Chronic Condition Subject Matter Expert Panel and BETOS Restructuring
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BETOS

Restructured BETOS Classification System (RBCS) Final Report

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Executive Summary

The Centers for Medicare & Medicaid Services (CMS) has long supported research and analysis to evaluate the provision of health services in the United States. In operating multi-billion dollar programs with major effects on the provision of health services to special populations, including many of the most vulnerable and with the most chronic conditions in the United States, CMS understands the crucial need to continually support policy development and analyses. Continuing concerns over the rising cost of health services and proposals for reform of government-financed and private sector health services have further highlighted the need for comprehensive, solid research.

In September 2019, the CMS Office of Enterprise and Data Analytics (OEDA) launched a project to restructure and maintain the Berenson-Eggers Type of Service[1] (BETOS) classification system. The project's objective was to update the BETOS classification system for healthcare services and supplies to facilitate meaningful analysis of healthcare spending and utilization, particularly in the Medicare Fee-for-Service (FFS) program.

This update restructures expenditures into meaningful clinical categories with the intent to ultimately group expenditures into functionally equivalent families. This resulted in the development of the Restructured BETOS Classification System (RBCS). RBCS development required an extensive review of the previous efforts to update BETOS and necessitated the exploration of innovative approaches to account for the majority of expenditures within Medicare Part B. The RBCS includes American Medical Association (AMA) Current Procedural Terminology (CPT Level One)[2] and Healthcare Common Procedure Coding System (HCPCS Level Two) codes, including codes for professional services, durable medical equipment (DME), drugs, and clinical lab tests.

As part of the model development process, a Technical Expert Panel (TEP) (see Appendix 1) from diverse backgrounds was identified, including, but not limited to: social science researchers, practicing physicians, physicians in academic institutions, and other federal agencies (such as CMS, the Centers for Disease Control and Prevention (CDC), and the Assistant Secretary for Planning and Evaluation (ASPE)). The TEP met four times (one face-to-face and three virtual meetings) to harness their individual expertise, review methodological approaches and data analyses, and provide consensus advice resulting in the recommendations of the final classification system.

A second part of the model development was to review the 13,415 individual CPT and HCPCS codes that were payable under Medicare. Expert clinical and master coder reviews were then conducted to verify annual coding updates and to analyze a subset of Medicare Part B data to guide the fiscal impact of capturing those codes. CPT and HCPCS codes were arranged into categories, subcategories, and families. Major vs. non-major procedure designations were also made. Decision rules (see Appendix 2) were developed and the taxonomy was expanded at each level to include services not previously captured to allow for trend analysis.

During each stage of development, validated and verified data was presented to the TEP to obtain a consensus opinion around the approach and to verify ongoing concurrence. The approach focused intensely on methods that would include previously uncaptured codes and that would significantly decrease the codes previously identified as "other" or "ungroupable." This focus on capturing ungrouped codes was particularly relevant in the area of the family development process. Table 1 shows how the development of the RBCS led to successful inclusion of codes into 158 families; now accounting for 4,070 codes in a family and $981 billion,

[1] Robert A. Berenson, MD, Mary Jo Braid-Forbes, MPH (May 2019). Updating BETOS 2.0 for 2018 and 2019. Report for the Medicare Payment Advisory Commission. https://www.urban.org/research/publication/development-and-structure-betos-20-illustrative-data.
[2] CPT® codes, descriptions, and other data are copyright 1966, 1970, 1973, 1977, 1981, 1983-2017. American Medical Association. All rights reserved. CPT is a registered trademark of the American Medical Association.

or over 88.5%, of all Part B FFS spending reviewed.

Spending not captured by RBCS families came from codes that could not be grouped into families based on spending thresholds, which is discussed in detail later in this report.

Table 1: RBCS Categorization and Spending (2014 – 2018)

	RBCS
Number of families	158
Codes assigned to a family*	4,070
Percent of codes accounted for by code families	30.3%
Total spending captured**	$981B
Percent of spending captured	88.5%

**Out of 13,415 paid codes*
***Out of $1.1 trillion*

This final report details the process undertaken during this project. Included in the report and appendices are significant details on the development of categories, subcategories, families, and procedure designation. The Final Taxonomy and "code crosswalk" are also included (see Appendix 3).

In conclusion, Team ***PRI*** successfully undertook the task of creating a RBCS taxonomy that:

- Provides a hierarchical structure that groups items and services into larger categories with more granular subcategories
- Permits objective and consistent assignment of all CPT and HCPCS codes
- Is compatible with the current BETOS system that allows for trend analysis
- Is structured around clear and logically sound rules that support long-term maintenance

Through this rigorous process, a total of 13,415 codes were categorized, capturing over $1.1 trillion in allowed spending. The classification system retains appropriate flexibility to adapt as new codes are introduced and old codes are retired.

The hierarchical construct of the RBCS can accommodate research needs at various levels of granularity. The RBCS classifications are clear, easily understood, and clinically relevant, which should help users understand how to interpret the RBCS taxonomy and facilitate the RBCS update process. The RBCS's structure and decision rules were designed to be future facing so that the taxonomy can adapt to changing trends and practice patterns over time. For example, telehealth is becoming an important tool for care delivery; however, it is not specifically identified in an RBCS family because it accounts for very little Medicare spending in the data being evaluated. If, over time, spending in telehealth reaches a certain level, it will be identified during the RBCS update process and assigned to a family. As such, the RBCS represents an important progression from the original BETOS taxonomy.

Project Overview

Background

The rapid evolution of medical services and technology has led to changes in Medicare spending and, in turn, has created challenges to understanding Medicare expenditures. Since the 1980s, CMS, policymakers, and researchers have relied on the BETOS taxonomy to understand shifts in Medicare Part B spending. However, since BETOS was originally developed, new avenues of utilization have materialized and the landscape of provided services has expanded, requiring the BETOS system to be refreshed. The ideal update would capture all expenditures within a meaningful framework and would facilitate the detection of fluctuations in spending and utilization over time.

As such, a group of expert panelists representing clinical, coding, policy, and research perspectives was convened to create a comprehensive re-mapping of BETOS, while maintaining some level of backward compatibility with the original BETOS taxonomy to support trend analysis.

Project Goals and Objectives

The RBCS TEP was tasked with developing an updated clinical classification system building upon the meaningful components of BETOS. The goal of the RBCS is to categorize the thousands of CPT and HCPCS codes used for Medicare Part B billing into a limited set of distinct categories. Such categories would support the study of contemporary spending trends while allowing for historical comparison/backward compatibility to support trend analysis.

The objectives for this project included:

- Review five years of Part B claims, including codes paid by the Medicare Physician Fee Schedule (MPFS) and the Outpatient Prospective Payment System (OPPS) code sets, and propose a new hierarchical classification system meeting the following requirements:
  - The classification taxonomy must capture all CPT and HCPCS codes paid by Medicare during the study timeframe
  - The new taxonomy must be compatible with the current BETOS system for longitudinal trend analysis
  - The final taxonomy must have clear and detailed rules for code classification
  - The decision rules must be logically sound and adequate to support long-term taxonomy maintenance

Technical Expert Panel (TEP)

As part of the model development process, a panel of experts knowledgeable in complex program management, Medicare administrative data, evidence-based medical practice and health policy research, and clinical coding were brought together. As shown below, the panel members represented an appropriate mix of perspectives needed for a comprehensive and representative discussion of the RBCS. The panel makeup includes social science and health services researchers, practicing physicians, physicians in academic institutions, health plans, and federal agencies. The TEP convened a total of four times (one face-to-face and three virtual meetings) over the course of this project (see Appendix 5).

Table 2: TEP Members

Panel Members	
Robert Anderson, PhD Centers for Disease Control and Prevention (CDC)	**Linda Andes, PhD** Centers for Disease Control and Prevention (CDC)
Robert Berenson, MD Urban Institute	**Suzanne Codespote, ASA** Office of the Actuary (CMS)
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RBCS Development Process

Technical Approach

Evaluating BETOS 2.0

The first step in the RBCS development process was to determine the extent to which this revision should borrow from the work already completed by the Medicare Payment Advisory Commission to update BETOS in 2017 and 2019, which resulted in a taxonomy called BETOS 2.0. Applicable aspects, pertinent to RBCS development, will be included through this report, but the bulk of the BETOS 2.0 development process will not be covered in depth here. Those interested in understanding the BETOS 2.0 taxonomy in greater detail should refer to the BETOS 2.0 documentation (Berenson, Forbes, 2017; 2019).

The BETOS 2.0 framework represents a promising starting point for this work for two primary reasons. First, BETOS 2.0 and the RBCS share two primary developmental objectives: both seek to more accurately capture current procedures and practice patterns, and both seek to maintain a certain level of compatibility with the original BETOS taxonomy. Because of this, many of the design decisions that were made during the BETOS 2.0 development have led to the underlying framework of the RBCS composite process.

Second, the BETOS 2.0 conceptual framework, decision rules, and taxonomy structure have been thoroughly reviewed and vetted by experts. The BETOS 2.0 taxonomy was carefully crafted with respect to clinical decision making, coding guidelines, and research requirements by an experienced research team. Throughout the BETOS 2.0 development process, panels of Subject Matter experts (SMEs) systematically evaluated the BETOS 2.0 design and decision rules. By building on this work, the RBCS design process takes advantage of this previous effort.

For these reasons, the RBCS design team and the TEP agreed that the RBCS taxonomy should begin with BETOS 2.0, which would then be modified as necessary to meet the RBCS design goals and objectives.

RBCS Taxonomic Structure

Like the original BETOS taxonomy and BETOS 2.0, the RBCS taxonomy is hierarchically structured, with categories at the highest level followed by subcategories and a family designation. Each lower level of the taxonomy is fixed and nested within the categorical structure above so that lower level groupings cannot span higher level groupings (e.g., a single subcategory cannot capture codes from two or more categories). Also consistent with the original BETOS taxonomy and BETOS 2.0, the RBCS differentiated major and non-major procedures.

Also like the original BETOS and BETOS 2.0, the RBCS taxonomy is condensed into a single code. In the RBCS, this code is six characters in length with each character or group of characters conveying important information about the code's place in the RBCS taxonomy. The RBCS category is identified by the first character, the subcategory is identified by the combined first and second characters, the family is identified by the third, fourth, and fifth characters, and the major vs. non-major procedure designation is identified by the sixth character. Imbedding intelligence into the code in this way should help data users determine a given code's general place in the RBCS taxonomy at a glance.

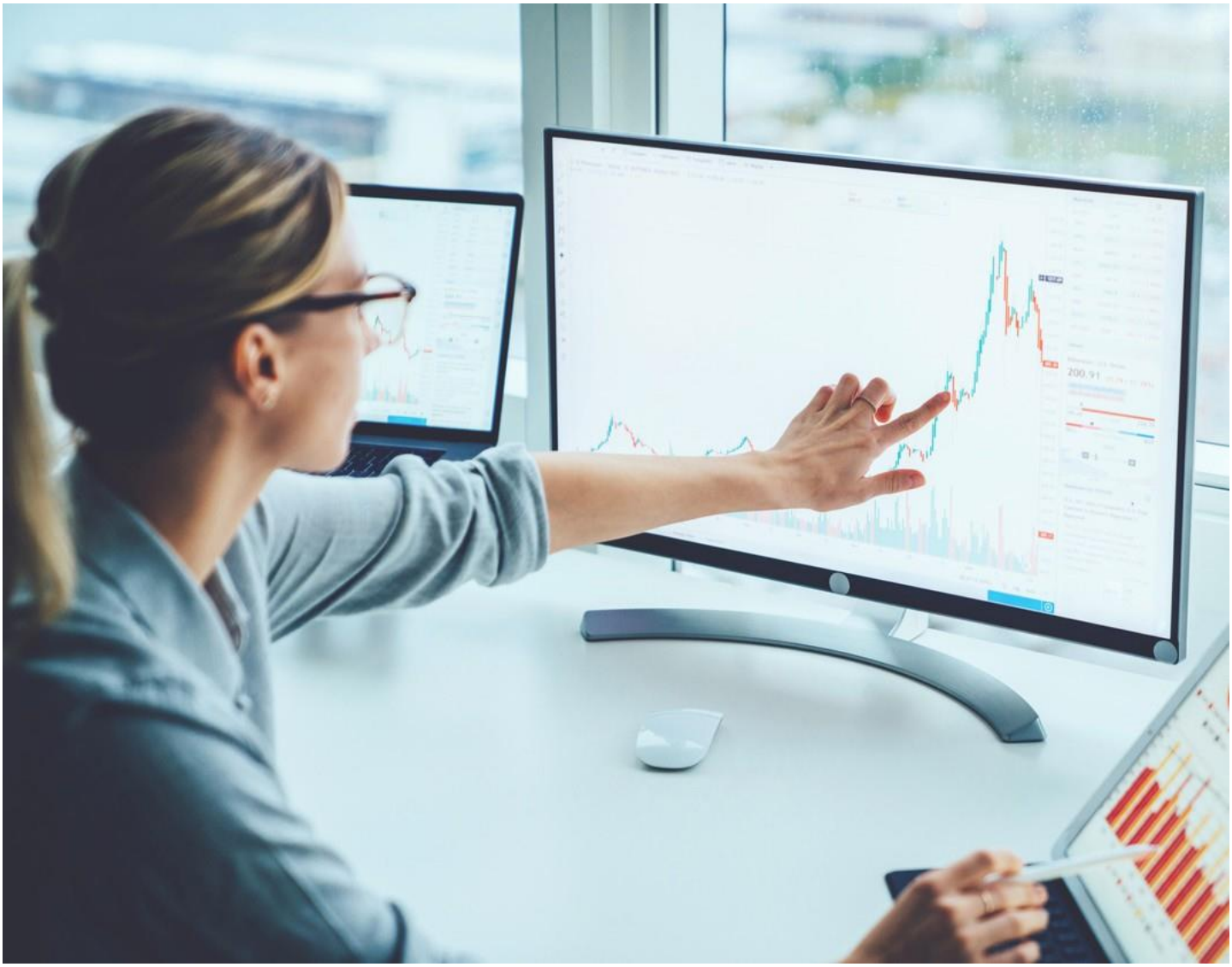
Figure 1: RBCS Code Structure

RBCS Development

Data

The current development of the RBCS taxonomy used the CMS Chronic Conditions Data Warehouse (CCW) Virtual Research Data Center (VRDC) Medicare FFS data from the carrier, DME, home health, and outpatient files for years 2014 – 2018. Each year, the RBCS process will be updated utilizing the most recently compiled five years of data. The next update will employ data from the years 2015 – 2019.

Data from these years were combined and analyzed as a single unit. Because the process uses such a large amount of data spread over several years, changes in spending and utilization will take time to emerge. This is important because spending and utilization are used during the family creation and major vs. non-major procedure code identification process (covered in more detail below). By using a large dataset composed of several years' worth of data, the taxonomy will naturally adjust to changing trends and practice patterns, but will do so slowly, giving the RBCS taxonomy the stability needed to be a useful research tool.



Categories

The final RBCS category assignment decision rules are presented in Table 3.

Table 3: RBCS Category Decision Rules

RBCS First Character	Category	Rule
A	Anesthesia	• All anesthesia codes were placed in the anesthesia category.
D	Durable Medical Equipment (DME)	• HCPCS codes for products and supplies were classified as DME.
E	Evaluation and Management (E&M)	• All codes identified as evaluation and management visits were classified as E&M. • CPT and HCPCS codes for physical examinations to obtain specimens for subsequent testing were assigned to the E&M category as well.
I	Imaging	• If the primary purpose of a given CPT or HCPCS code was to obtain an image, it was classified as imaging in the RBCS taxonomy. • For situations in which a CPT or HCPCS code appeared to combine imaging and a procedure, if the primary purpose was to produce an image for interpretation, the code was assigned to imaging.
O	Other	• Captured ambulance, enteral and parenteral feeding and nutrition services and supplies, and vision, hearing, and speech services were classified as other.
P	Procedure	• If the primary purpose of a given CPT or HCPCS code was to perform a procedure at a single time and place, it was classified as a procedure in the RBCS taxonomy. • For situations in which a CPT or HCPCS code appeared to combine imaging and a procedure, if the primary purpose was to produce an image to facilitate a procedure, the code was classified as a procedure in the RBCS taxonomy. • CPT and HCPCS codes for obtaining biopsy or measurement information were also assigned to the procedure code category.
R	Treatment	• If the medical intervention described by a given CPT or HCPCS code was intended to be delivered repeatedly as part of a series over time, it was classified as a treatment in the RBCS taxonomy. • CPT and HCPCS codes that linked an evaluation and management process with a treatment modality were classified as treatments.
T	Test	• If the purpose of the procedure was to obtain test results, the code was classified as a test.

An overview of code category assignment for the RBCS is presented in Table 4.

Table 4: Distribution of Codes by Category

Category	RBCS
Anesthesia	300
Durable Medical Equipment	2,140
Evaluation and Management	455
Imaging	880
Other	172
Procedure	6,229
Treatment	1,271
Test	1,968
Not Classified	0

Subcategories

Following the completion of the RBCS category development process, the same general process was repeated for subcategories. The rules for subcategory assignment, many of which are borrowed directly from BETOS 2.0, are presented in Table 5.

Table 5: RBCS Subcategory Classification Rules

Category	Subcategory Assignment Rules
Evaluation and Management	• Subcategory distinctions remain based primarily on place of service. • Most E&M (care management/coordination) spending is in “visits,” with substantial variation by place of service. • Certain E&M activities described by CPT/HCPCS codes, specific to a clinical domain (e.g., ophthalmology and behavioral health), were retained. • Recent policy interest in new E&M activities that do not require in-person patient encounters and are being recognized for MPFS payments gave rise to a subcategory for care coordination/management activities. As such codes increase in number, they may need to be grouped into subcategories and families in the future.

Category	Subcategory Assignment Rules
Procedures and Treatment	• Neither technical modality (e.g., endoscopy) nor service location (e.g., office or ambulatory surgical center) were deemed clinically important distinctions for creating subcategories. In the RBCS, organ system remains the sole basis for subcategories for procedures, and type of treatment remains the basis for treatment subcategories. • The CPT numbering system is useful for placing sets of codes into the appropriate organ system. The CPT classification is followed with some exceptions to reflect that services can be assigned to more than one organ system; for example, procedures on the spine reasonably can be considered either musculoskeletal or central nervous system. • Blood products and preparation for transfusion (to include CPT laboratory service codes) are categorized to PH (Procedure/Hematology). • Drugs administered orally are categorized as RX (Treatment/Miscellaneous). Some medications associated with chemotherapy, but also used for other treatment, are categorized as RX (Treatment/Miscellaneous) rather than RH (Treatment/ Chemotherapy). • Administration of preventive vaccines covered by Medicare are categorized to RI (Treatment/Injection) for influenza, pneumococcal, and Hepatitis B vaccines. • Component services for dialysis and supplies are grouped as RD (Treatment/Dialysis).
Imaging	• The original BETOS imaging subcategories continue to effectively present the different imaging modalities.
Tests	• A combination of clinical domain and clinical/coding expertise was used to create the subcategories. • HCPCS codes for travel allowance and collection of specimens are categorized as TL (Test/Laboratory), such as collection of venous blood by venipuncture. Venipunctures and arterial punctures for withdrawal of blood for diagnosis are categorized as procedures.
Anesthesia	• Spending was not analyzed inside this broad category, and no subcategory or family designations were created.
Durable Medical Equipment	• DA (Medical/Surgical Supplies) is assigned to items that get thrown away after use or that are not used with equipment. • DE (Other DME) is assigned to reusable medical equipment that can withstand repeated use. • Drug and supply dispensing fees paid to a pharmacy are categorized as DE (Other DME). • DF (Orthotic Devices) includes codes for prosthetics.
Other	• The OB (Other/Enteral & Parenteral) category includes formula, tubes, supply kits, etc., and all services and supplies related to enteral and parenteral nutrition.

The final RCBS taxonomy includes 41 subcategories. All subcategories and their associated categories are presented in Table 6. The first two characters of the RBCS taxonomy indicate category and subcategory assignment.

Table 6: RBCS Subcategories

Evaluation and Management	Procedures	Treatments
EB – Behavioral health services EC – Critical care services EE – Ophthalmological services EH – Home services EI – Hospital inpatient services EN – Nursing facility services EM – Care management/coordination EO – Observation care services EP – Hospice/palliation ER – Emergency department services EV – Office/outpatient services EX – Miscellaneous	PB – Breast PC – Cardiovascular PE – Eye PG – Digestive/ gastrointestinal PH – Hematology PM – Musculoskeletal PO – Other organ systems PS – Skin PV – Vascular	RB – Chiropractic RD – Dialysis RH – Chemotherapy RI – Injections and infusions (non-oncologic) RR – Radiation oncology RT – Physical, occupational, and speech therapy RX – Miscellaneous
Imaging	**Tests**	**Durable Medical Equipment**
IC – CT (computerized tomography) IM – MR (magnetic resonance) IN – Nuclear IU – Ultrasound IS – Standard X-ray IX – Miscellaneous	TA – Anatomic pathology TC – Cardiology TL – General laboratory TM – Molecular testing TN – Neurologic TP – Pulmonary function TX – Miscellaneous	DA – Medical/surgical supplies DB – Hospital beds DC – Oxygen and supplies DD – Wheelchairs DE – Other DME DF – Orthotic devices (includes prosthetics) DG – Drugs administered through DME
Other	**Anesthesia**	
OA – Ambulance OB – Enteral and parenteral OC – Vision, hearing, and speech	AA – Anesthesia	

Families (See Appendix 4)

Code families fill several roles in the RBCS procedure code classification schema. First, they provide more granular code groups than is available at the category and subcategory level. They group together clinically related services so that researchers can easily identify procedures that are relatively similar to one another.

Second, the family creation process relies on spending and utilization patterns, ensuring that the RBCS taxonomy stays up to date with changing practice trends. As practice patterns change or new CPT and HCPCS codes are introduced, spending will increase for groups of procedures that see more utilization and will decrease in groups that see decreasing utilization. In this way, new families will be introduced and old families will be retired. This has the dual benefit of keeping the RBCS taxonomy up to date with new technologies and trends, while also pruning families that experience decreased utilization.

The RBCS process used to combine codes into families began by identifying the highest spend non-anesthesia codes that account for 90% of all allowed spending. These high spend codes are used as starting points to build code families. From these high spend codes, codes that represent clinically similar services were identified. Clinical/coding experts and AMA CPT section and subsection headings were the primary means by which similar codes were grouped.

After codes were grouped, spending within these groups was evaluated. If these sets of related codes accounted for at least 0.1% ($1.1 billion) of non-anesthesia related spending, they were officially identified as an RBCS family group. If a set of codes was not able to account for at least 0.1% of allowed spending, no formal family was created and the codes remain unassigned at the family level.

The family classification was added to the RBCS taxonomy code as the third, fourth, and fifth characters of the code value. For each category, families were assigned a numeric value beginning with “001” in order of highest spending to lowest spending, with “001” assigned to the family with the highest spend. Numbers were assigned in this way because the families with the highest spend are likely to be the most stable over time. Codes that were not assigned to a family were always given the value of “000.” The list of all families and their associated taxonomy codes are presented in Appendix 4.

Major vs. Non-Major Procedures

The final step of the RBCS classification taxonomy development was to determine which codes in the procedure category were major vs. non-major procedures. This process used relative value units (RVUs) and the percentage of time a given code is used in an inpatient setting. RVU releases for 2015, 2016, 2017, 2018, and 2019 were obtained from the CMS website. The most recent non-missing RVU was retained for situations in which a code was assigned different RVUs across years. Only codes from the procedures category were classified in this way. Codes in all other categories were classified as non-procedures.

Inpatient utilization percentage was calculated using data from the VRDC carrier and DME claim files. This is because all claims in the hospital outpatient and home health files are billed via the UB-04 claim form (also known as the CMS-1450 or 837i). Most inpatient claims billed on a UB-04 will be paid by Medicare Part A, which does not use CPT or HCPCS codes. As a result, almost all CPT and HCPCS code data from UB-04 claims would be billed in non-inpatient settings. Thus, including codes from the hospital outpatient and home health files would only serve to increase the size of the denominator without contributing to the size of the numerator.

A code could be classified as major in four different ways:

- If a code was assigned an RVU greater than or equal to 9.0, it was identified as a major procedure.
- If a code was assigned an RVU greater than or equal to 5.5 but less than 9.0, and was used in an inpatient setting greater than 15% of the time, it was identified as a major procedure.
- If the CPT code description began with “unlisted” and occurred in an inpatient setting with a frequency greater than 15%, the code was classified as a major procedure. The RVU requirement was not included for unlisted codes because RVUs are not assigned to these codes.
- If the primary code for an add-on code was classified as a major procedure, the add-on code was also classified as a major procedure. Add-on codes represent procedures where the bulk of the effort is concentrated in the primary code. For this reason, add-on codes would generally not be classified as major procedures using RVU rules, even if they occurred within the context of a major procedure. To account for this, if all primary codes for a given add-on code were major procedures, the add-on code was also considered a major procedure. This rule was not applied in situations in which primary codes for the add-on code were a mix of major and non-major procedures.

The major vs. non-major designation was added to the RBCS taxonomy code as the sixth character of the code value. Major procedures were assigned an “M” and non-major procedures were assigned an “O” (other). An “N” (Not a procedure) was applied to all non-procedure codes.

Analysis

One of primary goals of the RBCS process is to create a taxonomy that is consistent with the original BETOS taxonomy at the category level. Comparisons between the original BETOS taxonomy, BETOS 2.0, and the RBCS are presented in Tables 7 and 8. Note that the RBCS taxonomy split the procedures category from the original BETOS into separate anesthesia, treatment, and procedure categories. Therefore, to compare the RBCS to the original BETOS at the procedure category, it is necessary to evaluate them at the procedures (sum) line, which combines the procedure, anesthesia, and treatment categories.

Table 7: Percent of Spending by Category for Original BETOS, BETOS 2.0, and RBCS*

Classification Heading	Original BETOS	BETOS 2.0	RBCS
Procedure	34%	20%	21%
Anesthesia		1%	1%
Treatment		13%	27%
Procedures (sum) **	34%	35%	50%
Evaluation and Management	27%	25%	27%
Imaging	9%	9%	9%
Tests	6%	3%	7%
Durable Medical Equipment	4%		4%
Other	15%		3%
Exceptions/Unclassified	<1%		
Codes with No Classification	5%	28%	

**All numbers rounded to closest percentage*
***This row sums the procedure, anesthesia, and treatment rows to allow comparisons between the original BETOS taxonomy and BETOS 2.0 and RBCS taxonomies*

Table 8: HCPCS/CPT Code Count by Category for Original BETOS, BETOS 2.0, and RBCS

Classification Heading	Original BETOS	BETOS 2.0	RBCS
Procedure	6,357	6,014	6,229
Anesthesia		295	300
Treatment		324	1,271
Procedures (sum)	6,357	6,633	7,800
Evaluation and Management	336	348	455
Imaging	857	757	880
Tests	1,759	460	1,968
Durable Medical Equipment	2,118		2,140
Other	770		172
Exceptions/Unclassified	126		
Codes with No Classification	1,092	5,217	

As shown in the procedures (sum) row of Tables 7 and 8, the procedure, anesthesia, and treatment categories under the RBCS captured a higher percentage of allowed spending and more codes relative to the procedures category in the original BETOS (7,800 codes and 50% of allowed spending for RBCS vs. 6,357 codes and 34% of allowed spending for original BETOS). The difference between the RBCS and the original BETOS with respect to the amount of spending accounted for and the number of codes assigned is the result of codes both moving into and out of the procedures group. Relative to the original BETOS taxonomy, 1,536 codes were added to the procedure group, while 93 codes classified as procedure codes in the original BETOS moved to non-procedure related categories. Most of the 1,536 additional codes were either not classified in the original taxonomy (627), or were grouped into the exceptions/unclassified category (24) or the “other” category (652). These three groups of codes account for 85% of new codes in the RBCS procedures group. How codes from these three groups are distributed in the RBCS taxonomy is presented in Table 9.

Table 9: RBCS Distribution of Codes Not Included in the Original BETOS Taxonomy or Classified As Exceptions/Unclassified or Other

	Original BETOS Classification			
RBCS Classification	**Not in Original BETOS**	**Exceptions/Unclassified**	**Other**	**Total**
Anesthesia	16	1		17
Treatment	279	15	649	943
Procedure	332	8	3	343
Evaluation and Management	76	77		153
Imaging	73	1		74
Test	263	4	2	269
Durable Medical Equipment	50	19	56	125
Other	3	1	60	64

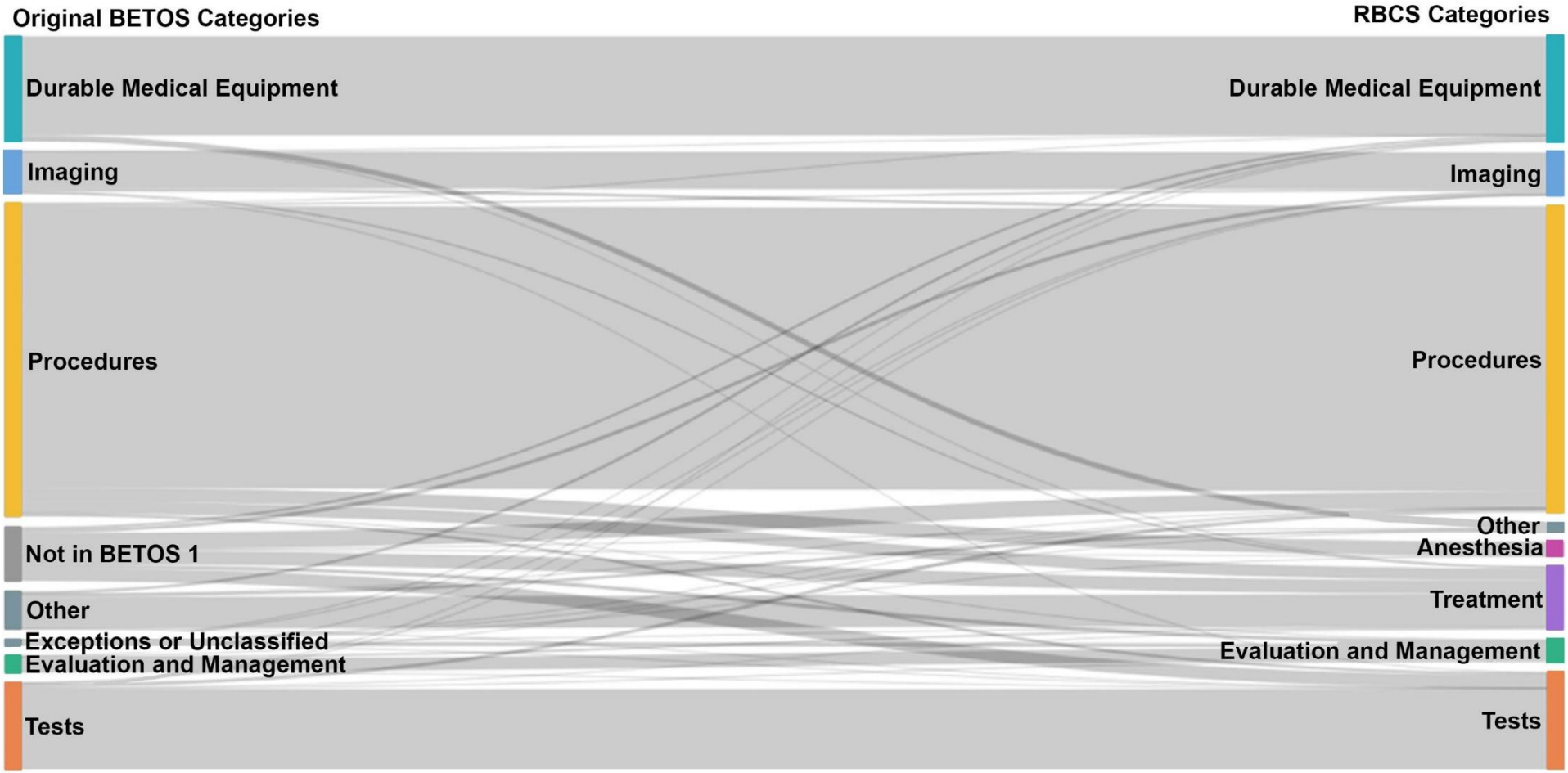
A similar pattern is present in the spending data. Of the $169 billion newly classified in the RBCS taxonomy, $166 billion was not classified in the original taxonomy, or was captured by the exceptions/unclassified category or “other” category. The breakdown of this spending is presented in Table 10.

Table 10: Distribution of Spending (in Millions) Not Included in the Original BETOS Taxonomy or Classified As Exceptions/Unclassified or Other

	Original BETOS Classification			
RBCS Classification	**Not in Original BETOS**	**Exceptions/Unclassified**	**Other**	**Total**
Anesthesia	$600	<$1		$600
Treatment	$25,532	$481	$132,200	$158,214
Procedure	$6,832	$17	$377	$7,226
Evaluation and Management	$6,286	$1,977		$8,263
Imaging	$4,103	$2		$4,105
Test	$6,035	1,275	<$1	$7,310
Durable Medical Equipment	$2,453	$23	$1,396	$3,872
Other	$107	$1	$36,559	$36,666

The consensus of the data presented in Tables 7 – 10 is that although at the category level there are large differences between the original BETOS taxonomy and the RBCS, these differences are the result of improved classification. Fewer codes are grouped into non-specific categories; instead, these codes are grouped into meaningful categories. A visual representation of movement between the original BETOS taxonomy to the RBCS is provided in Figure 2 below. The original BETOS categories are provided on the left side of the figure, and the RBCS categories are provided on the right. The number of codes belonging to each category is represented by the thickness of the colored bars next to each category label. The gray lines provide a visual representation of code movement between the original BETOS categories and the RBCS. For example, most codes in the original BETOS procedures category also fall into the RBCS procedures category. Of those that changed, most are assigned to the anesthesia or treatment categories.

Figure 2: Illustration of Code Movement between Categories from the Original BETOS (Left) to the RBCS (Right)



Category comparisons between BETOS 2.0 and the RBCS focused on codes that were categorized in the BETOS 2.0 hierarchy (i.e., codes not captured by BETOS 2.0 were excluded from this analysis). This analysis found very few differences in code category assignment between BETOS 2.0 and the RBCS. A total of 62 codes moved, and most were moved from the imaging category to the procedures category. A breakdown of code movement between categories is provided in Table 11 below.

Table 11: Movement between BETOS 2.0 to the RBCS at the Category Level

BETOS 2.0 Category	New RBCS Category	Codes Moved
Evaluation and Management	Treatment	10
Imaging	Procedure	31
	Treatment	1
Procedure	Test	2
	Treatment	5
Test	Procedure	3
Treatment	Procedure	10

Subcategories

Although the RBCS was designed to be consistent with the original BETOS taxonomy at the category level, there are significant differences at the subcategory level. The differences are a result of enhancements to improve the usefulness and accuracy of the overall taxonomy. As a result, comparisons between the original

BETOS and the RBCS are not particularly useful and will not be included in this analysis. Instead, this analysis will focus on comparisons between BETOS 2.0 and the RBCS.

An examination of codes that changed subcategories between BETOS 2.0 and the RBCS illustrates code assignment stability. Table 12 provides a breakdown showing that very few codes captured by BETOS 2.0 changed at the subcategory level. Out of the 8,198 codes classified by both BETOS 2.0 and the RBCS, only 167 (2%) changed subcategories. The largest percentage of those that changed were placed in a newly created subcategory for procedures related to the breast.

Table 12: Code Movement at the Subcategory Level between BETOS 2.0 and RBCS

BETOS 2.0 Subcategory	New RBCS Subcategory	Codes Moved
Anatomic pathology	Molecular testing	8
Behavioral health services	Office/outpatient services	1
	Physical, occupational, and speech therapy	1
Cardiography	Cardiovascular	2
Care management/coordination	Home services	3
	Hospice	1
Chiropractic	Spinal manipulation	4
Digestive/gastrointestinal	Dialysis	3
Miscellaneous	Cardiovascular	2
	Hematology	7
	Musculoskeletal	1
	Neurologic	1
	Other organ systems	1
	Physical, occupational, and speech therapy	9
	Radiation oncology	2
	Spinal manipulation	5
Observation care services	Office/outpatient services	1
Other organ systems	Anatomic pathology	1
	Breast	59
	Musculoskeletal	1
	Neurologic	1
Radiation oncology	Chemotherapy	1
Skin	Other organ systems	2
Standard X-ray	Cardiovascular	25
	CT scan	7
	Digestive/gastrointestinal	1
Ultrasound	Cardiovascular	5
	Dialysis	1
	Standard X-ray	1
Vascular	Cardiovascular	2
	Dialysis	2
	Hematology	6

A full breakdown of the RBCS subcategory assignment is provided below. All 52 subcategories are presented along with the total spending accounted for, and the number of codes captured by each subcategory. To help illustrate their place within the RBCS taxonomy, Table 13 presents subcategories nested within each RBCS category.

Table 13: Subcategories under the RBCS

	Allowed Spending (Millions)	% of Allowed Spending	Total Codes	% of Codes
Category: Anesthesia				
AA	$13,699	1.23%	300	2.24%
Category: Durable Medical Equipment				
Drugs administered through DME	$4,921	0.44%	39	0.29%
Hospital beds	$544	0.05%	37	0.28%
Medical/surgical supplies	$2,642	0.24%	290	2.16%
Orthotic devices	$13,798	1.24%	1029	7.67%
Other DME	$14,515	1.31%	436	3.25%
Oxygen and supplies	$5,560	0.50%	20	0.15%
Wheelchairs	$3,107	0.28%	289	2.15%
Category: Evaluation and Management				
Behavioral health services	$11,360	1.02%	72	0.54%
Care management/coordination	$2,051	0.18%	26	0.19%
Critical care services	$7,358	0.66%	18	0.13%
Emergency department services	$50,309	4.54%	14	0.10%
Home services	$3,419	0.31%	38	0.28%
Hospice	$16	0.00%	7	0.05%
Hospital inpatient services	$51,643	4.66%	22	0.16%
Miscellaneous	$472	0.04%	77	0.57%
Nursing facility services	$13,990	1.26%	28	0.21%
Observation care services	$4,311	0.39%	12	0.09%
Office/outpatient services	$144,998	13.07%	109	0.81%
Ophthalmological services	$12,967	1.17%	32	0.24%
Category: Imaging				
CT scan	$21,984	1.98%	70	0.52%
Miscellaneous	$1,906	0.17%	9	0.07%
MR	$11,771	1.06%	90	0.67%
Nuclear	$16,534	1.49%	216	1.61%
Standard X-ray	$23,985	2.16%	376	2.80%
Ultrasound	$22,816	2.06%	119	0.89%

	Allowed Spending (Millions)	% of Allowed Spending	Total Codes	% of Codes
Category: Other				
Ambulance	$34,187	3.08%	15	0.11%
Enteral and parenteral	$2,479	0.22%	43	0.32%
Vision, hearing, and speech services	$617	0.06%	114	0.85%
Category: Procedure				
Breast	$3,374	0.30%	59	0.44%
Cardiovascular	$38,647	3.48%	453	3.38%
Digestive/gastrointestinal	$30,821	2.78%	912	6.80%
Eye	$27,303	2.46%	293	2.18%
Hematology	$2,501	0.23%	68	0.51%
Musculoskeletal	$52,907	4.77%	2000	14.91%
Other organ systems	$29,567	2.67%	1594	11.88%
Skin	$28,462	2.57%	411	3.06%
Vascular	$23,434	2.11%	439	3.27%
Category: Test				
Anatomic pathology	$11,521	1.04%	110	0.82%
Cardiography	$6,827	0.62%	81	0.60%
Laboratory	$39,993	3.61%	1164	8.68%
Miscellaneous	$3,332	0.30%	153	1.14%
Molecular testing	$4,787	0.43%	318	2.37%
Neurologic	$6,128	0.55%	100	0.75%
Pulmonary function	$1,804	0.16%	42	0.31%
Category: Treatment				
Chemotherapy	$59,754	5.39%	206	1.54%
Dialysis	$64,357	5.80%	59	0.44%
Injections and infusions (non-oncologic)	$99,976	9.01%	641	4.78%
Miscellaneous	$8,519	0.77%	139	1.04%
Physical, occupational, and speech therapy	$42,016	3.79%	69	0.51%
Radiation oncology	$21,361	1.93%	148	1.10%
Spinal manipulation	$3,893	0.35%	9	0.07%

Families

A high-level comparison of RBCS vs. BETOS 2.0 families is presented in Table 14.

Table 14: Family Level Comparison of BETOS 2.0 and RBCS (2014 – 2018)

	BETOS 2.0	RBCS
Number of families	51*	158
Codes assigned to a family**	579	4,070
Percent of codes accounted for by code families	4.3%	30.3%
Total spending captured***	$345B	$981B
Percent of spending captured	31.1%	88.5%

**Four of the BETOS 2.0 families included in this table did not meet the 0.1% threshold used to create families in the RBCS taxonomy*
***Out of 13,415 paid codes*
****Out of $1.1 trillion*

Of the families created in BETOS 2.0, 66 codes from seven families were not captured in the RBCS. Of these 66 codes, 63 were from families that did not meet the spending threshold. The remaining three codes were removed from the family after clinical expert review. The distribution of these families is presented in Table 15.

Table 15: Distribution of Codes Captured by Families in BETOS 2.0 but Not Captured by Families in RBCS

BETOS 2.0 Family	Code Count
Nerve block injection*	34
Coronary artery bypass graft*	21
Femoral fracture repair*	5
Paring/cutting hyperkeratotic lesion*	3
Cystourethroscopy	1
Injection (including vaccinations)	1
Positron emission tomography (PET)	1

**These families were not created in the RBCS*

Major vs. Non-Major Procedure Code Classification

Very little variation was observed when comparing major vs. non-major procedures in the RCBS and BETOS 2.0. Of the 6,012 codes classified as procedures in BETOS 2.0, 5,677 (94%) retained their BETOS 2.0 designation. Changes between major vs. non-major designation are noted in Table 16.

Table 16: Changes in Major vs. Non-Major Code Assignment from BETOS 2.0 to RBCS

Code Movement	Code Count
Major to RBCS Non-Major	84
Major to RBCS Non-Procedure	3
Non-Major to RBCS Major	244
Non-Major to RBCS Non-Procedure	4

Conclusions

RBCS Development

Since its initial development over 30 years ago, the original BETOS taxonomy has become recognized as an important tool by those who want to investigate and better understand healthcare spending and utilization. It condensed trends in the thousands of procedure codes available for medical billing into a relatively small number of distinct and clinically meaningful groups. However, since BETOS was originally developed, medical practice has advanced and treatment patterns have changed, resulting in the BETOS taxonomy becoming outdated. The need to develop an updated and revised BETOS taxonomy led to, or brought about, the work presented in this report.

RBCS design work began with the understanding that it was an evolution of the BETOS framework, and that it would need to fill the same niche that the original BETOS occupied. Throughout the RBCS development process, careful consideration was given to how the classification system will be used, understood, and maintained over time. The design of the taxonomy, the decision rules, and the classification methodology were structured with these guiding operational principles in mind.

The taxonomy is hierarchically structured with several levels of granularity, which allows researchers to easily select the level(s) of analysis in which they are interested. The various groupings within each level of the hierarchy (categories, subcategories, and families) were carefully crafted to ensure they were clinically meaningful and informative. The RBCS process was guided by clinical, coding, and research experts, and the design decisions they recommended were validated and verified by a panel of SMEs. Although the RBCS framework borrowed heavily from the BETOS 2.0 taxonomy design, it expanded upon this work to create a more comprehensive classification structure.

The RBCS was able to accomplish the goals set at the beginning of this process. The RBCS process:

- Captured all CPT and HCPCS codes used to bill for services paid for by Medicare Part B.
- Maintained a high level of compatibility with the original BETOS taxonomy at the category level; this allows for a desired level of continuity so that research conducted with the original BETOS taxonomy can be compared to research conducted with the RBCS.
- Grouped the 13,415 CPT and HCPCS codes paid by Medicare into distinct and clinically meaningful categories, subcategories, and families.
- Provides well-defined and logically-sound decision rules to help researchers understand the meaning of various groupings within the taxonomy, and provides guidelines that will allow the RBCS taxonomy to evolve and develop over time.

Points of Consideration

Evolving Research Needs and Requirements

The true usefulness of a taxonomy is dependent on its ability to meet the needs of the end user. The RBCS development team kept those users in mind throughout the process. However, there is always the chance that important functionality was overlooked, or that some design decisions prevent the taxonomy from meeting the needs of all end users.

For example, the RBCS deviated from the exact "functional equivalence" requirement from the BETOS 2.0 structure. This change was made to increase the number of codes captured by families considered by the design team as an important research consideration. However, if end users decide that it is more useful to have codes within a family identically related, that design decision will need to be reviewed and potentially reversed. When the RBCS is used for research purposes and necessary changes or enhancements are identified, changes must be reviewed and potentially integrated into the next version of the RBCS.

Short-Term Stability and Long-Term Growth

Use of spending and utilization for family assignment and major vs. non-major procedure identification is an important aspect of the RBCS taxonomy. Data will differ from one revision to the next. There are both benefits and risks to making the RBCS taxonomy dynamically responsive to changes in the data. One benefit is that it is a "living" taxonomy that will adjust to changing practice patterns. As standards of care change over time, the RBCS development and maintenance process should identify and capture these changes.

The risk of this process is that the taxonomy may become unstable. Ideally, a taxonomy should not change dramatically over short periods of time. It should be possible to replicate research from different points in time without seeing wide fluctuations in results. If the taxonomy changes significantly over a short period of time, its value is diminished and the built-in flexibility of the taxonomy may become a liability. To mitigate this risk, the RBCS process evaluates spending and utilization over a rolling five-year timeframe. Evidence supports this to be a reasonable timeframe that balances the need to capture emerging trends while at the same time maintaining relative stability over time.

Taxonomy Uses

Although all CPT and HPCS codes included in the data used to develop the RBCS taxonomy are assigned to a meaningful category and subcategory, most (>69%) CPT and HCPCS codes are not assigned to a family. This is a consequence of using allowed spending to decide which codes are assigned to a family. This is not a major barrier for researchers interested in using the RBCS to report on Medicare spending, because over 89% of all spending is captured by families. It may be a barrier for researchers interested in investigating utilization for codes with lower Medicare spending at a level that is more granular than the subcategory level.

Another consideration to keep in mind is that the RBCS taxonomy only captures codes that result in Medicare spending. Codes not paid by Medicare were excluded from the RBCS taxonomy. If a need to capture codes not paid by Medicare is identified in the future, the RBCS assignment process must be revisited, which will require data sources that capture spending outside of Medicare; or, new RBCS decision rules will need to be developed so that spending is no longer used to determine family code assignment.

Maintaining and Updating the RBCS

The RBCS Team will annually update and maintain the RBCS classification system in consultation with the TEP, data analysts/scientists, and clinical and coding experts.

As part of the annual process, an Epidemiologist/Data Analyst will conduct quarterly literature reviews to identify changes in practice patterns and technology relevant to maintaining the classification system. The Project Director (PD) will review the information to identify and match new relevant CPT/HCPCS codes. The RBCS Lead, PD, and Epidemiologist/Data Analyst will meet to discuss the findings with the clinicians to identify clinical areas that require input from medical specialists. As previously noted, this proactive analysis of data may reveal the need to add other perspectives to the RBCS panel. The TEP members will be engaged once per year via webinar to review proposed changes and to make recommendations such as the need to add or remove CPT/HCPCS codes based on the identification of a new procedure or technology, or a change in practice patterns. Reclassification is based upon data findings, including changes in practice patterns and revisions to the CPT/HCPCS codes. All updates to the taxonomy will be executed by the RBCS Lead and PD, who are also responsible for the annual CPT/HCPCS crosswalk update. All updated reports and documentation will be sent by the PD to CMS.

The annual process includes the following steps:

1. Review new CPT/HCPCS codes and propose classification within the new system
2. Evaluate CPT/HCPCS codes already assigned and recommend any needed reassignments
3. Identify instances where new groups/subgroups should be added per changes in clinical practice patterns and technology
4. Update claims-based analysis to identify trends such as:
   a. Large increases in “other” which may warrant addition of new subcategory
   b. Large decreases in subcategory which may warrant retiring or consolidation of subcategories
5. Engage experts in evaluation of codes and evolving clinical practices, chronic conditions, procedures, and technologies
6. Update CPT/HCPCS crosswalk
7. Release documentation to support any proposed changes to crosswalk

Appendix 1 – List of Panel Participants

Panel Members	
Robert Anderson, PhD Centers for Disease Control and Prevention (CDC)	**Linda Andes, PhD** Centers for Disease Control and Prevention (CDC)
Robert Berenson, MD Urban Institute	**Suzanne Codespote, ASA** Office of the Actuary (CMS)
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David Nyweide, PhD Center for Medicare & Medicaid Innovation (CMMI) (CMS)	**Christopher Powers, PharmD** Cigna-HealthSpring
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Moderators	
Warren A. Jones, MD, FAAFP Provider Resources, Inc.	**Marie Templeman, MHA, PMP, CHC, ASQ-CMQ/OE, AHFI, CPC** Provider Resources, Inc.
Larry Field, DO, MBA, CHCQM, CPC, CHC, LHRM Provider Resources, Inc.	**Malinda Stanley, MPA, RHIA, CCS, CPC, CPB** Provider Resources, Inc.
Alex Bohl, PhD, BS Mathematica	**Scott Ode, PhD** Mathematica
Nancy McCall, ScD Mathematica	

Appendix 2 – RBCS Decision Rules

Review and Assignment of RBCS Codes

Categories

The decision rules for RBCS category assignment are presented in Table 17.

Table 17: Codes Being Classified for the RBCS Process

Rule	Example	Additional Instructions
If the primary purpose is to accomplish a procedure, which imaging facilitates, assign the code(s) to Procedure. If the primary purpose is to produce an image for interpretation, which the procedure facilitates, assign the code(s) to Imaging. If the primary purpose of the imaging is to facilitate a procedure, keep in procedure.	Fluoroscopy and sonographic guidance would be considered a Procedure	Classify all related codes (e.g., a separate Imaging code assigned to a Procedure code) as a Major (M) or Other (O) procedure. If a code for a procedure with Imaging as the primary purpose would be considered a major (M) procedure, assign the code to Procedures, not to Imaging. This is an exception from the general rule because we considered that a Major procedure, even for the purpose of generating an Image, should receive a Procedure designation.
Assign physical examinations performed for the purpose of obtaining specimens or otherwise related to obtaining test material for analysis to the E&M category.	Performing an examination to obtain a Pap smear	There will usually be a separate code for test interpretation, which naturally is assigned to Tests.
Assign procedures performed for the purpose of obtaining measurements, biopsies, or other test material for analysis to the Procedures category and appropriate subcategories.	Cystometrogram Prostate biopsy	
Assign E&M activities that are intrinsically linked to a treatment category, without which the treatment requiring application of specific technologies or extra modalities could not proceed, to the applicable treatment.	Dialysis Radiation therapy Physical therapy	
Assign CPT “unlisted” codes (identified when the first word in the code description is “unlisted”) to the subcategory of the organ system the unlisted codes are part of.	Unlisted procedure, pelvis, or hip joint	Unlisted codes would have no established work RVUs. For unlisted procedure codes, determine whether the code would be considered as Major (M) or Other (O) solely on the percent inpatient place of service, using the same 15% threshold for assigning other named procedures. Classify unlisted codes with 15 or more percent inpatient place of service as Major (M) procedures.

Rule	Example	Additional Instructions
Trace add-on codes to the primary code to which they are added, as described in the main body of the CPT at the add-on code number.		When the add-on code is for the same basic service as the primary service, assign it to the same broad category and subcategory as the primary code and, if a procedure, to the same M or O category. When the add-on code potentially represents a different type of service, such as Imaging or Tests, that was facilitated by the performance of the primary code (e.g., Intraoperative Neurophysiology—95920), assign it to the same broad category and subcategory as the primary code and, if a procedure, to the same M or O category. Procedural add-on codes that are associated with a procedure code within a family would be considered M or O based on the assignment of the family of the codes.

Subcategories

Table 18 presents the subcategory assignment methodology grouped by category.

Table 18: Guidelines for Subcategory Assignment

Category	Assignment
Evaluation and Management	Most E&M spending is in “visits,” with substantial variation by place of service. Certain E&M activities described by CPT/HCPCS codes specific to a clinical domain (e.g., ophthalmology and behavioral health) were retained. EP (Evaluation & Management/Hospice/Palliation) was added; hospice service was not identified in the BETOS 2.0 subcategories. Recent policy interest in new E&M activities that do not require in-person patient encounters and are being recognized for PFS payments gave rise to a subcategory for care coordination/management activities. As such codes increase in number, they may need to be grouped into subcategories and families in the future.

Category	Assignment
Procedures and Treatment	Neither technical modality (e.g., endoscopy) nor service location (e.g., office or ambulatory surgical center) were deemed clinically important distinctions for creating subcategories. In RBCS, organ system remains the sole basis for subcategories for Procedures, and type of treatment remains the basis for Treatment subcategories. The CPT numbering system is useful for placing sets of codes into the appropriate organ system. The CPT classification is followed with some exceptions to reflect that some services can be assigned to more than one organ system; for example, procedures on the spine reasonably can be considered either musculoskeletal or central nervous system. Blood products and preparation for transfusion (to include CPT laboratory service codes) are categorized to PH (Procedure/Hematology). Drugs administered orally are categorized as RX (Treatment/Miscellaneous). Some medications associated with chemotherapy but also used for other treatment are categorized as RX (Treatment/Miscellaneous) rather than RH (Treatment/Chemotherapy). Administration of preventive vaccines and vaccines covered by Medicare are categorized to RI (Treatment/Injection) for influenza, pneumococcal, and Hepatitis B vaccines. Component services for dialysis and supplies are grouped as RD (Treatment/ Dialysis).
Imaging	The original BETOS Imaging subcategories continue to effectively present the different imaging modalities.
Tests	A combination of clinical domain and clinical/coding expertise was used to create the subcategories. HCPCS codes for travel allowance and collection of specimens are categorized as TL (Test/Laboratory), such as collection of venous blood by venipuncture. Venipunctures and arterial punctures for withdrawal of blood for diagnosis are categorized as procedures.
Anesthesia	Spending was not analyzed inside this broad category, and no subcategory or family designations were created.
Durable Medical Equipment	DA (Medical/Surgical Supplies) is assigned to items that get thrown away after use or that are not used with equipment. DE (Other DME) is assigned to reusable medical equipment that can withstand repeated use. Drug and supply dispensing fees paid to a pharmacy are categorized as DE (Other DME). DF (Orthotic Devices) includes codes for prosthetics.

Category	Assignment
Other	The OB (Other/Enteral & Parental) category includes formula, tubes, supply kits, etc., and all services and supplies related to enteral and parental nutrition.

Families

The following process was used to determine family designations in the RBCS.

- The family creation process began with the highest spend codes that accounted for 90% of all non-anesthesia related spending in the dataset. These codes were used as anchor codes in the family identification process.
- Coding experts and clinicians used these anchor codes to identify related codes representing functionally equivalent procedures to the high spend codes.
- Code groups that followed the same general approach and accounted for greater than or equal to 0.1% of allowed spending were grouped into families.
- Families cannot span subcategories.

Major vs. Other Designation

Only codes in the procedure category could be identified as major or other procedures. All other codes were classified as non-procedures (N). A code could be classified as major in four different ways:

- If a code was assigned an RVU greater than or equal to 9.0, it was identified as a major procedure.
- If a code was assigned an RVU greater than or equal to 5.5 but less than 9, and greater than 15% of the number of CMS-1500 claims (carrier or DME) where this code appeared were identified as inpatient claims, it was identified as a major procedure.
- If the CPT code began with “unlisted” and occurred in an inpatient setting with a frequency greater than 15%, the code was classified as a major procedure.
- If the primary code for an add-on code was classified as a major procedure, the add-on code was also classified as a major procedure.

Appendix 3 – RBCS Final Taxonomy

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
AA000N	Anesthesia	AA	No RBCS Family	N	AA	000
DG006N	DME	Drugs administered through DME	Bronchodilator	N	DG	006
DG000N	DME	Drugs administered through DME	No RBCS Family	N	DG	000
DG004N	DME	Drugs administered through DME	Vasodilator	N	DG	004
DB000N	DME	Hospital beds	No RBCS Family	N	DB	000
DA000N	DME	Medical/surgical supplies	No RBCS Family	N	DA	000
DF003N	DME	Orthotic devices	Below Knee Orthotic	N	DF	003
DF008N	DME	Orthotic devices	Intermittent Urinary Catheter	N	DF	008
DF011N	DME	Orthotic devices	Knee Orthosis	N	DF	011
DF007N	DME	Orthotic devices	Lumbar Sacral Orthosis (LSO brace)	N	DF	007
DF000N	DME	Orthotic devices	No RBCS Family	N	DF	000
DF010N	DME	Orthotic devices	Ostomy	N	DF	010
DE012N	DME	Other DME	Blood Glucose Test or Reagent Strips	N	DE	012
DE001N	DME	Other DME	CPAP (sleep apnea)	N	DE	001
DE005N	DME	Other DME	Home Ventilator	N	DE	005
DE000N	DME	Other DME	No RBCS Family	N	DE	000
DC000N	DME	Oxygen and supplies	No RBCS Family	N	DC	000
DC002N	DME	Oxygen and supplies	Oxygen Concentrator	N	DC	002
DD000N	DME	Wheelchairs	No RBCS Family	N	DD	000
DD009N	DME	Wheelchairs	Power Wheelchairs and Accessories	N	DD	009
EB000N	E&M	Behavioral health services	No RBCS Family	N	EB	000
EB015N	E&M	Behavioral health services	Psychotherapy - Group	N	EB	015
EB009N	E&M	Behavioral health services	Psychotherapy - Nongroup	N	EB	009

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
EM019N	E&M	Care management/coordination	Chronic & Transitional Care Management	N	EM	019
EM000N	E&M	Care management/coordination	No RBCS Family	N	EM	000
EC010N	E&M	Critical care services	Critical Care E&M	N	EC	010
ER002N	E&M	Emergency department services	ED E&M	N	ER	002
ER000N	E&M	Emergency department services	No RBCS Family	N	ER	000
EH000N	E&M	Home services	No RBCS Family	N	EH	000
EH017N	E&M	Home services	Home E&M - New and Established	N	EH	017
EH018N	E&M	Home services	Home Health Skilled Services	N	EH	018
EP000N	E&M	Hospice	No RBCS Family	N	EP	000
EI014N	E&M	Hospital inpatient services	Hospital Discharge Management	N	EI	014
EI005N	E&M	Hospital inpatient services	Hospital E&M - Initial	N	EI	005
EI003N	E&M	Hospital inpatient services	Hospital E&M - Subsequent	N	EI	003
EI000N	E&M	Hospital inpatient services	No RBCS Family	N	EI	000
EX000N	E&M	Miscellaneous	No RBCS Family	N	EX	000
EN000N	E&M	Nursing facility services	No RBCS Family	N	EN	000
EN016N	E&M	Nursing facility services	Rest Home E&M	N	EN	016
EN008N	E&M	Nursing facility services	SNF E&M	N	EN	008
EO012N	E&M	Observation care services	Observation Care	N	EO	012
EV011N	E&M	Office/outpatient services	Annual Wellness Visits	N	EV	011
EV013N	E&M	Office/outpatient services	FQHC E&M - Facility Fee	N	EV	013
EV006N	E&M	Office/outpatient services	HOPD E&M - Facility Fee	N	EV	006
EV000N	E&M	Office/outpatient services	No RBCS Family	N	EV	000
EV001N	E&M	Office/outpatient services	Office E&M - Established	N	EV	001
EV004N	E&M	Office/outpatient services	Office E&M - New	N	EV	004
EE000N	E&M	Ophthalmological services	No RBCS Family	N	EE	000
EE007N	E&M	Ophthalmological services	Ophthalmological E&M	N	EE	007
IC003N	Imaging	CT scan	CT/CTA Abdomen and Pelvis	N	IC	003

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
IC007N	Imaging	CT scan	CT/CTA Chest	N	IC	007
IC006N	Imaging	CT scan	CT/CTA Head & Neck	N	IC	006
IC021N	Imaging	CT scan	CT/CTA Spine	N	IC	021
IC000N	Imaging	CT scan	No RBCS Family	N	IC	000
IM022N	Imaging	MR	MRI/MRA Abdomen and Pelvis	N	IM	022
IM020N	Imaging	MR	MRI/MRA Lower Extremity	N	IM	020
IM023N	Imaging	MR	MRI/MRA Other	N	IM	023
IM009N	Imaging	MR	MRI/MRA Head and Neck	N	IM	009
IM010N	Imaging	MR	MRI/MRA Spine	N	IM	010
IM000N	Imaging	MR	No RBCS Family	N	IM	000
IX017N	Imaging	Miscellaneous	Computerized Ophthalmic Imaging	N	IX	017
IX000N	Imaging	Miscellaneous	No RBCS Family	N	IX	000
IN002N	Imaging	Nuclear	Myocardial Perfusion Scan	N	IN	002
IN000N	Imaging	Nuclear	No RBCS Family	N	IN	000
IN008N	Imaging	Nuclear	PET- Oncology	N	IN	008
IS012N	Imaging	Standard X-ray	Angiography	N	IS	012
IS005N	Imaging	Standard X-ray	Mammography	N	IS	005
IS000N	Imaging	Standard X-ray	No RBCS Family	N	IS	000
IS004N	Imaging	Standard X-ray	X-ray - Chest	N	IS	004
IS013N	Imaging	Standard X-ray	X-ray - Lower Extremity	N	IS	013
IS019N	Imaging	Standard X-ray	X-ray - Spine and Pelvis	N	IS	019
IS024N	Imaging	Standard X-ray	X-ray - Upper Extremity	N	IS	024
IU015N	Imaging	Ultrasound	Duplex Scan - Extracranial Arteries	N	IU	015
IU014N	Imaging	Ultrasound	Duplex Scan - Extremity Arteries	N	IU	014
IU016N	Imaging	Ultrasound	Duplex Scan - Extremity Veins	N	IU	016
IU001N	Imaging	Ultrasound	Echocardiography (TTE/TEE)	N	IU	001
IU000N	Imaging	Ultrasound	No RBCS Family	N	IU	000
IU011N	Imaging	Ultrasound	Ultrasound - Abdomen & Pelvis	N	IU	011

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
IU018N	Imaging	Ultrasound	Ultrasound - Nonspecific	N	IU	018
OA004N	Other	Ambulance	Medical Transport Air	N	OA	004
OA002N	Other	Ambulance	Medical Transport Ground	N	OA	002
OA001N	Other	Ambulance	Medical Transport Ground Emergency	N	OA	001
OA003N	Other	Ambulance	Medical Transport Mileage	N	OA	003
OB006N	Other	Enteral and parenteral	Enteral Feeding and Formula	N	OB	006
OB000N	Other	Enteral and parenteral	No RBCS Family	N	OB	000
OB005N	Other	Enteral and parenteral	Parenteral Feeding and Formula	N	OB	005
OC000N	Other	Vision, hearing, and speech services	No RBCS Family	N	OC	000
PB033O	Procedure	Breast	Mastectomy	O	PB	033
PB033M	Procedure	Breast	Mastectomy	M	PB	033
PB000O	Procedure	Breast	No RBCS Family	O	PB	000
PC008O	Procedure	Cardiovascular	Comprehensive Electrophysiologic Evaluation	O	PC	008
PC008M	Procedure	Cardiovascular	Comprehensive Electrophysiologic Evaluation	M	PC	008
PC003M	Procedure	Cardiovascular	Insertion/Removal/Replacement ICD	M	PC	003
PC003O	Procedure	Cardiovascular	Insertion/Removal/Replacement ICD	O	PC	003
PC000O	Procedure	Cardiovascular	No RBCS Family	O	PC	000
PC000M	Procedure	Cardiovascular	No RBCS Family	M	PC	000
PC018M	Procedure	Cardiovascular	Pacemaker Insertion or Repair	M	PC	018
PC018O	Procedure	Cardiovascular	Pacemaker Insertion or Repair	O	PC	018
PC025M	Procedure	Cardiovascular	Pacemaker Removal	M	PC	025
PC025O	Procedure	Cardiovascular	Pacemaker Removal	O	PC	025
PC031M	Procedure	Cardiovascular	Percutaneous Coronary Artery Angioplasty and Stenting	M	PC	031
PC031O	Procedure	Cardiovascular	Percutaneous Coronary Artery Angioplasty and Stenting	O	PC	031

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
PC002O	Procedure	Cardiovascular	Percutaneous Transcatheterization	O	PC	002
PC002M	Procedure	Cardiovascular	Percutaneous Transcatheterization	M	PC	002
PG026M	Procedure	Digestive/gastrointestinal	Cholecystectomy - Laparoscopic	M	PG	026
PG012O	Procedure	Digestive/gastrointestinal	Colonoscopy - Lesion Removal	O	PG	012
PG043M	Procedure	Digestive/gastrointestinal	Hernia Repair - Laparoscopic (Any Site)	M	PG	043
PG043O	Procedure	Digestive/gastrointestinal	Hernia Repair - Laparoscopic (Any Site)	O	PG	043
PG047M	Procedure	Digestive/gastrointestinal	Hernia Repair - Open (Inguinal)	M	PG	047
PG047O	Procedure	Digestive/gastrointestinal	Hernia Repair - Open (Inguinal)	O	PG	047
PG004O	Procedure	Digestive/gastrointestinal	Lower GI Endoscopy - Other	O	PG	004
PG004M	Procedure	Digestive/gastrointestinal	Lower GI Endoscopy - Other	M	PG	004
PG000O	Procedure	Digestive/gastrointestinal	No RBCS Family	O	PG	000
PG000M	Procedure	Digestive/gastrointestinal	No RBCS Family	M	PG	000
PG006M	Procedure	Digestive/gastrointestinal	Upper GI Endoscopy	M	PG	006
PG006O	Procedure	Digestive/gastrointestinal	Upper GI Endoscopy	O	PG	006
PE001O	Procedure	Eye	Cataract Surgery	O	PE	001
PE001M	Procedure	Eye	Cataract Surgery	M	PE	001
PE035O	Procedure	Eye	Intravitreal Injection	O	PE	035
PE000O	Procedure	Eye	No RBCS Family	O	PE	000
PE000M	Procedure	Eye	No RBCS Family	M	PE	000
PE046M	Procedure	Eye	Vitrectomy - Mechanical	M	PE	046
PH000O	Procedure	Hematology	No RBCS Family	O	PH	000
PH034O	Procedure	Hematology	Red Blood Cell Transfusion	O	PH	034
PH034M	Procedure	Hematology	Red Blood Cell Transfusion	M	PH	034
PM020O	Procedure	Musculoskeletal	Arthrodesis Spine	O	PM	020
PM020M	Procedure	Musculoskeletal	Arthrodesis Spine	M	PM	020
PM044M	Procedure	Musculoskeletal	Arthroplasty - Hip	M	PM	044

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
PM014M	Procedure	Musculoskeletal	Arthroplasty - Knee	M	PM	014
PM039O	Procedure	Musculoskeletal	Arthroscopy - Lower Extremity	O	PM	039
PM039M	Procedure	Musculoskeletal	Arthroscopy - Lower Extremity	M	PM	039
PM021M	Procedure	Musculoskeletal	Arthroscopy - Upper Extremity	M	PM	021
PM021O	Procedure	Musculoskeletal	Arthroscopy - Upper Extremity	O	PM	021
PM036O	Procedure	Musculoskeletal	Destruction by Neurolytic Agent - Back	O	PM	036
PM015O	Procedure	Musculoskeletal	Joint Injection	O	PM	015
PM024M	Procedure	Musculoskeletal	Laminotomy or Laminectomy - Lumbar	M	PM	024
PM024O	Procedure	Musculoskeletal	Laminotomy or Laminectomy - Lumbar	O	PM	024
PM007O	Procedure	Musculoskeletal	Nerve Block Injection - Back	O	PM	007
PM011O	Procedure	Musculoskeletal	Neurostimulator - Back	O	PM	011
PM011M	Procedure	Musculoskeletal	Neurostimulator - Back	M	PM	011
PM000O	Procedure	Musculoskeletal	No RBCS Family	O	PM	000
PM000M	Procedure	Musculoskeletal	No RBCS Family	M	PM	000
PM041O	Procedure	Musculoskeletal	Percutaneous Vertebroplasty	O	PM	041
PM041M	Procedure	Musculoskeletal	Percutaneous Vertebroplasty	M	PM	041
PO050O	Procedure	Other organ systems	Bronchoscopy	O	PO	050
PO022M	Procedure	Other organ systems	Calculus Removal - Urinary	M	PO	022
PO022O	Procedure	Other organ systems	Calculus Removal - Urinary	O	PO	022
PO010O	Procedure	Other organ systems	Cystourethroscopy	O	PO	010
PO010M	Procedure	Other organ systems	Cystourethroscopy	M	PO	010
PO045M	Procedure	Other organ systems	Lymph Node Biopsy	M	PO	045
PO045O	Procedure	Other organ systems	Lymph Node Biopsy	O	PO	045
PO027M	Procedure	Other organ systems	Nasal/Sinus Endoscopy	M	PO	027
PO027O	Procedure	Other organ systems	Nasal/Sinus Endoscopy	O	PO	027
PO000O	Procedure	Other organ systems	No RBCS Family	O	PO	000
PO000M	Procedure	Other organ systems	No RBCS Family	M	PO	000
PO040M	Procedure	Other organ systems	Prostate Resection	M	PO	040

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
PO040O	Procedure	Other organ systems	Prostate Resection	O	PO	040
PS013O	Procedure	Skin	Debridement	O	PS	013
PS013M	Procedure	Skin	Debridement	M	PS	013
PS009O	Procedure	Skin	Destruction Skin Lesion	O	PS	009
PS017O	Procedure	Skin	Mohs Surgery	O	PS	017
PS023O	Procedure	Skin	Nail Procedure	O	PS	023
PS000O	Procedure	Skin	No RBCS Family	O	PS	000
PS000M	Procedure	Skin	No RBCS Family	M	PS	000
PS032O	Procedure	Skin	Skin Biopsy	O	PS	032
PS016M	Procedure	Skin	Skin Grafting	M	PS	016
PS016O	Procedure	Skin	Skin Grafting	O	PS	016
PS038O	Procedure	Skin	Skin Lesion Excision	O	PS	038
PS028O	Procedure	Skin	Wound Repair - All Levels	O	PS	028
PS028M	Procedure	Skin	Wound Repair - All Levels	M	PS	028
PV037M	Procedure	Vascular	A-V Fistula Creation	M	PV	037
PV029O	Procedure	Vascular	A-V Fistula PCI	O	PV	029
PV029M	Procedure	Vascular	A-V Fistula PCI	M	PV	029
PV000O	Procedure	Vascular	No RBCS Family	O	PV	000
PV000M	Procedure	Vascular	No RBCS Family	M	PV	000
PV005O	Procedure	Vascular	Transluminal Angioplasty - Arterial	O	PV	005
PV005M	Procedure	Vascular	Transluminal Angioplasty - Arterial	M	PV	005
PV030M	Procedure	Vascular	Transluminal Angioplasty - Venous	M	PV	030
PV030O	Procedure	Vascular	Transluminal Angioplasty - Venous	O	PV	030
PV049M	Procedure	Vascular	Transvascular Stent	M	PV	049
PV042O	Procedure	Vascular	Varicose Vein Ablation	O	PV	042
PV048M	Procedure	Vascular	Vascular Embolization	M	PV	048
PV048O	Procedure	Vascular	Vascular Embolization	O	PV	048
PV019O	Procedure	Vascular	Venous Catheter Insertion	O	PV	019

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
PV019M	Procedure	Vascular	Venous Catheter Insertion	M	PV	019
TA009N	Test	Anatomic pathology	Immunohistochemistry	N	TA	009
TA000N	Test	Anatomic pathology	No RBCS Family	N	TA	000
TA002N	Test	Anatomic pathology	Surgical Pathology Examination	N	TA	002
TC003N	Test	Cardiography	Electrocardiogram	N	TC	003
TC010N	Test	Cardiography	External Electrocardiographic Monitoring	N	TC	010
TC000N	Test	Cardiography	No RBCS Family	N	TC	000
TL013N	Test	General laboratory	Bacterial Culture	N	TL	013
TL004N	Test	General laboratory	Blood Count	N	TL	004
TL001N	Test	General laboratory	Clinical Chemistry	N	TL	001
TL005N	Test	General laboratory	Drug Tests	N	TL	005
TL006N	Test	General laboratory	Immunoassay	N	TL	006
TL000N	Test	General laboratory	No RBCS Family	N	TL	000
TL012N	Test	General laboratory	Venipuncture Blood Collection	N	TL	012
TX000N	Test	Miscellaneous	No RBCS Family	N	TX	000
TM011N	Test	Molecular testing	Infectious Agent Detection by DNA/RNA	N	TM	011
TM000N	Test	Molecular testing	No RBCS Family	N	TM	000
TN008N	Test	Neurologic	Electrical Nerve Conductivity	N	TN	008
TN000N	Test	Neurologic	No RBCS Family	N	TN	000
TN007N	Test	Neurologic	Sleep Study	N	TN	007
TP000N	Test	Pulmonary function	No RBCS Family	N	TP	000
RH002N	Treatment	Chemotherapy	Chemotherapeutic Agent	N	RH	002
RH012N	Treatment	Chemotherapy	Chemotherapy Administration	N	RH	012
RH000N	Treatment	Chemotherapy	No RBCS Family	N	RH	000
RD001N	Treatment	Dialysis	ESRD Related Services (Not Dialysis)	N	RD	001
RD032N	Treatment	Dialysis	Hemodialysis	N	RD	032

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
RD000N	Treatment	Dialysis	No RBCS Family	N	RD	000
RD028N	Treatment	Dialysis	Peritoneal Dialysis	N	RD	028
RI016N	Treatment	Injections and infusions (nononcologic)	Erythropoiesis-Stimulating Agent	N	RI	016
RI030N	Treatment	Injections and infusions (nononcologic)	Injection - Anticoagulant	N	RI	030
RI018N	Treatment	Injections and infusions (nononcologic)	Injection - Clotting Factors	N	RI	018
RI006N	Treatment	Injections and infusions (nononcologic)	Injection - Colony Stimulating Factors	N	RI	006
RI031N	Treatment	Injections and infusions (nononcologic)	Injection - Enzymes	N	RI	031
RI013N	Treatment	Injections and infusions (nononcologic)	Injection - Growth/Hormone Factor	N	RI	013
RI025N	Treatment	Injections and infusions (nononcologic)	Injection - Hyaluronan or Derivative	N	RI	025
RI008N	Treatment	Injections and infusions (nononcologic)	Injection - Immune Globulin	N	RI	008
RI019N	Treatment	Injections and infusions (nononcologic)	Injection - Immunomodulator	N	RI	019
RI005N	Treatment	Injections and infusions (nononcologic)	Injection - Macular Degeneration	N	RI	005
RI004N	Treatment	Injections and infusions (nononcologic)	Injection - Monoclonal Antibodies	N	RI	004
RI022N	Treatment	Injections and infusions (nononcologic)	Injection - Somatostatin	N	RI	022
RI024N	Treatment	Injections and infusions (nononcologic)	Injection - TNF Blocker	N	RI	024
RI026N	Treatment	Injections and infusions (nononcologic)	Injection - Vasodilator	N	RI	026

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
RI014N	Treatment	Injections and infusions (nononcologic)	Injection Administration	N	RI	014
RI015N	Treatment	Injections and infusions (nononcologic)	Intravenous Infusion, Hydration	N	RI	015
RI000N	Treatment	Injections and infusions (nononcologic)	No RBCS Family	N	RI	000
RI011N	Treatment	Injections and infusions (nononcologic)	Vaccine - Toxoids	N	RI	011
RI023N	Treatment	Injections and infusions (nononcologic)	Vaccine Admin - Flu, Pneum, & Hep B	N	RI	023
RX027N	Treatment	Miscellaneous	Cardiac Rehabilitation	N	RX	027
RX034N	Treatment	Miscellaneous	Hyperbaric Oxygen	N	RX	034
RX029N	Treatment	Miscellaneous	Immunosuppressive Drugs - Non-injectable	N	RX	029
RX000N	Treatment	Miscellaneous	No RBCS Family	N	RX	000
RT000N	Treatment	Physical, occupational, and speech therapy	No RBCS Family	N	RT	000
RT021N	Treatment	Physical, occupational, and speech therapy	Occupational Therapy	N	RT	021
RT003N	Treatment	Physical, occupational, and speech therapy	PT Treatment	N	RT	003
RT033N	Treatment	Physical, occupational, and speech therapy	PT/OT Evaluation	N	RT	033
RT020N	Treatment	Physical, occupational, and speech therapy	Speech Therapy	N	RT	020
RR009N	Treatment	Radiation oncology	Conventional Radiation Treatment	N	RR	009
RR007N	Treatment	Radiation oncology	Intensity Modulated Radiation Therapy (IMRT)	N	RR	007
RR000N	Treatment	Radiation oncology	No RBCS Family	N	RR	000
RR010N	Treatment	Radiation oncology	Radiation Treatment Planning	N	RR	010

RBCS Taxonomy Code	RBCS Category	RBCS Subcategory	RBCS Family	RBCS Major Procedure Indicator	RBCS Category and Subcategory Indicator	RBCS Family ID
RB017N	Treatment	Spinal manipulation	Chiropractic	N	RB	017
RB000N	Treatment	Spinal manipulation	No RBCS Family	N	RB	000

Appendix 4 – RBCS Broad Categories, Subcategories, and Families

RBCS Categories

I	Imaging
A	Anesthesia
D	Durable Medical Equipment (DME)
O	Other
P	Procedure
T	Test
E	Evaluation and Management (E&M)
R	Treatment

I – Imaging

Digit 1 Category	I
Digit 2 Subcategory	**IC – CT (computerized tomography)** **IM – MR (magnetic resonance)** **IN – Nuclear** **IU – Ultrasound** **IS – Standard X-ray** **IX – Miscellaneous**
Digits 3, 4, and 5 Family	**IC – CT (computerized tomography)** 000 No RBCS Family 003 CT/CTA Abdomen & Pelvis 006 CT/CTA Head & Neck 007 CT/CTA Chest 021 CT/CTA Spine **IM – MR (magnetic resonance)** 000 No RBCS Family 009 MRI/MRA Head & Neck 010 MRI/MRA Spine 020 MRI/MRA Lower Extremity 022 MRI/MRA Abdomen & Pelvis 023 MRI/MRA Other **IN – Nuclear** 000 No RBCS Family 002 Myocardial Perfusion Scan 008 PET – Oncology **IS – Standard X-ray** 000 No RBCS Family 004 X-ray – Chest 005 Mammography 012 Angiography 013 X-ray – Lower Extremity 019 X-ray – Spine & Pelvis 024 X-ray – Upper Extremity

Digit 1 Category	I
Digits 3, 4, and 5 Family	**IU – Ultrasound** 000 No RBCS Family 001 Echocardiography (TTE/TEE) 011 Ultrasound – Abdomen & Pelvis 014 Duplex Scan – Extremity Arteries 015 Duplex Scan – Extracranial Arteries 016 Duplex Scan – Extremity Veins 018 Ultrasound – Nonspecific **IX – Miscellaneous** 000 No RBCS Family 017 Computerized Ophthalmic Imaging
Digit 6	**N = Not a Procedure**

A – Anesthesia

Digit 1 Category	A
Digit 2 Subcategory	**AA – Anesthesia**
Digits 3, 4, and 5 Family	000 – No RBCS Family
Digit 6	**N = Not a Procedure**

D – Durable Medical Equipment & Supplies (DME)

Digit 1 Category	D
Digit 2 Subcategory	**DA – Medical/surgical supplies** **DB – Hospital beds** **DC – Oxygen and supplies** **DD – Wheelchairs** **DE – Other DME** **DF – Orthotic devices (includes prosthetics)** **DG – Drugs administered through DME**
Digits 3, 4, and 5 Family	**DA – Medical/surgical supplies** 000 No RBCS Family **DB – Hospital beds** 000 No RBCS Family **DC – Oxygen and supplies** 000 No RBCS Family 002 Oxygen Concentrator **DD – Wheelchairs** 000 No RBCS Family 009 Power Wheelchairs and Accessories

Digit 1 Category	D
Digits 3, 4, and 5 Family	**DE – Other DME** 000 No RBCS Family 001 CPAP (Sleep Apnea) 005 Home Ventilator 012 Blood Glucose Test or Reagent Strips **DF – Orthotic devices (includes prosthetics)** 000 No RBCS Family 003 Below Knee Orthotic 007 Lumbar-Sacral Orthosis (LSO Brace) 008 Intermittent Urinary Catheter 010 Ostomy 011 Knee Orthosis **DG – Drugs administered through DME** 000 No RBCS Family 004 Vasodilator 006 Bronchodilator
Digit 6	**N = Not a Procedure**

O – Other

Digit 1 Category	O
Digit 2 Subcategory	**OA – Ambulance** **OB – Enteral and parenteral** **OC – Vision, hearing, and speech**
Digits 3, 4, and 5 Family	**OA – Ambulance** 000 No RBCS Family 001 Medical Transport Ground Emergency 002 Medical Transport Ground 003 Medical Transport Mileage 004 Medical Transport Air **OB – Enteral and parenteral** 000 No RBCS Family 005 Parenteral Feeding & Formula 006 Enteral Feeding & Formula **OC – Vision, hearing, and speech** 000 No RBCS Family
Digit 6	**N = Not a Procedure**

P – Procedure

Digit 1 Category	P
Digit 2 Subcategory	**PB – Breast** **PC – Cardiovascular** **PE – Eye** **PG – Digestive/gastrointestinal** **PH – Hematology** **PM – Musculoskeletal** **PO – Other organ systems** **PS – Skin** **PV – Vascular**
Digits 3, 4, and 5 Family	**PB – Breast** 000 No RBCS Family 033 Mastectomy **PC – Cardiovascular** 000 No RBCS Family 002 Percutaneous Transcatheterization 003 Insertion/Removal/Replacement ICD 008 Comprehensive Electrophysiologic Evaluation 018 Pacemaker Insertion or Repair 025 Pacemaker Removal 031 Percutaneous Coronary Artery Angioplasty & Stenting **PE – Eye** 000 No RBCS Family 001 Cataract Surgery 035 Intravitreal Injection 046 Vitrectomy – Mechanical **PG – Digestive/gastrointestinal** 000 No RBCS Family 004 Lower GI Endoscopy – Other 006 Upper GI Endoscopy 012 Colonoscopy – Lesion Removal 026 Cholecystectomy – Laparoscopic 043 Hernia Repair – Laparoscopic (Any Site) 047 Hernia Repair – Open (Inguinal) **PH – Hematology** 000 No RBCS Family 034 Red Blood Cell Transfusion **PM – Musculoskeletal** 000 No RBCS Family 014 Arthroplasty – Knee 020 Arthrodesis Spine 007 Nerve Block Injection – Back 011 Neurostimulator – Back

Digit 1 Category	P
Digits 3, 4, and 5 Family	015 Joint Injection 021 Arthroscopy – Upper Extremity 024 Laminotomy or Laminectomy – Lumbar 036 Destruction by Neurolytic Agent – Back 039 Arthroscopy – Lower Extremity 041 Percutaneous Vertebroplasty 044 Arthroplasty – Hip **PO – Other organ systems** 000 No RBCS Family 010 Cystourethroscopy 022 Calculus Removal – Urinary 027 Nasal/Sinus Endoscopy 040 Prostate Resection 045 Lymph Node Biopsy 050 Bronchoscopy **PS – Skin** 000 No RBCS Family 009 Destruction Skin Lesion 013 Debridement 016 Skin Grafting 017 Mohs Surgery 023 Nail Procedure 028 Wound Repair – All Levels 032 Skin Biopsy 038 Skin Lesion Excision **PV – Vascular** 000 No RBCS Family 005 Transluminal Angioplasty – Arterial 019 Venous Catheter Insertion 020 A-V Fistula PCI 029 Transluminal Angioplasty – Venous 037 A-V Fistula Creation 042 Varicose Vein Ablation 048 Vascular Embolization 049 Transvascular Stent
Digit 6	**M = Major** **O = Other (non-major)**

T – Test

Digit 1 Category	T
Digit 2 Subcategory	**TA – Anatomic pathology** **TC – Cardiology** **TL – General laboratory** **TM – Molecular testing** **TN – Neurologic** **TP – Pulmonary function** **TX – Miscellaneous**
Digits 3, 4, and 5 Family	**TA – Anatomic pathology** 000 No RBCS Family 002 Surgical Pathology Examination 009 Immunohistochemistry **TC – Cardiology** 000 No RBCS Family 003 Electrocardiogram 010 External Electrocardiographic Monitoring **TL – General laboratory** 000 No RBCS Family 001 Clinical Chemistry 004 Blood Count 005 Drug Tests 006 Immunoassay 012 Venipuncture Blood Collection 013 Bacterial Culture **TM – Molecular testing** 000 No RBCS Family 011 Infectious Agent Detection by DNA/RNA **TN – Neurologic** 000 No RBCS Family 007 Sleep Study 008 Electrical Nerve Conductivity **TP – Pulmonary function** 000 No RBCS Family **TX – Miscellaneous** 000 No RBCS Family
Digit 6	**N = Not a Procedure**

E – Evaluation and Management (E&M)

Digit 1 Category	E
Digit 2 Subcategory	**EB – Behavioral health services** **EC – Critical care services** **EE – Ophthalmological services** **EH – Home services** **EI – Hospital inpatient services** **EN – Nursing facility services** **EM – Care management/coordination** **EO – Observation care services** **EP – Hospice/palliation** **ER – Emergency department services** **EV – Office/outpatient services** **EX – Miscellaneous**
Digits 3, 4, and 5 Family	**EB – Behavioral health services** 000 No RBCS Family 009 Psychotherapy – Non-group 015 Group Psychotherapy – Group **EC – Critical care services** 000 No RBCS Family 010 Critical Care E&M **EE – Ophthalmological services** 000 No RBCS Family 007 Ophthalmological E&M **EH – Home services** 000 No RBCS Family 017 Home E&M – New and Established 018 Home Health Skilled Services **EI – Hospital inpatient services** 000 No RBCS Family 003 Hospital E&M – Subsequent 005 Hospital E&M – Initial 014 Hospital Discharge Management **EM – Care management/coordination** 000 No RBCS Family 019 Chronic & Transitional Care Management **EN – Nursing facility services** 000 No RBCS Family 008 SNF E&M 016 Rest Home E&M **EO – Observation care services** 000 No RBCS Family 012 Observation Care **EP – Hospice/palliation** 000 No RBCS Family **ER – Emergency department services** 000 No RBCS Family 002 ED E&M

Digit 1 Category	E
Digits 3, 4, and 5 Family	**EV – Office/outpatient services** 000 No RBCS Family 001 Office E&M – Established 004 Office E&M – New 006 HOPD E&M – Facility Fee 011 Annual Wellness Visits 013 FQHC E&M – Facility Fee **EX – Miscellaneous** 000 No RBCS Family
Digit 6	**N = Not a Procedure**

R – Treatment

Digit 1 Category	R
Digit 2 Subcategory	**RB – Spinal manipulation** **RD – Dialysis** **RH – Chemotherapy** **RI – Injections and infusions (non-oncologic)** **RR – Radiation oncology** **RT – Physical, occupational, and speech therapy** **RX – Miscellaneous**
Digits 3, 4, and 5 Family	**RB – Spinal manipulation** 000 No RBCS Family 017 Chiropractic **RD – Dialysis** 000 No RBCS Family 001 ESRD Related Services (Not Dialysis) 028 Peritoneal Dialysis 032 Hemodialysis **RH – Chemotherapy** 000 No RBCS Family 002 Chemotherapeutic Agent 012 Chemotherapy Administration **RI – Injections and infusions (non-oncologic)** 000 No RBCS Family 004 Injection – Monoclonal Antibodies 005 Injection – Macular Degeneration 006 Injection – Colony Stimulating Factors 008 Injection – Immune Globulin 011 Vaccines, Toxoids 013 Injection – Growth/Hormone Factor 014 Injection Administration 015 Intravenous Infusion, Hydration 016 Erythropoiesis-stimulating Agent 018 Injection – Clotting Factors 019 Injection – Immunomodulator

Digit 1 Category	R
Digits 3, 4, and 5 Family	002 Injection – Somatostatin 003 Vaccine Admin – Flu, Pneum & Hep B 024 Injection – TNF Blocker 025 Injection – Hyaluronan or Derivative 026 Injection – Vasodilator 030 Injection – Anticoagulant 031 Injection – Enzymes **RR – Radiation oncology** 000 No RBCS Family 007 Intensity Modulated Radiation Therapy (IMRT) 009 Conventional Radiation Treatment 010 Radiation Treatment Planning **RT – Physical, occupational, and speech therapy** 000 No RBCS Family 003 PT Treatment 020 Speech Therapy 021 Occupational Therapy 033 PT/OT Evaluation **RX – Miscellaneous** 000 No RBCS Family 027 Cardiac Rehabilitation 029 Immunosuppressive Drugs – Non-injectable 034 Hyperbaric Oxygen
Digit 6	**N = Not a Procedure**

Appendix 5 – Technical Expert Panel Meeting Summaries

Chronic Conditions BETOS Face-to-Face Meeting Summary

In accordance with the Statement of Work (SOW), a combined face-to-face meeting of the Chronic Conditions and BETOS Restructuring Technical Expert Panel (TEP) was held on November 15, 2019 at the Centers for Medicare & Medicaid Services Headquarters, 7500 Security Boulevard, Baltimore, MD 21244. Members of both panels were in attendance either in person or by secure virtual link. The meeting agenda provided for an opening welcome from Andrew Shatto, Deputy Director, CMS Office of Enterprise Data and Analytics (OEDA). Mr. Shatto spoke on the requirement of Section 723 of the Medicare Modernization Act (MMA) which directed the development of a "plan to improve quality of care and reduce the cost of care for chronically ill Medicare beneficiaries."

The afternoon session focused on the history and development of the BETOS classification system in the late 1980s. The BETOS classification system allowed health system researchers and policy makers to review and study data on some of the more than 15,000 Healthcare Common Procedure Coding System (HCPCS) and Current Procedural Terminology (CPT) codes. The success of grouping the huge number of codes into meaningful and searchable categories was supported across the industry.

The Medicare Payment Advisory Commission (MedPAC) advised that it had contracted to review the BETOS system in 2011 and found that it had become outdated. CMS continued to support BETOS until 2016. CMS has not adopted any updated version of BETOS since then.

A major reason for CMS to convene this BETOS Restructuring TEP is to address updating BETOS. The panel is composed of highly talented professionals, such as social science researchers, health system researchers, representatives from industry and other governmental agencies.

Following an excellent presentation on the history of the BETOS system and discussion of attendees' awareness of the development of BETOS 2.0 project by the Urban Institute, the panel discussed the structure and some of the challenges of the BETOS system. The presenter then provided examples of how much more descriptive the same files would be following the taxonomy developed under the Urban Institute's BETOS 2.0.

Discussion identified that the challenge for CMS is that the restructured BETOS must address the universe of HCPCS and CPT codes to include Professional Services, DME, Drugs, and Clinical Lab Tests. The panel agreed upon the utility of the BETOS system and the significant need for updating. They also discussed the need to have more than the codes associated with fee schedules included.

There was uniform agreement that the BETOS 2.0 taxonomy could serve as a great platform to inform the development of the BETOS restructuring effort. Panel members identified that the restructured system would have to address some additional challenges they face, such as the inability to readily identify primary care spending, a key component driving decisions for plans and government.

Each year new codes are developed and other codes are retired; therefore, the system would have to be "update friendly" and must be able to adapt to data driven changes as well as allow researchers to readily access its own trove of data.

Another component that was emphasized is the importance of identifying "families of codes" that would more accurately capture the true costs of services. For example, if you focus on colonoscopy alone, you may miss the colonoscopy related fees unless the system allowed for readily identifying charges for related services.

Discussion also focused on the need to address varying ways of reporting service codes currently contained within BETOS. One proposal that the panel reviewed and adopted is the inclusion of OPPS in its structure.

In the final analysis, the panel recognized that it must provide solutions that address a hierarchical structure that allows for grouping into smaller subcategories. It also recognized that the restructured BETOS system must have backward compatibility with the existing BETOS in order to retain historical and trending capacities.

RBCS TEP Meeting Summary – 12/1/2019

The first of three virtual TEPs was held on behalf of the Centers for Medicare & Medicaid Services (CMS) Office of Enterprise and Data Analytics (OEDA). The TEP members were asked to discuss and provide input on the structure of the hierarchy, rules used to populate the hierarchy and the actual classification and mapping developed. The TEP agreed to adopt the BETOS 2.0 framework as the starting point for the RBCS. The nomenclature will include CPT and HCPCS codes submitted on Medicare professional (CMS-1500) and institutional (UB04/CMS-1450) claim forms. Extensive discussion was held on distinguishing facility charges versus allowed charges for professional services. It was noted that the Outpatient Prospective Payment System (OPPS) claims support facility fees and an associated professional fee is assumed. Codes with no spending will be excluded and monitored over time.

A TEP member suggested using the original BETOS as a starting point for the category and subcategory assignment. Most HCPCS codes and some CPT codes were not categorized in BETOS 2.0. The planned methodology moving forward is to group the uncategorized codes into three categories – Carrier and Hospital Outpatient (HOP), Durable Medical Equipment (DME), and Home Health. The TEP voted to create new categories for DME and Home Health in the RBCS. Results of the meeting will be used for further data mapping.

TEP participants included Robert Anderson, PhD, Linda Andes, PhD, Robert Berenson, MD, Suzanne Codespote, ASA, Zhenqiu Lin, PhD, L. Daniel Muldoon, MA, David Nyweide, PhD, Christopher Powers, PharmD, and W. Pete Welch, PhD. The RBCS moderators in attendance were Warren A. Jones, MD, FAAFP, Larry Field, DO, MBA, CHCQM, CPC, CHC, LHRM, Malinda Stanley, MPA, RHIA, CCS, CPC, CPB, Alex Bohl, PhD, BS and Scott Ode, PhD.

RBCS TEP Meeting Summary – 3/4/2020

The second virtual meeting was held to review and discuss data updates. To capture all CPT and HCPCS codes, the subcategory of EP – Hospice/Palliation was added to the EV – Evaluation and Management (E&M) category. TL – Laboratory was proposed in the T – Test category. Two new categories were proposed D – Durable Medical Equipment and Supplies, and O – Other to capture codes not addressed in BETOS 2.0. The RBCS will include eight broad categories: E&M, Procedure, Treatment, Imaging, Test, Anesthesia, DME & Supplies, and Other.

The RBCS accounts for a significantly higher proportion of allowed spend than BETOS 2.0. This is largely due to 5,217 codes not identified/classified in BETOS 2.0, and the increase in spending accounted for in the Treatment category. A dashboard was presented to the TEP members to provide a visual on categories and subcategories developed, and the amount of procedure codes and total costs. A TEP member questioned identification of the MPFS versus OPPS payment. There is no specific identification of the payment methodology in RBCS, all allowed spend is grouped together. Another member questioned payment of drugs administered by physicians in the Treatment category which includes chemotherapy, chiropractic, dialysis, injections/infusions, miscellaneous, PT/OT and radiation oncology. Identifying codes for the drug portion and the administration of the drug was also discussed.

Preliminary proposed families were also displayed in the dashboard to represent current findings. Extensive discussion was held on defining families and that families are best suited for quantifying spend, not for procedure identification. A five-year rolling window is being used for consistency and CPT and HCPCS code updates will be incorporated annually to maintain the family consistency over time. The spend threshold was dropped from 0.2% to 0.1% and a broad definition of "functionally equivalent" was adopted. All codes are assigned a category and subcategory but may not be part of a specific family. The drop in threshold and broader definition of functionally equivalent allows more codes and additional allowed spending to be captured in RBCS.

TEP participants included Linda Andes, PhD, Robert Berenson, MD, Mary Jo Braid-Forbes, MPH, Suzanne Codespote, ASA, Evelyn Cody, Zhenqiu Lin, PhD, L. Daniel Muldoon, MA, David Nyweide, PhD, and W. Pete Welch, PhD. The RBCS moderators in attendance were Warren A. Jones, MD, FAAFP, Larry Field, DO, MBA, CHCQM, CPC, CHC, LHRM, Malinda Stanley, MPA, RHIA, CCS, CPC, CPB, Alex Bohl, PhD, BS and Scott Ode, PhD.

RBCS TEP Meeting Summary – 5/6/2020

The third and final virtual meeting was held to review and discuss data updates and final recommendations of the RBCS. The TEP was informed that both data and clinical functional equivalence was utilized to create more families. In creating more families, additional spending was captured which provides more flexibility and granularity to end users as they implement their healthcare funding, utilization and systems research. It was noted that the scope of the work establishes a review of five years of Part B claims, ensures that the taxonomy developed captures both CPT and HCPCS codes, establishes clearly defined classification rules, significantly reduces the number of codes categorized as "other" and demonstrates continuity between BETOS and RBCS.

Subcategories were added to the new DME and Other RBCS categories:

- DME (DA – Medical/Surgical Supplies; DB – Hospital Beds; DC – Oxygen & Supplies; DD – Wheelchairs; DE – Other DME; DF – Orthotic Devices (includes prosthetics); and DG – Drugs Administered through DME)
- Other: (OA – Ambulance; OB – Enteral & Parenteral; OC – Vision, Hearing & Speech)

Additional subcategories were added to BETOS 2.0 categories:

- E&M (EP – Hospice/palliation)
- Procedure (PB – Breast; PH – Hematology)
- Test (TL – Laboratory; TM – Molecular testing)

The process for developing RBCS families was shared with the TEP:

- Evaluated spending across all 5 years (2014-2018; $1.1 trillion dollars)
- Dropped spending threshold from 0.2% to 0.1% to preserve as many BETOS 2.0 families as possible
- Adopted a broad definition of what "functionally equivalent" means

Some families were combined under the broader definition of functionally equivalent to capture as many codes and as much allowed spend as possible. A member stated that the integrity of the family definition is lost with the broader definition. An in-depth review of data, distributed in an Excel spreadsheet in advance of the meeting was presented: 929 family anchor codes were identified, 159 families were developed based on allowed spending, and all families were assigned a three-digit number which is reset for each category. Codes with no families are assigned 000. Four families in BETOS 2.0 did not meet the threshold in RBCS and are not included: femoral fracture repair, paring/cutting hyperkeratotic lesions, coronary artery bypass graft (CABG), and spinal instrumentation.

The process for assigning Major versus Other designation was discussed including add-on codes and unlisted codes. Further discussion was held on following BETOS 2.0 and past decision rules, and the need to keep families to something meaningful to meet the spend requirement. The process moving forward will include an annual update. A member stated the most common use of BETOS for MPFS has been at the category level rather than the family level. Additional review will be conducted based on the TEP feedback and a final report to CMS will be developed.

TEP participants included Robert Berenson, MD, Mary Jo Braid-Forbes, MPH, Suzanne Codespote, ASA, Zhenqiu Lin, PhD, David Nyweide, PhD, Christopher Powers, PharmD, and W. Pete Welch, PhD. The RBCS moderators in attendance were Warren A. Jones, MD, FAAFP, Larry Field, DO, MBA, CHCQM, CPC, CHC, LHRM, Malinda Stanley, MPA, RHIA, CCS, CPC, CPB, Alex Bohl, PhD, BS and Scott Ode, PhD.