AAHKS
AMERICAN ASSOCIATION OF HIP AND KNEE SURGEONS

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November 20, 2017

VIA E-MAIL FILING

Seema Verma, Administrator
Centers for Medicare & Medicaid Services
Department of Health and Human Services
200 Independence Ave, SW
Washington, DC 20101

RE: CMMI New Direction Request for Information

The American Association of Hip and Knee Surgeons (AAHKS) appreciates the opportunity to respond to the Centers for Medicare & Medicaid Services (CMS) on its Center for Medicare & Medicaid Innovation ("Innovation Center" or CMMI) New Direction Request for Information (RFI).

AAHKS is the foremost national specialty organization of more than 3,200 physicians with expertise in total joint arthroplasty (TJA) procedures. Many of our members conduct research in this area and are experts in the evidence based medicine issues associated with the risks and benefits of treatments for patients suffering from lower extremity joint conditions. AAHKS appreciates its ongoing close collaboration with the Administration and Congress to advance payment reform to best serve beneficiary access and outcomes. In all of our comments, AAHKS is guided by its three principles:

- Payment reform is most effective when physician-led;
- The burden of excessive physician reporting on metrics detracts from care; and
- Patient access, especially for high-risk patients, must remain a focus

We respond below to the 7 questions in the CMMI New Direction RFI as follows:

1. **Guiding Principles or Focus Areas**

AAHKS endorses the guiding principles proposed for CMMI which largely align with the policy positions recommended by AAHKS to CMS for the last several years.

- *Choice and competition in the market* – AAHKS has long supported competition based on quality, outcomes, and costs, so long as the measurement of those three factors is properly risk-adjusted to account for significant differences that may exist between patients.

- *Provider choice and incentives* – AAHKS has long supported voluntary models over mandatory models. Similarly, we have advocated that burdensome and unnecessary requirements be reduced to free more physician time for clinical matters. It is important that CMMI's embrace provider choice means that practices or facilities are not precluded from participation in Advanced APMs based on their size.

- *Patient-centered care* – We agree with the principle of empowering beneficiaries, their families, and caregivers to take ownership and make informed choices on their care, in partnership and with the guidance of physicians. This is impossible when mandatory, burdensome models arbitrarily narrow the choices available to patients and providers.

- *Benefit design and transparency* – AAHKS endorses using data-driven insights to ensure cost-effective care that also leads to improvements in beneficiary outcomes. We have long-focused on, and partnered with CMS, on ensuring that model data is derived from the least burdensome measures that are most related to the underlying procedures, or when widely reported provider-specific quality measures do not account or differences in patient populations.

- *Transparent model design and evaluation* – Providers and other healthcare stakeholders should know that their input and practical experience is reflected in model designs.

- *Small scale testing* – We agree that models should not be made mandatory or expanded nationally until they have been thoroughly evaluated and demonstrated to improve efficiency without impairing patient care.

2. <u>Innovation Center Model Designs that are Consistent with the Guiding Principles</u>

Under the RFI's discussion of potential models, CMS states a priority to "expanded opportunities for participation in Advanced APMs [Alternative Payment Models]." CMS seeks feedback on how it may be responsive to eligible clinicians and their patients, and potentially expedite the process for providers that want to participate in an Advanced APM. We offer several suggestions related to model designs. We also share an overview of a model design that AAHKS is preparing.

a. *Variation in Models to Match Variation in Physician Practices*

As an overarching principle, CMS should recognize that, in order to expand opportunities for Advanced APMs, multiple models must be available within any one practice area. Through our experience with CJR, BPCI, and development of our own episode payment APM, we have learned that a guiding principle must be that there cannot be one perfect model for bundled payments for TJA. Physician practices differ in several respects that are relevant to model design. There is variation in population and density of the community served. There is variation in the size of a practice and its level of sophistication and preparedness for the resource intensive technical aspects of participating in an Advanced APM. Finally, there is variation in any physician's willingness to take on financial risk.

Therefore, CMS must go beyond simply offering one good model for TJA. To achieve its goal of expanded opportunity, there must be different models that are scaled for different locations, practice sizes, and risk levels. As a practical matter, it may not be feasible to create multiple model options designed for every sub-specialty. Rather, CMS should contemplate bundled payment models for episodes of care that are sufficiently flexible to facilitate different practices. We realize that because of its significant share of Medicare expenditures, TJA may continue to warrant the focus of specialized, unique models.

This is particularly an issue for smaller practices and acute care facilities for whom the practical requirements of an Advanced APM are too resource-intensive. Such providers should not necessarily be bound to FFS and precluded from Advanced APM participation. We encourage CMS to focus on the role of virtual groups and other "provider aggregation" through third party conveners to increase the combined scale of economies for smaller provider and open broader participation in value-based care.

b. *Physician Episode Conveners*

CMS should ensure robust availability of models with physicians leading as initiators and conveners. We understand CMS's cited reason of administrative feasibility in designing the CJR model to be hospital-run so that CMS would have fewer direct contractual relationships to monitor. Yet, episode payment models without physician leadership increase the risk of significant decisions being made based on factors other than patient care. It has further been the experience of AAHKS members that not all facilities participating in the CJR have coordinated with surgeons on care planning and management or on gain sharing.

In order to ensure real provider choice, Advanced APM models must be presented that have the option of physician conveners, facility conveners, or other non-physician conveners. CMMI should specifically continue the BPCI practice of allowing non-physician organizations to serve as conveners. This is necessary to allow for Advanced APM participation for groups or

physicians who wish to direct the clinical coordination but that otherwise lack the size and economies of scale to bear risk or provide the necessary infrastructure.

c. AAHKS-Designed Arthroplasty Bundle Management

AAHKS is in the process of developing an entity, Arthroplasty Bundle Management (ABM) LLC, which will partner with conveners and episode initiators to assist AAHKS and non-AAHKS members in the creation of Advanced APMs for the delivery of primary TJA to areas and populations not currently served by BPCI and CJR. An overview of this in-progress entity is attached as **APPENDIX 1**.

3. Suggestions on the Structure, Approach, and Design of Potential Models

a. Risk adjustment

i. TJA-Related Clinical Factors

AAHKS believes that adequate risk adjustment is the essential component to a successful Advanced APM. Without properly accounting for the clinical, cost, and quality variations among patients with different health and socioeconomic (SES) characteristics, CMMI's guiding principles cannot be achieved. Effective risk adjustment or stratification can significantly improve physicians' willingness to participate in Advanced APMs or other models on what they see as fair ground. The prospect of being held accountable for factors not within their direct control is among the most demoralizing aspects of other value based payment models.

Historically, AAHKS members have been assessed on readmission, re-operations, cost, and length-of-stay. Most importantly, whatever quality and cost assessments are used, they must be risk-adjusted or else the measures lose their comparative value. Factors such as health status, stage of disease, genetic factors, local demographic and SES factors significantly impact the quality and outcomes of surgeries performed. These factors must be reflected in quality assessments to accommodate real variations in patient need and the costs of care.

On June 27, 2017, AAHKS presented to the CMMI Patient Care Models Group its detailed proposal for TJA risk stratification based on clinical risk factors.

ii. SES Factors

Providers of all types have become more aware of the impact of SES on clinical outcomes. Health status, stage of disease, genetic factors, local demographic and SES factors significantly impact the quality and outcomes of surgeries performed. CMS has received numerous comments from AAHKS on risk adjusting for poverty and other SES factors. In such

cases, it is preferable to account for dual eligible status as well as geographic location (zip code estimation of income and/or the AHRQ poverty index) across the relevant patient population. The dual eligibility status alone is overly narrow in the scope of what it may represent for a particular facility or jurisdiction. A patient's dual eligibility status is not necessarily a reflection of the economic status of a local population. Patients without dual eligibility status may still come from a severely economically depressed neighborhood. In short, adding geographic location to the assessed SES factors allows for measurement of the overall community effect, which helps to account for the unique nature of urban social topology. Supporting literature demonstrates that when poverty is controlled, race/ethnicity is less of an influence on cost or efficiency.

We acknowledge the concern expressed by some that the use of SES risk factors could lead to disparate levels of care for vulnerable populations. Nevertheless, the literature demonstrating the impact of SES factors on outcomes across multiple specialties is growing. The mere perception of higher risks could lead to providers avoiding vulnerable populations through various means. The access to quality care by vulnerable populations with socioeconomic risk factors should not be put at a disadvantage due to insufficient reimbursement to providers for factors outside their control.

b. Quality measures and excessive physician reporting

AAHKS fully supports the role of quality measures in the context of value based care. When shared savings are available, quality measures are necessary to safeguard against rationing of care and to properly reward those providers who excel at providing value. However, CMS should recognize (1) the overall shortage of outcome measures available compared to process measures, (2) the specific shortage in outcome measures related to surgical procedures, and (3) patient-reported outcome measures alone do not reliably assess the performance of the surgeon or the outcome of the TJA procedure.

For example, the timeframes currently applied under functional status outcome measures for TJA procedures (post-operative timeframe for evaluation of 60 to 180 days) are insufficient to assess the clinical outcome of the procedures. The most clinically appropriate time frame for a post-operative functional assessment should be at least from 180 days to one year following surgery, as TJA patients do not reach 90 percent functionality until at least 180 days after surgery. Full functionality is most likely to occur at one year following surgery.

CMS must also achieve a careful balance in the need for quality measurement and the administrative burden of collecting and reporting too much quality information. The administrative burden of reporting requirements under Medicare, including quality measures, often overburdens physicians who are trying to focus on direct patient care. We have discussed with CMMI previously the paradox of minimizing additional physician reporting burden by using existing tools such as the Consumer Assessment of Healthcare Providers and

Systems (CAHPS), when CAHPS is in fact a poor tool to assess individual physician performance and it is very difficult to amend. CMMI initiatives and models provide an opportunity, free from MIPS requirements, to focus on limited measures related to outcomes and other clinical priorities.

We applaud the Meaningful Measures initiative you announced on October 30, 2017. We agree with you that "Clinicians . . . have to report an array of measures to different payers . . . Moreover, it's not clear whether all of these measures are actually improving patient care." We understand this initiative will consist of a comprehensive review of quality measures to determine which ones may be related to improving patient care and outcomes.

New models from CMMI present an opportunity to immediately integrate findings from the Meaningful Measures initiative and utilize only the most focused measures. Further, CMS must take similar leadership on the overarching issue of shortage of clinical outcome measures for surgical procedures. AAHKS believes that the development of more accurate and simplified outcome measures, including the effective use of endorsed registries such as the American Joint Replacement Registry (AJRR), can be achieved.

c. Scope of episode

New CMMI models bundling TJA procedures should offer and test the provider's ability to engineer change in the way care is delivered to the patient when episodes are defined differently. This is an excellent opportunity for CMS to compare the CJR to episode models with alternative TJA episode definitions, such as limiting cases to elective TJA due to osteoarthritis. Elective procedures are a comparatively controlled clinical event, more subject to provider influence and care, unlike fracture cases that are currently included in the CJR model. Episodes could also be tested to include more or fewer TJA-related services than the CJR.

d. Coordinate new model applications with existing joint replacement model performance periods

As CMMI makes new models available, it should ensure they are available to physicians and entities operating under existing APM agreements with CMS, such as CJR, BPCI, ACOs, or other models. Some CMMI demonstrations have accepted applications only once. Certain providers may find themselves currently bound in any one of a number of APMs. Therefore, new demonstration models should be accepted over a several-year period to ensure current participants may smoothly transfer from one model to another. Alternatively, CMS could allow transfer of providers between APMs in the midst of a performance agreement.

4. Options Beyond FFS and MA for Paying for Care Delivery that Incorporate Price Sensitivity and Consumer Driven or Directed Focus

The issue of price sensitivity will be important for CMS and CMMI to consider moving forward. In most economic decisions, price is a method for providers and consumers to communicate both offered and perceived value of a product or service. The current methods of pricing episodes do not allow for patients to exercise this market power. Pricing that is based on historic cost may be relevant to payers, but holds little meaning to current patients. Pricing that is normalized to regional norms, as in CJR, does not create a market—it perpetuates price setting that prevents providers from utilizing their own assessment of internal cost to set prices in the market. Further, without differential patient financial responsibility, there is no incentive for patients to identify the best value among a selection of providers. While this area needs significant further work, it represents the greatest opportunity for beneficiaries to drive the conversation around value and to regain control of their individual decisions. AAHKS is poised to work with CMS to explore the way in which price flexibility can be used to further the journey toward care that is seen by all as high value.

5. CMS Engagement of Beneficiaries in Development of and Participation in New Models

CMMI should make draft demonstration models widely available for comment before finalization which will allow a wider range of provider and patient stakeholders to provide input into the model development and receive sufficient notice of key features. CMMI should further empower providers to communicate with their patients regarding participation in new models. Patients' primary relationship in the health care system is with a physician who will likely be the most trusted source to fully inform a patient on the clinical and quality impacts of model participation.

6. Are there payment waivers that CMS should consider as necessary to help healthcare providers innovate care delivery as part of a model test?

a. Waiver of 3-day rule prior to post-acute admission

In order to fully test the potential value based care, CMMI models addressing episode payment should offer a waiver from the required length of an inpatient admission prior to a post-acute care admission. There are instances when such flexibility may present the most efficient low-cost way to meet patient needs and control the cost of the bundle.

b. Stark – physician self-referral law

CMMI should also be prepared to offer targeted waivers from Stark regulations when coordinated care across an APM would be better served by payment arrangement among participants that account for volume or value.

7. Are there any other comments or suggestions related to the future direction of the Innovation Center?

The Innovation Center should consider creating an advisory board of active professionals who can represent the interests of practicing physicians so that ongoing and regular dialogue and two-way communication is further fostered.

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AAHKS appreciates your consideration of our comments. You can reach me at mzarski@aahks.org, or you may contact Joshua Kerr at jkerr@aahks.org.

Sincerely,

Mark I. Froimson, MD, MBA
President

Michael J. Zarski, JD
Executive Director
AAHKS

APPENDIX 1

Risk Stratification Proposal in Support of Advanced Alternative Payment Model

I. Background

AAHKS is in the process of developing an entity, Arthroplasty Bundle Management (ABM) LLC, which will partner with conveners and episode initiators to assist AAHKS and non-AAHKS members in the creation of advanced alternative payment models (AAPMs) for the delivery of primary total joint replacement (TJR, specifically total hip and total knee replacement) to areas and populations not currently served by Bundled Payments for Care Improvement (BPCI) and Comprehensive Care for Joint Replacement (CJR).

The purpose of this entity would be to assist underserved TJR surgeons with meeting the four aims of an advanced APM: improved quality, patient-centered engagement, cost effectiveness, and appropriate use of electronic medical records. Additionally, by focusing on delivering an AAPM to underserved areas, AAHKS hopes to expand the scope of value-based care by bringing the opportunity to participate in bundle payment programs to additional settings not served by current CMS AAPM offerings.

Many of the areas not served by AAPMs convened by CMS are more rural, with lower population density and fewer providers per capita. The hospitals are usually smaller than their counterparts in current AAPM MSAs and, as a consequence, usually lack the resources to develop techniques to manage the bundle. These regions also have higher costs for hip and knee replacement. Providers who practice in these areas are currently not able to participate in an APM. Specialists, like adult reconstruction orthopaedic surgeons, are currently limited to participating in the Merit Based Incentive Payment System (MIPS), and may have little incentive or training in techniques to increase quality and decrease cost while delivering TJR.

We believe AAPMs offer a better way to improve quality and improve cost effectiveness for TJR delivery than MIPS. AAHKS has long stated that a fundamental component to any successful AAPM for joint replacement requires a successful risk adjustment component. Our proposed risk stratification methodology is presented here in inform CMS's refinement of existing AAPMs and development of future AAPMs.

II. Overview of Model Parameters

This AAPM will fulfill the CMS requirements to establish qualified provider status and serve as a substitute for MIPS as called for in MACRA. Arthroplasty Bundle Management (ABM) will require quality and patient reported outcomes (PROMs) reporting through the American

Joint Replacement Registry, Electronic Medical Record participation, patient satisfaction reporting specifically geared toward TJR (as opposed to the CJR program requirements of hospital-wide HCAHPS reporting), and limited physician financial risk with or without the hospital either through episode initiation or a quality/financial metric to be determined. In addition, ABM would collect data to allow appropriate risk adjustment measurement. ABM would develop categories of patient cohorts based on the severity of comorbidities both medical and orthopaedic. ABM would negotiate with CMS for additional payments for higher risk cohorts in order to protect access for these patients and avoid the possibility of cherry picking or lemon dropping.

This AAPM would allow third party conveners and episode initiators to help under-capitalized hospitals and surgeons to participate in the model. AAHKS will partner with ABM to develop techniques to educate its members on methods and protocols of improving quality, decreasing cost, and managing risk. ABM would create divisions to convene the bundle, manage the bundle, and manage downside risk. ABM and partners would help providers negotiate with participating hospitals to achieve goals of decreased cost and improved quality. ABM and partners will serve as a convener for underserved physician and patient populations with insufficient volume under the current AAPMs. ABM will work with the physician and hospital groups to provide financial and quality analytic data to allow for successful implementation of the AAPM.

This would be a five-year demonstration project. This episode of care would mimic the Model 2 BPCI and CJR programs. The episode would start with admission to the hospital and would continue for 90 days after admission. All accrued costs associated with the episode would be added to the bundled episode. CMS would take a 2% discount from a 2 year historical average to determine target price in the first 2 years, MSA geographic average pricing would be used in years 3, 4 and 5. For virtual programs, if a historical target cannot be fairly determined due to disparity, geographic pricing can be used for year 1 and 2 or an average of all of the constituents of the virtual group minus the 2% discount.

III. Risk Stratification Proposal

It is important that primary TJR be risk stratified for optimal equity in bundled payment models. Hip fracture patients treated with prosthesis have been accommodated within BPCI and CJR with a higher reimbursement due to atypical costs when compared to elective TJR. It is important that conversion THR (CPT 27132) also be accommodated in the same manner, as these cases behave much more like revision TJR than primary TJR. Additionally, patients with high comorbidity burdens are at increased risk for complications and readmissions and are likely to be negatively impacted in a bundled scenario with lack of access due to their poorer financial metrics. It is important that higher risk patients either be reimbursed at higher levels or given exclusion status from the bundled payment model. This would eliminate potential barriers to access of care for high risk patients (lemon dropping) and dissuade choosing only the

best risk profile patients (cherry-picking), predictable, unintended consequences under the current AAPMs.

a. Summaries of Options

There are four options for risk stratification which seem reasonable and which can be offered to AAPM participating providers. These options satisfy the AAHKS objectives of (1) maintaining access to care for higher risk patients; (2) determining appropriate exclusion criteria for high risk patients, and (3) recognizing the need for co-morbidity (both medical and orthopaedic) based risk adjustment for costs and quality of care in order to fairly compensate hospitals and surgeons for caring for high risk patient cohorts.

i. Option 1

Construct tiered DRG's based on comorbidity and orthopaedic surgical risk variables that increase reimbursement with increasing risk of readmission and utilization of resources. Suggested DRG tiers could increase one level for each 15% increase in cost per medical comorbidity.

ii. Option 2

Agree upon criteria and/or composite risk scoring thresholds to define patients that are excluded from bundled episodes and allow payment by fee for service for those patients eliminated from the bundle. Criteria currently in use to exclude patients from both NQF 1550 (complications) and NQF 1551 (readmissions) include fractures, cancer patients, and transfers. Those in use already could be readily applied to the bundled episodes.

iii. Option 3

Evaluate the risk profile of the population treated and if the hospital's population has maintained or increased its composite risk (e.g., Risk of Mortality, Readmission or Severity of Illness) and/or socioeconomic risk factors (e.g. minority status, poor access or dual eligibility) at a level higher than average, and the quality remains higher than expected, then such institutions should be rewarded with a lower price target or a bonus for performance above the expected levels in the MSA. Institutions should be incentivized for taking care of a high-risk population at above average levels of quality.

iv. Option 4

Apply the in use medical comorbidities risk adjustment in the Hospital-Level, Risk-Standardized Payment Measure already being collected and test for improvement in the risk

adjustment model by adding the surgery specific risk factors proposed to Yale and CMS as additions to the risk factors used in NQF1550. An alternative would be to decrease incentives to cherry pick the lowest risk patients by offering disincentives to operate only on low risk patients, this would protect low socioeconomic status populations, academic teaching institutions, and safety net hospitals.

b. Role of Currently Used Co-Morbidities

AAHKS proposes to test these risk stratification models within the AAPM. It is our goal to combine the surgical risk factors previously proposed for addition to NQF 1550. The current co-morbidities are in table 12. A preliminary logistic model to predict thirty-day readmission after primary total hip replacement or total knee replacement illustrated that the combination of clinical measures identified by AAHKS and FORCE TJR and administrative data (ICD/CC [complicating or comorbid condition]) can significantly improve the prediction of thirty-day readmission rates based on medical morbidity variables alone. Thus, the addition of clinical variables, such as the factors presented below and identified by AAHKS, FORCE-TJR registry, and the Yale Group will improve the risk-adjustment model for thirty-day readmission rates and has the potential to enhance fair comparisons of the quality of care provided by hospitals and surgeons.

Table 12. Hierarchical Generalized Linear Model Results for Full July 2010-June 2012 Sample

Risk-Adjustment Category	Risk-Adjustment Variable	Estimate	Standard Error	Payment Ratio (PR)	95% Confidence Interval for PRs
Intercept	N/A	9.663	0.004	-	-
Demographics	Age-65 (years above 65, continuous)	0.015	0.000	1.015	(1.015-1.015)
Demographics	Male	-0.075	0.001	0.928	(0.926-0.929)
Procedure	Index Admission with an Elective THA Procedure	0.022	0.001	1.022	(1.020-1.024)
Procedure	Procedure Type (Bilateral Joint Replacement)	0.553	0.004	1.738	(1.726-1.751)
Procedure	Procedure Type(Staged Joint Replacement)	0.559	0.007	1.749	(1.726-1.773)
Procedure	Procedure Type (Single Joint Replacement)	0.000	-	1.000	-
Other Comorbidity	Morbid Obesity	0.118	0.002	1.125	(1.120-1.130)
Other Comorbidity	Congestive Heart Failure	0.058	0.002	1.060	(1.056-1.064)
Other Comorbidity	Acute Coronary Syndrome	0.021	0.001	1.021	(1.019-1.023)
Other Comorbidity	Valvular or Rheumatic Heart Disease	0.007	0.001	1.007	(1.004-1.009)
Other Comorbidity	Hypertension and Hypertension Complications	0.030	0.001	1.030	(1.028-1.033)

Other Comorbidity	History of Infection	0.044	0.001	1.045	(1.042-1.048)
Other Comorbidity	Metastatic Cancer and Acute Leukemia	0.033	0.007	1.034	(1.020-1.047)
Other Comorbidity	Cancer	-0.007	0.001	0.993	(0.991-0.995)
Other Comorbidity	Benign Neoplasms of Skin, Breast, Eye	-0.019	0.001	0.981	(0.979-0.984)
Other Comorbidity	Diabetes and Diabetes Complications	0.056	0.001	1.058	(1.056-1.060)
Other Comorbidity	Protein-Calorie Malnutrition	0.175	0.007	1.191	(1.175-1.206)
Other Comorbidity	Other Significant Endocrine and Metabolic Disorders	0.023	0.003	1.024	(1.019-1.029)
Other Comorbidity	Obesity/Disorders of Thyroid, Cholesterol, Lipids	-0.011	0.001	0.990	(0.988-0.992)
Other Comorbidity	Appendicitis	-0.053	0.014	0.948	(0.923-0.975)
Other Comorbidity	Bone/Joint/Muscle Infections/Necrosis	0.038	0.003	1.038	(1.032-1.045)
Other Comorbidity	Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	0.022	0.002	1.022	(1.019-1.026)
Other Comorbidity	Disorders of the Vertebrae and Spinal Discs	0.008	0.001	1.008	(1.006-1.010)
Other Comorbidity	Osteoarthritis of Hip or Knee	0.069	0.002	1.072	(1.067-1.076)
Other Comorbidity	Other Musculoskeletal and Connective Tissue Disorders	0.033	0.001	1.034	(1.031-1.037)
Other Comorbidity	Severe Hematological Disorders	0.062	0.006	1.064	(1.051-1.077)
Other Comorbidity	Coagulation Defects and Other Specified Hematological Disorders	0.020	0.002	1.020	(1.016-1.025)
Other Comorbidity	Delirium and Encephalopathy	0.040	0.006	1.041	(1.029-1.052)
Other Comorbidity	Dementia and Senility	0.100	0.003	1.105	(1.100-1.111)
Other Comorbidity	Major Psychiatric Disorders	0.091	0.003	1.095	(1.089-1.100)
Other Comorbidity	Depression/Anxiety	0.036	0.001	1.037	(1.034-1.040)
Other Comorbidity	Other Psychiatric Disorders	0.015	0.002	1.016	(1.012-1.019)
Other Comorbidity	Mental Retardation or Developmental Disability	0.272	0.017	1.313	(1.270-1.356)
Other Comorbidity	Hemiplegia, Paraplegia, Paralysis, Functional Disability	0.067	0.004	1.070	(1.061-1.078)
Other Comorbidity	Polyneuropathy	0.039	0.002	1.039	(1.035-1.043)
Other Comorbidity	Multiple Sclerosis	0.125	0.011	1.133	(1.109-1.158)
Other Comorbidity	Parkinson's and Huntington's Diseases	0.172	0.005	1.188	(1.176-1.200)
Other Comorbidity	Seizure Disorders and Convulsions	0.067	0.004	1.070	(1.061-1.079)

Other Comorbidity	Arrhythmias	0.013	0.001	1.013	(1.011-1.016)
Other Comorbidity	Stroke	0.045	0.004	1.047	(1.039-1.054)
Other Comorbidity	Vascular or Circulatory Disease	0.025	0.001	1.025	(1.023-1.027)
Other Comorbidity	Chronic Obstructive Pulmonary Disease (COPD)	0.044	0.001	1.045	(1.042-1.048)
Other Comorbidity	Pleural Effusion/Pneumothorax	-0.018	0.004	0.982	(0.974-0.990)
Other Comorbidity	Other Lung Disorders	0.017	0.001	1.017	(1.015-1.020)

The estimated between-hospital variance from the hierarchical generalized linear model is 0.014 (SE = 0.0004). The THA/TKA payment for a hospital with one standard deviation above average was 1.27 times that of a hospital with one standard deviation below average.

c. AAHKS Proposed Clinical Risk Factors

Clinical Risk Factor	ICD10 Code	Descriptor
Morbid obesity BMI >40	E66.09	Morbid (severe) obesity due to excess calories
Smoking	Z72.0	Tobacco use
Chronic anticoagulant use	Z79.01	Long-term (current) use of anticoagulants
Chronic narcotic use	F11.20	Opioid dependence, uncomplicated
Workmen's compensation case	Z56.9	Unspecified problems related to employment
Previous intra-articular infection	B94.9	Sequelae of unspecified infectious and parasitic diseases
Congenital hip deformity	M16.31 M16.32	Unilateral OA resulting from hip dysplasia R hip Unilateral OA resulting from hip dysplasia L hip
Angular knee deformity >15 degrees	M21.869	Other acquired deformity of knee
Previous ORIF hip	M16.51 M16.52	Unilateral post-traumatic osteoarthritis, right hip Unilateral post-traumatic osteoarthritis, left hip
Previous ORIF knee	M17.31 M17.32	Unilateral post-traumatic osteoarthritis, right knee Unilateral post-traumatic osteoarthritis, left knee
Depression/psychiatric disease	F48.9	Nonpsychotic mental disorder

Red variables are accounted for in the CMS Risk Stratification Medical comorbidities payment ratios.

d. Summaries of Risk Stratification Calculation

i. Option 1

For each 15% increase in medical comorbidities payment ratio, the DRG would increase 15%.

- Standard Target Price RVU 1: no adjustment
- Target Price RVU 2: 1 plus 15%
- Target Price RVU 3: 1 plus 30%
- Target Price RVU 4: 1 plus 45%
- Target Price RVU 5: 1 plus 60%
- Target Price RVU 6: 1 plus 80%
- Target Price RVU 7: 1plus 100%

Maximum adjustment would be capped at two times the target price.

As an example, morbid obesity has a payment ratio of 1.125 and diabetes has a payment ratio of 1.058. That would total to a payment ratio of 18.3% above standard and would qualify for Target Price RVU 2 or a 15% increase above the standard target price.

For each clinical risk factor not included in the CMS Risk adjustment model, we would propose increasing the payment ratio by 15%.

Clinical Risk Factor	ICD10 Code	Descriptor
Smoking	Z72.0	Tobacco use
Chronic narcotic use	F11.20	Opioid dependence, uncomplicated
Previous intra-articular infection	B94.9	Sequelae of unspecified infectious and parasitic diseases
Congenital hip deformity	M16.31 M16.32	Unilateral OA resulting from hip dysplasia R hip Unilateral OA resulting from hip dysplasia L hip
Angular knee deformity >15 degrees	M21.869	Other acquired deformity of knee

Previous ORIF hip	M16.51 M16.52	Unilateral post-traumatic osteoarthritis, right hip Unilateral post-traumatic osteoarthritis, left hip
Previous ORIF knee	M17.31 M17.32	Unilateral post-traumatic osteoarthritis, right knee Unilateral post-traumatic osteoarthritis, left knee

As an example a morbidly obese, diabetic patient with a history of congenital hip deformity would have a payment ratio of 33.3% and would qualify for DRG 3 or plus 30% above the standard target price.

ii. Option 2

Patients with payment ratios greater than two times the standard risk will be eliminated from the bundled arrangement and will be paid under fee for service.

iii. Option 3

Calculate the payment ratio for a given population under the bundle. If the payment ratio for a population is 15% higher than average and the quality delivered is equal to the standard risk population or average of the bundle cohort and the care is delivered at average cost, then that provider group should be eligible for an incentivized bonus payable in 15% increments relative to the target price.

iv. Option 4

Multiply the target price by the calculated payment ratio plus the clinical adjustment variables for each case. If an institution is more than one standard deviation below the average risk for the MSA then they should have their target price lowered. This will assist in discouraging cherry picking and will keep safety net, academic, and less resourced hospitals participating in the bundle.

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