

**Summary Report of Technical Expert Panel Meetings:  
Development of Inpatient Outcome Measures for the Merit-based  
Incentive Payment System**

October 2018

**Prepared by:**

Yale New Haven Health Services Corporation – Center for Outcomes Research and Evaluation  
(YNHHSC/CORE)

This material was prepared by YNHHSC/CORE under contract to the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy.

## Table of Contents

Background .....	3
CORE Project Team .....	3
The Technical Expert Panel .....	4
Technical Expert Panel Meetings.....	6
Executive Summaries of Technical Expert Panel Meetings and Input.....	6
Executive Summary of Technical Expert Panel Meeting 1 (September 14, 2017) .....	6
Executive Summary of Technical Expert Panel Meeting 2 (March 2, 2018).....	8
Executive Summary of Input Received after Technical Expert Panel Meeting 2 (March 2018). 9	
Executive Summary of Technical Expert Panel Meeting 3 (June 5, 2018).....	11
Executive Summary of Technical Expert Panel Meeting 4 (October 1, 2018) .....	15
Appendix A. CORE Project Team.....	21
Appendix B. Schedule of Technical Expert Panel Meetings.....	22
Appendix C. Detailed Summaries of Technical Expert Panel Meetings and Input .....	23
Detailed Summary of Technical Expert Panel Meeting 1 (September 14, 2017) .....	23
Detailed Summary of Input Received after Technical Expert Panel Meeting 1 (September 2017) .....	28
Detailed Summary of Technical Expert Panel Meeting 2 (March 2, 2018).....	35
Detailed Summary of Technical Expert Panel Meeting 3 (June 5, 2018).....	42
Detailed Summary of Technical Expert Panel Meeting 4 (October 1, 2018) .....	83

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Background

The Centers for Medicare & Medicaid Services (CMS) has contracted with Yale New Haven Health Services Corporation – Center for Outcomes Research and Evaluation (CORE) to adapt claims-based hospital measures that assess the quality of care provided to Medicare beneficiaries by clinicians who are eligible to participate in the Merit-based Incentive Payment System (hereinafter, MIPS eligible clinicians).

Previously, CORE developed a range of measures to assess hospital quality. The primary goal of this project is to re-specify (or adapt) two hospital quality measures for the measurement of MIPS eligible clinicians. The two measures CORE will re-specify are the:

1. Risk-Standardized Complication Rate Following Elective Primary Total Hip Arthroplasty and/or Total Knee Arthroplasty (hereafter, “hip/knee complication measure”).
2. Hospital-Wide All-Cause Unplanned Readmission Measure (hereafter “HWR measure”).

CMS will re-specify these two measures for use in assessing individual and/or groups of clinicians participating in the MIPS. The re-specified measures will assess each Clinician’s or Clinician Group’s readmission or complication rate, respectively, relative to that of other MIPS participating clinicians with similar patients. One of the measures, the HWR measure, is already in use in the MIPS; this is an updated re-specification.

As is standard with all measure development processes, CORE has convened a national Technical Expert Panel (TEP) of clinicians, patient advocates, and other stakeholders. This TEP is providing input on approaches to measure attribution that could apply to multiple measures and will help shape the approach to one or two specific measures on a full range of measure specifications, including the attribution, cohort definition, and risk adjustment.

This report summarizes the feedback and recommendations received from the TEP during the first, second, third, and fourth TEP meetings. In these meetings, CORE discussed key principles that will be used to define attribution rules for hospital measures that will be re-specified for the MIPS; presented candidate attribution rules to the TEP for consideration; and obtained input on final attribution rules for each measure. The report will be updated to include feedback and recommendations from future TEP meetings as they occur.

## CORE Project Team

The CORE Project Team consists of individuals with expertise in measure development, health services research, clinical medicine, statistics, and measurement methodology.

Jeph Herrin, PhD, leads the CORE Project Team. Dr. Herrin is a statistician and Adjunct Professor of Cardiology at Yale School of Medicine. He has contributed to several outcome measures developed by CORE.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

Lisa Suter, MD, MHS, Associate Director of Quality Measurement at CORE and an Associate Professor of Medicine at the Yale School of Medicine, oversees the work.

See [Appendix A](#) for the full list of members of the CORE Project Team.

## The Technical Expert Panel

In alignment with CMS’s Measures Management System<sup>1</sup>, CORE released a public call for nominations to convene the TEP. The TEP’s role is to provide feedback on key conceptual, clinical, and methodological decisions made in consultation with CORE.

[Table 1](#) lists the project’s TEP members. The TEP is comprised of individuals with diverse perspectives and backgrounds, including clinicians practicing in various settings, patients and caregivers, and other stakeholders with experience in measure development, clinical medicine, and policy. The appointment term for the TEP is from August 2017 through September 2018.

Table 1. TEP member name, affiliation, and location

Name, credentials, and professional role	Organizational affiliation	Location
<b>Kathleen Blake</b> , MD, MPH; Vice President, Healthcare Quality (cardiology)	American Medical Association	Washington, DC
<b>John Birkmeyer</b> , MD; Chief Clinical Officer (general surgery)	Sound Physicians	Tacoma, WA
<b>Dale Bratzler</b> , DO, MPH; Chief Quality Officer (internal medicine); Interim Chief Quality Officer	University of Oklahoma Physicians; Chickasaw Nation Department of Health	Oklahoma City, OK; Ada, OK
<b>Daniel Brotman</b> , MD, SFM, FACP; Professor of Medicine, Johns Hopkins University Director of Hospitalist Program, (internal medicine)	Johns Hopkins University School of Medicine; Johns Hopkins Hospital	Baltimore, MD
<b>Tracy Cardin</b> , ACNP-BC, SFHM; Director of Nurse Practitioner/Physician Assistant Services (nursing - inpatient)	University of Chicago Hospital Medicine	Chicago, IL
<b>Cathy Castillo</b> , BA	Patient or caregiver representative	Redwood City, CA

<sup>1</sup> Center for Medicare & Medicaid Services. Blueprint for the Center for Medicare & Medicaid Services Measures Management System Version 13.0. 2017; <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/MMS/Downloads/Blueprint-130.pdf>. Accessed October 12, 2017.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

<b>Name, credentials, and professional role</b>	<b>Organizational affiliation</b>	<b>Location</b>
<b>Bruce Chernof, MD</b> ; President and Chief Executive Officer (internal medicine)	The SCAN Foundation	Long Beach, CA
<b>Donna Cryer, JD</b> ; President and Chief Executive Officer	Global Liver Institute	Washington, DC
<b>Sherrie H. Kaplan, PhD, MPH</b> ; Assistant Vice Chancellor, Healthcare Measurement and Evaluation School of Medicine, Professor of Medicine and Anesthesiology & Perioperative Care	University of California, Irvine	Irvine, CA
<b>Timothy Kresowik, MD, MS</b> ; Professor of Surgery - Vascular Surgery (vascular surgery)	University of Iowa Hospitals & Clinics	Iowa City, IA
<b>Joshua Lapps, MA</b> ; Government Relations Manager	Society of Hospital Medicine	Philadelphia, PA
<b>Frederick Masoudi, MD, MSPH</b> ; Professor of Medicine and Staff Cardiologist (cardiology)	University of Colorado Denver, University of Colorado Anschutz Medical Campus	Aurora, CO
<b>Brian McCardel, MD</b> ; Orthopedic Surgeon/Board Member (orthopedics)	Sparrow Health System	Lansing, MI
<b>James Moore, MD</b> ; Clinical Professor of Anesthesiology and Perioperative Medicine (anesthesiology)	University of California Los Angeles Health	Los Angeles, CA
<b>Michelle Mourad, MD</b> ; Vice Chair for Clinical Affairs and Value, Medicine (internal medicine - hospital medicine)	University of California, San Francisco Health	San Francisco, CA
<b>Juan Quintana, DNP, MHS, CRNA</b> ; Certified Registered Nurse Anesthetist (nursing - anesthesia)	American Association of Nurse Anesthetists	Winnsboro, TX
<b>Carol Raphael, MA, MPH</b> ; Senior Advisor	Manatt Health Solutions	New York, NY
<b>Charlene Setlow</b> ; Patient	Patient representative	Salinas, CA
<b>Heidi L. Wald, MD, MSPH</b> ; Vice President for Clinical Performance	SCL Health	Aurora, CO

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Technical Expert Panel Meetings

CORE held its first TEP meeting on September 14, 2017 (TEP Meeting 1), its second TEP meeting on March 2, 2018 (TEP Meeting 2), its third TEP meeting on June 5, 2018 (TEP Meeting 3) and its fourth TEP meeting on October 1, 2018 (TEP Meeting 4).

TEP meetings follow a structured format. CORE presents key issues identified during measure development, and a proposed approach to addressing them, and TEP members review, discuss, and advise on the issues.

This summary report contains a content from the three TEP meetings as follows:

- A [summary of the first TEP meeting that CORE hosted on September 14, 2017](#) and [input received after the first TEP meeting](#).
- A [summary of the second TEP meeting that CORE hosted on March 2, 2018](#) and [input received after the second TEP meeting](#).
- A [summary of the third TEP meeting that CORE hosted on June 5, 2018](#).
- A [summary of the fourth TEP meeting that CORE hosted on October 1, 2018](#) and [input received after the fourth TEP meeting](#).

## Executive Summaries of Technical Expert Panel Meetings and Input

### Executive Summary of Technical Expert Panel Meeting 1 (September 14, 2017)

#### Overview of Meeting Materials

Prior to the TEP Meeting 1 held on September 14, 2017, CORE provided the TEP members with materials for review. Materials prepared for the TEP included:

- An overview of TEP member responsibilities.
- The project's overview.
- An overview of CMS policy relevant to the project.
- Background and key principles for adapting inpatient measures to clinicians.
- An example application of the key principles to consider the feasibility and validity of adapting an inpatient measure for clinicians, which used CMS's 30-day hospital acute myocardial infarction (AMI) readmission measure as a case study.

#### Overview of Information Presented by CORE

CORE reviewed:

- Goals of the meeting, project overview, and TEP Charter.
- Background on the MIPS.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- Key principles for adapting inpatient measures to clinicians.
- Candidate attribution rules to re-specify an example inpatient measure for measuring clinicians.

### Overview of TEP Feedback

The TEP:

- Reviewed and approved the TEP Charter, without any modifications.
- Provided input on the overall goal of attributing inpatient measures to clinicians. Specifically:
  - TEP members expressed concern about ensuring that measurement accounts for factors outside of clinician control.
  - TEP members noted the importance of ensuring the measurement leads to increased quality and collaboration within hospitals, while avoiding perverse incentives.
  - TEP members emphasized the importance of testing reliability and accuracy of attribution rules, with concern of small volume.
  - TEP members noted the complexity of cases that would limit adequate attribution to a sole provider and voiced support for attribution of an outcome to multiple clinicians to increase alignment of incentives and ensure comprehensive care of a patient.
- Supported five key principles for adapting inpatient measures to clinicians outlined by CORE with the following additional input.
  - TEP members expressed concern about how a hospital's underlying conditions may affect outcomes attributed to clinicians. Several offered solutions to disentangle hospital contributions from a measure of clinician quality.
  - TEP members supported adding a sixth principle that attribution should not create perverse incentives.

A detailed summary of TEP Meeting 1 is available in [Appendix C](#).

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## **Executive Summary of Technical Expert Panel Meeting 2 (March 2, 2018)**

### Overview of Meeting Materials

Prior to TEP Meeting 2 held on March 2, 2018, CORE provided the TEP members with materials for review. Materials prepared for the TEP included:

- The project's overview.
- An overview currently reported hospital outcome measures.
- Key principles for adapting inpatient measures to clinicians.
- Candidate attribution rules.

### Overview of Information Presented by CORE

CORE reviewed:

- Project background and status.
- The approach to re-specifying hospital-level measures for MIPS-participating clinicians.
- Design and specifications of two current hospital-level measures to be re-specified for clinicians:
  1. Hospital-Wide All-Cause Unplanned Readmission Measure (hereafter "HWR measure").
  2. Risk-Standardized Complication Rate Following Elective Primary Total Hip Arthroplasty and/or Total Knee Arthroplasty (hereafter "hip/knee complication measure").
- Candidate attribution rules for the HWR measure.

### Overview of TEP Feedback

The TEP:

- Sought clarification of and provided comments on the background of the HWR measure.
- Provided input on the candidate attribution rules for attributing patients to individual clinicians for the HWR measure being re-specified for MIPS-participating clinicians.
- Provided input via email, after the meeting, on the candidate attribution rules for attributing patients to individual clinicians for the hip/knee complication measure being re-specified.

A detailed summary of TEP Meeting 2 is available in [Appendix C](#).

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Executive Summary of Input Received after Technical Expert Panel Meeting 2 (March 2018)

### Overview of Information Presented by CORE

- By email, CORE sought TEP input on the three candidate attribution rules that CORE developed for the hip/knee complication measure ([Table C2 in Appendix C](#)).
- Specifically, CORE asked TEP members to respond to four questions:
  1. What additional advantages do you see for any of these three attribution rules?
  2. What additional disadvantages do you see?
  3. Should any of these attribution rules be excluded from consideration?
  4. Should we evaluate any additional attribution rules?

### Overview of TEP Feedback

Of the 19 TEP members, 12 provided feedback on the candidate attribution rules for the hip/knee complication measure via email.

- Eight TEP members commented on additional advantages for the presented attribution rules for the hip/knee complication measure. Specifically,
  - Two TEP members supported the Attending candidate attribution rule.
  - Five TEP members supported the Operator candidate attribution rule.
  - Five TEP members supported the Billing Surgeon candidate attribution rule.
- Seven TEP members commented on additional disadvantages for the presented attribution rules for the hip/knee complication measure. Specifically:
  - One TEP member explicitly stated disadvantages of the Operator candidate attribution rule. Specifically, the TEP member noted it is difficult to properly identify the most responsible physician using the candidate Operator attribution rule, and face validity among physicians could suffer as a result.
  - Six TEP members expressed broad concerns with the attribution rules.
- One TEP member provided input on whether any attribution rules should be excluded from consideration. Specifically:
  - One TEP member explicitly stated that the Attending candidate attribution rule was too broad.
- Eleven TEP members provided input on whether CORE should evaluate any additional attribution rules. Specifically:
  - Five TEP members requested additional clarity and modeling related to the three candidate attribution rules.
  - One TEP member suggested considering the role of the Discharge Clinician.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- One TEP member suggested letting hospitals assign patients to providers based on knowledge of workflow.
- One TEP member suggested allowing non-physician practitioners, such as nurse practitioners and physician assistants, to be attributed patients.
- Two TEP members saw no role for the outpatient provider.
- One TEP member suggested a dyad attribution rule capturing the Attending and the Billing Surgeon.

Of the 19 TEP members, one TEP member provided additional input on the candidate attribution rules for the HWR measure ([Table C1 in Appendix C](#)) via email.

- One TEP member expressed concerns that the HWR measure is more applicable and easier to implement in the community hospital setting, where handoffs occur and fewer physicians are generally involved. Specific concerns included:
  - Patients are often admitted to the TEP members hospital under an Attending physician who is only on night or weekend calls, at which point the subsequent care is provided by a different provider; and
  - Most patients admitted to this TEP member’s academic hospital receive primary care services outside of their practice. Therefore, attribution would be difficult.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## **Executive Summary of Technical Expert Panel Meeting 3 (June 5, 2018)**

### Overview of Meeting Materials

Prior to TEP Meeting 3 held on June 5, 2018, CORE provided the TEP members with materials for review. Materials prepared for the TEP included:

- The project’s overview and status.
- An overview of the hip/knee complication measure, a review of attribution rules, evaluation of attribution rules, and questions for TEP input
- An overview of the HWR measure, a review of attribution rules, supplemental results around discharge codes, evaluation of attribution rules, and questions for TEP input.
- Background on the issue of accounting for hospital quality, results, and CMS’s decision to not adjust for hospital quality.
- An overview of next steps for the project.

### Overview of Information Presented by CORE

- CORE reviewed the project’s background and status, including the approach to re-specifying the two hospital-level measures:
  1. Risk-Standardized Complication Rate Following Elective Primary Total Hip Arthroplasty and/or Total Knee Arthroplasty (“hip/knee complication measure”).
  2. Hospital-Wide All-Cause Unplanned Readmission Measure (“HWR measure”).
- CORE provided an overview of the hip/knee complication measure, a review of attribution rules, evaluation of attribution rules, and questions for TEP input.
  - The three attribution rules CORE evaluated were: 1) Attending (identified on the hospital institutional claim), 2) Operator (identified on the hospital institutional claim), and 3) Billing Surgeon (identified on physician billing claims; attribution defaulted attribution to the Operator if no Billing Surgeon was identified).
  - Results of evaluation showed that:
    - All three attribution rules result in assignment of nearly all patients.
    - Orthopedic specialty is identified ≥95% of the time.
    - The Attending is least often a surgeon but is still a surgeon 95% of the time.
    - The Billing Surgeon captures the most patients (99.9%).
    - All attribution rules have many small-volume (<5-10 cases) Clinicians and Clinician Groups. The Attending has the highest variance, and the Billing

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

Surgeon the lowest. After applying a minimum case volume cutoff of 25, all rules have about the same variance.

- There is substantial overlap across attributions.
- CORE provided an overview of the HWR measure, a review of attribution rules, supplemental results around discharge codes, evaluation of attribution rules, and questions for TEP input.
  - CORE evaluated four attribution rules for the HWR measure: 1) Attending identified on the institutional claim, 2) Discharge Clinician, 3) Outpatient Primary Care Provider (Outpatient PCP) and 4) Outpatient PCP+.
  - CORE deferred evaluating two attribution rules on conceptual grounds and shared supplemental findings for both. CORE welcomed TEP input on whether to pursue the rules for evaluation.
    1. Attending/Operator, which assigns the outcome to the Attending for the measure's four medical cohorts and to the Operator on the institutional claim for the surgery/gynecology cohort.
    2. Post-discharge Clinician. The approach would be affected by availability bias and may cause unintended consequence of providers avoiding caring for patients.
  - Evaluation results showed that:
    - Inpatient rules (Attending and Operator) are more likely to identify the Clinician consistent with reason for admission.
    - Outpatient rules (Outpatient and Outpatient PCP+) only capture about half of admissions versus two-thirds for inpatient rules.
    - The Attending rule captures the most patients.
    - The Attending rule has the smallest variance; the Outpatient PCP rule has the greatest variance.
    - Although the outpatient rules result in greater variance, they capture fewer patients and thus may have less impact on patient care.
- CORE reviewed background on the issue of accounting for hospital quality, results, and CMS's decision to not adjust for hospital quality. Results from the evaluation of risk-adjusting for hospital quality indicated that:
  - Relatively few clinicians are affected.
  - Clinician Groups are slightly more affected when accounting for hospital quality.
  - As expected, for those affected, some improve and some worsen.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- This ultimately is a conceptual, not an empirical, decision.
- Consistent with its position on not adjusting hospital measures for non-hospital factors that might impact quality, CMS will not risk adjust clinician measures for hospital quality.
- CORE reviewed next steps for re-specifying the two measures.

#### Overview of TEP Feedback

- The TEP provided input on CORE’s review of the hip/knee complication measure and evaluation of attribution rules.
  - Specifically, 14 of 15 TEP members favored attributing the patient/outcome to the Billing Surgeon. The Billing Surgeon is the clinician who bills for the patient’s Total Hip Arthroplasty (THA) or Total Knee Arthroplasty (TKA) procedure. Conceptually, the TEP supported that the clinician being compensated for performing the procedure should have primary responsibility for patient outcomes. A detailed summary of TEP input is in [Appendix C](#).
- The TEP provided input on CORE’s review of the HWR measure and evaluation of attribution rules.
  - In the early rounds of discussion, most TEP members favored multiple provider attribution, however, there was no strong consensus to one specific approach.
  - After multiple rounds of discussion and voting, CORE asked TEP members to cast a final vote for one of four final attribution approaches.
    - Three TEP members supported attribution to a single inpatient provider and a single outpatient provider.
    - Two TEP members supported attribution to multiple inpatient providers.
    - Seven TEP members supported attribution to multiple inpatient providers and a single outpatient provider.
    - Two TEP members supported attribution to a single inpatient provider.
  - After the meeting, CORE sought input from five TEP members not in attendance for TEP Meeting 3, to cast their final vote for one of four final attribution approaches for the HWR measure. Four of the five TEP members voted as follows:
    - One TEP member supported attribution to multiple inpatient providers and a single outpatient provider.
    - Three TEP members supported attribution to a single inpatient provider and a single outpatient provider.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- TEP members further suggested that CORE:
  - Consider adequacy of clinician-level risk adjustment.
  - Provide an explanation of predicted outcome rates and how they differ from observed outcome rates.
  - Reconsider non-inpatient outcome events (such as observation stays).
  - Consider testing the hip/knee complication measure using Medicare Advantage and/or all-payer data for comparison for more global measurement.
  - Consider future development of measures of functional status or symptoms (i.e., 'positive' outcomes) versus utilization ('negative' outcomes).
  - Share sensitivity analysis for minimum-volume thresholds.
  - Examine variation in clinician performance over time.
  - Test measure result reliability.
  - Separate hospitals with large versus small numbers of clinicians and re-examine effects of hospital quality.

A detailed summary of TEP Meeting 3 is available in [Appendix C](#).

## **Executive Summary of Technical Expert Panel Meeting 4 (October 1, 2018)**

### Overview of Meeting Materials

Prior to TEP Meeting 4 held on October 1, 2018, CORE provided the TEP members with materials for review. Materials prepared for the TEP included:

- The project's overview and status.
- An overview of the hip/knee complication (HKC) measure, a review of the final attribution, measure specifications, and measure testing and results.
- An overview of the hospital wide readmission (HWR) measure, a review of the final attribution, measure specifications, and measure testing and results.
- An overview of next steps for the project.

### Overview of Information Presented by CORE

- CORE reviewed project background and status.
- CORE reviewed the discussion of TEP meeting 3, described how TEP feedback was incorporated into the measures and summarized the interim work.
  - For HKC
    - Implemented the Billing Surgeon attribution
    - Calculated measure results
    - Performed measure testing
  - For HWR
    - Implemented three attributions:
      1. Discharge Clinician
      2. Outpatient Primary Care Provider (Outpatient PCP)
      3. Primary Inpatient Care Clinician
    - Calculated measure results
    - Performed measure testing
- CORE provided an overview of the HKC measure, a review of the final attribution rule, measure results and measure testing.
  - Results
    - Using the attribution rule the cohort consists of 7,928 Eligible Clinicians (ECs) and 3,572 Eligible Clinician Groups (EC Groups).

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- For ECs the mean Risk Standardized Complication Rate (RSCR) was 2.8% (SD 0.7%) with a median RSCR of 2.7% (IQR 0.8%) and a RSCR range 1.2%-7.2%.
    - For EC Groups the mean Risk Standardized Complication Rate (RSCR) was 2.8% (SD 0.5%) with a median RSCR of 2.8% (IQR 0.6%) and a RSCR range 1.4%-5.7%.
    - Using a 95% confidence interval for the RSCR EC and EC Groups were placed into three groups better than, worse than or no different than the national rate. For ECs 0.6% (51) were better, 0.9% (68) were worse and 98.5% (7,809) were no different than the national rate. For EC groups 1.9% (67) were better, 1.2% (44) were worse and 96.9% (3,461) were no different than the national rate.
  - Testing
    - Model performance showed an unadjusted complication rate calibration very close to (0,1) and a c-statistic of 0.65.
    - Calibration plots model is well-calibrated, and not only will predict outcome at low end but also at the high end.
    - Test-retest reliability for ECs had an adjusted ICC of 0.35 and EC Groups of 0.47 which is what is seen at the hospital level.
    - Signal-to-noise reliability or signal-to-noise ratio results were presented examining the variance between ECs or EC Groups and the variance within the group.
      - Using three full years of data, the signal to noise ratio was near 0.8 for ECs and EC Groups.
      - The range was 0.582 -0.988 for ECs and 0.46-0.996 for EC Groups. This is very similar to what was observed for the hospitals.
- CORE provided an overview of the HWR measure, a review of the final attribution rule, risk-adjustment approach, measure results and measure testing
  - The final attribution rule assigns patients to multiple providers: 1) Discharge Clinician, 2) Outpatient Primary Care Provider (Outpatient PCP), and 3) Primary Inpatient Care Clinician.
  - The risk-adjustment approach was adopted from the hospital-level HWR measure as patients' risk should be the same regardless of attribution. CORE used fixed effects models to construct standardized readmission ratios (SRRs) for each cohort and applied a post-estimation method to adjust these for between

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

provider variation. The final measure score is a risk adjusted readmission rate (RARR).

- Results:
  - Using the attribution rule the cohort consists of 170,755 ECs with a minimum volume threshold of 25 patients and 55,593 EC Groups.
  - For ECs the mean RARR was 15.2% with a range of 5.0% to 38.5%.
  - For EC Groups the mean RARR was 15.4% (SD 1.4%, IQR 1.6%) and a RARR range of 7.0% to 25.1%.
  - Using a 95% confidence interval for the RARR EC and EC Groups were placed into three groups better than, worse than or no different than the national rate. For ECs 9.1% (15,502) were better, 2.1% (3,617) were worse and 88.8% (151,636) were no different than the national rate. For EC Groups 7.8% (4,318) were better, 3.8% (2,129) were worse and 88.4% (49,146) were no different than the national rate.
- Testing
  - The measure demonstrated increasing measure result reliability as the case volume threshold increased.
  - At a threshold of 100 patients per EC Group, the test-retest reliability ICC was 0.40, indicating moderate reliability.
  - The signal to noise ratio of 0.98 and 1 indicates high reliability for both ECs and EC Groups, respectively.
    - Based on reliability results, CORE proposed a threshold of 100 patients per Eligible Clinician Group (TIN) to achieve acceptable measure result reliability.

#### Executive Summary of Input Received after Technical Expert Panel Meeting 4

For the HKC measure: CORE asked the TEP to respond to the question, “Do TEP members consider this measure a valid tool for evaluating clinician and clinician group performance?”

- A TEP member stated we may not have the capacity to determine the validity until of the measure until we have a better understanding of how it will be utilized.
- Another TEP member commented that the face validity is strong and presumed that the follow-up plan includes further validity testing after assessment of face validity from the TEP.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- During the presentation other input was provided:
  - Several TEP members agreed that knowing how the RSCR would be converted into a score would be helpful in determining whether this valid tool for evaluating clinician performance. The members noted that looking at the table of RSCR distribution for both EC and EC Groups, there is a spread, and certainly some performance differences. TEP members expressed concern that reporting the measure using performance categories of better, no different, or worse than the national rate would not provide sufficient performance variation.
  - A TEP member commented that it would be helpful to have a regression slide to that shows how much variation overlap there is.
- After the meeting, additional discussion and input was provided via email:
  - Several TEP members raised strong concerns about the exclusion of low volume ECs and EC Groups from the measure. Specifically:
    - The 25-case threshold meant that approximately half of providers would not be measured,
    - Volume cut-off excludes the very group of providers that may need measurement the most due to concerns that procedural specialties have a strong, direct volume-quality relationship,
    - MIPS measures should capture 100% of patients and 100% of providers.

These TEP members asked to see additional results to better understand how the measure would be used in the MIPS program.

For the HWR measure: CORE asked the TEP to respond to the question, “Do TEP members consider this measure a valid tool for evaluating clinician and clinician group performance?”

- TEP members asked clarifying questions:
  - One TEP member inquired how ECs or EC Groups who do not meet the reporting threshold would be accounted for under MIPS.
  - One TEP member asked if an EC Group with a Discharge Clinician and a Primary Inpatient Care Clinician assigned to the same patient would be counted twice against the group.
- CORE asked the TEP to provide input on the proposed measure specifications, the recommendation to require a minimum of 100 admissions per EC Group to achieve acceptable measure result reliability, and whether the measure is a valid tool for evaluating clinician group performance.
  - Six TEP members provided input on the recommended reporting threshold (clinician groups with at least 100 admissions).

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- Four supported the recommended reporting threshold.
- One TEP member expressed concern with the recommended reporting threshold.
- One TEP member asked what proportion of ECs and EC Groups are excluded from current reporting of the MIPS all-cause readmission measure for which the minimum case volume is  $\geq 200$  admissions.
  - One TEP member expressed concern with hospital-level effects affecting EC or EC Group quality. Another TEP member asked whether it is possible to include hospital effects in the statistical model for measure score calculation.
  - One TEP member expressed concern with missing data and overlapping penalties for hospitals and clinician groups.

Validity Survey: By electronic survey, CORE sought TEP input on the validity and usefulness of the measures.

- CORE asked TEP members to respond to four Likert scale questions (Strongly disagree – Strongly agree) and two optional open-ended questions:
  - The risk-standardized complication rates obtained from the MIPS hip/knee complications (HKC) measure as specified:
    - a. Are valid and useful measures of MIPS Eligible Clinician and MIPS Eligible Clinician Group quality of care. (Likert)
    - b. Will provide MIPS Eligible Clinicians and MIPS Eligible Clinician Groups with information that can be used to improve their quality of care. (Likert)
  - The risk-adjusted readmission rates obtained from the MIPS HWR measure as specified:
    - a. Are valid and useful measures of MIPS Eligible Clinician and MIPS Eligible Clinician Group quality of care. (Likert)
    - b. Will provide MIPS Eligible Clinicians and MIPS Eligible Clinician Groups with information that can be used to improve their quality of care. (Likert)

Responses:

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- HKC: The majority of the respondents, 13/16 or 81%, agreed that the MIPS HKC measure scores were valid and useful, and 12/16 or 75% agreed that the measure would provide information that could be used to improve the quality of care.
- HWR: The majority of the respondents, 12/17 or 70%, agreed that the HWR measure scores were valid and useful, and the same proportion agreed that the measure would provide information that could be used to improve the quality of care.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Appendix A. CORE Project Team

Table A1. Center for Outcomes Research and Evaluation (CORE) Project Team

Team member	Role
<b>Faseeha K. Altaf</b> , MPH	Project Coordinator
<b>Amanda Audette</b> , BS	Research Assistant
<b>Katie Balestracci</b> , PhD	Research Scientist
<b>Susannah M. Bernheim</b> , MD, MHS	Contract Director
<b>Elizabeth E. Drye</b> , MD, SM	Clinical Investigator
<b>Jeffrey Dussetschleger</b> , DDS, MPH	Project Coordinator
<b>Mariana Henry</b> , MPH	Research Associate
<b>Jeph Herrin</b> , PhD	Project Lead
<b>Raymond Jean</b> , MD	Clinical Investigator
<b>Heather Hussey</b> , MPH	Project Coordinator
<b>Andreina Jimenez</b> , MPH	Research Associate
<b>Harlan M. Krumholz</b> , MD, SM	Principal Investigator
<b>Shu-Xia Li</b> , PhD	Analyst
<b>Yixin Li</b> , MS	Analyst
<b>Zhenqiu Lin</b> , PhD	Analytics Director
<b>Lynette M Lines</b> , MS, PMP	Project Manager
<b>Kendall Loh</b> , BS	Research Associate
<b>Doris Peter</b> , PhD	Research Scientist
<b>Sriram Ramanan</b> , BS	Research Assistant
<b>Ilana Richman</b> , MD	Clinical Investigator
<b>Lisa Suter</b> , MD, MHS	Project Director
<b>Victoria Taiwo</b> , MHA	Research Associate

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Appendix B. Schedule of Technical Expert Panel Meetings

TEP feedback of CORE's approach to measure re-specification will inform the adaptation of existing hospital measures for clinicians. CORE will engage and seek input from the TEP through email communication and at least three meetings:

- TEP Meeting 1: Thursday, September 14, 2017 – 2:00 PM – 4:00 PM EST (Location: Teleconference/webinar).
- TEP Meeting 2: Friday, March 2, 2018 – 4:30 PM – 6:30 PM EST (Location: teleconference/webinar).
- TEP Meeting 3: Tuesday, June 5, 2018 – 8:00 AM – 3:30 PM EST (Location: Baltimore, MD area).
- TEP Meeting 4: Monday, October 1, 2018 – 1:00 PM – 3:00 PM EST (Location: teleconference/webinar).

## Appendix C. Detailed Summaries of Technical Expert Panel Meetings and Input

### Detailed Summary of Technical Expert Panel Meeting 1 (September 14, 2017)

#### Welcoming Remarks and Introductions

- CORE welcomed the TEP members to the meeting to discuss the development of inpatient outcome measures for MIPS. Of the 19 total TEP members, 15 attended the meeting. The CORE team reviewed the confidentiality agreement and the funding source for the project.
- CORE explained that it has developed a strategy for re-specifying hospital-level quality measures for clinicians and will use the strategy to build quality measures for clinicians that are closely aligned with those used to assess hospital quality.

#### Technical Expert Panel Charter

##### *CORE Presentation to the TEP*

- CORE reviewed the TEP Charter, which included the TEP's purpose and TEP member responsibilities, and sought the TEP's feedback on and approval of the Charter.

##### *TEP Feedback*

- The TEP approved the TEP Charter without modification.

#### Project Background and Policy Framework

##### *CORE Presentation to the TEP*

- CORE provided an overview of CMS's Quality Payment Program (QPP), which was established by statute and is a new program for measuring the quality of clinicians' care, and specifically of the MIPS to orient the TEP to how the program is set up.
- CORE noted that clinicians can participate in the QPP in one of two tracks: (1) the MIPS and (2) advanced Alternative Payment Models (APMs). Based on incentives that CMS has laid out, a majority of clinicians will participate in the MIPS initially; however, over time, due to financial incentives, more clinicians are expected to begin participating in APMs.
- CORE described the types of providers included in the MIPS (physicians and non-physician and non-physician practitioners) and explained that quality is one of four performance categories that will contribute to a Clinician or Clinician Group's composite performance score used to adjust Medicare payments to Clinician or Clinician Groups.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE noted that under the MIPS, there are currently few quality measures that evaluate inpatient clinicians, which is where this project's role has been defined.
- CORE described that the project's goal is to re-specify hospital measures to evaluate the quality of clinicians or clinician groups that primarily practice in an inpatient setting.
- The primary challenge will be to identify an attribution rule (rule for deciding which Clinician or Clinician Group is assigned the outcome when re-specifying a hospital measure), which will be important to consider in the overall context of re-specification (adapting an existing hospital measure to clinicians).

#### *TEP Feedback*

- Three TEP members sought clarification regarding the measures for which the attribution rule was being developed. Of these, one TEP member asked if the goal of the project was to re-specify all or select hospital measures for clinicians.
- CORE clarified that we are considering adapting one or more of CMS's hospital outcome measures. The measure(s) CORE will re-specify will be from among those that CORE previously developed for hospital quality measurement (for example, measures of readmission, mortality, complications, excess days in acute care) and are sensible to use for clinician quality measurement.
- CORE stated that CMS has not indicated the specific hospital measure(s) that will be re-specified for clinicians. The focus of TEP Meeting 1 was to provide an idea of the universe of measures CORE may work on re-specifying, but not to dive into any particular one except as a case study to build key principles.
- Seven TEP members voiced the importance of considering the specific measure (cohort, outcome) when identifying clinicians who had a significant role in influencing outcome.
- Three of the TEP members stated the need to keep in mind administrative considerations such as staffing ratios, nursing support, or pharmacy services as a provider's role can vary in different settings such as academic medical centers or physician groups. In this context, one TEP member highlighted that discharge instructions are often uninformative to patients, and sometimes patients leave hospitals without knowing their required actions.
- Two TEP members asked whether CORE would distinguish between hospital and clinician effects on quality of care.
- Six TEP members commented on attribution methods.
  - Two of these six TEP members suggested considering prospective attribution because it is important for clinicians to be aware that the care of a particular individual will be attributed to him or her. One of these TEP members noted

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

CMS's work to define patient relationship categories and encouraged CORE keep an eye on these.

- Three of the six TEP members supported multiple attribution to account for patients receiving care from more than one provider versus single attribution that assigns a patient to one provider. TEP members noted that single attribution would not likely to lead to collaboration whereas multiple attribution would promote accountability and engagement among clinicians treating the same patient to achieve a positive outcome.
- Two of the six TEP members identified the importance of transparency to providers about why and how a patient was assigned to them. Of these, one supported an attribution method in which a physician has an opportunity to see how and to what extent he/she and others may have contributed to the outcome; the TEP member also suggested integrating patient attestation into attribution.
- Three TEP members commented on potential perverse behaviors or unintended consequences. Of these:
  - One TEP member was concerned with whether evaluating the quality of clinicians with readmissions, for example, would result in unintended consequences and whether it may change clinicians' practice and behaviors. The TEP member asked whether clinicians would advise patients to return to the hospital if clinicians recognized they would be penalized for the readmission.
  - One TEP member suggested CORE ensure attribution engenders partnership between a clinician and a facility instead of fracturing the clinician-facility relationships.
  - One TEP member urged CORE to avoid a simplistic approach and noted that attribution will be imperfect but should encourage clinicians to provide quality care and avoid perverse incentives.
- Five TEP members commented on the data source or measure testing. Of these:
  - All five TEP members commented on the importance of testing measure reliability during re-specification.
  - One TEP member noted it would be important to consider whether and how to risk adjust. The TEP member noted that the length of a patient's stay is variable; a provider seeing a patient more often or a sicker patient for a longer period of time may help clearly link a clinician to a patient, the latter calling upon the need for appropriate risk adjustment.
  - Two TEP members suggested CORE consider the accuracy of attribution rules.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- One TEP member was concerned with the use administrative claims data for measure re-specification and in particular, for risk adjustment and data reliability. The TEP member stated that it would be important to consider the differences in data reported for an individual clinician versus a hospital as there are implications for providers at small group practices who lack capacity to access and report their data.
- One TEP member asked if the re-specified measure(s) would assess individual clinicians or clinician groups. A second TEP member asked for the definition of a clinician group.
- Two TEP members did not comment as they felt satisfied by the topics covered and other TEP input.

#### *CORE Response to TEP Feedback*

- CORE thanked the TEP members for their comments and confirmed that we would utilize the TEP's input to move forward and to discover what is feasible when re-specifying hospital measures for clinicians. CORE noted that many of the comments touched on the principles that the team had developed and stated that particular issues raised by the TEP members were unintended consequences of attribution that CORE would monitor.

#### Principles of Attribution

##### *CORE Presentation to the TEP*

- CORE introduced five key principles for the re-specification of hospital measures to clinicians, which CORE developed based on examination of literature, CORE's prior work on hospital measurement, and the policy goals of the QPP.
  1. Attribution is specific to the measure outcome.
  2. Adapted measures should align with original hospital measures.
  3. Clinician quality may be inseparable from hospital quality.
  4. Inpatient outcomes may be most reasonably attributed to inpatient clinicians.
  5. Attribution should align with policy goals.

##### *TEP Feedback*

- One TEP member commented on the second principle and noted that using the same risk-adjustment and reporting methods for clinicians may not be appropriate in all cases.
- Six TEP members provided feedback on the third principle. The TEP members suggested CORE consider analytically assessing the rationale behind the principle. Of these:

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- One TEP member was interested in whether there is clustering of the hospital effect on quality included in clinician scores. The TEP member stated utilizing methods to compare similar providers between and within hospitals may provide evidence to either support or refute the third principle.
- One TEP member agreed it is impossible to completely disentangle physician and hospital contributions to a specific quality measure or outcome, and suggested weighing measures differently in the MIPS based on their physician-sensitivity.
- Two TEP members said it is important to consider the role of the physician at multiple hospitals – for example, in following patients to various hospitals, advising patients to seek care at one facility over another, or affiliation with multiple hospitals.
- Two TEP members supported adjusting for hospital-level performance.
- One TEP member sought clarification on the fifth principle.
  - CORE clarified that the most important concept to consider in developing and testing attribution rules is that both clinical and policy sensibility need to be applied over the statistical properties of an attribution rule or measure.
- Three TEP members supported creating a sixth principle that would highlight the goal to improve patient care and carefully consider unintended consequences in selecting an attribution rule.
- Two TEP members expressed concern with the integrity of using administrative claims data for the measure(s); one noted a risk-adjusted measure built with electronic health record data would be more reliable than a claims-based measure.

#### *CORE Response to TEP Feedback*

- CORE appreciated the TEP’s review of and input on the key principles. CORE stated it would consider analytic work to support and to better describe the third principle, and would add a sixth principle per TEP input.

#### Case Study – 30-Day Acute Myocardial Infarction Readmission Measure

##### *CORE Presentation to the TEP*

- CORE introduced CMS’s 30-day hospital acute myocardial infarction (AMI) readmission measure, which CORE used as a case example to test potential attribution rules.
- CORE introduced the [eight candidate attribution rules](#) applied to the example AMI readmission measure and obtained TEP feedback via email after the meeting (see [next section for summary of TEP feedback on the rules](#)).

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Summary

- CORE thanked the TEP for its input and explained that there will be additional opportunities to discuss these topics in the future. Immediately following the meeting, CORE solicited TEP input on the attribution rules applies to the example measure of AMI readmission.

## **Detailed Summary of Input Received after Technical Expert Panel Meeting 1 (September 2017)**

### Case Study – 30-Day Acute Myocardial Infarction Readmission Measure

#### *CORE Presentation to the TEP*

- By email, CORE sought TEP input on eight candidate attribution rules developed and tested using CMS’s 30-day AMI readmission measure as a case example for future measure re-specification.
  1. Attending: This clinician is identified through an inpatient claim and assigns the outcome to the clinician responsible for the patient while he/she is in the hospital.
  2. Discharge Clinician: This clinician is identified through the outpatient (Carrier) claims and assigns the patient outcome to the clinician who sent the patient home, presumably after checking the patient’s conditions and treatment, and providing discharge instructions. The Discharge Clinician is identified as the one who reported the discharge code (Current Procedural Terminology [CPT®] code 99238 or 99239) during the hospitalization.
  3. Most Charges: This clinician is identified through the outpatient claims and assigns the patient outcome to the eligible clinician who billed the most charges for the patient during the hospital stay. The rationale for this method is that a clinician who bills the most for a patient’s care should be held responsible for the patient’s outcome.
  4. Most Claims: Similar to the prior rule, this assigns the outcome to the eligible clinician who bills the most claims for the patient during the hospital stay.
  5. Value Modifier, Adapted: This assigns the patient outcome to the primary care clinician who bills the most charges for the patient during the 12 months prior to admission.
  6. Value Modifier, Specialist: This assigns the patient outcome using the Value Modifier attribution method, but removes the precedence given to primary care physicians.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

7. Multiple: This assigns the patient to any clinician with a “patient-facing” claim during the inpatient stay, as well as to the Attending and Discharge Clinicians.
8. Hospital Measure: This assigns hospital score to any eligible clinician with a “patient-facing” claim during the inpatient stay as well as to the Attending and Discharge Clinicians.

#### *TEP Feedback*

16 of 19 TEP members emailed input on the attribution rules tested for the example measure of AMI readmission for CORE’s review.

- Eight TEP members commented on the Attending attribution rule. The TEP’s input below is not mutually exclusive.
  - Six TEP members were concerned that the definition of an Attending may not be consistent across institutions. For example, one TEP member noted that the Attending is the discharging provider or surgeon if a post-operative case whereas another TEP member noted the Attending is the admitting provider at another institution. Two of the six TEP members noted potential inconsistency with CMS’s patient relationship codes may be challenging.
  - Two TEP members supported this rule. Of these:
    - One TEP member ranked it as second choice (of eight).
    - One TEP member supported it as one of four top choices (the other three: Most Charges, Most Claims, Discharge Clinician).
  - Two TEP members thought this rule was problematic, in that the Attending often has no additional contact with patient after admission.
- Twelve TEP members commented on the Discharge Clinician attribution rule:
  - Seven TEP members supported this attribution rule. Of these:
    - Five TEP members voiced support for this attribution rule, as the Discharge Clinician is likely to have provided a significant amount of care; one TEP member noted a combination rule of Discharge Clinician and Most Charges would be most ideal. One TEP member suggested that Discharge Clinician be weighted more than others.
    - One TEP member ranked it as second choice (of eight).
    - One TEP member supported it as one of four top choices (the other three: Attending, Most Charges, Most Claims).
  - Four TEP members commented on unintended consequences or concerns with discharge coding practices.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- Three of the four TEP members noted the Discharge Clinician may not reflect who provided substantial care or the myriad of providers who cared for a patient during hospitalization.
    - Two of the four TEP members noted that not all providers bill discharge day CPT® codes 99238 or 99239 that CORE used to identify the Discharge Clinicians. Some providers could bill CPT® codes (99231, 99232, 99233) as reimbursement is virtually identical for these. However, one TEP member noted that the Discharge Clinician should be responsible for readmission.
    - Two of the four TEP members were concerned attribution to the Discharge Clinician may result in unintended consequences such as delaying discharge or assign responsibility more heavily to providers covering on weekends.
  - One TEP member asked whether the quality of the discharge summary could be considered with this attribution rule.
- Eight TEP members commented on the Most Charges attribution rule. Of these:
  - Five TEP members were concerned with the attribution rule because, for example:
    - It does not identify the responsible provider; the Discharge Clinician is more appropriate to identify as the responsible provider.
    - Providers can bill for different encounters or services, and reimbursement varies for different encounters or services; for example, procedures are more expensive. Related to this, two TEP members suggested testing whether Most Charges indicates “most responsibility.”
    - Multiple clinicians may have billed the same amount for a patient.
    - Some of the charges may not have been warranted.
  - Three TEP members supported the attribution rule. Of these:
    - One supported combining the Most Charges with the Discharge Clinician rule (with an emphasis on the Discharge Clinician).
    - One ranked it as fourth choice (of eight).
    - One supported it as one of four top choices (the other three: Discharge Clinician, Most Charges, Most Claims).
- Eight TEP members commented on the Most Claims attribution rule:
  - Three TEP members supported the attribution rule:

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- One of the three supported combining the Most Claims with the Discharge Clinician attribution rule (with an emphasis on the Discharge Clinician).
    - One of the three ranked it as first choice (of eight).
    - One of the three supported it as one of four top choices (the other three: Attending, Discharge Clinician, Most Charges).
  - Five TEP members were concerned with this Most Claims attribution rule for the same reasons as the Most Charges attribution rule.
- Thirteen TEP members commented on the Value Modifier, Adapted and Value Modifier, Specialist attribution rules:
  - Ten TEP members were concerned about the rules because, for example:
    - It is highly disruptive if the physician who interacts the most with a patient does not follow their patients to the hospital.
    - The Value Modifier definition of primary care should be revised.
    - A primary care provider (PCP) typically cannot influence care for an AMI patient; for other conditions, they may have more responsibility.
  - Three TEP members supported the attribution rules:
    - One TEP member noted that using the Value Modifier approach combined with the Discharge Clinician rule could capture the joint responsibility for a patient.
    - One TEP member stated that this rule can only be successful if each patient has an established PCP with whom they regularly interact.
    - One TEP member stated the rules were promising especially if they encouraged communication between inpatient and outpatient providers and stated that a PCP stands the best chance of knowing how a patient is likely to respond to care. However, the TEP member was concerned with attributing patient outcomes to a PCP for incorrect diagnoses made by an admitting physician.
- Fifteen TEP members commented on the multiple attribution rule.
  - Thirteen TEP members supported the rule because it made sense conceptually. Of these (not mutually exclusive):
    - One TEP member stated this is consistent with the approach being taken for CMS cost measures.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- Four TEP members voiced that the attribution rule was the most compelling as it would make transparent the many clinicians providing care to a patient.
- A few TEP members commented on whether the attribution rule should include weighting.
  - One TEP member favored the rule as long as higher weight could be placed on Discharge Clinicians.
  - One TEP member asked whether the rule could be weighted based on amount of contact with a patient and if the rule could accommodate both inpatient and outpatient clinicians.
  - One TEP member did not favor weighting although it makes clinical sense because it would be confusing to explain and challenging to construct given varied responsibilities of providers.
- Although supportive of the attribution rule:
  - One TEP member was unsure it would be fair (need data).
  - One TEP member noted it would not account for degree of influence a provider has for a patient.
  - One TEP member felt the Operator should be held responsible for procedure-based complications.
- Two TEP members called for data to understand the implications.
- One TEP member noted that attribution at the individual provider level will never completely encompass all those responsible for a patient's care. The TEP member stated that single attribution methods would likely create disharmony and lead to behavior avoiding problematic patients.
- One TEP member ranked it as fifth choice (of eight).
- One TEP member asked if CMS could afford if all clinicians were to be penalized or receive an incentive, if multiple providers were attributed an outcome.
  - One TEP member asked if the rule would include PCPs.
- Seven TEP members commented on the "hospital measure" attribution rule:
  - Six TEP members did not agree with the attribution rule.
    - Five TEP members agreed that applying the hospital score to clinicians would defeat the purpose of clinician attribution.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- One TEP member stated that this attribution rule was the least attractive to them because it would be hard to distinguish between providers versus within-provider variation. The TEP member noted applying the hospital score makes less sense for hospitals in which many providers care for smaller samples of patients.
    - One TEP member stated that this method aligns with the MIPS hospital-based provider reporting option yet moves away from individual clinician attribution.
- Additionally, eight TEP members proposed attribution rules for the team to consider or offered additional insights:
  - TEP members requested data to help understand trade-offs.
  - One TEP member stated that attribution rules should be evaluated across different types of health systems to ensure attribution performs well in all settings of care.
  - One TEP member found the list of candidate attribution rules to be adequate.
  - Two TEP members stated the importance of empirical testing to determine movement across attribution rules.
  - One TEP member proposed that certain clinical conditions may provide an expected list of clinicians that would be most likely to influence care for a patient. This condition, identified through specialty billing codes, could be used to narrow the list of clinicians responsible and promote team-based care.
  - Two TEP member supported attribution rules that are transparent or easily messaged to clinicians.
  - One TEP member voiced support for investigating attribution based on prescriptions written for patients, as complications resulting from inappropriately prescribed medications, or without full disclosure of side effects and risk is a substantial cause of adverse outcomes.
  - One TEP member commented on several aspects related to measure re-specification and testing. The TEP member:
    - Asked how reliability and validity at the individual clinician level would be determined, and noted that if using intraclass correlation coefficients, data would not support comparison of individual clinicians unless composites are created.
    - Noted that ranking clinicians who are being compared (distribution scoring) would be difficult and identified the need for confidence intervals around measure scores.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- Commented on clustering of the hospital effect on quality included in clinician scores. The TEP member favored a components of variation analysis to try to discriminate the effects of institution, provider, and patients on outcome measures. Additionally, the TEP member stated that disentangling hospital from clinician-level quality raises issues for hospitals where few clinicians provide the majority of care and the number of physicians per institution or comparison unit.
- Asked how turnover of clinician group membership would be addressed.

*CORE Response to TEP Feedback*

- The TEP's input on the example attribution rules for CMS's AMI readmission measure will be used as we determine attribution rules and testing during measure development.

## Detailed Summary of Technical Expert Panel Meeting 2 (March 2, 2018)

### Welcoming Remarks and Introductions

- CORE welcomed the TEP members to the meeting to discuss the development of inpatient outcome measures for MIPS. Of the 19 total TEP members, 15 attended the meeting.
- CORE reminded the TEP members of the confidentiality agreement and reviewed the funding source for the project.
- CORE described a strategy for re-specifying hospital-level quality measures for clinicians and noted it will use the strategy to build quality measures for clinicians that are closely aligned with those used to assess hospital quality.

### Project Overview

#### *CORE Presentation to the TEP*

- CORE provided an overview of the project objectives:
  - The primary goal of this project is to re-specify (or adapt) two hospital quality measures for the measurement of clinicians.
  - The two measures set for re-specification are the:
    1. HWR measure.
    2. Hip/knee complication measure.
- CORE described the three-pronged approach for measure re-specification:
  1. Identify a set of candidate attribution rules for the measure under consideration.
  2. Implement the candidate attribution rules on a common dataset.
  3. Use empirical results, clinical judgment, and policy considerations to select a final attribution rule.
- CORE provided a recap of TEP input from TEP Meeting 1 and thanked TEP members.

### Key Principles for Re-Specification

#### *CORE Presentation to the TEP*

- CORE described the six key principles used to guide selection of an attribution approach for the project. The criteria are built from prior work on hospital measurement, policy goals of the MIPS program, previous TEP feedback, and the context of adapting existing measures.

Principle 1. Attribution is specific to the measure outcome.

Principle 2. Re-specified measures should align with original hospital measures.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

Principle 3. Clinician quality reflects hospital quality.

Principle 4. Inpatient outcomes may be most reasonably attributed to inpatient clinicians.

Principle 5. Attribution should align with policy goals.

Principle 6. Attribution should consider the potential for unintended consequences.

### Measure Background: Hospital-wide Readmission Measure

#### *CORE Presentation to the TEP*

- CORE provided an overview of the HWR measure being re-specified for individual clinicians and clinician groups.
  - Cohort: CORE described the cohort inclusions and exclusions and explained that each admission is assigned to one of five distinct specialty cohorts according to primary diagnosis and/or procedure codes, with the goal of improving risk adjustment and usability.
  - Outcome: CORE noted the measure's outcome is unplanned readmissions within 30 days of discharge from an index admission, with the aim of capturing readmissions that arise from acute clinical events requiring urgent rehospitalization.
  - Risk model: CORE noted that the risk-adjustment model is constructed using 1 year of Medicare inpatient claims, that the measure adjusts each specialty cohort for risk factors to account for case mix and index admission diagnosis to account for service mix, and that separate risk-standardized rates from each specialty cohort are pooled for each hospital to create a single overall measure score.

#### *TEP Feedback*

- One TEP member suggested CORE adjust clinician scores for the hospitals in which they practice.
- One TEP member suggested CORE use volume of procedures or hospitalizations at hospitals for 'control' a given clinician has over her/his environment.
- Two TEP members commented on the specialty cohort categories in the risk adjustment model. They noted that the cohorts do not reflect the day-to-day environment in which modern clinicians practice.

#### *CORE Response to TEP Feedback*

- The TEP's input on the attribution rules for CMS's HWR readmission measure will be used as we determine attribution rules and testing during measure development.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Hospital-wide Readmission Measure: Candidate Attribution Rules for Evaluation

### CORE Presentation to the TEP

- CORE reviewed the potential attribution alignment between the currently used HWR measure and the re-specified HWR measure. CORE anticipates aligning measure features with the current HWR measure.
- CORE reviewed the six candidate attribution rules for the HWR measure and their pros and cons ([Table C1](#)).

Table C1. Candidate attribution rules for the HWR measure

Attribution rule	Pros	Cons
<b>Single inpatient provider</b>		
1. Attending (identified on hospital institutional claim)	<ul style="list-style-type: none"> <li>• Unambiguous</li> <li>• Inpatient provider</li> <li>• Responsible for the overall care of the patient during their hospital stay</li> <li>• Logical and easy for patients and public to understand</li> <li>• Simple to align with other inpatient measures</li> </ul>	<ul style="list-style-type: none"> <li>• May not be directly involved in care transition</li> </ul>
2. Attending/Operator (identified on hospital institutional claim)	<ul style="list-style-type: none"> <li>• Unambiguous</li> <li>• Inpatient provider</li> <li>• Responsible for the overall care of the patient during their hospital stay</li> <li>• Logical and easy for patients and public to understand</li> <li>• Simple to align with other inpatient measures</li> <li>• Operator may have more responsibility for surgical admissions</li> </ul>	<ul style="list-style-type: none"> <li>• May not be directly involved in care transition</li> </ul>

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

Attribution rule	Pros	Cons
3. Discharge Clinician (identified using billing claims)	<ul style="list-style-type: none"> <li>• Directly involved in care transition</li> <li>• Compensated for discharging the patient</li> <li>• Logical and easy for patients and public to understand</li> </ul>	<ul style="list-style-type: none"> <li>• May be ambiguous for some patients</li> </ul>
<b>Single outpatient provider</b>		
4. Outpatient (identified using physician carrier claims during 12 months prior to admission)	<ul style="list-style-type: none"> <li>• Outpatient provider is responsible for care post discharge</li> <li>• Aligns with existing program</li> </ul>	<ul style="list-style-type: none"> <li>• “Plurality” can be a very small proportion</li> <li>• Some patients may have no prior outpatient care</li> <li>• No certainty that provider has relationship with patient post discharge</li> </ul>
<b>Multiple</b>		
5. Dyad (combination of one inpatient and one outpatient provider)	<ul style="list-style-type: none"> <li>• Captures shared responsibility of inpatient and outpatient providers</li> <li>• Retains some consistency with existing program</li> </ul>	<ul style="list-style-type: none"> <li>• May be challenging to implement; will require some modification of risk adjustment</li> </ul>
6. Multiple	<ul style="list-style-type: none"> <li>• Conceptually attractive</li> </ul>	<ul style="list-style-type: none"> <li>• See notes above</li> </ul>

*TEP Feedback*

CORE paused twice for TEP input (after describing the single inpatient provider rules and after describing the multiple attribution rules).

- In the first set of responses, three TEP members commented on the single inpatient provider candidate attribution rules.
  - One TEP member suggested modifying the Discharge Clinician attribution rule to include subsequent care codes.
  - One TEP member suggested CORE apply different attribution rules for different cohorts.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- One TEP member expressed concern with attributing patients to hospitalists, noting that severity of the patient at admission is closely associated with being seen by a hospitalist.
- In the second set of responses, 13 TEP members commented on the candidate attribution rules. These responses are not mutually exclusive.
  - Nine TEP members supported the use of a multiple attribution model. More specifically, seven TEP members explicitly supported the use of a dyadic attribution model, and one TEP member explicitly supported the use of a multiple attribution model.
    - Six TEP members supported the use of the Discharge Clinician attribution rule.
    - Two TEP members supported the use of the Attending/Operator attribution rule.
    - One TEP member supported the use of the Attending attribution rule.
  - Five TEP members commented on additional disadvantages for the attribution rules.
    - Two of the five TEP members cited unintended consequences. Concerns include: outpatient providers could potentially avoid patients who were recently discharged and outpatient providers with no effect on the patient outcome, dermatologists for example, could be attributed to patients.
    - Two of the five TEP members noted the multiple attribution option is too technically complex.
    - One of the five TEP members noted a 30-day window to attribute the quality of a handoff for a medicine specialty may be too long.
  - Three TEP members provided input on if any of the candidate attribution rules should be excluded from consideration.
    - One of the three TEP members noted the outpatient attribution rule should be excluded as patients could be attributed to clinicians who have no control over the hospitalization or transfer of care.
    - One of the three TEP members noted that most of the attribution models, aside from the multiple attribution models, are likely to do harm to patients.
    - One of the three TEP members felt that attribution rules that focus on plurality rules or admitting physicians are likely inferior.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- Four TEP members suggested CORE explore additional candidate attribution rules.
  - Four TEP members suggested that, within the context of the candidate dyadic attribution approach, CORE identify the outpatient provider in ways other than by identifying the clinician billing the most primary care services.
  - Three of the four TEP members suggested attributing patients with different reasons for admission to the relevant clinical specialties.
  - One of the four TEP members suggested CORE follow a patient via data post-discharge to determine the clinician most responsible for care.

*CORE Response to TEP Feedback*

- The TEP's input on the attribution rules for CMS's HWR readmission measure will be used as we determine attribution rules and testing during measure development.

Hip/Knee Complication Measure: Candidate Attribution Rules for Evaluation

*CORE Presentation to the TEP*

- Due to time constraints, CORE decided to introduce the hip/knee complication measure to TEP members in the meeting and follow up via email with TEP members to obtain their input on the measure.
- CORE provided background on the main components of the currently reported hip/knee complication measure. CORE noted the measure evaluates the quality of care for patients receiving elective hip and/or knee replacement procedures, and noted the measure is designed to better inform consumers about care quality, incentivize efforts to reduce and/or prevent complications, and increase healthcare quality transparency.
  - Cohort: CORE reviewed the measure cohort for the hip/knee complication measure, including the inclusion and exclusion criteria.
  - Outcome: CORE reviewed the outcome of the currently reported hip/knee complication measure for the TEP. In the first 7 days, AMI, pneumonia, and sepsis are considered a complication of the procedure. Within the first 30 days, bleeding or embolism or death is considered a complication, and if a patient has a mechanical complication or joint infection during the first 90 days, it is considered a complication.
  - Risk model: CORE reviewed the risk-adjustment model and measure scoring for the currently reported hip/knee complication measure. CORE used 3 years of inpatient and outpatient claims to measure hospitals, and the measure adjusts

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

for case-mix differences among hospitals based on the clinical status of the patient at the time of the index admission.

- CORE reviewed the three candidate attribution rules for the hip/knee complication measure and their pros and cons ([Table C2](#)).

Table C2. Candidate attribution rules for the hip/knee complication measure

Attribution rule	Pros	Cons
1. Attending (identified on hospital institutional claim)	<ul style="list-style-type: none"> <li>• Unambiguous</li> <li>• Inpatient provider</li> <li>• Responsible for the overall care of the patient during their hospital stay</li> <li>• Logical and easy for patients and public to understand</li> <li>• Simple to align with other inpatient measures</li> </ul>	<ul style="list-style-type: none"> <li>• For primary elective surgical procedure, may make more sense to focus on operating physician</li> <li>• If not primary surgeon, may have limited influence over surgical complications</li> </ul>
2. Operator (identified on hospital institutional claim)	<ul style="list-style-type: none"> <li>• Unambiguous</li> <li>• Responsible for the patient procedure</li> <li>• Likely to be primary surgeon in case of patients admitted for elective hip or knee replacement</li> <li>• Logical and easy for patients and public to understand</li> </ul>	<ul style="list-style-type: none"> <li>• May have somewhat limited influence over medical complications</li> <li>• May not be primary surgeon</li> </ul>
3. Billing Surgeon (identified on physician billing claims)	<ul style="list-style-type: none"> <li>• Clinician compensated for the THA/TKA</li> <li>• Most likely to accurately identify the primary surgeon</li> </ul>	<ul style="list-style-type: none"> <li>• May be ambiguous (for example, two clinicians bill for the same procedure)</li> </ul>

### Summary

- CORE thanked the TEP for its input and explained that there will be additional opportunities to discuss these topics in the future. Immediately following the meeting, CORE solicited TEP input on the candidate attribution rules for the hip/knee complication measure.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Detailed Summary of Technical Expert Panel Meeting 3 (June 5, 2018)

### Roll Call and Introductions

- CORE welcomed participants to TEP Meeting 3 for the development of hospital outcome measures for the MIPS.
  - CORE reminded participants of the confidentiality agreement. TEP members represent themselves and not their organizations. TEP members can disclose that they are participating on the TEP but cannot discuss details until they are made public.
  - CORE introduced the meeting's facilitator whose role was to provide structure to our consensus-building process and maximize each TEP member's participation during the meeting.
- The meeting's facilitator reviewed the ground rules for the meeting. The facilitator acknowledged a few TEP members would participate remotely, and a few would not be able to participate in the meeting.
  - CORE facilitated the sharing of input from remote TEP participants during the meeting, including votes when they were taken.
- CORE reviewed the meeting's agenda and oriented participants to the meeting's materials.
- CORE conducted roll-call of meeting participants (TEP, CMS, CORE).
  - TEP members: 15 of 19 TEP members were in attendance (12 in person, 3 remotely). CORE also asked TEP members to state any disclosures not stated in prior meetings; no TEP members provided new disclosures.
  - CMS: CORE introduced CMS staff.
    - One CMS staff member, who joined in person, thanked TEP members for participating in the meeting and taking the time to work on the measures.
  - CORE: CORE Project Team members introduced themselves and thanked the TEP members for their participation.

### Recap of Acronyms and Terms

- CORE provided an overview of acronyms and terms included in the meeting materials and presentation.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Project Overview and Status

- CORE provided an overview of the project's and meeting's goals. CORE acknowledged that we received valuable feedback during TEP Meeting 2, in March 2018, which helped shape the candidate attribution rules for the two measures CORE is re-specifying.
- CORE reviewed the three-step approach to measure re-specification:
  1. Identify a set of candidate attribution rules for the measure under consideration
  2. Implement the candidate attribution rules on a common dataset
  3. Use empirical results, clinical judgment, and policy considerations to select a final attribution rule.
- CORE reviewed the six key principles the TEP previously endorsed to guide re-specification:
  - Principle 1. Attribution is specific to the measure outcome.
  - Principle 2. Re-specified measures should align with original hospital measures.
  - Principle 3. Clinician quality reflects hospital quality.
  - Principle 4. Inpatient outcomes may be most reasonably attributed to inpatient clinicians.
  - Principle 5. Attribution should align with policy goals.
  - Principle 6. Attribution should consider the potential for unintended consequences.
- CORE reviewed the status of measure development.
- CORE provided a recap of input from TEP Meeting 2 relevant to TEP Meeting 3. As a result of TEP Meeting 2 input, CORE:
  - Explored the possibility of attributing HWR outcome to Post-discharge Clinicians.
  - Examined modifications to the Discharge Clinician rule for the HWR measure.
  - Explored multiple approaches and brought a proposed approach for attributing the HWR outcome to multiple providers to the TEP.
  - Investigated the impact of accounting for hospital quality on both measures and reviewed with CMS.
  - Evaluated attribution rules prioritized by the TEP.
- CORE stated the goals for TEP Meeting 3 were to review the results of testing attribution rules, and to obtain the TEP's recommendation and build consensus on the attribution rule to implement for each measure. CORE stated that if the group could not reach consensus during TEP Meeting 3, we would log the TEP's input and share the TEP's input

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

with CMS. CORE noted that CMS is the ultimate decision-maker and arbitrator, and CORE would make transparent the TEP's input to CMS.

#### Hip/Knee Complication Measure: Measure Background

- CORE provided background on the three main components of the currently reported hospital-level hip/knee complication measure.
  - CORE noted the measure evaluates the quality of care for patients receiving elective hip or knee replacement procedures, and noted the measure is designed to better inform consumers about care quality, incentivize efforts to reduce and prevent complications, and increase healthcare quality transparency.
  - CORE reviewed the measure cohort for the hip/knee complication measure.
    - Includes patients:
      - Having a qualifying elective primary THA/TKA procedure during the index admission.
      - Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of admission and enrolled in Part A during the index admission.
      - 65 years or over.
    - Excludes patients:
      - Without at least 90 days post-discharge enrollment in Medicare FFS.
      - Discharged against medical advice.
      - Admissions for patients with more than two THA/TKA procedure codes during the index admission.
      - Admissions that were not randomly selected from a patient's multiple THA/TKA admissions in a given year.
  - CORE reviewed the outcome.
    - CORE noted during the first 7 days, AMI, pneumonia, and sepsis are considered a complication of the procedure. In the first 30 days, surgical site bleeding or pulmonary embolism or death is considered a complication, and if a patient has a mechanical complication or joint infection during the first 90 days it is considered a complication.
  - CORE reviewed the risk-adjustment model and measure approach.
    - CORE explained the team uses 3 years of inpatient and outpatient claims data to measure hospitals. The measure adjusts for case-mix differences

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

among hospitals based on the clinical status of the patient at index admission.

- CORE further explained that the measure calculates a risk-standardized complication rate (RSCR) using the risk adjustment model. The RSCR is the ratio of the number of outcomes predicted, based on the hospital's performance with its case mix; divided by the number of outcomes expected based on what an average hospital would achieve with the same patients; and multiplied by the national observed complication rate.
- CORE asked for TEP member feedback on the measure methodology and complications.
  - A TEP member asked if, in the RSCR model, the predicted outcomes depict the observed complication events or the modeled number of complication events.
    - CORE explained that the predicted value is a modeled number that accounts for hospital-specific effects in the hospital measure.
    - The same TEP member asked for clarification about whether the expected rate is an observed outcome with modifications to address background hospital performance signal.
      - CORE confirmed.
  - A TEP member asked if non-readmitted deaths are considered as part of the outcome.
    - CORE noted that the outcome incorporates only complications leading to hospitalization post-discharge, with death as the exception.
    - The TEP member emphasized the importance of a thorough risk-adjustment performance review, including case mix differences among clinicians, noting that physician-level heterogeneity washes out at the hospital-level.
      - CORE noted that was a great point and responded that more in-depth risk adjustment discussions will come after attribution consensus.
  - A TEP member noted that case-mix adjustment could reward clinicians that are not screening suitable elective surgery candidates and asked how this concept is handled.
    - CORE responded that the hip/knee complication measure does not consider appropriateness, adding that the measure adjusts for patient

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

level factors to allow measurement of provider differences, not patient differences.

- The same TEP member reiterated the concern and noted that adjusting for medical comorbidities would impact inappropriateness.
  - CORE responded that risk adjusting allows providers to acknowledge the complexity of patients, and not accounting for comorbidity in the measure would likely prompt clinicians to exclude complex patients that often do extraordinarily well.
- A TEP member inquired about the frequency of patients dying within 30 days following the procedure.
  - CORE responded that the national rate of death after a THA/TKA elective procedure is very low, well under 1%.
  - A TEP member asked if enough causality exists to merit the inclusion of death.
    - CORE responded that the original orthopedics and TEP strongly supported assessing severe complications, such as death.
- A TEP member asked if his/her understanding was correct: if a patient has a complication that leads to an emergency room visit or a complication is treated in-home, the complication would not be included because the measure is not able to access those claims. The TEP member personally knew three people who had complications following a THA procedure who landed in the emergency room but were not readmitted.
  - CORE confirmed the TEP member's understanding and noted for the development of the hospital-level measure, the measure development team and the TEP prioritized creating a reasonable threshold of outcome severity, which treatment at home and emergency department visits did not meet. CORE added that CMS reevaluates measures yearly and that this measure could be evaluated to expand other settings.
  - CORE added that the goal is to identify the range of performance rates among hospitals by capturing rates of severe complications, such as those that lead to readmissions. Likely, the approach would also identify providers with higher rates of less severe complications too, even though the measure does not directly capture them.
- A TEP member referred to another TEP member's earlier point, noting that attribution may not identify causation and that some complications are not

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

provider-based. The same TEP member also asked for further clarification how predicted outcomes differ from observed outcomes in the model.

- CORE clarified that the predicted number is based upon the model, and the model estimate includes a parameter, or estimate of provider effect. The parameter is included in the numerator but not in the denominator. CORE added this item to the parking lot list.
- The TEP member reiterated interest in transparency of the difference between observed and predicted rates.
- A TEP member replied to another TEP member's point and noted that a state-wide joint registry reports physician-level complication rates to the public, which changes their selection behavior. The TEP member added that case-mix adjustment will impact the predicted value.
- A TEP member addressed the TEP member's mortality question, adding that the *Hospital for Special Surgery* published data that showed THA/TKA mortality rates of about 0.10% for epidural and spinal anesthesia, and about 0.18% for general anesthesia.
- A TEP member agrees that the TEP member's point should be rehashed at later time. The TEP member added that observation stays vary, possibly washing out statistically, and requires more testing.
  - CORE noted that measure is continually reevaluated for validation and that these concerns should not impede measure re-specification.

#### Hip/Knee Complication Measure: Review of Attribution Rules

- CORE reviewed the attribution rules for hip/knee complication measure.
  - CORE noted that the attributions rules assign each patient's outcome to the Attending, Operator, or Billing Surgeon.
  - CORE explained that the sources for Attending and Operator are identified through the hospital institutional claim using a unique National Provider Identification (NPI). The Billing Surgeon is located using the billing claims and when missing, is assigned to the Operator.
  - CORE clarified Medicare billing further and noted that hospital claims, which typically identify Attending and Operator, also capture patient demographics, procedures, and co-morbidities. Physician billing claims indicate procedures done by the physician. A detailed algorithm exists that identifies the primary surgeon who billed for the procedures. Additionally, CORE added that this measure may not be attributed at an individual Clinician level but at a Clinician

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

Group level; therefore, for each attribution rule presented CORE will present results at the individual Clinician level and at the Clinician Group level.

#### Hip/Knee Complication Measure: Evaluation of Attribution Rules

- CORE presented the approach for evaluating attribution rules and reviewed the face validity results for each attribution rule.
  - CORE noted that it first examined feasibility: the number of patients and the distribution of admissions assigned to each Clinician or Clinician Group. Admission distribution results were reviewed at both the Clinician and Clinician Group levels, and with and without a  $\geq 25$  volume cutoff.
  - CORE summarized the takeaways, noting that the attribution rules capture nearly all patients and consist of many small-volume Clinician and Clinician Groups. CORE added that the Billing Surgeon had the highest assignment (99.9%).
  - A TEP member asked if the denominator is the total number of entities assigned in this cohort.
    - CORE thanked the TEP member and confirmed.
  - A TEP member asked if median numbers of patients for Attendings are badly skewed.
    - CORE confirmed.
    - The same TEP member suggested CORE should send TEP members the frequency distributions for each attribution rule.
    - CORE added, when a reasonable Clinician or Clinician Group cutoff is used, most of the patients are retained but you lose a lot of Clinicians. CORE added that results do not show much of a loss of Clinician Groups.
    - A TEP member noted further concern with the precision of the estimates, adding that volume restrictions could exclude the poorest quality physicians.
  - A TEP member noted that parts of the country that have high penetration rates of Medicare Advantage may be disproportionately affected by the exclusion. Additionally, the TEP member asked what percentages of patients that are having elective hip/knee surgery are Medicare patients.
    - CORE responded that the proportion of patients over 65 with Medicare is extraordinarily high but acknowledged that there is a greater proportion of patients under 65 that are non-Medicare recipients.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*



- CORE noted that the three attribution rules had substantial overlap and when adjusted for a  $\geq 25$  volume cutoff, overlapped  $< 97\%$ .
- CORE summarized the evaluation of the attribution rules.
- CORE noted multiple attribution was not explored because there was little TEP support, reasonability, and high attribution rule overlap.
  - A TEP member inquired if the intraclass coefficients were run at the Clinician level to address improvement in attribution rule precision estimates.
    - CORE clarified that the ICC is referring to signal-to-noise and noted that the patient-level variance is a constant so that the trend would be the same.
    - The TEP member noted concern with relationship because of the exclusions from one group to the other.
      - CORE clarified that since a logistic regression model was used; noise was constant for all the models.
  - A TEP member voiced concern with dismissing multiple attribution because it would neglect an opportunity to explore whether other Clinicians have an attributable role in other hospital-based surgical measures.
    - A TEP member agreed with the TEP member, noting the importance of consistent policy goals within CMS. Additionally, the TEP member noted that the CMS's Measures Management System emphasizes shared accountability. The TEP member suggested the measure development team and CMS analyze multiple attribution to promote team-based care of complex patients.
  - CORE noted that other measures exist that serve some of the mentioned purposes. CORE acknowledged that tradeoffs will occur because this measure is outcome specific but encouraged TEP feedback on generalizable options to future surgery measures. CORE added this measure is not representative of future surgical measures.
  - A TEP member supported the admission attribution results that 97% of cases the Attending, the Operator, the Billing Surgeon are going to be one and the same. The TEP member noted the importance of the 3% of other cases that could be attributed to hospitalists managing complicated patient stays.
  - A TEP member noted the generalizability of the Billing Surgeon attribution rule, which requires an internal quality data assurance process to ensure that the right person is attributed, to other surgical models.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- A TEP member suggested attributing outcome at a Clinician Group level versus individual Clinician level because volume restrictions can potentially single out Clinicians with too many patients they can reasonable see within a year. The TEP member added that the 1,500 maximum patients a year seen in the presented data would require a group-level outcome attribution.
  - CORE clarified that it is 1,500 for three years, which is 500 a year at the Clinician level not Clinician Group level, adding that Clinician Groups see a maximum of 6,000 to 7,000 patients over three years.
- A TEP member noted concern with the Attending attribution, adding penalization could incite perverse Clinician behavior.
  - CORE asked if the concern was whether the patient outcome will not get captured in the measure or that the attribution is not correct.
  - The TEP member clarified that the above concern was related to perverse behavior by clinicians.
- A TEP member also noted concern with the Attending rule and added that the rule impacts risk-adjustment feasibility and introduces bias.

*Candidate Attribution Rules: Hip/Knee Complication Measure*

CORE reviewed the pros and cons to each of the potential attribution options for the hip/knee complication measure.

- Rule: Attending
  - Pros: Unambiguous, inpatient provider, responsible for the overall care of the patient during their hospital stay, logical and easy for patients and public to understand, simple to align with other inpatient measures.
  - Cons: For primary elective surgical procedures, it may make more sense to focus on operating physician, if not primary surgeon, as Clinicians may have limited influence over surgical complications.
- Rule: Operator
  - Pros: Unambiguous, inpatient provider, responsible for the overall care of the patient during their hospital stay, logical and easy for patients and public to understand, simple to align with other inpatient measures.
  - Cons: May have somewhat limited influence over medical complications, may not be primary surgeon.
- Rule: Billing Surgeon
  - Pros: Clinician compensated for the THA/TKA, most likely to accurately identify the primary surgeon.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- Cons: Frequent ambiguity.
- CORE requested feedback from the TEP on attribution selections.
  - CORE asked TEP members to participate in voting on each of the attribution rules presented. [Table C3](#) below summarizes voting from 14 TEP members who were present.

Table C3. Hip/knee complication measure voting results

Attribution rule	TEP input: accept	TEP input: accept with reservations	TEP input: do not accept
Billing Surgeon	13 votes	1 vote	0 votes
Operator	2 votes	11 votes	1 vote
Attending	1 vote	0 votes	13 votes

- TEP members asked clarifying questions concerning the voting process.
  - CORE clarified TEP member questions.
  - CORE asked for TEP feedback on multiple attribution suggestions.

Hip/Knee Complication Measure: Discussion

- A TEP member supported the Billing Surgeon attribution rule because based on experience, Billing Surgeons mainly make decisions.
- A TEP member reiterated concern with the case-mix difference and risk-adjustment model.
- A TEP member supported the Billing Surgeon attribution but did emphasize the important of exploring multiple attribution. The TEP member acknowledged the important of exploring this concept to determine its feasibility.
  - CORE asked for specific suggestions for the multiple attribution approach.
  - The TEP member responded that anesthesiologists and people involved in pre-operative preparation of patients should be considered for multiple attribution. The TEP member noted that these clinicians play a big role in making sure patients are best prepped for surgery.
- A TEP member agreed with previous TEP members and noted that shared attribution is compelling. The TEP member indicated that low-volume Clinicians could potentially have differences in quality.
- A TEP member suggested lowering the volume cutoff to maximize quality demonstration, since the average group size for an orthopedic surgeon is <10.
- A TEP member supported the Operator attribution rule with reservations. The TEP member supported the Billing Surgeon because, feasibly, hospitals can identify the

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

Billing Surgeon easier, compared to the Operator. The TEP member also addressed previous TEP comments on multiple attribution and acknowledged the difficulty of anesthesiologists to identify measurable outcomes. The TEP member suggested CPT® codes be used to attribute anesthesiologists and aspires to high-quality team-based care.

- A TEP member supported the Billing Surgeon attribution rule because it identifies the accountable Clinician that everyone turns to when a complication emerges. For multiple attribution suggestions, the TEP member noted the importance of team communication, agrees that anesthesia should be included, and suggested thinking about positive outcomes. Additionally, the TEP member stated feeling comfortable with the Billing Surgeon attribution in non-complex patients but not in complex patients.
- A TEP member supported the Billing Surgeon attribution rule and the Operator default when the Billing Surgeon is missing. The TEP member added that it would be difficult to accept the Attending as the surgeon. The TEP member further stated support for multiple attribution, and including the anesthesiologists, but has concerns with feasibility.
- A TEP member supported the Billing Surgeon attribution rule and added that a single measure cannot solve all important problems. The TEP member addressed an earlier TEP member's low-volume point and stated that the measure may be used in a different way. The TEP member suggested CMS go through an in-depth discussion about team concept, when developing other measures.
  - The facilitator thanked the TEP member.
- A TEP member supported the Billing Surgeon attribution rule. The TEP member addressed the TEP member's multiple attribution point and added that surgeons and hospital administrators care about the outcomes. The TEP member suggested CORE and CMS continue reevaluating measures to enhance their feasibility. Also, the TEP member reiterated concern with the volume restriction of 25 patients and acknowledged that Medicare Fee-for-Service (FFS) does not capture Medicare Advantage patients to accurately depict volume numbers.
- A TEP member agreed with an earlier TEP member's point and noted acceptance of the Operator attribution rule. The TEP member indicated that it was primarily chosen as a backup choice for the Billing Surgeon. For multiple attribution, the TEP member suggested assigning percentages of damages to Clinicians.
- A TEP member hesitantly supported the Billing Surgeon attribution rule and advocated for shared accountability using the multiple attribution approach. The TEP member

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

noted that the goal is to increase quality of care. The TEP member further supported a TEP member's teamwork point and another TEP member's pre-operative points.

- A TEP member strongly supported the Billing Surgeon attribution rule. The TEP member encouraged CMS to revalidate measures with larger datasets and noted the importance of a team-based care attribution approach. Additionally, the TEP member supported hospitalists for a multiple attribution option and noted their important role in the immediate post-operative care. The TEP member also reiterated another TEP member's point, supporting positive outcomes versus negative outcomes.
- A TEP member supported the Attending attribution rule. The TEP member noted the importance of discharge safety and handoff efficiency, which were lacking in the Operator and Billing Surgeon attributions.
- A TEP member thanked the team. The TEP member supported the Billing Surgeon attribution rule and suggested using positive outcomes. Additionally, the TEP member asked how robotic procedures would be addressed in quality measures.
- A TEP member noted support for the team concept of attribution. The TEP member discussed approval of hospitalists but noted concern with variability across hospitals. And further noted interest in looking at functional outcomes as measures of success.
- A TEP member discussed that, in multiple attribution, anesthesiologists will only be compared to other anesthesiologists. The TEP member noted that measures can be created with the absence of complications but is usually not done because of acceptability.
- A TEP member noted that looking at the team as a group will encourage good behavior, which will improve quality of care.
- CORE summarized TEP members feedback and noted support for Billing Surgeon attribution rule. CORE noted that this measure can be used as a model for exploring multiple attribution to incorporate other attributions such as anesthesiologist and hospitalists in the future.
- A TEP member noted that Clinicians will no longer be allowed to choose team members, which will impact care quality.
  - CORE thanked the TEP member for the comment.
- A TEP member noted concern with the complexity of the multiple attribution. The TEP member agreed with another TEP member that the team's dynamic will be unstable and noted that hospital size will impact volume issues.
- A TEP member noted the importance of functional assessment measure development because such measures are geared for assessing surgery recovery.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

## Hospital-wide Readmission Measure: Measure Background

- CORE provided background on the three main components of the currently reported HWR measure.
  - CORE reviewed the measure background for the HWR measure. The measure:
    - Evaluates the quality of care for hospitalized patients by capturing unplanned readmissions;
    - Includes most (hospital-wide) conditions and procedures;
    - Intended to encourage lower readmission rates; and
    - Was originally developed as a hospital-level measure—currently reported on hospital compare public reporting.
  - CORE noted that a version of this measure was already adapted and is currently in use in the MIPS quality measure set.
  - CORE explained that each index admission is assigned to one of five distinct specialty cohorts according to principal discharge diagnosis and/or major procedure codes, with the goal of improving risk adjustment and usability. The distinct specialty cohorts, also known as ‘service lines’ are:
    - Cardiorespiratory
    - Cardiovascular
    - Medicine
    - Neurology
    - Surgery/gynecology
  - CORE noted that the patients in the surgery/gynecology cohort are not placed in that specific group due to any primary condition, but because they underwent a procedure at the hospital.
  - CORE noted the outcome for the HWR measure is unplanned readmission within 30 days of discharge from an index admission, with the aim of capturing readmissions that arise from acute clinical events requiring urgent rehospitalization.
    - CORE added that planned readmissions, and any readmissions within 30 days of discharge from an index admission that occurs after a planned readmission are not counted in the outcome.
  - CORE described the risk-adjustment model, noting that the model is constructed using 1 year of prior Medicare inpatient claims, that the measure adjusts each specialty cohort for risk factors to account for case mix and index admission

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

diagnosis to account for service mix, and that separate risk-standardized rates from each specialty cohort are pooled for each hospital to create a single overall measure score.

- CORE noted that the measure score is a risk-standardized readmission rate (RSRR) derived from results of five cohort models.
  - CORE added that this score is reported as a single RSRR for each hospital with an interval estimate to account for uncertainty.
- A TEP member asked under which specialty cohort a hip replacement procedure would fall.
  - CORE clarified that a hip replacement procedure would fall under the surgery/gynecology cohort.
- A TEP member asked if his/her understanding, that risk adjustment is calculated within specialty cohorts and then averaged across all cohorts, was correct.
  - CORE responded that the risk adjustment is calculated within specialty cohorts and the results combined using the geometric mean. CORE noted that each hospital receives a standardized risk ratio for each specialty cohort. Ratios are multiplied together, then the fifth root is taken.
  - A TEP member followed up and asked whether a pooled variance was considered.
    - CORE responded that each specialty cohort is weighted by the number of patients within that cohort.

#### Hospital-wide Readmission Measure: Review of Attribution Rules

- CORE reviewed the potential attribution rules for the re-specified HWR measure along with some information and additional analyses requested by the TEP.
  - CORE stated that for four of the six rules (two inpatient and two outpatient), complete measure results would be presented. CORE noted that for two rules, calculating measure results was deferred, however, supplemental findings would be shared.

#### *Attribution Rule: Attending Provider*

- CORE reiterated that this attribution rule assigns the outcome to the Attending and is identified on the hospital institutional claim.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

### *Attribution Rule: Attending/Operator*

- CORE noted the Attending/Operator attribution rule is a variation of the Attending attribution rule. The Attending/Operator rule assigns the outcome to the Attending for the four medical cohorts and assigns to the Operator for the surgery/gynecology cohort.
  - The Operator is identified on hospital institutional claims and is assigned the same way as the Attending.
  - CORE noted that patients are assigned to the surgery/gynecology cohort if they have a qualifying procedure, even if that is not their primary reason for admission.
- CORE mentioned that in the previous TEP meeting, members asked how often the Attending and the Operator were the same person.
  - CORE clarified that based on CORE's recent analyses, for 64% of index admissions in the surgery/gynecology cohort, Attending and Operator are the same Clinician; 36% of the time, they were different Clinicians.
  - CORE noted that results showed that the clinician specialties are similar; where they differ, the Attending is more often a generalist while the Operator is more often a surgeon.
    - CORE concluded that based on lack of interest from the TEP for the Attending/Operator attribution rule previously, CORE decided to defer further evaluation and testing.
  - A TEP member whether CORE's decision to defer further exploration assumed the goal of the measure is to identify a primary attributed provider as opposed to multiple providers.
    - CORE confirmed that this was partially a reason for the conclusion. CORE also noted that if there were multiple Clinicians involved, it might not be favorable to combine the Attending and Operator, but rather separate the two.
  - A TEP member asked if a patient who undergoes a certain procedure and is assigned to the surgical/gynecology cohort would be attributed to the Operator for the purposes of this measure.
    - CORE confirmed the TEP member's understanding of the attribution rule.

### *Attribution Rule: Discharge Clinician*

- CORE reviewed the Discharge Clinician attribution rule to the TEP. CORE noted the algorithm for identifying the Discharge Clinician relies on identifying the Clinician who files a discharge procedure code (99238 or 99239). Some admissions do not have a

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

discharge code within the last 3 days of the stay. They are assigned to the Attending in this case.

- CORE noted that in previous meeting, TEP members expressed concern that relevant subsequent care codes (99231, 99232, 99233) were excluded.
- A TEP member noted that the Billing Surgeon attribution was not considered for the surgery/gynecology cohort in the HWR measure as it was for the hip/knee complication measure.
  - CORE confirmed the TEP member's understanding and added that the HWR cohort includes a plethora of patients receiving multiple procedures during their stay. Lastly, CORE noted the challenge of working out an algorithm for resolving all those surgeries to identify the Billing Surgeon.
- A TEP member asked for additional clarification related to subsequent care codes.
  - Another TEP member clarified that subsequent care codes are non-admission codes and are considered a type of general management code (E&M codes). The TEP member noted that discharge codes are not required for use by Clinicians and are not necessarily any more lucrative than subsequent care codes. Also, the TEP member stated that that some Clinicians rely heavily on subsequent care codes even on the day of discharge.
- A TEP member asked what would classify as a major procedure. The TEP member noted that there may be some surgical procedures that are not listed as the major procedural codes.
  - CORE responded that there is an algorithm in place for defining major procedure codes with the concept being that it is a surgery for which a patient would be admitted to the hospital. CORE noted that there are several minor procedures that are not considered major, like intravenous placements and lumbar punctures.
  - The TEP member followed up and asked whether these major procedural codes align with CMS's code definition of major surgery.
    - CORE responded that the procedure codes are not defined by diagnosis-related groups. CORE noted that it is a clinically vetted algorithm for selecting a group of procedures originally created for the hospital-level HWR measure.
- CORE reviewed results on admissions without discharge codes within the last 3 days of admission within the five specialty cohorts.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE also reviewed results of patients without “discharge procedure” codes who had subsequent care codes from the last day of the discharge date. CORE noted that about 37% of these patients (without a “discharge procedure” code) has a subsequent care code.
- TEP member asked CORE to restate results.
  - CORE recapped that about 2 million of 6.6 million patients discharged, did not have a discharge code. CORE noted that of those 2 million, about one-third had a subsequent care code on their last day.
- CORE then reviewed results on how the specialty of the Attending compared to the specialty of the Clinician who filed the subsequent care code for each of the specialty cohorts.
  - A TEP member asked whether two thirds of patients did not have subsequent care codes due to the global period where it would not be appropriate to bill a subsequent care code for many of these patients.
    - CORE clarified that two-thirds of patients did not have “discharge procedure” codes.
    - The TEP member followed up and asked whether two-thirds of patients did not have discharge procedure codes because they were potentially paid through global or bundled payments instead.
      - CORE confirmed.
  - A TEP member asked how instances where more than one Clinician may bill subsequent care codes for a patient on their day of discharge are attributed.
    - CORE noted that the Clinician who billed the most charges would be selected as the Discharge Clinician. CORE stated that if two Clinicians billed for subsequent care on the last day, the Clinician who billed the most charges would be chosen. However, if there was a tie between Clinicians, one would be chosen at random.
    - A TEP member followed up on the TEP member’s question. The TEP member asked about the validity of highest biller being selected as the Discharge Clinician. The TEP member noted that there may be some instances where one Clinician may spend more time with a patient on the day of discharge and may bill higher, but another Clinician is most responsible for patient’s discharge.
      - CORE noted the TEP member’s point was valid and responded that given the wide variety of patients in this measure, producing

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

a specialty-based algorithm was not as practical as an algorithm for most charges.

- CORE added that the bill is not a total hospitalization cost, but a CPT® code that classifies who had the most discharge or subsequent care codes.
- A TEP recapped and noted the focus was the frequency of the codes being used as opposed to the dollar amount.
  - CORE clarified that the dollar amount is what is being looked at for discharge codes or subsequent care codes.
  - CORE confirmed that the highest dollar value is being looked at, and not charge line.
- A TEP member asked for clarification on what happens if a Clinician sees a patient five times with subsequent codes.
  - CORE responded that all codes charged on the last day are added up.
  - A TEP member asked whether subsequent care codes are limited to the last day of the patient stay, or if there was any reflection on prior days.
    - CORE explained that this algorithm is being used in cases where the Clinician who discharged is not immediately apparent, adding that patients do not have a Discharge Clinician identified roughly 30% of the time. CORE stated that in such cases, it would be possible to attribute the Clinician who had the highest bill on the last day as a proxy.
      - A TEP member noted CMS is facing a classic missing data problem in attempting to identify a Discharge Clinician and noted it may not make sense to attribute in those cases.
      - A TEP member asked why patients are discharged without a Discharge Clinician.
        - A TEP member noted that there is often no incentive for Clinicians to bill discharge codes or subsequent care codes.

#### *Attribution Rule: Post-discharge Clinician*

- CORE reviewed the Post-discharge Clinician attribution with the TEP. CORE noted that this attribution rule comes in response to TEP member interest in TEP Meeting 2.
  - CORE discussed the challenges and concerns regarding the Post-discharge Clinician attribution.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE noted that there is significant availability bias for the Post-discharge Clinician attribution rule, given that patients without readmissions have greater opportunity to see a Post-discharge Clinician, and that many patients often did not see any provider post-discharge.
    - CORE also noted that the Post-Discharge attribution rule has the potential to cause unintended consequences, as providers may be hesitant to see patients who have been discharged for fear of being held responsible for any readmissions.
  - Given these challenges and concerns, CORE noted it has deferred testing of the rule as proposed.
  - A TEP member asked if, within the context of multiple attribution, the Post-discharge Clinician candidate attribution rule would be considered.
    - CORE replied that the candidate attribution rules evaluated were those that CORE and the TEP also considered for multiple attribution. CORE noted that the Post-discharge Clinician candidate attribution rule had several drawbacks with identifying a Clinician and doing so in a way that is not biased. CORE made note that if there was strong interest, more work could be done in the future.
    - CORE added that given the assignment algorithm in the Post-discharge Clinician attribution rule, Clinicians have a strong disincentive to see new patients. CORE noted that half of the time when a patient has a post-discharge visit, it is with the PCP identified by the Outpatient PCP rule. Further, CORE pointed out the TEP concerns around incentivizing the post-discharge handoff processes and noted that focusing on a PCP might help capture a lot of those concerns.
  - A TEP member asked for clarification on CORE's point.
    - CORE clarified that the Discharge Clinician candidate attribution rule would still be considered as part of multiple attribution but clarified CORE did not plan to use or consider the additional subsequent care codes.
  - The same TEP member asked whether patients without Discharge Clinicians would be excluded from the model.
    - CORE clarified that these patients would not be excluded from the model, however they would be assigned to the Attending Clinician on the institutional claim in the current assignment algorithm.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- The TEP member followed up, and asked if, for patients who lack a Discharge Clinician, there is typically other coding for post-admission care.
  - CORE confirmed.
- The TEP member followed up again and expressed CORE was uncomfortable with taking any attribution off the table when considering the multiple attribution, and that Clinicians providing subsequent care on the day of discharge should be included in single or multiple attribution.
- CORE responded that if any individuals should be responsible because they provided care on the last day, it makes sense to include them in the Discharge Clinician attribution rule.

*Attribution Rules: Outpatient Primary Care Provider (Outpatient PCP) & Outpatient PCP+*

- CORE reviewed the Outpatient PCP attribution rule with the TEP.
  - CORE noted that the Outpatient PCP is identified using physician carrier claims during the 12 months prior to index admission. CORE added that the attribution algorithm looks for the PCP who bills the most primary care services within the 12-month period prior to the index admission date; if no PCP, then the specialist who bills the most primary care services.
  - CORE clarified that the most primary care services does not have to be the majority. CORE noted that it could be 5% of their billings during the last 12 months, but if it's more than any other Clinician billed that it is classified as the “most primary care services.”
  - CORE stated that the Outpatient PCP rule is for consideration as part of dyad or multiple provider approach.
  - A TEP member asked whether the Outpatient PCP is similar to what CMS is currently using for attribution in the quality and resource use report.
    - CORE noted that it adapted the Outpatient PCP candidate attribution rule from CMS’s methodology, and that CMS’s methodology looks at a calendar year and the attribution is not tied to the timing of any event.
  - A TEP member asked whether when referring to primary care services, CORE is referring to E&M codes.
    - CORE confirmed the TEP member’s understanding.
    - The TEP member noted that E&M codes do not necessarily have anything to do with primary care and further suggested that if a patient saw their

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

vascular surgeon multiple times while seeing their PCP one time, the patient would be attributed to the PCP.

- Another TEP member further clarified the prior TEP member's understanding. The TEP member clarified that if a patient saw a PCP, but also saw another Clinician, the attribution would go to the PCP based on the clinician specialty code. The TEP member further explained that if the patient is not seeing a PCP at all, then the attribution goes to whoever is providing those E&M services.
- A TEP member asked whether the attribution is based on the NPI and how the primary care designations are defined.
  - CORE noted that the specialty is identified by the Carrier claim line.
- CORE explained that the TEP member's earlier comment points to the differences between the Outpatient PCP and Outpatient PCP+ attribution.
  - The Outpatient PCP candidate attribution rule is completed in two steps:
    1. Look at all billing of primary care services completed by PCPs and attribute to the PCP who had the most services defined in dollars.
    2. If none exist, attribute to the relevant specialist.
  - The Outpatient PCP+ candidate attribution rule is completed in one step and does not prioritize PCPs over non-primary care specialties.
- Two TEP members asked whether a primary care designation in claims is used for attribution and if payments are based off NPI number or E&M codes.
- A TEP member highlighted practicing physicians have control over their designation by CMS to reflect their patient makeup.
- CORE recapped all 6 attribution rules for the HWR measure. CORE noted that the Post-discharge Clinician and Attending/Operator would not be evaluated for reasons discussed earlier. CORE noted results would be presented for the four remaining attribution rules (Attending, Discharge Clinician, Outpatient PCP, Outpatient PCP+).
  - A TEP member asked whether patients who qualify under MIPS but do not qualify under Medicare are included in the measure.
    - CORE responded that the HWR measure only includes patients 65 and older that are Medicare FFS beneficiaries.
    - The TEP member explained that with MIPS, there are times where Clinicians must report on non-Medicare cases. The TEP member asked whether these cases would be included anywhere in the measure.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE responded that if Medicare does not have the data, the outcomes for those patients cannot be reported. CORE added that for providers caring for many non-Medicare FFS beneficiaries, the measure will miss a proportion of those patients.
  - The TEP member asked whether the HWR measure is only to apply for the patient population as the measure designed.
    - CORE confirmed.

#### Hospital-wide Readmission Measure: Evaluation of Attribution Rules

- CORE discussed what was evaluated for the four remaining attribution rules for HWR measure.
  - CORE reviewed face validity results for distribution of admission with all cohorts combined.
    - About 5% of patients do not have any primary care services billed during the 12 months prior to admission
    - All attribution rules, except certain outpatient rules, result in many small volume Clinicians.
      - A TEP member noted that the 5% with no primary care services billed in the prior 12 months may represent the sickest patient, not the healthiest patients. The TEP member noted that patients who are not receiving outpatient services may sometimes be receiving care through the emergency room. The TEP member found the percentages presented in the face validity results for distribution of admission to be a little misleading.
- CORE discussed volume considerations for the HWR measure.
  - CORE noted that over 100,000 Clinicians were eligible for HWR measure.
  - CORE proposed restricting measure calculation to Clinicians with  $\geq 50$  admissions across all cohorts.
  - CORE also proposed restricting measure calculation to Clinician Groups with  $\geq 50$  admissions across all cohorts for outpatient attribution rules, which have nearly double the number of Clinicians.
    - A TEP member asked why a cutoff of  $\geq 50$  cases is used for the HWR measure while a cutoff of  $\geq 25$  cases is used for the hip/knee complication measure.
      - CORE responded that the 25-case volume cutoff was consistent with the minimum used for hospital reporting, and that the 50-

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

case volume cutoff was determined empirically by looking at the volume of patients with just one patient and comparing with the model.

- A TEP member highlighted that it could be helpful for CORE to run a threshold analysis with a certain number of patients as well as a sensitivity analysis for the different sample sizes.
  - CORE highlighted that the version of the HWR measure that is currently used in the MIPS programs has a minimum volume of 200. CORE noted that it hopes to include Clinician or Clinician Groups with a broad distribution of patients which contributes to the higher volume cutoff.
- CORE reviewed face validity results for distribution of admission.
  - CORE noted that, in general, assigned clinician specialties are similar across all attribution rules. CORE also added that inpatient providers are more similar to each other than to outpatient and that outpatient providers are more similar to each other than to inpatient. Finally, CORE noted that inpatient providers are more likely to represent a clinically relevant specialty for the given cohort.
- CORE reviewed the “signal” results with the TEP for both Clinician and Clinician Groups. CORE noted that signal was observed two different ways. CORE noted key takeaways from the signal results:
  - Clinician variance is greater than hospital variance, outpatient Clinician variance is greater than inpatient Clinician variance, and Clinician Group variance (inpatient and outpatient) is similar to hospital variance.
  - A TEP member asked whether the results were adjusted for error. The TEP member highlighted that the results only look at signal and do not adjust for Clinician variability.
    - CORE confirmed this to be correct.
    - The TEP member followed up, highlighting that 95% of the variance is not explained. The TEP member noted that the variance is small. Also, the TEP member noted it would be helpful to see how residual variance was examined.
- CORE reviewed the overlap results with the TEP and noted that overlap is defined as how often a patient is assigned to the same Clinician or Clinician Group by two different attribution rules.
  - There is substantial overlap between Attending and Discharge Clinician.
  - The largest overlap is between Outpatient PCP and Outpatient PCP+.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- A TEP member again noted that the Discharge Clinician to the Attending comparison seemed to be slightly misleading. The TEP member noted that in many cases, there is a role for the Attending and Discharge Clinician in a multiple attribution model. The TEP member expressed wanting to revisit this. CORE noted this to be an important point.
  - CORE clarified that the goal was not to be misleading, but to find a way to use and apply a Discharge Clinician algorithm. CORE noted that the Discharge Clinician is not always the Attending; 30% of the time the Discharge Clinician is unknown. In these cases, the algorithm is applied.
- The TEP member stated that if a different rule was used along with subsequent care codes, it would show that there are more people involved in a discharge event than just the Attending in many cases.
  - CORE noted that if attribution were to be implemented at the group level and if attributed to the Attending, a quarter of the cases would be attributed to the same Clinician Group as the assigned PCP, meaning about a quarter of the time, inpatient and outpatient Clinician Groups would be the same.
- A TEP member asked whether the Clinician Group is defined by the tax ID number.
  - CORE confirmed this to be correct.
- A TEP member asked what happens when a patient primarily visits their PCP for one reason and is then admitted to the hospital for an unrelated issue.
  - CORE noted this to be a good question and responded that there will be several cases where primary physicians may not have any control over their patients returning to the hospital after discharge.
  - CORE highlighted that the TEP would have opportunity to give input on attributing to singular provider as well as an additional provider if the primary provider was an inpatient provider.
- Two TEP members discussed their thoughts on multiple attribution and attributing to an inpatient provider.
  - A TEP member expressed concerns about attributing only to an inpatient Clinician and neglecting the responsibilities of an Outpatient PCP. The TEP member noted that this was done when the readmission measure was first implemented and highlighted that the hope for teamwork and collaboration with outpatient providers, when attributing to an inpatient provider may not actually happen.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- A second TEP member shared the concerns. The TEP member advised CORE to still consider multiple attribution including the Outpatient PCP and stated that the limitations of not being able to attribute some patients to a provider does not justify discounting the rule.
- A TEP member asked whether the TEP would be asked to compare the characteristics of the inpatient and outpatient algorithms, whether the TEP should be thinking about a multiple attribution context, and whether the Attending and Discharge Clinician are mutually exclusive.
  - CORE stated that it was clear the TEP members were interested in reconsidering voting against the Attending or Discharge Clinician. CORE highlighted that multiple attribution would still be considered. CORE instructed the TEP to focus on which attribution rules could be taken off the table and which may need more assessing when voting.
- A TEP member expressed interest in the outcome timeframe (30-day readmissions). The TEP member noted that timing speaks to differential responsibility amongst Clinicians. The TEP member stated that within the first 10 days of discharge, the patient could be attributed to a single Clinician (Attending or Discharge Clinician), but between 11 and 30 days, the TEP member noted there being potential for a shared or multiple attribution model.
- A TEP member questioned why a TEP member previously was against defaulting to the Attending when a Discharge Clinician could not be identified.
  - The prior TEP member felt that Discharge Clinician was an important attribution; however, this TEP member was unsure about the way the algorithm defaulted to the Attending, felt as though that entity was not captured properly, and was interested in revisiting a default to the Clinician who billed a subsequent care code on the last day of discharge.

#### *Dyad/Multiple Attribution*

- CORE reviewed multiple attribution with the TEP.
  - Inpatient providers had wider distributions for both Clinicians and Clinician Groups.
  - Using this approach would likely involve additional refinement and vetting of the analytic method.

#### Hospital-wide Readmission Measure: Discussion

- Below are the details capturing the TEP's votes during the three polling rounds and following discussion ([Table C4](#)).

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- For the HWR measure, CORE asked TEP members to participate in an initial round of voting regarding the attribution rules presented. Five TEP members sought clarification prior to the first round of voting.
- CORE team clarified that missing values for the Attending was 30 % for the entire measure, 67% for the surgery/gynecology cohort, and varied between 14% and 30% for all other cohorts.
  - The CORE team clarified that voting would not be separated by specialty cohort, and the TEP would vote on which of the attribution rules they found to be acceptable, acceptable with reservation, or not acceptable across all specialty cohorts for the first round of voting.
  - CORE clarified that these rules are to be standalone rules for this round of voting, meaning single attribution as opposed to multiple attribution.

Table C4. HWR measure voting results (rounds 1 and 2)

Voting round	Attribution rule	TEP input: accept	TEP input: accept with reservations	TEP input: do not accept
Round 1	Attending	5 votes	8 votes	2 votes
	Discharge Clinician	5 votes	8 votes	1 vote
	Outpatient PCP	0 votes	0 votes	14 votes
	Outpatient PCP+	0 votes	0 votes	14 votes
Round 2	Inpatient/Outpatient Dyad	3 votes	7 votes	4 votes
	Multiple Inpatient Provider	2 votes	8 votes	5 votes
	Single Inpatient (Revised Discharge Clinician Definition)	2 votes	6 votes	5 votes

- The facilitator moderated a round robin for the TEP members who voted “accept with reservations” for the Attending attribution rule. Eight TEP members voted “accept with reservations” for the Attending attribution rule.
  - A TEP member stated reservations because the Attending gets assigned to a patient at the time of arrival to the hospital, however, often the Attending does not end up caring for or discharging the patient.
    - Five other TEP members agreed with the TEP member and stated they voted “accept with reservations” for the Attending attribution rule for the same reason.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- A TEP member expressed interested in knowing whether any hospitals practiced assigning the admitting provider as the Attending on record for hospitalization regardless of who the Discharge Clinician was. The TEP member noted that if this is a hospital’s policy, facilities are essentially being asked to fundamentally change how they do business.
- A TEP member noted that hospitals across the country have a variety of designations for their clinicians, including categories like “Admitting Attending” and “Discharging Attending.” The TEP member added that given the discrepancy, CMS will not have a perfect solution in identifying the accurate Attending for each patient, and that processes will need to be improved across the board.
- A TEP member noted that anytime an organization is asked to go outside of their normal workflow and practices, a few consequences come into play. The TEP member expressed that attributions should be voted on based on reality as opposed to the assumption that there will be an immediate transformative effort on the part of hospitals to change the way they have been doing business.
- A TEP member emphasized that the billing data would be much more accurate on this metric than using what a hospital assigns.
- A TEP member reacted to the instability of the Attending rule. The TEP member voted for the Attending as an independent contribution and not as the default option for the Discharge Clinician.
  - CORE confirmed that the vote for the Attending rule was meant to be viewed as a single attribution. CORE also clarified that the focus is on the Attending listed on the claim, and there is only one.
- The facilitator moderated a round robin for the TEP members who voted “accept with reservations” for the Discharge Clinician attribution rule.
- Eight TEP members voted “accept with reservations” for the Discharge Clinician attribution rule.
  - A TEP member expressed concern with perverse incentives for Clinicians, support for multiple attribution and noted that if a single Clinician is responsible for a patient’s outcome this may lead to perverse behavior. The TEP member highlighted that there must be a model that will do no harm.
  - A TEP member echoed the TEP member’s stance against single attribution. The TEP member voiced wanting to include subsequent discharge codes because of the potential of capturing more Clinicians who may potentially be impacting a patient’s discharge. The TEP member suggested a three-step process for that algorithm that would entail looking at what Clinician billed discharge codes,

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

which billed subsequent care code, and if neither is found, then defaulting to the Attending.

- A TEP member agreed with two other TEP members. The TEP member suggested having an attribution that draws upon several different characteristics that confirm the importance of an individual Clinician to the outcomes for a patient.
- A TEP member liked the TEP member's three-step process. The TEP member voiced possibly having a four-step process that would default to the Attending if all else fails.
  - Another TEP member liked the TEP member's suggestion. The TEP member noted concern with one-third of patients being defaulted to the Attending.
- A TEP member agreed with the TEP members above and noted that modeling work was done by CORE superbly. The TEP member expressed that a single attribution is not the way to go, and to move to a multiple attribution model.
  - CORE thanked the TEP for their input and noted challenges with multiple attribution and did an overview of the results presented earlier. CORE emphasized that deciding on multiple attribution would involve doing some additional refinements of the method. CORE reviewed the summary slide. CORE added that ultimately CMS will make the final decision and will put TEP input into consideration.
- CORE asked the TEP whether they were more concerned that multiple in-patient Clinicians should have this measure attributed to them or that inpatient and outpatient Clinicians should both be attributed.
  - A TEP member clarified what was being asked of the TEP.
  - A TEP member questioned how CMS would execute attributing a single patient to multiple Clinicians.
- CORE noted that multiple attribution can introduce contradictions where the same patient may make one Clinician look good and another look bad; however, CORE highlighted that it is feasible.
  - A TEP member saw the model as being able to compare Clinicians in the same field as one another for example, Orthopedic surgeon readmission rates compared to fellow orthopedic surgeons. The TEP member voiced that this acknowledges that each Clinician has a very critical role and should be accountable.
    - CORE stated that it would not be feasible to give a Clinician two different scores for the same patient because they were the

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

Attending and the Discharge Clinician. CORE highlighted that this could introduce more challenges.

- A TEP member envisioned the idea being to compare Clinicians to their “peers” and their rates being adjusted by what they are measured.
  - The TEP member recounted CMS has a concept where Clinicians would be compared to their peers.
    - A TEP member noted that the TEP member’s statement was a critical issue and noted that if two different Clinicians with two separate specialties (e.g., PCP and anesthesiologist) contributed to the same patient’s outcome, they would both get the same score. The TEP member sought more clarification.
- CORE discussed how comparison would work within the HWR measure. CORE explained that in a multiple attribution approach where a patient would be attributed to a Discharge Clinicians and an Outpatient PCP, Discharge Clinician’s (this can include a wide variety of specialties) rate would be compared to other Discharge Clinicians, but not to another Outpatient PCP.
- Two TEP members discussed Clinician comparison and measure scoring.
  - A TEP member stated that measures are currently specific to current conditions and gave an example explaining why Clinicians are in fact being compared.
  - A TEP member added that since the observed-over-expected is at the patient level, it would not necessarily matter who the Clinicians are being compared to.
    - CORE explained how that model works and noted that as the TEP member stated, the model calculates predicted and expected values. CORE highlighted that the scores reported on, can be compared across groups and explained that the challenge is when an entity receives two scores and figuring out what to do with them.
- The facilitator moderated a round robin with the TEP on proposing what would be an ideal multiple attribution.
  - A TEP member noted that there is precedence in CMS for using a specialty breakdown in comparison tool and measures. The TEP member expressed doubts to there being any barrier in going down the same path on the HWR measure. Also, the TEP member noted that designing percentage scores would be impractical, and a better approach would be making every Clinician involved in a patient’s care responsible.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- A TEP member briefly touched on how the HWR measure might work with the MIPS scoring system and noted that overall, Clinicians would be compared to others who report on this measure.
- A TEP member noted that from her experience co-chairing a national committee focused on attribution, in the case of multiple attribution, many Clinicians are unaware that they are responsible for the care of a patient. The TEP member urged the team to think about how to make Clinicians aware that they are a part of a multiple attribution team to improve quality.
- A TEP member expressed that while a multiple attribution model can be complex, it's worth working through. The TEP member noted that there is way to identify the Clinicians that are accountable for inpatient and outpatient care and hold them accountable.
  - A TEP member agreed with the TEP member. The TEP member expressed that communication between Clinicians and patients can prevent readmissions.
- A TEP member noted reservations about readmission as a quality measure and expressed that it should be a utilization measure. The TEP member stated the ideal attribution would be to attribute a patient to any Clinician charging Medicare dollars during the admission and the post-discharge care and deducting payment if the patient is readmitted in a bundled payment concept.
- A TEP member reframed the question to the TEP as, which Clinician should receive credit for keeping a complex patient from being readmitted.
- A TEP member expressed that hospitals will have perverse incentives to prevent readmission. The TEP member agreed with the concept for holding everyone accountable and urged the team to consider including post-acute care providers into the multiple attribution rule.
- A TEP member suggested keeping attribution simple by identifying one Clinician or category where Clinicians would be confident in knowing which patients they are responsible for as opposed to assigning one patient to several Clinicians.
- A TEP member suggested multiple attribution with a simple dyad model especially on the outpatient side. The TEP member supported attributing to a PCP on the outpatient side, and if unable to identify a PCP, then not attributing at all. On the inpatient side, the TEP member supported attributing to the Discharge Clinician and the Clinician with the preponderance of care.
- A TEP member suggested attributing to the discharging physician in equal parts to the patient's identified PCP.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- A TEP member expressed preferring a simplistic multiple attribution. The TEP member added that a lot of the responsibility for readmission lies with the patient to access the information needed.
- A TEP member wanted to see the Discharge Clinician and the Outpatient PCP+ combined in a multiple attribution model.
- A TEP member suggested for inpatient, attributing to the Attending, because they had some impact on the patient's outcome regarding readmission. The TEP member also stated combining this attribution with the Outpatient PCP and noted that if the patient had a major surgery, the Operator can be attributed the outcome.
- A TEP member noted that having a mechanism to be able to know who to attribute a patient to when it comes to discharging patient would be difficult to develop and implement.
- A TEP member stated that more data would be helpful when thinking about multiple attribution. The TEP member noted that it would be more worthwhile to have a greater number of Clinicians in the inpatient setting who are given accountability for the readmission as opposed to a single individual.
- A TEP member expressed the need to move away from process measures and noted that the most important facet is how physician behavior is affected. The TEP member noted that multiple attribution should focus more patient care and ensure unintended behaviors are not promoted.
- A TEP member highlighted that the shift to a multiple attribution model, shifts the construct being measured from inpatient quality of care to outpatient quality of care. The TEP member noted that it would be easier to separate inpatient care and outpatient care as opposed to combining the two into one measure with multiple attributions.
- CORE asked the TEP whether there is a preferred specific multiple or single attribution approach to be considered.
  - A TEP member was fine with multiple attribution to inpatient providers, however uncomfortable with the idea of attributing to a PCP given fragmentation of care.
- CORE gave the TEP instructions on round 2 of HWR attribution voting. Table C4 present the final votes from round 2 of TEP voting. CORE instructed the TEP to choose between three options: attribution to 1) a dyad of one inpatient and one outpatient provider, 2) multiple inpatient providers, or 2) just the Discharge Clinician (revised to include subsequent care codes).

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- A TEP member asked whether the ask of the TEP was to vote on multiple attribution strategy versus two single attribution strategies.
- A TEP member noted that the one of the concerns in the inpatient/outpatient care measure is that the outpatient measure is including all surgical procedures. The TEP member also asked whether the multiple inpatient attribution is included in the dyad.
  - CORE confirmed that both inpatient and outpatient providers would be included in the dyad.
- A TEP member asked a follow up question on whether the inpatient and outpatient measures are to be assumed as separate measures.
  - CORE confirmed that they are to be assumed as being within the same measure.
- CORE then asked the TEP to vote on the question of multiple attribution. As noted in the table below, the majority of participating TEP members favored multiple attribution for the HWR measure ([Table C5](#)).

Table C5. Multiple attribution voting results

TEP input	TEP input: essential	TEP input: appropriate but not essential	TEP input: not optimal
Number of votes	6 votes	6 votes	3 votes

- Due to lack of time, CORE asked TEP to write down any additional comments they may have concerning their vote on multiple attribution. CORE shared with the TEP their additional comments. Summary of TEP feedback are as follows:
  - One TEP member recommended changing the dyad to allow for attribution to multiple inpatient providers as well as to an outpatient provider.
  - One TEP member suggested Clinicians attest to be the managing Clinician on each day of service for attribution. This TEP member also suggested including the Operator for multiple attribution.
  - One TEP member had reservations regarding multiple inpatient providers. Specifically, on how to identify who is truly responsible, and whether there are other inpatient providers who are equally responsible.
  - One TEP member commented on pulling the post-discharge timing into the attribution: if <10 days post-discharge attribute to inpatient provider, if >10 days also attribute to outpatient provider.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- One TEP member commented on timing and the construct of the dyad. TEP member noted that if a patient is readmitted within 4 or 5 days then attribute completely to inpatient Clinician. When longer than 4 or 5 days, not to attribute to inpatient Clinician. TEP member voiced that ideally, the discharge provider would be determined by whose name is on the discharge summary and not on the code for reimbursement.
- CORE briefly discussed the simultaneous development of CMS MIPS outpatient admission measures under development that evaluate the quality of outpatient Clinicians managing chronic disease patients.
  - A TEP member noted that this context was helpful but was not swayed to having and inpatient and outpatient providers in the attribution for the HWR measure. The TEP member expressed that the focus is on how PCPs can partner with the hospital in the hand of patient care.
    - CORE highlighted that in the proposed outpatient measure, the PCP is still responsible for preventing readmissions because if a readmission occurs more than 10 days after the hospitalization, it is counted as an admission in that measure.
    - A TEP member stated that this clarification was helpful.
  - A TEP member stated the importance of understanding what is being measured. The TEP member noted that blurring the boundaries between quality of inpatient and outpatient care can have a different take on attribution. The TEP member also expressed making sure the construct is accurate to prevent complications in the future.
  - A TEP member asked for reactions from another TEP member. The TEP member thought whether a patient is readmitted or not was most important. The TEP member stated that the idea of inpatient/outpatient dyad is important because both sides play a role.
    - The TEP member responded that the model measures what happened on the inpatient side that led to the patient's outcome, and then what happened on the outpatient side that led to the same patient's outcome, but that therefor the model measures two separate pieces of the same outcome differently.
  - A TEP member commented regarding the attestation recommendation to support the multiple inpatient providers approach. The TEP member noted that currently MIPS participants are reporting improvement activities by completing

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

attestations and the idea is to permit every one of the managing physicians during an inpatient stay to participate in broad quality reporting.

- A TEP member commented that the multiple inpatient providers and the inpatient/outpatient dyad are not fundamentally different models. The TEP member highlighted that they are just different gradations of the same model.
- After multiple rounds of discussion and voting, CORE asked TEP members to cast a final vote for one of four final attribution rules for the HWR measure. 14 members participating in the meeting voted as follows:
  - Attribute to single inpatient provider (Discharge Clinician) and single outpatient provider (Outpatient PCP or Outpatient PCP+).
    - Three TEP members supported this attribution rule.
  - Attribute to multiple inpatient providers (Discharge Clinician, possibly Plurality of Care, Admitting, and Operator).
    - Two TEP members supported this attribution rule.
  - Attribute to multiple inpatient providers (Discharge Clinician, possibly Plurality of Care, Admitting, and Operator) and a single outpatient provider (Outpatient PCP or Outpatient PCP+).
    - Seven TEP members supported this attribution rule.
  - Attribute to single inpatient provider (Discharge Clinician).
    - Two TEP members supported this attribution rule.

#### Accounting for Hospital Quality

- CORE provided background on one of the key principles guiding re-specification: Clinician quality reflects hospital quality. CORE summarized:
  - The conceptual rationale for the principle has precedent in that hospital measures reflect contributions from clinical staff and community. The hospital measures do not account for Clinician or community quality. Similarly, Clinician and Clinician Group performance may also reflect hospital quality and other factors. When measuring Clinicians and Clinician Groups, these measures would not account for hospital quality.
  - From the patient perspective, it is reasonable to not separate Clinician quality from hospital quality since it is important for patients to know how a Clinician or Clinician Group performs in their practice setting.
  - Clinician and Clinician Groups are best able to identify opportunities for improvement and holding them responsible for the hospital component of

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

patient outcomes gives them incentive to identify opportunities for improvement.

- Previously, many TEP members supported the principle. However, some TEP members thought CORE should further examine measurement approaches that account for hospital quality when measuring Clinician quality.
- CMS supported this principle because it aligns with programmatic goals, aligns with existing hospital measures, is patient-centered.
- It is methodologically challenging to account for hospital performance, since Clinicians practice at multiple hospitals, and there is no existing measure of ‘pure’ hospital quality.
- CORE noted CORE reviewed this issue with CMS and provided an overview of analyses CORE performed in response to prior TEP feedback.
  - CORE examined the issue by looking at what happened when Clinician measures adjusted for hospital quality.
  - Specifically, CORE explored the change in model variance and observed how adjusting for CMS’s Hospital Overall Star Rating category changed the performance quintile rank for Clinicians and Clinician Groups. In these analyses, CORE examined the Attending attribution rule for both the HKC and HWR measures as an example.
    - CMS’s Overall Hospital Star Rating assigns a hospital score 1-5 stars based on 57 quality measures across seven care domains: mortality, safety, readmission, patient experience, care effectiveness, care timeliness, efficient use of imaging.
    - The hip/knee complication and HWR measures are two of the 57 measures included in the calculation of CMS’s Overall Hospital Star Rating.
- CORE summarized results of the analyses.
  - For the hip/knee complication measure, hospital quality explains approximately one-third of the variation across Clinicians (variance for Clinician model: 0.24, Clinician with Overall Hospital Star Rating model: 0.18, original hospital-level measure model: 0.10).
    - A TEP member asked whether the three models were nested together or independent from one another.
      - CORE responded that the Clinician and Clinician with Star Rating models were nested.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*



- Relatively few Clinicians were affected by adding hospital quality to the risk model.
    - Clinician Groups are slightly more affected by accounting for hospital quality.
    - As expected, for those affected, some improve and some worsen.
    - Whether to adjust for hospital quality when measuring Clinician quality is a conceptual, not empirical decision.
  - CORE noted that consistent with its hospital measures, CMS will not risk adjust for hospital quality.
- A few TEP members had questions.
  - One TEP member if CORE’s analysis included Clinicians who worked at multiple institutions. The TEP member also asked if CORE looked at stability over the 3-year measurement period for the hip/knee complication measure (e.g., where a surgeon performed procedures); and a second TEP member later seconded considering this.
    - CORE clarified that adjustment occurred at the patient-level. In response to whether CORE looked at stability over the 3-year measurement period, CORE clarified that the hip/knee complication measure is reported at the hospital-level using 3 years of data, and the HWR measure is reported at the hospital-level using 1 year of data.
    - CORE added examining variation in Clinician performance over time to the parking lot list.
  - One TEP member appreciated CORE’s efforts and brought up a few points for CORE’s consideration:
    - Hospital quality is a function of a Clinician quality.
    - In the TEP member’s calculation, 15.5% of Clinicians moved one or more quartiles in either direction. The TEP member suggested monitoring this over time.
    - The TEP member also suggested separating hospitals with small and large numbers of Clinicians by patient sample to understand the impact on Clinicians with different case volumes.
  - One TEP member recommended plotting the estimates with error bars to see how these are distributed across quintiles.
  - In response to one TEP member who asked how variation in physician performance over time would be reported, CORE clarified how the measures will

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

be reported has not been decided on by CMS. CORE added that for the hospital-level measures, CMS currently reports the measures as point estimates with a 95% uncertainty estimate. The uncertainty allows the shifting described by the TEP member and acknowledges that performance categorization may not statistically be different from 1 year to the next even though the point estimate changes.

### Wrap-up

- CORE thanked TEP members for their participation and provided an overview of the project's next steps. In brief, CORE will:
  - Meet with the Clinical Workgroup regarding hip/knee complication measure re-specification.
  - Consider the TEP's input from the meeting.
  - Implement the attribution rule for each measure and fully test each measure.
  - Obtain public input (opportunity for additional TEP input).
  - Reconnect with the TEP about final specifications, testing, and face validity (opportunity for TEP input).
  - Finalize the measures' specifications.
- CORE also thanked the TEP members for their thoughtful participation. CORE confirmed CORE will complete measure testing and obtain public input on fully tested measures before measure implementation.
- The facilitator opened the floor for any questions and/or comments from the TEP members.
  - A TEP member noted the group made a lot of progress during the meeting. The TEP member noted the discussion, while very hard, was very important. The TEP member hoped CORE would provide the feedback to CMS – specifically the questions on how to re-specify the HWR measure given the limitations of the data sources and desire to capture meaningful experience both for the Clinicians and for patients.
  - A TEP member was thoroughly impressed with the preparation and thinking in the room. The TEP member also thought this will produce something good.
  - A TEP member provided kudos to CORE for tackling this work and echoed the thoughtfulness of the group, which led to him switching between various options.
  - A TEP member thanked the CORE team and expressed enjoyment working with CORE and appreciated CORE's work. The TEP member noted that none of this

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

work would be relevant if it does not improve patient outcomes and stated the TEP remember that that these metrics have been useful to help drive performance improvement.

- A TEP member echoed the prior comment(s).
- A TEP member applauded CORE. The TEP member underscored how important it is to work in multidisciplinary teams and shared appreciation for being able to work in these kinds of multidisciplinary teams.
- A TEP member thanked everybody. The TEP member referred to the discussion about stability and error bars, and the importance of keeping the topic front-and-center. The TEP member stated that there are concerns when one finds there is no statistical difference between a provider that is in the 1% vs 99%, yet, there are some real consequences in payments.
- A TEP member noted the meeting was a fascinating process in terms of information and knowledge building that probably does not have a correct answer. The TEP member agreed with another TEP member's comments from earlier in the day that we are creating a measure that in an ideal would work better in a bundled payment world.
- A TEP member shared it was a privilege to serve on the TEP and appreciated the opportunity. The TEP member stated it is was obvious that the group was very focused on efforts to improve quality of care, which can be hard to keep in mind when trying to explain what MACRA means and reporting requirements. The TEP member stated it would be nice if we can truly have these efforts be associated with improvements of care and asked for CMS to provide clarity on how it envisions shared or team-based accountability to look in the future of measure development.
- A TEP member thanked CORE for the solid preparatory work and underscored the value of in-person meetings. The TEP member thanked fellow TEP members for their thoughtful comments and noted their fluidity during the meeting. Also, the TEP member stated that what the TEP is trying to do will help break down the strong silos in the healthcare system.
- A TEP member stated it was delightful to be involved with a group of thoughtful caring professionals and was thankful for participating.
- A TEP member stated the meeting was engaging and thanked CORE for being incredibly well-prepared and keying up the discussions very well. The TEP member also thanked the facilitator. The TEP member stated hoped at the end

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

of the day is that CORE and the TEP can contribute to the development of a measure that will make things better for patients.

- The facilitator thanked the TEP members for their participation, attentiveness, thoughtfulness, respectfulness, keeping the patient in mind, and keeping everybody involved in the conversation. The facilitator thanked CORE for presenting with openness and keeping everyone involved, and closed the meeting.

## **Detailed Summary of Technical Expert Panel Meeting 4 (October 1, 2018)**

### Welcoming Remarks

- CORE welcomed participants to the TEP 4 for the development of inpatient outcome measures for MIPS. Of the 19 total TEP members, 12 attended the meeting.
  - CORE noted that today's meeting will be recorded for the purposes of note-taking and to share with TEP members who may not be joining the meeting.
  - CORE reminded the TEP members of the confidentiality agreement.
    - TEP members can disclose they are participating on the TEP but cannot discuss details until they are made public.
  - CORE will be drafting a summary of today's discussion to be posted publicly during the public comment period held later this year.
- CORE reviewed the agenda which includes an introduction to the project, the hip/knee complication measure and its background, the final attribution, measure specifications, the measure results and testing, and finally the TEP discussion. The same agenda will be used for the HWR measure, and will focus on the final attribution model, the measure specifications, risk-adjustment approach, results and testing, and finally the TEP discussion; all concluding with next steps.

### Recap of Acronyms and Terms

- CORE provided an overview of the acronyms and terms included in the meeting materials.
  - The main terms were hospital wide-readmission measure which is referred to as the HWR measure, and the hip/knee complications measure which is referred to as the HKC measure.
- CORE noted eligible clinicians as will be referred to as ECs, and eligible clinician groups as EC Groups.

### Project Review and Status

- CORE gave an overview of the project and the meeting goals which were to discuss the development of two measures, the HWR and the HKC measures, as well as the respecification of each from the hospital-level to the clinician and clinician group level.
- CORE thanked the TEP members for their input during this process.
- CORE reviewed the timeline for the project, noting that CORE anticipates the development of these measures to be completed no later than March 2019.
- The project is currently in the mid-to-late stages, and the focus is now on the testing results.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- The next main items will be obtaining additional stakeholder input on measure development.
- CORE will be engaging with a group convened by CMS, the Quality Payment Program Clinician Champions, comprised of frontline primary care providers who advise CMS on the implementation of MIPS measures.
- CORE also mentioned that CORE spoke with an orthopedic society clinical workgroup comprised of representatives from key orthopedic professional societies for the HKC measure.
  - Updates will be provided in the HKC measure presentation.
- CORE will be hosting a public comment period in which the measure specifications and testing results will be posted; TEP members will be informed when public comments begins.
- CORE will be hosting two listening sessions during the public comment period to solicit additional public feedback on the proposed measure specifications.
- CORE reviewed the TEP input for TEP meeting 3; CORE heard TEP input on the set of proposed attribution rules for both measures.
  - For the HWR measure, the TEP previously suggested an additional attribution rule capturing the provider who provided the most care during the inpatient stay and supported multiple attribution for the hospital-wide readmission measure.
  - CORE explored the final options ranked by the TEP and arrived at a solution consistent with the preferences for attribution; this will be presented today.
- In response to TEP Meeting 3 input, CORE:
  - Implemented the billing surgeon attribution algorithm for the HKC measure.
  - Constructed final measure results and performed measure testing for both measures.
  - Implemented an attribution rule for the HWR measure to include a discharge clinician, outpatient primary care provider, and primary inpatient care clinician.
- CORE noted goals for today.
  - For the HKC measure: review the specifications and testing results, obtain TEP input on those results, and prepare TEP members to complete a survey that will assess the face validity of the measure after the meeting.
  - For the HWR measure: review the final set of attribution rules, the measurement approach and the testing results, obtain TEP input, and ensure that TEP members are prepared to take a follow-up survey on face validity.
  - CORE described a survey to evaluate both measures through a series of questions which will be distributed via email after this meeting to all TEP members. They will have one week to complete the survey.
- CORE paused for questions.
- A TEP member asked if NQF has endorsed a clinician-level readmission measure yet.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE responded that they are not aware of any clinician-level readmission measure that has gone through NQF.

### Measure Background: Hip/Knee Complication Measure

- CORE provided a background on the MIPS HKC measure.
  - The measure evaluates the quality of care for patients receiving elective hip or knee replacement (THA and TKA) procedures.
  - This measure contributes to:
    - Better informing consumers about care quality
    - Incentivizing efforts to prevent complications
    - Increasing healthcare quality transparency
- CORE noted that the outcome of the measure includes mortality, medical and surgical complications of surgery.
- CORE discussed the final attribution rule.
  - This is the same as presented in the previous meeting, in which this rule received very strong support.
  - The Billing Surgeon is identified using clinician billing claims.
  - This rule prioritizes assigning the outcome to the eligible clinician (EC) who bills for the procedure.
  - If no Billing Surgeon is identified, this defaults to the Operator on the hospital claim.
- CORE presented the cohort.
  - The attribution was implemented using several samples.
  - There were almost 8,000 ECs, and about 3,500 EC Groups.
  - The median number of cases was 69 for ECs and 109 for EC Groups.
  - The risk adjustment model included the same set of risk factors
  - CORE constructed the risk-standardized complication rate for all clinician and clinician groups.
- CORE discussed the EC-level RSCRs.
  - For the 8,000 eligible clinicians, CORE applied a minimum volume requirement of at least 25 admissions per EC; this is consistent with the hospital-level measure and was confirmed in empirical reliability testing below.
  - The overall range of RSCRs was 1.2-7.2%.
  - The mean is 2.8 and the median is similar; there is a symmetric distribution.
  - The interquartile range was 2.7% (2.4% to 3.2%); 75% of clinicians were around the median.
- CORE reviewed the EC group-level RSCRs.
  - Using the same 25 minimum case volume requirement per EC Group, the mean number of admission per EC Group was 250.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- EC group-level RCSRs have a narrower distribution than the EC-level rates, as expected when the same number of patients are put into fewer numbers of groups; there is a range of 1.4 to 5.7%.
- The mean and median are both 2.8%.
- The interquartile range is a little smaller than it was for the clinicians at 2.8% (2.5% to 3.1%).
- CORE reviewed a table displaying statistical outliers.
  - For this measure, 95% confidence intervals were constructed for each of the risk-standardized complication rates.
  - Those confidence intervals were used to classify the EC and EC Groups as either better, worse, or no different than the national rate according to their placement in the confidence interval.
- A TEP member asked how this information is going to be specifically used by CMS, and if clinicians will be penalized for performing worse than the national rate.
  - CORE responded that CMS has not indicated how the measure will be implemented. It is expected that if this measure is adopted by CMS for MIPS, it would be used to affect reimbursement.
  - CORE noted they do not know if CMS would use the outlier status or some other rule; however, outlier status is presented here.
  - CORE further explained that there are measures already in MIPS that use alternative approaches for assigning payments or integrating into quality scores for defining payment. CORE explained that this data was presented not to represent how CMS will use the measures, but to reflect how the hospital-level measure is portrayed on *Hospital Compare*.
  - CORE highlighted they want to be transparent on information for eligible clinician level measures, and that Dr. Lein Han, CORE's representative from CMS is listening in on today's conversation and that CMS will review the summary reports, ensuring that TEP questions related to implementation will be heard by CMS.
- A TEP member asked if, for every MIPS measure, a performance threshold is determined each year, and if scoring for the individual measure is based on comparing to that performance threshold.
  - CORE responded that for a large proportion of measures this is the case, particularly for process measures; and continued that CMS will consider the implementation of all measures moving forward. CORE noted that it does not take a position on this because this is not included in the scope of work for measure development.
  - The TEP member clarified that for MIPS, ECs and EC Groups are placed into deciles based on their performance; each decile range to corresponds to a

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

number of points. An overall score is then calculated based on performance across measures.

- CORE remarked that the above statement is correct; this is currently how the All-Cause Readmission (ACR) measure is implemented in MIPS. CORE, again, noted that it does not know how this measure will be implemented or whether it will be implemented identically to the existing measure specifications.
- A TEP member commented that in thinking about the bureaucratic investment into creating measures and scoring measures, that they want to make sure that measures have impact on those providers who are worse than national rate. They asked if CORE should examine what percentage of clinicians for other measures perform worse than the national rate, and if this should inform how the measure is evaluated.
  - CORE noted it does not have information about other measures in MIPS in terms of their distribution, and therefore comparisons cannot be made. CORE also noted that there are many different measures that are implemented both in public reporting and payment; some approaches incorporate statistical significance, and some have point estimates without accommodating estimate uncertainty.
- CORE reviewed a table presenting the model performance.
  - Analyses were performed on three samples
    - Two years of data, April 2013-March 2015 were randomly divided in to two approximately equal samples Development Sample (302,561 admissions) and Validation Sample (302,519 admissions).
    - There was a third Temporal Validation Sample consisting of data from April 2015-March 2017 (653,598).
  - For model testing, CORE estimated the risk adjustment model on the first sample and compared the results to the second sample. Results close to (0, 1) indicate good calibration.
    - When comparing development with validation sample, the calibration was close to (0,1).
    - When comparing development with temporal validation sample, calibration was close to (0, 1).
  - The discrimination referred to how the predicted rate of the outcome compared with the observed rate among groups in the lowest decile and the highest decile.
    - The model discriminated between low-risk patients and higher-risk patients.
  - The c-statistic or the area under the receiver operating curve was 0.65 in all three samples, which was very similar to what has been observed for hospital-level risk models.
- CORE reviewed the calibration plots for the development sample.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE grouped the predicted probability of all patients in the sample into deciles, which should be similar to the observed range of probabilities.
- The model was well-calibrated and will predict outcomes at the low and high end.
- The predicted and observed risk of the outcome were very similar by decile, similar to the hospital models.
- A TEP member asked how the prediction model is calculated and whether it is risk-adjusted.
  - CORE responded that the model includes all risk factors, but does not include the random effect of the provider.
  - It is not adjusted for ECs or the EC Group effects, but is rather is simply the patient level risk model.
- CORE discussed the test-retest reliability.
  - This was calculated by splitting the assigned patients to EC and EC Groups randomly in half (for example, if an EC has 50 cases attributed, we randomly select 25 patients to each group), then estimate the measure separately, using the two samples. Results are then compared across all the ECs and EC Groups.
  - If the measure is capturing a true underlying attribute of the clinician, then the measure results from both samples should be similar.
  - To measure signals of quality, CORE measured each clinician using half their patients to calculate an ICC [2,1], which is appropriate for measuring test-retest reliability.
  - Because we used two years of data and we expected the HKC measure to use three years (as the hospital-level measure does), we can adjust that to get the bottom row reliability giving 0.35 and 0.47, for ECs and EC Groups, respectively.
    - This was very similar to what is seen for the test-retest reliability at the hospital level, which is typically 0.4 or greater.
- A TEP member asked if this is split half reliability because this is not applying test-retest over time. TEP members had some confusion given that two years of combined data were used rather than over time. The TEP member noted split-half reliability was calculated using the aggregate of two years and splitting the sample in half.
  - CORE responded that this is correct, as this measure is designed to measure quality over three years, like the hospital level measure. CORE added that the normal measurement period is three years, and that two years of data were used which is a smaller sample than normal. CORE noted that this is split to get the Intra-class Correlation Coefficients (ICC) and that it is adjusted to account for the fact that the data is for three years and has twice as many patients.
  - The TEP member asked if this was split by year, rather than test by time. The member continued to explain that this is split-half reliability, technically. The member noted this could be included in other discussions.
  - CORE acknowledged this comment about terminology.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE reviewed the signal-to-noise reliability or signal-to-noise ratio; and that it is examining how the variance between ECs or EC Groups compares to the variance within the EC or EC group. CORE noted:
  - Three full years of data were used for this analysis.
  - This captures a sense of where the variation is in the outcome; specifically, whether it is at the EC or EC group level or is it truly at the patient level. To the extent that it's at the measurement level, EC or EC group, then there is higher signal to noise reliability.
  - The average using three full years of data was near 0.8 for ECs and EC Groups.
  - The range was approximately 0.6 to 1.0 for ECs and 0.46 to 1.0 for EC Groups, to what was observed for the hospitals.
- A TEP member asked for an explanation for why in one test, three full years of data are used, while in the earlier test, CORE used split samples, using only two years of data.
  - CORE responded that for the development and validation samples, two years of data each were used for that process. CORE provided additional clarification noting that the split sample used four years of data and then split this into half, with each representing two years.
  - CORE further explained they did not use only two years of data, but rather equivalent volume as if there were two years of data. CORE noted that they did not want to use three years of data and split it into groups and then have only the equivalent volume of a year and a half of cases per clinician. CORE added some data to the first reliability testing, and then, for the second reliability testing, used only three years of data, thinking that three full years of data was sufficient. CORE added that this is how the measure is reported at the hospital level, and so no additional data were added into the analysis.
  - The TEP member asked for further clarification and asked why the same data sample was not used for both types of testing.
  - CORE noted that for the test-retest reliability to have split samples that were each equal to three years, six full years of data would be needed, which CORE did not have.
    - CORE used four years of data and split it in half.
    - For the signal to noise ratio, six years of data were not needed; just three full years of data.
    - The information was organized not for statistical reasons but due to data availability.
- A TEP member asked if there was no option of three full years of data for test-retest reliability.
  - CORE responded that this is correct, to test-retest reliability includes three full years, this would have to start with six full years of data and split it in half.
  - CORE explained that to run the top reliability test, for every EC, all patients must be divided into two equal groups. Thus, each EC has two measure

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

results calculated and then comparisons are made between the two measures results. CORE added that this is not a question of the number of years, but the volume because the fewer patients at a clinician level, the more unstable the measure results are. CORE continued to note that even with four years of data, there were still fewer cases per clinician, leading to slightly lower reliability tests. CORE highlighted that the signal-to-noise provides a wider range of higher reliability and explained that the top method is trying to calculate two scores for every clinician, and in that way, uses only half of the results in any one given measure score calculation. CORE noted that this needed more data, and while it says two years, we used four, split them into two groups, so the volume was the equivalent of two years of data.

- The TEP member was satisfied with this explanation, reiterating that this is two years of data that is derived really from four years of data.
- CORE thanked everyone for asking questions and encouraged TEP members to ask for clarifications.
- CORE reviewed the summary of the results.
  - The risk-standardized complication rates do vary meaningfully for ECs and EC Groups.
  - This model is consistent with CMS's NQF-endorsed hospital-level measures.
  - The reliability is moderate at minimum, consistent with other measures, meaning that it tended to be moderate or above and is consistent with hospital-level measures.
  - CORE asked for the TEP members thoughts on the measure specification, and if this measure is valid for evaluating clinician and clinician performance.
- A TEP member noted that the in the presentation, there were data on reliability, but not on validity and suggested to change the term used. They asked if this is a reliable method for assessing clinician performance. They also asked if the adjustment moved the needle on the ICCs that were provided, which would raise questions about what is included when adjusting. The member noted that this might resonate as important to some stakeholders.
  - CORE responded they are depending on TEP members to provide some insight into validity and asked for clarification on which ICC is being referred to.
  - The TEP member explained that in the split half reliability presentation, the raw ICC for eligible clinicians is 0.22, and then the adjusted ICC is 0.35.
  - CORE discussed that the adjustment is to account for the fact that we had two years of data instead of three years in each sample; it is sample size adjustment.
  - The TEP member responded that it would be important to clarify if CORE is asking TEP members to talk about how accurate these are from the face validity standpoint; because it seems that CORE is empirically testing for reliability.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE responded that the data provided are not on validity. CORE added that in evaluating reliability we were thinking not only of the reliability table, but also the attribution rule being used, the results received, the variability, and whether the measure has face validity.
- CORE noted that CORE has met with representatives from the four major orthopedic societies – the American Academy of Hip and Knee Surgeons, the American Academy of Orthopedic Surgeons, the Hip Society, and the Knee Society. CORE added that each contributed a representative to a clinical workgroup that has reviewed the specifications and the testing and supported the attribution to the billing surgeon and the other aspects of the measure in this presentation.
  - Their feedback was to follow up on social risk for an elective procedure and look at a physician CPT code to ensure that the denominator or the cohort definition, which is intending to remove non-elective or revision procedures, is as nuanced as possible.
  - CORE is investigating that aspect, but it has a relatively small impact.

#### Overview of TEP Feedback

- CORE asked if there were any thoughts on the proposed specifications, and if TEP members considered this measure a valid tool for evaluating EC and EC Group performance.
- A TEP member noted that validity cannot be determined until plans for implementation are announced. The member added that this could be circumstantial based on the way it is going to be used in practice.
- Another TEP member commented that the face validity is strong and said that if the process going forward is like that of the hospital measure, it would be presumed that the follow-up plan is more validity testing after assessment of face validity from the TEP.
  - CORE responded that they will consider how to perform additional testing.
  - CORE commented that the original hospital HKC measure went through medical record review to validate the complication definition, and that the measure has been through NQF endorsement, and its own technical expert panel. It has also been in use with a chart-abstracted validation of the outcome.
  - CORE noted that when they raised this with the Clinical Workgroup consisting of members of the different orthopedic societies and an outside consultant, who works with CORE closely on orthopedic measure development, they supported the measure, noting it was ‘as good as it’s gonna get [with claims data]’.
  - A TEP member agreed that knowing how the RSCR would be converted into a score would be helpful in knowing whether this is good tool for evaluating clinician performance. The member noted that looking at the table for both EC and the EC Groups, there is a spread, and certainly some performance differences. For the better, no different, or worse than the national rate, if that is the analysis for scoring they question the worth of the metrics. The member

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

commented that policy and implementation implications will inform how useful the measure is.

- CORE further elaborated that this is the distribution. CORE added that the current HWR measure used in the MIPS program is implemented with a decile approach, and also that the number of outliers for this measure is like the hospital-level HKC measure, shown on *Hospital Compare*.
- CORE noted that the way the hospital-level measure is used in other payment programs is different. CORE added that the distribution of performance at the EC level and a similar distribution at EC Group level, there is a similar distribution at hospitals. CORE highlighted that although the hospital measure has been implemented longer, the distribution is slightly narrowing in response to measurement.
- A TEP member commented that it would be helpful to have a regression slide to see how much variation overlap there is. They suggested that clinician rates could be plotted on the x-axis, and the standard error on the y-axis, thus one can check the overlap to determine whether there is meaningful variation at the high and low end, and if there is noise in the outlier groups. This might be more helpful than a histogram which does not include the error rates.
  - CORE commented that this is a good point, though this could be challenging due to the thousands of clinicians included in the sample. However, this feedback may be considered in upcoming work.
  - The TEP member further explained that this could be narrowed by region or other factors. While it makes sense not to do this for individual clinicians, within versus between hospital variation may be more compelling if presented this way.
  - CORE thanked the TEP members for their input on the HKC measure.

#### Review of Measure: Hospital-Wide Readmission Measure

- CORE provided a review of the HWR measure.
  - CORE reviewed the measure background for the HWR measure. The measure:
    - Evaluates the quality of care for hospitalized patients by capturing unplanned readmissions;
    - Includes most (hospital-wide) conditions and procedures;
    - Intended to incentivize readmission reduction efforts;
    - Publicly report risk-adjusted rates; and
    - Was originally developed as a hospital-level measure—currently reported in the MIPS quality measure set. (all-cause readmission)
  - CORE noted additional measure background details can be found in the Appendix.
  - CORE reviewed the HWR specialty cohort assignment, noting each index admission is assigned to one of five distinct specialty cohorts according to

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

principal discharge diagnosis and/or major procedure codes. The distinct subcohorts, also known as “specialty cohorts” are:

- Surgical/gynecology
  - Cardiorespiratory
  - Cardiovascular
  - Neurology
  - Medicine
- CORE clarified that these are not determined by the specialty of the provider.
  - CORE noted the goal of using subcohorts is to improve risk adjustment and usability —patients in each subcohort are more similar with similar readmission rates.

#### Final Attribution Specification: Hospital-wide Readmission Measure

- CORE reviewed the final attribution specification, noting this was based on TEP rankings and discussions, internal discussions, and consultations with CMS.
  - CORE added the final attribution specification was a multiple attribution that included Discharge Clinician, Outpatient Primary Care Provider (outpatient PCP), and Primary Inpatient Care Provider.
  - CORE described the Discharge Clinician, initially defined as the EC that files the last discharge procedure with the discharge procedure codes of either 99238 or 99239.
    - CORE further explained that based on TEP input, if there is no discharge procedure on file, the Discharge Clinician is identified using the last “subsequent care code” if it was filed for care during the last three days of the inpatient stay. Additionally, the outcome will be assigned to the EC appearing on the relevant claim.
  - CORE presented the Outpatient PCP, noting this included the EC that files the plurality of primary care claims for the patient during the 365 days prior to the admission date. CORE added that this attribution is unchanged from the attribution considered and endorsed by the TEP previously. CORE noted that this differs from the attribution used by the current MIPS HWR measure in that it uses 365 days prior to admission in place of current calendar year.
  - CORE presented the Primary Inpatient Care Provider, which is a new attribution based on TEP input. It is the Eligible Clinician that files the plurality of charges for the patient during their inpatient stay.
    - This attribution rule was examined using charges versus number of claims; both approaches only counted “patient-facing” charges/claims. For four of five cohorts, both approaches gave very similar results, however, in the surgical cohort the plurality of charges identified mostly surgical specialties and plurality of claims more often identified other non-surgical specialties. Thus, we adopted plurality of charges as uniform approach across specialty cohorts.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE asked for feedback on the final attribution specification: multiple attribution (Discharge Clinician, Outpatient PCP, and Primary Inpatient Care Provider).
  - One TEP member noted the methodology makes sense, adding that they approve having a uniform approach across the specialty cohorts, within the Plurality Inpatient Care Provider attribution, if it does not adversely impact the other specialty cohorts.
  - One TEP member noted concern with the Plurality Inpatient Care Provider attribution, that a surgical procedure would not be attributed to the surgeon but to a secondary individual with less control over who was referred for surgery. The TEP member expressed apprehension with not including a surgeon attribution.
    - CORE clarified that the goal is identify the highest billing clinician, which for the Surgical Cohort is most often the surgeon.
  - A TEP member further inquired if the uniform approach, for the Plurality Inpatient Care Provider attribution, includes the Surgical Cohort.
    - CORE responded that the specialties include the five subcohorts.
    - CORE clarified that there are two ways the Plurality Inpatient Care Provider can be identified. CORE explained that in general, surgeons bill for the surgery they perform (which is usually a large charge), but not for every time they see the patient in the hospital. In contrast, other specialties, such as rheumatologists, bill for each consultation or patient encounter. If the claims approach is used, the rheumatologist or other non-surgical provider would most often be attributed for surgical patients, but if the charges approach is used, the surgeon would most often be attributed. CORE noted that the charges approach allows for the right person to be attributed.
  - A TEP member asked if surgery charges, where a surgeon is involved in the procedure, will be attributed to the surgeon and then attributed to other classifications.
    - CORE requested clarification, asking if this is for attribution or for the way patients are assigned to specialty cohorts.
      - The TEP member responded for assignment to specialty cohorts.
      - CORE clarified that the first check determines if patients have a surgical procedure, noting they are either assigned to the Surgical Cohort or assigned to one of the other four subcohorts.
        - The TEP member thanked CORE, confirming that was his understanding.
    - A TEP member acknowledged the explanation, adding if there is no surgeon then it would go to the other non-surgical specialties.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE noted this was accurate for assigning the cohorts.
- A TEP member suggested changing the word plurality to the greatest proportion of charges to avoid confusion.
  - CORE agreed and acknowledged the useful revision to the language.
- A TEP member asked if the same patient could count against the multiple attribution and the hospital-wide readmission measure for a total of four times against a hospital.
  - CORE responded that it will count only once against the hospital and then up to three times against the different ECs to which the patient’s outcome could be attributed.
    - A TEP member expressed concern with this methodology, as the same patient will count multiple times.
      - CORE responded that previous TEP consensus focused on the importance of capturing more than one inpatient provider and the influence of outpatient providers. CORE recognized the tradeoffs between methodologic issues and TEP feedback on multiple attribution.
    - A TEP member added that this speaks to new level of scrutiny of reporting, where hospitals must examine how they report to the Quality Payment Program to prevent negative repercussions. The TEP member mentioned a hospital could be ‘dinged’ multiple times if there is separate reporting and could be affected only once if everything is done under a single hospital TIN.
- One TEP member provided an example of a hospital inpatient stay that included five different hospitalists, noting the initial EC went on vacation, and asked if, in this scenario, that EC would be assigned to the patient.
  - CORE responded that the first clinician would be attributed, as they billed the most charges, and the second clinician attributed would be the identified as the Discharging Clinician.

Measure Entities: Hospital-wide Readmission Measure

- CORE discussed the implication of the Multiple Attribution, the same EC may have some patients attributed because they are the Discharge Clinician, some because they are the Primary Inpatient Care Provider, and some because they are the Outpatient PCP. CORE further noted that these are not distinguished, adding that the EC uses all patients attributed, regardless of why they are attributed. As a result, the final measure result applies to a “Unique Eligible Clinician” or a “Unique Eligible Clinician Group”.

Risk-adjustment Approach: Hospital-wide Readmission Measure

- CORE reviewed the risk adjustment approach for the HWR measure.
  - CORE noted the risk variables were adopted from the hospital-level HWR measure as patients’ risk should be the same regardless of attribution, adding

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

that the risk-adjustment approach used by the original hospital measure (which models the quality effect directly) cannot be adopted because patients can be assigned to multiple ECs or EC Groups. At the prior TEP, CORE presented an alternative method that creates a score for each entity, then “adjusts” these for between-provider variation.

- CORE noted that instead of using mixed-effects models to estimate EC or EC Group effect directly, CORE used fixed effects models to construct standardized readmission ratios (SRRs) for each cohort and applies a post-estimation method to adjust these for between provider variation. These adjusted SRRs are then combined across cohorts to produce a single RARR. CORE added that this method has been used in the results that follow, adapting related analyses (such as reliability) to this new method.

#### Measure Results: Hospital-wide Readmission Measure

- CORE reviewed the EC measure results for fewer than 25 admissions.
  - CORE highlighted that the percentage of admissions in the Discharge Clinician, Outpatient PCP, and Primary Inpatient Care Provider with at least 25 patients were 80, 71, and 72, respectively. CORE further added that 96 percent had a Unique TIN/NPIs, with a median of 52 patients.
- CORE reviewed the EC Group measure results for fewer than 25 admissions.
  - CORE noted that 99 percent of patients were assigned to either the Discharge Clinician, Outpatient PCP, or the Primary Inpatient Care Provider. The median was 73 patients with 131,000 Eligible Clinician Groups and 56,000 Eligible Clinician Groups with fewer than 25 admissions.
  - A TEP member asked if an EC Group with a Discharge Clinician and a Primary Inpatient Care Provider assigned to the same patient would be counted twice against the group.
    - CORE responded that a decision has not been made whether this measure will be an EC or EC Group measure.
    - CORE noted that once a decision has been made, a score for the ECs or EC Groups will be assigned, noting that EC’s scores will not be combined to form the EC Group’s score.
- CORE reviewed the specialty cohort results at the 25-admission cutoff. CORE highlighted the number of entities by number of specialty cohorts attributed, adding that percent of EC and EC Groups with patients from all five specialty cohorts were approximately 70% and 80%, respectively.
- CORE reviewed the unadjusted rates results for the ECs across the five subcohorts.
  - CORE noted the mean percentage for the unadjusted rates within the Cardio-respiratory, Cardio-vascular, Medicine, Neurology, and Surgical cohorts were 17.8%, 14.0%, 15.0%, 12.7%, and 12.7%, respectively.
- CORE reviewed the unadjusted rates results for the Eligible Clinicians Groups.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE presented the mean percentage for the unadjusted rates within the Cardio-respiratory, Cardio-vascular, Medicine, Neurology, and Surgical cohorts were 18.0%, 14%, 14.9%, 12.8%, and 12.2%, respectively.
- CORE reviewed the Standardized Risk Ratios (SRRs) and Risk Adjusted Readmission Rates (RARRs) results for the EC at the 25-admission cutoff.
  - CORE noted the median SRR across the subcohorts was 1, adding that the range was notable with low SRRs around 0.3 or 0.4 and high SRRs of 2 or 3.39. The RARRs ranged from 5% to 38%, with a mean of 15%.
- CORE reviewed the SRRs and RARRs results for the EC Groups at the 25-admission cutoff.
  - CORE added that the median is approximately 1, which is expected for a SRR. CORE discussed the RARRs ranged from 7% and up to 25%, which is narrower than the ECs.
- CORE reviewed the outliers results for the HWR measure, noting these results are intended to indicate whether the measure can identify statistically significant differences across the range of measured ECs and EC Groups.
- CORE requested feedback on the HWR measure results.
  - A TEP member asked if discussion that focuses on the impact of the 25-admission cutoff impact will occur later, noting concern that 75% of the sample is not represented.
    - CORE responded that the cutoff will be discussed more in detail, adding that we do not lose many patients, only ECs with small numbers of patients.
    - The TEP member further asked if CORE, programmatically, knows what will occur with those ECs.
    - CORE responded that is not known, adding it is difficult to make any kind of statement as these ECs only have one or two patients assigned to them.
      - A TEP member agreed, noting it is the same volume outcome problem that occurs with readmissions at the hospital level.
      - CORE clarified that MIPS has requirements for how they define ECs in their program, noting the numbers do not reflect all the details that Medicare considers for implementing MIPS measures.
  - CORE noted the current MIPS ACR measure has a 200-case threshold.

#### Measure Testing: Hospital-wide Readmission Measure

- CORE reviewed the HWR Model performance.
  - CORE noted the C-statistics for the Cardio-respiratory, Cardio-vascular, Medicine, Neurology, and Surgical cohorts were 0.64, 0.66, 0.65, 0.63, and 0.70, respectively. CORE highlighted that the Development Sample, Validation Sample,

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

and Temporal Validation Sample were analyzed using one year of data as the measurement period. CORE also noted that the calibration results were all close to (0,1), within the three samples.

- CORE reviewed the HWR measure testing, which included the test-retest reliability and signal-to-noise ratio results.
  - CORE reviewed that compared to the HKC reliability score at the 25-admission cutoff of 0.4 the HWR measure reliability scores are much lower. The ECs, at the 25-admission cutoff, had an ICC of 0.16 and the EC Groups, at the 25-admission cutoff, had an ICC of 0.30. CORE further noted that to obtain an ICC of 0.40 or greater, an admission cutoff of 150 or 200 patients will have to be used. CORE added that as the admission cutoff increases the ICC increases and keeps fewer numbers of entities.
  - The signal to noise ratios of 0.98 and 1 are high across the admission cutoffs within the ECs and EC Groups, respectively.
  - CORE further noted that based on reliability results, CORE proposes reporting the measure using a threshold of 100 patients per EC Group.
- CORE summarized that the HWR measure demonstrates meaningful variability and the model performs similar to other measures. CORE added that signal to noise ratio is high, but reliability metrics diverge at lower volume thresholds.
- CORE requested the following feedback from the TEP:
  - What are your thoughts on this proposed measure specification?
  - What are your thoughts on the recommended reporting threshold?
  - Do you think this measure is a valid tool for evaluating clinician performance?
- CORE added that a TEP survey will provide the TEP with an opportunity for additional comments.
  - A TEP member thanked CORE for the different analyses, noting these results can be used to understand the strengths and weakness of each type of approach. The member noted that the threshold of 100 patients per TIN at the EC Group level seems reasonable. The member inquired if CORE was prepared to support the EC Groups and dismiss the EC to meet the 100-case threshold. Additionally, the member noted concern with hospital level variability that may be driving EC performance on the measure as opposed to the EC Groups. The member further asked if it is possible to model the hospital effect as another random effect, or a nested effect, in the model to assess if results are picking up a different and new signal, when looking at EC Groups, or just picking up hospitals signals.
    - CORE responded that they cannot model nested hospital effects because most EC Groups have patients at different hospitals, which makes it difficult to model directly. CORE added they have run additional analyses, clarifying that this measure is not accounting for external effects, only what is happening at the Clinician level.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- A TEP member noted concern with the 100-case threshold, adding that even within the EC Groups, 6% of the patient sample and 96% of the ECs are lost. The TEP member suggest comparing Clinician versus hospital level to analyze what accounts for most of the variability.
  - CORE noted that of proportion of entities lost and the number of the ECs and EC Groups lost is not equivalent to the proportions of patients lost, as most of the patients (96%) fall within the larger EC/EC Groups. CORE added that for a hospital-wide measure, CORE is comfortable recommending to CMS a limited number of entities as these EC Groups will have enough patients to represent a diverse hospital-wide population.
- A TEP member expressed agreement, noting that to expect a measure to get all ECs with patients is unrealistic. The TEP member further expressed satisfaction with number of ECs and EC Groups that were excluded at the 100-case threshold, as these ECs and EC groups with few patients would not be entrenched in hospital processes. The member stated that they are fine the proposed 100-case threshold.
- A TEP member asked for the current proportion of ECs and EC Groups excluded from the MIPS ACR measure.
  - CORE noted the proportion of ECs and EC Groups not attributed in this measure should be fewer than for the ACR measure, which has a minimum volume threshold of 200 cases.
  - The TEP member added that it will be an easier proposal, if CORE highlights that the HWR measure will have a greater number EC Groups who are attributable compared to the current MIPS measure.
- A TEP member agreed with the 100-case threshold. The TEP member suggested adding the admission numbers for the different reporting thresholds results, as is this will make it easier to recognize that a lot of patients are not being lost with increasing the volume threshold.
- Another TEP member agreed with threshold of 100-case threshold and asked if shrinkage adjustment is feasible in this measure.
  - CORE responded that current method does apply shrinkage to create the final estimates. CORE explained that after SRRs were calculated a shrinkage adjustment is done, which pulls smaller hospitals toward the mean.
    - The TEP member thanked CORE.
- A TEP member echoed a previous TEP member, noting concern with the possible overlap between EC Groups that may result in dual penalty for the hospital and EC Groups because of factors beyond their control.
- A TEP member asked if the same variables from the MIPS ACR measure were used for the HWR measure.

*The materials within this document do not represent final specifications for the Development of Inpatient Outcome Measures for the Merit-based Incentive Payment System.*

- CORE confirmed.
- The TEP member noted more patients are need for risk adjustment, adding this can included as a rational for choosing a threshold.
  - CORE clarified that risk-adjustment is done at the cohort level, adding one model is estimated for the entire cohort.
  - The TEP member asked if the risk adjustment done at the cohort level is assigned to the individual clinicians.
    - CORE agreed.
- CORE thanked the TEP members and discussed next steps which included obtaining face validity survey feedback, public comment, and finalizing measure.

#### Wrap-Up

- CORE noted the next steps will be to obtain additional stakeholder input via specific sessions discussed earlier and via public comment.
- CORE will send a web-based survey to TEP members to evaluate the face validity of each measure. The survey will have a field to fill out any comments.
- CORE will be clarifying some of the points raised on the call for those who were not able to join today.
- CORE is happy to connect via email or phone if there are other questions or concerns.
- CORE thanked TEP members for their input and looks forward to being in touch soon.