

Replication of the ISAR-REACT 5 Trial in Healthcare Data Claims

NCT 01944800

August 3, 2021

## 1. RCT Details

This section provides a high-level overview of the 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

**Ticagrelor or Prasugrel in Patients with Acute Coronary Syndromes ([ISAR-REACT 5 trial](#))**

### 1.2 Intended aim(s)

To compare ticagrelor (180-mg loading dose, 90 mg twice daily thereafter) and prasugrel (60-mg loading dose, 10 mg daily thereafter) for the prevention of cardiovascular events in patients admitted to the hospital with an acute coronary syndrome, with or without ST-segment elevation, who were scheduled to undergo coronary angiography.

### 1.3 Primary endpoint for replication and RCT finding

The primary outcome was composite of death, myocardial infarction, or stroke at 1 year after randomization

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

Assuming an incidence of 10.0% in ticagrelor users and 12.9% in prasugrel users, 1,895 patients would be required for each group to achieve 80% power to detect a relative risk reduction of 22.5% in the rate of the primary outcome in the ticagrelor group as compared with the prasugrel group, using a two-sided alpha of 0.05.

### 1.5 Primary trial estimate targeted for replication

HR = 1.36 (95% CI 1.09–1.70) comparing ticagrelor to prasugrel (Schupke et al., 2019)

## 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.

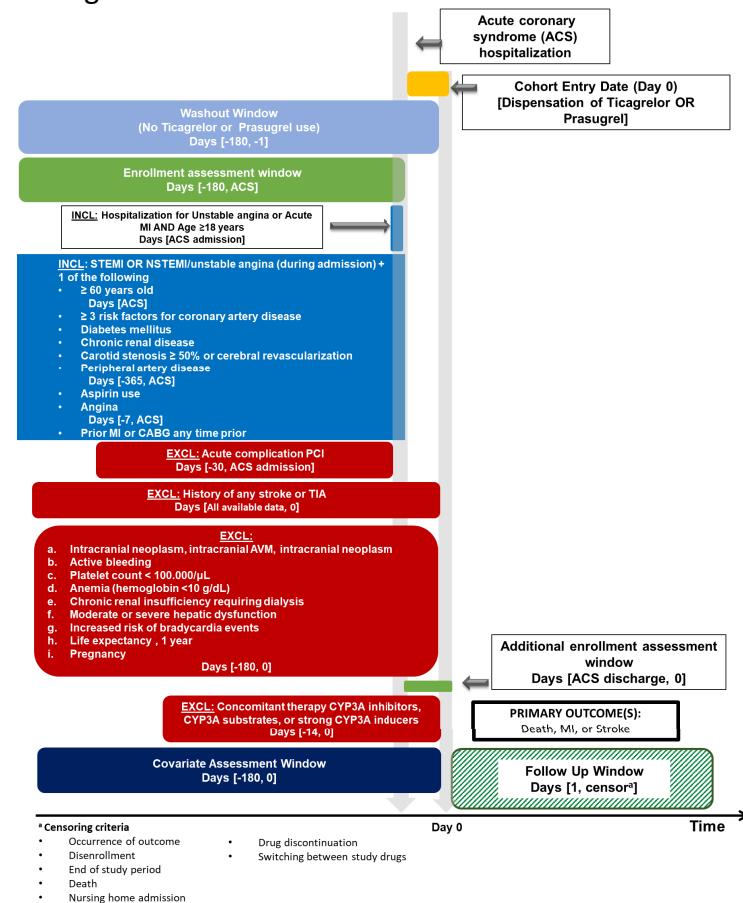
## 3. Data Source(s)

Optum, MarketScan

#### 4. Study Design Diagram

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

Figure 1.



## 5. Cohort Identification

### 5.1 Cohort Summary

This study will involve a new user, parallel group, retrospective cohort study design comparing ticagrelor 90 mg twice daily to prasugrel 10 mg daily. The patients will be required to have continuous enrollment during the baseline period of 180 days before initiation of ticagrelor or prasugrel (index date). We will restrict the analyses to patients with an acute coronary syndrome, with or without ST-segment elevation, who were scheduled to undergo coronary angiography.

### 5.2 Important steps for cohort formation

New use of ticagrelor, exposure, and prasugrel 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 ticagrelor in the U.S. started on 2011-07-20.

- For Marketscan: 2011-07-20 to 2018-12-31 (end of data availability).
- For Optum: 2011-07-20 to 2020-03-31 (end of data availability).

#### 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		MarketScan	
	Less Excluded Patients	Remaining Patients	Less Excluded Patients	Remaining Patients
All patients		78,779,380		200,203,908
Parent: Did not meet cohort entry criteria	78,582,029	197,351	-199978288	225,620
Parent: Excluded due to insufficient enrollment	-27,693	169,658	-56919	168,701
Parent: Inclusion # 1.2.3	-7,584	162,074	-17110	151,591

Parent: Excluded based on Start of Prasugrel 10mg OR Ticagrelor 90mg	-139,539	22,535	-122209	29,382
Parent: Excluded based on Exclusion # 13 - PCI	-1,511	21,024	-1228	28,154
Parent: Excluded based on Enrollment with allowed gap	-16	21,008	-25	28,129
Parent: Final cohort		21,008		28,129
Did not meet cohort entry criteria	0	21,008	0	28,129
Excluded due to insufficient enrollment	0	21,008	0	28,129
Excluded due to prior use of referent	-325	20,683	-372	27,757
Excluded due to prior use of exposure	-341	20,342	-535	27,222
Excluded because patient qualified in >1 exposure category	-5	20,337	-3	27,219
Excluded based on Inclusion # 2 - Age $\geq$ 18	0	20,337	0	27,219
Excluded based on Exclusion # 2 - history of stroke or TIA	-6,788	13,549	-6784	20,435
Excluded based on Exclusion # 3 - intracranial neoplasm, intracranial AVM, intracranial aneurysm	-15	13,534	-11	20,424
Excluded based on Exclusion # 4 - Active bleeding	-446	13,088	-595	19,829
Excluded based on Exclusion # 6 - Thrombocytopenia	-269	12,819	-261	19,568
Excluded based on Exclusion # 7 - Anemia	-1,033	11,786	-891	18,677
Excluded based on Exclusion # 10 - chronic renal insufficiency	-38	11,748	-37	18,640
Excluded based on Exclusion # 11 - Moderate/severe hepatic dysfunction	-544	11,204	-578	18,062
Excluded based on Exclusion # 12 - Increased risk of bradycardia events	-342	10,862	-413	17,649
Excluded based on Exclusion # 14 - CCI $\geq$ 10	-24	10,838	-8	17,641
Excluded based on Exclusion # 15 - Concomitant therapy with strong CYP3A inhibitors/inducers	-28	10,810	-53	17,588
Excluded based on Exclusion # 19 - Pregnancy	-3	10,807	-6	17,582
Final cohort		<b>10,807</b>		<b>17,582</b>

prior 6 months.

## 6. Variables

### 6.1 Exposure-related variables:

#### Study drug:

The study exposure of interest is initiation of ticagrelor. Initiation will be defined as starting treatment with ticagrelor or a comparator drug with no prior use of the corresponding drug in the past 6 months (washout period).

#### Comparator agents:

New initiators of prasugrel 10 mg, defined by no use of ticagrelor or prasugrel in the

### 6.2 Preliminary covariates:

- Age
- Sex

- Combined Comorbidity Index (CCI), measured over the default 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:** composite of death, myocardial infarction, or stroke at 1 year after randomization
- Secondary outcomes:
  - Individual components:
  - Hospital admission for MI
  - Hospital admission for stroke
  - Death

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 ticagrelor 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 (ticagrelor and comparator) plus a defined grace period (i.e., 30 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
- The date of augmentation/switching from exposure or comparator to clopidogrel, measured as the initiation of clopidogrel starting from 1 day after cohort entry date
  - 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 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 links:

Optum: <https://bwh-dope.aetion.com/projects/details/1740/rwrs/71503>

Marketscan: <https://bwh-dope.aetion.com/projects/details/1739/rwrs/71505>

Date conducted: 06/11/2021

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

Variable	Optum			MarketScan		
	Exposure - Ticagrelor (90 mg)	Exposure - Prasugrel (10 mg)	Difference	Exposure - Ticagrelor (90 mg)	Exposure - Prasugrel (10 mg)	Difference
Number of patients	6,722	4,085	- (-, -)	9,025	8,557	- (-, -)
Age						
...mean (sd)	63.60 (11.12)	59.90 (10.02)	3.70 (3.29, 4.11)	58.41 (9.83)	56.88 (8.90)	1.54 (1.26, 1.81)
...median [IQR]	64.00 [56.00, 71.00]	60.00 [53.00, 67.00]	- (-, -)	59.00 [52.00, 63.00]	58.00 [51.00, 63.00]	- (-, -)
Gender						
...1 - Male; n (%)	4,796 (71.3%)	3,152 (77.2%)	-5.8% (-7.5%, -4.1%)	6,790 (75.2%)	6,835 (79.9%)	-4.6% (-5.9%, -3.4%)
...2 - Female; n (%)	1,925 (28.6%)	933 (22.8%)	5.8% (4.1%, 7.5%)	2,235 (24.8%)	1,722 (20.1%)	4.6% (3.4%, 5.9%)
CCI (180 days)- ICD9 and ICD10						
...mean (sd)	1.51 (1.96)	0.93 (1.74)	0.58 (0.51, 0.65)	0.74 (1.54)	0.50 (1.43)	0.24 (0.19, 0.28)
...median [IQR]	1.00 [0.00, 3.00]	1.00 [0.00, 2.00]	- (-, -)	0.00 [0.00, 2.00]	0.00 [-1.00, 1.00]	- (-, -)

- Report summary parameters of study population

FEASIBILITY- FOR STUDY OUTCOME		
Variable	Optum	MarketScan
	Value	Value
Number of patients in full cohort	10,807	17,582
Number of patients dropped as incomplete cases	0	0
Number of patients that did not begin follow-up	3	5

Number of patients in analytic cohort	10,804	17,577
Number of events	777	1063
Number of person-years	7,415.55	13,945.70
Number of patients in group: Exposure - Ticagrelor (90 mg)	6,719	9,021
Number of patients in group: Exposure - Prasugrel (10 mg)	4,085	8,556
Risk per 1,000 patients	71.92	60.48
Rate per 1,000 person-years	104.78	76.22

- Report median follow-up time by treatment group

MEDIAN FOLLOW-UP TIME FOR STUDY OUTCOME		
Median Follow-Up Time (Days) [IQR]		
	Optum	Marketscan
<b>Patient Group</b>	<b>Median Follow-Up Time (Days) [IQR]</b>	<b>Median Follow-Up Time (Days) [IQR]</b>
<b>Overall Patient Population</b>	196 [58, 391]	249 [91, 420]
<b>Referent</b>	172 [58, 386]	230 [85, 412]
<b>Exposure</b>	232 [81, 403]	273 [109, 433]

- Report reasons for censoring in the overall study population

CENSORING REASONS FOR STUDY OUTCOME		
	Optum	Marketscan
<b>Overall</b>		
Outcome	368 (3.4%)	516 (2.9%)

Death	0 (0.0%)	0 (0.0%)
Start of an additional exposure	179 (1.7%)	331 (1.9%)
End of index exposure	4,994 (46.2%)	8,242 (46.9%)
Specified date reached	412 (3.8%)	734 (4.2%)
End of patient data	0 (0.0%)	0 (0.0%)
End of patient enrollment	1,873 (17.3%)	4,889 (27.8%)
Switch to clopidogrel + Nursing home admission	2,978 (27.6%)	2,865 (16.3%)

- Report overall risk of the primary outcome.

	Optum	Marketscan	Pooled
Risk per 1,000 patients	71.92	60.48	64.81

## 8. Initial Power Assessment

Action report links:

Optum: <https://bwh-dope.aetion.com/projects/details/1740/rwrs/71504>

Marketscan: <https://bwh-dope.aetion.com/projects/details/1739/rwrs/71508>

Date conducted: 06/11/2021

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 3 covariates: age, sex, 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

<b>Superiority Analysis</b>	
Number of patients matched	24,266
Reference	12,133
Exposed	12,133
Risk per 1,000 patients	64.81
Desired HR from RCT	1.36
Alpha (2-sided)	0.05
Number of events expected	1572.67946
Power	0.999982406

Marketscan

<b>Superiority Analysis</b>	
Number of patients matched	16,164
Reference	8,082
Exposed	8,082
Risk per 1,000 patients	60.48
Desired HR from RCT	1.36
Alpha (2-sided)	0.05
Number of events expected	977.59872
Power	0.997793559

Optum

<b>Superiority Analysis</b>	
Number of patients matched	8,102
Reference	4,051
Exposed	4,051
Risk per 1,000 patients	71.92
Desired HR from RCT	1.36
Alpha (2-sided)	0.05
Number of events expected	582.69584
Power	0.960047459

- 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 name:

Optum: <https://bwh-dope.aetion.com/projects/details/1740/rwrs/71506>

Marketscan: <https://bwh-dope.aetion.com/projects/details/1739/rwrs/71510>

Date conducted: 06/10/2021

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- For Table 1, please refer to **Appendix B**.

- Report reasons for censoring by treatment group.

	Overall	Referent	Exposure
Dummy Outcome	0 (0.00%)	0 (0.00%)	0 (0.00%)
Death	45 (0.31%)	17 (0.23%)	28 (0.38%)
Start of an additional exposure	307 (2.10%)	248 (3.40%)	59 (0.81%)
End of index exposure	8,472 (58.03%)	4,309 (59.03%)	4,163 (57.03%)
Specified date reached	602 (4.12%)	245 (3.36%)	357 (4.89%)
End of patient enrollment	3,773 (25.84%)	1,714 (23.48%)	2,059 (28.21%)
Switch to clopidogrel + Nursing home admission	1,401 (9.60%)	767 (10.51%)	634 (8.68%)

- Report follow-up time by treatment group.

Median Follow-Up Time (Days) [IQR]		
Patient Group	Optum	Marketscan
Overall Patient Population	208 [58-395]	259 [99-430]
Referent	178 [58-391]	241 [88-419]

Exposure	229 [80-402]	286 [112-445]
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## 10. Final Power Assessment

Date conducted: 06/10/2021

- 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.

Pooled

Superiority Analysis	
Number of patients matched	14,600
Reference	7,300
Exposed	7,300
Risk per 1,000 patients	65.52
Desired HR from RCT	1.36
Alpha (2-sided)	0.05
Number of events expected	956.592
Power	0.997405863

Marketscan

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

<b>Superiority Analysis</b>	
Number of patients matched	9,604
Reference	4,802
Exposed	4,802
Risk per 1,000 patients	61.61
Desired HR from RCT	1.36
Alpha (2-sided)	0.05
Number of events expected	591.70244
Power	0.962446362

Optum

<b>Superiority Analysis</b>	
Number of patients matched	4,996
Reference	2,498
Exposed	2,498
Risk per 1,000 patients	71.92
Desired HR from RCT	1.36
Alpha (2-sided)	0.05
Number of events expected	359.31232
Power	0.830035796

- 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](https://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**

Schupke S., Neumann F., Menichelli M., et al. Ticagrelor or Prasugrel in Patients with Acute Coronary Syndromes. *N Engl J Med.* 2019; 381:1524-1534

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><b>Trial Name (with web links)</b></u>	<a href="#">ISAR-REACT 5</a>
<u><b>Trial Name (with pdf links)</b></u>	<a href="#">ISAR-REACT 5</a>
<u><b>NCT</b></u>	<a href="#">NCT01944800</a>
<u><b>Therapeutic Area</b></u>	Cardiology/Vascular Diseases
<u><b>Study Batch</b></u>	Antiplatelets
<u><b>Brand Name</b></u>	Brilinta
<u><b>Generic Name</b></u>	Ticagrelor
<u><b>Sponsor</b></u>	Deutsches Herzzentrum Muenchen
<u><b>Year</b></u>	2019
<u><b>Measurable Endpoint</b></u>	The primary end point was the composite of stroke, myocardial infarction, or death
<u><b>Exposure</b></u>	Ticagrelor
<u><b>Comparator</b></u>	Prasugrel
<u><b>Population</b></u>	Patients who were hospitalized for an acute coronary syndrome (ST-segment elevation myocardial infarction, non-ST-segment elevation myocardial infarction or unstable angina pectoris) with planned invasive strategy
<u><b>Trial Finding</b></u>	HR = 1.36 (95% CI, 1.09 to 1.70)
<u><b>No. of Patients</b></u>	4,018 (2,012 in exposed arm)
<u><b>Power</b></u>	80% power; 1895 patients in each group would be needed for the trial to detect a relative risk that was lower by 22.5% in the rate of the primary end point in the ticagrelor group as compared with the prasugrel group

## Appendix A

### Coronary angiography

Procedure codes any diagnosis position, inpatient and outpatient setting

Source : <https://www.cordis.com/content/dam/cordis/web/documents/fact-sheet/cordis-cardiology-reimbursement-fact>

### CPT

93451 performed

Left heart catheterization including intraprocedural injection(s) for left ventriculography, imaging

93452 supervision and interpretation, when performed

Combined right and left heart catheterization including intraprocedural injection(s) for left ventriculography,

93453 imaging supervision and interpretation, when performed

93454 Coronary angiography

93455 Coronary angiography with bypass grafts

93456 Coronary angiography with right heart catheterization

93457 Coronary angiography and bypass grafts, with right heart catheterization

93458 Coronary angiography with left heart catheterization

93459 Coronary angiography and bypass grafts, with left heart catheterization

93460 Coronary angiography with right and left heart catheterization

93461 Coronary angiography with bypass grafts, right and left heart catheterization

93563 Injection/imaging for coronary angiography with cath for congenital anomaly

93564 Injection/imaging for bypass graft angiography with cath for congenital anomaly

93565 Injection/imaging for left heart angiography with cath for congenital anomaly

93566 Injection/imaging for right heart angiography with cath for congenital anomaly

Computed tomographic angiography, heart, coronary arteries and bypass grafts (when present), with

75574 contrast material, including 3D image postprocessing (including evaluation of cardiac structure and morphology, assessment of cardiac function, and evaluation of venous structures, if performed)

### ICD-9 PX

37.21 Right heart cardiac catheterization

37.22 Left heart cardiac catheterization

37.23 Combined right and left heart cardiac catheterization

### ICD 10 PX

## Appendix A

B21	Fluoroscopy (heart)
B210xxx	Coronary Artery, Single
B211xxx	Coronary Arteries, Multiple
B212xxx	Coronary Artery Bypass Graft, Single
B213xxx	Coronary Artery Bypass Grafts, Multiple
B214xxx	Heart, Right
B215xxx	Heart, Left
B216xxx	Heart, Right and Left
B217xxx	Internal Mammary Bypass Graft, Right
B218xxx	Internal Mammary Bypass Graft, Left
B21Fxxx	Bypass Graft, Other
B22	CT Scan (heart)
B221xxx	Coronary Arteries, Multiple
B223xxx	Coronary Artery Bypass Grafts, Multiple
B226xxx	Heart, Right and Left
B31	Fluoroscopy (upper arteries)
B312xxx	Subclavian Artery, Left
B313xxx	Common Carotid Artery, Right
B314xxx	Common Carotid Artery, Left
B315xxx	Common Carotid Arteries, Bilateral
B316xxx	Internal Carotid Artery, Right
B317xxx	Internal Carotid Artery, Left
B318xxx	Internal Carotid Arteries, Bilateral
B319xxx	External Carotid Artery, Right
B31Bxxx	External Carotid Artery, Left
B31Cxxx	External Carotid Arteries, Bilateral
B32	CT scan (upper arteries)
B325xxx	Common Carotid Arteries, Bilateral
B328xxx	Internal Carotid Arteries, Bilateral

## Appendix A

Major bleeding exclusion criteria: 1 inpatient (any position) or 2 outpatient diagnosis (separated by 7-365 days)

- 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
- 578.9 (ICD9) HEMORRHAGE OF GASTROINTESTINAL TRACT UNSPECIFIED
- 423 (ICD9) HEMOPERICARDIUM
- 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

## Appendix A

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

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

## Appendix A

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

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

578.1 (ICD9) BLOOD IN STOOL

719.1 (ICD9) HEMARTHROSIS

719.1 (ICD9) HEMARTHROSIS SITE UNSPECIFIED

719.11 (ICD9) HERARTHROSIS INVOLVING SHOULDER REGION

719.12 (ICD9) HEMARTHROSIS INVOLVING UPPER ARM

719.13 (ICD9) HEMARTHROSIS INVOLVING FOREARM

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- 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
- 430 (ICD9) SUBARACHNOID HEMORRHAGE
- 431 (ICD9) INTRACEREBRAL HEMORRHAGE
- 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

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- 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

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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

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

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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
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	
R31.29	
R31.9	(ICD10) Hematuria, unspecified
784.7	(ICD9) EPISTAXIS
784.8	(ICD9) HEMORRHAGE FROM THROAT

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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

The occurrence of Inpatient with the following attributes:

**Legacy Attribute** Procedure Code (Any Position) is any of: { "44.43", "43255", "0W3P8ZZ" }

44.43 (ICD9) ENDOSCOPIC CONTROL OF GASTRIC OR DUODENAL BLEEDING

43255 (HCPGS) 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

0W3P8ZZ (ICD10) Control Bleeding in Gastrointestinal Tract, Via Natural or Artificial Opening Endoscopic

## Appendix A

PCI

Procedure codes in any position, inpatient or outpatient setting

HCPCS/CPT codes:

92925 (HCPCS) Percutaneous transluminal coronary atherectomy, with coronary angioplasty when performed; each additional branch of a major coronary artery (List separately in addition to code for primary procedure)

92920 (HCPCS) Percutaneous transluminal coronary angioplasty; single major coronary artery or branch

92921 (HCPCS) Percutaneous transluminal coronary angioplasty; each additional branch of a major coronary artery (List separately in addition to code for primary procedure)

92924 (HCPCS) Percutaneous transluminal coronary atherectomy, with coronary angioplasty when performed; single major coronary artery or branch

92929 (HCPCS) Percutaneous transcatheter placement of intracoronary stent(s), with coronary angioplasty when performed; each additional branch of a major coronary artery (List separately in addition to code for primary procedure)

92933 (HCPCS) Percutaneous transluminal coronary atherectomy, with intracoronary stent, with coronary angioplasty when performed; single major coronary artery or branch

92934 (HCPCS) Percutaneous transluminal coronary atherectomy, with intracoronary stent, with coronary angioplasty when performed; each additional branch of a major coronary artery (List separately in addition to code for primary procedure)

92928 (HCPCS) Percutaneous transcatheter placement of intracoronary stent(s), with coronary angioplasty when performed; single major coronary artery or branch

ICD-9 px codes:

0.66 (ICD9) PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY [PTCA]

36.09 (ICD9) OTHER REMOVAL OF CORONARY ARTERY OBSTRUCTION

36.06 (ICD9) INSERTION OF NON

36.07 (ICD9) INSERTION OF DRUG

ICD-10 px codes:

027004Z (ICD10) Dilation of Coronary Artery, One Artery with Drug

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027005Z (ICD10) Dilation of Coronary Artery, One Artery with Two Drug  
(ICD10) Dilation of Coronary Artery, One Artery with Four or More Intraluminal Devices,

02700GZ Open Approach

027035Z (ICD10) Dilation of Coronary Artery, One Artery with Two Drug

027037Z (ICD10) Dilation of Coronary Artery, One Artery with Four or More Drug  
(ICD10) Dilation of Coronary Artery, One Artery with Two Intraluminal Devices,

02703EZ Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, One Artery with Three Intraluminal Devices,

02703FZ Percutaneous Approach

270456 (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Two Drug

027045Z (ICD10) Dilation of Coronary Artery, One Artery with Two Drug

027046Z (ICD10) Dilation of Coronary Artery, One Artery with Three Drug  
(ICD10) Dilation of Coronary Artery, One Artery with Intraluminal Device, Percutaneous

02704DZ Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Two Intraluminal Devices,

2.70E+09 Percutaneous Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Four or More Intraluminal

02704G6 Devices, Percutaneous Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, One Artery with Radioactive Intraluminal Device,

02704TZ Percutaneous Endoscopic Approach

027104Z (ICD10) Dilation of Coronary Artery, Two Arteries with Drug

027105Z (ICD10) Dilation of Coronary Artery, Two Arteries with Two Drug

271066 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Three Drug  
(ICD10) Dilation of Coronary Artery, Two Arteries with Four or More Intraluminal Devices,

02710GZ Open Approach

271466 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Three Drug  
(ICD10) Dilation of Coronary Artery, Two Arteries with Three Intraluminal Devices,

02714FZ Percutaneous Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, Percutaneous Endoscopic

02714Z6 Approach

027205Z (ICD10) Dilation of Coronary Artery, Three Arteries with Two Drug

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272346 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Drug  
027235Z (ICD10) Dilation of Coronary Artery, Three Arteries with Two Drug  
272366 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Three Drug  
(ICD10) Dilation of Coronary Artery, Three Arteries with Two Intraluminal Devices,  
02723EZ Percutaneous Approach  
272446 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Drug  
027244Z (ICD10) Dilation of Coronary Artery, Three Arteries with Drug  
272476 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Four or More Drug  
(ICD10) Dilation of Coronary Artery, Three Arteries with Three Intraluminal Devices,  
02724FZ Percutaneous Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Intraluminal Device, Open  
02730DZ Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Three Intraluminal Devices,  
02730FZ Open Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Radioactive Intraluminal  
02730TZ Device, Open Approach  
273346 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Drug  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Three Intraluminal Devices,  
02733FZ Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Radioactive Intraluminal  
02733TZ Device, Percutaneous Approach  
273446 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Drug  
(ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Four or More  
273476 Drug  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Two Intraluminal Devices,  
02734EZ Percutaneous Endoscopic Approach  
(ICD10) Extirpation of Matter from Coronary Artery, One Artery, Bifurcation, Percutaneous  
02C04Z6 Endoscopic Approach  
(ICD10) Extirpation of Matter from Coronary Artery, One Artery, Percutaneous Endoscopic  
02C04ZZ Approach

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02C23ZZ (ICD10) Extirpation of Matter from Coronary Artery, Three Arteries, Percutaneous Approach  
(ICD10) Extirpation of Matter from Coronary Artery, Three Arteries, Bifurcation,  
02C24Z6 Percutaneous Endoscopic Approach  
(ICD10) Extirpation of Matter from Coronary Artery, Four or More Arteries, Bifurcation,  
02C33Z6 Percutaneous Approach  
(ICD10) Extirpation of Matter from Coronary Artery, Four or More Arteries, Percutaneous  
02C33ZZ Approach  
(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Four or More Intraluminal  
02700G6 Devices, Open Approach  
(ICD10) Dilation of Coronary Artery, One Artery with Radioactive Intraluminal Device, Open  
02700TZ Approach  
270346 (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Drug  
027034Z (ICD10) Dilation of Coronary Artery, One Artery with Drug  
270356 (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Two Drug  
(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Intraluminal Device,  
02703D6 Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, One Artery with Radioactive Intraluminal Device,  
02703TZ Percutaneous Approach  
027044Z (ICD10) Dilation of Coronary Artery, One Artery with Drug  
(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Intraluminal Device,  
02704D6 Percutaneous Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Two Intraluminal  
2.71E+09 Devices, Open Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries with Two Intraluminal Devices, Open  
02710EZ Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries with Three Intraluminal Devices, Open  
02710FZ Approach  
027134Z (ICD10) Dilation of Coronary Artery, Two Arteries with Drug  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Intraluminal Device,  
02713D6 Percutaneous Approach

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02713EZ (ICD10) Dilation of Coronary Artery, Two Arteries with Two Intraluminal Devices, Percutaneous Approach

02713TZ (ICD10) Dilation of Coronary Artery, Two Arteries with Radioactive Intraluminal Device, Percutaneous Approach

02713ZZ (ICD10) Dilation of Coronary Artery, Two Arteries, Percutaneous Approach

02714TZ (ICD10) Dilation of Coronary Artery, Two Arteries with Four or More Drug

02714GZ (ICD10) Dilation of Coronary Artery, Two Arteries with Four or More Intraluminal Devices, Percutaneous Endoscopic Approach

027204Z (ICD10) Dilation of Coronary Artery, Three Arteries with Drug

272056 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Two Drug

02720FZ (ICD10) Dilation of Coronary Artery, Three Arteries with Three Intraluminal Devices, Open Approach

02720TZ (ICD10) Dilation of Coronary Artery, Three Arteries with Radioactive Intraluminal Device, Open Approach

027237Z (ICD10) Dilation of Coronary Artery, Three Arteries with Four or More Drug

02723FZ (ICD10) Dilation of Coronary Artery, Three Arteries with Three Intraluminal Devices, Percutaneous Approach

027245Z (ICD10) Dilation of Coronary Artery, Three Arteries with Two Drug

272466 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Three Drug

027246Z (ICD10) Dilation of Coronary Artery, Three Arteries with Three Drug

02724Z6 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, Percutaneous Endoscopic Approach

273046 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Drug

273076 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Four or More Drug

273366 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Three Drug

027337Z (ICD10) Dilation of Coronary Artery, Four or More Arteries with Four or More Drug

02733T6 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Radioactive Intraluminal Device, Percutaneous Approach

02733Z6 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, Percutaneous Approach

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027344Z (ICD10) Dilation of Coronary Artery, Four or More Arteries with Drug  
027346Z (ICD10) Dilation of Coronary Artery, Four or More Arteries with Three Drug  
  (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Intraluminal  
02734D6 Device, Percutaneous Endoscopic Approach  
  (ICD10) Dilation of Coronary Artery, Four or More Arteries with Intraluminal Device,  
02734DZ Percutaneous Endoscopic Approach  
  (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Three  
02734F6 Intraluminal Devices, Percutaneous Endoscopic Approach  
  (ICD10) Dilation of Coronary Artery, Four or More Arteries with Radioactive Intraluminal  
02734TZ Device, Percutaneous Endoscopic Approach  
  (ICD10) Exirpation of Matter from Coronary Artery, One Artery, Bifurcation, Percutaneous  
02C03Z6 Approach  
270066 (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Three Drug  
027007Z (ICD10) Dilation of Coronary Artery, One Artery with Four or More Drug  
  (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Intraluminal Device, Open  
02700D6 Approach  
02700DZ (ICD10) Dilation of Coronary Artery, One Artery with Intraluminal Device, Open Approach  
  (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Two Intraluminal Devices,  
2.70E+09 Open Approach  
  (ICD10) Dilation of Coronary Artery, One Artery with Two Intraluminal Devices, Open  
02700EZ Approach  
  (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Three Intraluminal  
02700F6 Devices, Open Approach  
  (ICD10) Dilation of Coronary Artery, One Artery with Three Intraluminal Devices, Open  
02700FZ Approach  
027036Z (ICD10) Dilation of Coronary Artery, One Artery with Three Drug  
  (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Two Intraluminal Devices,  
2.70E+09 Percutaneous Approach  
270466 (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Three Drug  
270476 (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Four or More Drug

## Appendix A

02704EZ (ICD10) Dilation of Coronary Artery, One Artery with Two Intraluminal Devices, Percutaneous Endoscopic Approach

02704FZ (ICD10) Dilation of Coronary Artery, One Artery with Three Intraluminal Devices, Percutaneous Endoscopic Approach

271046 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Drug

271076 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Four or More Drug

(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Three Intraluminal Devices, Open Approach

(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Radioactive Intraluminal Device, Open Approach

271356 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Two Drug

027135Z (ICD10) Dilation of Coronary Artery, Two Arteries with Two Drug

02713Z6 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, Percutaneous Approach

271456 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Two Drug

(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Intraluminal Device, Percutaneous Endoscopic Approach

(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Three Intraluminal Devices, Percutaneous Endoscopic Approach

(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Radioactive Intraluminal Device, Percutaneous Endoscopic Approach

027206Z (ICD10) Dilation of Coronary Artery, Three Arteries with Three Drug

027207Z (ICD10) Dilation of Coronary Artery, Three Arteries with Four or More Drug

(ICD10) Dilation of Coronary Artery, Three Arteries with Intraluminal Device, Open Approach

(ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Two Intraluminal Devices, Open Approach

2.72E+09 (ICD10) Dilation of Coronary Artery, Three Arteries with Two Intraluminal Devices, Open Approach

02720EZ (ICD10) Dilation of Coronary Artery, Three Arteries with Four or More Intraluminal Devices, Open Approach

02720GZ Open Approach

## Appendix A

- 02720T6 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Radioactive Intraluminal Device, Open Approach
- 027234Z (ICD10) Dilation of Coronary Artery, Three Arteries with Drug
- (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Intraluminal Device, Percutaneous Approach
- 02723D6 (ICD10) Dilation of Coronary Artery, Three Arteries with Intraluminal Device, Percutaneous Approach
- 02723DZ (ICD10) Dilation of Coronary Artery, Three Arteries with Four or More Drug
- (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Three Intraluminal Devices, Percutaneous Endoscopic Approach
- 02724F6 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Radioactive Intraluminal Device, Percutaneous Endoscopic Approach
- 02724T6 (ICD10) Dilation of Coronary Artery, Three Arteries with Radioactive Intraluminal Device, Percutaneous Endoscopic Approach
- 02724TZ (ICD10) Dilation of Coronary Artery, Three Arteries with Radioactive Intraluminal Device, Percutaneous Endoscopic Approach
- 02724ZZ (ICD10) Dilation of Coronary Artery, Three Arteries, Percutaneous Endoscopic Approach
- 273056 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Two Drug
- 273066 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Three Drug
- (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Intraluminal Device, Open Approach
- 02730D6 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Radioactive Intraluminal Device, Open Approach
- 02730T6 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Two Drug
- (ICD10) Dilation of Coronary Artery, Four or More Arteries with Intraluminal Device, Percutaneous Approach
- 02733DZ (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Two Intraluminal Devices, Percutaneous Approach
- 2.73E+09 (ICD10) Dilation of Coronary Artery, Four or More Arteries with Two Drug
- (ICD10) Dilation of Coronary Artery, Four or More Arteries with Four or More Intraluminal Devices, Percutaneous Endoscopic Approach
- 02734GZ (ICD10) Dilation of Coronary Artery, Four or More Arteries, Percutaneous Endoscopic Approach
- 02734ZZ (ICD10) Dilation of Coronary Artery, Four or More Arteries, Percutaneous Endoscopic Approach

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02C14ZZ	(ICD10) Extrication of Matter from Coronary Artery, Two Arteries, Percutaneous Endoscopic Approach
02700T6	(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Radioactive Intraluminal Device, Open Approach
270366	(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Three Drug
270376	(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Four or More Drug
02703DZ	(ICD10) Dilation of Coronary Artery, One Artery with Intraluminal Device, Percutaneous Approach
02703GZ	(ICD10) Dilation of Coronary Artery, One Artery with Four or More Intraluminal Devices, Percutaneous Approach
02703Z6	(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, Percutaneous Approach
02703ZZ	(ICD10) Dilation of Coronary Artery, One Artery, Percutaneous Approach
270446	(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Drug
02704GZ	(ICD10) Dilation of Coronary Artery, One Artery with Four or More Intraluminal Devices, Percutaneous Endoscopic Approach
02704T6	(ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Radioactive Intraluminal Device, Percutaneous Endoscopic Approach
02704ZZ	(ICD10) Dilation of Coronary Artery, One Artery, Percutaneous Endoscopic Approach
027107Z	(ICD10) Dilation of Coronary Artery, Two Arteries with Four or More Drug
02710DZ	(ICD10) Dilation of Coronary Artery, Two Arteries with Intraluminal Device, Open Approach
02710TZ	(ICD10) Dilation of Coronary Artery, Two Arteries with Radioactive Intraluminal Device, Open Approach
271346	(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Drug
271376	(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Four or More Drug
027137Z	(ICD10) Dilation of Coronary Artery, Two Arteries with Four or More Drug
2.71E+09	(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Two Intraluminal Devices, Percutaneous Approach
271446	(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Drug
027146Z	(ICD10) Dilation of Coronary Artery, Two Arteries with Three Drug

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02714DZ (ICD10) Dilation of Coronary Artery, Two Arteries with Intraluminal Device, Percutaneous Endoscopic Approach

02714G6 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Four or More Intraluminal Devices, Percutaneous Endoscopic Approach

02714TZ (ICD10) Dilation of Coronary Artery, Two Arteries with Radioactive Intraluminal Device, Percutaneous Endoscopic Approach

272046 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Drug

272066 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Three Drug

02720D6 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Intraluminal Device, Open Approach

02720G6 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Four or More Intraluminal Devices, Open Approach

027236Z (ICD10) Dilation of Coronary Artery, Three Arteries with Three Drug

02723GZ (ICD10) Dilation of Coronary Artery, Three Arteries with Four or More Intraluminal Devices, Percutaneous Approach

02723TZ (ICD10) Dilation of Coronary Artery, Three Arteries with Radioactive Intraluminal Device, Percutaneous Approach

02723Z6 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, Percutaneous Approach

02724D6 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Intraluminal Device, Percutaneous Endoscopic Approach

2.72E+09 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Two Intraluminal Devices, Percutaneous Endoscopic Approach

02724GZ (ICD10) Dilation of Coronary Artery, Three Arteries with Four or More Intraluminal Devices, Percutaneous Endoscopic Approach

027306Z (ICD10) Dilation of Coronary Artery, Four or More Arteries with Three Drug

027307Z (ICD10) Dilation of Coronary Artery, Four or More Arteries with Four or More Drug

02730EZ (ICD10) Dilation of Coronary Artery, Four or More Arteries with Two Intraluminal Devices, Open Approach

02730F6 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Three Intraluminal Devices, Open Approach

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- (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Four or More Intraluminal Devices, Open Approach
- 02730G6
- (ICD10) Dilation of Coronary Artery, Four or More Arteries with Drug
- 027334Z
- (ICD10) Dilation of Coronary Artery, Four or More Arteries with Two Drug
- (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Four or More Drug
- 273376
- (ICD10) Dilation of Coronary Artery, Four or More Arteries with Two Intraluminal Devices, Percutaneous Approach
- (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Three Intraluminal Devices, Percutaneous Approach
- 02733F6
- (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Two Drug
- (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Two Intraluminal Devices, Percutaneous Endoscopic Approach
- (ICD10) Exirpation of Matter from Coronary Artery, Three Arteries, Bifurcation, Percutaneous Approach
- 2.73E+09
- (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Drug
- 270046
- (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Two Drug
- 270056
- (ICD10) Dilation of Coronary Artery, One Artery with Three Drug
- 27006Z
- (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Four or More Drug
- (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Three Intraluminal Devices, Percutaneous Approach
- 02703F6
- (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Four or More Intraluminal Devices, Percutaneous Approach
- (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Radioactive Intraluminal Device, Percutaneous Approach
- 02703G6
- (ICD10) Dilation of Coronary Artery, One Artery with Four or More Drug
- (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, with Three Intraluminal Devices, Percutaneous Endoscopic Approach
- 02704F6
- (ICD10) Dilation of Coronary Artery, One Artery, Bifurcation, Percutaneous Endoscopic Approach
- 02704Z6
- (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Two Drug
- 271056

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027106Z (ICD10) Dilation of Coronary Artery, Two Arteries with Three Drug  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Intraluminal Device,  
02710D6 Open Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Four or More  
02710G6 Intraluminal Devices, Open Approach  
271366 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Three Drug  
027136Z (ICD10) Dilation of Coronary Artery, Two Arteries with Three Drug  
(ICD10) Dilation of Coronary Artery, Two Arteries with Intraluminal Device, Percutaneous  
02713DZ Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Three Intraluminal  
02713F6 Devices, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries with Three Intraluminal Devices,  
02713FZ Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Four or More  
02713G6 Intraluminal Devices, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries with Four or More Intraluminal Devices,  
02713GZ Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Radioactive  
02713T6 Intraluminal Device, Percutaneous Approach  
027144Z (ICD10) Dilation of Coronary Artery, Two Arteries with Drug  
027145Z (ICD10) Dilation of Coronary Artery, Two Arteries with Two Drug  
271476 (ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Four or More Drug  
(ICD10) Dilation of Coronary Artery, Two Arteries, Bifurcation, with Two Intraluminal  
2.71E+09 Devices, Percutaneous Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, Two Arteries with Two Intraluminal Devices,  
02714EZ Percutaneous Endoscopic Approach  
02714ZZ (ICD10) Dilation of Coronary Artery, Two Arteries, Percutaneous Endoscopic Approach  
272076 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Four or More Drug  
(ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Three Intraluminal  
02720F6 Devices, Open Approach  
272356 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Two Drug

## Appendix A

272376 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Four or More Drug  
(ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Two Intraluminal

2.72E+09 Devices, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Three Intraluminal

02723F6 Devices, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Four or More

02723G6 Intraluminal Devices, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Radioactive

02723T6 Intraluminal Device, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Three Arteries, Percutaneous Approach

272456 (ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Two Drug  
(ICD10) Dilation of Coronary Artery, Three Arteries with Intraluminal Device, Percutaneous

02724DZ Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, Three Arteries with Two Intraluminal Devices,

02724EZ Percutaneous Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, Three Arteries, Bifurcation, with Four or More

02724G6 Intraluminal Devices, Percutaneous Endoscopic Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Drug

027304Z (ICD10) Dilation of Coronary Artery, Four or More Arteries with Two Drug  
(ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Two

2.73E+09 Intraluminal Devices, Open Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Four or More Intraluminal

02730GZ Devices, Open Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Three Drug

(ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Intraluminal

02733D6 Device, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Four or More

02733G6 Intraluminal Devices, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries with Four or More Intraluminal

02733GZ Devices, Percutaneous Approach  
(ICD10) Dilation of Coronary Artery, Four or More Arteries, Percutaneous Approach

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273466 (ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Three Drug

027347Z (ICD10) Dilation of Coronary Artery, Four or More Arteries with Four or More Drug

(ICD10) Dilation of Coronary Artery, Four or More Arteries with Three Intraluminal Devices,

02734FZ Percutaneous Endoscopic Approach

(ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Four or More

02734G6 Intraluminal Devices, Percutaneous Endoscopic Approach

(ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, with Radioactive

02734T6 Intraluminal Device, Percutaneous Endoscopic Approach

(ICD10) Dilation of Coronary Artery, Four or More Arteries, Bifurcation, Percutaneous

02734Z6 Endoscopic Approach

02C03ZZ (ICD10) Exirpation of Matter from Coronary Artery, One Artery, Percutaneous Approach

(ICD10) Exirpation of Matter from Coronary Artery, Two Arteries, Bifurcation,

02C13Z6 Percutaneous Approach

02C13ZZ (ICD10) Exirpation of Matter from Coronary Artery, Two Arteries, Percutaneous Approach

(ICD10) Exirpation of Matter from Coronary Artery, Two Arteries, Bifurcation,

02C14Z6 Percutaneous Endoscopic Approach

(ICD10) Exirpation of Matter from Coronary Artery, Three Arteries, Percutaneous

02C24ZZ Endoscopic Approach

(ICD10) Exirpation of Matter from Coronary Artery, Four or More Arteries, Bifurcation,

02C34Z6 Percutaneous Endoscopic Approach

(ICD10) Exirpation of Matter from Coronary Artery, Four or More Arteries, Percutaneous

02C34ZZ Endoscopic Approach

# 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

# Appendix A

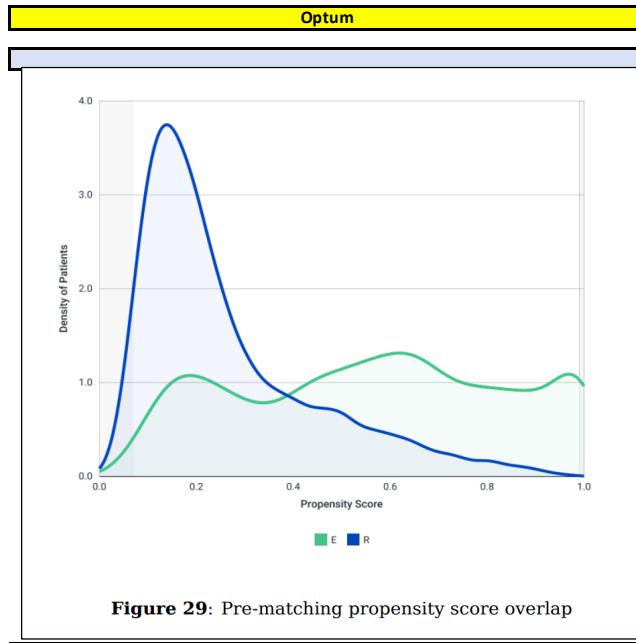
## ICD-9 Px inpatient any position

- 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
- 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

## Appendix A

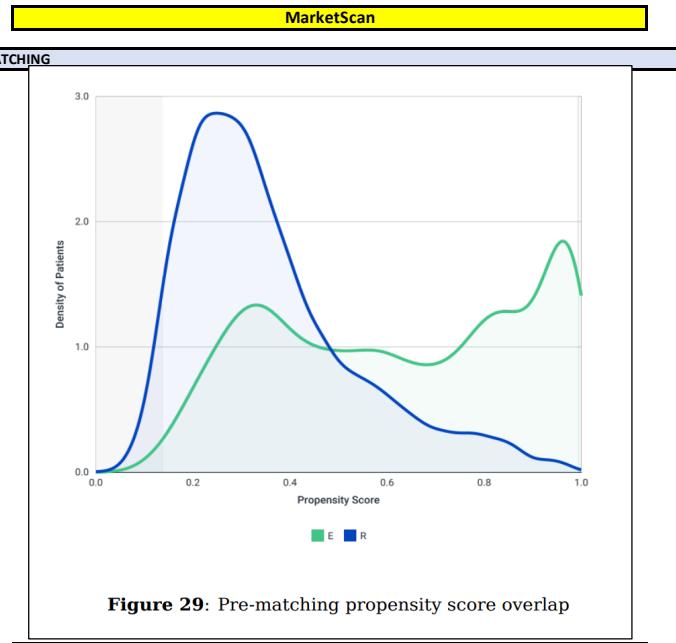
- 73.51 Manual rotation of fetal head
- 73.59 Other manually assisted delivery
- 73.6 Episiotomy
- 73.8 Operations on fetus to facilitate delivery
- 73.9 Other operations assisting delivery
- 73.91 External version assisting delivery
- 73.92 Replacement of prolapsed umbilical cord
- 73.93 Incision of cervix to assist delivery
- 73.94 Pubiotomy to assist delivery
- 73.99 Other operations assisting delivery
- 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

## Appendix B



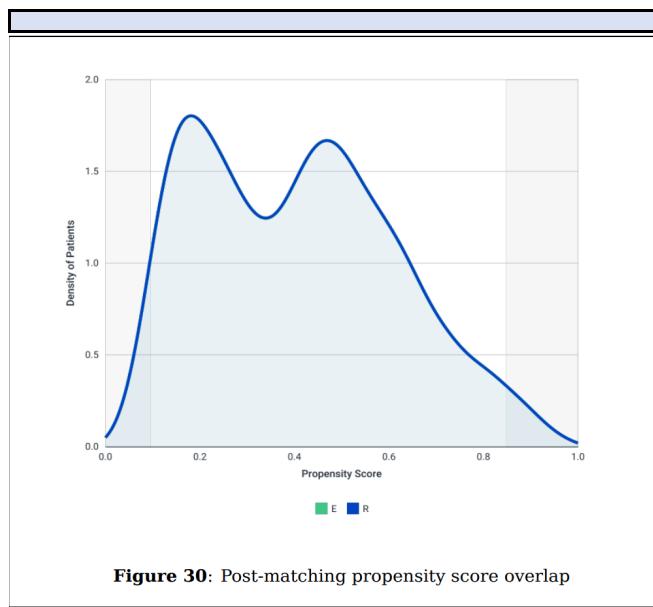
**Figure 29:** Pre-matching propensity score overlap

The c-statistics for the propensity score model, pre-matching was 0.811. The post-matching c-statistic was 0.562.

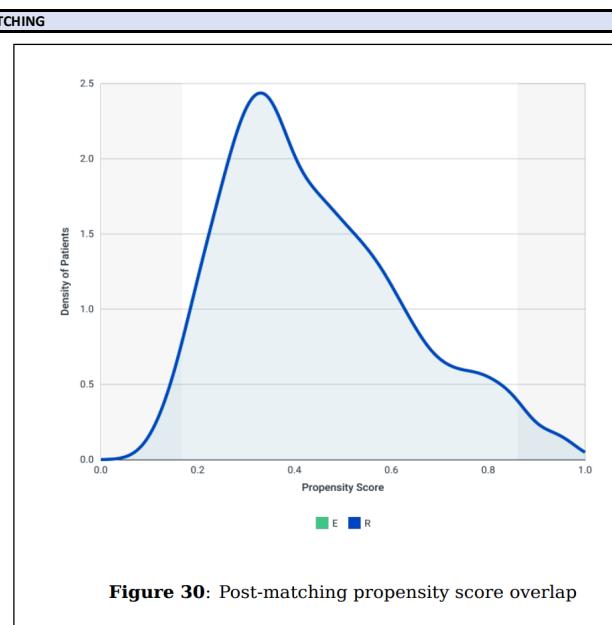


**Figure 29:** Pre-matching propensity score overlap

The c-statistics for the propensity score model, pre-matching was 0.795. The post-matching c-statistic was 0.535.



**Figure 30:** Post-matching propensity score overlap



**Figure 30:** Post-matching propensity score overlap

# Appendix B

	Optum			Marketscan			Pooled		
	Ticagrelor	Prasugrel	St. Diff	Ticagrelor	Prasugrel	St. Diff	Ticagrelor	Prasugrel	St. Diff
Number of patients	6,722	4,085		9,025	8,557		15,747	12,642	
Quarter/Year of Cohort Entry Date									
...Q3 2011; n (%)	1 (0.0%)	169 (4.1%)	-0.2924	2 (0.0%)	478 (5.6%)	-0.3444	003 (0.0%)	647 (5.1%)	-0.328
...Q4 2011; n (%)	2 (0.0%)	195 (4.8%)	-0.3176	19 (0.2%)	644 (7.5%)	-0.3864	021 (0.1%)	839 (6.6%)	-0.367
...Q1 2012; n (%)	11 (0.2%)	165 (4.0%)	-0.2674	51 (0.6%)	695 (8.1%)	-0.3741	062 (0.4%)	860 (6.8%)	-0.349
...Q2 2012; n (%)	30 (0.4%)	187 (4.6%)	-0.2715	104 (1.2%)	607 (7.1%)	-0.2991	134 (0.9%)	794 (6.3%)	-0.293
...Q3 2012; n (%)	44 (0.7%)	181 (4.4%)	-0.2363	142 (1.6%)	621 (7.3%)	-0.2791	186 (1.2%)	802 (6.3%)	-0.271
...Q4 2012; n (%)	42 (0.6%)	177 (4.3%)	-0.2411	177 (2.0%)	557 (6.5%)	-0.2245	219 (1.4%)	734 (5.8%)	-0.238
...Q1 2013; n (%)	80 (1.2%)	168 (4.1%)	-0.1813	172 (1.9%)	373 (4.4%)	-0.1435	252 (1.6%)	541 (4.3%)	-0.160
...Q2 2013; n (%)	95 (1.4%)	143 (3.5%)	-0.1362	196 (2.2%)	302 (3.5%)	-0.0782	291 (1.8%)	445 (3.5%)	-0.106
...Q3 2013; n (%)	75 (1.1%)	147 (3.6%)	-0.1656	255 (2.8%)	376 (4.4%)	-0.0860	330 (2.1%)	523 (4.1%)	-0.116
...Q4 2013; n (%)	82 (1.2%)	139 (3.4%)	-0.1472	275 (3.0%)	315 (3.7%)	-0.0389	357 (2.3%)	454 (3.6%)	-0.077
...Q1 2014; n (%)	81 (1.2%)	122 (3.0%)	-0.1258	245 (2.7%)	296 (3.5%)	-0.0462	326 (2.1%)	418 (3.3%)	-0.074
...Q2 2014; n (%)	92 (1.4%)	126 (3.1%)	-0.1148	319 (3.5%)	301 (3.5%)	0.0000	411 (2.6%)	427 (3.4%)	-0.047
...Q3 2014; n (%)	109 (1.6%)	117 (2.9%)	-0.0877	399 (4.4%)	312 (3.6%)	0.0408	508 (3.2%)	429 (3.4%)	-0.011
...Q4 2014; n (%)	109 (1.6%)	117 (2.9%)	-0.0877	430 (4.8%)	297 (3.5%)	0.0652	539 (3.4%)	414 (3.3%)	0.006
...Q1 2015; n (%)	92 (1.4%)	87 (2.1%)	-0.0534	335 (3.7%)	190 (2.2%)	0.0887	427 (2.7%)	277 (2.2%)	0.032
...Q2 2015; n (%)	102 (1.5%)	78 (1.9%)	-0.0309	354 (3.9%)	166 (1.9%)	0.1194	456 (2.9%)	244 (1.9%)	0.065
...Q3 2015; n (%)	110 (1.6%)	96 (2.4%)	-0.0572	436 (4.8%)	191 (2.2%)	0.1418	546 (3.5%)	287 (2.3%)	0.072
...Q4 2015; n (%)	130 (1.9%)	124 (3.0%)	-0.0712	483 (5.4%)	234 (2.7%)	0.1373	613 (3.9%)	358 (2.8%)	0.061
...Q1 2016; n (%)	117 (1.7%)	129 (3.2%)	-0.0971	462 (5.1%)	247 (2.9%)	0.1124	579 (3.7%)	376 (3.0%)	0.039
...Q2 2016; n (%)	170 (2.5%)	118 (2.9%)	-0.0247	497 (5.5%)	231 (2.7%)	0.1416	667 (4.2%)	349 (2.8%)	0.076
...Q3 2016; n (%)	199 (3.0%)	130 (3.2%)	-0.0115	534 (5.9%)	232 (2.7%)	0.1582	733 (4.7%)	362 (2.9%)	0.094
...Q4 2016; n (%)	213 (3.2%)	133 (3.3%)	-0.0056	576 (6.4%)	225 (2.6%)	0.1841	789 (5.0%)	358 (2.8%)	0.114
...Q1 2017; n (%)	276 (4.1%)	113 (2.8%)	0.0713	524 (5.8%)	158 (1.8%)	0.2104	800 (5.1%)	271 (2.1%)	0.162
...Q2 2017; n (%)	411 (6.1%)	122 (3.0%)	0.1492	578 (6.4%)	162 (1.9%)	0.2271	989 (6.3%)	284 (2.2%)	0.204
...Q3 2017; n (%)	490 (7.3%)	125 (3.1%)	0.1900	693 (7.7%)	192 (2.2%)	0.2556	1,183 (7.5%)	317 (2.5%)	0.231
...Q4 2017; n (%)	578 (8.6%)	122 (3.0%)	0.2413	756 (8.4%)	154 (1.8%)	0.3034	1,334 (8.5%)	276 (2.2%)	0.283
...Q1 2018; n (%)	535 (8.0%)	96 (2.4%)	0.2543	11 (0.1%)	1 (0.0%)	0.0447	546 (3.5%)	097 (0.8%)	0.187
Demographics									
Age									
...mean (sd)	63.60 (11.12)	59.90 (10.02)	0.3496	58.41 (9.83)	56.88 (8.90)	0.1632	60.63 (10.40)	57.86 (9.28)	0.281
...median [IQR]	64.00 [56.00, 71.00]	60.00 [53.00, 67.00]	0.3779	59.00 [52.00, 63.00]	58.00 [51.00, 63.00]	0.1066	61.13 (10.40)	58.65 (9.28)	0.252
Gender without zero category- United									
...Males; n (%)	4,796 (71.3%)	3,152 (77.2%)	-0.1352	6,790 (75.2%)	6,835 (79.9%)	-0.0054	11,586 (73.6%)	9,987 (79.0%)	-0.127
...Females; n (%)	1,925 (28.6%)	933 (22.8%)	0.1330	2,235 (24.8%)	1,722 (20.1%)	-0.0054	4,160 (26.4%)	2,655 (21.0%)	0.127
...Missing; n (%)	1 (0.0%)	0 (0.0%)	#DIV/0!						
Region without zero category- United v3 (lumping missing)									
...Northeast; n (%)	732 (10.9%)	300 (7.3%)	0.1254	1,683 (18.6%)	1,345 (15.7%)	0.0770	2,415 (15.3%)	1,645 (13.0%)	0.066
...South; n (%)	2,955 (44.0%)	2,035 (49.8%)	-0.1164	3,993 (44.2%)	3,705 (43.3%)	0.0181	6,948 (44.1%)	5,740 (45.4%)	-0.026
...Midwest; n (%)	1,721 (25.6%)	929 (22.7%)	0.0678	2,321 (25.7%)	2,089 (24.4%)	0.0300	4,042 (25.7%)	3,018 (23.9%)	0.042
...West; n (%)	1,314 (19.5%)	821 (20.1%)	-0.0151	970 (10.7%)	1,285 (15.0%)	-0.1288	2,284 (14.5%)	2,106 (16.7%)	-0.061
Metropolitan Statistical Area - Urban (any MSA) vs Rural (non-MSA)									
...Urban; n (%)				6,388 (70.8%)	6,604 (77.2%)	-0.1463	6,388 (70.8%)	6,604 (77.2%)	-0.1463
...Rural; n (%)				710 (7.9%)	207 (2.4%)	0.2508	710 (7.9%)	207 (2.4%)	0.2508
...Unknown/Missing; n (%)				1,927 (21.4%)	1,746 (20.4%)	0.0246	1,927 (21.4%)	1,746 (20.4%)	0.0246
Commercial vs Medicare Advantage- Business Type Code									
...COM = COMMERCIAL; n (%)	3,343 (49.7%)	2,633 (64.5%)	-0.3024				3,343 (49.7%)	2,633 (64.5%)	-0.3024
...MCR = MEDICARE; n (%)	3,379 (50.3%)	1,452 (35.5%)	0.3024				3,379 (50.3%)	1,452 (35.5%)	0.3024

# Appendix B

...MCD = MEDICAID; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!			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!			0 (0.0%)	0 (0.0%)	#DIV/0!
...UNK = UNKNOWN (added in 2015); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!			0 (0.0%)	0 (0.0%)	#DIV/0!
Commercial vs Medicare Advantage- Data Type								
...1 - Fee For Service; n (%)			6,570 (72.8%)	6,428 (75.1%)	-0.0524	6,570 (72.8%)	6,428 (75.1%)	-0.0524
...2 - Encounter; n (%)			732 (8.1%)	757 (8.8%)	-0.0252	732 (8.1%)	757 (8.8%)	-0.0252
...3 - Medicare; n (%)			1,510 (16.7%)	1,196 (14.0%)	0.0750	1,510 (16.7%)	1,196 (14.0%)	0.0750
...4 - Medicare Encounter; n (%)			213 (2.4%)	176 (2.1%)	0.0202	213 (2.4%)	176 (2.1%)	0.0202
Lifestyle factors								
Obesity; n (%)	1,853 (27.6%)	1,014 (24.8%)	0.0637	1,853 (20.5%)	1,538 (18.0%)	0.0634	3,706 (23.5%)	2,552 (20.2%)
Overweight; n (%)	480 (7.1%)	194 (4.7%)	0.1020	330 (3.7%)	161 (1.9%)	0.1093	810 (5.1%)	355 (2.8%)
Smoking; n (%)	3,323 (49.4%)	1,925 (47.1%)	0.0460	2,999 (33.2%)	2,822 (33.0%)	0.0043	6,322 (40.1%)	4,747 (37.5%)
Alcohol abuse or dependence+Drug abuse or dependence (	377 (5.6%)	168 (4.1%)	0.0699	293 (3.2%)	266 (3.1%)	0.0057	670 (4.3%)	434 (3.4%)
Diabetes-related conditions								
Diabetic retinopathy; n (%)	138 (2.1%)	60 (1.5%)	0.0451	115 (1.3%)	99 (1.2%)	0.0090	253 (1.6%)	159 (1.3%)
Occurrence of Diabetic Neuropathy v2 Copy; n (%)	463 (6.9%)	185 (4.5%)	0.1037	318 (3.5%)	249 (2.9%)	0.0341	781 (5.0%)	434 (3.4%)
Occurrence of diabetic nephropathy V3 with ICD10 Copy; n	386 (5.7%)	132 (3.2%)	0.1215	219 (2.4%)	132 (1.5%)	0.0651	605 (3.8%)	264 (2.1%)
Hypoglycemia v2; n (%)	21 (0.3%)	36 (0.9%)	-0.0778	71 (0.8%)	79 (0.9%)	-0.0109	92 (0.6%)	115 (0.9%)
Hyperglycemia; n (%)	527 (7.8%)	318 (7.8%)	0.0000	563 (6.2%)	438 (5.1%)	0.0477	1,090 (6.9%)	756 (6.0%)
Disorders of fluid electrolyte and acid-base balance; n (%)	968 (14.4%)	461 (11.3%)	0.0927	815 (9.0%)	691 (8.1%)	0.0322	1,783 (11.3%)	1,152 (9.1%)
Hyperosmolar hyperglycemic nonketotic syndrome (HONK)	21 (0.3%)	12 (0.3%)	0.0000	8 (0.1%)	10 (0.1%)	0.0000	029 (0.2%)	022 (0.2%)
Diabetic Foot; n (%)	57 (0.8%)	27 (0.7%)	0.0116	45 (0.5%)	54 (0.6%)	-0.0135	102 (0.6%)	081 (0.6%)
Skin infections v2; n (%)	212 (3.2%)	134 (3.3%)	-0.0056	265 (2.9%)	261 (3.1%)	-0.0117	477 (3.0%)	395 (3.1%)
Erectile dysfunction; n (%)	198 (2.9%)	141 (3.5%)	-0.0341	244 (2.7%)	198 (2.3%)	0.0256	442 (2.8%)	339 (2.7%)
Diabetes with unspecified complication; n (%)	231 (3.4%)	84 (2.1%)	0.0796	223 (2.5%)	184 (2.2%)	0.0198	454 (2.9%)	268 (2.1%)
Diabetes mellitus without mention of complications; n (%)	2,290 (34.1%)	1,403 (34.3%)	-0.0042	2,797 (31.0%)	2,784 (32.5%)	-0.0322	5,087 (32.3%)	4,187 (33.1%)
Diabetes with peripheral circulatory disorders+Gangrene+O	232 (3.5%)	66 (1.6%)	0.1207	125 (1.4%)	97 (1.1%)	0.0270	357 (2.3%)	163 (1.3%)
Diabetes with other ophthalmic manifestations+Retinal de	43 (0.6%)	14 (0.3%)	0.0448	80 (0.9%)	90 (1.1%)	-0.0201	123 (0.8%)	104 (0.8%)
Cardiovascular-related conditions								
Hypertension: 1 inpatient or 2 outpatient claims within 365	5,346 (79.5%)	3,106 (76.0%)	0.0842	6,673 (73.9%)	5,846 (68.3%)	0.1238	12,019 (76.3%)	8,952 (70.8%)
Malignant hypertension; n (%)	171 (2.5%)	190 (4.7%)	-0.1183	2,791 (30.9%)	4,225 (49.4%)	-0.3843	2,962 (18.8%)	4,415 (34.9%)
Hyperlipidemia v2; n (%)	5,379 (80.0%)	3,348 (82.0%)	-0.0510	6,450 (71.5%)	5,864 (68.5%)	0.0655	11,829 (75.1%)	9,212 (72.9%)
Acute MI; n (%)	6,184 (92.0%)	3,877 (94.9%)	-0.1174	8,521 (94.4%)	8,293 (96.9%)	-0.1228	14,705 (93.4%)	12,170 (96.3%)
ACS/unstable angina; n (%)	2,766 (41.1%)	1,553 (38.0%)	0.0634	3,475 (38.5%)	3,016 (35.2%)	0.0684	6,241 (39.6%)	4,569 (36.1%)
Old MI; n (%)	952 (14.2%)	510 (12.5%)	0.0500	774 (8.6%)	705 (8.2%)	0.0144	1,726 (11.0%)	1,215 (9.6%)
Stable angina; n (%)	1,583 (23.5%)	665 (16.3%)	0.1811	1,561 (17.3%)	1,077 (12.6%)	0.1321	3,144 (20.0%)	1,742 (13.8%)
Coronary atherosclerosis and other forms of chronic isch	6,461 (96.1%)	3,951 (96.7%)	-0.0322	8,365 (92.7%)	7,850 (91.7%)	0.0373	14,826 (94.2%)	11,801 (93.3%)
Ischemic stroke (w and w/o mention of cerebral infarction	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	000 (0.0%)	000 (0.0%)
TIA; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	000 (0.0%)	000 (0.0%)
Late effects of cerebrovascular disease; n (%)	26 (0.4%)	6 (0.1%)	0.0601	9 (0.1%)	9 (0.1%)	0.0000	035 (0.2%)	015 (0.1%)
Heart failure (CHF); n (%)	1,300 (19.3%)	634 (15.5%)	0.1004	1,206 (13.4%)	1,105 (12.9%)	0.0148	2,506 (15.9%)	1,739 (13.8%)
Peripheral Vascular Disease (PVD) or PVD Surgery v2; n (%)	369 (5.5%)	164 (4.0%)	0.0706	250 (2.8%)	232 (2.7%)	0.0061	619 (3.9%)	396 (3.1%)
Atrial fibrillation; n (%)	541 (8.0%)	252 (6.2%)	0.0701	454 (5.0%)	355 (4.1%)	0.0432	995 (6.3%)	607 (4.8%)
Other cardiac dysrhythmia; n (%)	2,369 (35.2%)	1,204 (29.5%)	0.1221	2,553 (28.3%)	2,010 (23.5%)	0.1097	4,922 (31.3%)	3,214 (25.4%)
Hemorrhagic stroke+Other cerebrovascular disease+Cereb	39 (0.6%)	13 (0.3%)	0.0448	28 (0.3%)	14 (0.2%)	0.0200	067 (0.4%)	027 (0.2%)
Other atherosclerosis+Cardiac conduction disorders+Other	2,572 (38.3%)	1,384 (33.9%)	0.0917	2,672 (29.6%)	2,323 (27.1%)	0.0555	5,244 (33.3%)	3,707 (29.3%)
Previous cardiac procedure (CABG or PTCA or Stent) + Hist	6,575 (97.8%)	4,012 (98.2%)	-0.0286	8,349 (92.5%)	7,936 (92.7%)	-0.0076	14,924 (94.8%)	11,948 (94.5%)
Kidney-related conditions								
Occurrence of acute renal disease v2; n (%)	533 (7.9%)	227 (5.6%)	0.0918	425 (4.7%)	294 (3.4%)	0.0660	958 (6.1%)	521 (4.1%)
Occurrence of hypertensive nephropathy; n (%)	543 (8.1%)	212 (5.2%)	0.1166	316 (3.5%)	229 (2.7%)	0.0462	859 (5.5%)	441 (3.5%)
Occurrence of miscellaneous renal insufficiency v2; n (%)	338 (5.0%)	187 (4.6%)	0.0187	272 (3.0%)	226 (2.6%)	0.0242	610 (3.9%)	413 (3.3%)

# Appendix B

Occurrence of chronic renal insufficiency w/o CKD (for PS)	306 (4.6%)	164 (4.0%)	0.0296	201 (2.2%)	164 (1.9%)	0.0212	507 (3.2%)	328 (2.6%)	0.036
Chronic kidney disease Stage 1-2 (for PS); n (%)	176 (2.6%)	62 (1.5%)	0.0777	78 (0.9%)	65 (0.8%)	0.0109	254 (1.6%)	127 (1.0%)	0.053
CKD stage 3-6 + dialysis (for PS); n (%)	443 (6.6%)	146 (3.6%)	0.1367	256 (2.8%)	168 (2.0%)	0.0523	699 (4.4%)	314 (2.5%)	0.104
Bladder stones+Kidney stones (for PS); n (%)	133 (2.0%)	76 (1.9%)	0.0072	155 (1.7%)	155 (1.8%)	-0.0076	288 (1.8%)	231 (1.8%)	0.000
Urinary tract infections (UTIs); n (%)	322 (4.8%)	151 (3.7%)	0.0545	256 (2.8%)	265 (3.1%)	-0.0177	578 (3.7%)	416 (3.3%)	0.022
Edema; n (%)	230 (3.4%)	110 (2.7%)	0.0407	202 (2.2%)	159 (1.9%)	0.0212	432 (2.7%)	269 (2.1%)	0.039
Other comorbidities									
COPD; n (%)	860 (12.8%)	431 (10.6%)	0.0685	643 (7.1%)	560 (6.5%)	0.0238	1,503 (9.5%)	991 (7.8%)	0.061
Asthma; n (%)	438 (6.5%)	253 (6.2%)	0.0123	445 (4.9%)	371 (4.3%)	0.0286	883 (5.6%)	624 (4.9%)	0.031
Obstructive sleep apnea; n (%)	711 (10.6%)	388 (9.5%)	0.0366	818 (9.1%)	674 (7.9%)	0.0430	1,529 (9.7%)	1,062 (8.4%)	0.045
Pneumonia; n (%)	281 (4.2%)	136 (3.3%)	0.0474	244 (2.7%)	212 (2.5%)	0.0126	525 (3.3%)	348 (2.8%)	0.029
Hyperthyroidism + Hypothyroidism + Other disorders of thy	921 (13.7%)	441 (10.8%)	0.0885	882 (9.8%)	723 (8.4%)	0.0487	1,803 (11.4%)	1,164 (9.2%)	0.072
Liver disease; n (%)	4 (0.1%)	5 (0.1%)	0.0000	3 (0.0%)	1 (0.0%)	#DIV/0!	007 (0.0%)	006 (0.0%)	#DIV/0!
Osteoarthritis; n (%)	1,078 (16.0%)	516 (12.6%)	0.0972	916 (10.1%)	716 (8.4%)	0.0587	1,994 (12.7%)	1,232 (9.7%)	0.095
Other arthritis, arthropathies and musculoskeletal pain; n	2,166 (32.2%)	1,211 (29.6%)	0.0563	2,538 (28.1%)	2,206 (25.8%)	0.0519	4,704 (29.9%)	3,417 (27.0%)	0.064
Dorsopathies; n (%)	1,508 (22.4%)	880 (21.5%)	0.0217	1,749 (19.4%)	1,486 (17.4%)	0.0516	3,257 (20.7%)	2,366 (18.7%)	0.050
Fractures; n (%)	136 (2.0%)	68 (1.7%)	0.0223	146 (1.6%)	117 (1.4%)	0.0165	282 (1.8%)	185 (1.5%)	0.024
Falls v2; n (%)	127 (1.9%)	45 (1.1%)	0.0659	56 (0.6%)	35 (0.4%)	0.0284	183 (1.2%)	080 (0.6%)	0.064
Osteoporosis; n (%)	197 (2.9%)	80 (2.0%)	0.0582	120 (1.3%)	72 (0.8%)	0.0491	317 (2.0%)	152 (1.2%)	0.064
Depression; n (%)	635 (9.4%)	382 (9.4%)	0.0000	575 (6.4%)	566 (6.6%)	-0.0081	1,210 (7.7%)	948 (7.5%)	0.008
Anxiety; n (%)	875 (13.0%)	465 (11.4%)	0.0489	804 (8.9%)	608 (7.1%)	0.0664	1,679 (10.7%)	1,073 (8.5%)	0.075
Sleep_Disorder; n (%)	255 (3.8%)	315 (7.7%)	-0.1681	477 (5.3%)	702 (8.2%)	-0.1158	732 (4.6%)	1,017 (8.0%)	-0.140
Dementia; n (%)	118 (1.8%)	34 (0.8%)	0.0884	46 (0.5%)	31 (0.4%)	0.0149	164 (1.0%)	065 (0.5%)	0.058
Delirium; n (%)	60 (0.9%)	27 (0.7%)	0.0225	44 (0.5%)	33 (0.4%)	0.0149	104 (0.7%)	060 (0.5%)	0.026
Psychosis; n (%)	37 (0.6%)	19 (0.5%)	0.0135	25 (0.3%)	17 (0.2%)	0.0200	062 (0.4%)	036 (0.3%)	0.017
Use of medications									
Use of ACE inhibitors; n (%)	3,343 (49.7%)	2,234 (54.7%)	-0.1002	4,901 (54.3%)	4,985 (58.3%)	-0.0807	8,244 (52.4%)	7,219 (57.1%)	-0.095
Use of ARBs; n (%)	1,464 (21.8%)	735 (18.0%)	0.0953	1,721 (19.1%)	1,420 (16.6%)	0.0653	3,185 (20.2%)	2,155 (17.0%)	0.082
Use of Loop Diuretics - United; n (%)	620 (9.2%)	250 (6.1%)	0.1168	536 (5.9%)	483 (5.6%)	0.0129	1,156 (7.3%)	733 (5.8%)	0.061
Use of other diuretics- United; n (%)	273 (4.1%)	151 (3.7%)	0.0207	348 (3.9%)	318 (3.7%)	0.0105	621 (3.9%)	469 (3.7%)	0.010
Use of nitrates-United; n (%)	2,800 (41.7%)	1,806 (44.2%)	-0.0505	3,934 (43.6%)	3,837 (44.8%)	-0.0242	6,734 (42.8%)	5,643 (44.6%)	-0.036
Use of other hypertension drugs; n (%)	295 (4.4%)	145 (3.5%)	0.0462	292 (3.2%)	293 (3.4%)	-0.0112	587 (3.7%)	438 (3.5%)	0.011
Use of digoxin- United; n (%)	52 (0.8%)	34 (0.8%)	0.0000	40 (0.4%)	49 (0.6%)	-0.0284	092 (0.6%)	083 (0.7%)	-0.012
Use of Anti-arrhythmics; n (%)	144 (2.1%)	71 (1.7%)	0.0293	122 (1.4%)	159 (1.9%)	-0.0393	266 (1.7%)	230 (1.8%)	-0.008
Use of COPD/asthma meds- United; n (%)	844 (12.6%)	485 (11.9%)	0.0214	971 (10.8%)	928 (10.8%)	0.0000	1,815 (11.5%)	1,413 (11.2%)	0.009
Use of statins; n (%)	6,084 (90.5%)	3,736 (91.5%)	-0.0349	8,217 (91.0%)	7,798 (91.1%)	-0.0035	14,301 (90.8%)	11,534 (91.2%)	-0.014
Use of other lipid-lowering drugs; n (%)	442 (6.6%)	340 (8.3%)	-0.0648	695 (7.7%)	801 (9.4%)	-0.0608	1,137 (7.2%)	1,141 (9.0%)	-0.066
Use of antiplatelet agents; n (%)	532 (7.9%)	340 (8.3%)	-0.0147	616 (6.8%)	695 (8.1%)	-0.0495	1,148 (7.3%)	1,035 (8.2%)	-0.034
Use of oral anticoagulants (Dabigatran, Rivaroxaban, Apixa	230 (3.4%)	81 (2.0%)	0.0865	230 (2.5%)	210 (2.5%)	0.0000	460 (2.9%)	291 (2.3%)	0.038
Use of heparin and other low-molecular weight heparins;	27 (0.4%)	11 (0.3%)	0.0169	0 (0.0%)	0 (0.0%)	#DIV/0!	027 (0.2%)	011 (0.1%)	0.026
Use of NSAIDs; n (%)	996 (14.8%)	539 (13.2%)	0.0461	1,386 (15.4%)	1,189 (13.9%)	0.0424	2,382 (15.1%)	1,728 (13.7%)	0.040
Use of oral corticosteroids; n (%)	1,091 (16.2%)	556 (13.6%)	0.0731	1,337 (14.8%)	1,173 (13.7%)	0.0315	2,428 (15.4%)	1,729 (13.7%)	0.048
Use of bisphosphonate (United); n (%)	75 (1.1%)	33 (0.8%)	0.0309	46 (0.5%)	42 (0.5%)	0.0000	121 (0.8%)	075 (0.6%)	0.024
Use of opioids- United; n (%)	1,316 (19.6%)	924 (22.6%)	-0.0736	1,852 (20.5%)	1,859 (21.7%)	-0.0294	3,168 (20.1%)	2,783 (22.0%)	-0.047
Use of antidepressants; n (%)	1,106 (16.5%)	650 (15.9%)	0.0163	1,388 (15.4%)	1,229 (14.4%)	0.0281	2,494 (15.8%)	1,879 (14.9%)	0.025
Use of antipsychotics; n (%)	93 (1.4%)	36 (0.9%)	0.0469	86 (1.0%)	65 (0.8%)	0.0212	179 (1.1%)	101 (0.8%)	0.031
Use of anticonvulsants; n (%)	635 (9.4%)	293 (7.2%)	0.0798	589 (6.5%)	494 (5.8%)	0.0291	1,224 (7.8%)	787 (6.2%)	0.063
Use of Benzos- United; n (%)	608 (9.0%)	383 (9.4%)	-0.0138	881 (9.8%)	790 (9.2%)	0.0205	1,489 (9.5%)	1,173 (9.3%)	0.007
Use of anxiolytics/hypnotics- United; n (%)	285 (4.2%)	226 (5.5%)	-0.0605	443 (4.9%)	467 (5.5%)	-0.0270	728 (4.6%)	693 (5.5%)	-0.041
Use of dementia meds- United; n (%)	44 (0.7%)	19 (0.5%)	0.0259	27 (0.3%)	8 (0.1%)	0.0448	071 (0.5%)	027 (0.2%)	0.051

# Appendix B

Use of antiparkinsonian meds- United; n (%)	118 (1.8%)	46 (1.1%)	0.0586	101 (1.1%)	71 (0.8%)	0.0309	219 (1.4%)	117 (0.9%)	0.047
Use of glucose test strips; n (%)	86 (1.3%)	48 (1.2%)	0.0090	116 (1.3%)	113 (1.3%)	0.0000	202 (1.3%)	161 (1.3%)	0.000
Use of thiazide- United; n (%)	537 (8.0%)	288 (7.1%)	0.0341	606 (6.7%)	544 (6.4%)	0.0121	1,143 (7.3%)	832 (6.6%)	0.028
Use of beta blockers; n (%)	5,753 (85.6%)	3,550 (86.9%)	-0.0378	7,873 (87.2%)	7,618 (89.0%)	-0.0556	13,626 (86.5%)	11,168 (88.3%)	-0.054
Use of calcium channel blockers; n (%)	1,357 (20.2%)	706 (17.3%)	0.0744	1,642 (18.2%)	1,370 (16.0%)	0.0585	2,999 (19.0%)	2,076 (16.4%)	0.068
Use of aspirin; n (%)	1,042 (15.5%)	369 (9.0%)	0.1992	1,807 (20.0%)	925 (10.8%)	0.2570	2,849 (18.1%)	1,294 (10.2%)	0.228
Use of Low Intensity Statins; n (%)	1,500 (22.3%)	1,250 (30.6%)	-0.1890	2,143 (23.7%)	2,734 (32.0%)	-0.1860	3,643 (23.1%)	3,984 (31.5%)	-0.189
Use of High Intensity Statins; n (%)	5,326 (79.2%)	2,878 (70.5%)	0.2015	7,021 (77.8%)	5,772 (67.5%)	0.2326	12,347 (78.4%)	8,650 (68.4%)	0.228
Use of Sympathomimetic agents; n (%)	66 (1.0%)	45 (1.1%)	-0.0098	121 (1.3%)	85 (1.0%)	0.0281	187 (1.2%)	130 (1.0%)	0.019
Use of CNS stimulants; n (%)	27 (0.4%)	13 (0.3%)	0.0169	44 (0.5%)	54 (0.6%)	-0.0135	071 (0.5%)	067 (0.5%)	0.000
All antidiabetic medications except Insulin; n (%)	1,603 (23.8%)	915 (22.4%)	0.0332	2,040 (22.6%)	1,948 (22.8%)	-0.0048	3,643 (23.1%)	2,863 (22.6%)	0.012
DM Medications - Insulin Copy; n (%)	616 (9.2%)	352 (8.6%)	0.0211	817 (9.1%)	765 (8.9%)	0.0070	1,433 (9.1%)	1,117 (8.8%)	0.011
Use of estrogens, progestins, androgens; n (%)	195 (2.9%)	153 (3.7%)	-0.0448	381 (4.2%)	381 (4.5%)	-0.0147	576 (3.7%)	534 (4.2%)	-0.026
Use of Angiogenesis inhibitors; n (%)	4 (0.1%)	0 (0.0%)	0.0447	1 (0.0%)	0 (0.0%)	#DIV/0!	005 (0.0%)	000 (0.0%)	#DIV/0!
Use of Oral Immunosuppressants; n (%)	7 (0.1%)	4 (0.1%)	0.0000	18 (0.2%)	15 (0.2%)	0.0000	025 (0.2%)	019 (0.2%)	0.000
Use of fondaparinux or Bivalirudin; n (%)	0 (0.0%)	2 (0.0%)	#DIV/0!	0 (0.0%)	2 (0.0%)	#DIV/0!	000 (0.0%)	004 (0.0%)	#DIV/0!
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!	000 (0.0%)	000 (0.0%)	#DIV/0!
Use of CYP inhibitors; n (%)	1,063 (15.8%)	645 (15.8%)	0.0000	1,373 (15.2%)	1,295 (15.1%)	0.0028	2,436 (15.5%)	1,940 (15.3%)	0.006
Use of CYP inducers; n (%)	19 (0.3%)	14 (0.3%)	0.0000	27 (0.3%)	33 (0.4%)	-0.0169	046 (0.3%)	047 (0.4%)	-0.017
Burden of disease/Healthcare utilization									
Combined comorbidity score, 180 days Copy									
...mean (sd)	1.51 (1.96)	0.93 (1.74)	0.3130	0.74 (1.54)	0.50 (1.43)	0.1615	1.07 (1.73)	0.64 (1.54)	0.263
...median [IQR]	1.00 [0.00, 3.00]	1.00 [0.00, 2.00]	0.0000	0.00 [0.00, 2.00]	0.00 [-1.00, 1.00]	0.0000	0.43 (1.73)	0.32 (1.54)	0.067
Frailty Score (mean): Empirical Version 365 days, v2									
...mean (sd)	0.18 (0.04)	0.17 (0.04)	0.2500	0.17 (0.03)	0.17 (0.03)	0.0000	0.17 (0.03)	0.17 (0.03)	0.000
...median [IQR]	0.17 [0.15, 0.20]	0.17 [0.15, 0.19]	0.0000	0.16 [0.15, 0.19]	0.16 [0.14, 0.18]	0.0000	0.16 (0.03)	0.16 (0.03)	0.000
Total N distinct ICD9/ICD10 diagnoses at the 3rd digit level									
...mean (sd)	11.01 (9.01)	6.41 (8.19)	0.5343	7.66 (8.06)	4.42 (7.09)	0.4268	9.09 (8.48)	5.06 (7.46)	0.505
...median [IQR]	10.00 [4.00, 17.00]	3.00 [0.00, 11.00]	0.8130	6.00 [0.00, 14.00]	0.00 [0.00, 9.00]	0.7905	7.71 (8.48)	0.97 (7.46)	0.844
HAS-BLED Score (ICD-9 and ICD-10), 180 days									
...mean (sd)	3.50 (0.58)	3.35 (0.56)	0.2631	3.18 (0.48)	3.14 (0.44)	0.0869	3.32 (0.53)	3.21 (0.48)	0.218
...median [IQR]	3.00 [3.00, 4.00]	3.00 [3.00, 4.00]	0.0000	3.00 [3.00, 3.00]	3.00 [3.00, 3.00]	0.0000	3.00 (0.53)	3.00 (0.48)	0.000
number of different/distinct medication prescriptions									
...mean (sd)	8.94 (4.49)	8.53 (4.32)	0.0931	8.71 (4.31)	8.50 (4.18)	0.0495	8.81 (4.39)	8.51 (4.23)	0.070
...median [IQR]	8.00 [6.00, 11.00]	8.00 [5.00, 11.00]	0.0000	8.00 [6.00, 11.00]	8.00 [5.00, 11.00]	0.0000	8.00 (4.39)	8.00 (4.23)	0.000
Any hospitalization within prior 30 days; n (%)	6,722 (100.0%)	4,085 (100.0%)	#DIV/0!	9,025 (100.0%)	8,557 (100.0%)	#DIV/0!	15,747 (100.0%)	12,642 (100.0%)	#DIV/0!
Number of Hospitalizations									
...mean (sd)	1.08 (0.30)	1.08 (0.32)	0.0000	1.06 (0.26)	1.08 (0.29)	-0.0726	1.07 (0.28)	1.08 (0.30)	-0.034
...median [IQR]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	0.0000	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	0.0000	1.00 (0.28)	1.00 (0.30)	0.000
Number of hospital days									
...mean (sd)	3.60 (1.94)	3.61 (1.94)	-0.0052	3.42 (1.84)	3.60 (1.80)	-0.0989	3.50 (1.88)	3.60 (1.85)	-0.054
...median [IQR]	3.00 [3.00, 4.00]	3.00 [3.00, 4.00]	0.0000	3.00 [3.00, 4.00]	3.00 [3.00, 4.00]	0.0000	3.00 (1.88)	3.00 (1.85)	0.000
Number of Emergency Department (ED) visits v3									
...mean (sd)	1.07 (1.30)	1.06 (1.32)	0.0076	3.52 (5.63)	3.31 (6.05)	0.0359	2.47 (4.35)	2.58 (5.03)	-0.023
...median [IQR]	1.00 [0.00, 1.00]	1.00 [0.00, 1.00]	0.0000	2.00 [0.00, 4.00]	2.00 [0.00, 4.00]	0.0000	1.57 (4.35)	1.68 (5.03)	-0.023
Number of Office visits									
...mean (sd)	3.12 (3.16)	2.92 (3.33)	0.0616	2.77 (2.94)	2.67 (2.93)	0.0341	2.92 (3.04)	2.75 (3.06)	0.056
...median [IQR]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	0.0000	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	0.0000	2.00 (3.04)	2.00 (3.06)	0.000
Number of internal medicine/family medicine visits									
...mean (sd)	7.11 (10.84)	5.72 (9.60)	0.1358	3.93 (5.98)	3.75 (6.60)	0.0286	5.29 (8.41)	4.39 (7.70)	0.112
...median [IQR]	4.00 [1.00, 9.00]	3.00 [0.00, 7.00]	0.0977	2.00 [0.00, 5.00]	2.00 [0.00, 5.00]	0.0000	2.85 (8.41)	2.32 (7.70)	0.066

# Appendix B

Number of Cardiologist visits								
...mean (sd)	8.41 (5.38)	8.07 (4.88)	0.0662	1.06 (2.17)	0.97 (2.18)	0.0414	4.20 (3.88)	3.26 (3.30)
...median [IQR]	8.00 [5.00, 11.00]	7.00 [5.00, 10.00]	0.1947	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.0000	3.41 (3.88)	2.26 (3.30)
Number electrocardiograms received v2								
...mean (sd)	3.28 (2.45)	3.32 (2.52)	-0.0161	0.98 (1.33)	1.05 (1.40)	-0.0513	1.96 (1.89)	1.78 (1.84)
...median [IQR]	3.00 [2.00, 4.00]	3.00 [2.00, 5.00]	0.0000	1.00 [0.00, 1.00]	1.00 [0.00, 2.00]	0.0000	1.85 (1.89)	1.65 (1.84)
Number of BNP tests								
...mean (sd)	0.10 (0.37)	0.10 (0.37)	0.0000	0.12 (0.38)	0.13 (0.39)	-0.0260	0.11 (0.38)	0.12 (0.38)
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.38)	0.00 (0.38)
Number of Cardiac biomarkers tests (tropnin, CK-MBs, Myo)								
...mean (sd)	0.68 (1.66)	0.76 (1.77)	-0.0466	0.69 (1.61)	0.83 (1.79)	-0.0822	0.69 (1.63)	0.81 (1.78)
...median [IQR]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.0000	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.0000	0.00 (1.63)	0.00 (1.78)
Number of Ambulatory Blood pressure monitoring tests								
...mean (sd)	0.00 (0.02)	0.00 (0.02)	0.0000	0.00 (0.04)	0.00 (0.03)	0.0000	0.00 (0.03)	0.00 (0.03)
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.03)	0.00 (0.03)
N of days on antihypertensive medications during baseline								
...mean (sd)	81.19 (79.68)	71.98 (77.47)	0.1172	74.18 (78.62)	68.85 (77.22)	0.0684	77.17 (79.07)	69.86 (77.30)
...median [IQR]	62.50 [1.00, 172.00]	21.00 [1.00, 164.00]	0.5281	29.00 [1.00, 167.00]	8.00 [1.00, 162.00]	0.2695	43.30 (79.07)	12.20 (77.30)
N of days in database anytime prior								
...mean (sd)	1,685.49 (1,370.91)	1,619.30 (1,246.27)	0.0505	2,118.05 (1,473.24)	1,786.28 (1,260.85)	0.2420	1933.40 (1430.45)	1732.32 (1256.16)
...median [IQR]	1,246.00 [606.00, 2,412.420.00 [605.00, 2,412.420.00]	1,242.00 [605.00, 2,412.420.00]	0.0031	1,804.00 [830.00, 3,21,443.00 [726.00, 2,71,443.00]	1,443.00 [726.00, 2,71,443.00]	0.2633	1565.80 (1430.45)	1378.05 (1256.16)
Mean Copay for per prescription cost (charges in U.S. \$) (1)								
...mean (sd)	21.80 (31.56)	25.04 (28.00)	-0.1086	15.43 (20.81)	18.99 (25.39)	-0.1534	18.15 (25.95)	20.94 (26.26)
...median [IQR]	13.33 [5.00, 27.78]	17.11 [7.40, 33.33]	-0.1267	10.00 [1.98, 21.01]	12.44 [4.50, 25.29]	-0.1051	11.42 (25.95)	13.95 (26.26)
...Missing; n (%)	879 (13.1%)	638 (15.6%)	-0.0714	1,391 (15.4%)	1,411 (16.5%)	-0.0300	2,270 (14.4%)	2,049 (16.2%)
Duration of index hospitalization (i.e. anchor hospitalization)								
...mean (sd)	1.00 (0.00)	1.00 (0.00)	#DIV/0!	1.00 (0.00)	1.00 (0.00)	#DIV/0!	1.00 (0.00)	1.00 (0.00)
...median [IQR]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	#DIV/0!	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	#DIV/0!	1.00 (0.00)	#DIV/0!
N of Generic name drugs								
...mean (sd)	13.03 (11.49)	11.70 (10.59)	0.1204	11.38 (9.78)	10.30 (8.90)	0.1155	12.08 (10.54)	10.75 (9.48)
...median [IQR]	10.00 [5.00, 17.00]	8.00 [4.00, 16.00]	0.1810	9.00 [5.00, 15.00]	8.00 [4.00, 14.00]	0.1069	9.43 (10.54)	8.00 (9.48)
N of Brand name drugs								
...mean (sd)	3.08 (3.59)	3.51 (4.09)	-0.1117	3.42 (3.62)	3.99 (4.24)	-0.1446	3.27 (3.61)	3.83 (4.19)
...median [IQR]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	0.0000	2.00 [1.00, 4.00]	2.00 [1.00, 5.00]	0.0000	2.00 (3.61)	2.00 (4.19)
Number of D-dimer tests								
...mean (sd)	0.06 (0.25)	0.06 (0.25)	0.0000	0.07 (0.28)	0.07 (0.29)	0.0000	0.07 (0.27)	0.07 (0.28)
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.27)	0.00 (0.28)
Number of CRP, high-sensitivity CRP tests								
...mean (sd)	0.05 (0.30)	0.04 (0.33)	0.0317	0.04 (0.27)	0.04 (0.26)	0.0000	0.04 (0.28)	0.04 (0.28)
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.28)	0.00 (0.28)
Number of PT or aPTT tests								
...mean (sd)	0.39 (1.09)	0.36 (0.99)	0.0288	0.37 (0.92)	0.44 (1.04)	-0.0713	0.38 (1.00)	0.41 (1.02)
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.0000	0.00 (1.00)	0.00 (1.02)
Number of Bleeding time tests								
...mean (sd)	0.00 (0.02)	0.00 (0.00)	0.0000	0.00 (0.01)	0.00 (0.00)	0.0000	0.00 (0.02)	0.00 (0.00)
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.02)	0.00 (0.00)
Occurrence of creatinine tests ordered (for PS); n (%)								
	227 (3.4%)	107 (2.6%)	0.0469	228 (2.5%)	265 (3.1%)	-0.0364	455 (2.9%)	372 (2.9%)
Cardiovascular stress test; n (%)								
	15 (0.2%)	6 (0.1%)	0.0258	15 (0.2%)	15 (0.2%)	0.0000	0.30 (0.2%)	0.21 (0.2%)
Echocardiogram; n (%)								
	5,099 (75.9%)	2,718 (66.5%)	0.2087	6,478 (71.8%)	5,447 (63.7%)	0.1739	11,577 (73.5%)	8,165 (64.6%)
Colonoscopy; n (%)								
	222 (3.3%)	152 (3.7%)	-0.0218	329 (3.6%)	294 (3.4%)	0.0109	551 (3.5%)	446 (3.5%)
Fecal occult blood (FOB) test; n (%)								
	163 (2.4%)	115 (2.8%)	-0.0251	224 (2.5%)	226 (2.6%)	-0.0063	387 (2.5%)	341 (2.7%)

## Appendix B

Flu vaccine; n (%)	978 (14.5%)	523 (12.8%)	0.0495	768 (8.5%)	687 (8.0%)	0.0182	1,746 (11.1%)	1,210 (9.6%)	0.049
Mammogram; n (%)	396 (5.9%)	170 (4.2%)	0.0777	369 (4.1%)	301 (3.5%)	0.0314	765 (4.9%)	471 (3.7%)	0.059
Pap smear; n (%)	132 (2.0%)	85 (2.1%)	-0.0071	174 (1.9%)	182 (2.1%)	-0.0143	306 (1.9%)	267 (2.1%)	-0.014
Pneumonia vaccine; n (%)	1,315 (19.6%)	496 (12.1%)	0.2065	754 (8.4%)	461 (5.4%)	0.1186	2,069 (13.1%)	957 (7.6%)	0.181
PSA test or Prostate exam for DRE; n (%)	1,018 (15.1%)	646 (15.8%)	-0.0194	1,125 (12.5%)	1,167 (13.6%)	-0.0327	2,143 (13.6%)	1,813 (14.3%)	-0.020
Bone mineral density; n (%)	110 (1.6%)	60 (1.5%)	0.0081	79 (0.9%)	47 (0.5%)	0.0480	189 (1.2%)	107 (0.8%)	0.040
Drug eluting stent; n (%)	998 (14.8%)	1,987 (48.6%)	-0.7796	2,503 (27.7%)	3,877 (45.3%)	-0.3718	3,501 (22.2%)	5,864 (46.4%)	-0.527
Bare metal stent; n (%)	5,844 (86.9%)	2,853 (69.8%)	0.4244	7,737 (85.7%)	4,842 (56.6%)	0.6782	13,581 (86.2%)	7,695 (60.9%)	0.599

# Appendix B

	Optum			Marketscan			Pooled		
	Ticagrelor	Prasugrel	St. Diff	Ticagrelor	Prasugrel	St. Diff	Ticagrelor	Prasugrel	St. Diff
Number of patients	2,498	2,498		4,802	4,802		7,300	7,300	
Quarter/Year of Cohort Entry Date									
...Q3 2011; n (%)	1 (0.0%)	0 (0.0%)	#DIV/0!	2 (0.0%)	2 (0.0%)	#DIV/0!	003 (0.0%)	002 (0.0%)	#DIV/0!
...Q4 2011; n (%)	2 (0.1%)	2 (0.1%)	0.0000	19 (0.4%)	20 (0.4%)	0.0000	021 (0.3%)	022 (0.3%)	0.000
...Q1 2012; n (%)	11 (0.4%)	16 (0.6%)	-0.0284	51 (1.1%)	42 (0.9%)	0.0201	062 (0.8%)	058 (0.8%)	0.000
...Q2 2012; n (%)	30 (1.2%)	23 (0.9%)	0.0294	104 (2.2%)	98 (2.0%)	0.0139	134 (1.8%)	121 (1.7%)	0.008
...Q3 2012; n (%)	44 (1.8%)	51 (2.0%)	-0.0146	142 (3.0%)	156 (3.2%)	-0.0115	186 (2.5%)	207 (2.8%)	-0.019
...Q4 2012; n (%)	42 (1.7%)	54 (2.2%)	-0.0362	177 (3.7%)	189 (3.9%)	-0.0105	219 (3.0%)	243 (3.3%)	-0.017
...Q1 2013; n (%)	78 (3.1%)	67 (2.7%)	0.0238	171 (3.6%)	176 (3.7%)	-0.0053	249 (3.4%)	243 (3.3%)	0.006
...Q2 2013; n (%)	89 (3.6%)	78 (3.1%)	0.0278	188 (3.9%)	190 (4.0%)	-0.0051	277 (3.8%)	268 (3.7%)	0.005
...Q3 2013; n (%)	70 (2.8%)	71 (2.8%)	0.0000	243 (5.1%)	253 (5.3%)	-0.0090	313 (4.3%)	324 (4.4%)	-0.005
...Q4 2013; n (%)	75 (3.0%)	73 (2.9%)	0.0059	249 (5.2%)	235 (4.9%)	0.0137	324 (4.4%)	308 (4.2%)	0.010
...Q1 2014; n (%)	77 (3.1%)	74 (3.0%)	0.0058	224 (4.7%)	223 (4.6%)	0.0047	301 (4.1%)	297 (4.1%)	0.000
...Q2 2014; n (%)	79 (3.2%)	70 (2.8%)	0.0235	258 (5.4%)	265 (5.5%)	-0.0044	337 (4.6%)	335 (4.6%)	0.000
...Q3 2014; n (%)	89 (3.6%)	76 (3.0%)	0.0336	278 (5.8%)	291 (6.1%)	-0.0127	367 (5.0%)	367 (5.0%)	0.000
...Q4 2014; n (%)	90 (3.6%)	78 (3.1%)	0.0278	302 (6.3%)	285 (5.9%)	0.0167	392 (5.4%)	363 (5.0%)	0.018
...Q1 2015; n (%)	67 (2.7%)	71 (2.8%)	-0.0061	186 (3.9%)	188 (3.9%)	0.0000	253 (3.5%)	259 (3.5%)	0.000
...Q2 2015; n (%)	63 (2.5%)	62 (2.5%)	0.0000	158 (3.3%)	166 (3.5%)	-0.0110	221 (3.0%)	228 (3.1%)	-0.006
...Q3 2015; n (%)	78 (3.1%)	77 (3.1%)	0.0000	205 (4.3%)	191 (4.0%)	0.0150	283 (3.9%)	268 (3.7%)	0.010
...Q4 2015; n (%)	100 (4.0%)	90 (3.6%)	0.0209	249 (5.2%)	234 (4.9%)	0.0137	349 (4.8%)	324 (4.4%)	0.019
...Q1 2016; n (%)	84 (3.4%)	91 (3.6%)	-0.0109	263 (5.5%)	244 (5.1%)	0.0179	347 (4.8%)	335 (4.6%)	0.009
...Q2 2016; n (%)	97 (3.9%)	102 (4.1%)	-0.0102	236 (4.9%)	230 (4.8%)	0.0047	333 (4.6%)	332 (4.5%)	0.005
...Q3 2016; n (%)	104 (4.2%)	112 (4.5%)	-0.0147	249 (5.2%)	232 (4.8%)	0.0184	353 (4.8%)	344 (4.7%)	0.005
...Q4 2016; n (%)	129 (5.2%)	123 (4.9%)	0.0137	216 (4.5%)	225 (4.7%)	-0.0095	345 (4.7%)	348 (4.8%)	-0.005
...Q1 2017; n (%)	100 (4.0%)	113 (4.5%)	-0.0248	141 (2.9%)	158 (3.3%)	-0.0231	241 (3.3%)	271 (3.7%)	-0.022
...Q2 2017; n (%)	110 (4.4%)	122 (4.9%)	-0.0237	159 (3.3%)	162 (3.4%)	-0.0056	269 (3.7%)	284 (3.9%)	-0.010
...Q3 2017; n (%)	119 (4.8%)	125 (5.0%)	-0.0093	173 (3.6%)	192 (4.0%)	-0.0209	292 (4.0%)	317 (4.3%)	-0.015
...Q4 2017; n (%)	107 (4.3%)	122 (4.9%)	-0.0286	158 (3.3%)	154 (3.2%)	0.0056	265 (3.6%)	276 (3.8%)	-0.011
...Q1 2018; n (%)	92 (3.7%)	96 (3.8%)	-0.0053	1 (0.0%)	1 (0.0%)	#DIV/0!	093 (1.3%)	097 (1.3%)	0.000
Demographics									
Age									
...mean (sd)	61.84 (11.27)	61.48 (10.03)	0.0337	57.39 (9.86)	57.47 (8.66)	-0.0086	58.91 (10.36)	58.84 (9.15)	0.007
...median [IQR]	62.00 [54.00, 70.00]	62.00 [55.00, 69.00]	0.0000	58.00 [51.00, 63.00]	58.00 [52.00, 63.00]	0.0000	59.37 (10.36)	59.37 (9.15)	0.000
Gender without zero category- United									
...Males; n (%)	1,877 (75.1%)	1,880 (75.3%)	-0.0046	3,759 (78.3%)	3,743 (77.9%)	0.0005	5,636 (77.2%)	5,623 (77.0%)	0.005
...Females; n (%)	621 (24.9%)	618 (24.7%)	0.0046	1,043 (21.7%)	1,059 (22.1%)	0.0005	1,664 (22.8%)	1,677 (23.0%)	-0.005
Region without zero category- United v3 (lumping missing)									
...Northeast; n (%)	234 (9.4%)	215 (8.6%)	0.0280	784 (16.3%)	779 (16.2%)	0.0027	1,018 (13.9%)	994 (13.6%)	0.009
...South; n (%)	1,185 (47.4%)	1,187 (47.5%)	-0.0020	2,159 (45.0%)	2,186 (45.5%)	-0.0100	3,344 (45.8%)	3,373 (46.2%)	-0.008
...Midwest; n (%)	576 (23.1%)	584 (23.4%)	-0.0071	1,178 (24.5%)	1,165 (24.3%)	0.0047	1,754 (24.0%)	1,749 (24.0%)	0.000
...West; n (%)	503 (20.1%)	512 (20.5%)	-0.0099	629 (13.1%)	614 (12.8%)	0.0089	1,132 (15.5%)	1,126 (15.4%)	0.003
Metropolitan Statistical Area - Urban (any MSA) vs Rural (non-MSA)									
...Urban; n (%)				3,606 (75.1%)	3,607 (75.1%)	0.0000	3,606 (75.1%)	3,607 (75.1%)	0.0000
...Rural; n (%)				204 (4.2%)	207 (4.3%)	-0.0050	204 (4.2%)	207 (4.3%)	-0.0050
...Unknown/Missing; n (%)				992 (20.7%)	988 (20.6%)	0.0025	992 (20.7%)	988 (20.6%)	0.0025
Commercial vs Medicare Advantage- Business Type Code									
...COM = COMMERCIAL; n (%)	1,370 (54.8%)	1,414 (56.6%)	-0.0362				1,370 (54.8%)	1,414 (56.6%)	-0.0362
...MCR = MEDICARE; n (%)	1,128 (45.2%)	1,084 (43.4%)	0.0362				1,128 (45.2%)	1,084 (43.4%)	0.0362
...MCD = MEDICAID; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!				0 (0.0%)	0 (0.0%)	#DIV/0!

# Appendix B

...NONE = NO BUSINESS LINE CODE (added in 2015); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!			0 (0.0%)	0 (0.0%)	#DIV/0!	
...UNK = UNKNOWN (added in 2015); n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!			0 (0.0%)	0 (0.0%)	#DIV/0!	
Commercial vs Medicare Advantage- Data Type									
...1 - Fee For Service; n (%)			3,556 (74.1%)	3,556 (74.3%)	-0.0046	3,556 (74.1%)	3,556 (74.3%)	-0.0046	
...2 - Encounter; n (%)			419 (8.7%)	418 (8.7%)	0.0000	419 (8.7%)	418 (8.7%)	0.0000	
...3 - Medicare; n (%)			725 (15.1%)	714 (14.9%)	0.0056	725 (15.1%)	714 (14.9%)	0.0056	
...4 - Medicare Encounter; n (%)			102 (2.1%)	104 (2.2%)	-0.0069	102 (2.1%)	104 (2.2%)	-0.0069	
Lifestyle factors									
Obesity; n (%)	647 (25.9%)	658 (26.3%)	-0.0091	966 (20.1%)	937 (19.5%)	0.0151	1,613 (22.1%)	1,595 (21.8%)	0.007
Overweight; n (%)	134 (5.4%)	155 (6.2%)	-0.0342	111 (2.3%)	119 (2.5%)	-0.0131	245 (3.4%)	274 (3.8%)	-0.021
Smoking; n (%)	1,220 (48.8%)	1,220 (48.8%)	0.0000	1,586 (33.0%)	1,579 (32.9%)	0.0021	2,806 (38.4%)	2,799 (38.3%)	0.002
Alcohol abuse or dependence+Drug abuse or dependence (	133 (5.3%)	120 (4.8%)	0.0228	157 (3.3%)	150 (3.1%)	0.0114	290 (4.0%)	270 (3.7%)	0.016
Diabetes-related conditions									
Diabetic retinopathy; n (%)	39 (1.6%)	38 (1.5%)	0.0081	61 (1.3%)	56 (1.2%)	0.0090	100 (1.4%)	94 (1.3%)	0.009
Occurrence of Diabetic Neuropathy v2 Copy; n (%)	138 (5.5%)	141 (5.6%)	-0.0044	158 (3.3%)	159 (3.3%)	0.0000	296 (4.1%)	300 (4.1%)	0.000
Occurrence of diabetic nephropathy V3 with ICD10 Copy; n	97 (3.9%)	112 (4.5%)	-0.0299	79 (1.6%)	86 (1.8%)	-0.0155	176 (2.4%)	198 (2.7%)	-0.019
Hypoglycemia v2; n (%)	18 (0.7%)	15 (0.6%)	0.0124	50 (1.0%)	49 (1.0%)	0.0000	068 (0.9%)	064 (0.9%)	0.000
Hyperglycemia; n (%)	205 (8.2%)	199 (8.0%)	0.0073	290 (6.0%)	294 (6.1%)	-0.0042	495 (6.8%)	493 (6.8%)	0.000
Disorders of fluid electrolyte and acid-base balance; n (%)	302 (12.1%)	310 (12.4%)	-0.0092	432 (9.0%)	416 (8.7%)	0.0106	734 (10.1%)	726 (9.9%)	0.007
Hyperosmolar hyperglycemic nonketotic syndrome (HONK)	9 (0.4%)	9 (0.4%)	0.0000	3 (0.1%)	6 (0.1%)	0.0000	012 (0.2%)	015 (0.2%)	0.000
Diabetic Foot; n (%)	24 (1.0%)	20 (0.8%)	0.0212	29 (0.6%)	30 (0.6%)	0.0000	053 (0.7%)	050 (0.7%)	0.000
Skin infections v2; n (%)	83 (3.3%)	83 (3.3%)	0.0000	157 (3.3%)	151 (3.1%)	0.0114	240 (3.3%)	234 (3.2%)	0.006
Erectile dysfunction; n (%)	80 (3.2%)	82 (3.3%)	-0.0056	138 (2.9%)	129 (2.7%)	0.0121	218 (3.0%)	211 (2.9%)	0.006
Diabetes with unspecified complication; n (%)	60 (2.4%)	65 (2.6%)	-0.0128	117 (2.4%)	118 (2.5%)	-0.0065	177 (2.4%)	183 (2.5%)	-0.006
Diabetes mellitus without mention of complications; n (%)	821 (32.9%)	854 (34.2%)	-0.0275	1,551 (32.3%)	1,561 (32.5%)	-0.0043	2,372 (32.5%)	2,415 (33.1%)	-0.013
Diabetes with peripheral circulatory disorders+Gangrene+	44 (1.8%)	54 (2.2%)	-0.0286	55 (1.1%)	58 (1.2%)	-0.0094	099 (1.4%)	112 (1.5%)	-0.008
Diabetes with other ophthalmic manifestations+Retinal de	10 (0.4%)	11 (0.4%)	0.0000	48 (1.0%)	45 (0.9%)	0.0103	058 (0.8%)	056 (0.8%)	0.000
Cardiovascular-related conditions									
Hypertension: 1 inpatient or 2 outpatient claims within 365	1,929 (77.2%)	1,929 (77.2%)	0.0000	3,455 (71.9%)	3,453 (71.9%)	0.0000	5,384 (73.8%)	5,382 (73.7%)	0.002
Malignant hypertension; n (%)	109 (4.4%)	104 (4.2%)	0.0099	2,019 (42.0%)	2,011 (41.9%)	0.0020	2,128 (29.2%)	2,115 (29.0%)	0.004
Hyperlipidemia v2; n (%)	2,030 (81.3%)	2,020 (80.9%)	0.0102	3,419 (71.2%)	3,412 (71.1%)	0.0022	5,449 (74.6%)	5,432 (74.4%)	0.005
Acute MI; n (%)	2,312 (92.6%)	2,315 (92.7%)	-0.0038	4,566 (95.1%)	4,566 (95.1%)	0.0000	6,878 (94.2%)	6,881 (94.3%)	-0.004
ACS/unstable angina; n (%)	1,044 (41.8%)	1,017 (40.7%)	0.0223	1,795 (37.4%)	1,824 (38.0%)	-0.0124	2,839 (38.9%)	2,841 (38.9%)	0.000
Old MI; n (%)	351 (14.1%)	343 (13.7%)	0.0116	408 (8.5%)	423 (8.8%)	-0.0107	759 (10.4%)	766 (10.5%)	-0.003
Stable angina; n (%)	509 (20.4%)	506 (20.3%)	0.0025	716 (14.9%)	717 (14.9%)	0.0000	1,225 (16.8%)	1,223 (16.8%)	0.000
Coronary atherosclerosis and other forms of chronic isch	2,408 (96.4%)	2,407 (96.4%)	0.0000	4,455 (92.8%)	4,454 (92.8%)	0.0000	6,863 (94.0%)	6,861 (94.0%)	0.000
Ischemic stroke (w and w/o mention of cerebral infarction	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	000 (0.0%)	000 (0.0%)	#DIV/0!
TIA; n (%)	0 (0.0%)	0 (0.0%)	#DIV/0!	0 (0.0%)	0 (0.0%)	#DIV/0!	000 (0.0%)	000 (0.0%)	#DIV/0!
Late effects of cerebrovascular disease; n (%)	5 (0.2%)	5 (0.2%)	0.0000	2 (0.0%)	3 (0.1%)	-0.0447	007 (0.1%)	008 (0.1%)	0.000
Heart failure (CHF); n (%)	433 (17.3%)	428 (17.1%)	0.0053	642 (13.4%)	641 (13.3%)	0.0029	1,075 (14.7%)	1,069 (14.6%)	0.003
Peripheral Vascular Disease (PVD) or PVD Surgery v2; n (%)	108 (4.3%)	117 (4.7%)	-0.0193	130 (2.7%)	135 (2.8%)	-0.0061	238 (3.3%)	252 (3.5%)	-0.011
Atrial fibrillation; n (%)	180 (7.2%)	170 (6.8%)	0.0157	194 (4.0%)	210 (4.4%)	-0.0199	374 (5.1%)	380 (5.2%)	-0.005
Other cardiac dysrhythmia; n (%)	799 (32.0%)	772 (30.9%)	0.0237	1,200 (25.0%)	1,244 (25.9%)	-0.0207	1,999 (27.4%)	2,016 (27.6%)	-0.004
Hemorrhagic stroke+Other cerebrovascular disease+Cereb	12 (0.5%)	12 (0.5%)	0.0000	13 (0.3%)	11 (0.2%)	0.0200	025 (0.3%)	023 (0.3%)	0.000
Other atherosclerosis+Cardiac conduction disorders+Other	883 (35.3%)	880 (35.2%)	0.0021	1,345 (28.0%)	1,355 (28.2%)	-0.0044	2,228 (30.5%)	2,235 (30.6%)	-0.002
Previous cardiac procedure (CABG or PTCA or Stent) + Hist	2,455 (98.3%)	2,459 (98.4%)	-0.0079	4,491 (93.5%)	4,482 (93.3%)	0.0081	6,946 (95.2%)	6,941 (95.1%)	0.005
Kidney-related conditions									
Occurrence of acute renal disease v2; n (%)	169 (6.8%)	179 (7.2%)	-0.0157	192 (4.0%)	182 (3.8%)	0.0103	361 (4.9%)	361 (4.9%)	0.000
Occurrence of hypertensive nephropathy; n (%)	160 (6.4%)	166 (6.6%)	-0.0081	133 (2.8%)	147 (3.1%)	-0.0177	293 (4.0%)	313 (4.3%)	-0.015
Occurrence of miscellaneous renal insufficiency v2; n (%)	131 (5.2%)	127 (5.1%)	0.0045	126 (2.6%)	137 (2.9%)	-0.0183	257 (3.5%)	264 (3.6%)	-0.005
Occurrence of chronic renal insufficiency w/o CKD (for PS)	115 (4.6%)	114 (4.6%)	0.0000	91 (1.9%)	101 (2.1%)	-0.0143	206 (2.8%)	215 (2.9%)	-0.006

# Appendix B

Chronic kidney disease Stage 1-2 (for PS); n (%)	50 (2.0%)	52 (2.1%)	-0.0071	43 (0.9%)	47 (1.0%)	-0.0103	093 (1.3%)	099 (1.4%)	-0.009
CKD stage 3-6 + dialysis (for PS); n (%)	133 (5.3%)	123 (4.9%)	0.0182	108 (2.2%)	110 (2.3%)	-0.0067	241 (3.3%)	233 (3.2%)	0.006
Bladder stones+Kidney stones (for PS); n (%)	54 (2.2%)	52 (2.1%)	0.0069	92 (1.9%)	87 (1.8%)	0.0074	146 (2.0%)	139 (1.9%)	0.007
Urinary tract infections (UTIs); n (%)	104 (4.2%)	115 (4.6%)	-0.0195	150 (3.1%)	146 (3.0%)	0.0058	254 (3.5%)	261 (3.6%)	-0.005
Edema; n (%)	67 (2.7%)	78 (3.1%)	-0.0238	97 (2.0%)	98 (2.0%)	0.0000	164 (2.2%)	176 (2.4%)	-0.013
Other comorbidities									
COPD; n (%)	310 (12.4%)	306 (12.2%)	0.0061	324 (6.7%)	336 (7.0%)	-0.0119	634 (8.7%)	642 (8.8%)	-0.004
Asthma; n (%)	146 (5.8%)	162 (6.5%)	-0.0291	220 (4.6%)	215 (4.5%)	0.0048	366 (5.0%)	377 (5.2%)	-0.009
Obstructive sleep apnea; n (%)	259 (10.4%)	259 (10.4%)	0.0000	392 (8.2%)	412 (8.6%)	-0.0144	651 (8.9%)	671 (9.2%)	-0.010
Pneumonia; n (%)	87 (3.5%)	87 (3.5%)	0.0000	137 (2.9%)	127 (2.6%)	0.0183	224 (3.1%)	214 (2.9%)	0.012
Hyperthyroidism + Hypothyroidism + Other disorders of thy	278 (11.1%)	304 (12.2%)	-0.0343	429 (8.9%)	452 (9.4%)	-0.0173	707 (9.7%)	756 (10.4%)	-0.023
Liver disease; n (%)	3 (0.1%)	2 (0.1%)	0.0000	1 (0.0%)	1 (0.0%)	#DIV/0!	004 (0.1%)	003 (0.0%)	0.045
Osteoarthritis; n (%)	337 (13.5%)	342 (13.7%)	-0.0058	423 (8.8%)	424 (8.8%)	0.0000	760 (10.4%)	766 (10.5%)	-0.003
Other arthritis, arthropathies and musculoskeletal pain; n	768 (30.7%)	773 (30.9%)	-0.0043	1,282 (26.7%)	1,303 (27.1%)	-0.0090	2,050 (28.1%)	2,076 (28.4%)	-0.007
Dorsopathies; n (%)	534 (21.4%)	556 (22.3%)	-0.0218	872 (18.2%)	879 (18.3%)	-0.0026	1,406 (19.3%)	1,435 (19.7%)	-0.010
Fractures; n (%)	44 (1.8%)	52 (2.1%)	-0.0217	67 (1.4%)	67 (1.4%)	0.0000	111 (1.5%)	119 (1.6%)	-0.008
Falls v2; n (%)	29 (1.2%)	32 (1.3%)	-0.0090	28 (0.6%)	26 (0.5%)	0.0135	057 (0.8%)	058 (0.8%)	0.000
Osteoporosis; n (%)	63 (2.5%)	56 (2.2%)	0.0198	49 (1.0%)	40 (0.8%)	0.0212	112 (1.5%)	096 (1.3%)	0.017
Depression; n (%)	259 (10.4%)	241 (9.6%)	0.0267	320 (6.7%)	321 (6.7%)	0.0000	579 (7.9%)	562 (7.7%)	0.007
Anxiety; n (%)	323 (12.9%)	318 (12.7%)	0.0060	386 (8.0%)	391 (8.1%)	-0.0037	709 (9.7%)	709 (9.7%)	0.000
Sleep_Disorder; n (%)	153 (6.1%)	148 (5.9%)	0.0084	335 (7.0%)	333 (6.9%)	0.0039	488 (6.7%)	481 (6.6%)	0.004
Dementia; n (%)	34 (1.4%)	25 (1.0%)	0.0367	20 (0.4%)	24 (0.5%)	-0.0149	054 (0.7%)	049 (0.7%)	0.000
Delirium; n (%)	19 (0.8%)	19 (0.8%)	0.0000	19 (0.4%)	19 (0.4%)	0.0000	038 (0.5%)	038 (0.5%)	0.000
Psychosis; n (%)	11 (0.4%)	13 (0.5%)	-0.0149	17 (0.4%)	13 (0.3%)	0.0169	028 (0.4%)	026 (0.4%)	0.000
Use of medications									
Use of ACE inhibitors; n (%)	1,332 (53.3%)	1,316 (52.7%)	0.0120	2,689 (56.0%)	2,716 (56.6%)	-0.0121	4,021 (55.1%)	4,032 (55.2%)	-0.002
Use of ARBs; n (%)	486 (19.5%)	498 (19.9%)	-0.0101	879 (18.3%)	855 (17.8%)	0.0130	1,365 (18.7%)	1,353 (18.5%)	0.005
Use of Loop Diuretics - United; n (%)	193 (7.7%)	190 (7.6%)	0.0038	254 (5.3%)	286 (6.0%)	-0.0303	447 (6.1%)	476 (6.5%)	-0.016
Use of other diuretics- United; n (%)	98 (3.9%)	103 (4.1%)	-0.0102	188 (3.9%)	207 (4.3%)	-0.0202	286 (3.9%)	310 (4.2%)	-0.015
Use of nitrates-United; n (%)	1,089 (43.6%)	1,086 (43.5%)	0.0020	2,102 (43.8%)	2,128 (44.3%)	-0.0101	3,191 (43.7%)	3,214 (44.0%)	-0.006
Use of other hypertension drugs; n (%)	93 (3.7%)	94 (3.8%)	-0.0053	150 (3.1%)	163 (3.4%)	-0.0169	243 (3.3%)	257 (3.5%)	-0.011
Use of digoxin- United; n (%)	21 (0.8%)	20 (0.8%)	0.0000	18 (0.4%)	21 (0.4%)	0.0000	039 (0.5%)	041 (0.6%)	-0.014
Use of Anti-arrhythmics; n (%)	40 (1.6%)	42 (1.7%)	-0.0079	73 (1.5%)	74 (1.5%)	0.0000	113 (1.5%)	116 (1.6%)	-0.008
Use of COPD/asthma meds- United; n (%)	336 (13.5%)	315 (12.6%)	0.0267	529 (11.0%)	526 (11.0%)	0.0000	865 (11.8%)	841 (11.5%)	0.009
Use of statins; n (%)	2,267 (90.8%)	2,280 (91.3%)	-0.0175	4,415 (91.9%)	4,394 (91.5%)	0.0145	6,682 (91.5%)	6,674 (91.4%)	0.004
Use of other lipid-lowering drugs; n (%)	179 (7.2%)	189 (7.6%)	-0.0153	387 (8.1%)	408 (8.5%)	-0.0145	566 (7.8%)	597 (8.2%)	-0.015
Use of antiplatelet agents; n (%)	197 (7.9%)	217 (8.7%)	-0.0290	322 (6.7%)	359 (7.5%)	-0.0312	519 (7.1%)	576 (7.9%)	-0.030
Use of oral anticoagulants (Dabigatran, Rivaroxaban, Apixaban)	56 (2.2%)	58 (2.3%)	-0.0067	106 (2.2%)	113 (2.4%)	-0.0133	162 (2.2%)	171 (2.3%)	-0.007
Use of heparin and other low-molecular weight heparins; n	6 (0.2%)	8 (0.3%)	-0.0200	0 (0.0%)	0 (0.0%)	#DIV/0!	006 (0.1%)	008 (0.1%)	0.000
Use of NSAIDs; n (%)	315 (12.6%)	339 (13.6%)	-0.0296	700 (14.6%)	702 (14.6%)	0.0000	1,015 (13.9%)	1,041 (14.3%)	-0.011
Use of oral corticosteroids; n (%)	386 (15.5%)	372 (14.9%)	0.0167	660 (13.7%)	671 (14.0%)	-0.0087	1,046 (14.3%)	1,043 (14.3%)	0.000
Use of bisphosphonate (United); n (%)	25 (1.0%)	22 (0.9%)	0.0103	20 (0.4%)	16 (0.3%)	0.0169	045 (0.6%)	038 (0.5%)	0.014
Use of opioids- United; n (%)	540 (21.6%)	533 (21.3%)	0.0073	998 (20.8%)	989 (20.6%)	0.0049	1,538 (21.1%)	1,522 (20.8%)	0.007
Use of antidepressants; n (%)	421 (16.9%)	409 (16.4%)	0.0134	746 (15.5%)	735 (15.3%)	0.0055	1,167 (16.0%)	1,144 (15.7%)	0.008
Use of antipsychotics; n (%)	22 (0.9%)	27 (1.1%)	-0.0201	36 (0.7%)	45 (0.9%)	-0.0225	058 (0.8%)	072 (1.0%)	-0.021
Use of anticonvulsants; n (%)	198 (7.9%)	199 (8.0%)	-0.0037	286 (6.0%)	296 (6.2%)	-0.0084	484 (6.6%)	495 (6.8%)	-0.008
Use of Benzos- United; n (%)	249 (10.0%)	247 (9.9%)	0.0033	457 (9.5%)	466 (9.7%)	-0.0068	706 (9.7%)	713 (9.8%)	-0.003
Use of anxiolytics/hypnotics- United; n (%)	128 (5.1%)	123 (4.9%)	0.0092	242 (5.0%)	240 (5.0%)	0.0000	370 (5.1%)	363 (5.0%)	0.005
Use of dementia meds- United; n (%)	15 (0.6%)	13 (0.5%)	0.0135	5 (0.1%)	7 (0.1%)	0.0000	020 (0.3%)	020 (0.3%)	0.000
Use of antiparkinsonian meds- United; n (%)	27 (1.1%)	31 (1.2%)	-0.0094	46 (1.0%)	38 (0.8%)	0.0212	073 (1.0%)	069 (0.9%)	0.010

## Appendix B

# Appendix B

...mean (sd)	8.18 (5.00)	8.14 (5.05)	0.0080	1.00 (2.09)	1.02 (2.27)	-0.0092	3.46 (3.38)	3.46 (3.48)	0.000
...median [IQR]	8.00 [5.00, 11.00]	7.00 [5.00, 10.00]	0.1990	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.0000	2.74 (3.38)	2.40 (3.48)	0.099
Number electrocardiograms received v2									
...mean (sd)	3.33 (2.45)	3.33 (2.62)	0.0000	0.97 (1.32)	0.97 (1.36)	0.0000	1.78 (1.79)	1.78 (1.89)	0.000
...median [IQR]	3.00 [2.00, 4.00]	3.00 [2.00, 5.00]	0.0000	1.00 [0.00, 1.00]	1.00 [0.00, 1.00]	0.0000	1.68 (1.79)	1.68 (1.89)	0.000
Number of BNP tests									
...mean (sd)	0.11 (0.37)	0.10 (0.40)	0.0260	0.12 (0.37)	0.12 (0.38)	0.0000	0.12 (0.37)	0.11 (0.39)	0.026
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.37)	0.00 (0.39)	0.000
Number of Cardiac biomarkers tests (tropnin, CK-MBS, My)									
...mean (sd)	0.68 (1.63)	0.73 (1.73)	-0.0297	0.72 (1.67)	0.73 (1.60)	-0.0061	0.71 (1.66)	0.73 (1.65)	-0.012
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.0000	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.0000	0.00 (1.66)	0.00 (1.65)	0.000
Number of Ambulatory Blood pressure monitoring tests									
...mean (sd)	0.00 (0.03)	0.00 (0.02)	0.0000	0.00 (0.04)	0.00 (0.03)	0.0000	0.00 (0.04)	0.00 (0.03)	0.000
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.04)	0.00 (0.03)	0.000
N of days on antihypertensive medications during baseline									
...mean (sd)	75.35 (78.69)	75.92 (78.36)	-0.0073	71.06 (77.53)	71.15 (77.62)	-0.0012	72.53 (77.93)	72.78 (77.87)	-0.003
...median [IQR]	31.00 [1.00, 168.00]	35.00 [1.00, 168.00]	-0.0509	14.00 [1.00, 163.00]	12.00 [1.00, 164.00]	0.0258	19.82 (77.93)	19.87 (77.87)	-0.001
N of days in database anytime prior									
...mean (sd)	1,658.31 (1,306.21)	1,660.85 (1,331.74)	-0.0019	1,989.48 (1,379.50)	1,998.92 (1,372.00)	-0.0069	1876.16 (1354.87)	1883.24 (1358.36)	-0.005
...median [IQR]	1,246.00 [612.00, 2,4	1,227.50 [593.75, 2,4	0.0140	1,682.50 [800.00, 3,0	1,693.00 [824.75, 3,0	-0.0076	1533.13 (1354.87)	1533.71 (1358.36)	0.000
Mean Copay for per prescription cost (charges in U.S. \$) (1									
...mean (sd)	23.00 (28.64)	23.95 (28.18)	-0.0334	16.82 (22.87)	16.49 (20.73)	0.0151	18.93 (24.99)	19.04 (23.55)	-0.005
...median [IQR]	14.98 [6.00, 29.47]	15.31 [6.44, 30.82]	-0.0116	10.69 [2.63, 22.50]	10.42 [2.98, 22.00]	0.0124	12.16 (24.99)	12.09 (23.55)	0.003
...Missing; n (%)	351 (14.1%)	361 (14.5%)	-0.0114	739 (15.4%)	743 (15.5%)	-0.0028	1,090 (14.9%)	1,104 (15.1%)	-0.006
Duration of index hospitalization (i.e. anchor hospitalizatio									
...mean (sd)	1.00 (0.00)	1.00 (0.00)	#DIV/0!	1.00 (0.00)	1.00 (0.00)	#DIV/0!	1.00 (0.00)	1.00 (0.00)	#DIV/0!
...median [IQR]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	#DIV/0!	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	#DIV/0!	1.00 (0.00)	1.00 (0.00)	#DIV/0!
N of Generic name drugs									
...mean (sd)	12.43 (11.07)	12.50 (11.04)	-0.0063	10.82 (9.17)	10.89 (9.29)	-0.0076	11.37 (9.86)	11.44 (9.92)	-0.007
...median [IQR]	9.00 [5.00, 16.00]	9.00 [5.00, 16.00]	0.0000	8.00 [4.00, 14.00]	8.00 [4.00, 14.00]	0.0000	8.34 (9.86)	8.34 (9.92)	0.000
N of Brand name drugs									
...mean (sd)	3.15 (3.47)	3.17 (4.09)	-0.0053	3.53 (3.65)	3.59 (3.74)	-0.0162	3.40 (3.59)	3.45 (3.86)	-0.013
...median [IQR]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	0.0000	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	0.0000	2.00 (3.59)	2.00 (3.86)	0.000
Number of D-dimer tests									
...mean (sd)	0.06 (0.26)	0.06 (0.26)	0.0000	0.07 (0.30)	0.07 (0.28)	0.0000	0.07 (0.29)	0.07 (0.27)	0.000
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.29)	0.00 (0.27)	0.000
Number of CRP, high-sensitivity CRP tests									
...mean (sd)	0.05 (0.27)	0.04 (0.24)	0.0391	0.04 (0.25)	0.04 (0.24)	0.0000	0.04 (0.26)	0.04 (0.24)	0.000
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (0.26)	0.00 (0.24)	0.000
Number of PT or aPTTt tests									
...mean (sd)	0.37 (1.05)	0.37 (1.00)	0.0000	0.39 (0.98)	0.40 (1.02)	-0.0100	0.38 (1.00)	0.39 (1.01)	-0.010
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.0000	0.00 (1.00)	0.00 (1.01)	0.000
Number of Bleeding time tests									
...mean (sd)	0.00 (0.00)	0.00 (0.00)	#DIV/0!	0.00 (0.00)	0.00 (0.00)	#DIV/0!	0.00 (0.00)	0.00 (0.00)	#DIV/0!
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	#DIV/0!	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	#DIV/0!	0.00 (0.00)	0.00 (0.00)	#DIV/0!
Occurrence of creatinine tests ordered (for PS); n (%)	68 (2.7%)	68 (2.7%)	0.0000	119 (2.5%)	130 (2.7%)	-0.0126	187 (2.6%)	198 (2.7%)	-0.006
Cardiovascular stress test; n (%)	8 (0.3%)	5 (0.2%)	0.0200	10 (0.2%)	10 (0.2%)	0.0000	018 (0.2%)	015 (0.2%)	0.000
Echocardiogram; n (%)	1,774 (71.0%)	1,764 (70.6%)	0.0088	3,228 (67.2%)	3,232 (67.3%)	-0.0021	5,002 (68.5%)	4,996 (68.4%)	0.002
Colonoscopy; n (%)	79 (3.2%)	84 (3.4%)	-0.0112	178 (3.7%)	177 (3.7%)	0.0000	257 (3.5%)	261 (3.6%)	-0.005
Fecal occult blood (FOB) test; n (%)	67 (2.7%)	69 (2.8%)	-0.0061	114 (2.4%)	116 (2.4%)	0.0000	181 (2.5%)	185 (2.5%)	0.000
Flu vaccine; n (%)	348 (13.9%)	337 (13.5%)	0.0116	412 (8.6%)	404 (8.4%)	0.0072	760 (10.4%)	741 (10.2%)	0.007

## Appendix B

Mammogram; n (%)	116 (4.6%)	120 (4.8%)	-0.0095	156 (3.2%)	168 (3.5%)	-0.0167	272 (3.7%)	288 (3.9%)	-0.010
Pap smear; n (%)	49 (2.0%)	49 (2.0%)	0.0000	100 (2.1%)	96 (2.0%)	0.0071	149 (2.0%)	145 (2.0%)	0.000
Pneumonia vaccine; n (%)	377 (15.1%)	400 (16.0%)	-0.0248	343 (7.1%)	331 (6.9%)	0.0078	720 (9.9%)	731 (10.0%)	-0.003
PSA test or Prostate exam for DRE; n (%)	380 (15.2%)	385 (15.4%)	-0.0056	621 (12.9%)	632 (13.2%)	-0.0089	1,001 (13.7%)	1,017 (13.9%)	-0.006
Bone mineral density; n (%)	39 (1.6%)	41 (1.6%)	0.0000	34 (0.7%)	32 (0.7%)	0.0000	073 (1.0%)	073 (1.0%)	0.000
Drug eluting stent; n (%)	826 (33.1%)	800 (32.0%)	0.0235	1,804 (37.6%)	1,804 (37.6%)	0.0000	2,630 (36.0%)	2,604 (35.7%)	0.006
Bare metal stent; n (%)	2,143 (85.8%)	2,146 (85.9%)	-0.0029	3,978 (82.8%)	3,958 (82.4%)	0.0106	6,121 (83.8%)	6,104 (83.6%)	0.005