Adherence to Chronic Medications For Individuals with Diabetes Mellitus

3a Measure Information Form (MIF)

Data Source

Electronic administrative data/claims; pharmacy data

For measure calculation, the following Medicare files were required:

- Denominator tables
- Prescription drug benefit (Part D) coverage tables
- Beneficiary file
- Institutional claims (Part A)
- Non-institutional claims (Part B)—physician carrier/non-DME
- Prescription drug benefit (Part D) claims

For physician group attribution, the following were required:

- Non-institutional claims (Part B)—physician carrier/non-DME
- Denominator tables to determine individual enrollment
- Beneficiary file or coverage table to determine hospice benefit and Medicare as secondary payor status
- CMS physician and physician specialty tables
- National Plan & Provider Enumeration System (NPPES) database

Measure Set ID

TBD

Version Number and Effective Date

Version 3

January 1, 2012 – December 31, 2012

CMS Approval Date

TBD

NQF ID

NQF #545

Date Endorsed

September 23, 2011

Care Setting

Ambulatory care

Office

Unit of Measurement

Population: States

Clinicians: Group

Measurement Duration

Any time during the measurement period

Measurement Period

Year

Measure Type

Process

Measure Scoring

Rate/proportion

Payer Source

Medicare fee-for-service (FFS)

Improvement Notation

Better quality = higher score

Measure Steward

Centers for Medicare & Medicaid Services (CMS)

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Not applicable

Measure Description

The measure addresses adherence to three types of chronic medications; statins, angiotensin converting enzyme inhibitors (ACEIs)/angiotensin receptor blockers (ARBs) and oral hypoglycemic agents. The measure is divided into three submeasures:

Measure A: The percentage of eligible individuals who had at least two prescriptions for statins and who have a Proportion of Days Covered (PDC) of at least 0.8 during the measurement period (12 consecutive months)

Measure B: The percentage of eligible individuals who had at least two prescriptions for ACEIs/ARBs and who have a PDC of at least 0.8 during the measurement period (12 consecutive months)

Measure C: The percentage of eligible individuals who had at least two prescriptions for a single oral hypoglycemic agent or at least two prescriptions for multiple agents within an anti-diabetic class and who have a PDC of at least 0.8 for at least 1 anti-diabetic class during the measurement period (12 consecutive months)

Rationale

Diabetic patients often require chronic treatment with oral hypoglycemics, statins, and/or ACEIs/ARBs. Adherence to chronic medication regimens has been documented in the literature to be less than optimal. Poor adherence can reduce the effectiveness of treatment, and interventions to improve adherence can provide an opportunity for quality improvement.

Almost 23.2% of persons 60 years and older—12.2 million—had diabetes in the United States in 2007 (American Diabetes Association, 2010). According to the Centers for Disease Control and Prevention (CDC) National Diabetes Surveillance System, the prevalence of diagnosed diabetes in 2007 among people aged 65-74 (19.1%) was approximately 13 times that of people less than 45 years of age (1.5%) (CDC, 2009b). Among adults 65-74 years of age with diabetes mellitus, the two most common comorbid conditions in 2007 were hypertension (74.9%) (CDC, 2009d) and high blood cholesterol (66.3%) (CDC, 2009c). The incidence of new cases of diabetes for those 65-79 years was 12.5 per 1,000 in 2007 (CDC, 2009a). The leading cause of mortality among diabetic patients is heart disease, and the rate of mortality due to heart disease and stroke are 2 to 4 times higher among diabetics than among non-diabetics (CDC, 2005). Lipid-lowering drugs, in particular statins, have been shown to be effective at reducing adverse cardiovascular events in patients with diabetes (Cholesterol Treatment Trialists' (CTT) Collaborators, Kearney et. al, 2008). Furthermore, treatment with certain drugs among diabetics is underutilized. A study by Yang et al. found that among a population of Medicare Part D enrollees, non-adherence (defined as proportion of days covered <80%) rates for oral hypoglycemic agents were 35%, 42% for ACEIs/ARBS, and 46% for statins (2009).

References:

American Diabetes Association. (2010). Diabetes statistics. Retrieved April 15, 2010, from http://www.diabetes.org/diabetes-basics/diabetes-statistics/

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. (Page last reviewed 2005, December 20). National Diabetes Fact Sheet. Retrieved April 15, 2010, from http://www.cdc.gov/diabetes/pubs/estimates.htm#deaths

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Division of Diabetes Translation. (Page last reviewed 2009a, February 27). National Health Interview Survey. Incidence of Diagnosed Diabetes per 1,000 Population Aged 18–79 Years, by Age, United States, 1980–2007. Retrieved April 15, 2010, from http://www.cdc.gov/diabetes/statistics/incidence/fig3.htm

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Division of Diabetes Translation. (Page last reviewed 2009b, July 24.). Percentage of Civilian, Noninstitutionalized Population with Diagnosed Diabetes, by Age, United States, 1980–2007. Retrieved April 15, 2010, from http://www.cdc.gov/diabetes/statistics/prev/national/tprevage.htm

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Division of Diabetes Translation. (Page last reviewed 2009c, July 21). Behavioral Risk Factor Surveillance System. Percentage of High Blood Cholesterol for Adults with Diabetes, by Age, United States, 1995–2007. Retrieved April 15, 2010, from http://www.cdc.gov/diabetes/statistics/comp/table8_2a.htm

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Cholesterol Treatment Trialists' (CTT) Collaborators, Kearney, P. M., Blackwell, L., Collins, R., Keech, A., Simes, J, et al. (2008). Efficacy of cholesterol-lowering therapy in 18,686 people with diabetes in 14 randomised trials of statins: A meta-analysis. *Lancet, 371*(9607), 117-25.

Yang, Y., Thumula, V., Pace, P. F., Banahan, B. F. 3rd, Wilkin, W. E., & Lobb, W. B. (2009). Predictors of medication nonadherence among patients with diabetes in Medicare Part D programs: A retrospective cohort study. *Clinical Therapeutics, 31* (10), 2178-2188; discussion 2150-2171.

Clinical Recommendation Statement

ADA 2010 guidelines concerning the use of statins:
Statin therapy should be added to lifestyle therapy, regardless of baseline lipid levels, for diabetic patients:

- With overt cardiovascular disease (CVD). (A)
- Without CVD who are over the age of 40 years and have one or more other CVD risk factors. (A)

In individuals without overt CVD, the primary goal is an LDL cholesterol <100 mg/dl (2.6 mmol/l). (A)

In individuals with overt CVD, a lower LDL cholesterol goal of <70 mg/dl (1.8 mmol/l), using a high dose of statin, is an option. (B).

ADA 2010 guidelines concerning the use of ACEIs/ARBs:
Patients [with diabetes] with more severe hypertension (systolic blood pressure at least 140 mmHg or diastolic blood pressure of at least 90 mmHg) at diagnosis or follow-up should receive pharmacologic therapy in addition to lifestyle therapy. (A)

Pharmacologic therapy for patients with diabetes and hypertension should be paired with a regimen that includes either an ACE inhibitor or an angiotensin II receptor blocker (ARB). If one class is not tolerated, the other should be substituted. If needed to achieve blood pressure targets, a thiazide diuretic should be added to those with an estimated glomerular filtration rate (GFR) … of at least 30 ml/min/1.73 m^2 and a loop diuretic for those with an estimated GFR <30 ml/min/1.73 m^2. (C)

If ACE inhibitors, ARBs, or diuretics are used, kidney function and serum potassium levels should be closely monitored. (E)

In pregnant patients with diabetes and chronic hypertension, blood pressure target goals of 110–129/65–79 mmHg are suggested in the interest of long-term maternal health and minimizing impaired fetal growth. ACE inhibitors and ARBs are contraindicated during pregnancy. (E)

In patients with known CVD, ACE inhibitor (C), aspirin (A), and statin therapy (A) (if not contraindicated) should be used to reduce the risk of cardiovascular events.

In the treatment of the non-pregnant patient with micro- or macroalbuminuria, either ACE inhibitors or ARBs should be used. (A)

While there are no adequate head-to-head comparisons of ACE inhibitors and ARBs, there is clinical trial support for each of the following statements:

- In patients with type 1 diabetes, hypertension, and any degree of albuminuria, ACE inhibitors have been shown to delay the progression of nephropathy. (A)

- In patients with type 2 diabetes, hypertension, and microalbuminuria, both ACE inhibitors and ARBs have been shown to delay the progression to macroalbuminuria. (A)

- In patients with type 2 diabetes, hypertension, macroalbuminuria, and renal insufficiency (serum creatinine >1.5 mg/dl), ARBs have been shown to delay the progression of nephropathy. (A)

References

American Diabetes Association. (2010). Standards of medical care in diabetes—2010. *Diabetes Care, 33*(suppl. 1), S13-S61.

Release Notes/Summary of Changes

Statement of intent for the selection of ICD-10 codes: The goal was to convert this measure to a new code set, fully consistent with the intent of the original measure.

2011 Updates

- See Codes Table attachment for updated NDC list.
- Updated National Drug Codes (NDCs) as of October 28, 2011.
- Added new combination drug sitagliptin-simvastatin.
- Added new diabetic drug linagliptin.
- Updated ICD-9-CM and ICD-10-CM diagnosis codes used to identify diabetes mellitus with recent changes, added 648.00, 648.01, 648.02, 648.03, 648.04, and removed invalid code 648.0.
- Updated visit type codes with recent changes, added 99224-99226.

2012 Updates

- Updated National Drug Codes (NDCs) as of October 31, 2012.
- See Codes Table attachment for NDC Updates and ICD-9-CM to ICD-10-CM Crosswalk.
- Added azilsartan to "Angiotensin II Inhibitors."
- Added amlodipine-olmesartan-hydrochlorothiazide to Antihypertensive Combinations.
- Added azilsartan medoxomil-chlorthalidone to Antihypertensive Combinations.
- Added linagliptin-metformin to Anti-diabetic Combinations.
- Deleted insulin isophane (pork), insulin regular (pork), insulin zinc (human), insulin zinc (pork), and insulin zinc extended (human) from Insulin.
- Modified age requirement to at least 18 at the beginning of the measurement period.

Technical Specifications

- **Target Population**

  At least 18 years of age as of the beginning of the measurement year

Denominator

- **Denominator Statement**

  Denominator A: Individuals 18 years or older with diabetes mellitus and at least two prescriptions for statins during the measurement year

  Denominator B: Individuals 18 years or older with diabetes mellitus and at least two prescriptions for ACEIs/ARBs during the measurement year

  Denominator C: Individuals 18 years or older with diabetes mellitus and at least two prescriptions for a single oral hypoglycemic agent or at least two prescriptions for multiple agents within an anti-diabetic class

- **Denominator Details**

  A separate denominator is calculated for each drug class and each anti-diabetic drug class.

  Target population meets the following conditions:

1. Continuously enrolled in Part D with no more than a 1-month gap in enrollment during the measurement year.*
2. Continuously enrolled in Part A and Part B with no more than a 1-month gap in Part A enrollment and no more than a 1-month gap in Part B enrollment during the measurement year.
3. No more than 1 month of HMO enrollment during the measurement year.

*If calculating an optional measure based on "new" or "continuous" status, then Part D continuous enrollment with no more than a 1-month gap in coverage is required for both the current measurement period and 6 months prior to the measurement period.

IDENTIFICATION OF DIABETES MELLITUS

Individuals with diabetes mellitus are identified using diagnosis codes and/or drug proxy to identify diabetes mellitus within the inpatient or outpatient claims data.** Individuals must have:

At least two face-to-face encounters with a principal or secondary diagnosis of diabetes with different dates of service in an outpatient setting or non-acute inpatient setting during the measurement period;

OR

At least one face-to-face encounter with a principal or secondary diagnosis of diabetes in an acute inpatient or emergency department setting during the measurement period.

OR

At least one ambulatory prescription claim for insulin or other anti-diabetic medication dispensed during the measurement period.

**Adapted from NCQA HEDIS 2012 (2012). Note: HEDIS uses a look-back period of 1 year for both the prescription data and diagnosis.

CODES USED TO IDENTIFY DIABETES MELLITUS DIAGNOSIS:

ICD-9-CM: 250.xx, 357.2, 362.01, 362.02, 362.03, 362.04, 362.05, 362.06, 362.07, 366.41, 648.00, 648.01, 648.02, 648.03, 648.04

ICD-10-CM: E08.311, E08.319, E08.321, E08.329, E08.331, E08.339, E08.341, E08.349, E08.351, E08.359, E08.40, E08.42, E09.311, E09.319, E09.321, E09.329, E09.331, E09.339, E09.341, E09.349, E09.351, E09.359, E09.36, E09.40, E09.42, E10.10, E10.11, E10.21, E10.22, E10.29, E10.311, E10.319, E10.321, E10.329, E10.331, E10.339, E10.341, E10.349, E10.351, E10.359, E10.36, E10.39, E10.40, E10.41, E10.42, E10.43, E10.44, E10.49, E10.51, E10.52, E10.59, E10.610, E10.618, E10.620, E10.621, E10.622, E10.628, E10.630, E10.638, E10.641, E10.649, E10.65, E10.69, E10.8, E10.9, E11.00, E11.01, E11.21, E11.22, E11.29, E11.311, E11.319, E11.321, E11.329, E11.331, E11.339, E11.341, E11.349, E11.351, E11.359, E11.36, E11.39, E11.40, E11.41, E11.42, E11.43, E11.44, E11.49, E11.51, E11.52, E11.59, E11.610, E11.618, E11.620, E11.621, E11.622, E11.628, E11.630, E11.638, E11.641, E11.649, E11.65, E11.69, E11.8, E11.9, E13.00, E13.01, E13.10, E13.11, E13.21, E13.22, E13.29, E13.311, E13.319, E13.321, E13.329, E13.331, E13.339, E13.341, E13.349, E13.351, E13.359, E13.36, E13.39, E13.40, E13.41, E13.42, E13.43, E13.44, E13.49, E13.51, E13.52, E13.59, E13.610, E13.618, E13.620, E13.621, E13.622, E13.628, E13.630, E13.638, E13.641, E13.649, E13.65, E13.69, E13.8, E13.9, O24.011, O24.012, O24.013, O24.019, O24.02, O24.03, O24.111, O24.112, O24.113, O24.119, O24.12, O24.13, O24.311, O24.312, O24.313, O24.319, O24.32, O24.33, O24.811, O24.812, O24.813, O24.819, O24.82, O24.83, O24.911, O24.912, O24.913, O24.919, O24.92, O24.93

DRG: 637,638

CODES USED TO IDENTIFY ENCOUNTER TYPE:

OUTPATIENT SETTING
CPT: 92002, 92004, 92012, 92014, 99201-99205, 99211-99215, 99217-99220, 99241-99245, 99341-99345, 99347-99350, 99384-99387, 99394-99397, 99401-99404, 99411, 99412, 99420, 99429, 99455, 99456

UB-92 revenue: 051x, 0520-0523, 0526-0529, 057x-059x, 077x, 082x-085x, 088x, 0982, 0983

NONACUTE INPATIENT
CPT: 99304-99310, 99315, 99316, 99318, 99324-99328, 99334-99337

UB-92 revenue: 0118, 0128, 0138, 0148, 0158, 019x, 0524, 0525, 055x, 066x

ACUTE INPATIENT
CPT: 99221-99223, 99224-99226, 99231-99233, 99238, 99239, 99251-99255, 99291

UB-92 revenue: 010x, 0110-0114, 0119, 0120-0124, 0129, 0130-0134, 0139, 0140-0144, 0149, 0150-0154, 0159, 016x, 020x-022x, 072x, 080x, 0987

EMERGENCY DEPARTMENT
CPT: 99281-99285

UB-92 revenue: 045x, 0981

The following are the diabetic medications by class for the denominator. The route of administration includes all oral formulations of the medications listed below.

CODES USED TO IDENTIFY DIABETIC INDIVIDUALS:
Alpha-glucosidase inhibitors:
acarbose
miglitol

Anti-diabetic amylin analogs:
pramlintide

Anti-diabetic combinations:
glipizide-metformin
glyburide-metformin
pioglitazone-glimepiride
pioglitazone-metformin
rosiglitazone-glimepiride
rosiglitazone-metformin
saxagliptin-metformin
sitagliptin-metformin
repaglinide-metformin
sitagliptin-simvastatin
linagliptin- metformin

Dipeptidyl peptidase-4 (dpp-4) inhibitors:
sitagliptin,
saxagliptin,

linagliptin

Incretin mimetics:
exenatide,
liraglutide

Insulin:
insulin aspart
insulin aspart
protamine & aspart (human)
insulin detemir
insulin glargine
insulin glulisine
insulin isophane & reg (human)
insulin isophane (human)
insulin lispro (human)
insulin lispro protamine & lispro (human)
insulin regular (human) includes inhalation

Meglitinides:
nateglinide
repaglinide

Sulfonylureas:
chlorpropamide
glimepiride
glipizide
glyburide
tolazamide
tolbutamide,
glyburide micronized

Thiazolidinediones:
pioglitazone
rosiglitazone

The following are the statin medications by class for the denominator. The route of administration includes all oral formulations of the medications listed below.

STATIN MEDICATIONS:

HMG-COA reductase inhibitors (statins):
atorvastatin
fluvastatin,
lovastatin
pitavastatin
pravastatin
rosuvastatin
simvastati

HMG-COA reductase inhibitors (statins) combinations:
amlodipine-atorvastatin
ezetimibe-simvastatin

niacin-lovastatin
niacin-simvastatin
sitagliptin-simvastatin
sitagliptin-simvastatin

The following are the ACEI/ARB medications by class for the denominator. The route of administration includes all oral formulations of the medications listed below.

ACEI/ARB MEDICATIONS:

Angiotensin-converting enzyme inhibitors (ACEIs):
benazepril
captopril
enalapril
fosinopril
lisinopril
moexipril
perindopril
quinapril
ramipril
trandolapril

Angiotensin II receptor blockers (ARBs):
candesartan
eprosartan
irbesartan,
losartan,
olmesartan,
telmisartan
valsartan
azilsartan

Antihypertensive combinations:
aliskiren-valsartan
amlodipine-benazepril
amlodipine-olmesartan
amlodipine -valsartan
amlodipine-valsartan-hydrochlorothiazide
benazepril-hydrochlorothiazide
candesartan-hydrochlorothiazide
captopril-hydrochlorothiazide
enalapril maleate-hydrochlorothiazide
enalapril-felodipine
eprosartan-hydrochlorothiazide
fosinopril-hydrochlorothiazide
irbesartan-hydrochlorothiazide
lisinopril- hydrochlorothiazide
lisinopril-dietary management product
losartan-hydrochlorothiazide
moexipril-hydrochlorothiazide
olmesartan-hydrochlorothiazide
olmesartan medoxomil-amlodipine-hydrochlorothiazide
quinapril-hydrochlorothiazide

telmisartan-amlodipine
telmisartan-hydrochlorothiazide
trandolapril-verapamil
valsartan-hydrochlorothiazide
amlodipine-olmesartan-hydrochlorothiazide
azilsartan medoxomil-chlorthalidone

The following are the oral hypoglycemic agent medications by class for the denominator. The route of administration includes all oral formulations of the medications listed below.

ORAL HYPOGLYCEMIC AGENT MEDICATIONS:

Alpha-glucosidase inhibitors:
acarbose
miglitol

Anti-diabetic combinations:
glipizide-metformin
glyburide-metformin
metformin -dietary management product
pioglitazone-glimepiride
pioglitazone-metformin
rosiglitazone-glimepiride
rosiglitazone-metformin
sitagliptin-metformin
repaglinide-metformin
saxagliptin-metformin
sitagliptin-simvastatin
linagliptin-metformin

Biguanides:
metformin

Dipeptidyl peptidase-4 (dpp-4) inhibitors:
sitagliptin
saxagliptin
sitagliptin-simvastatin
linagliptin

Meglitinides:
nateglinide
repaglinide

Sulfonylureas:
chlorpropamide
glimepiride
glipizide
glyburide
tolazamide
tolbutamide
glyburide micronized

Thiazolidinediones:
pioglitazone
rosiglitazone

- **Denominator Exceptions and Exclusions**

  We excluded the following individuals from the denominator:

  Individuals with polycystic ovaries, gestational diabetes, or steroid-induced diabetes who do not have a face-to-face visit with a diagnosis of diabetes in any setting during the measurement period

  EXCLUSION 1
  Individuals with a diagnosis of polycystic ovaries who do not have a face-to-face visit with a diagnosis of diabetes in any setting during the measurement period*

  EXCLUSION 2
  Individuals with a diagnosis of gestational diabetes or steroid-induced diabetes who do not have a face-to-face visit with a diagnosis of diabetes mellitus in any setting during the measurement period

- **Denominator Exceptions and Exclusions Details**

  Diagnostic Exclusions for Diabetes Denominator:

  EXCLUSION 1

  Polycystic Ovaries
  ICD-9-CM: 256.4
  ICD-10-CM: E28.2

  EXCLUSION 2

  Steroid-Induced Diabetes
  ICD-9-CM: 249.xx, 251.8, 962.0

  ICD-10-CM: E08.00, E08.01, E08.10, E08.11, E08.21, E08.22, E08.29, E08.311, E08.319, E08.321, E08.329, E08.331, E08.339, E08.341, E08.349, E08.351, E08.359, E08.36, E08.39, E08.40, E08.41, E08.42, E08.43, E08.44, E08.49, E08.51, E08.52, E08.59, E08.610, E08.618, E08.620, E08.621, E08.622, E08.628, E08.630, E08.638, E08.641, E08.649, E08.65, E08.69, E08.8, E08.9, E09.00, E09.01, E09.10, E09.11, E09.21, E09.22, E09.29, E09.311, E09.319, E09.321, E09.329, E09.331, E09.339, E09.341, E09.349, E09.351, E09.359, E09.36, E09.39, E09.40, E09.41, E09.42, E09.43, E09.44, E09.49, E09.51, E09.52, E09.59, E09.610, E09.618, E09.620, E09.621, E09.622, E09.628, E09.630, E09.638, E09.641, E09.649, E09.65, E09.69, E09.8, E09.9, E16.8, T38.0X1A, T38.0X2A, T38.0X3A, T38.0X4A, T50.0X1A, T50.0X2A, T50.0X3A, T50.0X4A

  Gestational Diabetes
  ICD-9-CM: 648.80, 648.81, 648.82, 648.83, 648.84

  ICD-10-CM: O24.410, O24.414, O24.419, O24.420, O24.424, O24.429, O24.430, O24.434, O24.439, O99.810, O99.814, O99.815

  *Adapted from NCQA HEDIS 2012 (2012). Note: HEDIS uses a look-back period of 1 year prior to the measurement period for both the prescription data and diagnosis.

Numerator

- **Numerator Statement**

  Numerator A: Individuals in Denominator A with at least two prescriptions for statins with a PDC of at least 0.8 for statins

  Numerator B: Individuals in Denominator B with at least two prescriptions for ACEIs/ARBs with a PDC of at least 0.8 for ACEIs/ARBs

  Numerator C: Individuals in Denominator C with at least two prescriptions for oral hypoglycemic agents, in any anti-diabetic class, with a PDC of at least 0.8 for at least one anti-diabetic class

- **Numerator Details**

  The numerator is calculated as follows:

  PDC Numerator for Each Individual in Each Drug Class:
  The PDC numerator is the sum of the days covered by the days' supply of all drug claims in each respective drug class. The period covered by the PDC starts on the day the first prescription is filled (index date) and lasts through the end of the measurement period, or death, whichever comes first. For prescriptions with a days' supply that extends beyond the end of the measurement period, count only the days for which the drug was available to the individual during the measurement period. If there are prescriptions for the same drug (generic name) on the same date of service, keep the prescription with the largest days' supply. If prescriptions for the same drug (generic name) overlap, then adjust the prescription start date to be the day after the previous fill has ended.

  PDC Denominator:
  The PDC denominator is the number of days from the first prescription date through the end of the measurement period, or death date, whichever comes first.

  Optional Calculation Using More Than One Year of Data:

  Optional PDC Numerator:
  - For new users (individuals with no prescriptions for drugs in the respective drug class during the 180 days prior to the measurement period), the PDC numerator is the sum of the days covered by the days' supply of the prescriptions in the respective drug class (statins, ACEIs/ARBs, or oral hypoglycemics) during the measurement period. The period covered by the PDC for new users starts on the day the first prescription is filled (index date) and lasts through the end of the measurement period, or death, whichever comes first. For prescriptions with a days' supply that extends beyond the end of the measurement period, count only the days for which the drug was available to the individual during the measurement period. If prescriptions for the same drug (generic name) overlap, then adjust the prescription start date to be the day after the previous fill has ended.

  - For continuous users (individuals with 1 or more prescriptions for drugs in the respective drug class during the 180 days prior to the measurement period), the PDC numerator is the sum of the days covered by the days' supply of the prescriptions in the respective drug class (statins, ACEIs/ARBs, or oral hypoglycemics) during the measurement period. The period covered by the PDC for continuous users is the number of days from the beginning of the measurement period through the end of the measurement period or death, whichever comes first. For prescriptions with a days' supply that extends beyond the beginning or end of the measurement period, count only the days for

which the drug was available to the individual during the measurement period. If prescriptions for the same drug (generic name) overlap, then adjust the prescription start date to be the day after the previous fill has ended.

Optional PDC Denominator:

- For new users, the PDC denominator is the number of days that starts on the day the first prescription is filled (index date) and lasts through the end of the measurement period, or death, whichever comes first.
- For continuous users, the PDC denominator is the number of days from the beginning of the measurement period through the end of the measurement period, or death, whichever comes first.

Stratification or Risk Adjustment

Depending on the operational use of the measure, measure results will be stratified by:

- State
- Physician Group*
- Age and Race/Ethnicity
- Dual Eligibility

*See algorithm section below for the physician group attribution methodology used for this measure.

No risk adjustment necessary

Sampling

Not applicable

Calculation Algorithm

Denominators will be calculated separately for each drug class: statins, ACEIs/ARBs, and oral hypoglycemic agents.

Denominator A: Individuals at least 18 years of age as of the beginning of the measurement period with diabetes mellitus and at least two prescriptions for statins during the measurement period

Denominator B: Individuals at least 18 years of age as of the beginning of the measurement period with diabetes mellitus and at least two prescriptions for angiotensin converting enzyme inhibitors (ACEIs)/angiotensin receptor blockers (ARBs) during the measurement period

Denominator C: Individuals at least 18 years of age as of the beginning of the measurement period with diabetes mellitus and at least two prescriptions for a single oral hypoglycemic agent or at least two prescriptions for multiple agents within an anti-diabetic class during the measurement period

1. Pull individuals who are 18 or older as of the beginning of the measurement period.

2. Include individuals who were continuously enrolled in Part D coverage during the measurement year, with no more than a one-month gap in enrollment during the measurement year, or up until their death date if they died during the measurement period.

3. Include individuals who had no more than a one-month gap in Part A enrollment, no more than a one-month gap in Part B enrollment, and no more than 1 month of HMO enrollment during the current measurement period (FFS individuals only).

4. Of those individuals identified in Step 3, keep those who had:

At least two face-to-face encounters with a principal or secondary diagnosis of diabetes with different dates of service in an outpatient setting or non-acute inpatient setting during the measurement period

OR

At least one face-to-face encounter with a principal or secondary diagnosis of diabetes in an acute inpatient setting or emergency department setting during the measurement period

OR

At least one ambulatory prescription claim for insulin or other anti-diabetic medication dispensed during the measurement period.

5. Of the individuals identified in Step 4, exclude those with a diagnosis of polycystic ovaries, gestational diabetes, or steroid-induced diabetes who do not have at least one face-to-face visit with a diagnosis of diabetes in any setting during the measurement period.

6. Pull all Part D claims for statins, ACEIs/ARBs, and oral hypoglycemic agents. Attach generic name and drug ID to the dataset.

7. For Denominator C (oral hypoglycemic agents) only:
   a. Classify the claims into 1 of 7 anti-diabetic classes
      - Alpha-glucosidase inhibitors
      - Anti-diabetic combinations
      - Biguanides
      - Dipeptidyl peptidase-4 (dpp-4) inhibitors
      - Meglitinides
      - Sulfonylureas
      - Thiazolidinediones (drug category=Insulin sensitizing agents)
   b. Keep individuals with at least 2 claims for a drug in the corresponding anti-diabetic class on different dates of service during the measurement period.
   c. Of the individuals in Step 5, include those that are also in the drug class dataset created in Step 7b.
   d. For each individual in each anti-diabetic dataset created in Step 7c, identify the date of the first prescription in the measurement year as the index event.
   e. Concatenate the 7 anti-diabetic denominator datasets created in Step 7c. De-duplicate the full dataset by the beneficiary identifier to determine the number of unique individuals in the oral hypoglycemic agent denominator (Denominator C).

8. For Denominator A (statins) and Denominator B (ACEIs/ARBs),
   a. Keep individuals with at least 2 claims for a drug in the corresponding class on different dates of service during the measurement period.
   b. Of the individuals in Step 5, include those that are also in the drug class dataset created in Step 8a. This is Denominator A (statins) or Denominator B (ACEIs/ARBs).
   c. For each individual in each dataset created in Step 8b, identify the date of the first prescription in the measurement period as the index event.

Create Numerator:
Numerator A: Individuals with diabetes mellitus who fill at least 2 prescriptions for statins with a PDC of at least 0.8 during the measurement period

Numerator B: Individuals with diabetes mellitus who fill at least 2 prescriptions for ACEIs/ARBs with a PDC of at least 0.8 during the measurement period

Numerator C: Individuals with diabetes mellitus who fill at least 2 prescriptions for oral hypoglycemic agents, in any anti-diabetic drug class, with a PDC of at least 0.8 during the measurement period

1. For the individuals in Denominator A, Denominator B, and the 7 anti-diabetic denominators (created in Denominator Step 7e), calculate the PDC for each individual according to the following methods:

   Step 1a: Determine the individual's measurement period, defined as the number of days from the index prescription date through the end of the measurement year, or death, whichever comes first. Index date is the date of the first prescription in the measurement period.

   Step 1b: Within the measurement period, count the days the individual was covered by at least one drug in the class based on the prescription fill date and days of supply.
   1. Pull Part D claims for drugs in the respective drug class for individuals in the denominators. Attach drug ID and generic name to the datasets.
   2. Sort and de-duplicate claims by beneficiary ID, service date, generic name, and descending days' supply. If prescriptions for the same drug (generic name) are dispensed on the same date of service for an individual, keep the dispensing with the largest days' supply.
   3. Calculate the number of days covered per individual for each drug class.
      i. For prescriptions with a days' supply that extends beyond the end of the measurement period, count only the days for which the drug was available to the individual during the measurement period.
      ii. If prescriptions for the same drug (generic name) overlap, then adjust the prescription start date to be the day after the previous fill has ended.
      iii. If prescriptions for different drugs (different generic names) overlap, do not adjust the prescription start date.

   Step 1c: Calculate the PDC for each individual. Divide the number of covered days found in Step 1b by the number of days in the individual's measurement period found in Step 1a.

   An example of SAS code for Step 1 was adapted from PQA, and is also available at the URL: http://www2.sas.com/proceedings/forum2007/043-2007.pdf.

2. Of the individuals identified in Numerator Step 1, count the number of individuals with a calculated PDC of at least 0.8 for each drug class. This will create Numerator A (statins) and Numerator B (ACEIs/ARBs), along with the 7 anti-diabetic numerator datasets, which will be used to calculate Numerator C in the following step.

3. Merge the 7 anti-diabetic numerator datasets created in Numerator Step 2 by beneficiary identifier, so a dataset is created with the unique beneficiary identifier and the 7 separate PDCs for each oral hypoglycemic drug class (Numerator C). If a PDC does not exist for a certain oral hypoglycemic drug class for an individual, it will be set to missing.

For each individual, if any of the 7 oral hypoglycemic drug PDCs are at least 0.8, then that individual is included in Numerator C. Refer to the following table for an example of the numerator calculations.

Illustration of Calculating Adherence to Chronic Medications for Individuals with Diabetes Mellitus

	PDC					
	Measure A: Statins	Measure B: ACEIs/ARBs	Measure C: Oral Hypoglycemic Agents			
Diabetes Mellitus Individuals in the Denominator	PDC (Step 1)	PDC (Step 1)	Class 1	Class 2	Class n	Final Adherence Designation for Oral Hypoglycemics
Individual 1	0.20	0.20	0.50	-	-	N
Individual 2	0.90	0.85	0.80	0.90	0.60	Y
Individual 3	-	0.40	0.60	-	-	N
Individual 4	-	-	0.40	0.70	0.90	Y
Individual 5	-	0.50	-	-	0.80	Y
Individual 6	-	0.70	-	-	-	-
Individual 7	0.90	0.20	0.40	-	-	N
Number of Individuals with PDC ≥ 0.80	**2**	**1**				3
Number of Individuals in Denominator	**3**	**6**				6
Measure Value	**66.7%**	**16.7%**				50.0%

Optional PDC Calculation Using More Than One Year of Data:

Optional PDC Numerator:

- For new users (individuals with no prescriptions for drugs in the respective drug class during the 180 days prior to the measurement period), the PDC numerator is the sum of the days covered by the days' supply of the prescriptions during the measurement period. The period covered by the PDC for new users starts on the day the first prescription is filled (index date) and lasts through the end of the measurement period, or death, whichever comes first. For prescriptions with a days' supply that extends beyond the end of the measurement period, count only the days for which the drug was available to the individual during the measurement period. If prescriptions for the same drug (generic name) overlap, then adjust the prescription start date to be the day after the previous fill has ended.

- For continuous users (individuals with 1 or more prescriptions for drugs in the respective drug class during the 180 days prior to the measurement period), the PDC numerator is the sum of the days covered by the days' supply of the prescriptions during the measurement period. The period covered by the PDC for continuous users is the beginning of the measurement period through the end of the measurement period or death, whichever comes first. For prescriptions with a days' supply that extends beyond the beginning or end of the measurement period, count only the days for which the drug was available to the individual during the measurement period. If prescriptions for the same drug (generic name) overlap, then adjust the prescription start date to be the day after the previous fill has ended.

Optional PDC Denominator:

- For new users, the PDC denominator is the number of days that starts on the day the first prescription is filled (index date) and lasts through the end of the measurement period, or death, whichever comes first.

- For continuous users, the PDC denominator is the number of days from the beginning of the measurement period through the end of the measurement period, or death, whichever comes first.

Physician Group Attribution:

Physician group attribution was adapted from *Generating Medicare Physician Quality Performance Measurement Results (GEM) Project: Physician and Other Provider Grouping and Patient Attribution Methodologies* (http://www.cms.gov/GEM). The following is intended as guidance and reflects only one of many methodologies for assigning individuals to a medical group. Please note that the physician group attribution methodology excludes patients that died, even though the overall measure does not.

I. Identify Physician and Medical Groups

1. Identify all Tax Identification Numbers (TINs)/National Provider Identification (NPI)/UPIN combinations from all Part B claims in the measurement year and the prior year. The NPI for the performing provider is used.

   If no NPI is available on the claim, check other data sources, such as CMS provider tables or the National Plan and Provider Enumeration System (NPPES), for a current NPI, based on the physician UPIN. Keep records with valid NPI. Valid NPIs have 10 numeric characters (no alpha characters).

   Note: Due to NPI implementation, UPINs are not necessary for attribution using Part B data from 2008 and later.

2. For valid NPIs, pull credentials and specialty code(s). Credentials and specialty codes are pulled in the following order:
   a. From the CMS provider tables
   b. If not found in A, then pull from NPPES

3. Create 1 record per NPI with all credentials and all specialties. A provider may have more than 1 specialty.

4. Attach TIN to NPI, keeping only those records with credentials indicating a physician (MD or DO), physician assistant (PA), or nurse practitioner (NP).

5. Identify medical group TINs: Medical group TINs are defined as TINs that had physician, physician assistant, or nurse practitioner provider specialty codes on at least 50% of Part B carrier claim line items billed by the TIN during the measurement year or prior year. (The provider specialty codes are listed after Patient Attribution.)
   a. Pull Part B records billed by TINS identified in #4 during the measurement year and prior year.
   b. Identify claims that had the performing NPI (npi_prfrmg) in the list of eligible physicians/TINs, keeping those that match by TIN, performing NPI, and provider state code.
   c. Calculate the percent of Part B claims that match by TIN, npi_prfrmg, and provider state code for each TIN, keeping those TINs with percent greater than or equal to 50%.
   d. Delete invalid TINs. Examples of invalid TINs are defined as having the same value for all 9 digits or values of 012345678, 012345678, 123456789, 987654321, or 87654321.

6. Identify TINs that are not solo practices.
   a. Pull Part B records billed by physicians identified in #4 for the measurement year and/or prior year. If the performing NPI is not on the claim, match to obtain NPI from the list created in #4 by UPIN.

b. Count unique NPIs per TIN.
c. Keep only those TINs having 2 or more providers.
d. Delete invalid TINs. Examples of invalid TINs are defined as having the same value for all 9 digits or values of 012345678, 012345678, 123456789, 987654321, or 87654321.

7. Create final group of TINs from #5 and #6 (TINs that are medical groups and are not solo practices).

8. Create file of TINs and NPIs associated with those TINs. These are now referred to as the medical group TINs.

II. Identify Individual Sample and Claims

9. Create individual sample.
    a. Pull individuals with 11+ months of Parts A, B, & D during the measurement year.
    b. Verify the individual did not have any months with Medicare as secondary payor. Remove individuals with BENE_PRMRY_PYR_CD not equal to one of the following:
        - A = working-age beneficiary/spouse with EGHP
        - B = ESRD in the 18-month coordination period with an employer group health plan
        - G = working disabled for any month of the year
    c. Verify the individual resides in the U.S., Puerto Rico, Virgin Islands or Washington D.C.
    d. Exclude individuals that enter the Medicare hospice at any point during the measurement year.
    e. Exclude individuals that died during the measurement year.

10. For individuals identified in #9, pull office visit claims that occur during the measurement year and in the 6 months prior to the measurement year.
    a. Office visit claims have CPT codes of 99201-99205, 99211-99215 and 99241-99245.
    b. Exclude claims with no physician_upin and no npi_prfrmg.

11. Attach medical group TIN to claims by NPI or UPIN if no performing NPI is available.

III. Patient Attribution

12. Pull all Part B office claims from #11 with specialties indicating primary care, cardiology, cardiac surgery, endocrinology and nephrology (see list of provider specialties and specialty codes). Attribute each individual to at most 1 medical group TIN for each measure.
    a. Evaluate specialty on claim (HSE_B_HCFA_PRVDR_SPCLTY_CD) first. If specialty on claim does not match any of the measure-specific specialties, then check additional specialty fields.
    b. If the provider specialty indicates nurse practitioners or physician assistants ('50' or '97'), then check additional specialty codes to assign a specialty to that medical group TIN.

13. For each individual, count claims per medical group TIN. Keep only individuals with 2 or more E&M claims.

14. Attribute individual to the medical group TIN with the most claims. If a tie occurs between medical group TINs, attribute the TIN with most recent claim.

15. Attach the medical group TIN to the denominator and numerator files by individual.

Provider Specialties and Specialty Codes

Provider specialties and specialty codes include only physician, physician assistants, and nurse practitioners for physician grouping, TIN selection, and patient attribution. The provider specialty codes and the associated provider specialty are shown below:

01—General practice*
02—General surgery
03—Allergy/immunology

04—Otolaryngology
05—Anesthesiology
06—Cardiology*
07—Dermatology
08—Family practice*
09—Interventional pain management
10—Gastroenterology
11—Internal medicine*
12—Osteopathic manipulative therapy
13—Neurology
14—Neurosurgery
16—Obstetrics/gynecology*
18—Ophthalmology
20—Orthopedic surgery
22—Pathology
24—Plastic and reconstructive surgery
25—Physical medicine and rehabilitation
26—Psychiatry
28—Colorectal surgery
29—Pulmonary disease
30—Diagnostic radiology
33—Thoracic surgery
34—Urology
36—Nuclear medicine
37—Pediatric medicine
38—Geriatric medicine*
39—Nephrology*
40—Hand surgery
44—Infectious disease
46—Endocrinology*
50—Nurse practitioner*
66—Rheumatology
70—Multi-specialty clinic or group practice*
72—Pain management
76—Peripheral vascular disease
77—Vascular surgery
78—Cardiac surgery*
79—Addiction medicine
81—Critical care (intensivists)
82—Hematology
83—Hematology/oncology
84—Preventive medicine*
85—Maxillofacial surgery
86—Neuropsychiatry
90—Medical oncology
91—Surgical oncology
92—Radiation oncology
93—Emergency medicine
94—Interventional radiology
97—Physician assistant*
98—Gynecologist/oncologist
99—Unknown physician specialty
Other—NA

*Provider specialties used for patient attribution specific to this measure.