

**Detailed Methodology Specifications
for the 2010 Quality and Resource Use Reports (QRURs)**

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INTRODUCTION¹

In an effort to enhance the efficiency of health care services provided to Medicare beneficiaries, the Centers for Medicare & Medicaid Services (CMS) is currently developing and implementing a set of value-based purchasing (VBP) initiatives. The Agency-wide VBP initiatives affect physician practices, hospitals, nursing homes, home health agencies, and dialysis facilities. Under VBP initiatives, CMS intends to offer financial incentives to providers based on performance to drive improvements in their clinical quality, patient-centeredness, and efficiency. To support the goal of enhancing efficiency through VBP, CMS has been: (1) developing provider resource use and quality measures, (2) evaluating providers on their comparative resource use, and (3) educating providers about the efficient use of resources. These measures and provider feedback reports provide the foundation for CMS' VBP programs.

CMS' physician-focused VBP initiatives to date include creating and distributing physician feedback reports on high cost imaging services, physician referral and utilization patterns for echocardiograms, magnetic resonance imaging, angiography, and computerized tomography imaging; analyzing commercial episode groupers; developing and collecting data for CMS' voluntary Physician Quality Reporting Initiative (PQRI); calculating quality measures from Medicare claims data for CMS' Generating Medicare Physician Quality Performance Measurement Results (GEM) project; developing and collecting data for quality of care measures and Medicare savings under CMS' Physician Group Practice Demonstration; and developing quality measures for CMS' Electronic Health Records Demonstration.

In 2008, CMS expanded its physician feedback program to: (1) develop meaningful, actionable, and fair measures of resource use for physician practices with the ultimate goal of using the measures in the Agency's physician VBP initiatives, and (2) provide feedback to physicians in order to encourage more efficient practice. To date, CMS has pursued a phased pilot approach to physician feedback reporting to expand CMS' understanding of the policy issues related to measuring physician-driven costs of care and quality. In the first phase of the approach, CMS prepared and distributed a limited number of resource use reports that included individual physician-level cost measures. In the second phase of the approach, CMS is preparing and will be distributing a larger number of reports in fall 2010, to both individual physicians and group practices, and expanding the report to include selected quality measures. This Phase II report is referred to as the 2010 Quality and Resource Use Report (QRUR).

This document provides details of the methodology used to produce the 2010 QRURs in Phase II, one for medical practice groups (MPGs) and another for individual physicians and other eligible professionals (EPs) billing under the MPGs ("affiliated" EPs). The methodology developed through a multitude of option documents, presentations, field testing of Phase I and Phase II report designs with physicians across the country, and feedback from physicians who received physician feedback reports in Phase I of the project. This document supplements the concise methodology appendix that accompanies the 2010 QRURs prepared for approximately 36 MPGs and 1,600 EPs affiliated with those MPGs.

¹ A list of acronyms is included in Appendix F at the end of this document.

Overview of QRUR process. The rest of this section provides an overview of the process for calculating the quality and resource use measures included in the QRURs, as well as the criteria for EP or MPG report eligibility. Figure 1-1 on the following page shows the main steps involved in producing the 2010 QRURs. Each stage is explained later in this document.

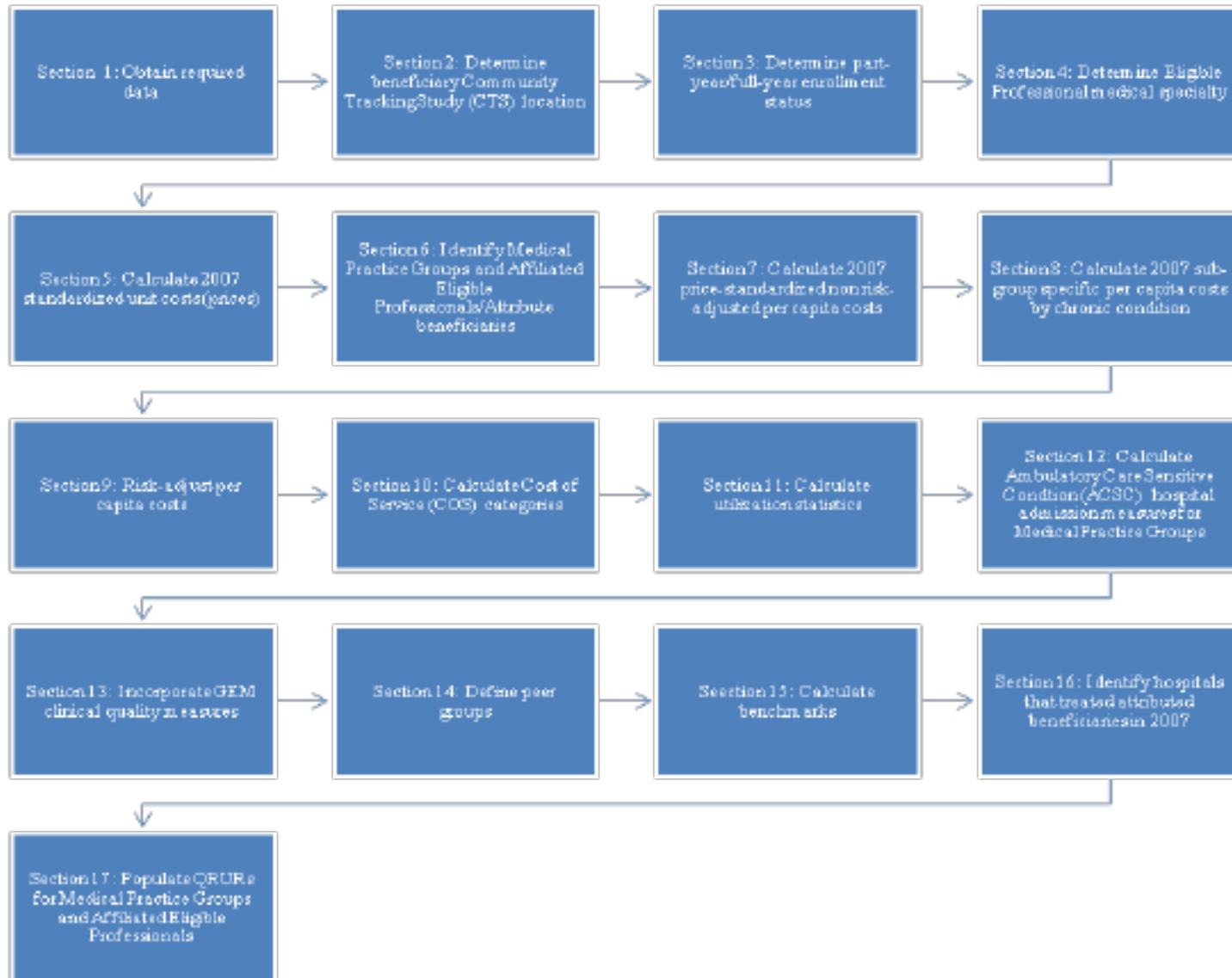
Medicare data used in the 2010 QRURs. As shown in Figure 1-1, the first main step in creating the 2010 QRUR involves obtaining the various datasets used to calculate the performance measures included in the QRURs, which are described in Section 1. Medicare claims were the primary data source for the per capita cost measures and associated cost of service category and utilization measures, the ambulatory care sensitive condition measures, and the GEM measures.

Select Medicare beneficiaries and EPs for the 2010 QRURs. The next step involves identifying Medicare beneficiaries who lived in a Community Tracking Study (CTS) site in 2007, using Medicare enrollment records, and identifying EPs that practiced in a CTS site in 2007 (see Section 2). Beneficiaries who lived in one of the 12 CTS sites at least part of the year in 2007 comprised the sample for calculating performance measures for EPs and MPGs who treated these beneficiaries. EPs and MPGs who practiced in one of the 12 CTS sites in 2007 comprised the set of providers eligible to receive a 2010 QRUR. CTS sites include Boston, MA; Cleveland, OH; Greenville, SC; Indianapolis, IN; Lansing, MI; Little Rock, AR; Miami, FL; Northern NJ; Orange County, CA; Phoenix, AZ; Seattle, WA; and Syracuse, NY. These 12 communities were randomly selected for the Center for Studying Health System Change's Community Tracking Study to provide a representative profile of health systems across the United States (<https://www.hschange.org>) (see Section 2 for details).

Identify 2006 and 2007 full-year and part-year beneficiaries. After identifying the sample of beneficiaries for the 2010 QRUR performance measures, the Medicare enrollment files were used to identify whether these beneficiaries were enrolled full-year or part-year in original Medicare fee-for-service (FFS) in 2006 and 2007. The 2006 enrollment information was used in adjusting 2007 QRUR cost measures to account for patient mix (see Section 9, Risk Adjust Per Capita Cost Measures). The 2007 enrollment information was used in calculating cost and utilization measures from the 2007 Medicare claims data. Although information for both full- and part-year beneficiaries was used in the QRURs, we weighted annualized measures for part-year beneficiaries to reflect having only partial information to capture their treatment for the full calendar year. We used Medicare's Denominator files to identify beneficiaries in CTS sites who were enrolled in both Medicare Part A and Part B of original Medicare FFS for the entire 12 months of the 2006 or 2007 calendar year ("full-year" beneficiaries), for only one month or more of the 2006 or 2007 ("part-year" beneficiaries), or for none of the 12 months during 2006 or 2007 (see Section 3 for greater detail). Costs or services for 2007 part-year beneficiaries (for example, those who became eligible for Medicare during the year, were enrolled in a Medicare Advantage program for part of the year, or who died) for the part of the year observed in the claims data are summed with annual costs or services observed for 2007 full-year beneficiaries. However, annualized costs and service counts are then weighted by the portion of 2007 that each beneficiary was enrolled in both Parts A and B FFS Medicare.

FIGURE 1-1.

FLOW CHART FOR 2010 QUALITY AND RESOURCE USE REPORTS PROCESSING SYSTEM



Determine the medical specialty of EPs. The fourth main step involves determining the medical specialty of EPs based on Medicare claims data (see Section 4). Some EPs list different specialties on different claims, such as general practitioner versus endocrinologist, depending on the treatment provided to a given patient or at a given practice site. A single medical specialty designation is required to determine the peer group for the EP in determining the EP's relative performance compared to a peer group-based benchmark.

Standardize unit costs (prices) for the per capita cost measures. Prior to calculating any cost measures for the 2010 QRURs, unit costs (prices) for the 2007 Medicare claims were standardized (see Section 5 for details). Price standardization equalizes the costs associated with a specific service provided in a given health care setting (for example, home health versus outpatient hospital), regardless of when and where it was provided, and regardless of differences in Medicare payment rates among the same class of providers (for example, home health agencies versus skilled nursing facilities). For most types of medical services, Medicare adjusts payments to providers to reflect differences in local input prices (for example, wage rates and real estate costs). "Medicare costs" refer to the total reimbursement paid to providers for services provided to Medicare beneficiaries, except in cases where Medicare is the secondary payer, often referred to as allowed charges. For physician, anesthesiology, ambulance, and clinical lab services and Part B drugs, allowed charges were used to measure "Medicare costs" because allowed charges was provided in the data for these types of claims. However, allowed charges for other services was not a provided data element, and therefore other items like payments to providers from Medicare, from beneficiaries (copayments and deductibles), and from third-party private payers were included in calculating "Medicare costs." Services may be defined as discrete services (such as physician office visits) or bundled services (such as hospital stays). Costs shown in the QRUR were standardized to allow comparisons of costs for individual MPGs or EPs to those of peers who may practice in locations or settings where reimbursement rates are higher or lower. Appendix C provides detail on exactly which costs were used for each payment system.

Identify MPGs and attribute beneficiaries to MPGs and EPs. Also prior to calculating performance measures, beneficiaries are attributed to EPs and medical groups to establish accountability for the cost or quality outcomes of assigned beneficiaries. However, medical group practices and the EPs who constitute the group practice are not always easy to clearly identify from Medicare claims or from other Medicare databases. Therefore, the next step in the QRUR process involves identifying medical practice groups, according to a specific definition adopted for the 2010 QRURs (see Section 6). This process first identified tax identification numbers (TINs), a claims variable commonly used to identify medical group practices from Medicare claims data. For purposes of this report, CMS adopted additional criteria to define an MPG; that is, an MPG is a provider entity, identified by a single TIN in the 2007 Carrier (physician/supplier) claims, that meets three additional criteria:

- (1) at least one EP identified as a primary care physician and at least one EP identified as a medical specialist or surgeon billed for evaluation and management (E&M) Medicare services under the TIN,
- (2) at least one EP (of any specialty) billing under the TIN in 2007 was identified on his/her 2007 Carrier claims as practicing in one of the 12 CTS sites, and

- (3) at least 5,000 Medicare beneficiaries were retrospectively attributed to the TIN in 2007.

The main advantage of including a multispecialty mix is that the medical practice group is likely to have the specialty composition necessary to provide a broad spectrum of care. The 5,000 beneficiary attribution threshold increases the likelihood that this is a large enough patient pool to generate statistically stable results.

Following MPG attribution, beneficiaries were then attributed to individual EPs affiliated with MPGs and to unaffiliated EPs (see Section 6 for details). Beneficiaries not assigned to an MPG or an affiliated EP were assigned, if possible, to an unaffiliated EP. Although unaffiliated EPs did not receive a 2010 QRUR, they were included in peer group comparisons with affiliated EPs. This process first required establishing a definition of an affiliated EP. Some EPs bill under more than one TIN, which was the claims variable used to define a single medical practice group and affiliated EPs practicing within that group. Because the 2010 QRURs measure performance for a single MPG across all of the Medicare beneficiaries treated by EPs affiliated with that practice in 2007, we assigned EPs to a single TIN. EPs billing under more than one TIN in 2007 were assigned to the TIN under which they billed the most Part B Medicare Carrier (physician/supplier) claims in 2007.

For these reports, Medicare beneficiaries residing in the 12 CTS sites in 2006 and 2007 were retrospectively attributed to a single MPG based on a “plurality-minimum rule” (also described in more detail in Section 6). That is, a beneficiary was attributed to the MPG that billed for the greatest number (plurality) of observed E&M claims for that beneficiary in 2007, provided that the MPG billed for at least 30 percent of the total observed 2007 E&M costs for that beneficiary. After beneficiaries were attributed to an MPG, they were attributed to a single affiliated EP within the MPG through a similar method. Beneficiaries not attributed to an MPG were retrospectively attributed to a single unaffiliated EP, again based on the same plurality-minimum rule. Beneficiary attribution determined the single MPG or single EP held accountable for the beneficiary’s cost and quality outcomes measured in the reports.

Calculate non-risk adjusted per capita cost measures. Per capita costs were used as the primary measure of resource use in the 2010 QRURs. The 2010 QRURs reported both price-standardized, but not risk-adjusted, per capita costs as well as risk-adjusted measures for MPGs and EPs (see Section 7). In this next step of the QRUR processing, we calculated non-risk-adjusted per capita costs, as the average (mean) of an MPG’s or EP’s 2007 Medicare FFS Parts A and B payments per attributed beneficiary. The 2007 per capita cost measure includes all costs incurred in all health care settings (except for outpatient prescription drug costs) for all CTS-site beneficiaries enrolled in both Parts A and B of original FFS Medicare for any part of 2007. Medicare costs were obtained from 2007 administrative claims data using inpatient, outpatient, skilled nursing facility, home health, hospice, durable medical equipment, and Medicare Carrier (non-institutional provider) claims. Part D claims were not included in the 2007 cost calculations because analytic files for Medicare-covered outpatient prescription drug payments were not yet available.

To the extent that Medicare claims include such information, costs were comprised of payments to providers from Medicare, from beneficiaries (copayments and deductibles), and from third-party private payers. Data elements available in Medicare’s standard analytic claims files were used to derive the standardized costs. In the case of physician services (and Part B

drugs, labs, and anesthesiology services, and other services described in the Part B file), this means that the allowable charges variables were used. For other types of services, such as home health and inpatient hospitalizations, total allowable payments were derived from the data elements provided in the data. Appendix C shows the payment components that were used for each of Medicare's 16 distinct payment systems.

Calculate subgroup-specific non-risk adjusted per capita cost measures. As well as calculating an overall per capita cost measure based on all beneficiaries attributed to an EP or MPG, we also calculated per capita costs for selected subgroups of Medicare beneficiaries diagnosed as having one or more of the following chronic conditions in 2007: chronic obstructive pulmonary disease, coronary artery disease, diabetes, prostate cancer, or congestive heart failure (see Section 8). Chronic health conditions are diseases or illnesses that are commonly expected to last at least six months, require ongoing monitoring to avoid loss of normal life functioning, and are not expected to improve or be resolved without treatment. The subgroup-specific per capita cost measures included all annual treatment costs incurred by beneficiaries with the specific condition; that is, they were not limited to costs associated with treating the condition itself. If a beneficiary has more than one of the selected chronic conditions, this beneficiary's total per capita costs were included in both sub-group cost measures.

Risk adjust costs for overall and subgroup-specific per capita cost measures. The next step involves risk adjusting 2007 per capita costs and subgroup-specific per capita costs (see Section 9). Risk adjustment takes into account differences in patient characteristics that may make costs of care higher or lower, no matter where the patient is treated or how efficient the care is. For peer comparisons, an MPG's or EP's per capita costs were risk adjusted based on the unique mix of patients attributed to the group or to the EP. Factors included in the risk-adjustment model include the patient's age, sex, original reason for Medicare entitlement (age or disability), presence of end-stage renal disease, past history of diseases or conditions known to increase risk (co-morbidities), and Medicaid entitlement. Costs for patients with high risk were adjusted downward, and costs for patients with low risk were adjusted upward. Thus, for MPGs or EPs who had a higher than average proportion of patients with serious medical conditions or other higher-cost risk factors, risk adjusted per capita costs were lower than unadjusted costs, because costs of higher-risk patients were adjusted downward. For MPGs or EPs who treated comparatively lower-risk patients, risk adjusted per capita costs were higher than unadjusted costs, because costs for lower-risk patients were adjusted upwards.

Calculate cost of service categories for per capita cost measures. After risk adjusting per capita cost measures, we partitioned total costs into discrete cost of service categories based on costs incurred in different settings (for example, in hospitals versus skilled nursing facilities) and services provide by different providers (for example, the provider receiving the QRUR versus other EPs who treated the beneficiary in 2007) (see Section 10). Breaking out total per capita costs in this way can help illuminate cost drivers and make the information provided in the QRURs more actionable. Additional breakdowns were provided for the following categories of services:

- (1) All professional E&M services provided by primary care physicians, medical specialists, surgeons, and emergency room physicians
- (2) All procedures performed by primary care physicians, medical specialists, surgeons, and emergency room physicians

- (3) Inpatient hospital facility services
- (4) Hospital outpatient and emergency services, including clinic or emergency visits, procedures, laboratory tests, and imaging services
- (5) All ancillary services provided in ambulatory settings, including laboratory tests, imaging services, and durable medical equipment
- (6) Post-acute services including skilled nursing care, psychiatric or rehabilitation care, hospice care, and home health care
- (7) All other Medicare-covered services (services not captured in other categories, such as anesthesia; ambulance services; chemotherapy and other Part B drugs; orthotics; chiropractic; enteral and parenteral nutrition; some medically necessary vision, hearing, and speech services; and influenza immunization)

Calculate utilization statistics for subgroup-specific per capita cost measures. The 2010 QRURs also displayed selected utilization statistics for the subgroup-specific per capita cost measures (see Section 11), again to help providers pinpoint where their treatment patterns might differ substantially from their peers. The following utilization statistics were provided for each set of attributed beneficiaries with a given chronic condition:

- (1) Number of beneficiaries attributed to the MPG or EP who had the chronic condition in 2007
- (2) Average number of inpatient hospital admissions per attributed beneficiary with the chronic condition in 2007 (whether or not hospital admissions were for that chronic condition)
- (3) Average number of hospital emergency department (ED) visits (that did not lead to an inpatient admission) per attributed beneficiary with the chronic condition in 2007 (whether or not ED visits were related to that chronic condition).

Calculate ambulatory care sensitive condition measures for MPGs. In addition to per capita costs, the QRURs included selected ambulatory care sensitive condition (ACSC) measures for MPGs, which can be seen both as a measure of quality of care and resource use (see Section 12). ACSC rates for MPGs were calculated from Medicare administrative claims data. ACSCs are conditions for which good outpatient care can prevent complications or more serious disease. These conditions include congestive heart failure, chronic obstructive pulmonary disease, urinary tract infection, bacterial pneumonia, diabetes, and dehydration. High or increasing rates of hospitalization for these conditions in a defined population of patients may indicate inadequate access to high-quality ambulatory care.

Calculate GEM measures: The other set of measures of MPG and EP quality of care for Medicare beneficiaries included in the 2010 QRURs are known as GEM measures (Generating Medicare Physician Quality Performance Measurement Results) (see Section 13). These provide 2007 performance rates on a set of clinical quality measures for Medicare beneficiaries attributed to an MPG or an EP. We obtained 2007 GEM measures for MPGs from a CMS website. GEM measures for individual EPs were calculated for the 2010 QRURs by Masspro (see Section 13). The GEM project used 2006 and 2007 Medicare administrative claims data to generate

performance rates for 12 ambulatory care quality measures, based on HEDIS[®] measures appropriate to the Medicare population:

- (1) Breast Cancer Screening for Women up to 69 Years of Age
- (2) LDL Screening for Beneficiaries up to 75 Years of Age with Diabetes
- (3) Eye Exam (retinal) for Beneficiaries up to 75 Years of Age with Diabetes
- (4) HbA1c Testing for Beneficiaries up to 75 Years of Age with Diabetes
- (5) LDL-C Screening for Beneficiaries up to 75 Years of Age with Cardiovascular Conditions
- (6) Colorectal Cancer Screening for Beneficiaries up to 80 Years of Age
- (7) Medical Attention for Nephropathy for Diabetics up to 75 Years of Age
- (8) Persistence of β -Blocker Treatment after Heart Attack
- (9) Annual Monitoring for Beneficiaries on Persistent Medications (ACE Inhibitors or Angiotensin Receptor Blockers, Digoxin, Diuretics, and Anti-Convulsants)
- (10) Antidepressant Medication Management (Acute Phase)
- (11) β -Blocker Treatment after Heart Attack
- (12) Disease-Modifying Anti-Rheumatic Drug Therapy in Rheumatoid Arthritis

GEM measures were only calculated for a limited set of medical specialties: specialties deemed to be primary care specialties, cardiologists, neurologists, psychiatrists, nephrologists, endocrinologists, rheumatologists, and neuropsychiatrists. GEM measures were restricted to these specialties based on the mainly primary care nature of the measures calculated for the GEM project. Because CMS wanted 2010 QRURs to have both a least one quality and cost measure for an EP who received an individual report, only EPs with one of the above GEM measures (and who met the minimum case size criteria for the GEM measure and for a per capita cost measure) were eligible for a report. This was also true for MPGs, but because MPGs identified for the 2010 QRURs all included a variety of physician specialties and at least 5,000 attributed beneficiaries, all MPGs were eligible to receive a group-level report.

Define peer groups. For each measure calculated for the 2010 QRURs—per capita costs, cost of service categories, subgroup-specific per capita costs, utilization rates for subgroups, ACSC rates, and GEM rates—EP or MPG performance was compared with a group of its peers (see Section 14). For the 2010 QRURs, a peer group included only EPs and MPGs in the 12 CTS sites that had at least a minimum number of observations to report on a given measure. The minimum number of observations differed by type of measure, as described in Section 14. To ensure useful comparisons, the peer group for each measure was required to include at least 30 MPGs or EPs with at least the minimum number of observations to report.

Define benchmarks. Benchmarks for all measures included in the 2010 QRURs were calculated based on peer group performance (see Section 15). In the 2010 QRURs, most often an EP's or MPG's performance on a measure was compared with the mean performance among EPs or MPGs included in their peer group. In some exhibits in the report, an EP's or MPG's

performance was also compared with the 10th, 50th, and 90th percentile EP's or MPG's performance in the peer group.

Identify hospitals that treated CTS-site beneficiaries. The 2010 QRURs display a list of hospitals that treated beneficiaries attributed to an MPG or EP in 2007 (see Section 16). Hospitals for which at least 10 percent of the MPG's or EP's 2007 hospital stays for attributed Medicare patients were listed in the reports.

Populate 2010 QRURs. The final step in the process of producing QRURs involves populating the reports. Several criteria, described in Section 17, were applied to determine whether an MPG or an EP was eligible to receive a 2010 QRUR and whether a particular measure was displayed on the MPG's or EP's report.

The remaining sections of this report describe these procedures and the underlying programming methods in detail.

SECTION 1

MEDICARE DATA USED IN THE 2010 QUALITY AND COST REPORTS

Three primary Medicare data sources were used to identify the Medicare beneficiary and EP sample for the 2010 QRURs, and to calculate resource use measures (per capita cost, subgroup-specific per capita cost, cost of service categories, utilization, ACSC rates) and GEM measures. The Medicare enrollment files are described in Section 1.1, the Medicare claims files used for the resource use measures are described in Section 1.2, and the Medicare files used for the GEM measures are described in Section 1.3.

1.1 DATA FILES USED TO IDENTIFY MEDICARE BENEFICIARY RESIDENCE AND CHARACTERISTICS

Medicare's Denominator Files—derived from the Medicare Enrollment Database— for 2006 and 2007 were used to identify residency of Medicare beneficiaries, particularly to establish whether they were living in a CTS site in each of the two years. Beneficiaries who did not live in a CTS site in both years were not included in the reports to provide consistency to the beneficiary population included in the reports. Medicare's Denominator Files for 2006 and 2007 were also used to identify selected characteristics of the Medicare CTS-site sample. The Denominator Files contain demographic and enrollment information about each beneficiary enrolled in Medicare during a calendar year.

The information in the Denominator File is “frozen” in March of the following calendar year. Some of the information contained in this file includes the beneficiary unique identifier, state and county residence codes, ZIP Code, date of birth, date of death, sex, race, age, monthly Medicare entitlement indicators, reasons for entitlement, whether or not the beneficiary's state of residence paid for the beneficiary's Medicare Part A or Part B monthly premiums (“state buy-in” indicator), and monthly Medicare managed care enrollment indicators.

1.2 DATA FILES USED TO CONSTRUCT RESOURCE USE MEASURES AND IDENTIFY EP PRACTICE SITE AND CHARACTERISTICS

Claims information obtained from Medicare's Standard Analytical Files (SAFs) was used to construct the resource use measures for the 2010 QRURs. SAFs contain information collected by Medicare to pay for health care services provided to a Medicare beneficiary in original Medicare FFS. SAFs are available for each institutional (inpatient, outpatient, skilled nursing facility, hospice, or home health agency) and non-institutional (physician and durable medical equipment providers) claim type. The record unit of SAFs is the claim (some episodes of care may have more than one claim).

SAF files contain final action claims data, developed from the Medicare National Claims History (NCH) database, in which all claims adjustments have been resolved. Under Medicare claims processing procedures, when an error is discovered on a claim, a duplicate claim is submitted indicating that the prior claim was an error. A subsequent claim containing the corrected information may then be submitted. The SAFs contain only the final action claims, or non-rejected claims for which a payment has been made. All disputes and adjustments have been resolved and details clarified.

The geographic scope of the SAFs is national. Zip code is the finest level of geographic detail available in the file. Data are submitted continually from the Medicare Administrative Contractors (MACs) to CMS, but SAFs are produced by calendar year. The end date of the claim determines in which calendar year SAF the claim is included. Providers submit claims to the fiscal intermediary or Carrier for processing and payment. The MAC forwards all claims to CMS. Annual files are created each July for services incurred in the prior calendar year and processed through June of the current year (18 month window). The current year's data is created after 6 months and then updated quarterly and finalized after 18 months.

1.3 DATA FILES USED TO CONSTRUCT GENERATING MEDICARE PHYSICIAN QUALITY PERFORMANCE MEASUREMENT RESULTS (GEM) MEASURES²

CMS provided the following Medicare data sources for the GEM project:

- Health Account Joint Information (HAJI) database containing 2005, 2006, and 2007 national Part A and Part B FFS claims (similar to the 7 types of SAF claim files)
- 2006 and 2007 Medicare Part D (outpatient prescription drug) claims database
- Standard Data Processing System (SDPS) database containing national enrollment, physician, and other tables derived from the Medicare Enrollment Database and Part D Enrollment Database (including Denominator files)
- National Unique Physician Identification Number (UPIN) Files

The measure calculations for the GEM project require a variety of data from a number of different database sources. These sources, although containing information on beneficiaries that can be cross-linked, generally are tailor made for specific purposes. The HAJI database, the source for SDPS data, contains all FFS claim histories on both Part A and Part B components of Medicare coverage as well as Part D claims. Other information such as Medicare enrollment is available from the Medicare Enrollment Database; information relating to private medical group and solo practices is found in both the SDPS physician tables as well as the National UPIN Files, and information relating to Part D enrollment and claims can be found in two of the databases referenced above.

1.4 DATA FILES USED TO IDENTIFY SELECTED BENEFICIARY CHRONIC CONDITIONS

Data from the CMS Chronic Condition Warehouse (CCW) were used to identify beneficiaries with the five conditions of interest selected by CMS: chronic obstructive pulmonary disease, coronary artery disease, diabetes, prostate cancer, or congestive heart failure. Subgroup-specific per capita cost measures were constructed for each of these chronic conditions.

CMS launched the CCW database in response to the Medicare Modernization Act of 2003 (MMA). Section 723 of the MMA outlined a plan to improve the quality of care and reduce the

² Derived from "Physician and Other Medical Provider Grouping and Patient Attribution Methodologies: Generating Medicare Physician Quality Performance Measurement Results (GEM) Project"; http://www1.cms.gov/GEM/05_TechnicalDocuments.asp#TopOfPage, accessed July 5, 2010.

cost of care for chronically ill Medicare beneficiaries. An essential component of this plan was to establish a data warehouse that contains Medicare claims data and assessments, linked by beneficiary, across the continuum of care. The CCW contains FFS institutional and non-institutional claims, assessment data, and enrollment/eligibility information for 100% of the Medicare FFS population from 2005 forward.

The 21 predefined CCW conditions, defined by CMS in collaboration with the Research Data Assistance Center (ResDAC) and Buccaneer Computer Systems and Services, Inc. (BCSSI), make it easy to select a study population with a condition of interest. Medicare claims-based utilization information is used to make the chronic condition determinations (i.e., an indicator that the beneficiary received a service or treatment for the condition of interest). For chronic condition definitions, see http://www.ccwdata.org/downloads/CCW_UserManual.pdf (accessed July 7, 2010).

1.5 HIERARCHICAL CONDITION CATEGORY (HCC) SCORES

Clinical (case-mix) differences among patients can affect their medical costs, regardless of the care provided. For peer comparisons, an MPG's or EP's per capita costs and subgroup-specific per capita costs were risk adjusted based on the unique mix of patients the group or EP treated during a given time period. For the 2010 QRURs, we used the Hierarchical Condition Categories (HCC) model developed for CMS that assigns International Classification of Diseases-9th Revision (ICD-9) diagnosis codes (each with similar disease characteristics and costs) to 70 clinical conditions. The CMS-HCC risk adjustment model is used to adjust payments for Part C benefits offered by Medicare Advantage plans and Program of All Inclusive Care for the Elderly (PACE) organizations to aged/disabled beneficiaries. The CMS-HCC model incorporates both prior year diseases and demographic factors. There are separate sets of coefficients for beneficiaries in the community, beneficiaries in long term care institutions, new Medicare enrollees, and End- Stage Renal Disease (ESRD) beneficiaries in dialysis, transplant, and functioning graft status (both community and institutional). The CMS-HCC model was first used for payment in 2004 and has been recalibrated two times since then (2007 and 2009).

CMS calculated and provided the Community and New Enrollee HCC scores that were used in risk adjusting 2007 per capita costs for the 2010 QRURs. The ESRD and institutional scores were not used. An ESRD flag instead of the ESRD score was used because the ESRD model is concurrent and including the flag in the adjustment model permitted us to estimate the prospective impact of ESRD. No adjustment was made for institutional status because institutionalization during the year is endogenous and the effect of institutionalization on costs is small on average, once HCC score is included.

1.6 DATA FILES USED TO IDENTIFY CONTACT INFORMATION FOR MPGs AND EPs

CMS' Provider Enrollment, Chain, and Ownership System (PECOS) Global Extract file, not currently complete, was used in part to identify names of EPs affiliated with MPGs, and to identify MGP (TIN) and EP (National Provider Identifier [NPI]) names and addresses for mailing of an advance notice letter. CMS provided information for most of the missing contact information from other CMS sources. The advance notice letter informed the MGP or EP of the

availability of their 2010 QRUR, explained the purpose of the QRUR, and contained instructions for obtaining their QRUR.

The PECOS Global Extract file contains information on Medicare providers, suppliers, and practitioners that have been approved by CMS to bill Medicare for their services. The Global Extract file provides a monthly snapshot of all current information on Approved enrollment records in the PECOS application at the time the data is extracted from the system. The Global Extract file consists of two separate files, one containing enrollment records for individuals, and one containing enrollment records for organizations.

1.7 DATA FILES USED TO IDENTIFY PQRI PARTICIPATION

Only MPGs in which an affiliated EP participated in PQRI in 2007, 2008, or 2009 were eligible to obtain a 2010 QRUR. EP participation in the PQRI program was identified by the Iowa Foundation for Medical Care (IFMC). Participation was defined as the EP having submitted at least one PQRI Quality Data Code (QDC) on Part B claims in 2007, 2008, or 2009, whether or not the QDC was valid.

1.8 DATA FILES USED TO IDENTIFY HOSPITALS THAT TREATED CTS SITE BENEFICIARIES

The 2010 QRURs include a listing of hospitals which accounted for at least 10 percent of the MPG's or EP's attributed beneficiary hospital stays in 2007. Names of such hospitals were obtained by matching their hospital identification number derived from the 2007 Medicare Inpatient Hospital claims with CMS' Hospital Compare database.

SECTION 2

SELECT MEDICARE BENEFICIARIES AND ELIGIBLE PROFESSIONALS FOR THE 2010 QUALITY AND COST REPORTS

The first step of the QRUR reporting system involves identifying Medicare beneficiaries who lived in a Community Tracking Study (CTS) site in 2006 and 2007, based on Medicare enrollment records. The CTS sites include Boston, MA; Cleveland, OH; Greenville, SC; Indianapolis, IN; Lansing, MI; Little Rock, AR; Miami, FL; Northern NJ; Orange County, CA; Phoenix, AZ; Seattle, WA; and Syracuse, NY. These 12 communities were randomly selected for the Center for Studying Health System Change's (HSC) Community Tracking Study to provide a representative profile of health systems across the United States (<http://www.hschange.org>).

Section 2.1 describes the rationale for selecting the CTS sites for physician feedback report distribution in Phases I and II of the Physician Feedback Program. Section 2.2 describes the rationale for selecting beneficiaries who lived in one of the 12 CTS sites in 2006 and 2007 as the population used to derive EP and MPG performance measures for the Phases I and II feedback reports. Section 2.3 provides details on how Medicare beneficiary residence was determined for 2007. Finally, Section 2.4 describes how an EP's single CTS practice site in 2007 was defined.

2.1 RATIONALE FOR SELECTING CTS SITES FOR PHASES I AND II

The primary reason for using the 12 CTS sites for testing Phases I and II feedback reports is because the 12 communities were randomly selected from different strata of geographic region and population size, and hence are more likely to provide representative study areas than would a purposive sample of sites. There are three secondary reasons for using the CTS sites:

- In addition to representing the diversity of providers along the dimensions used to sample them, the 12 communities vary in terms of physician market structure, Medicare spending, percent of the population that are aged, and experience with public- or private-sector performance measurement and reporting. Thus, they afford an opportunity to test feedback reports in diverse contexts.
- Since 1996, HSC has conducted six rounds of site visits in each of the 12 CTS sites, each round including interviews with 40-100 stakeholders in each community (the number varies by size of the market and round).³ HSC researchers target an extensive group of organizations and individuals to interview, including the largest and most influential organizations (medical groups, hospitals, health plans, public and private employers, safety net providers, professional associations, local policymakers) in the market. HSC prepare Issue Briefs and publish articles in peer-reviewed journals on changes in the health care system in these. A list of Issue Briefs and articles developed can

³ Approximately 500 interviews were conducted between February 2007 and June 2007 in the 12 communities with representatives of health plans, hospitals, physician organizations, major employers, benefit consultants, insurance brokers, community health centers, consumer advocates and state and local policy makers.

be found at <http://www.hschange.org>. The background provided by these studies can be useful for planning and interpreting the results of the phased tests. For example, we can interpret test results in the context of (1) private payers in the local area providing performance feedback, and (2) physicians' general competitive strategies in the local market.

- They were already selected, thereby facilitating a rapid start-up of the of the physician feedback report program.

The following provides additional detail on how the CTS sites were selected, and how well they represent the full diversity of health service market areas.

The site definitions were based on metropolitan statistical areas (MSAs) as defined by the Office of Management and Budget and the nonmetropolitan portions of economic areas as defined by the Bureau of Economic Analysis (BEA).⁴ MSAs are readily understood and match the definition used by other analysts; BEA Economic Areas, while not used universally, provide a rational and independent basis for assigning non-metropolitan areas to defined economic markets. The use of counties also facilitated the comparison with and use of secondary data.

Each MSA was considered a self-contained site eligible for inclusion in the study. However, 18 large, complex metropolitan areas were designated as Consolidated Metropolitan Statistical Areas (CMSAs). Each CMSA had two or more component Primary Metropolitan Statistical Areas (PMSAs) and the 15 component PMSAs that make up the New York- Northern New Jersey-Long Island CMSA. Because the health care markets in these large metropolitan areas are likely to mirror this complexity, one objective was to define submarkets within an overall market and sample one or more submarkets of the larger CMSA, rather than to view the most complex areas as single sites for potential selection. In the definition of submarkets, the conceptual principle was identifying subareas in which the services provided and the services used by residents overlapped as much as possible. After reviewing available evidence on health care markets in the 18 CMSAs, HSC adopted the operational procedure of dividing the CMSAs into their PMSA component parts as sites eligible for independent selection, after combining PMSAs of less than 350,000 population with an adjacent PMSA.⁵

Sites were selected to be representative of the full diversity in geographic region and population size.

- **Region.** Stratification by region and systematic sampling by state ensured the full diversity of health delivery systems across the nation, as well as diversity

⁴ See 1990 Census of Population and Housing, Supplementary Reports, Metropolitan Areas as Defined by the Office of Management and Budget, June 30, 1993 (1990 CPH-S-1), and Kenneth P. Johnson, "Redefinition of the BEA Economic Areas," Survey of Current Business, February 1995, pp.75-81.

⁵ The New York PMSA was split into New York City and its suburban counties; all other sites consisted of one or more PMSAs. Of the 18 CMSAs, 6 remained as single sites, 6 were split into two sites, and 6 were split into 3 or more sites. The largest CMSAs, such as New York or Los Angeles, were likely to have multiple component sites selected in the larger sample of sites discussed later in this paper. Systematic sampling techniques used for geographic stratification prevented a non-representative "overload" of sites selected from a single CMSA.

with respect to historical evolution and community “culture,” as reflected by differences across regions.

- **Population Size.** The sampling plan used separate stratum of the smallest MSAs and built implicit stratification by population size into the geographic stratification.

High-population MSAs (for example, the New York and Los Angeles CMSAs and the large cities of the Northeast corridor) were designated as certainty sites and selected with probability of one. The remaining sites were separated into strata and selected using a sequential selection process with geographic region and city size used as implicit stratification. Once the initial pool of sites was selected, a random sub-sample of 12 sites was selected with equal probability. We used this sub-sample of sites for the Phases I and II feedback reports.

The 12 sites all represent areas with populations of 200,000 or more persons. Table 3.1 shows their distribution by population size and geographic region.

TABLE 2.1
CHARACTERISTICS OF THE CTS SITES

	Northeast	Midwest	South	West
Small	Syracuse, NY	Lansing, MI	Greenville, SC Little Rock, AK	
Medium	Northern New Jersey	Cleveland, OH Indianapolis, IN	Phoenix, AZ	Seattle, WA
Large	Boston, MA		Miami, FL	Orange County, CA

In addition, the random sampling strategy generated sites that vary greatly across other key parameters relevant for the development of Medicare physician feedback reports. Such variation allows for the thorough testing of feedback reports. For example, the 12 sites include:

- Areas of relatively high (e.g., Boston) and low (e.g., Seattle) Medicare spending
- Areas with diffuse physician markets dominated by solo and small group practices (e.g., Miami), those with highly consolidated markets dominated by well-capitalized, large single- or multi-specialty groups (e.g., Boston, Seattle, Phoenix), and those where physicians are tightly affiliated with a given hospital system (e.g., Greenville)
- Areas where physicians derive substantial revenue from capitation (e.g., Orange County) and those where capitated contracts are rare (e.g., Little Rock)
- Areas with strong purchaser coalitions (e.g., Seattle and Orange County) and those without (e.g., Indianapolis)
- Areas with maturing public or private sector initiatives on performance measurement and reporting (e.g., Boston, Orange County) and areas where

physicians have had minimal exposure to such efforts (e.g., Northern New Jersey)

2.2 METHODOLOGY USED TO SELECT MEDICARE BENEFICIARIES FOR THE QRURs

The CTS file used to draw the CTS beneficiary sample was constructed for beneficiaries residing in a county in 2006 included in one of the 12 CTS sites shown in Appendix Table A. The steps involved in creating the CTS sample file were:

Step 1: Mathematica created a file of Federal Information Processing Standards (FIPS) county codes included in CTS sites in 2006 obtained from HSC

Step 2: Because Medicare's beneficiary enrollment files use Social Security Administration (SSA) instead of FIPS codes, Mathematica created a crosswalk file and sent this finder file to Acumen, LLC, a Research Data Distribution Center contractor for CMS in 2008 (the file layout is shown in Appendix Table A)

Step 3: Acumen identified all beneficiaries (through their Health Insurance Claims Account Number or HICAN) living in the finder file county codes from Medicare's 2006 Denominator File

Step 4: Acumen pulled 2006 and 2007 SAF claims for all seven claims types and enrollment data for beneficiaries identified in the previous step and sent the claims files and 2006 and 2007 Denominator Files for these beneficiaries to Mathematica

Step 5: Mathematica loaded the beneficiary claims and Denominator data files into SAS software and ran quality assurance checks on the SAS datasets

2.3 DETERMINE MEDICARE BENEFICIARY RESIDENCE IN 2007

The beneficiary sample for the Phases I and II feedback reports was based on residency in a CTS site in 2006. However, the 2010 QRUR resource use measures were based on EP and MGP performance in 2007. Therefore, the QRUR resource use measures were calculated for beneficiaries who lived in a CTS site in 2006 AND who were still alive and residing in a CTS site in 2007. The 2007 Denominator File information on date of death and state and county code of residence was used to establish the 2007 beneficiary criteria.

The 2007 beneficiary residency restriction was applied because the focus of the 2010 QRUR was on performance measurement for EPs practicing in a CTS site and treating CTS-site beneficiaries. This restriction facilitated calculation of measures based on most or at least a large portion of an EP's Medicare patient panel for EPs practicing in a CTS site. Inclusion of beneficiaries not living in a CTS site in 2007 in the measure calculations would have increased the likelihood of assigning treatment responsibility to a CTS-site EP who no longer treated the beneficiary in 2007.

2.4 DETERMINE EP PRACTICE SITE IN 2007

Some EPs practice in more than one location. To help maximize the probability of including an EP's full Medicare patient panel residing in a CTS site, we restricted QRUR production to EPs practicing in a CTS site in 2007. This section describes how we established a single practice

location for EPs with more than one practice location listed in Medicare claims files. Calculating measures for non-CTS-site EPs would have a high likelihood of producing inefficient estimators of true performance because they would be based on a very small portion of the EP's Medicare patient panel (that is, only on beneficiaries who lived in a CTS site).

2.4.1 Data Files Used to Determine 2007 EP Practice Site

The 2007 Carrier SAF contains final action claims data submitted by non-institutional providers. Examples of non-institutional providers include physicians, physician assistants, clinical social workers, nurse practitioners, independent clinical laboratories, ambulance providers, and free-standing ambulatory surgical centers. Some of the information contained in this file includes diagnosis and procedure (ICD-9 diagnosis, CMS' Healthcare Common Procedure Coding System (HCPCS) codes), dates of service, reimbursement amount, and non-institutional provider numbers (e.g., UPIN, PIN, NPI). Each observation in this file is at the line-item level.

2.4.2 Process Used to Determine 2007 EP Practice Site

To determine an EP's practice location in 2007, we used the majority ZIP Code identified in claims included in the 2007 Carrier SAF for which the EP was a performing UPIN.^{6,7}

Step 1: Count up a UPIN's unique ZIP Codes for which it is a performing UPIN on a 2007 Carrier line item. For example, if a performing UPIN has 5 line items on a single Carrier claim with the same ZIP Code, this would be collapsed to one record with one unique ZIP Code. However, if the performing UPIN has 5 line items with 4 having the same ZIP Code and one having a different ZIP Code, then this would be collapsed to two unique ZIP Code records.

Step 2: Assign the majority ZIP Code among the UPIN's ZIP Code records to the performing UPIN.

Step 3: In case of a tie, first assign the ZIP Code that is in a CTS site. In cases of ties of two or more CTS site ZIP Codes, or two or more non-CTS site ZIP Codes, randomly assign a ZIP Code.

Step 4: Crosswalk the UPIN's majority ZIP Code to the CTS site number.

⁶ A unique physician identification number, or UPIN, is used by Medicare to identify doctors across the United States. UPINs are six-place alpha numeric identifiers assigned to all physicians. UPINs were discontinued in the second quarter of 2007 and replaced by National Provider Identifier, or NPI numbers. However, most 2007 claims still used the UPIN for physician identification.

⁷ The UPIN's (NPI's) CTS site practice location can potentially be derived directly from the National Plan and Provider Enumeration System (NPPES) or CMS PECOS file starting with 2008 claims data.

SECTION 3

IDENTIFY 2006 AND 2007 FULL-YEAR AND PART-YEAR BENEFICIARIES

This section describes identification of Medicare beneficiaries in the CTS sites who were enrolled in both Medicare Part A and Part B of original Medicare FFS for the entire 12 months of the 2007 calendar year (“full-year” beneficiaries), for only one month or more of the 2007 (“part-year” beneficiaries), or for none of the 12 months during 2007. As described in following sections of this document, 2007 resource use performance measures were weighted to reflect the contribution of the Medicare beneficiary to the measure in 2007. Full- or part-year status was also required for 2006 to select the appropriate HCC score for the risk adjustment model, described in Section 9.⁸

3.1 DATA FILES USED TO IDENTIFY 2007 CALENDAR YEAR ENROLLMENT

Medicare’s Denominator Files for 2006 and 2007 were used to identify Medicare beneficiary full-year or part-year status in Medicare FFS in 2006 and 2007. The Denominator File contains demographic and enrollment information about each beneficiary enrolled in Medicare during a calendar year. The information in the Denominator File is 'frozen' in March of the following calendar year. Some of the information contained in this file includes the beneficiary unique identifier, state and county residence codes, ZIP Code, date of birth, date of death, sex, race, age, monthly Medicare entitlement indicators (Parts A/B/Both), reasons for entitlement, state buy-in indicators, and monthly Medicare managed care enrollment indicators (yes/no).

3.2 PROCESS FOR IDENTIFYING 2006 AND 2007 CALENDAR YEAR ENROLLMENT

Beneficiaries in the CTS sites were identified as full-year or part-year separately for 2006 and 2007 through the steps below. For 2006 part-year enrollees, the New Enrollee HCC score was used in the cost measures risk adjustment models because Community HCC scores— included in the model for 2006 full-year enrollees—require a full calendar year of claims data to calculate. For 2007 part-year enrollees, costs were annualized then weighted to reflect having incomplete 2007 calendar year Medicare claims data for these enrollees.

Step 1: For all beneficiaries, set the following flags using the appropriate calendar year (2006 or 2007) Denominator File, which indicate whether the beneficiary has incomplete calendar year FFS claims for at least one of the following reasons:

a) The beneficiary died during the year: If a death date was present in the Denominator File (not equal to missing) on or between 1/1 and 12/31 of the calendar year, and the death verification switch indicated that the death had been verified (a value of “V”) the month of death was used to determine the number of months of potential FFS eligibility during the calendar year (that is, the beneficiary might have been alive but had been in a

⁸ Part-year Medicare FFS enrollees in 2007 had their 2007 costs/utilization measures weighted in the risk adjustment model. Part-year Medicare FFS enrollees in 2006 did not have a full 2006 HCC score but instead their score was that of a New Enrollee – based on sex, age, Medicaid status, and ESRD status.

Medicare Advantage plan, which also in part determines the length of time the beneficiary was in Medicare FFS for the calendar year).

b) The beneficiary was enrolled in a Medicare managed care plan at least one month during the calendar year: Using the Health Maintenance Organization (HMO) Indicator field in the Denominator file, the HMO flag was set to 0 for the given month if the beneficiary had a value of 1, 2, A, B, or C for the month; the HMO flag was set to 1 for the given month if the beneficiary had a value of 0 or 4 for the month. Codes for the HMO Indicator field are as follows:

0 = NOT A MEMBER OF HMO
1 = NON LOCK-IN, HEALTH CARE FINANCING ADMINISTRATION (HCFA) TO PROCESS PROVIDER CLAIMS
2 = NON LOCK-IN, GROUP HEALTH ORGANIZATION TO PROCESS IN-PLAN PART A AND IN-AREA PART B CLAIMS
4 = Fee-for-service participant in case or disease management demonstration project (effective 2005 forward)
A = LOCK-IN, HCFA TO PROCESS PROVIDER CLAIMS
B = LOCK-IN, GROUP HEALTH ORGANIZATION TO PROCESS IN-PLAN PART A AND IN-AREA PART B CLAIMS
C = LOCK-IN, GROUP HEALTH ORGANIZATION TO PROCESS ALL PROVIDER CLAIMS

c) The beneficiary gained or lost Part A or B entitlement during the calendar year: Using the Buy-In Indicator field in the Denominator file, the Buy-In flag was set to 0 for the given month if the beneficiary had a value of 0, 1, or 2 for the month; the Buy-In flag was set to 1 for the given month if the beneficiary had a value of 3, A, B, or C in the month.⁹ Codes for the Buy-In Indicator are as follows:

0 = NOT ENTITLED
1 = PART A ONLY
2 = PART B ONLY
3 = PART A AND PART B
A = PART A, STATE BUY-IN
B = PART B, STATE BUY-IN
C = PARTS A AND B, STATE BUY-IN

Step 2: For each beneficiary, for each year 2006 or 2007, create a part-year variable that counts the number of months in the given calendar year the beneficiary was still alive and in which the HMO flag AND the Buy-in flag (not the Buy-in indicator) = 1.

⁹ Beneficiaries with a value of A or B were considered to have both Parts A and B coverage because, in order for a state to “buy-in” to Part A for a Medicare beneficiary (that is, pay the Part A premium for the beneficiary because the beneficiary is not automatically eligible for “premium free” Part A coverage), the beneficiary must already be enrolled in Part B. The same is true for Part B; that is, if the individual is not enrolled in premium free Part A or is not paying Part A premiums, the individual is not eligible for state payment of their Medicare Part B premium. Therefore, if the beneficiary is “bought in” to either Part A or Part B by their state, they necessarily have the other part of Medicare.

For example, if the beneficiary was in Medicare FFS in January-February 2007 (and had both Parts A/B entitlement and was alive), then enrolled in an HMO plan from March-April 2007, then transferred back to Medicare FFS May-July 2007, then died in mid-August, the part-year flag for this beneficiary for 2007 would equal 6.

The part-year variable for full-year Medicare FFS beneficiaries (i.e., not part-year for any reason, including death) would have a count of 12. The part-year variable for beneficiaries not enrolled in both Parts A and B of Medicare FFS for at least one month during the year (i.e., died in the previous calendar year; lost Part A or Part B entitlement in the previous calendar year and did not obtain it again in the current calendar year; were enrolled in a Medicare managed care plan for the entire current calendar year) would have a count of 0.

Step 3: Using the part-year variable, calculate a weight for each beneficiary equal to the month count from Step 2, divided by 12 for each year 2006 or 2007. (In the example above, the beneficiary's weight would be 5/12 for 2007). Full-year FFS beneficiaries (i.e., not part-year for any reason, including death) would have weight = 1. If a beneficiary's part-year variable for 2007 = 0, then the weight = 0 and the beneficiary was dropped from the 2007 analysis file. If the beneficiary's part-year variable for 2006 = 0 but the beneficiary's part-year variable was positive for 2007, the beneficiary was retained in the 2007 analysis file.

SECTION 4 DETERMINE THE MEDICAL SPECIALTY OF ELIGIBLE PROFESSIONALS

4.1 DETERMINE A SINGLE MEDICAL SPECIALTY FOR EPs

Some EPs list different specialties on different claims, such as general practitioner versus endocrinologist, depending on the treatment provided to a given patient or at a given practice site. A single medical specialty designation is required to determine who the peer group is for the EP in determining the EP's performance compared to a peer group benchmark.

To determine an EP's single medical specialty in 2007, we used the majority HCFA medical specialty code identified in the 2007 Carrier SAF for which the EP was a performing UPIN:¹⁰

Step 1: De-duplicate 2007 Carrier SAF line-item records for the CTS sample by performing UPIN and the EP's medical specialty (HCFA_SPECIALTY)

Step 2: Count up a given EP's medical specialty for which it is a performing UPIN on a 2007 Carrier line item. For example, if a performing UPIN has 5 line items on a single Carrier claim with the same medical specialty, this would be collapsed to one record. However, if the performing UPIN has 5 line items with 4 having the same medical specialty and one having a different medical specialty, then this would be collapsed to two records.

Step 3: Assign the majority medical specialty among the EP's de-duplicated medical specialty records to the performing UPIN, with one exception: if the majority medical specialty = 99 (unknown physician specialty) for a given EP, assign the next most frequent medical specialty for that EP if there is one. (For example, performing UPIN has 10 records, 9 of which=99 but one of which=01, then assign HCFA medical specialty=01.)

Step 4: In case of a tie, randomly assign medical specialty to the performing UPIN among the tied medical specialties.

4.2 COLLAPSE MEDICAL SPECIALTY INTO FIVE CATEGORIES

We defined a variable, "Physician Stratification Category," that collapsed medical specialties into five mutually exclusive categories, for use in the attribution program (see Section 6), for use in the cost of service categories program (see Section 10), and for potential use in establishing broad medical specialty peer groups (tested in Phase I feedback reports but not used in QRURs). EPs were classified into one of five Physician Stratification Categories based on their majority medical specialty determined in Section 4.1, as follows:

¹⁰ The UPIN's (NPI's) medical specialty can potentially be derived directly from the NPPES or CMS PECOS file starting with 2008 claims data.

Step 1: Determine an EP's Physician Stratification Category based on the EP's majority medical specialty codes according to Appendix Table B, Column (3), which lists all medical specialties eligible for beneficiary attribution for the 2010 QRURs.

Step 2: Set Physician Stratification Category = Other for all performing UPINs with a medical specialty code not included in Step 1 (see Appendix Table B, Column (2)).

SECTION 5

STANDARDIZE UNIT COSTS (PRICES) FOR THE PER CAPITA COST MEASURES

Geographic variations in Medicare payments to providers may reflect factors unrelated to the care provided to patients. All unit costs have been adjusted (standardized) such that a given service is priced at the same level across all providers within the same facility type or setting as defined in Appendix C, regardless of geographic location, differences in Medicare payment rates among facilities, or the year in which the service was provided. “Unit costs” refer to the total reimbursement paid to providers for services provided to Medicare beneficiaries. These may include discrete services (such as physician office visits or consultations) or bundled services (such as hospital stays). For most types of medical services, Medicare adjusts payments to providers to reflect differences in local input prices (for example, wage rates and real estate costs). The costs reported in the QRUR are therefore price standardized to allow for comparisons to peers who may practice in locations or facilities where reimbursement rates are higher or lower. Price standardization is performed prior to calculating per capita price-adjusted and risk-adjusted per capita cost measures.

5.1 INTRODUCTION

Prior to running the standardized pricing programs to standardize prices for the 2007 Medicare claims data, we dropped all claims with a missing claim payment amount (Institutional claims: PMT_AMT) or line-items with a missing line-item payment amount (Carrier/Durable Medical Equipment (DME) claims: LINEPMT). We retained claims with a zero or negative dollar amount.

Next, we ran the standardized pricing programs on all 7 Medicare claims types, described in Section 5.2. Our procedures for creating standardized unit costs borrowed heavily from previous work by the Medicare Payment Advisory Commission (MedPAC) and were developed in consultation with MedPAC staff, Dan Dunn of Ingenix, and others.¹¹ In general, four aspects of the Medicare payment system are standardized.

1. *Payment adjustments based on annual updates to payment rates.* Medicare’s annual updates in payment rates are common to nearly all Medicare payment systems. Part B drugs are the only exception. They are priced on a quarterly basis, based on average sales prices.

2. *Payment adjustments based on the geographic location in which the service is provided.* Nearly all payment systems make adjustments to reflect geographic differences in the cost of labor and other inputs to the production of medical services. In other cases, there are special payment rules for rural providers and those in designated provider shortage areas. In addition, some services are priced at the MAC level, with each MAC serving different geographic areas. We standardize service costs to reflect such differences.

¹¹ A brief description of the procedures MedPAC used to create standardized unit costs is contained in the June 2006 “Report to Congress: Increasing the Value of Medicare,” page 25.

3. *Payment adjustments for different levels of payment associated with different payment systems for classes of providers.* In some instances, designated classes of providers of a given type are singled out to be paid on a different basis than most other providers. For example, most acute care hospitals are paid on a prospective Diagnosis-Related Group (DRG) basis. Critical Access Hospitals, however, are paid retrospectively on a cost basis. We standardized so that all classes of providers within the same facility type or setting as defined in Appendix C are assigned identical unit costs for any given service.

4. *Payment adjustments for provider-specific differences in payment.* In some cases, specific facilities receive differential payments by virtue of their case mix, function, or costs. Examples are disproportionate share and graduate medical education payments to hospitals. We standardize so that all providers of a given type within a given payment system face the same unit cost structure.

5.2 GENERAL APPROACHES FOR STANDARDIZING UNIT COSTS OF SERVICES

Methods by which payments to providers are determined vary depending on the type of provider, and require distinct approaches to creating standardized unit costs. A key dividing line is between those payment systems that pay providers retrospectively (for example, fee-for-service) according to a fee schedule, and those that pay prospectively, where Medicare pays providers a fixed, or quasi-fixed, sum for a bundle of services determined by patient condition or diagnosis (for example, hospital DRG payments). There are also a couple of hybrid payment systems, discussed in greater detail below. We first describe our general approaches to creating standardized unit costs in retrospective and prospective payment systems and then provide more details about specific payment systems.

5.2.1 Create Standardized Unit Costs for Retrospective Payment Systems

Medicare pays for physician services, clinical laboratory services, Part B drugs, ambulance services, and durable medical equipment (DME) retrospectively. Professional and ambulance services are paid according to fee schedules, where fees are adjusted by geographic practice cost indices (GPCIs) to account for differences in the cost of inputs; Part B drugs are mostly paid according to the average sales price; DME is paid according to state fee schedules; while clinical lab prices are set by carriers, subject to national limits. In other payment systems, the Medicare program sets prospective per-diem rates for skilled nursing facility (SNF), hospice, and psychiatric facility services, but then pays retrospectively on the basis of the length of stay. We characterize these payment systems as hybrids. Depending on the presence of a national fee schedule and other data-related factors, standardized unit costs will be set to fee-schedule values (actual allowed charges for which geographic adjusters have been netted out) or based on average allowed charges in the base year. Standardized unit costs for hybrid systems will be based on the average per-diem payment multiplied by length of stay. Costs were adjusted to the base year costs for 2006 (that is, the first year of claims pulled for CTS-site beneficiaries). To determine the factors to adjust between 2007 and 2006, we researched base rate payment changes using the CMS web site and the final rules in the Federal Register for each payment type.

5.2.2 Create Standardized Unit Costs for Prospective Payment Systems

The majority of Medicare costs are for services such as hospital care and home health that are paid through prospective payment systems. With the exception of Part B services, the Medicare payment is based on average costs across patients with a given diagnosis or functional presentation, not on the actual costs expended for that patient. For example, for inpatient hospital care, the general approach is to constructing a standardized price for each DRG by averaging total payments (including indirect medical education [IME], disproportionate share hospital [DSH], and outlier adjustments) in each DRG across a nationally representative sample of beneficiaries.

Specific approaches for each of 16 Medicare payment systems are provided in Appendix C. Following Section 5.3 below, Table 5.1 summarizes the Medicare payment factors and pricing differentials standardized on for each of the 16 Medicare payment systems that exist for different classes of providers or services.

5.3 FIX LINE ITEMS AND CLAIMS THAT HAD NONZERO ORIGINAL PAYMENT AMOUNT, BUT A MISSING OR \$0 STANDARDIZED PRICE

After running the standardized pricing programs described above and in Appendix C, for all claims/line items that had a nonzero original payment amount but had a missing or \$0 standardized payment amount, we filled in the standardized payment amount with payment information from the original claim and adjusted the price back to a 2006 basis. (If after applying the above step, the total standardized payment amount was still missing or equal to \$0 because all of the variables used to calculate the standardized payment had missing or \$0 payment amounts, we dropped the claim or line item from the QRUR files, although the rest of the beneficiaries' claims were retained for the QRURs.)

TABLE 5.1 STANDARDIZED FACTORS FOR UNIT COST STANDARDIZATION METHODOLOGY

Payment System	Basic Approach	What Is Standardized?		
		Geographic Adjustments	Payment Across Classes of Providers	Provider-Specific Adjustments
Physician Services	Number of Relative Value Units (RVUs) associated with service, times the 2006 conversion rate. Modifier codes that affect payment are applied to these amounts.	<p>GPCI adjustments (to account for differences in input costs across CMS' 89 payment areas)</p> <p>Additional payments to providers practicing in designated shortage areas (Health Professional Shortage Areas and Physician Shortage Areas), under the Medicare Incentive program</p> <p>Payment difference across carrier regions (for Carrier-priced services)</p>		Non-Medicare-participating physician adjustments
Anesthesiology Services	Average payment in 2006 by anesthesia HCPCS code.	GPCI adjustments (to account for differences in input costs across CMS' 89 payment areas)		Complex rules dictate payment when anesthesiologist supervises various numbers of Certified Registered Nurse Anesthetists. We assign a national average payment per anesthesia HCPCS code to standardize.
Part B Drugs	Average per unit payment in 2006 by HCPCS code multiplied by number of units.	Payment difference across carrier regions (for Carrier-priced drugs)		
Clinical Laboratory Services	Assign National Limitation Amount (NLA) value, based on HCPCS code.	Differences across Carrier regions in fee schedule amounts are standardized		Payment is reduced if provider charges are below Carrier fee schedule amount. We eliminate this reduction.

Table 5.1 (continued)

Payment System	Basic Approach	What Is Standardized?		
		Geographic Adjustments	Payment Across Classes of Providers	Provider-Specific Adjustments
Ambulance Services	Average payment in 2006 by ambulance HCPCS code.	<p>Payment differences across Medicare payment areas</p> <p>Rural add-on payments</p>	During PPS phase-in period, payment differences between hospital and free-standing providers	<p>During PPS phase-in period, component of payment based on old provider-specific charge or cost-based payment.</p> <p>Differences in average distance of trips.</p>
Ambulatory Surgical Centers (community based)	Assignment of 2006 APC conversion factor times APC relative weight (with adjustments for modifiers), matched on HCPCS code.	Adjustments for local wage levels, based on hospital wage index (varies by metropolitan areas and non-metropolitan parts of a state)		
Hospital acute inpatient services	Average national payment by DRG, with adjustments for departmental or hospital transfers	<p>Adjustments for local wage rates based on hospital wage index and geographic adjustment factor (GAF)</p> <p>Cost of living adjustments--COLA (AK and HI only)</p>	<p>Critical access hospitals (CAHs) paid on cost-basis. We assign average DRG payment, same as hospitals paid prospectively.</p> <p>Maryland hospitals, which are paid under the state's system and are not part of the PPS system. We assign average DRG payment, same as hospitals paid prospectively.</p>	<p>Disproportionate share hospital (DSH) adjustments</p> <p>Indirect graduate medical education (IME) adjustments</p> <p>Hospital bad debt adjustments</p>

Table 5.1 (continued)

Payment System	Basic Approach	What Is Standardized?		
		Geographic Adjustments	Payment Across Classes of Providers	Provider-Specific Adjustments
Long-term care hospitals	Long-term care (LTC) base rate times LTC-DRG relative weight, by LTC-DRG.	Adjustments for local wage levels, based on hospital wage index		
Inpatient rehabilitation facilities	Assign 2006 mean national payment per case mix group.	Adjustments for local wage levels, based on hospital wage index		DSH
		Added payment to Inpatient Rehabilitation Facilities located in rural areas		IME
Inpatient psychiatric facilities	Assign mean national per diem payment in 2006 for each psychiatric DRG, multiply by Length of Stay and then make adjustment to account for variable per diem adjusters.	Adjustments for local wage levels, based on hospital wage index		Differential payment depending on whether the facility has an emergency department.
		COLA adjusters Rural location adjustments		IME During PPS phase-in period, component of payment based on old provider-specific charge or cost-based payment
Skilled Nursing Facilities	Assign 2006 mean national payment per Resource Utilization Group score.	Adjustments for local wage levels, based on hospital wage index Differential payment levels for urban and rural SNFs	Swing beds in CAHs	
Home Health	Assign 2006 national average cost per Home Health Resource Group for claims based on Home Health Resource Groups. When the number of visits in episode are <5, standardize unit cost based on sum of nationally set per visit amounts associated with type of visit listed in claim, consistent with payment rules.	Adjustments for local wage levels, based on hospital wage index		

Table 5.1 (continued)

Payment System	Basic Approach	What Is Standardized?		
		Geographic Adjustments	Payment Across Classes of Providers	Provider-Specific Adjustments
Hospital outpatient services paid under Outpatient Prospective Payment System (OPPS)	Assign services paid under OPPS their relevant Ambulatory Payment Classification (APC) value (conversion value times APC relative weight). Payment discounts for multiple procedures made.	Adjustments for local wage levels, based on hospital wage index Hold harmless adjustments for cancer, children's, and small rural hospitals	Add on payment for sole rural hospitals Critical access hospitals paid on a cost basis Indian health service facilities paid on a cost basis Maryland hospitals paid under state's payment system	
Hospital outpatient services not covered under OPPS (e.g., therapy services, clinical lab services, ESRD, etc.)	Mean national payment by HCPCS code in 2006 is assigned, adjusted for number of units where applicable.	Adjustments for local wage levels, based on hospital wage index	Differential payments based on type of facility (e.g., hospital based vs. free-standing dialysis facilities)	
Hospice	Average daily payments in 2006 per type of service calculated and assigned to revenue units. These are then aggregated to claim level.	Adjustments for local wage levels, based on hospice wage index		Facilities subject to the inpatient or absolute dollar caps
Durable Medical Equipment	Average national payment by HCPCS code-modifier code combination. Modifiers account for new vs. used equipment, rental vs. purchase.	State-level differences in payment schedules		Reductions in payment if provider charges are below state fee schedule amount

SECTION 6

IDENTIFY MEDICAL PRACTICE GROUPS AND ATTRIBUTE BENEFICIARIES TO MEDICAL PRACTICE GROUPS AND ELIGIBLE PROFESSIONALS

This section describes how we identified MPGs for the 2010 QRURs prepared for group practices, which in turn required attributing beneficiaries to MPGs. Following MPG attribution, this section describes how beneficiaries were attributed to EPs affiliated with the MPGs and to unaffiliated EPs. The attribution algorithms for affiliated and unaffiliated EPs apply only for purposes of calculating resource use measures – per capita costs, subgroup-specific per capita costs, cost of service categories, utilization categories, and ambulatory care sensitive conditions. GEM measures used a different attribution methodology as determined by a separate contractor who calculated the GEM measures under a separate contract with CMS (see Section 13).

6.1 DEFINE MEDICAL PRACTICE GROUPS

For purposes of the 2010 QRURs, a medical practice group was defined as a single provider entity, identified by its tax identification number (TIN), which meets three criteria:

- (1) at least 5,000 Medicare beneficiaries living in one of the 12 CTS sites were retrospectively attributed to the TIN in 2007
- (2) at least one primary care physician and at least one medical specialist or surgeon billed for evaluation and management (E&M) Medicare services in the 2007 Carrier claims file under the TIN
- (3) at least one EP billing Medicare Carrier claims under the TIN in 2007 was identified as practicing in one of the 12 CTS sites

The main advantage of including a multispecialty mix is that the medical practice group is likely to have the specialty composition necessary to provide a broad spectrum of care. The 5,000 beneficiary attribution threshold increases the likelihood that this is a large enough patient pool to generate statistically stable results.

6.1.1. Determine primary TIN (medical practice group) affiliation for EPs

Some EPs bill under more than one TIN, which is the claims identifier used to define a single medical practice group and affiliated EPs practicing within that group. Because the 2010 QRURs measured performance for a single MPG based on all of the beneficiaries treated by affiliated EPs during 2007, EPs were required to be assigned to a single MPG. We defined the EP's primary MPG with which it was affiliated—if the EP billed under more than one TIN—as the TIN under which they billed the most Part B Medicare claims in 2007.

Step 1: Using the 2007 Carrier claims file (including line items for beneficiaries outside CTS sites), identify all unique TINs in the dataset

Step 2: Sort by TIN and performing UPIN (where a UPIN is listed as a performing UPIN on at least one Carrier claim line item)

Step 3: In case the same UPIN is associated with multiple TINs, assign it to the TIN under which it billed the highest number of Carrier claims in 2007; i.e., its primary TIN.

6.1.2. Determine whether at least 5,000 Medicare beneficiaries living in one of the 12 CTS sites were retrospectively attributed to the TIN in 2007

Step 1: Beneficiaries were attributed to a TIN based on E&M line items. Identify all E&M line items for beneficiaries in all 12 CTS sites that include the following Berenson-Eggers Type of Service (BETOS) codes:¹²

M1A - OFFICE VISITS NEW	M3 - EMERGENCY ROOM VISIT
M1B - OFFICE VISITS ESTABLISHED	M4A - HOME VISIT
M2A - HOSPITAL VISIT INITIAL	M4B - NURSING HOME VISIT
M2B - HOSPITAL VISIT SUBSEQUENT	M5D - SPECIALIST OTHER
M2C - HOSPITAL VISIT CRITICAL CARE	M6 - CONSULTATIONS

However, exclude those E&M line items that have one of the above BETOS codes, and that also have one of the following Current Procedural Terminology (CPT)/HCPCS codes:¹³

99381	95117	99394	0500F	99175	99272	0115T
99382	99391	0502F	G0248	99288	99273	0116T
99383	99392	0503F	95115	99263	99274	0117T
99384	99393	99432	G0250	99271	99275	0130T

Step 2: Attribute beneficiaries to TINs using this step-wise plurality-minimum rule:

- i. Find the TIN that billed for the greatest number of E&M line items for the beneficiary during 2007 among all TINs.
- ii. Among the TINs identified in Step (i), find the TIN(s) that billed for at least 30 percent of the annual E&M costs for the beneficiary.
- iii. If no TIN is identified in Step (ii), the beneficiary will not be assigned to a TIN.

¹²The Berenson-Eggers Type of Service (BETOS) coding system was developed for CMS primarily for analyzing the growth in Medicare expenditures. The coding system covers all HCPCS codes; assigns a HCPCS code to only one BETOS code; consists of readily understood clinical categories (as opposed to statistical or financial categories); consists of categories that permit objective assignment; is stable over time; and is relatively immune to minor changes in technology or practice patterns. Codes were obtained from https://www.cms.gov/HCPCSReleaseCodeSets/20_BETOS.asp; a complete listing of 2007 BETOS codes are shown in Appendix E.

¹³ These codes include ones that, while indicate face-to-face patient encounters in most cases, do not indicate that the performing physician had ongoing responsibility for the patient’s outcomes of care. They include billing codes for preventive medicine evaluations, visits for allergy injections, prenatal care visits, codes for pharmacists to bill third-party payers for medication therapy management services, codes for directing the transporting staff from a hospital/facility using two-way communication, demonstration of use of medical technologies, and several discontinued codes.

- iv. If more than one TIN is identified in Step (ii), assign the beneficiary to the TIN that billed for the greatest 2007 total annual (standardized unit) costs i.e. costs for all (not just E&M) line items for the beneficiary.
- v. If more than one TIN is identified in Step (iv), use a random number to attribute the beneficiary to a single TIN out of all TINs identified in Step (iv).

Step 3: For each TIN with assigned beneficiaries (from step v. above), count the number of beneficiaries assigned to the TIN.

Step 4: Mark a TIN as being potentially eligible to be an MPG if the count of assigned beneficiaries is at least 5,000 for that TIN.

6.1.3. Determine whether at least one primary care physician and at least one medical specialist or surgeon billed for E&M Medicare services in the 2007 Carrier claims file under the TIN

Step 1: Use the EP's maximum medical specialty defined in Section 4 above to separately identify physician and non-physician UPINs. Define an EP as a physician if their maximum medical specialty variable suggests that the UPIN is for a physician rather than a nurse practitioner, physician assistant or other allied health professional.

Step 2: For each performing UPIN identified as a physician, designate the EP as a Primary Care Physician (PCP), Medical Specialist (MS), or Surgeon (SRG) as follows:¹⁴

PCP = 1 if HCFA_SPECIALTY is equal to 01, 08, 11, 37, 38, 70, or 84

MS = 1 if HCFA_SPECIALTY is equal to 03, 06, 07, 10, 12, 13, 18, 25, 26, 29, 32, 36, 39, 44, 46, 66, 79, 81, 82, 83, 86, 90, 92, 93, or 99

SRG = 1 if HCFA_SPECIALTY is equal to 02, 04, 14, 16, 20, 24, 28, 33, 34, 40, 76, 77, 78, 85, 91, or 98

Step 3: For each eligible TIN from 6.1.2., check whether at least one PCP and at least one MS or SRG billed Medicare Part B claims under the TIN in 2007.

6.1.4. Determine whether at least one EP billing Medicare Carrier claims under the TIN in 2007 was identified as practicing in one of the 12 CTS sites

Step 1: Keep TINs for which at least one performing UPIN is in one of the 12 CTS sites based on the EP's maximum ZIP Code defined in Section 2.4 above.

6.1.5. Define a TIN as an MPG.

If a TIN satisfies 6.1.1, 6.1.2, and 6.1.3, set a flag defining the TIN as an MPG and generate a unique identifier for the MPG.

¹⁴ A list of all current HCFA specialty codes is included in Appendix B.

6.2 DETERMINE WHICH EPs ARE ELIGIBLE FOR PATIENT ATTRIBUTION

Not all EPs were defined as eligible for patient attribution for the 2010 QRURs. Only performing UPINs with the following designations were eligible for attribution of patients for the per capita and subgroup-specific per capita cost measures:

- i. A HCFA medical specialty code is included in one of the Physician Stratification Category Codes not equal to “Other” above
- ii. UPIN does NOT start with W, X, Y, Z (Group UPIN codes)
- iii. UPIN starts with a letter and the numeric component of the UPIN has at least 5 digits
- iv. UPIN did NOT “touch” more than 900 beneficiaries in 2007: defined as a UPIN listed as the performing UPIN on a Carrier claim (NOT line item) for 900 or more unique beneficiaries in the 2007 Carrier claims file. (Presumed to be a group UPIN.)
- v. One of the steps in determining an EP name for a QRUR report required assigning an NPI to a UPIN based on the CMS PECOS database. However, within the database, several NPIs were assigned to two UPINs each. Based on a manual search of each UPIN/NPI combination, we retained one of the combinations and designated the other as ineligible for attribution. We did not systematize this task; it is considered a one-off, contained in its own well-documented stand-alone program.

If EP failed any of these five criteria in 2007, the EP was NOT eligible for beneficiary/patient attribution for 2007 per capita measures (some EPs might have been attributed GEM measures, though, which was done through a different process and CMS contractor (see Section 13)).

6.3 DEFINE AFFILIATED EPs AND ATTRIBUTE MPG-BENEFICIARIES TO AFFILIATED EPs

Beneficiaries attributed to an MPG were in turn attributed to affiliated EPs using the following step-wise plurality-minimum attribution rule:

Step 1: For each performing UPIN billing under an MPG as defined in 6.1, set a flag defining the EP as affiliated with the particular MPG, whether or not the UPIN is in a CTS site.

Step 2: Find the attribution-eligible EP/UPIN affiliated with the MPG who billed for the greatest number of E&M line items billed by all attribution-eligible EPs/UPINs for a given beneficiary during 2007, among all attribution-eligible EPs/UPINs affiliated with the MPG.

Step 3: Among UPINs identified in Step 2, find UPIN(s) who billed for at least 20 percent of the annual E&M costs for the beneficiary. (Note: Calculation of annual E&M costs for the beneficiary will include all UPIN E&M line items, not just line items for attribution-eligible UPINs).

Step 4: If no UPIN is identified in Step 3, the beneficiary will remain unassigned to an affiliated EP. If a single UPIN is identified in Step 3, the beneficiary is assigned to that EP/UPIN.

Step 5: If more than one UPIN is identified in Step 3, find the UPIN who billed for the greatest total annual costs, i.e., costs for all line items (including non-E&M line items and line items for attribution-ineligible UPINs) for the beneficiary. The beneficiary is assigned to that EP/UPIN.

6.4 DEFINE UNAFFILIATED EPs AND ATTRIBUTE NON-MPG-BENEFICIARIES TO UNAFFILIATED EPs

Beneficiaries who were not attributed to an MPG were attributed to unaffiliated EPs using the following step-wise plurality-minimum attribution rule:

Step 1: For performing UPINs not associated with an MPG, set a flag defining the EP as unaffiliated.

Step 2: Find the attribution-eligible unaffiliated EP/UPIN who billed for the greatest number of E&M line items billed by all attribution-eligible EPs/UPINs for a given beneficiary during 2007, among all attribution-eligible unaffiliated EPs/UPINs.

Step 3: Among UPINs identified in Step 2, find the UPIN(s) who billed for at least 20 percent of the annual E&M costs for the beneficiary. (Note: Calculation of annual E&M costs for the beneficiary will include all UPIN E&M line items, not just line items for attribution-eligible UPINs).

Step 4: If no UPIN is identified in Step 3, the beneficiary will remain unassigned to an unaffiliated EP (note that such beneficiaries are not assigned to an MPG, an affiliated EP, or an unaffiliated EP). If a single UPIN is identified in Step 3, the beneficiary is assigned to that EP/UPIN.

Step 5: If more than one UPIN is identified in Step 3, find the UPIN who billed for the greatest total annual costs, i.e., costs for all line items (including non-E&M line items and line items for attribution-ineligible UPINs) for the beneficiary. The beneficiary is assigned to that EP/UPIN.

SECTION 7

CALCULATE NON-RISK ADJUSTED PER CAPITA COST MEASURES

The 2007 per capita cost measure includes all beneficiaries who were enrolled in both Parts A and B of original FFS Medicare for any part of the calendar year 2007. Costs for part-year beneficiaries (for example, those who became eligible for Medicare during the year, were enrolled in a Medicare Advantage program for part of the year, or who died) for the part of the year observed in the claims data are annualized and summed with costs observed for full-year beneficiaries. However, costs are then weighted by the portion of the year that each beneficiary was enrolled in both Parts A and B FFS Medicare. This weighting is done so that attributed beneficiaries with less than a full year's worth of FFS claims data do not contribute as much to the MPG's or EP's per capita costs as do beneficiaries with a full year of claims data.

Per capita cost measures were calculated using 2007 Medicare Part A (Hospital Insurance) and Part B (Medical Insurance) claims for all FFS Medicare beneficiaries residing in the 12 CTS sites in 2007. Part D (Outpatient Prescription Drug) claims were not included in the 2007 cost measure calculations because not all beneficiaries have Medicare Part D and some who do not have it instead may have creditable prescription drug coverage through other insurance sources or the retiree subsidy, for which Medicare does not have claims data. While CMS realizes that excluding outpatient prescription drug claims from resource use measures is not ideal, CMS is working on how to resolve this issue for future reports.

Medicare costs were obtained from 2007 administrative claims data using inpatient, outpatient, skilled nursing facility, home health, hospice, durable medical equipment, and Medicare Carrier (non-institutional provider) claims. To the extent that Medicare claims include such information, costs are comprised of payments to providers from Medicare, from beneficiaries (copayments and deductibles), and from third-party private payers.

7.1 CALCULATE 2007 BENEFICIARY PRICE-STANDARDIZED TOTAL COSTS

Sum over beneficiaries' 2007 standardized payment variables, respectively, across all seven Medicare claims types to create calendar year 2007 annual beneficiary price-standardized costs. For part-year beneficiaries, only sum standardized payments over the months they were in both Parts A and B FFS Medicare in 2007. For full-year beneficiaries, sum standardized payments over all 12 months of 2007.

7.2 CALCULATE 2007 MPG OR EP PRICE-STANDARDIZED PER CAPITA COSTS

Calculate MPG or EP 2007 price-standardized but non-risk-adjusted per capita costs based on all beneficiaries assigned to a given MPG or EP as follows:

Step 1: For a given MPG or EP, sum 2007 price-standardized costs of all attributed beneficiaries for the periods of time they were in both Parts A and B FFS Medicare in 2007; this is the numerator of the per capita cost measure.

Step 2: For a given MPG or EP, sum the 2007 weights of all attributed beneficiaries; this is the denominator of the per capita cost measure (for example, an EP is attributed ten 2007

full-year and two 2007 part-year beneficiaries with weights of 5/12 and 4/12 for the two part-year beneficiaries; the denominator would equal 10.75)

Step 3: Divide the numerator of the per capita cost measure by the denominator of the per capita cost measure = MPG's or EP's price-standardized per capita cost measure

SECTION 8

CALCULATE SUBGROUP-SPECIFIC NON-RISK ADJUSTED PER CAPITA COST MEASURES

Subgroup-specific per capita cost measures were calculated for Medicare FFS beneficiaries residing in one of the 12 CTS sites in 2006 and 2007 who were diagnosed as having one or more of the following chronic conditions in 2007: chronic obstructive pulmonary disease, coronary artery disease, diabetes, prostate cancer, or congestive heart failure. The data for identifying beneficiaries with one of these conditions in 2007 is described in Section 1.4 above.

The subgroups are not mutually exclusive, which means that a beneficiary's costs may be included in the per capita costs for more than one condition subgroup. The subgroup per capita cost calculation represents the average price-standardized and risk-adjusted costs of treating Medicare beneficiaries who have a specific condition. However, it does not reflect the average cost of treating the condition itself, because all Medicare costs for each beneficiary are included in the total (not just costs related to treatment for the chronic condition of interest).

8.1 IDENTIFY SUBGROUPS BASED ON CCW FLAGS

The 2007 CCW flags were extracted from the CCW Chronic Condition Summary File for all beneficiaries residing in a CTS site in 2006. The Chronic Condition Summary File contains summarized clinical information for all beneficiaries. The Chronic Condition Summary File is constructed each year, based on the specified reference period for each condition.

There are three chronic condition (CC) variables for each CCW indicator, with values that signify whether the pattern of utilization (i.e., FFS claims) indicated the presence of the condition for the beneficiary during the surveillance period ending with the last month of the reference period (e.g., December 2005 for the yearly indicators in the 2005 CC Summary File). It is important to note that claims prior to the reference year (e.g., 2005) may have been examined to make this determination, if the CCW definition was a 2- or 3- year condition (e.g., diabetes, congestive heart failure, Alzheimer's). We used the yearly indicator for each CCW indicator, which indicates whether the chronic condition definition was met during the respective time period ending December 31, 2007.

The yearly CCW indicator has four indicator values:

- 0: Neither claims nor coverage met
- 1: Claims met, coverage not met
- 2: Claims not met, coverage met
- 3: Claims and coverage met

An indicator value of "3" means that the pattern of utilization indicates the beneficiary was being treated for the condition, and the beneficiary had Medicare Part A and B FFS coverage – and no Medicare Advantage coverage for the entire reference period – for the entire reference period or until death (i.e., the reference period can be anywhere from 1 to 3 years, depending on the condition of interest). The value of "1" means that the pattern of claims indicates the beneficiary is being treated for the condition – however, the beneficiary was not covered for the

full reference period. This limited reference period could be due to new enrollment into the Medicare program (i.e., beneficiaries who became newly eligible), a break in Part A or Part B entitlement, or one or more months of Medicare Advantage coverage during the reference period. The other two potential values in this field (2 or 0) indicate absence of the condition during the reference period. The twos [2's] had Medicare Part A and Part B FFS coverage throughout the full reference period, the zeroes [0's] did not. In both cases, there were no claims to indicate current treatment for the particular condition. For the 2010 QRURs, beneficiaries with a value of 1 or 3 for the 2007 CCW flag were identified as having the particular chronic condition.

Based on CMS' conditions of interest, we used the following flags from the CCW database:

- CHF – Congestive Heart Failure End Year Flag
- COPD – Congestive Obstructive Pulmonary Disease End Year Flag
- DIAB – Diabetes End Year Flag
- IHD – Ischemic Heart Disease End Year Flag
- PRC – Prostate Cancer End Year Flag

8.2 CALCULATE 2007 MPG OR EP SUBGROUP-SPECIFIC PRICE-STANDARDIZED PER CAPITA COSTS

Calculate MPG or EP 2007 price-standardized, but non-risk-adjusted, per capita costs for each subgroup of attributed beneficiaries with a given chronic condition as follows:

Step 1: For a given MPG or EP, sum 2007 price-standardized costs of all attributed beneficiaries with the chronic condition (CCW flag = 1 or 3) for the periods of time they were in both Parts A and B FFS Medicare in 2007; this is the numerator of the subgroup-specific per capita cost measure

Step 2: For a given MPG or EP, sum the 2007 weights of all attributed beneficiaries with the chronic condition; this is the denominator of the subgroup-specific per capita cost measure (for example, an EP is attributed ten 2007 full-year and two 2007 part-year beneficiaries with weights of 5/12 and 4/12 for the two part-year beneficiaries; the denominator would equal 10.75)

Step 3: Divide the numerator of the subgroup-specific per capita cost measure by the denominator of the subgroup-specific per capita cost measure = MPG's or EP's price-standardized subgroup-specific per capita cost measure

SECTION 9

RISK ADJUST COSTS FOR OVERALL AND SUBGROUP-SPECIFIC PER CAPITA COST MEASURES

Clinical (case-mix) differences among patients can affect their medical costs, regardless of the care provided. For peer comparisons, an MPG's or EP's per capita costs and subgroup per capita costs (see Section 8) were risk adjusted based on the unique mix of patients the group or EP treated during a given time period.

For the 2010 QRURs, we used the Hierarchical Condition Categories (HCC) model developed for CMS that assigns ICD-9 diagnosis codes (each with similar disease characteristics and costs) to 70 clinical conditions.¹⁵ For each Medicare beneficiary enrolled in Medicare fee-for-service for all of 2006, the HCC model generates a 2006 risk score based on the presence of these conditions in 2006—and on sex, age, original reason for Medicare entitlement (either age or disability), and Medicaid entitlement—as predictors of costs in 2007 based on beneficiary morbidity. This is called the Community HCC score. Scores for beneficiaries enrolled in Medicare fee-for-service for only part of 2006 are based only on sex, age, original reason for Medicare entitlement (either age or disability), and Medicaid entitlement status. This is called the New Enrollee HCC score. Risk adjustment of 2007 costs also takes into account 2006 ESRD status (presence of end-stage renal disease) for both full-year and part-year beneficiaries.

CMS calculated and provided the Community and New Enrollee HCC scores that were used for risk adjusting 2007 per capita costs for the 2010 QRURs. The ESRD indicator was obtained from the 2006 Denominator File. Chronic condition flags for 2007 were obtained from the CCW Database as described in Section 8. Full-year and part-year beneficiary weights calculated in Section 3 were applied to the model.

A statistical risk adjustment model estimates the independent effects of risk scores on absolute beneficiary price-standardized total costs for 2007 and adjusts these costs for each beneficiary prior to calculating per capita risk-adjusted price-standardized cost measures for an MPG or EP. To ensure that extreme outlier costs do not have a disproportionate effect on the cost distributions, costs below the 1st percentile are eliminated from the cost calculations, and costs above the 99th percentile are rounded down to the 99th percentile.

¹⁵ The HCC model uses diagnoses identified for a patient within a given year to predict health risks for the following years along with potential resource utilization. HCC consists of cost groups, or diagnoses, that are grouped into the 70 HCCs. These are groups of similar diagnoses that CMS has deemed risk factors for patients. Each HCC has a specific weight and specific reimbursement tied to it from which a Medicare Advantage Contractor is paid. Medicare Advantage plans receive a base payment for each of its enrollees, or patients, and then in addition to that base payment can receive additional reimbursement based upon the HCCs identified for that enrollee within a given year. A patient may have multiple HCCs identified during one patient encounter. However, the same HCC is not reimbursed twice (or however many times a patient may be seen within the year) with the same diagnosis or set of related diagnoses that fall into that HCC.

9.1 ESTIMATE RISK ADJUSTMENT MODEL

9.1.1. Drop beneficiaries from model

Beneficiaries who did not have a 2006 Community or New Enrollee HCC score provided by CMS were dropped from the model.

9.1.2. Winsorize costs

Step 1: Identify the top 1.0% and bottom 1.0% of the distribution of 2007 beneficiary price-standardized total costs.

Step 2: For beneficiaries with costs in the top 1 percentile of the distribution, change their cost to the 99th percentile cost.

Step 3: Drop beneficiaries from the model whose costs are in the bottom 1 percentile of the cost distribution.

Step 4: For each subgroup condition, perform the same Winsorization, using only records for patients with the relevant condition.

9.1.3. Calculate predicted costs from the risk adjustment model

Estimate the following weighted model for overall 2007 beneficiary price-standardized Winsorized total costs, and separately for each subgroup condition:

$$\begin{aligned} \text{WINSORIZED_COST} = & a + b1 * \text{COMMUNITY_HCC_SCORE} + \\ & b2 * \text{COMMUNITY_HCC_SCORE_SQUARED} + \\ & b3 * \text{NEW_ENROLLEE_HCC_SCORE} + \\ & b4 * \text{NEW_ENROLLEE_HCC_SCORE_SQUARED} + \\ & b5 * \text{ESRD_FLAG} + \text{Error term} \end{aligned}$$

where a is the constant and b1 through b5 are the estimated regression coefficients for their respective variables.

9.2 CALCULATE RISK ADJUSTED PER CAPITA COSTS

Step 1: Save the predicted costs and residuals from the regressions in 8.3.3

Step 2: Calculate the overall weighted mean cost for all beneficiaries used in the model, and by subgroup condition

Step 3: Output residual, predicted, and actual costs by beneficiary, and aggregate mean costs, overall and by subgroup condition

Step 4: Adjusted per capita cost for the MPG or EP = aggregate mean cost * (mean actual cost for the MPG's or EP's attributed patients / mean predicted cost for the MPG's or EP's attributed patients), overall and by subgroup condition

Step 5: Perform Step 4 calculation for all of an MPG's or EP's attributed patients, and for the MPG's or EP's attributed patients with a specified chronic condition for each subgroup condition

SECTION 10

CALCULATE COST OF SERVICE CATEGORIES FOR PER CAPITA COST MEASURES

The goal of separating per capita costs into cost of service (COS) categories is to provide EPs and MPGs with details on how their costs of delivering specific health care services compare with their peers. However, it is important to note that different categories of service can be complements or substitutes so that being high in one and low in another category may or may not be desirable; the intent of the COS category comparisons is to provide information on broad areas where providers *may* be able to improve the efficiency of care provided. This section describes how COS categories were calculated and COS costs risk adjusted. It also describes the calculations for the percentage of an EP's or MPG's attributed patients provided services in each COS category in 2007. Finally, this section describes calculation of the number of Medicare patients that EPs and MPGs treated in 2007, and the mean number of other EPs who treated their attributed patients in 2007.

CMS chose COS categories that: (1) are feasible given the structure of Medicare claims, and (2) capture distinct types of services that EPs or MPGs may be able to influence, either directly through their own practice patterns (for instance, E&M services) or indirectly through referral patterns or improved outpatient care (which can prevent certain types of hospitalizations). The EP and MPG QRURs have the same cost of service breakouts, except that the MPG reports further break out the E&M and procedure costs by type of EP (for example, PCP or medical specialist). Tables 11.2 and 11.3 at the end of this section display specific COS categories for the EP and MPG 2010 QRURs, respectively.

10.1. SEPARATE EACH BENEFICIARY'S ANNUAL 2007 TOTAL COSTS INTO CATEGORIES RELEVANT FOR EP QRURs

Step 1: Obtain 2007 Medicare claims and categorize them into one (and only one) service category. Obtain all 2007 Medicare claims (from the 7 claim types)¹⁶ for beneficiaries who lived in one of the 12 CTS sites in 2006 and 2007 and were attributed to an affiliated or unaffiliated EP. Each claim (or line item of a claim) has a BETOS¹⁷ code that classifies the health service listed on the claim into a broad, clinically-relevant category. We assigned each claim or line item of a claim an indicator of type of service based on the BETOS code. Table 10.1 below provides the key linking each BETOS code to a type of service. Any service that did not fit into one of the categories listed in one of the categories was assigned to the "Other" category. Some claims have BETOS categories that would make them E&M or procedure costs, but are provided by non-medical professionals, such as ambulance drivers. We excluded such claims (i.e., with a medical specialty code indicating that the performing EP is not a medical professional) from the E&M and procedure categories. These excluded costs are instead included in the "Other" COS category.

¹⁶ Five of the seven claim types are from institutional files and have claim-level records: (1) inpatient hospital, (2) skilled nursing facility, (3) outpatient, (4) home health agencies, and (5) hospice. The other two claim types are from non-institutional files and have line-item-level records: (6) Carrier and (7) Durable Medical Equipment.

¹⁷ Section 6.1.2 provides information on BETOS codes. Appendix E provides a full list of 2007 BETOS codes.

TABLE 10.1: COST OF SERVICE CATEGORY DEFINITIONS

Category		Claim type(s) ^a	Claim (or line) item falls into this category if it meets the following criteria	
			Criteria 1	Criteria 2
1	E&M services	Carrier (-Ambulatory Surgery Center [ASC] costs)	BETOS in (all M1-M6)	AND HCFA_Specialty code NOT in (45, 47, 49, 51-54, 59-61, 69, 75, 87,88, 95, and any specialty code beginning with A or B)
2	Procedures	Carrier(- ASC costs)	BETOS in (All P1-P9)	
3	Inpatient hospital facility	Inpatient	All <i>short-stay*</i> inpatient claims	
4	Outpatient and ER services: total	Outpatient + ASC costs from carrier	BETOS in (M1-M6, P1-P9, T1, T2, I1-I4)	
4a	Outpatient/ER: Clinic or emergency visits	Outpatient + ASC costs from carrier	BETOS in (all M1-M6)	
4b	Outpatient/ER: Procedures	Outpatient + ASC costs from carrier	BETOS in (all P1-P9)	
4c	Outpatient/ER: Laboratory tests	Outpatient + ASC costs from carrier	BETOS in (all T1, T2)	
4d	Outpatient/ER: Imaging services	Outpatient + ASC costs from carrier	BETOS in (all I1- I4)	
5a	Ancillary services: Lab tests (independent)	Carrier	BETOS in (all T1, T2)	
5b	Ancillary services: Imaging services	Carrier	BETOS in (all I1-I4)	
	Ancillary services: durable medical equipment	DME	All DME claims	Not applicable
6a	Post-acute services: Skilled nursing facilities	SNF	All SNF claims	
6b	Post-acute services: Psychiatric or rehab facility	Inpatient	Psychiatric and rehabilitation payments**	
6c	Post-acute services: Hospice	5c	All Hospice claims	
6d	Post-acute services: Home health	Home health	All home health claims	

Step 2: Calculate total costs in 2007 for each COS category for each beneficiary. For each beneficiary, sum the costs in each COS category for claims incurred in 2007.

Step 3: Separate E&M and procedure costs into those provided by the attributed EP vs. services for beneficiaries attributed to the EP but provided to the beneficiaries by other (non-attributed) EPs. Claims (or line items) that have the same performing UPIN as the attributed EP are linked to the EP; claims (or line) items with a different performing UPIN are designated as being provided by another EP. We separated each patient's total E&M and provider costs for the year into those provided by the EP to which the patient was attributed and those provided by other EPs to which the patient was not attributed.

10.2 SEPARATE EACH BENEFICIARY'S ANNUAL 2007 TOTAL COSTS INTO CATEGORIES RELEVANT FOR MPG QRURs

This process is the same as that described in section 10.1 except for the following:

- (1) The set of beneficiaries is limited to those attributed to an MPG
- (2) Step 3 in 10.1 was skipped because the E&M and procedure costs for MPG QRURs are not broken out by those provided by the attributed EP vs. other EPs
- (3) The E&M and procedure costs are broken out by the type of EP who performed the services; the types of EPs, defined by Physician Stratification Category (see Section 4.2), are: primary care physicians, medical specialists, surgeons, emergency room physicians, and others.

10.3 RISK ADJUST COS COSTS

COS categories derived from 10.2 were risk adjusted as follows, using the results from the risk adjustment model described in Section 9: aggregate mean cost * (mean actual COS cost for the MPG's or EP's attributed patients / mean predicted cost for the MPG's or EP's attributed patients).

10.4 DETERMINE THE PERCENTAGE OF AN EP'S OR MPG'S PATIENTS WHO USED A SELECTED COS SERVICE

Step 1: Determine whether each beneficiary used a particular COS service in 2007. Create an indicator for whether a beneficiary used a particular service in 2007 among the COS categories listed in Table 10.2 (for EPs) or Table 10.3 (MPGs). (These tables duplicate those in the 2010 QRURs, using illustrative data). The indicator = 1 if the beneficiary had positive costs for that COS category in 2007; the indicator = 0 otherwise.

Step 2: Drop beneficiaries who are not in the final cost calculations. For all COS categories, limit calculations to beneficiaries who are included in the per capita cost measure calculations. The per capita cost risk-adjustment process (see Section 9) drops beneficiaries who: (1) do not have a 2007 HCC score, or (2) are in the lowest 1 percentile of beneficiary costs in 2007. This step drops those beneficiaries from the dataset as well.

Step 3: Calculate the percentage of beneficiaries attributed to a particular EP or MPG who used each type of COS service in 2007:

- (1) Construct a weight for each beneficiary and each COS category. If the beneficiary had a positive expenditure in 2007 in the COS category, the beneficiary's COS category weight is 1. If the beneficiary had no expenditures in 2007 in the COS category, the beneficiary is assigned a weight equal to their full-year or part-year weight (see Section 3). The purpose of using the weights—rather than simply calculating the percentage of patients attributed to an EP or MPG who used a COS service in 2007—is to account for the fact that part-year beneficiaries are observed for a shorter period of time and therefore have a lower likelihood of using a service in the year (even if that person had the same underlying service use pattern as someone who was observed for the full year).
- (2) Calculate the percentage of an EP's or MPG's attributed patients who used a particular service in the year as: the weighted annualize sum of the given COS costs for attributed beneficiaries divided by the sum of weights of attributed beneficiaries.

10.5 ADDITIONAL EP-LEVEL SUMMARY STATISTICS

The following statistics were calculated for all Medicare beneficiaries attributed to an EP (see Table 10.2):

- (1) Number of beneficiaries attributed to the EP in 2007. A part-year beneficiary was counted as a full-year beneficiary for this statistic. That is, if an EP treated 5 part-year beneficiaries and 4 full-year beneficiaries in 2007, then the count would be 9.
- (2) Average number of other EPs in all health care settings who treated the QRUR EP's attributed patients in 2007, calculated as follows. Using claims data, we counted the total number of unique EPs who treated a particular beneficiary in 2007 (limited to HCFA medical specialty codes as indicated in Column 4 of Appendix Table B). We subtracted 1 from this count to get the number of other EPs who treated that beneficiary in 2007. We then took the average number of EPs across all of the beneficiaries attributed to the QRUR EP in 2007. A part-year beneficiary was counted as a full-year beneficiary for this statistic.

10.6 ADDITIONAL MPG-LEVEL SUMMARY STATISTICS

The following statistics were calculated for all Medicare beneficiaries attributed to an MPG (see Table 10.3):

- (1) Number of beneficiaries attributed to the MPG in 2007. A part-year beneficiary was counted as a full-year beneficiary for this statistic. That is, if an MPG treated 5 part-year beneficiaries and 4 full-year beneficiaries in 2007, then the count would be 9.

- (2) Average number of EPs in all health care settings who treated the MPG's attributed beneficiaries in 2007, calculated as follows. Using claims data, we counted the total number of unique EPs who treated a particular beneficiary in 2007 (limited to HCFA medical specialty codes as indicated in Column 4 of Appendix Table B). We then took the average number of EPs across all of the beneficiaries attributed to the MPG in 2007. A part-year beneficiary was counted as a full-year beneficiary for this statistic.
- (3) Percentage of the EPs from (2) above (that is, treated the MPG's attributed beneficiaries in 2007) who were affiliated with the MPG.

**Table 10.2: Your Medicare Patients' Per Capita Costs for Specific Services
Compared to Mean Among Medical Professionals in Your Specialty
in the Indianapolis Metropolitan Area, 2007**

A. Service Category	B. Your Medicare Patients Using Any Service in This Category		C. Per Capita Costs* for Your Medicare Patients	D. Mean Per Capita Costs* for Medical Professionals in Your Specialty in Indianapolis (n=134)	E. Amount by Which Your Per Capita Costs are Higher or (Lower) than Mean Costs for Medical Professionals in Your Specialty in Indianapolis
	Number	Percent			
TOTAL	240	100%	\$14,034	\$15,137	(\$1,103)
<i>Average number of professionals in all care settings other than you who treated each patient = 3</i>					
Evaluation and Management Services in All Settings					
Provided by YOU for your patients	100%		\$1,796	\$1,038	\$758
Provided by OTHER professionals treating your patients	89%		\$1,923	\$2,203	(\$280)
Procedures in All Settings					
Provided by YOU for your patients	24%		\$168	\$211	(\$43)
Provided by OTHER professionals treating your patients	41%		\$84	\$70	\$14
Hospital Services					
Inpatient Hospital Facility Services	44%		\$1,768	\$2,847	(\$1,079)
Outpatient and Emergency Services	30%		\$2,344	\$2,930	(\$586)
Clinic or Emergency Visits	24%		\$1,206	\$1,156	
Procedures	22%		\$538	\$1,002	
Laboratory Tests	30%		\$296	\$242	
Imaging Services	26%		\$304	\$530	
Services in Ambulatory Settings					
All Ancillary Services	80%		\$2,779	\$2,526	\$253
Laboratory Tests	80%		\$1,000	\$641	
Imaging Services	69%		\$766	\$889	
Durable Medical Equipment	18%		\$1,013	\$996	
Post-Acute Care					
All Post-Acute Services	20%		\$814	\$1,357	(\$543)
Skilled Nursing Facility	12%		\$331	\$548	
Psychiatric or Rehab Facility	5%		\$268	\$402	
Hospice	5%		\$78	\$218	
Home Health	16%		\$137	\$189	
Other Services					
All Other Services**	100%		\$2,358	\$1,955	\$403

* In calculating service-specific per capita costs, the numerator is the total costs for a category of service used by attributed patients; the denominator is the total number of Medicare patients attributed to a medical professional, not just those who used the service. The sum of component costs may not be exactly equal to total costs due to rounding. Cost breakdowns are provided only for medical professionals attributed at least 30 beneficiaries for the per capita cost measure.

**All Other Services include services not captured in other service categories, such as anesthesia, ambulance services, chemotherapy, other Part B drugs, orthotics, chiropractic, enteral and parenteral nutrition, vision services, hearing and speech services, and influenza immunizations.

Table 10.3: Your Group's Medicare Patients' Per Capita Costs* for Specific Services Compared to Mean Among Medical Practice Groups in 12 Metropolitan Areas, 2007

A. Service Category	B. Medicare Patients in ABC Healthcare Associates Using Any Service in This Category		C. Per Capita Costs for Medicare Patients in ABC Healthcare Associates (n=5,653)	D. Mean Per Capita Costs for Medical Practice Groups in 12 Metro Areas (n=284)	E. Amount by Which Your Group's Costs are Higher or (Lower) than Mean in 12 Metro Areas
	Number	Percent			
TOTAL	5,653	100%	\$20,123	\$17,323	<u>\$2,800</u>
<i>Average number of professionals in all care settings who treated each patient = 15</i>					
<i>Percent of professionals treating your patients who were part of your medical practice group = 50%</i>					
Evaluation & Management Services in All Settings					
All Professional Evaluation & Management Services	100%		\$5,332	\$3,137	<u>\$2,195</u>
Primary Care Physicians	100%		\$1,847	\$859	
Medical Specialists	65%		\$2,100	\$1,288	
Surgeons	40%		\$885	\$743	
Emergency Department Physicians	22%		\$500	\$247	
Other Professionals**	%		\$	\$	
Procedures in All Settings					
All Procedures	65%		\$362	\$453	(\$91)
Primary Care Physicians	42%		\$181	\$146	
Medical Specialists	38%		\$95	\$162	
Surgeons	56%		\$54	\$74	
Emergency Department Physicians	18%		\$32	\$71	
Other Professionals**	%				
Hospital Services					
Inpatient Hospital Facility Services	44%		\$2,535	\$1,207	<u>\$1,328</u>
Outpatient and Emergency Services	30%		\$3,361	\$2,136	<u>\$1,225</u>
Clinic or Emergency Visits	24%		\$1,052	\$910	
Procedures	22%		\$989	\$526	
Laboratory Tests	30%		\$704	\$421	
Imaging Services	26%		\$616	\$279	
Services in Ambulatory Settings					
All Ancillary Services	80%		\$3,984	\$3,622	<u>\$362</u>
Laboratory Tests	80%		\$1,851	\$1,441	
Imaging Services	69%		\$1,339	\$1,435	
Durable Medical Equipment	18%		\$794	\$746	
Post-Acute Care					
All Post-Acute Services	20%		\$1,167	\$1,945	(\$778)
Skilled Nursing Facility	12%		\$502	\$884	
Psychiatric or Rehab Facility	5%		\$317	\$501	
Hospice	5%		\$236	\$363	
Home Health	16%		\$112	\$197	
Other Services					
All Other Services***	100%		\$3,381	\$4,823	(\$1,442)

*In calculating service-specific per capita costs, the numerator is the total costs for a category of service used by attributed patients; the denominator is the total number of Medicare patients attributed to a medical practice group, not just those who used the service. The sum of component costs may not be exactly equal to total costs due to rounding. Cost breakdowns are provided only for medical practice groups attributed at least 30 beneficiaries for the per capita cost measure.

**Other Professionals include, for example, physician assistants, nurse practitioners, clinical nurse specialists, certified nurse anesthetists, clinical social workers, clinical psychologists, dietitians, audiologists, physical therapists, and speech therapists.

*** Includes services not captured in other categories, such as anesthesia, ambulance services, chemotherapy, other Part B drugs, orthotics, chiropractic, enteral and parenteral nutrition, vision services, hearing and speech services, and influenza immunizations.

SECTION 11

CALCULATE UTILIZATION STATISTICS FOR SUBGROUP-SPECIFIC PER CAPITA COST MEASURES

To provide more detail on the subgroup-specific per capita costs for the selected five chronic conditions displayed in the QRURs (chronic obstructive pulmonary disease, coronary artery disease, diabetes, prostate cancer, and congestive heart failure), utilization statistics were provided for each measure as follows:

- (1) The number of beneficiaries attributed to the MPG or EP who had the chronic condition in 2007
- (2) The average number of inpatient hospital admissions (including readmissions) per attributed beneficiary with the chronic condition in 2007 (whether or not hospital admissions were for that chronic condition)

Hospitalizations for part-year beneficiaries with the chronic condition for the part of 2007 the beneficiary was enrolled in both Parts A and B FFS Medicare are summed with 2007 hospitalizations for full-year beneficiaries with the same condition. This sum is then divided by the sum of weights for attributed beneficiaries, where the weight for each beneficiary is equal to the portion of 2007 that the beneficiary was alive and enrolled in both Parts A and B of FFS Medicare.

- (3) The average number of hospital emergency department (ED) visits (that did not lead to an inpatient admission) per attributed beneficiary with the chronic condition in 2007 (whether or not ED visits were related to that chronic condition).

Hospital ED visits for part-year beneficiaries with the chronic condition for the part of 2007 the beneficiary was enrolled in both Parts A and B of FFS Medicare are summed with 2007 hospital ED visits for full-year beneficiaries with the same condition. This sum is then divided by the sum of weights for attributed beneficiaries, where the weight for each beneficiary is equal to the portion of 2007 that the beneficiary was alive and enrolled in both Parts A and B of FFS Medicare.

Hospital utilization statistics include all inpatient admissions and ED visits incurred by beneficiaries with a given chronic condition, whether or not such utilization was directly related to the specific condition of interest.

11.1 CALCULATE NUMBER OF BENEFICIARIES WITH CHRONIC CONDITION

Count the number of beneficiaries attributed to the MPG or EP with a given CCW flag (chronic condition) as defined in Section 8. Both full-year and part-year beneficiaries count as a “full-year” beneficiary for this statistic.

11.2 CALCULATE AVERAGE NUMBER OF INPATIENT HOSPITAL ADMISSIONS

Step 1: For all beneficiaries attributed to the MPG or EP with a given CCW flag (chronic condition), sum up the number of hospitalizations identified in the 2007 Inpatient Hospital SAF for all full-year and part-year beneficiaries with the condition. This is the numerator for the average. (Note that beneficiaries who were dropped in the risk-adjustment model (because they lacked HCC scores and/or are were the bottom 1 percentile of total costs) are included in hospital admission counts.)

Step 2: For all beneficiaries attributed to the MPG or EP with a given CCW flag (chronic condition), sum up the full-year and part-year weights calculated in Section 3. This is the denominator for the average.

Step 3: Divide the numerator in Step 1 by the denominator in Step 2.

11.3 CALCULATE AVERAGE NUMBER OF HOSPITAL EMERGENCY DEPARTMENT VISITS

The method for identifying hospital emergency department (ED) visits was derived from Research Data Assistance Center (ResDAC)¹⁸ guidance (www.resdac.umn.edu/Tools/TBs/TN-003_EmergencyRoominClaims_508.pdf, accessed July 7, 2010):

- For those Medicare beneficiaries seen in the ED, but NOT admitted to the hospital, services appear in the CMS Outpatient SAF
- To find these claims in the Outpatient Hospital SAF, use revenue center code values of 0450-0459 and 0981
- The revenue center codes on the Outpatient Hospital SAF are called REVCNTR01-REVCNTR58

Step 1: For all beneficiaries attributed to the MPG or EP with a given CCW indicator (chronic condition), sum up the number of ED visits identified in the 2007 Outpatient SAF as specified by ResDAC, for all full-year and part-year beneficiaries with the condition. This is the numerator for the average. (Note that beneficiaries dropped in the risk-adjustment model because they lacked HCC scores and/or were in the bottom 1 percentile of the beneficiary 2007 annual cost distribution are included in ED visit counts.)

Step 2: For all beneficiaries attributed to the MPG or EP with a given CCW flag (chronic condition), sum the full-year and part-year weights calculated in Section 3. This is the denominator for the average.

Step 3: Divide the numerator in Step 1 by the denominator in Step 2.

¹⁸ ResDAC is a CMS contractor that provides free assistance to academic, government and non-profit researchers interested in using Medicare and/or Medicaid data for their research. ResDAC is staffed by a consortium of epidemiologists, public health specialists, health services researchers, biostatisticians, and health informatics specialists from the University of Minnesota (see <http://www.resdac.umn.edu/>, accessed July 7, 2010).

SECTION 12

CALCULATE AMBULATORY CARE SENSITIVE CONDITION MEASURES FOR MEDICAL PRACTICE GROUPS

The Agency for Healthcare Research and Quality (AHRQ) developed a set of Prevention Quality Indicators (PQIs) that includes measures of potentially avoidable hospitalizations for Ambulatory Care Sensitive Conditions (ACSCs). These are conditions for which good outpatient care can prevent complications or more severe disease. The measures rely on hospital discharge data but are not intended as measures of hospital quality. Rather, they reflect access to high quality ambulatory care within a larger system of care.

The 2010 QRURs include rates of hospital admission for Medicare beneficiaries attributed to medical practice groups (MPGs), calculated from 2007 Medicare Inpatient Hospital claims data, for the following six ACSCs:

- (1) Congestive heart failure (CHF)
- (2) Bacterial pneumonia
- (3) Urinary tract infection (UTI)
- (4) Chronic Obstructive Pulmonary Disease (COPD)
- (5) Dehydration
- (6) Diabetes – a composite measure, based on short term diabetes complications; uncontrolled diabetes; long term diabetes complications; and lower extremity amputation for diabetes

For each ACSC, the number of beneficiaries attributed to the MPG who were identified as having been hospitalized for that condition in 2007 (the numerator) is divided by the sum of attributed beneficiary weights, where a beneficiary's weight is equal to the portion of the year the beneficiary was alive and enrolled in both Parts A and B Medicare FFS in 2007 (the denominator). (Note that the denominator is not restricted to the number diagnosed with the specific condition.)

12.1 DESCRIPTION OF PREVENTION QUALITY INDICATORS/ACSCs¹⁹

The PQIs are a set of measures that can be used with hospital inpatient discharge data to identify quality of care for “ambulatory care-sensitive conditions.” AHRQ distributes a PQI software tool for free, which can be applied to any hospital inpatient administrative data. The PQIs are part of a set of AHRQ Quality Indicators developed by investigators at Stanford University and the University of California under a contract with AHRQ.

¹⁹ This section was derived from http://www.qualityindicators.ahrq.gov/pqi_overview.htm, accessed July 7, 2010.

AHRQ notes that even though PQI indicators are based on hospital inpatient data, they provide insight into the community health care system or services outside the hospital setting. Patients with diabetes may be hospitalized for diabetic complications if their conditions are not adequately monitored or if they do not receive the patient education needed for appropriate self-management. Patients may be hospitalized for asthma if primary care providers fail to adhere to practice guidelines or to prescribe appropriate treatments. Patients with appendicitis who do not have ready access to surgical evaluation may experience delays in receiving needed care, which can result in a life-threatening condition—perforated appendicitis. For detailed specifications on each PQI, see <http://www.qualityindicators.ahrq.gov/TechnicalSpecs41.htm#PQI41>, accessed July 7, 2010).

12.2 CALCULATE AMBULATORY CARE SENSITIVE CONDITION HOSPITALIZATION RATES

This section documents the steps for creating ACSC hospitalization rates for the six conditions included in 2010 QRURs for MPGs:

Step 1: Identify all 2007 beneficiaries attributed to a given MPG. (Note that beneficiaries who were dropped in the risk-adjustment model (because they lacked HCC scores and/or were the bottom 1 percentile of total costs) are included in ACSC rates.)

Step 2: Identify all short-stay hospital claims for beneficiaries identified in Step 1 for a given MPG, using the 2007 Medicare Inpatient Hospital SAF.

Step 3: Apply the AHRQ PQI software programs to short-stay hospital claims identified in Step 2 for the given MPG to identify hospitalizations for each ACSC condition below (that is, each PQI condition), based on diagnostic and procedure information on the claims. (The PQI software has separate programs that separately identify hospitalizations for each particular ACSC condition; see <http://www.qualityindicators.ahrq.gov/software.htm>, access July 7, 2010; tapq# refers to numerator (“top”), (a)mbulatory care sensitive condition, pq indicator, the indicator number.)

- CHF (tapq08)
- Bacterial pneumonia (tapq11)
- UTI (tapq12)
- COPD (tapq05)
- Dehydration (tapq10)
- Diabetes (including) (tapq01, tapq03, tapq04, tapq06)
 - Uncontrolled diabetes
 - Short term diabetes complications
 - Long term diabetes complications
 - Lower extremity amputation

Step 4: Sum the number of hospitalizations for each condition for a given MPG across all of its attributed beneficiaries (the numerator for the ACSC rate), and divide by the weighted number of 2007 beneficiaries attributed to the MPG (the denominator for the ACSC rate), where the weight reflects full-year or part-year status of the beneficiary calculated in Section

3. (The count of hospitalizations for the diabetes ACSC is calculated by summing the counts for each of the four PQIs focused on diabetes into one composite: uncontrolled diabetes, short term complications, long term complications and lower extremity amputation.)

SECTION 13 CALCULATE GEM MEASURES

Using the methodology developed for the Generating Medicare Physician Quality Performance Measurement Results (GEM) project, CMS contracted with Masspro (the Quality Improvement Organization for Massachusetts) to identify medical practice groups (using TINs) and individual eligible professionals (using UPINs or NPIs) and to generate performance results for 12 measures of clinical quality, based on 2006 and 2007 Medicare Part B and Part D claims data. These measures, based on HEDIS[®] measures appropriate to the Medicare population, reflect recommended preventive and clinical care for some common health conditions and provide a limited picture of a group's or medical professional's performance for a subset of their patients (see <http://www.cms.gov/GEM/>).

Each performance measure is calculated by determining the number of beneficiaries attributed to the MPG or EP for whom the particular health care service, screening test, medication, or other intervention was indicated (the denominator) and the number of attributed beneficiaries in the denominator who received the recommended health care service (the numerator). A measure rate is then calculated by dividing the numerator count by the denominator count and expressing the result as a percentage. The highest possible rate for a GEM quality measure is 100 percent and the lowest possible rate is 0 percent. Criteria for the GEM project stipulate that no statistics for a given measure be calculated for MPGs or individual eligible professionals with fewer than 11 observations for a given measure.

The 12 GEM ambulatory care measures are as follows:²⁰

- (1) Breast Cancer Screening for Women up to 69 Years of Age
- (2) LDL Screening for Beneficiaries up to 75 Years of Age with Diabetes
- (3) Eye Exam (retinal) for Beneficiaries up to 75 Years of Age with Diabetes
- (4) HbA1c Testing for Beneficiaries up to 75 Years of Age with Diabetes
- (5) LDL-C Screening for Beneficiaries up to 75 Years of Age with Cardiovascular Conditions
- (6) Colorectal Cancer Screening for Beneficiaries up to 80 Years of Age
- (7) Medical Attention for Nephropathy for Diabetics up to 75 Years of Age
- (8) Persistence of Beta-Blocker Treatment after Heart Attack

²⁰ Specifications for each of these measures can be found in "GEM 2007 Measure Functional Specification Document for 2007 Data," see http://www1.cms.gov/GEM/05_TechnicalDocuments.asp#TopOfPage, accessed July 5, 2010,

- (9) Annual Monitoring for Beneficiaries on Persistent Medications (ACE Inhibitors or Angiotensin Receptor Blockers, Digoxin, Diuretics, and Anti-Convulsants)
- (10) Antidepressant Medication Management (Acute Phase)
- (11) Beta-Blocker Treatment after Heart Attack
- (12) Disease-Modifying Anti-Rheumatic Drug Therapy in Rheumatoid Arthritis

13.1 CALCULATE GEM MEASURES FOR MEDICAL PRACTICE GROUPS

For the 2010 QRURs, GEM measures for MPGs were obtained from <http://www.cms.gov/GEM>, previously calculated by Masspro, and then merged onto MPG files by TIN. The CMS website includes detailed documentation on the methodology for calculating GEM measures. Following is a summary of Masspro's methodology.²¹

Step 1: Identify medical groups for the GEM project, based on unique TINs in Part B Carrier claim line items for the GEM project's measurement year 2006 or 2007. The source of these data was Medicare claims obtained from the Health Account Joint Information (HAJI) database. The GEM project focuses on TINs for medical groups. For the GEM project, a medical group practice is defined as an organization that bills CMS for medical services to Medicare beneficiaries and consists of at least two practitioners, at least one of whom is credentialed as a physician (i.e., medical doctor or doctor of osteopathic medicine). These screening processes are conducted by identifying all unique GEM-eligible medical group TINs in the HAJI database by applying the following inclusion criteria:

- 1) Medical group TINs for GEM are defined as those that had physician, physician assistant or nurse practitioner provider specialty codes on at least 50 percent of Part B carrier claim line items billed by that TIN during the measurement year of 2006 or 2007. The list of 55 eligible physician, physician assistant and nurse practitioner provider specialty codes is shown in Appendix Table B, Column (5).
- 2) Medical group TINs are also defined as those that had two or more UPINs with physician, physician assistant or nurse practitioner provider specialty codes on Part B carrier claim line items billed by that TIN during the GEM measurement year of 2006 or 2007.

Step 2: Identify UPINs on Part B carrier claim line items in the HAJI database for the measurement years 2006 and 2007, respectively. TIN grouping is conducted only for UPINs that represent physicians, physician assistants and nurse practitioners who provided service to Medicare beneficiaries during the measurement years. As a result, those UPINs that represent other types of providers, and providers who may have only done referrals for

²¹ Derived from "Physician and Other Medical Provider Grouping and Patient Attribution Methodologies: Generating Medicare Physician Quality Performance Measurement Results (GEM) Project"; http://www1.cms.gov/GEM/05_TechnicalDocuments.asp#TopOfPage, accessed July 5, 2010.

Medicare beneficiaries, are screened out of the GEM project database. This is done by applying the following inclusion criteria:

- 1) Only include UPINs that are in the “Performing UPIN” field on Part B carrier claim line items. Do not use UPINs in the “Referring UPIN” field.
- 2) The provider specialty codes on Part B carrier claim line items with each UPIN are checked to ensure the UPIN represents a physician, physician assistant or nurse practitioner. The list of 55 eligible specialty codes is in Appendix Table B, Column (5).

Step 3: For each unique medical group TIN identified in Step 2, all of the unique physician and other medical provider UPINs identified in Step 2 that billed through that TIN in Part B carrier claim line items for measurement years 2006 and 2007, respectively, are identified. CMS deemed that primary care physicians include specialty codes 01, 08, 11, 16, 38, 70 and 84. Primary care providers also include nurse practitioners and physician assistants with specialty codes 50 and 97 if they were practicing as part of a TIN that had a plurality of UPINs with specialty codes for physician primary care providers.

Step 4: Attribute patients to the medical groups for the measurement year 2006 or 2007. Identify all GEM quality measure-eligible beneficiaries by applying the inclusion and exclusion criteria listed below to identify GEM beneficiaries who had full-year Medicare FFS coverage and complete Medicare claims data for 2006 and 2007, respectively:

- 1) Beneficiary became Medicare eligible on or before January 1st of the measurement year 2006 or 2007.
- 2) Beneficiary must have a record in the Medicare enrollment files.
- 3) Beneficiary must have both Part A and Part B enrollment for all 12 months (January 1 to December 31) of the measurement year, 2006 or 2007. Beneficiary cannot have any months of Part A only or Part B only enrollment in the measurement year. Beneficiaries are excluded from the project if the Medicare Entitlement/Buy-in Indicator is not “3” or “C” (Part A and Part B; or Parts A and B, State Buy-In) for all months of 2006 or 2007.
- 4) Beneficiary did not have any months of Medicare Advantage or other Medicare coordinated care plan enrollment in each of the measurement years. This is found by using the variable “HMO Coverage” from the Denominator file. The value of HMO coverage is the number of months a beneficiary was enrolled in Medicare managed care.
- 5) Beneficiary did not have any months of Medicare as a secondary payer (due to working aged or disabled status) in each of the measurement years. This means the Beneficiary Primary Payer Code (from the Medicare Enrollment Database) is not equal to “A” (Working Aged Beneficiary/Spouse with Employer Group Health Plan), “B” (ESRD beneficiary in the 18 month coordination period with an employer group health plan) or “G” (working disabled) for any month of the year. All other values are

valid. This criterion excludes beneficiaries for whom a private health insurance plan was the primary payer instead of Medicare, and thus Medicare claims will not provide a complete record of the health services provided to the beneficiary.

6) Beneficiary did not reside outside of the United States. Beneficiaries with a State Code that is greater than “53” in the Denominator file are excluded from attribution. State codes 01–53 include the 50 states, the District of Columbia, the U.S. Virgin Islands and Puerto Rico.

7) Beneficiary did not enter the Medicare Hospice benefit at any point in each of the measurement years.

8) For each of the measurement years, beneficiary did not die on or before December 31 of the measurement year (2006 or 2007).

Step 5: Identify all of Part B carrier claim line items billed during 2006 and during the measurement year (2006 or 2007) and during the last six months (July – December) of the year prior to the measurement year (2005 or 2006) for each GEM quality measure eligible beneficiary identified in Step 4. If less than six months of claims are available for the beneficiary in the prior year (2005 or 2006), then use all the claims data available for that year from those last six months. From each beneficiary’s line items, identify all of the visits billed as Part B carrier claim line items with Office or Other Outpatient E&M CPT codes or Consultation E&M CPT codes during the measurement year (2006 or 2007) and during the last six months (July – December) of the year prior to the measurement year (2005 or 2006). These visits are identified by CPT codes 99201–99205, 99211–99215 and 99241–99245.

Step 6: Attribute each beneficiary to at most one TIN for the primary care quality measures, if at least one TIN is available that provided two or more eligible E&M visits for that beneficiary and were billed by primary care providers. Flag that TIN as responsible for that beneficiary for all 12 GEM quality measures.

Step 7: Attribute each beneficiary to at most one TIN for the cardiology quality measures, if at least one TIN is available that provided two or more eligible E&M visits for that beneficiary and were billed by cardiology providers. Cardiologists use specialty code 06. Cardiology providers also include nurse practitioners and physician assistants with specialty codes 50 and 97 if they were practicing as part of a TIN that had a plurality of UPINs with the specialty code for cardiologists. Flag that TIN as responsible for that beneficiary for the GEM quality measures listed in Table 13.2 below. Step 7 applies respectively to the other specialties and measures listed in Table 13.2.

Table 13.2. GEM Project Quality Measures and Physician Specialties Eligible for Patient Attribution and Quality Performance Assessment

GEM Project Quality Measures	Physician Specialties for Patient Attribution and Quality Performance Assessment
1. Breast Cancer Screening	Primary care (01, 08, 11, 16, 38, 70 and 84)
2. LDL Testing for Diabetes	Primary care, Cardiology (06), Endocrinology (46)
3. Retinal Eye exam for Diabetics	Primary care, Endocrinology (46)
4. HbA1c Testing for Diabetics	Primary care, Endocrinology (46)
5. Nephropathy testing for Diabetics	Primary care, Endocrinology (46), Nephrology (39)
6. Cardiovascular LDL Testing	Primary care, Cardiology (06)
7. Beta Blocker Treatment after Heart Attack	Primary care, Cardiology (06)
8. Persistence of Beta-Blocker Treatment after a Heart Attack	Primary care, Cardiology (06)
9. Annual Monitoring for Patients on Persistent Medications (ACE Inhibitors, digoxin, diuretics, anti-convulsants)	Primary care (all medications) Cardiology (06) (all but anti-convulsants) Neurology (13) (anticonvulsants only)
10. Antidepressant Medication Management (6 months)	Primary care, Psychiatry (26, 86)
11. Disease-modifying Anti-Rheumatic Drug Therapy	Primary care, Rheumatology (66)
12. Colorectal Cancer Screening	Primary care

Step 8: In applying the plurality rule for attribution to the primary care and different subspecialty medical groups in Steps 6 and 7, the following three tiebreakers were used when necessary to ensure that each beneficiary is only attributed to one TIN for each subspecialty. First, if there is a tie among two or more TINs in the number of eligible E&M codes billed by each type of specialty provider, attribute the beneficiary to the TIN that provided the most recent E&M visit. Second, if there is still a tie, attribute the beneficiary to the TIN that provided the earliest E&M visit. Third, if there is still a tie, attribute the beneficiary to one of the remaining TINs at random. (However, check the number of beneficiaries attributed using random allocation. If more than 0.5% of beneficiaries end up with random attribution for any of the subspecialties, then additional rules for tiebreaking would have been developed.)

Step 9: Consolidate redundant attribution so that each TIN has one set of quality measures for which it is responsible for each attributed beneficiary. For example, if a beneficiary was attributed to the same TIN for both primary care and for cardiology, then the TIN was accountable for all 12 GEM quality measures for that beneficiary since the cardiology quality measures are a subset of the primary care quality measures. However, if a beneficiary was attributed to the same TIN for both cardiology and endocrinology, then the TIN was accountable for eight GEM quality measures since there are five cardiology

measures and four endocrinology measures; but with one quality measure common to both subspecialties, the overall total for the TIN for that beneficiary was eight quality measures.

13.2 CALCULATE GEM MEASURES FOR ELIGIBLE PROFESSIONALS

This section describes the specifications written by Mathematica and implemented by Masspro for generating individual EP performance rates for the 2007 GEM quality measures. The specifications were largely derived from the CMS specifications for calculating GEM measures for MPGs and the same databases were used as described in Section 13.1. The specifications include identifying EPs; identifying E&M line items; and attributing beneficiaries to individual EPs. Rules for identifying beneficiaries eligible for GEM measure calculations are the same as those used by Masspro to identify GEM quality measure-eligible beneficiaries for medical group attribution described in their document “Physician and Other Medical Provider Grouping and Patient Attribution Methodologies,” http://www1.cms.gov/GEM/05_TechnicalDocuments.asp#TopOfPage, accessed July 5, 2010.

Step 1: Identify eligible providers. Use Part B Carrier claim line items in the HAJI database for the measurement year 2006 or 2007 and retain items satisfying all of the following criteria: (1) the UPIN is a “Performing UPIN”; (2) the UPIN represents a physician, physician assistant, nurse practitioner, medical specialist, surgeon, or emergency medicine provider. If the UPIN is missing but the NPI is populated, use the crosswalk between UPINs and NPIs to assign UPIN to provider. Use the same list of provider specialty codes in identifying UPIN specialty as for TIN GEM calculations. If a single UPIN is associated with multiple specialties, use plurality of Carrier claims to assign specialty to provider.

Step 2: Identify E&M line items. Identify all of Part B carrier claim line items billed during the measurement year 2006 or 2007 and during the last six months (July – December) of the year prior to the measurement year (2005 or 2006) for each GEM quality measure-eligible beneficiary identified by Masspro. If less than six months of claims are available for the beneficiary in the prior year (2005 or 2006), then use all the claims data available for that year from those last six months. From each beneficiary’s line items, identify all of the visits with E&M HCPCS codes for the measurement year (2006 or 2007) and during the last six months (July – December) of the year prior to the measurement year (2005 or 2006), as given in Appendix Table D (which also lists the specific E&M HCPCS codes to exclude for this purpose).

Step 3: Attribute beneficiaries to primary care providers. Identify all primary care provider UPINs (including nurse practitioners and physician assistants) (provider specialty codes: 01, 08, 11, 16, 38, 50, 70, 84, 97) that billed two or more eligible E&M codes for a beneficiary in a given measurement period (2005-2006 or 2006-2007). Attribute the beneficiary to the primary care provider who billed for the plurality of eligible E&M visits, with the added criterion that the primary care provider billed for at least 10 percent of the beneficiary’s eligible E&M visits for the period. Flag that UPIN as responsible for that beneficiary for all primary care GEM quality measures. If no provider meets the 10%

minimum, the beneficiary will not be attributed to any provider for primary care GEM quality measures.

Step 4: Attribute beneficiaries to specialists. Use the same rules as above to attribute beneficiaries to cardiology providers (code 06), endocrinology providers (code 46), nephrology providers (code 39), neurology providers (code 13), psychiatry providers (codes 26, 86), and rheumatology providers (code 66). Flag the UPIN as responsible for that beneficiary for all of the particular specialty care GEM quality measures. Note that nurse practitioners and physician assistants are not candidates for attribution for specialty care.

Step 5: Apply attribution tiebreaker rule: Use the following tiebreakers to ensure that each beneficiary is only attributed to one UPIN for each specialty type: 1) Attribute the beneficiary to the UPIN who provided the most recent E&M visit; 2) attribute the beneficiary to the UPIN who provided the earliest E&M visit; and if there is still a tie 3) attribute the beneficiary to one of the remaining tied UPINs at random.

SECTION 14 DEFINE PEER GROUPS

An individual EP's or MPG's performance on a measure is compared to the performance of its peer group for that measure. For the measures displayed in the medical practice group QRUR, the peer group is defined as MPGs or EPs (affiliated or unaffiliated) in the 12 CTS sites that had the minimum required number of observations to report for that measure. To ensure useful comparisons, the peer group for either an MPG or EP must include at least 30 peers with the minimum required number of observations for the given measure. This section describes the peer groups for the 2010 QRUR reports.

14.1 DEFINE PEER GROUPS FOR MEDICAL PRACTICE GROUPS

The peer group for all MPGs consist of all MPGs across all of the 12 CTS sites that have sufficient observations for reporting the specific performance measure.

Sufficient observations for the resource use measures (per capita cost, subgroup-specific per capita cost, cost of service categories, utilization statistics, and ACSC rates) is at least 30 attributed patients; as determined for the GEM project, sufficient observations for the 12 GEM measures is at least 11 attributed patients.

For all measures, both full-year and part-year attributed beneficiaries are counted as a full beneficiary in determining sufficient observations. For example, if an MPG is attributed 10 full-year and 2 part-year beneficiaries, observations = 12 for the measure.

14.2 DEFINE PEER GROUPS FOR ELIGIBLE PROFESSIONALS

There are two peer groups for affiliated EPs:

- (1) All same-medical specialty (as determined by the HCFA 2-digit provider specialty code) affiliated and unaffiliated EPs in the same CTS site who have sufficient observations for reporting the specific performance measure
- (2) All same-medical specialty (as determined by the HCFA 2-digit provider specialty code) affiliated and unaffiliated EPs across all 12 CTS sites who have sufficient observations for reporting the specific performance measure

Sufficient observations for the resource use measures (per capita costs, subgroup-specific per capita costs, cost of service categories for per capita cost measure, and utilization statistics for the subgroup-specific per capita cost measure) is at least 30 attributed patients; as determined for the GEM project, sufficient observations for each of the 12 GEM measures is at least 11 attributed patients.

For all measures, both full-year and part-year attributed beneficiaries are counted as a full beneficiary in determining sufficient observations. For example, if an EP is attributed 10 full-year and 2 part-year beneficiaries, observations = 12 for the measure.

SECTION 15 CALCULATE BENCHMARKS

In the 2010 QRURs, most often an EP's or MPG's performance on a measure is compared with the mean (average) performance among EPs or MPGs included in their peer group. In some exhibits in the report, an EP's or MPG's performance is also compared with the 10th, 50th, and 90th percentile EP's or MPG's performance in the peer group. This section describes how benchmarks were calculated for the 2010 QRURs.

15.1 CALCULATE SIMPLE MEAN (AVERAGE) BENCHMARKS

Step 1: Identify all MPGs (or EPs) that meet the required minimum number of observations criterion for the given measure and meet other peer group criteria (see Section 14; for example, for the subgroup-specific per capita cost measure for EPs, identify all affiliated and unaffiliated EPs who have at least 30 attributed patients with the specific chronic condition and are of the same medical specialty and practiced in the same CTS site in 2007).

Step 2: Sum the given measure across all MPGs (or EPs) identified in Step 1.

Step 3: Divide the sum in Step 2 by the number of MPGs (or EPs) identified in Step 1.

15.2 CALCULATE 10TH, 50TH, AND 90TH PERCENTILE BENCHMARKS

Step 1: Identify all MPGs (or EPs) that meet the required minimum number of observations criterion for the given measure (see Section 14).

Step 2: Rank the MPGs (or EPs) identified in Step 1 from lowest to highest performer (for example, for per capita costs, rank MPGs from those with the lowest per capita costs for attributed beneficiaries to the highest cost MPG).

Step 3: Calculate the 10th, 50th, and 90th percentile outcomes for the given performance measure across MPG or EP rankings from Step 2.

SECTION 16

IDENTIFY HOSPITALS THAT TREATED CTS-SITE BENEFICIARIES

The 2010 QRURs include a listing of hospitals which accounted for at least 10 percent of the MPG's or EP's attributed beneficiary hospital stays in 2007. To avoid dealing with small contributions which are unlikely to have a substantial impact on an MPG's or EP's hospitalizations, we required that a hospital represent at least 10 percent of the total stays for a hospital to be considered linked to that MPG or EP. This threshold, while arbitrary, ensures that in most cases, only hospitals that have cared for a substantial share of the MPG's or EP's attributed beneficiaries will be listed on their QRUR.

This section describes how the hospital list was generated:

Step 1: Identify all 2007 hospitalizations (stays) for all beneficiaries assigned to a given MPG or EP in the 2007 Inpatient Hospital SAF. (Note that a beneficiary can have more than one hospital stay in 2007.)

Step 2: Count the total number of hospital stays across all beneficiaries attributed to the given MPG or EP.

Step 3: Identify the hospital's provider ID number for each of the stays identified in Step 2. Create a flag that "links" the hospital ID to the MPG or EP. (Note that a hospital ID can be linked to multiple MPGs or EPs if beneficiaries in different MPGs or attributed to different EPs were hospitalized at the hospital.)

We also used a file provided by IFMC, `Open_Providers_Jun09PR_02_16_09.xls`, that contains information for whether a hospital changed IDs because it converted to Critical Access Hospital (CAH) status. From this file, we used the original ID (`HSP_ID`), new ID (`HSP_ID_ORIG`), and the end date for when the hospital converted to CAH status (`HSP_XREF_END_DT`).

Step 4: Count the total number of beneficiary hospital stays, by hospital ID, for each MPG or EP.

Step 5: For each hospital ID, divide the total number of hospital stays for the hospital ID (from Step 4) by the total number of hospitals stays across all attributed beneficiaries for a given MPG or EP (from Step 2).

Step 6: If a hospital ID's percentage from Step 5 is at least 10 percent, create a flag for the hospital ID equal to 1; if the hospital ID percentage is less than 10, the flag equals 0.

Step 7: For hospitals with a flag = 1 from Step 6, match their hospital ID with the `DBO_VWHQI_HOSP` table within the Hospital Compare Access Database (variables used were hospital id (Provider_Number) and hospital name (Hospital_Name)), downloaded from CMS's Hospital Compare website, to find the hospital's name.

Step 8: If the hospital's ID is not located in the Hospital Compare Access Database (approximately 160), manually find the hospital's name. The following resources were used to manually locate hospital names:

- Search the CMS Medicare Provider Listing file located at: http://www.ihs.gov/RPMS/Downloads/CMS_Medicare_Provider_Listing.pdf
- Search the IFMC-provided file: Open_Providers_Jun09PR_02_16_09.xls
- Conduct a GOOGLE search

Step 9: For the given MPG or EP, list each hospital's name located under Steps 7 and 8.

SECTION 17

POPULATE 2010 QUALITY AND RESOURCE USE REPORTS

Medical practice groups (MPGs) that meet the criteria for a 2010 QRUR will receive a report of the group's performance compared with all medical practice group peers on the 2007 performance measures described in this document. MPG QRURs will include a list of physicians and allied health professionals who have been identified as affiliated with the MPG, as described in Section 6.1.1.

Eligible professionals (EPs) who meet the criteria for a 2010 QRUR will receive a report of their individual performance compared with their EP peers on the 2007 performance measures described in this document.

This section lists the criteria that render an MPG or EP eligible to receive a 2010 QRUR.

17.1 QRUR CRITERIA FOR MEDICAL PRACTICE GROUPS

- As described in Section 6.1, the TIN must meet the criteria for identification as an MPG.
- The MPG must have at least one affiliated EP who participated in the PQRI program in 2007, 2008, or 2009 (see Section 6.1.1 for the definition of an affiliated EP).
- The MPG must have at least one GEM measure that meets reporting requirements: (1) the MPG has at least one GEM measure that meets the 11 minimum case size criterion (see Section 13.1); and (2) the MPG must be able to be compared with a "reportable peer group" for at least one GEM measure identified in (1), where reportable peer group is defined as a minimum of 30 members that meet the 11 minimum case size criterion for the GEM measure (see Section 14.1).
- The MPG must meet the reporting requirements for the overall per capita cost measure: (1) the MPG meets the 30 minimum case size criterion for the per capita cost measure (see Section 7.2); and (2) the MPG must be able to be compared with a "reportable peer group" for the per capita cost measure, where reportable peer group is defined as a minimum of 30 members that meet the 30 minimum case size criterion for the per capita cost measure (see Section 14.1).

17.2 QRUR CRITERIA FOR ELIGIBLE PROFESSIONALS

- As described in Section 6.1.1, the EP must be affiliated with an MPG.
- The EP must be eligible for beneficiary attribution (see Section 6.2).
- The EP must have been identified as practicing in a CTS site in 2007 (see Section 2.4).
- The EP must have at least one GEM measure that meets reporting requirements:

- (1) the EP has at least one GEM measure that meets the 11 minimum case size criterion (see Section 13.2); and
 - (2) the EP must be able to be compared with a “reportable peer group” that is of the EP’s same HCFA medical specialty and in the same CTS site in 2007 for at least one GEM measure identified in (1), where reportable peer group is defined as a minimum of 30 members that meet the 11 minimum case size criterion for the GEM measure (see Section 14.2)
- An EP must meet the reporting requirements for the overall per capita cost measure:
 - (1) the EP meets the 30 minimum case size criterion for the per capita cost measure (see Section 7.2); and
 - (2) the EP must be able to be compared with a “reportable peer group” that is of the EP’s same HCFA medical specialty and in the same CTS site in 2007 for the per capita cost measure, where reportable peer group is defined as a minimum of 30 members that meet the 30 minimum case size criterion for the per capita cost measure (see Section 14.2)

**APPENDIX TABLE A
COUNTIES IN THE COMMUNITY TRACKING STUDY**

MSA, COUNTY STATE AND COUNTY FIPS CODE FOR 12 CTS SITES

Site number	Metropolitan Statistical Area Name	County	FIPS State	FIPS County
1	Boston, MA Portion	Bristol, MA	25	005
1	Boston, MA Portion	Essex, MA	25	009
1	Boston, MA Portion	Middlesex, MA	25	017
1	Boston, MA Portion	Norfolk, MA	25	021
1	Boston, MA Portion	Plymouth, MA	25	023
1	Boston, MA Portion	Suffolk, MA	25	025
2	Cleveland-Lorain-Elyria, OH	Ashtabula, OH	39	007
2	Cleveland-Lorain-Elyria, OH	Cuyahoga, OH	39	035
2	Cleveland-Lorain-Elyria, OH	Geauga, OH	39	055
2	Cleveland-Lorain-Elyria, OH	Lake, OH	39	085
2	Cleveland-Lorain-Elyria, OH	Lorain, OH	39	093
2	Cleveland-Lorain-Elyria, OH	Medina, OH	39	103
3	Greenville-Spartanburg-Anderson, SC	Anderson, SC	45	007
3	Greenville-Spartanburg-Anderson, SC	Cherokee, SC	45	021
3	Greenville-Spartanburg-Anderson, SC	Greenville, SC	45	045
3	Greenville-Spartanburg-Anderson, SC	Pickens, SC	45	077
3	Greenville-Spartanburg-Anderson, SC	Spartanburg, SC	45	083
4	Indianapolis, IN	Boone, IN	18	011
4	Indianapolis, IN	Hamilton, IN	18	057
4	Indianapolis, IN	Hancock, IN	18	059
4	Indianapolis, IN	Hendricks, IN	18	063
4	Indianapolis, IN	Johnson, IN	18	081
4	Indianapolis, IN	Madison, IN	18	095
4	Indianapolis, IN	Marion, IN	18	097
4	Indianapolis, IN	Morgan, IN	18	109
4	Indianapolis, IN	Shelby, IN	18	145
5	Lansing-East Lansing, MI	Clinton, MI	26	037
5	Lansing-East Lansing, MI	Eaton, MI	26	045
5	Lansing-East Lansing, MI	Ingham, MI	26	065

Site number	Metropolitan Statistical Area Name	County	FIPS State	FIPS County
6	Little Rock-North Little Rock, AR	Faulkner, AR	05	045
6	Little Rock-North Little Rock, AR	Lonoke, AR	05	085
6	Little Rock-North Little Rock, AR	Pulaski, AR	05	119
6	Little Rock-North Little Rock, AR	Saline, AR	05	125
7	Miami, FL (Old FIPS Code)	Dade, FL	12	025
7	Miami, FL (Current FIPS Code)	Dade, FL	12	086
8	Newark, NJ	Essex, NJ	34	013
8	Newark, NJ	Morris, NJ	34	027
8	Newark, NJ	Sussex, NJ	34	037
8	Newark, NJ	Union, NJ	34	039
8	Newark, NJ	Warren, NJ	34	041
9	Orange County, CA	Orange, CA	06	059
10	Phoenix-Mesa, AZ	Maricopa, AZ	04	013
10	Phoenix-Mesa, AZ	Pinal, AZ	04	021
11	Seattle-Bellevue-Everett, WA	Island, WA	53	029
11	Seattle-Bellevue-Everett, WA	King, WA	53	033
11	Seattle-Bellevue-Everett, WA	Snohomish, WA	53	061
12	Syracuse, NY	Cayuga, NY	36	011
12	Syracuse, NY	Madison, NY	36	053
12	Syracuse, NY	Onondaga, NY	36	067
12	Syracuse, NY	Oswego, NY	36	075

FILE LAYOUT FOR CTS SITES COUNTY CODE FINDER FILE
(49 RECORDS)

Variable	Type	Location	Length	Description
SITE_NUMBER	N	1	2	CTS Site Number (1-12)
MSA_NAME	A	4	39	MSA Name
COUNTY, STATE	A	44	15	County and State Name
STATE (SSA)	A	60	2	SSA State Code
COUNTY (SSA)	A	62	3	SSA County Code

**APPENDIX TABLE B
HCFA CODE PROVIDER SPECIALTY TABLE**

Column (1) HCFA Specialty Code/Provider Specialty	Column (2) Physician Stratification Category (Section 5)	Column (3) Provider Specialties Eligible for Attribution (Section 7.2)	Column (4) Provider Specialties included in EP- Level and MPG-Level Summary Statistics (Sections 11.5 and 11.6)	Column (5) Provider Specialty Codes including Physicians, Physician Assistants and Nurse Practitioners for Physician Grouping TIN Selection -- GEM (Section 14)	Column (6) Provider Specialty Codes Flagged for Patient Attribution for GEM (Section 14)
01 = General practice	Primary Care Physicians	XX	XX	XX	XX
02 = General surgery	Surgeons	XX	XX	XX	
03 = Allergy/immunology	Medical Specialists	XX	XX	XX	
04 = Otolaryngology	Surgeons	XX	XX	XX	
05 = Anesthesiology	Other		XX	XX	
06 = Cardiology	Medical Specialists	XX	XX	XX	XX
07 = Dermatology	Medical Specialists	XX	XX	XX	
08 = Family practice	Primary Care Physicians	XX	XX	XX	XX
09 = Interventional Pain Management	Medical Specialists	XX	XX	XX	
10 = Gastroenterology	Medical Specialists	XX	XX	XX	
11 = Internal medicine	Primary Care Physicians	XX	XX	XX	XX
12 = Osteopathic manipulative therapy	Medical Specialists	XX	XX	XX	
13 = Neurology	Medical Specialists	XX	XX	XX	XX
14 = Neurosurgery	Surgeons	XX	XX	XX	
15 = Unassigned	NA				
16 = Obstetrics/gynecology	Surgeons	XX	XX	XX	XX
17 = Unassigned	NA				
18 = Ophthalmology	Surgeons	XX	XX	XX	
19 = Oral surgery (dentists only)	Surgeons	XX	XX		
20 = Orthopedic surgery	Surgeons	XX	XX	XX	
21 = Unassigned	NA				
22 = Pathology	Other		XX	XX	
23 = Unassigned	NA				
24 = Plastic and reconstructive surgery	Surgeons	XX	XX	XX	
25 = Physical medicine and rehabilitation	Medical Specialists	XX	XX	XX	
26 = Psychiatry	Medical Specialists	XX	XX	XX	XX
27 = Unassigned	NA				
28 = Colorectal surgery (formerly proctology)	Surgeons	XX	XX	XX	
29 = Pulmonary disease	Medical Specialists	XX	XX	XX	
30 = Diagnostic radiology	Other		XX	XX	
31 = Unassigned	NA				
32 = Anesthesiologist assistant	Other	XX	XX		
33 = Thoracic surgery	Surgeons	XX	XX	XX	
34 = Urology	Surgeons	XX	XX	XX	
35 = Chiropractor, licensed	Other		XX		
36 = Nuclear medicine	Other		XX	XX	
37 = Pediatric medicine	Other		XX	XX	
38 = Geriatric medicine	Primary Care Physicians	XX	XX	XX	XX
39 = Nephrology	Medical Specialists	XX	XX	XX	XX
40 = Hand surgery	Surgeons	XX	XX	XX	
41 = Optometrist	Other		XX		
42 = Certified nurse midwife	Other		XX		
43 = Certified registered nurse anesthesiologist	Other		XX		

Column (1) HCFA Specialty Code/Provider Specialty	Column (2) Physician Stratification Category (Section 5)	Column (3) Provider Specialties Eligible for Attribution (Section 7.2)	Column (4) Provider Specialties included in EP- Level and MPG-Level Summary Statistics (Sections 11.5 and 11.6)	Column (5) Provider Specialty Codes including Physicians, Physician Assistants and Nurse Practitioners for Physician Grouping TIN Selection -- GEM (Section 14)	Column (6) Provider Specialty Codes Flagged for Patient Attribution for GEM (Section 14)
44 = Infectious disease	Medical Specialists	XX	XX	XX	
45 = Mammography screening center	Other				
46 = Endocrinology	Medical Specialists	XX	XX	XX	XX
47 = Independent Diagnostic Testing Facility	Other				
48 = Podiatry	Other		XX		
49 = Ambulatory surgical center	Other				
50 = Nurse practitioner	Nurse/PA	XX	XX	XX	XX
51 = Medical supply company with certified orthotist	NA				
52 = Medical supply company with certified prosthetist	NA				
53 = Medical supply company with certified prosthetist-orthotist	NA				
54 = Medical supply company for DMERC	NA				
55 = Individual certified orthotist	NA		XX		
56 = Individual certified prosthetist	NA		XX		
57 = Individual certified prosthetist-orthotist	NA		XX		
58 = Medical supply company with registered pharmacist	NA		XX		
59 = Ambulance service supplier, e.g., private ambulance companies, funeral homes, etc.	Other				
60 = Public health or welfare agencies (federal, state, and local)	Other				
61 = Voluntary health or charitable agencies (e.g., National Cancer Society, National Heart Association, Catholic Charities)	NA				
62 = Psychologist (billing independently)	Other		XX		
63 = Portable X-ray supplier	Other		XX		
64 = Audiologist (billing independently)	Other		XX		
65 = Physical therapist (independently practicing)	Other		XX		
66 = Rheumatology	Medical Specialists	XX	XX	XX	XX
67 = Occupational therapist (independently practicing)	Other		XX		
68 = Clinical psychologist	Other		XX		
69 = Clinical laboratory (billing independently)	Other				
70 = Multispecialty clinic or group practice	Other		XX	XX	XX
71 = Registered dietician/nutrition professional	Other		XX		
72 = Pain management	Other		XX	XX	
73 = Mass immunization roster billers	Other		XX		
74 = Radiation therapy centers	Other		XX		
75 = Slide preparation facilities	Other				
76 = Peripheral vascular disease	Surgeons	XX	XX	XX	
77 = Vascular surgery	Surgeons	XX	XX	XX	

Column (1) HCFA Specialty Code/Provider Specialty	Column (2) Physician Stratification Category (Section 5)	Column (3) Provider Specialties Eligible for Attribution (Section 7.2)	Column (4) Provider Specialties included in EP- Level and MPG-Level Summary Statistics (Sections 11.5 and 11.6)	Column (5) Provider Specialty Codes including Physicians, Physician Assistants and Nurse Practitioners for Physician Grouping TIN Selection -- GEM (Section 14)	Column (6) Provider Specialty Codes Flagged for Patient Attribution for GEM (Section 14)
78 = Cardiac surgery	Surgeons	XX	XX	XX	
79 = Addiction medicine	Medical Specialists	XX	XX	XX	
80 = Licensed clinical social worker	Other		XX		
81 = Critical care (intensivists)	Medical Specialists	XX	XX	XX	
82 = Hematology	Medical Specialists	XX	XX	XX	
83 = Hematology/oncology	Medical Specialists	XX	XX	XX	
84 = Preventive medicine	Primary Care Physicians	XX	XX	XX	XX
85 = Maxillofacial surgery	Surgeons	XX	XX	XX	
86 = Neuropsychiatry	Medical Specialists	XX	XX	XX	XX
87 = All other suppliers (e.g. drug and department stores) (note: DMERC used 87 to mean department store from 10/93 through 9/94; recoded eff 10/94 to A7; NCH cross-walked DMERC reported 87 to A7)	Other				
88 = Unknown supplier/provider (note: DMERC used 87 to mean grocery store from 10/93 - 9/94; recoded eff 10/94 to A8; NCH cross-walked DMERC reported 88 to A8.	Other				
89 = Certified clinical nurse specialist	Nurse/PA	XX	XX		
90 = Medical oncology	Medical Specialists	XX	XX	XX	
91 = Surgical oncology	Surgeons	XX	XX	XX	
92 = Radiation oncology	Other		XX	XX	
93 = Emergency medicine	Emergency Medicine Physician	XX	XX	XX	
94 = Interventional radiology	Other		XX	XX	
95 = Part B CAP drug vendor	Other				
96 = Optician	Other		XX		
97 = Physician assistant	Nurse/PA	XX	XX	XX	XX
98 = Gynecologist/oncologist	Surgeons	XX	XX	XX	
99 = Unknown physician	Other		XX	XX	
A0 = Hospital	NA		XX		
A1 = SNF	NA		XX		
A2 = Intermediate care nursing facility (DMERCs only)	NA		XX		
A3 = Nursing facility, other (DMERCs only)	NA		XX		
A4 = HHA (DMERCs only)	NA		XX		
A5 = Pharmacy (DMERCs only)	NA		XX		
A6 = Medical supply company with respiratory therapist (DMERCs only)	NA		XX		
A7 = Department store (for DMERC use)	NA		XX		
A8 = Grocery store (for DMERC use)	NA		XX		

Source: See <https://www.cms.gov/MedicareProviderSupEnroll/Downloads/JSMTDL-08515MedicarProviderTypetoHCPTaxonomy.pdf>. Note that several of the HCFA specialty codes in this table were retired after 2007 and are not longer used on Medicare claims. However, they were present on Medicare claims in 2006 and 2007, the years of claims data used for the 2010 QRUR reports.

APPENDIX C

SPECIFIC APPROACHES FOR STANDARDIZING UNIT COSTS OF SERVICES

Following are details on deriving standardized unit costs for each of the 16 Medicare payment systems.

C.1 PHYSICIAN SERVICES

We first merged the 2006 RVU file to Carrier file claims data, matching on HCPCS code. Total RVUs were assigned to each line item depending on whether it was provided in a facility or non-facility setting, consistent with CMS rules. The number of RVUs was then multiplied by the 2006 national conversion factor to create standardized unit costs. We then made adjustments to these values to account for various modifier codes, and to account for provision by non-physician providers. In addition, for services provided in multiple units, we multiplied the standardized unit cost by the counter variable (MTUS_CNT), when applicable. This is the approach used by MedPAC, but we additionally included a check of our procedures by calculating an alternative standardized unit cost: allowed charges for which the influence of GPCIs is netted out. This was done by creating an average of the physician work, practice expense, and professional liability GPCIs, weighted by the percentage of total RVUs associated with these three components, and dividing the allowed charge by this average GPCI. Allowable charges were obtained from the Carrier claims data using line item allowable charges for up to 13 line items in a claim: LLWCHG01-LLWCHG13.

Fee schedule-based standardized unit cost values were then compared with those generated by the adjusted allowed charge approach, to identify cases where the ratio of the two significantly differs from one. This approach is useful in identifying special situations that need to be accommodated in the code. For line items where the two standardized unit costs differ significantly and for which no explanation is apparent in the claims file, we assumed that the adjusted allowed charge is a more accurate estimate of the standardized unit cost.²²

There are a number of professional services that are not paid on an RVU basis, but are Carrier priced (for example, new technologies). For these, we used claims from our nationally representative five percent sample of beneficiaries to generate the mean allowed charge for each non-RVU HCPCS code in the base year. These mean values were matched back to line items by using the HCPCS code.

Base year (2006) standardized unit costs values were then applied to claims from 2007 by matching on HCPCS codes. For new HCPCS codes in 2007, we applied the base year procedures to 2007 claims.²³

²² This approach, which we refined, was recommended by Ingenix.

²³ The national conversion factor for physician services did not change between 2005 and 2007.

C.2 ANESTHESIOLOGY SERVICES

Payments for anesthesiology services followed a different formula, where specific types of surgeries (as indicated by HCPCS codes) were assigned differing numbers of base units. In addition, the number of time units (in 15-minute increments) was added to the number of base units and the total was multiplied by a regional conversion factor that accounts for local wage and other input costs. Actual payments were even more complex, because often payments to physician anesthesiologists vary depending on the number of certified registered nurse anesthesiologists they are supervising. Because of the complexities of the payment rules, which we would not always be able to replicate, we used the allowed charge divided by the local conversion factor as our standardized unit cost. This eliminates the influence of geographic adjusters.

To standardize across years, we investigated changes in the national conversion factor. Adjusted allowed charges in 2007 were multiplied by a constant factor to account for the change in these rates. For 2007, the anesthesia conversion factor was divided by 17.7594.

C.3 AMBULANCE SERVICES

Ambulance services are also captured by HCPCS codes. Payment often accounts for the mileage driven (with special provisions for rural providers), equipment used, and other factors. Since we did not want to judge a physician's resource use on the basis of how far his or her patients need to travel during ambulance trips, or whether the patients live in urban and rural areas, we calculated national average allowed charges for each ambulance HCPCS code in the base year, and assigned these values, matching on HCPCS codes, as our standardized unit costs. The base year means by HCPCS code were then applied to the other years.

C.4 CLINICAL LAB SERVICES

Clinical laboratory services are priced by carriers, subject to a ceiling price referred to as the National Limitation Amount (NLA). In practice, most clinical lab services are priced at the NLA. We assigned the national average allowed charge for each HCPCS code as our standardized unit cost. For most such codes, this was equivalent to the NLA.

Base year (2006) standardized unit cost values were applied to 2007 by matching on HCPCS codes. For new clinical lab HCPCS codes in 2007, we followed similar procedures using 2007 claims.

C.5 PART B DRUGS

Part B drugs are priced nationally. Starting in 2006, Part B drug payments were based on average sales prices, which are updated quarterly. Consequently, we standardized unit costs within years, as well as across years. We calculated the average allowed charge by Part B drug HCPCS code in 2006 and applied these means to all three years, accounting for the number of units administered.

C.6 AMBULATORY SURGICAL CENTER SERVICES

Physician services provided in Ambulatory Surgical Centers (ASCs) are billed separately from facility charges. Physician charges were handled as described above. For ASC facility charges in our base year, HCPCS codes were used to assign an Ambulatory Payment Classification (APC) to each procedure approved to be provided in an ASC. The national APC payment rate was then assigned to each ASC claim. Consistent with payment rules, the payment for second and subsequent procedures was reduced by 50 percent.

C.7 HOSPITAL INPATIENT SERVICES

We calculated the base year average payment (from all sources) by DRG, and assigned that mean to hospital stays as our standardized unit cost. The base year average payment was calculated as : Claim payment amount + Beneficiary inpatient deductible amount + Beneficiary Part A coinsurance liability amount + Primary payer claim payment amount + Claim pass through per-diem amount (PMT_AMT+DED_AMT+COIN_AMT+PRPAYAMT+PER_DIEM). Adjustments for hospital transfers were made according to regulations in place in the base year. Because we wished to standardize unit costs across all short-stay hospitals, no special procedures were applied to critical-access hospitals, which are paid retrospectively. Base year DRG averages were applied to other years.

New DRGs defined in 2007 were assigned the average 2007 payment, which was then deflated to 2006 payment levels by applying increase in the base payment rate between 2006 and 2007. The adjustment factor for putting 2007 payments on a 2006 basis was 0.9718.

C.8 SKILLED NURSING FACILITY (SNF) SERVICES

Medicare uses a prospective system to calculate a per-diem rate for SNFs, and then retrospectively pays on the basis of the length of stay. Daily rates are set according to resource utilization groups (RUGs), which are based on therapy and service use, the presence of certain medical conditions, and activities of daily living. Consequently, we melded our approach of creating standardized unit costs in prospective and retrospective payment systems by calculating the average daily rate nationally for each RUG in our base year, then multiplying these mean values by the length of stay to create the standardized unit cost. The total payment for each stay was calculated as: Claim payment amount + Beneficiary inpatient deductible amount + Beneficiary Part A coinsurance liability amount + Primary payer claim payment amount + Claim pass through per-diem amount + Beneficiary blood deductible liability amount (PMT_AMT+DED_AMT+COIN_AMT+PRPAYAMT+PER_DIEM+BLDDEDAM). SNF length of stay was calculated as “the last day on the billing statement covering services rendered to the beneficiary” minus “the first day on the billing statement covering services rendered to the beneficiary” plus one (THRU_DT-FROM_DT + 1).

The number of RUG classifications changed in 2006, increasing from 44 to 56. For any RUGs that were present in 2007 claims, but not in 2006, the total average daily rate was calculated as above, multiplied by the length of stay, and was then adjusted by a factor of 0.987 to account for SNF base rate increases in 2007 (to put the payment back to a 2006 level).

C.9 HOME HEALTH

Home health is paid a prospectively set rate per 60-day episode units. Payment is based on 153 home health resource groups (HHRGs); payment reflects the expected cost of the patient given the patient's clinical and function presentation as well as the number of therapy visits. We calculated average payment by HHRG in the base year and then assigned these averages as our standardized unit costs to claims, matching on the HHRG contained in the claim.

Payment for home health claims was calculated as the sum over all line items (up to 45 line items) of: Revenue center payment amount + Revenue center 2nd Medicare secondary payer paid amount + Revenue center coinsurance/wage adjusted coinsurance ($REVPMT_{ii} + RMVSP1_{ii} + RVMSP2_{ii} + WGDJ_{ii}$). If the HHRG that occurred in 2007 did not appear in 2006 claims, we calculated the average payment for 2007 and adjusted the average by multiplying it by 0.9681.

C.10 HOSPITAL OUTPATIENT SERVICES (PAID UNDER OPPTS AND NOT PAID UNDER OPPTS)

Hospital outpatient services are paid a prospectively set rate. Specific services, as indicated by HCPCS codes, map into APCs. Payment is based on a conversion factor times relative weights assigned to each APC, with further adjustment for local input prices and other provider-specific policy adjustments. We calculated APC-specific standardized unit costs as the product of the annual conversion factor in the base year times the APC relative weight, and assigned these values to outpatient claims, matching on the APC value. This was then applied to provider types (e.g. Critical Access Hospitals) not covered under the outpatient prospective payment system (OPPS). Some providers and some services are not covered under OPPS. For these, we assigned national average payments for each HCPCS code. The payments for each line item were calculated as: Revenue center payment amount + Revenue center cash deductible amount + Revenue center coinsurance/wage adjusted coinsurance ($REVPMTA_{ii} + RVDTBLA_{ii} + WGDJA_{ii}$), where *ii* refers to the line item number. Outpatient services can have up to 45 line items per claim.

C.11 INPATIENT REHABILITATION FACILITIES AND LONG TERM CARE HOSPITALS

Inpatient Rehabilitation Facilities (IRF) are paid using a prospective system in which payment is based on case-mix groups (CMGs), which capture various patient characteristics. However, inpatient rehabilitation facility stays are not as prevalent as short-stay hospitals; among inpatient rehabilitation stays, some CMG categories are rarely used. As a consequence, we lacked sufficient observations in our base year to provide reliable CMG-level average costs for many categories. Therefore, we adopted the DRG price approach described above in the context of short-stay inpatient stays. The CMG-based standardized unit cost was calculated using the base year (2006) IRF base rate times the relative weight associated with the CMG. These CMG-level standardized unit costs were then assigned to IRF claims in other years.

Medicare pays for the operating and capital costs associated with hospital inpatient stays in long term care hospitals. Medicare sets per discharge payment rates for different case-mix groups

called long-term care diagnosis-related groups (LTC-DRGs) based on the expected relative costliness of treatment for patients in the group. As with IRF stays, we lacked sufficient observations in our base year of LTC hospital stays to provide reliable LTC-DRG level average costs. Therefore, we adopted the DRG price approach described above in the context of short-stay inpatient stays. The LTC-DRG unit cost was calculated using the base year (2006) LTC-DRG base rate times the relative weight associated with the LTC-DRG. These LTC-DRG level standardized unit costs were then assigned to LTC-DRG claims in other years.

C.12 INPATIENT PSYCHIATRIC FACILITIES

Inpatient psychiatric facilities are paid using a hybrid prospective/retrospective system that lends itself to the average unit cost adjusted for actual length of stay approach described above. Payment is based on a DRG-based per-diem rate that is multiplied by the length of stay (with various adjustments). We calculated average per-diem rates using claims from the base year for each relevant DRG. The average was then multiplied by the length of stay associated with the claim to derive the standardized payment. Base year per-diem averages were applied to claims in other years. In 2005, the payment system was changed from a cost-based retrospective system to this hybrid system, with the changes phased in over time. The approach we used can be applied to all years.

C.13 HOSPICE CARE

Payment for hospice care also combines prospective and retrospective elements. A daily rate is set prospectively based on four categories of care: routine home care, intensive home care during periods of crisis, inpatient care to provide respite for primary caregivers, and inpatient care for services that cannot be provided elsewhere. Payments are then based retrospectively on the number of days services were provided in each of these categories. Although this suggests that standardized unit costs should be calculated as the average per-diem payments for hospice patients in each of these four categories multiplied by the number of days the patient spent in each setting, we found that the units of service in the Hospice SAF were very unreliable. Consequently, we defined the standardized unit cost at the claim level as the national average per diem cost of hospice care times the number of days hospice services were received.

Total cost at the line item level was defined as: Claim payment amount + Primary payer (other than Medicare) claim paid amount $PMT_AMT + PRPAYAMT$. Hospice length of stay was calculated as $THRU_DT - FROM_DT + 1$.

C.14 DURABLE MEDICAL EQUIPMENT

Unit costs paid for durable medical equipment are set according to state fee schedules (or at charges, if less). We calculated the average national payment for each type of equipment in the base year. Payments for durable medical equipment were calculated as: Line payment amount + Beneficiary Part B deductible amount + Line coinsurance amount + Line Beneficiary Primary Payer Paid Amount ($LNPMT_{ii} + LDDMT_{ii} + CNMT_{ii} + LPRDMT_{ii}$), where *ii* refers to the line item number. There are up to 13 line items in the durable medical equipment claims.

Types of equipment are defined by HCPCS codes. We assigned these values to individual line items after matching on the HCPCS code. For some types of equipment, there are different payment rates depending on whether the equipment was purchased or rented. Consequently, for these types of equipment, we calculated separate mean values and made standardized unit cost assignment accordingly. In averaging rental fees, we adjusted for varying time periods during which the equipment was rented.

APPENDIX TABLE D
EVALUATION & MANAGEMENT HCPCS CODES FOR INDIVIDUAL ELIGIBLE
PROFESSIONAL GEM MEASURE ATTRIBUTION

E&M HCPCS CODES TO INCLUDE FOR ATTRIBUTION								
99201	99222	99283	99324	95133	97760	G8014	G8062	G8158
99202	99223	99284	99325	95134	97761	G8015	G8075	G8159
99203	99431	99285	99326	95144	97762	G8016	G8076	G8160
99204	99435	99289	99327	95145	99025	G8017	G8077	G8161
99205	G0244	99290	99328	95146	99091	G8018	G8078	G8162
99385	G0378	G0263	99331	95147	99500	G8019	G8079	G8163
99386	G0379	G0264	99332	95148	99501	G8020	G8080	G8164
99387	99217	99341	99333	95149	99502	G8021	G8081	G8165
G0101	99231	99342	99334	95165	99503	G8022	G8082	G8166
G0245	99232	99343	99335	95170	99504	G8023	G8093	G8167
G0344	99233	99344	99336	95180	99505	G8024	G8094	G8170
99058	99234	99345	99337	95831	99506	G8025	G8099	G8171
99211	99235	99347	57410	95832	99507	G8026	G8100	G8172
99212	99236	99348	59425	95833	99508	G8027	G8103	G8182
99213	99238	99349	59426	95834	99509	G8028	G8104	G8183
99214	99239	99350	59430	95851	99510	G8029	G8106	G8184
99215	99356	99600	90901	95852	99511	G8030	G8107	G8185
99354	99357	99601	90911	95857	99512	G8031	G8108	G8186
99355	99361	99602	92502	96100	99539	G8032	G8109	99241
99395	99362	99300	92504	96105	0074T	G8033	G8110	99242
99396	99433	99301	92506	96110	1002F	G8034	G8111	99243
99397	94656	99302	92507	96111	4000F	G8035	G8112	99244
99401	94657	99303	92508	96115	4001F	G8036	G8113	99245
99402	94660	99304	92531	96117	4002F	G8037	G8114	99251
99403	94662	99305	92532	96150	4006F	G8038	G8115	99252
99404	99291	99306	92533	96151	4009F	G8039	G8116	99253
99411	99292	99307	92534	96152	4011F	G8040	G8117	99254
99412	99293	99308	92630	96153	G0270	G8041	G8126	99255
99420	99294	99309	92633	96154	G0271	G8051	G8127	99261
99429	99295	99310	93660	96155	G0337	G8052	G8128	99262
1000F	99296	99311	93662	97001	G0372	G8053	G8129	G0175
1001F	99297	99312	93668	97002	G8006	G8054	G8130	G0375
2000F	99298	99313	93797	97003	G8007	G8055	G8131	G0376
G0246	99299	99315	93798	97004	G8008	G8056	G8152	

G0247	99440	99316	95120	97005	G8009	G8057	G8153	
99218	99026	99318	95125	97006	G8010	G8058	G8154	
99219	99027	99321	95130	97703	G8011	G8059	G8155	
99220	99281	99322	95131	97750	G8012	G8060	G8156	
99221	99282	99323	95132	97755	G8013	G8061	G8157	
E&M HCPCS CODES TO EXCLUDE FOR ATTRIBUTION								
99381		95115		0503F			99273	
99382		95117		G0250			99274	
99383		99391		99175			99275	
99384		99392		99288			0115T	
99432		99393		99263			0116T	
0500F		99394		99271			0117T	
G0248		0502F		99272			0130T	

APPENDIX E
2007 BETOS CODES AND DESCRIPTIONS

(1) EVALUATION AND MANAGEMENT

M1A = Office visits - new
M1B = Office visits - established
M2A = Hospital visit - initial
M2B = Hospital visit - subsequent
M2C = Hospital visit - critical care
M3 = Emergency room visit
M4A = Home visit
M4B = Nursing home visit
M5A = Specialist - pathology (HCPCS moved to T1G in 2003)
M5B = Specialist - psychiatry
M5C = Specialist - ophthalmology
M5D = Specialist - other
M6 = Consultations

(2) PROCEDURES

P0 = Anesthesia
P1A = Major procedure - breast
P1B = Major procedure - colectomy
P1C = Major procedure - cholecystectomy
P1D = Major procedure - turp
P1E = Major procedure - hysterectomy
P1F = Major procedure - explor/decompr/excis disc
P1G = Major procedure - Other
P2A = Major procedure, cardiovascular-CABG
P2B = Major procedure, cardiovascular-Aneurysm repair
P2C = Major Procedure, cardiovascular-Thromboendarterectomy
P2D = Major procedure, cardiovascular-Coronary angioplasty (PTCA)
P2E = Major procedure, cardiovascular-Pacemaker insertion
P2F = Major procedure, cardiovascular-Other
P3A = Major procedure, orthopedic - Hip fracture repair
P3B = Major procedure, orthopedic - Hip replacement
P3C = Major procedure, orthopedic - Knee replacement
P3D = Major procedure, orthopedic - other
P4A = Eye procedure - corneal transplant
P4B = Eye procedure - cataract removal/lens insertion
P4C = Eye procedure - retinal detachment
P4D = Eye procedure - treatment of retinal lesions
P4E = Eye procedure - other
P5A = Ambulatory procedures - skin
P5B = Ambulatory procedures - musculoskeletal
P5C = Ambulatory procedures - groin hernia repair
P5D = Ambulatory procedures - lithotripsy
P5E = Ambulatory procedures - other
P6A = Minor procedures - skin
P6B = Minor procedures - musculoskeletal
P6C = Minor procedures - other (Medicare fee schedule)
P6D = Minor procedures - other (non-Medicare fee schedule)
P7A = Oncology - radiation therapy
P7B = Oncology - other

P8A = Endoscopy - arthroscopy
P8B = Endoscopy - upper gastrointestinal
P8C = Endoscopy - sigmoidoscopy
P8D = Endoscopy - colonoscopy
P8E = Endoscopy - cystoscopy
P8F = Endoscopy - bronchoscopy
P8G = Endoscopy - laparoscopic cholecystectomy
P8H = Endoscopy - laryngoscopy
P8I = Endoscopy - other
P9A = Dialysis services (Medicare Fee Schedule)
P9B = Dialysis services (Non-Medicare Fee Schedule)

(3) IMAGING

I1A = Standard imaging - chest
I1B = Standard imaging - musculoskeletal
I1C = Standard imaging - breast
I1D = Standard imaging - contrast gastrointestinal
I1E = Standard imaging - nuclear medicine
I1F = Standard imaging - other
I2A = Advanced imaging - CAT/CT/CTA: brain/head/neck
I2B = Advanced imaging - CAT/CT/CTA: other
I2C = Advanced imaging - MRI/MRA: brain/head/neck
I2D = Advanced imaging - MRI/MRA: other
I3A = Echography/ultrasonography - eye
I3B = Echography/ultrasonography - abdomen/pelvis
I3C = Echography/ultrasonography - heart
I3D = Echography/ultrasonography - carotid arteries
I3E = Echography/ultrasonography - prostate, transrectal
I3F = Echography/ultrasonography - other
I4A = Imaging/procedure - heart including cardiac catheter
I4B = Imaging/procedure - other

(4) TESTS

T1A = Lab tests - routine venipuncture (non Medicare fee schedule)
T1B = Lab tests - automated general profiles
T1C = Lab tests - urinalysis
T1D = Lab tests - blood counts
T1E = Lab tests - glucose
T1F = Lab tests - bacterial cultures
T1G = Lab tests - other (Medicare fee schedule)
T1H = Lab tests - other (non-Medicare fee schedule)
T2A = Other tests - electrocardiograms
T2B = Other tests - cardiovascular stress tests
T2C = Other tests - EKG monitoring
T2D = Other tests - other

(5) DURABLE MEDICAL EQUIPMENT

D1A = Medical/surgical supplies
D1B = Hospital beds
D1C = Oxygen and supplies
D1D = Wheelchairs
D1E = Other DME
D1F = Prosthetic/Orthotic devices
D1G = Drugs Administered through DME

(6) OTHER

- O1A = Ambulance
- O1B = Chiropractic
- O1C = Enteral and parenteral
- O1D = Chemotherapy
- O1E = Other drugs
- O1F = Hearing and speech services
- O1G = Immunizations/Vaccinations

(7) EXCEPTIONS/UNCLASSIFIED

- Y1 = Other - Medicare fee schedule
- Y2 = Other - non-Medicare fee schedule
- Z1 = Local codes
- Z2 = Undefined codes

Note: For a crosswalk of HCPCS codes to BETOS codes, see
https://www.cms.gov/HCPCSReleaseCodeSets/20_BETOS.asp

Source: Centers for Medicare & Medicaid Services Health Care Common Procedure Coding System (HCPCS), 2007

**APPENDIX F
LIST OF ACRONYMS**

ACSC	Ambulatory care sensitive condition
AHRQ	Agency for Healthcare Research and Quality
APC	Ambulatory payment classification
ASC	Ambulatory surgical center
ACE	Angiotensin converting enzyme
BCSSI	Buccaneer Computer Systems and Services, Inc.
BEA	Bureau of Economic Analysis
BETOS	Berenson-Eggers Type of Service Codes
CAH	Critical access hospital
CC	Chronic condition
CCW	CMS Chronic Condition Warehouse
CHF	Congestive heart failure
CMG	Case-mix groups
CMS	Centers for Medicare & Medicaid Services
CMSAs	Consolidated metropolitan statistical areas
COLA	Cost of living adjustments
COPD	Chronic obstructive pulmonary disease
COS	Cost of service
CPT	Current procedural terminology
CTS	Community Tracking Study
DME	Durable medical equipment
DRG	Diagnosis-related group

DSH	Disproportionate share hospital
ED	Emergency department
E&M	Evaluation and management
EPs	Individual physicians and other eligible professionals
ESRD	End-stage renal disease
FFS	Medicare fee-for-service
FIPS	Federal Information Processing Standards
GAF	Geographic adjustment factor
GEM	Generating Medicare Physician Quality Performance Measurement Results project
GPCIs	Geographic practice cost indices
HAI	Health account joint information
HbA1c	Hemoglobin A1c
HCC	Hierarchical condition categories
HCFA	Health Care Financing Administration
HCPCS	Healthcare Common Procedure Coding System
HHRGs	Home health resource groups
HICAN	Health insurance claims account number
HMO	Health maintenance organization
HSC	Center for Studying Health System Change
ICD-9	International Classification of Diseases–9th Revision (ICD-9) diagnosis codes
IME	Indirect medical education
IRF	Inpatient rehabilitation facilities
IFMC	Iowa Foundation for Medical Care
LDL	Low-density lipoprotein
LTC	Long-term care

MACs	Medicare administrative contractors
MedPAC	Medicare Payment Advisory Commission
MMA	Modernization Act of 2003
MPGs	Medical practice groups
MS	Medical specialist
MSAs	Metropolitan statistical areas
NCH	Medicare National Claims History Database
NLA	National limitation amount
NPI	National provider identifier
NPPES	National Plan and Provider Enumeration System
OPPS	Outpatient Prospective Payment System
PACE	Program of All Inclusive Care for the Elderly
PCP	Primary care physician
PECOS	CMS' Provider Enrollment, Chain, and Ownership System
PMSAs	Primary metropolitan statistical areas
PPS	Prospective payment system
PQIs	Prevention quality indicators
PQRI	Physician Quality Reporting Initiative
QDC	Quality data code
QRUR	Quality and Resource Use Report
ResDAC	Research Data Assistance Center
RUGs	Resource utilization groups
RVUs	Relative value units
SAFs	Medicare's Standard Analytical Files
SDPS	Standard Data Processing System Database

SNF	Skilled nursing facility
SRG	Surgeon
SSA	Social Security Administration
TINs	Tax identification numbers
UPIN	Unique physician identification number
UTI	Urinary tract infection
VBP	Value-based purchasing

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