

**The following content was supplied by the authors as supporting material and has not been copy-edited or verified by JBJS.**

**APPENDIX A: Composition of the Musculoskeletal Disease Management – Non-spine Clinical Subcommittee**

| <b>Name and Credentials</b>              | <b>Specialty</b>                       | <b>City, State</b> |
|--|--|--------------------|
| Adam Rana, MD                            | Orthopedic Surgery                     | Falmouth, ME       |
| *Adolph Yates, MD                        | Orthopedic Surgery                     | Pittsburgh, PA     |
| Alex Limanni, MD                         | Rheumatology                           | Dallas, TX         |
| Ammar Sarwar, MD                         | Interventional Radiology               | Boston, MA         |
| Andrew Gordon, MD, PhD                   | Physical Medicine and Rehabilitation   | Silver Spring, MD  |
| Bela Pandit, DPM, FACFAS                 | Podiatry                               | Chicago, IL        |
| Daniel Moon, MD, MS, MBA                 | Orthopedic Surgery                     | Aurora, CO         |
| Daniel Wessell, MD                       | Diagnostic Radiology                   | Jacksonville, FL   |
| David Friedenson, MD                     | Emergency Medicine                     | Denver, CO         |
| Dennis Rivenburgh, MS, ATC, PA-C, DFAAPA | Physician Assistant                    | Baltimore, MD      |
| Dheeraj Mahajan, MD, CMD, FACP           | Internal Medicine                      | Melrose Park, IL   |
| Edward Mariano, MD, MAS                  | Anesthesiology                         | Palo Alto, CA      |
| Heather Smith, PT, MPH                   | Physical Therapy                       | Alexandria, VA     |
| Jennifer Koontz, MD, MPH, FAAFP          | Sports Medicine                        | Newton, KS         |
| Jeremy Furniss, OTD, OTR/L, BCG, CDP     | Occupational Therapy                   | Bethesda, MD       |
| *Juan Quintana, DNAP, MHS, CRNA          | Certified Registered Nurse Anesthetist | Winnsboro, TX      |
| Kenneth Hunt, MD                         | Orthopedic Surgery                     | Aurora, CO         |
| Kevin Klauer, DO, EJD, FACEP             | Emergency Medicine                     | Knoxville, TN      |
| Kirk Whetstone, MD                       | Physical Medicine and Rehabilitation   | Columbus, OH       |
| Marc DeHart, MD                          | Orthopedic Surgery                     | San Antonio, TX    |
| Mark Levine, MD                          | Internal Medicine                      | Aurora, CO         |
| Michael DePalma, PA-C                    | Orthopedic Surgery                     | Hanover, PA        |
| Michael Wasserman, MD                    | Geriatric Medicine                     | Woodland Hills, CA |
| Michael Zychowicz, DNP                   | Orthopedic Nurse Practitioner          | Durham, NC         |
| Robert (Dale) Blasier, MD, FRCS, MBA     | Orthopedic Surgery                     | Little Rock, AR    |
| Robin Kamal, MD                          | Hand Surgery                           | Palo Alto, CA      |
| Steven Schmitt, MD                       | Infectious Disease                     | Cleveland, OH      |
| William Beach, MD                        | Orthopedic Surgery                     | Richmond, VA       |

**APPENDIX B: CMS-HCC V22 2016 Risk Adjustment Variables**

| HCC Risk Adjustment Variables <sup>1</sup>                              | All Episodes |        |
|---|--------------|--------|
|   | N            | %      |
| <b>Total # of Episodes</b>  | 249,301      |        |
| HCC1: HIV/AIDS  | 181          | 0.07%  |
| HCC2: Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock | 743          | 0.30%  |
| HCC6: Opportunistic Infections  | 264          | 0.11%  |
| HCC8: Metastatic Cancer and Acute Leukemia                              | 786          | 0.32%  |
| HCC9: Lung and Other Severe Cancers                                     | 1,284        | 0.52%  |
| HCC10: Lymphoma and Other Cancers                                       | 2,356        | 0.95%  |
| HCC11: Colorectal, Bladder, and Other Cancers                           | 2,858        | 1.15%  |
| HCC12: Breast, Prostate, and Other Cancers and Tumors                   | 12,302       | 4.93%  |
| HCC17: Diabetes with Acute Complications                                | 274          | 0.11%  |
| HCC18: Diabetes with Chronic Complications                              | 25,981       | 10.42% |
| HCC19: Diabetes without Complication                                    | 30,724       | 12.32% |
| HCC21: Protein-Calorie Malnutrition                                     | 289          | 0.12%  |
| HCC22: Morbid Obesity   | 15,467       | 6.20%  |
| HCC23: Other Significant Endocrine and Metabolic Disorders              | 4,285        | 1.72%  |
| HCC27: End-Stage Liver Disease  | 360          | 0.14%  |
| HCC28: Cirrhosis of Liver   | 725          | 0.29%  |
| HCC29: Chronic Hepatitis  | 677          | 0.27%  |
| HCC33: Intestinal Obstruction/Perforation                               | 700          | 0.28%  |
| HCC34: Chronic Pancreatitis   | 179          | 0.07%  |
| HCC35: Inflammatory Bowel Disease                                       | 1,660        | 0.67%  |
| HCC39: Bone/Joint/Muscle Infections/Necrosis                            | 1,881        | 0.75%  |
| HCC40: Rheumatoid Arthritis and Inflammatory Connective Tissue Disease  | 16,934       | 6.79%  |
| HCC46: Severe Hematological Disorders                                   | 495          | 0.20%  |
| HCC47: Disorders of Immunity  | 1,402        | 0.56%  |
| HCC48: Coagulation Defects and Other Specified Hematological Disorders  | 7,871        | 3.16%  |
| HCC54: Drug/Alcohol Psychosis   | 60           | 0.02%  |
| HCC55: Drug/Alcohol Dependence  | 2,890        | 1.16%  |
| HCC57: Schizophrenia  | 747          | 0.30%  |
| HCC58: Major Depressive, Bipolar, and Paranoid Disorders                | 12,351       | 4.95%  |
| HCC70: Quadriplegia   | 39           | 0.02%  |
| HCC71: Paraplegia   | 34           | 0.01%  |

|   |        |        |
|---|--------|--------|
| HCC72: Spinal Cord Disorders/Injuries   | 515    | 0.21%  |
| HCC73: Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease             | 22     | 0.01%  |
| HCC74: Cerebral Palsy   | 60     | 0.02%  |
| HCC75: Myasthenia Gravis/Myoneural Disorders, Inflammatory and Toxic Neuropathy | 1,176  | 0.47%  |
| HCC76: Muscular Dystrophy   | 27     | 0.01%  |
| HCC77: Multiple Sclerosis   | 629    | 0.25%  |
| HCC78: Parkinson's and Huntington's Diseases                                    | 1,928  | 0.77%  |
| HCC79: Seizure Disorders and Convulsions  | 2,443  | 0.98%  |
| HCC80: Coma, Brain Compression/Anoxic Damage                                    | 51     | 0.02%  |
| HCC82: Respirator Dependence/Tracheostomy Status                                | 62     | 0.02%  |
| HCC83: Respiratory Arrest   | 16     | 0.01%  |
| HCC84: Cardio-Respiratory Failure and Shock                                     | 1,111  | 0.45%  |
| HCC85: Congestive Heart Failure   | 14,849 | 5.96%  |
| HCC86: Acute Myocardial Infarction  | 1,161  | 0.47%  |
| HCC87: Unstable Angina and Other Acute Ischemic Heart Disease                   | 1,352  | 0.54%  |
| HCC88: Angina Pectoris  | 5,027  | 2.02%  |
| HCC96: Specified Heart Arrhythmias  | 27,857 | 11.17% |
| HCC99: Cerebral Hemorrhage  | 238    | 0.10%  |
| HCC100: Ischemic or Unspecified Stroke  | 2,284  | 0.92%  |
| HCC103: Hemiplegia/Hemiparesis  | 451    | 0.18%  |
| HCC104: Monoplegia, Other Paralytic Syndromes                                   | 88     | 0.04%  |
| HCC106: Atherosclerosis of the Extremities with Ulceration or Gangrene          | 188    | 0.08%  |
| HCC107: Vascular Disease with Complications                                     | 2,901  | 1.16%  |
| HCC108: Vascular Disease  | 21,333 | 8.56%  |
| HCC110: Cystic Fibrosis   | .      | .      |
| HCC111: Chronic Obstructive Pulmonary Disease                                   | 17,517 | 7.03%  |
| HCC112: Fibrosis of Lung and Other Chronic Lung Disorders                       | 1,585  | 0.64%  |
| HCC114: Aspiration and Specified Bacterial Pneumonias                           | 272    | 0.11%  |
| HCC115: Pneumococcal Pneumonia, Empyema, Lung Abscess                           | 208    | 0.08%  |
| HCC122: Proliferative Diabetic Retinopathy and Vitreous Hemorrhage              | 575    | 0.23%  |
| HCC124: Exudative Macular Degeneration  | 2,373  | 0.95%  |
| HCC134: Dialysis Status   | 365    | 0.15%  |
| HCC135: Acute Renal Failure   | 2,314  | 0.93%  |
| HCC136: Chronic Kidney Disease, Stage 5   | 335    | 0.13%  |

|   |       |       |
|---|-------|-------|
| HCC137: Chronic Kidney Disease, Severe (Stage 4)                                | 1,138 | 0.46% |
| HCC157: Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone | 12    | 0.00% |
| HCC158: Pressure Ulcer of Skin with Full Thickness Skin Loss                    | 144   | 0.06% |
| HCC161: Chronic Ulcer of Skin, Except Pressure                                  | 1,855 | 0.74% |
| HCC162: Severe Skin Burn or Condition   | 12    | 0.00% |
| HCC166: Severe Head Injury  | *     | *     |
| HCC167: Major Head Injury   | 235   | 0.09% |
| HCC169: Vertebral Fractures without Spinal Cord Injury                          | 610   | 0.24% |
| HCC170: Hip Fracture/Dislocation  | 651   | 0.26% |
| HCC173: Traumatic Amputations and Complications                                 | 76    | 0.03% |
| HCC176: Complications of Specified Implanted Device or Graft                    | 1,818 | 0.73% |
| HCC186: Major Organ Transplant or Replacement Status                            | 342   | 0.14% |
| HCC188: Artificial Openings for Feeding or Elimination                          | 357   | 0.14% |
| HCC189: Amputation Status, Lower Limb/Amputation Complications                  | 250   | 0.10% |

<sup>1</sup> The methodology for creation of these variables and ICD-10 mapping for the HCCs can be found on the CMS website: <https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Downloads/2016FinalICD-10HCCandRxHCCMappings.zip>

<sup>2</sup> Any group with a count less than 10 is indicated with an \* in order to prevent possible identification