.3%)	410 (19.0%)	0.01	675 (11.9%)	696 (12.3%)	-0.01	2,065 (25.6%)	2,108 (26.1%)	-0.01	3,156 (19.9%)	3,214 (20.2%)	-0.01		
Acute MI; n (%)	105 (4.9%)	99 (4.6%)	0.01	181 (3.2%)	186 (3.3%)	-0.01	360 (4.5%)	359 (4.5%)	-0.01	646 (4.1%)	644 (4.1%)	0.00		
ACS/unstable angina; n (%)	37 (1.7%)	37 (1.7%)	0.00	54 (1.0%)	51 (0.9%)	0.01	115 (1.4%)	93 (1.2%)	0.01	206 (1.3%)	181 (1.1%)	0.02		
Old MI; n (%)	83 (3.9%)	71 (3.3%)	0.03	87 (1.5%)	87 (1.5%)	0.00	384 (4.8%)	453 (5.6%)	0.00	554 (3.5%)	611 (3.8%)	-0.02		
Stable angina; n (%)	48 (2.2%)	48 (2.2%)	0.00	79 (1.4%)	79 (1.4%)	0.00	206 (2.6%)	224 (2.8%)	0.00	333 (2.1%)	351 (2.2%)	-0.01		
Coronary atherosclerosis and other forms of chronic ischemic heart disease; n (%)	289 (13.4%)	298 (13.8%)	-0.01	454 (8.0%)	461 (8.1%)	0.00	1,692 (21.0%)	1,759 (21.8%)	0.00	2,435 (15.3%)	2,518 (15.8%)	-0.01		
Other atherosclerosis with ICD10 v2 Copy; n (%)	18 (0.8%)	18 (0.8%)	0.00	27 (0.5%)	23 (0.4%)	0.01	95 (1.2%)	84 (1.0%)	0.01	120 (0.9%)	125 (0.8%)	0.01		
Previous cardiac procedure (CABG or PTCA or Stent) v4; n (%)	16 (0.7%)	** (0.2%)	0.07	22 (0.4%)	18 (0.3%)	0.02	38 (0.5%)	47 (0.6%)	0.02	76 (0.5%)	#VALUE!	#VALUE!		
History of CABG or PTCA; n (%)	91 (4.2%)	91 (4.2%)	0.00	77 (1.4%)	68 (1.2%)	0.02	686 (8.5%)	719 (8.9%)	0.02	854 (5.4%)	878 (5.5%)	0.00		
Any stroke; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!		
Ischemic stroke (w and w/o mention of cerebral infarction); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!		
Hemorrhagic stroke; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!		
TIA; n (%)	25 (1.2%)	21 (1.0%)	0.02	39 (0.7%)	42 (0.7%)	0.00	83 (1.0%)	86 (1.1%)	0.00	147 (0.9%)	149 (0.9%)	0.00		
Other cerebrovascular disease; n (%)	33 (1.5%)	29 (1.3%)	0.02	44 (0.8%)	39 (0.7%)	0.01	157 (1.9%)	172 (2.1%)	0.01	234 (1.5%)	240 (1.5%)	0.00		
Cerebrovascular procedure; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!		
Heart failure (CHF); n (%)	** (0.0%)	** (0.1%)	-0.04	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	#VALUE!	#VALUE!	#VALUE!		
Peripheral Vascular Disease (PVD) or PVD Surgery v2; n (%)	110 (5.1%)	117 (5.4%)	-0.01	158 (2.8%)	170 (3.0%)	-0.01	562 (7.0%)	582 (7.2%)	-0.01	830 (5.2%)	869 (5.5%)	-0.01		
Atrial fibrillation; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!		
Other cardiac dysrhythmia; n (%)	340 (15.8%)	346 (16.1%)	-0.01	765 (13.5%)	774 (13.6%)	0.00	1,354 (16.8%)	1,380 (17.1%)	0.00	2,459 (15.5%)	2,500 (15.7%)	-0.01		
Cardiac conduction disorders; n (%)	160 (7.4%)	143 (6.6%)	0.03	253 (4.5%)	242 (4.3%)	0.01	687 (8.5%)	625 (7.7%)	0.01	1100 (6.9%)	1010 (6.4%)	0.02		
Other CVD; n (%)	562 (26.1%)	566 (26.3%)	0.00	1,205 (21.2%)	1,196 (21.1%)	0.00	1,992 (24.7%)	2,067 (25.6%)	0.00	3,759 (23.7%)	3,829 (24.1%)	-0.01		
Diabetes-related complications														
Occurrence of Diabetic Neuropathy v2 Copy; n (%)	122 (5.7%)	102 (4.7%)	0.05	129 (2.3%)	126 (2.2%)	0.01	296 (3.7%)	329 (4.1%)	0.01	547 (3.4%)	557 (3.5%)	-0.01		
Occurrence of diabetic nephropathy V3 with ICD10 Copy; n (%)	64 (3.0%)	68 (3.2%)	-0.01	67 (1.2%)	59 (1.0%)	0.02	166 (2.1%)	160 (2.0%)	0.02	297 (1.9%)	287 (1.8%)	0.01		
Hypoglycemia v2; n (%)	19 (0.9%)	20 (0.9%)	0.00	34 (0.6%)	42 (0.7%)	-0.01	159 (2.0%)	160 (2.0%)	-0.01	212 (1.3%)	222 (1.4%)	-0.01		
Hyperglycemia; n (%)	184 (8.5%)	165 (7.7%)	0.03	254 (4.5%)	279 (4.9%)	-0.02	684 (8.5%)	723 (9.0%)	-0.02	1122 (7.1%)	1167 (7.3%)	-0.01		
Diabetic ketoacidosis; n (%)	** (0.2%)	** (0.4%)	-0.04	13 (0.2%)	18 (0.3%)	-0.02	17 (0.2%)	12 (0.1%)	-0.02	#VALUE!	#VALUE!	#VALUE!		
Hypertension: 1 inpatient or 2 outpatient claims within 365 days; n (%)	1,369 (63.6%)	1,422 (66.0%)	-0.05	2,732 (48.1%)	2,786 (49.1%)	-0.02	6,580 (81.6%)	6,669 (82.7%)	-0.02	10,681 (67.2%)	10,877 (68.4%)	-0.03		
Hyperlipidemia v2; n (%)	1,052 (48.9%)	1,086 (50.4%)	-0.03	1,897 (33.4%)	1,933 (34.1%)	-0.01	4,942 (61.3%)	5,001 (62.0%)	-0.01	7,891 (49.7%)	8,020 (50.5%)	-0.02		
Edema; n (%)	388 (18.0%)	395 (18.3%)	-0.01	733 (12.9%)	731 (12.9%)	0.00	1,048 (13.0%)	1,096 (13.6%)	0.00	2169 (13.6%)	2222 (14.0%)	-0.01		
Renal Dysfunction (non-diabetic) v2; n (%)	501 (23.3%)	506 (23.5%)	0.00	698 (12.3%)	725 (12.8%)	-0.02	1,871 (23.2%)	2,002 (24.8%)	-0.02	3070 (19.3%)	3233 (20.3%)	-0.03		
Occurrence of acute renal disease v2; n (%)	229 (10.6%)	224 (10.4%)	0.01	340 (6.0%)	354 (6.2%)	-0.01	799 (9.9%)	858 (10.6%)	-0.01	1368 (8.6%)	1436 (9.0%)	-0.01		
Occurrence of chronic renal insufficiency; n (%)	241 (11.2%)	271 (12.6%)	-0.04	257 (4.5%)	267 (4.7%)	-0.01	988 (12.3%)	1,094 (13.6%)	-0.01	1486 (9.4%)	1632 (10.3%)	-0.03		
Chronic kidney disease v2; n (%)	236 (11.0%)	258 (12.0%)	-0.03	226 (4.0%)	246 (4.3%)	-0.02	951 (11.8%)	1,039 (12.9%)	-0.02	1413 (8.9%)	1543 (9.7%)	-0.03		
CKD Stage 3-4; n (%)	154 (7.2%)	158 (7.3%)	0.00	121 (2.1%)	139 (2.4%)	-0.02	595 (7.4%)	649 (8.0%)	-0.02	870 (5.5%)	946 (6.0%)	-0.02		
Occurrence of hypertensive nephropathy; n (%)	154 (7.2%)	170 (7.9%)	-0.03	154 (2.7%)	165 (2.9%)	-0.01	758 (9.4%)	839 (10.4%)	-0.01	1066 (6.7%)	1174 (7.4%)	-0.03		
Occurrence of miscellaneous renal insufficiency v2; n (%)	187 (8.7%)	182 (8.5%)	0.01	286 (5.0%)	286 (5.0%)	0.00	681 (8.4%)	697 (8.6%)	0.00	1154 (7.3%)	1165 (7.3%)	0.00		
Other Covariates														

Appendix B

Liver disease; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	#DIV/0!
Osteoarthritis; n (%)	665 (30.9%)	642 (29.8%)	0.02	1,107 (19.5%)	1,110 (19.6%)	0.00	3,006 (37.3%)	2,998 (37.2%)	4778 (30.1%)	4750 (29.9%)	0.00
Other arthritis, arthropathies and musculoskeletal pain; n (%)	1,448 (67.3%)	1,425 (66.2%)	0.02	3,489 (61.5%)	3,441 (60.6%)	0.02	4,956 (61.5%)	4,958 (61.5%)	9893 (62.2%)	9824 (61.8%)	0.01
Dorsopathies; n (%)	797 (37.0%)	772 (35.9%)	0.02	1,632 (28.8%)	1,652 (29.1%)	-0.01	2,750 (34.1%)	2,772 (34.4%)	5179 (32.6%)	5196 (32.7%)	0.00
Fractures; n (%)	230 (10.7%)	225 (10.5%)	0.01	430 (7.6%)	402 (7.1%)	0.02	838 (10.4%)	816 (10.1%)	1498 (9.4%)	1443 (9.1%)	0.01
Falls v2; n (%)	186 (8.6%)	186 (8.6%)	0.00	166 (2.9%)	152 (2.7%)	0.01	313 (3.9%)	308 (3.8%)	665 (4.2%)	646 (4.1%)	0.01
Osteoporosis; n (%)	137 (6.4%)	178 (8.3%)	-0.07	153 (2.7%)	165 (2.9%)	-0.01	1,050 (13.0%)	1,096 (13.6%)	1340 (8.4%)	1439 (9.1%)	-0.02
Depression; n (%)	428 (19.9%)	441 (20.5%)	-0.01	810 (14.3%)	802 (14.1%)	0.01	1,481 (18.4%)	1,528 (18.9%)	2719 (17.1%)	2771 (17.4%)	-0.01
Anxiety; n (%)	409 (19.0%)	425 (19.7%)	-0.02	797 (14.0%)	791 (13.9%)	0.00	1,388 (17.2%)	1,389 (17.2%)	2594 (16.3%)	2605 (16.4%)	0.00
Sleep_Disorder; n (%)	245 (11.4%)	259 (12.0%)	-0.02	651 (11.5%)	697 (12.3%)	-0.02	827 (10.3%)	851 (10.6%)	1723 (10.8%)	1807 (11.4%)	-0.02
Dementia; n (%)	160 (7.4%)	171 (7.9%)	-0.02	134 (2.4%)	135 (2.4%)	0.00	842 (10.4%)	913 (11.3%)	1136 (7.1%)	1219 (7.7%)	-0.02
Delirium; n (%)	74 (3.4%)	87 (4.0%)	-0.03	104 (1.8%)	92 (1.6%)	0.02	306 (3.8%)	299 (3.7%)	484 (3.0%)	478 (3.0%)	0.00
Psychosis; n (%)	59 (2.7%)	66 (3.1%)	-0.02	65 (1.1%)	64 (1.1%)	0.00	219 (2.7%)	224 (2.8%)	343 (2.2%)	354 (2.2%)	0.00
Obesity; n (%)	704 (32.7%)	715 (33.2%)	-0.01	1,534 (27.0%)	1,531 (27.0%)	0.00	1,869 (23.2%)	1,896 (23.5%)	4107 (25.8%)	4142 (26.1%)	-0.01
Overweight; n (%)	111 (5.2%)	99 (4.6%)	0.03	156 (2.7%)	136 (2.4%)	0.02	369 (4.6%)	368 (4.6%)	636 (4.0%)	603 (3.8%)	0.01
Smoking; n (%)	690 (32.0%)	677 (31.4%)	0.01	934 (16.5%)	920 (16.2%)	0.01	3,048 (37.8%)	2,933 (36.4%)	4672 (29.4%)	4530 (28.5%)	0.02
Alcohol abuse or dependence; n (%)	62 (2.9%)	57 (2.6%)	0.02	129 (2.3%)	111 (2.0%)	0.02	106 (1.3%)	91 (1.1%)	297 (1.9%)	259 (1.6%)	0.02
Drug abuse or dependence; n (%)	78 (3.6%)	79 (3.7%)	-0.01	110 (1.9%)	111 (2.0%)	-0.01	90 (1.0%)	80 (1.0%)	278 (1.7%)	270 (1.7%)	0.00
COPD; n (%)	382 (17.7%)	428 (19.9%)	-0.06	582 (10.3%)	567 (10.0%)	0.01	1,887 (23.4%)	1,932 (24.0%)	2851 (17.9%)	2927 (18.4%)	-0.01
Asthma; n (%)	276 (12.8%)	297 (13.8%)	-0.03	628 (11.1%)	632 (11.1%)	0.00	900 (11.2%)	931 (11.5%)	1804 (11.4%)	1860 (11.7%)	-0.01
Obstructive sleep apnea; n (%)	309 (14.4%)	310 (14.4%)	0.00	689 (12.1%)	706 (12.4%)	-0.01	825 (10.2%)	824 (10.2%)	1823 (11.5%)	1840 (11.6%)	0.00
Pneumonia; n (%)	378 (17.6%)	411 (19.1%)	-0.04	856 (15.1%)	841 (14.8%)	0.01	1,435 (17.8%)	1,421 (17.6%)	2669 (16.8%)	2673 (16.8%)	0.00
Other Medications											
Use of ACE inhibitors; n (%)	487 (22.6%)	520 (24.2%)	-0.04	1,094 (19.3%)	1,090 (19.2%)	0.00	2,376 (29.5%)	2,459 (30.5%)	3957 (24.9%)	4069 (25.6%)	-0.02
Use of ARBs; n (%)	323 (15.0%)	332 (15.4%)	-0.01	691 (12.2%)	745 (13.1%)	-0.03	1,583 (19.6%)	1,624 (20.1%)	2597 (16.3%)	2701 (17.0%)	-0.02
Use of Loop Diuretics - United; n (%)	189 (8.8%)	195 (9.1%)	-0.01	333 (5.9%)	336 (5.9%)	0.00	967 (12.0%)	1,047 (13.0%)	1489 (9.4%)	1578 (9.9%)	-0.02
Use of other diuretics-United; n (%)	36 (1.7%)	37 (1.7%)	0.00	84 (1.5%)	80 (1.4%)	0.01	136 (1.7%)	166 (2.1%)	256 (1.6%)	283 (1.8%)	-0.02
Use of nitrates-United; n (%)	53 (2.5%)	53 (2.5%)	0.00	98 (1.7%)	96 (1.7%)	0.00	393 (4.9%)	401 (5.0%)	544 (3.4%)	550 (3.5%)	-0.01
Use of other hypertension drugs; n (%)	85 (3.9%)	83 (3.9%)	0.00	151 (2.7%)	159 (2.8%)	-0.01	474 (5.9%)	436 (5.4%)	710 (4.5%)	678 (4.3%)	0.01
Use of Anti-arrhythmics; n (%)	** (0.3%)	** (0.1%)	0.04	17 (0.3%)	** (0.2%)	0.02	28 (0.3%)	27 (0.3%)	#VALUE!	#VALUE!	#VALUE!
Use of COPD/asthma meds- United; n (%)	418 (19.4%)	417 (19.4%)	0.00	941 (16.6%)	1,113 (19.6%)	-0.08	1,885 (23.4%)	1,847 (22.9%)	3244 (20.4%)	3377 (21.2%)	-0.02
Use of statins; n (%)	707 (32.8%)	726 (33.7%)	-0.02	1,422 (25.1%)	1,416 (25.0%)	0.00	3,609 (44.7%)	3,654 (45.3%)	5738 (36.1%)	5796 (36.5%)	-0.01
Use of other lipid-lowering drugs; n (%)	115 (5.3%)	133 (6.2%)	-0.04	293 (5.2%)	306 (5.4%)	-0.01	606 (7.7%)	620 (7.7%)	1014 (6.4%)	1059 (6.7%)	-0.01
Use of antiplatelet agents; n (%)	91 (4.2%)	95 (4.4%)	-0.01	223 (3.9%)	210 (3.7%)	0.01	597 (7.4%)	586 (7.3%)	911 (5.7%)	891 (5.6%)	0.00
Use of heparin and other low-molecular weight heparins; n (%)	243 (11.3%)	207 (9.6%)	0.06	** (0.0%)	** (0.0%)	#DIV/0!	650 (8.1%)	484 (6.0%)	#VALUE!	#VALUE!	#VALUE!
Use of NSAIDs; n (%)	489 (22.7%)	440 (20.4%)	0.06	1,388 (24.5%)	1,337 (23.6%)	0.02	1,650 (20.5%)	1,599 (19.8%)	3527 (22.2%)	3376 (21.2%)	0.02
Use of oral corticosteroids; n (%)	619 (28.8%)	619 (28.8%)	0.00	1,372 (24.2%)	1,678 (29.6%)	-0.12	2,737 (33.9%)	2,708 (33.6%)	4728 (29.7%)	5005 (31.5%)	-0.04
Use of bisphosphonate (United); n (%)	58 (2.7%)	63 (2.9%)	-0.01	48 (0.8%)	72 (1.3%)	-0.05	352 (4.4%)	348 (4.3%)	458 (2.9%)	483 (3.0%)	-0.01
Use of opioids- United; n (%)	1,105 (51.3%)	1,065 (49.5%)	0.04	3,029 (53.4%)	3,012 (53.1%)	0.01	3,819 (47.4%)	3,797 (47.1%)	7953 (50.0%)	7874 (49.5%)	0.01
Use of antidepressants; n (%)	614 (28.5%)	621 (28.8%)	-0.01	1,416 (25.0%)	1,411 (24.9%)	0.00	2,513 (31.2%)	2,528 (31.3%)	4543 (28.6%)	4560 (28.7%)	0.00
Use of antipsychotics; n (%)	109 (5.1%)	120 (5.6%)	-0.02	211 (3.7%)	204 (3.6%)	0.01	453 (5.6%)	461 (5.7%)	773 (4.9%)	785 (4.9%)	0.00
Labs											
Lab values- HbA1c (%) v3; n (%)	259 (12.0%)	263 (12.2%)	-0.01	42 (0.7%)	49 (0.9%)	-0.02	N/A	N/A	301 (3.8%)	312 (4.0%)	-0.01
Lab values- HbA1c (%) (within 3 months) v3; n (%)	164 (7.6%)	161 (7.5%)	0.00	27 (0.5%)	41 (0.7%)	-0.03	N/A	N/A	191 (2.4%)	202 (2.6%)	-0.01
Lab values- HbA1c (%) (within 6 months) v3; n (%)	259 (12.0%)	263 (12.2%)	-0.01	42 (0.7%)	49 (0.9%)	-0.02	N/A	N/A	301 (3.8%)	312 (4.0%)	-0.01
Lab values- BNP; n (%)	23 (1.1%)	29 (1.3%)	-0.02	** (0.0%)	** (0.1%)	-0.04	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
Lab values- BNP (within 3 months); n (%)	23 (1.1%)	27 (1.3%)	-0.02	** (0.0%)	** (0.1%)	-0.04	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
Lab values- BNP (within 6 months); n (%)	23 (1.1%)	29 (1.3%)	-0.02	** (0.0%)	** (0.1%)	-0.04	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
Lab values- BUN (mg/dl); n (%)	508 (23.6%)	589 (27.4%)	-0.09	51 (0.9%)	68 (1.2%)	-0.03	N/A	N/A	559 (7.1%)	657 (8.4%)	-0.05
Lab values- BUN (mg/dl) (within 3 months); n (%)	358 (16.6%)	415 (19.3%)	-0.07	36 (0.6%)	53 (0.9%)	-0.03	N/A	N/A	394 (5.0%)	468 (6.0%)	-0.04
Lab values- BUN (mg/dl) (within 6 months); n (%)	508 (23.6%)	589 (27.4%)	-0.09	51 (0.9%)	68 (1.2%)	-0.03	N/A	N/A	559 (7.1%)	657 (8.4%)	-0.05
Lab values- Creatinine (mg/dl) v2; n (%)	512 (23.8%)	608 (28.2%)	-0.10	52 (0.9%)	74 (1.3%)	-0.04	N/A	N/A	564 (7.2%)	682 (8.7%)	-0.06
Lab values- Creatinine (mg/dl) (within 3 months) v2; n (%)	359 (16.7%)	431 (20.0%)	-0.09	37 (0.7%)	57 (1.0%)	-0.03	N/A	N/A	396 (5.1%)	488 (6.2%)	-0.05
Lab values- Creatinine (mg/dl) (within 6 months) v2; n (%)	512 (23.8%)	608 (28.2%)	-0.10	52 (0.9%)	74 (1.3%)	-0.04	N/A	N/A	564 (7.2%)	682 (8.7%)	-0.06
Lab values- HDL level (mg/dl); n (%)	314 (14.6%)	352 (16.3%)	-0.05	35 (0.6%)	44 (0.8%)	-0.02	N/A	N/A	349 (4.5%)	396 (5.1%)	-0.03
Lab values- HDL level (mg/dl) (within 3 months); n (%)	179 (8.3%)	191 (8.9%)	-0.02	21 (0.4%)	28 (0.5%)	-0.01	N/A	N/A	200 (2.6%)	219 (2.8%)	-0.01
Lab values- HDL level (mg/dl) (within 6 months); n (%)	314 (14.6%)	352 (16.3%)	-0.05	35 (0.6%)	44 (0.8%)	-0.02	N/A	N/A	349 (4.5%)	396 (5.1%)	-0.03
Lab values- LDL level (mg/dl) v2; n (%)	324 (15.0%)	363 (16.9%)	-0.05	38 (0.7%)	44 (0.8%)	-0.01	N/A	N/A	362 (4.6%)	407 (5.2%)	-0.03
Lab values- LDL level (mg/dl) (within 3 months) v2; n (%)	181 (8.4%)	197 (9.2%)	-0.03	24 (0.4%)	28 (0.5%)	-0.01	N/A	N/A	205 (2.6%)	225 (2.9%)	-0.02
Lab values- LDL level (mg/dl) (within 6 months) v2; n (%)	324 (15.0%)	363 (16.9%)	-0.05	38 (0.7%)	44 (0.8%)	-0.01	N/A	N/A	362 (4.6%)	407 (5.2%)	-0.03
Lab values- NT-proBNP; n (%)	** (0.2%)	** (0.3%)	-0.02	0 (0.0%)	0 (0.0%)	#DIV/0!	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
Lab values- NT-proBNP (within 3 months); n (%)	** (0.2%)	** (0.3%)	-0.02	0 (0.0%)	0 (0.0%)	#DIV/0!	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
Lab values- NT-proBNP (within 6 months); n (%)	** (0.2%)	** (0.3%)	-0.02	0 (0.0%)	0 (0.0%)	#DIV/0!	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
Lab values- Total cholesterol (mg/dl) v2; n (%)	321 (14.9%)	355 (16.5%)	-0.04	35 (0.6%)	45 (0.8%)	-0.02	N/A	N/A	356 (4.5%)	400 (5.1%)	-0.03
Lab values- Total cholesterol (mg/dl) (within 3 months) v2; n (%)	183 (8.5%)	192 (8.9%)	-0.01	21 (0.4%)	29 (0.5%)	-0.01	N/A	N/A	204 (2.6%)	221 (2.8%)	-0.01
Lab values- Total cholesterol (mg/dl) (within 6 months) v2; n (%)	321 (14.9%)	355 (16.5%)	-0.04	35 (0.6%)	45 (0.8%)	-0.02	N/A	N/A	356 (4.5%)	400 (5.1%)	-0.03
Lab values- Triglyceride level (mg/dl); n (%)	316 (14.7%)	351 (16.3%)	-0.04	34 (0.6%)	43 (0.8%)	-0.02	N/A	N/A	350 (4.5%)	394 (5.0%)	-0.02

Appendix B

Lab values- Triglyceride level (mg/dl) (within 3 months); n (%)	181 (8.4%)	190 (8.8%)	-0.01	20 (0.4%)	28 (0.5%)	-0.01	N/A	N/A	201 (2.6%)	218 (2.8%)	-0.01
Lab values- Triglyceride level (mg/dl) (within 6 months); n (%)	316 (14.7%)	351 (16.3%)	-0.04	34 (0.6%)	43 (0.8%)	-0.02	N/A	N/A	350 (4.5%)	394 (5.0%)	-0.02
Lab result number- HbA1c (%) mean (only 2 to 20 included) v4	258	259		41	47		N/A	N/A	299	306	
...mean (sd)	6.67 (1.56)	6.63 (1.56)	0.03	7.09 (1.30)	7.13 (1.71)	-0.03	N/A	N/A	6.73 (1.53)	6.71 (1.59)	0.01
...Missing; n (%)	1,895 (88.0%)	1,894 (88.0%)	0.00	5,634 (99.3%)	5,628 (99.2%)	0.01	N/A	N/A	7,529 (96.2%)	7,522 (96.1%)	0.01
Lab result number- BNP mean v2	23	29		2	3		N/A	N/A	25	32	
...mean (sd)	65.94 (82.23)	155.95 (239.40)	-0.50	38.70 (3.11)	75.00 (68.46)	-0.75	N/A	N/A	63.76 (82.23)	148.36 (235.92)	-0.48
...Missing; n (%)	2,130 (98.9%)	2,124 (98.7%)	0.02	5,673 (100.0%)	5,672 (99.9%)	0.04	N/A	N/A	7,803 (99.7%)	7,796 (99.6%)	0.02
Lab result number- BUN (mg/dl) mean v2	508	589		51	68		N/A	N/A	559	657	
...mean (sd)	16.85 (6.32)	16.63 (6.05)	0.04	3,939.06 (28,003.10)	1,780.81 (14,550.16)	0.10	N/A	N/A	374.69 (8397.57)	199.22 (4657.11)	0.03
...Missing; n (%)	1,645 (76.4%)	1,564 (72.6%)	0.09	5,624 (99.1%)	5,607 (98.8%)	0.03	N/A	N/A	7,269 (92.9%)	7,171 (91.6%)	0.05
Lab result number- Creatinine (mg/dl) mean (only 0.1 to 15 included) v3	508	601		49	72		N/A	N/A	557	673	
...mean (sd)	0.97 (0.31)	0.94 (0.24)	0.11	1.01 (0.26)	0.96 (0.26)	0.19	N/A	N/A	0.97 (0.31)	0.94 (0.24)	0.11
...Missing; n (%)	1,645 (76.4%)	1,552 (72.1%)	0.10	5,626 (99.1%)	5,603 (98.7%)	0.04	N/A	N/A	7,271 (92.9%)	7,155 (91.4%)	0.06
Lab result number- HDL level (mg/dl) mean (only <=5000 included) v2	314	352		35	43		N/A	N/A	349	395	
...mean (sd)	53.71 (16.56)	52.98 (16.30)	0.04	46.42 (18.95)	48.02 (16.23)	-0.09	N/A	N/A	52.98 (16.83)	52.44 (16.31)	0.03
...Missing; n (%)	1,839 (85.4%)	1,801 (83.7%)	0.05	5,640 (99.4%)	5,632 (99.2%)	0.02	N/A	N/A	7,479 (95.5%)	7,433 (95.0%)	0.02
Lab result number- LDL level (mg/dl) mean (only <=5000 included) v2	318	351		32	41		N/A	N/A	350	392	
...mean (sd)	102.29 (35.24)	102.76 (39.24)	-0.01	100.14 (43.88)	102.63 (43.57)	-0.06	N/A	N/A	102.09 (36.15)	102.75 (39.76)	-0.02
...Missing; n (%)	1,835 (85.2%)	1,802 (83.7%)	0.04	5,643 (99.4%)	5,634 (99.3%)	0.01	N/A	N/A	7,478 (95.5%)	7,436 (95.0%)	0.02
Lab result number- Total cholesterol (mg/dl) mean (only <=5000 included) v2	320	354		35	44		N/A	N/A	355	398	
...mean (sd)	186.00 (39.30)	186.53 (44.31)	-0.01	179.03 (51.44)	184.27 (47.29)	-0.11	N/A	N/A	185.31 (40.69)	186.28 (44.70)	-0.02
...Missing; n (%)	1,833 (85.1%)	1,799 (83.6%)	0.04	5,640 (99.4%)	5,631 (99.2%)	0.02	N/A	N/A	7,473 (95.5%)	7,430 (94.9%)	0.03
Lab result number- Triglyceride level (mg/dl) mean (only <=5000 included) v2	316	351		34	42		N/A	N/A	350	393	
...mean (sd)	141.37 (80.85)	145.40 (97.12)	-0.05	161.92 (102.42)	148.55 (81.44)	0.14	N/A	N/A	143.37 (83.26)	145.74 (95.72)	-0.03
...Missing; n (%)	1,837 (85.3%)	1,802 (83.7%)	0.04	5,641 (99.4%)	5,633 (99.3%)	0.01	N/A	N/A	7,478 (95.5%)	7,435 (95.0%)	0.02
Lab result number- Hemoglobin mean (only >0 included)	427	464		42	56		N/A	N/A	469	520	
...mean (sd)	13.45 (1.77)	13.33 (1.82)	0.07	3,417.04 (22,063.44)	2,673.48 (19,909.23)	0.04	N/A	N/A	318.25 (6544.44)	299.81 (6493.68)	0.00
...Missing; n (%)	1,726 (80.2%)	1,689 (78.4%)	0.04	5,633 (99.3%)	5,619 (99.0%)	0.03	N/A	N/A	7,359 (94.0%)	7,308 (93.4%)	0.02
Lab result number- Serum sodium mean (only >90 and <190 included)	495	574		47	67		N/A	N/A	542	641	
...mean (sd)	140.20 (2.66)	140.06 (2.68)	0.05	139.22 (3.38)	139.19 (2.55)	0.01	N/A	N/A	140.12 (2.73)	139.97 (2.67)	0.06
...Missing; n (%)	1,658 (77.0%)	1,579 (73.3%)	0.09	5,628 (99.2%)	5,608 (98.8%)	0.04	N/A	N/A	7,286 (93.1%)	7,187 (91.8%)	0.05
Lab result number- Albumin mean (only >0 and <=10 included)	472	522		42	55		N/A	N/A	514	577	
...mean (sd)	4.08 (0.39)	4.10 (0.36)	-0.05	3.91 (0.93)	4.02 (0.66)	-0.14	N/A	N/A	4.07 (0.46)	4.09 (0.40)	-0.05
...Missing; n (%)	1,681 (78.1%)	1,631 (75.8%)	0.05	5,633 (99.3%)	5,620 (99.0%)	0.03	N/A	N/A	7,314 (93.4%)	7,251 (92.6%)	0.03
Lab result number- Glucose (fasting or random) mean (only 10-1000 included)	491	568		50	71		N/A	N/A	541	639	
...mean (sd)	113.45 (43.92)	110.67 (37.41)	0.07	142.44 (59.71)	144.25 (99.21)	-0.02	N/A	N/A	116.13 (45.62)	114.40 (48.28)	0.04
...Missing; n (%)	1,662 (77.2%)	1,585 (73.6%)	0.08	5,625 (99.1%)	5,604 (98.7%)	0.04	N/A	N/A	7,287 (93.1%)	7,189 (91.8%)	0.05
Lab result number- Potassium mean (only 1-7 included)	507	592		48	64		N/A	N/A	555	656	
...mean (sd)	4.33 (0.42)	4.32 (0.42)	0.02	4.30 (0.44)	4.24 (0.40)	0.14	N/A	N/A	4.33 (0.42)	4.31 (0.42)	0.05
...Missing; n (%)	1,646 (76.5%)	1,561 (72.5%)	0.09	5,627 (99.2%)	5,611 (98.9%)	0.03	N/A	N/A	7,273 (92.9%)	7,172 (91.6%)	0.05
Comorbidity Scores											
CCI (180 days)- ICD9 and ICD10 v2											
...mean (sd)	2.79 (2.31)	2.78 (2.47)	0.00	1.74 (2.00)	1.69 (2.04)	0.02	2.57 (2.34)	2.53 (2.39)	2.30 (2.22)	2.26 (2.28)	0.02
Non-Frailty; n (%)	1,041 (48.4%)	1,027 (47.7%)	0.01	2,447 (43.1%)	2,383 (42.0%)	0.02	310 (3.8%)	252 (3.1%)	3,798 (23.9%)	3,662 (23.0%)	0.02
Frailty Score (mean): Empirical Version 365 days, v2											
...mean (sd)	0.19 (0.06)	0.19 (0.07)	0.00	0.16 (0.05)	0.16 (0.05)	0.00	0.09 (0.07)	0.10 (0.07)	0.13 (0.06)	0.13 (0.06)	0.00
Healthcare Utilization											
Any hospitalization; n (%)	2,034 (94.5%)	2,011 (93.4%)	0.05	5,674 (100.0%)	5,675 (100.0%)	#DIV/0!	7,678 (95.2%)	7,733 (95.9%)	15,386 (96.8%)	15,419 (97.0%)	-0.01
Any hospitalization within prior 30 days; n (%)	1,966 (91.3%)	1,967 (91.4%)	0.00	5,661 (99.8%)	5,658 (99.7%)	0.02	7,617 (94.4%)	7,655 (94.9%)	15244 (95.9%)	15280 (96.1%)	-0.01
Any hospitalization during prior 31-180 days; n (%)	262 (12.2%)	247 (11.5%)	0.02	448 (7.9%)	415 (7.3%)	0.02	1,216 (15.1%)	1,052 (13.0%)	1926 (12.1%)	1714 (10.8%)	0.04
Internal medicine/family medicine visits; n (%)	1,920 (89.2%)	1,911 (88.8%)	0.01	4,445 (78.3%)	4,436 (78.2%)	0.00	7,824 (97.0%)	7,851 (97.3%)	14189 (89.3%)	14198 (89.3%)	0.00
Internal medicine/family medicine visits (30 days prior) v2; n (%)	1,743 (81.0%)	1,723 (80.0%)	0.03	3,220 (56.7%)	3,134 (55.2%)	0.03	7,554 (93.7%)	7,574 (93.9%)	12517 (78.8%)	12431 (78.2%)	0.01
Internal medicine/family medicine visits (31 to 180 days prior) v2; n (%)	1,375 (63.9%)	1,360 (63.2%)	0.01	3,520 (62.0%)	3,585 (63.2%)	-0.02	5,892 (73.1%)	5,955 (73.8%)	10787 (67.9%)	10900 (68.6%)	-0.02
Cardiologist visit; n (%)	1,530 (71.1%)	1,486 (69.0%)	0.05	1,416 (25.0%)	1,453 (25.6%)	-0.01	5,922 (73.4%)	5,904 (73.2%)	8868 (55.8%)	8843 (55.6%)	0.00
Number of Cardiologist visits (30 days prior); n (%)	1,393 (64.7%)	1,361 (63.2%)	0.03	1,000 (17.6%)	1,011 (17.8%)	-0.01	5,390 (66.8%)	5,362 (66.5%)	7783 (49.0%)	7734 (48.7%)	0.01
Number of Cardiologist visits (31 to 180 days prior); n (%)	405 (18.8%)	404 (18.8%)	0.00	619 (10.9%)	637 (11.2%)	-0.01	2,029 (25.2%)	2,030 (25.2%)	3053 (19.2%)	3071 (19.3%)	0.00
Electrocardiogram v2; n (%)	1,793 (83.3%)	1,843 (85.6%)	-0.06	2,747 (48.4%)	2,750 (48.5%)	0.00	7,025 (87.1%)	7,025 (87.1%)	11565 (72.8%)	11618 (73.1%)	-0.01
Use of glucose test strips; n (%)	28 (1.3%)	29 (1.3%)	0.00	46 (0.8%)	46 (0.8%)	0.00	98 (1.2%)	98 (1.2%)	172 (1.1%)	173 (1.1%)	0.00
Dialysis; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	** (0.0%)	** (0.0%)	#VALUE!	#VALUE!	#VALUE!

Appendix B

number of different/distinct medication prescriptions											
...mean (sd)	9.05 (5.56)	9.04 (5.50)	0.00	8.49 (5.04)	8.53 (5.59)	-0.01	9.74 (4.89)	9.85 (4.98)	9.20 (5.04)	9.27 (5.28)	-0.01
Number of Hospitalizations											
...mean (sd)	1.16 (0.62)	1.17 (0.70)	-0.02	1.18 (0.52)	1.17 (0.48)	0.02	1.25 (0.72)	1.26 (0.68)	1.21 (0.64)	1.22 (0.62)	-0.02
Number of hospital days											
...mean (sd)	5.88 (3.52)	5.78 (5.88)	0.02	5.05 (3.36)	4.99 (4.88)	0.01	6.38 (3.73)	6.32 (6.02)	5.84 (3.57)	5.77 (5.62)	0.01
Number of Emergency Department (ED) visits v3											
...mean (sd)	1.58 (2.36)	1.60 (2.03)	-0.01	3.00 (4.68)	2.87 (4.74)	0.03	1.67 (1.95)	1.72 (2.10)	2.13 (3.24)	2.11 (3.29)	0.01
Number of Office visits											
...mean (sd)	5.23 (4.60)	5.24 (4.55)	0.00	4.86 (4.49)	4.89 (4.50)	-0.01	13.55 (14.34)	13.53 (13.73)	9.32 (10.70)	9.32 (10.28)	0.00
Number of internal medicine/family medicine visits											
...mean (sd)	11.10 (14.06)	9.98 (12.28)	0.08	5.68 (9.10)	5.56 (8.53)	0.01	12.71 (10.92)	11.84 (10.57)	9.98 (10.81)	9.35 (10.15)	0.06
Number of Cardiologist visits											
...mean (sd)	2.39 (3.48)	2.36 (3.42)	0.01	0.64 (1.87)	0.63 (2.02)	0.01	2.81 (4.08)	2.87 (4.25)	1.98 (3.37)	2.00 (3.49)	-0.01
Number electrocardiograms received v2											
...mean (sd)	1.98 (2.14)	2.01 (2.00)	-0.01	0.83 (1.16)	0.83 (1.22)	0.00	2.02 (1.75)	2.03 (1.70)	1.59 (1.63)	1.60 (1.59)	-0.01
Number of HbA1c tests ordered											
...mean (sd)	0.32 (0.65)	0.32 (0.64)	0.00	0.20 (0.51)	0.20 (0.50)	0.00	0.35 (0.66)	0.35 (0.65)	0.29 (0.61)	0.29 (0.60)	0.00
Number of glucose tests ordered											
...mean (sd)	0.21 (1.51)	0.19 (0.99)	0.02	0.10 (0.52)	0.11 (0.78)	-0.02	0.14 (0.59)	0.14 (0.54)	0.14 (0.76)	0.14 (0.71)	0.00
Number of lipid tests ordered											
...mean (sd)	0.47 (0.72)	0.50 (1.17)	-0.03	0.35 (0.72)	0.35 (0.70)	0.00	0.55 (0.71)	0.55 (0.74)	0.47 (0.71)	0.47 (0.80)	0.00
Total N distinct ICD9/ICD10 diagnoses at the 3rd digit level Copy											
...mean (sd)	11.03 (11.87)	11.05 (12.50)	0.00	7.05 (9.40)	6.75 (9.53)	0.03	13.29 (12.56)	12.93 (13.09)	10.76 (11.43)	10.47 (11.86)	0.02
For PS											
Hemorrhagic stroke+Other cerebrovascular disease+Cerebrovascular procedure (for PS); n (%)	33 (1.5%)	29 (1.3%)	0.02	44 (0.8%)	39 (0.7%)	0.01	157 (1.9%)	172 (2.1%)	234 (1.5%)	240 (1.5%)	0.00
Major trauma potentially causing prolonged immobili	173 (8.0%)	170 (7.9%)	#DIV/0!	379 (6.7%)	349 (6.1%)	#DIV/0!	559 (6.9%)	538 (6.7%)	379 (6.7%)	349 (6.1%)	0.02
Occurrence of creatinine tests ordered (for PS); n (%)	159 (7.4%)	154 (7.2%)	0.01	327 (5.8%)	314 (5.5%)	0.01	846 (10.5%)	782 (9.7%)	1332 (8.4%)	1250 (7.9%)	0.02
Occurrence of BUN tests ordered (for PS); n (%)	78 (3.6%)	76 (3.5%)	0.01	153 (2.7%)	169 (3.0%)	-0.02	407 (5.0%)	413 (5.1%)	638 (4.0%)	658 (4.1%)	-0.01
Occurrence of chronic renal insufficiency w/o CKD (for PS) v2; n (%)	118 (5.5%)	122 (5.7%)	-0.01	142 (2.5%)	136 (2.4%)	0.01	464 (5.8%)	515 (6.4%)	724 (4.6%)	773 (4.9%)	-0.01
Chronic kidney disease Stage 1-2 (for PS); n (%)	52 (2.4%)	55 (2.6%)	-0.01	43 (0.8%)	49 (0.9%)	-0.01	133 (1.6%)	224 (1.4%)	224 (1.4%)	237 (1.5%)	-0.01
Chronic kidney disease Stage 3-6 (for PS); n (%)	154 (7.2%)	158 (7.3%)	0.00	121 (2.1%)	139 (2.4%)	-0.02	595 (7.4%)	649 (8.0%)	870 (5.5%)	946 (6.0%)	-0.02
Acute kidney injury; n (%)	238 (11.1%)	231 (10.7%)	#DIV/0!	350 (6.2%)	363 (6.4%)	#DIV/0!	824 (10.2%)	887 (11.0%)	350 (6.2%)	363 (6.4%)	-0.01
Bladder stones+Kidney stones (for PS); n (%)	87 (4.0%)	62 (2.9%)	0.06	167 (2.9%)	179 (3.2%)	-0.02	312 (3.9%)	275 (3.4%)	566 (3.6%)	516 (3.2%)	0.02
Alcohol abuse or dependence+Drug abuse or dependence (for PS); n (%)	131 (6.1%)	127 (5.9%)	0.01	220 (3.9%)	205 (3.6%)	0.02	186 (2.3%)	166 (2.1%)	537 (3.4%)	498 (3.1%)	0.02
Other atherosclerosis+Cardiac conduction disorders+Other CVD (for PS) v2 Copy; n (%)	668 (31.0%)	666 (30.9%)	0.00	1,387 (24.4%)	1,374 (24.2%)	0.00	2,499 (31.0%)	2,539 (31.5%)	4554 (28.7%)	4579 (28.8%)	0.00
Previous cardiac procedure (CABG or PTCA or Stent) + History of CABG or PTCA (for PS) v3; n (%)	94 (4.4%)	92 (4.3%)	0.00	85 (1.5%)	77 (1.4%)	0.01	698 (8.7%)	736 (9.1%)	877 (5.5%)	905 (5.7%)	-0.01
Diabetes with complication; n (%)	194 (9.0%)	192 (8.9%)	#DIV/0!	246 (4.3%)	251 (4.4%)	#DIV/0!	611 (7.6%)	661 (8.2%)	246 (4.3%)	251 (4.4%)	0.00
Delirium + Psychosis (for PS); n (%)	112 (5.2%)	133 (6.2%)	-0.04	153 (2.7%)	137 (2.4%)	0.02	469 (5.8%)	463 (5.7%)	734 (4.6%)	733 (4.6%)	0.00
Any use of Meglitinides (for PS); n (%)	** (0.2%)	** (0.2%)	0.00	** (0.2%)	** (0.1%)	0.03	29 (0.4%)	24 (0.3%)	#VALUE!	#VALUE!	#VALUE!
Any use of AGIs (for PS); n (%)	** (0.0%)	** (0.0%)	#DIV/0!	** (0.0%)	** (0.1%)	-0.04	** (0.0%)	** (0.0%)	#VALUE!	#VALUE!	#VALUE!
CKD stage 3-6 + dialysis (for PS); n (%)	154 (7.2%)	159 (7.4%)	-0.01	121 (2.1%)	139 (2.4%)	-0.02	598 (7.4%)	651 (8.1%)	873 (5.5%)	949 (6.0%)	-0.02
Use of thiazide; n (%)	184 (8.5%)	197 (9.2%)	-0.02	388 (6.8%)	414 (7.3%)	-0.02	964 (12.0%)	1,010 (12.5%)	1536 (9.7%)	1621 (10.2%)	-0.02
Use of beta blockers; n (%)	517 (24.0%)	523 (24.3%)	-0.01	1,040 (18.3%)	1,072 (18.9%)	-0.02	2,759 (34.2%)	2,859 (35.4%)	4316 (27.2%)	4454 (28.0%)	-0.02
Use of calcium channel blockers; n (%)	392 (18.2%)	406 (18.9%)	-0.02	825 (14.5%)	832 (14.7%)	-0.01	2,170 (26.9%)	2,197 (27.2%)	3387 (21.3%)	3435 (21.6%)	-0.01
All antidiabetic medications except insulin; n (%)	308 (14.3%)	331 (15.4%)	-0.03	650 (11.5%)	655 (11.5%)	0.00	1,245 (15.4%)	1,281 (15.9%)	2203 (13.9%)	2267 (14.3%)	-0.01
DM Medications - Insulin Copy; n (%)	109 (5.1%)	104 (4.8%)	0.01	219 (3.9%)	224 (3.9%)	0.00	276 (3.4%)	297 (3.7%)	604 (3.8%)	625 (3.9%)	-0.01
Use of Low Intensity Statins; n (%)	433 (20.1%)	458 (21.3%)	-0.03	804 (14.2%)	874 (15.4%)	-0.03	2,351 (29.2%)	2,398 (29.7%)	3588 (22.6%)	3730 (23.5%)	-0.02
Use of High Intensity Statins; n (%)	282 (13.1%)	285 (13.2%)	0.00	593 (10.4%)	540 (9.5%)	0.03	1,285 (15.9%)	1,313 (16.3%)	2160 (13.6%)	2138 (13.5%)	0.00
Malignant hypertension; n (%)	79 (3.7%)	123 (5.7%)	-0.09	1,702 (30.0%)	1,848 (32.6%)	-0.06	2,901 (36.0%)	3,205 (39.7%)	4682 (29.5%)	5176 (32.6%)	-0.07
Cardiovascular stress test; n (%)	17 (0.8%)	** (0.3%)	0.07	41 (0.7%)	27 (0.5%)	0.03	94 (1.2%)	97 (1.2%)	152 (1.0%)	#VALUE!	#VALUE!
Echocardiogram; n (%)	1,240 (57.6%)	1,203 (55.9%)	0.03	3,183 (56.1%)	3,236 (57.0%)	-0.02	4,635 (57.5%)	4,681 (58.0%)	9058 (57.0%)	9120 (57.4%)	-0.01
Number of BNP tests											
...mean (sd)	0.11 (0.39)	0.12 (0.39)	-0.03	0.10 (0.36)	0.10 (0.35)	0.00	0.15 (0.41)	0.16 (0.44)	0.13 (0.39)	0.13 (0.40)	0.00
Number of Cardiac biomarkers tests (troponin , CK-MBs, Myoglobin, CPK)											
...mean (sd)	0.49 (1.92)	0.49 (1.37)	0.00	0.36 (1.04)	0.38 (1.28)	-0.02	0.30 (0.62)	0.32 (0.66)	0.35 (1.04)	0.36 (1.03)	0.00
Number of Ambulatory Blood pressure monitoring tests											
...mean (sd)	0.00 (0.00)	0.00 (0.00)	#DIV/0!	0.00 (0.02)	0.00 (0.01)	0.00	0.00 (0.00)	0.00 (0.00)	0.00 (0.01)	0.00 (0.01)	0.00
N of days on antihypertensive medications during baseline											
...mean (sd)	77.64 (79.51)	81.69 (80.51)	-0.05	62.17 (77.97)	63.02 (77.51)	-0.01	110.17 (77.59)	112.91 (76.57)	88.62 (77.99)	90.87 (77.45)	0.00
N of days in database anytime prior											
...mean (sd)	1,744.50 (1,301.73)	1,772.23 (1,328.01)	-0.02	1,984.17 (1,373.99)	2,044.08 (1,376.43)	-0.04	638.67 (341.16)	621.10 (306.74)	1268.92 (981.16)	1285.15 (981.38)	0.00
Mean Copay for per prescription cost (charges in U.S. \$) (180-1 day prior)											
...mean (sd)	22.68 (37.15)	21.62 (36.53)	0.03	14.31 (19.86)	14.46 (36.77)	-0.01	109.17 (121.45)	109.27 (115.41)	63.58 (88.39)	63.54 (86.16)	0.00
...Missing; n (%)	149 (6.9%)	137 (6.4%)	0.02	504 (8.9%)	484 (8.5%)	0.01	246 (3.1%)	247 (3.1%)	899 (5.7%)	868 (5.5%)	0.01

Appendix B

Colonoscopy; n (%)	82 (3.8%)	82 (3.8%)	0.00	212 (3.7%)	211 (3.7%)	0.00	386 (4.8%)	354 (4.4%)	680 (4.3%)	647 (4.1%)	0.01
Fecal occult blood (FOB) test; n (%)	66 (3.1%)	74 (3.4%)	-0.02	192 (3.4%)	190 (3.3%)	0.01	213 (2.6%)	217 (2.7%)	471 (3.0%)	481 (3.0%)	0.00
Flu vaccine; n (%)	329 (15.3%)	332 (15.4%)	0.00	576 (10.1%)	577 (10.2%)	0.00	2,499 (31.0%)	2,520 (31.2%)	3404 (21.4%)	3429 (21.6%)	0.00
Mammogram; n (%)	259 (12.0%)	264 (12.3%)	-0.01	565 (10.0%)	569 (10.0%)	0.00	1,091 (13.5%)	1,051 (13.0%)	1915 (12.0%)	1884 (11.9%)	0.00
Pap smear; n (%)	105 (4.9%)	116 (5.4%)	-0.02	447 (7.9%)	442 (7.8%)	0.00	235 (2.9%)	231 (2.9%)	787 (5.0%)	789 (5.0%)	0.00
Pneumonia vaccine; n (%)	332 (15.4%)	312 (14.5%)	0.03	385 (6.8%)	370 (6.5%)	0.01	1,839 (22.8%)	1,696 (21.0%)	2556 (16.1%)	2378 (15.0%)	0.03
PSA test or Prostate exam for DRE; n (%)	201 (9.3%)	201 (9.3%)	0.00	463 (8.2%)	480 (8.5%)	-0.01	939 (11.6%)	905 (11.2%)	1603 (10.1%)	1586 (10.0%)	0.00
Bone mineral density; n (%)	71 (3.3%)	73 (3.4%)	-0.01	93 (1.6%)	95 (1.7%)	-0.01	399 (4.9%)	389 (4.8%)	563 (3.5%)	557 (3.5%)	0.00
Use of CNS stimulants; n (%)	18 (0.8%)	18 (0.8%)	0.00	65 (1.1%)	93 (1.6%)	-0.04	37 (0.5%)	39 (0.5%)	120 (0.8%)	150 (0.9%)	-0.01
Use of estrogens, progestins, androgens; n (%)	197 (9.2%)	183 (8.5%)	0.02	817 (14.4%)	822 (14.5%)	0.00	331 (4.1%)	320 (4.0%)	1345 (8.5%)	1325 (8.5%)	0.01
Use of Angiogenesis inhibitors; n (%)	0 (0.0%)	** (0.0%)	#DIV/0!	** (0.1%)	** (0.0%)	0.04	** (0.1%)	** (0.0%)	#VALUE!	#VALUE!	#VALUE!
Use of Oral Immunosuppressants; n (%)	** (0.2%)	** (0.1%)	0.03	15 (0.3%)	13 (0.2%)	0.02	** (0.0%)	** (0.1%)	#VALUE!	#VALUE!	#VALUE!
Use of fondaparinux or Bivalirudin; n (%)	** (0.3%)	** (0.3%)	0.00	** (0.2%)	15 (0.3%)	-0.02	** (0.1%)	** (0.1%)	#VALUE!	#VALUE!	#VALUE!
Use of other direct thrombin inhibitors (lepirudin, desirudin; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	#DIV/0!
Use of Ticagrelor or ON CED; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	** (0.0%)	#DIV/0!	0 (0.0%)	** (0.0%)	0 (0.0%)	#VALUE!	#VALUE!
Use of Ticagrelor; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	** (0.0%)	** (0.0%)	#DIV/0!	** (0.1%)	** (0.1%)	#VALUE!	#VALUE!	#VALUE!
Number of D-dimer tests											
...mean (sd)	0.13 (0.36)	0.11 (0.36)	0.06	0.14 (0.39)	0.13 (0.38)	0.03	0.13 (0.37)	0.13 (0.36)	0.13 (0.38)	0.13 (0.37)	0.00
Numbe of CRP, high-sensitivity CRP tests											
...mean (sd)	0.12 (0.49)	0.11 (0.48)	0.02	0.08 (0.46)	0.08 (0.41)	0.00	0.14 (0.55)	0.14 (0.59)	0.12 (0.51)	0.11 (0.52)	0.00
Number of PT or aPTT tests											
...mean (sd)	0.66 (1.64)	0.64 (1.64)	0.01	0.53 (1.27)	0.50 (1.36)	0.02	0.35 (0.78)	0.35 (0.84)	0.46 (1.12)	0.44 (1.18)	0.00
Number of Bleeding time tests											
...mean (sd)	0.00 (0.00)	0.00 (0.00)	#DIV/0!	0.00 (0.00)	0.00 (0.01)	0.00	0.00 (0.03)	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)	0.00
HAS-BLED Score (ICD-9 and ICD-10), 180 days											
...mean (sd)	2.77 (1.05)	2.78 (1.01)	-0.01	2.25 (0.99)	2.26 (0.96)	-0.01	3.45 (0.80)	3.46 (0.79)	2.93 (0.91)	2.94 (0.89)	0.00
N of Generic name drugs											
...mean (sd)	15.55 (13.45)	15.82 (15.34)	-0.02	12.64 (11.01)	12.67 (12.69)	0.00	17.54 (13.04)	18.06 (15.69)	15.52 (12.41)	15.83 (14.64)	0.00
N of Brand name drugs											
...mean (sd)	3.36 (5.57)	3.32 (3.34)	0.01	3.47 (5.19)	3.52 (3.38)	-0.01	3.69 (5.67)	3.68 (3.75)	3.57 (5.49)	3.57 (3.57)	0.00
Use of clopidogrel ; n (%)	55 (2.6%)	65 (3.0%)	-0.02	101 (1.8%)	97 (1.7%)	0.01	398 (4.9%)	418 (5.2%)	554 (3.5%)	580 (3.6%)	-0.01
Systemic embolism; n (%)	52 (2.4%)	45 (2.1%)	0.02	90 (1.6%)	103 (1.8%)	-0.02	125 (1.5%)	109 (1.4%)	267 (1.7%)	257 (1.6%)	0.01
DVT; n (%)	1,045 (48.5%)	1,024 (47.6%)	0.02	2,760 (48.6%)	2,714 (47.8%)	0.02	3,571 (44.3%)	3,541 (43.9%)	7376 (46.4%)	7279 (45.8%)	0.01
Post-thrombotic syndrome; n (%)	** (0.1%)	** (0.1%)	#DIV/0!	** (0.1%)	** (0.1%)	#DIV/0!	** (0.1%)	** (0.0%)	** (0.1%)	** (0.1%)	0.00
PE; n (%)	2,153 (100.0%)	2,153 (100.0%)	#DIV/0!	5,673 (100.0%)	5,670 (99.9%)	0.04	8,060 (99.9%)	8,061 (100.0%)	15886 (100.0%)	15884 (99.9%)	0.04
Coagulation defects; n (%)	61 (2.8%)	57 (2.6%)	#DIV/0!	136 (2.4%)	147 (2.6%)	#DIV/0!	130 (1.6%)	129 (1.6%)	136 (2.4%)	147 (2.6%)	-0.01
Diabetes: 1 inpatient or 2 outpatient claims within 18	462 (21.5%)	486 (22.6%)	-0.03	879 (15.5%)	890 (15.7%)	-0.01	1,976 (24.5%)	2,034 (25.2%)	3317 (20.9%)	3410 (21.5%)	-0.01
Intracranial or retroperitoneal hemorrhage: 1 inpatient; n (%)	** (0.0%)	** (0.0%)	#DIV/0!	** (0.1%)	** (0.0%)	0.04	** (0.1%)	** (0.1%)	#VALUE!	#VALUE!	#VALUE!
Peptic Ulcer Disease; n (%)	639 (29.7%)	621 (28.8%)	0.02	1,051 (18.5%)	1,072 (18.9%)	-0.01	2,798 (34.7%)	2,786 (34.5%)	4488 (28.2%)	4479 (28.2%)	0.00
Major Surgery ; n (%)	181 (8.4%)	166 (7.7%)	#DIV/0!	319 (5.6%)	326 (5.7%)	#DIV/0!	810 (10.0%)	775 (9.6%)	319 (5.6%)	326 (5.7%)	0.00
Upper GI bleed; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	#DIV/0!
Lower/ unspecified GI bleed; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	#DIV/0!
Urogenital bleed; n (%)	15 (0.7%)	13 (0.6%)	0.01	50 (0.9%)	48 (0.8%)	0.01	** (0.0%)	0 (0.0%)	#VALUE!	61 (0.4%)	#VALUE!
Other bleeds; n (%)	113 (5.2%)	100 (4.6%)	0.03	201 (3.5%)	201 (3.5%)	0.00	393 (4.9%)	390 (4.8%)	707 (4.4%)	691 (4.3%)	0.00
Prior cancer; n (%)	353 (16.4%)	337 (15.7%)	0.02	593 (10.4%)	565 (10.0%)	0.01	1,581 (19.6%)	1,430 (17.7%)	2527 (15.9%)	2332 (14.7%)	0.03
Antibiotics; n (%)	1,052 (48.9%)	1,088 (50.5%)	#DIV/0!	2,823 (49.7%)	2,803 (49.4%)	#DIV/0!	4,541 (56.3%)	4,569 (56.7%)	2,823 (49.7%)	2,803 (49.4%)	0.01
Aspirin; n (%)	15 (0.7%)	13 (0.6%)	0.01	74 (1.3%)	77 (1.4%)	-0.01	28 (0.3%)	34 (0.4%)	117 (0.7%)	124 (0.8%)	-0.01
Aspirin/dipyridamole; n (%)	** (0.1%)	** (0.1%)	0.00	** (0.1%)	** (0.1%)	0.00	20 (0.2%)	24 (0.3%)	#VALUE!	#VALUE!	#VALUE!
Other antiplatelet agents; n (%)	** (0.2%)	** (0.2%)	0.00	** (0.1%)	** (0.1%)	0.00	29 (0.4%)	28 (0.3%)	#VALUE!	#VALUE!	#VALUE!
PGP inhibitors; n (%)	484 (22.5%)	480 (22.3%)	0.00	1,254 (22.1%)	1,233 (21.7%)	0.01	2,139 (26.5%)	2,148 (26.6%)	3877 (24.4%)	3861 (24.3%)	0.00
Other gastroprotective agents; n (%)	32 (1.5%)	29 (1.3%)	0.02	71 (1.3%)	71 (1.3%)	0.00	148 (1.8%)	162 (2.0%)	251 (1.6%)	262 (1.6%)	0.00
Number of lipid tests ordered											
...mean (sd)	0.47 (0.72)	0.50 (1.17)	-0.03	0.35 (0.72)	0.35 (0.70)	0.00	0.58 (0.79)	0.58 (0.83)	0.48 (0.76)	0.49 (0.84)	0.00
Proton pump inhibitor; n (%)	528 (24.5%)	528 (24.5%)	0.00	1,233 (21.7%)	1,226 (21.6%)	0.00	2,637 (32.7%)	2,717 (33.7%)	4398 (27.7%)	4471 (28.1%)	-0.01
H2 receptor antagonist; n (%)	75 (3.5%)	89 (4.1%)	-0.03	186 (3.3%)	199 (3.5%)	-0.01	506 (6.3%)	511 (6.3%)	767 (4.8%)	799 (5.0%)	-0.01
Vitamin K therapy; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	** (0.0%)	0 (0.0%)	#VALUE!	0 (0.0%)	#VALUE!
Number of INR (prothrombin) tests ordered											
...mean (sd)	0.48 (1.24)	0.37 (0.92)	0.10	0.39 (0.95)	0.33 (0.81)	0.07	0.33 (0.72)	0.31 (0.68)	0.37 (0.89)	0.33 (0.76)	0.00
Treating prescriber - Cardiologist; n (%)	1,407 (65.4%)	1,372 (63.7%)	0.04	3,348 (59.0%)	3,290 (58.0%)	0.02	5,390 (66.8%)	5,362 (66.5%)	10145 (63.8%)	10024 (63.1%)	0.01
Treating prescriber - Primary Care Physician; n (%)	1,960 (91.0%)	1,960 (91.0%)	0.00	2,531 (44.6%)	2,528 (44.5%)	0.00	3,504 (43.4%)	3,546 (44.0%)	7995 (50.3%)	8034 (50.6%)	-0.01
Treating prescriber - Other; n (%)	2,143 (99.5%)	2,145 (99.6%)	-0.01	5,286 (93.1%)	5,294 (93.3%)	-0.01	8,058 (99.9%)	8,057 (99.9%)	15487 (97.4%)	15496 (97.5%)	-0.01
Alpha blockers; n (%)	170 (7.9%)	164 (7.6%)	0.01	281 (5.0%)	291 (5.1%)	0.00	827 (10.3%)	807 (10.0%)	1278 (8.0%)	1262 (7.9%)	0.00
CHA2DS2 VASc score, 180 days, V											
...mean (sd)	3.05 (1.73)	3.21 (1.73)	-0.09	2.80 (1.64)	2.93 (1.60)	-0.08	3.97 (1.85)	4.17 (1.82)	3.43 (1.76)	3.60 (1.73)	0.00
Use of Prasugrel; n (%)	** (0.1%)	** (0.1%)	0.00	** (0.1%)	** (0.1%)	0.00	0 (0.0%)	0 (0.0%)	#VALUE!	#VALUE!	#VALUE!
Use of Loop Diuretics+other diuretics+other hyperten-	282 (13.1%)	289 (13.4%)	-0.01	517 (9.1%)	523 (9.2%)	0.00	1,414 (17.5%)	1,476 (18.3%)	2213 (13.9%)	2288 (14.4%)	-0.01
Commercial vs Medicare Advantage- Business Type Code - CORRECT ONE - OPTUM							0	0			
...Commercial; n (%)		878 (40.8%)	0.07	1204 (21.2%)	1281 (22.6%)	-0.03	-	-	2,154 (27.5%)	2,159 (27.6%)	0.00
...Medicare Advantage; n (%)	1,203 (55.9%)	1275 (59.2%)	-0.07	4471 (78.8%)	4394 (77.4%)	0.03	-	-	5,674 (72.5%)	5,669 (72.4%)	0.00

Appendix B

Commercial vs Medicare Advantage- Business Type Code											
...COM = COMMERCIAL; n (%)	950 (44.1%)	878 (40.8%)	0.07	-	-	#VALUE!	-	-	950 (44.1%)	878 (40.8%)	0.07
...MCR = MEDICARE; n (%)	1,203 (55.9%)	1,275 (59.2%)	-0.07	-	-	#VALUE!	-	-	1,203 (55.9%)	1,275 (59.2%)	-0.07
...MCD = MEDICAID; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	-	-	#VALUE!	-	-	0 (0.0%)	0 (0.0%)	#DIV/0!
...NONE = NO BUSINESS LINE CODE (added in 2015); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	-	-	#VALUE!	-	-	0 (0.0%)	0 (0.0%)	#DIV/0!
...UNK = UNKNOWN (added in 2015); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	-	-	#VALUE!	-	-	0 (0.0%)	0 (0.0%)	#DIV/0!
Commercial vs Medicare Advantage- Data Type											
...1 - Fee For Service; n (%)	-	-		0	0		-	-			
...2 - Encounter; n (%)	-	-		3,978 (70.1%)	3,898 (68.7%)		-	-	3,978 (70.1%)	3,898 (68.7%)	0.00
...3 - Medicare; n (%)	-	-		493 (8.7%)	496 (8.7%)		-	-	493 (8.7%)	496 (8.7%)	0.00
...4 - Medicare Encounter; n (%)	-	-		1,080 (19.0%)	1,153 (20.3%)		-	-	1,080 (19.0%)	1,153 (20.3%)	0.00
...4 - Medicare Encounter; n (%)	-	-		124 (2.2%)	128 (2.3%)		-	-	124 (2.2%)	128 (2.3%)	0.00
Metropolitan Statistical Area - Urban (any MSA) vs Rural (non-MSA)											
...Urban; n (%)	-	-		4,248 (74.9%)	4,262 (75.1%)		-	-	4,248 (74.9%)	4,262 (75.1%)	
...Rural; n (%)	-	-		226 (4.0%)	198 (3.5%)		-	-	226 (4.0%)	198 (3.5%)	
...Unknown/Missing; n (%)	-	-		1,201 (21.2%)	1,215 (21.4%)		-	-	1,201 (21.2%)	1,215 (21.4%)	