

DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
Center for Consumer Information and Insurance Oversight
200 Independence Avenue SW
Washington, DC 20201



Date: July 27, 2018

Subject: Updated 2019 Benefit Year Final HHS Risk Adjustment Model Coefficients

As detailed in the HHS Notice of Benefit and Payment Parameters for 2019 final rule, the 2019 benefit year final HHS risk adjustment model coefficients are based on blended coefficients separately solved from the 2016 enrollee-level EDGE data and the 2014 and 2015 Truven MarketScan® data.¹ We previously released updated 2019 benefit year final coefficients to address a few technical errors in the adult risk adjustment model coefficients and the infant risk adjustment model coefficients that were identified after publication of the final rule.² Consistent with 45 C.F.R. § 153.320(b)(1)(i), this document announces a further update to the 2019 benefit year final risk adjustment model coefficients (or factors) to reflect an additional recalibration related to an update to the 2016 enrollee-level EDGE dataset.

The 2019 benefit year was the first year recalibrating coefficients with enrollee-level EDGE data. CMS only collects masked data from the issuers' EDGE servers. Therefore, to link enrollees across enrollment, medical, pharmacy and supplemental claims files in the enrollee-level EDGE dataset, CMS generates SysID, which is a randomly generated combination of an individual person identifier and an issuer identifier. The SysID was created specifically for the enrollee-level EDGE data extract from issuers' EDGE servers and cannot be decrypted by CMS to identify the enrollee or issuer. In the 2016 enrollee-level EDGE dataset, certain SysIDs appeared in the medical, pharmacy and supplemental claims files but were not present in the enrollment file ("orphan" SysIDs). For the previously published update to the 2019 benefit year final risk adjustment model coefficients,³ CMS removed the claims associated with such enrollees prior to solving for the 2019 recalibration coefficients as these claims were not useful without the age, sex and enrollment duration data elements from the enrollment file. At that time, CMS was unable to verify whether these SysIDs also existed in the enrollment file.

CMS has since identified and resolved the data issue(s) with these SysIDs, and is therefore updating the final coefficients for the 2019 benefit year accordingly. Due to temporary files stored on two issuers' EDGE servers, SysIDs were separately generated for enrollment and claims files

¹ Patient Protection and Affordable Care Act; HHS Notice of Benefit and Payment Parameters for 2019; Final Rule, (April 17, 2018), available at: <https://www.gpo.gov/fdsys/pkg/FR-2018-04-17/pdf/2018-07355.pdf>

² See the Patient Protection and Affordable Care Act; HHS Notice of Benefit and Payment Parameters for 2019; Final Rule; Correction, 83 FR 21925 (May 11, 2018), available at: <https://www.federalregister.gov/documents/2018/05/11/2018-10089/patient-protection-and-affordable-care-act-hhs-notice-of-benefit-and-payment-parameters-for-2019>. Also see the CMS Memo: 2019 Benefit Year Final HHS Risk Adjustment Model Coefficients, (April 12, 2018), available at: <https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/2019-Final-HHS-RA-Model-Coefficients.pdf>.

³ See note 2.

prior to CMS’s extract of the data from these issuers’ servers. The SysIDs associated with those issuers were present in both the enrollment and claims files, but they were not identical for each enrollee across all files. While we are now able to identify these SysIDs in the enrollment file, we are still unable to link the claims for these SysIDs with the enrollment data elements because these orphan SysIDs were separately randomized across the enrollment and claims files. Therefore, we are dropping these SysIDs across all enrollment and claims files in the 2016 enrollee-level EDGE recalibration dataset for the updated final 2019 benefit year coefficients that are provided below.

This update does not significantly alter the 2019 benefit year risk adjustment models. The overall change in coefficients due to the update to the 2016 enrollee-level EDGE recalibration dataset is very small, and is further mitigated by the blending of two other sets of solved coefficients from the 2014 and 2015 Truven MarketScan® data.

The tables below show the updated final coefficients for the 2019 benefit year for the adult risk adjustment models (Table 1), the child risk adjustment models (Table 2), and the infant risk adjustment models (Table 3). Because we are updating the data for the 2016 enrollee-level EDGE data, we are also publishing updated R-squared statistics for all models and datasets separately to verify their statistical validity. The updated R-squared statistic for each model is shown in Table 4. We note that the R-squared statistic for the models solved from the 2014 and 2015 MarketScan® data shown in Table 4 below are unchanged from those published in the HHS Notice of Benefit and Payment Parameters for 2019 final rule.⁴

TABLE 1: Final Adult Risk Adjustment Model Coefficients for 2019 Benefit Year

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
<i>Demographic Factors</i>						
	Age 21-24, Male	0.168	0.133	0.092	0.051	0.049
	Age 25-29, Male	0.155	0.120	0.079	0.038	0.035
	Age 30-34, Male	0.188	0.145	0.094	0.043	0.039
	Age 35-39, Male	0.238	0.186	0.125	0.063	0.059
	Age 40-44, Male	0.293	0.234	0.165	0.093	0.088
	Age 45-49, Male	0.348	0.282	0.203	0.122	0.116
	Age 50-54, Male	0.458	0.380	0.289	0.193	0.185
	Age 55-59, Male	0.514	0.427	0.326	0.218	0.210
	Age 60-64, Male	0.576	0.475	0.361	0.236	0.226
	Age 21-24, Female	0.271	0.220	0.155	0.089	0.084
	Age 25-29, Female	0.306	0.246	0.174	0.099	0.093
	Age 30-34, Female	0.413	0.340	0.254	0.168	0.161
	Age 35-39, Female	0.494	0.412	0.319	0.227	0.220
	Age 40-44, Female	0.548	0.457	0.354	0.250	0.242
	Age 45-49, Female	0.556	0.460	0.352	0.239	0.230

⁴ 83 FR at 16954.

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
	Age 50-54, Female	0.619	0.519	0.403	0.280	0.270
	Age 55-59, Female	0.604	0.501	0.382	0.253	0.242
	Age 60-64, Female	0.618	0.508	0.381	0.241	0.229
<i>Diagnosis Factors</i>						
HCC001	HIV/AIDS	0.880	0.770	0.667	0.592	0.585
HCC002	Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock	7.992	7.804	7.680	7.723	7.729
HCC003	Central Nervous System Infections, Except Viral Meningitis	5.756	5.674	5.611	5.632	5.634
HCC004	Viral or Unspecified Meningitis	4.392	4.189	4.057	3.986	3.980
HCC006	Opportunistic Infections	6.159	6.077	6.023	5.989	5.985
HCC008	Metastatic Cancer	21.782	21.350	21.018	21.062	21.066
HCC009	Lung, Brain, and Other Severe Cancers, Including Pediatric Acute Lymphoid Leukemia	12.394	12.071	11.829	11.811	11.808
HCC010	Non-Hodgkin's Lymphomas and Other Cancers and Tumors	5.567	5.350	5.183	5.112	5.104
HCC011	Colorectal, Breast (Age < 50), Kidney, and Other Cancers	4.287	4.070	3.901	3.828	3.821
HCC012	Breast (Age 50+) and Prostate Cancer, Benign/Uncertain Brain Tumors, and Other Cancers and Tumors	2.635	2.478	2.353	2.281	2.273
HCC013	Thyroid Cancer, Melanoma, Neurofibromatosis, and Other Cancers and Tumors	1.207	1.081	0.973	0.858	0.847
HCC018	Pancreas Transplant Status/Complications	4.435	4.242	4.110	4.119	4.119
HCC019	Diabetes with Acute Complications	0.601	0.529	0.462	0.388	0.381
HCC020	Diabetes with Chronic Complications	0.601	0.529	0.462	0.388	0.381
HCC021	Diabetes without Complication	0.601	0.529	0.462	0.388	0.381
HCC023	Protein-Calorie Malnutrition	11.426	11.418	11.404	11.482	11.490
HCC026	Mucopolysaccharidosis	2.377	2.278	2.198	2.136	2.130
HCC027	Lipidoses and Glycogenosis	2.377	2.278	2.198	2.136	2.130
HCC029	Amyloidosis, Porphyria, and Other Metabolic Disorders	2.377	2.278	2.198	2.136	2.130
HCC030	Adrenal, Pituitary, and Other Significant Endocrine Disorders	2.377	2.278	2.198	2.136	2.130

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
HCC034	Liver Transplant Status/Complications	10.515	10.418	10.353	10.335	10.332
HCC035	End-Stage Liver Disease	5.687	5.482	5.340	5.332	5.331
HCC036	Cirrhosis of Liver	1.995	1.869	1.781	1.727	1.721
HCC037_ 1	Chronic Viral Hepatitis C	0.710	0.606	0.547	0.512	0.508
HCC037_ 2	Chronic Hepatitis, Other/Unspecified	0.700	0.582	0.521	0.473	0.468
HCC038	Acute Liver Failure/Disease, Including Neonatal Hepatitis	4.286	4.141	4.040	4.011	4.009
HCC041	Intestine Transplant Status/Complications	28.205	28.158	28.120	28.160	28.160
HCC042	Peritonitis/Gastrointestinal Perforation/Necrotizing Enterocolitis	9.708	9.478	9.308	9.319	9.320
HCC045	Intestinal Obstruction	5.500	5.265	5.107	5.095	5.094
HCC046	Chronic Pancreatitis	4.435	4.242	4.110	4.119	4.119
HCC047	Acute Pancreatitis/Other Pancreatic Disorders and Intestinal Malabsorption	2.239	2.081	1.968	1.893	1.885
HCC048	Inflammatory Bowel Disease	2.195	2.013	1.871	1.768	1.758
HCC054	Necrotizing Fasciitis	5.501	5.327	5.195	5.202	5.202
HCC055	Bone/Joint/Muscle Infections/Necrosis	5.501	5.327	5.195	5.202	5.202
HCC056	Rheumatoid Arthritis and Specified Autoimmune Disorders	3.317	3.132	2.982	2.926	2.920
HCC057	Systemic Lupus Erythematosus and Other Autoimmune Disorders	0.992	0.877	0.779	0.667	0.655
HCC061	Osteogenesis Imperfecta and Other Osteodystrophies	2.652	2.475	2.335	2.256	2.248
HCC062	Congenital/Developmental Skeletal and Connective Tissue Disorders	2.652	2.475	2.335	2.256	2.248
HCC063	Cleft Lip/Cleft Palate	1.417	1.267	1.157	1.073	1.067
HCC066	Hemophilia	52.749	52.450	52.205	52.208	52.208
HCC067	Myelodysplastic Syndromes and Myelofibrosis	12.457	12.329	12.232	12.231	12.231
HCC068	Aplastic Anemia	12.457	12.329	12.232	12.231	12.231
HCC069	Acquired Hemolytic Anemia, Including Hemolytic Disease of Newborn	7.850	7.723	7.622	7.591	7.588
HCC070	Sickle Cell Anemia (Hb-SS)	7.850	7.723	7.622	7.591	7.588
HCC071	Thalassemia Major	7.850	7.723	7.622	7.591	7.588
HCC073	Combined and Other Severe Immunodeficiencies	5.200	5.076	4.985	4.982	4.982

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
HCC074	Disorders of the Immune Mechanism	5.200	5.076	4.985	4.982	4.982
HCC075	Coagulation Defects and Other Specified Hematological Disorders	2.651	2.567	2.498	2.460	2.456
HCC081	Drug Psychosis	3.805	3.576	3.404	3.281	3.267
HCC082	Drug Dependence	3.805	3.576	3.404	3.281	3.267
HCC087	Schizophrenia	3.053	2.820	2.649	2.557	2.548
HCC088	Major Depressive and Bipolar Disorders	1.622	1.470	1.350	1.231	1.219
HCC089	Reactive and Unspecified Psychosis, Delusional Disorders	1.622	1.470	1.350	1.231	1.219
HCC090	Personality Disorders	1.123	1.009	0.901	0.780	0.769
HCC094	Anorexia/Bulimia Nervosa	2.547	2.395	2.274	2.200	2.193
HCC096	Prader-Willi, Patau, Edwards, and Autosomal Deletion Syndromes	3.903	3.807	3.730	3.671	3.665
HCC097	Down Syndrome, Fragile X, Other Chromosomal Anomalies, and Congenital Malformation Syndromes	1.047	0.955	0.873	0.795	0.787
HCC102	Autistic Disorder	1.123	1.009	0.901	0.780	0.769
HCC103	Pervasive Developmental Disorders, Except Autistic Disorder	1.123	1.009	0.901	0.780	0.769
HCC106	Traumatic Complete Lesion Cervical Spinal Cord	9.980	9.845	9.744	9.727	9.725
HCC107	Quadriplegia	9.980	9.845	9.744	9.727	9.725
HCC108	Traumatic Complete Lesion Dorsal Spinal Cord	7.554	7.406	7.296	7.265	7.261
HCC109	Paraplegia	7.554	7.406	7.296	7.265	7.261
HCC110	Spinal Cord Disorders/Injuries	5.204	5.001	4.850	4.810	4.805
HCC111	Amyotrophic Lateral Sclerosis and Other Anterior Horn Cell Disease	1.974	1.774	1.631	1.544	1.534
HCC112	Quadriplegic Cerebral Palsy	0.296	0.192	0.120	0.072	0.071
HCC113	Cerebral Palsy, Except Quadriplegic	0.250	0.176	0.120	0.072	0.071
HCC114	Spina Bifida and Other Brain/Spinal/Nervous System Congenital Anomalies	0.351	0.297	0.262	0.238	0.233
HCC115	Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy	5.251	5.126	5.034	5.016	5.014
HCC117	Muscular Dystrophy	2.063	1.921	1.819	1.720	1.708

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
HCC118	Multiple Sclerosis	8.446	8.155	7.932	7.907	7.904
HCC119	Parkinson`s, Huntington`s, and Spinocerebellar Disease, and Other Neurodegenerative Disorders	2.063	1.921	1.819	1.720	1.708
HCC120	Seizure Disorders and Convulsions	1.388	1.246	1.136	1.043	1.033
HCC121	Hydrocephalus	5.916	5.809	5.718	5.691	5.689
HCC122	Non-Traumatic Coma, and Brain Compression/Anoxic Damage	8.305	8.171	8.062	8.054	8.052
HCC125	Respirator Dependence/Tracheostomy Status	26.609	26.573	26.538	26.620	26.627
HCC126	Respiratory Arrest	8.043	7.895	7.789	7.859	7.867
HCC127	Cardio-Respiratory Failure and Shock, Including Respiratory Distress Syndromes	8.043	7.895	7.789	7.859	7.867
HCC128	Heart Assistive Device/Artificial Heart	28.436	28.234	28.087	28.136	28.141
HCC129	Heart Transplant	28.436	28.234	28.087	28.136	28.141
HCC130	Congestive Heart Failure	2.798	2.703	2.633	2.622	2.621
HCC131	Acute Myocardial Infarction	8.070	7.782	7.571	7.658	7.666
HCC132	Unstable Angina and Other Acute Ischemic Heart Disease	4.812	4.551	4.380	4.371	4.371
HCC135	Heart Infection/Inflammation, Except Rheumatic	5.460	5.343	5.256	5.225	5.223
HCC142	Specified Heart Arrhythmias	2.464	2.333	2.231	2.157	2.149
HCC145	Intracranial Hemorrhage	7.611	7.357	7.177	7.153	7.151
HCC146	Ischemic or Unspecified Stroke	2.161	2.009	1.915	1.893	1.891
HCC149	Cerebral Aneurysm and Arteriovenous Malformation	3.160	2.988	2.863	2.797	2.791
HCC150	Hemiplegia/ Hemiparesis	4.502	4.407	4.340	4.387	4.392
HCC151	Monoplegia, Other Paralytic Syndromes	2.736	2.614	2.528	2.489	2.485
HCC153	Atherosclerosis of the Extremities with Ulceration or Gangrene	9.046	8.966	8.906	8.995	9.003
HCC154	Vascular Disease with Complications	6.704	6.546	6.430	6.415	6.413
HCC156	Pulmonary Embolism and Deep Vein Thrombosis	3.344	3.200	3.094	3.038	3.032

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
HCC158	Lung Transplant Status/Complications	25.613	25.469	25.358	25.432	25.440
HCC159	Cystic Fibrosis	14.182	13.898	13.669	13.675	13.675
HCC160	Chronic Obstructive Pulmonary Disease, Including Bronchiectasis	0.875	0.774	0.684	0.590	0.580
HCC161	Asthma	0.875	0.774	0.684	0.590	0.580
HCC162	Fibrosis of Lung and Other Lung Disorders	1.865	1.764	1.691	1.637	1.631
HCC163	Aspiration and Specified Bacterial Pneumonias and Other Severe Lung Infections	6.261	6.215	6.180	6.186	6.186
HCC183	Kidney Transplant Status	7.453	7.251	7.111	7.062	7.056
HCC184	End Stage Renal Disease	29.901	29.673	29.491	29.637	29.650
HCC187	Chronic Kidney Disease, Stage 5	1.318	1.262	1.224	1.233	1.234
HCC188	Chronic Kidney Disease, Stage 4	1.318	1.262	1.224	1.233	1.234
HCC203	Ectopic and Molar Pregnancy, Except with Renal Failure, Shock, or Embolism	1.154	1.009	0.878	0.670	0.647
HCC204	Miscarriage with Complications	1.154	1.009	0.878	0.670	0.647
HCC205	Miscarriage with No or Minor Complications	1.154	1.009	0.878	0.670	0.647
HCC207	Completed Pregnancy With Major Complications	3.324	2.909	2.687	2.413	2.383
HCC208	Completed Pregnancy With Complications	3.324	2.909	2.687	2.413	2.383
HCC209	Completed Pregnancy with No or Minor Complications	3.324	2.909	2.687	2.413	2.383
HCC217	Chronic Ulcer of Skin, Except Pressure	1.987	1.887	1.817	1.798	1.796
HCC226	Hip Fractures and Pathological Vertebral or Humerus Fractures	8.801	8.587	8.429	8.458	8.461
HCC227	Pathological Fractures, Except of Vertebrae, Hip, or Humerus	3.856	3.726	3.626	3.563	3.559
HCC251	Stem Cell, Including Bone Marrow, Transplant Status/Complications	24.309	24.308	24.303	24.331	24.333
HCC253	Artificial Openings for Feeding or Elimination	8.282	8.195	8.129	8.162	8.166
HCC254	Amputation Status, Lower Limb/Amputation Complications	3.475	3.360	3.279	3.303	3.305
			<i>Interaction Factors</i>			

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
SEVERE x HCC006	Severe illness x Opportunistic Infections	7.698	7.901	8.038	8.182	8.196
SEVERE x HCC008	Severe illness x Metastatic Cancer	7.698	7.901	8.038	8.182	8.196
SEVERE x HCC009	Severe illness x Lung, Brain, and Other Severe Cancers, Including Pediatric Acute Lymphoid Leukemia	7.698	7.901	8.038	8.182	8.196
SEVERE x HCC010	Severe illness x Non- Hodgkin's Lymphomas and Other Cancers and Tumors	7.698	7.901	8.038	8.182	8.196
SEVERE x HCC115	Severe illness x Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy	7.698	7.901	8.038	8.182	8.196
SEVERE x HCC135	Severe illness x Heart Infection/Inflammation, Except Rheumatic	7.698	7.901	8.038	8.182	8.196
SEVERE x HCC145	Severe illness x Intracranial Hemorrhage	7.698	7.901	8.038	8.182	8.196
SEVERE x G06	Severe illness x HCC group G06 (G06 is HCC Group 6 which includes the following HCCs in the blood disease category: 67, 68)	7.698	7.901	8.038	8.182	8.196
SEVERE x G08	Severe illness x HCC group G08 (G08 is HCC Group 8 which includes the following HCCs in the blood disease category: 73, 74)	7.698	7.901	8.038	8.182	8.196
SEVERE x HCC035	Severe illness x End-Stage Liver Disease	1.452	1.544	1.598	1.724	1.735
SEVERE x HCC038	Severe illness x Acute Liver Failure/Disease, Including Neonatal Hepatitis	1.452	1.544	1.598	1.724	1.735
SEVERE x HCC153	Severe illness x Atherosclerosis of the Extremities with Ulceration or Gangrene	1.452	1.544	1.598	1.724	1.735

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
SEVERE x HCC154	Severe illness x Vascular Disease with Complications	1.452	1.544	1.598	1.724	1.735
SEVERE x HCC163	Severe illness x Aspiration and Specified Bacterial Pneumonias and Other Severe Lung Infections	1.452	1.544	1.598	1.724	1.735
SEVERE x HCC253	Severe illness x Artificial Openings for Feeding or Elimination	1.452	1.544	1.598	1.724	1.735
SEVERE x G03	Severe illness x HCC group G03 (G03 is HCC Group 3 which includes the following HCCs in the musculoskeletal disease category: 54, 55)	1.452	1.544	1.598	1.724	1.735
<i>Enrollment Duration Factors</i>						
	1 month of enrollment	0.416	0.364	0.325	0.306	0.304
	2 months of enrollment	0.381	0.332	0.293	0.275	0.273
	3 months of enrollment	0.326	0.281	0.244	0.227	0.225
	4 months of enrollment	0.278	0.240	0.205	0.189	0.188
	5 months of enrollment	0.248	0.216	0.184	0.169	0.168
	6 months of enrollment	0.207	0.180	0.153	0.138	0.137
	7 months of enrollment	0.189	0.165	0.141	0.126	0.125
	8 months of enrollment	0.136	0.119	0.102	0.091	0.091
	9 months of enrollment	0.096	0.084	0.073	0.067	0.066
	10 months of enrollment	0.070	0.065	0.060	0.057	0.057
	11 months of enrollment	0.064	0.060	0.057	0.055	0.055
<i>Prescription Drug Factors</i>						
RXC 01	Anti-HIV Agents	7.811	7.248	6.822	6.597	6.573
RXC 02	Anti-Hepatitis C (HCV) Agents	39.840	39.299	38.868	39.024	39.038
RXC 03	Antiarrhythmics	0.113	0.113	0.113	0.113	0.113
RXC 04	Phosphate Binders	0.729	0.729	0.729	0.729	0.729
RXC 05	Inflammatory Bowel Disease Agents	2.016	1.837	1.697	1.505	1.484
RXC 06	Insulin	1.494	1.345	1.182	0.990	0.971
RXC 07	Anti-Diabetic Agents, Except Insulin and Metformin Only	0.491	0.427	0.358	0.270	0.262
RXC 08	Multiple Sclerosis Agents	21.116	20.326	19.734	19.709	19.700
RXC 09	Immune Suppressants and Immunomodulators	13.255	12.665	12.224	12.254	12.253
RXC 10	Cystic Fibrosis Agents	13.019	12.687	12.461	12.540	12.549
RXC 01 x HCC001	Additional effect for enrollees with RXC 01 (Anti-HIV Agents) and HCC 001 (HIV/AIDS)	2.202	2.317	2.419	2.774	2.810

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
RXC 02 x HCC037_1, 036, 035, 034	Additional effect for enrollees with RXC 02 (Anti-Hepatitis C (HCV) Agents) and (HCC 037_1 (Chronic Viral Hepatitis C) or 036 (Cirrhosis of Liver) or 035 (End-Stage Liver Disease) or 034 (Liver Transplant Status/Complications))	2.642	2.834	2.970	3.016	3.021
RXC 03 x HCC142	Additional effect for enrollees with RxC 03 (Antiarrhythmics) and HCC 142 (Specified Heart Arrhythmias)	0.000	0.000	0.000	0.000	0.000
RXC 04 x HCC184, 183, 187, 188	Additional effect for enrollees with RxC 04 (Phosphate Binders) and (HCC 184 (End Stage Renal Disease) or 183 (Kidney Transplant Status) or 187 (Chronic Kidney Disease, Stage 5) or 188 (Chronic Kidney Disease, Severe Stage 4))	0.000	0.000	0.000	0.000	0.000
RXC 05 x HCC048, 041	Additional effect for enrollees with RxC 05 (Inflammatory Bowel Disease Agents) and (HCC 048 (Inflammatory Bowel Disease) or 041 (Intestine Transplant Status/Complications))	-1.195	-1.098	-1.000	-0.891	-0.881
RXC 06 x HCC018, 019, 020, 021	Additional effect for enrollees with RxC 06 (Insulin) and (HCC 018 (Pancreas Transplant Status/Complications) or 019 (Diabetes with Acute Complications) or 020 (Diabetes with Chronic Complications) or 021 (Diabetes without Complication))	0.421	0.395	0.455	0.532	0.537

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
RXC 07 x HCC018, 019, 020, 021	Additional effect for enrollees with RxC 07 (Anti-Diabetic Agents, Except Insulin and Metformin Only) and (HCC 018 (Pancreas Transplant Status/Complications) or 019 (Diabetes with Acute Complications) or 020 (Diabetes with Chronic Complications) or 021 (Diabetes without Complication))	-0.200	-0.183	-0.152	-0.152	-0.154
RXC 08 x HCC118	Additional effect for enrollees with RxC 08 (Multiple Sclerosis Agents) and HCC 118 (Multiple Sclerosis)	-5.520	-4.995	-4.611	-4.437	-4.415
RXC 09 x HCC056 or 057 and 048 or 041	Additional effect for enrollees with RxC 09 (Immune Suppressants and Immunomodulators) and (HCC 048 (Inflammatory Bowel Disease) or 041 (Intestine Transplant Status/Complications)) and (HCC 056 (Rheumatoid Arthritis and Specified Autoimmune Disorders) or 057 (Systemic Lupus Erythematosus and Other Autoimmune Disorders))	-0.337	-0.352	-0.357	-0.383	-0.384
RXC 09 x HCC056	Additional effect for enrollees with RxC 09 (Immune Suppressants and Immunomodulators) and HCC 056 (Rheumatoid Arthritis and Specified Autoimmune Disorders)	-2.863	-2.634	-2.454	-2.325	-2.310
RXC 09 x HCC057	Additional effect for enrollees with RxC 09 (Immune Suppressants and Immunomodulators) and HCC 057 (Systemic Lupus Erythematosus and Other Autoimmune Disorders)	-0.594	-0.443	-0.321	-0.175	-0.162
RXC 09 x HCC048, 041	Additional effect for enrollees with RxC 09 (Immune Suppressants and Immunomodulators) and (HCC 048 (Inflammatory Bowel Disease) or 041 (Intestine Transplant Status/Complications))	1.125	1.388	1.561	1.761	1.784

HCC or RXC No.	Factor	Platinum	Gold	Silver	Bronze	Catastrophic
RXC 10 x HCC159, 158	Additional effect for enrollees with RxC 10 (Cystic Fibrosis Agents) and (HCC 159 (Cystic Fibrosis) or 158 (Lung Transplant Status/Complications))	29.048	29.277	29.406	29.466	29.472

TABLE 2: Final Child Risk Adjustment Model Coefficients for 2019 Benefit Year

Factor	Platinum	Gold	Silver	Bronze	Catastrophic
<i>Demographic Factors</i>					
Age 2-4, Male	0.200	0.149	0.092	0.042	0.038
Age 5-9, Male	0.139	0.100	0.055	0.019	0.016
Age 10-14, Male	0.195	0.153	0.101	0.061	0.058
Age 15-20, Male	0.259	0.210	0.152	0.100	0.096
Age 2-4, Female	0.154	0.110	0.062	0.025	0.022
Age 5-9, Female	0.102	0.069	0.031	0.005	0.003
Age 10-14, Female	0.183	0.143	0.095	0.060	0.057
Age 15-20, Female	0.282	0.225	0.156	0.092	0.087
<i>Diagnosis Factors</i>					
HIV/AIDS	5.426	4.995	4.673	4.556	4.542
Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock	13.733	13.563	13.452	13.459	13.461
Central Nervous System Infections, Except Viral Meningitis	8.191	8.033	7.917	7.925	7.925
Viral or Unspecified Meningitis	3.567	3.363	3.230	3.082	3.068
Opportunistic Infections	16.950	16.903	16.865	16.849	16.846
Metastatic Cancer	32.463	32.255	32.077	32.087	32.087
Lung, Brain, and Other Severe Cancers, Including Pediatric Acute Lymphoid Leukemia	10.020	9.785	9.590	9.509	9.502
Non-Hodgkin's Lymphomas and Other Cancers and Tumors	7.832	7.598	7.408	7.302	7.290
Colorectal, Breast (Age < 50), Kidney, and Other Cancers	3.032	2.860	2.718	2.600	2.587
Breast (Age 50+) and Prostate Cancer, Benign/Uncertain Brain Tumors, and Other Cancers and Tumors	3.032	2.860	2.718	2.600	2.587

Factor	Platinum	Gold	Silver	Bronze	Catastrophic
Thyroid Cancer, Melanoma, Neurofibromatosis, and Other Cancers and Tumors	1.189	1.058	0.944	0.819	0.807
Pancreas Transplant Status/Complications	22.358	22.099	21.896	21.922	21.925
Diabetes with Acute Complications	2.548	2.232	2.030	1.748	1.720
Diabetes with Chronic Complications	2.548	2.232	2.030	1.748	1.720
Diabetes without Complication	2.548	2.232	2.030	1.748	1.720
Protein-Calorie Malnutrition	12.783	12.692	12.616	12.656	12.659
Mucopolysaccharidosis	7.949	7.724	7.536	7.494	7.490
Lipidoses and Glycogenosis	7.949	7.724	7.536	7.494	7.490
Congenital Metabolic Disorders, Not Elsewhere Classified	7.949	7.724	7.536	7.494	7.490
Amyloidosis, Porphyria, and Other Metabolic Disorders	7.949	7.724	7.536	7.494	7.490
Adrenal, Pituitary, and Other Significant Endocrine Disorders	7.949	7.724	7.536	7.494	7.490
Liver Transplant Status/Complications	22.358	22.099	21.896	21.922	21.925
End-Stage Liver Disease	11.858	11.709	11.609	11.604	11.603
Cirrhosis of Liver	5.781	5.645	5.534	5.506	5.506
Chronic Viral Hepatitis C	6.268	6.113	5.982	5.965	5.966
Chronic Hepatitis, Other/Unspecified	1.196	1.083	0.980	0.923	0.920
Acute Liver Failure/Disease, Including Neonatal Hepatitis	11.660	11.519	11.415	11.416	11.416
Intestine Transplant Status/Complications	22.358	22.099	21.896	21.922	21.925
Peritonitis/Gastrointestinal Perforation/Necrotizing Enterocolitis	11.313	11.025	10.807	10.804	10.805
Intestinal Obstruction	4.513	4.318	4.162	4.066	4.057
Chronic Pancreatitis	10.634	10.426	10.275	10.278	10.278
Acute Pancreatitis/Other Pancreatic Disorders and Intestinal Malabsorption	2.267	2.151	2.049	1.952	1.942
Inflammatory Bowel Disease	7.060	6.690	6.407	6.296	6.284
Necrotizing Fasciitis	3.918	3.717	3.556	3.480	3.473
Bone/Joint/Muscle Infections/Necrosis	3.918	3.717	3.556	3.480	3.473

Factor	Platinum	Gold	Silver	Bronze	Catastrophic
Rheumatoid Arthritis and Specified Autoimmune Disorders	4.278	4.048	3.852	3.759	3.751
Systemic Lupus Erythematosus and Other Autoimmune Disorders	1.090	0.969	0.853	0.725	0.714
Osteogenesis Imperfecta and Other Osteodystrophies	1.396	1.287	1.188	1.105	1.097
Congenital/Developmental Skeletal and Connective Tissue Disorders	1.396	1.287	1.188	1.105	1.097
Cleft Lip/Cleft Palate	1.429	1.254	1.116	0.988	0.976
Hemophilia	60.496	60.019	59.640	59.614	59.611
Myelodysplastic Syndromes and Myelofibrosis	14.744	14.623	14.533	14.502	14.498
Aplastic Anemia	14.744	14.623	14.533	14.502	14.498
Acquired Hemolytic Anemia, Including Hemolytic Disease of Newborn	6.955	6.742	6.572	6.484	6.476
Sickle Cell Anemia (Hb-SS)	6.955	6.742	6.572	6.484	6.476
Thalassemia Major	6.955	6.742	6.572	6.484	6.476
Combined and Other Severe Immunodeficiencies	5.856	5.713	5.599	5.539	5.533
Disorders of the Immune Mechanism	5.856	5.713	5.599	5.539	5.533
Coagulation Defects and Other Specified Hematological Disorders	4.665	4.546	4.444	4.371	4.363
Drug Psychosis	5.640	5.385	5.204	5.125	5.119
Drug Dependence	5.640	5.385	5.204	5.125	5.119
Schizophrenia	4.816	4.470	4.215	4.085	4.071
Major Depressive and Bipolar Disorders	2.205	1.998	1.824	1.645	1.628
Reactive and Unspecified Psychosis, Delusional Disorders	2.119	1.922	1.754	1.576	1.559
Personality Disorders	0.623	0.519	0.407	0.260	0.245
Anorexia/Bulimia Nervosa	2.645	2.460	2.308	2.227	2.218
Prader-Willi, Patau, Edwards, and Autosomal Deletion Syndromes	2.114	1.957	1.845	1.792	1.786
Down Syndrome, Fragile X, Other Chromosomal Anomalies, and Congenital Malformation Syndromes	1.780	1.634	1.522	1.431	1.423
Autistic Disorder	2.007	1.827	1.668	1.503	1.487

Factor	Platinum	Gold	Silver	Bronze	Catastrophic
Pervasive Developmental Disorders, Except Autistic Disorder	0.682	0.589	0.482	0.347	0.336
Traumatic Complete Lesion Cervical Spinal Cord	11.528	11.464	11.429	11.509	11.517
Quadriplegia	11.528	11.464	11.429	11.509	11.517
Traumatic Complete Lesion Dorsal Spinal Cord	9.200	9.031	8.886	8.872	8.866
Paraplegia	9.200	9.031	8.886	8.872	8.866
Spinal Cord Disorders/Injuries	3.674	3.483	3.335	3.244	3.236
Amyotrophic Lateral Sclerosis and Other Anterior Horn Cell Disease	4.955	4.758	4.596	4.510	4.503
Quadriplegic Cerebral Palsy	2.964	2.765	2.636	2.639	2.639
Cerebral Palsy, Except Quadriplegic	0.487	0.392	0.322	0.263	0.261
Spina Bifida and Other Brain/Spinal/Nervous System Congenital Anomalies	1.430	1.310	1.216	1.144	1.137
Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy	9.745	9.584	9.457	9.436	9.437
Muscular Dystrophy	2.547	2.372	2.243	2.141	2.131
Multiple Sclerosis	10.439	10.097	9.828	9.795	9.791
Parkinson's, Huntington's, and Spinocerebellar Disease, and Other Neurodegenerative Disorders	2.547	2.372	2.243	2.141	2.131
Seizure Disorders and Convulsions	2.003	1.851	1.712	1.566	1.552
Hydrocephalus	4.217	4.107	4.025	4.005	4.004
Non-Traumatic Coma, and Brain Compression/Anoxic Damage	5.718	5.594	5.492	5.449	5.444
Respirator Dependence/Tracheostomy Status	31.867	31.759	31.681	31.818	31.830
Respiratory Arrest	9.784	9.560	9.410	9.375	9.369
Cardio-Respiratory Failure and Shock, Including Respiratory Distress Syndromes	9.784	9.560	9.410	9.375	9.369

Factor	Platinum	Gold	Silver	Bronze	Catastrophic
Heart Assistive Device/Artificial Heart	22.358	22.099	21.896	21.922	21.925
Heart Transplant	22.358	22.099	21.896	21.922	21.925
Congestive Heart Failure	5.770	5.671	5.585	5.541	5.536
Acute Myocardial Infarction	5.164	5.090	5.048	5.035	5.033
Unstable Angina and Other Acute Ischemic Heart Disease	3.836	3.759	3.702	3.671	3.670
Heart Infection/Inflammation, Except Rheumatic	11.876	11.770	11.688	11.669	11.668
Hypoplastic Left Heart Syndrome and Other Severe Congenital Heart Disorders	4.760	4.602	4.445	4.329	4.319
Major Congenital Heart/Circulatory Disorders	1.343	1.247	1.129	1.011	1.001
Atrial and Ventricular Septal Defects, Patent Ductus Arteriosus, and Other Congenital Heart/Circulatory Disorders	0.873	0.785	0.682	0.589	0.582
Specified Heart Arrhythmias	3.747	3.589	3.451	3.374	3.366
Intracranial Hemorrhage	12.662	12.448	12.294	12.288	12.289
Ischemic or Unspecified Stroke	5.396	5.318	5.270	5.281	5.285
Cerebral Aneurysm and Arteriovenous Malformation	3.380	3.194	3.062	2.987	2.979
Hemiplegia/Hemiparesis	4.165	4.058	3.984	3.951	3.945
Monoplegia, Other Paralytic Syndromes	3.506	3.377	3.287	3.258	3.257
Atherosclerosis of the Extremities with Ulceration or Gangrene	11.696	11.460	11.285	11.210	11.202
Vascular Disease with Complications	14.177	14.065	13.975	13.996	13.997
Pulmonary Embolism and Deep Vein Thrombosis	13.557	13.449	13.370	13.406	13.410
Lung Transplant Status/Complications	22.358	22.099	21.896	21.922	21.925
Cystic Fibrosis	22.358	22.099	21.896	21.922	21.925
Chronic Obstructive Pulmonary Disease, Including Bronchiectasis	0.373	0.309	0.224	0.133	0.125
Asthma	0.373	0.309	0.224	0.133	0.125
Fibrosis of Lung and Other Lung Disorders	3.075	2.973	2.874	2.803	2.797

Factor	Platinum	Gold	Silver	Bronze	Catastrophic
Aspiration and Specified Bacterial Pneumonias and Other Severe Lung Infections	8.195	8.139	8.091	8.123	8.126
Kidney Transplant Status	12.322	12.052	11.856	11.829	11.824
End Stage Renal Disease	36.027	35.917	35.828	35.931	35.940
Chronic Kidney Disease, Stage 5	4.151	4.020	3.912	3.815	3.809
Chronic Kidney Disease, Severe (Stage 4)	4.151	4.020	3.912	3.815	3.809
Ectopic and Molar Pregnancy, Except with Renal Failure, Shock, or Embolism	1.059	0.904	0.760	0.533	0.507
Miscarriage with Complications	1.059	0.904	0.760	0.533	0.507
Miscarriage with No or Minor Complications	1.059	0.904	0.760	0.533	0.507
Completed Pregnancy With Major Complications	2.896	2.511	2.293	1.987	1.950
Completed Pregnancy With Complications	2.896	2.511	2.293	1.987	1.950
Completed Pregnancy with No or Minor Complications	2.896	2.511	2.293	1.987	1.950
Chronic Ulcer of Skin, Except Pressure	2.337	2.247	2.159	2.087	2.080
Hip Fractures and Pathological Vertebral or Humerus Fractures	5.451	5.177	4.955	4.844	4.836
Pathological Fractures, Except of Vertebrae, Hip, or Humerus	1.667	1.537	1.406	1.265	1.250
Stem Cell, Including Bone Marrow, Transplant Status/Complications	22.358	22.099	21.896	21.922	21.925
Artificial Openings for Feeding or Elimination	11.384	11.271	11.197	11.307	11.317
Amputation Status, Lower Limb/Amputation Complications	6.739	6.500	6.325	6.211	6.199

TABLE 3: Final Infant Risk Adjustment Model Coefficients for 2019 Benefit Year

Group	Platinum	Gold	Silver	Bronze	Catastrophic
Extremely Immature * Severity Level 5 (Highest)	253.763	252.422	251.308	251.304	251.306
Extremely Immature * Severity Level 4	154.074	152.661	151.499	151.388	151.376
Extremely Immature * Severity Level 3	33.799	32.769	31.902	31.653	31.634
Extremely Immature * Severity Level 2	33.799	32.769	31.902	31.653	31.634
Extremely Immature * Severity Level 1 (Lowest)	33.799	32.769	31.902	31.653	31.634
Immature *Severity Level 5 (Highest)	159.649	158.315	157.209	157.194	157.192
Immature *Severity Level 4	72.444	71.099	69.985	69.913	69.903
Immature *Severity Level 3	32.790	31.659	30.727	30.518	30.498
Immature *Severity Level 2	24.326	23.239	22.347	22.078	22.051
Immature *Severity Level 1 (Lowest)	24.326	23.239	22.347	22.078	22.051
Premature/Multiples * Severity Level 5 (Highest)	115.889	114.606	113.560	113.467	113.459
Premature/Multiples * Severity Level 4	27.442	26.218	25.238	25.027	25.010
Premature/Multiples * Severity Level 3	14.207	13.249	12.477	12.039	11.996
Premature/Multiples * Severity Level 2	8.000	7.266	6.646	6.016	5.948
Premature/Multiples * Severity Level 1 (Lowest)	5.319	4.787	4.243	3.649	3.598
Term *Severity Level 5 (Highest)	91.532	90.403	89.465	89.276	89.260
Term *Severity Level 4	14.970	14.050	13.323	12.838	12.796
Term *Severity Level 3	5.857	5.299	4.767	4.150	4.091
Term *Severity Level 2	3.573	3.147	2.666	1.994	1.935
Term *Severity Level 1 (Lowest)	1.548	1.323	0.917	0.450	0.425
Age1 *Severity Level 5 (Highest)	54.547	53.880	53.323	53.226	53.218
Age1 *Severity Level 4	9.642	9.158	8.757	8.501	8.478

Group	Platinum	Gold	Silver	Bronze	Catastrophic
Age1 *Severity Level 3	3.059	2.786	2.512	2.264	2.246
Age1 *Severity Level 2	1.960	1.747	1.508	1.246	1.226
Age1 *Severity Level 1 (Lowest)	0.522	0.445	0.332	0.253	0.248
Age 0 Male	0.624	0.581	0.558	0.499	0.492
Age 1 Male	0.108	0.093	0.079	0.054	0.052

TABLE 4: R-Squared Statistic for Final HHS Risk Adjustment Models

Risk Adjustment Model	R-Squared Statistic		
	2014 MarketScan[®]	2015 MarketScan[®]	2016 Enrollee-level EDGE
Platinum Adult	0.4221	0.4212	0.4278
Platinum Child	0.293	0.3314	0.3093
Platinum Infant	0.3284	0.3329	0.3255
Gold Adult	0.4179	0.4164	0.4224
Gold Child	0.2883	0.3269	0.3047
Gold Infant	0.3264	0.3309	0.3217
Silver Adult	0.4143	0.4123	0.4177
Silver Child	0.2841	0.3227	0.3007
Silver Infant	0.325	0.3295	0.3187
Bronze Adult	0.4117	0.4095	0.4148
Bronze Child	0.2805	0.3188	0.2972
Bronze Infant	0.3247	0.3292	0.3171
Catastrophic Adult	0.4115	0.4094	0.4141
Catastrophic Child	0.2803	0.3186	0.2965
Catastrophic Infant	0.3247	0.3292	0.3168