Effect of Sitagliptin on Cardiovascular Outcomes in Type 2 Diabetes (TECOS trial)

NCT03936062

December 27, 2019

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
   Effect of Sitagliptin on Cardiovascular Outcomes in Type 2 Diabetes (TECOS trial)

   1.2 Intended aim(s)
   TECOS primarily tested the hypothesis that sitagliptin, when used as part of usual diabetes care, is non-inferior to usual care without sitagliptin with regard to the risk of significant confirmed cardiovascular outcomes.

   1.3 Primary endpoint for replication and RCT finding
   Composite of cardiovascular death, nonfatal myocardial infarction, nonfatal stroke, or hospitalization for unstable angina

   1.4 Required power for primary endpoint and noninferiority margin (if applicable)
   Power of 90% for the test of noninferiority (hazard ratio, 1.00). For superiority, 1,300 patients with a primary composite cardiovascular outcome would provide a power of approximately 81% to determine the superiority of sitagliptin over placebo (hazard ratio, 0.85).

   1.5 Primary trial estimate targeted for replication
   HR = 0.98 (95% CI, 0.88 - 1.09) comparing sitagliptin to placebo (Green et al., 2015)

2. **Person responsible for implementation of replication in Aetion**
   Ajinkya Pawar, Ph.D. implemented the study design in the Aetion Evidence Platform. S/he 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.
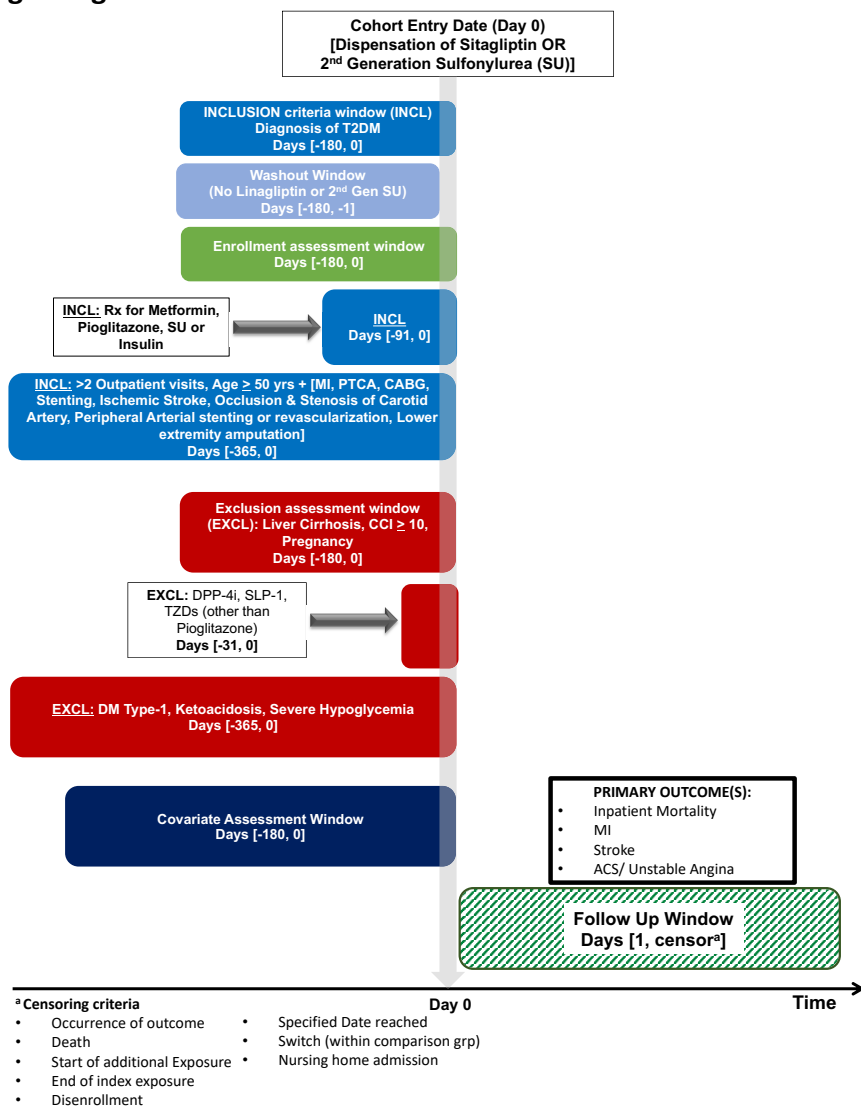
3. **Data Source(s)**
   United/Optum, MarketScan, Medicare

4. Study Design Diagram

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

Design Diagram – TECOS TRIAL REPLICATION

Cohort Entry Date (Day 0)
[Dispensation of Sitagliptin OR 2nd Generation Sulfonylurea (SU)]

INCLUSION criteria window (INCL)
Diagnosis of T2DM
Days [-180, 0]

Washout Window
(No Linagliptin or 2nd Gen SU)
Days [-180, -1]

Enrollment assessment window
Days [-180, 0]

INCL: Rx for Metformin, Pioglitazone, SU or Insulin → **INCL Days [-91, 0]**

INCL: >2 Outpatient visits, Age ≥ 50 yrs + [MI, PTCA, CABG, Stenting, Ischemic Stroke, Occlusion & Stenosis of Carotid Artery, Peripheral Arterial stenting or revascularization, Lower extremity amputation]
Days [-365, 0]

Exclusion assessment window
(EXCL): Liver Cirrhosis, CCI ≥ 10, Pregnancy
Days [-180, 0]

EXCL: DPP-4i, SLP-1, TZDs (other than Pioglitazone)
Days [-31, 0] →

EXCL: DM Type-1, Ketoacidosis, Severe Hypoglycemia
Days [-365, 0]

PRIMARY OUTCOME(S):
- Inpatient Mortality
- MI
- Stroke
- ACS/ Unstable Angina

Covariate Assessment Window
Days [-180, 0]

Follow Up Window
Days [1, censor[a]]

Day 0 **Time**

[a] **Censoring criteria**
- Occurrence of outcome
- Death
- Start of additional Exposure
- End of index exposure
- Disenrollment
- Specified Date reached
- Switch (within comparison grp)
- Nursing home admission

5. Cohort Identification

5.1 Cohort Summary

This study will involve a new user, parallel group, cohort study design comparing sitagliptin to the 2nd generation sulfonylurea (SU) antidiabetic class as a proxy for placebo. 2nd generation SUs are not known to have an impact on the outcome of interest. In addition, SUs were the most frequent background treatment in TECOS (after metformin), and both DPP4i and SUs are preferentially prescribed to similarly older patients in the real world (Patorno et al., 2019). The patients will be required to have continuous enrollment during the baseline period of 180 days before initiation of sitagliptin or a comparator drug (cohort entry date). Follow-up for the outcome (4P-MACE), begins the day after drug initiation. As in the trial, patients are allowed to take other antidiabetic medications during the study.

5.2 Important steps for cohort formation

New users (defined as no use in 180 days prior to index date) of an exposure and a comparator drug will be identified.

5.2.1 Eligible cohort entry dates

Market availability of sitagliptin in the U.S. started on October 17, 2006.

- For Marketscan: October 17, 2006-Dec 2017 (end of data availability).
- For Medicare: Jan 1, 2012-Dec 31, 2017 (start- end of data availability).
- For Optum: October 17, 2006-March 31, 2019 (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	Medicare*

	Less Excluded Patients	Remaining Patients	Less Excluded Patients	Remaining Patients	Less Excluded Patients	Remaining Patients
All patients		74,864,884		191,990,035		23,466,175
Patients who used exposure or a reference between **17 Oct 2006** to Dec 2017 (for Marketscan)/March 2019 (for Optum) and 01 January 2012-December 2017 for Medicare	-72908924	1,955,960	-188954110	3,035,925	-19512001	3,954,174
Excluded due to insufficient enrollment	-260546	1,695,414	-374862	2,661,063	-1094721	2,859,453
Excluded due to prior use of referent	-1135398	560,016	-1658570	1,002,493	-1745525	1,113,928
Excluded due to prior use of exposure	-237943	322,073	-531814	470,679	-511933	601,995
Excluded because patient qualified in >1 exposure category	-1,240	320,833	-3,027	467,652	-1,510	600,485
Excluded based on Age	-14	320,819	0	467,652	0	600,485
Excluded based on Gender	-32	320,787	0	467,652	0	600,485
Excluded based on Inclusion 1- DM Type 2 with ICD-10	-31605	289,182	-73914	393,738	-11767	588,718
Excluded based on Inclusion 1- Continuous use of Metformin, pioglitazone, or a sulfonylurea, or stable dose of insulin for past 3 months	-31597	257,585	-50189	343,549	-61901	526,817
Excluded based on Inclusion 2- At least 2 outpatient visits in prior year	-533	257,052	-1,385	342,164	-412	526,405
Excluded based on Inclusion 3- Age >=50 AND History of a major clinical manifestation of coronary artery disease/Ischemic cerebrovascular disease	-101729	155,323	-167085	175,079	-88675	437,730
Excluded based on Exclusion 1- history of type 1 diabetes mellitus or a history of ketoacidosis	-3282	152,041	-3487	171,592	-9452	428,278
Excluded based on Exclusion 2- ≥2 hospitalizations for severe Hypoglycemia in prior year	-21	152,020	-39	171,553	-318	427,960
Excluded based on Exclusion 3- DPP-4 i, GLP-1, or a thiazolidinedione other than pioglitazone within past 3 months	-1711	150,309	-1979	169,574	-4416	423,544
Excluded based on Exclusion 4- Cirrhosis of liver	-506	149,803	-316	169,258	-1,388	422,156
Excluded based on Exclusion 7-Pregnancy	-8	149,795	-7	169,251	-13	422,143
Excluded based on Exclusion 8- CCI 180days >=10	-2092	147,703	-1029	168,222	-10402	411,741
Final cohort		**147,703**		**168,222**		**411,741**

* Medicare database includes only patients ≥65 years of age with at least one diagnosis for diabetes, heart failure, or stroke.

6. Variables

6.1 Exposure-related variables:

Study drug:
The study exposure of interest is initiation of sitagliptin. Initiation will be defined by no use of sitagliptin or a comparator in the prior 6 months before treatment initiation (washout period).

Comparator agents:
- Initiators of sitagliptin will be compared to initiators of-
  - 2nd generation sulfonylureas

Because sitagliptin and comparators are frequently used as second or third line treatments of T2DM, we expect it to be unlikely that sitagliptin and comparators are initiated in patients with substantially different baseline risk for proposed outcomes.

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**). These covariates are based on those used by Patorno et al. (2019).

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**: 4-point major adverse cardiovascular events (MACE), i.e., non-fatal myocardial infarction, non-fatal stroke, or CV mortality; as well as each individual component:
- Secondary outcomes: Individual MACE components:
    - Hospital admission for MI (for purposes of this individual component, fatal MI is included)
    - Hospital admission for stroke (for purposes of this individual component, fatal stroke is included)
    - Hospital admission for ACS/unstable angina
    - All-cause mortality/CV mortality:
        - All-cause inpatient mortality identified using discharge status codes will be used as a proxy for "CV mortality" in commercial databases
        - Information on CV mortality through data linkage with the National Death Index (NDI) will only become available at a later date for Medicare and will be used in secondary analyses.

Control outcomes of interest (control outcomes only serve to assess aspects of study validity but are not further interpreted):
1. Severe hypoglycemia (we expect to see protective effect; American Diabetes Association, 2018)

Control outcome definitions

Outcome	Hospital Discharge Code(s)	Comments
Severe hypoglycemia	**Severe hypoglycemia** Any-position ED or primary inpatient ICD-9 diagnosis: 251.0, 251.1x, 251.2x, or 250.8x. Outcomes identified by 250.8x are not included if they co-occur with one of the following diagnoses: 259.8, 272.7, 681.xx, 682.xx, 686.9, 707.1x, 707.2x, 707.8, 707.9, 709.3, 730.0x, 730.1x, 730.2x, 731.8	Note- The corresponding ICD-10 codes will be used also

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 liraglutide 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 (sitagliptin 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 an exposure to a comparator or any other agent in the comparator class and vice versa (e.g. switching from glimepiride to glipizide would be a censoring event);
  - A dosage change on the index treatment does not fulfill this criterion
  - An added treatment that is not part of the exposure or comparator group does not fulfill this criterion (e.g. if a sitagliptin user adds insulin, he or she does not get censored at the time of insulin augmentation)

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/640/results/26047/result/0
Marketscan: https://bwh-dope.aetion.com/#/projects/details/638/results/26040/result/0
Medicare: https://bwh-dope.aetion.com/#/projects/details/639/results/26043/result/0

Date conducted: Sep 30, 2018

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
- Report summary parameters of study population
- Report median follow-up time by treatment group
- Report reasons for censoring in the overall study population

8. Initial Power Assessment

Aetion report links:
Optum: https://bwh-dope.aetion.com/#/projects/details/640/results/26049/result/0
Marketscan: https://bwh-dope.aetion.com/#/projects/details/638/results/26050/result/0
Medicare: https://bwh-dope.aetion.com/#/projects/details/639/results/26051/result/0

Date conducted: Sep 30, 2018

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 in the subsequent sections, after incorporating feedback and refining the protocol.

Reviewed by PI:	Jessica M. Franklin	Date reviewed:	10/26/18
Reviewed by FDA:	Ken Quinto	Date reviewed:	12/11/18
Reasons for stopping analysis (if required):			

9. Balance Assessment after PS matching

Aetion report links (Sitagliptin vs. 2nd generation SUs):
Optum: https://bwh-dope.aetion.com/projects/details/640/results/44780/result/0
Marketscan: https://bwh-dope.aetion.com/projects/details/638/results/44781/result/0
Medicare: https://bwh-dope.aetion.com/projects/details/639/results/45413/result/0

Date conducted: 11/18/2019 (Medicare 11/30/2019)

After review of initial feasibility and power analyses, complete creation of the remaining covariates (see Table 1 below for list of covariates). 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 (excluding laboratory values, which are missing in some patients).

- 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	7,596 (2.17%)	4,072 (2.33%)	3,524 (2.02%)
Start of an additional exposure	22,929 (6.56%)	6,881 (3.94%)	16,048 (9.18%)
End of index exposure	210,496 (60.23%)	104,902 (60.03%)	105,594 (60.43%)
Specified date reached	36,338 (10.40%)	19,668 (11.26%)	16,670 (9.54%)
End of patient enrollment	33,356 (9.54%)	17,150 (9.81%)	16,206 (9.27%)
Switch to other SUs (for censoring) + nursing home admission	38,761 (11.09%)	22,065 (12.63%)	16,696 (9.55%)

- Report follow-up time by treatment group.

Patient Group	Median Follow-Up Time (Days) [IQR]		
	Optum	Marketscan	Medicare
Overall Patient Population	118 [58-270]	120 [58-300]	118 [58-297]
Referent	118 [58-295]	121 [58-316]	121 [58-316]
Exposure	118 [58-246]	118 [58-279]	118 [58-279]

- Report overall risk of the primary outcome.

	Optum	Marketscan	Medicare
Risk per 1,000 patients	29.17	37.73	62.67

10. Final Power Assessment

Date conducted:

- 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. If the study is to be implemented in more than one database, copy and paste excel sheet to report power for each database separately and for the pooled analysis that uses data from all databases together. Power calculations are based on the formulas from Chow et al. (2008).

  o Pooled

Non-inferiority Analysis		Superiority Analysis	
Number of patients matched		Number of patients matched	
Reference	174,738	Reference	174,738
Exposed	174,738	Exposed	174,738
Risk per 1,000 patients	43.19	Risk per 1,000 patients	43.19
Assumed HR from RCT	1	Desired HR from RCT	0.85
Alpha (2-sided)	0.05	Alpha (2-sided)	0.05
Non-inferiority margin	1.3		
Number of events expected	15093.86844	Number of events expected	15093.86844
Power	1	Power	1

- o Optum

Non-inferiority Analysis		Superiority Analysis	
Number of patients matched		Number of patients matched	
Reference	29,727	Reference	29,727
Exposed	29,727	Exposed	29,727
Risk per 1,000 patients	29.17	Risk per 1,000 patients	29.17
Assumed HR from RCT	1	Desired HR from RCT	0.85
Alpha (2-sided)	0.05	Alpha (2-sided)	0.05
Non-inferiority margin	1.3		
Number of events expected	1734.27318	Number of events expected	1734.27318
Power	0.999770031	Power	0.92278468

- o Marketscan

Non-inferiority Analysis		Superiority Analysis	
Number of patients matched		Number of patients matched	
Reference	42,600	Reference	42,600
Exposed	42,600	Exposed	42,600
Risk per 1,000 patients	37.73	Risk per 1,000 patients	37.73
Assumed HR from RCT	1	Desired HR from RCT	0.85
Alpha (2-sided)	0.05	Alpha (2-sided)	0.05
Non-inferiority margin	1.3		
Number of events expected	3214.596	Number of events expected	3214.596
Power	0.999999978	Power	0.995942377

- o Medicare

Non-inferiority Analysis		Superiority Analysis	
Number of patients matched		Number of patients matched	
Reference	102,411	Reference	102,411
Exposed	102,411	Exposed	102,411
Risk per 1,000 patients	62.67	Risk per 1,000 patients	62.67
Assumed HR from RCT	1	Desired HR from RCT	0.85
Alpha (2-sided)	0.05	Alpha (2-sided)	0.05
Non-inferiority margin	1.3		
Number of events expected	12836.19474	Number of events expected	12836.19474
Power	1	Power	1

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

advisory board. Reviewers evaluate the results of the analyses described above in Sections 9 and 10, including numbers of patients, balance in patient characteristics, follow-up time, and reasons for censoring by treatment group, as well as overall rates of outcomes and study power.

Reviewed by PI:	Jessica Franklin	Date reviewed:	12/9/19
Reviewed by FDA:	Ken Quinto	Date reviewed:	12/20/19
Reasons for stopping analysis (if required):			

11. Study Confidence and Concerns

Deadline for voting on study confidence and listing concerns: 12/20/19

- 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.

12. Register study protocol on clinicalTrials.gov

Date conducted:

- Register the study on clinicalTrials.gov and upload this document.

13. Comparative Analyses

Aetion report name:
Date conducted:

13.1   For **primary analysis**:

- In the PS-matched cohort from Section 9, calculate the HR for each outcome for sitagliptin versus 2nd generation SU patients using a Cox proportional hazards model.

13.2   For secondary analyses:

- In both pre-matched cohorts, perform asymmetrical trimming to remove patients with PS values below the 2.5th percentile of treated patients and above the 97.5th percentile of untreated patients. In the trimmed cohort, calculate the HR for canagliflozin versus referent patients using a Cox proportional hazards model, adjusting for deciles of the PS.

14. Requested Results

14.1   Results from primary and secondary analyses;

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

HR, Hazard Ratio; CI, Confidence Interval.

15. References

American Diabetes Association. 8. Pharmacologic Approaches to Glycemic Treatment: Standards of Medical Care in Diabetes-2018. Diabetes Care. 2018;41(Suppl 1):S73-S85. doi:10.2337/dc18-S008.

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

Green JB, Bethel MA, Armstrong PW, Buse JB, Engel SS, Garg J, Josse R, Kaufman KD, Koglin J, Korn S, Lachin JM. Effect of sitagliptin on cardiovascular outcomes in type 2 diabetes. New England Journal of Medicine. 2015; 373(3):232-42.

Patorno E, Pawar A, Franklin JM, et al. Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study. Circulation. 2019; in press. (https://www.ahajournals.org/doi/pdf/10.1161/CIRCULATIONAHA.118.039177)

Appendix A

#	TECOS trial definitions	Implementation in routine care	Please see the following Google Drive for further details or any missing information: https://drive.google.com/open?id=1WD618wrywYjEaXzfLTcuK-VCcnb6b-gV	
	Trial details- 2b- Failed S with NI- No label change		ICD-10 codes are not listed in this document because of excel cell size limitations and excessive number of ICD-10 codes. Full ICD-10 code lists will be available in the above Google Drive Folder (link above). ICD-9 to ICD-10 code conversions were completed using a SAS macro that implements forward/ backward mapping based on the CMS ICD-9 to ICD-10 mapping: https://www.nber.org/data/icd9-icd-10-cm-and-pcs-crosswalk-general-equivalence-mapping.html	
	EXPOSURE vs. COMPARISON		Reference/Rationale	Color coding
	Sitagliptin versus placebo	Sitagliptin vs. 2nd generation sulfonylureas		Criteria
	PRIMARY OUTCOME			Adequate mapping in claims
	The primary cardiovascular outcome was a composite of cardiovascular death, nonfatal myocardial infarction, nonfatal stroke, or hospitalization for unstable angina. **HR 0.98; 95% CI, 0.88 to 1.09; P<0.001**	Measured 1 days after drug initiation in diagnosis position specified below and inpatient care setting: **Inpatient mortality/MI/Stroke/Angina --** **For ACS/unstable angina** Any diagnosis position in inpatient care setting Discharge diagnosis ICD-9 411.xx **For MI** Any diagnosis position in inpatient care setting ICD-9 Dx 410.X (acute myocardial infarction) excluding 410.x2 (subsequent episode of care) **For stroke** Primary diagnosis position in inpatient care setting ICD-9 discharge diagnosis: 430.xx Subarachnoid hemorrhage (SAH) 431.xx Intracerebral hemorrhage (ICH) 433.x1 Occlusion and stenosis of precerebral arteries with cerebral infarction 434.xx (excluding 434.x0) Occlusion and stenosis of cerebral arteries with cerebral infarction 436.x Acute, but ill-defined cerebrovascular events **Mortality- See Mortality Sheet.**	**For MI:** →PPV 94% in Medicare claims data [Kiyota Y, Schneeweiss S, Glynn RJ, Cannuscio CC, Avorn J, Solomon DH. Accuracy of Medicare claims-based diagnosis of acute myocardial infarction: estimating positive predictive value on the basis of review of hospital records. American heart journal 2004;148:99-104.] →PPV 88.4% in commercially-insured population [Wahl PM, Rodgers K, Schneeweiss S, et al. Validation of claims-based diagnostic and procedure codes for cardiovascular and gastrointestinal serious adverse events in a commercially-insured population. Pharmacoepidemiology and Drug Safety 2010;19:596-603.] **For stroke:** PPV of 85% or higher for ischemic stroke PPV ranging from 80% to 98% for hemorrhagic stroke →[Andrade SE, Harrold LR, Tjia J, et al. A systematic review of validated methods for identifying cerebrovascular accident or transient ischemic attack using administrative data. Pharmacoepidemiology and Drug Safety 2012;21 Suppl 1:100-28.] →[Tirschwell DL, Longstreth WT, Jr. Validating administrative data in stroke research. Stroke; a journal of cerebral circulation 2002;33:2465-70.] →[Roumie CL, Mitchel E, Gideon PS, Varas-Lorenzo C, Castellsague J, Griffin MR. Validation of ICD-9 codes with a high positive predictive value for incident strokes resulting in hospitalization using Medicaid health data. Pharmacoepidemiology and drug safety 2008;17:20-6.]	Intermediate mapping in claims
	INCLUSION CRITERIA			Poor mapping or cannot be measured in claims
	Patient has T2DM with HbA1c of ≥6.5% (48 mmol/mol) and ≤8.0% (64 mmol/mol). HbA1c must be documented within 3 months prior to study enrollment, while receiving **either:**	Measured 180 days prior to drug initiation any diagnosis position in inpatient or outpatient care settings: Patients with a diagnosis of T2DM (ICD-9 Dx code of 250.x0 or 250.x2; ICD-10 Dx code of E11.x) in the 180 days prior to drug initiation in any diagnosis position and inpatient or outpatient care setting	Patorno, Elisabetta et al. "Cardiovascular outcomes associated with canagliflozin versus other non-gliflozin antidiabetic drugs: population based cohort study." BMJ 2018;360:k119 http://dx.doi.org/10.1136/bmj.k119 Patorno, Elisabetta et al. "Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study." Circulation. 2019 Apr 8. doi: 10.1161/CIRCULATIONAHA.118.039177	Can't be measured in claims but not important for the analysis
1	• Metformin, pioglitazone, or a sulfonylurea as monotherapy or any dual combination of metformin, pioglitazone, or a sulfonylurea continuously without alteration in dose for at least 3 months. Note: patients who have received insulin for only a short period (i.e. less than 14 days) during a hospitalization or for the management of acute illness will not be excluded for that reason.	Measured 91 days prior to drug initiation as any dispensing of one of the following drugs: Metformin, pioglitazone, or a sulfonylurea (monotherapy or any dual combination)		
	• A stable dose of insulin (±20% of the scheduled total daily insulin dose) either alone or in combination with a stable dose of metformin for at least 3 months. The use of supplemental/sliding scale insulin during the prior 3 months is permissible, as long as the total daily insulin dose is within ±20% of the scheduled total daily insulin dose. Note: Patients who have required modification of their usual daily insulin dose for a short period (b14 days) during a hospitalization or for the management of acute illness will not be excluded for that reason.	Measured 91 days prior to drug initiation as any dispensing of insulin (Please see AHA therapies sheet for full definition).		
2	Patient is able to see a usual care provider at least twice per year.	Measured 365 days prior to drug initiation as any 2 claims in outpatient care setting		
3	Patient is ≥50 years of age with pre-existing vascular disease, defined as **having any one of the following:**	Patient is ≥50 years of age **measured on day of drug initiation**		

Appendix A

3a	• History of a major clinical manifestation of coronary artery disease (i.e., MI, surgical or percutaneous [balloon and/or stent] coronary revascularization procedure, or coronary angiography showing at least one stenosis ≥50% in a major epicardial artery or branch vessel);	**Measured 365 days prior to drug initiation in any diagnosis/procedure position and care setting defined below:** **Inpatient or outpatient Acute MI:** 410.xx, **Inpatient or outpatient Old MI:** 412.xx Also include 414.xx (Inpatient or outpatient) **PTCA:** Inpatient CPT-4: 92973, 92982, 92984, 92995, 92996, 92920 – 92921, 92924 – 92925, 92937, 92938, 92941, 92943, 92944 OR – Inpatient or outpatient ICD-9 procedure: 00.66, 36.01, 36.02, 36.03, 36.05, 36.09 **Stenting:** Inpatient CPT-4: 92980, 92981, 92928 – 92929, 92933 - 92934 OR – Inpatient or outpatient ICD-9 procedure: 36.06, 36.07 **CABG:** Inpatient CPT-4: 33510 – 33536, 33545, 33572. OR – Inpatient or outpatient ICD-9 procedure: 36.1x, 36.2x	Patorno, Elisabetta et al. "Cardiovascular outcomes associated with canagliflozin versus other non-gliflozin antidiabetic drugs: population based cohort study." BMJ 2018;360:k119 http://dx.doi.org/10.1136/bmj.k119 Patorno, Elisabetta et al. "Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study." Circulation. 2019 Apr 8. doi: 10.1161/CIRCULATIONAHA.118.039177
3b	• Ischemic cerebrovascular disease, including:		
	◦ History of ischemic stroke. Strokes not known to be hemorrhagic will be allowed as part of this criterion;	**Measured 365 days prior to drug initiation in any diagnosis position and inpatient or outpatient care setting:** Ischemic stroke (w and w/o mention of cerebral infarction)- 433.xx, 434.xx, 436.xx	Patorno, Elisabetta et al. "Cardiovascular outcomes associated with canagliflozin versus other non-gliflozin antidiabetic drugs: population based cohort study." BMJ 2018;360:k119 http://dx.doi.org/10.1136/bmj.k119 Patorno, Elisabetta et al. "Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study." Circulation. 2019 Apr 8. doi: 10.1161/CIRCULATIONAHA.118.039177
	◦ History of carotid arterial disease as documented by ≥50% stenosis documented by carotid ultrasound, magnetic resonance imaging (MRI), or angiography, with or without symptoms of neurologic deficit.	**Measured 365 days prior to drug initiation in any diagnosis position and inpatient or outpatient care setting:** **Occlusion and stenosis of carotid artery without mention of cerebral infarction** 433.10	Patorno, Elisabetta et al. "Cardiovascular outcomes associated with canagliflozin versus other non-gliflozin antidiabetic drugs: population based cohort study." BMJ 2018;360:k119 http://dx.doi.org/10.1136/bmj.k119 Patorno, Elisabetta et al. "Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study." Circulation. 2019 Apr 8. doi: 10.1161/CIRCULATIONAHA.118.039177
	• Atherosclerotic peripheral arterial disease, as documented by objective evidence such as amputation due to vascular disease, current symptoms of intermittent claudication confirmed by an ankle brachial pressure index or toe brachial pressure index less than 0.9, or history of surgical or percutaneous revascularization procedure.	**Measured 365 days prior to drug initiation in any diagnosis/procedure position and inpatient or outpatient care setting:** **Peripheral arterial stenting or surgical revascularization** ICD-9 39.25, 39.50, 39.99. **Lower extremity amputation** ICD-9 diagnosis: V49.7x ICD-9 procedure: 84.10-84.18 CPT: 27590, 27591, 27592, 27880, 27881, 27882, 27884, 27886, 27888, 27889, 28800, 28805, 28810, 28820, 28825 **Ankle brachial pressure index <0.9** ICD-9 440.21	Patorno, Elisabetta et al. "Cardiovascular outcomes associated with canagliflozin versus other non-gliflozin antidiabetic drugs: population based cohort study." BMJ 2018;360:k119 http://dx.doi.org/10.1136/bmj.k119 Patorno, Elisabetta et al. "Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study." Circulation. 2019 Apr 8. doi: 10.1161/CIRCULATIONAHA.118.039177
4	Female patients agree to use an effective method of contraception or must not otherwise be at risk of becoming pregnant.	Since this is an inclusion criteria, it's difficult to implement the contraceptive use requirement here, but we have pregnancy as an exclusion criteria later, so this requirement is implemented then.	
5	Patient understands the study procedures, alternative treatments available, and the risks involved with the study, and voluntarily agrees to participate by providing written informed consent.	N/A	
6	Patient agrees to provide permission to obtain all medical records necessary for complete data ascertainment during the follow-up period.	N/A	
EXCLUSION CRITERIA			
1	Patient has a history of type 1 diabetes mellitus or a history of ketoacidosis.	**Measured 180 days prior to drug initiation in any diagnosis position and inpatient or outpatient care setting:** DM type 1- At least 1 inpatient or outpatient ICD-9 Dx code of 250.x1 or 250.x3 or ICD-10 Dx code of E10.x in the 6 months prior to drug initiation. Ketoacidosis 250.1x	Patorno, Elisabetta et al. "Cardiovascular outcomes associated with canagliflozin versus other non-gliflozin antidiabetic drugs: population based cohort study." BMJ 2018;360:k119 http://dx.doi.org/10.1136/bmj.k119 Patorno, Elisabetta et al. "Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study." Circulation. 2019 Apr 8. doi: 10.1161/CIRCULATIONAHA.118.039177

Appendix A

#	Criterion	Measurement	Reference
2	Patient has a history of ≥2 episodes of **severe hypoglycemia during the 12 months** prior to enrollment. Severe hypoglycemia (hypoglycemia requiring assistance) refers to instances in which the patient was sufficiently disoriented or incapacitated as to require help from another individual or from medical personnel (whether or not this assistance was actually provided).	**Measured 365 days prior to drug initiation in any diagnosis position and inpatient care setting:** 251.1x, 251.20, 962.30 Also, 250.8x as long as none of the following codes are co-occurring diagnoses (i.e. same day): 259.8, 272.7,681.xx, 682.xx, 686.9x , 707.xx , 709.3, 730.0-730.2, 731.8	Patorno, Elisabetta et al. "Cardiovascular outcomes associated with canagliflozin versus other non-gliflozin antidiabetic drugs: population based cohort study." BMJ 2018;360:k119 http://dx.doi.org/10.1136/bmj.k119 Patorno, Elisabetta et al. "Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study." Circulation. 2019 Apr 8. doi: 10.1161/CIRCULATIONAHA.118.039177
3	Patient has taken an approved or investigational DPP-4 inhibitor agent (eg, sitagliptin, alogliptin, saxagliptin, or vildagliptin), GLP-1 analogues (eg, exenatide, exenatide LAR, or liraglutide), or a thiazolidinedione other than pioglitazone within the past 3 months.	**Measured 91 days prior to drug initiation as a dispensing of one of the following drugs:** DDP-4, GLP-1, or a thiazolidinedione (other than pioglitazone). Please see full definition in the AHA therapies sheet.	
4	Patient has cirrhosis of the liver, as assessed by medical history.	**Measured 180 days prior to drug initiation in any diagnosis position and inpatient or outpatient care setting:** Liver cirrhosis- 571.2, 571.5, 571.6	Karagozian R et al. "Obesity paradox in advanced liver disease: obesity is associated with lower mortality in hospitalized patients with cirrhosis." Liver int. 2016 Oct; 1450-6. doi: 10.1111/liv.13137. Epub 2016 May 4.
5	Patient is enrolled in another experimental protocol which involves the use of an investigational drug or device, or an intervention that would interfere with the conduct of the trial.	N/A	
6	Patient has a **planned or anticipated** revascularization procedure.	N/A	
7	Pregnancy or planned pregnancy during the trial period.	**Measured 180 days prior to drug initiation in any diagnosis/procedure position and inpatient or outpatient care setting:** Refer to Pregnancy sheet.	Patorno, Elisabetta et al. "Cardiovascular outcomes associated with canagliflozin versus other non-gliflozin antidiabetic drugs: population based cohort study." BMJ 2018;360:k119 http://dx.doi.org/10.1136/bmj.k119 Patorno, Elisabetta et al. "Empagliflozin and the Risk of Heart Failure Hospitalization in Routine Clinical Care: A First Analysis from the Empagliflozin Comparative Effectiveness and Safety (EMPRISE) Study." Circulation. 2019 Apr 8. doi: 10.1161/CIRCULATIONAHA.118.039177
8	Patient has medical history that indicates a life expectancy of <2 years or might limit the individual's ability to take trial treatments for the duration of the study.	**Measured 180 days prior to drug initiation:** Exclude patients with a combined comorbidity score >=10	Gagne, Josh J et. al. "A combined comorbidity score predicted mortality in elderly patients better than existing scores." J Clin Epidemiol. 2011 Jul;64(7):749-59. doi: 10.1016/j.jclinepi.2010.10.004. Sun, Jenny W et. al. "Validation of the Combined Comorbidity Index of Charlson and Elixhauser to Predict 30-Day Mortality Across ICD-9 and ICD-10." Med Care. 2018 Sep;56(9):812. doi: 10.1097/MLR.0000000000000954.
9	Patient has a history or current evidence of any condition, therapy, lab abnormality, or other circumstance which, in the opinion of the investigator or coordinator, might pose a risk to the patient, make participation not in the patient's best interest, confound the results of the study (eg, if patient cannot comply with requirements of the study), or interfere with the patient's participation for the full duration of the study.	N/A	
10	Patient has an estimated GFR (calculated based on serum creatinine via the MDRD formula) of b30 mL/ min per 1.73 m2.	N/A	
11	Patient has a known allergy or intolerance to sitagliptin.	N/A	
12	Patient has previously been enrolled in the trial.	N/A	

Appendix A

Trial ID	
Trial Name (with web links)	TECOS
Trial Name (with pdf links)	
NCT	NCT00790205
Trial category	
Therapeutic Area	Endocrinology
RCT Category	2b- Failed S with NI- No label change
Brand Name	
Generic Name	Sitagliptin
Sponsor	Merck Sharp & Dohme Corp.
Year	2015
Measurable endpoint	Composite of cardiovascular death, nonfatal myocardial infarction, nonfatal stroke, or hospitalization for unstable angina
Exposure	Sitagliptin
Comparator	Placebo
Population	
Trial finding	HR 0.98; 95% CI, 0.88 to 1.09; P<0.001
Notes	
No. of Patients	
Non-inferiority margin	HR = 1.30
Assay Sens. Endpoint	
Assay Sens. Finding	
Ajinkya comments	
Power	power of approximately 81% to determine the superiority of sitagliptin over placebo (hazard ratio, 0.85)
Blinding	
Statistical Method	
Approval indication	

Appendix A

Mortality- Dependent on data source.

1. All-cause mortality / inpatient mortality
Identified using the vital status file-

Medicare
Identified using the discharge status codes-

Optum-
• 20 = EXPIRED
• 21 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 22 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 23 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 24 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 25 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 26 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 27 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 28 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 29 = EXPIRED TO BE DEFINED AT STATE LEVEL
• 40 = EXPIRED AT HOME (HOSPICE)
• 41 = EXPIRED IN A MEDICAL FACILITY (HOSPICE)
• 42 = EXPIRED - PLACE UNKNOWN (HOSPICE)

Truven-
• 20 - Died
• 22 - Died
• 23 - Died
• 24 - Died
• 25 - Died
• 26 - Died
• 27 - Died
• 28 - Died
• 29 - Died
• 40 - Other died status or Expired at home (Hospice claims only) (depends on year)
• 41 - Other died status or Expired in medical facility (Hospice claims only) (depends on year)

Appendix A

- 42 - Other died status or Expired - place unknown (Hospice claims only) (depends on year)
- 21 - Died or Disch./Transf. to court/law enforcement (depends on year)

2. CV mortality
Information on CV mortality through data linkage with the National Death Index (NDI) will be available for Medicare and Optum Clinformatics at a later date. We will conduct secondary analyses using CV mortality at that time.

Appendix A

Antidiabetic class	Specific agent	Notes
SGLT2-inhibitors	Canagliflozin	Approved 3/29/2013
	Dapagliflozin	
	Empagliflozin	
	Ertugliflozin	Approved Dec 21, 2017
2nd generation sulfonylureas	Glimepiride	
	Glipizide	
	Glyburide	
DPP-4 inhibitors	Alogliptin	
	Linagliptin	
	Saxagliptin	
	Sitagliptin	
GLP-1 receptor agonist (GLP1-RA)	Exenatide	
	Liraglutide	
	Albiglutide	Approved April 15, 2014 and discontinued July 26, 2017
	Dulaglutide	Approved Sep 18, 2014
	Lixisenatide	Approved July 28, 2016
	Semaglutide	Approved Dec 5, 2017
Insulin	Insulin Aspart	
	Insulin Aspart/Insulin Aspart Protamine	
	Insulin Degludec	
	Insulin Detemir	
	Insulin Glargine	
	Insulin Glulisine	
	Insulin human isophane (NPH)	
	Insulin human regular *(search with NPH, don't want bf-pk)*	
	Insulin human regular/ Insulin human isophane (NPH)	
	Insulin Lispro	
	Insulin Lispro/Insulin Lispro Protamine	
Glitazones	Pioglitazone	

Glitazones	Rosiglitazone	
Meglitinides	Nateglinide	
	Repaglinide	
Alpha-glucosidase inhibitors	Acarbose	
	Miglitol	
Pramlintide	Pramlintide	
1st generation sulfonylureas	Acetohexamide	
	Chlorpropamide	
	Tolazamide	
	Tolbutamide	

Appendix A

Pregnancy

Dx codes

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

Procedure codes

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

Appendix A

72.4 FORCEPS ROTATION OF FETAL HEAD
72.5 BREECH EXTRACTION
72.51 PARTIAL BREECH EXTRACTION WITH FORCEPS TO AFTERCOMING HEAD
72.52 OTHER PARTIAL BREECH EXTRACTION
72.53 TOTAL BREECH EXTRACTION WITH FORCEPS TO AFTERCOMING HEAD
72.54 OTHER TOTAL BREECH EXTRACTION
72.6 FORCEPS APPLICATION TO AFTERCOMING HEAD
72.7 VACUUM EXTRACTION
72.71 VACUUM EXTRACTION WITH EPISIOTOMY
72.79 OTHER VACUUM EXTRACTION
72.8 OTHER SPECIFIED INSTRUMENTAL DELIVERY
72.9 UNSPECIFIED INSTRUMENTAL DELIVERY
73.0 ARTIFICIAL RUPTURE OF MEMBRANES
73.01 INDUCTION OF LABOR BY ARTIFICIAL RUPTURE OF MEMBRANES
73.09 OTHER ARTIFICIAL RUPTURE OF MEMBRANES
73.1 OTHER SURGICAL INDUCTION OF LABOR
73.2 INTERNAL AND COMBINED VERSION AND EXTRACTION
73.21 INTERNAL AND COMBINED VERSION WITHOUT EXTRACTION
73.22 INTERNAL AND COMBINED VERSION WITH EXTRACTION
73.3 FAILED FORCEPS
73.4 MEDICAL INDUCTION OF LABOR
73.5 MANUALLY ASSISTED DELIVERY
73.51 MANUAL ROTATION OF FETAL HEAD
73.59 OTHER MANUALLY ASSISTED DELIVERY
73.6 EPISIOTOMY
73.8 OPERATIONS ON FETUS TO FACILITATE DELIVERY
73.9 OTHER OPERATIONS ASSISTING DELIVERY
73.91 EXTERNAL VERSION ASSISTING DELIVERY
73.92 REPLACEMENT OF PROLAPSED UMBILICAL CORD
73.93 INCISION OF CERVIX TO ASSIST DELIVERY
73.94 PUBIOTOMY TO ASSIST DELIVERY
73.99 OTHER OPERATIONS ASSISTING DELIVERY
74.0 CLASSICAL CESAREAN SECTION
74.1 LOW CERVICAL CESAREAN SECTION
74.2 EXTRAPERITONEAL CESAREAN SECTION

Appendix A

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

Optum	MarketScan	Medicare

BEFORE PS MATCHING		
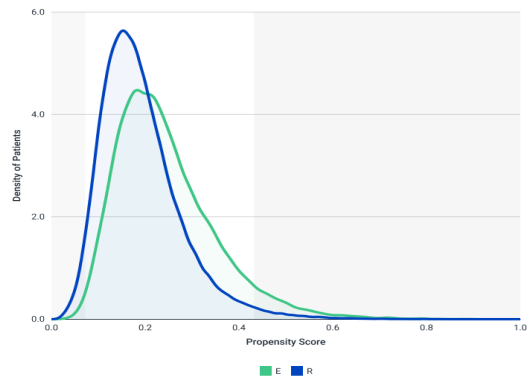
Figure 49: Pre-matching propensity score overlap
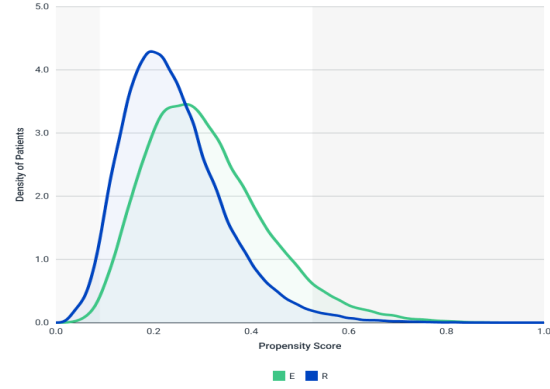
Figure 49: Pre-matching propensity score overlap
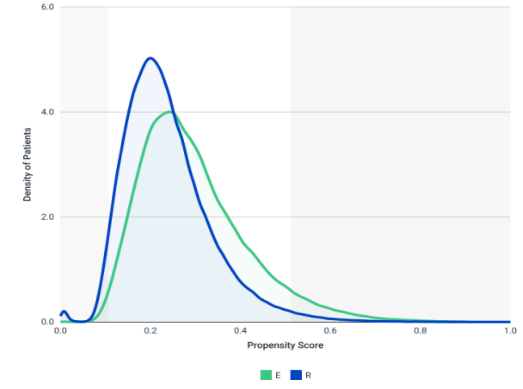
Figure 24: Pre-matching propensity score overlap

The c-statistics for the propensity score model, pre-matching was 0.657. The post-matching c-statistic was 0.52.

The c-statistics for the propensity score model, pre-matching was 0.662. The post-matching c-statistic was 0.518.

The c-statistics for the propensity score model, pre-matching was 0.651. The post-matching c-statistic was 0.511.

AFTER PS MATCHING		
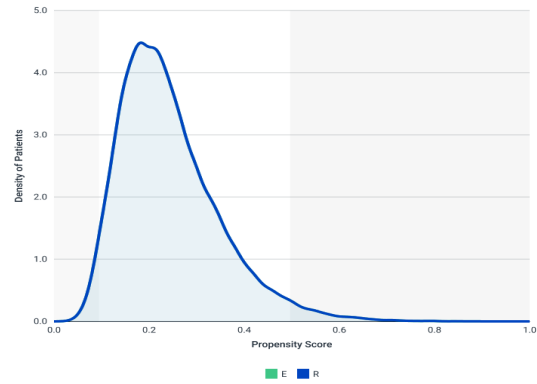
Figure 50: Post-matching propensity score overlap
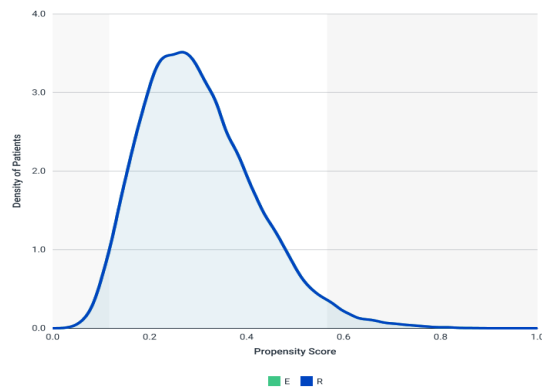
Figure 50: Post-matching propensity score overlap
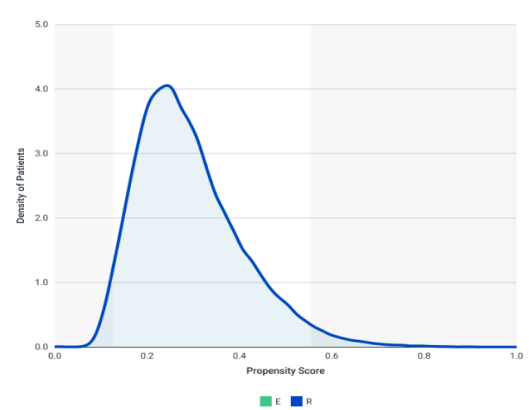
Figure 25: Post-matching propensity score overlap

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Unmatched

	Optum		MarketScan		Medicare		POOLED		
Variable	Reference-2nd Generation SUs	Exposure-Sitagliptin	Reference-2nd Generation SUs	Exposure-Sitagliptin	Reference-2nd Generation SUs	Exposure-Sitagliptin	Reference-2nd Generation SUs	Exposure-Sitagliptin	St. Diff.
Number of patients	117,685	29,759	124,594	43,306	306,304	103,677	548,583	176,742	
Age									
...mean (sd)	69.87 (9.37)	69.12 (9.34)	67.93 (10.74)	66.24 (10.14)	75.78 (7.53)	75.65 (7.46)	72.73 (8.76)	72.24 (8.52)	0.06
...median [IQR]	70.00 [63.00, 77.00]	69.00 [62.00, 76.00]	66.00 [59.00, 77.00]	64.00 [59.00, 74.00]	75.00 [70.00, 81.00]	5.00 [70.00, 81.00]	71.88 (8.76)	71.29 (8.52)	0.07
Age categories									
...18 - 54; n (%)	7,614 (6.5%)	2,061 (6.9%)	12,188 (9.8%)	4,808 (11.1%)	0 (0.0%)	0 (0.0%)	19,802 (3.6%)	6,869 (3.9%)	-0.02
...55 - 64; n (%)	26,192 (22.3%)	7,381 (24.8%)	45,377 (36.4%)	18,182 (42.0%)	5,258 (1.7%)	1,675 (1.6%)	76,827 (14.0%)	27,238 (15.4%)	-0.04
...65 - 74; n (%)	43,590 (37.0%)	11,349 (38.1%)	29,690 (23.8%)	10,347 (23.9%)	143,586 (46.9%)	49,319 (47.6%)	216,866 (39.5%)	71,015 (40.2%)	-0.01
...>=75; n (%)	40,289 (34.2%)	8,968 (30.1%)	37,339 (30.0%)	9,969 (23.0%)	157,460 (51.4%)	52,683 (50.8%)	235,088 (42.9%)	71,620 (40.5%)	0.05
Gender-									
...Males; n (%)	70,996 (60.3%)	16,783 (56.4%)	78,953 (63.4%)	26,549 (61.3%)	159,873 (52.2%)	49,637 (47.9%)	309,822 (56.5%)	92,969 (52.6%)	0.08
...Females; n (%)	46,689 (39.7%)	12,976 (43.6%)	45,641 (36.6%)	16,757 (38.7%)	146,431 (47.8%)	54,040 (52.1%)	238,761 (43.5%)	83,773 (47.4%)	-0.08
Race without zero category									
...White; n (%)	N/A	N/A	N/A	N/A	243,220 (79.4%)	78,796 (76.0%)	243,220 (79.4%)	78,796 (76.0%)	0.08
...Black; n (%)	N/A	N/A	N/A	N/A	35,871 (11.7%)	12,037 (11.6%)	35,871 (11.7%)	12,037 (11.6%)	0.00
...Asian; n (%)	N/A	N/A	N/A	N/A	7,863 (2.6%)	4,365 (4.2%)	7,863 (2.6%)	4,365 (4.2%)	-0.09
...Hispanic; n (%)	N/A	N/A	N/A	N/A	10,197 (3.3%)	4,546 (4.4%)	10,197 (3.3%)	4,546 (4.4%)	-0.06
...North American Native; n (%)	N/A	N/A	N/A	N/A	1,936 (0.6%)	527 (0.5%)	1,936 (0.6%)	527 (0.5%)	0.01
...Other/Unknown; n (%)	N/A	N/A	N/A	N/A	7,217 (2.4%)	3,406 (3.3%)	7,217 (2.4%)	3,406 (3.3%)	-0.05
Region- (lumping missing&other category with West)									
...Northeast; n (%)	11,989 (10.2%)	4,227 (14.2%)	19,997 (16.0%)	9,324 (21.5%)	53,453 (17.5%)	24,496 (23.6%)	85,439 (15.6%)	38,047 (21.5%)	-0.15
...South; n (%)	57,501 (48.9%)	15,058 (50.6%)	40,843 (32.8%)	11,503 (26.6%)	136,902 (44.7%)	42,919 (41.4%)	235,246 (42.9%)	69,480 (39.3%)	0.07
...Midwest; n (%)	24,332 (20.7%)	5,057 (17.0%)	48,364 (38.8%)	17,570 (40.6%)	72,970 (23.8%)	19,059 (18.4%)	145,666 (26.6%)	41,686 (23.6%)	0.07
...West; n (%)	23,863 (20.3%)	5,417 (18.2%)	14,184 (11.4%)	4,488 (10.4%)	42,979 (14.0%)	17,203 (16.6%)	81,026 (14.8%)	27,108 (15.3%)	-0.01
...Unknown+missing; n (%)	N/A	N/A	1,206 (1.0%)	421 (1.0%)	N/A	N/A	1,206 (1.0%)	421 (1.0%)	0.00
CV Covariates									
Ischemic heart disease; n (%)	78,804 (67.0%)	19,763 (66.4%)	79,177 (63.5%)	27,756 (64.1%)	208,853 (68.2%)	70,050 (67.6%)	366,834 (66.9%)	117,569 (66.5%)	0.01
Acute MI; n (%)	7,116 (6.0%)	1,556 (5.2%)	7,950 (6.4%)	2,449 (5.7%)	14,690 (4.8%)	4,757 (4.6%)	29,756 (5.4%)	8,762 (5.0%)	0.02
ACS/unstable angina; n (%)	6,453 (5.5%)	1,610 (5.4%)	7,089 (5.7%)	2,520 (5.8%)	12,974 (4.2%)	4,714 (4.5%)	26,516 (4.8%)	8,844 (5.0%)	-0.01
Old MI; n (%)	11,986 (10.2%)	2,817 (9.5%)	6,665 (5.3%)	2,069 (4.8%)	31,200 (10.2%)	9,830 (9.5%)	49,851 (9.1%)	14,716 (8.3%)	0.03
Stable angina; n (%)	9,950 (8.5%)	2,606 (8.8%)	8,129 (6.5%)	3,044 (7.0%)	22,435 (7.3%)	8,273 (8.0%)	40,514 (7.4%)	13,923 (7.9%)	-0.02
Coronary atherosclerosis and other forms of chronic ischemic heart disease; n (%)	74,752 (63.5%)	18,866 (63.4%)	75,286 (60.4%)	26,621 (61.5%)	201,279 (65.7%)	67,394 (65.0%)	351,317 (64.0%)	112,881 (63.9%)	0.00
Other atherosclerosis with ICD10 ; n (%)	3,467 (2.9%)	858 (2.9%)	3,167 (2.5%)	1,108 (2.6%)	10,599 (3.5%)	3,723 (3.6%)	17,233 (3.1%)	5,689 (3.2%)	-0.01
Previous cardiac procedure (CABG or PTCA or Stent) v4; n (%)	4,865 (4.1%)	1,125 (3.8%)	6,743 (5.4%)	2,291 (5.3%)	7,210 (2.4%)	2,586 (2.5%)	18,818 (3.4%)	6,002 (3.4%)	0.00
History of CABG or PTCA; n (%)	18,909 (16.1%)	4,629 (15.6%)	9,546 (7.7%)	3,482 (8.0%)	60,080 (19.6%)	19,148 (18.5%)	88,535 (16.1%)	27,259 (15.4%)	0.02
Any stroke; n (%)	25,490 (21.7%)	6,467 (21.7%)	26,317 (21.1%)	8,740 (20.2%)	73,052 (23.8%)	25,655 (24.7%)	124,859 (22.8%)	40,862 (23.1%)	-0.01
Ischemic stroke (w and w/o mention of cerebral infarction); n (%)	25,318 (21.5%)	6,437 (21.6%)	26,168 (21.0%)	8,684 (20.1%)	72,515 (23.7%)	25,469 (24.6%)	124,001 (22.6%)	40,590 (23.0%)	-0.01
Hemorrhagic stroke; n (%)	785 (0.7%)	181 (0.6%)	821 (0.7%)	273 (0.6%)	2,062 (0.7%)	741 (0.7%)	3,668 (0.7%)	1195 (0.7%)	0.00
TIA; n (%)	5,153 (4.4%)	1,294 (4.3%)	5,539 (4.4%)	1,696 (3.9%)	14,598 (4.8%)	5,155 (5.0%)	25,290 (4.6%)	8,145 (4.6%)	0.00
Other cerebrovascular disease; n (%)	5,877 (5.0%)	1,522 (5.1%)	4,899 (3.9%)	1,570 (3.6%)	18,592 (6.1%)	6,646 (6.4%)	29,368 (5.4%)	9,738 (5.5%)	0.00
Late effects of cerebrovascular disease; n (%)	6,322 (5.4%)	1,505 (5.1%)	4,660 (3.7%)	1,422 (3.3%)	19,216 (6.3%)	6,725 (6.5%)	30,198 (5.5%)	9,652 (5.5%)	0.00
Cerebrovascular procedure; n (%)	548 (0.5%)	95 (0.3%)	658 (0.5%)	185 (0.4%)	1,139 (0.4%)	370 (0.4%)	2,345 (0.4%)	650 (0.4%)	0.00
Heart failure (CHF); n (%)	24,633 (20.9%)	5,822 (19.6%)	20,633 (16.6%)	6,241 (14.4%)	74,334 (24.3%)	24,555 (23.7%)	119,600 (21.8%)	36,618 (20.7%)	0.03
Peripheral Vascular Disease (PVD) or PVD Surgery ; n (%)	17,611 (15.0%)	4,589 (15.4%)	14,270 (11.5%)	4,895 (11.3%)	60,993 (19.9%)	22,399 (21.6%)	92,874 (16.9%)	31,883 (18.0%)	-0.03
Atrial fibrillation; n (%)	17,961 (15.3%)	4,302 (14.5%)	16,153 (13.0%)	5,109 (11.8%)	64,943 (21.2%)	21,134 (20.4%)	99,057 (18.1%)	30,545 (17.3%)	0.02
Other cardiac dysrhythmia; n (%)	20,210 (17.2%)	5,107 (17.2%)	17,075 (13.7%)	5,812 (13.4%)	67,788 (22.1%)	23,313 (22.5%)	105,073 (19.2%)	34,232 (19.4%)	-0.01
Cardiac conduction disorders; n (%)	6,876 (5.8%)	1,676 (5.6%)	5,401 (4.3%)	1,770 (4.1%)	24,291 (7.9%)	7,964 (7.7%)	36,568 (6.7%)	11,410 (6.5%)	0.01
Other CVD; n (%)	28,933 (24.6%)	7,152 (24.0%)	26,394 (21.2%)	9,187 (21.2%)	86,701 (28.3%)	29,729 (28.7%)	142,028 (25.9%)	46,068 (26.1%)	0.00
Diabetes-related complications									
Diabetic retinopathy; n (%)	6,792 (5.8%)	1,907 (6.4%)	4,974 (4.0%)	1,711 (4.0%)	19,459 (6.4%)	7,094 (6.8%)	31,225 (5.7%)	10,712 (6.1%)	-0.02
Diabetes with other ophthalmic manifestations; n (%)	543 (0.5%)	145 (0.5%)	3,717 (3.0%)	1,300 (3.0%)	7,490 (2.4%)	2,860 (2.8%)	11,750 (2.1%)	4,305 (2.4%)	-0.02

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Retinal detachment, vitreous hemorrhage, vitrectomy; n (%)	502 (0.4%)	149 (0.5%)	425 (0.3%)	169 (0.4%)	1,324 (0.4%)	477 (0.5%)	2,251 (0.4%)	795 (0.4%)	0.00
Retinal laser coagulation therapy; n (%)	687 (0.6%)	173 (0.6%)	814 (0.7%)	289 (0.7%)	1,636 (0.5%)	625 (0.6%)	3,137 (0.6%)	1,087 (0.6%)	0.00
Occurrence of Diabetic Neuropathy ; n (%)	21,372 (18.2%)	5,846 (19.6%)	13,374 (10.7%)	4,906 (11.3%)	61,487 (20.1%)	22,354 (21.6%)	96,233 (17.5%)	33,106 (18.7%)	-0.03
Occurrence of diabetic nephropathy with ICD10 ; n (%)	17,094 (14.5%)	4,492 (15.1%)	6,872 (5.5%)	2,490 (5.7%)	34,763 (11.3%)	11,686 (11.3%)	58,729 (10.7%)	18,668 (10.6%)	0.00
Hypoglycemia ; n (%)	4,301 (3.7%)	1,080 (3.6%)	4,669 (3.7%)	1,322 (3.1%)	11,714 (3.8%)	4,268 (4.1%)	20,684 (3.8%)	6,670 (3.8%)	0.00
Hyperglycemia; n (%)	6,940 (5.9%)	1,796 (6.0%)	4,682 (3.8%)	1,805 (4.2%)	20,768 (6.8%)	7,619 (7.3%)	32,390 (5.9%)	11,220 (6.3%)	-0.02
Disorders of fluid electrolyte and acid-base balance; n (%)	16,879 (14.3%)	4,101 (13.8%)	12,788 (10.3%)	3,971 (9.2%)	51,918 (16.9%)	17,299 (16.7%)	81,585 (14.9%)	25,371 (14.4%)	0.01
Diabetic ketoacidosis; n (%)	8 (0.0%)	4 (0.0%)	4 (0.0%)	6 (0.0%)	59 (0.0%)	29 (0.0%)	071 (0.0%)	39 (0.0%)	#DIV/0!
Hyperosmolar hyperglycemic nonketotic syndrome (HONK); n (%)	735 (0.6%)	186 (0.6%)	558 (0.4%)	219 (0.5%)	1,883 (0.6%)	782 (0.8%)	3,176 (0.6%)	1,187 (0.7%)	-0.01
Diabetes with peripheral circulatory disorders with ICD-10 ; n (%)	10,913 (9.3%)	2,930 (9.8%)	6,325 (5.1%)	2,235 (5.2%)	30,630 (10.0%)	11,331 (10.9%)	47,868 (8.7%)	16,496 (9.3%)	-0.02
Diabetic Foot; n (%)	4,737 (4.0%)	1,128 (3.8%)	4,679 (3.8%)	1,315 (3.0%)	14,480 (4.7%)	4,711 (4.5%)	23,896 (4.4%)	7,154 (4.0%)	0.02
Gangrene ; n (%)	897 (0.8%)	213 (0.7%)	1,024 (0.8%)	259 (0.6%)	2,075 (0.7%)	645 (0.6%)	3,996 (0.7%)	1117 (0.6%)	0.01
Lower extremity amputation; n (%)	2,269 (1.9%)	560 (1.9%)	1,606 (1.3%)	406 (0.9%)	5,709 (1.9%)	1,731 (1.7%)	9,584 (1.7%)	2,697 (1.5%)	0.02
Osteomyelitis; n (%)	1,650 (1.4%)	400 (1.3%)	1,708 (1.4%)	464 (1.1%)	3,949 (1.3%)	1,281 (1.2%)	7,307 (1.3%)	2,145 (1.2%)	0.01
Skin infections ; n (%)	9,367 (8.0%)	2,364 (7.9%)	9,934 (8.0%)	3,078 (7.1%)	29,857 (9.7%)	10,257 (9.9%)	49,158 (9.0%)	15,699 (8.9%)	0.00
Erectile dysfunction; n (%)	2,941 (2.5%)	803 (2.7%)	2,179 (1.7%)	898 (2.1%)	6,731 (2.2%)	2,409 (2.3%)	11,851 (2.2%)	4,110 (2.3%)	-0.01
Diabetes with unspecified complication; n (%)	6,237 (5.3%)	1,854 (6.2%)	4,515 (3.6%)	1,863 (4.3%)	16,358 (5.3%)	6,490 (6.3%)	27,110 (4.9%)	10,207 (5.8%)	-0.04
Diabetes mellitus without mention of complications; n (%)	108,490 (92.2%)	27,552 (92.6%)	118,114 (94.8%)	41,128 (95.0%)	291,495 (95.2%)	98,958 (95.4%)	518,099 (94.4%)	167,638 (94.8%)	-0.02
Hypertension: 1 inpatient or 2 outpatient claims within 365 days; n (%)	104,710 (89.0%)	26,803 (90.1%)	89,084 (71.5%)	31,959 (73.8%)	289,155 (94.4%)	98,398 (94.9%)	482,949 (88.0%)	157,160 (88.9%)	-0.03
Hyperlipidemia ; n (%)	88,208 (75.0%)	23,829 (80.1%)	66,037 (53.0%)	26,210 (60.5%)	241,943 (79.0%)	85,290 (82.3%)	396,188 (72.2%)	135,329 (76.6%)	-0.10
Edema; n (%)	12,166 (10.3%)	3,160 (10.6%)	8,422 (6.8%)	2,900 (6.7%)	43,638 (14.2%)	15,275 (14.7%)	64,226 (11.7%)	21,335 (12.1%)	-0.01
Renal Dysfunction (non-diabetic) ; n (%)	34,556 (29.4%)	8,697 (29.2%)	24,149 (19.4%)	7,618 (17.6%)	101,983 (33.3%)	33,219 (32.0%)	160,688 (29.3%)	49,534 (28.0%)	0.03
Occurrence of acute renal disease ; n (%)	9,176 (7.8%)	2,303 (7.7%)	7,529 (6.0%)	2,364 (5.5%)	27,683 (9.0%)	9,014 (8.7%)	44,388 (8.1%)	13,681 (7.7%)	0.01
Occurrence of chronic renal insufficiency; n (%)	26,299 (22.3%)	6,629 (22.3%)	15,567 (12.5%)	4,810 (11.1%)	80,327 (26.2%)	25,599 (24.7%)	122,193 (22.3%)	37,038 (21.0%)	0.03
Chronic kidney disease ; n (%)	25,427 (21.6%)	6,414 (21.6%)	15,096 (12.1%)	4,651 (10.7%)	76,724 (25.0%)	24,322 (23.5%)	117,247 (21.4%)	35,387 (20.0%)	0.03
CKD Stage 3-4; n (%)	16,485 (14.0%)	4,165 (14.0%)	9,049 (7.3%)	2,907 (6.7%)	50,577 (16.5%)	15,911 (15.3%)	76,111 (13.9%)	22,983 (13.0%)	0.03
Occurrence of hypertensive nephropathy; n (%)	13,898 (11.8%)	3,469 (11.7%)	7,405 (5.9%)	2,248 (5.2%)	44,203 (14.4%)	13,558 (13.1%)	65,506 (11.9%)	19,275 (10.9%)	0.03
Occurrence of miscellaneous renal insufficiency ; n (%)	11,417 (9.7%)	2,848 (9.6%)	8,521 (6.8%)	2,733 (6.3%)	36,288 (11.8%)	12,083 (11.7%)	56,226 (10.2%)	17,664 (10.0%)	0.01
Glaucoma or cataracts ; n (%)	22,045 (18.7%)	6,100 (20.5%)	19,768 (15.9%)	7,152 (16.5%)	75,520 (24.7%)	28,078 (27.1%)	117,333 (21.4%)	41,330 (23.4%)	-0.05
Cellulitis or abscess of toe; n (%)	2,530 (2.1%)	580 (1.9%)	1,977 (1.6%)	612 (1.4%)	6,701 (2.2%)	2,284 (2.2%)	11,208 (2.0%)	3,476 (2.0%)	0.00
Foot ulcer; n (%)	4,764 (4.0%)	1,126 (3.8%)	4,802 (3.9%)	1,346 (3.1%)	14,632 (4.8%)	4,749 (4.6%)	24,198 (4.4%)	7,221 (4.1%)	0.01
Bladder stones; n (%)	222 (0.2%)	47 (0.2%)	201 (0.2%)	57 (0.1%)	754 (0.2%)	262 (0.3%)	1,177 (0.2%)	366 (0.2%)	0.00
Kidney stones; n (%)	3,129 (2.7%)	875 (2.9%)	3,063 (2.5%)	1,111 (2.6%)	10,287 (3.4%)	3,806 (3.7%)	16,479 (3.0%)	5,792 (3.3%)	-0.02
Urinary tract infections (UTIs); n (%)	15,015 (12.8%)	3,954 (13.3%)	11,397 (9.1%)	3,910 (9.0%)	58,284 (19.0%)	22,343 (21.6%)	84,696 (15.4%)	30,207 (17.1%)	-0.05
Dipstick urinalysis; n (%)	41,828 (35.5%)	12,029 (40.4%)	36,355 (29.2%)	14,111 (32.6%)	136,259 (44.5%)	50,061 (48.3%)	214,442 (39.1%)	76,201 (43.1%)	-0.08
Non-dipstick urinalysis; n (%)	36,680 (31.2%)	10,741 (36.1%)	24,847 (19.9%)	10,552 (24.4%)	99,581 (32.5%)	36,845 (35.5%)	161,108 (29.4%)	58,138 (32.9%)	-0.08
Urine function test; n (%)	3,685 (3.1%)	966 (3.2%)	4,130 (3.3%)	1,563 (3.6%)	13,705 (4.5%)	5,353 (5.2%)	21,520 (3.9%)	7,882 (4.5%)	-0.03
Cytology; n (%)	2,085 (1.8%)	508 (1.7%)	2,891 (2.3%)	1,038 (2.4%)	6,823 (2.2%)	2,478 (2.4%)	11,799 (2.2%)	4,024 (2.3%)	-0.01
Cystos; n (%)	2,560 (2.2%)	656 (2.2%)	3,232 (2.6%)	1,103 (2.5%)	8,994 (2.9%)	3,007 (2.9%)	14,786 (2.7%)	4,766 (2.7%)	0.00
Other Covariates									
Liver disease; n (%)	5,430 (4.6%)	1,451 (4.9%)	4,661 (3.7%)	1,750 (4.0%)	14,982 (4.9%)	5,840 (5.6%)	25,073 (4.6%)	9,041 (5.1%)	-0.02
Osteoarthritis; n (%)	21,010 (17.9%)	5,685 (19.1%)	16,332 (13.1%)	5,835 (13.5%)	81,257 (26.5%)	30,002 (28.9%)	118,599 (21.6%)	41,522 (23.5%)	-0.05
Other arthritis, arthropathies and musculoskeletal pain; n (%)	49,144 (41.8%)	13,202 (44.4%)	45,060 (36.2%)	16,081 (37.1%)	161,043 (52.6%)	58,296 (56.2%)	255,247 (46.5%)	87,579 (49.6%)	-0.06
Dorsopathies; n (%)	27,972 (23.8%)	7,679 (25.8%)	24,944 (20.0%)	9,217 (21.3%)	93,330 (30.5%)	33,983 (32.8%)	146,246 (26.7%)	50,879 (28.8%)	-0.05
Fractures; n (%)	5,255 (4.5%)	1,326 (4.5%)	5,354 (4.3%)	1,717 (4.0%)	18,468 (6.0%)	6,509 (6.3%)	29,077 (5.3%)	9,552 (5.4%)	0.00
Falls ; n (%)	6,284 (5.3%)	1,678 (5.6%)	1,959 (1.6%)	682 (1.6%)	23,069 (7.5%)	8,086 (7.8%)	31,312 (5.7%)	10,446 (5.9%)	-0.01
Osteoporosis; n (%)	6,103 (5.2%)	1,964 (6.6%)	4,918 (3.9%)	1,875 (4.3%)	24,889 (8.1%)	11,921 (11.5%)	35,910 (6.5%)	15,760 (8.9%)	-0.09
Hyperthyroidism; n (%)	847 (0.7%)	274 (0.9%)	612 (0.5%)	277 (0.6%)	3,328 (1.1%)	1,334 (1.3%)	4,787 (0.9%)	1,885 (1.1%)	-0.02
Hypothyroidism ; n (%)	17,253 (14.7%)	5,020 (16.9%)	11,089 (8.9%)	4,678 (10.8%)	50,836 (16.6%)	19,054 (18.4%)	79,178 (14.4%)	28,752 (16.3%)	-0.05
Other disorders of thyroid gland ; n (%)	3,725 (3.2%)	1,301 (4.4%)	3,046 (2.4%)	1,586 (3.7%)	12,920 (4.2%)	5,825 (5.6%)	19,691 (3.6%)	8,712 (4.9%)	-0.06
Depression; n (%)	12,117 (10.3%)	3,389 (11.4%)	9,066 (7.3%)	3,262 (7.5%)	44,576 (14.6%)	16,859 (16.3%)	65,759 (12.0%)	23,510 (13.3%)	-0.04
Anxiety; n (%)	9,087 (7.7%)	2,673 (9.0%)	5,448 (4.4%)	2,120 (4.9%)	34,453 (11.2%)	12,747 (12.3%)	48,988 (8.9%)	17,540 (9.9%)	-0.03
Sleep_Disorder; n (%)	11,137 (9.5%)	3,176 (10.7%)	12,982 (10.4%)	5,001 (11.5%)	33,719 (11.0%)	11,667 (11.3%)	57,838 (10.5%)	19,844 (11.2%)	-0.02
Dementia; n (%)	8,913 (7.6%)	2,271 (7.6%)	6,575 (5.3%)	1,940 (4.5%)	39,772 (13.0%)	14,957 (14.4%)	55,260 (10.1%)	19,168 (10.8%)	-0.02
Delirium; n (%)	3,536 (3.1%)	915 (3.1%)	3,307 (2.7%)	1,004 (2.3%)	13,751 (4.5%)	5,106 (4.9%)	20,594 (3.8%)	7,025 (4.0%)	-0.01
Psychosis; n (%)	2,382 (2.0%)	617 (2.1%)	2,097 (1.7%)	598 (1.4%)	11,025 (3.6%)	3,967 (3.8%)	15,504 (2.8%)	5,182 (2.9%)	-0.01
Obesity; n (%)	18,267 (15.5%)	5,260 (17.7%)	11,002 (8.8%)	4,542 (10.5%)	45,865 (15.0%)	16,121 (15.5%)	75,134 (13.7%)	25,923 (14.7%)	-0.03
Overweight; n (%)	4,108 (3.5%)	1,280 (4.3%)	1,273 (1.0%)	626 (1.4%)	10,394 (3.4%)	3,782 (3.6%)	15,775 (2.9%)	5,688 (3.2%)	-0.02

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Smoking; n (%)	18,795 (16.0%)	4,685 (15.7%)	9,206 (7.4%)	3,169 (7.3%)	62,562 (20.4%)	19,676 (19.0%)	90,563 (16.5%)	27,530 (15.6%)	0.02
Alcohol abuse or dependence; n (%)	1,421 (1.2%)	287 (1.0%)	966 (0.8%)	270 (0.6%)	2,989 (1.0%)	901 (0.9%)	5,376 (1.0%)	1,458 (0.8%)	0.02
Drug abuse or dependence; n (%)	1,825 (1.6%)	474 (1.6%)	875 (0.7%)	264 (0.6%)	4,320 (1.4%)	1,453 (1.4%)	7,020 (1.3%)	2,191 (1.2%)	0.01
COPD; n (%)	19,735 (16.8%)	4,681 (15.7%)	15,832 (12.7%)	4,907 (11.3%)	61,237 (20.0%)	20,088 (19.4%)	96,804 (17.6%)	29,676 (16.8%)	0.02
Asthma; n (%)	7,433 (6.3%)	2,141 (7.2%)	6,080 (4.9%)	2,268 (5.2%)	23,366 (7.6%)	8,761 (8.5%)	36,879 (6.7%)	13,170 (7.5%)	-0.03
Obstructive sleep apnea; n (%)	10,664 (9.1%)	3,106 (10.4%)	10,321 (8.3%)	4,281 (9.9%)	26,855 (8.8%)	9,150 (8.8%)	47,840 (8.7%)	16,537 (9.4%)	-0.02
Pneumonia; n (%)	7,668 (6.5%)	1,657 (5.6%)	7,710 (6.2%)	2,240 (5.2%)	23,525 (7.7%)	7,763 (7.5%)	38,903 (7.1%)	11,660 (6.6%)	0.02
Imaging; n (%)	634 (0.5%)	128 (0.4%)	394 (0.3%)	119 (0.3%)	1,614 (0.5%)	554 (0.5%)	2,642 (0.5%)	801 (0.5%)	0.00
Diabetes Medications									
DM Medications - AGIs; n (%)	372 (0.3%)	96 (0.3%)	376 (0.3%)	139 (0.3%)	1,037 (0.3%)	431 (0.4%)	1,785 (0.3%)	666 (0.4%)	-0.02
DM Medications - Glitazones; n (%)	8,229 (7.0%)	2,709 (9.1%)	10,908 (8.8%)	4,523 (10.4%)	12,093 (3.9%)	6,087 (5.9%)	31,230 (5.7%)	13,319 (7.5%)	-0.07
DM Medications - GLP-1 RA; n (%)	509 (0.4%)	191 (0.6%)	563 (0.5%)	188 (0.4%)	850 (0.3%)	342 (0.3%)	1,922 (0.4%)	#VALUE!	#VALUE!
DM Medications - Insulin; n (%)	15,960 (13.6%)	5,836 (19.6%)	15,477 (12.4%)	6,702 (15.5%)	49,256 (16.1%)	22,937 (22.1%)	80,693 (14.7%)	35,475 (20.1%)	-0.14
DM Medications - Meglitinides; n (%)	942 (0.8%)	677 (2.3%)	1,640 (1.3%)	1,574 (3.6%)	3,540 (1.2%)	3,201 (3.1%)	6,122 (1.1%)	5,452 (3.1%)	-0.14
DM Medications - Metformin; n (%)	56,560 (48.1%)	17,047 (57.3%)	58,461 (46.9%)	25,481 (58.8%)	135,361 (44.2%)	57,121 (55.1%)	250,382 (45.6%)	99,649 (56.4%)	-0.22
Concomitant initiation or current use of SGLT2i; n (%)	994 (0.8%)	436 (1.5%)	690 (0.6%)	575 (1.3%)	1,805 (0.6%)	1,291 (1.2%)	3,489 (0.6%)	2,302 (1.3%)	-0.07
Concomitant initiation or current use of AGIs; n (%)	253 (0.2%)	64 (0.2%)	280 (0.2%)	92 (0.2%)	704 (0.2%)	304 (0.3%)	1,237 (0.2%)	460 (0.3%)	-0.02
Concomitant initiation or current use of Glitazones; n (%)	5,587 (4.7%)	1,440 (4.8%)	7,210 (5.8%)	2,282 (5.3%)	7,638 (2.5%)	3,431 (3.3%)	20,435 (3.7%)	7,153 (4.0%)	-0.02
Concomitant initiation or current use of GLP-1 RA; n (%)	227 (0.2%)	68 (0.2%)	312 (0.3%)	57 (0.1%)	327 (0.1%)	113 (0.1%)	#VALUE!	#VALUE!	#VALUE!
Concomitant initiation or current use of Insulin; n (%)	10,116 (8.6%)	3,986 (13.4%)	9,739 (7.8%)	4,333 (10.0%)	31,424 (10.3%)	15,966 (15.4%)	51,279 (9.3%)	24,285 (13.7%)	-0.14
Concomitant initiation or current use of Meglitinides; n (%)	535 (0.5%)	485 (1.6%)	950 (0.8%)	1,104 (2.5%)	2,171 (0.7%)	2,367 (2.3%)	3,656 (0.7%)	3,956 (2.2%)	-0.13
Concomitant initiation or current use of Metformin; n (%)	42,837 (36.4%)	13,655 (45.9%)	44,541 (35.7%)	20,708 (47.8%)	98,310 (32.1%)	44,919 (43.3%)	185,688 (33.8%)	79,282 (44.9%)	-0.23
Past use of SGLT2i; n (%)	445 (0.4%)	209 (0.7%)	315 (0.3%)	214 (0.5%)	1,055 (0.3%)	568 (0.5%)	1,815 (0.3%)	991 (0.6%)	-0.04
Past use of AGIs ; n (%)	119 (0.1%)	32 (0.1%)	96 (0.1%)	47 (0.1%)	333 (0.1%)	127 (0.1%)	548 (0.1%)	206 (0.1%)	0.00
Past use of Glitazones ; n (%)	2,642 (2.2%)	1,269 (4.3%)	3,699 (3.0%)	2,241 (5.2%)	4,455 (1.5%)	2,656 (2.6%)	10,796 (2.0%)	6,166 (3.5%)	-0.09
Past use of GLP-1 RA ; n (%)	292 (0.2%)	124 (0.4%)	255 (0.2%)	134 (0.3%)	523 (0.2%)	229 (0.2%)	1,070 (0.2%)	487 (0.3%)	-0.02
Past use of Insulin ; n (%)	5,844 (5.0%)	1,850 (6.2%)	5,738 (4.6%)	2,370 (5.5%)	17,835 (5.8%)	6,974 (6.7%)	29,417 (5.4%)	11,194 (6.3%)	-0.04
Past use of Meglitinides ; n (%)	407 (0.3%)	192 (0.6%)	690 (0.6%)	470 (1.1%)	1,369 (0.4%)	834 (0.8%)	2,466 (0.4%)	1,496 (0.8%)	-0.05
Past use of metformin (final) ; n (%)	13,723 (11.7%)	3,392 (11.4%)	13,920 (11.2%)	4,773 (11.0%)	37,051 (12.1%)	12,202 (11.8%)	64,694 (11.8%)	20,367 (11.5%)	0.01
Other Medications									
Use of ACE inhibitors; n (%)	54,239 (46.1%)	12,202 (41.0%)	56,542 (45.4%)	18,022 (41.6%)	131,273 (42.9%)	40,555 (39.1%)	242,054 (44.1%)	70,779 (40.0%)	0.08
Use of ARBs; n (%)	25,030 (21.3%)	8,315 (27.9%)	28,565 (22.9%)	12,351 (28.5%)	76,768 (25.1%)	32,742 (31.6%)	130,363 (23.8%)	53,408 (30.2%)	-0.14
Use of Loop Diuretics - ; n (%)	28,952 (24.6%)	6,708 (22.5%)	30,314 (24.3%)	9,013 (20.8%)	93,126 (30.4%)	29,520 (28.5%)	152,392 (27.8%)	45,241 (25.6%)	0.05
Use of other diuretics- ; n (%)	5,674 (4.8%)	1,464 (4.9%)	6,178 (5.0%)	2,066 (4.8%)	17,047 (5.6%)	5,658 (5.5%)	28,899 (5.3%)	9,188 (5.2%)	0.00
Use of nitrates-; n (%)	17,689 (15.0%)	4,233 (14.2%)	21,232 (17.0%)	6,834 (15.8%)	52,053 (17.0%)	17,114 (16.5%)	90,974 (16.6%)	28,181 (15.9%)	0.02
Use of other hypertension drugs; n (%)	12,758 (10.8%)	2,776 (9.3%)	12,657 (10.2%)	3,485 (8.0%)	37,331 (12.2%)	11,366 (11.0%)	62,746 (11.4%)	17,627 (10.0%)	0.05
Use of digoxin-; n (%)	5,809 (4.9%)	1,265 (4.3%)	7,057 (5.7%)	2,115 (4.9%)	17,623 (5.8%)	5,746 (5.5%)	30,489 (5.6%)	9,126 (5.2%)	0.02
Use of Anti-arrhythmics; n (%)	4,023 (3.4%)	1,037 (3.5%)	5,048 (4.1%)	1,661 (3.8%)	13,423 (4.4%)	4,451 (4.3%)	22,494 (4.1%)	7,149 (4.0%)	0.01
Use of COPD/asthma meds- ; n (%)	18,132 (15.4%)	5,349 (18.0%)	20,060 (16.1%)	7,587 (17.5%)	57,441 (18.8%)	22,852 (22.0%)	95,633 (17.4%)	35,788 (20.2%)	-0.07
Use of statins; n (%)	78,990 (67.1%)	21,287 (71.5%)	84,053 (67.5%)	31,003 (71.6%)	212,184 (69.3%)	75,861 (73.2%)	375,227 (68.4%)	128,151 (72.5%)	-0.09
Use of other lipid-lowering drugs; n (%)	14,917 (12.7%)	4,648 (15.6%)	20,396 (16.4%)	8,393 (19.4%)	36,070 (11.8%)	14,623 (14.1%)	71,383 (13.0%)	27,664 (15.7%)	-0.08
Use of antiplatelet agents; n (%)	32,387 (27.5%)	8,801 (29.6%)	40,482 (32.5%)	14,677 (33.9%)	84,313 (27.5%)	30,711 (29.6%)	157,182 (28.7%)	54,189 (30.7%)	-0.04
Use of oral anticoagulants (Dabigatran, Rivaroxaban, Apixaban, Warfarin); n (%)	13,819 (11.7%)	3,377 (11.3%)	15,147 (12.2%)	4,720 (10.9%)	48,289 (15.8%)	15,695 (15.1%)	77,255 (14.1%)	23,792 (13.5%)	0.02
Use of heparin and other low-molecular weight heparins; n (%)	1,120 (1.0%)	249 (0.8%)	84 (0.1%)	31 (0.1%)	2,943 (1.0%)	937 (0.9%)	4,147 (0.8%)	1,217 (0.7%)	0.01
Use of NSAIDs; n (%)	14,354 (12.2%)	4,038 (13.6%)	15,019 (12.1%)	5,782 (13.4%)	42,896 (14.0%)	17,195 (16.6%)	72,269 (13.2%)	27,015 (15.3%)	-0.06
Use of oral corticosteroids; n (%)	20,557 (17.5%)	5,245 (17.6%)	21,988 (17.6%)	7,546 (17.4%)	66,685 (21.8%)	22,585 (21.8%)	109,230 (19.9%)	35,376 (20.0%)	0.00
Use of bisphosphonate (); n (%)	2,897 (2.5%)	926 (3.1%)	3,145 (2.5%)	1,139 (2.6%)	9,018 (2.9%)	4,530 (4.4%)	15,060 (2.7%)	6,595 (3.7%)	-0.06
Use of opioids- ; n (%)	35,963 (30.6%)	9,123 (30.7%)	40,525 (32.5%)	13,385 (30.9%)	100,549 (32.8%)	33,144 (32.0%)	177,037 (32.3%)	55,652 (31.5%)	0.02
Use of antidepressants; n (%)	27,916 (23.7%)	7,888 (26.5%)	28,755 (23.1%)	10,402 (24.0%)	86,397 (28.2%)	32,027 (30.9%)	143,068 (26.1%)	50,317 (28.5%)	-0.05
Use of antipsychotics; n (%)	3,309 (2.8%)	989 (3.3%)	3,200 (2.6%)	1,004 (2.3%)	13,359 (4.4%)	5,613 (5.4%)	19,868 (3.6%)	7,606 (4.3%)	-0.04
Use of anticonvulsants; n (%)	19,086 (16.2%)	5,320 (17.9%)	17,058 (13.7%)	6,022 (13.9%)	62,576 (20.4%)	22,838 (22.0%)	98,720 (18.0%)	34,180 (19.3%)	-0.03
Use of lithium-; n (%)	152 (0.1%)	46 (0.2%)	176 (0.1%)	63 (0.1%)	380 (0.1%)	124 (0.1%)	708 (0.1%)	233 (0.1%)	0.00
Use of Benzos-; n (%)	11,453 (9.7%)	3,378 (11.4%)	17,055 (13.7%)	5,882 (13.6%)	37,412 (12.2%)	13,247 (12.8%)	65,920 (12.0%)	22,507 (12.7%)	-0.02
Use of anxiolytics/hypnotics- ; n (%)	7,983 (6.8%)	2,254 (7.6%)	9,769 (7.8%)	3,688 (8.5%)	22,911 (7.5%)	9,271 (8.9%)	40,663 (7.4%)	15,213 (8.6%)	-0.04
Use of dementia meds- ; n (%)	4,036 (3.4%)	1,145 (3.8%)	4,105 (3.3%)	1,213 (2.8%)	20,223 (6.6%)	8,743 (8.4%)	28,364 (5.2%)	11,101 (6.3%)	-0.05
Use of antiparkinsonian meds-; n (%)	3,220 (2.7%)	916 (3.1%)	3,571 (2.9%)	1,193 (2.8%)	12,914 (4.2%)	4,733 (4.6%)	19,705 (3.6%)	6,842 (3.9%)	-0.02
Any use of pramlintide; n (%)	17 (0.0%)	9 (0.0%)	49 (0.1%)	37 (0.1%)	24 (0.0%)	29 (0.0%)	090 (0.0%)	075 (0.0%)	#DIV/0!
Any use of 1st generation sulfonylureas; n (%)	80 (0.1%)	11 (0.0%)	190 (0.2%)	15 (0.0%)	210 (0.1%)	27 (0.0%)	480 (0.1%)	053 (0.0%)	0.00
Entresto (sacubitril/valsartan); n (%)	189 (0.2%)	65 (0.2%)	44 (0.0%)	20 (0.0%)	248 (0.1%)	120 (0.1%)	481 (0.1%)	205 (0.1%)	0.00

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Initiation as monotherapy v4 ; n (%)	30,107 (25.6%)	7,242 (24.3%)	29,945 (24.0%)	10,416 (24.1%)	63,712 (20.8%)	20,833 (20.1%)	123,764 (22.6%)	38,491 (21.8%)	0.02
Labs							242,279	73,065	
Lab values- HbA1c (%) ; n (%)	29,636 (25.2%)	8,836 (29.7%)	4,979 (4.0%)	1,899 (4.4%)	N/A	N/A	34,615 (14.3%)	10,735 (14.7%)	-0.01
Lab values- HbA1c (%) (within 3 months) ; n (%)	22,154 (18.8%)	6,713 (22.6%)	3,792 (3.0%)	1,466 (3.4%)	N/A	N/A	25,946 (10.7%)	8,179 (11.2%)	-0.02
Lab values- HbA1c (%) (within 6 months) ; n (%)	29,636 (25.2%)	8,836 (29.7%)	4,979 (4.0%)	1,899 (4.4%)	N/A	N/A	34,615 (14.3%)	10,735 (14.7%)	-0.01
Lab values- BNP; n (%)	1,183 (1.0%)	355 (1.2%)	168 (0.1%)	74 (0.2%)	N/A	N/A	1,351 (0.6%)	429 (0.6%)	0.00
Lab values- BNP (within 3 months); n (%)	761 (0.6%)	220 (0.7%)	112 (0.1%)	54 (0.1%)	N/A	N/A	873 (0.4%)	274 (0.4%)	0.00
Lab values- BNP (within 6 months); n (%)	1,183 (1.0%)	355 (1.2%)	168 (0.1%)	74 (0.2%)	N/A	N/A	1,351 (0.6%)	429 (0.6%)	0.00
Lab values- BUN (mg/dl); n (%)	32,750 (27.8%)	9,782 (32.9%)	4,699 (3.8%)	2,083 (4.8%)	N/A	N/A	37,449 (15.5%)	11,865 (16.2%)	-0.02
Lab values- BUN (mg/dl) (within 3 months); n (%)	24,568 (20.9%)	7,492 (25.2%)	3,526 (2.8%)	1,589 (3.7%)	N/A	N/A	28,094 (11.6%)	9,081 (12.4%)	-0.02
Lab values- BUN (mg/dl) (within 6 months); n (%)	32,750 (27.8%)	9,782 (32.9%)	4,699 (3.8%)	2,083 (4.8%)	N/A	N/A	37,449 (15.5%)	11,865 (16.2%)	-0.02
Lab values- Creatinine (mg/dl) ; n (%)	33,612 (28.6%)	10,026 (33.7%)	4,992 (4.0%)	2,214 (5.1%)	N/A	N/A	38,604 (15.9%)	12,240 (16.8%)	-0.02
Lab values- Creatinine (mg/dl) (within 3 months) ; n (%)	25,223 (21.4%)	7,691 (25.8%)	3,751 (3.0%)	1,680 (3.9%)	N/A	N/A	28,974 (12.0%)	9,371 (12.8%)	-0.02
Lab values- Creatinine (mg/dl) (within 6 months) ; n (%)	33,612 (28.6%)	10,026 (33.7%)	4,992 (4.0%)	2,214 (5.1%)	N/A	N/A	38,604 (15.9%)	12,240 (16.8%)	-0.02
Lab values- HDL level (mg/dl); n (%)	25,367 (21.6%)	7,868 (26.4%)	4,371 (3.5%)	1,733 (4.0%)	N/A	N/A	29,738 (12.3%)	9,601 (13.1%)	-0.02
Lab values- HDL level (mg/dl) (within 3 months); n (%)	17,842 (15.2%)	5,652 (19.0%)	3,126 (2.5%)	1,273 (2.9%)	N/A	N/A	20,968 (8.7%)	6,925 (9.5%)	-0.03
Lab values- HDL level (mg/dl) (within 6 months); n (%)	25,367 (21.6%)	7,868 (26.4%)	4,371 (3.5%)	1,733 (4.0%)	N/A	N/A	29,738 (12.3%)	9,601 (13.1%)	-0.02
Lab values- LDL level (mg/dl) ; n (%)	26,132 (22.2%)	8,058 (27.1%)	4,734 (3.8%)	1,843 (4.3%)	N/A	N/A	30,866 (12.7%)	9,901 (13.6%)	-0.03
Lab values- LDL level (mg/dl) (within 3 months) ; n (%)	18,361 (15.6%)	5,776 (19.4%)	3,399 (2.7%)	1,353 (3.1%)	N/A	N/A	21,760 (9.0%)	7,129 (9.8%)	-0.03
Lab values- LDL level (mg/dl) (within 6 months) ; n (%)	26,132 (22.2%)	8,058 (27.1%)	4,734 (3.8%)	1,843 (4.3%)	N/A	N/A	30,866 (12.7%)	9,901 (13.6%)	-0.03
Lab values- NT-proBNP; n (%)	147 (0.1%)	44 (0.1%)	13 (0.0%)	4 (0.0%)	N/A	N/A	160 (0.1%)	48 (0.1%)	0.00
Lab values- NT-proBNP (within 3 months); n (%)	87 (0.1%)	20 (0.1%)	7 (0.0%)	2 (0.0%)	N/A	N/A	94 (0.0%)	22 (0.0%)	-
Lab values- NT-proBNP (within 6 months); n (%)	147 (0.1%)	44 (0.1%)	13 (0.0%)	4 (0.0%)	N/A	N/A	160 (0.1%)	48 (0.1%)	-
Lab values- Total cholesterol (mg/dl) ; n (%)	25,813 (21.9%)	7,987 (26.8%)	4,557 (3.7%)	1,811 (4.2%)	N/A	N/A	30,370 (12.5%)	9,798 (13.4%)	-0.03
Lab values- Total cholesterol (mg/dl) (within 3 months) ; n (%)	18,137 (15.4%)	5,731 (19.3%)	3,255 (2.6%)	1,323 (3.1%)	N/A	N/A	21,392 (8.8%)	7,054 (9.7%)	-0.03
Lab values- Total cholesterol (mg/dl) (within 6 months) ; n (%)	25,813 (21.9%)	7,987 (26.8%)	4,557 (3.7%)	1,811 (4.2%)	N/A	N/A	30,370 (12.5%)	9,798 (13.4%)	-0.03
Lab values- Triglyceride level (mg/dl); n (%)	25,491 (21.7%)	7,878 (26.5%)	4,465 (3.6%)	1,779 (4.1%)	N/A	N/A	29,956 (12.4%)	9,657 (13.2%)	-0.02
Lab values- Triglyceride level (mg/dl) (within 3 months); n (%)	17,919 (15.2%)	5,649 (19.0%)	3,196 (2.6%)	1,307 (3.0%)	N/A	N/A	21,115 (8.7%)	6,956 (9.5%)	-0.03
Lab values- Triglyceride level (mg/dl) (within 6 months); n (%)	25,491 (21.7%)	7,878 (26.5%)	4,465 (3.6%)	1,779 (4.1%)	N/A	N/A	29,956 (12.4%)	9,657 (13.2%)	-0.02
Lab result number- HbA1c (%) mean (only 2 to 20 included) v4	29,363	8,750	4,334	1,833	N/A	N/A	33,697	10,583	
...mean (sd)	7.89 (1.77)	7.78 (1.69)	8.01 (1.85)	7.92 (1.76)	N/A	N/A	7.91 (1.78)	7.80 (1.70)	0.06
...median [IQR]	7.45 [6.70, 8.65]	7.40 [6.60, 8.50]	7.50 [6.70, 8.80]	7.50 [6.70, 8.70]	N/A	N/A	7.46 (1.78)	7.42 (1.70)	0.02
...Missing; n (%)	88,322 (75.0%)	21,009 (70.6%)	120,260 (96.5%)	41,473 (95.8%)	N/A	N/A	208,582 (86.1%)	62,482 (85.5%)	0.02
Lab result number- BNP mean	1,183	355	168	74	N/A	N/A	1,351	429	
...mean (sd)	302.70 (552.45)	212.12 (352.66)	339.91 (671.94)	210.76 (314.60)	N/A	N/A	307.33 (568.82)	211.89 (346.86)	0.20
...median [IQR]	127.33 [46.80, 331.80]	106.50 [36.60, 238.00]	93.50 [37.50, 330.50]	100.50 [30.75, 261.62]	N/A	N/A	#VALUE!	105.47 (346.86)	#VALUE!
...Missing; n (%)	116,502 (99.0%)	29,404 (98.8%)	124,426 (99.9%)	43,232 (99.8%)	N/A	N/A	240,928 (99.4%)	72,636 (99.4%)	0.00
Lab result number- BUN (mg/dl) mean	32,750	9,782	4,699	2,083	N/A	N/A	37,449	11,865	
...mean (sd)	20.84 (10.09)	20.26 (9.38)	705.76 (11,062.74)	217.15 (4,979.06)	N/A	N/A	106.78 (3918.48)	54.83 (2085.99)	0.02
...median [IQR]	18.33 [14.50, 24.33]	18.00 [14.00, 23.75]	18.00 [14.00, 23.00]	17.00 [14.00, 22.00]	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
...Missing; n (%)	84,935 (72.2%)	19,977 (67.1%)	119,895 (96.2%)	41,223 (95.2%)	N/A	N/A	204,830 (84.5%)	61,200 (83.8%)	0.02
Lab result number- Creatinine (mg/dl) mean (only 0.1 to 15 included)	33,274	9,917	4,811	2,079	N/A	N/A	38,085	11,996	
...mean (sd)	1.16 (0.58)	1.13 (0.55)	1.11 (0.58)	1.05 (0.51)	N/A	N/A	1.15 (0.58)	1.12 (0.54)	0.05
...median [IQR]	1.04 [0.85, 1.31]	1.02 [0.84, 1.28]	1.00 [0.83, 1.22]	0.98 [0.81, 1.15]	N/A	N/A	1.03 (0.58)	1.01 (0.54)	0.04
...Missing; n (%)	84,411 (71.7%)	19,842 (66.7%)	119,783 (96.1%)	41,227 (95.2%)	N/A	N/A	204,194 (84.3%)	61,069 (83.6%)	0.02
Lab result number- HDL level (mg/dl) mean (only =<5000 included)	25,367	7,868	4,357	1,732	N/A	N/A	29,724	9,600	
...mean (sd)	44.55 (13.79)	45.39 (14.02)	44.51 (66.02)	43.66 (14.21)	N/A	N/A	44.54 (28.30)	45.08 (14.06)	-0.02
...median [IQR]	43.00 [35.50, 52.00]	44.00 [36.00, 53.00]	42.00 [35.00, 50.00]	42.00 [35.00, 51.00]	N/A	N/A	42.85 (28.30)	43.64 (14.06)	-0.04
...Missing; n (%)	92,318 (78.4%)	21,891 (73.6%)	120,237 (96.5%)	41,574 (96.0%)	N/A	N/A	212,555 (87.7%)	63,465 (86.9%)	0.02
Lab result number- LDL level (mg/dl) mean (only =<5000 included)	25,614	7,895	4,389	1,745	N/A	N/A	30,003	9,640	
...mean (sd)	85.78 (41.18)	83.18 (39.96)	88.03 (42.48)	86.46 (42.72)	N/A	N/A	86.11 (41.37)	83.77 (40.48)	0.06
...median [IQR]	82.00 [61.00, 109.00]	79.40 [59.00, 104.00]	85.00 [62.00, 111.00]	83.00 [62.00, 110.50]	N/A	N/A	82.44 (41.37)	80.05 (40.48)	0.06
...Missing; n (%)	92,071 (78.2%)	21,864 (73.5%)	120,205 (96.5%)	41,561 (96.0%)	N/A	N/A	212,276 (87.6%)	63,425 (86.8%)	0.02

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Lab result number- Total cholesterol (mg/dl) mean (only =<5000 included)	25,796	7,976	4,539	1,807	N/A	N/A	30,335	9,783	
...mean (sd)	170.43 (50.39)	167.26 (48.36)	173.43 (50.55)	171.71 (52.14)	N/A	N/A	170.88 (50.41)	168.08 (49.08)	0.06
...median [IQR]	164.00 [138.00, 197.00]	161.00 [136.50, 191.50]	167.00 [141.00, 200.00]	166.00 [140.00, 198.00]	N/A	N/A	164.45 (50.41)	161.92 (49.08)	0.05
...Missing; n (%)	91,889 (78.1%)	21,783 (73.2%)	120,055 (96.4%)	41,499 (95.8%)	N/A	N/A	211,944 (87.5%)	63,282 (86.6%)	0.03
Lab result number- Triglyceride level (mg/dl) mean (only =<5000 included)	25,488	7,878	4,450	1,778	N/A	N/A	29,938	9,656	
...mean (sd)	185.44 (156.55)	178.86 (148.70)	192.77 (168.94)	192.68 (182.22)	N/A	N/A	186.53 (158.46)	181.40 (155.42)	0.03
...median [IQR]	150.00 [107.00, 217.00]	146.00 [104.00, 210.00]	152.25 [109.00, 220.62]	150.00 [106.00, 221.00]	N/A	N/A	150.33 (158.46)	146.74 (155.42)	0.02
...Missing; n (%)	92,197 (78.3%)	21,881 (73.5%)	120,144 (96.5%)	41,528 (95.9%)	N/A	N/A	212,341 (87.6%)	63,409 (86.8%)	0.02
Lab result number- Hemoglobin mean (only >0 included)	23,872	7,214	3,292	1,439	N/A	N/A	27,164	8,653	
...mean (sd)	13.24 (1.82)	13.26 (1.76)	5,116.60 (195,020.21)	313.03 (6,066.36)	N/A	N/A	631.72 (67884.51)	63.11 (2473.43)	0.01
...median [IQR]	13.30 [12.05, 14.50]	13.30 [12.10, 14.50]	13.50 [12.20, 14.65]	13.50 [12.25, 14.70]	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
...Missing; n (%)	93,813 (79.7%)	22,545 (75.8%)	121,302 (97.4%)	41,867 (96.7%)	N/A	N/A	215,115 (88.8%)	64,412 (88.2%)	0.02
Lab result number- Serum sodium mean (only > 90 and < 190 included)	32,487	9,706	4,212	1,898	N/A	N/A	36,699	11,604	
...mean (sd)	139.35 (2.92)	139.52 (2.83)	138.95 (2.86)	139.10 (2.73)	N/A	N/A	139.30 (2.91)	139.45 (2.81)	-0.05
...median [IQR]	139.50 [138.00, 141.00]	140.00 [138.00, 141.33]	139.00 [137.25, 141.00]	139.00 [137.65, 141.00]	N/A	N/A	139.44 (2.91)	139.84 (2.81)	-0.14
...Missing; n (%)	85,198 (72.4%)	20,053 (67.4%)	120,382 (96.6%)	41,408 (95.6%)	N/A	N/A	205,580 (84.9%)	61,461 (84.1%)	0.02
Lab result number- Albumin mean (only >0 and <=10 included)	29,792	9,021	3,808	1,707	N/A	N/A	33,600	10,728	
...mean (sd)	4.16 (0.35)	4.17 (0.35)	4.15 (0.50)	4.14 (0.59)	N/A	N/A	4.16 (0.37)	4.17 (0.40)	-0.03
...median [IQR]	4.20 [4.00, 4.40]	4.20 [4.00, 4.40]	4.20 [4.00, 4.40]	4.20 [4.00, 4.45]	N/A	N/A	4.20 (0.37)	4.20 (0.40)	0.00
...Missing; n (%)	87,893 (74.7%)	20,738 (69.7%)	120,786 (96.9%)	41,599 (96.1%)	N/A	N/A	208,679 (86.1%)	62,337 (85.3%)	0.02
Lab result number- Glucose (fasting or random) mean (only 10-1000 included)	32,468	9,708	4,185	1,876	N/A	N/A	36,653	11,584	
...mean (sd)	166.92 (73.20)	161.27 (67.25)	170.78 (75.20)	164.77 (71.73)	N/A	N/A	167.36 (73.43)	161.84 (68.00)	0.08
...median [IQR]	148.00 [119.00, 193.00]	144.00 [117.00, 185.00]	151.00 [121.00, 198.75]	145.00 [119.08, 189.00]	N/A	N/A	148.34 (73.43)	144.16 (68.00)	0.06
...Missing; n (%)	85,217 (72.4%)	20,051 (67.4%)	120,409 (96.6%)	41,430 (95.7%)	N/A	N/A	205,626 (84.9%)	61,481 (84.1%)	0.02
Lab result number- Potassium mean (only 1-7 included)	33,114	9,891	4,624	2,044	N/A	N/A	37,738	11,935	
...mean (sd)	4.45 (0.46)	4.43 (0.45)	4.38 (0.45)	4.38 (0.44)	N/A	N/A	4.44 (0.46)	4.42 (0.45)	0.04
...median [IQR]	4.40 [4.15, 4.70]	4.40 [4.12, 4.70]	4.40 [4.10, 4.70]	4.40 [4.10, 4.65]	N/A	N/A	4.40 (0.46)	4.40 (0.45)	0.00
...Missing; n (%)	84,571 (71.9%)	19,868 (66.8%)	119,970 (96.3%)	41,262 (95.3%)	N/A	N/A	204,541 (84.4%)	61,130 (83.7%)	0.02
Comorbidity Scores									
CCI (180 days)- ICD9 and ICD10									
...mean (sd)	3.56 (2.35)	3.54 (2.35)	2.65 (2.17)	2.56 (2.12)	4.15 (2.42)	4.19 (2.41)	3.68 (2.35)	3.68 (2.33)	0.00
...median [IQR]	3.00 [2.00, 5.00]	3.00 [2.00, 5.00]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	4.00 [2.00, 6.00]	4.00 [2.00, 6.00]	3.33 (2.35)	3.34 (2.33)	0.00
Frailty Score: Qualitative Version 365 days as Categories, v1									
...0; n (%)	21,406 (18.2%)	5,871 (19.7%)	6,853 (5.5%)	3,610 (8.3%)	41,807 (13.6%)	15,665 (15.1%)	70,066 (12.8%)	25,146 (14.2%)	-0.04
...1 to 2; n (%)	39,327 (33.4%)	10,519 (35.3%)	51,129 (41.0%)	18,494 (42.7%)	73,716 (24.1%)	24,561 (23.7%)	164,172 (29.9%)	53,574 (30.3%)	-0.01
...3 or more; n (%)	56,952 (48.4%)	13,369 (44.9%)	66,612 (53.5%)	21,202 (49.0%)	190,781 (62.3%)	63,451 (61.2%)	314,345 (57.3%)	98,022 (55.5%)	0.04
Frailty Score: Empirical Version 365 days as Categories,									
...< 0.12908; n (%)	5,864 (5.0%)	1,676 (5.6%)	6,888 (5.5%)	2,978 (6.9%)	5,981 (2.0%)	2,264 (2.2%)	18,733 (3.4%)	6,918 (3.9%)	-0.03
...0.12908 - 0.1631167; n (%)	24,734 (21.0%)	6,531 (21.9%)	27,427 (22.0%)	10,535 (24.3%)	31,035 (10.1%)	10,737 (10.4%)	83,196 (15.2%)	27,803 (15.7%)	-0.01
...>= 0.1631167; n (%)	87,087 (74.0%)	21,552 (72.4%)	90,279 (72.5%)	29,793 (68.8%)	269,288 (87.9%)	90,676 (87.5%)	446,654 (81.4%)	142,021 (80.4%)	0.03
Non-Frailty; n (%)	62,261 (52.9%)	16,998 (57.1%)	58,216 (46.7%)	21,937 (50.7%)	11,446 (3.7%)	3,726 (3.6%)	131,923 (24.0%)	42,661 (24.1%)	0.00
Frailty Score (mean): Qualitative Version 365 days, v1									
...mean (sd)	2.97 (2.65)	2.75 (2.55)	3.19 (2.29)	2.94 (2.24)	3.78 (2.89)	3.74 (2.95)	3.47 (2.71)	3.38 (2.73)	0.03
...median [IQR]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	3.00 [2.00, 4.00]	2.00 [1.00, 4.00]	3.00 [1.00, 6.00]	3.00 [1.00, 6.00]	2.79 (2.71)	2.59 (2.73)	0.07
Frailty Score (mean): Empirical Version 365 days,									
...mean (sd)	0.18 (0.07)	0.17 (0.07)	0.20 (0.06)	0.19 (0.06)	0.24 (0.08)	0.25 (0.08)	0.22 (0.07)	0.22 (0.07)	0.00
...median [IQR]	0.17 [0.13, 0.22]	0.16 [0.12, 0.21]	0.18 [0.15, 0.22]	0.18 [0.15, 0.21]	0.23 [0.19, 0.29]	0.23 [0.19, 0.29]	0.21 (0.07)	0.21 (0.07)	0.00
Healthcare Utilization									
Any hospitalization; n (%)	31,029 (26.4%)	6,773 (22.8%)	38,526 (30.9%)	11,231 (25.9%)	85,357 (27.9%)	27,777 (26.8%)	154,912 (28.2%)	45,781 (25.9%)	0.05
Any hospitalization within prior 30 days; n (%)	14,219 (12.1%)	2,902 (9.8%)	16,906 (13.6%)	4,526 (10.5%)	33,515 (10.9%)	10,979 (10.6%)	64,640 (11.8%)	18,407 (10.4%)	0.04
Any hospitalization during prior 31-180 days; n (%)	19,490 (16.6%)	4,538 (15.2%)	24,550 (19.7%)	7,488 (17.3%)	60,385 (19.7%)	19,677 (19.0%)	104,425 (19.0%)	31,703 (17.9%)	0.03
Endocrinologist Visit; n (%)	7,995 (6.8%)	3,571 (12.0%)	8,438 (6.8%)	5,272 (12.2%)	25,598 (8.4%)	13,439 (13.0%)	42,031 (7.7%)	22,282 (12.6%)	-0.16
Endocrinologist Visit (30 days prior); n (%)	4,658 (4.0%)	2,186 (7.3%)	5,059 (4.1%)	3,405 (7.9%)	13,779 (4.5%)	7,806 (7.5%)	23,496 (4.3%)	13,397 (7.6%)	-0.14
Endocrinologist Visit (31 to 180 days prior); n (%)	5,356 (4.6%)	2,429 (8.2%)	5,416 (4.3%)	3,438 (7.9%)	18,906 (6.2%)	9,468 (9.1%)	29,678 (5.4%)	15,335 (8.7%)	-0.13
Internal medicine/family medicine visits; n (%)	102,084 (86.7%)	25,865 (86.9%)	102,764 (82.5%)	36,903 (85.2%)	266,343 (87.0%)	90,264 (87.1%)	471,191 (85.9%)	153,032 (86.6%)	-0.02
Internal medicine/family medicine visits (30 days prior); n (%)	76,112 (64.7%)	19,520 (65.6%)	74,503 (59.8%)	26,903 (62.1%)	188,745 (61.6%)	65,647 (63.3%)	339,360 (61.9%)	112,070 (63.4%)	-0.03

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Internal medicine/family medicine visits (31 to 180 days prior) ; n (%)	89,538 (76.1%)	23,378 (78.6%)	89,891 (72.1%)	32,962 (76.1%)	237,761 (77.6%)	81,893 (79.0%)	417,190 (76.0%)	138,233 (78.2%)	-0.05
Cardiologist visit; n (%)	64,077 (54.4%)	16,806 (56.5%)	57,020 (45.8%)	21,383 (49.4%)	183,503 (59.9%)	63,025 (60.8%)	304,600 (55.5%)	101,214 (57.3%)	-0.04
Number of Cardiologist visits (30 days prior); n (%)	27,683 (23.5%)	6,944 (23.3%)	22,417 (18.0%)	8,351 (19.3%)	72,663 (23.7%)	25,568 (24.7%)	122,763 (22.4%)	40,863 (23.1%)	-0.02
Number of Cardiologist visits (31 to 180 days prior); n (%)	52,002 (44.2%)	14,115 (47.4%)	48,005 (38.5%)	18,177 (42.0%)	157,097 (51.3%)	54,253 (52.3%)	257,104 (46.9%)	86,545 (49.0%)	-0.04
Electrocardiogram ; n (%)	60,155 (51.1%)	15,717 (52.8%)	62,346 (50.0%)	22,093 (51.0%)	168,509 (55.0%)	59,129 (57.0%)	291,010 (53.0%)	96,939 (54.8%)	-0.04
Use of glucose test strips; n (%)	5,000 (4.2%)	1,539 (5.2%)	4,866 (3.9%)	2,007 (4.6%)	12,883 (4.2%)	4,655 (4.5%)	22,749 (4.1%)	8,201 (4.6%)	-0.02
Dialysis; n (%)	775 (0.7%)	122 (0.4%)	849 (0.7%)	225 (0.5%)	4,837 (1.6%)	1,196 (1.2%)	6,461 (1.2%)	1,543 (0.9%)	0.03
Naïve new user v8 ; n (%)	49,305 (41.9%)	10,730 (36.1%)	51,732 (41.5%)	15,574 (36.0%)	110,966 (36.2%)	33,036 (31.9%)	212,003 (38.6%)	59,340 (33.6%)	0.10
N antidiabetic drugs at index date									
...mean (sd)	1.52 (0.62)	1.68 (0.66)	1.51 (0.63)	1.67 (0.66)	1.47 (0.60)	1.66 (0.66)	1.49 (0.61)	1.67 (0.66)	-0.28
...median [IQR]	1.00 [1.00, 2.00]	2.00 [1.00, 2.00]	1.00 [1.00, 2.00]	2.00 [1.00, 2.00]	1.00 [1.00, 2.00]	2.00 [1.00, 2.00]	1.00 (0.61)	2.00 (0.66)	-1.57
number of different/distinct medication prescriptions									
...mean (sd)	10.39 (5.16)	11.20 (5.60)	10.53 (5.16)	10.84 (5.32)	10.98 (5.02)	11.85 (5.55)	10.75 (5.08)	11.49 (5.50)	-0.14
...median [IQR]	10.00 [7.00, 13.00]	10.00 [7.00, 14.00]	10.00 [7.00, 13.00]	10.00 [7.00, 14.00]	10.00 [7.00, 14.00]	11.00 [8.00, 15.00]	10.00 (5.08)	10.59 (5.50)	-0.11
Number of Hospitalizations									
...mean (sd)	0.35 (0.68)	0.30 (0.65)	0.39 (0.68)	0.32 (0.63)	0.40 (0.77)	0.39 (0.77)	0.39 (0.73)	0.36 (0.72)	0.04
...median [IQR]	0.00 [0.00, 1.00]	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 (0.73)	0.00 (0.72)	0.00
Number of hospital days									
...mean (sd)	2.18 (6.04)	1.95 (6.01)	2.59 (7.05)	2.15 (6.52)	2.67 (6.96)	2.72 (7.33)	2.55 (6.79)	2.45 (6.93)	0.01
...median [IQR]	0.00 [0.00, 2.00]	0.00 [0.00, 0.00]	0.00 [0.00, 3.00]	0.00 [0.00, 2.00]	0.00 [0.00, 3.00]	0.00 [0.00, 3.00]	0.00 (6.79)	0.00 (6.93)	0.00
Number of Emergency Department (ED) visits									
...mean (sd)	0.76 (1.72)	0.74 (1.78)	0.59 (2.49)	0.49 (2.23)	1.03 (2.00)	0.98 (2.10)	0.87 (2.07)	0.82 (2.08)	0.02
...median [IQR]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 2.00]	0.00 [0.00, 2.00]	0.00 (2.07)	0.00 (2.08)	0.00
Number of Office visits									
...mean (sd)	5.74 (4.68)	6.30 (4.81)	6.02 (5.08)	6.41 (4.84)	6.56 (5.19)	7.04 (5.47)	6.26 (5.06)	6.76 (5.21)	-0.10
...median [IQR]	5.00 [3.00, 8.00]	5.00 [3.00, 8.00]	5.00 [3.00, 8.00]	5.00 [3.00, 8.00]	5.00 [3.00, 9.00]	6.00 [3.00, 10.00]	5.00 (5.06)	5.59 (5.21)	-0.11
Number of Endocrinologist visits									
...mean (sd)	0.31 (1.81)	0.59 (2.52)	0.31 (1.79)	0.62 (2.88)	0.46 (2.57)	0.77 (3.65)	0.39 (2.26)	0.70 (3.30)	-0.11
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 (2.26)	0.00 (3.30)	0.00
Number of internal medicine/family medicine visits									
...mean (sd)	11.67 (16.93)	11.94 (16.11)	8.17 (12.67)	8.75 (12.69)	10.19 (12.62)	10.90 (13.48)	10.05 (13.67)	10.55 (13.77)	-0.04
...median [IQR]	7.00 [2.00, 15.00]	7.00 [3.00, 15.00]	5.00 [1.00, 10.00]	5.00 [2.00, 11.00]	6.00 [2.00, 14.00]	7.00 [3.00, 15.00]	5.99 (13.67)	6.51 (13.77)	-0.04
Number of Cardiologist visits									
...mean (sd)	3.58 (6.52)	3.72 (6.54)	2.48 (4.91)	2.73 (5.15)	3.71 (6.44)	3.95 (6.94)	3.40 (6.14)	3.61 (6.48)	-0.03
...median [IQR]	1.00 [0.00, 4.00]	1.00 [0.00, 5.00]	0.00 [0.00, 3.00]	0.00 [0.00, 3.00]	1.00 [0.00, 5.00]	1.00 [0.00, 5.00]	0.77 (6.14)	0.75 (6.48)	0.00
Number electrocardiograms received									
...mean (sd)	1.28 (2.15)	1.32 (2.27)	1.08 (1.70)	1.08 (1.70)	1.38 (2.03)	1.43 (2.07)	1.29 (1.99)	1.33 (2.02)	-0.02
...median [IQR]	1.00 [0.00, 2.00]	1.00 [0.00, 2.00]	1.00 [0.00, 1.00]	1.00 [0.00, 1.00]	1.00 [0.00, 2.00]	1.00 [0.00, 2.00]	1.00 (1.99)	1.00 (2.02)	0.00
Number of HbA1c tests ordered									
...mean (sd)	1.04 (0.93)	1.21 (0.97)	0.69 (0.87)	0.83 (0.92)	1.23 (0.93)	1.36 (1.00)	1.07 (0.92)	1.20 (0.98)	-0.14
...median [IQR]	1.00 [0.00, 2.00]	1.00 [1.00, 2.00]	0.00 [0.00, 1.00]	1.00 [0.00, 1.00]	1.00 [1.00, 2.00]	1.00 [1.00, 2.00]	0.77 (0.92)	1.00 (0.98)	-0.24
Number of glucose tests ordered									
...mean (sd)	0.61 (3.51)	0.82 (5.19)	0.44 (1.85)	0.49 (1.71)	0.49 (1.24)	0.56 (1.29)	0.50 (2.07)	0.59 (2.50)	-0.04
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 (2.07)	0.00 (2.50)	0.00
Number of lipid tests ordered									
...mean (sd)	0.87 (0.99)	1.04 (1.08)	0.64 (1.15)	0.78 (1.21)	0.92 (0.89)	1.06 (0.95)	0.85 (0.98)	0.99 (1.04)	-0.14
...median [IQR]	1.00 [0.00, 1.00]	1.00 [0.00, 2.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	1.00 [0.00, 1.00]	1.00 [0.00, 2.00]	0.77 (0.98)	0.75 (1.04)	0.02
Number of creatinine tests ordered									
...mean (sd)	0.10 (0.50)	0.10 (0.46)	0.12 (0.57)	0.09 (0.44)	0.15 (0.62)	0.13 (0.54)	0.13 (0.58)	0.12 (0.50)	0.02
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 (0.58)	0.00 (0.50)	0.00
Number of BUN tests ordered									
...mean (sd)	0.07 (0.56)	0.07 (0.50)	0.09 (0.57)	0.07 (0.44)	0.11 (0.57)	0.09 (0.49)	0.10 (0.57)	0.08 (0.48)	0.04
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 (0.57)	0.00 (0.48)	0.00
Number of tests for microalbuminuria									
...mean (sd)	0.55 (1.04)	0.66 (1.15)	0.31 (0.79)	0.40 (0.92)	0.38 (0.72)	0.43 (0.77)	0.40 (0.81)	0.46 (0.88)	-0.07
...median [IQR]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 (0.81)	0.00 (0.88)	0.00
Total N distinct ICD9/ICD10 diagnoses at the 3rd digit level									
...mean (sd)	6.83 (9.63)	7.34 (10.38)	3.54 (7.30)	3.64 (7.42)	9.10 (11.55)	9.58 (11.86)	7.35 (10.32)	7.75 (10.68)	-0.04
...median [IQR]	4.00 [0.00, 10.00]	4.00 [0.00, 11.00]	0.00 [0.00, 4.00]	0.00 [0.00, 4.00]	5.00 [0.00, 14.00]	5.00 [0.00, 15.00]	3.65 (10.32)	3.61 (10.68)	0.00
Use of thiazide; n (%)	14,035 (11.9%)	3,360 (11.3%)	14,093 (11.3%)	4,532 (10.5%)	38,970 (12.7%)	12,451 (12.0%)	67,098 (12.2%)	20,343 (11.5%)	0.02
Use of beta blockers; n (%)	67,251 (57.1%)	16,807 (56.5%)	73,540 (59.0%)	25,059 (57.9%)	189,722 (61.9%)	63,832 (61.6%)	330,513 (60.2%)	105,698 (59.8%)	0.01
Use of calcium channel blockers; n (%)	36,173 (30.7%)	9,328 (31.3%)	37,784 (30.3%)	12,933 (29.9%)	108,802 (35.5%)	37,734 (36.4%)	182,759 (33.3%)	59,995 (33.9%)	-0.01

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

	Optum		MarketScan		Medicare		POOLED		
Variable	Reference-2nd Generation SUs	Exposure-Sitagliptin	Reference-2nd Generation SUs	Exposure-Sitagliptin	Reference-2nd Generation SUs	Exposure-Sitagliptin	Reference-2nd Generation SUs	Exposure-Sitagliptin	St. Diff.
Number of patients	29727	29727	42600	42600	102411	102411	174,738	174,738	
Age									
...mean (sd)	69.12 (9.30)	69.12 (9.34)	66.33 (10.33)	66.30 (10.16)	75.64 (7.48)	75.65 (7.46)	72.26 (8.57)	72.26 (8.52)	0.00
...median [IQR]	69.00 [62.00, 76.00]	69.00 [62.00, 76.00]	64.00 [58.00, 74.00]	64.00 [59.00, 74.00]	75.00 [69.00, 81.00]	75.00 [70.00, 81.00]	71.30 (8.57)	71.30 (8.52)	0.00
Age categories									
...18 - 54; n (%)	2,134 (7.2%)	2,058 (6.9%)	4,943 (11.6%)	4,689 (11.0%)	0 (0.0%)	0 (0.0%)	7,077 (4.1%)	6,747 (3.9%)	0.01
...55 - 64; n (%)	7,091 (23.9%)	7,372 (24.8%)	17,575 (41.3%)	17,810 (41.8%)	1,639 (1.6%)	1,663 (1.6%)	26,305 (15.1%)	26,845 (15.4%)	-0.01
...65 - 74; n (%)	11,421 (38.4%)	11,335 (38.1%)	9,824 (23.1%)	10,211 (24.0%)	48,995 (47.8%)	48,760 (47.6%)	70,240 (40.2%)	70,306 (40.2%)	0.00
...>=75; n (%)	9,081 (30.5%)	8,962 (30.1%)	10,258 (24.1%)	9,890 (23.2%)	51,777 (50.6%)	51,988 (50.8%)	71,116 (40.7%)	70,840 (40.5%)	0.00
Gender-									
...Males; n (%)	16,707 (56.2%)	16,770 (56.4%)	26,043 (61.1%)	26,160 (61.4%)	48,955 (47.8%)	49,246 (48.1%)	91,705 (52.5%)	92,176 (52.8%)	-0.01
...Females; n (%)	13,020 (43.8%)	12,957 (43.6%)	16,557 (38.9%)	16,440 (38.6%)	53,456 (52.2%)	53,165 (51.9%)	83,033 (47.5%)	82,562 (47.2%)	0.01
Race without zero category									
...White; n (%)	N/A	N/A	N/A	N/A	78,029 (76.2%)	78,110 (76.3%)	78,029 (76.2%)	78,110 (76.3%)	0.00
...Black; n (%)	N/A	N/A	N/A	N/A	11,990 (11.7%)	11,921 (11.6%)	11,990 (11.7%)	11,921 (11.6%)	0.00
...Asian; n (%)	N/A	N/A	N/A	N/A	4,049 (4.0%)	4,135 (4.0%)	4,049 (4.0%)	4,135 (4.0%)	0.00
...Hispanic; n (%)	N/A	N/A	N/A	N/A	4,455 (4.4%)	4,419 (4.3%)	4,455 (4.4%)	4,419 (4.3%)	0.00
...North American Native; n (%)	N/A	N/A	N/A	N/A	507 (0.5%)	527 (0.5%)	507 (0.5%)	527 (0.5%)	0.00
...Other/Unknown; n (%)	N/A	N/A	N/A	N/A	3,381 (3.3%)	3,299 (3.2%)	3,381 (3.3%)	3,299 (3.2%)	0.01
Region- (lumping missing&other category with West)									
...Northeast; n (%)	4,282 (14.4%)	4,214 (14.2%)	9,061 (21.3%)	9,017 (21.2%)	23,934 (23.4%)	23,883 (23.3%)	37,277 (21.3%)	37,114 (21.2%)	0.00
...South; n (%)	14,991 (50.4%)	15,045 (50.6%)	11,460 (26.9%)	11,433 (26.8%)	42,802 (41.8%)	42,665 (41.7%)	69,253 (39.6%)	69,143 (39.6%)	0.00
...Midwest; n (%)	4,983 (16.8%)	5,055 (17.0%)	17,261 (40.5%)	17,306 (40.6%)	19,090 (18.6%)	19,020 (18.6%)	41,334 (23.7%)	41,381 (23.7%)	0.00
...West; n (%)	5,471 (18.4%)	5,413 (18.2%)	4,420 (10.4%)	4,425 (10.4%)	16,585 (16.2%)	16,843 (16.4%)	26,476 (15.2%)	26,681 (15.3%)	0.00
...Unknown+missing; n (%)	N/A	N/A	398 (0.9%)	419 (1.0%)	N/A	N/A	398 (0.9%)	419 (1.0%)	-0.01
CV Covariates									
Ischemic heart disease; n (%)	19,747 (66.4%)	19,742 (66.4%)	27,261 (64.0%)	27,300 (64.1%)	69,177 (67.5%)	69,239 (67.6%)	116,185 (66.5%)	116,281 (66.5%)	0.00
Acute MI; n (%)	1,484 (5.0%)	1,555 (5.2%)	2,434 (5.7%)	2,420 (5.7%)	4,732 (4.6%)	4,708 (4.6%)	8,650 (5.0%)	8,683 (5.0%)	0.00
ACS/unstable angina; n (%)	1,542 (5.2%)	1,607 (5.4%)	2,448 (5.7%)	2,483 (5.8%)	4,573 (4.5%)	4,651 (4.5%)	8,563 (4.9%)	8,741 (5.0%)	0.00
Old MI; n (%)	2,812 (9.5%)	2,811 (9.5%)	2,027 (4.8%)	2,046 (4.8%)	9,882 (9.6%)	9,759 (9.5%)	14,721 (8.4%)	14,616 (8.4%)	0.00
Stable angina; n (%)	2,591 (8.7%)	2,601 (8.7%)	3,005 (7.1%)	2,982 (7.0%)	8,120 (7.9%)	8,137 (7.9%)	13,716 (7.8%)	13,720 (7.9%)	0.00
Coronary atherosclerosis and other forms of chronic ischemic heart disease; n (%)	18,771 (63.1%)	18,846 (63.4%)	26,077 (61.2%)	26,181 (61.5%)	66,512 (64.9%)	66,608 (65.0%)	111,360 (63.7%)	111,635 (63.9%)	0.00
Other atherosclerosis with ICD10 ; n (%)	790 (2.7%)	858 (2.9%)	1,074 (2.5%)	1,092 (2.6%)	3,628 (3.5%)	3,676 (3.6%)	5,492 (3.1%)	5,626 (3.2%)	-0.01
Previous cardiac procedure (CABG or PTCA or Stent) v4; n (%)	1,030 (3.5%)	1,123 (3.8%)	2,130 (5.0%)	2,269 (5.3%)	2,370 (2.3%)	2,554 (2.5%)	5,530 (3.2%)	5,946 (3.4%)	-0.01
History of CABG or PTCA; n (%)	4,453 (15.0%)	4,624 (15.6%)	3,519 (8.3%)	3,414 (8.0%)	19,111 (18.7%)	18,973 (18.5%)	27,083 (15.5%)	27,011 (15.5%)	0.00
Any stroke; n (%)	6,435 (21.6%)	6,459 (21.7%)	8,532 (20.0%)	8,599 (20.2%)	25,540 (24.9%)	25,325 (24.7%)	40,507 (23.2%)	40,383 (23.1%)	0.00
Ischemic stroke (w and w/o mention of cerebral infarction); n (%)	6,395 (21.5%)	6,429 (21.6%)	8,476 (19.9%)	8,544 (20.1%)	25,344 (24.7%)	25,140 (24.5%)	40,215 (23.0%)	40,113 (23.0%)	0.00
Hemorrhagic stroke; n (%)	153 (0.5%)	181 (0.6%)	267 (0.6%)	269 (0.6%)	731 (0.7%)	734 (0.7%)	1,151 (0.7%)	1,184 (0.7%)	0.00
TIA; n (%)	1,271 (4.3%)	1,290 (4.3%)	1,638 (3.8%)	1,664 (3.9%)	5,051 (4.9%)	5,085 (5.0%)	7,960 (4.6%)	8,039 (4.6%)	0.00
Other cerebrovascular disease; n (%)	1,504 (5.1%)	1,522 (5.1%)	1,619 (3.8%)	1,534 (3.6%)	6,569 (6.4%)	6,547 (6.4%)	9,692 (5.5%)	9,603 (5.5%)	0.00
Late effects of cerebrovascular disease; n (%)	1,537 (5.2%)	1,504 (5.1%)	1,428 (3.4%)	1,404 (3.3%)	6,846 (6.7%)	6,639 (6.5%)	9,811 (5.6%)	9,547 (5.5%)	0.00
Cerebrovascular procedure; n (%)	121 (0.4%)	95 (0.3%)	185 (0.4%)	183 (0.4%)	347 (0.3%)	366 (0.4%)	653 (0.4%)	644 (0.4%)	0.00
Heart failure (CHF); n (%)	5,804 (19.5%)	5,818 (19.6%)	6,286 (14.8%)	6,163 (14.5%)	24,326 (23.8%)	24,239 (23.7%)	36,416 (20.8%)	36,220 (20.7%)	0.00
Peripheral Vascular Disease (PVD) or PVD Surgery ; n (%)	4,609 (15.5%)	4,584 (15.4%)	4,885 (11.5%)	4,787 (11.2%)	22,088 (21.6%)	22,005 (21.5%)	31,582 (18.1%)	31,376 (18.0%)	0.00
Atrial fibrillation; n (%)	4,253 (14.3%)	4,299 (14.5%)	5,058 (11.9%)	5,049 (11.9%)	21,032 (20.5%)	20,931 (20.4%)	30,343 (17.4%)	30,279 (17.3%)	0.00
Other cardiac dysrhythmia; n (%)	5,074 (17.1%)	5,103 (17.2%)	5,630 (13.2%)	5,736 (13.5%)	23,178 (22.6%)	23,020 (22.5%)	33,882 (19.4%)	33,859 (19.4%)	0.00
Cardiac conduction disorders; n (%)	1,629 (5.5%)	1,675 (5.6%)	1,733 (4.1%)	1,742 (4.1%)	8,051 (7.9%)	7,876 (7.7%)	11,413 (6.5%)	11,293 (6.5%)	0.00
Other CVD; n (%)	7,186 (24.2%)	7,142 (24.0%)	9,007 (21.1%)	9,016 (21.2%)	29,402 (28.7%)	29,351 (28.7%)	45,595 (26.1%)	45,509 (26.0%)	0.00
Diabetes-related complications									
Diabetic retinopathy; n (%)	1,918 (6.5%)	1,899 (6.4%)	1,668 (3.9%)	1,667 (3.9%)	6,863 (6.7%)	6,927 (6.8%)	10,449 (6.0%)	10,493 (6.0%)	0.00
Diabetes with other ophthalmic manifestations; n (%)	167 (0.6%)	145 (0.5%)	1,278 (3.0%)	1,276 (3.0%)	2,810 (2.7%)	2,793 (2.7%)	4,255 (2.4%)	4,214 (2.4%)	0.00

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Covariate									
Retinal detachment, vitreous hemorrhage, vitrectomy; n (%)	135 (0.5%)	149 (0.5%)	133 (0.3%)	166 (0.4%)	425 (0.4%)	464 (0.5%)	693 (0.4%)	779 (0.4%)	0.00
Retinal laser coagulation therapy; n (%)	182 (0.6%)	173 (0.6%)	260 (0.6%)	284 (0.7%)	580 (0.6%)	607 (0.6%)	1,022 (0.6%)	1,064 (0.6%)	0.00
Occurrence of Diabetic Neuropathy ; n (%)	5,913 (19.9%)	5,840 (19.6%)	4,816 (11.3%)	4,778 (11.2%)	22,008 (21.5%)	21,921 (21.4%)	32,737 (18.7%)	32,539 (18.6%)	0.00
Occurrence of diabetic nephropathy with ICD10 ; n (%)	4,521 (15.2%)	4,484 (15.1%)	2,463 (5.8%)	2,421 (5.7%)	11,652 (11.4%)	11,510 (11.2%)	18,636 (10.7%)	18,415 (10.5%)	0.01
Hypoglycemia ; n (%)	1,110 (3.7%)	1,077 (3.6%)	1,283 (3.0%)	1,306 (3.1%)	4,201 (4.1%)	4,170 (4.1%)	6,594 (3.8%)	6,553 (3.8%)	0.00
Hyperglycemia; n (%)	1,789 (6.0%)	1,795 (6.0%)	1,763 (4.1%)	1,772 (4.2%)	7,494 (7.3%)	7,515 (7.3%)	11,046 (6.3%)	11,082 (6.3%)	0.00
Disorders of fluid electrolyte and acid-base balance; n (%)	3,986 (13.4%)	4,093 (13.8%)	3,893 (9.1%)	3,929 (9.2%)	17,450 (17.0%)	17,131 (16.7%)	25,329 (14.5%)	25,153 (14.4%)	0.00
Diabetic ketoacidosis; n (%)	3 (0.0%)	4 (0.0%)	2 (0.0%)	6 (0.0%)	31 (0.0%)	29 (0.0%)	036 (0.0%)	039 (0.0%)	#DIV/0!
Hyperosmolar hyperglycemic nonketotic syndrome (HONK); n (%)	180 (0.6%)	186 (0.6%)	201 (0.5%)	207 (0.5%)	751 (0.7%)	762 (0.7%)	1,132 (0.6%)	1,155 (0.7%)	-0.01
Diabetes with peripheral circulatory disorders with ICD-10 ; n (%)	2,922 (9.8%)	2,927 (9.8%)	2,271 (5.3%)	2,171 (5.1%)	11,073 (10.8%)	11,106 (10.8%)	16,266 (9.3%)	16,204 (9.3%)	0.00
Diabetic Foot; n (%)	1,120 (3.8%)	1,127 (3.8%)	1,347 (3.2%)	1,292 (3.0%)	4,785 (4.7%)	4,658 (4.5%)	7,252 (4.2%)	7,077 (4.1%)	0.01
Gangrene ; n (%)	222 (0.7%)	213 (0.7%)	260 (0.6%)	254 (0.6%)	663 (0.6%)	639 (0.6%)	1,145 (0.7%)	1,106 (0.6%)	0.01
Lower extremity amputation; n (%)	571 (1.9%)	560 (1.9%)	437 (1.0%)	403 (0.9%)	1,712 (1.7%)	1,718 (1.7%)	2,720 (1.6%)	2,681 (1.5%)	0.01
Osteomyelitis; n (%)	403 (1.4%)	399 (1.3%)	519 (1.2%)	457 (1.1%)	1,273 (1.2%)	1,267 (1.2%)	2,195 (1.3%)	2,123 (1.2%)	0.01
Skin infections ; n (%)	2,301 (7.7%)	2,363 (7.9%)	3,071 (7.2%)	3,038 (7.1%)	10,296 (10.1%)	10,122 (9.9%)	15,668 (9.0%)	15,523 (8.9%)	0.00
Erectile dysfunction; n (%)	775 (2.6%)	802 (2.7%)	888 (2.1%)	881 (2.1%)	2,403 (2.3%)	2,380 (2.3%)	4,066 (2.3%)	4,063 (2.3%)	0.00
Diabetes with unspecified complication; n (%)	1,863 (6.3%)	1,849 (6.2%)	1,859 (4.4%)	1,814 (4.3%)	6,426 (6.3%)	6,351 (6.2%)	10,148 (5.8%)	10,014 (5.7%)	0.00
Diabetes mellitus without mention of complications; n (%)	27,552 (92.7%)	27,521 (92.6%)	40,513 (95.1%)	40,470 (95.0%)	97,729 (95.4%)	97,734 (95.4%)	165,794 (94.9%)	165,725 (94.8%)	0.00
Hypertension: 1 inpatient or 2 outpatient claims within 365 days; n (%)	26,771 (90.1%)	26,773 (90.1%)	31,437 (73.8%)	31,407 (73.7%)	97,195 (94.9%)	97,173 (94.9%)	155,403 (88.9%)	155,353 (88.9%)	0.00
Hyperlipidemia ; n (%)	23,855 (80.2%)	23,797 (80.1%)	25,697 (60.3%)	25,671 (60.3%)	84,137 (82.2%)	84,130 (82.1%)	133,689 (76.5%)	133,598 (76.5%)	0.00
Edema; n (%)	3,092 (10.4%)	3,153 (10.6%)	2,925 (6.9%)	2,853 (6.7%)	15,151 (14.8%)	15,070 (14.7%)	21,168 (12.1%)	21,076 (12.1%)	0.00
Renal Dysfunction (non-diabetic) ; n (%)	8,526 (28.7%)	8,686 (29.2%)	7,501 (17.6%)	7,507 (17.6%)	33,142 (32.4%)	32,819 (32.0%)	49,169 (28.1%)	49,012 (28.0%)	0.00
Occurrence of acute renal disease ; n (%)	2,238 (7.5%)	2,298 (7.7%)	2,338 (5.5%)	2,329 (5.5%)	9,092 (8.9%)	8,926 (8.7%)	13,668 (7.8%)	13,553 (7.8%)	0.00
Occurrence of chronic renal insufficiency; n (%)	6,518 (21.9%)	6,621 (22.3%)	4,835 (11.3%)	4,740 (11.1%)	25,668 (25.1%)	25,291 (24.7%)	37,021 (21.2%)	36,652 (21.0%)	0.00
Chronic kidney disease ; n (%)	6,285 (21.1%)	6,406 (21.5%)	4,651 (10.9%)	4,584 (10.8%)	24,388 (23.8%)	24,047 (23.5%)	35,324 (20.2%)	35,037 (20.1%)	0.00
CKD Stage 3-4; n (%)	4,145 (13.9%)	4,161 (14.0%)	2,852 (6.7%)	2,859 (6.7%)	15,873 (15.5%)	15,739 (15.4%)	22,870 (13.1%)	22,759 (13.0%)	0.00
Occurrence of hypertensive nephropathy; n (%)	3,411 (11.5%)	3,468 (11.7%)	2,193 (5.1%)	2,217 (5.2%)	13,686 (13.4%)	13,414 (13.1%)	19,290 (11.0%)	19,099 (10.9%)	0.00
Occurrence of miscellaneous renal insufficiency ; n (%)	2,817 (9.5%)	2,845 (9.6%)	2,640 (6.2%)	2,693 (6.3%)	11,951 (11.7%)	11,930 (11.6%)	17,408 (10.0%)	17,468 (10.0%)	0.00
Glaucoma or cataracts ; n (%)	5,943 (20.0%)	6,088 (20.5%)	7,023 (16.5%)	7,005 (16.4%)	26,942 (26.3%)	27,628 (27.0%)	39,908 (22.8%)	40,721 (23.3%)	-0.01
Cellulitis or abscess of toe; n (%)	631 (2.1%)	580 (2.0%)	586 (1.4%)	604 (1.4%)	2,291 (2.2%)	2,264 (2.2%)	3,508 (2.0%)	3,448 (2.0%)	0.00
Foot ulcer; n (%)	1,138 (3.8%)	1,125 (3.8%)	1,380 (3.2%)	1,322 (3.1%)	4,839 (4.7%)	4,694 (4.6%)	7,357 (4.2%)	7,141 (4.1%)	0.01
Bladder stones; n (%)	50 (0.2%)	47 (0.2%)	57 (0.1%)	57 (0.1%)	280 (0.3%)	257 (0.3%)	387 (0.2%)	361 (0.2%)	0.00
Kidney stones; n (%)	859 (2.9%)	875 (2.9%)	1,050 (2.5%)	1,089 (2.6%)	3,806 (3.7%)	3,735 (3.6%)	5,715 (3.3%)	5,699 (3.3%)	0.00
Urinary tract infections (UTIs); n (%)	3,935 (13.2%)	3,948 (13.3%)	3,824 (9.0%)	3,849 (9.0%)	22,033 (21.5%)	21,918 (21.4%)	29,792 (17.0%)	29,715 (17.0%)	0.00
Dipstick urinalysis; n (%)	11,544 (38.8%)	12,011 (40.4%)	13,540 (31.8%)	13,806 (32.4%)	48,563 (47.4%)	49,255 (48.1%)	73,647 (42.1%)	75,072 (43.0%)	-0.02
Non-dipstick urinalysis; n (%)	10,656 (35.8%)	10,724 (36.1%)	10,365 (24.3%)	10,251 (24.1%)	36,142 (35.3%)	36,237 (35.4%)	57,163 (32.7%)	57,212 (32.7%)	0.00
Urine function test; n (%)	1,027 (3.5%)	963 (3.2%)	1,439 (3.4%)	1,533 (3.6%)	4,908 (4.8%)	5,253 (5.1%)	7,374 (4.2%)	7,749 (4.4%)	-0.01
Cytology; n (%)	512 (1.7%)	506 (1.7%)	942 (2.2%)	1,019 (2.4%)	2,366 (2.3%)	2,440 (2.4%)	3,820 (2.2%)	3,965 (2.3%)	-0.01
Cystos; n (%)	649 (2.2%)	654 (2.2%)	1,037 (2.4%)	1,086 (2.5%)	3,050 (3.0%)	2,976 (2.9%)	4,736 (2.7%)	4,716 (2.7%)	0.00
Other Covariates									
Liver disease; n (%)	1,450 (4.9%)	1,449 (4.9%)	1,712 (4.0%)	1,706 (4.0%)	5,633 (5.5%)	5,716 (5.6%)	8,795 (5.0%)	8,871 (5.1%)	0.00
Osteoarthritis; n (%)	5,746 (19.3%)	5,678 (19.1%)	5,761 (13.5%)	5,728 (13.4%)	29,354 (28.7%)	29,454 (28.8%)	40,861 (23.4%)	40,860 (23.4%)	0.00
Other arthritis, arthropathies and musculoskeletal pain; n (%)	13,225 (44.5%)	13,184 (44.4%)	15,938 (37.4%)	15,775 (37.0%)	57,375 (56.0%)	57,366 (56.0%)	86,538 (49.5%)	86,325 (49.4%)	0.00
Dorsopathies; n (%)	7,645 (25.7%)	7,663 (25.8%)	8,975 (21.1%)	9,034 (21.2%)	33,337 (32.6%)	33,387 (32.6%)	49,957 (28.6%)	50,084 (28.7%)	0.00
Fractures; n (%)	1,335 (4.5%)	1,325 (4.5%)	1,729 (4.1%)	1,680 (3.9%)	6,526 (6.4%)	6,427 (6.3%)	9,590 (5.5%)	9,432 (5.4%)	0.00
Falls ; n (%)	1,648 (5.5%)	1,676 (5.6%)	671 (1.6%)	669 (1.6%)	7,999 (7.8%)	7,998 (7.8%)	10,318 (5.9%)	10,343 (5.9%)	0.00
Osteoporosis; n (%)	2,026 (6.8%)	1,959 (6.6%)	1,826 (4.3%)	1,829 (4.3%)	11,401 (11.1%)	11,491 (11.2%)	15,253 (8.7%)	15,279 (8.7%)	0.00
Hyperthyroidism; n (%)	258 (0.9%)	273 (0.9%)	254 (0.6%)	269 (0.6%)	1,392 (1.4%)	1,291 (1.3%)	1,904 (1.1%)	1,833 (1.0%)	0.01
Hypothyroidism ; n (%)	5,006 (16.8%)	5,007 (16.8%)	4,596 (10.8%)	4,556 (10.7%)	18,859 (18.4%)	18,715 (18.3%)	28,461 (16.3%)	28,278 (16.2%)	0.00
Other disorders of thyroid gland ; n (%)	1,304 (4.4%)	1,297 (4.4%)	1,405 (3.3%)	1,511 (3.5%)	5,386 (5.3%)	5,644 (5.5%)	8,095 (4.6%)	8,452 (4.8%)	-0.01
Depression; n (%)	3,342 (11.2%)	3,384 (11.4%)	3,165 (7.4%)	3,203 (7.5%)	16,712 (16.3%)	16,568 (16.2%)	23,219 (13.3%)	23,155 (13.3%)	0.00
Anxiety; n (%)	2,701 (9.1%)	2,670 (9.0%)	2,053 (4.8%)	2,071 (4.9%)	12,712 (12.4%)	12,566 (12.3%)	17,466 (10.0%)	17,307 (9.9%)	0.00
Sleep_Disorder; n (%)	3,198 (10.8%)	3,169 (10.7%)	4,986 (11.7%)	4,912 (11.5%)	11,466 (11.2%)	11,493 (11.2%)	19,650 (11.2%)	19,574 (11.2%)	0.00
Dementia; n (%)	2,224 (7.5%)	2,267 (7.6%)	1,970 (4.6%)	1,919 (4.5%)	14,941 (14.6%)	14,723 (14.4%)	19,135 (11.0%)	18,909 (10.8%)	0.01
Delirium; n (%)	884 (3.0%)	914 (3.1%)	984 (2.3%)	996 (2.3%)	5,202 (5.1%)	5,036 (4.9%)	7,070 (4.0%)	6,946 (4.0%)	0.00
Psychosis; n (%)	582 (2.0%)	615 (2.1%)	598 (1.4%)	593 (1.4%)	4,032 (3.9%)	3,917 (3.8%)	5,212 (3.0%)	5,125 (2.9%)	0.01
Obesity; n (%)	5,273 (17.7%)	5,251 (17.7%)	4,452 (10.5%)	4,430 (10.4%)	16,002 (15.6%)	15,920 (15.5%)	25,727 (14.7%)	25,601 (14.7%)	0.00
Overweight; n (%)	1,301 (4.4%)	1,275 (4.3%)	597 (1.4%)	604 (1.4%)	3,724 (3.6%)	3,738 (3.6%)	5,622 (3.2%)	5,617 (3.2%)	0.00

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Smoking; n (%)	4,679 (15.7%)	4,679 (15.7%)	3,092 (7.3%)	3,132 (7.4%)	19,687 (19.2%)	19,521 (19.1%)	27,458 (15.7%)	27,332 (15.6%)	0.00
Alcohol abuse or dependence; n (%)	287 (1.0%)	287 (1.0%)	264 (0.6%)	266 (0.6%)	887 (0.9%)	899 (0.9%)	1,438 (0.8%)	1,452 (0.8%)	0.00
Drug abuse or dependence; n (%)	453 (1.5%)	473 (1.6%)	281 (0.7%)	259 (0.6%)	1,406 (1.4%)	1,440 (1.4%)	2,140 (1.2%)	2,172 (1.2%)	0.00
COPD; n (%)	4,606 (15.5%)	4,680 (15.7%)	4,833 (11.3%)	4,849 (11.4%)	19,771 (19.3%)	19,860 (19.4%)	29,210 (16.7%)	29,389 (16.8%)	0.00
Asthma; n (%)	2,066 (6.9%)	2,129 (7.2%)	2,217 (5.2%)	2,218 (5.2%)	8,593 (8.4%)	8,606 (8.4%)	12,876 (7.4%)	12,953 (7.4%)	0.00
Obstructive sleep apnea; n (%)	3,164 (10.6%)	3,100 (10.4%)	4,205 (9.9%)	4,193 (9.8%)	9,119 (8.9%)	9,049 (8.8%)	16,488 (9.4%)	16,342 (9.4%)	0.00
Pneumonia; n (%)	1,627 (5.5%)	1,654 (5.6%)	2,255 (5.3%)	2,217 (5.2%)	7,732 (7.5%)	7,674 (7.5%)	11,614 (6.6%)	11,545 (6.6%)	0.00
Imaging; n (%)	146 (0.5%)	128 (0.4%)	101 (0.2%)	114 (0.3%)	500 (0.5%)	545 (0.5%)	747 (0.4%)	787 (0.5%)	-0.01
Diabetes Medications									
DM Medications - AGIs; n (%)	96 (0.3%)	96 (0.3%)	136 (0.3%)	133 (0.3%)	411 (0.4%)	414 (0.4%)	643 (0.4%)	643 (0.4%)	0.00
DM Medications - Glitazones; n (%)	2,692 (9.1%)	2,696 (9.1%)	4,523 (10.6%)	4,386 (10.3%)	5,892 (5.8%)	5,851 (5.7%)	13,107 (7.5%)	12,933 (7.4%)	0.00
DM Medications - GLP-1 RA; n (%)	198 (0.7%)	190 (0.6%)	182 (0.4%)	187 (0.4%)	354 (0.3%)	332 (0.3%)	#VALUE!	#VALUE!	#VALUE!
DM Medications - Insulin; n (%)	5,880 (19.8%)	5,819 (19.6%)	6,527 (15.3%)	6,474 (15.2%)	22,926 (22.4%)	22,323 (21.8%)	35,333 (20.2%)	34,616 (19.8%)	0.01
DM Medications - Meglitinides; n (%)	577 (1.9%)	659 (2.2%)	1,311 (3.1%)	1,333 (3.1%)	2,582 (2.5%)	2,736 (2.7%)	4,470 (2.6%)	4,728 (2.7%)	-0.01
DM Medications - Metformin; n (%)	17,034 (57.3%)	17,021 (57.3%)	24,802 (58.2%)	24,873 (58.4%)	56,177 (54.9%)	56,075 (54.8%)	98,013 (56.1%)	97,969 (56.1%)	0.00
Concomitant initiation or current use of SGLT2i; n (%)	429 (1.4%)	433 (1.5%)	501 (1.2%)	524 (1.2%)	1,159 (1.1%)	1,179 (1.2%)	2,089 (1.2%)	2,136 (1.2%)	0.00
Concomitant initiation or current use of AGIs; n (%)	61 (0.2%)	64 (0.2%)	95 (0.2%)	89 (0.2%)	289 (0.3%)	289 (0.3%)	445 (0.3%)	442 (0.3%)	0.00
Concomitant initiation or current use of Glitazones; n (%)	1,457 (4.9%)	1,440 (4.8%)	2,368 (5.6%)	2,260 (5.3%)	3,357 (3.3%)	3,309 (3.2%)	7,182 (4.1%)	7,009 (4.0%)	0.01
Concomitant initiation or current use of GLP-1 RA; n (%)	70 (0.2%)	67 (0.2%)	55 (0.1%)	57 (0.1%)	119 (0.1%)	111 (0.1%)	244 (0.1%)	235 (0.1%)	0.00
Concomitant initiation or current use of Insulin; n (%)	3,960 (13.3%)	3,969 (13.4%)	4,274 (10.0%)	4,170 (9.8%)	15,825 (15.5%)	15,444 (15.1%)	24,059 (13.8%)	23,583 (13.5%)	0.01
Concomitant initiation or current use of Meglitinides; n (%)	316 (1.1%)	475 (1.6%)	746 (1.8%)	939 (2.2%)	1,784 (1.7%)	1,940 (1.9%)	2,846 (1.6%)	3,354 (1.9%)	-0.02
Concomitant initiation or current use of Metformin; n (%)	13,532 (45.5%)	13,632 (45.9%)	20,013 (47.0%)	20,149 (47.3%)	43,913 (42.9%)	43,951 (42.9%)	77,458 (44.3%)	77,732 (44.5%)	0.00
Past use of SGLT2i; n (%)	215 (0.7%)	209 (0.7%)	212 (0.5%)	203 (0.5%)	582 (0.6%)	557 (0.5%)	1,009 (0.6%)	969 (0.6%)	0.00
Past use of AGIs ; n (%)	35 (0.1%)	32 (0.1%)	41 (0.1%)	44 (0.1%)	122 (0.1%)	125 (0.1%)	198 (0.1%)	201 (0.1%)	0.00
Past use of Glitazones ; n (%)	1,235 (4.2%)	1,256 (4.2%)	2,156 (5.1%)	2,126 (5.0%)	2,535 (2.5%)	2,542 (2.5%)	5,926 (3.4%)	5,924 (3.4%)	0.00
Past use of GLP-1 RA ; n (%)	131 (0.4%)	124 (0.4%)	129 (0.3%)	133 (0.3%)	235 (0.2%)	221 (0.2%)	495 (0.3%)	478 (0.3%)	0.00
Past use of Insulin ; n (%)	1,920 (6.5%)	1,850 (6.2%)	2,253 (5.3%)	2,305 (5.4%)	7,103 (6.9%)	6,882 (6.7%)	11,276 (6.5%)	11,037 (6.3%)	0.00
Past use of Meglitinides ; n (%)	261 (0.9%)	184 (0.6%)	565 (1.3%)	394 (0.9%)	798 (0.8%)	796 (0.8%)	1,624 (0.9%)	1,374 (0.8%)	0.01
Past use of metformin (final) ; n (%)	3,502 (11.8%)	3,389 (11.4%)	4,789 (11.2%)	4,724 (11.1%)	12,264 (12.0%)	12,124 (11.8%)	20,555 (11.8%)	20,237 (11.6%)	0.01
Other Medications									
Use of ACE inhibitors; n (%)	12,130 (40.8%)	12,196 (41.0%)	17,833 (41.9%)	17,824 (41.8%)	40,301 (39.4%)	40,254 (39.3%)	70,264 (40.2%)	70,274 (40.2%)	0.00
Use of ARBs; n (%)	8,377 (28.2%)	8,297 (27.9%)	12,003 (28.2%)	12,003 (28.2%)	31,904 (31.2%)	31,978 (31.2%)	52,284 (29.9%)	52,278 (29.9%)	0.00
Use of Loop Diuretics - ; n (%)	6,654 (22.4%)	6,700 (22.5%)	8,970 (21.1%)	8,915 (20.9%)	29,451 (28.8%)	29,240 (28.6%)	45,075 (25.8%)	44,855 (25.7%)	0.00
Use of other diuretics- ; n (%)	1,482 (5.0%)	1,460 (4.9%)	2,026 (4.8%)	2,032 (4.8%)	5,716 (5.6%)	5,595 (5.5%)	9,224 (5.3%)	9,087 (5.2%)	0.00
Use of nitrates-; n (%)	4,156 (14.0%)	4,225 (14.2%)	6,759 (15.9%)	6,740 (15.8%)	16,769 (16.4%)	16,892 (16.5%)	27,684 (15.8%)	27,857 (15.9%)	0.00
Use of other hypertension drugs; n (%)	2,725 (9.2%)	2,775 (9.3%)	3,435 (8.1%)	3,452 (8.1%)	11,247 (11.0%)	11,238 (11.0%)	17,407 (10.0%)	17,465 (10.0%)	0.00
Use of digoxin-; n (%)	1,243 (4.2%)	1,265 (4.3%)	2,096 (4.9%)	2,094 (4.9%)	5,653 (5.5%)	5,682 (5.5%)	8,992 (5.1%)	9,041 (5.2%)	0.00
Use of Anti-arrhythmics; n (%)	1,009 (3.4%)	1,037 (3.5%)	1,646 (3.9%)	1,637 (3.8%)	4,512 (4.4%)	4,398 (4.3%)	7,167 (4.1%)	7,072 (4.0%)	0.01
Use of COPD/asthma meds- ; n (%)	5,314 (17.9%)	5,331 (17.9%)	7,511 (17.6%)	7,445 (17.5%)	22,193 (21.7%)	22,356 (21.8%)	35,018 (20.0%)	35,132 (20.1%)	0.00
Use of statins; n (%)	21,217 (71.4%)	21,259 (71.5%)	30,505 (71.6%)	30,420 (71.4%)	74,884 (73.1%)	74,789 (73.0%)	126,606 (72.5%)	126,468 (72.4%)	0.00
Use of other lipid-lowering drugs; n (%)	4,653 (15.7%)	4,636 (15.6%)	8,222 (19.3%)	8,219 (19.3%)	14,426 (14.1%)	14,315 (14.0%)	27,301 (15.6%)	27,170 (15.5%)	0.00
Use of antiplatelet agents; n (%)	8,723 (29.3%)	8,787 (29.6%)	14,464 (34.0%)	14,420 (33.8%)	29,939 (29.2%)	30,180 (29.5%)	53,126 (30.4%)	53,387 (30.6%)	0.00
Use of oral anticoagulants (Dabigatran, Rivaroxaban, Apixaban, Warfarin); n (%)	3,349 (11.3%)	3,375 (11.4%)	4,638 (10.9%)	4,669 (11.0%)	15,605 (15.2%)	15,554 (15.2%)	23,592 (13.5%)	23,598 (13.5%)	0.00
Use of heparin and other low-molecular weight heparins; n (%)	266 (0.9%)	249 (0.8%)	36 (0.1%)	31 (0.1%)	932 (0.9%)	931 (0.9%)	1,234 (0.7%)	1,211 (0.7%)	0.00
Use of NSAIDs; n (%)	4,026 (13.5%)	4,031 (13.6%)	5,599 (13.1%)	5,656 (13.3%)	16,708 (16.3%)	16,790 (16.4%)	26,333 (15.1%)	26,477 (15.2%)	0.00
Use of oral corticosteroids; n (%)	5,138 (17.3%)	5,237 (17.6%)	7,511 (17.6%)	7,423 (17.4%)	22,295 (21.8%)	22,282 (21.8%)	34,944 (20.0%)	34,942 (20.0%)	0.00
Use of bisphosphonate (); n (%)	939 (3.2%)	924 (3.1%)	1,106 (2.6%)	1,119 (2.6%)	4,332 (4.2%)	4,362 (4.3%)	6,377 (3.6%)	6,405 (3.7%)	-0.01
Use of opioids- ; n (%)	9,061 (30.5%)	9,112 (30.7%)	13,177 (30.9%)	13,185 (31.0%)	32,771 (32.0%)	32,800 (32.0%)	55,009 (31.5%)	55,097 (31.5%)	0.00
Use of antidepressants; n (%)	7,899 (26.6%)	7,878 (26.5%)	10,404 (24.4%)	10,233 (24.0%)	31,518 (30.8%)	31,530 (30.8%)	49,821 (28.5%)	49,641 (28.4%)	0.00
Use of antipsychotics; n (%)	982 (3.3%)	988 (3.3%)	1,038 (2.4%)	994 (2.3%)	5,625 (5.5%)	5,472 (5.3%)	7,645 (4.4%)	7,454 (4.3%)	0.00
Use of anticonvulsants; n (%)	5,309 (17.9%)	5,312 (17.9%)	6,020 (14.1%)	5,899 (13.8%)	22,554 (22.0%)	22,494 (22.0%)	33,883 (19.4%)	33,705 (19.3%)	0.00
Use of lithium-; n (%)	49 (0.2%)	46 (0.2%)	64 (0.2%)	62 (0.1%)	169 (0.2%)	124 (0.1%)	282 (0.2%)	232 (0.1%)	0.03
Use of Benzos-; n (%)	3,328 (11.2%)	3,370 (11.3%)	5,785 (13.6%)	5,788 (13.6%)	13,195 (12.9%)	13,059 (12.8%)	22,308 (12.8%)	22,217 (12.7%)	0.00
Use of anxiolytics/hypnotics- ; n (%)	2,212 (7.4%)	2,250 (7.6%)	3,697 (8.7%)	3,609 (8.5%)	8,941 (8.7%)	9,025 (8.8%)	14,850 (8.5%)	14,884 (8.5%)	0.00
Use of dementia meds- ; n (%)	1,145 (3.9%)	1,142 (3.8%)	1,201 (2.8%)	1,199 (2.8%)	8,554 (8.4%)	8,470 (8.3%)	10,900 (6.2%)	10,811 (6.2%)	0.00
Use of antiparkinsonian meds- ; n (%)	875 (2.9%)	915 (3.1%)	1,237 (2.9%)	1,176 (2.8%)	4,679 (4.6%)	4,656 (4.5%)	6,791 (3.9%)	6,747 (3.9%)	0.00
Any use of pramlintide; n (%)	8 (0.0%)	9 (0.0%)	28 (0.1%)	37 (0.1%)	12 (0.0%)	27 (0.0%)	048 (0.0%)	073 (0.0%)	#DIV/0!
Any use of 1st generation sulfonylureas; n (%)	15 (0.1%)	11 (0.0%)	41 (0.1%)	15 (0.0%)	51 (0.0%)	27 (0.0%)	107 (0.1%)	053 (0.0%)	0.00
Entresto (sacubitril/valsartan); n (%)	56 (0.2%)	65 (0.2%)	23 (0.1%)	19 (0.0%)	93 (0.1%)	120 (0.1%)	172 (0.1%)	204 (0.1%)	0.00

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Initiation as monotherapy v4 ; n (%)	7,093 (23.9%)	7,240 (24.4%)	9,995 (23.5%)	10,304 (24.2%)	20,129 (19.7%)	20,714 (20.2%)	37,217 (21.3%)	38,258 (21.9%)	-0.01
Labs							72,327	72,327	
Lab values-HbA1c (%) ; n (%)	8,669 (29.2%)	8,827 (29.7%)	2,042 (4.8%)	1,847 (4.3%)	N/A	N/A	10,711 (14.8%)	10,674 (14.8%)	0.00
Lab values-HbA1c (%) (within 3 months) ; n (%)	6,595 (22.2%)	6,705 (22.6%)	1,575 (3.7%)	1,424 (3.3%)	N/A	N/A	8,170 (11.3%)	8,129 (11.2%)	0.00
Lab values-HbA1c (%) (within 6 months) ; n (%)	8,669 (29.2%)	8,827 (29.7%)	2,042 (4.8%)	1,847 (4.3%)	N/A	N/A	10,711 (14.8%)	10,674 (14.8%)	0.00
Lab values-BNP; n (%)	329 (1.1%)	354 (1.2%)	66 (0.2%)	73 (0.2%)	N/A	N/A	395 (0.5%)	427 (0.6%)	-0.01
Lab values-BNP (within 3 months); n (%)	201 (0.7%)	219 (0.7%)	42 (0.1%)	54 (0.1%)	N/A	N/A	243 (0.3%)	273 (0.4%)	-0.02
Lab values-BNP (within 6 months); n (%)	329 (1.1%)	354 (1.2%)	66 (0.2%)	73 (0.2%)	N/A	N/A	395 (0.5%)	427 (0.6%)	-0.01
Lab values-BUN (mg/dl); n (%)	9,465 (31.8%)	9,769 (32.9%)	1,999 (4.7%)	2,034 (4.8%)	N/A	N/A	11,464 (15.9%)	11,803 (16.3%)	-0.01
Lab values-BUN (mg/dl) (within 3 months); n (%)	7,205 (24.2%)	7,482 (25.2%)	1,527 (3.6%)	1,550 (3.6%)	N/A	N/A	8,732 (12.1%)	9,032 (12.5%)	-0.01
Lab values-BUN (mg/dl) (within 6 months); n (%)	9,465 (31.8%)	9,769 (32.9%)	1,999 (4.7%)	2,034 (4.8%)	N/A	N/A	11,464 (15.9%)	11,803 (16.3%)	-0.01
Lab values-Creatinine (mg/dl) ; n (%)	9,694 (32.6%)	10,013 (33.7%)	2,137 (5.0%)	2,158 (5.1%)	N/A	N/A	11,831 (16.4%)	12,171 (16.8%)	-0.01
Lab values-Creatinine (mg/dl) (within 3 months) ; n (%)	7,384 (24.8%)	7,681 (25.8%)	1,642 (3.9%)	1,636 (3.8%)	N/A	N/A	9,026 (12.5%)	9,317 (12.9%)	-0.01
Lab values-Creatinine (mg/dl) (within 6 months) ; n (%)	9,694 (32.6%)	10,013 (33.7%)	2,137 (5.0%)	2,158 (5.1%)	N/A	N/A	11,831 (16.4%)	12,171 (16.8%)	-0.01
Lab values-HDL level (mg/dl); n (%)	7,615 (25.6%)	7,857 (26.4%)	1,837 (4.3%)	1,684 (4.0%)	N/A	N/A	9,452 (13.1%)	9,541 (13.2%)	0.00
Lab values-HDL level (mg/dl) (within 3 months); n (%)	5,408 (18.2%)	5,644 (19.0%)	1,322 (3.1%)	1,239 (2.9%)	N/A	N/A	6,730 (9.3%)	6,883 (9.5%)	-0.01
Lab values-HDL level (mg/dl) (within 6 months); n (%)	7,615 (25.6%)	7,857 (26.4%)	1,837 (4.3%)	1,684 (4.0%)	N/A	N/A	9,452 (13.1%)	9,541 (13.2%)	0.00
Lab values-LDL level (mg/dl) ; n (%)	7,779 (26.2%)	8,047 (27.1%)	1,951 (4.6%)	1,792 (4.2%)	N/A	N/A	9,730 (13.5%)	9,839 (13.6%)	0.00
Lab values-LDL level (mg/dl) (within 3 months) ; n (%)	5,526 (18.6%)	5,768 (19.4%)	1,406 (3.3%)	1,317 (3.1%)	N/A	N/A	6,932 (9.6%)	7,085 (9.8%)	-0.01
Lab values-LDL level (mg/dl) (within 6 months) ; n (%)	7,779 (26.2%)	8,047 (27.1%)	1,951 (4.6%)	1,792 (4.2%)	N/A	N/A	9,730 (13.5%)	9,839 (13.6%)	0.00
Lab values-NT-proBNP; n (%)	46 (0.2%)	43 (0.1%)	3 (0.0%)	3 (0.0%)	N/A	N/A	49 (0.1%)	0 (0.1%)	-
Lab values-NT-proBNP (within 3 months); n (%)	28 (0.1%)	19 (0.1%)	2 (0.0%)	2 (0.0%)	N/A	N/A	30 (0.0%)	0 (0.0%)	-
Lab values-NT-proBNP (within 6 months); n (%)	46 (0.2%)	43 (0.1%)	3 (0.0%)	3 (0.0%)	N/A	N/A	49 (0.1%)	46 (0.1%)	-
Lab values-Total cholesterol (mg/dl) ; n (%)	7,723 (26.0%)	7,976 (26.8%)	1,908 (4.5%)	1,761 (4.1%)	N/A	N/A	9,631 (13.3%)	9,737 (13.5%)	-0.01
Lab values-Total cholesterol (mg/dl) (within 3 months) ; n (%)	5,490 (18.5%)	5,723 (19.3%)	1,373 (3.2%)	1,289 (3.0%)	N/A	N/A	6,863 (9.5%)	7,012 (9.7%)	-0.01
Lab values-Total cholesterol (mg/dl) (within 6 months) ; n (%)	7,723 (26.0%)	7,976 (26.8%)	1,908 (4.5%)	1,761 (4.1%)	N/A	N/A	9,631 (13.3%)	9,737 (13.5%)	-0.01
Lab values-Triglyceride level (mg/dl); n (%)	7,638 (25.7%)	7,867 (26.5%)	1,873 (4.4%)	1,730 (4.1%)	N/A	N/A	9,511 (13.1%)	9,597 (13.3%)	-0.01
Lab values-Triglyceride level (mg/dl) (within 3 months); n (%)	5,426 (18.3%)	5,641 (19.0%)	1,351 (3.2%)	1,273 (3.0%)	N/A	N/A	6,777 (9.4%)	6,914 (9.6%)	-0.01
Lab values-Triglyceride level (mg/dl) (within 6 months); n (%)	7,638 (25.7%)	7,867 (26.5%)	1,873 (4.4%)	1,730 (4.1%)	N/A	N/A	9,511 (13.1%)	9,597 (13.3%)	-0.01
Lab result number-HbA1c (%) mean (only 2 to 20 included) v4	8,595	8,741	1,872	1,782	N/A	N/A	10,467	10,523	
...mean (sd)	7.99 (1.78)	7.78 (1.69)	8.13 (1.88)	7.90 (1.75)	N/A	N/A	8.02 (1.80)	7.80 (1.70)	0.13
...median [IQR]	7.60 [6.80, 8.80]	7.40 [6.60, 8.50]	7.70 [6.80, 9.00]	7.45 [6.70, 8.65]	N/A	N/A	7.62 (1.80)	7.41 (1.70)	0.12
...Missing; n (%)	21,132 (71.1%)	20,986 (70.6%)	40,728 (95.6%)	40,818 (95.8%)	N/A	N/A	61,860 (85.5%)	61,804 (85.5%)	0.00
Lab result number- BNP mean	329	354	66	73	N/A	N/A	395	427	
...mean (sd)	221.45 (330.00)	212.58 (353.05)	324.29 (602.41)	213.53 (315.86)	N/A	N/A	238.63 (388.97)	212.74 (347.44)	0.07
...median [IQR]	97.00 [38.70, 238.45]	106.60 [36.45, 239.20]	89.50 [29.62, 339.62]	101.00 [32.00, 264.25]	N/A	N/A	#VALUE!	105.64 (347.44)	#VALUE!
...Missing; n (%)	29,398 (98.9%)	29,373 (98.8%)	42,534 (99.8%)	42,527 (99.8%)	N/A	N/A	71,932 (99.5%)	71,900 (99.4%)	0.01
Lab result number- BUN (mg/dl) mean	9,465	9,769	1,999	2,034	N/A	N/A	11,464	11,803	
...mean (sd)	20.54 (9.90)	20.26 (9.38)	844.91 (11,853.76)	221.96 (5,038.61)	N/A	N/A	164.29 (4949.29)	55.02 (2091.42)	0.03
...median [IQR]	18.00 [14.00, 24.00]	18.00 [14.00, 23.77]	17.00 [14.00, 22.00]	17.00 [14.00, 22.00]	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
...Missing; n (%)	20,262 (68.2%)	19,958 (67.1%)	40,601 (95.3%)	40,566 (95.2%)	N/A	N/A	60,863 (84.1%)	60,524 (83.7%)	0.01
Lab result number- Creatinine (mg/dl) mean (only 0.1 to 15 included)	9,619	9,904	2,042	2,033	N/A	N/A	11,661	11,937	
...mean (sd)	1.13 (0.55)	1.13 (0.55)	1.07 (0.59)	1.05 (0.51)	N/A	N/A	1.12 (0.56)	1.12 (0.54)	0.00
...median [IQR]	1.01 [0.83, 1.29]	1.02 [0.84, 1.28]	0.98 [0.80, 1.16]	0.98 [0.81, 1.15]	N/A	N/A	1.00 (0.56)	1.01 (0.54)	-0.02
...Missing; n (%)	20,108 (67.6%)	19,823 (66.7%)	40,558 (95.2%)	40,567 (95.2%)	N/A	N/A	60,666 (83.9%)	60,390 (83.7%)	0.01
Lab result number- HDL level (mg/dl) mean (only =<5000 included)	7,615	7,857	1,830	1,683	N/A	N/A	9,445	9,540	
...mean (sd)	44.85 (13.87)	45.38 (14.01)	43.92 (15.63)	43.57 (14.19)	N/A	N/A	44.67 (14.23)	45.06 (14.04)	-0.03
...median [IQR]	43.00 [36.00, 52.00]	44.00 [36.00, 53.00]	42.00 [35.00, 51.00]	42.00 [35.00, 51.00]	N/A	N/A	42.81 (14.23)	43.65 (14.04)	-0.06
...Missing; n (%)	22,112 (74.4%)	21,870 (73.6%)	40,770 (95.7%)	40,917 (96.0%)	N/A	N/A	62,882 (86.9%)	62,787 (86.8%)	0.00
Lab result number- LDL level (mg/dl) mean (only =<5000 included)	7,617	7,885	1,824	1,694	N/A	N/A	9,441	9,579	
...mean (sd)	85.26 (40.77)	83.19 (39.97)	87.55 (41.77)	86.51 (42.89)	N/A	N/A	85.70 (40.97)	83.78 (40.50)	0.05
...median [IQR]	82.00 [61.00, 109.00]	79.40 [59.00, 104.00]	85.00 [62.50, 112.00]	83.00 [62.00, 111.00]	N/A	N/A	82.58 (40.97)	80.04 (40.50)	0.06
...Missing; n (%)	22,110 (74.4%)	21,842 (73.5%)	40,776 (95.7%)	40,906 (96.0%)	N/A	N/A	62,886 (86.9%)	62,748 (86.8%)	0.00

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Lab result number- Total cholesterol (mg/dl) mean (only =<5000 included)	7,718	7,965	1,900	1,757	N/A	N/A	9,618	9,722	
...mean (sd)	170.55 (48.85)	167.26 (48.37)	172.88 (50.42)	171.42 (51.31)	N/A	N/A	171.01 (49.17)	168.01 (48.92)	0.06
...median [IQR]	164.00 [138.00, 197.00]	161.00 [136.50, 191.50]	167.00 [142.00, 199.00]	166.00 [140.00, 198.00]	N/A	N/A	164.59 (49.17)	161.90 (48.92)	0.05
...Missing; n (%)	22,009 (74.0%)	21,762 (73.2%)	40,700 (95.5%)	40,843 (95.9%)	N/A	N/A	62,709 (86.7%)	62,605 (86.6%)	0.00
Lab result number- Triglyceride level (mg/dl) mean (only =<5000 included)	7,638	7,867	1,866	1,729	N/A	N/A	9,504	9,596	
...mean (sd)	187.28 (156.16)	178.93 (148.77)	189.86 (160.62)	191.36 (174.88)	N/A	N/A	187.79 (157.05)	181.17 (153.81)	0.04
...median [IQR]	152.00 [109.00, 215.00]	146.00 [104.00, 210.00]	152.00 [106.38, 218.50]	149.33 [106.25, 219.00]	N/A	N/A	152.00 (157.05)	146.60 (153.81)	0.03
...Missing; n (%)	22,089 (74.3%)	21,860 (73.5%)	40,734 (95.6%)	40,871 (95.9%)	N/A	N/A	62,823 (86.9%)	62,731 (86.7%)	0.01
Lab result number- Hemoglobin mean (only >0 included)	7,029	7,205	1,467	1,399	N/A	N/A	8,496	8,604	
...mean (sd)	13.26 (1.79)	13.26 (1.76)	612.63 (9,372.79)	321.61 (6,152.32)	N/A	N/A	116.75 (3894.08)	63.40 (2480.38)	0.02
...median [IQR]	13.30 [12.10, 14.50]	13.30 [12.10, 14.50]	13.50 [12.30, 14.70]	13.50 [12.30, 14.70]	N/A	N/A	#VALUE!	#VALUE!	#VALUE!
...Missing; n (%)	22,698 (76.4%)	22,522 (75.8%)	41,133 (96.6%)	41,201 (96.7%)	N/A	N/A	63,831 (88.3%)	63,723 (88.1%)	0.01
Lab result number- Serum sodium mean (only > 90 and < 190 included)	9,400	9,693	1,874	1,847	N/A	N/A	11,274	11,540	
...mean (sd)	139.35 (2.89)	139.52 (2.83)	138.98 (2.87)	139.11 (2.74)	N/A	N/A	139.29 (2.89)	139.45 (2.82)	-0.06
...median [IQR]	139.50 [138.00, 141.00]	140.00 [138.00, 141.33]	139.00 [137.50, 141.00]	139.00 [137.50, 141.00]	N/A	N/A	139.42 (2.89)	139.84 (2.82)	-0.15
...Missing; n (%)	20,327 (68.4%)	20,034 (67.4%)	40,726 (95.6%)	40,753 (95.7%)	N/A	N/A	61,053 (84.4%)	60,787 (84.0%)	0.01
Lab result number- Albumin mean (only >0 and <=10 included)	8,711	9,009	1,706	1,663	N/A	N/A	10,417	10,672	
...mean (sd)	4.17 (0.35)	4.17 (0.35)	4.15 (0.52)	4.14 (0.59)	N/A	N/A	4.17 (0.38)	4.17 (0.40)	0.00
...median [IQR]	4.20 [4.00, 4.40]	4.20 [4.00, 4.40]	4.20 [4.00, 4.40]	4.20 [4.00, 4.43]	N/A	N/A	4.20 (0.38)	4.20 (0.40)	0.00
...Missing; n (%)	21,016 (70.7%)	20,718 (69.7%)	40,894 (96.0%)	40,937 (96.1%)	N/A	N/A	61,910 (85.6%)	61,655 (85.2%)	0.01
Lab result number- Glucose (fasting or random) mean (only 10-1000 included)	9,394	9,695	1,867	1,826	N/A	N/A	11,261	11,521	
...mean (sd)	168.15 (72.56)	161.26 (67.24)	173.78 (76.66)	164.94 (72.28)	N/A	N/A	169.08 (73.26)	161.84 (68.07)	0.10
...median [IQR]	150.00 [121.00, 195.50]	144.00 [117.00, 185.00]	153.67 [124.00, 202.50]	145.00 [119.00, 189.00]	N/A	N/A	150.61 (73.26)	144.16 (68.07)	0.09
...Missing; n (%)	20,333 (68.4%)	20,032 (67.4%)	40,733 (95.6%)	40,774 (95.7%)	N/A	N/A	61,066 (84.4%)	60,806 (84.1%)	0.01
Lab result number- Potassium mean (only 1-7 included)	9,573	9,878	1,980	1,995	N/A	N/A	11,553	11,873	
...mean (sd)	4.45 (0.45)	4.43 (0.45)	4.37 (0.44)	4.38 (0.44)	N/A	N/A	4.44 (0.45)	4.42 (0.45)	0.04
...median [IQR]	4.40 [4.15, 4.70]	4.40 [4.12, 4.70]	4.35 [4.05, 4.70]	4.40 [4.10, 4.65]	N/A	N/A	4.39 (0.45)	4.40 (0.45)	-0.02
...Missing; n (%)	20,154 (67.8%)	19,849 (66.8%)	40,620 (95.4%)	40,605 (95.3%)	N/A	N/A	60,774 (84.0%)	60,454 (83.6%)	0.01
Comorbidity Scores									
CCI (180 days)- ICD9 and ICD10									
...mean (sd)	3.53 (2.31)	3.54 (2.35)	2.57 (2.10)	2.56 (2.12)	4.21 (2.40)	4.19 (2.41)	3.69 (2.31)	3.68 (2.33)	0.00
...median [IQR]	3.00 [2.00, 5.00]	3.00 [2.00, 5.00]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	4.00 [2.00, 6.00]	4.00 [2.00, 6.00]	3.34 (2.31)	3.34 (2.33)	0.00
Frailty Score: Qualitative Version 365 days as Categories, v1									
...0; n (%)	6,384 (21.5%)	5,865 (19.7%)	3,424 (8.0%)	3,464 (8.1%)	15,773 (15.4%)	15,429 (15.1%)	25,581 (14.6%)	24,758 (14.2%)	0.01
...1 to 2; n (%)	10,115 (34.0%)	10,511 (35.4%)	18,141 (42.6%)	18,211 (42.7%)	24,197 (23.6%)	24,350 (23.8%)	52,453 (30.0%)	53,072 (30.4%)	-0.01
...3 or more; n (%)	13,228 (44.5%)	13,351 (44.9%)	21,035 (49.4%)	20,925 (49.1%)	62,441 (61.0%)	62,632 (61.2%)	96,704 (55.3%)	96,908 (55.5%)	0.00
Frailty Score: Empirical Version 365 days as Categories,									
...< 0.12908; n (%)	1,610 (5.4%)	1,675 (5.6%)	2,733 (6.4%)	2,919 (6.9%)	1,887 (1.8%)	2,260 (2.2%)	6,230 (3.6%)	6,854 (3.9%)	-0.02
...0.12908 - 0.1631167; n (%)	6,451 (21.7%)	6,526 (22.0%)	10,144 (23.8%)	10,347 (24.3%)	10,000 (9.8%)	10,659 (10.4%)	26,595 (15.2%)	27,532 (15.8%)	-0.02
...>= 0.1631167; n (%)	21,666 (72.9%)	21,526 (72.4%)	29,723 (69.8%)	29,334 (68.9%)	90,524 (88.4%)	89,492 (87.4%)	141,913 (81.2%)	140,352 (80.3%)	0.02
Non-Frailty; n (%)	16,772 (56.4%)	16,976 (57.1%)	21,481 (50.4%)	21,489 (50.4%)	3,954 (3.9%)	3,683 (3.6%)	42,207 (24.2%)	42,148 (24.1%)	0.00
Frailty Score (mean): Qualitative Version 365 days, v1									
...mean (sd)	2.71 (2.55)	2.75 (2.55)	2.95 (2.22)	2.95 (2.24)	3.72 (2.94)	3.73 (2.95)	3.36 (2.72)	3.37 (2.73)	0.00
...median [IQR]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	3.00 [1.00, 6.00]	3.00 [1.00, 6.00]	2.59 (2.72)	2.59 (2.73)	0.00
Frailty Score (mean): Empirical Version 365 days,									
...mean (sd)	0.17 (0.07)	0.17 (0.07)	0.19 (0.06)	0.19 (0.06)	0.25 (0.08)	0.25 (0.08)	0.22 (0.07)	0.22 (0.07)	0.00
...median [IQR]	0.16 [0.12, 0.21]	0.16 [0.12, 0.21]	0.18 [0.15, 0.22]	0.18 [0.15, 0.21]	0.23 [0.19, 0.29]	0.23 [0.19, 0.29]	0.21 (0.07)	0.21 (0.07)	0.00
Healthcare Utilization									
Any hospitalization; n (%)	6,882 (23.2%)	6,765 (22.8%)	11,065 (26.0%)	11,100 (26.1%)	27,916 (27.3%)	27,495 (26.8%)	45,863 (26.2%)	45,360 (26.0%)	0.00
Any hospitalization within prior 30 days; n (%)	2,859 (9.6%)	2,900 (9.8%)	4,437 (10.4%)	4,490 (10.5%)	10,985 (10.7%)	10,851 (10.6%)	18,281 (10.5%)	18,241 (10.4%)	0.00
Any hospitalization during prior 31-180 days; n (%)	4,537 (15.3%)	4,531 (15.2%)	7,362 (17.3%)	7,387 (17.3%)	19,769 (19.3%)	19,486 (19.0%)	31,668 (18.1%)	31,404 (18.0%)	0.00
Endocrinologist Visit; n (%)	3,404 (11.5%)	3,551 (11.9%)	4,825 (11.3%)	4,946 (11.6%)	12,520 (12.2%)	12,940 (12.6%)	20,749 (11.9%)	21,437 (12.3%)	-0.01
Endocrinologist Visit (30 days prior); n (%)	2,140 (7.2%)	2,169 (7.3%)	3,180 (7.5%)	3,140 (7.4%)	7,592 (7.4%)	7,411 (7.2%)	12,912 (7.4%)	12,720 (7.3%)	0.00
Endocrinologist Visit (31 to 180 days prior); n (%)	2,399 (8.1%)	2,412 (8.1%)	3,183 (7.5%)	3,195 (7.5%)	9,156 (8.9%)	9,098 (8.9%)	14,738 (8.4%)	14,705 (8.4%)	0.00
Internal medicine/family medicine visits; n (%)	26,096 (87.8%)	25,836 (86.9%)	36,484 (85.6%)	36,277 (85.2%)	89,704 (87.6%)	89,135 (87.0%)	152,284 (87.1%)	151,248 (86.6%)	0.01
Internal medicine/family medicine visits (30 days prior) ; n (%)	19,588 (65.9%)	19,501 (65.6%)	26,797 (62.9%)	26,480 (62.2%)	64,921 (63.4%)	64,807 (63.3%)	111,306 (63.7%)	110,788 (63.4%)	0.01

Table 1: Sitagliptin vs 2nd Generation Sulfonylureas

Internal medicine/family medicine visits (31 to 180 days prior) ; n (%)	23,320 (78.4%)	23,349 (78.5%)	32,491 (76.3%)	32,370 (76.0%)	81,075 (79.2%)	80,830 (78.9%)	136,886 (78.3%)	136,549 (78.1%)	0.00
Cardiologist visit; n (%)	16,806 (56.5%)	16,784 (56.5%)	21,071 (49.5%)	20,964 (49.2%)	62,396 (60.9%)	62,201 (60.7%)	100,273 (57.4%)	99,949 (57.2%)	0.00
Number of Cardiologist visits (30 days prior); n (%)	6,841 (23.0%)	6,934 (23.3%)	8,260 (19.4%)	8,178 (19.2%)	25,354 (24.8%)	25,197 (24.6%)	40,455 (23.2%)	40,309 (23.1%)	0.00
Number of Cardiologist visits (31 to 180 days prior); n (%)	14,105 (47.4%)	14,093 (47.4%)	17,962 (42.2%)	17,810 (41.8%)	53,633 (52.4%)	53,527 (52.3%)	85,700 (49.0%)	85,430 (48.9%)	0.00
Electrocardiogram ; n (%)	15,569 (52.4%)	15,698 (52.8%)	21,582 (50.7%)	21,691 (50.9%)	58,001 (56.6%)	58,332 (57.0%)	95,152 (54.5%)	95,721 (54.8%)	-0.01
Use of glucose test strips; n (%)	1,526 (5.1%)	1,536 (5.2%)	1,947 (4.6%)	1,947 (4.6%)	4,540 (4.4%)	4,587 (4.5%)	8,013 (4.6%)	8,070 (4.6%)	0.00
Dialysis; n (%)	143 (0.5%)	122 (0.4%)	209 (0.5%)	225 (0.5%)	1,302 (1.3%)	1,191 (1.2%)	1,654 (0.9%)	1,538 (0.9%)	0.00
Naive new user v8 ; n (%)	10,615 (35.7%)	10,728 (36.1%)	15,150 (35.6%)	15,436 (36.2%)	32,363 (31.6%)	32,876 (32.1%)	58,128 (33.3%)	59,040 (33.8%)	-0.01
N antidiabetic drugs at index date									
...mean (sd)	1.67 (0.68)	1.68 (0.66)	1.66 (0.67)	1.66 (0.65)	1.65 (0.67)	1.65 (0.65)	1.66 (0.67)	1.66 (0.65)	0.00
...median [IQR]	2.00 [1.00, 2.00]	2.00 [1.00, 2.00]	2.00 [1.00, 2.00]	2.00 [1.00, 2.00]	2.00 [1.00, 2.00]	2.00 [1.00, 2.00]	2.00 (0.67)	2.00 (0.65)	0.00
number of different/distinct medication prescriptions									
...mean (sd)	11.17 (5.48)	11.19 (5.59)	10.87 (5.26)	10.82 (5.31)	11.81 (5.35)	11.79 (5.49)	11.47 (5.35)	11.45 (5.46)	0.00
...median [IQR]	10.00 [7.00, 14.00]	10.00 [7.00, 14.00]	10.00 [7.00, 14.00]	10.00 [7.00, 14.00]	11.00 [8.00, 15.00]	11.00 [8.00, 15.00]	10.59 (5.35)	10.59 (5.46)	0.00
Number of Hospitalizations									
...mean (sd)	0.30 (0.62)	0.30 (0.65)	0.32 (0.62)	0.32 (0.63)	0.40 (0.77)	0.39 (0.77)	0.36 (0.71)	0.36 (0.72)	0.00
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 (0.71)	0.00 (0.72)	0.00
Number of hospital days									
...mean (sd)	1.90 (5.67)	1.95 (6.01)	2.18 (6.63)	2.16 (6.53)	2.78 (7.68)	2.72 (7.30)	2.48 (7.12)	2.45 (6.91)	0.00
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 2.00]	0.00 [0.00, 2.00]	0.00 [0.00, 3.00]	0.00 [0.00, 3.00]	0.00 (7.12)	0.00 (6.91)	0.00
Number of Emergency Department (ED) visits									
...mean (sd)	0.73 (1.64)	0.74 (1.78)	0.49 (2.08)	0.49 (2.24)	0.99 (1.84)	0.98 (2.11)	0.82 (1.87)	0.82 (2.09)	0.00
...median [IQR]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 2.00]	0.00 [0.00, 2.00]	0.00 (1.87)	0.00 (2.09)	0.00
Number of Office visits									
...mean (sd)	6.28 (4.95)	6.29 (4.80)	6.42 (5.51)	6.38 (4.80)	6.99 (5.50)	6.99 (5.42)	6.73 (5.41)	6.72 (5.17)	0.00
...median [IQR]	5.00 [3.00, 8.00]	5.00 [3.00, 8.00]	5.00 [3.00, 8.00]	5.00 [3.00, 8.00]	6.00 [3.00, 10.00]	6.00 [3.00, 10.00]	5.59 (5.41)	5.59 (5.17)	0.00
Number of Endocrinologist visits									
...mean (sd)	0.56 (2.48)	0.58 (2.51)	0.54 (2.42)	0.58 (2.79)	0.71 (3.34)	0.74 (3.52)	0.64 (3.00)	0.67 (3.20)	-0.01
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 (3.00)	0.00 (3.20)	0.00
Number of internal medicine/family medicine visits									
...mean (sd)	12.02 (17.25)	11.94 (16.11)	8.50 (12.80)	8.74 (12.71)	10.70 (13.45)	10.86 (13.42)	10.39 (14.02)	10.53 (13.75)	-0.01
...median [IQR]	7.00 [3.00, 15.00]	7.00 [3.00, 15.00]	5.00 [2.00, 11.00]	5.00 [2.00, 11.00]	7.00 [3.00, 14.00]	7.00 [3.00, 15.00]	6.51 (14.02)	6.51 (13.75)	0.00
Number of Cardiologist visits									
...mean (sd)	3.60 (6.45)	3.71 (6.54)	2.70 (5.12)	2.72 (5.14)	3.91 (6.81)	3.95 (6.94)	3.56 (6.38)	3.61 (6.48)	-0.01
...median [IQR]	1.00 [0.00, 5.00]	1.00 [0.00, 5.00]	0.00 [0.00, 3.00]	0.00 [0.00, 3.00]	1.00 [0.00, 5.00]	1.00 [0.00, 5.00]	0.76 (6.38)	0.76 (6.48)	0.00
Number electrocardiograms received									
...mean (sd)	1.29 (2.17)	1.32 (2.27)	1.08 (1.67)	1.08 (1.71)	1.44 (2.09)	1.43 (2.07)	1.33 (2.01)	1.33 (2.03)	0.00
...median [IQR]	1.00 [0.00, 2.00]	1.00 [0.00, 2.00]	1.00 [0.00, 2.00]	1.00 [0.00, 1.00]	1.00 [0.00, 2.00]	1.00 [0.00, 2.00]	1.00 (2.01)	1.00 (2.03)	0.00
Number of HbA1c tests ordered									
...mean (sd)	1.21 (0.99)	1.21 (0.96)	0.83 (0.94)	0.82 (0.92)	1.36 (1.00)	1.35 (0.99)	1.21 (0.98)	1.20 (0.97)	0.01
...median [IQR]	1.00 [0.00, 2.00]	1.00 [1.00, 2.00]	1.00 [0.00, 1.00]	1.00 [0.00, 1.00]	1.00 [1.00, 2.00]	1.00 [1.00, 2.00]	1.00 (0.98)	1.00 (0.97)	0.00
Number of glucose tests ordered									
...mean (sd)	0.79 (5.17)	0.82 (5.19)	0.50 (1.97)	0.49 (1.71)	0.55 (1.41)	0.55 (1.28)	0.58 (2.58)	0.58 (2.50)	0.00
...median [IQR]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 (2.58)	0.00 (2.50)	0.00
Number of lipid tests ordered									
...mean (sd)	1.04 (1.10)	1.04 (1.07)	0.79 (1.32)	0.78 (1.20)	1.05 (0.96)	1.05 (0.94)	0.98 (1.08)	0.98 (1.03)	0.00
...median [IQR]	1.00 [0.00, 2.00]	1.00 [0.00, 2.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	1.00 [0.00, 2.00]	1.00 [0.00, 2.00]	0.76 (1.08)	0.76 (1.03)	0.00
Number of creatinine tests ordered									
...mean (sd)	0.10 (0.53)	0.10 (0.46)	0.10 (0.48)	0.09 (0.44)	0.14 (0.59)	0.13 (0.54)	0.12 (0.55)	0.12 (0.50)	0.00
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 (0.55)	0.00 (0.50)	0.00
Number of BUN tests ordered									
...mean (sd)	0.07 (0.57)	0.07 (0.50)	0.07 (0.48)	0.07 (0.44)	0.10 (0.53)	0.09 (0.49)	0.09 (0.53)	0.08 (0.48)	0.02
...median [IQR]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 (0.53)	0.00 (0.48)	0.00
Number of tests for microalbuminuria									
...mean (sd)	0.67 (1.16)	0.66 (1.15)	0.40 (0.90)	0.40 (0.91)	0.43 (0.78)	0.43 (0.76)	0.46 (0.88)	0.46 (0.87)	0.00
...median [IQR]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 (0.88)	0.00 (0.87)	0.00
Total N distinct ICD9/ICD10 diagnoses at the 3rd digit level									
...mean (sd)	7.34 (10.04)	7.34 (10.38)	3.62 (7.39)	3.63 (7.40)	9.68 (11.90)	9.57 (11.86)	7.80 (10.65)	7.74 (10.68)	0.01
...median [IQR]	4.00 [0.00, 11.00]	4.00 [0.00, 11.00]	0.00 [0.00, 4.00]	0.00 [0.00, 4.00]	6.00 [0.00, 15.00]	5.00 [0.00, 15.00]	4.20 (10.65)	3.61 (10.68)	0.06
Use of thiazide; n (%)	3,428 (11.5%)	3,358 (11.3%)	4,478 (10.5%)	4,470 (10.5%)	12,338 (12.0%)	12,334 (12.0%)	20,244 (11.6%)	20,162 (11.5%)	0.00
Use of beta blockers; n (%)	16,752 (56.4%)	16,787 (56.5%)	24,718 (58.0%)	24,658 (57.9%)	63,213 (61.7%)	63,051 (61.6%)	104,683 (59.9%)	104,496 (59.8%)	0.00
Use of calcium channel blockers; n (%)	9,269 (31.2%)	9,316 (31.3%)	12,735 (29.9%)	12,730 (29.9%)	37,118 (36.2%)	37,223 (36.3%)	59,122 (33.8%)	59,269 (33.9%)	0.00