Overview of Risk Adjustment for DSRIP Potentially Preventable Event Measures

Purpose of this Document

HHSC is providing this document as context for the Category 3 measures for which pay for performance (P4P) is contingent on using a risk adjustment methodology (generally, the Potentially Preventable Admission and Readmission (PPA and PPR) measures). For purposes of benchmarking these measures, Texas Medicaid uses a particular risk adjustment methodology using 3M software; however, there are many other risk adjustment methods as detailed below. If a provider has the ability to use the 3M methodology for risk adjustment, that would be most consistent with the Category 3 benchmark information, but other methods are allowed. The provider should specify in its Category 3 selection tool how it plans to risk adjust if it selects one of these P4P measures.

Background

Risk adjustment is used for a variety of purposes in the health care industry. While risk adjustment is a complex procedure, in reality it is a corrective mechanism employed to reduce the differences in the reporting of health care outcomes, taking into account the difference in risk among the patients. Risk adjustment creates the premises to make a fair comparative performance evaluation between health care providers. For example, comparing rates between two hospitals for a similar medical treatment would unfairly penalize the hospital performing the treatment on patients with higher risks, in the absence of risk adjustment. The risk factors of a patient being hospitalized are various patient-level factors that influence the likelihood of being hospitalized and receiving a certain type of medical treatment. The risk adjustment when comparing outcome rates for two different patient samples (within one health care provider, or between two providers) is done by adjusting statistically for the risk factors differences between the two samples so the outcome rates can be compared fairly (in spite of the differences due to the risk factors). In choosing the risk factors for an outcome, it is recommended first to list all the potential risk factors that could conceptually and clinically influence the outcome of a medical treatment.

Risk-adjustment has been used interchangeably with other terms like case mix, severity, and comorbidity, and is used by varied users including health care administrators, health plans, payers, policymakers, clinicians and researchers. Defined broadly, risk-adjustment is a "generic reference to accounting for patient-related factors before examining outcomes of care, regardless of the context"[1]. In choosing the most appropriate risk-adjustment strategy, one has

[1] Risk Adjustment for Measuring Healthcare Outcomes, Fourth Edition. Lisa Iezzoni. Health Administration Press. Chicago, Illinois. 2012

to take in consideration several aspects: (1) risk of what outcome; (2) over what time frame; (3) for what population;; (4) for what purpose; (5) what risk factors; (6) using what data and (7) employing which analytic methods. Given that answering these questions proves to be very difficult in real life, especially working from scratch, it is recommended to use risk-adjustment methods that have been already developed, tested and validated.

One of the direct and simple ways to do a risk adjustment of an outcome when comparing a similar medical intervention between two samples is through statistical modeling. Each provider interested in producing risk adjusted outcomes (results) of their DSRIP projects should have access to statistical analysis capacity (either in-house or contracting out). The statistical modeling will allow a provider to produce an expected value for its outcome based on the relationship between the respective outcome and its risk factors as the same relationship exists in a value observed at local, regional or national level. Then, the magnitude of the difference between the observed and the expected outcomes rates can be quantified if it is statistically significant. While statistical modeling provides the way to estimate the relationship between the outcome of interest and its risk factors, one of the commonly used procedures to do it, is the logistic regression. This method can be detailed and provided to interested providers as part of the technical assistance that HHSC has available to RHPs.

Other more complex and sophisticated, although frequently used risk adjustment methods are the following: ACGs, APACHE, APR-DRGs, CSI, DRGs, DS, MedisGroups, NSQIP, and PRISM. What distinguishes these methods from each other is the way they define the risk and the type of outcome they measure. APR-DRGs, for example, can predict hospital cost in addition to in-hospital mortality. It is recommended to choose the appropriate risk-adjusted method designed for the target outcome based on the risk factors and the population of interest (see table below).

Risk-adjustment Methods[2]

Method	Risk	Population
Adjusted Clinical Groups (ACGs)	Resource consumption over the course of time based on morbidity profile; risk of high cost; disease markers	All people within general population
Acute Physiology and Chronic Health Evaluation (APACHE I, II, III)	In-hospital mortality	Adult patients in ICU
All Patient Refined Diagnosis Related groups (APR-DRGs)	Two versions: resource use ("severity of illness") and in-	All hospitalized patients, including pediatric

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	hospital mortality	
Comprehensive Severity Index (CSI)	Physiologic complexity comprising of the extent and interactions of patients' diseases presented to medical personnel	Separate components for adults and pediatric (inpatient & outpatient), long-term, hospice, and rehabilitation care
Diagnosis Related Groups (DRGs)	Total hospital LOS or charges	All hospitalized patients
Disease Staging (DS) Clinical	Complexity, etiology, and extent of organ system involvement	All patients with one or more diseases covering all clinical conditions
MedisGroups	Admission-based and mid-stay mortality risks; Admission-based LOS and LOS outlier status	All hospitalized patients
National Surgical Quality Improvement Program (NSQIP)	Death & postoperative complications within 30 days of major surgery	Veterans undergoing major surgery in eight specialties
Pediatric Risk of Mortality Score (PRISM)	PICU mortality	Patients in PICUs

While some risk-adjustment methods are adequate for certain medical conditions, others are better suited to measure outcomes related to all conditions. For example, there are two outcomes used in the RHP Planning Protocol to measure Hospital Readmission rates, and each one employs a different method to risk adjust. IT-3.1 "Hospital-Wide All-Cause Unplanned Readmission Measures (HWR)" estimates the risk-standardized re-admission rate (RSRR) to estimate hospital-level all-cause readmission after admission for any eligible condition within 30 days of discharge for patients 18 years and older. The measure reports one single summary RSRR based on the risk factors associated with five clinical specialties (surgery/gynecology, general medicine, cardiorespiratory, cardiovascular and neurology). The measures can also indicate the hospital standardized risk ratio (SRR) for each of the five clinical specialties.

The other readmission outcome in the RHP Planning Protocol is IT-3.12, "All-Cause Readmissions" which is one of the HEDIS healthcare utilization measures of great interest these days. This measure applies also to the population 18 years and older, but it measures the number of acute inpatient stays that were followed by an acute readmission for any cause and the predicted probability of an acute readmission. The risk-adjustment determination takes into consideration the presence of surgeries, discharge condition, comorbidity, age and gender.

The 3M methodology used to analyze PPEs in Category 4 is based on All Patient Refined DRGs (APR DRGs). APR DRGs are an extension of DRGs to account for severity of illness and risk of

mortality. Assignment to a "Base" APR-DRG is based on Principal Diagnosis, for Medical patients, or Most Important Surgical Procedure (performed in an Operating Room). Each Base APR-DRG is divided into 4 subclasses through a combination of two Severity of Illness (SOI) classes and two Risk of Mortality (ROM) classes. Furthermore, SOI and ROM assignment take into account the interaction among principal & secondary diagnoses, age, and, in some cases, procedures. Both an admission APR DRG and discharge APR DRG are computed. The APR DRGs used by the 3M software are widely used for public reporting and payment, and for severity adjustment in quality assessment initiatives (e.g. AHRQ Quality Indicators, JCAHO hospital accreditation process). More than 40 percent of hospitals have the APR DRG software and most major hospital system vendors have integrated it into their systems. APR DRGs are assigned using standard administrative data and do not require any additional data collection.

Comprehensive and detailed risk adjustment for each of the PPEs is key for their correct meaning and interpretation. For example, an individual who is admitted for GI surgery with multiple co-morbidities has a much higher risk of developing a post admission complication than a patient admitted for uncomplicated GI surgery. Risk adjustment must take into account the condition of the patient at admission including not only the diagnoses, age, sex, and interaction between secondary findings (laboratory and clinical), but potentially other factors not included in ICD-9-CM.