The differences are in the details

Considerations for comparing 30-day unplanned readmission rates

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The Hospital Readmissions Reduction Program (HRRP) of the Patient Protection and Affordable Care Act (ACA), initiated by the Centers for Medicare and Medicaid Services (CMS) in October 2012, increased attention on the importance of reducing hospital readmissions, which add unnecessary cost to the healthcare system and can adversely impact patient health.

Readmissions within 30 days of discharge from an acute hospital stay have become a key quality of care indicator and can be measured through administrative claims data by payers and providers. Medicare's HRRP currently measures and reports 30-day readmissions for six admission types—acute myocardial infarction (AMI), coronary artery bypass graft (CABG), chronic obstructive pulmonary disease (COPD), heart failure (HF), pneumonia, and total hip arthroplasty (THA)/total knee arthroplasty (TKA)—and imposes a financial penalty (up to 3%) on all of a hospital's Medicare admissions if the hospital is found to have excess readmissions (Boccuti & Casillas, 2017; Hospital Compare, 2017). Readmissions are an important metric in Medicare's star ratings of Medicare Advantage plans (Medicare.gov, 2017), are included as a quality metric in the Medicare Accountable Care Organization (ACO) program (RTI International, 2017), and are in the Healthcare Effectiveness Data and Information Set (HEDIS) ratings (NCQA, 2017) of the National Committee on Quality Assurance (NCQA). In addition, readmission reduction is targeted by participants in Medicare's Comprehensive Care for Joint Replacement (CJR) and Bundled Payment for Care Improvement (BPCI) programs as a tactic for reducing bundled payment costs.

Given the interest in readmissions, it's not surprising that many readmission metrics have been developed. These metrics primarily aim to quantify either "unplanned" or "potentially preventable" readmissions. While potentially preventable readmission rates may be appealing from a care intervention standpoint, determining whether or not a readmission was potentially preventable can be complicated, cost-prohibitive, and usually involves some level of subjectivity because chart reviews, patient interviews, and surveys are often used to determine preventability (Auerbach et al., 2016;

Van Walraven, Bennett, Jennings, Austin, & Forster, 2011). This subjectivity and a lack of standardized methodology result in highly variable reported rates of potentially preventable readmissions (Van Walraven et al., 2011).

One alternative to manual review is 3M's Potentially Preventable Readmission (PPR) software, which automates the process of determining a readmission's potential preventability. However, a study comparing 3M's PPR results to those of manual review concluded that the two methodologies produced dramatically different results. Particularly, 3M's PPR software classified many more readmissions as potentially preventable than did manual review (Jackson et al., 2014).

Consequently, unplanned readmissions are often measured instead of potentially preventable readmissions to determine population-level readmission rates. Both CMS and NCQA use unplanned readmission measures in their quality initiatives because unplanned readmissions are the result of acute illness or complications of care. Because calculating unplanned readmission rates requires only administrative claims data, unplanned readmission measures can be easily calculated and used to compare performance between entities without introducing biases common in chart review, patient interviews, and surveys. Still, there are many different ways to measure unplanned readmissions.

We reviewed seven of the most prominent 30-day unplanned readmission measures. We selected these measures because they are used by CMS and NCQA, or because they focus on populations not covered by CMS and NCQA metrics (see Figure 1). While the definitions of index admissions, readmissions, and eligible patients as well as risk adjustment methodologies vary among the measures we reviewed, they have one thing in common: their definition and exclusion of "planned or potentially planned procedures" from the calculated readmission rate.

In the sections below, we identify key elements that should be considered when evaluating readmission rates across populations or when comparing readmission rates with different methodologies. While some of the methodological differences between these measures seem minor, others can have a major impact on results. One study determined that hospital rankings on readmission rates varied dramatically depending on what methodology was used (Van Walraven, Wong, Hawken, & Forster, 2012). In addition, analyses have shown that different age groups and insurance coverage have a meaningful impact

on readmission rates (Barrett et al., 2015). Therefore, to avoid making potentially misleading conclusions, one must understand the impact of these key factors when evaluating unplanned readmission rates.

Readmission calculation

An unplanned readmission rate is calculated as

$$\frac{\textit{Number of qualifying unplanned readmissions}}{\textit{Number of qualifying index admissions}}$$

The index admission is the initial acute admission to which an unplanned readmission is attributed. For some measures, the index admission is a stand-alone event; for other measures an index admission can also be an unplanned readmission for a previous index admission. Most of the reviewed measures also have clinical restrictions that limit the index admissions to only a handful of diagnoses and/or procedures of interest. The majority of the measures exclude potential index admissions if the

admission is for the medical treatment of cancer, psychiatric conditions, or rehabilitation.

When determining whether an unplanned readmission occurred, all of the measures we reviewed evaluate only the first subsequent acute admission within 30 days of discharge. All measures exclude admissions for planned or potentially planned procedures from the readmission calculation. Planned procedures include admissions for rehabilitation, organ transplants, maintenance chemotherapy, and pregnancy/delivery. Some examples of potentially planned procedures include non-acute full and partial hip replacements, mastectomies, heart valve procedures, and spinal fusions. Though all of the measures maintain their own code lists for identifying planned and potentially planned procedures, the definitions of planned or potentially planned procedures are fairly consistent across the measures.

While there are differences across all aspects of the measures' unplanned readmission calculations, perhaps the biggest difference is how a measure defines the index admission.

FIGURE 1: SUMMARY OF INCLUDED READMISSION MEASURES

READMISSION MEASURE AND SPONSOR	DESCRIPTION
ALL-CAUSE HOSPITAL-WIDE 30-DAY READMISSION (HWR) MEASURE; CMS	CMS measure for calculating unplanned readmission rates in the aged Medicare fee-for-service (FFS) population. The readmission quality metric for ACOs is based on this measure (RTI International, 2017). This measure is used in the Hospital Inpatient Quality Reporting (IQR) Program and is publicly reported on the Hospital Compare website.* (YNHHSC/CORE, 2017)
PROCEDURE-SPECIFIC HOSPITAL-LEVEL 30-DAY READMISSION MEASURE FOR CABG SURGERY AND ELECTIVE THA AND/OR TKA PROCEDURES; CMS	CMS measure for calculating unplanned readmission rates in the aged Medicare FFS population following specific surgeries. These measures are part of the HRRP. They are also used in the Hospital IQR Program and are publicly reported on Hospital Compare.* (YNHHSC/CORE, 2016b)
CONDITION-SPECIFIC HOSPITAL-LEVEL 30-DAY READMISSION MEASURES FOR AMI, COPD, HEART FAILURE, PNEUMONIA, AND STROKE; CMS	CMS measure for calculating unplanned readmission rates in the aged Medicare FFS population for specific conditions. All measures except stroke are included in the HRRP. All five measures are used in the Hospital IQR Program and are publicly reported on Hospital Compare.* (YNHHSC/CORE, 2016a)
INPATIENT PSYCHIATRIC FACILITY (IPF) ALL-CAUSE UNPLANNED 30-DAY READMISSION MEASURE; CMS	CMS measure for calculating unplanned readmission rates from IPFs in the adult Medicare FFS population. (Health Services Advisory Group, 2016)
PLAN ALL-CAUSE 30-DAY READMISSION (PCR) MEASURE; NCQA	HEDIS measure for calculating unplanned readmission rates for commercial, Medicaid, and Medicare Advantage insurance plans. (NCQA, 2017)
PEDIATRIC ALL-CONDITION READMISSION MEASURE; CENTER OF EXCELLENCE FOR PEDIATRIC QUALITY MEASUREMENT (CEPQM)	CEPQM measure for calculating unplanned readmission rates in the pediatric population. (CEPQM, 2016)

* The Hospital Inpatient Quality Reporting (IQR) program gathers quality of care information and metrics and publishes it on the publicly available Hospital Compare website. The goal of the Hospital IQR program is to give consumers meaningful information that would allow them to make informed decisions about their healthcare. It was also developed to encourage hospitals to improve the quality of care they provide to their patients.

The definition of an index admission is important because unplanned readmissions are more common for certain admission types. In particular, medical admissions tend to have higher unplanned readmission rates than surgical admissions (Jencks, Williams, & Coleman, 2009). Certain medical conditions also tend to have much higher unplanned readmission rates, including sepsis, congestive heart failure, COPD, and renal failure in adults as well as anemia/neutropenia, ventricular shunt procedures, and sickle cell anemia in pediatrics (Mayr et al., 2017; Hines, Barrett, Jiang, & Steiner, 2014; Berry et al., 2013). In addition, admissions for psychiatric conditions and drug/alcohol abuse have higher readmission rates than most medical conditions (Fingar & Washington, 2006). These known differences between condition-specific unplanned readmission rates are amplified when readmissions can also count as index admissions. Therefore, understanding which admission types are included as index admissions in an unplanned readmission metric is key to understanding and comparing rates.

Measure eligibility, risk adjustment, and patient demographics

The majority of the readmission measures in Figure 1 focus on a particular subset of the general population. The measures require that individuals meet certain eligibility requirements. Of these, age and insurance type will have the biggest impact on a reported unplanned readmission rate. The majority of unplanned readmissions can be attributable to the aged Medicare population (Barrett et al., 2015). Consequently, their inclusion or exclusion from a measure could dramatically change the reported unplanned readmission rate. Medicaid populations also tend to have higher unplanned readmission rates, especially for older adults (Strom et al., 2017), while patients with private commercial insurance usually have the lowest unplanned readmission rates (Barrett et al., 2015). Finally, unplanned readmission rates of pediatric populations tend to be substantially lower than those of adult populations (Barrett et al., 2015). Therefore, it is important to understand which patients are included in an unplanned readmission rate because the eligible population will impact the reported value.

All of the unplanned readmission measures in Figure 1 are risk-adjusted. CMS and NCQA use the clinical condition categories included in CMS's Hierarchical Condition Categories (HCC) risk-adjustment model and adjust for patient age, gender, discharge diagnosis, and recent comorbidities. NCQA also adjusts for the presence of surgeries during the index admission. However, the CMS readmission measures use the condition categories only to create risk factor variables; it does not use the HCC's hierarchical

logic (YNHHSC/CORE, 2017). NCQA supplements the condition categories with its own categorization and ranking logic, and uses different risk adjustment weights for each product line (commercial, Medicaid, and Medicare Advantage) (NCQA, 2017). In comparison, the CEPQM uses a pediatric-specific risk-adjustment algorithm. Consequently, while many of the included variables are the same for the reviewed measures, each has its own risk-adjustment methodology and weighting structure.

Factors other than those captured by the various risk-adjustment methods have been shown to impact unplanned readmission rates, including socioeconomic status (Bernheim et al., 2016), race/ethnicity (Gani, Lucas, Kim, Schneider, & Pawlik, 2015), and geographic location (Jencks et al., 2009). One study found 22 patient characteristics that significantly predicted readmission rates in addition to the factors included in CMS's risk adjustment methodology (Barnett, Hsu, & McWilliams, 2015). Therefore, for particular populations, certain patient characteristics that are not included in any of the measures' risk adjustments should be considered when trying to understand unplanned readmission rates.

Going forward

Readmission rates are key metrics for measuring the performance of hospitals, health plans, ACOs, physicians, and post-acute care facilities because they are tied to financial rewards and penalties for these entities. The methodology used to measure unplanned readmissions can impact reported rates. In particular, restrictions on patient eligibility and demographics, index admissions, and risk adjustment can significantly impact results and may affect decisions about care delivery improvements. While CMS, NCQA, and CEPQM have readmission metrics that are each widely used, their results are not easily comparable because they employ different methodologies and focus on different populations. In particular, the use of condition-specific readmission measures in Medicare's HRRP means that caution should be exercised when comparing a hospital's results to other readmission metrics because the conditions included in the HRRP can have higher-than-normal readmission rates, especially in comparison to an all-cause reported rate.

The need to accurately compare readmission rates for varying population segments and key stakeholders is clear. Milliman is in the process of adding unplanned readmission logic to its Health Cost Guidelines™ Grouper and developing unplanned readmission benchmarks, which will provide insights into interpreting readmission performance for hospitals, payers, and providers.

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