

Risk Adjustment Methods for PPC and PPR (Calculation of Hospital Actual to Expected (A/E) Ratios)

Brief Description of Risk Adjustment terms, methods and calculations for PPR and PPC for Hospital Quality Based Payment Program

Terms

Potentially Preventable Complications (PPC)

Potentially Preventable Complications (PPCs) are harmful events (e.g. accidental laceration during a procedure, improper administration of medication) or negative outcomes (e.g. hospital-acquired pneumonia, C. difficile colitis) that develop after hospital admission and may result from processes of care and treatment rather than from natural progression of the underlying illness (disease) and are therefore potentially preventable.

Potentially Preventable Readmissions (PPR)

A Potentially Preventable Readmission (PPR) is a readmission (return hospitalization within the specified readmission time interval, as defined below) that is clinically-related (as defined below) to the initial hospital admission. The Initial Admission initiates a readmission chain (as defined below).

Readmission time interval: The readmission time interval is the maximum number of days allowed between the discharge date of a prior admission and the admit date of a subsequent admission in order for the subsequent admission to be a readmission.

Clinically-related: The underlying reason for readmission is plausibly related to the care rendered during or immediately following a prior hospital admission, within a specified readmission time interval.

Readmission chain: A readmission chain is a sequence of PPRs that are all clinically-related to the Initial Admission. A readmission chain may contain an Initial Admission and only one PPR, which is the most common situation, or may contain multiple PPRs following the Initial Admission.

All Patient Refined Diagnosis Related Group (DRG)

APR DRGs classify patients according to their reason for admission, severity of illness and risk of mortality. [An "admission" APR DRG is based on the principal diagnosis from the

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discharge abstract, but eliminates certain secondary diagnoses that are not considered present on admission, as well as specific procedures that were not the cause of admission from consideration in the assignment of the APR DRG. Complications and other conditions that arise during the hospitalization are not used in the admission APR DRG assignment logic.] APR DRG is a classification system that uses APR DRGs taking in consideration severity of illness, risk of mortality and resource intensity.

Severity of Illness

Severity of illness (SOI) is defined as the extent of organ system derangement (loss of function) or physiologic decompensation for a patient. It gives a medical classification into 1=minor, 2=moderate, 3=major, and 4=extreme.

Risk of Mortality

Refers to the likelihood of dying. There are four subclasses of 1=minor, 2=moderate, 3=major, and 4=extreme.

Resource Intensity

The relative volume and types of diagnostic, therapeutic and bed services used in the management of a particular disease

Actual to Expected Ratio (A/E)

The ratio of the actual PPR/PPC weights to the expected PPR/PPC weights. This is calculated by dividing the Actual PPR/PPC Weights (derived from HCUP Relative PPR/PPC Weights) by the Expected PPR/PPC Weights (for each hospital).

Methods and calculations

Potentially Preventable Complications (PPC)

1. Each admission may be at risk for some PPC categories but not the others. Therefore, for a particular PPC category PPC(i), only the admissions that are at-risk of PPC(i) will be used for calculating the state norm of this PPC(i). Here PPC(i) is one of the 65 PPC categories.

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2. To calculate state norm for PPC(i), the sum of statewide counts of PPC(i) within each level of APR DRG and SOI (admission DRG and SOI instead of discharge DRG and SOI is used) is divided by the sum of statewide admissions at risk of PPC(i) within the corresponding level of APR DRG and SOI.
3. The DRG/SOI-specific expected number of PPC(i) for each hospital is calculated by multiplying the total number of admissions at risk of PPC(i) within each DRG/SOI of the hospital by the state norm for the corresponding DRG/SOI computed in (2) above.
4. Sum the expected number of PPC(i) calculated in (3) above across all levels of DRG/SOI, this is the expected total number of PPC(i) for the hospital. The actual number of PPC(i) for the hospital is simply the summation of actual counts of PPC(i) across all DRG/SOI levels.
5. The numbers calculated thus far are unweighted actual and expected counts for PPC(i). The weighted counts are calculated by multiplying the counts by the weight of PPC(i) [designated as W(i)].
6. Repeat step 1-5 for all 65 categories of PPC. The unweighted total actual PPC is the sum of actual PPC counts for all 65 categories, and the unweighted total expected PPC is the sum of expected PPC counts for all 65 categories. The total weighted counts are the summation of weighted PPCs for all categories. If the actual counts for PPC1, PPC2,... PPC65 are designated A1, A2,...A65; and expected counts for PPC1, PPC2,...PPC65 are designated as E1, E2,... E65; relative weight for PPC1, PPC2,... PPC65 are designated as W1, W2,...W65; then the unweighted and weighted PPC will be expressed as:
 - Unweighted PPC = (A1+A2+...+A65) - (E1+E2+...+E65)
 - Weighted PPC = (A1*W1 + A2*W2 + ...A65*W65)-(E1*W1+E2*W2+...+E65*W65)
7. The unweighted and weighted A/E ratio will be expressed as:
Unweighted A/E ratio = (A1+A2+...+A65) / (E1+E2+...+E65)
Weighted A/E ratio = (A1*W1+A2*W2+...A65*W65) / (E1*W1+E2*W2+...+E65*W65)

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Here in the “weighted A/E ratio” above, each term of the numerator and denominator is multiplied by PPC weight. Since the Texas PC weights will be the HCUP PPC weights multiplied by a scaling factor, when calculating weighted A/E ratio, the scaling factors cancel out.

Potentially Preventable Readmissions (PPR)

1. Some admissions may be at risk for PPR but not the others. Therefore, only the admissions that are at-risk of PPR will be used for calculating the state PPR norms.
2. Calculation of norms and rates
 - a. To calculate state PPR norm, the sum of statewide number of initial admissions within each level of APR DRG and SOI (chain level discharge APR DRG and chain level discharge SOI is used) is divided by the sum of statewide admissions at risk for PPR within the corresponding level of APR DRG and SOI.
 - b. 3M indicated PPR rates also should also be adjusted based on age and mental health/Substance Abuse status. So based on each combination of age range (<18, 18-84, >84) and mental health status (0, 1, 2, 3), the adjusted factor is calculated by the sum of statewide number of initial admissions divided by the expected number of initial admissions (multiplying total number of admissions at risk of PPR within each age/mental level by the state norm computed in (2[a]) above).
3. The DRG/SOI-specific expected number of PPR for each a hospital is calculated by multiplying the total number of admissions at risk of PPR within each DRG/SOI of the hospital by the state norm for the corresponding DRG/SOI and the adjusted factor computed in (2[a] and 2[b]) above.
4. Sum the expected number of PPR calculated in (3) above across all levels of DRG/SOI, this is the expected total number of PPR for the hospital. The actual number of PPR for the hospital is simply the summation of actual counts of PPR across all DRG/SOI levels.

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5. The numbers calculated thus far are unweighted actual and expected counts for PPR. The weighted counts are calculated by multiplying the counts by the PPR DRG/SOI weights.

Here in the “weighted A/E ratio” above, each term of the numerator (actual) and denominator (expected) is multiplied by PPR Texas specific DRG/SOI weight.