Global Budget Revenue Contracts Market Shift Adjustments
Draft Technical Report

Health Services Cost Review Commission
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This document contains technical specifications for Global Budget Contract Market Share adjustments for RY 2016.

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This draft document, prepared in conjunction with the Payment Models Work Group, contains principles for consideration as market shift adjustments are developed and applied. It is a work in progress and may be modified as the approaches and calculations for adjustments are finalized.

1. Introduction

The Market Shift Adjustments (MSAs) mechanism is part of a much broader set of tools that links global budgets to populations and patients under the State's new All-Payer Model.

The specific purpose of MSAs is to provide a criteria for increasing or decreasing the approved regulated revenue of Maryland hospitals operating under Global Budget Revenue (GBR) rate arrangements to ensure that revenue is appropriately reallocated when shifts in patient volumes occur between hospitals as a result of efforts to achieve the Triple Aim of better care, better health, and lower costs. In fact, MSAs under global budget revenue arrangements are fundamentally different from a volume adjustment. Hospitals under a population-based payment system, such as GBR, have a fixed budget for providing services to the population in their service area. Therefore, it is imperative that MSAs reflect shifts in patient volumes independent of general volume increases in the market.

This document lays out the principles governing the development of MSA mechanisms that will be applied as part of Maryland's global budget system and provides a brief overview of the methodology.

2. Overview

MSAs should contain the following features:

- A specified population from which hospitals' market shifts will be calculated;
- A defined set of covered services of the MSA ; and
- An MSA approach that is budget neutral to the maximum extent practicable and/or results in demonstrably higher quality of care.

The MSA should complement the global budget revenue incentives to eliminate marginal services that do not add value, are unnecessary or result from better community based care. Therefore, MSAs should not be applied to these appropriate reductions in utilization.

MSAs are one of the global budget tools necessary to account for changes in utilization levels and patterns. The global budget revenue agreements contain other mechanisms intended to ensure the continued provision of needed services for Maryland patients including:

- **Population/Demographic Adjustments:** Changing demographics could result in a growth in the demand for hospital services. Currently, the annual update factor adjusts revenue to capture changes in overall population. Annual hospital level population adjustments will capture changes in total population/demographics in each hospital's service area.
- **Annual Update Provides Flexibility to Fund Innovation/New Services/Growth in Selected Quaternary Services:** Targeted funding could be provided through the Update Process. For example, the new Holy

Cross Germantown Hospital is partially funded from the general update process. Consideration is given to annual budget changes for quaternary services such as transplants, burns, and highly specialized cancer care for Johns Hopkins Hospital and University of Maryland Hospital Center under their global budget agreements.

- **Transfers to Johns Hopkins Hospital, University of Maryland Hospital Center, and Shock Trauma Center:** Adjustments will be made for changes in patient transfers to respective centers to ensure that resources are available to treat patients needing the specialized care provided in these settings.

- **Potentially Avoidable Utilization (PAU**): PAU is excluded from the MSAs and will be analyzed separately. The exclusion of PAU avoids the possibility of rewarding a hospital that increased PAU at the expense of a hospital that appropriately reduced its PAU. A PAU focused analysis, when warranted, will allow an assessment PAU reductions that are not driven by improvements in population health, such as diversion of patients to an unregulated setting, transfer of patients due to changes in referral patterns by purchasers, or a less favorable change in service delivery (eliminating or contracting service lines that have high PAU volumes) that should not be rewarded.

The basis for distinguishing between desirable and undesirable utilization changes is the Triple Aim of the new system: to improve health care outcomes, enhance patient experiences, and control costs. MSAs, together with other global budget agreement provisions and HSCRC policies, will need to focus on efforts that support the Triple Aim.

Examples of actions that help achieve the Triple Aim are those that result from:

- Providing high quality hospital care resulting in fewer hospital-acquired conditions;
- Making efforts to improve care coordination and patient discharge planning resulting in fewer re-hospitalizations;
- Promoting the provision of care in the most appropriate setting, resulting in fewer initial hospitalizations for ambulatory care sensitive conditions and conditions that can be treated equally effectively in other settings at lower cost; and
- Providing services in lower cost settings without compromising patient care.

Possible examples of actions that undermine the Triple Aim and should be avoided include:

- Prompting patients with unprofitable service needs to seek care elsewhere or reducing the volume of non-profitable services below the amount needed by patients within the hospital's service area;
- Reducing capacity or service ability to the point of creating long waiting lists or delays;
- Under investing in new technology or modes of care proven to be efficient ways of improving patient health, safety or quality; and
- Reducing the total level of a hospital's medical staff or the quality of affiliated providers to the point of compromising patient care.

Similarly, the MSA together with other mechanisms and policies must distinguish between increases in utilization at any given hospital that should be recognized and those that should not be recognized. For

example, hospitals should receive increases to their approved regulated revenue in circumstances that result in a shift of patient volumes that are beyond the hospital's control, such as the closure of a service at a particular hospital and resulting relocation of patients receiving that service to another facility, or other discrete and readily identifiable events. As long as the financial drivers of the shift are transparent and value based, hospitals should also receive a market shift adjustment if organizations such as Health Maintenance Organizations, Accountable Care Organizations or Primary Care Medical Homes direct their members to the facility to improve efficiency, cost-effectiveness and quality.

The MSA policy should not encourage shifts in volume that are not clearly relatable to improvements in the overall value of care, for example, such as marketing or acquisition strategies that merely shift the location or ownership of resources without increasing access, improving outcomes, or reducing costs in a geographic area. In February 2014, the Commission reduced the variable cost factor for volume changes from 85% to 50% for services provided outside of global budgets revenue arrangements, yet subject to the All Payer Model. Applying this lower variable cost factor to market shift adjustments will contribute to limiting incentives to increase volume through strategies that do not improve care or value.

3. Guiding Principles

In developing its MSA approach, the HSCRC should follow certain guiding principles. These include:

1. Provide clear incentives

1.1. Promote the three part aim
1.2. Emphasize value, recognizing that this concept will take some time to develop
1.3. Promote investments in care coordination
1.4. Encourage appropriate utilization and delivery of high quality care
1.5. Avoid paying twice for the same service

2. Reinforce the maintenance of services to the community.

2.1. Encourage competition to promote responsive provision of services
2.2. Competition should be based on value
2.3. Revenue should generally follow the patient
2.4. Support strategies pursued by entities such as ACOs, PCMH, and MCOs seeking to direct patients to low cost, high quality settings

3. Changes constituting market shift should be clearly defined.

3.1. Volume increase alone is not a market shift change.
3.2. Market shift should be evaluated in combination with the overall volume trend to ensure that shift has occurred, rather than volume growth
3.3. If one hospital has higher volume and other hospitals serving the same area do not have corresponding declines in volume, a market shift should not be awarded.
3.4. Increases in the global budget of one hospital should be funded fully by the decrease in other hospitals' budgets
3.5. Market shift changes should reflect services provided by the hospital

3.6. Substantial reductions at a facility may result in a global budget reduction even if not accompanied by shift to other facilities in service area. (Investigate shift to unregulated facilities and limitations on types of procedures)
3.7. Closures of services or discrete and readily identifiable events should result in a global budget adjustment and a market shift adjustment as needed
3.8. Market shifts in Potentially Avoidable Utilization (PAU) should be evaluated separately[1]

4. Market Shift Calculations

1.1. Market Shift Algorithm

Based on the principles listed above, an algorithm has been developed to calculate market shift adjustments for a specific service area (e.g. orthopedic surgery) and defined geographic location (e.g. zip code). The algorithm compares the growth in volumes at hospitals with utilization increases to the decline in volumes at hospitals with utilization decreases. Adjustments are capped at the lesser of the growth for volume gainers or the decline for volume loses. This approach disentangles market shifts from collective changes in volume in the service area and removes incentives for driving up volume in the service area.

Table 1 provides an illustration of the calculation done for zip code 21000 and General Surgery service line. Within this zip code, the total volume increase is 654 and decline is 129. Applying the lesser of the two rule, the allowed market shift is limited to 129 ECMADs and allocated to other hospitals with volume increases proportional to this hospital's volume increase in total utilization. In the end, the net impact of market shifts in each zip code and service line combination equals zero.

Table 1: Example Calculation of the Market Shift Algorithm

Zip code 21000 General Surgery	Volume CY13	Volume CY14	Volume Growth	Hospital's Proportion of Total Increase/Decline	Market Shift
	A	B	C=B-A	D=C/Subtotal C	E=D*Allowed Market Shift
Hospital A	1,000	1,500	500	76%	99
Hospital B	500	600	100	15%	20
Hospital C	50	100	50	8%	10
Hospital D	-	4	4	1%	1
Utilization Increase	1,550	2,204	654	100%	129
Hospital E	500	400	(100)	78%	(100)
Hospital F	50	25	(25)	19%	(25)

[1] There are limited circumstances where HSCRC might want to recognize a market shift in PAUs. For example, if an HMO moved all of its patients from one facility to another, there may be an appropriate shift in revenue for some level of PAU cases. Similarly, if a PCMH changed its hospital affiliation, there may be a shift in PAU volumes from one facility to another.

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Hospital G	4	-	(4)	3%	(4)
Utilization Decline	554	425	(129)	100%	(129)
Zip Total	**2,104**	**2,629**	**525**	-	0
Allowed Market Shift			**129**		

1.2. Geographic Area Definitions

Market shift is focused on movement of patients and services between Maryland hospitals. Narrowly defined geographic regions are ideal for calculating market shift as the individual hospitals serving the region are not likely to be differentially impacted by population growth or demographically driven changes in utilization rates. Calculating market shift at the statewide level, in contrast, would result in the movement of dollars to hospitals in regions experiencing population growth at the expense of other regions. Adjustments for changes in population and demographics are already addressed by annual demographic adjustments to each hospital's global budget.

In densely populated regions of the State where there is significant completion among hospitals, market share calculations are performed at the zip code level. However, zip code level calculations introduce random variation to the measurement in small geographic areas where the population density is low and health care market is concentrated. Such zip codes are aggregated to limit the impact of small cell sizes on the calculations. In particular, the following county zip codes are aggregated at a county level:

Garrett, Allegany, Washington, Carroll, Cecil, Kent, Queen Anne's, Caroline, Talbot, Dorchester, Wicomico, Somerset, Calvert, Charles, Saint Mary's, Worcester, Harford, Frederick

In calculating market shifts all hospitals will have the same geographic definitions. For example, to calculate volume changes in Garrett County all zip codes in Garrett County will be added together for each of the hospitals which had a volume in Garrett County. The calculations of volume changes will be based on zip code level analysis for the remaining of the counties that are not aggregated such as Baltimore City.

1.3. Service Line Definitions

Narrow definitions of service lines are proposed to prevent utilization growth for one component of the service line from masking a shift in patients for another service line. For instance, a service line that captures all surgical procedures might be growing at every hospital in a region due to increasing demand for orthopedic surgery and thereby mask the shift of fifty cardiac surgical procedures from one hospital to another.

Movement of cases from inpatient to outpatient settings and utilization of observation units creates a challenge in differentiating shifts from one hospital to another, or shifts from a hospital's inpatient to outpatient services. Staff has started to address this issue by including all observation cases with 24 hours or more in inpatient counts and assigning them weights that are similar to an inpatient case. Staff is planning to continue to work on combining other outpatient cases with inpatients for future year adjustments and evaluating the impact of inpatient to outpatient services on a case by case basis.

Inpatient service lines are developed using the existing 3M methodology to group APR DRGs to specific service lines with a few modifications. The cross walk of APR DRGs to Service lines are included in APPENDIX I.

While inpatient service lines have been widely used and understood easily due to the availability of APR DRGs, outpatient service lines are more difficult to develop. Conceptually, staff uses an inpatient like logic and assigns the visits based upon the reasons for acquiring services. For example, all services provided for emergency department patients are grouped under the Emergency Department service line. APPENDIX II provides the hierarchy of outpatient service lines.

1.4. Exclusions

The following services or cases and the rationale to exclude from the market shift calculations.

1. Potentially Avoidable Utilization (PAU): As hospitals improve care and population health, trends in potentially avoidable utilization could reflect differential performance among hospitals rather than market shifts. In other words, one hospital may perform better than the others and reduce their PAU while another hospital serving a similar market may have an increase in their PAU. For the rate year 2016 adjustments, staff included only readmissions and prevention quality indicators (PQIs) developed by AHRQ that were measured in both inpatient and observation cases equaling or exceeding 24 hours and more. APPENDIX III and IV provide overviews of readmissions indicators and PQIs.
2. Categorical exclusions: These cases represent the most specialized services received at Academic Medical Centers (AMCs) and are based upon actual trends in these hospitals under their global budgets. APPENDIX V provides the definitions of categorical cases.

1.5. Timing of Adjustments

To accommodate the HSCRC case mix data submission timelines, there will be a six month lag between the measurement period and the rate adjustments. The rate year 2016 adjustments will be based on comparing the measurement period of July 2014 - December 2014 to a base year period of July 2013 - December 2013. After this initial measurement period, a full calendar year will be used to calculate market shift adjustments. Accordingly, rate year 2017 adjustment will be based on Jan - Dec 2015 compared to Jan - Dec 2014 time periods.

1.6. Case Weights and Equivalent Case Mix Adjusted Discharges

To measure utilization, HSCRC developed equivalent case mix adjusted discharges (ECMADs) as a method to quantify inpatient and outpatient hospital volume into a single measure. A hospital's ECMAD count includes case mix adjusted inpatient discharges as well as equivalent adjusted outpatient case mix discharges, which is based on case-mix adjusted outpatient visits converted to inpatient discharges by the ratio of average inpatient visit charge per discharge to average outpatient charge per visit.

Inpatient weights are developed using the Hospital Specific Relative Value (Iterative Weights) methodology. APPENDIX VI provides the detailed steps for calculating inpatient weights. Historically, HSCRC has been modifying the 3M APR DRGs to account for differences in resource use within Rehabilitation DRG (860) and psychiatric DRGs (voluntary and involuntary). Staff evaluated the impact of these modifications and found that the differences between national APR DRGs and Maryland specific DRGs were very limited. Furthermore, staff

expects t transition to ICD-10 will create inaccuracies in defining these modifications and 3M will improve the APR DRG classifications using more granular information from ICD-10 codes. Based on these considerations, HSCRC will use national 3M APR DRGs for all adjustments starting in the rate year 2016 adjustments.

Outpatient weights primary rely on EAPG grouping. After EAPGs weights are assigned to each CPT code in the patient records, a principal record type is assigned to differentiate types of visits into four main categories:

Principle EAPG Type A: Radiation, Chemo, & Major Infusion

Principal EAPG Type 2: Significant Procedures

Principal EAPG Type 3: Medical Visit

Principal EAPG Type 4: All Other (Ancillary, Incidental, Drug, Durable Medical Equipment, Unassigned EAPG Types.)

Once each record is grouped into four principal EAPG types, singleton weights are developed within each group and normalized. Singleton weights are used to assign the highest EAPG that in turn determines the assignment of the APG category for that record. Afterwards, these EAPGs are mapped to initial service lines using EAPG to Service line mapping (Appendix VII). Service lines used for Market shifts are determined using a hierarchy of services aiming to group the visits in accordance to the purpose of the patient visit. APPENDIX VIII provides technical documentation on outpatient weights.

5. Market Shift Revenue Calculations

HSCRC staff evaluated several options in calculating the cost associated with market shift changes calculated using the algorithm described above. Two viable alternatives emerged:

- the hospital specific average charge per ECMAD; or

- each hospital's service line specific average charge per ECMAD.

Service line specific cost calculations have an advantage of overcoming the variation in outpatient services within each service line. Inpatient DRG weights and prices have the advantage of decades of refinement, while outpatient weights are relatively new. Hospital specific charges per ECMAD have the advantage of overcoming some of the underlying variation in charge for equivalent case on the outpatient side as further refinements are made over time. The Maryland Hospital Association sent a letter to staff indicating that the hospital industry supports use of the hospital service line average charge per ECMAD. Staff has made a detailed review of the results using this approach compared to the alternative and we are satisfied with the results. Therefore, we are planning to use service line ECMAD average charges to develop the adjustments for each hospital. Consistent with initial policy implementation for the new All Payer Model, staff plans to use a 50% variable cost factor for market shift adjustments between regulated hospitals.

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APPENDIX

Technical Specifications for Market Shift Calculations for Rate Year 2016

1. APR DRG Version= 32
2. EAPG Version= 38
3. Readmission Logic= Readmission Reduction Program CY 2015 Logic
4. Prevention Quality Indicators Version= 4.5
5. Adjustment periods= July-Dec 2014 vs July-Dec 2013

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APPENDIX I: APR DRG Service Line Map (APR DRG version32)

APR DRG	DESCRIPTION	Product Category	Prodline
1	Liver transplant &/or intestinal transplant	Transplant Surgery	40
2	Heart &/or lung transplant	Transplant Surgery	40
3	Bone marrow transplant	Transplant Surgery	40
4	ECMO or tracheostomy w long term mechanical ventilation w extensive procedure	Ventilator Support	45
5	Tracheostomy w long term mechanical ventilation w/o extensive procedure	Ventilator Support	45
6	Pancreas transplant	Transplant Surgery	40
20	Craniotomy for trauma	Neurological Surgery	23
21	Craniotomy except for trauma	Neurological Surgery	23
22	Ventricular shunt procedures	Neurological Surgery	23
23	Spinal procedures	Spinal Surgery	37
24	Extracranial vascular procedures	Neurological Surgery	23
26	Other nervous system & related procedures	Neurological Surgery	23
40	Spinal disorders & injuries	Neurology	24
41	Nervous system malignancy	Oncology	26
42	Degenerative nervous system disorders exc mult sclerosis	Neurology	24
43	Multiple sclerosis & other demyelinating diseases	Neurology	24
44	Intracranial hemorrhage	Neurology	24
45	CVA & precerebral occlusion w infarct	Neurology	24
46	Nonspecific CVA & precerebral occlusion w/o infarct	Neurology	24
47	Transient ischemia	Neurology	24
48	Peripheral, cranial & autonomic nerve disorders	Neurology	24
49	Bacterial & tuberculous infections of nervous system	Infectious Disease	17
50	Non-bacterial infections of nervous system exc viral meningitis	Infectious Disease	17
51	Viral meningitis	Infectious Disease	17
52	Nontraumatic stupor & coma	Neurology	24
53	Seizure	Neurology	24
54	Migraine & other headaches	Neurology	24
55	Head trauma w coma >1 hr or hemorrhage	Neurology	24
56	Brain contusion/laceration & complicated skull Fx, coma < 1 hr or no coma	Neurology	24
57	Concussion, closed skull Fx nos,uncomplicated intracranial injury, coma <	Neurology	24

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APR DRG	DESCRIPTION	Product Category	Prodline
	1 hr or no coma		
58	Other disorders of nervous system	Neurology	24
70	Orbital procedures	Ophthalmologic Surg	27
73	Eye procedures except orbit	Ophthalmologic Surg	27
80	Acute major eye infections	Ophthalmology	28
82	Eye disorders except major infections	Ophthalmology	28
89	Major cranial/facial bone procedures	ENT Surgery	8
90	Major larynx & trachea procedures	ENT Surgery	8
91	Other major head & neck procedures	ENT Surgery	8
92	Facial bone procedures except major cranial/facial bone procedures	ENT Surgery	8
93	Sinus & mastoid procedures	ENT Surgery	8
95	Cleft lip & palate repair	ENT Surgery	8
97	Tonsil & adenoid procedures	ENT Surgery	8
98	Other ear, nose, mouth & throat procedures	ENT Surgery	8
110	Ear, nose, mouth, throat, cranial/facial malignancies	Oncology	26
111	Vertigo & other labyrinth disorders	Otolaryngology	32
113	Infections of upper respiratory tract	Otolaryngology	32
114	Dental & oral diseases & injuries	Dental	3
115	Other ear, nose, mouth,throat & cranial/facial diagnoses	Otolaryngology	32
120	Major respiratory & chest procedures	Thoracic Surgery	39
121	Other respiratory & chest procedures	Thoracic Surgery	39
130	Respiratory system diagnosis w ventilator support 96+ hours	Pulmonary	34
131	Cystic fibrosis - pulmonary disease	Pulmonary	34
132	BPD & oth chronic respiratory diseases arising in perinatal period	Pulmonary	34
133	Pulmonary edema & respiratory failure	Pulmonary	34
134	Pulmonary embolism	Pulmonary	34
135	Major chest & respiratory trauma	Trauma	41
136	Respiratory malignancy	Oncology	26
137	Major respiratory infections & inflammations	Pulmonary	34
138	Bronchiolitis & RSV pneumonia	Pulmonary	34
139	Other pneumonia	Pulmonary	34
140	Chronic obstructive pulmonary disease	Pulmonary	34
141	Asthma	Pulmonary	34
142	Interstitial lung disease	Pulmonary	34
143	Other respiratory diagnoses except signs, symptoms & minor diagnoses	Pulmonary	34
144	Respiratory signs, symptoms & minor diagnoses	Pulmonary	34

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APR DRG	DESCRIPTION	Product Category	Prodline
160	Major cardiothoracic repair of heart anomaly	Cardiothoracic Surgery	2
161	Cardiac defibrillator & heart assist implant	Cardiothoracic Surgery	2
162	Cardiac valve procedures w cardiac catheterization	Cardiothoracic Surgery	2
163	Cardiac valve procedures w/o cardiac catheterization	Cardiothoracic Surgery	2
165	Coronary bypass w cardiac cath or percutaneous cardiac procedure	Cardiothoracic Surgery	2
166	Coronary bypass w/o cardiac cath or percutaneous cardiac procedure	Cardiothoracic Surgery	2
167	Other cardiothoracic procedures	Cardiothoracic Surgery	2
169	Major thoracic & abdominal vascular procedures	Vascular Surgery	44
170	Permanent cardiac pacemaker implant w AMI, heart failure or shock	EP/Chronic Rhythm Mgmt	9
171	Perm cardiac pacemaker implant w/o AMI, heart failure or shock	EP/Chronic Rhythm Mgmt	9
173	Other vascular procedures	Vascular Surgery	44
174	Percutaneous cardiovascular procedures w AMI	Invasive Cardiology	19
175	Percutaneous cardiovascular procedures w/o AMI	Invasive Cardiology	19
176	Cardiac pacemaker & defibrillator device replacement	EP/Chronic Rhythm Mgmt	9
177	Cardiac pacemaker & defibrillator revision except device replacement	EP/Chronic Rhythm Mgmt	9
180	Other circulatory system procedures	Cardiothoracic Surgery	2
190	Acute myocardial infarction	Myocardial Infarction	20
191	Cardiac catheterization w circ disord exc ischemic heart disease	Invasive Cardiology	19
192	Cardiac catheterization for ischemic heart disease	Invasive Cardiology	19
193	Acute & subacute endocarditis	Cardiology	1
194	Heart failure	Cardiology	1
196	Cardiac arrest	Cardiology	1
197	Peripheral & other vascular disorders	General Medicine	11
198	Angina pectoris & coronary atherosclerosis	Cardiology	1
199	Hypertension	Cardiology	1

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APR DRG	DESCRIPTION	Product Category	Prodline
200	Cardiac structural & valvular disorders	Cardiology	1
201	Cardiac arrhythmia & conduction disorders	Cardiology	1
203	Chest pain	Cardiology	1
204	Syncope & collapse	Cardiology	1
205	Cardiomyopathy	Cardiology	1
206	Malfunction,reaction,complication of cardiac/vasc device or procedure	Cardiology	1
207	Other circulatory system diagnoses	Cardiology	1
220	Major stomach, esophageal & duodenal procedures	General Surgery	12
221	Major small & large bowel procedures	General Surgery	12
222	Other stomach, esophageal & duodenal procedures	General Surgery	12
223	Other small & large bowel procedures	General Surgery	12
224	Peritoneal adhesiolysis	General Surgery	12
225	Appendectomy	General Surgery	12
226	Anal procedures	General Surgery	12
227	Hernia procedures except inguinal, femoral & umbilical	General Surgery	12
228	Inguinal, femoral & umbilical hernia procedures	General Surgery	12
229	Other digestive system & abdominal procedures	General Surgery	12
240	Digestive malignancy	Oncology	26
241	Peptic ulcer & gastritis	Gastroenterology	10
242	Major esophageal disorders	Gastroenterology	10
243	Other esophageal disorders	Gastroenterology	10
244	Diverticulitis & diverticulosis	Gastroenterology	10
245	Inflammatory bowel disease	Gastroenterology	10
246	Gastrointestinal vascular insufficiency	Gastroenterology	10
247	Intestinal obstruction	Gastroenterology	10
248	Major gastrointestinal & peritoneal infections	Gastroenterology	10
249	Non-bacterial gastroenteritis, nausea & vomiting	Gastroenterology	10
251	Abdominal pain	Gastroenterology	10
252	Malfunction, reaction & complication of GI device or procedure	Gastroenterology	10
253	Other & unspecified gastrointestinal hemorrhage	Gastroenterology	10
254	Other digestive system diagnoses	Gastroenterology	10
260	Major pancreas, liver & shunt procedures	General Surgery	12
261	Major biliary tract procedures	General Surgery	12
262	Cholecystectomy except laparoscopic	General Surgery	12
263	Laparoscopic cholecystectomy	General Surgery	12
264	Other hepatobiliary, pancreas & abdominal procedures	General Surgery	12
279	Hepatic coma & other major acute liver disorders	Gastroenterology	10

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APR DRG	DESCRIPTION	Product Category	Prodline
280	Alcoholic liver disease	Gastroenterology	10
281	Malignancy of hepatobiliary system & pancreas	Oncology	26
282	Disorders of pancreas except malignancy	Gastroenterology	10
283	Other disorders of the liver	Gastroenterology	10
284	Disorders of gallbladder & biliary tract	Gastroenterology	10
301	Hip joint replacement	Orthopedic Surgery	29
302	Knee joint replacement	Orthopedic Surgery	29
303	Dorsal & lumbar fusion proc for curvature of back	Orthopedic Surgery	29
304	Dorsal & lumbar fusion proc except for curvature of back	Orthopedic Surgery	29
305	Amputation of lower limb except toes	Orthopedic Surgery	29
308	Hip & femur procedures for trauma except joint replacement	Orthopedic Surgery	29
309	Hip & femur procedures for non-trauma except joint replacement	Orthopedic Surgery	29
310	Intervertebral disc excision & decompression	Orthopedic Surgery	29
312	Skin graft, except hand, for musculoskeletal & connective tissue diagnoses	Orthopedic Surgery	29
313	Knee & lower leg procedures except foot	Orthopedic Surgery	29
314	Foot & toe procedures	Orthopedic Surgery	29
315	Shoulder, upper arm & forearm procedures	Orthopedic Surgery	29
316	Hand & wrist procedures	Orthopedic Surgery	29
317	Tendon, muscle & other soft tissue procedures	Orthopedic Surgery	29
320	Other musculoskeletal system & connective tissue procedures	Orthopedic Surgery	29
321	Cervical spinal fusion & other back/neck proc exc disc excis/decomp	Spinal Surgery	37
340	Fracture of femur	Orthopedics	30
341	Fracture of pelvis or dislocation of hip	Orthopedics	30
342	Fractures & dislocations except femur, pelvis & back	Orthopedics	30
343	Musculoskeletal malignancy & pathol fracture d/t muscskel malig	Oncology	26
344	Osteomyelitis, septic arthritis & other musculoskeletal infections	Infectious Disease	17
346	Connective tissue disorders	Rheumatology	36
347	Other back & neck disorders, fractures & injuries	Orthopedics	30
349	Malfunction, reaction, complic of orthopedic device or procedure	Orthopedics	30
351	Other musculoskeletal system & connective tissue diagnoses	Rheumatology	36
361	Skin graft for skin & subcutaneous tissue diagnoses	General Surgery	12
362	Mastectomy procedures	General Surgery	12
363	Breast procedures except mastectomy	General Surgery	12
364	Other skin, subcutaneous tissue & related procedures	General Surgery	12
380	Skin ulcers	Dermatology	4
381	Major skin disorders	Dermatology	4

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APR DRG	DESCRIPTION	Product Category	Prodline
382	Malignant breast disorders	Oncology	26
383	Cellulitis & other bacterial skin infections	Infectious Disease	17
384	Contusion, open wound & other trauma to skin & subcutaneous tissue	Dermatology	4
385	Other skin, subcutaneous tissue & breast disorders	Dermatology	4
401	Pituitary & adrenal procedures	Endocrinology Surgery	7
403	Procedures for obesity	Endocrinology Surgery	7
404	Thyroid, parathyroid & thyroglossal procedures	Endocrinology Surgery	7
405	Other procedures for endocrine, nutritional & metabolic disorders	Endocrinology Surgery	7
420	Diabetes	Diabetes	5
421	Malnutrition, failure to thrive & other nutritional disorders	Endocrinology	6
422	Hypovolemia & related electrolyte disorders	Endocrinology	6
423	Inborn errors of metabolism	Endocrinology	6
424	Other endocrine disorders	Endocrinology	6
425	Electrolyte disorders except hypovolemia related	Endocrinology	6
440	Kidney transplant	Transplant Surgery	40
441	Major bladder procedures	Urological Surgery	42
442	Kidney & urinary tract procedures for malignancy	Oncology	26
443	Kidney & urinary tract procedures for nonmalignancy	Urological Surgery	42
444	Renal dialysis access device procedure only	Urological Surgery	42
445	Other bladder procedures	Urological Surgery	42
446	Urethral & transurethral procedures	Urological Surgery	42
447	Other kidney, urinary tract & related procedures	Urological Surgery	42
460	Renal failure	Nephrology	22
461	Kidney & urinary tract malignancy	Oncology	26
462	Nephritis & nephrosis	Nephrology	22
463	Kidney & urinary tract infections	Nephrology	22
465	Urinary stones & acquired upper urinary tract obstruction	Urology	43
466	Malfunction, reaction, complic of genitourinary device or proc	Nephrology	22
468	Other kidney & urinary tract diagnoses, signs & symptoms	Nephrology	22
480	Major male pelvic procedures	Urological Surgery	42
481	Penis procedures	Urological Surgery	42
482	Transurethral prostatectomy	Urological Surgery	42
483	Testes & scrotal procedures	Urological Surgery	42

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APR DRG	DESCRIPTION	Product Category	Prodline
484	Other male reproductive system & related procedures	General Surgery	12
500	Malignancy, male reproductive system	Oncology	26
501	Male reproductive system diagnoses except malignancy	Urology	43
510	Pelvic evisceration, radical hysterectomy & other radical GYN procs	Gynecological Surg	13
511	Uterine & adnexa procedures for ovarian & adnexal malignancy	Oncology	26
512	Uterine & adnexa procedures for non-ovarian & non-adnexal malig	Oncology	26
513	Uterine & adnexa procedures for non-malignancy except leiomyoma	Gynecological Surg	13
514	Female reproductive system reconstructive procedures	Gynecological Surg	13
517	Dilation & curettage for non-obstetric diagnoses	Gynecological Surg	13
518	Other female reproductive system & related procedures	Gynecological Surg	13
519	Uterine & adnexa procedures for leiomyoma	Gynecological Surg	13
530	Female reproductive system malignancy	Oncology	26
531	Female reproductive system infections	Gynecology	14
532	Menstrual & other female reproductive system disorders	Gynecology	14
540	Cesarean delivery	Obstetrics/Delivery	25
541	Vaginal delivery w sterilization &/or D&C	Obstetrics/Delivery	25
542	Vaginal delivery w complicating procedures exc sterilization &/or D&C	Obstetrics/Delivery	25
544	D&C, aspiration curettage or hysterotomy for obstetric diagnoses	Other Obstetrics	31
545	Ectopic pregnancy procedure	Gynecological Surg	13
546	Other O.R. proc for obstetric diagnoses except delivery diagnoses	Other Obstetrics	31
560	Vaginal delivery	Obstetrics/Delivery	25
561	Postpartum & post abortion diagnoses w/o procedure	Other Obstetrics	31
563	Threatened abortion	Other Obstetrics	31
564	Abortion w/o D&C, aspiration curettage or hysterotomy	Other Obstetrics	31
565	False labor	Other Obstetrics	31
566	Other antepartum diagnoses	Other Obstetrics	31
580	Neonate, transferred <5 days old, not born here	Neonatology	21
581	Neonate, transferred < 5 days old, born here	Neonatology	21
583	Neonate w ECMO	Neonatology	21
588	Neonate bwt <1500g w major procedure	Neonatology	21
589	Neonate bwt <500g	Neonatology	21
591	Neonate birthwt 500-749g w/o major procedure	Neonatology	21
593	Neonate birthwt 750-999g w/o major procedure	Neonatology	21
602	Neonate bwt 1000-1249g w resp dist synd/oth maj resp or maj anom	Neonatology	21
603	Neonate birthwt 1000-1249g w or w/o other significant condition	Neonatology	21
607	Neonate bwt 1250-1499g w resp dist synd/oth maj resp or maj anom	Neonatology	21
608	Neonate bwt 1250-1499g w or w/o other significant condition	Neonatology	21

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APR DRG	DESCRIPTION	Product Category	Prodline
609	Neonate bwt 1500-2499g w major procedure	Neonatology	21
611	Neonate birthwt 1500-1999g w major anomaly	Neonatology	21
612	Neonate bwt 1500-1999g w resp dist synd/oth maj resp cond	Neonatology	21
613	Neonate birthwt 1500-1999g w congenital/perinatal infection	Neonatology	21
614	Neonate bwt 1500-1999g w or w/o other significant condition	Neonatology	21
621	Neonate bwt 2000-2499g w major anomaly	Neonatology	21
622	Neonate bwt 2000-2499g w resp dist synd/oth maj resp cond	Neonatology	21
623	Neonate bwt 2000-2499g w congenital/perinatal infection	Neonatology	21
625	Neonate bwt 2000-2499g w other significant condition	Neonatology	21
626	Neonate bwt 2000-2499g, normal newborn or neonate w other problem	Neonatology	21
630	Neonate birthwt >2499g w major cardiovascular procedure	Neonatology	21
631	Neonate birthwt >2499g w other major procedure	Neonatology	21
633	Neonate birthwt >2499g w major anomaly	Neonatology	21
634	Neonate, birthwt >2499g w resp dist synd/oth maj resp cond	Neonatology	21
636	Neonate birthwt >2499g w congenital/perinatal infection	Neonatology	21
639	Neonate birthwt >2499g w other significant condition	Neonatology	21
640	Neonate birthwt >2499g, normal newborn or neonate w other problem	Normal Newborn	48
650	Splenectomy	General Surgery	12
651	Other procedures of blood & blood-forming organs	General Surgery	12
660	Major hematologic/immunologic diag exc sickle cell crisis & coagul	Hematology	15
661	Coagulation & platelet disorders	Hematology	15
662	Sickle cell anemia crisis	Hematology	15
663	Other anemia & disorders of blood & blood-forming organs	Hematology	15
680	Major O.R. procedures for lymphatic/hematopoietic/other neoplasms	General Surgery	12
681	Other O.R. procedures for lymphatic/hematopoietic/other neoplasms	General Surgery	12
690	Acute leukemia	Oncology	26
691	Lymphoma, myeloma & non-acute leukemia	Oncology	26
692	Radiotherapy	Oncology	26
693	Chemotherapy	Oncology	26
694	Lymphatic & other malignancies & neoplasms of uncertain behavior	Oncology	26
710	Infectious & parasitic diseases including HIV w O.R. procedure	General Surgery	12
711	Post-op, post-trauma, other device infections w O.R. procedure	General Surgery	12
720	Septicemia & disseminated infections	Infectious Disease	17
721	Post-operative, post-traumatic, other device infections	General Surgery	12
722	Fever	Infectious Disease	17
723	Viral illness	Infectious Disease	17
724	Other infectious & parasitic diseases	Infectious Disease	17

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APR DRG	DESCRIPTION	Product Category	Prodline
740	Mental illness diagnosis w O.R. procedure	General Surgery	12
750	Schizophrenia	Psychiatry	33
751	Major depressive disorders & other/unspecified psychoses	Psychiatry	33
752	Disorders of personality & impulse control	Psychiatry	33
753	Bipolar disorders	Psychiatry	33
754	Depression except major depressive disorder	Psychiatry	33
755	Adjustment disorders & neuroses except depressive diagnoses	Psychiatry	33
756	Acute anxiety & delirium states	Psychiatry	33
757	Organic mental health disturbances	Psychiatry	33
758	Childhood behavioral disorders	Psychiatry	33
759	Eating disorders	Psychiatry	33
760	Other mental health disorders	Psychiatry	33
770	Drug & alcohol abuse or dependence, left against medical advice	Substance Abuse	38
772	Alcohol & drug dependence w rehab or rehab/detox therapy	Substance Abuse	38
773	Opioid abuse & dependence	Substance Abuse	38
774	Cocaine abuse & dependence	Substance Abuse	38
775	Alcohol abuse & dependence	Substance Abuse	38
776	Other drug abuse & dependence	Substance Abuse	38
791	O.R. procedure for other complications of treatment	Injuries/complic. of prior care	18
811	Allergic reactions	General Medicine	11
812	Poisoning of medicinal agents	General Medicine	11
813	Other complications of treatment	Injuries/complic. of prior care	18
815	Other injury, poisoning & toxic effect diagnoses	General Medicine	11
816	Toxic effects of non-medicinal substances	General Medicine	11
841	Extensive 3rd degree burns w skin graft	General Medicine	11
842	Full thickness burns w skin graft	General Medicine	11
843	Extensive 3rd degree or full thickness burns w/o skin graft	General Medicine	11
844	Partial thickness burns w or w/o skin graft	General Medicine	11
850	Procedure w diag of rehab, aftercare or oth contact w health service	General Surgery	12
860	Rehabilitation	Rehabilitation	35
861	Signs, symptoms & other factors influencing health status	General Medicine	11
862	Other aftercare & convalescence	General Medicine	11
863	Neonatal aftercare	General Medicine	11
890	HIV w multiple major HIV related conditions	HIV	16
892	HIV w major HIV related condition	HIV	16

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APR DRG	DESCRIPTION	Product Category	Prodline
893	HIV w multiple significant HIV related conditions	HIV	16
894	HIV w one signif HIV cond or w/o signif related cond	HIV	16
910	Craniotomy for multiple significant trauma	Trauma	41
911	Extensive abdominal/thoracic procedures for mult significant trauma	Trauma	41
912	Musculoskeletal & other procedures for multiple significant trauma	Trauma	41
930	Multiple significant trauma w/o O.R. procedure	Trauma	41
950	Extensive procedure unrelated to principal diagnosis	General Surgery	12
951	Moderately extensive procedure unrelated to principal diagnosis	General Surgery	12
952	Nonextensive procedure unrelated to principal diagnosis	General Surgery	12
955	Invalid	Invalid	46
956	Ungroupable	Ungroupable	47

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APPENDIX II Outpatient Service Line Assignment Hierarchy

1. **Radiation Therapy/Infusion/Chemo/Oncology Radiation**

   Therapy/Infusion/Chemo/Oncology cases where operating (rctchg40)<drug charge (rctchg67), Operating Room (rctchg40)<Radiation (rctchg 45 & rctchg46);Included EAPGS: (1, 110, 111,117, 340,341,342,343,344,345,346,347,348,349,431, 432,433, 434,441,443,460,461,462,463,464,465,476,477,478,482,483,484, 802, and 803)

2. **Emergency Department:** Emergency Department cases where emergency (rctchg28), free standing center (rctchg34), or Trauma Resuscitation rate center charges(rctchg90) > 0

3. **Drug:** Drug cases where EAPGs are assigned to drug service line

4. **Major Surgery**: Major Surgery cases where EAPGs are assigned to major surgery service line

5. **Cardiovascular:** Cardiovascular cases where EAPGs are assigned to cardiovascular service line

6. **Minor Surgery:** Cases where EAPGs are assigned to minor surgery service line

7. **Psychiatry**: Cases where EAPGs are assigned psychiatry service line

8. **Rehab & Therapy**: Cases where EAPGs are assigned rehab & therapy service line

9. **Clinic**: Cases where clinic (rctchg29), clinic services primary (rctchg30), oncology clinic (rctchg35), operating room clinic (rctchg79), or UM shock trauma clinic rate center charges (rctchg37) > 010.

10. **Unassigned**: If high weight eapg =0