# March 2015 – Release of AHRQ Quality Indicators™ Software for SAS QI Version 5.0

The Agency for Healthcare Research and Quality (AHRQ) announces the release of the AHRQ Quality Indicators™ (QI) software for SAS QI v5.0 for the Prevention Quality Indicators (PQI), Inpatient Quality Indicators (IQI), Patient Safety Indicators (PSI) and Pediatric Quality Indicators (PDI) modules.

All of the relevant AHRQ QI™ software and documentation regarding SAS QI v5.0 can be found on the AHRQ QI website at: http://www.qualityindicators.ahrq.gov.

The following sections summarize the major changes from SAS QI v4.5a of the Technical Specifications and QI software to v5.0 of the Technical Specifications and QI Software (i.e., SAS QI v5.0).

## 1.0 FY 2015 Coding Updates

There were no coding changes implemented in SAS QI v5.0 of the AHRQ QI software based solely on FY 2015 coding updates to the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). Five new Medicare Severity-Diagnostic Related Groups (MS-DRG) with the corresponding Major Diagnostic Categories (MDC) have been added:

- Endovascular Cardiac Valve Replacement w MCC (266)
- Endovascular Cardiac Valve Replacement w/o MCC (267)
- Back & Neck Procedure excluding spinal fusion w MCC or disc device/neurostimulator (518)
- Back & Neck Procedure excluding spinal fusion w CC (519)
- Back & Neck Procedure excluding spinal fusion w/o CC/MCC (520)

## 2.0 Specification Changes

SAS QI v5.0 of the AHRQ QI software implements some specification and programming changes that were identified through a detailed deliberation and assessment process with AHRQ representatives and AHRQ stakeholders. These specification changes are detailed in the Log of Coding Updates and Revisions for each AHRQ QI module. See the specific changes at: http://www.qualityindicators.ahrq.gov/modules/Default.aspx.

## 3.0 Limited License Edition of the 3M™ APR DRG Grouper

The Limited License edition of the 3M™ APR DRG Grouper was updated from Version 31 to Version 32.

# 4.0 Population Files and Risk Adjustment Coefficient Tables

SAS QI v5.0 of the AHRQ QI software includes Census population data through 2014. The population data, which are based on the 2010 Census, are used to calculate the denominators for the area-level QI. For additional information on the population file, see *2014 Population File for Use with AHRQ Quality Indicators™* available at: http://www.qualityindicators.ahrq.gov/Downloads/Software/SAS/V45/1995-2013_Population_Files_V4.5.zip.

New risk adjustment models were derived for all indicators in SAS QI v5.0 of the AHRQ QI software, based on the discharges from an aggregation of the 2012 Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) from 45 States[1]. The file for the development of the risk adjustment models included more than 30 million discharges from community hospitals that are not designated as rehabilitation or acute long-term care facilities. The coefficients from the models are embedded in the software, and the user does not need to manipulate them.

# 5.0 Version 5.0 Technical Specification Benchmark Data Tables

New benchmark data tables have been created for SAS QI v5.0 of the AHRQ QI software. Benchmark Data Tables are based on the discharges from an aggregation of the 2012 Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) from 45 States[2]. The resulting file included more than 30 million discharges from community hospitals that are not designated as rehabilitation or acute long-term care facilities. Users can refer to these tables to determine if their rates approximate the population rate and how their case-mix compares to the population rate. The population rate refers to the overall rate for the reference population. If the population rate is higher than the expected rate, then the provider's case-mix is less severe than the overall population. If the population rate is lower than the expected rate, then the provider's case-mix is more severe than the overall population. Version 5.0 Benchmark Data Tables can be found at the following websites:

- For PQIs, http://www.qualityindicators.ahrq.gov/modules/pqi_resources.aspx
- For PSIs, http://www.qualityindicators.ahrq.gov/modules/psi_resources.aspx
- For PDIs, http://www.qualityindicators.ahrq.gov/modules/pdi_resources.aspx
- For IQIs, http://www.qualityindicators.ahrq.gov/modules/iqi_resources.aspx

# 6.0 Reporting of Rates for Specific Measures

The AHRQ QI SAS software only reports expected rates, risk-adjusted rates and smoothed rates for measures that are risk adjusted. For measures that are not risk-adjusted, only the numerators, denominators and observed rates are reported.

[1] Some applications of the reference population are limited to 37 states. Details of this population are described in the document *Reference Population for POA-Sensitive Indicators*

# 7.0 Revisions to SAS Software Installation

SAS QI v5.0 of the AHRQ QI software continues to require the SAS/STAT statistical software package that must be obtained separately. The software is applicable to both 32-bit and 64-bit applications. The SAS QI v5.0 software no longer includes the Prediction Module which had required a separate installation step.

# 8.0 Revisions to Handling Information on Diagnoses Present on Admission

In prior versions of the SAS AHRQ QI software, the Prediction Module would compensate for missing information on diagnoses being present on admission (POA). In the SAS QI v5.0 Software, the Prediction Module has been removed. In the SAS QI v5.0 Software, POA is handled as follows:

- If POA information is *available* in the input data, it is used to identify whether or not a diagnosis is present on admission using the following criteria:
  - The diagnosis is identified as *present on admission* if either of these conditions exists:
    - The diagnosis code is expected to have POA reported based on ICD-9-CM coding guidelines and the associated POA value is either "Y" for present on admission or "W" for clinically undetermined.
    - The diagnosis code is exempt from POA reporting according to the ICD-9-CM coding guidelines.
  - In all other cases, the diagnosis is identified as *not present on admission*. This includes cases in which POA information is unavailable (i.e., data field in the record is blank)

- If POA information is *unavailable* in the input data, it is assumed the diagnosis is not present on admission.

SAS code to adjust the QI indicator flags for POA information has been moved from the observed rate programs (program 2) to the assignment program (program 1).

Risk adjustment models have been developed for both scenarios (i.e., input data with POA information and input data without POA). The SAS QI v5.0 of the AHRQ QI Software includes regression coefficients and population means specific to both situations.

# 9.0 Improved Implementation of Stratified Indicators

During development and testing of previous versions of the AHRQ QI software, it was noted that implementation of the strata for several indicators (i.e., IQI 02 and IQI 09) did not necessarily ensure mutually exclusive strata. This introduced issues for the comparison of overall QI rates with the stratified rates. Specifically, the overall rate did not necessarily equal the sum of the stratified rates. In Version 5.0 (SAS), the strata were redefined to be mutually exclusive. In addition, the hierarchy for assigning the strata for several other indicators (i.e., IQI 04, IQI 11, IQI 17, and PSI 04) was modified to be based on the prior probability of death, instead of the relative prevalence in the reference population.

# 10.0 Removal of Use of External Cause of Injury Codes from the PSI and PDI Modules in Version 5.0

The use of External Cause of Injury Codes (E Codes) has been removed from most of the PSIs and PDIs that use E Codes. This change is in anticipation of the ICD-10 implementation of the QI Software. Many E Codes cannot be mapped into the ICD-10 classification. In addition, E Codes can be inconsistently reported by hospitals. The following QIs have had E Codes removed from the selection criteria:

- *PDI 1, PSI 15, and PSI 25*. All codes in the range of E870.x were removed.
- *PDI 3*. All codes in the range of E871.x were removed.
- *PDI 13, PSI 16, and PSI 26*. The E code for mismatched blood transfusion (E8760) was removed.
- *PSI 5 and PSI 21*. All codes in the range of E871.x were removed.
- *PSI 8*. All codes in the range of E850-E869, E951-E952, E962, and E980-E982 were removed. It should be noted that this PSI 8 still uses some E Codes in the denominator exclusion criteria for self-inflicted injury.

# 11.0 Additional Improvements

Improvement area changes were implemented that are in addition to the technical modifications that were made since the 4.5 release by the Analytics team.

- Removing unused formats and macros. The SAS lookup formats and macros from previous versions that are no longer being used by the current version were removed. Across all modules 224 formats and 5 macros were being loaded into system memory but never used. Removing them will reduce memory requirements.

- Adding Individual Measure Graph. The IQSASP3 program includes an ODS graph to highlight the difference between the observed, expected and risk adjusted rates. The graph includes high and low confidence levels to help determine if a provider's risk adjusted rate is significantly different than the national rate. The graph can be modified in the Control file to change the measure or limit by hospital ID.

- Integrated APR-DRG Limited License Grouper into IQI Control. The 3M Limited License Grouper is available as a separate download. A new version of the SAS program uses input from the CONTROL file and simplifies grouper support file access. The APR-DRG Limited License grouper now accepts ICD10 diagnosis codes.

- Additional comments were added throughout the programs to clarify processing steps and assist in understanding output. Comments to areas commonly reported to technical assistance are now included in the program to supplement the software instructions.

  • A SAS program that generates a single row input file in the format outline in the software instructions is now available for testing.

# 12.0 Enhancements and Fixes to Software Bugs

SAS QI v5.0 of the AHRQ QI software makes improvements to and corrects the following issues found in SAS QI v4.5a of the software:

- *Adding code for PQI 5*. Code 491.22 (obstructive chronic bronchitis with acute bronchitis) was added to the numerator specification for chronic obstructive pulmonary disease (COPD). When acute bronchitis is documented with COPD, this code should be assigned.
- *Further restriction of denominator exclusion for PQI 10*. AHRQ identified inconsistencies between hypertensive renal failure (for which all stages POA are excluded) and other renal failure (for which only stage V and end stage renal disease are excluded). The code set for this exclusion has been limited to diagnosis codes 403.x1, 404.x2, 404.x3, 585.5, 585.6.
- *Fixing SAS code to exclude toe amputation for PQI 16*. The exclusion for toe amputation had been commented out of PSSAS1.SAS in Version 4.5a. The code has been corrected to execute this exclusion criterion.
- *Adding code to numerator exclusion for IQI 2*. The code for acute mumps pancreatitis (072.3) was added to the numerator exclusion for acute pancreatitis. This was due to a technical error. The code set has been corrected.
- *Adding code to denominator exclusion for IQI 9*. The code for acute mumps pancreatitis (072.3) was added to the denominator exclusion for acute pancreatitis. This was due to a technical error. The code set has been corrected.
- *Adding codes to denominator specification for IQI 18*. Two codes related to gastrointestinal hemorrhage (456.20, esophageal varices in diseases classified elsewhere with bleeding; and 530.7, gastrointestinal laceration/hemorrhage syndrome) were added to the denominator specification. This was due to a technical error. The code set has been corrected.
- *Adding codes to denominator specification for IQI 20*. Three codes related to influenza virus (488.01, influenza virus due to identified avian influenza virus; 488.11, H1N1 virus, and 488.81, identified novel influenza virus) were added to the denominator specification. This was due to a technical error. The code set has been corrected.
- *Removing code from numerator exclusion for IQI 25*. During the development of the ICD-10 version of the QI software, AHRQ identified a code in the numerator exclusion that does not, by definition, involve the heart, and maps differently in ICD-10 (392.0, rheumatic chorea without heart involvement). This code has been removed from the numerator exclusion.
- *Updating exclusion for NQI 2*. Exclusion for polycystic kidney disease was changed to autosomal recessive (753.14) from autosomal dominant (753.13) since it does not present in the neonatal period. The code set has been corrected.
- *Updating denominator exclusion for PDI 1, PSI 15, and PSI 25*. A code for insertion of recombinant bone morphogenetic protein (84.52) was also removed from the denominator exclusion for spine surgery because it was not specific to the spine. The code set has been corrected.
- *Removing denominator exclusion for PDI 8*. The denominator exclusion for coagulopathy

was dropped to resolve internal inconsistency due to excluding and stratifying based on the same codes.

- *Updating to numerator inclusion for PDI 8, PSI 9, and PSI 27*. New procedure codes for endovascular embolization/occlusion vessels head/neck using bioactive coils (39.76) and uterine art embolization with or without coils (68.24 and 68.25, respectively) were added the numerator inclusion criteria. These additions were to correct a technical error. The set names used in the QI SAS Software were also consolidated to remove redundancy.
- *Updating denominator exclusion and expanding definitions for PDI 9 and PSI 11*. During ICD-10 mapping work, AHRQ identified one code that needed to be removed from the denominator exclusions (coded 24.2 for gingivoplasty) and various codes that needed to be added. Additions to the denominator exclusions included facial bone operations (76.31, 76.39, 76.41-76.45, 76.61-76.64, 76.7x, 76.92-76.99), laryngo-tracheal operations (31.0, 31.61-31.64,31.71-31.72, 31.91-31.95), thoracoscopic surgery under for lung cancer surgery (32.30, 32.41, 32.50) and esophagostomy under esophagal surgery (42.10, 42.11, 42.12, 42.19). The denominator exclusion for senility (old age) without psychosis (797) was dropped under "degenerative neurological disorder". The code for temporary tracheostomy (31.1) was added to the definition of tracheostomy since many tracheostomies involved this code rather than other codes already in the list. The set names for laryngeal, pharyngeal, facial, and nose/mouth procedures were consolidated. The code set has been corrected.
- *Removing codes from the numerator and denominator specification for PDI 10 and PSI 13*. The code for postoperative shock (99800) was removed from the numerator and denominator specification because it was never intended to be a permanent inclusion. The code set has been corrected.
- *Adding codes to the denominator exclusion for PDI 10 and PSI 4*. Missing pressure ulcer codes (707.0x) were added to denominator exclusion for infection. The code set has been corrected.
- *Adding codes to denominator exclusion for PDI 11 and PDI 12*. A code for intestinal transplant (46.97) was added to the denominator exclusion for transplant procedures. This was due to a technical error. The code set has been corrected.
- *Removing codes from denominator exclusion for PDI 16*. A code was dropped from the bacterial gastroenteritis exclusion because it is not associated with diarrhea (006.2, amebic nondysenteric infection). This was due to a technical error. The code set has been corrected.
- *Updating the list of qualifying low-mortality DRGs for PSI 2*. The list of low-mortality DRGs was updated using an aggregation of the 2012 Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) from 45 States[3]. The resulting file included more than 30 million discharges from community hospitals that were not rehabilitation or acute long-term care. Low-mortality DRGs have a mortality rate less than 0.5 percent for adults.
- *Updating strata definitions for PSI 4*. The code for phlebitis and thrombophlebitis of lower extremities not otherwise specified (451.2) was removed from the selection criteria

[3] Some applications of the reference population are limited to 37 states. Details of this population are described in the document *Reference Population for POA-Sensitive Indicators*

for stratum A because it was erroneously included in the previous version. Abortion-related shock codes (634.5x, 635.5x, 636.5x, 637.5x, 638.5x) were added to the stratum D criteria. The code set has been corrected.

- *Removing codes from numerator and denominator specification for PSI 7 and PSI 23*. A code for other and unspecified infection due to central venous catheter (999.31) was removed from the inclusion criteria. This code was never intended as a permanent inclusion. The code set has been corrected.
- *Adding codes to the denominator exclusion for PSI 8*. New codes for self-inflicted injury by air gun (E955.6) or paintball gun (E955.7) were added to the denominator exclusion for self-inflicted injury. The code set has been corrected.
- *Adding codes to denominator exclusions for PSI 9 and PSI 27*. Codes for platelet disorders were added to the denominator exclusion for coagulation disorders (286.53) and codes specific to purpura and other hemorrhagic conditions (287.1, 287.30, 287.31, 287.32, 287.33, 287.39, 287.41, 287.5, and 287.8-287.9). The code set has been corrected.
- *Removing codes from numerator and exclusions for PSI 10*. Diabetic complications were removed from the numerator criteria. In addition, the denominator exclusion for diabetes was removed. This was due to low validity and the fact that the codes are unrelated to acute kidney injury. The code set has been corrected.
- *Updating denominator exclusions for PSI 10*. The denominator exclusion for chronic kidney failure is now restricted to Stage V or End Stage Renal Disease (403.x1, 404.x2, 404.x3, 585.5, 585.6). This change was to clarify the exclusion. A code for ulcer of esophagus with bleeding (530.21) was added to the denominator exclusion for GI hemorrhage. This was due to a technical error.
- *Updating the numerator and denominator specification for PSI 12*. The code for phlebitis and thrombophlebitis of lower extremities not otherwise specified (451.2) was removed from the numerator and denominator specification. This code was never intended as a permanent inclusion. In addition, the code for extracorporeal membrane oxygenation (ECMO) (code 39.65) was added to the denominator exclusion. This is because ECMO involves indwelling arterial and venous catheters that greatly increase the risk of DVT, despite continuous anticoagulant therapy. The code set has been corrected.

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