Patient Safety: Off-Cycle Measure Review 2017

FINAL REPORT

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NATIONAL QUALITY FORUM

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Patient Safety: Off-Cycle Measure Review 2017

FINAL REPORT

Executive Summary

The NQF Patient Safety Standing Committee is responsible for overseeing the patient safety measure portfolio. This oversight function includes evaluating both newly submitted and previously endorsed measures against NQF's measure evaluation criteria, identifying gaps in the measurement portfolio, providing input on how the portfolio should evolve, and serving on any ad hoc, off-cycle, or expedited projects in patient safety. When not involved in the more traditional endorsement project activities, which usually include evaluation of 20-25 measures over a seven-month timeframe, the Committee is available for "off-cycle" activities. These can include any of the actions noted above, but are accomplished through an abbreviated format (e.g., evaluation of one or two measures over a shorter timeframe, quarterly web-based meetings to discuss various measurement issues, etc.).

This report summarizes the evaluation of six measures undergoing evaluation against NQF's standard evaluation criteria during the Committee's early 2017 off-cycle activities. The Committee also reviewed measure 0022: *Use of High-Risk Medications in the Elderly (DAE)* based on the CSAC's decision from the Patient Safety 2015-2017 project to defer endorsement until the developer responded to concerns about the measure's potential unintended consequences. The Committee chose to maintain its decision to recommend the measure for endorsement. The Committee did not recommend any of the six measures submitted by the Altarum Institute for endorsement:

- 2740 Proportion of Patients with Coronary Artery Disease (CAD) That Have a Potentially Avoidable Complication (during the episode time window)
- 2747 Proportion of Patients with Heart Failure (HF) That Have a Potentially Avoidable Complication (during the episode time window)
- 2748 Proportion of Patients with Hypertension (HTN) That Have a Potentially Avoidable Complication (during the episode time window)
- 2749 Proportion of Patients with Arrhythmias (ARR) That Have a Potentially Avoidable Complication (during the episode time window)
- 2751 Proportion of Patients Undergoing an Angioplasty Procedure (Percutaneous Coronary Intervention - PCI) That Have a Potentially Avoidable Complication (during the episode time window)
- 2752 Proportion of Patients Undergoing Pacemaker/Defibrillator Implantation (PCMDFR) That Have a Potentially Avoidable Complication (during the episode time window)

A public comment period was held from April 25 to May 25. NQF received one public comment that supported the Committee's decision not to endorse the measures. The Altarum Institute chose to withdraw the measures from further consideration on June 1, 2017, ending the off-cycle review.

Brief summaries of the measures reviewed in this off-cycle review are included in the body of the report; detailed summaries of the Committee's discussion and ratings of the criteria for each measure are in Appendix A.

Introduction

Volunteer, multistakeholder committees are a key component of NQF's Consensus Development Process (CDP), and thus the success of the process largely depends on the participation of its committee members. In 2013, NQF began transitioning to the use of standing committees for the CDP. These standing committees oversee NQF's various measure portfolios. This oversight includes evaluating both newly submitted and previously endorsed measures against NQF's measure evaluation criteria, identifying gaps in the measurement portfolio, providing feedback on how the portfolio should evolve, and serving on any ad hoc or expedited projects in standing committees' designated topic areas.

When not involved in the more traditional endorsement project activities, which usually include evaluation of 20-25 measures over a seven-month timeframe, the Committee is available for "off-cycle" activities. These can include any of the actions noted above, as well as other activities such as serving as clinical or technical experts for other standing bodies (e.g., the Measure Applications Partnership (MAP) or cross-cutting measurement areas like cost and resource use measurement), collaborating with measure developers to fill gaps in measurement, and addressing strategic measurement issues in the patient safety. Typically, these off-cycle activities will be conducted via quarterly, two-hour web meetings or conference calls for each standing committee during the off-cycle timeframe, as needed.

Refining the NQF Measure Evaluation Process

To streamline and improve the periodic evaluation of currently endorsed measures, NQF has updated its process for the evaluation of measures for maintenance of endorsement. This change took effect beginning October 1, 2015. NQF's endorsement criteria have not changed, and all measures continue to be evaluated using the same criteria. However, under the new approach, there is a shift in emphasis for evaluation of currently endorsed measures:

- **Evidence:** If the developer attests that the evidence for a measure has not changed since its previous endorsement evaluation, there is a decreased emphasis on evidence, meaning that a committee may accept the prior evaluation of this criterion without further discussion or need for a vote. This applies only to measures that previously passed the evidence criterion without an exception. If a measure was granted an evidence exception, the evidence for that measure must be revisited.
- **Opportunity for Improvement (Gap):** For re-evaluation of endorsed measures, there is increased emphasis on current performance and opportunity for improvement. Endorsed measures that are "topped out" with little opportunity for further improvement are eligible for Inactive Endorsement with Reserve Status.
- **Reliability**
    - Specifications: There is no change in the evaluation of the current specifications.
    - Testing: If the developer has not presented additional testing information, a committee may accept the prior evaluation of the testing results without further discussion or need for a vote.
- **Validity:** There is less emphasis on this criterion if the developer has not presented additional testing information, and a committee may accept the prior evaluation of this subcriterion

without further discussion and vote. However, a committee still considers whether the specifications are consistent with the evidence. Also, for outcome measures, a committee discusses questions required for the SDS Trial even if no change in testing is presented.

- **Feasibility:** The emphasis on this criterion is the same for both new and previously endorsed measures, as feasibility issues might have arisen for endorsed measures that have been implemented.
- **Usability and Use:** For re-evaluation of endorsed measures, there is increased emphasis on the use of the measure, especially use for accountability purposes. There also is an increased emphasis on improvement in results over time and on unexpected findings, both positive and negative.

Measure 0022 Deferral of Endorsement Decision

This maintenance measure was endorsed in 2009 and re-endorsed in 2012. The measure assesses whether or not older adults were dispensed a high-risk mediation. The Committee discussed continued endorsement of the measure during the 2015-2017 Patient Safety Project's July 27-28, 2016, in-person meeting. The developers shared extensive evidence showing that certain medications harm older adults. Adverse drug events, falls, confusion, hospitalization, and even death can result. This measure is a part of the Healthcare Effectiveness Data and Information Set (HEDIS) and was recently updated to match the most recent American Geriatric Society Beers Criteria, which is a list of medications that are potentially inappropriate for older adults. During the July in-person meeting, the Committee expressed that this is an important safety issue, and noted that performance on the measure has improved since it was initially endorsed.

Overall, the Committee agreed that the measure meets the criteria for NQF endorsement. However, a member of the Consensus Standards Approval Committee (CSAC) raised concerns that the measure may incentivize health plans to not cover medications on the Beers list, forcing patients to purchase the medications out of pocket. This issue was of particular concern with respect to hormone replacement therapy. The CSAC requested a response on this issue from the developer (i.e., National Committee on Quality Assurance), and deferred an endorsement decision until the Patient Safety Standing Committee was able to reconsider the unintended consequences.

The developers investigated the issue and found that most Medicare Advantage plans do cover Hormone Replacement Therapy (HRT). They also noted that health plans have various methods for discouraging the use of drugs that are potentially inappropriate, not medically necessary, or of high cost when lower cost options are available. Regardless of any formulary restrictions or prior-authorization programs, all Medicare plans must have a process in place for members/providers to request exceptions to the plan's formulary if a noncovered drug is deemed medically necessary and or if they require an exception to the utilization management requirements. If a plan denies an exception, members/providers have the right to appeal the decision. The developers have not seen evidence that consumers have reported that they do not have access to drugs in this measure. When the measure was posted for the HEDIS public comment period, no comments were received from consumer groups with this concern. The Committee discussed the unintended consequences and the developers response

during the off-cycle review webinar on April 12, 2017, and chose to maintain its decision to recommend the measure for endorsement.

Full details on the background and description, including a final report of the 2015-2017 evaluation, are available on the NQF project webpage.

Patient Safety Measure Evaluation

On April 11, 2017, and April 12, 2017, the Patient Safety Standing Committee met via webinar to evaluate six measures against NQF's standard evaluation criteria.

Table 1. Patient Safety 2017 Off-Cycle Measure Evaluation Summary

	Maintenance	New	Total
Measures under consideration	1	6	7
Measures not recommended for endorsement	0	6	6
Reasons for not recommending	Importance – N/A Scientific Acceptability – N/A Overall – N/A Competing Measure – N/A	Importance – 6 Scientific Acceptability – 6 Overall – 6 Competing Measure – 0	

Comments Received Prior to Committee Evaluation

NQF solicits comments on endorsed measures on an ongoing basis through the Quality Positioning System (QPS). In addition, NQF solicits comments prior to the evaluation of the measures via an online tool located on the project webpage. For this evaluation cycle, the pre-evaluation comment period was open from March 30 to April 7, 2017. No pre-evaluation comments were received.

Comments Received After Committee Evaluation

A public comment period was held from April 25 to May 25, 2017, and NQF received one comment. The commenter agreed with the Committee's decision not to endorse the measures. The comment noted that the Committee voted on all criteria although they did not pass the first "must pass" criterion – 1a. importance to measure and report. The Committee voted on all of the criteria via survey after the measure evaluation webinar. As a result, the fact that the measures did not pass criterion 1a was not determined until all of the voting results were calculated. There were no comments opposing the Committee's recommendation to not endorse the six measures. The measure developers chose to withdraw the measures from further consideration on June 1, 2017, ending the off-cycle review.

Overarching Issues

The Committee reviewed a suite of six measures that assess whether patients experienced potentially avoidable complications (PACs) within a defined time window; each measure focuses on a different set of patients based on condition or procedure. During the Standing Committee's discussion of the

measures, five overarching issues emerged that the Committee factored into its ratings and recommendations.

Assessment of Measure Validity

The developers assessed the face validity of each of the six submitted measures based on an expert review. The expert panels unanimously approved the validity of the measure construction (e.g., whether the appropriate administrative codes were used), but did not evaluate the validity of the measure scores. NQF's measure evaluation criteria require an assessment of the computed measure score. Moreover, many Committee members expressed discomfort with the lack of empirical testing at either the measure score or data element level, especially given the broad range of complications for which providers would be held accountable. Committee members contended that at least some of the PACs included in the measures (e.g., catheter-associated urinary tract infections) were identified using ICD-9 or ICD-10 codes that have questionable validity, and expressed a desire to see more information supporting the validity of the developers' approach.

Limitations of Measure Testing

All six measures were specified to capture PACs in patients 18 and older. However, the developers were only able to perform reliability testing and other analyses in a sample of patients age 18-64, due to data limitations. The Committee expressed concerns about not having access to information about reliability or validity of the measure when applied to patients age 65 and older, noting that measure results in the 18-64 population may vary substantially from those in the 65 and older population. NQF requires that measures be tested in the populations for which they are specified.

Wide Range of Potentially Avoidable Complications and their Connection to the Index Conditions or Procedures

Each of the six measures submitted for review focuses on a different patient population based on specific conditions (e.g., patients with coronary artery disease or heart failure) or procedures (e.g., patients undergoing angioplasty or pacemaker implantation). The measures assess whether one or more of a wide range (150 or more) of PACs occurred in those patients within the given time window. The Committee expressed concerns that the measures cast too wide a net, suggesting that some of the PACs may not be associated with quality of care for the specific conditions or procedures that are the focus of each measure. Committee members noted that many of the PACs were not any more likely to occur in these populations than they were in different or broader populations, and questioned why the measures were focused on these specific conditions and procedures when there seemed to be little direct connection between those conditions or procedures and the complications being measured.

Measurement Window

Several of the six measures submitted for review capture PACs that occur up to 12 months after the index episode of care or 90 days after the index procedure. The Committee had concerns that these time windows may be too wide. For example, it may not be plausible to attribute a fall to a procedure that took place 80 days prior to that event.

Suitability of the Measures for Accountability Purposes

Committee members agreed that these measures appeared to be valuable tools for quality improvement, enabling assessment of provider groups' overall PAC rates and identification of areas where care could be improved. Committee members recognized that the measures could be especially useful for improving quality in the context of accountable care organizations or bundled payment programs. However, the Committee noted that NQF endorsement implies that a measure is suitable for both quality improvement *and* accountability purposes (e.g., payment or public reporting). Given the limited testing conducted on the measures, as well as their wide scope in terms of complications for which providers would be held accountable, Committee members suggested that the measures may not be ready for use in payment or public reporting programs.

Summary of Measure Evaluation

The following brief summaries of the measure evaluation highlight the major issues that the Committee considered. Details of the Committee's discussion and ratings of the criteria for each measure are in included in Appendix A.

2740 Proportion of Patients with Coronary Artery Disease (CAD) That Have a Potentially Avoidable Complication (during the episode time window) (Altarum Institute): Not Recommended

Description: Percent of adult population aged 18+ years with coronary artery disease (CAD) who are followed for at least one year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. PACs are defined as one of two types: (1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to CAD, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc. (2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc. All relevant admissions in a patient with CAD are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition; **Measure Type**: Outcome; **Level of Analysis:** Clinician: Group/Practice; **Setting of Care:** Provider organization; **Data Source**: Claims (Only)

This measure assesses PACs related to coronary artery disease (CAD) care. It is a new measure and one of the six similar measures submitted for endorsement (i.e., measure 2747, 2748, 2749, 2751, and 2752). The developer provided a review of the literature related to care for patients with CAD with evidence that demonstrates how proper management of CAD leads to improved outcomes. It demonstrated a gap in performance by showing that 40 percent of providers (unadjusted and adjusted for risk) included in their test sample had a PAC during the episode time window of 12 months. Some Committee members expressed concerns about attributing PACs to care for CAD many months after. The Committee also had concerns about the measure specifications. One Committee member noted that adequate reliability could only be assessed for 468 out of 5,840 providers identified for testing the measure and questioned the measure's exclusion criteria. The Committee noted that the measure is specified for all adults (18 and older), but the measure was only tested in the 18-64 population. Therefore, the Committee could not fully assess the performance gap, reliability, or validity of the

measure. The developers demonstrated the face validity of the way the measure is constructed. However, the developers did not assess the face validity of the measure score.

The developer submitted a memo with justification for the validity of the measure score, but the group of experts that initially approved the measure specifications did not assess it. The Committee also raised several concerns about the number of complications included as PACs in the measure. Several Committee members were concerned with the lack of evidence of how certain PACs were associated with CAD. For example, one Committee member cited viral pneumonia as being unrelated or loosely related to CAD care. The Committee found that the measure is highly feasible to implement because all of the data elements are captured in routine care. However, the Committee questioned the usability of the measure as a national metric for performance. Ultimately, the Committee agreed that the measure does not meet the criteria for NQF endorsement.

2747 Proportion of Patients with Heart Failure (HF) That Have a Potentially Avoidable Complication (during the episode time window) (Altarum Institute): Not Recommended

Description: Percent of adult population aged 18+ years with heart failure (HF) who are followed for at least one year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. PACs are defined as one of two types: (1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to HF, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc. (2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc. All relevant admissions in a patient with HF are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in a heart failure patient is considered a PAC. **Measure Type**: Outcome; **Level of Analysis:** Clinician: Group/Practice; **Setting of Care:** Provider organization; **Data Source**: Claims (Only)

This measure assesses PACs related to heart failure (HF) care. It is a new measure and one of the six similar measures submitted for endorsement (i.e., measure 2740, 2748, 2749, 2751, and 2752). The developers provided studies that demonstrate the high rate of readmissions following HF. They also cited a meta-analysis of 53 randomized control trials that demonstrate the preventability of PACs associated with HF care. The developers conducted the same testing for this measure in the same patient population as the other five similar measures. Therefore, the Committee had concerns similar to those cited in the measure 2740 evaluation summary. The Committee agreed that the measure does not meet the criteria for NQF endorsement.

2748 Proportion of Patients with Hypertension (HTN) That Have a Potentially Avoidable Complication (during the episode time window) (Altarum Institute): Not Recommended

Description: Percent of adult population aged 18+ years with hypertension (HTN) who are followed for at least one year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. PACs are defined as one of two types: (1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time

window for any of the complications directly related to HTN, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc. (2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc. All relevant admissions in a patient with HTN are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in a hypertension patient is considered a PAC. **Measure Type**: Outcome; **Level of Analysis:** Clinician: Group/Practice; **Setting of Care:** Provider organization; **Data Source**: Claims (Only)

This measure assesses PACs related to hypertension (HTN). It is a new measure and one of the six similar measures submitted for endorsement (i.e., measure 2740, 2747, 2749, 2751, and 2752). The developer provided a review of the evidence on how inadequate management of HTN can lead to PACs. The review included several interventions that providers can employ to prevent PACs associated with HTN (e.g., self-care techniques, patient education, care coordination, etc.). The developers conducted the same testing for this measure in the same patient population as the other five similar measures. Therefore, the Committee had concerns similar to those cited in the measure 2740 evaluation summary. The Committee agreed that the measure does not meet the criteria for NQF endorsement.

2749 Proportion of Patients with Arrhythmias (ARR) That Have a Potentially Avoidable Complication (during the episode time window) (Altarum Institute): Not Recommended

Description: Percent of adult population aged 18+ years who triggered an episode of arrhythmias (ARR), are followed for at least one year, and have one or more potentially avoidable complications (PACs). PACs are defined as one of two types: (1) Type 1 PACs - PACs directly related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to ARR, such as for hypotension, cardiac arrest, fluid and electrolyte disturbances etc. (2) Type 2 PACs - PACs suggesting Patient Safety Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc. All relevant admissions in a patient with ARR are considered potentially avoidable and flagged as PACs. **Measure Type**: Outcome; **Level of Analysis:** Clinician: Group/Practice; **Setting of Care:** Provider organization; **Data Source**: Claims (Only)

This measure assesses PACs related to arrhythmias (ARR). It is a new measure and one of the six similar measures submitted for endorsement (i.e., measure 2740, 2747, 2748, 2751, and 2752). The developer provided evidence that links PACs to primary and secondary preventative care gaps (e.g., poor patient education, poor care coordination, and poor follow-up) for patients with ARR. The developers conducted the same testing for this measure in the same patient population as the other five similar measures. Therefore, the Committee had concerns similar to those cited in the measure 2740 evaluation summary. The Committee agreed that the measure does not meet the criteria for NQF endorsement.

2751 Proportion of Patients Undergoing an Angioplasty Procedure (Percutaneous Coronary Intervention - PCI) That Have a Potentially Avoidable Complication (during the episode time window) (Altarum Institute): Not Recommended

Description: Percent of adult population aged 18+ years who had a percutaneous coronary intervention (PCI) procedure, are followed for at least 90 days, and have one or more potentially avoidable complications (PACs). PACs may occur during the index stay or during the 90-day post discharge period. PACs are defined as one of two types: (1) Type 1 PACs - PACs directly related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to PCI, such as for hypotension, cardiac arrest, fluid and electrolyte disturbances etc. (2) Type 2 PACs - PACs suggesting Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc. All relevant admissions in a patient with PCI are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization a PCI patient is considered a PAC. **Measure Type**: Outcome; **Level of Analysis:** Clinician: Group/Practice; **Setting of Care:** Provider organization; **Data Source**: Claims (Only)

This measure assesses PACs related to an angioplasty procedure. It is a new measure and one of the six similar measures submitted for endorsement (i.e., measure 2740, 2747, 2748, 2749, and 2752). The developer provided evidence that links gaps in adequate processes of care to PACs associated with angioplasty procedures. The developer found a performance gap (unadjusted: 50 percent and adjusted: 48.5 percent) that was higher than the rate of PACs associated with conditions captured by the other similar measures. One Committee member noted that the period of 90 days is unusual and differs from the typical 30-day post-procedure tracking period. The developers conducted the same testing for this measure in the same patient population as the other five similar measures. Therefore, the Committee had concerns similar to those cited in the measure 2740 evaluation summary. The Committee agreed that the measure does not meet the criteria for NQF endorsement.

2752 Proportion of Patients Undergoing Pacemaker / Defibrillator Implantation (PCMDFR) That Have a Potentially Avoidable Complication (during the episode time window) (Altarum Institute): Not Recommended

Description: Percent of adult population aged 18+ years who had a pacemaker/defibrillator implantation (PCMDFR), are followed for at least 30 days, and have one or more potentially avoidable complications (PACs). PACs may occur during the index stay or during the 30-day post discharge period. PACs are defined as one of two types: (1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to PCMDFR, such as for wound infection, hypotension, cardiac arrest etc. (2) Type 2 PACs - PACs suggesting Patient Safety Failures or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc. **Measure Type**: Outcome; **Level of Analysis:** Clinician: Group/Practice; **Setting of Care:** Provider organization; **Data Source**: Claims (Only)

This measure assesses PACs related to a pacemaker/defibrillator implantation procedure. It is a new measure and one of the six similar measures submitted for endorsement (i.e., measure 2740, 2747, 2748, 2749, and 2751). The developer provided similar evidence to the other five measures that links gaps in adequate processes of care to PACs associated with angioplasty procedures. The developer found a performance gap (unadjusted: 47 percent and adjusted: 46 percent) that was higher than the rate of PACs associated with conditions captured by the other similar measures. The developers conducted the same testing for this measure in the same patient population as the other five similar measures. Therefore, the Committee had concerns similar to those cited in the measure 2740 evaluation summary. The Committee agreed that the measure does not meet the criteria for NQF endorsement.

Appendix A: Details of Measure Evaluation

Rating Scale: H=High; **M**=Moderate; **L**=Low; **I**=Insufficient; **NA**=Not Applicable; **Y**=Yes; **N**=No

Measures Not Recommended

2740 Proportion of Patients with Coronary Artery Disease (CAD) That Have a Potentially Avoidable Complication (during the episode time window)

Submission | Specifications

Description: Percent of adult population aged 18 + years with coronary artery disease (CAD) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_CAD_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to CAD.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to CAD, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with CAD are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in a heart failure patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs in the most recent 12 months, they get counted as a "yes" or a 1. The "PAC overview" tab in the enclosed workbook labeled NQF_CAD_all_codes_risk_adjustment_01.25.17.xls gives the percent of CAD episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in CAD episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with CAD for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

Numerator Statement: Outcome: Number of patients with an episode of coronary artery disease (CAD) that had one or more potentially avoidable complications (PACs) during the most recent 12 months.

Denominator Statement: Adult patients aged 18 years and above with an episode of coronary artery disease (CAD) and are followed for at least 12months.

Exclusions: Patients are excluded from the measure if they are less than 18 years of age, have an incomplete episode of care (less than 18 months of claims), have an enrollment gap of more than 30 days, or have outlier costs for the most recent 12months of claim costs.

Claims are excluded from the episode if they are for services that are not relevant for care of coronary artery disease.

Adjustment/Stratification: N/A

Level of Analysis: Clinician : Group/Practice

Setting of Care: Ambulatory Surgery Center, Clinician Office/Clinic, Hospital, Other

Type of Measure: Outcome

Data Source: Claims (Only)

Measure Steward: Altarum Institute

STANDING COMMITTEE MEETING [04/11/2017-04/12/2017]

1. Importance to Measure and Report: The measure meets the Importance criteria

(1a. Evidence: 1b. Performance Gap, 1c. High Priority)

1a. Evidence: **7-Pass; 7-Fail**; 1b. Performance Gap: **H-1;M-10;L-2;I-1**

Rationale:

- The developer presented a review of the literature related to care for patients with Coronary Artery Disease (CAD). They provide evidence (de Brantes 2010) to support the rationale that the ability to clearly identify the type and frequency of potentially avoidable conditions (PACs) creates actionable information for providers and health plans.
- The developers also provide evidence from several studies that demonstrate how proper management of CAD leads to improved outcomes.
- The developer found that of providers in the test sample had high rates of PACs (40% unadjusted and 40.1% adjusted), which demonstrated a performance gap.

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2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity)

2a. Reliability: **H-0; M-4; L-5; I-5**; 2b. Validity: **M-3; L-3; I-8**

Rationale:

- The measure is specified for patients 18 and older, but the reliability and validity testing was done in the 18-64 population.
- The developers found that the measure is reliability at a minimum of 10 episodes per provider group at 0.73. The measure becomes increasingly reliable as the number of episodes increase.
- The developers report that the expert panels unanimously approved the validity of how the measure is constructed, but there was no assessment of the validity of the measure score.
- The c-statistics of the testing and validation samples (0.803 and 0.792, respectively) indicate that the risk models have strong discriminatory power.
- Hosmer-Lemeshow Goodness-of-Fit tests and comparisons of observed to expected probabilities across risk deciles were further examined to assess the model's overall predictive accuracy. Although the H-L test was significant for the testing sample, meaning that the model is not a good fit, this test is generally known to be sensitive to the number of groupings used and sample sizes.

3. Feasibility: H-6; M-6; L-2; I-0

(3a. Data generated during care; 3b. Electronic sources; and 3c. Data collection can be implemented (eMeasure feasibility assessment of data elements and logic)

Rationale:

- All data elements are in defined fields in electronic claims and is generated as a byproduct of care processes.

4. Use and Usability: H-1; M-3; L-7; I-3

(4a. Accountability/transparency; and 4b. Improvement – progress demonstrated; and 4c. Benefits outweigh evidence of unintended negative consequences)

Rationale:

- Measure is currently used in accountability programs.

5. Related and Competing Measures

- 0337 : Pressure Ulcer Rate (PDI 2)
- 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)
- 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- 0531 Patient Safety for Selected Indicators (Composite Measure, endorsed) (AHRQ)
- NQMC 010028: Ambulatory care sensitive conditions (ACSC): age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care prevents or reduces the need for admission to the hospital, per 100,000 population younger than age 75 years. (AHRQ)
- CMS defined hospital acquired conditions (HACs) are a subset of the measures PACs.

Standing Committee Recommendation for Endorsement: **Y-2; N-12**

2747 Proportion of Patients with Heart Failure (HF) That Have a Potentially Avoidable Complication (during the episode time window)

Submission | Specifications

Description: Percent of adult population aged 18 + years with heart failure (HF) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_HF_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to HF.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to HF, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with HF are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in a heart failure patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs in the most recent 12 months, they get counted as a "yes" or a 1. The "PAC overview" tab in the enclosed workbook labeled NQF_HF_all_codes_risk_adjustment_01.25.17.xls gives the percent of HF episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in HF episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with HF for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

Numerator Statement: Outcome: Number of patients with heart failure (HF), who have one or more potentially avoidable complications (PACs) during the most recent 12 months.

Denominator Statement: Adult patients aged 18 years and above with an episode of heart failure (HF) and are followed for at least 12 months.

Exclusions: Patients are excluded from the measure if they are less than 18 years of age, have an incomplete episode of care (less than 18 months of claims), have an enrollment gap of more than 30 days, or have outlier costs for the most recent 12months of claim costs.

Claims are excluded from the episode if they are for services that are not relevant for care of heart failure.

Adjustment/Stratification: N/A

Level of Analysis: Clinician : Group/Practice

Setting of Care: Ambulatory Surgery Center, Clinician Office/Clinic, Other

Type of Measure: Outcome

Data Source: Claims (Only)

Measure Steward: Altarum Institute

STANDING COMMITTEE MEETING [04/11/2017-04/12/2017]

1. Importance to Measure and Report: The measure meets the Importance criteria

(1a. Evidence: 1b. Performance Gap, 1c. High Priority)

1a. Evidence: **9-Pass; 5-Fail**; 1b. Performance Gap: **H-2; M-8; L-2; I-2**

Rationale:

- The developers cite a number of studies demonstrates the high rate of readmissions follow heart failure (HF) hospitalizations.
- The developers cite a systematic review from the AHRQ that found, through a meta-analysis of 53 published randomized control trials and reported on 47 studies, home-visiting programs and heart failure clinic interventions, both of which are multicomponent complex interventions, reduced all-cause readmissions.

- The ability to clearly identify the type and frequency of each PAC creates a highly actionable measure for all providers that are managing or co-managing the patient; as well as for the health plan with whom the patient is a member.
- The developer found that of providers in the test sample had high rates of PACs (41% unadjusted and 40% adjusted), which demonstrated a performance gap.

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2. Scientific Acceptability of Measure Properties: <u>The measure meets the Scientific Acceptability criteria</u>

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity)

2a. Reliability: **H-0; M-5; L-4; I-5** 2b. Validity: **H-0; M-2; L-4; I-8**

<u>Rationale</u>:

- The measure is specified for patients 18 and older, but the reliability and validity testing was done in the 18-64 population.
- The developers found that the measure is reliability at a minimum of 10 episodes per provider group at 0.61. The measure becomes increasingly reliable as the number of episodes increase.
- The developers report that the expert panels unanimously approved the validity of how the measure is constructed, but there was no assessment of the validity of the measure score.
- The c-statistics of the testing and validation samples (0.807 and 0.754, respectively) indicate that the risk models have strong discriminatory power.
- Hosmer-Lemeshow Goodness-of-Fit tests and comparisons of observed to expected probabilities across risk deciles were further examined to assess the model's overall predictive accuracy. Although the H-L test was significant for the testing sample, meaning that the model is not a good fit, this test is generally known to be sensitive to the number of groupings used and sample sizes.

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3. Feasibility: H-4; M-8; L-1; I-1

(3a. Data generated during care; 3b. Electronic sources; and 3c. Data collection can be implemented (eMeasure feasibility assessment of data elements and logic)

<u>Rationale</u>:

- All data elements are in defined fields in electronic claims and is generated as a byproduct of care processes.

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4. Use and Usability: H-1; M-3; L-7; I-3

(4a. Accountability/transparency; and 4b. Improvement – progress demonstrated; and 4c. Benefits outweigh evidence of unintended negative consequences)

<u>Rationale</u>:

- Measure is currently used in accountability programs.

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5. Related and Competing Measures

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

- 0337 : Pressure Ulcer Rate (PDI 2)

- 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)
- 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- 0531 Patient Safety for Selected Indicators (Composite Measure, AHRQ) (endorsed)
- NQMC 010028: Ambulatory care sensitive conditions (ACSC): age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care prevents or reduces the need for admission to the hospital, per 100,000 population younger than age75 years. (AHRQ)
- CMS defined hospital acquired conditions (HACs) are a subset of our PACs.

Standing Committee Recommendation for Endorsement: **Y-2**; **N-12**

2748 Proportion of Patients with Hypertension (HTN) That Have a Potentially Avoidable Complication (during the episode time window)

Submission | Specifications

Description: Percent of adult population aged 18 + years with hypertension (HTN) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_HTN_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to HTN.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to HTN, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with HTN are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in a hypertension patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs in the most recent 12 months, they get counted as a “yes” or a 1. The “PAC overview” tab in the enclosed workbook labeled NQF_HTN_all_codes_risk_adjustment_01.25.17.xls gives the percent of HTN episodes that have a PAC and the tab labeled “PAC drill down” gives the types of PACs and their frequencies in HTN episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with HTN for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in “allowed amounts” for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

Numerator Statement: Outcome: Number of patients with an episode of hypertension (HTN) that had one or more potentially avoidable complications (PACs) during the most recent 12 months.

Denominator Statement: Adult patients aged 18 years and above with an episode of hypertension (HTN) and are followed for at least 12months.

Exclusions: Patients are excluded from the measure if they are less than 18 years of age, have an incomplete episode of care (less than 18 months of claims), have an enrollment gap of more than 30 days, or have outlier costs for the most recent 12months of claim costs.

Claims are excluded from the episode if they are for services that are not relevant for care of hypertension.

Adjustment/Stratification: N/A

Level of Analysis: Clinician : Group/Practice

Setting of Care: Ambulatory Surgery Center, Clinician Office/Clinic, Other

Type of Measure: Outcome

Data Source: Claims (Only)

Measure Steward: Altarum Institute

STANDING COMMITTEE MEETING [04/11/2017-04/12/2017]

1. Importance to Measure and Report: The measure meets the Importance criteria

(1a. Evidence: 1b. Performance Gap, 1c. High Priority)

1a. Evidence: **8-Pass; 6-Fail**; 1b. Performance Gap: **H-1; M-9; L-2; I-2;**

Rationale:

- The developers provide a review of the evidence related to care for patients with hypertension how inappropriate care can lead to potentially avoidable conditions.
- Lack of patient education on self-care techniques, poor care coordination, and poor arrangements of patient follow-up could lead to unnecessary ER visits, hospitalizations and gaps in care leading to increased morbidity.
- There is evidence that patients with multiple chronic conditions, including hypertension, are at greater risk for PACs. The developer note the importance of this measure for encouraging the managing of all of the patient's conditions, not simply one.
- The developer found that of providers in the test sample had high rates of PACs (30% unadjusted and 31% adjusted), which demonstrated a performance gap.

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2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity)

2a. Reliability: **H-0; M-4; L-5; I-5** 2b. Validity: **H-0; M-3; L-3; I-8**

Rationale:

- The measure is specified for patients 18 and older, but the reliability and validity testing was done in the 18-64 population.
- The developers found that the measure is reliability at a minimum of 10 episodes per provider group at 0.79. The measure becomes increasingly reliable as the number of episodes increase.
- The developers report that the expert panels unanimously approved the validity of how the measure is constructed, but there was no assessment of the validity of the measure score.

- The c-statistics of the testing and validation samples (0.807 and 0.754, respectively) indicate that the risk models have strong discriminatory power.
- Hosmer-Lemeshow Goodness-of-Fit tests and comparisons of observed to expected probabilities across risk deciles were further examined to assess the model's overall predictive accuracy. Although the H-L test was significant for the testing sample, meaning that the model is not a good fit, this test is generally known to be sensitive to the number of groupings used and sample sizes.

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3. Feasibility: H-4; M-7; L-2; I-1

(3a. Data generated during care; 3b. Electronic sources; and 3c. Data collection can be implemented (eMeasure feasibility assessment of data elements and logic)

Rationale:

- All data elements are in defined fields in electronic claims and is generated as a byproduct of care processes.

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4. Use and Usability: H-1; M-2; L-8; I-3

(4a. Accountability/transparency; and 4b. Improvement – progress demonstrated; and 4c. Benefits outweigh evidence of unintended negative consequences)

Rationale:

- Measure is currently used in accountability programs.

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5. Related and Competing Measures

- 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization
- 0337 : Pressure Ulcer Rate (PDI 2)
- 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)
- 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- 0531 Patient Safety for Selected Indicators (Composite Measure, AHRQ) (endorsed)
- NQMC 010028: Ambulatory care sensitive conditions (ACSC): age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care prevents or reduces the need for admission to the hospital, per 100,000 population younger than age75 years. (AHRQ)
- CMS defined hospital acquired conditions (HACs) are a subset of our PACs.

Standing Committee Recommendation for Endorsement: **Y-2**; **N-12**

2749 Proportion of Patients with Arrhythmias (ARR) That Have a Potentially Avoidable Complication (during the episode time window)

Submission | Specifications

Description: Percent of adult population aged 18 + years with arrhythmias (ARR) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_ARRBLK_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to ARR.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to ARR, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with ARR are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in an arrhythmia patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs in the most recent 12 months, they get counted as a "yes" or a 1. The "PAC overview" tab in the enclosed workbook labeled NQF_ARRBLK_all_codes_risk_adjustment_01.25.17.xls gives the percent of ARR episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in ARR episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with ARR for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

Numerator Statement: Outcome: Number of patients with an episode of arrhythmias (ARR) that had one or more potentially avoidable complications (PACs) during the most recent 12 months.

Denominator Statement: Adult patients aged 18 years and above with an episode of arrhythmias (ARR) and are followed for at least 12months.

Exclusions: Patients are excluded from the measure if they are less than 18 years of age, have an incomplete episode of care (less than 18 months of claims), have an enrollment gap of more than 30 days, or have outlier costs for the most recent 12months of claim costs. Claims are excluded from the episode if they are for services that are not relevant for care of arrhythmia/heart block.

Adjustment/Stratification: N/A

Level of Analysis: Clinician : Group/Practice

Setting of Care: Ambulatory Surgery Center, Clinician Office/Clinic, Other

Type of Measure: Outcome

Data Source: Claims (Only)

Measure Steward: Altarum Institute

STANDING COMMITTEE MEETING [04/11/2017-04/12/2017]

1. Importance to Measure and Report: The measure meets the Importance criteria

(1a. Evidence: 1b. Performance Gap, 1c. High Priority)

1a. Evidence: **7-Pass; 7-Fail**; 1b. Performance Gap: **H-1; M-8; L-3; I-2**

Rationale:

- As a rationale for this measure, the developer links increased PAC rates to primary & secondary prevention care gaps, poor patient education, poor care coordination, and poor follow-up, and states that PACs for ARR patients should occur rarely in well-managed patients.
- In addition to linking processes of care to outcomes, the developer provides an extensive PAC literature review as well as background information on the process for PAC development.
- The developer found that of providers in the test sample had high rates of PACs (35.7% unadjusted and 35.9% adjusted), which demonstrated a performance gap.

2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity)

2a. Reliability: **H-0; M-4; L-5; I-5** 2b. Validity: **H-0; M-1; L-5; I-8**

Rationale:

- The measure is specified for patients 18 and older, but the reliability and validity testing was done in the 18-64 population.
- The developers found that the measure is reliability at a minimum of 10 episodes per provider group at 0.66. The measure becomes increasingly reliable as the number of episodes increase.
- The developers report that the expert panels unanimously approved the validity of how the measure is constructed, but there was no assessment of the validity of the measure score.
- The c-statistics of the testing and validation samples (0.781 and 0.773, respectively) indicate that the risk models have strong discriminatory power.
- Hosmer-Lemeshow Goodness-of-Fit tests and comparisons of observed to expected probabilities across risk deciles were further examined to assess the model's overall predictive accuracy. Although the H-L test was significant for the testing sample, meaning that the model is not a good fit, this test is generally known to be sensitive to the number of groupings used and sample sizes.

3. Feasibility: H-4; M-6; L-3; I-1

(3a. Data generated during care; 3b. Electronic sources; and 3c. Data collection can be implemented (eMeasure feasibility assessment of data elements and logic)

Rationale:

- All data elements are in defined fields in electronic claims and is generated as a byproduct of care processes.

4. Use and Usability: H-1; M-1; L-8; I-3

(4a. Accountability/transparency; and 4b. Improvement – progress demonstrated; and 4c. Benefits outweigh evidence of unintended negative consequences)

Rationale:

- Measure is currently used in accountability programs.

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5. Related and Competing Measures

- 0337 : Pressure Ulcer Rate (PDI 2)
- 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)
- 0705 : Proportion of Patients Hospitalized with Stroke that have a Potentially Avoidable Complication (during the Index Stay or in the 30-day Post-Discharge Period)
- 0708 : Proportion of Patients Hospitalized with Pneumonia that have a Potentially Avoidable Complication (during the Index Stay or in the 30-day Post-Discharge Period)
- 0709 : Proportion of patients with a chronic condition that have a potentially avoidable complication during a calendar year.
- 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- 0531 Patient Safety for Selected Indicators (Composite Measure, endorsed) (AHRQ)

Standing Committee Recommendation for Endorsement: **Y-1**; **N-13**

2751 Proportion of Patients Undergoing an Angioplasty Procedure (Percutaneous Coronary Intervention - PCI) That Have a Potentially Avoidable Complication (during the episode time window)

Submission | Specifications

Description: Percent of adult population aged 18 + years who had a percutaneous coronary intervention (PCI) procedure, are followed for at least 90-days, and have one or more potentially avoidable complications (PACs). PACs may occur during the index stay or during the 90-day post discharge period.

Please reference attached document labeled NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to PCI.

We define PACs as one of two types:

(1) Type 1 PACs - PACs directly related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to PCI, such as for hypotension, cardiac arrest, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs suggesting Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with PCI are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for (insert condition) in a PCI patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs, they get counted as a “yes” or a 1. The enclosed workbook labeled

NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx serves as an example. The tab labeled PAC overview gives the percent of PCI episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in PCI episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with PCI for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

Numerator Statement: Number of patients who underwent a percutaneous coronary intervention (PCI) procedure, are followed for at least 90-days, and have one or more potentially avoidable complications (PACs) during the episode time window.

Denominator Statement: Adult patients aged 18 years and above who underwent an Angioplasty (percutaneous coronary intervention - PCI) procedure and are followed for at least 90-days

Exclusions: Patients are excluded from the measure if they are less than 18 years of age, have any enrollment gap during the episode time window, or have outlier costs.

Claims are excluded from the episode if they are for services that are not relevant to PCI care.

Adjustment/Stratification: N/A

Level of Analysis: Facility

Setting of Care: Ambulatory Surgery Center, Hospital, Other

Type of Measure: Outcome

Data Source: Claims (Only)

Measure Steward: Altarum Institute

STANDING COMMITTEE MEETING [04/11/2017-04/12/2017]

1. Importance to Measure and Report: The measure meets the Importance criteria

(1a. Evidence: 1b. Performance Gap, 1c. High Priority)

1a. Evidence: **7-Pass; 6-Fail**; 1b. Performance Gap: **H-1; M-7; L-3; I-2**

Rationale:

- As a rationale for this measure, the developer links increased PAC rates to primary & secondary prevention care gaps, poor patient education, poor care coordination and poor follow-up. The developer states that PACs such as bleeding, AMI, stroke, and readmission should occur rarely in well-managed patients.
- In addition to linking processes of care to outcomes, the developer provides an extensive PAC literature review for PCI, Patient Safety Failures & processes of care, as well as background information on the process for PAC development.
- The developer found that of providers in the test sample had high rates of PACs (50% unadjusted and 48.5% adjusted), which demonstrated a performance gap.

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2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity)

2a. Reliability: **H-0; M-5; L-4; I-5** 2b. Validity: **H-0; M-3 ;L-3; I-8**

Rationale:

- The measure is specified for patients 18 and older, but the reliability and validity testing was done in the 18-64 population.
- The developers found that the measure is reliability at a minimum of 10 episodes per provider group at 0.51. The measure becomes increasingly reliable as the number of episodes increase.
- The developers report that the expert panels unanimously approved the validity of how the measure is constructed, but there was no assessment of the validity of the measure score.
- The c-statistics of the testing and validation samples (0.726 and 0.680, respectively) indicate that the risk models have strong discriminatory power.
- Hosmer-Lemeshow Goodness-of-Fit tests and comparisons of observed to expected probabilities across risk deciles were further examined to assess the model's overall predictive accuracy. Although the H-L test was significant for the testing sample, meaning that the model is not a good fit, this test is generally known to be sensitive to the number of groupings used and sample sizes.

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3. Feasibility: H-3; M-8; L-2; I-1

(3a. Data generated during care; 3b. Electronic sources; and 3c. Data collection can be implemented (eMeasure feasibility assessment of data elements and logic)

Rationale:

- All data elements are in defined fields in electronic claims and is generated as a byproduct of care processes.

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4. Use and Usability: H-1; M-2; L-8; I-3

(4a. Accountability/transparency; and 4b. Improvement – progress demonstrated; and 4c. Benefits outweigh evidence of unintended negative consequences)

Rationale:

- Measure is currently used in accountability programs.

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5. Related and Competing Measures

- 0141 : Patient Fall Rate
- 0202 : Falls with injury
- 0337 : Pressure Ulcer Rate (PDI 2)
- 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)
- 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI)
- 0705 : Proportion of Patients Hospitalized with Stroke that have a Potentially Avoidable Complication (during the Index Stay or in the 30-day Post-Discharge Period)
- 0708 : Proportion of Patients Hospitalized with Pneumonia that have a Potentially Avoidable Complication (during the Index Stay or in the 30-day Post-Discharge Period)
- 0709 : Proportion of patients with a chronic condition that have a potentially avoidable complication during a calendar year.
- 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- 0531 Patient Safety for Selected Indicators (Composite Measure, endorsed) (AHRQ)

- CMS defined hospital acquired conditions (HACs) are a subset of our PACs.

Standing Committee Recommendation for Endorsement: **Y-2**; **N-12**

2752 Proportion of Patients Undergoing Pacemaker / Defibrillator Implantation (PCMDFR) That Have a Potentially Avoidable Complication (during the episode time window)

Submission | Specifications

Description: Percent of adult population aged 18 + years who had a pacemaker/defibrillator implantation (PCMDFR), are followed for at least 30-days, and have one or more potentially avoidable complications (PACs). PACs may occur during the index stay or during the 30-day post discharge period.

Please reference attached document labeled NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls, in the tabs labeled PACs I-9 and I-10 for a list of code definitions of PACs relevant to PCMDFR.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to PCMDFR, such as for wound infection, hypotension, cardiac arrest etc.

(2) Type 2 PACs - PACs suggesting Patient Safety Failures or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

PACs may occur at any point during the episode period, including the index stay or 30-day post discharge period

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs during the episode time window, they get counted as a "yes" or a 1. The enclosed workbook labeled NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls, serves as an example. The tab labeled PAC overview gives the percent of PCMDFR episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in PCMDFR episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with PCMDFR for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

Numerator Statement: Number of patients who underwent a pacemaker/defibrillator implantation (PCMDFR), are followed for at least 30-days, and have one or more potentially avoidable complications (PACs) during the episode time window.

Denominator Statement: Adult patients aged 18 years and above who underwent a Pacemaker/defibrillator implantation (PCMDFR) procedure and are followed for at least 30-days.

Exclusions: Patients are excluded from the measure if they are less than 18 years of age, have any enrollment gap during the episode time window, or have outlier costs.

Claims are excluded from the episode if they are for services that are not relevant to PCMDFR care.

Adjustment/Stratification: N/A

Level of Analysis: Facility

Setting of Care: Ambulatory Surgery Center, Hospital, Other

Type of Measure: Outcome

Data Source: Claims (Only)

Measure Steward: Altarum Institute

STANDING COMMITTEE MEETING [04/11/2017-04/12/2017]

1. Importance to Measure and Report: The measure meets the Importance criteria

(1a. Evidence: 1b. Performance Gap, 1c. High Priority)

1a. Evidence: **8-Pass; 6-Fail**; 1b. Performance Gap: **H-1; M-10; L-1; I-2**

Rationale:

- As a rationale for this measure, the developer links increased PAC rates to primary & secondary prevention care gaps, poor patient education, poor care coordination, and poor follow-up, and states that PACs for PCMDFR patients should occur rarely in well-managed patients.
- In addition to linking processes of care to outcomes, the developer provides an extensive PAC literature review as well as background information on the process for PAC development.
- The developer found that of providers in the test sample had high rates of PACs (47% unadjusted and 46% adjusted), which demonstrated a performance gap.

---

2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity)

2a. Reliability: **H-0; M-4; L-5; I-5**; 2b. Validity: **H-0; M-2; L-5; I-7**

Rationale:

- The measure is specified for patients 18 and older, but the reliability and validity testing was done in the 18-64 population.
- The developers found that the measure is reliability at a minimum of 10 episodes per provider group at 0.61. The measure becomes increasingly reliable as the number of episodes increase.
- The developers report that the expert panels unanimously approved the validity of how the measure is constructed, but there was no assessment of the validity of the measure score.
- The c-statistics of the testing sample (0.740) indicate that the risk model have strong discriminatory power.
- Hosmer-Lemeshow Goodness-of-Fit tests and comparisons of observed to expected probabilities across risk deciles were further examined to assess the model's overall predictive accuracy. Although the H-L test was significant for the testing sample, meaning that the model is not a good fit, this test is generally known to be sensitive to the number of groupings used and sample sizes.

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3. Feasibility: H-4; M-8; L-1; I-1

(3a. Data generated during care; 3b. Electronic sources; and 3c. Data collection can be implemented (eMeasure feasibility assessment of data elements and logic)

Rationale:

- All data elements are in defined fields in electronic claims and is generated as a byproduct of care processes.

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4. Use and Usability: H-1; M-3; L-7; I-3

(4a. Accountability/transparency; and 4b. Improvement – progress demonstrated; and 4c. Benefits outweigh evidence of unintended negative consequences)

Rationale:

- Measure is currently used in accountability programs.

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5. Related and Competing Measures

- 0141 : Patient Fall Rate
- 0202 : Falls with injury
- 0337 : Pressure Ulcer Rate (PDI 2)
- 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)
- 0705 : Proportion of Patients Hospitalized with Stroke that have a Potentially Avoidable Complication (during the Index Stay or in the 30-day Post-Discharge Period)
- 0708 : Proportion of Patients Hospitalized with Pneumonia that have a Potentially Avoidable Complication (during the Index Stay or in the 30-day Post-Discharge Period)
- 0709 : Proportion of patients with a chronic condition that have a potentially avoidable complication during a calendar year.
- 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- 0531 Patient Safety for Selected Indicators (Composite Measure, endorsed) (AHRQ)
- CMS defined hospital acquired conditions (HACs) are a subset of our PACs.

Standing Committee Recommendation for Endorsement: **Y-2**; **N-12**

Appendix B: Patient Safety Standing Committee and NQF Staff

COMMITTEE MEMBERS

Ed Septimus, MD (Co-Chair)
Medical Director Infection Prevention and Epidemiology, HCA, and Professor of Internal Medicine, Texas A&M Health Science Center College of Medicine, Hospital Corporation of America
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Chief Scientific Officer

Marcia Wilson, PhD, MBA
Former Senior Vice President, Quality Measurement

Andrew Lyzenga, MPP
Senior Director

Andrew Anderson, MHA
Senior Project Manager

Desmirra Quinnonez
Project Analyst

Appendix C: Patient Safety Portfolio—Use In Federal Programs

NQF #	Title	Federal Programs: Finalized as of July 24, 2016
0022	Use of High Risk Medications in the Elderly	Medicare Physician Quality Reporting System (PQRS), Physician Feedback/Quality and Resource Use Reports (QRUR), Physician Value-Based Payment Modifier (VBM)
0097	Medication Reconciliation	Medicare Physician Quality Reporting System (PQRS), Physician Compare, Physician Feedback/Quality and Resource Use Reports (QRUR), Physician Value-Based Payment Modifier (VBM)
0101	Falls: Screening for Future Fall Risk	Medicare Physician Quality Reporting System (PQRS), Medicare Shared Savings Program (MSSP), Physician Feedback/Quality and Resource Use Reports (QRUR), Physician Value-Based Payment Modifier (VBM)
0138	Urinary Catheter-Associated Urinary Tract Infection for Intensive Care Unit (ICU) Patients	Hospital Compare, Hospital Inpatient Quality Reporting, Hospital Value-Based Purchasing, Hospital-Acquired Condition Reduction Program, Inpatient Rehabilitation Facility Quality Reporting, Long-Term Care Hospital Quality Reporting, Prospective Payment System (PPS)-Exempt Cancer Hospital Quality Reporting
0139	Central Line Catheter-Associated Blood Stream Infection Rate for ICU and High-Risk Nursery (HRN) Patients	Hospital Compare, Hospital Inpatient Quality Reporting, Hospital Value-Based Purchasing, Hospital-Acquired Condition Reduction Program, Long-Term Care Hospital Quality Reporting, Medicaid, Prospective Payment System (PPS)-Exempt Cancer Hospital Quality Reporting
0141	Patient Fall Rate	N/A
0202	Falls with injury	N/A
0204	Skill Mix (Registered Nurse [RN], Licensed Vocational/Practical Nurse [LVN/LPN], Unlicensed Assistive Personnel [UAP], and Contract)	N/A
0205	Nursing Care Hours Per Patient Day (RN, LPN, and UAP)	N/A
0206	Practice Environment Scale - Nursing Work Index (composite and five subscales)	N/A
0239	Perioperative Care: Venous Thromboembolism (VTE) Prophylaxis	Medicare Physician Quality Reporting System (PQRS), Physician Feedback/Quality and Resource Use Reports (QRUR), Physician Value-Based Payment Modifier (VBM)
0266	Patient Fall	Ambulatory Surgical Center Quality Reporting, Hospital Compare
0337	Pressure Ulcer Rate (PDI 2)	N/A

NQF #	Title	Federal Programs: Finalized as of July 24, 2016
0344	Accidental Puncture or Laceration Rate (PDI 1)	N/A
0345	Accidental Puncture or Laceration Rate (PSI 15)	N/A
0346	Iatrogenic Pneumothorax Rate (PSI 6)	N/A
0347	Death Rate in Low-Mortality Diagnosis Related Groups (PSI 2)	N/A
0348	Iatrogenic Pneumothorax Rate (PDI 5)	N/A
0349	Transfusion Reaction (PSI 16)	N/A
0350	Transfusion Reaction (PDI 13)	N/A
0352	Failure to Rescue In-Hospital Mortality (risk adjusted)	N/A
0353	Failure to Rescue 30-Day Mortality (risk adjusted)	N/A
0362	Retained Surgical Item or Unretrieved Device Fragment Count (PDI 3)	N/A
0363	Retained Surgical Item or Unretrieved Device Fragment Count (PSI 05)	N/A
0419	Documentation of Current Medications in the Medical Record	Medicare Physician Quality Reporting System (PQRS), Medicare Shared Savings Program (MSSP), Physician Feedback/Quality and Resource Use Reports (QRUR), Physician Value-Based Payment Modifier (VBM)
0450	Postoperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)	N/A
0500	Severe Sepsis and Septic Shock: Management Bundle	Hospital Compare, Hospital Inpatient Quality Reporting
0530	Mortality for Selected Conditions	N/A
0531	Patient Safety for Selected Indicators	Hospital Compare, Hospital Inpatient Quality Reporting, Hospital Value-Based Purchasing, Hospital-Acquired Condition Reduction Program
0537	Multifactor Fall Risk Assessment Conducted in Patients 65 and Older	Home Health Quality Reporting
0538	Pressure Ulcer Prevention Included in Plan of Care	Home Health Quality Reporting

NQF #	Title	Federal Programs: Finalized as of July 24, 2016
0541	Proportion of Days Covered (PDC): 5 Rates by Therapeutic Category	Qualified Health Plan (QHP) Quality Rating System (QRS)
0553	Care for Older Adults (COA) – Medication Review	N/A
0555	Monthly INR Monitoring for Beneficiaries on Warfarin	N/A
0556	INR for Beneficiaries Taking Warfarin and Interacting Anti-Infective Medications	N/A
0674	Percent of Residents Experiencing One or More Falls with Major Injury (Long Stay)	Inpatient Rehabilitation Facility Quality Reporting, Long-Term Care Hospital Quality Reporting, Skilled Nursing Facility Quality Reporting
0678	Percent of Residents with Pressure Ulcers That Are New or Worsened (Short-Stay)	Home Health Quality Reporting, Inpatient Rehabilitation Facility Quality Reporting, Long-Term Care Hospital Quality Reporting, Skilled Nursing Facility Quality Reporting
0679	Percent of High Risk Residents with Pressure Ulcers (Long Stay)	N/A
0684	Percent of Residents with a Urinary Tract Infection (Long-Stay)	N/A
0687	Percent of Residents Who Were Physically Restrained (Long Stay)	N/A
0689	Percent of Residents Who Lose Too Much Weight (Long-Stay)	N/A
0709	Proportion of patients with a chronic condition That Have a potentially avoidable complication during a calendar year.	N/A
0751	Risk Adjusted Urinary Tract Infection Outcome Measure After Surgery	N/A
0753	American College of Surgeons – Centers for Disease Control and Prevention (ACS-CDC) Harmonized Procedure Specific Surgical Site Infection (SSI) Outcome Measure	Hospital Compare, Hospital Inpatient Quality Reporting, Hospital Value-Based Purchasing, Hospital-Acquired Condition Reduction Program, Prospective Payment System (PPS)-Exempt Cancer Hospital Quality Reporting

NQF #	Title	Federal Programs: Finalized as of July 24, 2016
1716	National Healthcare Safety Network (NHSN) Facility-Wide Inpatient Hospital-Onset Methicillin-Resistant Staphylococcus Aureus (MRSA) Bacteremia Outcome Measure	Hospital Compare, Hospital Inpatient Quality Reporting, Hospital Value-Based Purchasing, Hospital-Acquired Condition Reduction Program, Inpatient Rehabilitation Facility Quality Reporting, Long-Term Care Hospital Quality Reporting, Prospective Payment System (PPS)-Exempt Cancer Hospital Quality Reporting
1717	National Healthcare Safety Network (NHSN) Facility-Wide Inpatient Hospital-Onset Clostridium Difficile Infection (CDI) Outcome Measure	Hospital Compare, Hospital Inpatient Quality Reporting, Hospital Value-Based Purchasing, Hospital-Acquired Condition Reduction Program, Inpatient Rehabilitation Facility Quality Reporting, Long-Term Care Hospital Quality Reporting, Prospective Payment System (PPS)-Exempt Cancer Hospital Quality Reporting
2337	Antipsychotic Use in Children Under 5 Years Old	N/A
2371	Annual Monitoring for Patients on Persistent Medications (MPM)	Medicaid, Qualified Health Plan (QHP) Quality Rating System (QRS)
2720	National Healthcare Safety Network (NHSN) Antimicrobial Use Measure	N/A
2723	Wrong-Patient Retract-and-Reorder (WP-RAR) Measure	N/A
2726	Prevention of Central Venous Catheter (CVC)-Related Bloodstream Infections	N/A
2732	INR Monitoring for Individuals on Warfarin after Hospital Discharge	N/A

Appendix D: Measure Specifications

2740 Proportion of Patients with Coronary Artery Disease (CAD) That Have a Potentially Avoidable Complication (during the episode time window)

STATUS

Submitted

STEWARD

Altarum Institute

DESCRIPTION

Percent of adult population aged 18 + years with coronary artery disease (CAD) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_CAD_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to CAD.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to CAD, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with CAD are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in a heart failure patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs in the most recent 12 months, they get counted as a "yes" or a 1. The "PAC overview" tab in the enclosed workbook labeled NQF_CAD_all_codes_risk_adjustment_01.25.17.xls gives the percent of CAD episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in CAD episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with CAD for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

TYPE

Outcome

DATA SOURCE

Claims (Only) The information is based on a two-year claims database from a large regional commercial insurer. The database has over 3.2 million covered lives and $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

The methodology can be used on any claims database with at least two years of data and a minimum of 150 patients with the index condition or hospitalization.

The calculations of rates of potentially avoidable complications can be replicated by anyone that uses the measure specifications along with the metadata file that is available for free on our web site at http://www.hci3.org/ecre/xml-agreement.html.

We also plan on providing a limited automated analysis, at no cost, on our website.

The methodology has been tested on databases of several health plans as well as on a few employer databases.

No data collection instrument was used.

No data collection instrument provided Attachment NQF_CAD_all_codes_risk_adjustment_01.25.17.xlsx

LEVEL

Clinician : Group/Practice

SETTING

Ambulatory Surgery Center, Clinician Office/Clinic, Hospital, Other Across the care continuum

NUMERATOR STATEMENT

Outcome: Number of patients with an episode of coronary artery disease (CAD) that had one or more potentially avoidable complications (PACs) during the most recent 12 months.

NUMERATOR DETAILS

Patients with a CAD episode, and are identified as having services for potentially avoidable complications (PACs), during the most recent 12 months of the episode. The enclosed excel workbook entitled

NQF_CAD_all_codes_risk_adjustment_01.25.17 gives the detailed codes for PACs in the tab entitled PACs I-9 and I-10s. In the PAC tab, a PAC group name is given in column B, PAC type in column C, PAC ICD-9 diagnosis codes in column D and PAC ICD-10 diagnosis codes in column E. PACs are identified only based on diagnosis codes.

Services for PACs are identified as follows:

a. Any service (professional, outpatient facility, ancillary) that is relevant to CAD and has a PAC code in any position on the claim

b. Any admission to an inpatient facility, that has a diagnosis code in the principal position that is relevant to CAD

DENOMINATOR STATEMENT

Adult patients aged 18 years and above with an episode of coronary artery disease (CAD) and are followed for at least 12months.

DENOMINATOR DETAILS

Please refer to the enclosed excel workbook entitled

NQF_CAD_all_codes_risk_adjustment 01.25.17 - tab entitled “Triggers I-9 and I-10”

The target population is identified using the following criteria:

Using administrative claims database, patients with CAD are identified using one of the following trigger criteria:

a. Patients having an office visit with a trigger diagnosis code of CAD, in any position, followed by a second confirmatory claim at least 30 days later that could be an office visit, or an outpatient facility claim (with a trigger diagnosis code of CAD in any position), or an inpatient stay claim (with a trigger code of CAD in the principal position).

b. Patients having an emergency department visit with a trigger diagnosis code of CAD in any position.

c. Patients with an acute care facility claim with a trigger diagnosis code of CAD in the principal position.

Inclusion criteria: Patients identified to have CAD based on the trigger criteria listed above are retained in the measure if they meet the following inclusion criteria:

1. The patient has continuous enrollment for the entire time window, with no more than a 30-day enrollment gap.

2. The patient has at least 18 months of claims in the database.

3. Patient is at least 18 years of age

Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims include inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient’s episode of care. Services that contain a PAC code and that are assigned to a CAD episode will be flagged as a potentially avoidable complication.

EXCLUSIONS

Patients are excluded from the measure if they are less than 18 years of age, have an incomplete episode of care (less than 18 months of claims), have an enrollment gap of more than 30 days, or have outlier costs for the most recent 12months of claim costs.

Claims are excluded from the episode if they are for services that are not relevant for care of coronary artery disease.

EXCLUSION DETAILS

Denominator exclusions could be due to exclusion of either patients and / or claims:

Please refer to the enclosed excel workbook entitled (NQF_CAD_all_codes_risk_adjustment 01.25.17.xls)

1. Patients are excluded from the measure if they meet one of the following criteria:

a. age is < 18 years

b. gender is missing

c. there is an enrollment gap of more than 30 days during the episode time window

d. there is less than 18 months of claims in the database for a given patient

e. the episode is an outlier, defined as in the 1st or 99th percentile of all episodes.

2. Claims are excluded from a CAD episode if they are not considered relevant to the care for the chronic condition, such as trauma related claims, or are for major surgical services.

RISK ADJUSTMENT

Statistical risk model

113253

113253

STRATIFICATION

None

TYPE SCORE

Rate/proportion better quality = lower score

ALGORITHM

Please refer to the enclosed excel workbook entitled (NQF_CAD_all_codes_risk_adjustment 01.25.17.xls).

Identifying the Target Population -Assembling the Denominator:

Using administrative claims database, patients with CAD are identified as those who fulfilled the trigger criteria for CAD. CAD patients should have claims that have trigger diagnosis codes as defined in the TRIGGERS tab (Triggers I-9 & I-10) of the enclosed workbook. In addition, they should meet one of the following trigger criteria:

1. Have a hospitalization with a trigger code in the principal position of an inpatient stay claim

2. Have an outpatient facility visit such as an emergency department visit with one of the trigger codes in any position, OR

3. Have a physician visit with a trigger code in any position AND a confirming claim at least 30 days later that could be any of the three below:

- An in-patient stay claim with a trigger diagnosis code of CAD in the principal position,

- An emergency department visit claim with a trigger code for CAD in any position or

- Another professional visit claim with a trigger code for CAD in any position

Patients are retained if they are 18 years of age or more, do not have a missing gender, have continuous enrollment with an enrollment gap of less than 30 days, and have at least 18 months of data in the claims dataset. Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims could be inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient?s episode of care. Hospitalizations carrying diagnosis codes relevant to CAD, and relevant admissions to post-acute care facilities are also included in the episode. If a patient has more than one concurrent episode open, and the claim is relevant to both episodes, the claim could get multi-assigned, except in the case of procedural episodes that get carved out with respect to the index stay. Therefore, if an inpatient stay claim carried a principal Dx code that matched the trigger diagnosis code for CAD but they also had a procedure code for CABG (coronary artery bypass surgery), the stay claim would get uniquely assigned to CABG and not be counted with CAD.

Once all the relevant services are assigned, outlier episodes (those with total episode costs below the 1st percentile or above the 99th percentile) are excluded.

Cases meeting the Outcome -- Assembling the Numerator:

Episodes included in the denominator are flagged as having a PAC (potentially avoidable complication) if:

a. Any claim (professional, outpatient facility, ancillary) that is relevant has a PAC code in any position on the claim

b. Any admission to an inpatient facility, that is relevant to CAD as identified through a relevant principal diagnosis code Relevant claims that do not have any PAC codes, and do not qualify as a PAC based on the criteria outlined above, are listed as typical claims. All pharmacy services are considered typical because the claims don?t include diagnosis codes. Episodes that have even a single PAC claim are added to the numerator.

Time-period of data:

The time-period to be analyzed for the measure is the most recent 12 months of a triggered CAD episode.

Calculating the measure:

Proportion of CAD patients that have PACs is simply the ratio of patients with PACs within the CAD population and is called the PAC rate as shown in the equation below:

PAC rate = Patients with CAD that have at least one PAC claim / Total number of CAD patients

Aggregating Data & Drill Down Calculations:

A flow chart demonstrating the series of steps and the counts of patients at each step is shown in tab entitled Decision Tree of the enclosed workbook called NQF_CAD_all_codes_risk_adjustment 01.25.17.xls

Further analysis from this construct helps create actionable reports.

For example, as shown in the tab labeled PAC overview, not only do we have the PAC rate for a population, we can calculate the frequency of PACs occurring due to hospitalizations, or in an outpatient facility, or in professional claims. These could be further broken down by the PAC type – type 1 being directly related to CAD and so actionable by the managing physician; and type 2 PACs related to patient safety and broader system failures and requiring collaboration among providers. The drill down details identify the highest volume PACs (see tab labeled as "PAC Drill down Graph"). This helps focus strategies in reducing PACs and make the data actionable.

Risk Adjustment:

Conceptual Model: Variations in outcomes across populations may be due to patient-related factors or due to provider-controlled factors. When we adjust for patient-related factors, the remaining variance in PAC rates are due to factors that could be controlled by all providers that are managing or co-managing the patient, during the entire episode time window.

Once we have the observed PAC rates based on the above calculations, we risk-adjust them for patient factors such as patient demographics, comorbidities collected historically, and for severity of illness or procedure using subtypes collected from the index stay and / or look-back period. This helps adjust for factors outside the providers control and levels the playing field for provider performance comparisons.

Unit of Analysis:

The unit of analysis is the individual episode.

Dependent Variable:

The dependent variable is a dichotomous variable indicating whether an episode had one or more claims assigned as a PAC (=1) or not (=0).

Independent Variables:

Several patient-related "risk factors" or covariates are included in the model. This list was selected based on input from various clinical experts in clinical working groups. Risk Factors used in the models were:

Patient demographics: age, gender, and an indicator of whether a member has enrolled within the previous 6 months. This latter risk factor is intended to account for the patient?s lack of claims history, which limits the number of potential comorbidities that can be identified.

Comorbidities: These are conditions or events that occurred prior to the start of the episode that can have a potential impact on the patient?s risk of having a PAC. The risk factors are 170 disease indicators (0/1) identified through the presence of ICD diagnosis codes on individual medical claims and collected from the historical claims data before the start of an episode. These are universally applied across all episodes. Please see the tab labeled "All Risk Factors I-9" and "All Risk Factors I-10" for a list of risk factors and their corresponding codes in the enclosed workbook called NQF_CAD_all_codes_risk_adjustment 01.25.17.xls

Episode Subtypes or Severity Markers: These are markers that distinguish an episode as being more severe than another. They indicate either specific patient comorbidities that are known to make the procedure or condition more difficult to treat (e.g., obesity) or severity of the illness itself (e.g., unstable angina). Please see the tab labeled "Subtypes I-9 and I-10" for a list of subtypes and their corresponding codes in the enclosed workbook called NQF_CAD_all_codes_risk_adjustment 01.25.17.xls

To avoid creating perverse incentives all comorbidities and subtypes are identified prior to or at the very start of the episode. None are identified during the episode period.

Statistical Methods

We use logistic regression to model the probability of at least one PAC occurring during the episode. For each patient, based on their historic risk / severity profile, the "predicted" coefficients from the risk adjustment models are summed to give the ?patient-level? predicted probabilities of the occurrence of a PAC.

To prevent unstable coefficients, comorbidities and subtypes are included in the models as covariates if they are present in at least 10 episodes. No further model building is conducted after the initial models are built. This reflects a desire to explain as much variation in the probability of having a PAC as possible, but it does not make it a priority that all covariates in the model be individually significant or even uncorrelated with each other. Accordingly, the model uses a very large group of covariates. This modeling approach allows for fewer potentially artificial constraints around the definitions of what constitutes severity of a episode condition, and lets each regression model determine for itself which of the factors are more significant for a specific episode. Non-significant covariates in episode models can not overly influence predicted outcomes, nor is much harm realized, if a group of correlated covariates work together to explain variation rather than having the variation explained by a single best factor.

The risk adjustment model for CAD are shown in the enclosed workbook entitled NQF_CAD_all_codes_risk_adjustment 01.25.17.xls, tab entitled CAD_Risk_Model. All the variables with an n >=10 are retained in the model and the model coefficients are shown, along with their z-scores and p-values. As you may notice some of the covariates such as obesity are

collected from both historical claims (risk factors) as well as from the episode trigger date and look-back period of the episode (subtypes). When more than one line of business is included in the data, separate models are calculated for each sample (i.e., commercial, Medicaid etc.).

Provider Attribution and calculating PAC rates by provider group:

Once episodes are constructed they are attributed to the provider group that has the maximum number of E&M claims during the episode time window.

To directly compare PAC rates across provider groups while also appropriately accounting for differences in patient severity, we calculate a risk-standardized PAC rate (RSPR) for each provider group. This method is similar to the methods employed by the Centers for Medicare and Medicaid Services (CMS) and endorsed by the National Quality Forum (NQF) to construct similar provider-level measures (i.e., mortality, readmissions, etc.).

1. For each provider group, the actual number of PAC occurrences are summed across all attributed patients, to give the "observed" PAC rates for CAD for the provider group.

2. Similarly, patient-level probability estimates are summed across all attributed patients to give ?expected? PAC rates for the provider group.

3. The observed sum is then divided by the summed probabilities (O/E). This number yields whether the provider group had more PACs than expected (ratio>1), as expected (ratio=1), or less than expected (ratio<1). This calculation yields a practice-level unstandardized performance ratio.

4. To facilitate accurate comparisons of rates across provider groups, the O/E ratio is multiplied by the overall expected PAC rate across all provider groups, to obtain the risk-standardized PAC rate (RSPR) for the group.

The formula for this calculation is as follows:

Adj Outcome_j={(SUM Observed_ij)/(SUM Prob_ij)} × {(SUM Prob_i) / (# of episodes)}

Where individual is attributed to unit of analysis j (e.g., practice, provider, etc.)

The risk-standardized PAC rate (RSPR) therefore adjusts the provider group?s observed PAC rate, by the severity of its patients. It represents what a provider group?s PAC rate would be if its patient population was reflective of the overall population, leveling the playing field, and allowing for meaningful comparisons across all groups adjusted similarly. This is what we call RSPR (risk standardized PAC rate) and is used for provider group outcomes comparisons.

Minimum sample size requirements for PAC measures are a function of the reliability testing of the measures on every dataset on which the measures are applied. Our research suggests that minimum sample sizes to achieve high degrees of reliability in the measures are a function of the dataset analyzed, and as such may vary from dataset to dataset. One should not infer that a minimum sample size achieved in one dataset will apply to another. 113253

5.1 Identified measures: 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)

0337 : Pressure Ulcer Rate (PDI 2)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Some measures such as 0337, 0450, and NQMC 010028 are in fact, subsets of our measure and so harmonized.

However, there are some measures that are not harmonized, in particular, the Hospital wide all-cause readmission measure. While the submitted PAC measure include hospitalizations and readmissions that occur during the episode time window, the hospitalizations, by definition, have to be relevant to the underlying condition. For chronic conditions, most relevant hospitalizations within the entire episode time window are considered potentially avoidable. PACs include readmissions and are designed to enable accountability at the locus of provider control as well as some shared accountability between settings, centered around a patient, and for a specific medical episode of care. In that sense, they are consistent with the all-cause 30-day readmission rates, but represent a subset of those admissions. However, they do extend to the entire episode time window. As such, the PAC measures, as submitted, don't create added burden of reporting because the readmissions reported are simply a part of the broader 30-day all-cause readmission measures already endorsed by NQF. Because PAC measures are comprehensive, they include patient safety events as well as other adverse events, including hospitalizations and ED visits during the entire continuum of care. As a result, they are a comprehensive measure of avoidable complications for a specific medical episode. The data collection for the measures is automated by a software package and is fully harmonized with all other PAC measures. A single download automates creation of all reports related to each of the PAC measures.

5b.1 If competing, why superior or rationale for additive value: PAC measures are composite measures representing "all-cause harms". They look at many "care defects" comprehensively. They are composed of several cross-cutting measures and together they paint a global picture of the provider's overall performance.

PACs may occur any time during the most recent 12 months. Furthermore, the measure is constructed so that the occurrence of any number of PACs during a defined episode would only count as one occurrence. PACs look at readmissions, emergency room visits, adverse events due to errors of omission or commission. They look at complications that are due to patient safety failures, and also those directly related to the index condition. These are all a cause of significant waste and quality concerns. As such, the measure can provide clinicians with an overall and comprehensive view, in one measure, of all potentially avoidable complications for a patient and drive quality improvement efforts.

For clinicians and facilities increasingly engaged in value-based payment efforts and/or driving quality improvement for population health, the value of a PAC measure over a series of related, but more discrete measures, is that one can better determine if the sources of complications primarily stem from activities within the facility or outside the facility, and the specific nature of the complications that have a higher frequency of occurrence. While individual components of the PAC measure may have small frequencies and may be difficult to interpret with regards to provider performance or actionability, aggregating all the PACs into a comprehensive, composite measure provides the parsimony that is so desirable. For providers, it's far easier to construct a quality dashboard from a parsimonious set of measures, and that's what PAC measures offer.

Further, as a comprehensive outcome measure, PACs are also useful for public transparency of quality, as substantiated by the research from Judy Hibbard and colleagues previously cited in the "testing" section of this submission. As a comprehensive outcome measure, they are easier to explain to the average consumer. From a patient's point of view, any bad outcome has an impact on their health with respect to return to work, functional limitations and need for additional support. If a provider has a high PAC rate with regards to one component PAC but not the other PACs, the impact on the patient is still adverse. In selecting providers, individual

component PAC scores would mean nothing to a patient, but aggregating it to a comprehensive quality score could be a measure of “all-cause” harms and easier to interpret and act on.

2747 Proportion of Patients with Heart Failure (HF) That Have a Potentially Avoidable Complication (during the episode time window)

STATUS

Submitted

STEWARD

Altarum Institute

DESCRIPTION

Percent of adult population aged 18 + years with heart failure (HF) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_HF_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to HF.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to HF, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with HF are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in a heart failure patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs in the most recent 12 months, they get counted as a “yes” or a 1. The “PAC overview” tab in the enclosed workbook labeled NQF_HF_all_codes_risk_adjustment_01.25.17.xls gives the percent of HF episodes that have a PAC and the tab labeled “PAC drill down” gives the types of PACs and their frequencies in HF episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with HF for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in “allowed amounts” for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

TYPE

Outcome

DATA SOURCE

Claims (Only) The information is based on a two-year claims database from a large regional commercial insurer. The database has over 3.2 million covered lives and $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

The methodology can be used on any claims database with at least two years of data and a minimum of 150 patients with the index condition or hospitalization.

The calculations of rates of potentially avoidable complications can be replicated by anyone that uses the measure specifications along with the metadata file that is available for free on our web site at http://www.hci3.org/ecre/xml-agreement.html.

We also plan on providing a limited automated analysis, at no cost, on our website.

The methodology has been tested on databases of several health plans as well as on a few employer databases.

No data collection instrument was used.

No data collection instrument provided Attachment NQF_HF_all_codes_risk_adjustment_01.25.17-636213723062282570.xlsx

LEVEL

Clinician : Group/Practice

SETTING

Ambulatory Surgery Center, Clinician Office/Clinic, Other Across the care continuum

NUMERATOR STATEMENT

Outcome: Number of patients with heart failure (HF), who have one or more potentially avoidable complications (PACs) during the most recent 12 months.

NUMERATOR DETAILS

Patients with a HF episode, that were identified as having services that included a potentially avoidable complications (PACs) diagnosis code during the most recent 12 months of the episode. The enclosed excel workbook entitled NQF_HF_all_codes_risk_adjustment_01.25.17gives the detailed codes for PACs in the tab entitled PACs I-9s & I-10s. In the PAC tab, a PAC group name is given in column B, PAC type in column C, PAC ICD-9 diagnosis codes in column D and PAC ICD-10 diagnosis codes in column E. PACs are identified only based on diagnosis codes.

Services for PACs are identified as follows:

a. Any service (professional, outpatient facility, ancillary) that is relevant to HF and has a PAC code in any position on the claim

b. Any admission to an inpatient facility, that has a diagnosis code in the principal position that is relevant to HF

DENOMINATOR STATEMENT

Adult patients aged 18 years and above with an episode of heart failure (HF) and are followed for at least 12 months.

DENOMINATOR DETAILS

Please refer to the enclosed excel workbook entitled NQF_HF_all_codes_risk_adjustment 01.25.17- tab entitled "Triggers I-9 & I-10"

The target population is identified using the following criteria:

Using administrative claims database, patients with HF are identified using one of the following trigger criteria:

a. Patients having an office visit with a trigger diagnosis code of HF, in any position, followed by a second confirmatory claim at least 30 days later that could be an office visit, or an outpatient facility claim (with a trigger diagnosis code of HF in any position), or an inpatient stay claim (with a trigger code of HF in the principal position).

b. Patients having an emergency department visit with a trigger diagnosis code of HF in any position.

c. Patients with an acute care facility claim with a trigger diagnosis code of HF in the principal position.

Inclusion criteria: Patients identified to have HF based on the trigger criteria listed above are retained in the measure if they meet the following inclusion criteria:

1. The patient has continuous enrollment for the entire time window, with no more than a 30-day enrollment gap.

2. The patient has at least 18 months of claims in the database.

3. Patient is at least 18 years of age

Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims include inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient's episode of care. Services that contain a PAC code and that are assigned to a HF episode will be flagged as a potentially avoidable complication.

EXCLUSIONS

Patients are excluded from the measure if they are less than 18 years of age, have an incomplete episode of care (less than 18 months of claims), have an enrollment gap of more than 30 days, or have outlier costs for the most recent 12months of claim costs.

Claims are excluded from the episode if they are for services that are not relevant for care of heart failure.

EXCLUSION DETAILS

Denominator exclusions could be due to exclusion of either patients and / or claims:

Please refer to the enclosed excel workbook entitled (NQF_HF_all_codes_risk_adjustment 01.25.17.xls) – tab entitled Decision Tree

1. Patients are excluded from the measure if they meet one of the following criteria:

a. age is < 18 years

b. gender is missing

c. there is an enrollment gap of more than 30 days during the episode time window

d. there is less than 18 months of claims in the database for a given patient

e. the episode is an outlier, defined as in the 1st or 99th percentile of all episodes.

2. Claims are excluded from a HF episode if they are not considered relevant to the care for the chronic condition, such as trauma related claims, or are for major surgical services.

RISK ADJUSTMENT

Statistical risk model

113253

113253

STRATIFICATION

None

TYPE SCORE

Rate/proportion better quality = lower score

ALGORITHM

Please refer to the enclosed excel workbook entitled (NQF_HF_all_codes_risk_adjustment 01.25.17.xls).

Identifying the Target Population -- Assembling the Denominator:

Using administrative claims database, patients with HF are identified as those who fulfilled the trigger criteria for HF. Heart Failure patients should have claims that have trigger diagnosis codes as defined in the TRIGGERS tab (Triggers I-9 & I-10) of the enclosed workbook. In addition, they should meet one of the following trigger criteria:

1. Have a hospitalization with a trigger code in the principal position of an inpatient stay claim

2. Have an outpatient facility visit such as an emergency department visit with one of the trigger codes in any position, OR

3. Have a physician visit with a trigger code in any position AND a confirming claim at least 30 days later that could be any of the three below:

- An in-patient stay claim with a trigger diagnosis code of heart failure in the principal position,

- An emergency department visit claim with a trigger code for heart failure in any position or

- Another professional visit claim with a trigger code for heart failure in any position

Patients are retained if they are 18 years of age or more, do not have a missing gender, have continuous enrollment with an enrollment gap of less than 30 days, and have at least 18 months of data in the claims dataset.

Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims could be inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient's episode of care. Hospitalizations carrying diagnosis codes relevant to heart failure, and relevant admissions to post-acute care facilities are also included in the episode. If a patient has more than one concurrent episode open, and the claim is relevant to both episodes, the claim could get multi-assigned, except in the case of procedural episodes that get carved out with respect to the index stay. Therefore, if an inpatient stay claim carried a principal Dx code that matched the trigger diagnosis code for HF but they also had a procedure code for CABG (coronary artery bypass surgery), the stay claim would get uniquely assigned to CABG and not be counted with HF.

Once all the relevant services are assigned, outlier episodes (those with total episode costs below the 1st percentile or above the 99th percentile) are excluded.

Cases meeting the Outcome -- Assembling the Numerator:

Episodes included in the denominator are flagged as having a PAC (potentially avoidable complication) if:

a. Any claim (professional, outpatient facility, ancillary) that is relevant has a PAC code in any position on the claim

b. Any admission to an inpatient facility, that is relevant to heart failure as identified through a relevant principal diagnosis code

Relevant claims that do not have any PAC codes, and do not qualify as a PAC based on the criteria outlined above, are listed as typical claims. All pharmacy services are considered typical because the claims don't include diagnosis codes. Episodes that have even a single PAC claim are added to the numerator.

Time-period of data:

The time-period to be analyzed for the measure is the most recent 12 months of a triggered heart failure episode.

Calculating the measure:

Proportion of HF patients that have PACs is simply the ratio of patients with PACs within the HF population and is called the PAC rate as shown in the equation below:

PAC rate = Patients with HF that have at least one PAC claim / Total number of HF patients

Aggregating Data & Drill Down Calculations:

A flow chart demonstrating the series of steps and the counts of patients at each step is shown in the tab entitled Decision Tree of the enclosed workbook called NQF_HF_all_codes_risk_adjustment01.25.17.xls

Further analysis from this construct helps create actionable reports. For example, as shown in the tab labeled PAC overview, not only do we have the PAC rate for a population, we can calculate the frequency of PACs occurring due to hospitalizations, or in an outpatient facility, or in professional claims. These could be further broken down by the PAC type – type 1 being directly related to HF and so actionable by the managing physician; and type 2 PACs related to patient safety and broader system failures and requiring collaboration among providers. The drill down details identify the highest volume PACs (see tab labeled as "PAC Drill down Graph"). This helps focus strategies in reducing PACs and make the data actionable.

Risk Adjustment:

Conceptual Model:

Variations in outcomes across populations may be due to patient-related factors or due to provider-controlled factors. When we adjust for patient-related factors, the remaining variance in PAC rates are due to factors that could be controlled by all providers that are managing or co-managing the patient, during the entire episode time window.

Once we have the observed PAC rates based on the above calculations, we risk-adjust them for patient factors such as patient demographics, comorbidities collected historically, and for severity of illness using subtypes indicators collected from the trigger claim and / or the look-back period. This helps adjust for factors outside the providers control and levels the playing field for provider performance comparisons.

Unit of Analysis:

The unit of analysis is the individual episode.

Dependent Variable:

The dependent variable is a dichotomous variable indicating whether an episode had one or more PACs (=1) or not (=0).

Independent Variables:

Several patient-related "risk factors" or covariates are included in the model: This list was selected based on input from various clinical experts in clinical working groups. Risk Factors used in the models were:

Patient demographics: age, gender, and an indicator of whether a member has enrolled within the previous 6 months. This latter risk factor is intended to account for the patient's lack of claims history, which limits the number of potential comorbidities that can be identified.

Comorbidities: These are conditions or events that occurred prior to the start of the episode that can have a potential impact on the patient's risk of having a PAC. The risk factors are 170 disease indicators (0/1) identified through the presence of ICD diagnosis codes on individual medical claims and collected from the historical claims data before the start of an episode. These are universally applied across all episodes. Please see the tab labeled "All Risk Factors I-9" and "All Risk Factors I-10" for a list of risk factors and their corresponding codes in the enclosed workbook called NQF_HF_all_codes_risk_adjustment 01.25.17.xls.

Episode Subtypes or Severity Markers: These are markers that distinguish an episode as being more severe than another. They indicate either specific patient comorbidities that are known to make the procedure or condition more difficult to treat (e.g., obesity) or severity of the illness itself (e.g., systolic vs. diastolic heart failure). Subtypes are unique to each episode. Please see the tab labeled "Subtypes I-9 & I-10" for a list of subtypes and their corresponding codes in the enclosed workbook called NQF_HF_all_codes_risk_adjustment 01.25.17.xls

To avoid creating perverse incentives all comorbidities and subtypes are identified prior to or at the very start of the episode. None are identified during the episode period.

Statistical Methods:

We use logistic regression to model the probability of at least one PAC occurring during the episode. For each patient, based on their historic risk / severity profile, the "predicted" coefficients from the risk adjustment models are summed to give the "patient-level" predicted probabilities of the occurrence of a PAC.

To prevent unstable coefficients, comorbidities and subtypes are included in the models as covariates if they are present in at least 10 episodes. No further model building is conducted after the initial models are built. This reflects a desire to explain as much variation in the probability of having a PAC as possible, but it does not make it a priority that all covariates in the model be individually significant or even uncorrelated with each other. Accordingly, the model uses a very large group of covariates. This modeling approach allows for fewer potentially artificial constraints around the definitions of what constitutes severity of a episode condition, and lets each regression model determine for itself which of the factors are more significant for a specific episode. Non-significant covariates in episode models can not overly influence predicted outcomes, nor is much harm realized, if a group of correlated covariates work together to explain variation rather than having the variation explained by a single best factor.

The risk adjustment model for heart failure are shown in the enclosed workbook entitled NQF_HF_all_codes_risk_adjustment 01.25.17.xls, tab entitled HF_Risk_Model. All the variables

with an n >=10 are retained in the model and the model coefficients are shown, along with their z-scores and p-values. As you may notice some of the covariates such as obesity are collected from both historical claims (risk factors) as well as from the episode trigger date and look-back period of the episode (subtypes).When more than one line of business is included in the data, separate models are calculated for each sample (i.e., commercial, Medicaid etc.).

Provider Attribution and calculating PAC rates by provider group:

Once episodes are constructed they are attributed to the provider group that has the maximum number of E&M claims during the episode time window.

To directly compare PAC rates across provider groups while also appropriately accounting for differences in patient severity, we calculate a risk-standardized PAC rate (RSPR) for each provider group. This method is similar to the methods employed by the Centers for Medicare and Medicaid Services (CMS) and endorsed by the National Quality Forum (NQF) to construct similar provider-level measures (i.e., mortality, readmissions, etc.).

1. For each provider group, the actual number of PAC occurrences are summed across all attributed patients, to give the "observed" PAC rates for HF for the provider group.

2. Similarly, patient-level probability estimates are summed across all attributed patients to give "expected" PAC rates for the provider group.

3. The observed sum is then divided by the summed probabilities (O/E). This number yields whether the provider group had more PACs than expected (ratio>1), as expected (ratio=1), or less than expected (ratio<1). This calculation yields a practice-level unstandardized performance ratio.

4. To facilitate accurate comparisons of rates across provider groups, the O/E ratio is multiplied by the overall expected PAC rate across all provider groups, to obtain the risk-standardized PAC rate (RSPR) for the group.

The formula for this calculation is as follows:

RSPR_j={(SUM Observed_ij)/(SUM Prob_ij)} × {(SUM Prob_i) / (# of episodes)}

Where an individual i is attributed to the unit of attribution j (e.g., physician group)

The risk-standardized PAC rate (RSPR) therefore adjusts the provider group's observed PAC rate, by the severity of its patients. It represents what a provider group's PAC rate would be if its patient population was reflective of the overall population, leveling the playing field, and allowing for meaningful comparisons across all groups adjusted similarly.

This is what we call RSPR (risk standardized PAC rate) and is used for provider group outcomes comparisons.

Minimum sample size requirements for PAC measures are a function of the reliability testing of the measures on every dataset on which the measures are applied. Our research suggests that minimum sample sizes to achieve high degrees of reliability in the measures are a function of the dataset analyzed, and as such may vary from dataset to dataset. One should not infer that a minimum sample size achieved, or even a general lack of reliability, in one dataset will apply to another. 113253

5.1 Identified measures: 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0337 : Pressure Ulcer Rate (PDI 2)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Some measures such as 0337, 0450, and NQMC 010028 are in fact, subsets of our measure and so harmonized. However, there are some measures that are not harmonized, in particular the 30-day all-cause readmission measures and the Hospital wide all-cause readmission measure. While the submitted PAC measure include hospitalizations and readmissions that occur during the episode time window, the hospitalizations, by definition, have to be relevant to the underlying condition. For chronic conditions, most relevant hospitalizations within the entire episode time window are considered potentially avoidable. PACs include readmissions and are designed to enable accountability at the locus of provider control as well as some shared accountability between settings, centered around a patient, and for a specific medical episode of care. In that sense, they are consistent with the all-cause 30-day readmission rates, but represent a subset of those admissions. However, they do extend to the entire episode time window. As such, the PAC measures, as submitted, don't create added burden of reporting because the readmissions reported are simply a part of the broader 30-day all-cause readmission measures already endorsed by NQF. Because PAC measures are comprehensive, they include patient safety events as well as other adverse events, including hospitalizations and ED visits during the entire continuum of care. As a result, they are a comprehensive measure of avoidable complications for a specific medical episode. The data collection for the measures is automated by a software package and is fully harmonized with all other PAC measures. A single download automates creation of all reports related to each of the PAC measures.

5b.1 If competing, why superior or rationale for additive value: PAC measures are composite measures representing all-cause harms. They look at many care defects comprehensively. They are composed of several cross-cutting measures and together they paint a global picture of the provider's overall performance.

PACs may occur any time during the most recent 12 months. Furthermore, the measure is constructed so that the occurrence of any number of PACs during a defined episode would only count as one occurrence. PACs look at readmissions, emergency room visits, adverse events due to errors of omission or commission. They look at complications that are due to patient safety failures, and also those directly related to the index condition. These are all a cause of significant waste and quality concerns. As such, the measure can provide clinicians with an overall and comprehensive view, in one measure, of all potentially avoidable complications for a patient and drive quality improvement efforts.

For clinicians and facilities increasingly engaged in value-based payment efforts and/or driving quality improvement for population health, the value of a PAC measure over a series of related, but more discrete measures, is that one can better determine if the sources of complications primarily stem from activities within the facility or outside the facility, and the specific nature of the complications that have a higher frequency of occurrence. While individual components of the PAC measure may have small frequencies and may be difficult to interpret with regards to provider performance or actionability, aggregating all the PACs into a comprehensive, composite measure provides the parsimony that is so desirable. For providers, it's far easier to construct a quality dashboard from a parsimonious set of measures, and that's what PAC measures offer.

Further, as a comprehensive outcome measure, PACs are also useful for public transparency of quality, as substantiated by the research from Judy Hibbard and colleagues previously cited in the ?testing? section of this submission. As a comprehensive outcome measure, they are easier to explain to the average consumer. From a patient's point of view, any bad outcome has an impact on their health with respect to return to work, functional limitations and need for additional support. If a provider has a high PAC rate with regards to one component PAC but not the other PACs, the impact on the patient is still adverse. In selecting providers, individual component PAC scores would mean nothing to a patient, but aggregating it to a comprehensive quality score could be a measure of ?all-cause? harms and easier to interpret and act on.

2748 Proportion of Patients with Hypertension (HTN) That Have a Potentially Avoidable Complication (during the episode time window)

STATUS

Submitted

STEWARD

Altarum Institute

DESCRIPTION

Percent of adult population aged 18 + years with hypertension (HTN) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_HTN_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to HTN.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to HTN, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with HTN are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in a hypertension patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs in the most recent 12 months, they get counted as a "yes" or a 1. The "PAC overview" tab in the enclosed workbook labeled NQF_HTN_all_codes_risk_adjustment_01.25.17.xls gives the percent of HTN episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in HTN episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with HTN for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in “allowed amounts” for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

TYPE

Outcome

DATA SOURCE

Claims (Only) The information is based on a two-year claims database from a large regional commercial insurer. The database has over 3.2 million covered lives and $25.9 billion in “allowed amounts” for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

The methodology can be used on any claims database with at least two years of data and a minimum of 150 patients with the index condition or hospitalization.

The calculations of rates of potentially avoidable complications can be replicated by anyone that uses the measure specifications along with the metadata file that is available for free on our web site at http://www.hci3.org/ecre/xml-agreement.html.

We also plan on providing a limited automated analysis, at no cost, on our website.

The methodology has been tested on databases of several health plans as well as on a few employer databases.

No data collection instrument was used.

No data collection instrument provided Attachment NQF_HTN_all_codes_risk_adjustment_01.25.17.xlsx

LEVEL

Clinician : Group/Practice

SETTING

Ambulatory Surgery Center, Clinician Office/Clinic, Other Across the care continuum

NUMERATOR STATEMENT

Outcome: Number of patients with an episode of hypertension (HTN) that had one or more potentially avoidable complications (PACs) during the most recent 12 months.

NUMERATOR DETAILS

Patients with a HTN episode, that were identified as having services that included a potentially avoidable complications (PACs) diagnosis code during the most recent 12 months of the episode. The enclosed excel workbook entitled NQF_HTN_all_codes_risk_adjustment_01.25.17 gives the detailed codes for PACs in the tab entitled PACs I-9s & I-10s. In the PAC tab, a PAC group name is given in column B, PAC type in column C, PAC ICD-9 diagnosis codes in column D and PAC ICD-10 diagnosis codes in column E. PACs are identified only based on diagnosis codes.

Services for PACs are identified as follows:

a. Any service (professional, outpatient facility, ancillary) that is relevant to HTN and has a PAC code in any position on the claim

b. Any admission to an inpatient facility, that has a diagnosis code in the principal position that is relevant to HTN

DENOMINATOR STATEMENT

Adult patients aged 18 years and above with an episode of hypertension (HTN) and are followed for at least 12months.

DENOMINATOR DETAILS

Please refer to the enclosed excel workbook entitled NQF_HTN_all_codes_risk_adjustment 01.25.17 - tab entitled "Triggers I-9 & I-10"

The target population is identified using the following criteria:

Using administrative claims database, patients with HTN are identified using one of the following trigger criteria:

a. Patients having an office visit with a trigger diagnosis code of HTN, in any position, followed by a second confirmatory claim at least 30 days later that could be an office visit, or an outpatient facility claim (with a trigger diagnosis code of HTN in any position), or an inpatient stay claim (with a trigger code of HTN in the principal position).

b. Patients having an emergency department visit with a trigger diagnosis code of HTN in any position.

c. Patients with an acute care facility claim with a trigger diagnosis code of HTN in the principal position.

Inclusion criteria: Patients identified to have HTN based on the trigger criteria listed above are retained in the measure if they meet the following inclusion criteria:

1. The patient has continuous enrollment for the entire time window, with no more than a 30-day enrollment gap.

2. The patient has at least 18 months of claims in the database.

3. Patient is at least 18 years of age

Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims include inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient's episode of care. Services that contain a PAC code and that are assigned to a HTN episode will be flagged as a potentially avoidable complication.

EXCLUSIONS

Patients are excluded from the measure if they are less than 18 years of age, have an incomplete episode of care (less than 18 months of claims), have an enrollment gap of more than 30 days, or have outlier costs for the most recent 12months of claim costs.

Claims are excluded from the episode if they are for services that are not relevant for care of hypertension.

EXCLUSION DETAILS

Denominator exclusions could be due to exclusion of either patients and / or claims:

Please refer to the enclosed excel workbook entitled (NQF_HTN_all_codes_risk_adjustment 01.25.17.xls) – tab entitled Decision Tree

1. Patients are excluded from the measure if they meet one of the following criteria:

a. age is < 18 years

b. gender is missing

c. there is an enrollment gap of more than 30 days during the episode time window

d. there is less than 18 months of claims in the database for a given patient

e. the episode is an outlier, defined as in the 1st or 99th percentile of all episodes.

2. Claims are excluded from a HTN episode if they are not considered relevant to the care for the chronic condition, such as trauma related claims, or are for major surgical services

RISK ADJUSTMENT

Statistical risk model

113253

113253

STRATIFICATION

None

TYPE SCORE

Rate/proportion better quality = lower score

ALGORITHM

Please refer to the enclosed excel workbook entitled (NQF_HTN_all_codes_risk_adjustment 01.25.17.xls).

Identifying the Target Population -- Assembling the Denominator:

Using administrative claims database, patients with HTN are identified as those who fulfilled the trigger criteria for HTN. Hypertension patients should have claims that have trigger diagnosis codes as defined in the TRIGGERS tab (Triggers I-9 & I-10) of the enclosed workbook. In addition, they should meet one of the following trigger criteria:

1. Have a hospitalization with a trigger code in the principal position of an inpatient stay claim

2. Have an outpatient facility visit such as an emergency department visit with one of the trigger codes in any position, OR

3. Have a physician visit with a trigger code in any position AND a confirming claim at least 30 days later that could be any of the three below:

- An in-patient stay claim with a trigger diagnosis code of hypertension in the principal position,

- An emergency department visit claim with a trigger code for hypertension in any position or

- Another professional visit claim with a trigger code for hypertension in any position

Patients are retained if they are 18 years of age or more, do not have a missing gender, have continuous enrollment with an enrollment gap of less than 30 days, and have at least 18 months of data in the claims dataset.

Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims could be inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient's episode of care. Hospitalizations carrying diagnosis codes relevant to hypertension, and relevant

admissions to post-acute care facilities are also included in the episode. If a patient has more than one concurrent episode open, and the claim is relevant to both episodes, the claim could get multi-assigned, except in the case of procedural episodes that get carved out with respect to the index stay.

Once all the relevant services are assigned, outlier episodes (those with total episode costs below the 1st percentile or above the 99th percentile) are excluded.

Cases meeting the Outcome -- Assembling the Numerator:

Episodes included in the denominator are flagged as having a PAC (potentially avoidable complication) if:

a. Any claim (professional, outpatient facility, ancillary) that is relevant has a PAC code in any position on the claim

b. Any admission to an inpatient facility, that is relevant to hypertension as identified through a relevant principal diagnosis code

Relevant claims that do not have any PAC codes, and do not qualify as a PAC based on the criteria outlined above, are listed as typical claims. All pharmacy services are considered typical because the claims don't include diagnosis codes. Episodes that have even a single PAC claim are added to the numerator.

Time-period of data:

The time-period to be analyzed for the measure is the most recent 12 months of a triggered hypertension episode.

Calculating the measure:

Proportion of HTN patients that have PACs is simply the ratio of patients with PACs within the HTN population and is called the PAC rate as shown in the equation below:

PAC rate = Patients with HTN that have at least one PAC claim / Total number of HTN patients

Aggregating Data & Drill Down Calculations:

A flow chart demonstrating the series of steps and the counts of patients at each step is shown in the tab entitled Decision Tree of the enclosed workbook called NQF_HTN_all_codes_risk_adjustment 01.25.17.xls

Further analysis from this construct helps create actionable reports. For example, as shown in the tab labeled PAC overview, not only do we have the PAC rate for a population, we can calculate the frequency of PACs occurring due to hospitalizations, or in an outpatient facility, or in professional claims. These could be further broken down by the PAC type – type 1 being directly related to HTN and so actionable by the managing physician; and type 2 PACs related to patient safety and broader system failures and requiring collaboration among providers. The drill down details identify the highest volume PACs (see tab labeled as "PAC Drill down Graph"). This helps focus strategies in reducing PACs and make the data actionable.

Risk Adjustment:

Conceptual Model:

Variations in outcomes across populations may be due to patient-related factors or due to provider-controlled factors. When we adjust for patient-related factors, the remaining variance in PAC rates are due to factors that could be controlled by all providers that are managing or co-managing the patient, during the entire episode time window.

Once we have the observed PAC rates based on the above calculations, we risk-adjust them for patient factors such as patient demographics, comorbidities collected historically, and for

severity of illness using subtypes indicators collected from the trigger claim and / or the look-back period. This helps adjust for factors outside the providers control and levels the playing field for provider performance comparisons.

Unit of Analysis:

The unit of analysis is the individual episode.

Dependent Variable:

The dependent variable is a dichotomous variable indicating whether an episode had one or more PACs (=1) or not (=0).

Independent Variables:

Several patient-related "risk factors" or covariates are included in the model: This list was selected based on input from various clinical experts in clinical working groups. Risk Factors used in the models were:

Patient demographics: age, gender, and an indicator of whether a member has enrolled within the previous 6 months. This latter risk factor is intended to account for the patient's lack of claims history, which limits the number of potential comorbidities that can be identified.

Comorbidities: These are conditions or events that occurred prior to the start of the episode that can have a potential impact on the patient's risk of having a PAC. The risk factors are 170 disease indicators (0/1) identified through the presence of ICD diagnosis codes on individual medical claims and collected from the historical claims data before the start of an episode. These are universally applied across all episodes. Please see the tab labeled "All Risk Factors I-9" and "All Risk Factors I-10" for a list of risk factors and their corresponding codes in the enclosed workbook called NQF_HTN_all_codes_risk_adjustment 01.25.17.xls.

Episode Subtypes or Severity Markers: These are markers that distinguish an episode as being more severe than another. They indicate either specific patient comorbidities that are known to make the procedure or condition more difficult to treat (e.g., obesity) or severity of the illness itself (e.g., hypertensive heart disease). Subtypes are unique to each episode. Please see the tab labeled "Subtypes I-9 & I-10" for a list of subtypes and their corresponding codes in the enclosed workbook called NQF_HTN_all_codes_risk_adjustment 01.25.17.xls

To avoid creating perverse incentives all comorbidities and subtypes are identified prior to or at the very start of the episode. None are identified during the episode period.

Statistical Methods:

We use logistic regression to model the probability of at least one PAC occurring during the episode. For each patient, based on their historic risk / severity profile, the "predicted" coefficients from the risk adjustment models are summed to give the "patient-level" predicted probabilities of the occurrence of a PAC.

To prevent unstable coefficients, comorbidities and subtypes are included in the models as covariates if they are present in at least 10 episodes. No further model building is conducted after the initial models are built. This reflects a desire to explain as much variation in the probability of having a PAC as possible, but it does not make it a priority that all covariates in the model be individually significant or even uncorrelated with each other. Accordingly, the model uses a very large group of covariates. This modeling approach allows for fewer potentially artificial constraints around the definitions of what constitutes severity of a episode condition, and lets each regression model determine for itself which of the factors are more significant for a specific episode. Non-significant covariates in episode models can not overly influence

predicted outcomes, nor is much harm realized, if a group of correlated covariates work together to explain variation rather than having the variation explained by a single best factor.

The risk adjustment model for hypertention are shown in the enclosed workbook entitled NQF_HTN_all_codes_risk_adjustment 01.25.17.xls, tab entitled HTN_Risk_Model. All the variables with an n >=10 are retained in the model and the model coefficients are shown, along with their z-scores and p-values. As you may notice some of the covariates such as obesity are collected from both historical claims (risk factors) as well as from the episode trigger date and look-back period of the episode (subtypes).

When more than one line of business is included in the data, separate models are calculated for each sample (i.e., commercial, Medicaid etc.).

Provider Attribution and calculating PAC rates by provider group:

Once episodes are constructed they are attributed to the provider group that has the maximum number of E&M claims during the episode time window.

To directly compare PAC rates across provider groups while also appropriately accounting for differences in patient severity, we calculate a risk-standardized PAC rate (RSPR) for each provider group. This method is similar to the methods employed by the Centers for Medicare and Medicaid Services (CMS) and endorsed by the National Quality Forum (NQF) to construct similar provider-level measures (i.e., mortality, readmissions, etc.).

1. For each provider group, the actual number of PAC occurrences are summed across all attributed patients, to give the "observed" PAC rates for HTN for the provider group.

2. Similarly, patient-level probability estimates are summed across all attributed patients to give "expected" PAC rates for the provider group.

3. The observed sum is then divided by the summed probabilities (O/E). This number yields whether the provider group had more PACs than expected (ratio>1), as expected (ratio=1), or less than expected (ratio<1). This calculation yields a practice-level unstandardized performance ratio.

4. To facilitate accurate comparisons of rates across provider groups, the O/E ratio is multiplied by the overall expected PAC rate across all provider groups, to obtain the risk-standardized PAC rate (RSPR) for the group.

The formula for this calculation is as follows:

RSPR_j={(SUM Observed_ij)/(SUM Prob_ij)} × {(SUM Prob_i) / (# of episodes)}

Where an individual i is attributed to the unit of attribution j (e.g., physician group)

The risk-standardized PAC rate (RSPR) therefore adjusts the provider group's observed PAC rate, by the severity of its patients. It represents what a provider group's PAC rate would be if its patient population was reflective of the overall population, leveling the playing field, and allowing for meaningful comparisons across all groups adjusted similarly.

This is what we call RSPR (risk standardized PAC rate) and is used for provider group outcomes comparisons.

Minimum sample size requirements for PAC measures are a function of the reliability testing of the measures on every dataset on which the measures are applied. Our research suggests that minimum sample sizes to achieve high degrees of reliability in the measures are a function of the dataset analyzed, and as such may vary from dataset to dataset. One should not infer that a minimum sample size achieved, or even a general lack of reliability, in one dataset will apply to another. 113253

5.1 Identified measures: 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)

0337 : Pressure Ulcer Rate (PDI 2)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Some measures such as 0337, 0450, and NQMC 010028 are in fact, subsets of our measure and so harmonized. However, there are some measures that are not harmonized, in particular the Hospital wide all-cause readmission measure. While the submitted PAC measure include hospitalizations and readmissions that occur during the episode time window, the hospitalizations, by definition, have to be relevant to the underlying condition. For chronic conditions, most relevant hospitalizations within the entire episode time window are considered potentially avoidable. PACs include readmissions and are designed to enable accountability at the locus of provider control as well as some shared accountability between settings, centered around a patient, and for a specific medical episode of care. In that sense, they are consistent with the all-cause 30-day readmission rates, but represent a subset of those admissions. However, they do extend to the entire episode time window. As such, the PAC measures, as submitted, don't create added burden of reporting because the readmissions reported are simply a part of the broader 30-day all-cause readmission measures already endorsed by NQF. Because PAC measures are comprehensive, they include patient safety events as well as other adverse events, including hospitalizations and ED visits during the entire continuum of care. As a result, they are a comprehensive measure of avoidable complications for a specific medical episode. The data collection for the measures is automated by a software package and is fully harmonized with all other PAC measures. A single download automates creation of all reports related to each of the PAC measures.

5b.1 If competing, why superior or rationale for additive value: PAC measures are composite measures representing "all-cause harms". They look at many "care defects" comprehensively. They are composed of several cross-cutting measures and together they paint a global picture of the provider's overall performance.

PACs may occur any time during the most recent 12. Furthermore, the measure is constructed so that the occurrence of any number of PACs during a defined episode would only count as one occurrence. PACs look at readmissions, emergency room visits, adverse events due to errors of omission or commission. They look at complications that are due to patient safety failures, and also those directly related to the index condition. These are all a cause of significant waste and quality concerns. As such, the measure can provide clinicians with an overall and comprehensive view, in one measure, of all potentially avoidable complications for a patient and drive quality improvement efforts.

For clinicians and facilities increasingly engaged in value-based payment efforts and/or driving quality improvement for population health, the value of a PAC measure over a series of related, but more discrete measures, is that one can better determine if the sources of complications primarily stem from activities within the facility or outside the facility, and the specific nature of the complications that have a higher frequency of occurrence. While individual components of the PAC measure may have small frequencies and may be difficult to interpret with regards to provider performance or actionability, aggregating all the PACs into a comprehensive, composite measure provides the parsimony that is so desirable. For providers, it's far easier to

construct a quality dashboard from a parsimonious set of measures, and that's what PAC measures offer.

Further, as a comprehensive outcome measure, PACs are also useful for public transparency of quality, as substantiated by the research from Judy Hibbard and colleagues previously cited in the "testing" section of this submission. As a comprehensive outcome measure, they are easier to explain to the average consumer. From a patient's point of view, any bad outcome has an impact on their health with respect to return to work, functional limitations and need for additional support. If a provider has a high PAC rate with regards to one component PAC but not the other PACs, the impact on the patient is still adverse. In selecting providers, individual component PAC scores would mean nothing to a patient, but aggregating it to a comprehensive quality score could be a measure of "all-cause" harms and easier to interpret and act on.

2749 Proportion of Patients with Arrhythmias (ARR) That Have a Potentially Avoidable Complication (during the episode time window)

STATUS

Submitted

STEWARD

Altarum Institute

DESCRIPTION

Percent of adult population aged 18 + years with arrhythmias (ARR) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_ARRBLK_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to ARR.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to ARR, such as for hypotension, acute heart failure, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs related to Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with ARR are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for acute pulmonary edema in an arrhythmia patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs in the most recent 12 months, they get counted as a "yes" or a 1. The "PAC overview" tab in the enclosed workbook labeled NQF_ARRBLK_all_codes_risk_adjustment_01.25.17.xls gives the percent of ARR episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in ARR episodes within this dataset. The Decision Tree tab in the

same workbook highlights the flow diagrams for the selection of patients with ARR for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in “allowed amounts” for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

TYPE

Outcome

DATA SOURCE

Claims (Only) The information is based on a two-year claims database from a large regional commercial insurer. The database has over 3.2 million covered lives and $25.9 billion in “allowed amounts” for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

The methodology can be used on any claims database with at least two years of data and a minimum of 150 patients with the index condition or hospitalization.

The calculations of rates of potentially avoidable complications can be replicated by anyone that uses the measure specifications along with the metadata file that is available for free on our web site at http://www.hci3.org/ecre/xml-agreement.html.

We also plan on providing a limited automated analysis, at no cost, on our website.

The methodology has been tested on databases of several health plans as well as on a few employer databases.

No data collection instrument was used.

No data collection instrument provided Attachment NQF_ARRBLK_all_codes_risk_adjustment_01.25.17.xlsx

LEVEL

Clinician : Group/Practice

SETTING

Ambulatory Surgery Center, Clinician Office/Clinic, Other Across the care continuum

NUMERATOR STATEMENT

Outcome: Number of patients with an episode of arrhythmias (ARR) that had one or more potentially avoidable complications (PACs) during the most recent 12 months.

NUMERATOR DETAILS

Patients with a ARR episode, that were identified as having services that included a potentially avoidable complications (PACs) diagnosis code during the most recent 12 months of the episode. The enclosed excel workbook entitled NQF_ARRBLK_all_codes_risk_adjustment_01.25.17 gives the detailed codes for PACs in the tab entitled PACs I-9s & I-10s. In the PAC tab, a PAC group name is given in column B, PAC type in column C, PAC ICD-9 diagnosis codes in column D and PAC ICD-10 diagnosis codes in column E. PACs are identified only based on diagnosis codes.

Services for PACs are identified as follows:

a. Any service (professional, outpatient facility, ancillary) that is relevant to ARR and has a PAC code in any position on the claim

b. Any admission to an inpatient facility, that has a diagnosis code in the principal position that is relevant to ARR

DENOMINATOR STATEMENT

Adult patients aged 18 years and above with an episode of arrhythmias (ARR) and are followed for at least 12months.

DENOMINATOR DETAILS

Please refer to the enclosed excel workbook entitled NQF_ARRBLK_all_codes_risk_adjustment 01.25.17 - tab entitled "Triggers I-9 & I-10"

The target population is identified using the following criteria:

Using administrative claims database, patients with ARR are identified using one of the following trigger criteria:

a. Patients having an office visit with a trigger diagnosis code of ARR, in any position, followed by a second confirmatory claim at least 30 days later that could be an office visit, or an outpatient facility claim (with a trigger diagnosis code of ARR in any position), or an inpatient stay claim (with a trigger code of ARR in the principal position).

b. Patients having an emergency department visit with a trigger diagnosis code of ARR in any position.

c. Patients with an acute care facility claim with a trigger diagnosis code of ARR in the principal position.

Inclusion criteria: Patients identified to have ARR based on the trigger criteria listed above are retained in the measure if they meet the following inclusion criteria:

1. The patient has continuous enrollment for the entire time window, with no more than a 30-day enrollment gap.

2. The patient has at least 18 months of claims in the database.

3. Patient is at least 18 years of age

Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims include inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient's episode of care. Services that contain a PAC code and that are assigned to a ARR episode will be flagged as a potentially avoidable complication.

EXCLUSIONS

Patients are excluded from the measure if they are less than 18 years of age, have an incomplete episode of care (less than 18 months of claims), have an enrollment gap of more than 30 days, or have outlier costs for the most recent 12months of claim costs. Claims are excluded from the episode if they are for services that are not relevant for care of arrhythmia/heart block.

EXCLUSION DETAILS

Denominator exclusions include exclusions of "patients" as well as "claims" not relevant to ARR care. Please refer to the enclosed excel workbook entitled (NQF_ARRBLK_all_codes_risk_adjustment 01.25.17.xls)

1. "Patients" are excluded from the measure if they meet one of the following criteria:

a. If age is < 18 years

b. If gender is missing

c. If they do not have continuous enrollment for the entire time window with a maximum of 30 day enrollment gap with the entity providing the data (this helps determine if the database has captured most of the claims for the patient in the time window).

d. If the patient does not have at least 12 months of claims in the database (this helps eliminate incomplete episodes).

e. The episode cost is an outlier (less than 1st percentile or greater than 99th percentile value for all episodes of the same type). This eliminates extreme variation that may result from random outlier events.

2. Claims are excluded from a ARR episode if they are not considered relevant to the care for the chronic condition, such as trauma related claims, or are for major surgical services.

RISK ADJUSTMENT

Statistical risk model

113253

113253

STRATIFICATION

None

TYPE SCORE

Rate/proportion better quality = lower score

ALGORITHM

Identifying the Target Population -- Assembling the Denominator:

Using administrative claims database, patients with ARR are identified as those who fulfilled the trigger criteria for ARR. ARR patients should have claims that have trigger diagnosis codes as defined in the TRIGGERS tab (Triggers I-9 & I-10) of the enclosed workbook. In addition, they should meet one of the following trigger criteria:

1. Have a hospitalization with a trigger code in the principal position of an inpatient stay claim

2. Have an outpatient facility visit such as an emergency department visit with one of the trigger codes in any position, OR

3. Have a physician visit with a trigger code in any position AND a confirming claim at least 30 days later that could be any of the three below:

- An in-patient stay claim with a trigger diagnosis code of ARR in the principal position,

- An emergency department visit claim with a trigger code for ARR in any position or

- Another professional visit claim with a trigger code for ARR in any position

Patients are retained if they are 18 years of age or more, do not have a missing gender, have continuous enrollment with an enrollment gap of less than 30 days, and have at least 18 months of data in the claims dataset. Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims could be inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient's episode of care. Hospitalizations carrying diagnosis codes relevant to ARR, and relevant admissions to post-acute care facilities are also included in the episode.

If a patient has more than one concurrent episode, and the claim is relevant to both episodes, the claim could get multi-assigned, except in the case of procedural episodes that get carved out with respect to the index stay. So if an inpatient stay claim carried a principal Dx code that matched the trigger diagnosis code for ARR but they also had a procedure code for PCMDFR (pacemaker), the stay claim would get uniquely assigned to PCMDFR and not be counted with ARR.

Once all the relevant services are assigned, outlier episodes (those with total episode costs below the 1st percentile or above the 99th percentile) are excluded.

Cases meeting the Outcome -- Assembling the Numerator:

Episodes included in the denominator are flagged as having a PAC (potentially avoidable complication) if:

a. Any claim (professional, outpatient facility, ancillary) that is relevant has a PAC code in any position on the claim

b. Any admission to an inpatient facility, that is relevant to ARR as identified through a relevant principal diagnosis code

Relevant claims that do not have any PAC codes, and do not qualify as a PAC based on the criteria outlined above, are listed as typical claims. All pharmacy services are considered typical because the claims don't include diagnosis codes. Episodes that have even a single PAC claim are added to the numerator.

Time-period of data:

The time-period to be analyzed for the measure is the most recent 12 months of a triggered ARR episode.

Calculating the measure:

Proportion of ARR patients that have PACs, is simply the ratio of patients with PACs within the ARR population and is called the PAC rate as shown in the equation below:

PAC rate = Patients with ARR that have at least one PAC claim / Total number of ARR patients

Aggregating Data & Drill Down Calculations:

A flow chart demonstrating the series of steps and the counts of patients at each step is shown in tab entitled Decision Tree of the enclosed workbook called NQF_ARRBLK_all_codes_risk_adjustment 01.25.17.xls

Further analysis from this construct helps create actionable reports.

Further analysis from this construct helps create actionable reports. For example, as shown in the tab labeled PAC overview, not only do we have the PAC rate for a population, we can calculate the frequency of PACs occurring due to hospitalizations, or in an outpatient facility, or in professional claims. These could be further broken down by the PAC type – type 1 being directly related to ARR and so actionable by the managing physician; and type 2 PACs related to

patient safety and broader system failures and requiring collaboration among providers. The drill down details identify the highest volume PACs (see tab labeled as “PAC Drill down Graph”). This helps focus strategies in reducing PACs and make the data actionable.

Risk Adjustment:

Conceptual Model:

Variations in outcomes across populations may be due to patient-related factors or due to provider-controlled factors. When we adjust for patient-related factors, the remaining variance in PAC rates are due to factors that could be controlled by all providers that are managing or co-managing the patient, during the entire episode time window.

Once we have the observed PAC rates based on the above calculations, we risk-adjust them for patient factors such as patient demographics, comorbidities collected historically, and for severity of illness or procedure using subtypes collected from the index stay and / or look-back period. This helps adjust for factors outside the providers control and levels the playing field for provider performance comparisons.

Unit of Analysis:

The unit of analysis is the individual episode.

Dependent Variable:

The dependent variable is a dichotomous variable indicating whether an episode had one or more claims assigned as a PAC (=1) or not (=0).

Independent Variables:

Several patient-related “risk factors” or covariates are included in the model: This list was selected based on input from various clinical experts in clinical working groups. Risk Factors used in the models were:

Patient demographics: age, gender, and an indicator of whether a member has enrolled within the previous 6 months. This latter risk factor is intended to account for the patient’s lack of claims history, which limits the number of potential comorbidities that can be identified.

Comorbidities: These are conditions or events that occurred prior to the start of the episode that can have a potential impact on the patient’s risk of having a PAC. The risk factors are 170 disease indicators (0/1) identified through the presence of ICD diagnosis codes on individual medical claims and collected from the historical claims data before the start of an episode. These are universally applied across all episodes. Please see the tab labeled “All Risk Factors I-9” and “All Risk Factors I-10” for a list of risk factors and their corresponding codes in the enclosed workbook called NQF_ARRBLK_all_codes_risk_adjustment 01.25.17.xls

Episode Subtypes or Severity Markers: These are markers that distinguish an episode as being more severe than another. They indicate either specific patient comorbidities that are known to make the procedure or condition more difficult to treat (e.g., heart aneurysm, obesity) or severity of the illness itself (e.g., high grade heart block). Please see the tab labeled “Subtypes I-9” and “Subtypes I-10” for a list of subtypes and their corresponding codes in the enclosed workbook called NQF_ARRBLK_all_codes_risk_adjustment 01.25.17

To avoid creating perverse incentives all comorbidities and subtypes are identified prior to or at the very start of the episode. None are identified during the episode period.

Statistical Methods

We use logistic regression to model the probability of at least one PAC occurring during the episode. For each patient, based on their historic risk / severity profile, the “predicted”

coefficients from the risk adjustment models are summed to give the “patient-level” predicted probabilities of the occurrence of a PAC.

To prevent unstable coefficients, comorbidities and subtypes are included in the models as covariates if they are present in at least 10 episodes. No further model building is conducted after the initial models are built. This reflects a desire to explain as much variation in the probability of having a PAC as possible, but it does not make it a priority that all covariates in the model be individually significant or even uncorrelated with each other. Accordingly, the model uses a very large group of covariates. This modeling approach allows for fewer potentially artificial constraints around the definitions of what constitutes severity of a episode condition, and lets each regression model determine for itself which of the factors are more significant for a specific episode. Non-significant covariates in episode models can not overly influence predicted outcomes, nor is much harm realized, if a group of correlated covariates work together to explain variation rather than having the variation explained by a single best factor.

The risk adjustment model for ARR are shown in the enclosed workbook entitled NQF_ARR_all_codes_risk_adjustment 01.25.17.xls, tab entitled ARR_Risk_Model. All the variables with an n >=10 are retained in the model and the model coefficients are shown, along with their z-scores and p-values. As you may notice some of the covariates such as obesity are collected from both historical claims (risk factors) as well as from the episode trigger date and look-back period of the episode (subtypes). When more than one line of business is included in the data, separate models are calculated for each sample (i.e., commercial, Medicaid etc.).

Provider Attribution and calculating PAC rates by provider group:

Once episodes are constructed they are attributed to the provider group that has the maximum number of E&M claims during the episode time window.

To directly compare PAC rates across provider groups while also appropriately accounting for differences in patient severity, we calculate a risk-standardized PAC rate (RSPR) for each provider group. This method is similar to the methods employed by the Centers for Medicare and Medicaid Services (CMS) and endorsed by the National Quality Forum (NQF) to construct similar provider-level measures (i.e., mortality, readmissions, etc.).

1. For each provider group, the actual number of PAC occurrences are summed across all attributed patients, to give the “observed” PAC rates for ARR for the provider group.

2. Similarly, patient-level probability estimates are summed across all attributed patients to give “expected” PAC rates for the provider group.

3. The observed sum is then divided by the summed probabilities (O/E). This number yields whether the provider group had more PACs than expected (ratio>1), as expected (ratio=1), or less than expected (ratio<1). This calculation yields a practice-level unstandardized performance ratio.

4. To facilitate accurate comparisons of rates across provider groups, the O/E ratio is multiplied by the overall expected PAC rate across all provider groups, to obtain the risk-standardized PAC rate (RSPR) for the group.

The formula for this calculation is as follows:

Adj Outcome_j={(SUM Observed_ij)/(SUM Prob_ij)} × {(SUM Prob_i) / (# of episodes)}

Where individual is attributed to unit of analysis j (e.g., physician group)

The risk-standardized PAC rate (RSPR) therefore adjusts the provider group’s observed PAC rate, by the severity of its patients. It represents what a provider group’s PAC rate would be if its

patient population was reflective of the overall population, leveling the playing field, and allowing for meaningful comparisons across all groups adjusted similarly.

This is what we call RSPR (risk standardized PAC rate) and is used for provider group outcomes comparisons.

Minimum sample size requirements for PAC measures are a function of the reliability testing of the measures on every dataset on which the measures are applied. Our research suggests that minimum sample sizes to achieve high degrees of reliability in the measures are a function of the dataset analyzed, and as such may vary from dataset to dataset. One should not infer that a minimum sample size achieved in one dataset would apply to another. 113253

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5.1 Identified measures: 0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)

0337 : Pressure Ulcer Rate (PDI 2)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Some measures such as 0337, 0450, and NQMC 010028 are in fact, subsets of our measure and so harmonized. However, there are some measures that are not harmonized, in particular, the Hospital wide all-cause readmission measure. While the submitted PAC measure include hospitalizations and readmissions that occur during the episode time window, the hospitalizations, by definition, have to be relevant to the underlying condition. For chronic conditions, most relevant hospitalizations within the entire episode time window are considered potentially avoidable. PACs include readmissions and are designed to enable accountability at the locus of provider control as well as some shared accountability between settings, centered around a patient, and for a specific medical episode of care. In that sense, they are consistent with the all-cause 30-day readmission rates, but represent a subset of those admissions. However, they do extend to the entire episode time window. As such, the PAC measures, as submitted, don't create added burden of reporting because the readmissions reported are simply a part of the broader 30-day all-cause readmission measures already endorsed by NQF. Because PAC measures are comprehensive, they include patient safety events as well as other adverse events, including hospitalizations and ED visits during the entire continuum of care. As a result, they are a comprehensive measure of avoidable complications for a specific medical episode. The data collection for all of the measures is automated by a software package and is fully harmonized with all other PAC measures. A single download automates creation of all reports related to each of the PAC measures.

5b.1 If competing, why superior or rationale for additive value: PAC measures are composite measures representing "all-cause harms". They look at many "care defects" comprehensively. They are composed of several cross-cutting measures and together they paint a global picture of the provider's overall performance.

PACs may occur any time during the most recent 12 months. Furthermore, the measure is constructed so that the occurrence of any number of PACs during a defined episode would only count as one occurrence. PACs look at readmissions, emergency room visits, adverse events due to errors of omission or commission. They look at complications that are due to patient safety failures, and also those directly related to the index condition. These are all a cause of significant waste and quality concerns. As such, the measure can provide clinicians with an overall and

comprehensive view, in one measure, of all potentially avoidable complications for a patient and drive quality improvement efforts.

For clinicians and facilities increasingly engaged in value-based payment efforts and/or driving quality improvement for population health, the value of a PAC measure over a series of related, but more discrete measures, is that one can better determine if the sources of complications primarily stem from activities within the facility or outside the facility, and the specific nature of the complications that have a higher frequency of occurrence. While individual components of the PAC measure may have small frequencies and may be difficult to interpret with regards to provider performance or actionability, aggregating all the PACs into a comprehensive, composite measure provides the parsimony that is so desirable. For providers, it's far easier to construct a quality dashboard from a parsimonious set of measures, and that's what PAC measures offer.

Further, as a comprehensive outcome measure, PACs are also useful for public transparency of quality, as substantiated by the research from Judy Hibbard and colleagues previously cited in the "testing" section of this submission. As a comprehensive outcome measure, they are easier to explain to the average consumer. From a patient's point of view, any bad outcome has an impact on their health with respect to return to work, functional limitations and need for additional support. If a provider has a high PAC rate with regards to one component PAC but not the other PACs, the impact on the patient is still adverse. In selecting providers, individual component PAC scores would mean nothing to a patient, but aggregating it to a comprehensive quality score could be a measure of "all-cause" harms and easier to interpret and act on.

2751 Proportion of Patients undergoing an Angioplasty Procedure (Percutaneous Coronary Intervention - PCI) That Have a Potentially Avoidable Complication (during the episode time window)

STATUS

Submitted

STEWARD

Altarum Institute

DESCRIPTION

Percent of adult population aged 18 + years who had a percutaneous coronary intervention (PCI) procedure, are followed for at least 90-days, and have one or more potentially avoidable complications (PACs). PACs may occur during the index stay or during the 90-day post discharge period.

Please reference attached document labeled NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to PCI.

We define PACs as one of two types:

(1) Type 1 PACs - PACs directly related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to PCI, such as for hypotension, cardiac arrest, fluid and electrolyte disturbances etc.

(2) Type 2 PACs - PACs suggesting Patient Safety or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

All relevant admissions in a patient with PCI are considered potentially avoidable and flagged as PACs. This particularly applies to hospitalizations due to acute exacerbations of the index condition. For example, a hospitalization for (insert condition) in a PCI patient is considered a PAC.

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs, they get counted as a "yes" or a 1. The enclosed workbook labeled NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx serves as an example. The tab labeled PAC overview gives the percent of PCI episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in PCI episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with PCI for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

TYPE

Outcome

DATA SOURCE

Claims (Only) The information is based on a two-year claims database from a commercial insurer. The database has over 3.2 million covered lives and $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

The methodology can be used on any claims database with at least two years of data and a minimum of 150 patients with the index condition or hospitalization.

The calculations of rates of potentially avoidable complications can be replicated by anyone that uses the measure specifications

along with the metadata file that is available for free on our web site at http://www.hci3.org/ecre/xml-agreement.html.

We also plan on providing a limited automated analysis, at no cost, on our website.

The methodology has been tested on databases of several health plans as well as on a few employer databases.

No data collection instrument was used.

No data collection instrument provided Attachment NQF_PCI_all_codes_risk_adjustment_01.25.17_xlsx.xlsx

LEVEL

Facility

SETTING

Ambulatory Surgery Center, Hospital, Other Across the care continuum

NUMERATOR STATEMENT

Number of patients who underwent a percutaneous coronary intervention (PCI) procedure, are followed for at least 90-days, and have one or more potentially avoidable complications (PACs) during the episode time window.

NUMERATOR DETAILS

Patients that have triggered a PCI episode, are followed for at least 90-days, and are identified as having services for potentially avoidable complications (PACs). PACs may occur during the index stay or during the 90-day post discharge period. The enclosed excel workbook entitled NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx gives the detailed codes for PACs in the tabs entitled PACs I-9 and PACs I-10. In the PAC tab, a PAC group name is given in column B, PAC type in column C, PAC ICD-9 diagnosis codes in Column D and PAC ICD-10 diagnosis codes in column E. PACs are identified only based on diagnosis codes.

Services for PACs are identified as follows:

a. Any Index stay that has a PAC diagnosis code in any position except in the PRIMARY (principal) position is considered as having a potentially avoidable complication

b. Any readmission to an acute care facility 2 days or later after discharge but within 90-days post-discharge, that is relevant to PCI

c. Any admission to a post-acute care facility, that is relevant to PCI and has a PAC code in any position on the claim

d. Any other service (professional, outpatient facility, ancillary) that is relevant to PCI and has a PAC code in any position on the claim

DENOMINATOR STATEMENT

Adult patients aged 18 years and above who underwent an Angioplasty (percutaneous coronary intervention - PCI) procedure and are followed for at least 90-days

DENOMINATOR DETAILS

Please refer to the enclosed excel workbook entitled

NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx- tab entitled “Triggers I-9 and I-10”The target population is identified using the following criteria:

1. Using administrative claims database, patients undergoing PCI are identified using one of the following criteria:

a. Patients with a principal procedure code of PCI on an inpatient stay claim with a qualifying principal diagnosis code relevant to the PCI procedure.

b. Patients with a procedure trigger code of PCI in any position on an outpatient facility claim with a qualifying diagnosis code relevant to the PCI procedure in any position.

c. Patients having a professional service carrying a procedure trigger code of PCI in any position with a qualifying diagnosis code relevant to the PCI procedure in any position .

The trigger codes for PCI and the qualifying diagnosis codes are provided in the tab called “Triggers I-9” or “Triggers I-10”.

2. The patient should have continuous enrollment for the entire time window with no more than 30 days as an enrollment gap, with the entity providing the data (so we can ensure that the database has captured most of the claims for the patient during the episode time window).

3. The patient should have a complete episode time window in the claims data – so the end date of the episode should not be past the database claims end date.

4. Patient should be at least 18 years of age

5. Patients that have a trigger code on a professional claim and have no associated facility bill are considered as having an orphan (incomplete) episode and are dropped from analysis.

Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims could be inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient's episode of care. Relevant index admissions, readmissions and admissions to post-acute care facilities are also included in the episode.

EXCLUSIONS

Patients are excluded from the measure if they are less than 18 years of age, have any enrollment gap during the episode time window, or have outlier costs.

Claims are excluded from the episode if they are for services that are not relevant to PCI care.

EXCLUSION DETAILS

Denominator exclusions include exclusions of "patients" as well as "claims" not relevant to PCI care. Please refer to the enclosed excel workbook entitled (NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx)

1. "Patients" are excluded from the measure if they meet one of the following criteria:

a. If age is < 18 years

b. If gender is missing

c. If they do not have continuous enrollment for the entire time window with the entity providing the data

d. If the episode time window extends beyond the dataset end date

e. the episode is an outlier, defined as in the 1st or 99th percentile of all episodes.

2. Claims are excluded from a PCI episode if they are not considered relevant to PCI care, such as claims for the management of other unrelated chronic conditions or other major surgical procedures.

RISK ADJUSTMENT

Statistical risk model

113253

113253

STRATIFICATION

None

TYPE SCORE

Rate/proportion better quality = lower score

Please refer to the enclosed excel workbook entitled (NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx).

Identifying the Target Population --Assembling the Denominator:

Using administrative claims database, patients undergoing a PCI are identified using one of the following criteria: 1) Patients with a procedure code of PCI in the principal position on an in-patient facility claim with a qualifying principal diagnosis code relevant to the PCI procedure, 2) Patients with a procedure code of PCI in any position on an out-patient facility claim with a qualifying diagnosis code relevant to the PCI procedure in any position, 3) Patients having a professional service carrying a trigger procedure code of PCI in any position with a qualifying diagnosis code relevant to the PCI procedure in any position. The trigger codes for PCI are provided in the tab called “Triggers I-9” or “Triggers I-10”.

Patients are retained if they are 18 years of age or more, do not have a missing gender, have a complete episode time window in the database, have a maximum of 30-day enrollment gap for the entire episode time window, and have no outlier episode costs. All relevant professional, laboratory, imaging, ancillary and other claims that are incurred during the episode time window are included as part of the episode. Relevant index stays, readmissions and admissions to post-acute care facilities are also included in the denominator. All relevant pharmacy claims carrying codes that match the ingredients listed in the Pharmacy tab of the enclosed workbook are also included as part of the episode.

If a patient has more than one concurrent episode, and the claim is relevant to both episodes, the claim could get multi-assigned, except in the case of procedural episodes that get carved out with respect to the index stay. Therefore, if an inpatient stay claim carried a procedure code that matched the trigger procedure code for PCI but they also had a qualifying diagnosis code for CAD (coronary artery disease), the stay claim would trigger both episodes concurrently, but get uniquely assigned to PCI and not be counted with CAD.

Once all the episodes are assembled, episodes that match the exclusion criteria, such as those with outlier costs (those with total episode costs less than 1st percentile or greater than 99th percentile), are flagged and excluded from the final analysis.

Cases meeting the Outcome: Assembling the Numerator:

For every episode included in the denominator, services are flagged as having a PAC (potentially avoidable complication) based on the criteria listed below:

-Any Index stay that has a PAC diagnosis code in any position except in the PRIMARY (principal) position is considered as having a potentially avoidable complication

-Any readmission to an acute care facility 2 days or later after discharge but within 90-days post-discharge, that is relevant to PCI

-Any admission to a post-acute care facility, that is relevant to PCI and has a PAC code in any position on the claim

-Any other service (professional, outpatient facility, laboratory, imaging, ancillary) that is relevant to PCI and has a PAC code in any position on the claim

Relevant claims that do not have any PAC codes, and do not qualify as a PAC based on the criteria outlined above, are listed as typical claims. All included relevant pharmacy services are flagged as typical because the claims don't include diagnosis codes. Patients that have even a single PAC claim are counted as part of the numerator.

Time-period of data:

The time-period to be analyzed for the measure consists of all relevant claims with a 30-day look-back period and a 90-day look-forward period from the trigger claim for a PCI episode.

Calculating the measure:

Proportion of PCI patients that have PACs is simply the ratio of patients with PACs within the PCI population and is called the PAC rate as shown in the equation below:

PAC rate = Patients with PCI that have at least one PAC claim / Total number of PCI patients

A flow chart demonstrating the series of steps and the counts of patients at each step is shown in tab entitled Decision Tree of the enclosed workbook called NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx

Aggregating Data & Drill Down Calculations:

Further analysis from this construct helps create actionable reports.

For example as shown in the tab labeled PAC overview, not only do we have the PAC rate for a population, we can calculate the frequency of PACs occurring due to hospitalizations, or in an outpatient facility, or in professional claims. These could be further broken down by the PAC type – type 1 being directly related to PCMDFR and so actionable by the servicing physician, while type 2 PACs are related to patient safety and broader system failures and can be improved by process improvement. The drill down details identify the highest volume PACs (see tab labeled as ?PAC Drill down Graph?). Additionally, analyzing what portion of the PACs occur during the index stay vs. in the post-discharge period and how many are due to readmissions helps focus strategies in reducing them.

Risk Adjustment:

Conceptual Model:

Variations in outcomes across populations may be due to patient-related factors or due to provider-controlled factors. When we adjust for patient-related factors, the remaining variance in PAC rates are due to factors that could be controlled by all providers that are managing or co-managing the patient, during the entire episode time window.

Once we have the observed PAC rates based on the above calculations, we risk-adjust them for patient factors such as patient demographics, comorbidities collected historically, and for severity of illness or procedure using subtypes collected from the index stay and / or look-back period. This helps adjust for factors outside the providers control and levels the playing field for provider performance comparisons.

Unit of Analysis:

The unit of analysis is the individual episode.

Dependent Variable:

The dependent variable is a dichotomous variable indicating whether an episode had one or more claims assigned as a PAC (=1) or not (=0).

Independent Variables:

Several patient-related “risk factors” or covariates are included in the model:

Patient demographics: age, gender, and an indicator of whether a member has enrolled within the previous 6 months. This latter risk factor is intended to account for the patient’s lack of claims history, which limits the number of potential comorbidities that can be identified.

Comorbidities: These are conditions or events that occurred prior to the start of the episode that can have a potential impact on the patient’s risk of having a PAC. The risk factors are 170 disease indicators (0/1) identified through the presence of ICD diagnosis codes on individual

medical claims and collected from the historical claims data before the start of an episode. These are universally applied across all episodes. Please see the tab labeled “All Risk Factors I-9” and “All Risk Factors I-10” for a list of risk factors and their corresponding codes in the enclosed workbook called NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx

Episode Subtypes or Severity Markers: These are markers that distinguish an episode as being more severe than another. They indicate either specific patient comorbidities that are known to make the procedure or condition more difficult to treat (e.g., obesity) or severity of the illness itself (e.g., unstable angina). Please see the tab labeled “Subtypes I-9” and “Subtypes I-10” for a list of subtypes and their corresponding codes in the enclosed workbook called NQF_PCI_all_codes_risk_adjustment_01.25.17 xlsx.

To avoid creating perverse incentives all comorbidities and subtypes are identified prior to or at the very start of the episode. None are identified during the episode period.

Statistical Methods:

We use logistic regression to model the probability of at least one PAC occurring during the episode.or each patient, based on their historic risk / severity profile, the "predicted" coefficients from the risk adjustment models are summed to give the "patient-level" predicted probabilities of the occurrence of a PAC. To prevent unstable coefficients, comorbidities and subtypes are included in the models as covariates if they are present in at least 10 episodes. No further model building is conducted after the initial models are built. This reflects a desire to explain as much variation in the probability of having a PAC as possible, but it does not make it a priority that all covariates in the model be individually significant or even uncorrelated with each other. Accordingly, the model uses a very large group of covariates. This modeling approach allows for fewer potentially artificial constraints around the definitions of what constitutes severity of a episode condition, and lets each regression model determine for itself which of the factors are more significant for a specific episode. Non-significant covariates in episode models can not overly influence predicted outcomes, nor is much harm realized, if a group of correlated covariates work together to explain variation rather than having the variation explained by a single best factor.

The risk adjustment model for PCI is shown in the enclosed workbook entitled NQF_PCI_all_codes_risk_adjustment 01.25.17.xls, tab entitled Risk_Model. All the variables with an n >=10 are retained in the model and the model coefficients are shown, along with their z-scores and p-values. As you may notice some of the covariates such as obesity are collected from both historical claims (risk factors) as well as from the episode trigger date and look-back period of the episode (subtypes). When more than one line of business is included in the data, separate models are calculated for each sample (i.e., commercial, Medicaid etc.).

Provider Attribution and calculating PAC rates by facility:

Once episodes are constructed they are attributed to providers based on one of the various attribution rules. For PCI, episodes are attributed to the facility where the episode triggered, or, if the episode is triggered off a professional claim, it is attributed to the first facility claim that overlaps the professional trigger claim date.

To directly compare PAC rates across facilities while also appropriately accounting for differences in patient severity, we calculate a risk-standardized PAC rate (RSPR) for each facility. Using the logistic regression technique described above, a model is developed that gives estimates for each risk factor and subtype for the patients in the population analyzed. These estimates are used to develop patient-level probabilities for the occurrence of PACs. The patient-level probability estimates are summed to construct aggregated measures (e.g.,

facility/provider-level). This method is similar to the methods employed by the Centers for Medicare and Medicaid Services (CMS) and endorsed by the National Quality Forum (NQF) to construct similar facility- and practice-level measures (i.e., mortality, readmissions, etc.):

1: For each facility, the actual number of PAC occurrences are summed across all attributed patients, to give the ?observed? PAC rates for the facility.

2. Similarly, patient-level probability estimates are summed across all attributed patients to give "expected" PAC rates for the facility.

3. The observed sum is then divided by the summed probabilities (O/E). This number yields whether the facility had more PACs than expected (ratio>1), as expected (ratio=1), or less than expected (ratio<1). This calculation yields a practice-level unstandardized performance ratio.

4. To facilitate accurate comparisons of rates across facilities, the O/E ratio is multiplied by the overall expected PAC rate across all facilities, to obtain the risk-standardized PAC rate (RSPR) for the facility.

The formula for this calculation is as follows:

Adj Outcome_j={(SUM Observed_ij)/(SUM Prob_ij)} × {(SUM Prob_i) / (# of episodes)}

Where individual is attributed to unit of analysis j (e.g., facility, practice, provider, etc.)

The risk-standardized PAC rate (RSPR) therefore adjusts the facility's observed PAC rate, by the severity of its patients. It represents what a facility's PAC rate would be if its patient population was reflective of the overall population, leveling the playing field, and allowing for meaningful comparisons across all facilities adjusted similarly.

This is what we call RSPR (risk standardized PAC rate) and is used for outcomes comparisons across facilities.

Minimum sample size requirements for PAC measures are a function of the reliability testing of the measures on every dataset on which the measures are applied. Our research suggests that minimum sample sizes to achieve high degrees of reliability in the measures are a function of the dataset analyzed, and as such may vary from dataset to dataset. One should not infer that a minimum sample size achieved, or even a general lack of reliability, in one dataset will apply to another. 113253

5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI)

0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)

0337 : Pressure Ulcer Rate (PDI 2)

0141 : Patient Fall Rate

0202 : Falls with injury

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Some measures such as 0531, 0450, 0337, 0141, 0202 are in fact, subsets of our measure. However, there are some measures that are not harmonized, in particular the 30-day all-cause readmission measure and the Hospital wide all-cause readmission measure. While the submitted PAC measures include hospitalizations and readmissions that occur during the episode time window, the hospitalizations, by definition, have to be relevant to the index event. PACs include relevant

readmissions, and are designed to enable accountability at the locus of provider control as well as some shared accountability between settings, centered around a patient, and for a specific medical episode of care. In that sense, they are consistent with the all-cause 30-day readmission rates, but represent a subset of those admissions. However, they do extend to the entire episode time window. As such, the PAC measures, as submitted, don't create added burden of reporting because the readmissions reported are simply a part of the broader 30-day all-cause readmission measures already endorsed by NQF. Because PAC measures are comprehensive, they include patient safety events that can occur during the stay, as well as adverse events, including readmissions, that can occur post-discharge. As a result, they provide facilities and physicians with an overall measure of avoidable complications for a specific medical episode. The data collection for the measures is automated by a software package and is fully harmonized with all other PAC measures. A single download automates creation of all reports related to each of the PAC measures.

5b.1 If competing, why superior or rationale for additive value: PAC measures are composite measures representing "all-cause harms". They look at many "care defects" comprehensively. They are composed of several cross-cutting measures and together they paint a global picture of the provider's overall performance.

PACs may occur any time during the 90-day episode time window. Furthermore, the measure is constructed so that the occurrence of any number of PACs during a defined episode would only count as one occurrence. PACs look at readmissions, emergency room visits, adverse events due to errors of omission or commission. They look at complications that are due to patient safety failures, and also those directly related to the index condition. These are all a cause of significant waste and quality concerns. As such, the measure can provide clinicians with an overall and comprehensive view, in one measure, of all potentially avoidable complications for a patient and drive quality improvement efforts.

For clinicians and facilities increasingly engaged in value-based payment efforts and/or driving quality improvement for population health, the value of a PAC measure over a series of related, but more discrete measures, is that one can better determine if the sources of complications primarily stem from activities within the facility or outside the facility, and the specific nature of the complications that have a higher frequency of occurrence. While individual components of the PAC measure may have small frequencies, and may be difficult to interpret with regards to provider performance or actionability, aggregating all the PACs into a comprehensive, composite measure provides the parsimony that is so desirable. For providers, it's far easier to construct a quality dashboard from a parsimonious set of measures, and that's what PAC measures offer.

Further, as a comprehensive outcome measure, PACs are also useful for public transparency of quality, as substantiated by the research from Judy Hibbard and colleagues previously cited in the "testing" section of this submission. As a comprehensive outcome measure, they are easier to explain to the average consumer. From a patient's point of view, any bad outcome has an impact on their health with respect to return to work, functional limitations and need for additional support. If a provider has a high PAC rate with regards to one component PAC but not the other PACs, the impact on the patient is still adverse. In selecting providers, individual component PAC scores would mean nothing to a patient, but aggregating it to a comprehensive quality score could be a measure of "all-cause" harms and easier to interpret and act on.

2752 Proportion of Patients undergoing Pacemaker / Defibrillator Implantation (PCMDFR) That Have a Potentially Avoidable Complication (during the episode time window)

STATUS

Submitted

STEWARD

Altarum Institute

DESCRIPTION

Percent of adult population aged 18 + years who had a pacemaker/defibrillator implantation (PCMDFR), are followed for at least 30-days, and have one or more potentially avoidable complications (PACs). PACs may occur during the index stay or during the 30-day post discharge period.

Please reference attached document labeled NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls, in the tabs labeled PACs I-9 and I-10 for a list of code definitions of PACs relevant to PCMDFR.

We define PACs as one of two types:

(1) Type 1 PACs - PACs related to the index condition: Patients are considered to have a PAC, if they receive services during the episode time window for any of the complications directly related to PCMDFR, such as for wound infection, hypotension, cardiac arrest etc.

(2) Type 2 PACs - PACs suggesting Patient Safety Failures or broader System Failures: Patients are also considered to have a PAC, if they receive services during the episode time window for any of the complications related to patient safety or health system failures such as for sepsis, infections, phlebitis, deep vein thrombosis, pressure sores etc.

PACs may occur at any point during the episode period, including the index stay or 30-day post discharge period

PACs are counted as a dichotomous (yes/no) outcome. If a patient had one or more PACs during the episode time window, they get counted as a "yes" or a 1. The enclosed workbook labeled NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls, serves as an example. The tab labeled PAC overview gives the percent of PCMDFR episodes that have a PAC and the tab labeled "PAC drill down" gives the types of PACs and their frequencies in PCMDFR episodes within this dataset. The Decision Tree tab in the same workbook highlights the flow diagrams for the selection of patients with PCMDFR for this measure.

The information is based on a two-year claims database from a commercial insurer. The database had over 3.2 million covered lives and over $25.9 billion in "allowed amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

TYPE

Outcome

DATA SOURCE

Claims (Only) The information is based on a two-year claims database from a large regional commercial insurer. The database has over 3.2 million covered lives and $25.9 billion in "allowed

amounts" for claims costs. The database is an administrative claims database with medical as well as pharmacy claims.

The methodology can be used on any claims database with at least two years of data and a minimum of 150 patients with the index condition or hospitalization. Having pharmacy data adds to the richness of the risk-adjustment models.

The calculations of rates of potentially avoidable complications can be replicated by anyone that uses the measure specifications along with the metadata file that is available for free on our web site at http://www.hci3.org/ecre/xml-agreement.html.

We also plan on providing a limited automated analysis, at no cost, on our website.

The methodology has been tested on databases of several health plans as well as on a few employer databases.

No data collection instrument was used.

No data collection instrument provided Attachment NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xlsx

LEVEL

Facility

SETTING

Ambulatory Surgery Center, Hospital, Other Across the care continuum

NUMERATOR STATEMENT

Number of patients who underwent a pacemaker/defibrillator implantation (PCMDFR), are followed for at least 30-days, and have one or more potentially avoidable complications (PACs) during the episode time window.

NUMERATOR DETAILS

Patients that have triggered a PCMDFR episode, are followed for at least 30-days, and are identified as having services for potentially avoidable complications (PACs). PACs may occur during the index stay or during the 30-day post discharge period. The enclosed excel workbook entitled NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls gives the detailed codes for PACs in the tabs entitled PACs I-9 and I-10. In the PAC tab, a PAC group name is given in column B, PAC type in column C, PAC ICD-9 diagnosis codes in column D and PAC ICD-10 diagnosis codes in column E. PACs are identified only based on diagnosis codes.

Services for PACs are identified as follows:

a. Any Index stay that has a PAC diagnosis code in any position except in the PRIMARY (principal) position is considered as having a potentially avoidable complication

b. Any readmission to an acute care facility 2 days or later after discharge but within 30-days post-discharge, that is relevant to PCMDFR

c. Any admission to a post-acute care facility, that is relevant to PCMDFR and has a PAC code in any position on the claim

d. Any other service (professional, outpatient facility, ancillary) that is relevant to PCMDFR and has a PAC code in any position on the claim

DENOMINATOR STATEMENT

Adult patients aged 18 years and above who underwent a Pacemaker/defibrillator implantation (PCMDFR) procedure and are followed for at least 30-days.

DENOMINATOR DETAILS

Please refer to the enclosed excel workbook entitled NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls-tab entitled “Triggers I-9 and I-10”

The target population is identified using the following criteria:

1. Using administrative claims database, patients undergoing PCMDFR are identified using one of the following criteria:

a. Patients with a principal procedure code of PCMDFR on an inpatient stay claim with a qualifying principal diagnosis code relevant to the PCMDFR procedure.

b. Patients with a procedure trigger code of PCMDFR in any position on an outpatient facility claim with a qualifying diagnosis code relevant to the PCMDFR procedure in any position.

c. Patients having a professional service carrying a procedure trigger code of PCMDFR in any position with a qualifying diagnosis code relevant to the PCMDFR procedure in any position.

The trigger codes for PCMDFR and the qualifying diagnosis codes are provided in the tab called “Triggers I-9 and I-10”.

2. The patient should have continuous enrollment for the entire time window with no enrollment gap, with the entity providing the data (so we can ensure that the database has captured most of the claims for the patient during the episode time window).

3. The patient should have a complete episode time window in the claims data – so the end date of the episode should not be past the database claims end date.

4. Patient should be at least 18 years of age

5. Patients that have a trigger code on a professional claim and have no associated facility bill are considered as having an orphan (incomplete) episode and are dropped from analysis.

Once the episode is triggered all relevant claims are assigned to the episode. Relevant claims could be inpatient facility claims, outpatient facility claims, professional services, laboratory services, imaging services, ancillary claims, home health, durable medical equipment as well as pharmacy claims across the entire continuum of care centered around the patient’s episode of care. Relevant index admissions, readmissions and admissions to post-acute care facilities are also included in the episode.

EXCLUSIONS

Patients are excluded from the measure if they are less than 18 years of age, have any enrollment gap during the episode time window, or have outlier costs.

Claims are excluded from the episode if they are for services that are not relevant to PCMDFR care.

EXCLUSION DETAILS

Denominator exclusions include exclusions of "patients" as well as "claims" not relevant to PCMDFR care. Please refer to the enclosed excel workbook entitled (NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls) – tab entitled Decision Tree

1. "Patients" are excluded from the measure if they meet one of the following criteria:

a. If age is < 18 years

b. If gender is missing

c. If they do not have continuous enrollment for the entire episode time window with the entity providing the data

d. If the episode time window extends beyond the dataset end date

e. the episode is an outlier, defined as in the 1st or 99th percentile of all episodes.

2. Claims are excluded from a PCMDFR episode if they are not considered relevant to PCMDFR care, such as claims for the management of other unrelated chronic conditions or other major surgical procedures.

RISK ADJUSTMENT

Statistical risk model

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STRATIFICATION

None

TYPE SCORE

Rate/proportion better quality = lower score

ALGORITHM

Please refer to the enclosed excel workbook entitled (NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls).

Identifying the Target Population -- Assembling the Denominator:

Using administrative claims database, patients undergoing a PCMDFR are identified using one of the following criteria:

1) Patients with a procedure code of PCMDFR in the principal position on an in-patient facility claim with a qualifying principal diagnosis code relevant to the PCMDFR procedure, 2) Patients with a procedure code of PCMDFR in any position on an outpatient facility claim with a qualifying diagnosis code relevant to the PCMDFR procedure in any position, 3) Patients having a professional service carrying a trigger procedure code of PCMDFR in any position with a qualifying diagnosis code relevant to the PCMDFR procedure in any position. The trigger codes for PCMDFR are provided in the tab called “Triggers I-9 and I-10”.

Patients are retained if they are 18 years of age or more, do not have a missing gender, have a complete episode time window in the database, have no enrollment gap for the entire episode time window, and have no outlier episode costs. All relevant professional, laboratory, imaging, ancillary and other claims that are incurred during the episode time window are included as part of the episode. Relevant index stays, readmissions and admissions to post-acute care facilities are also included in the episode. All relevant pharmacy claims are also included as part of the episode.

If a patient has more than one concurrent episode, and the claim is relevant to both episodes, the claim could get multi-assigned, except in the case of procedural episodes that get carved out with respect to the index stay. So if an inpatient stay claim carried a procedure code that matched the trigger procedure code for PCMDFR but they also had a qualifying diagnosis code

for arrhythmias, the stay claim would trigger both episodes concurrently, but get uniquely assigned to PCMDFR and not be counted with and episode of arrhythmia.

Once all the relevant services are assigned, outlier episodes (those with total episode costs below the 1st percentile or above the 99th percentile) are flagged and excluded.

Cases meeting the Outcome -- Assembling the Numerator:

For every episode included in the denominator, services are flagged as having a PAC (potentially avoidable complication) based on the criteria listed below:

Any Index stay that has a PAC diagnosis code in any position except in the PRIMARY (principal) position

Any readmission to an acute care facility 2 days or later after discharge but within 30-days post-discharge, that is relevant to PCMDFR

Any admission to a post-acute care facility, that is relevant to PCMDFR and has a PAC code in any position on the claim

Any other service (professional, outpatient facility, laboratory, imaging, ancillary) that is relevant to PCMDFR and has a PAC code in any position on the claim

Relevant claims that do not have any PAC codes, and do not qualify as a PAC based on the criteria outlined above, are listed as typical claims. All included relevant pharmacy services are flagged as typical because the claims don't include diagnosis codes. Patients that have even a single PAC claim are counted as part of the numerator.

Time-period of data:

The time-period to be analyzed for the measure consists of all relevant claims with a 7-day look-back period and a 30-day look-forward period from the trigger claim for a PCMDRF episode.

Calculating the measure:

Proportion of PCMDFR patients that have PACs, is simply the ratio of patients with PACs within the PCMDFR population and is called the PAC rate as shown in the equation below:

PAC rate = Patients with PCMDFR that have at least one PAC claim / Total number of PCMDFR patients

Aggregating Data & Drill Down Calculations:

A flow chart demonstrating the series of steps and the counts of patients at each step is shown in tab entitled Decision Tree of the enclosed workbook called NQF_PCMDFR_all_codes_risk_adjustment_01.26.17.xls

Further analysis from this construct helps create actionable reports.

For example as shown in the tab labeled PAC overview, not only do we have the PAC rate for a population, we can calculate the frequency of PACs occurring due to hospitalizations, or in an outpatient facility, or in professional claims. These could be further broken by the PAC type – type 1 being directly related to PCMDFR and so actionable by the servicing physician, while type 2 PACs are related to patient safety and broader system failures and can be improved by process improvement. The drill down details identify the highest volume PACs (see tab labeled as "PAC Drill down Graph"). Additionally, analyzing what portion of the PACs occur during the index stay, vs. in the post-discharge period and how many are due to readmissions helps focus strategies in reducing them.

Risk Adjustment:

Conceptual Model:

Variations in outcomes across populations may be due to patient-related factors or due to provider-controlled factors. When we adjust for patient-related factors, the remaining variance in PAC rates are due to factors that could be controlled by all providers that are managing or co-managing the patient, during the entire episode time window.

Once we have the observed PAC rates based on the above calculations, we risk-adjust them for patient factors such as patient demographics, comorbidities collected historically, and for severity of illness or procedure using subtypes collected from the index stay and / or look-back period. This helps adjust for factors outside the providers control and levels the playing field for provider performance comparisons.

Unit of Analysis:

The unit of analysis is the individual episode.

Dependent Variable:

The dependent variable is a dichotomous variable indicating whether an episode had one or more claims assigned as a PAC (=1) or not (=0).

Independent Variables:

Several patient-related "risk factors" or covariates are included in the model. This list was selected based on input from various clinical experts in clinical working groups. Risk Factors used in the models were:

Patient demographics: age, gender, and an indicator of whether a member has enrolled within the previous 6 months. This latter risk factor is intended to account for the patient's lack of claims history, which limits the number of potential comorbidities that can be identified.

Comorbidities: These are conditions or events that occurred prior to the start of the episode that can have a potential impact on the patient's risk of having a PAC. The risk factors are 170 disease indicators (0/1) identified through the presence of ICD diagnosis codes on individual medical claims and collected from the historical claims data before the start of an episode. These are universally applied across all episodes. Please see the tab labeled "All Risk Factors I-9" and "All Risk Factors I-10" for a list of risk factors and their corresponding codes in the enclosed workbook called NQF_PCMDFR_all_codes_risk_adjustment 01.25.17.xls

Episode Subtypes or Severity Markers: These are markers that distinguish an episode as being more severe than another. They indicate either specific patient comorbidities that are known to make the procedure or condition more difficult to treat (e.g., obesity) or severity of the illness itself (e.g., unstable angina, cardiomyopathy etc.). Please see the tab labeled "Subtypes I-9 and I-10" for a list of subtypes and their corresponding codes in the enclosed workbook called NQF_PCMDFR_all_codes_risk_adjustment 01.25.17.xls

To avoid creating perverse incentives all comorbidities and subtypes are identified prior to or at the very start of the episode. None are identified during the episode period.

Statistical Methods:

We use logistic regression to model the probability of at least one PAC occurring during the episode. For each patient, based on their historic risk / severity profile, the "predicted" coefficients from the risk adjustment models are summed to give the "patient-level" predicted probabilities of the occurrence of a PAC.

To prevent unstable coefficients, comorbidities and subtypes are included in the models as covariates if they are present in at least 10 episodes. No further model building is conducted after the initial models are built. This reflects a desire to explain as much variation in the probability of having a PAC as possible, but it does not make it a priority that all covariates in the

model be individually significant or even uncorrelated with each other. Accordingly, the model uses a very large group of covariates. This modeling approach allows for fewer potentially artificial constraints around the definitions of what constitutes severity of a episode condition, and lets each regression model determine for itself which of the factors are more significant for a specific episode. Non-significant covariates in episode models can not overly influence predicted outcomes, nor is much harm realized, if a group of correlated covariates work together to explain variation rather than having the variation explained by a single best factor.

The risk adjustment model for PCMDFR is shown in the enclosed workbook entitled NQF_PCMDFR_all_codes_risk_adjustment 01.25.17.xls, tab entitled Risk_Model. All the variables with an n >=10 are retained in the model and the model coefficients are shown, along with their z-scores and p-values. As you may notice some of the covariates such as obesity are collected from both historical claims (risk factors) as well as from the episode trigger date and look-back period of the episode (subtypes).

When more than one line of business is included in the data, separate models are calculated for each sample (i.e., commercial, Medicaid etc.).

Provider Attribution and calculating PAC rates by facility

Once episodes are constructed they are attributed to providers based on one of the various attribution rules. For PCMDFR, episodes are attributed to the facility where the episode triggered, or, if the episode is triggered off a professional claim, it is attributed to the first facility claim that overlaps the professional trigger claim date.

To directly compare PAC rates across facilities while also appropriately accounting for differences in patient severity, we calculate a risk-standardized PAC rate (RSPR) for each facility. Using the logistic regression technique described above, a model is developed that gives estimates for each risk factor and subtype for the patients in the population analyzed. These estimates are used to develop patient-level probabilities for the occurrence of PACs. The patient-level probability estimates are summed to construct aggregated measures (e.g., facility/provider-level). This method is similar to the methods employed by the Centers for Medicare and Medicaid Services (CMS) and endorsed by the National Quality Forum (NQF) to construct similar facility- and practice-level measures (i.e., mortality, readmissions, etc.):

1. For each facility, the actual number of PAC occurrences are summed across all attributed patients, to give the “observed” PAC rates for the facility.

2. Similarly, patient-level probability estimates are summed across all attributed patients to give “expected” PAC rates for the facility.

3. The observed sum is then divided by the summed probabilities (O/E). This number yields whether the facility had more PACs than expected (ratio>1), as expected (ratio=1), or less than expected (ratio<1). This calculation yields a practice-level unstandardized performance ratio.

4. To facilitate accurate comparisons of rates across facilities, the O/E ratio is multiplied by the overall expected PAC rate across all facilities, to obtain the risk-standardized PAC rate (RSPR) for the facility.

The formula for this calculation is as follows:

Adj Outcome_j={(SUM Observed_ij)/(SUM Prob_ij)} × {(SUM Prob_i) / (# of episodes)}

Where individual is attributed to unit of analysis j (e.g., facility, practice, provider group, etc.)

The risk-standardized PAC rate (RSPR) therefore adjusts the facility’s observed PAC rate, by the severity of its patients. It represents what a facility’s PAC rate would be if its patient population

was reflective of the overall population, leveling the playing field, and allowing for meaningful comparisons across all facilities adjusted similarly.

This is what we call RSPR (risk standardized PAC rate) and is used for outcomes comparisons across facilities.

Minimum sample size requirements for PAC measures are a function of the reliability testing of the measures on every dataset on which the measures are applied. Our research suggests that minimum sample sizes to achieve high degrees of reliability in the measures are a function of the dataset analyzed, and as such may vary from dataset to dataset. One should not infer that a minimum sample size achieved, or even a general lack of reliability, in one dataset will apply to another. 113253

5.1 Identified measures: 0694 :

0450 : Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (PSI 12)

0337 : Pressure Ulcer Rate (PDI 2)

0141 : Patient Fall Rate

0202 : Falls with injury

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Some of the measures such as 0531, 0450, 0337, 0141, 0202 are in fact, subsets of our measure and so harmonized. Measure 0694 in particular is closely associated – but it is a subset of our population because it includes only defibrillator patients (not those that had a pacemaker implant), and it includes only type 1 PACs within the defibrillator implant population. But measure 0694 also relies on participation of providers in a proprietary data registry, while the PAC measures are based on administrative claims data alone. Additionally, there are some measures that are not harmonized, in particular the 30-day all-cause readmission measure and the Hospital wide all-cause readmission measure. While the submitted PAC measures include hospitalizations and readmissions that occur during the episode time window, the hospitalizations have to be relevant to the index event. PACs include relevant readmissions, and are designed to enable accountability at the locus of provider control as well as some shared accountability between settings, centered around a patient, and for a specific medical episode of care. In that sense, they are consistent with the all-cause 30-day readmission rates, but represent a subset of those admissions. However, they do extend to the entire episode time window. As such, the PAC measures, as submitted, don't create added burden of reporting because the readmissions reported are simply a part of the broader 30-day all-cause readmission measures already endorsed by NQF. Because PAC measures are comprehensive, they include patient safety events that can occur during the stay, as well as adverse events, including readmissions, that can occur post-discharge. As a result, they provide facilities and physicians with an overall measure of avoidable complications for a specific medical episode. The data collection for the measures is automated by a software package and is fully harmonized with all other PAC measures. A single download automates creation of all reports related to each of the PAC measures.

5b.1 If competing, why superior or rationale for additive value: PAC measures are composite measures representing "all-cause harms". They look at many "care defects" comprehensively. They are composed of several cross-cutting measures and together they paint a global picture of the provider's overall performance.

PACs may occur any time during the 90-day episode time window. Furthermore, the measure is constructed so that the occurrence of any number of PACs during a defined episode would only count as one occurrence. PACs look at readmissions, emergency room visits, adverse events due to errors of omission or commission. It looks at complications that are due to patient safety failures, and also those directly related to the index condition. These are a cause of significant waste and quality concerns for patients with an episode of Pacemaker / Defibrillator implantation. As such, the measure can provide clinicians with an overall and comprehensive view, in one measure, of all potentially avoidable complications for a patient and drive quality improvement efforts.

For clinicians and facilities increasingly engaged in value-based payment efforts and/or driving quality improvement for population health, the value of a PAC measure over a series of related, but more discrete measures, is that one can better determine if the sources of complications primarily stem from activities within the facility or outside the facility, and the specific nature of the complications that have a higher frequency of occurrence. While individual components of the PAC measure may have small frequencies and may be difficult to interpret with regards to provider performance or actionability, aggregating all the PACs into a comprehensive, composite measure provides the parsimony that is so desirable. For providers, it's far easier to construct a quality dashboard from a parsimonious set of measures, and that's what PAC measures offer.

Further, as a comprehensive outcome measures, PACs are also useful for public transparency of quality, as substantiated by the research from Judy Hibbard and colleagues previously cited in the "testing" section of this submission. As a comprehensive outcome measure, they are easier to explain to the average consumer. From a patient's point of view, any bad outcome has an impact on their health with respect to return to work, functional limitations and need for additional support. If a provider has a high PAC rate with regards to one component PAC but not the other PACs, the impact on the patient is still adverse. In selecting providers, individual component PAC scores would mean nothing to a patient, but aggregating it to a comprehensive quality score could be a measure of "all-cause" harms and easier to interpret and act on.

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