AHRQ Quality Indicators™ Software Instructions, Windows® Application (WinQI) v2021

Prepared for:

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1. Executive Summary

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ (QIs) were developed specifically to meet the short-term needs for information on healthcare quality using standardized, user-friendly methods and existing sources of administrative data. The AHRQ QI program is unique in that it provides free, publicly available software tools that allow users to calculate the AHRQ QI rates based on their own administrative data using a standard personal computer. Each version of the QIs is released with software in two different platforms: a SAS®* application and a Microsoft Windows® application. The SAS QI software was first released in the late 1990s. It consists of several modules of SAS code and requires a SAS license to run. The Windows-based software, known as WinQI, was first released in 2005. It was created to provide an easy-to-use, low-cost option for calculating the QIs that is not dependent on licensed software. Developed on Microsoft® Visual Studio using C# and .NET, AHRQ WinQI runs on the Windows operating system and requires only freely available software components: AHRQ-produced software, Microsoft .NET (for runtime environment and core software libraries), and Microsoft SQL Server® Express (for data storage and manipulation). Table 1 lists the differences between SAS QI v2021 and WinQI v2021. Both the SAS QI v2021 and WinQI v2021 software are available as 64-bit applications. These 64-bit applications are targeted for Windows 8 and Windows 10 operating systems.

Table 1. Differences Between SAS QI v2021 and WinQI v2021

SAS QI v2021	WinQI v2021
Requires licensed SAS software.	Requires free downloadable software.
User can modify the software.	User is unable to modify the software.
Data load and error checking are at the discretion of the user.	Includes data load and error-checking functions.
User must run a set of programs for each module, and all indicators in a module are displayed in output.	All indicators may be (but are not required to be) calculated in a single program, and user can select which indicators to output.
Area-level indicator denominators are adjusted based on the combination of county, age, gender, and race in the numerator (adjustments are generally small [<0.01% in absolute terms]).	Area-level indicator denominators are not adjusted.
Area-level reports in SAS QI drop the discharges from the numerator count that have missing or incorrect patient county codes.	Area-level reports in WinQI include the discharges in the numerator count that have missing or incorrect patient county codes.

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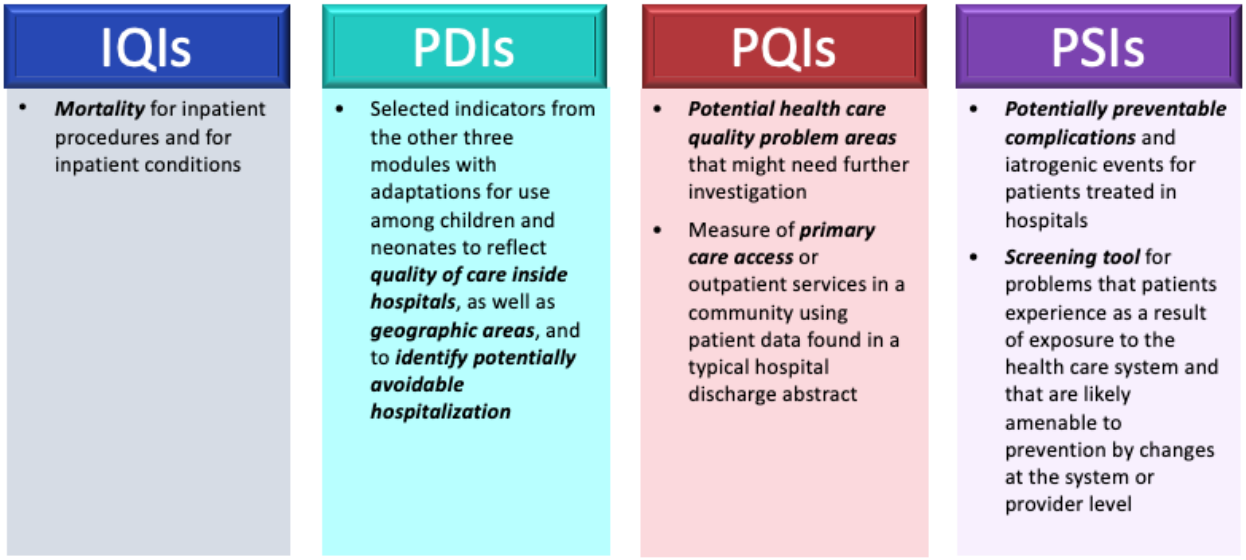
Hospital-level reports in SAS QI drop the discharges from the numerator count that have missing or incorrect hospital IDs.	Hospital-level reports in WinQI include the discharges in the numerator count that have missing or incorrect hospital IDs.

Both versions of the QI software are updated on an annual basis to reflect changes in the AHRQ QI *Technical Specifications*. New software versions and updated technical specifications are released simultaneously. Routine annual updates include changes based on the *International Classification of Diseases, 10th Revision, Clinical Modification* (ICD-10-CM), Medicare Severity Diagnosis-Related Groups (MS-DRGs), and Major Diagnostic Categories (MDCs); an updated version of the 3M™ All Patient Refined Diagnosis-Related Group (APR-DRG) grouper; new U.S. Census population files; and newly derived risk adjustment parameters.

The AHRQ QIs are organized around four collections (modules) of indicators: Inpatient Quality Indicators (IQIs), Pediatric Quality Indicators (PDIs), Prevention Quality Indicators (PQIs), and Patient Safety Indicators (PSIs). Data captured by and characteristics of each of the modules are shown in Figure 1. Detailed definitions of each indicator, with complete listings of ICD-10-CM and MS-DRG codes specifically included or excluded, are contained in the AHRQ QI *Technical Specifications*. Additional data on the magnitude of each indicator across an aggregation of State Inpatient Databases (SID) files is not presently included in the Inpatient Quality Indicator v2021 Benchmark Data Tables, Pediatric Quality Indicator v2021 Benchmark Data Tables, Prevention Quality Indicator v2021 Benchmark Data Tables, and Patient Safety Indicator v2021 Benchmark Data Tables documents. Benchmark Data Tables will be included in the software and published in future releases. See Appendix D for links to these documents as well as additional documentation on the AHRQ QIs.

Figure 1. Characteristics of AHRQ QI Modules



NOTE: IQIs=Inpatient Quality Indicators; PDIs=Pediatric Quality Indicators; PQIs=Prevention Quality Indicators; PSIs=Patient Safety Indicators.

This document contains instructions for the WinQI v2021 software, which can be downloaded from the AHRQ QI website (http://www.qualityindicators.ahrq.gov/Software/WinQI.aspx). The software can calculate results for all indicators (IQIs, PDIs, PQIs, and PSIs) in a single program, and the user can select which indicators to show in the output. The application is targeted for and tested on personal computers running the Microsoft Windows 8 and Windows 10 operating systems. AHRQ made this tool publicly available to assist users in producing information on healthcare quality in a more cost-effective manner.

The AHRQ WinQI software is intended to be used with data that cover an entire patient population (e.g., all discharges from a hospital in a year) or that were sampled from a patient population using simple random sampling. The WinQI application does not support discharge-level weighted QI estimates or standard errors for weighted estimates. Thus, analyses using data obtained from a complex sampling design will not produce accurate estimates for the population from which the data were sampled.

The use of the Prediction Module that estimated the prevalence of conditions when present on admission (POA) data were missing was discontinued in WinQI v5.0. Beginning with fiscal year 2008 (October 1, 2007), the Uniform Billing Claim Form 04 (UB-04) data specification manual includes a POA indicator (https://www.cms.gov/Medicare/Coding/ICD10/Downloads/2018-ICD-10-CM-Coding-Guidelines.pdf). POA data may impact the prevalence of the outcome of interest and the risk-adjusted rates by excluding secondary diagnoses coded as complications from the identification of covariates. If the user's input file does not include POA data, the QI software will assume that the outcome of interest occurred in the hospital.

The reference population data used by the software are based on the Healthcare Cost and Utilization Project SID for fiscal year (FY) 2018. These databases were used to create the regression coefficients applied to risk adjustment and the shrinkage factors used to calculate smoothed rates.

Acknowledgments

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ (QIs) program uses the Healthcare Cost and Utilization Project (HCUP) FY 2018 State Inpatient Databases (SID) to compute reference population data. HCUP is a family of healthcare databases and related software tools and products developed through a Federal-State-industry partnership and sponsored by AHRQ. HCUP databases bring together the data collection efforts of State data organizations, hospital associations, private data organizations, and the Federal Government to create a national information resource of encounter-level healthcare data. HCUP databases comprise the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information beginning in 1988. These databases enable research on a broad range of health policy issues, including cost and quality of health services; medical practice patterns; access to healthcare programs; and outcomes of treatments at the national, State, and local market levels. The HCUP databases represent 97 percent of all annual discharges in the United States.

The AHRQ QI program would like to acknowledge the HCUP partner organizations that participated in the HCUP SIDs:

Alaska State Hospital and Nursing Home Association **Alaska** Department of Health and Social Services, **Arizona** Department of Health Services, **Arkansas** Department of Health, **California** Office of Statewide Health Planning and Development, **Colorado** Hospital Association, **Connecticut** Hospital Association, **Delaware** Division of Public Health, **District of Columbia** Hospital Association, **Florida** Agency for Health Care Administration, **Georgia** Hospital Association, **Hawaii** Laulima Data Alliance, a non-profit subsidiary of the Healthcare Association of Hawaii, **Hawaii** University of Hawaii at Hilo**, Illinois** Department of Public Health, **Indiana** Hospital Association, **Iowa** Hospital Association, **Kansas** Hospital Association, **Kentucky** Cabinet for Health and Family Services, **Louisiana** Department of Health, **Maine** Health Data Organization, **Maryland** Health Services Cost Review Commission, **Massachusetts** Center for Health Information and Analysis, **Michigan** Health & Hospital Association, **Minnesota** Hospital Association (provides data for Minnesota and North Dakota), **Mississippi** State Department of Health, **Missouri** Hospital Industry Data Institute, **Montana** Hospital Association, **Nebraska** Hospital Association, **Nevada** Department of Health and Human Services, **New Hampshire** Department of Health & Human Services, **New Jersey** Department of Health, **New Mexico** Department of Health, **New York** State Department of Health, **North Carolina** Department of Health and Human Services, **North Dakota** (data provided by the Minnesota Hospital Association), **Ohio** Hospital Association, **Oklahoma** State Department of Health, **Oregon** Association of Hospitals and Health Systems, **Oregon** Office of Health Analytics, **Pennsylvania** Health Care Cost Containment Council, **Rhode Island** Department of Health, **South Carolina** Revenue and Fiscal Affairs Office, **South Dakota** Association of Healthcare Organizations, **Tennessee** Hospital Association, **Texas** Department of State Health Services, **Utah** Department of Health, **Vermont** Association of Hospitals and Health Systems, **Virginia** Health Information, **Washington** State Department of Health, **West Virginia**
Department of Health and Human Resources, **Wisconsin** Department of Health Services, **Wyoming** Hospital Association. For more information on HCUP, visit http://www.hcup-us.ahrq.gov.

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1. Installation

1.1 Before You Begin

Make sure that you have **Administrator permissions** on your computer so that you can install the software. You may also need information technology (IT) support when installing the software. You will need to download the latest Windows® service pack and updates for your operating system.[1]

Check your system to ensure it meets the minimum requirements (see Section 1.2).

Uninstall any previous versions of the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ Windows® (WinQI) software by going to **My Computer** and choosing **Uninstall or change programs** in Windows 8 and Windows 10. Then, reboot your computer to complete the uninstall step. You should **not** uninstall Microsoft® .NET Framework or SQL Server® Express if you already have these programs installed.

1.2 Hardware and software requirements

The WinQI software has been tested on the following configuration:

- 64-bit Microsoft Windows 8 and Windows 10
- .NET Framework Version 4.6.2
- Microsoft SQL Server Express 2008, 2012, 2014, 2017 and 2019 (Note: SQL Express 2005 is no longer supported starting with v2018.)

Approximate disk space requirements:

- Microsoft .NET Framework v4.6.2: 115 MB
- Microsoft SQL Server Express 2012/2014: 1.0 GB
- WinQI application: 225 MB (.NET Framework included)

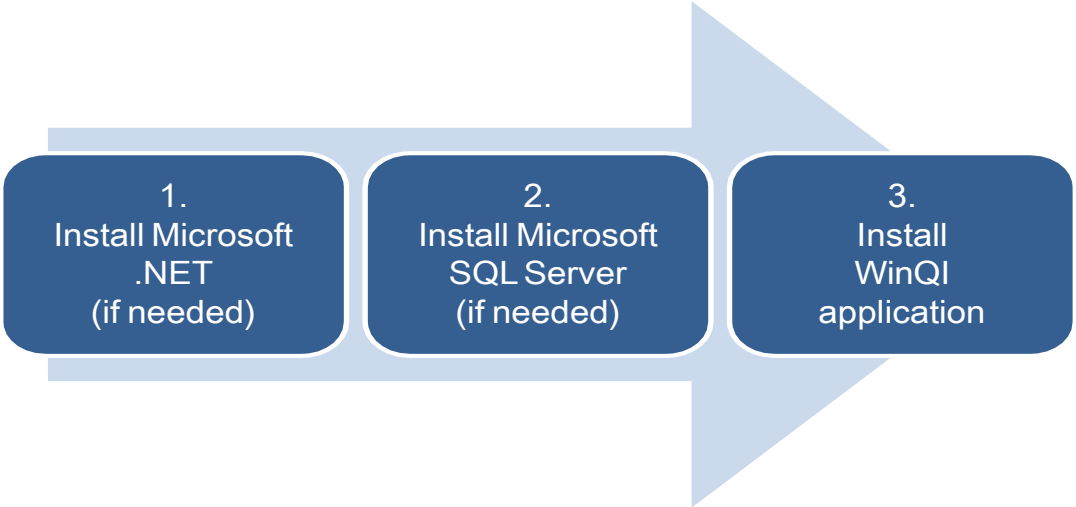
[1] The installer for WinQI will create a database called "qualityindicators" and then create all necessary database objects. If the database already exists on your system, WinQI can be installed with an account that has permissions to create and drop database objects. You may change passwords, rename the account, change permissions, or rename the database after the installation has completed. The database connection settings can be changed from within WinQI under Program Options. For ongoing operation, WinQI requires the ability to insert and delete data as well as to truncate tables, drop and create indexes, and drop and create tables.

- QI data: 100 MB is typical, but it can range up to 10 GB depending on the number of discharge records you wish to process. If the dataset is larger than 4 GB, then SQL Server Express 2012 and above, such as, 2019 is required.

1.3 Installation process

The installation process is depicted in Figure 2.

Figure 2. Installation Process



1.3.1 Step 1: Microsoft .NET installation (needed to be installed separately for WinQI v7.0 and below only)

WinQI v2021 requires Microsoft .NET Framework v4.6.2. In WinQI v2021, Microsoft .NET Framework v4.6.2 is included in the installer and will be prompted to install if it is not already installed on your machine. Note that your Windows operating systems may already have Microsoft .Net framework pre-installed. So, it's likely that the WinQI installation may not prompt you to install the framework.

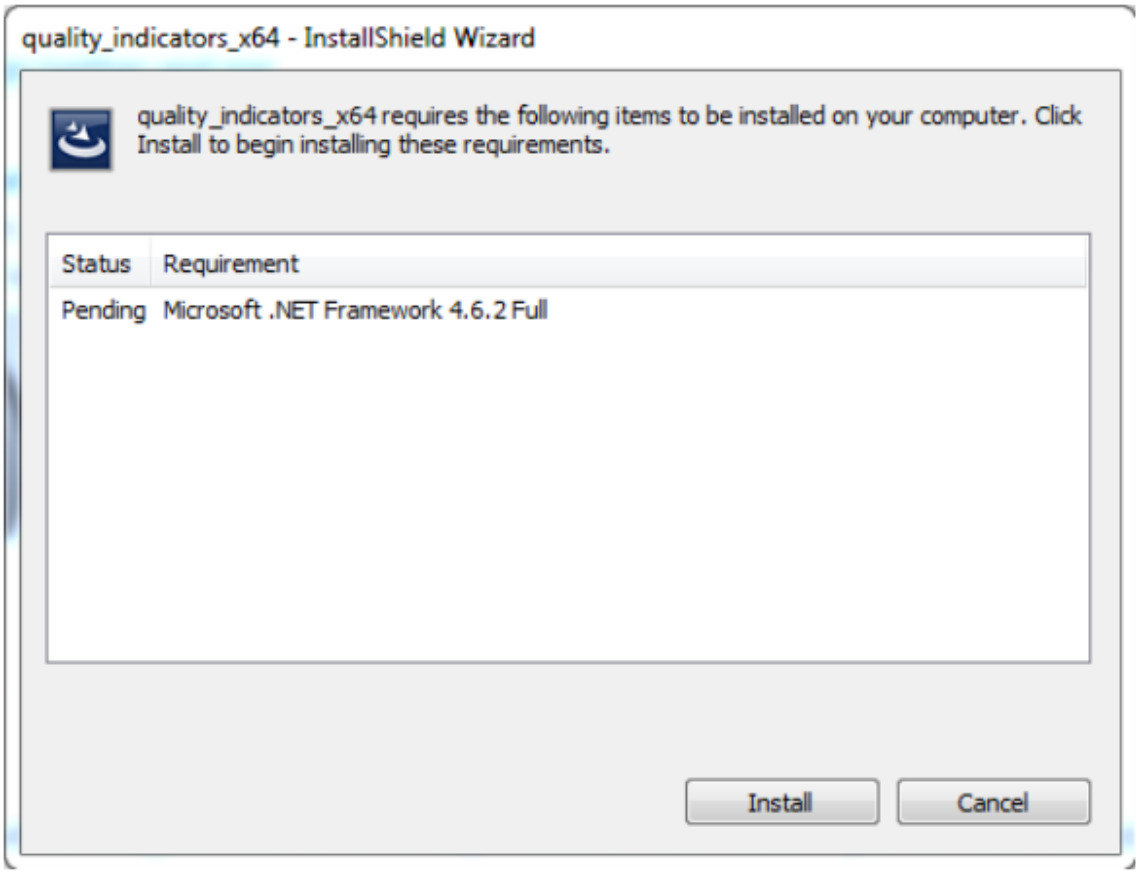
Before you begin:

To check whether your system already has the Microsoft .NET Framework v4.6.2 installed, go to **Control Panel** and select **Programs and Features** (Windows 8 and Windows 10).

To install:

1. Click <**Microsoft .Net Framework Download Page**> (https://www.microsoft.com/en-us/download/details.aspx?id=53344). Click the <**Download**> button, choose <**Save**> to save it to your desktop, and then <**Run**> it.
2. The program will prompt you for confirmation and ask you to Install Microsoft .NET Framework 4.6.2 (Screenshot 1). Then, the installation will proceed on its own.

Screenshot 1: WinQI Installation Wizard



1.3.2 Step 2: SQL Server installation

WinQI is a single-user desktop application that requires Microsoft SQL Server to store program data. You may choose from several different editions of SQL Server; it must be 2008 or later. (2008 or later editions are required for datasets larger than 4 GB or 4.5 million discharge records). A SQL Server database instance can be installed locally on your personal computer (PC) or accessed over a network. Most users prefer to have SQL Server 2012 and above, such as, 2019 Express Edition installed on their PCs unless local IT policies prohibit this setup.

If you choose to use an existing networked instance of SQL Server, contact your database or network administrator for the connection hostname, login, and password that will be required during the WinQI installation process.

Microsoft SQL Server 2012 and above, such as, 2019 Express Editions are recommended for WinQI. SQL Server can be downloaded from the WinQI software page on the AHRQ QIs website. See Table 2 for guidance on when you will need to download SQL Server.

Table 2. User Configurations and SQL Server Versions

If you…	The best choice is…
Already installed a local database with a previous version of WinQI . . .	Retain current SQL Server installation unless you have an older SQL Express, such as 2008 version installed.
Have IT rules that prefer a networked instance of SQL Server instead of desktop software . . .	Do not install SQL Server. Get connection information from your database administrator.
Have a PC with at least a 1 GHz processor, 512 MB RAM, and 600 MB free disk space . . .	Download SQL Server 2012 Express Edition and above.

To install SQL Server 2012 and above, such as, 2019 Express Edition:

1. Expand the tab "Software Instructions & Tutorial Video" tab and under the "Supporting Software section, click "<**Microsoft SQL Server 2019 Express Edition**> on the WinQI download page. This will take you to the SQL Server download website.
2. Click the <**Download**> button for the file called SQLEXPR_x64_ENU.exe (Windows 8/10 64-bit). Then choose <**Run**>, or <**Save**> it to your desktop and then <**Run**> it.
3. If you are running Windows 8, you will see a **User Access Control Panel** prompt asking you whether it should allow the installation software to make changes to your computer. Select <**Yes**>.
4. Accept the **End User License Agreement**; then click <**Install**> and <**Next**> on the next pages.
5. Complete setup and installation by choosing **All Default Options** in the **SQL Server Installation Wizard**. At the end of the wizard, you will click <**Install**> and then <**Finish**> to complete the process.
6. The **SQL Server** folder is created automatically in your **Program Files** folder.

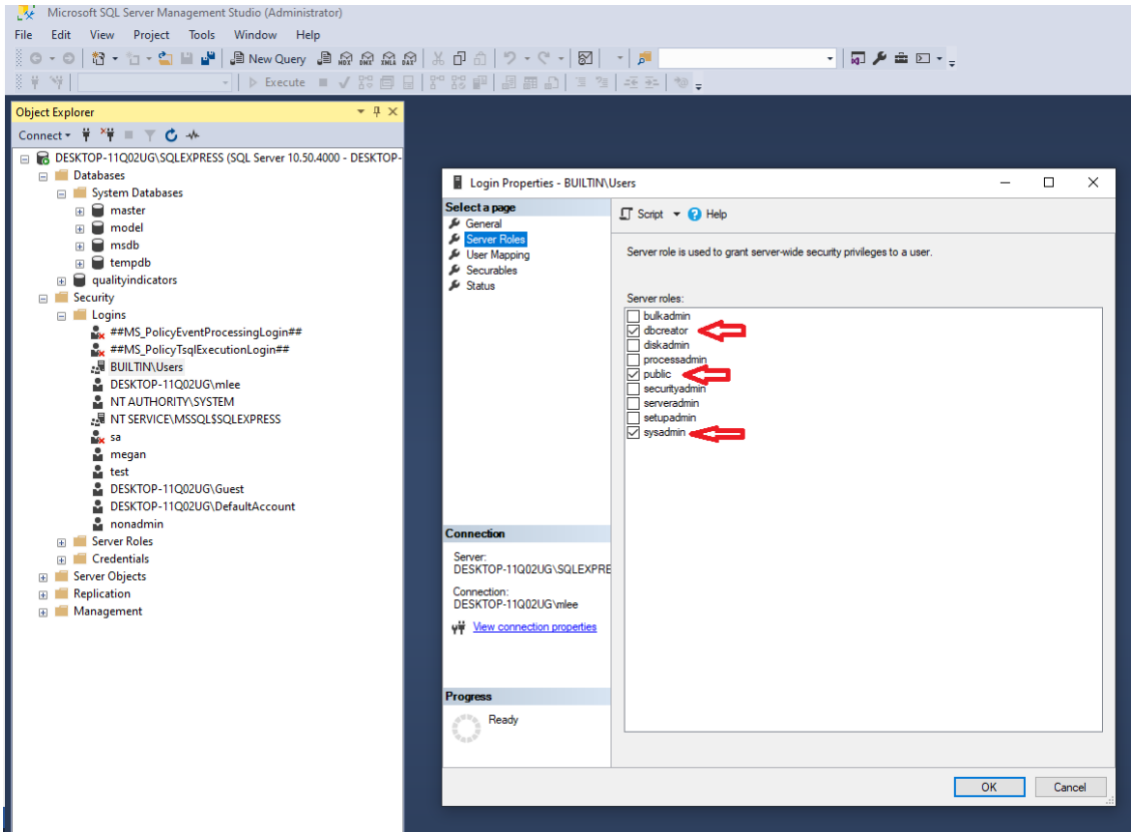
1.3.3 Step 3: WinQI installation

To install on Windows 8 and Windows 10:

1. Go to the WinQI software page and download the software. If you will use the built-in 3M's limited license APR-DRG grouper to compute DRGs and not provide on your own in the input discharge file, , then you must install WinQI 64-bit with APR-DRG Grouper Version.
2. Click <**Save**> to download the application to your desktop.
3. Double-click on the **AHRQ** icon on your desktop in the folder where the software is downloaded to <**Run**> the installer. Note: You will need to unzip the contents of the downloaded file before you <**Launch**> the installer.
4. If you choose to install WinQI 64-bit with APR-DRG Grouper Version, at the wizard welcome page, click <**Next**>; then accept the terms in the 3M™ APR-DRG software license agreement and click <**Next**>.

5. Choose the destination folder in which to install the software and click <**Next**>.
6. On the **Database Server** screen, enter the host and name of the SQL Server instance in the **Database Server** field that was created during installation of SQL Server. If you are using an existing SQL Server instance, specify its host and name. If a default installation was performed, then the connection string will be "pc-name\SQLEXPRESS", or ".\SQLEXPRESS," or "(local)\SQLEXPRESS," or "(local)." When you refer to (local), it means the SQL Server unnamed instance of local (localhost) server. Also, check the option to connect with the standard Windows authentication process. You may choose to connect using SQL Server Authentication by providing a corresponding username(login ID) and password.
7. For SQL Server Authentication, your database or network administrator may need to setup a login ID and password on SQL server. A SQL server client tool, such as the Microsoft Server Management Studio tool, can be used to setup a login ID and password on SQL Server. https://docs.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-ver15
8. **Database Permissions:** You will need "public", "sysadmin", and "dbcreator" server roles for the database (Screenshot 2).

Screenshot 2: Database Permissions



9. Click <**Next**> to begin the installation. The installer will build the QI database and install files, and then it will populate the U.S. Census population table. Ensure that a message window appears showing the status bar as it loads records from the U.S. Census population file.
10. If you already have the Microsoft Visual C++ Library installed and a dialog box appears asking whether to uninstall or repair the installation, please connect to the internet, if not already connected and reinstall the software. If you do not have the Microsoft Visual C++ Redistributable package installed, WinQI will automatically install it if you are connected to the internet. It is important that you have the correct version of the C++ Redistributable package installed (C++ 2012 Redistributable: 11.0.50727) before running the software.
11. Click <**Finish**> when the program has completed. This completes the installation of the WinQI software.

To start the program, click **Start > Programs > AHRQ > Quality Indicators >ahrq**. You can also pin the program to your desktop for easier access by creating a shortcut: Right-click on <**ahrq**> in the **Program** menu and choose <**Send to**>… then <**Desktop**>.

Note: If you will be uploading data files in Microsoft Access or Microsoft Excel format, before you continue, double-check that you have the **Microsoft Access Database Engine 2010 Redistributable** component installed on your computer. Otherwise, you will not be able to upload files in these formats.

2. Background

Each module of the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ (QIs) reflects quality of care measures to highlight potential quality concerns, identify areas that need further study and investigation, and track changes over time. The data required for measuring these indicators come from hospital discharge abstracts or billing claims (administrative data), which are readily available within hospitals or from many State data organizations. The AHRQ QI software is intended to be used with data that cover an entire patient population (e.g., all discharges from a hospital in a year) or that were sampled from a patient population using a simple random sample. Beginning with Quality Indicators™ Windows® (WinQI) Software Version 4.1, the software does not support weighted QI estimates or standard errors for weighted estimates. Thus, analyses using data obtained from a complex sampling design will not produce accurate estimates for the population from which the data were sampled. The residential population data for the area-level utilization indicators are from the U.S. Census Bureau (see *2021 Population File for Use with AHRQ Quality Indicators™*).

The software generates observed, expected, risk-adjusted, and smoothed rates across the modules for most indicators. Observed rates are the raw rates, which are the count of discharge records including the health outcome of interest divided by the count of discharge records in the patient population at risk. Expected and risk-adjusted rates both acknowledge that individual hospitals (or areas of the country) are unique and differ in two important ways from the representative profile observed in the reference population. First, heterogeneity exists in the quality of care that is provided. Some hospitals and areas provide exemplary care. Others provide substandard care. This is an important dimension of differences. Second, most individual hospitals serve patients with a distribution of covariates (demographics and comorbidities) that differ from the reference population. Some hospitals serve populations that are at higher risk for adverse events, and some serve populations that are at lower risk. Thus, this is a dimension that makes it difficult to make meaningful comparisons of observed rates. The expected and risk-adjusted rates each peg one of these two dimensions (quality of care or patient mix) to that observed in the reference population and then comment on the second dimension, as observed in the local data.

The expected rate answers the question, “What rate of adverse events would we expect to see if this hospital (or area) provided the average level of care observed in the reference population, but provided it to patients with the locally observed distribution of characteristics?” (i.e., average performance from the reference population of the universe of patients applied to a locally observed mix of patients with their local risk profiles). When the observed rate is smaller than the expected rate (or the observed/expected ratio is <1), then there is reason to think that the hospital (or area) is performing better than average on this indicator.

The risk-adjusted rate answers the converse question, “What rate of adverse events would we see in this hospital (or area) if they provided the locally observed quality of care to patients whose distribution of characteristics matched those in the reference population?” (i.e., locally observed

performance on a representative mix of patients from the reference population). Risk-adjusted rates are useful in comparisons between hospitals or areas. They are evaluated on an identical mix of patients, so calculating them is an attempt to remove the confounding influence of patient mix (different profiles of risk that are not related to care) from the comparison.

The smoothed rate is a weighted average of the reference population rate and the locally observed (hospital or area) rate. If the data from the individual hospital or area include many observations and provide a numerically stable estimate of the rate, then the smoothed rate will be very close to the risk-adjusted rate, and it will not be heavily influenced by the reference population rate. Conversely, the smoothed rate will be closer to the reference population rate if the hospital or area rate is based on a small number of observations, and it may not be numerically stable, especially from year to year.

The software also calculates 95 percent intervals for some of the rates (confidence intervals in the case of risk-adjusted rates, probability intervals for composite and smoothed rates). These intervals can be used to test whether the computed rate is statistically different from a reference value. If the reference value is greater than the upper bound of the interval, then the computed rate is statistically lower than the reference value. If the reference value is less than the lower bound of the interval, then the computed value is statistically higher than the reference value. If the reference value falls between the lower and upper bounds, then there is no statistical difference between the computed rate and the reference value. For a more thorough explanation of risk-adjusted and smoothed rates, please see the technical documentation on the AHRQ QIs website.

2.1 Inpatient Quality Indicators Background

In v2021, the Inpatient Quality Indicators (IQI) module contains 15 indicators (plus two composite indicators) that reflect the quality of care inside hospitals. The Inpatient Quality Indicators (IQIs) provide a perspective on quality of care inside hospitals, including, Inpatient mortality for surgical procedures and medical conditions; Utilization of procedures for which there are questions of overuse, underuse, and misuse. The IQIs can be used to help hospitals assess quality of care inside the hospital and identify areas that might need further study. Prior to v2019, the six volume measures were intended to be paired with the corresponding mortality indicators. The indicators include three groups of measures that are based on hospital stays.

1. Volume indicators have been retired in v2019 because volume as a “stand-alone” measure is not useful for quality improvement. Prior to v2019, the IQI module included six volume indicators for inpatient procedures. The module includes 15 inpatient mortality indicators for medical conditions and surgical procedures that have been shown to have mortality rates that vary substantially across institutions and for which evidence suggests that high mortality may be associated with deficiencies in the quality of care. These indicators are measured as rates, the number of deaths divided by the number of admissions for the procedure or condition. Eight of these mortality indicators are for procedures, six of which are also measured by a volume indicator. The other seven mortality indicators are associated with medical conditions.

2. Three indicators have stratified results reported in WinQI v2019. Overall results for these measures and results for those discharges with specific medical conditions are reported. The results for IQI 09 Pancreatic Resection Mortality Rate are reported separately for those patients who have pancreatic cancer and those who do not. The results for IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate are reported separately for patients, depending on whether the AAA was ruptured or unruptured and whether the repair was open or endovascular. The results for IQI 17 Acute Stroke Mortality Rate are reported separately for patients with subarachnoid stroke, those with hemorrhagic stroke, and those with ischemic stroke. WinQI v2019 does not report smoothed rates for the strata; all other results reported for the overall indicator are also reported for the strata.
3. The software does not report expected rates, risk-adjusted rates, and smoothed rates for the following indicators: IQI 21 Cesarean Delivery Rate, Uncomplicated; IQI 22 Vaginal Birth After Cesarean (VBAC) Delivery Rate, Uncomplicated; and IQI 33 Primary Cesarean Delivery Rate, Uncomplicated. These measures are not risk-adjusted, so only the numerators, denominators, and observed rates are reported.

2.2 Pediatric Quality Indicators Background

In v2021, the Pediatric Quality Indicators (PDI) module contains seven (plus three composite) indicators that reflect the quality of care inside hospitals and four indicators that reflect the quality of care outside hospitals. The Pediatric Quality Indicators (PDIs) focus on potentially preventable complications and iatrogenic events for pediatric patients treated in hospitals and on preventable hospitalizations among pediatric patients, considering the special characteristics of the pediatric population. The PDIs can be used to identify potential quality and patient safety issues specific to the pediatric inpatient population. They can help hospitals identify problems in pediatric hospital care that may need further study and evaluate preventive care for children in outpatient settings. These indicators serve as flags for potential quality problems rather than definitive measures of quality of care. The indicators include two groups of measures that are based on hospital stays.

1. The module includes seven hospital-level PDIs for medical conditions and procedures that have been shown to have complication/adverse event rates that vary substantially across institutions and for which evidence suggests that high complication/adverse event rates may be associated with deficiencies in the quality of care. The module also includes three indicators for neonates. These indicators are measured as rates—outcome of interest/adverse events divided by the population at risk for the procedure or condition. The adverse, event-related, hospital-level indicators usually include only those cases in which a secondary diagnosis code flags a potentially preventable complication. A few indicators are based on procedure codes that imply or infer a potential preventable adverse event. The adverse event-related indicators are for surgical discharges, and a few are for either medical or surgical discharges. Two of the hospital-level PDIs (PDI 08 Perioperative Hemorrhage or Hematoma Rate, and PDI 09 Postoperative Respiratory Failure Rate) incorporate information about when procedures were performed (relative to the admission date) if this information is available. Note, however, that

if the day of procedure information is missing, the computed rates for these indicators will be slightly lower than if the information were available. Admission type and point of origin are used by two of the PDIs (PDI 08 and PDI 9) to identify elective surgeries.

2. The module includes seven area-level PDIs (four individual indicators and three composites).

Note that PSI 17 Birth Trauma Rate–Injury to Neonate is calculated using the PDI module because it is based on discharges of patients 17 years of age and younger. PSI 17 uses all in-hospital newborns as the denominator. The PSI 17 Standalone Module calculates these two indicators, respectively, without the need to run the entire PDI module in SAS QI. In WinQI, PSI 17 is calculated with the PSI module. This standalone SAS QI module is available as a separate download from the AHRQ QI website.

2.3 Prevention Quality Indicators Background

In v2021, the Prevention Quality Indicators (PQI) module contains ten indicators and four composite indicators that measure adult hospital admissions for ambulatory care sensitive conditions (ACSCs) across geographic areas.

The Prevention Quality Indicators (PQIs) identify issues of access to outpatient care, including appropriate follow-up care after hospital discharge. More specifically, the PQIs use data from hospital discharges to identify admissions that might have been avoided through access to high-quality outpatient care. The PQIs are population-based indicators that capture all cases of the potentially preventable complications that occur in a given population (in a community or region) either during a hospitalization or in a subsequent hospitalization. The PQIs are a key tool for community health needs assessments.

The PQIs provide a good starting point for assessing quality of health services in the community. The PQIs use administrative data found in a typical hospital discharge abstract to:

- Flag potential health care quality problem areas that need further investigation
- Provide a quick check on primary care access or outpatient services in a community
- Help organizations identify unmet needs in their communities

ACSCs represent conditions for which hospitalization could be avoided if the patient receives timely and adequate outpatient care. Many factors influence the quality of outpatient care once it is obtained, including access to care and adequately prescribed treatments. In addition, patient compliance with those treatments and other patient factors may play a role. Areas with lower socioeconomic status tend to have higher admission rates for ACSCs than areas with higher socioeconomic status. As with utilization indicators, these conditions have no “right rates” of admission. Very low rates could signal inappropriate underutilization of healthcare resources, whereas very high rates could indicate potential overuse of inpatient care.

Hospital admission for ACSCs therefore is not a measure of hospital quality but a potential indicator of outpatient and community healthcare needs. For example, if an area has a relatively

high hospital admission rate for diabetes complications, the local healthcare hospitals should work with the community to identify reasons and strategies to address the problem.

Except for perforated appendix, each indicator is measured as the number of hospital admissions for a particular ACSC divided by the residential population in an area.

2.4 Patient Safety Indicators Background

In v2021, the Patient Safety Indicators (PSI) module contains indicators that reflect the quality of care inside hospitals.

The Patient Safety Indicators (PSIs) provide information on potentially avoidable safety events that represent opportunities for improvement in the delivery of care. More specifically, they focus on potential in-hospital complications and adverse events following surgeries, procedures, and childbirth. The PSIs can be used to help hospitals assess the incidence of adverse events and in-hospital complications and identify issues that might need further study.

PSI 17 is calculated by the PDI module in SAS QI because it is based on pediatric discharges. The indicators include two groups of measures that are based on hospital stays. In WinQI, it is calculated with the PSI module.

The module includes 17 hospital-level PSIs (plus one composite) for medical conditions and surgical procedures that have been shown to have complication/adverse event rates that vary substantially across institutions and for which evidence suggests that high complication/adverse event rates may be associated with deficiencies in the quality of care. These indicators are measured as rates: the number of complications/adverse events divided by the number of admissions for the procedure or condition. The hospital-level indicators include only those cases in which a secondary diagnosis code flags a potentially preventable complication.

Eight of these indicators are for surgical discharges, eight are for either medical or surgical discharges, and three are for obstetric discharges. Six of the hospital-level PSIs (PSI 03 Pressure Ulcer Rate, PSI 09 Perioperative Hemorrhage or Hematoma Rate, PSI 10 Postoperative Acute Kidney Injury Requiring Dialysis Rate, PSI 11 Postoperative Respiratory Failure Rate, PSI 12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate, and PSI 14 Postoperative Wound Dehiscence Rate) incorporate information about when procedures were performed (relative to the admission date) if this information is available. Note, however, that if the day of procedure information is missing, the computed rates for these indicators will be slightly lower than if the information were available. Admission type is used by four of the PSIs (PSI 10, PSI 11, PSI 13 Postoperative Sepsis Rate, and PSI 17) to identify elective surgeries and newborn admissions.

Note that PSI 02 Death Rate in Low-Mortality Diagnosis-Related Groups is reported as a single hospital-level measure (observed and risk-adjusted). A single measure is necessary to ensure adequate reliability of the hospital-level rates by pooling an infrequent event over a large group of

patients. However, the denominator for the indicator is very heterogeneous, and the mortality rate among the low mortality MS-DRGs varies by MS-DRG type. Users should compare the observed rate to the risk-adjusted rate, which accounts for differences among hospitals in patient case-mix (i.e., age, sex, MS-DRG, and comorbidities). For example, a hospital may have a high PSI 02 observed rate only because the hospital has a higher-than-average share of adult medical MS-DRGs.

The software does not report expected rates, risk-adjusted rates, and smoothed rates for the following indicators: PSI 17; PSI 18 Obstetric Trauma Rate–Vaginal Delivery With Instrument; and PSI 19 Obstetric Trauma Rate–Vaginal Delivery Without Instrument. These measures are not risk-adjusted, so only the numerators, denominators, and observed rates are reported. WinQI v2021 stratifies PSI 04 Death Rate among Surgical Inpatients with Serious Treatable Complications by the five treatable complications contained in the overall indicator: deep vein thrombosis/pulmonary embolism, pneumonia, sepsis, shock/cardiac arrest, and gastrointestinal hemorrhage/acute ulcer. WinQI v2021 does not report smoothed rates for the strata; all other results reported for the overall indicator are also reported for the strata. The strata results may not equal the sum of the overall results because the strata are not mutually exclusive.

3. Overview of the WinQI Software

This document describes the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ Windows® (WinQI) software (Version v2021), a free tool that allows users to run AHRQ QI analyses with data that they provide. Anyone who has access to administrative discharge data can run this software.

3.1 Reference populations

When applicable, the software calculates risk-adjusted and expected rates using a reference population that is an aggregation of FY 2018 discharges from all the States that participate in the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID). For additional information on HCUP and SID, see the Acknowledgments section of this report and AHRQ's HCUP website (https://www.ahrq.gov/research/data/hcup/index.html).

Regression coefficients from the reference population are applied to the individual cases in the risk adjustment process. These reference population file regression coefficients are provided as part of the WinQI v2021 software. The risk-adjusted rates for the hospital-level indicators will then reflect the age, sex, condition/severity, and comorbidity distribution in the reference population rather than the distribution for the hospitals in the user's data. Similarly, the risk-adjusted rates for the area-level indicators will reflect the age and sex distribution in the reference population rather than the distribution for the areas in the user's data. This approach will allow risk-adjusted rates produced by various users to be compared directly to the reference population. The regression coefficients were derived from the HCUP SID and, for area-level indicators, U.S. Census data. The code to generate these reference population coefficients is not part of the WinQI software.

3.2 Data included

The WinQI software does not include data for any individual hospitals or groups of hospitals.

The only QI rates included in the software are for the reference population (see Section 3.1). You cannot use this software unless you provide your own administrative discharge data to analyze. The data requirements and specifications are outlined in Appendix A.

In addition to the reference population rates, the software includes risk adjustment coefficients and model parameters (e.g., signal variance estimates) based on a statistical analysis of the reference population. These data are populated in the respective tables of the QI database during installation and generally cannot be modified (an exception to this is the composite weights that you can modify before generating a composite report, as described in Section 12.4.2.3).

3.3 Benchmarks

Having calculated an observed rate for an indicator, the obvious next question is, "Compared to what?" Users typically want comparisons with other hospitals or a national rate. However, neither of these is generally appropriate given that hospitals vary in the patients they treat. For example, it

would not be fair to compare mortality rates from a hospital that specializes in high-risk cases to an "average" hospital, nor would it be reasonable to compare a hospital that serves a largely elderly population with one that serves a more balanced area. An appropriate benchmark for a hospital is necessarily specific to the demographics and the types of cases it receives.

For most purposes, the most useful check is to compare the observed rate with the expected rate calculated from the same group of cases. The WinQI software calculates these rates (see Section 12.4).

For hospital-level indicators, the expected rate takes into account the age, sex, comorbidities, severity of illness, and other characteristics of the actual patients at risk for each outcome. For area-level indicators, the expected rate takes into account the mix of age and sex in each area. The WinQI software provides an option to risk adjust based on poverty demographics in a given area along with age and sex for the Prevention Quality Indicators (PQIs) and the area-level Pediatric Quality Indicators (PDIs; see Section 12.3.4). The risk-adjusted rate calculated by the software is the observed rate divided by the expected rate times the reference population rate.[2] The risk-adjusted rate is the rate that would be expected if the specific group of "at-risk" patients in a service area or hospital received the "average" expected treatment.[3]

3.4 Using the WinQI software for analysis

The WinQI software provides built-in tools to assist users in analyzing the rates that are produced.

3.4.1 Reviewing individual cases

The WinQI software includes tools to review the individual cases that are selected for each indicator. Once you have loaded your data and generated indicators for specific modules, select the module you would like to analyze and click <**Create Patient Report**> (see Section 12.6) on the **Home** screen under the **Create Reports** section of the screen. Then select the desired indicator on the **Patient-Level Report** screen. This tool can be useful for selecting cases for chart review and further study.

Click on the row number of an individual case or the "View Case Details" link starting with v2021 to get more information about that case. The **Case Details** screen traces an indicator for a single case, showing why each case was or was not included, excluded, or flagged (including which Medicare Severity Diagnosis-Related Group or *International Classification of Diseases, 10th Revision, Clinical Modification* codes contributed to this assignment).

[2] The reference population rate is used in the calculation of the risk-adjusted rate only when creating a report stratified by county or hospital or when no stratification is used. Otherwise, the risk-adjusted rate is equal to the observed-expected ratio.
[3] See the http://www.qualityindicators.ahrq.gov/modules/Default.aspx report.

You may also drill down on the **Observed Numerator** or **Observed Denominator** values from the **Hospital-Level** or **Area-Level Report summary** screens to review corresponding individual cases for the specific indicator and selected stratifiers.

3.4.2 Stratification

You may "drill into" QI rates by using the **Report Wizard** to generate reports that are stratified according to a particular data element, including up to three "custom" or user-supplied fields. Stratification allows you to divide the discharges into groups by attributes, such as age or race, and view the observed, expected, and risk-adjusted rates for each group. This tool helps to identify whether there are differences in quality of care for different groups, and it can be used to identify areas and opportunities for quality improvement.

3.5 Other documentation

The QIs are separated into four modules: Patient Safety Indicators (PSIs), Inpatient Quality Indicators (IQIs), Prevention Quality Indicators (PQIs), and Pediatric Quality Indicators (PDIs). Each module is documented separately in technical specifications documents that provide detailed definitions of specific QI inclusion and exclusion criteria.

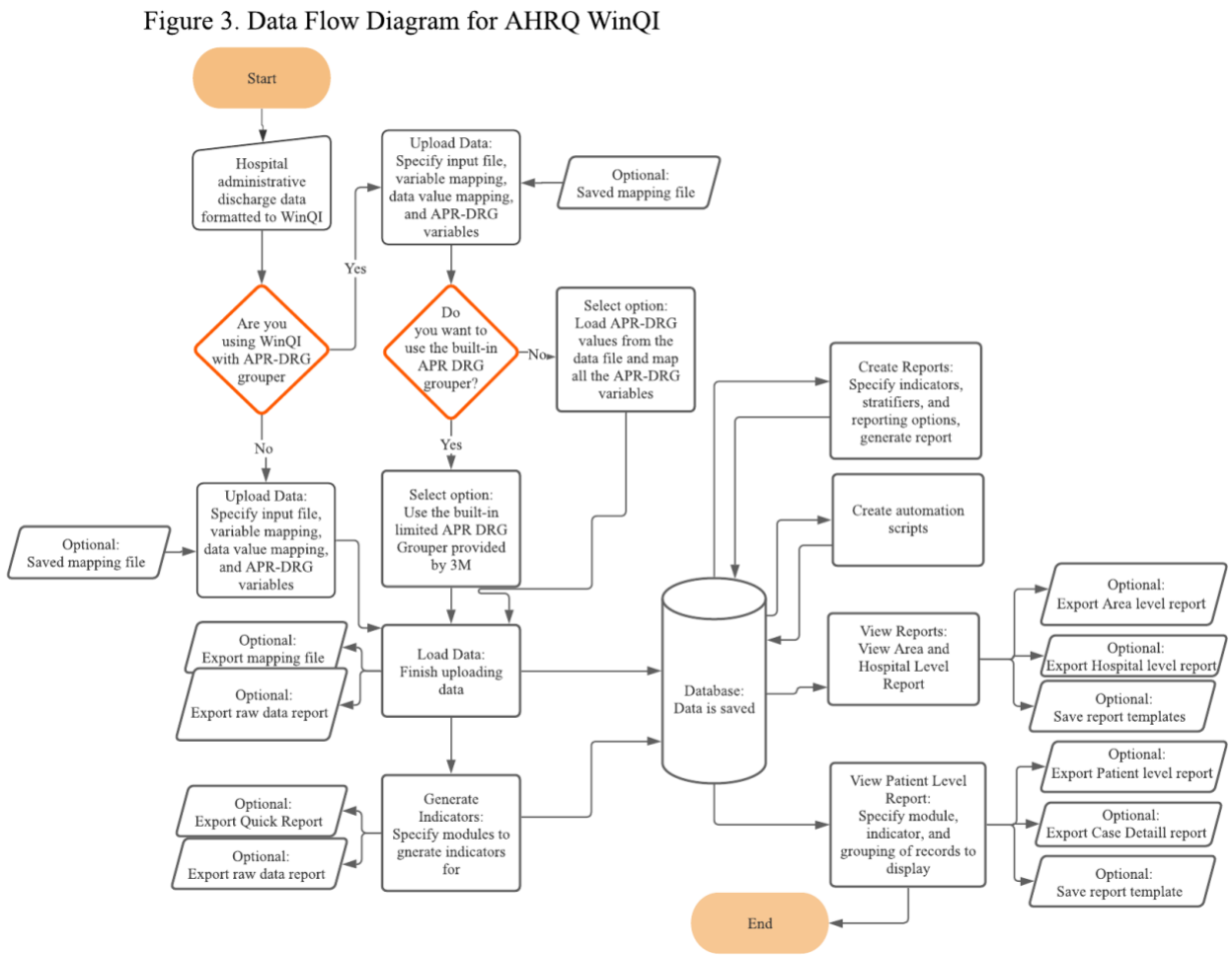
Each technical specifications document provides the codes for specific diagnoses and procedures, other criteria that are used to construct the denominator and numerator from discharge records, and the logical conditions under which records would be excluded. Other available downloads include the SAS®[4] syntax and instructions, as well as a list of the coding changes made for each fiscal year by module (see the change logs and release notes for details on WinQI v2021 and SAS QI v2021).

[4] SAS is a statistical software package distributed by the SAS Institute Inc. (http://www.sas.com). The company may be contacted directly regarding the licensing of its products. The SAS Institute Inc., has no affiliation with AHRQ or involvement in the development of the AHRQ QIs.

4. WinQI Flowchart

Figure 3 is a visual representation of the major processes included in the Quality Indicators™ Windows® (WinQI) software. It also specifies the inputs and outputs of these processes. These processes, inputs, and outputs are further detailed in the sections that follow.

Figure 3. Data Flow Diagram for AHRQ WinQI



5. Getting Started

5.1 Using WinQI

5.1.1 How do I start the WinQI software?

For Windows 8 and above, click on your computer's <**Start**> button and type "AHRQ" to find the installed software on your computer. Once you see the "AHRQ" Desktop App icon, click on it to launch the application.

Note: WinQI is no more supported on Windows 7.

5.1.2 How do I use this instruction manual?

The main part of this manual is organized into the sections shown in Figure 4.

Figure 4. Data Flow Diagram for How to Use This Manual

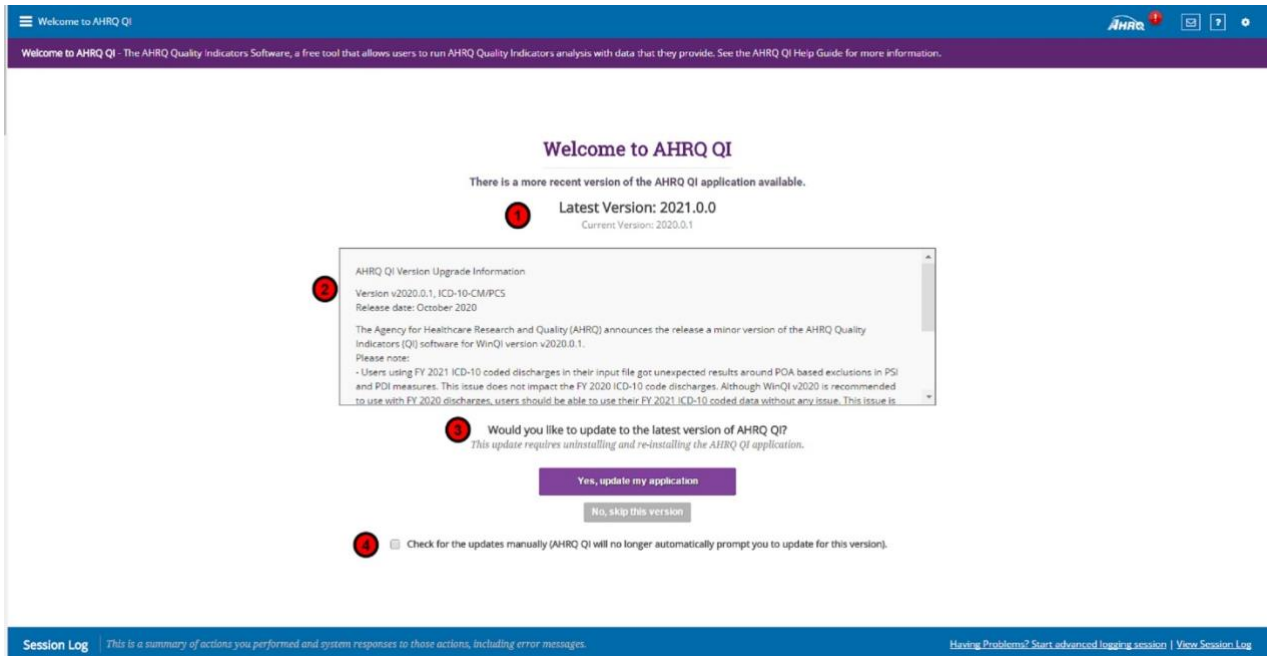
Most of these sections show screenshots of each process step for each software function. The discussion of the capabilities for each screen includes answers to the following questions: (1) What is this screen for? (2) How is this screen organized? and (3) What should I do here? Time-saving tips and other questions may also be included in the discussion.

6. WinQI Intelligent Installer

6.1 What is this screen for?

This is a new feature starting with v6.0 of the Quality Indicators™ Windows® (WinQI) software. When you launch the software, the WinQI software goes out to the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ (QIs) website and checks for the latest available version of the software. You must be connected to the internet for this feature to work. If the latest version is higher than the version you have, the WinQI software informs you that there is a newer version available and also displays the features available in the latest version. It then asks you if you wish to upgrade your software now. You may decide to upgrade your software, in which case the software will perform the update for you. If you have the most recent version and no later version is available, then the software will take you to the **Welcome** screen (Screenshot 3).

Screenshot 3: New Version Notification Screen



6.2 How is this screen organized?

1

6.2.1 Latest version

This section shows what version of the software you have and what is the latest version on the website.

2

6.2.2 Release notes

This section informs you of the high-level features included in the latest release so you can make an informed decision about whether you should upgrade sooner rather than later.

3

Would you like to upgrade to the latest version?

In this section, the software first informs you that when upgrading from your current version to the latest version, you should export any data and reports you wish to save, because all data and reports in the database will be overwritten upon a new installation. It then asks you if you would like to upgrade now. If you answer in the affirmative, the software warns you that you need to export your data and any needed reports and asks you to confirm that you wish to continue. You may continue or cancel the upgrade. If you decide not to upgrade, the software goes to the **Welcome** screen.

4

6.2.3 Check for upgrades manually

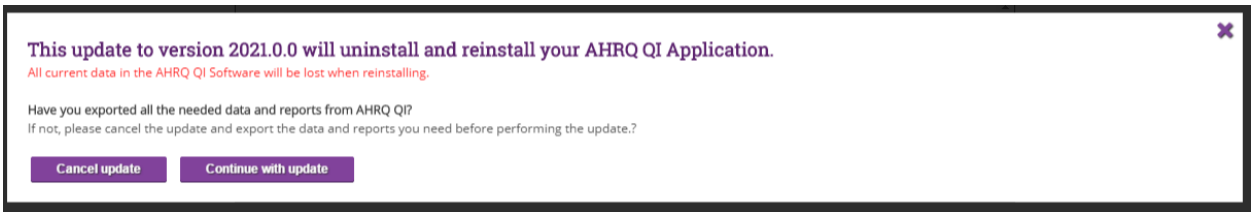
By checking this checkbox, you turn off the software feature that automatically checks for upgrades each time you launch the software. Even if you turn off the automatic check, you may still subsequently check for upgrades by selecting the **Check for Upgrades** option under the **WinQI Menu** or in the left-hand menu.

6.3 What should I do here?

If a newer version of the software is available, read the features of the newest release and determine whether or not it will be helpful to upgrade now. In general, we recommend that you install the latest version of the software because certain technical issues may also have been resolved in the newer version. If you decide to upgrade, please be sure to export your data and any reports in which you are interested before you perform the upgrade.

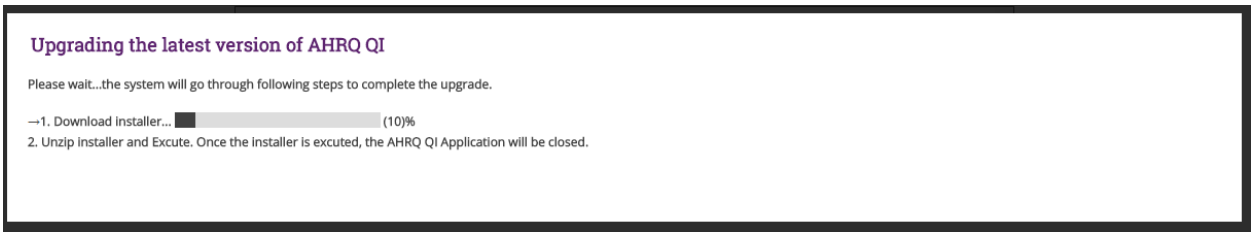
To continue with the update or to cancel the update, please click the appropriate button below (Screenshot 4).

Screenshot 4: Update to Version 2021



If you decide to continue with the update, the following screen appears when the upgrading is in progress (Screenshot 5). The screen also contains instructions for next steps.

Screenshot 5: Upgrading to Latest Version of AHRQ QI

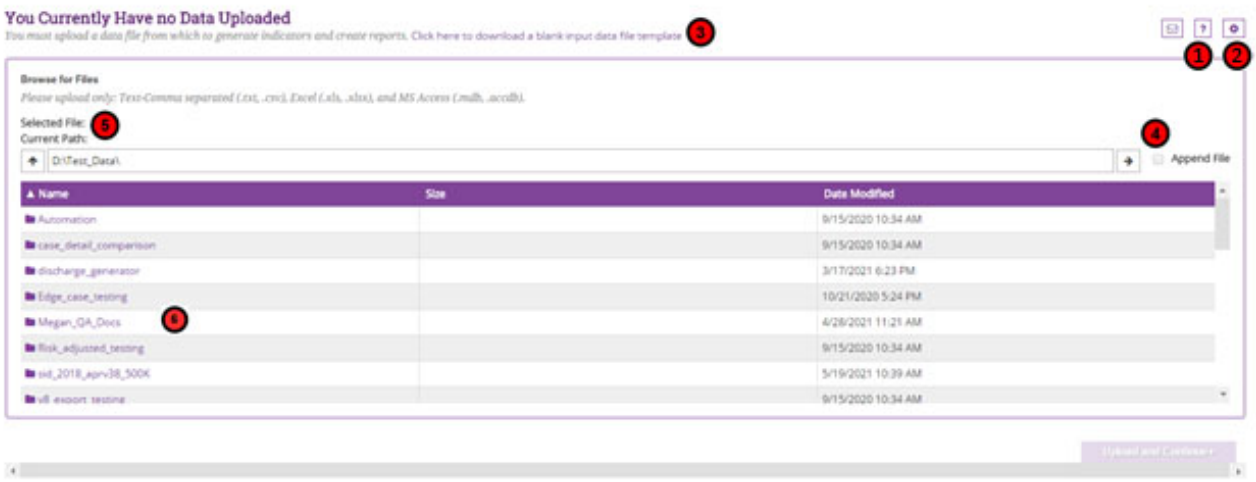


7. WinQI Home Screen

7.1 What is this screen for?

This screen (Screenshot 6) shows the initial **Home** screen that you will see the first time you log in to the application. You will also see this screen if you have logged in but have not yet imported a data file. You must import a data file in order to perform any Quality Indicator (QI) analysis.

Screenshot 6: Home Screen



7.2 How is this screen organized?

7.2.1 Contact QI support

Clicking the mail icon will inform you how you can reach the AHRQ QIs support team for any questions or issues and what information you will need to send them. This icon is available on all of the screens of the Quality Indicators™ Windows® (WinQI) application.

7.2.2 Help

When you click the **Help** button, a window pops up and brings you to the **WinQI Help Guide**. *This icon is available on all of the screens of the WinQI application and will bring up help specific* to the screen or function you are on.

7.2.3 Tools

This icon will bring up a menu containing several helpful tools that are available to you throughout the application. Please see Section 13 for a description of the available tools.

7.2.4 Blank input data file template

This option is available for v2021. Clicking the link "Click here" will allow you to download a blank input data file (.csv) to setup your data for WinQI. Please refer to the WinQI input data format in Appendix A.

4

7.2.5 Append File option

This option is available starting in v2021. You can combine your new input data file with the existing data in WinQI when importing their files. This requires you to use the .csv file format for importing in your data. Clicking the "Append File" checkbox when importing your input data file will combine your data in WinQI v2021. You can continue to append files. Once combined, you will be required to re-generate your QI rates.

Therefore, by selecting this option, you will see decrease in your hard drive space.

If you do not check the Append File checkbox, it will stop appending your data, but replace your existing imported data.

It is recommended that you keep an eye on the size of the combined data in WinQI, as the larger the input data becomes, the more resources are required to run WinQI. WinQI is tested with a maximum of 7 million discharges input data file and, depending upon the resources (memory and disk space) in your machine/database server, a larger file can cause WinQI to slowdown and may eventually stop processing.

5

7.2.6 Selected file / current path

In this field, you can type in the full path and name of the file you would like to upload and click the right arrow -> to continue with uploading. Alternatively, as you navigate your folder structure from the bottom portion of the screen, the path of the current folder you are on and/or the selected file will be shown in this field.

6

7.3 File folder

This section shows your file folder structure, which you can navigate to select the file you would like to upload. Click on the name of the folder to go to it or click on the name of the file to select it. You can also sort the folder structure by name, file size, and date modified by clicking the header of the appropriate column. Sort the files to help you find your file more easily.

7.3.1 What should I do here?

Type in the full path and name of your input file in the "This PC" field and click the right arrow ->. Alternatively, browse to the appropriate folder, select the file, and then select <**Upload and Continue**> to begin the **Import File** process.

8. About Input Data

See Appendix A for a detailed description of the input data elements and coding conventions used by the Quality Indicators™ Windows® (WinQI) software.

8.1 Questions on input data

8.1.1 Where do I begin?

The first thing you need to do is obtain a file that contains the inpatient discharge records you want to analyze. Once you have this file, run the WinQI application. Start by entering the file path to locate the file on your computer and begin the **Import File** process. The graphical user interface will guide you through the steps to load data, generate indicators, create reports, and review cases.

8.1.2 What kind of input data can be used by the software?

The software uses readily available hospital inpatient administrative data that provide demographics on the patient and the hospital; diagnosis codes; procedure codes; and information about the admission, payer, and discharge.

8.1.3 What format should the data be in?

Two formatting issues to keep in mind are that

- Each row of data should represent a separate discharge record, and
- Each column of data should represent a single variable for all discharges. There is a limit of 200 columns.

The software accepts three common data formats:

- **Text (comma-separated),**
- **Microsoft Access, and**
- **Microsoft Excel.**

If the data file meets these requirements, the **Data Import Wizard** will assist users in transforming their data into the QI data format with flags for each indicator, clinical classifications flags, and comorbidity flags (see Appendix C for a definition of each flag).

8.1.4 What is the easiest format to work with?

If you have the flexibility to create your input file in any format, it is easiest to use a comma-separated value format (.csv or CSV) and use the variable names in the **Data Elements** table as column headers. For each *mapped* variable in the **Data Elements** table, use the numeric values listed. None of these suggestions are mandatory, but they will simplify data import.

Note that the .CSV format can be problematic for international users who might use commas to denote the decimal place in numeric fields. The WinQI software is not able to properly interpret commas used as decimal separators. Users are required to reformat their data so that decimal points (i.e., ".") are used as decimal separators.

8.1.5 What data must be included?

The WinQI Input Data Dictionary (see Appendix A) lists the data that should be included for each discharge.

8.1.6 What if I don't have all the data?

It is not necessary to create "dummy data" to fill the columns or create missing data elements. See the comments in the **Data Elements** table in the software and on the **Data Mapping** screen in the **Data Import Wizard** to determine the consequences of leaving out any variable.

8.1.7 What if my data have additional variables that I want to use?

Your input file may contain extra data that are not required. Any variables that are not used in the **Data Mapping** screen will not be imported with your data.

The software allows you to use up to three "custom stratifiers." These fields allow you to calculate rates for hospital-level indicators using whatever custom grouping you wish. However, the application can use variables only in the first 200 fields of your data, so you should be sure that all required variables are in the first 200 fields.

8.1.8 My file does not have column headers. Do I need to put them in?

Column headers are required for Excel files but are not required for CSV files. The software **Data Import Wizard** allows you to map variables by name or by position. However, *including column headers is generally easier and less likely to result in error*. Though not required, we recommend that you include column headers in CSV files.

8.1.9 What are the different data types?

Numeric and string values must match the format specified.

Mapped variables have specific meanings according to the coding conventions in your organization, and they have specific meanings in the WinQI application. For example, the WinQI disposition value for "died" is "20."

There are four types of data elements:

- **Numbers,**
- **Dates,**
- **Strings, and**
- **Mapped variables.**

Your data do not have to use "20" to mean "died," but in order for the WinQI application to calculate mortality indicators, you will need to provide the translation in the **Crosswalk** screen.

8.1.10 What if I have commas in some of my data values?

Comma-separated value format files use commas to separate the data values. If you have commas within any data values (e.g., "Private, incl. HMO"), then you will need to put double quotes around each data element. When selecting your file, check the appropriate box to have the quotes recognized. And, as noted in Section 8.1.4, the CSV format can be problematic for international users who might use commas to denote the decimal place in numeric fields. The WinQI software is

not able to properly interpret commas used as decimal separators. Users are required to reformat their data so that decimal points (i.e., ".") are used as decimal separators.

8.1.11 Can I use tabs instead of commas as a delimiter?

Yes. You can switch the delimiter to **Tabs** on the **Program Options->Other** screen from the Settings menu.

8.1.12 What about external cause of injury codes (E-codes)?

External cause of injury codes (E-codes) are used to classify environmental events, circumstances, and conditions as the cause of injury, poisoning, or other adverse events. The use of E-codes is not always required by a State uniform billing committee or a State data organization. Users should have knowledge of the E-code requirements and practices of hospitals represented in the input data file. AHRQ has conducted some methodological work in understanding the completeness of E-coding in hospital billing data. Reports can be found at http://www.hcup-us.ahrq.gov/reports/methods/methods_topic.jsp.

E-code variables may be used in place of secondary diagnosis fields in the WinQI software. If your data have separate variables for E-codes, you can use the **Data Mapping** feature (see Section 9.2.2.2) in the **Data Import Wizard** to map the QI variables to your E-code variables, starting with the first available (unmapped) secondary diagnosis QI variable. If the number of diagnosis fields plus the number of E-code fields in your input data exceed 35, then you may wish to preprocess your data to fill in the gaps and get the maximum use of the 34 secondary diagnosis fields. If your data have a present on admission (POA) flag associated with an E-code variable, then map the E-code POA variable to the QI POA variable that corresponds to the secondary diagnosis to which the E-code was mapped.

8.1.13 What about All Patient Refined (APR) Medicare Severity Diagnosis-Related Group (MS-DRG) codes?

In addition to other factors like age, sex, and race, risk adjustment for some of the Inpatient Quality Indicators (IQIs) relies on results, such as the risk-of-mortality subclass, determined by the 3M™ All Patient Refined Diagnosis-Related Group (APR-DRG) software. This grouper has been reported to perform well in predicting death when compared to other DRG-based systems.

Users who want to report risk-adjusted IQI rates may use the built-in limited license version of the 3M™ APR-DRG grouper (admissions). The optional limited license grouper available with the AHRQ WinQI software is "multiversion" (i.e., Versions 20, 23–30, 32, 33, 34, 35, 36, 37, 38 etc.). The software will apply the correct version based on the discharge year and quarter. Users who have their own APR-DRG grouper can use either the applicable MS-DRG version or the *International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM)* mapping to Version 38. If you are using your own APR-DRG grouper, you should be using the "admissions" APR-DRG option.

Information on the 3M™ APR-DRG system is available at http://solutions.3m.com/wps/portal/3M/en_US/3M_Health_Information_Systems/HIS/Products/APRDRG_Software/.

9. Import Data File

This section walks you through the process for importing your data file into the Quality Indicators™ Windows® (WinQI) software. As mentioned previously, a data file (containing administrative discharge data) needs to be imported into the database prior to performing any QI analysis. An overview of the steps in the data import process is outlined below.

- **Specify input file**—Choose the appropriate file that you would like to import.
- **Input file option**—Provide additional information about your data input file.
- **Check file readability**—The application will check your data input file to ensure each row can be read.
- **Data mapping**—Map the variables from your data input file to the corresponding Agency for Healthcare Research and Quality (AHRQ) Quality Indicator™ (QI) variables.
- **Mapping quick check**—Review the variables that have and have not been mapped to your data file.
- **Prepare for crosswalk**—The application will process the values specified for crosswalk variables.
- **Crosswalk**—Review and confirm the crosswalk of the values in your input file to QI values for specific variables.
- **Data errors**—The application will report data errors or warnings that need to be addressed.
- **Load data—**Your data file will be loaded into the application, and a summary of the load process will be displayed. This is the last step in the process.

At any step in the import process, you may exit the process and return to the **Home** screen. This will result in all changes being discarded, and you will need to resume the import process from Step 1.

For additional information on the definition of input columns, compatible formats for your data, and so forth, refer to the Input Data Dictionary (see Appendix A).

9.1 Specify input file

9.1.1 What is this screen for?

The first step in importing an input file is to specify the file you want to upload and import.

9.1.2 How is this screen organized?

This screen (Screenshot 6) shows the **Home** screen if this is your first time using the software with the current version. Because you have not uploaded any data, the screen will display a message saying, “You currently have no data uploaded.”

However, if a file has been uploaded in a previous session, you will see that file on this screen. Uploading a new file will override the previously uploaded file.

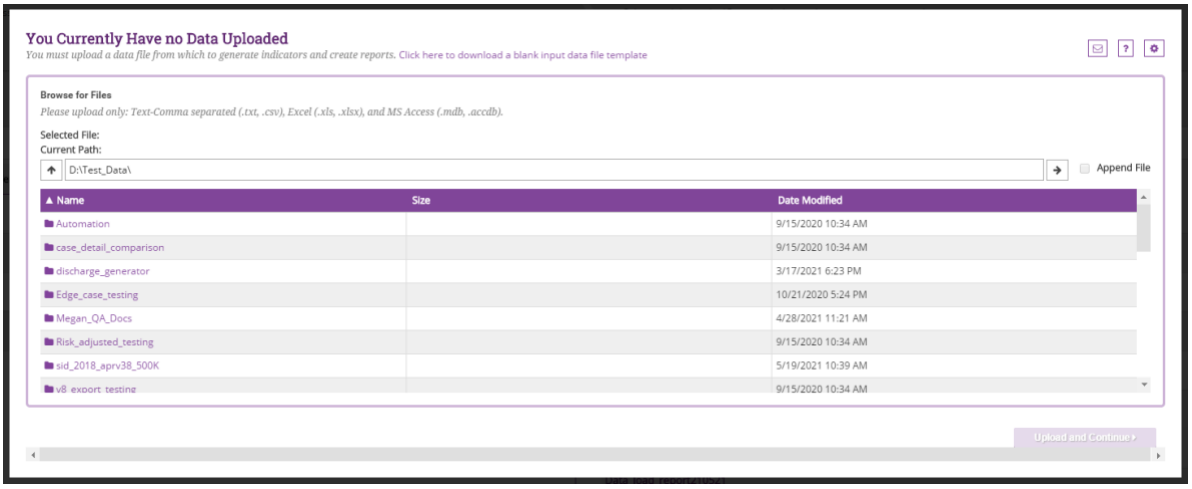
If at any time during the import process, you decide to edit and replace your data input file, you may press the <**Cancel**> button to return to the **Home** screen and begin the import process again. Any changes you have made before completing the process will not be saved.

9.1.3 What should I do here?

To upload your file, type the full path name or browse to and select the appropriate file to upload (Screenshot 7). Only one file can be uploaded at a time. Your file can be in any of the formats listed below; however, we recommend that you use the CSV format, if possible. A blank input data file template can be downloaded from this screen by clicking the "Click here to download a blank input data file template" link.

- Text–Comma separated (.txt, .csv)
- Microsoft Excel (.xls, .xlsx)
- Microsoft Access (.mdb, .accdb)

Screenshot 7: Browse and Upload File



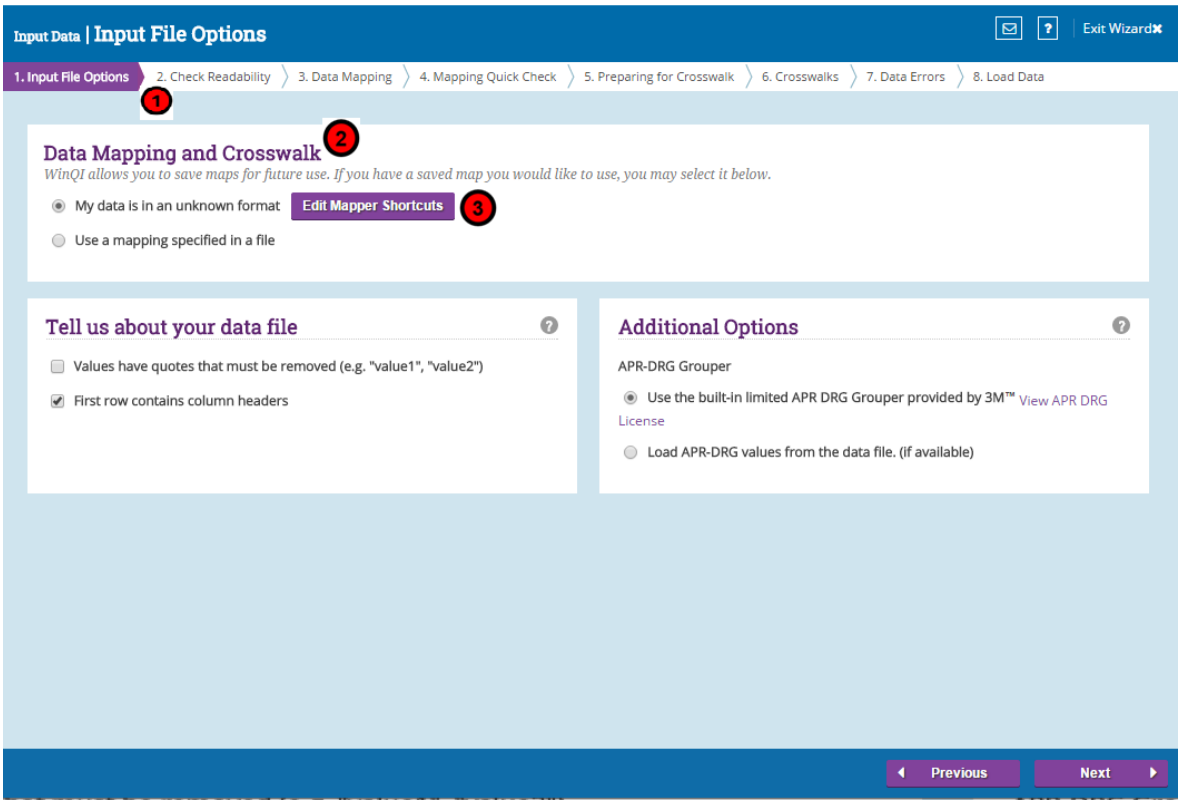
Once you have located your file and are ready to move on to the next step in the import process, click <**Upload and Continue**>, and you will be taken to the **1.Input File Options** step.

9.2 Input File options

9.2.1 What is this screen for?

Use this screen (Screenshot 8) to provide information about your data format. You may also specify a mapping file on this screen. A mapping file describes the contents of your file to the application. See the description in Section 9.2.2.2 for more information on mapping files.

Screenshot 8: Input File Options



9.2.2 How is this screen organized?

1

9.2.2.1 Navigation

Along the top of the screen from this step on, you will notice the sequence of steps in the import process. The step that is highlighted in purple will let you know where you are in the process at any given time.

The screen is separated into three sections: “Data Mapping and Crosswalk,” “Tell us about your data file,” and “Additional Options,” each of which are described below. The “Additional Options” section will only be available in WinQI with APR-DRG Grouper Version.

2

9.2.2.2 Data mapping and crosswalk

In this section, you will specify whether you are using a mapping file (if so, which one) or whether you will be manually mapping via the wizard. The mapping file specifies the mapping of variables in your input file to QI variables. It also specifies mapping of the crosswalk variables and other attributes of your file. This is important for the WinQI software to know how to process your data. The program will preselect the <**My data is an unknown format**> option by default. Once you have completed the import process and saved a mapping of your variables, you can reuse those specifications with other data files in future sessions. Using a saved mapping file enables you to save time on the import process.

There are two types of mapping files:

1. **By Position** mapping files define columns based on the exact order of columns. The column headings of text files imported with positional mappings are ignored and may be excluded. An error message will be displayed if you attempt to use a **By Position** mapping file with an MDB data file or ACCDB file.

2. **By Name** mapping files can be used only with files that have column names. These columns may be in any order. The program will not allow you to use a mapping file that is inappropriate for the type of file you have selected.

A saved mapping file may be used in two ways:

1. You may bypass the **Check Readability**, **Data Mapping**, and **Crosswalks** screens. If you have saved a mapping file in a previous session and would like to use it for this import, select the indicator to the left of <**Use a mapping specified in a file**> to access that file. A <**Browse**> button will appear, which will then allow you to find and select the appropriate mapping file. Only Quality Indicators Mapping (.qim) files can be used here. If you are sure that you are uploading a valid mapping file that matches the data structure of your input file, you can check the <**Skip validation and mapping screens(Jump to Data Load**> checkbox and then click the <**Next**> button to jump to the **Load Data** section of the process. It is recommended that you do not skip validation and mapping screen checkbox if you are importing for the first time.
2. You may use a mapping file in which the specifications in the file (such as the variable mapping, crosswalk mapping, and other input specifications) do not perfectly match your input data specification. Make sure that the <**Skip validation and mapping screens(Jump to Data Load)**> checkbox is not checked. This option will allow you to make desired changes on subsequent screens.

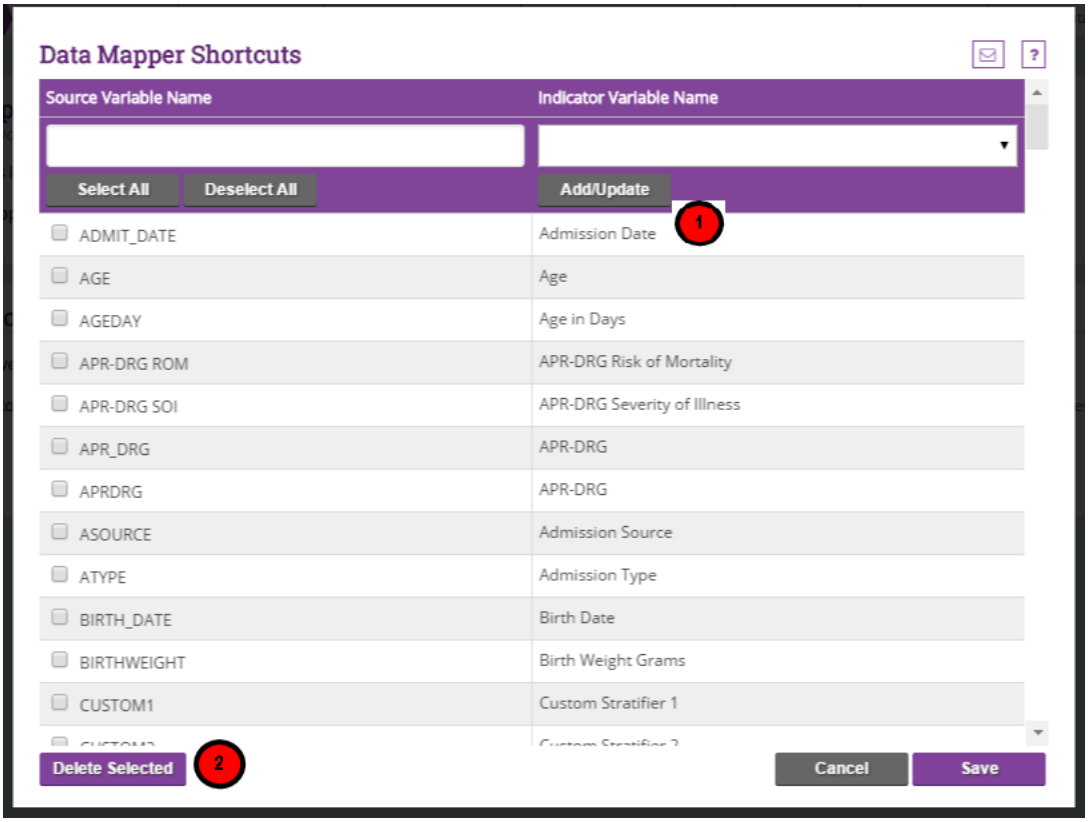
3 If you are not using a saved mapping file, the software may still determine a default mapping if your column headers match the default column names specified in the Input Data Dictionary (see Appendix A). You can edit the default mapping by clicking the <**Edit Mapper Shortcuts**button.

9.2.2.3 Data mapper shortcuts

9.2.2.3.1 What is this screen for?

This screen (Screenshot 9), accessed by clicking the <**Edit Mapper Shortcuts**> button on the **Input File Options** screen, allows you to map variables in the **Data Mapper** Shortcuts screen. If you load similar files but do not use a mapping file, this can save effort in the **Data Import Wizard**.

Screenshot 9: Data Mapper Shortcuts



1

9.2.2.3.2 How is this screen organized?

9.2.2.3.2.1 Mapping controls

The controls used to create new matches include the Source Variable Name, the Indicator Variable Name, and the <**Add/Update**> button.

2

9.2.2.3.2.2 Mapped variables

The mapped variables are listed, along with checkboxes and a <**Delete Selected**> button to delete selected variables.

9.2.2.3.2.3 What should I do here?

To delete the association between a source variable and a QI variable, click the checkbox next to the source variable and then click the <**Delete Selected**> button.

To create an association, type the variable name as it appears in the **Input Data** file into the **Source Variable Name** field, select an Indicator variable name from the drop-down menu, and then click the <**Add/Update**> button.

After all desired changes have been made, click the <**Save**> button at the bottom of the screen.

9.2.2.4 Tell us about your data

This section allows you to provide additional details about your data file (such as the use of quotes or column headers). Click on the corresponding filters to indicate whether any values in your input file have quotes that need to be removed or whether the first row in your file contains the column headers. We recommend that you include column headers in your first row. Doing so will simplify the processing of your file and will help reduce errors. If you have specified a mapping file, then information in this section will be prepopulated from the mapping file.

9.2.2.5 Additional options

This section of the screen allows you to indicate whether you will be using the built-in All Patient Refined Diagnosis-Related Group (APR-DRG) grouper (included in the WinQI software) or mapping the APR-DRG values from your input data file. APR-DRG values (user supplied or calculated by the built-in grouper) are needed for calculating risk-adjusted rates. The application will select the <**Use the built-in limited APR-DRG grouper provided by 3M™**> option by default. If you have specified a mapping file, then information in this section will be prepopulated from the mapping file.

9.2.3 What should I do here?

Select the information you would like to provide about your data file. If you have provided all the necessary information, click the <**Next**> button to continue to the **Check Readability** step. If you have uploaded a valid mapping file that matches the data structure of your input file, you can check the <**Skip validation and mapping screens**> checkbox and then click the <**Next**> button to jump directly to the **Load Data** section of the process. Remember that clicking <**Cancel**> will take you back to the **Home** screen, and all the selections you have made in the import process will be lost.

9.2.4 Other questions

9.2.4.1 Why can't I uncheck the "First row contains column headings" checkbox for an Excel file?

The **Data Import Wizard** requires alphanumeric column headings for Excel files. You should make sure that all your column names have alphabetical characters in them; otherwise, data values may be misread and lost (e.g., external cause of injury codes [E-codes] and *International Classification of Diseases, 10th Revision, Clinical Modification* [ICD-10-CM] codes that look like numbers but are not purely numeric).

9.2.4.2 Why are alphabetical column headers so important for Excel?

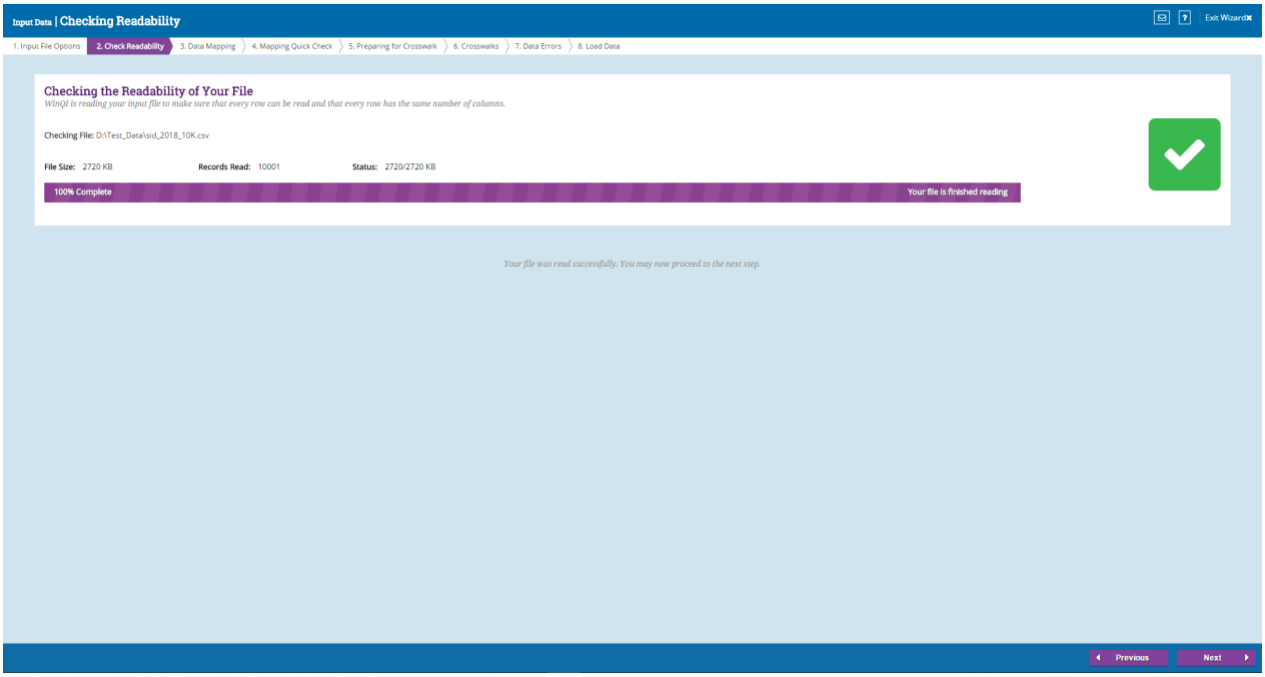
The driver that reads Excel files examines the first few rows of the file to determine whether each column should be interpreted as a column of text or as a column of numbers. If the driver decides to interpret the column as numeric, then it will cause an error or silently skip over any data that do not comprise a valid number. This error can easily happen if a column contains numeric ICD-10-CM codes mixed with E- or V-codes.

9.3 Check file readability

9.3.1 What is this screen for?

This screen (Screenshot 10) displays the application's progress as it scans your input data file to ensure that each row can be read. It is important to ensure that the file is in a readable format prior to performing any further processing.

Screenshot 10: Check Readability



9.3.2 How is this screen organized?

The screen displays a progress bar indicating the percentage of your input file that has been read by the application. You can also use the number of records read or the status to gauge completeness of the readability check. When the scan is complete, a message will appear stating that "Your file is finished reading," and a check mark will appear to the right of the progress bar.

9.3.3 What should I do here?

Check to make sure that the correct data file has been specified and that the file has not become corrupted. Please note that an error in this step indicates a serious issue that is preventing the file from being read. If an error is found, click <**Cancel**> to exit the process, review your file for issues, and then start the import process again.

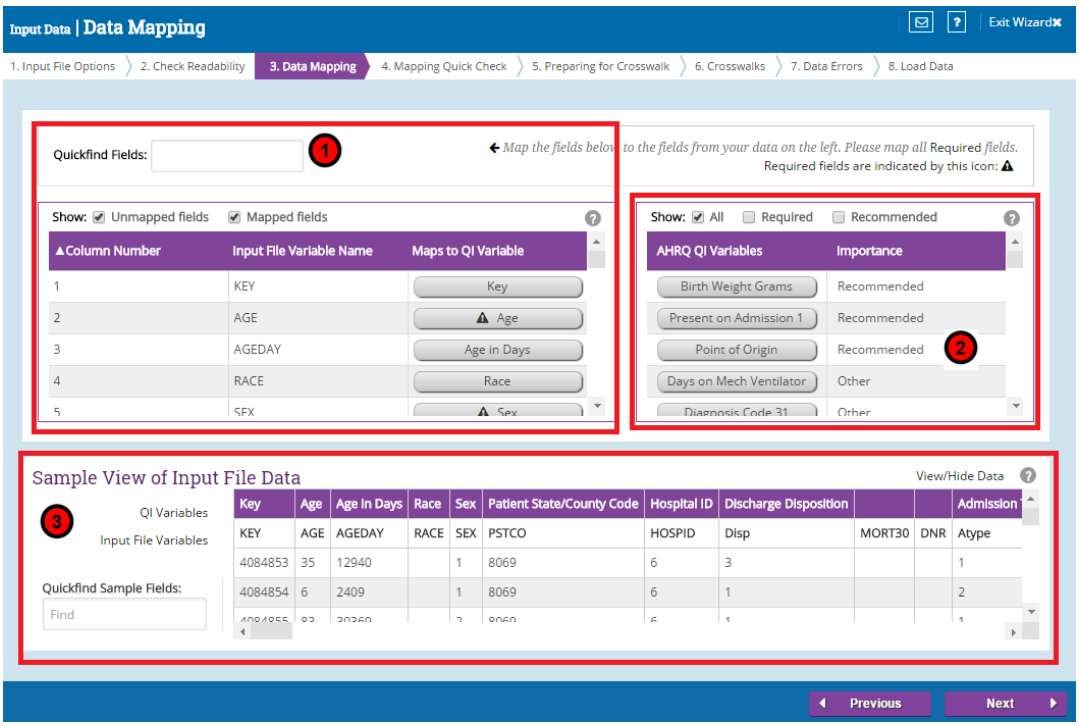
Once the scan is complete and you have confirmed that no readability errors were found, click the <**Next**> button to continue to the **Data Mapping** step.

9.4 Data mapping

9.4.1 What is this screen for?

This screen (Screenshot 11) allows you to map variables from your data input file to the WinQI variables. This is important for the WinQI software to know how to process your data. If you uploaded a mapping file in the **Select File Options** portion of the process, the variables on this screen will be mapped accordingly. If the column names in your input file match the names of the input variables as specified in the Input Data Dictionary (see Appendix A), the auto-mapper will map the variables according to the column headers.

Screenshot 11: Data Mapping



9.4.2 How is this screen organized?

The screen is divided into three sections: input variables, AHRQ QI variables, and sample data view, each of which are described below.

1

9.4.2.1 Input variables

This section lists the names of all variables found in your data file, along with the position of each variable (the column number) within each row. The view will default to show all variables (mapped and unmapped); however, you can change the view by clicking the filters to the left of the **Show** field. Be sure to find all unmapped variables and map them to the appropriate QI variable. The **Quickfind** field option allows you to search for a specific field by typing the first few letters of the variable into the text box. You can also sort the fields by column number, input variable

name, or QI variable name. Note that your input data may contain variables that do not correspond to variables used by the WinQI software.

2

9.4.2.2 QI variables

This section lists the names of all QI variables (see Appendix A) that have not been mapped to one of your data input file variables. Each variable will also indicate whether it is *Required*, *Recommended*, or *Other*. You can view different groups of variables using the filters at the top of the chart. The default view lists all the QI variables; however, you can also view required variables only to see whether there are any that you may have missed, or you can view recommended variables only to see which variables you have not mapped that would be worthwhile to go back and map.

Required variables must be mapped in order for you to continue through the import process. The required variables include the following:

- Age
- Sex
- Discharge Year
- Discharge Quarter
- Principal Diagnosis

Recommended variables are not required to be mapped in order for you to move forward with the import process, but all of them are used in QI data analysis. Thus, we highly recommend that you include these variables in your input file and map them to QI variables in order to get the most accurate results from the QI calculations.

To map QI variables, drag the desired QI variable from the table on the right and drop it into the field next to the intended input variable in the **Input Variable** table on the left. You can remove a mapping by dragging the QI variable back to the **QI Variable** table. If you are not sure how one of your variables matches up to a QI variable, look at the **Sample Data View** of your data to see what values are stored in the variable.

Recommended variables include the following:

- Discharge Disposition
- Admission Type
- Admission Source
- Length of Stay
- Point of Origin
- APR-DRG
- APR-DRG Risk of Mortality

- Age in days
- Birth Weight in grams
- Procedure Code 1
- Patient State/County Code
- Present on Admission flag variables (corresponding to Diagnosis code variables that have been mapped)
- Days to Procedure code variables (corresponding to Procedure codes that have been mapped)

Other variables are not used for calculating QI rates. Some of them could be used for stratification or as a record identifier if you export the records for use in other software.

Other variables include the following (please see Appendix A: Input Data Dictionary for a detailed description of each of these variables):

- DRG
- Major Diagnostic Category (MDC)
- DRG Version
- Birth Date
- Admission Date
- Discharge Date
- Remaining Diagnosis codes
- Present on Admission (POA) codes
- (Remaining) Procedure codes
- Days to Procedure codes
- APR-DRG Severity of Illness
- Race
- Primary Payer
- Hospital ID
- Days on Mechanical Ventilator
- Custom Stratifier 1
- Custom Stratifier 2
- Custom Stratifier 3
- Patient ID

3

9.4.2.3 Sample data view

This section displays a snapshot of the first 50 rows of your input file to give you an idea of the data that appear in each column. This data view is provided to aid you in mapping the QI variables to the appropriate variable in the input file. You can locate specific columns from your input file by typing part of the column name into the **Quickfind** field. As you change which QI variables are

mapped and unmapped, the corresponding header will update in this section. You have the ability to hide these data by clicking on the <**View/Hide Data**> button.

9.4.3 What should I do here?

Map a QI variable to the variable in your data file by clicking on a variable in the right-hand list, dragging it to the **Input File Variables** list on the left, and dropping it next to the corresponding variable name in your input data file. Remove a mapping by dragging the QI variable back to the QI variable tray.

If you are not sure how one of your variables matches up to a QI variable, look at the **Sample Data View** of your data to see what values are stored in the variable.

If you would like to go back and make changes to any of the selections you have made so far, click the <**Previous**> button to return to earlier steps in the process.

When you are finished mapping your data, click the <**Next**> button to continue to the **Mapping Quick Check** step in the import process.

EXAMPLE: The required variable "Sex" is listed under **Variables Used by QI Software**. You are not sure which of your variables corresponds to this. You look at the **Sample Data View**, and you notice that a column labeled "GG" contains the values "m" and "f." Therefore, you conclude that you need to drag the "Sex" variable to the empty spot next to "GG" in the **Input File Variables** area.

9.4.4 Time-saving tips

9.4.4.1 Select variable names

If possible, use the QI variable names for the columns when you create your data file. If they are found (spelled exactly the same), they will automatically match up.

9.4.4.2 Data mapper shortcuts

Other column names can be matched up automatically to QI variables. These include the SAS®-equivalent variable names and other common mappings, such as "Ecode1" to "Diagnosis Code 31." You may edit the shortcut table on the **Data Mapper Shortcuts** screen.

For fields that are indexed, such as Diagnosis Codes (DX1, DX2, DX3, or PR1, PR2), Days to Procedure 1, Days to Procedure 2, POA1, POA2, etc., it can take a long time for users to finish mapping one at a time. Starting with version v2018, the WinQI software contains a new feature in which the system intelligently senses the indexed fields. After the user completes the first drag-and-drop of one of the indexed fields, it does the following:

1. Asks whether the user wants all other field names (i.e., all secondary diagnosis) to be mapped automatically.
2. If the user chooses <**Yes**>, the system tries to guess the rest of the unmapped, indexed fields in the input file by matching the name.

3. Once identified, the system auto-maps all of these indexed, unmapped fields.
4. The user can choose <**No**> and manually map each field if necessary.

9.4.5 Other questions

9.4.5.1 What is the difference between "Required," "Recommended," and "All" variables?

Required variables are critical to the proper flagging of discharges for the majority of the QIs. You will not be allowed to load a file that does not have all these variables. While recommended variables are not required to be mapped in order for you to move forward with the import process, we highly recommend that you include them in your input file and map them to QI variables given that all of them are used in QI analysis. Depending on what type of analysis you are interested in, your calculated QI rates may not be accurate unless these variables are included. If you leave these variables unmapped, they will be treated as blanks in every record.

9.4.5.2 What if I have extra variables in my file?

The application only imports and processes variables that have been mapped. Any variables in your file that are not mapped will not be imported and will not affect the QI calculations.

9.4.5.3 What if I don't have inputs for all variables?

The QI calculations are based on the data inputs for mapped variables in your file. For best results, correct any issues identified during the import process and populate any blank fields with the proper inputs, if available. Normally, you should correct your input file to get the best results possible.

9.4.5.4 What if I have fewer than 35 diagnoses or 30 procedures?

You can map the number of diagnosis and procedure variables that are coded according to the conventions in your institution. Unmapped QI variables will be treated as blank.

9.4.5.5 What if I have more than 35 diagnoses or 30 procedures?

You may use only up to 35 diagnosis codes and 30 procedure codes. You may wish to preprocess your data to remove empty elements in order to get maximum efficiency out of the number of codes allowed. If you do preprocess your data, ensure that the procedures and procedure day fields are appropriately matched.

9.4.5.6 What is the proper format for diagnosis codes?

For ICD-10-CM format, diagnosis codes are between three and seven alphanumeric characters. Please see the Centers for Medicare & Medicaid (CMS) website for additional information.

In all cases, you must remove the decimal point before loading the data.

The WinQI software runs an exact textual comparison of all codes. Therefore, it is important not to pad any additional characters (such as trailing zeros) to the right of ICD-10-CM codes. Similarly,

if the rightmost and/or leftmost character is a zero, you should not remove this zero because it will change the meaning of the code.

9.4.5.7 What is the proper format for procedure codes?

Procedure codes are always numbers.

For ICD-10 format, procedure codes consist of seven alphanumeric characters with no decimal point. As with diagnosis codes, you should remove any decimal points, and you should not add or remove characters or zeros on the left side of the code. Please see the CMS website for additional information on ICD-10 coding.

9.4.5.8 Why does my data view display quotation marks?

This indicates that your input data are separated by quotation marks. To remove the quotes, access the **Input File Options** screen and enable the checkbox labeled <**Values are enclosed in quotes**>. Selecting this checkbox will remove the quotation marks in your data upon import.

9.4.5.9 What if I have separate fields for E-codes?

Diagnosis fields 31–35 are intended for E-codes; however, you may put E-codes in any secondary diagnosis field.

9.4.5.10 Why are none of my E-code variables mapped to a QI variable?

You may map any of the unused secondary diagnosis variables from the list of variables used by QI software to your data's E-code variables.

9.4.5.11 How should I map my data element for the patient's location?

If you intend to use the area-level rates, the recommended approach is to map the Federal Information Processing Standards (FIPS) State/county code for the patient's residence to the data element labeled "Patient State/County Code." If the FIPS State/county code of the patient's residence is not available, then you may map the hospital FIPS State/county code to the data element labeled "Patient State/County Code." However, we recommend that you then analyze the area rates at the State or metropolitan area level.

If the hospital FIPS code is used in Patient State/County Code, users should be aware that rates may be biased for hospitals that serve as regional referral centers. These hospitals are likely to treat patients from outside the metropolitan area, county, or even the State in which the facility is located.

Using the patient FIPS State/county code for analysis may more accurately reflect the population truly at risk. If you choose to use the hospital FIPS State/county code for analysis, you should use caution and also used with larger geographic areas to minimize bias from patients who come from a county that is different from that in which the hospital is located.

The software provides you with the option of producing output by metropolitan area or by county. When metropolitan area is selected, urban areas are always defined by metropolitan areas. When county is selected, urban areas will be defined by county. Rural areas are always defined by county.

The metropolitan area definitions are from three different sources:

1. The "modified FIPS" definition is from the Area Health Resource File. The mapping is from county to modified FIPS county (e.g., Baltimore City to Baltimore County).
2. The "1999 OMB" definition is from Office of Management and Budget (OMB) circular 99-04 (last revised May 6, 2002). The mapping is from county to Metropolitan Statistical Area (MSA) except in New England, where counties are assigned to the New England County Metropolitan Area (NECMA). OMB defines NECMA as a county-based alternative to the city- and town-based New England MSA and Consolidated MSA (CMSA). For example, Hampden and Hampshire Counties in western Massachusetts are assigned to the Springfield, MA, NECMA, even though the town of Holland in Hampden County is part of the Boston MSA.
3. The "2003 OMB" definition is from OMB circular 03-04 (last revised December 4, 2005). The mapping is from county to either MSA or Micropolitan Statistical Area.

9.4.5.12 Can custom stratifiers be used for personal information?

Custom stratifiers are intended for grouping records; they are not meant for storing patient information. For small datasets, it is feasible to store extra patient information (such as name) but doing so will cause the program to run more slowly and require more disk space. You can instead save information in the **Key** field or in the **Patient ID** field.

9.4.5.13 What's the difference between "Key" and "Patient ID"?

The **Key field** is intended to distinguish discharge records, whereas the **Patient ID** field is intended to help link patients across discharges. However, any data may be stored in either field. The **Key** field is displayed in several places in the application, but the **Patient ID** field is included only in the **Export Data** screen. Additionally, patient ID data are stored in a separate table and require additional disk space. The **Key** field and the **Patient ID** field can be used for tracking or printing results, but the software does not link records belonging to the same patient.

9.4.5.14 Can I use information from a complex survey design to obtain nationally representative results?

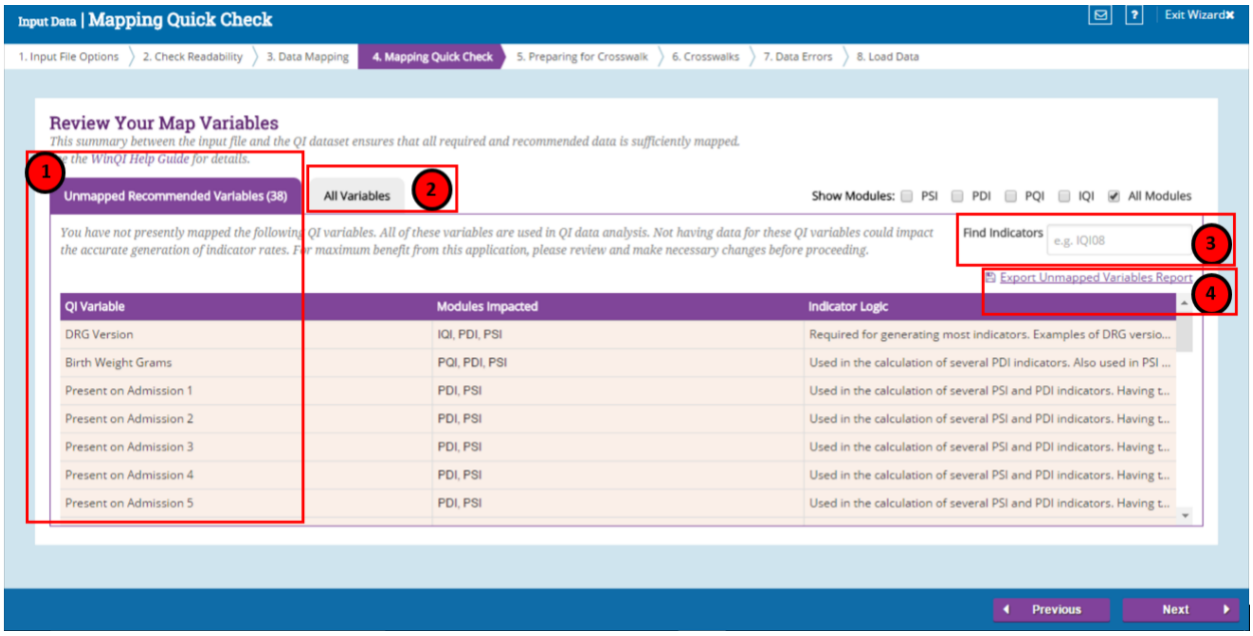
No. The software is intended to be used with data that cover an entire patient population (e.g., all discharges from a hospital in a year) or that were sampled from a patient population using simple random sampling. The software does not support weighted QI estimates or standard errors for weighted estimates. Thus, analyses using data obtained from a complex sampling design will not produce accurate estimates for the population from which the data were sampled.

9.5 Mapping quick check

9.5.1 What is this screen for?

This screen (Screenshot 12) summarizes the information from your data input file so that you can have a clear understanding of which QI variables have been mapped to your input variables and which have not been mapped. Unmapped recommended variables in particular are called out because QI analysis may not be accurate unless these variables are included and mapped. This screen will help you see what impact unmapped variables in your file will have, and whether you wish to continue without mapping those variables or whether you wish to go back and map these variables before continuing.

Screenshot 12: Mapping Quick Check



9.5.2 How is this screen organized?

1

9.5.2.1 Unmapped recommended variables

In the **Unmapped Recommended Variables** tab, you can see which QI modules and indicators are impacted by each unmapped recommended variable and learn more about whether or not each variable affects indicator logic or risk adjustment. Click on the text in any field under the **Modules Impacted** or **Indicator Logic** columns for more information about the impacts of each QI variable in calculating observed and/or risk-adjusted rates. To know more about what a "recommended variable" is, see Section 9.4.5.1. Although the software will not stop you from moving forward without including and mapping all the recommended variables, it is highly recommended that you do so to allow for the most accurate reporting.

2

9.5.2.2 All variables

By clicking the **All Variables** tab, you will see the full set of mapped and unmapped variables. This screen will have an option that lets you export a report that contains all variables mapping status report to your computer.

3

9.5.2.3 Module/indicator search

If you have an interest in knowing what variables impact a specific module, you have the ability to filter the information by one or more modules using the filters at the top of the chart. The default view will show information for all modules. If you are interested in knowing what variables impact a specific indicator, you can search for the indicator by typing its number in the **Find Indicators** search box. Please do not include spaces in the indicator number. For example, to search for IQI08, type "IQI08" (without a space), not "IQI 08" (with a space).

9.5.3 What should I do here?

Scan the list of warning messages to see if anything needs to be corrected. If you would like to go back and map the recommended QI variables to your data input file or otherwise edit your variable mapping, click <**Previous**> to return to the **Data Mapping** step.

When you are satisfied with your mapped variables, click the <**Next**> button to continue to the **Prepare for Crosswalk** step in the import process.

4

9.5.4 Export unmapped variables report

This option lets you export a report that contains unmapped recommended variables to your computer.

9.6 Prepare for crosswalk

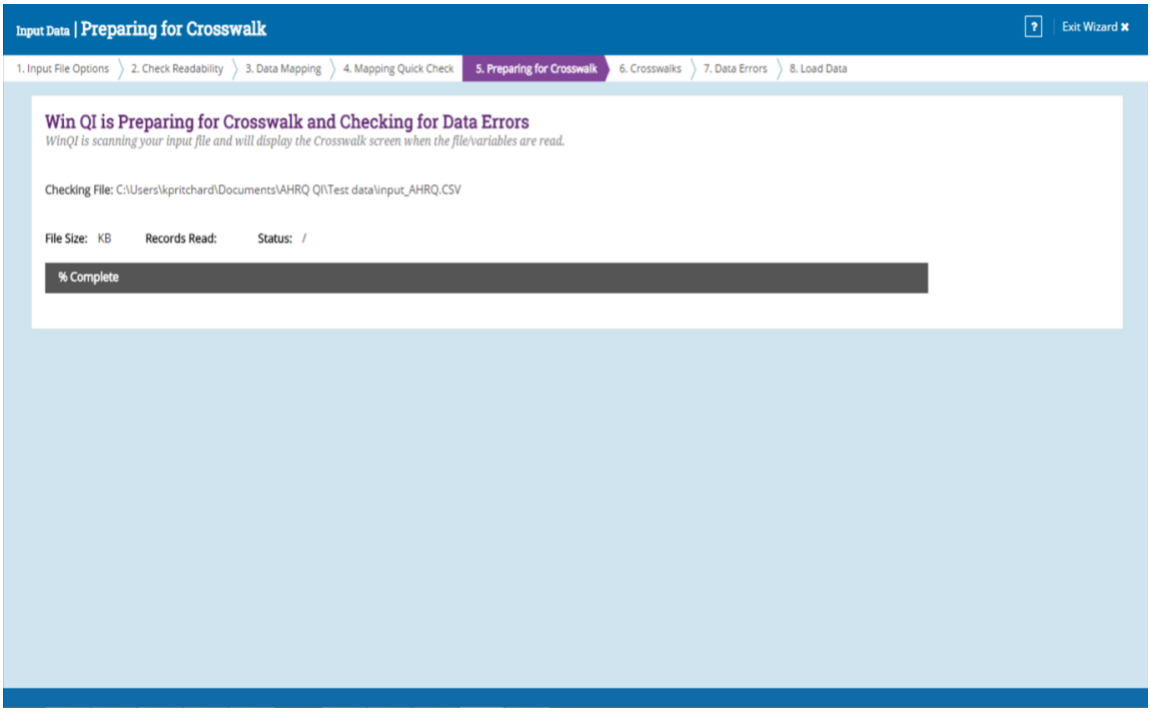
9.6.1 What is this screen for?

During this step in the import process, the application is reading your input file per the data mapping specified in the previous step. It is processing the values specified for the crosswalk variables and also determining errors in the data values specified in the file. Data errors will be displayed on the subsequent **Data Errors** screen.

9.6.2 How is this screen organized?

As Screenshot 13 shows, the progress bar indicates the percentage of your input file that has been read by the application. You can also use the number of records read or the status to gauge completeness of the readability check. When the scan is complete, a message will appear stating that "Your file is finished reading," and a check mark will appear to the right of the progress bar.

Screenshot 13: Prepare for Crosswalk



9.6.3 What should I do here?

Once the application has finished processing, click the <**Next**> button to proceed to the **Crosswalks** step.

9.7 Crosswalks

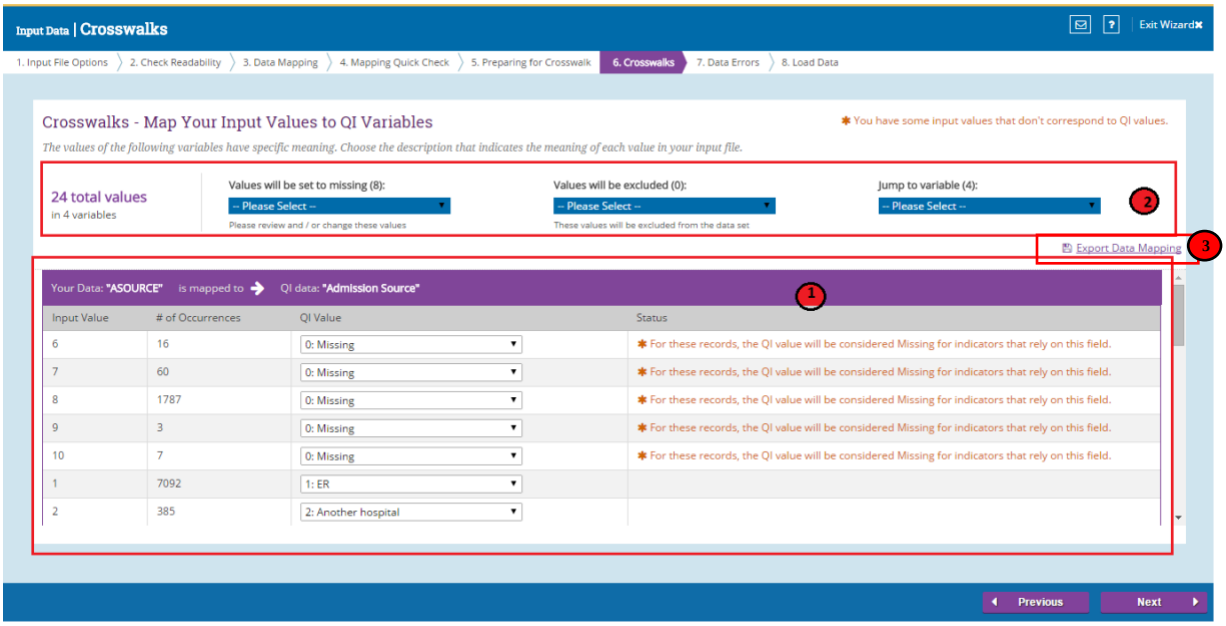
9.7.1 What is this screen for?

The purpose of this screen (Screenshot 14) is to allow you to review and confirm the crosswalk of the values in your input file to the values used by the WinQI software for the following variables:

- Admission Source
- Admission Type
- Discharge Disposition
- Point of Origin
- Primary Payer
- Race
- Sex

For more information about the values used by the WinQI software, please refer to the WinQI Input Data Dictionary in Appendix A.

Screenshot 14: Crosswalks



9.7.2 How is this screen organized?

1

9.7.2.1 Input variables, occurrences, and QI value

For each variable, the table will display the input value, the number of occurrences of each input value, the corresponding QI value, and an optional message indicating status of the mapping.

2

9.7.2.2 Filters to jump to a specific value or variable

At the top of the screen are three drop-down menus that allow the user to jump to a specific variable value ("missing" or "exclude") or to a variable itself. In addition, the left corner of the screen displays the total number of variables in the crosswalk and the total number of distinct values in those variables.

3

9.7.2.3 Export data mapping

This option lets you export your data mapping and crosswalk information. You can recognize columns by name or position.

9.7.3 What should I do here?

The WinQI software assigns specific meaning to these values and processes them a certain way, so it is important that the values accurately reflect their intended meaning (refer to the Input Data Dictionary in Appendix A for more information about each variable and corresponding values). Compare the input value to the proposed QI value. Where an input value is not a valid QI value (or may be blank), the software may assign it by default to either "Missing" or "Exclude from Dataset," based on the severity of having an invalid value for that variable. Please review each

mapped variable and make changes if necessary. To specify a different QI value, click the arrow next to the QI value, and select one from the drop-down menu.

Before moving on to the next step in the import process, you may export your map settings by clicking the <**Export Data Mapping**> button. Mappings selections from **Input File Options**, **Data Mapping**, and **Crosswalk** screens will be included in the export. The mapping file can be used to specify the data structure of a future input file and save time in the import process.

If you would like to go back and review the summary of your mapped and unmapped variables, click the <**Previous**> button to go back to the **Mapping Quick Check** section.

Once you have reviewed the values for each input value and are ready to move on, click <**Next**> to go to the **Data Errors** section.

9.7.4 Other questions

9.7.4.1 What effect does <Map to Missing> have?

Missing values affect different variables in different ways. Records with missing values for sex will not be loaded. You may map values to missing for admission type, admission source, and discharge disposition, but this will affect the assignment for some indicators. For example, a missing disposition code is a denominator exclusion criterion for some indicators. Primary payer is used solely for stratification; missing values will be displayed as “Missing” in any reports. Missing race values affect hospital-level and area-level indicators differently. For hospital indicators, a missing race may be used in stratification. However, race is required for obtaining the denominator of area-level indicators, and missing values cannot be used.

9.7.4.2 Why would I want to exclude cases from the dataset?

This option will depend on your knowledge of your input data. Particular values may be the result of data errors, or they may be from cases that are incomplete.

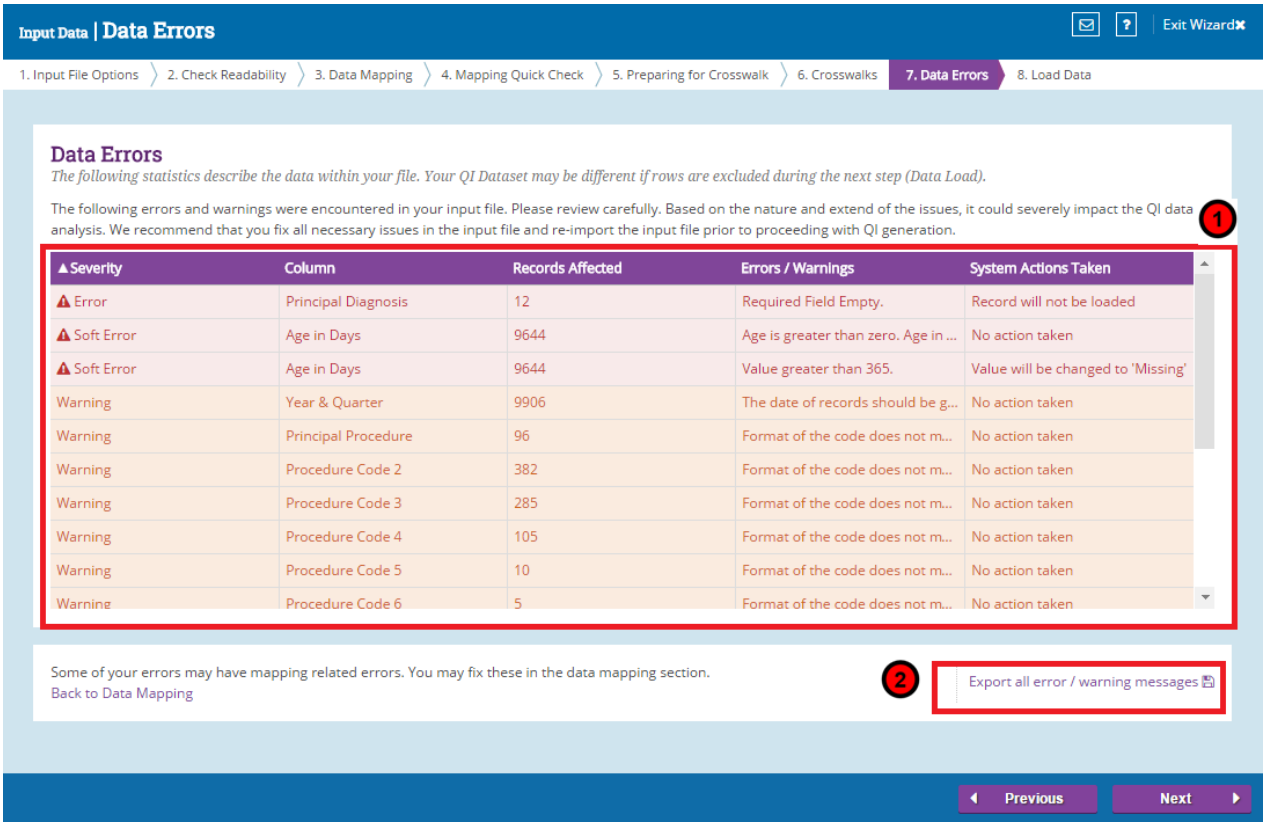
You can also use this option to limit your analysis to a particular population of interest. For example, to get female-only rate reports, you can exclude all males.

9.8 Data errors

9.8.1 What is this screen for?

Prior to loading the data, this screen (Screenshot 15) identifies any data errors your input file contains. You may want to review the number and severity of errors to determine whether you want to continue with the data load process or exit the process at this time and fix the data issues before loading the data.

Screenshot 15: Data Errors



9.8.2 How is this screen organized?

1

9.8.2.1 Errors

Errors will be displayed in order of severity of the error. In some cases, it may be a warning only. You can determine the action that will be taken by the software as a result of each error by reviewing the field to the right of the error description field. Some potential actions are that the record will not be loaded, or the value of the variable will be set to blank (missing).

2

9.8.2.2 Export messages

You can export all error messages by clicking the <**Export all error/warning messages**> button at the bottom of the chart. You will want to export the error messages if you wish to review the data errors with someone other than the person running the software to determine next steps.

9.8.3 What should I do here?

Review the error messages (and the corresponding action that will be taken by the system) to see the impact of each error and decide whether you would like to continue through the import process or go back and fix the issues. Know your data. The warnings provided are intended to catch common errors. However, depending on the typical case mix and coding conventions in your

institution, these warnings may or may not be significant. If you decide to move forward without addressing the errors or warnings, the system may change the value set to "missing" or exclude the record from analysis based on the severity of the issue. We recommend that you fix all necessary issues and reimport the updated file to ensure greater accuracy of the QI results.

If you choose not to address the errors and warnings and continue with loading the data, you may proceed to the **Load Data** section by clicking the <**Next**> button.

9.8.4 Other questions

9.8.4.1 How can I find out which rows had problems?

Formatting errors due to individual values on records are written to the QI Session Log (see Section 10.2.8). You can view the error messages along with the line number if you view the **QI Session Log**. Figure 5 shows a screenshot of lines printed to the session log. The **QI Session Log** may be accessed from the **Home** screen in the **Tools** section.

Figure 5. How To Identify Rows With Problems.

```
Check For Data Errors
Reading column names from the first row in the file
Read 106 values from first row.
KEY column number = 1
Hospital ID column number = 34
Reading Text File (CSV)
    File is 1046475 characters.
Row 4, COLUMN Age, KEY 94615. Not an integer: "abcdefg"
Row 6, COLUMN Age, KEY 94617.  Missing or invalid required value  Row
7, COLUMN Age, KEY 94618.  Missing or invalid required value  Read
1046475 characters from file, total of 3637 rows
```

9.8.4.2 Does the program check for invalid ICD-10-CM codes?

No. The program only performs basic format checks; it does not check the reasonableness of the data. A three- to seven-character string will be accepted as an ICD-10-CM diagnosis code. Users should verify the quality of their discharge data by some other means before loading the file with this program.

9.8.4.3 Why does it check for leading zeros in ICD-10-CM codes?

QI users often use a spreadsheet program such as Excel to calculate some fields before loading data into the WinQI software. Frequently, the spreadsheet will reformat text that it considers numbers into the simplest format. For example, it may remove a leading zero that it considers unnecessary from "04567," thus changing the code to "4567." This is a completely different diagnosis code and will result in errors in your QI results.

The diagnosis codes in the range of 001 to 100 are related to infectious diseases. Removing all leading zeros can result in a subtle error in which some of the QIs are unaffected and some are incorrect.

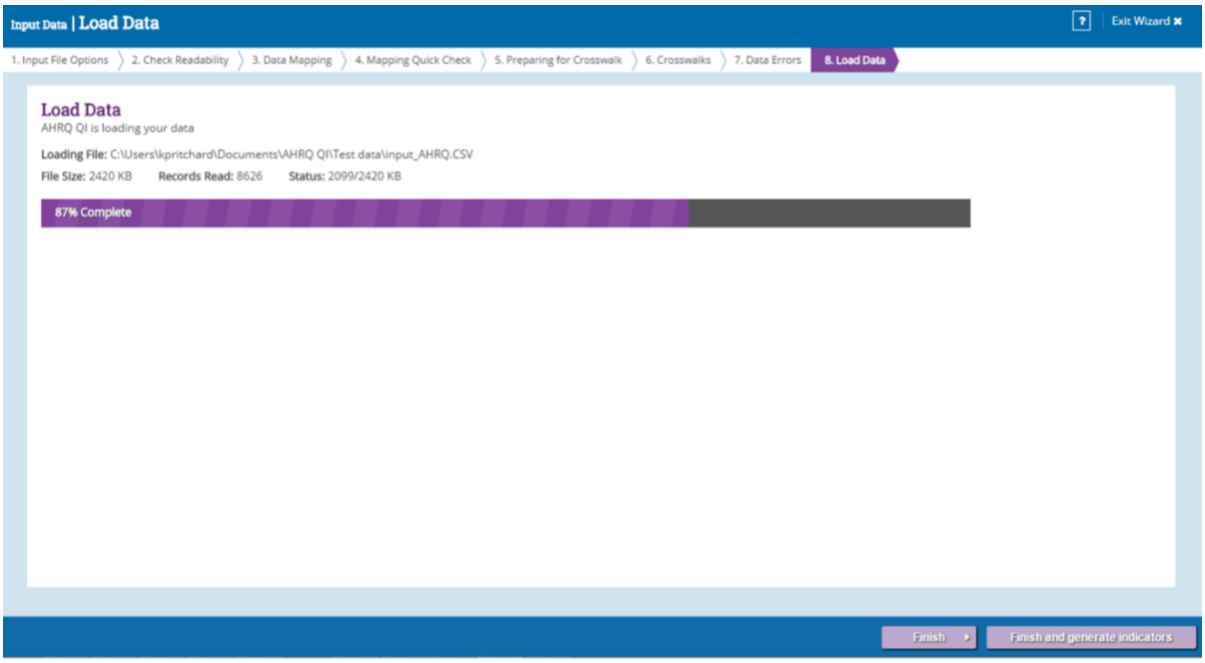
Because most diagnosis codes do not have leading zeros, it is certainly possible that a data file will not have any leading zeros in a column. If you see the message "Column of ICD-10-CM codes does not have any leading zeros (warning)," consider the number of diagnosis codes involved. The more codes found in a column, the more improbable it is that they all will happen to not have leading zeros. If all or most of the diagnosis and procedure code columns have this warning, it may signal that the zeros were stripped out of the entire file at some point before the file was imported into the **Data Import Wizard**.

9.9 Load data

9.9.1 What is this screen for?

This screen (Screenshot 16) displays a progress bar as your data are loaded into the application. Upon completion, it will show some statistics of the loaded data plus any data errors that were encountered during the loading process.

Screenshot 16: Load Data



9.9.2 How is this screen organized?

9.9.2.1 Progress

This area lets you know how far along the data read has progressed within your file. The number of records read increases incrementally as the check progresses. When the scan is complete, a "Your data is finished loading" message and a check mark will appear to the right of the progress bar.

9.9.3 What should I do here?

Upon completion of the data load, check the values displayed next to **Total Rows Loaded** and **Total Rows Excluded** to confirm that they match your expectations.

9.9.4 Other questions

9.9.4.1 Why are rows "excluded"?

There are several reasons this might occur. Records may be excluded because you specified <**Exclude From Dataset**> in the **Crosswalk** screen. They also may be excluded due to data value errors, such as invalid numbers in the **Age** or **DRG** field. You will have an opportunity to review the reasons for excluded rows on the screen that follows.

9.9.4.2 What should I do if no rows were loaded?

If no rows were loaded, click <**Previous**> to return to the **Crosswalk** screen, and correct the value settings for rows excluded from analysis. If you have errors in your data file, then you may need to exit the import process, edit the file, and restart the import process.

9.10 Load data report

9.10.1 What are these screens for?

These screens (Screenshots 17 and 18) provide statistics of the data load process and summarize any errors or warnings encountered during the data load.

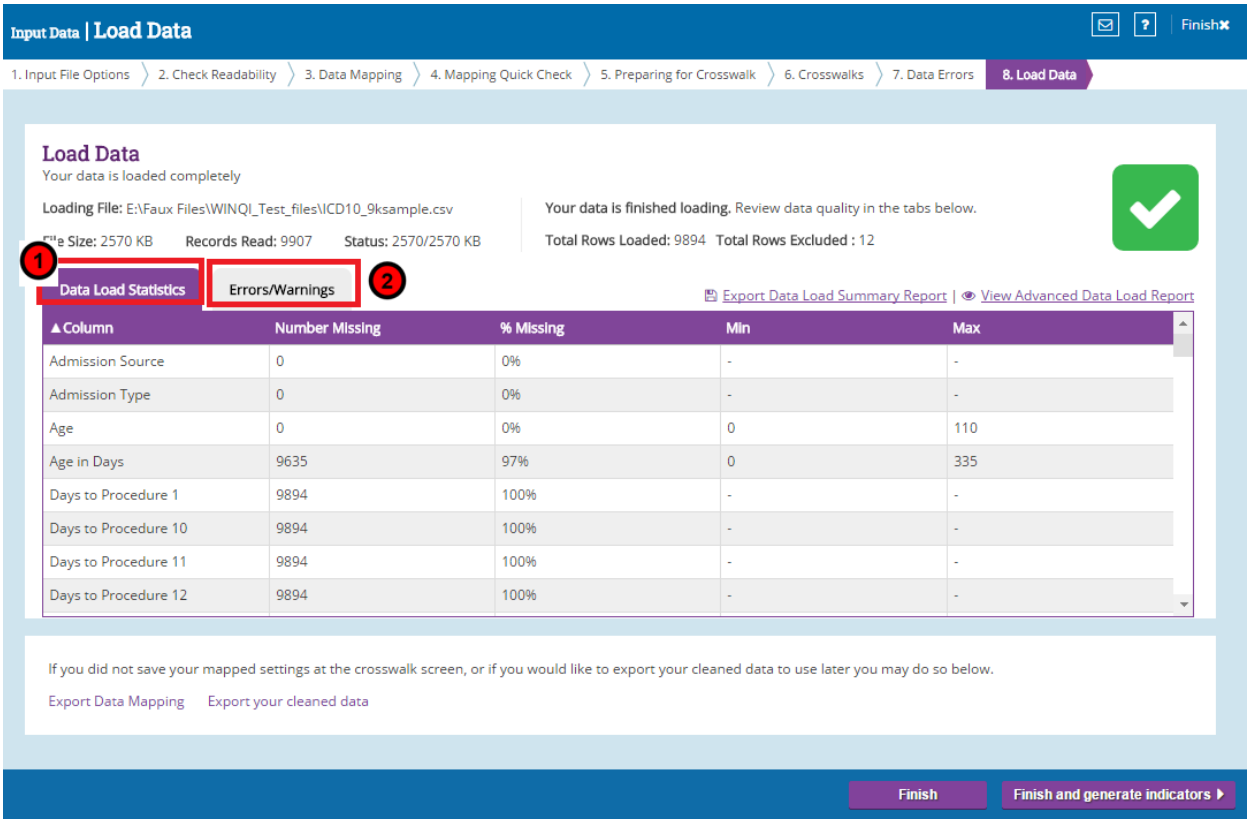
9.10.2 How are these screens organized?

1

9.10.2.1 Data Load Statistics tab

This screen (Screenshot 17) will give you an idea of what the information in your imported data file looks like and a snapshot view of the data loaded in the QI database. When viewing the information under the **Data Load Statistics** tab, you will see a list of QI variables as well as the number and percentage of records missing that value and the minimum and maximum values for each variable. This information that it reports should be checked for reasonableness based on your own knowledge of your data. For example, a file that has only adult patients should show 100 percent missing for "Age in Days," but a file containing a mix of adults and children should reflect this mix by having "Age in Days" for every child under 1 year old. You can also export a summary of the Load Data process by clicking the <**Export Data Load Summary Report**> link at the top of the table. Additionally, you can also view the advanced data load report by clicking on the link <**View Advanced Data Load Report**> at the top of the table. The advanced data load report is a summary of data issues that could impact your reports. See section 9.10.5.2 for details.

Screenshot 17: Data Load Statistics

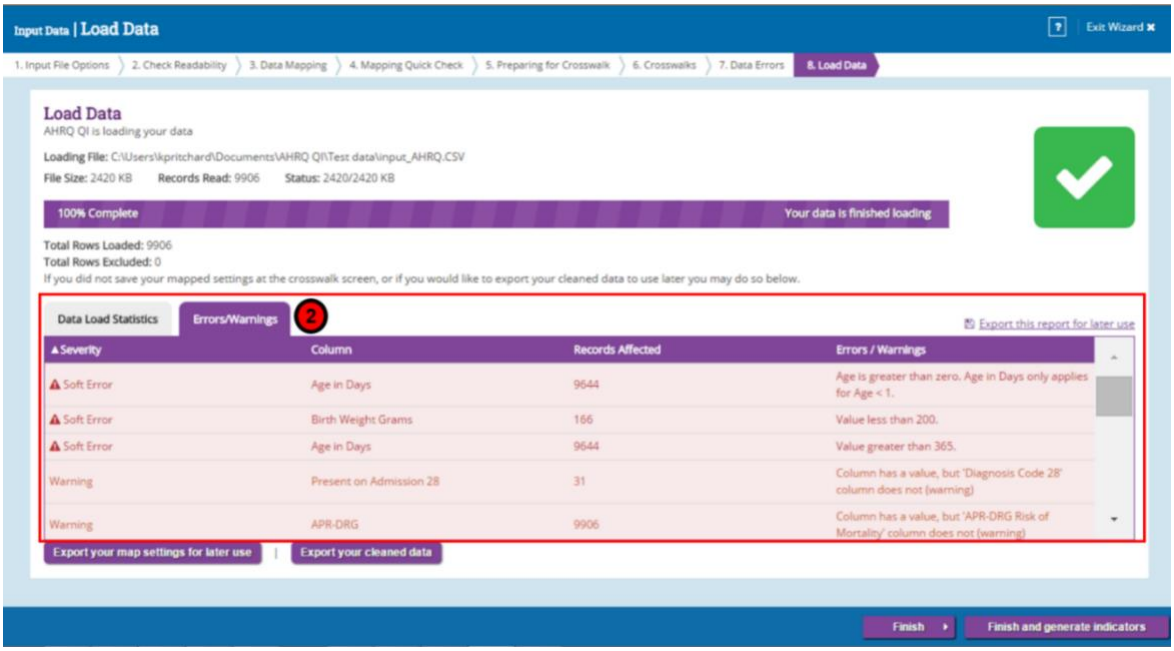


2

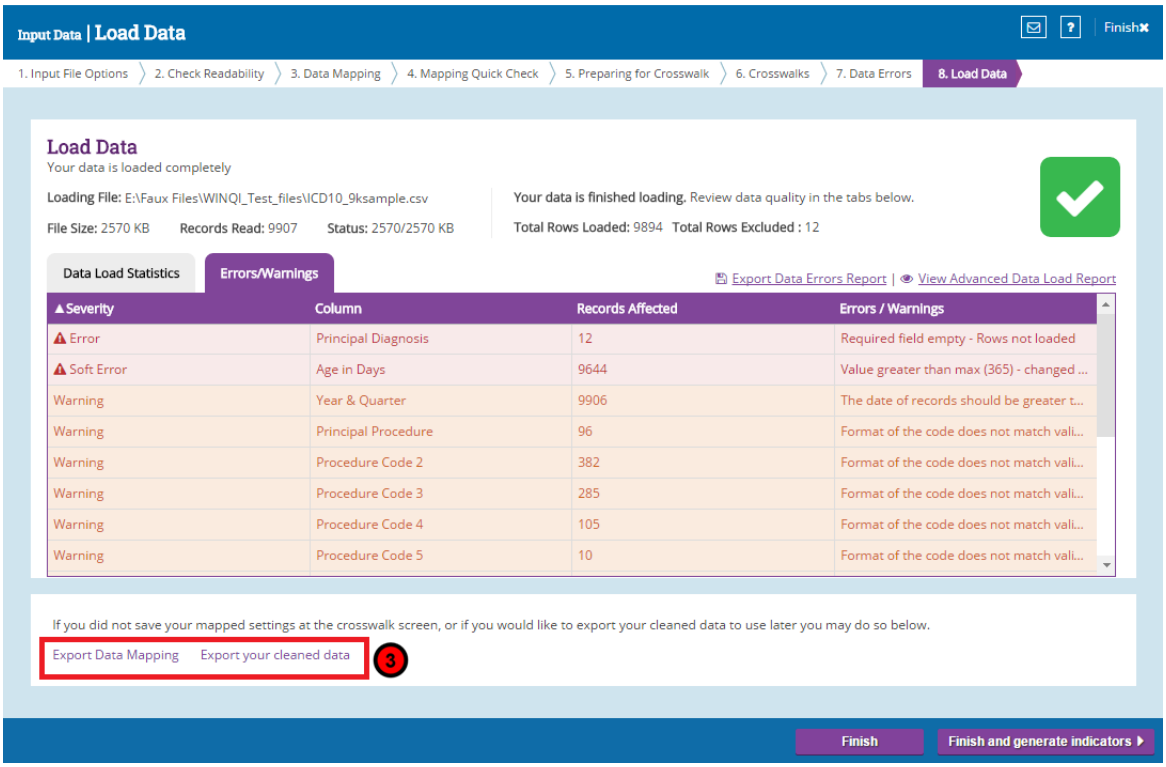
9.10.2.2 Errors and Warnings tab

The **Errors/Warnings** tab (Screenshots 18 and 19) shows the data errors in the input file and what (if any) action was taken by the application when loading the corresponding records. Based on the severity of the error, certain records may get excluded from the dataset entirely, or the values of certain variables may be set to missing.

Screenshot 18: Errors and Warnings



Screenshot 19: Errors and Warnings



3 9.10.3 What should I do here?

Scan this report to verify that your data were loaded correctly. You can export a summary of the data error report by clicking the <**Export Data Error Report**> link at the top of the table. You

may also export the data that were loaded into the database by clicking the < **Export your cleaned data** > link at the bottom of the table. For a description of the exported data, please see the Export Data Dictionary in Appendix C.

At this time, you will have an opportunity to save your mapping file for use at a later time. If you would like to save your mapping file, click <**Export Data Mapping**>.

Notice that once the load is complete, the application does not immediately start generating indicators. You have the opportunity to decide whether or not you would like to move on to this step at this time or save your data and generate indicators at a later time.

Clicking the <**Finish**> button will complete the import process and take you to the **Home** screen, where you will now see your imported file. If you decide to move on to **Generate Indicators**, click the <**Finish and generate indicators**> button to complete the import process and move on to begin the indicator generation process.

9.10.4 Other questions

9.10.4.1 Doesn't this tell me the same information as the Data Errors screen?

The **Data Errors** screen tells you what will be loaded before the settings are finalized; this screen tells you what was actually loaded. The counts may be different when more than one error occurs on the same record.

9.10.5 Advanced Data Load Report

9.10.5.1What is this screen for?

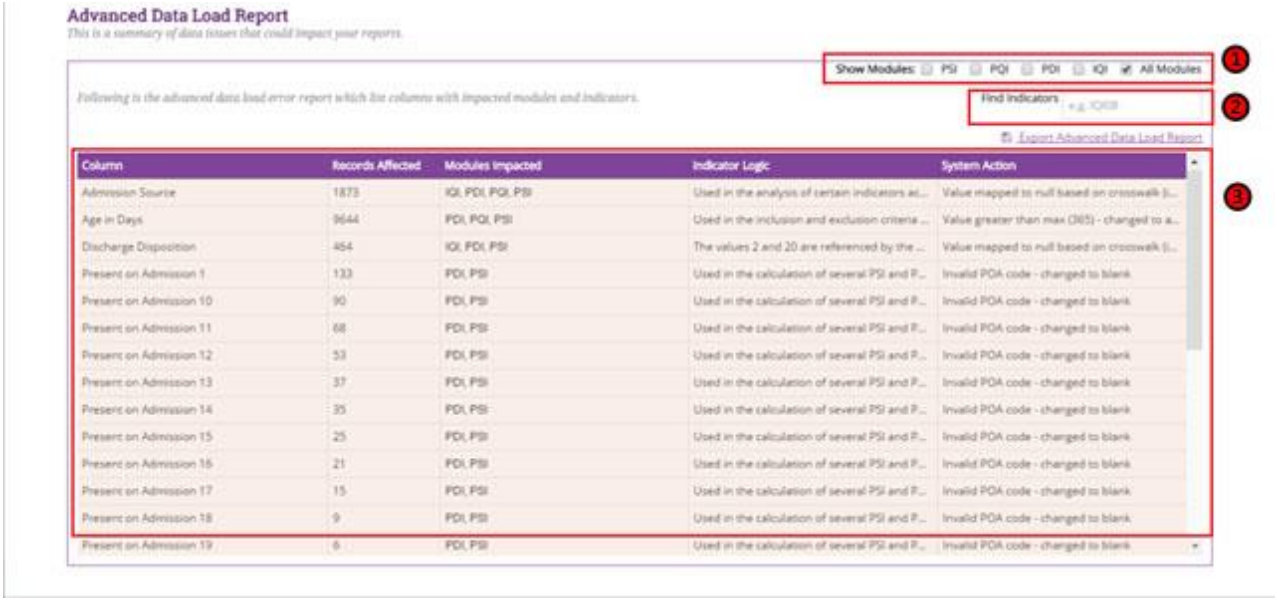
Following loading of the data, you can run this report to get a better sense of data issues in your dataset and what (if any) impact it will have on your reports and the indicator numbers included in the reports. Data issues may be due to issues with not mapping certain fields, missing or erroneous data values, or explicit user instructions during crosswalk. Impact may be on indicator logic, risk adjustment, and/or grouping (stratification) of reports. You should review this report to determine whether you want to continue with indicator generation or whether you want to fix your data issues and re-upload your data file prior to indicator generation.

This report may be retrieved from the following places:

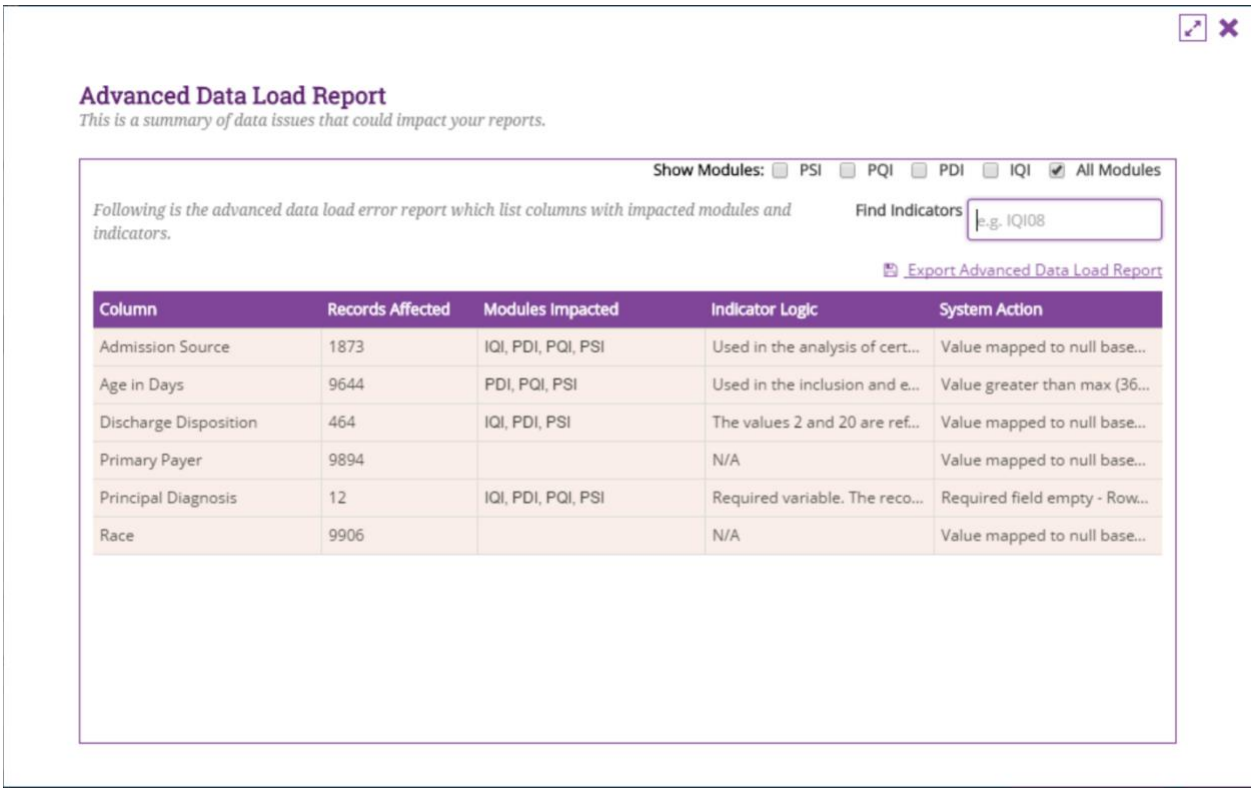
1. **Load Data** screen—after loading the data into the database.
2. **Report Summary (Hospital Report or Area Report)** and **Patient-Level Report**—In this case, the report shows the possible impact of the data issues only for the modules shown on the report.

9.10.5.2 How is this screen organized?

Screenshot 20: Advanced Data Load Report



Screenshot 21: Advanced Data Load Report



1

9.10.5.2.1 Show modules

In this section, you can select which modules you are interested in assessing for impact. By default, all modules are selected, but you can change the default and select only the modules in which you are interested.

2

9.10.5.2.2 Find indicators

If you are interested only in specific indicator(s), you can check whether issues in your data could impact this indicator(s). You can search by one indicator at a time. Please type the name of the indicator without spaces (e.g., “IQI08”).

3

9.10.5.2.3 Columns and related impact

In this section, you will see all the fields in your dataset that have some issues. Corresponding to each of the columns, you will see how many records were affected, which modules are impacted, whether the column impacts indicator logic or risk adjustment or stratification, and what system action was taken to address the issue (for example, the record was not loaded, or the column was set to missing)

9.10.5.3 What should I do here?

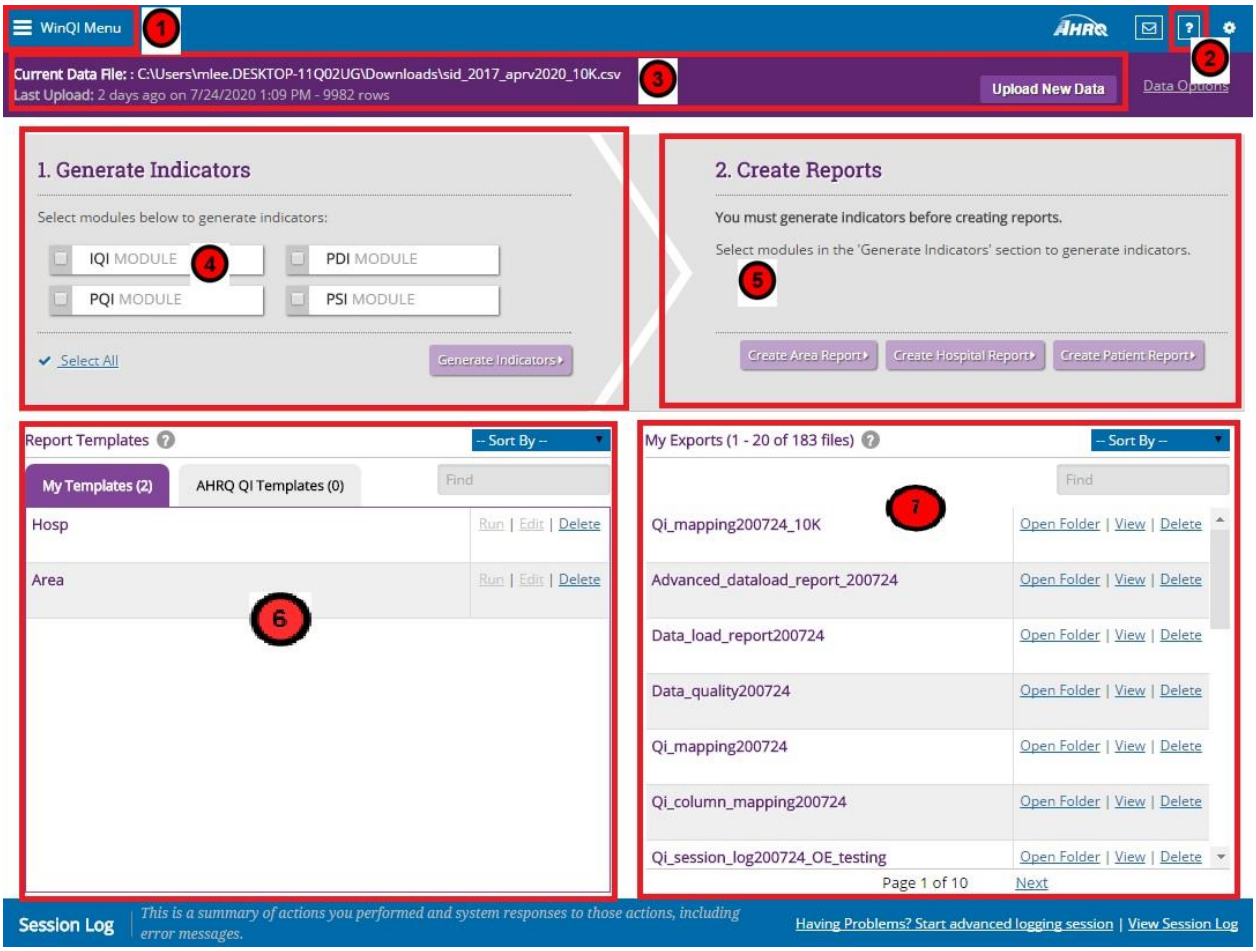
Review the nature of the issues and the corresponding system action taken for all modules/indicators in which you are interested. You can export the advanced data validation report by clicking on the **Advanced Data Load Report** link. Depending on the nature of the issues, you can determine whether you want to continue with generating indicators or whether you want to exit the application, fix your data issues, and reload your data file prior to continuing. Close this report window to return to the **Load Data** screen.

10. Home Screen (After Data Import)

10.1 What is this screen for?

This screen (Screenshot 22) is what you will see after you have imported and saved a data file.

Screenshot 22: Home Screen (After Data Import)



10.2 How is this screen organized?

1

10.2.1 WinQI menu

When you open the application after you have already imported and saved a data file, the menu options will expand to the following:

- **Home**—This will keep you on the current **Home** screen.
- **Data**—This will allow you to do the following:
  - **Upload New Data:** Launches the import file process so that you can upload another input data file that you would like to analyze.

- **Export Data:** Allows you to export the processed data currently saved in the database and in the QI format that was generated during the import process. You will be asked to select what types of fields to include in your export file.
- **View Data Load Summary:** Displays the Data Load Report that appears at the end of the import file process for the data currently loaded in the database.
- **View Advanced Data Load Report:** Allows you to view a summary of data issues in your data file, corresponding action taken by the system (if any), and potential impact on indicator rates or grouping.
- **Export Data Mapping File:** Allows you to export the data mapping file if you have not done so during the data import process. The Data Mapping file can be re-used where you don't need to manually map your variables to WinQI variables.

- **Indicators**—This allows you to generate indicators for those modules for which indicators have not yet been generated.
- **Reports**—This allows you to create one of the following reports as long as you have generated indicators for one or more modules. You may also view the Hospital or Area Report that was last run:
  - Area Report
  - Hospital Report
  - Patient-Level Report
  - Quick Report
  - My Exports – you will be able to pull any report as long as you ran it once
- **Program**—This allows you to
  - **Check for Upgrades**—This performs a check to see if there is an upgraded version of the Quality Indicators™ Windows® (WinQI) software available. If so, you will receive a prompt asking whether you want to upgrade now. Please see Section 6.2.3 for a detailed description of the **Check for Upgrades** feature.
- **Close**—This option will close the menu.
- **Exit Program**—This option will exit the WinQI application.

2

10.2.2 Help

When you click the <**?**> icon, you will be able to access the WinQI Help Guide for the screen or feature you are on.

3

10.2.3 Imported file information

This section displays information about your most recent imported data file, such as the name of the file, when it was uploaded, and how many rows of data the file contains. If you would like to

replace the data file with another, click the <**Upload New Data**> button and browse for the appropriate file. Remember that replacing your current data and importing a new file will cause the application to overwrite your existing data and all related indicator calculations.

If you would like to view the data load summary for the current import file, export the data, or view an advanced data load report, click the <**Data Options**> button.

If you would like to compute numerator, denominator, and observed rates using the exported data file, you must account for present on admission (POA) exclusions. WinQI keeps track of POA exclusions separately and the exclusions are applied at the time of aggregation of numerator and denominator. In the exported file, the column with the indicator number (for example, PSIxx) represents the numerator and denominator counts without considering the POA exclusion.

The column with a POA suffix (for example, PSIxx_POA) indicates that the case is a POA exclusion. PSIxx_POA = 1 indicates the exclusion is applied, and 0 indicates the POA exclusion is not applied. Follow the logic below to compute the numerator and denominator:

- To find the numerator using the exported file, count cases with PSIxx with 1s where PSIxx_POA values are not equal to 1 (i.e., where PSIxx_POA = 0 or blank). XXXXX
- To find the denominator using the exported file, count cases with PSIxx = 1 or 0 where PSIxx_POA values are not equal to 1 (i.e., where PSIxx_POA = 0 or blank).

The built-in **Quick Report** (see Section 11.4) has the above-mentioned POA exclusion logic included that you can use for your validation.

4

10.2.4 Generate indicators

This section allows you to generate indicators for the module(s) that have not yet been generated. Choose the module(s) for which you would like to generate indicators or click <**Select All**>; then click the <**Generate Indicators**> button to begin the Generate Indicators process. Please see Section 11 for a detailed description of the Generate Indicators process.

5

10.2.5 Create reports

This section allows you to create reports for any module for which indicators have already been generated. One or more modules can be selected to run Area or Hospital Reports; however, only one module can be selected to run a Patient-Level Report. Select your desired module(s) and choose the report you would like to create to begin the Create Report process.

6

10.2.6 Report templates

This section shows report templates that you can use to create new reports rather than going through the **Reports Wizard**. Report templates may be either “AHRQ QI Templates” (that is, predefined by the software) or “My Templates” (that is, defined by you when previously creating a report). Report templates save you time because you don’t have to navigate through the whole

Reports Wizard each time you want to run a report. Report templates are also carried from one version of the software to the next. When you generate a particular report the first time, you can save those parameters as a template (on the **Additional Options** screen) and run the template in the future to create the report with the same parameters. You can save as many report templates as you like (do so if you are generating reports with different selection criteria, groupings, etc.). Make sure to name the template appropriately and provide a description that will help you recollect the parameters of that report.

Within each tab—**My Templates** or **AHRQ QI Templates**—you will see the following:

1. The name and description of the report. On hover, you can also see the report type (Area or Hospital), modules that were selected for the template, the WinQI version on which the template was based, the last modified date (My Templates only), and the input file the template was created on (My Templates only).
2. **Run** link—Clicking on this link will start the process of generating the report by loading the parameters in the corresponding report template. You will be taken to the **Create Report** screen. When the report is finished generating, you may proceed to view the report summary by clicking <**Next**>. Please note that the <**Run**> link will be available only if the basic, underlying criteria for the report have been met. For example, if the report template is based on the PSI module and you have not yet generated indicators for the PSI module with your current input file, then the <**Run**> link will not be available for the corresponding template.
3. **Edit** link—Clicking on this link will load all the parameters for the corresponding report template and will position you on the first screen of the **Report Wizard**. Navigate through the wizard screens and change any parameters you wish to change. Remember to save the new template (you may overwrite the current template or save it as a new template) before creating the report with the revised template. You cannot overwrite an AHRQ QI template. If you make any changes to an AHRQ QI template, you can only save it as a new template (which will then appear in your **My Templates** tab). Please note that the <**Edit**> link will be available only if the basic, underlying criteria for the report have been met. For example, if the report template is based on the PSI module and you have not yet generated indicators for the PSI module with your current input file, then the <**Edit**> link will not be available for the corresponding template.
4. **Delete** link—This link is available only in the **My Templates** tab. Clicking on this link will delete the corresponding report template. You cannot delete an AHRQ QI template.
5. You can **sort** report templates in alphabetical order (A–Z or Z–A) or by date (most recent or least recent).
6. You can search for a particular template by typing a partial name or description in the **Find** box.

7

10.2.7 My Exports

The **My Exports** section provides one central place in which you can see all the reports or other data files you have exported through the WinQI software. You may perform the following actions in this section:

1. **Open Folder** to open the folder in which the file has been saved and then open the file from there.
2. **View** the file by opening it directly in the WinQI software. The file will be opened in the format in which it was saved (for example, .csv).
3. **Delete** will delete the corresponding file from the file system.
4. **Sort** by all exported files in date order (most recent or least recent) or alphabetical order (A–Z or Z–A).
5. You can search for a particular exported file by typing a partial name or description in the **Find** search box.

10.2.8 Session Log

In this section, you can view your **Session Log** or start an advanced logging session to help troubleshoot any issues you are encountering. The Session Log provides a record of all activities during the session. It also records any errors that might be generated during the session. There is other important information captured in the session log to identify the user's environment, such as version of WinQI, OS version, number of processers and total processor time, total system memory, available memory and memory allocated, CPU usage, available disk space, and database information. This information can be useful for problem solving.

There are several ways to save your Session Log:

1. A cumulative Session Log is automatically stored in a text file that has the ".log" extension.
2. There is a <**Save QI Session Log**> button on the **Home** screen, located under the **Tools** menu. Selecting this control allows you to specify a different location (such as your desktop) to save a snapshot of the log information for the current session. This information is saved in rich text format.
3. You can also select the <**View Session Log**> option in the bottom right of the **Home** screen.

10.3 What should I do here?

Click one of the options in the menu bar or on the main screen. You can generate indicators and create reports based on the current data import file, or you can replace the current data file with another that you would like to analyze.

10.4 Other questions

10.4.1 What happens to the data after the application is closed?

The most recent set of imported data and indicator calculations are saved between sessions. Once a new data file is loaded, the previous data file is replaced.

10.4.2 What if I forget to save a report?

The latest report will stay in the database until you go through the Create Reports process to generate a new report. If your report has been generated at least once, you can use the <My Exports> section on the Home screen to access the report, and then use the <**Export this report for later use**> button on that screen to save the report to a file.

10.4.3 What if I have a problem?

You may contact qisupport@ahrq.hhs.gov if you have problems running the WinQI application. To provide context for your questions, please include a copy of the **QI Session Log** (saved after starting **Advanced Session Log**) and a copy of your column mapping—either the .qim mapping file or the contents of the **Mapping Quick Check** screen.

11. Generate Indicators

Once you have completed the import process, the next step is to begin generating indicators. The **Generate Indicators** process goes through your loaded discharge data and performs all the Quality Indicator™ (QI) analysis and indicator calculations necessary for creating reports. You do not need to generate indicators at the same time you import the file. You may safely exit the application and return at a later time. As long as you have finished loading the data, your data will be saved in the database and will be available for you to generate indicators at a later time.

The process of generating indicators includes the following steps:

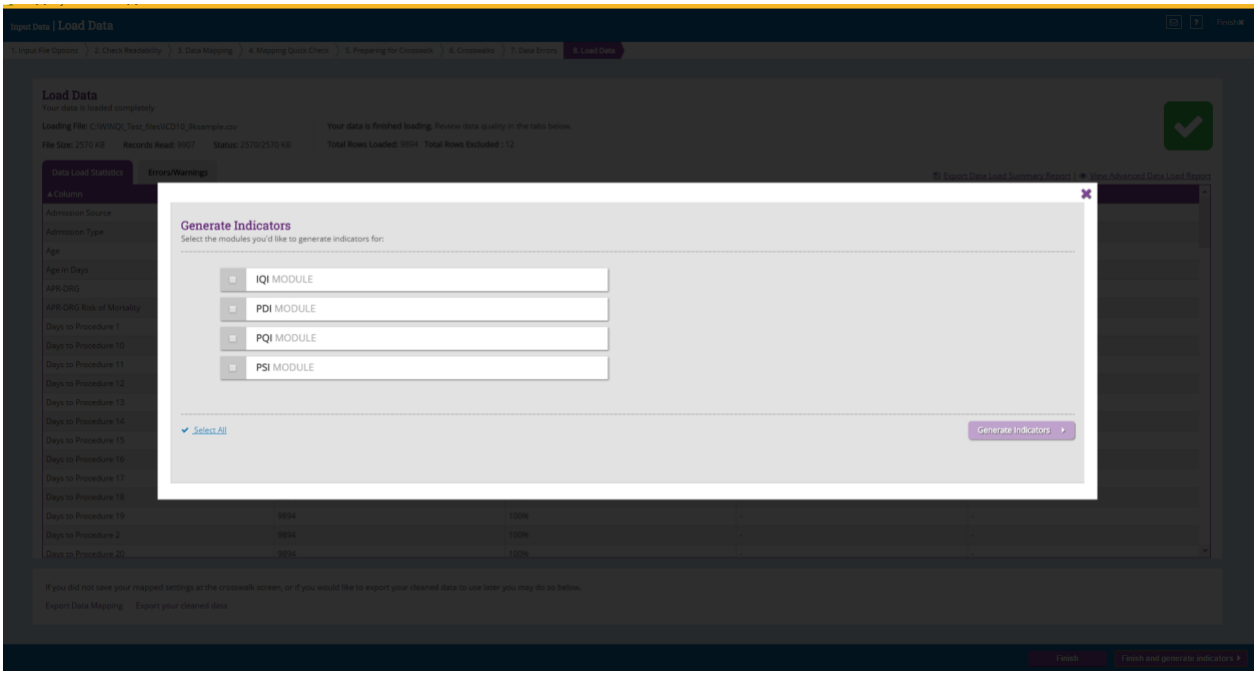
- **Select modules to generate indicators**—Allows you to select one or more modules (Prevention Quality Indicators [PQIs], Inpatient Quality Indicators [IQIs], Patient Safety Indicators [PSIs], Pediatric Quality Indicators [PDIs]) for which you would like to generate indicators.
- **Generate indicators**—Generates the indicators for the module(s) you have chosen to analyze.
- **Display Quick Report**—Shows the total numerator and, where applicable, the denominator and observed rate for each indicator.

11.1 Select modules to generate indicators

11.1.1 What is this screen for?

This screen (Screenshot 23) allows you to choose the module(s) for which you would like to generate indicators.

Screenshot 23: Select Modules To Generate Indicators



11.1.2 How is this screen organized?

Options for **PQI**, **IQI**, **PSI**, **PDI**, and **Select All** will appear alongside checkboxes.

11.1.3 What should I do here?

You have the option to generate indicators for all modules, or you can select the specific modules that you are interested in analyzing. If you wish, you may return at a later time and generate indicators for subsequent modules as long as your input file has not changed. Also, selecting only some of the modules at a time shortens the indicator generation process in any given session.

The application does not allow you to generate individual indicators within a module. If you are interested in a specific indicator (for example, PSI 6), you must generate all PSI indicators. However, when you begin creating reports, you will have the option to select specific indicators.

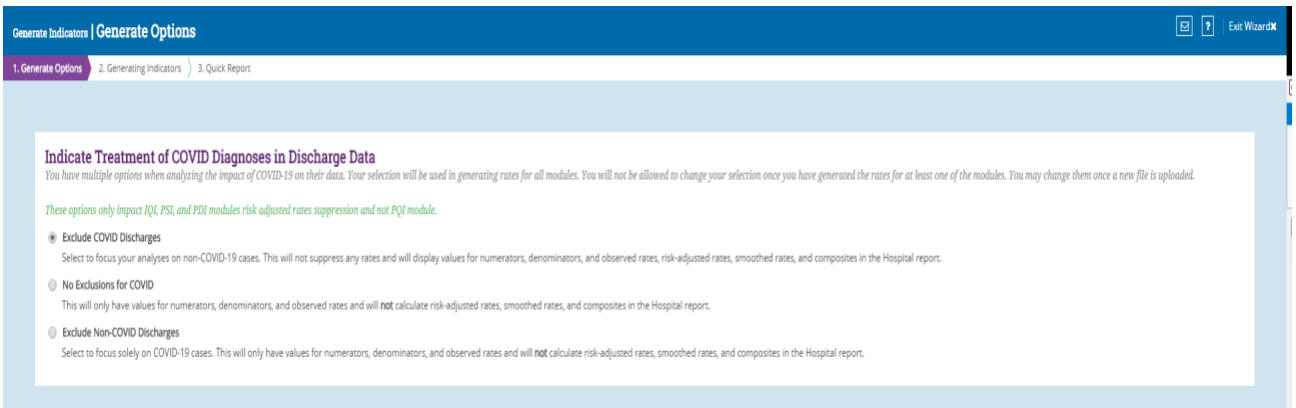
Once you have selected your desired module(s), click the <**Generate Selected Indicators**> button to begin the Generate Indicators process.

11.2 Generate Options

11.2.1 Indicate Treatment of COVID Diagnoses in Discharge Data?

This option is available starting in v2021. You now have multiple options when analyzing the impact of COVID-19 on users' data. These following selections will be used in generating rates for all modules. Note that you will not be allowed to change your selection once you have generated the rates for at least one of the modules. You may, however, change them once a new file is uploaded. These options only impact IQI, PSI, and PDI modules risk-adjusted rates suppression and not the PQI module.

Screenshot 24: Generate Options: COVID Diagnosis in Discharge Data



- Option 1 - Exclude COVID Discharges—Select this option to focus your analyses on non-COVID-19 cases. No suppression will be applied. This will not suppress any rates and will display values for numerators, denominators, observed rates, risk-adjusted rates, smooth rates, and composites in the Hospital Report.

• Option 2 - No Exclusion for COVID—This will only have values for numerators, denominators, and observed rates, and it will not calculate risk-adjusted rates, smoothed rates, and composites in the Hospital Report.

• Option 3 - Exclude Non-COVID Discharges—Select to focus solely on COVID-19 cases. This will only have values for the numerator, denominators, and observed rates, and it will not calculate risk-adjusted rates, smoothed rates, and composites in the Hospital Report**.**

11.2.2 Indicate if data is available for number of days to procedure (PRDAY)

This option is available starting in v2021. You now have two options when analyzing the rates due to available PRDAY in your data. If you have the PRDAY data included in your input data file and mapped during importing your data, the default section will be "PRDAY is included." However, you are allowed to change your selection. Your selection will be used in generating rates for all modules. You will not be allowed to change your selection once you have generated the rates for at least one of the modules. You may, however, change it once a new file is uploaded.

Screenshot 24a: Generate Indicators: PRDAY option

• Default option - PRDAY is included—No suppression will be applied

• Option 2 - PRDAY is not included—This will suppress expected rates, risk-adjusted rates, smooth rates, and composite rates for measures PSI 04, 09, 10, 11, 12, 14, 15, and PDI 08, and PDI 09.

Throughout the Generate Indicators process, clicking the <**Cancel**> button will exit the screen and take you back to the **Generate Indicators** selection screen. If you have not completed the indicator generation process, any selections you have made will not be saved.

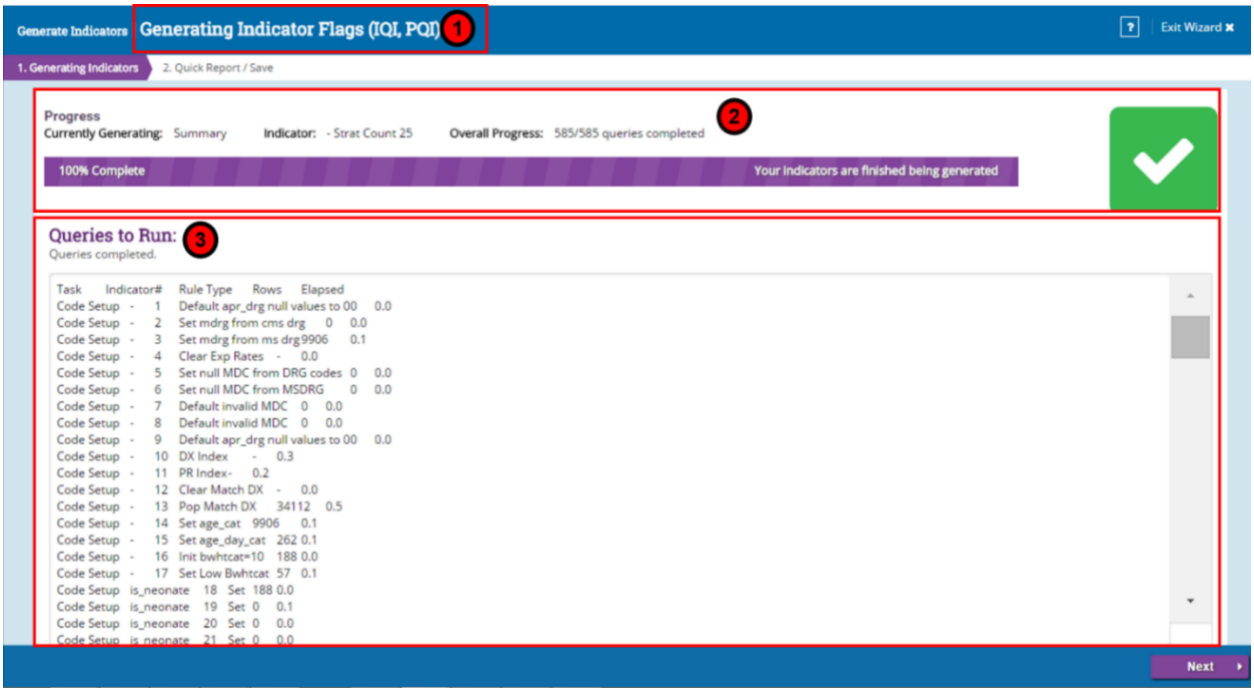
11.3 Generate indicators

11.3.1 What is this screen for?

This screen (Screenshot 24b) shows progress as the application works to generate indicators for the module(s) you selected in the **Select Modules To Generate Indicators** step. Generating indicators

is a multistep process, and it can take a few minutes to several hours based on the size of your input file.

Screenshot 24b: Generate Indicators



11.3.2 How is this screen organized?

1

11.3.2.1Modules

At the top of the screen, you will see the module(s) you have chosen to generate.

2

11.3.2.2Progress

The progress bar tracks the application's progress in generating the indicators for the module(s) you selected. When the generation has completed, the progress bar will display "100% Complete" as well as a message saying, "Your indicators are finished being generated." When the generation is 100 percent complete, you may proceed to the next screen.

3

11.3.2.3Queries to run

This section of the screen displays a list of all the work that the WinQI software is doing. Queries correspond to specific inclusion or exclusion rules listed in the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ (QIs) *Technical Specifications* for each indicator. This information may also be helpful to the AHRQ QIs support team if you have questions about your results.

11.3.3 What should I do here?

Be patient during this process: Some indicators are complex, and the analysis may take several minutes or hours. When the queries are completed, a "completed" message will appear. If no errors were found, you will also see a message indicating that no errors were encountered. If the application encountered any errors, an "Errors were encountered" message will appear, along with a link that will allow you to view the errors.

The <**Next**> button will be unavailable until all the queries have been run, but when the Generate Indicators process is complete, you can view a quick report of your data.

If you click the <**Cancel**> button at this stage, all the indicator calculations will be discarded, and you will be taken back to the **Home** screen.

11.4 Other questions

11.4.1 What's a "Query"?

This term is an instruction to the database. The AHRQ QIs *Technical Specifications* list one query per inclusion or exclusion rule.

11.4.2 What should I do if I get an error?

If you receive a Structured Query Language (SQL) error on this screen, your entire results should be considered invalid.

Check the QI Session Log to see what the error was. The error may be due to your database server being shut down; in that case, retry the data load at another time. Other errors should be sent to the WinQI support team for assistance.

11.4.3 What should I do if I'm loading millions of rows and an SQL query times out?

You may edit the maximum amount of time that each query is permitted to run on the **Program Options** screen. The default setting for **Indicator Query Timeout** is 43200 seconds. Normally, this is more than sufficient, but for very large datasets, you may need to increase this value. This timeout is the maximum time allowed for each query to complete without error; most queries will run much faster.

11.4.4 Why are there so many queries?

There are approximately 100 indicators, each with multiple rules. Additionally, there are queries to assign categories to discharges and to calculate risk-adjusted rates.

11.4.5 Why does it run all indicators when I am only interested in a few?

You need to generate indicator flags only once. The results are then summarized for quick reporting. Once this screen has completed, you may go through the **Create Reports** process multiple times to prepare reports that display as many or as few indicators as you wish. The entire

indicator-flagging analysis must run for a module before you can generate any reports for that module.

11.5 Display Quick Report

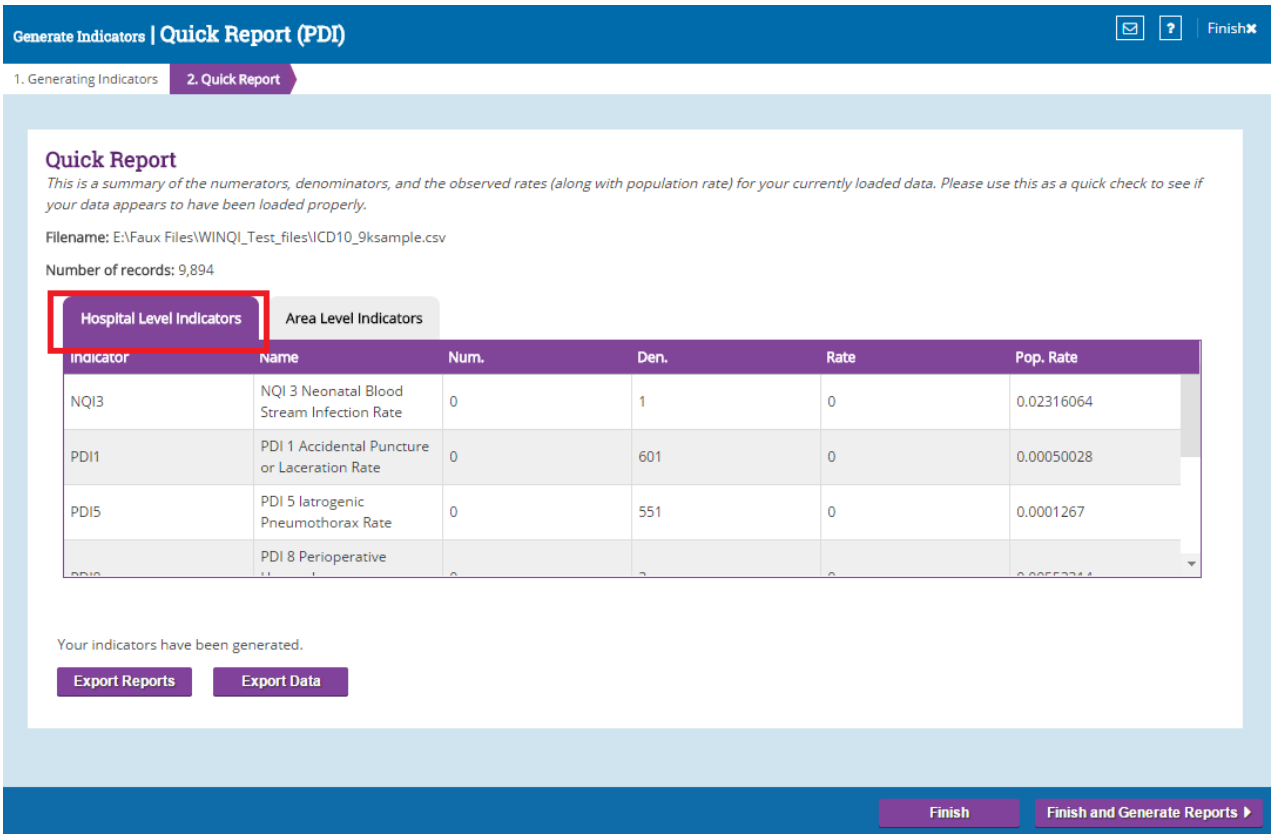
11.5.1 What are these screens for?

The purpose of the **Quick Report** screen (Screenshots 25 and 26) is to give you an understanding of how your data translates into a report and allows you to check to see whether your data appear to have loaded properly.

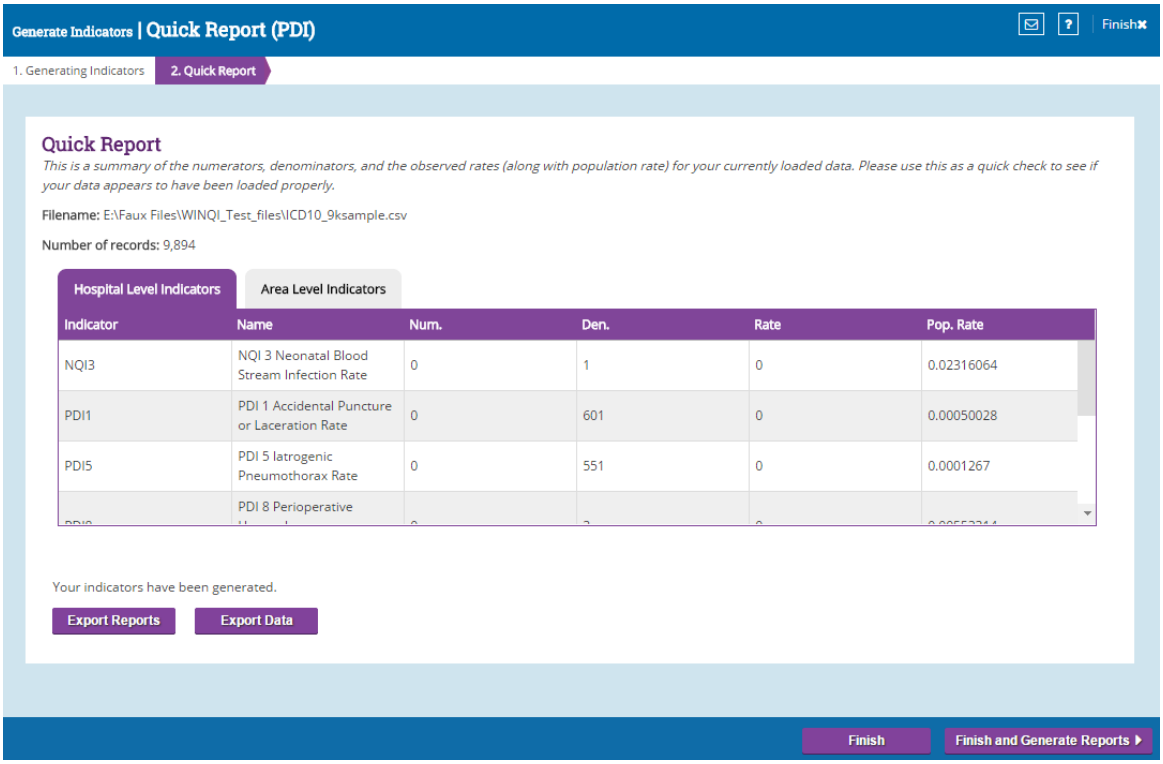
11.5.2 How are these screens organized?

11.5.2.1Hospital-level indicators

Screenshot 25: Hospital-Level Indicators



Screenshot 26: Quick Report

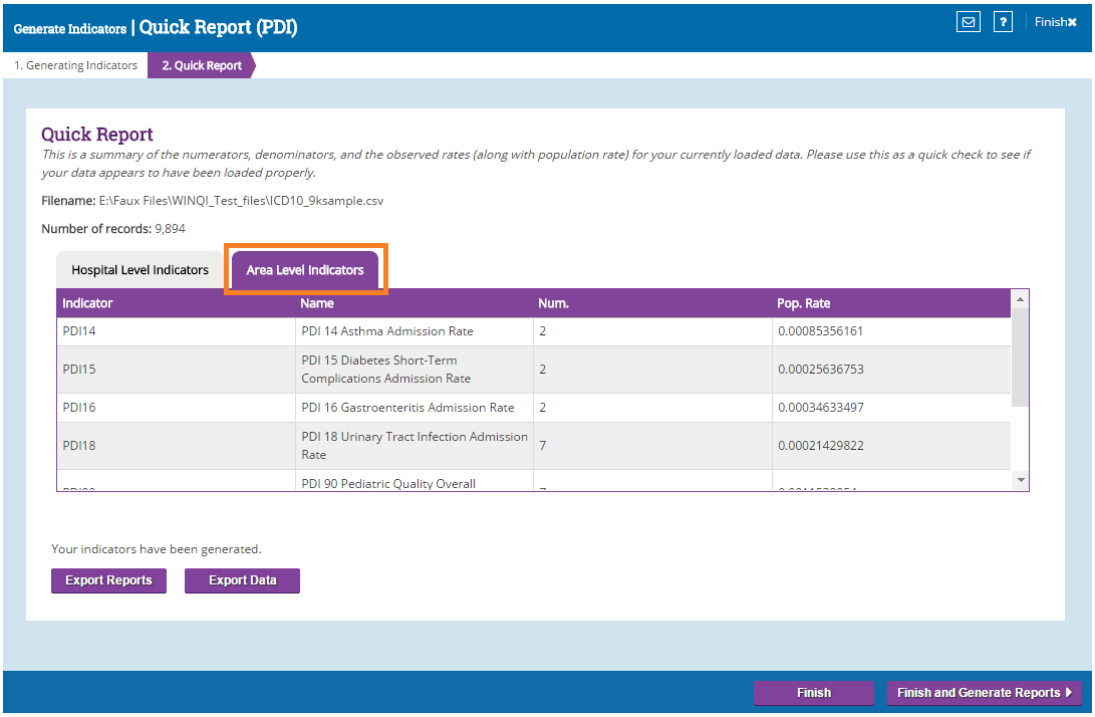


This area (Screenshot 27) displays the numerator and denominator, observed rate, and population rate for all hospital-level indicators.

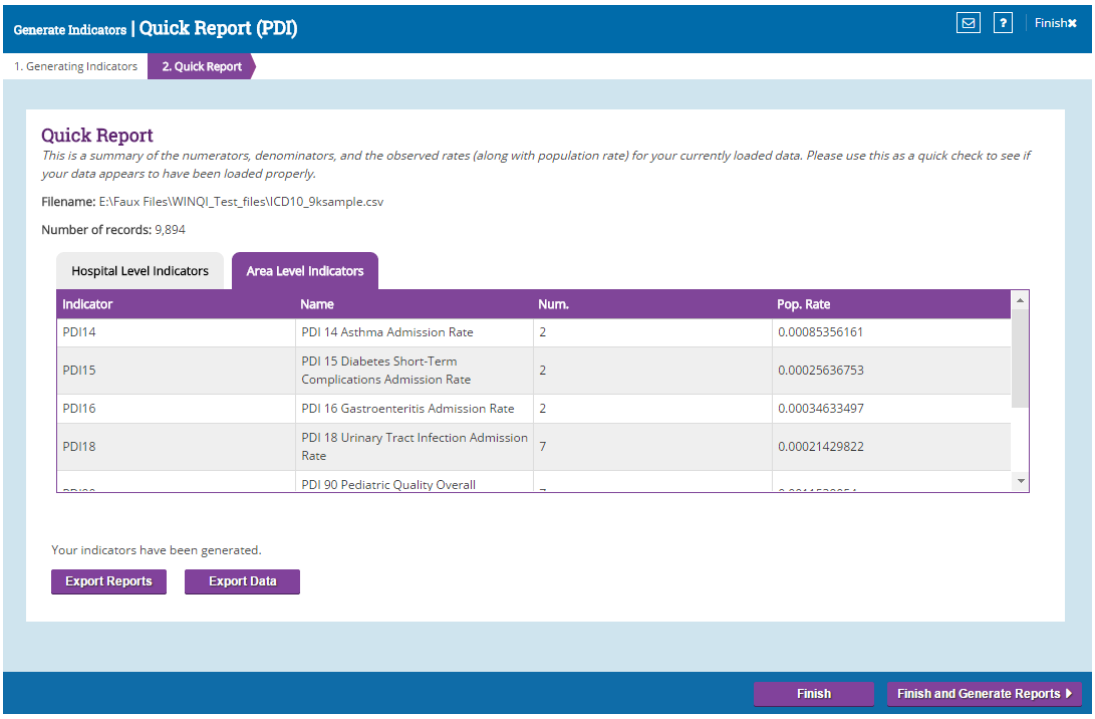
- **Numerator**—This term is the numerator for the observed rate. It is defined as the total number of cases that meet the inclusion criteria and the flag criteria but do not meet the exclusion criteria.
- **Denominator**—This term is the denominator for the observed rate. It is defined as the total number of cases that meet the inclusion criteria but do not meet the exclusion criteria. Volume indicators are not reported as a rate and do not have a denominator.
- **Observed Rate**—This term is the observed rate for the indicator. This term is equal to the numerator divided by the denominator (Num/Den).
- **Population Rate**—This term is the overall rate for this indicator in the reference population. The reference population is pooled discharges from the 2013 State Inpatient Databases (SID). This rate is used in the calculation of the risk-adjusted rate (observed rate divided by the expected rate, multiplied by the population rate), and it is not affected by the currently loaded data.

11.5.2.2 Area-level indicators

Screenshot 27: Area-Level Indicators



Screenshot 28: Area-Level Indicators



This area (Screenshot 28) displays the number of cases found for each indicator in your discharge data, along with the overall population rate.

- **Numerator**—This term is the numerator for the observed rate. It is defined as the total number of cases that meet the inclusion criteria and the flag criteria but do not meet the exclusion criteria.
- **Population Rate**—This term is the overall rate for this indicator in the reference population. The reference population consists of pooled discharges from the SID data for the latest available year. This rate is used in the calculation of the risk-adjusted rate (observed rate divided by the expected rate, multiplied by the population rate), and it is not affected by the currently loaded data.

11.5.3 What should I do here?

Pay close attention to the data in this report! This is your opportunity to perform a quality check of the report to make sure the values are what you expected, or to determine whether you need to go back and make changes to your data before you begin to create detailed reports. If you would like to save this report, click the <**Export Reports**> button.

When you are satisfied with the information the quick report is showing, you can click the <**Finish and Generate Reports**> button to begin creating your reports. A window will appear that allows you to select the module(s) for which you would like to generate reports. Select the appropriate module(s); then select whether you would like to create an Area-, Hospital-, or Patient-Level Report. Only one module may be selected when creating a Patient-Level Report.

Click the <**Finish**> button if you would like to create your reports at a later time. You will be returned to the **Home** screen, which will display the module(s) for which you can create reports when you are ready to do so. The Home screen will also display the modules for which indicators have not yet been generated and therefore are not yet available for creating reports. You can also click the <**Finish**> button if you decide that you need to go back and make changes to your data. This will take you back to the Home screen. Once there, you can click the <**Upload New Data**> button to upload a new input file with your edited data.

NOTE: The application will not allow you to create reports for the modules for which you have not already generated indicators.

11.5.4 Other questions

11.5.4.1 Why is the population rate inappropriate for comparison?

The population rate is based on the reference population, which itself is based on the universe of hospital discharges in 45 States (see the Acknowledgments section). It would be fair to compare your observed rate with the population rate only if your hospital(s) perfectly matched the average demographics and severity of cases in this sample. A more appropriate rate with which to compare is the expected rate, which can be calculated during the Create Reports process. If you are using

data from a State, the State rate is included when you run a hospital report as a total for all hospitals with the indicator. The State rate can be compared with the population rate or individual hospital rates.

11.5.4.2 Why is the population rate displayed?

It can be useful to see if your observed rates are "in the same ballpark" as the population rate to determine whether the data load was correct. You can use the population rate to verify the calculation of the risk-adjusted rates that are calculated during the **Create Reports** process.

11.5.4.3 Why are no denominators or rates displayed for area-level indicators?

It is necessary to go through the **Create Reports** process to select the correct Census population to get a denominator for area-level indicators. Also, many discharge files will contain a few out-of-State discharges that can inflate the total population counts if the proper stratifiers are not selected.

12. Create Reports

12.1 Report basics

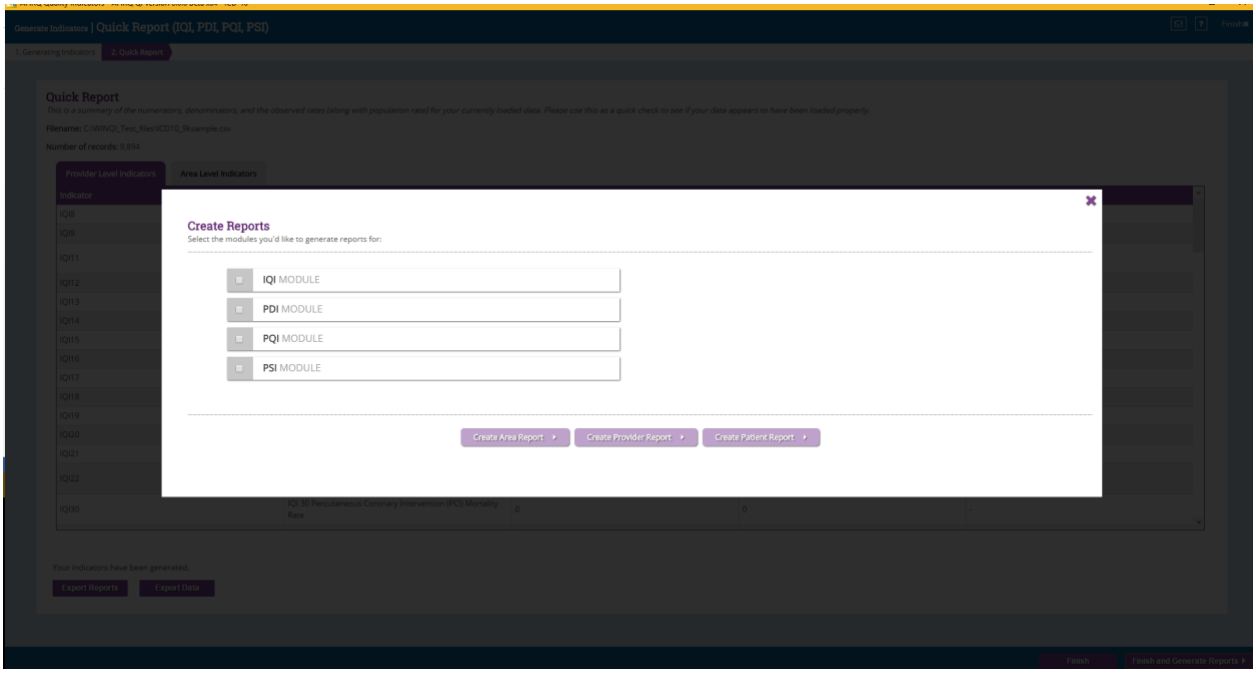
This section describes the type of reports the Quality Indicators™ Windows® (WinQI) software provides and walks you through the process of generating each report. The reports you can create include the **Hospital Report**, **Area Report**, **Patient-Level Report**, **Case-Level Details Report**, and **Quick Report**.

The **Create Reports** screen (Screenshot 29) allows you to choose the type of report you would like to create and select the module(s) for which you would like to create the report. You can reach this screen in two ways: by continuing on to Create Reports immediately after you have finished generating indicators or by choosing your reports and module(s) on the Home page after indicators have been generated during follow-on sessions.

The WinQI software provides reporting that takes you through the following steps:

- **Quality indicators**—Select QIs to include in a report.
- **Filter criteria**—Select the hospitals, quarters, and/or years for which you wish to select records.
- **Stratifiers**—Select stratifiers for your report.
- **Additional options**—Select additional options for data analysis.
- **Create reports**—Generate and view hospital-level and area-level reports.
- **Additional reports**—Drill down to corresponding patient-level and case-level details reports.

Screenshot 29: Create Reports



NOTE: The application will not allow you to create reports for the modules for which you have not already generated indicators.

12.2 What kinds of reports can I generate?

The WinQI software provides several types of reports. Table 3 lists the kinds of reports that WinQI can generate and the sections in the instruction manual that discuss them.

Table 3. Types of Reports Provided by WinQI Software

SECTION NUMBER	SOFTWARE COMMAND/DESCRIPTION
AREA-LEVEL RATES REPORT	
Section 12.3.1	Select Indicators and Composite Measures
Section 12.3.2	Select Date Range
Section 12.3.3	Select Stratifiers for Use With Area Indicators
Section 12.3.4	Additional Options for Data Analysis
Section 12.3.5	Create Report
Section 12.3.6	View Report
HOSPITAL-LEVEL RATES REPORT	
Section 12.4.1	Select Indicators
Section 12.4.2	Select Filter Criteria (Hospitals, Date Ranges, and Composite Indicators)
Section 12.4.3	Select Stratifiers for Use With Hospital Indicators
Section 12.4.4	Additional Options for Data Analysis
Section 12.4.5	Create Report
Section 12.4.6	View Report
Section 12.5	Composite Report
PATIENT-LEVEL REPORT	
Section 12.6	Patient Level Report
Section 12.7	Case Details
QUICK REPORT ON INPUT DATA	
Section 11.4	Quick Report

12.3 Area-Level Report

This section explains the process for creating an area-level report from your data. The Area-Level Report shows calculated QI rates for area-level indicators. Area-level indicators identify hospital admissions that evidence suggests might have been avoided through access to high-quality outpatient or preventive care. Population estimates from a U.S. Census Bureau dataset are usually used to calculate area-level rates. Please refer to the *Empirical Methods* document (https://qualityindicators.ahrq.gov/Downloads/Resources/Publications/2021/Empirical_Methods_2021.pdf) for more details on calculating area-level rates.

When calculating the Area-Level Report, you may select specific indicators and filter or group them by specific criteria. Details are presented in the sections that follow. The steps for running this report include the following:

- Select indicators.
- Select date range.
- Select stratifiers.
- Select additional options for data analysis.
- Create report.
- Display report.

12.3.1 Select indicators (Area-Level Report)

Use this screen (Screenshot 30) to specify the indicators to include in the report. You can also select whether or not to include the composite measures. Beginning with WinQI v4.5, four hospital-level indicators have been stratified into two to five mutually exclusive sub-indicators:

- IQI 09 Pancreatic Resection Mortality Rate
- IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate
- IQI 17 Acute Stroke Mortality Rate
- PSI 04 Death Rate among Surgical Inpatients with Serious Treatable Complications

The software reports observed, expected, and risk-adjusted rates for the overall indicator and for the individual strata. Smoothed rates are not reported for the strata.

Indicators on this screen are listed by module and then by number. Strata results are listed by module and number of the overall indicator, followed by another number matching the order of the strata (i.e., "1" for stratum A, "2" for stratum B, etc.). Table 4 lists the stratified indicators, the strata names, and the number convention used on the selection screen.

Table 4. List of Stratified Indicators in Version 2021

MODULE AND NUMBER ON SELECTION SCREEN	INDICATOR TITLE
IQI9	IQI 09 Pancreatic Resection Mortality Rate
IQI901	IQI 9 Pancreatic Resection Mortality Rate Stratum : Presence of Pancreatic Cancer
IQI902	IQI 9 Pancreatic Resection Mortality Rate Stratum: Absence of Pancreatic Cancer
IQI11	IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate
IQI111	IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate Stratum_OPEN_RUPTURED: Open Repair of Ruptured AAA
IQI112	IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate Stratum_OPEN_UNRUPTURED: Open Repair of Unruptured AAA

MODULE AND NUMBER ON SELECTION SCREEN	INDICATOR TITLE
IQI113	IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate Stratum_ENDO_RUPTURED: Endovascular Repair of Ruptured AAA
IQI114	IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate Stratum_ENDO_UNRUPTURED: Endovascular Repair of Unruptured AAA
IQI17	IQI 17 Acute Stroke Mortality Rate
IQI171	IQI 17 Acute Stroke Mortality Rate Stratum_HEMSTROKE_SUBARACH: Subarachnoid Hemorrhage
IQI172	IQI 17 Acute Stroke Mortality Rate Stratum_HEMSTROKE_INTRACER: Intracerebral Hemorrhage
IQI173	IQI 17 Acute Stroke Mortality Rate Stratum_ISCHEMSTROKE: Ischemic Stroke
PSI4	PSI 04 Death Rate among Surgical Inpatients with Serious Treatable Complications
PSI42	PSI 4 Death Rate among Surgical Inpatients with Serious Treatable Complications Stratum: Deep Vein Thrombosis/Pulmonary Embolism (DVT/PE)
PSI43	PSI 4 Death Rate among Surgical Inpatients with Serious Treatable Complications Stratum: Pneumonia
PSI44	PSI 4 Death Rate among Surgical Inpatients with Serious Treatable Complications Stratum: Sepsis
PSI45	PSI 4 Death Rate among Surgical Inpatients with Serious Treatable Complications Stratum: Shock/Cardiac Arrest
PSI46	PSI 4 Death Rate among Surgical Inpatients with Serious Treatable Complications Stratum: Gastrointestinal (GI) Hemorrhage/Acute Ulcer
PSI14	PSI 14 Postoperative Wound Dehiscence Rate
PSI141	PSI 14 Postoperative Wound Dehiscence Rate Stratum: Open Approach
PSI142	PSI 14 Postoperative Wound Dehiscence Rate Stratum: Non-Open Approach

To ensure that the strata are mutually exclusive within each indicator, the strata were prioritized in order of their relative prevalence in the reference population data. If a discharge record meets the denominator criteria for several strata, then the software assigns the record to the one (and only one) candidate stratum whose outcome is most prevalent in the reference population.

- For Inpatient Quality Indicator (IQI) 09, strata are prioritized to ensure mutual exclusivity by determining whether the criteria for stratum A are met and, if not, by testing whether the criteria for stratum B are met. The mutual exclusivity prioritization for IQIs 09 is as follows:

  Stratum : Presence of Pancreatic Cancer

  Stratum: Absence of Pancreatic Cancer

- For PSI 04, prioritization to ensure mutual exclusivity for the strata is as follows:

  Stratum: Shock/Cardiac Arrest

Stratum: Sepsis

Stratum: Pneumonia

Stratum: Deep Vein Thrombosis/Pulmonary Embolism (DVT/PE)

Stratum: Gastrointestinal (GI) hemorrhage/Acute Ulcer

- For IQI 11, prioritization to ensure mutual exclusivity for the strata is as follows:

  Stratum Open/Ruptured (Open repair of ruptured AAA)

  Stratum Endo/Ruptured (Endovascular repair of ruptured AAA)

  Stratum Open/Intact (Open repair of unruptured AAA)

  Stratum Endo/Intact (Endovascular repair of unruptured AAA)

- For IQI 17, the mutual exclusivity prioritization is as follows (listed from highest mortality to lowest mortality):

  Stratum_HEMSTROKE_INTRACER: Intracerebral Hemorrhage

  Stratum_HEMSTROKE_SUBARACH: Subarachnoid Hemorrhage

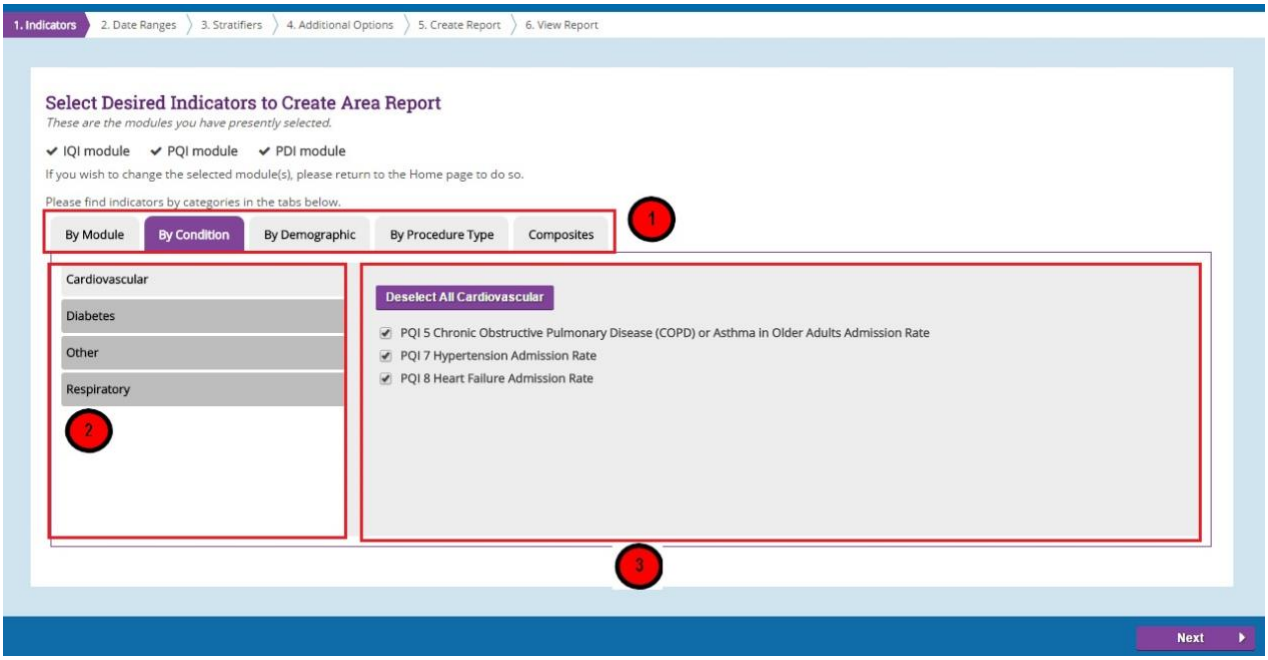
  Stratum_ISCHEMSTROKE: Ischemic Stroke

- For PSI 14, the mutual exclusivity prioritization is as follows:

  Stratum: Open Approach

  Stratum: Non-Open Approach

Screenshot 30: Select Indicators (Area-Level Report)



12.3.1.1 How is this screen organized?

Indicators are organized according to categories that may be of interest to different types of users. Each indicator is listed in several different tabs. Stratified indicators will also appear on this screen and are labeled accordingly (e.g., Stratum A, Stratum B, etc.).

NOTE: If you have created reports previously, all your selections have been saved. To specify a new group of indicators, deselect and select the indicators as desired.

1 12.3.1.1.1 Top-level tabs

- **By Module**—The traditional way of finding indicators; separate tabs for the Patient Safety Indicators (PSIs), Inpatient Quality Indicators (IQIs), PQIs (Prevention Quality Indicators), and PDIs (Pediatric Quality Indicators). Only those modules that you selected on the earlier screen will be shown here.
- **By Condition**—Screens for indicators that are grouped by the particular condition.
- **By Demographic**—Screens for each of several interesting demographic groupings.
- **By Procedure Type**—Separate screens for indicators related to medical, surgical, and obstetric cases.
- **Composite Measures**—The area-level composite measures. A checkbox appears next to each of the composite measures. The indicators comprising the composite measure are listed below the composite measure name.

2 12.3.1.1.2 Subtabs

Each of the tabs contains a number of screens, as described in the preceding section, that are accessed via the subtabs.

3 12.3.1.1.3 Indicators

Each screen (subtab) contains a list of indicators with checkboxes. All indicators apply to that category and subcategory. For example, the "Cardiovascular" subtab under the "By Condition" tab will list all area-level indicators for the cardiovascular condition for the selected modules.

A checkbox above the list can be used to select all indicators in that category.

12.3.1.2 What should I do here?

Click on one of the tabs in the top row to select a category. When a tab in the top row is clicked, subtabs are displayed below the main tabs.

Select the indicators for which you would like to run a report. You can use the tabs and subtabs to locate specific indicators. There is no need to search through all the tabs if you know exactly which indicators you are looking for. Instead, it may be more useful to search in the **By Module** tab.

Click <**Next**> when the desired indicators and composites have been selected.

12.3.1.3 Time-saving tips

12.3.1.3.1 Selecting/deselecting everything

You have the option to **Select All** or **Deselect All** indicators within modules. The first time you run the application, all the indicators for selected modules will be preselected by default. If you are interested in running a report on only a small number of indicators, you should deselect all indicators and then select the few that you would like to analyze.

12.3.1.3.2 Clearing a Screen

Click the <**Select All…**> checkbox to select the entire screen, and then click it again to deselect the entire screen.

12.3.1.4 Other questions

12.3.1.4.1 Why can't I find an indicator that used to be on this screen?

Area- and hospital-level indicators pertain to different populations and are separated into two completely different processes. You will see only area-level indicators under **Area-Level Report**. Additionally, only indicators for the modules that you have chosen will appear on this screen. If you would like to view indicators from a different module, you will need to return to the main screen and generate indicators for additional modules.

12.3.1.4.2 Why can't I find indicators for a certain module?

Only modules that you have selected on the previous screen will be available to use to create a report. If a desired module does not appear on the previous screen, this is likely because indicators have not been generated for that particular module. To create a report for a module for which indicators have not been generated, go back to the Home screen, and go through the Generate Indicators process for the desired module.

12.3.1.4.3 What if I just want to see the cases for each indicator?

You don't need to go through the full reports process to see the individual cases for each indicator. After you have imported your data file, you can view the cases using the **Patient-Level Report** option (see Section 12.6).

12.3.1.4.4 Where can I find more information about the use of composite measures?

The WinQI team conducted several workgroups on composite measures, one for each of the QI modules (PQIs, IQIs, PSIs, PDIs). The reports from these workgroups can be downloaded from their respective QI resource screens.

PQIs Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/v2021/PQI_Composite_Development.pdf

IQIs Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/IQI/v2021/IQI_Composite_Development.pdf

PSIs Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/v2021/PSI_Composite_Development.pdf

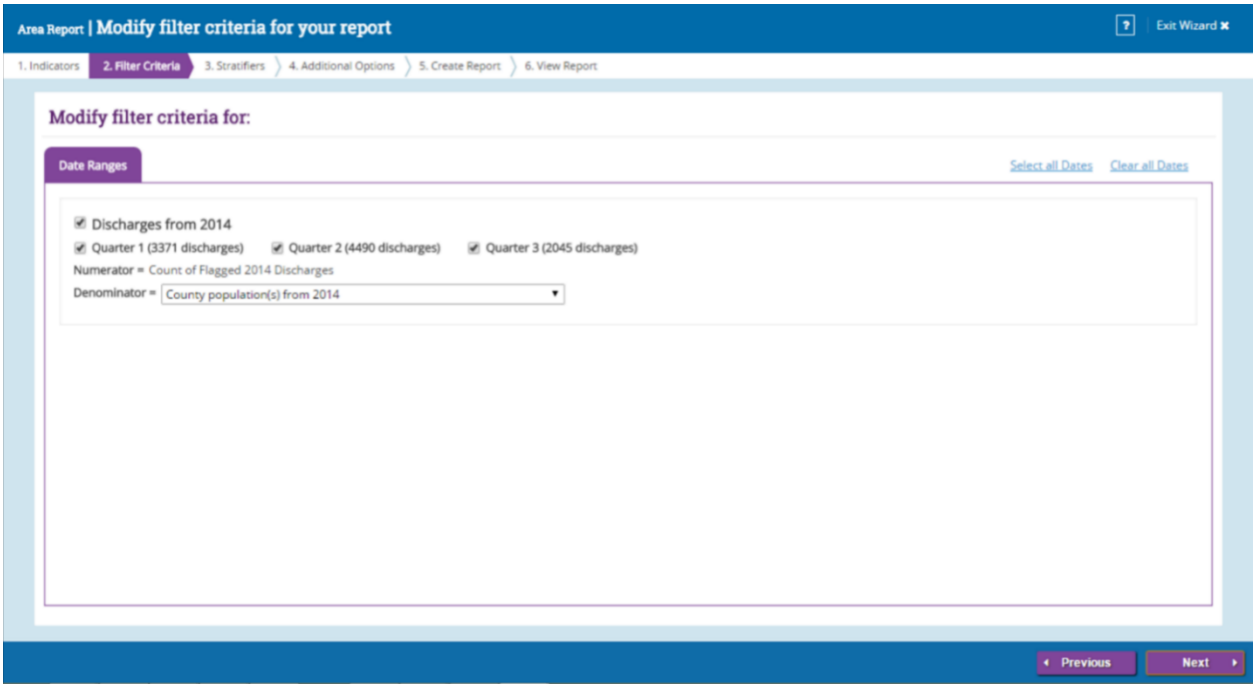
PDIs Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/v2021/PDI_Composite_Development.pdf

12.3.2 Select date range (area reports)

12.3.2.1 What is this screen for?

This screen (Screenshot 31) allows you to limit the discharge records you wish to include in your report to only those discharges that occurred during the selected quarters. Additionally, in this screen, you may select a different denominator for each year.

Screenshot 31: Select Date Range (Area Reports)



12.3.2.2 How is this screen organized?

12.3.2.2.1 Discharge year

Each year represented in the input data is listed.

12.3.2.2.2 Quarters

The quarters in the input data are listed below the corresponding year.

12.3.2.2.3 Numerator and denominator

The numerator (count of all flagged discharges for the corresponding year) and denominator (county population for the corresponding year) appear below the quarters. The default denominator is the population from the corresponding year.

12.3.2.3 What should I do here?

Modify or select the checkboxes next to the years and quarters that you wish to include in your report. If desired, you may also change the default denominator for some or all of the years in your data. The following options are available:

- **County population(s) from [year]**—This is the default option. This option is the total population from the selected year for all counties in your input file.
- **Adjusted [year] population**—The denominator of each rate will be scaled down based on the number of quarters selected for that year. This option is useful if you want to get annualized rates but have only data for a partial year.

- **Population from a different year**—You may specify a population for a different year to go with your input data. This option may be useful if the "Year" field is incorrect or missing.
- **None**—No population data will be included to match this year in your input file. This option may be appropriate if you have records with an invalid year field but still wish to count these records as part of the total. You should not use this option in combination with a stratification selection that includes year.

12.3.2.4 Other questions

12.3.2.4.1 How does the program determine the numerator and denominator for each rate?

The program first gets a list of all the discharge year and quarter values that you have selected. This selection includes the records with a missing year or quarter value if you have checked the appropriate box.

The program then totals the numerators for the selected indicators for each year grouped by the selected stratifiers.

For the denominator, the program totals the Census population that you have selected for each discharge year. The Census population figures are also grouped by the selected stratifiers. Unless you have selected "none" above, you will have a separate total population for each discharge year.

The indicator numerators and denominators are joined together to obtain the observed rate grouped by the selected stratifiers.

12.3.2.4.2 Why should you not stratify by discharge year when you have selected "None" for a discharge year?

These records will be grouped by the discharge year, but they will not have a denominator.

12.3.2.4.3 When is it useful to select "None" for a denominator?

This option may be appropriate in either of two instances: (1) You have incorrect year data for some records, or (2) you want a 1-year rate that spans multiple calendar years.

In the first case, suppose you have many discharges that occurred in "2019," but a few were incorrectly recorded as "219." If you select "County population for 2019" as the denominator for the 2019 records and "None" as the denominator for the "219" records, the total numerator will include all records and the total denominator will include the population for 2019. (If you stratify by year, then the numerator cases will be separated and "219" records will have no denominator.)

In the second case, if you want a 12-month rate that spans 2 calendar years, you would select the population to go with one discharge year and not select a population for the other year.

12.3.2.4.4 How is an annualized rate calculated?

When selecting the denominator to go with a discharge year, the population is divided by four times the number of selected quarters. So, if you select only three quarters but want an annualized rate, you would get the following:

- Total numerator = sum of the cases from three quarters
- Total denominator = three times one-quarter of the population (If you stratify by quarter, this will be three lines.)

Total observed rate = three-quarters of cases divided by three-quarters of the total population. Multiplied through, this is four times the rate per quarter.

12.3.2.4.5 How does denominator selection compare with the options in the AHRQ SAS® QI syntax?

To use the SAS QI software for area-level indicators, you must select the population year in your control file. Your data file is assumed to be a full year of discharges; thus, the observed rate is calculated as the numerator total divided by the population for the selected year. It does not matter what data you have populated in the "Year" field in the discharge records—if you have several different "Year" values, these are treated as though they are all the same.

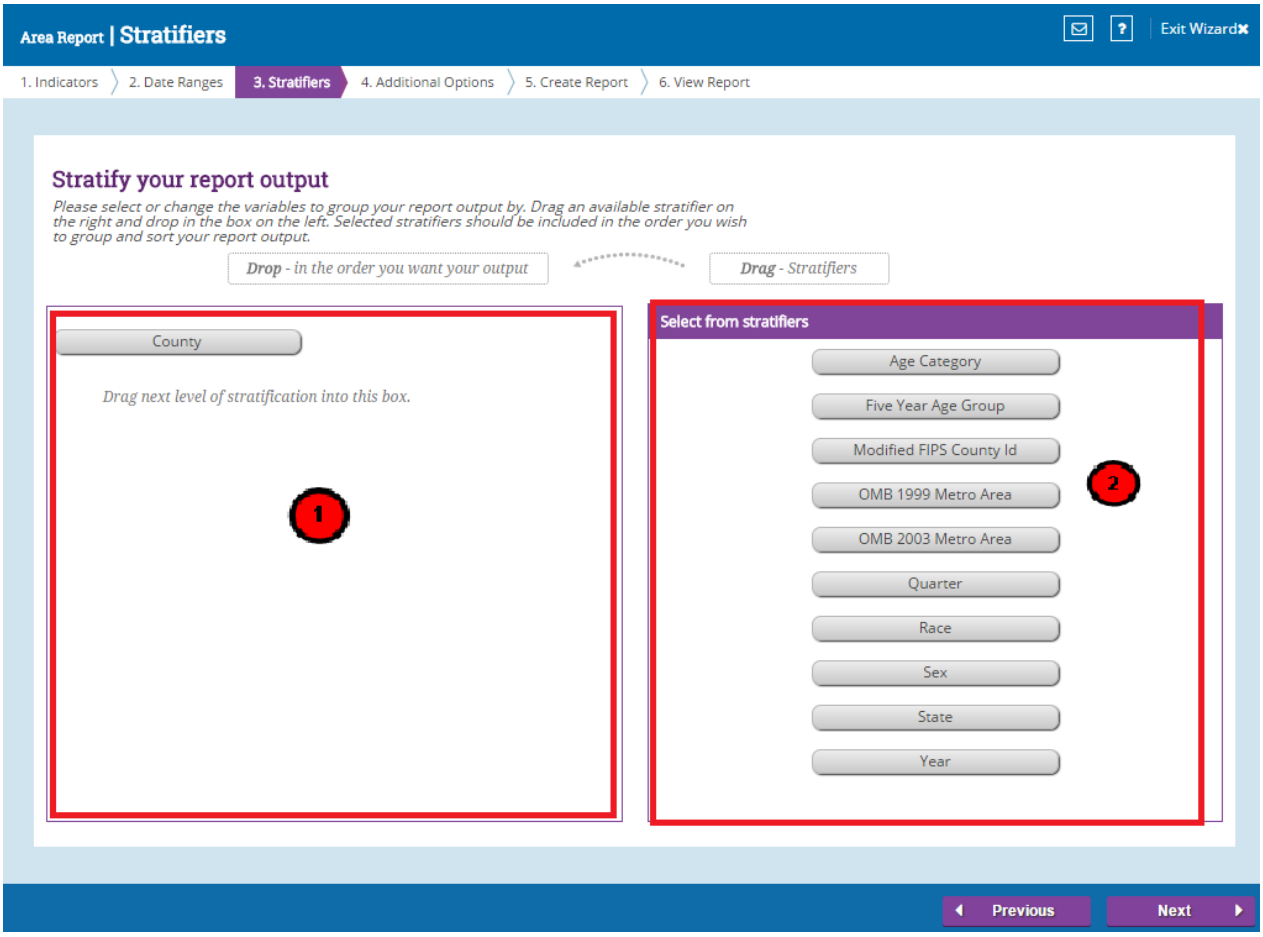
To get the same result from WinQI, you should select the year from the list. If you have more than one discharge year, you should select the year as the denominator only once and select "None" for the other discharge years.

12.3.3 Select stratifiers for use with area indicators

12.3.3.1 What is this screen for?

This screen (Screenshot 32) is used to build a hierarchy of stratification for area-level indicators. On this screen, you will indicate to the WinQI software what variables you want your report output grouped by. You will also indicate the order of the "group by" variables.

Screenshot 32: Select Stratifiers (Area Reports)



12.3.3.2 How is this screen organized?

1 12.3.3.2.1 Selected stratifiers

This area displays the area-level stratifiers (variables by which to group the report) currently selected in the hierarchical order in which they will be sorted.

2 12.3.3.2.2 Select from stratifiers

This area displays a list of available stratifiers (variables by which to group the report) that can be used for reports on area-level indicators.

12.3.3.3 What should I do here?

Click on a desired stratifier in the **Select from Stratifiers** box, drag it to the selected stratifiers area, and drop it in the desired position. Area stratifiers are as follows: Age category, Five-year age group, Sex, Year, Quarter, Race, County, Modified FIPS County ID, State, OMB 1999 Metro area, and OMB 2003 Metro area. Only those variables that are in your input file and that have been mapped to QI variables will be available for stratification.

To remove a selected stratifier, click and drag it back to the **Select From Stratifiers** list.

To reposition a stratifier, click and drag it up or down in the list of selected stratifiers. You will see a line that shows you where the stratifier will be placed.

The risk adjustment process for the Area Report has changed in v2021. The risk adjustment stratification report will be calculated and displayed differently with different stratification selected by the user.

- Overall or/and County for Area Report — If no stratifier (i.e., Overall), or just County, is selected by you, then the risk adjustment calculation will compute risk-adjusted rates, smoothed rates, and corresponding variance estimates.
- Any other stratification combination — Only risk-adjusted rates and variances are calculated. Note that the risk-adjusted rates are calculated as the O/E ratio. In the View Report screen, you will see warning message "For more granular stratification only risk-adjusted rates and variance are calculated."

12.3.3.4 Other questions

12.3.3.4.1 What's the difference between hospital- and area-level stratifiers?

The population used to calculate area-level indicators is based on the U.S. Census. In that context, some fields do not make sense, such as "Hospital ID."

12.3.3.4.2 What is a "stratifier"?

A stratifier is how your data will be broken down. In database parlance, this is equivalent to an item in a "group by" clause.

12.3.3.4.3 What if I just want the totals for each indicator?

Do not select any stratifiers.

12.3.3.4.4 Does the order matter?

Yes. It determines the order in which the stratifiers are listed on the reports and the order in which the rows are sorted.

12.3.3.4.5 How do I know which stratifiers to select?

Select stratifiers that will provide you with useful information. For example, if you are processing data from a single hospital, selecting a single stratifier for "County" will not provide you with any useful information. If your data do not separate patients by race, then the "Race" stratifier will be of no use.

12.3.3.4.6 Can I display the names of each county?

Yes. Select the "State/County" stratifier, then choose the option **"Show the names of each county, State, or metro area"** on the **Additional Options for Data Analysis** screen. The county will be the patient county of residence.

12.3.3.4.7 What are the definitions of the metro areas?

The Office of Management and Budget defines metropolitan and micropolitan statistical areas. Visit the United States Census Bureau for more information.

12.3.3.4.8 What is the Modified Federal Information Processing Standards stratifier?

Federal Information Processing Standards (FIPS) codes are a standardized set of numeric or alphabetic codes issued by the National Institute of Standards and Technology to ensure uniform identification of geographic entities through all Federal Government agencies. The entities covered include States and statistically equivalent entities, counties and statistically equivalent entities, named populated and related location entities (such as places and county subdivisions), and American Indian and Alaska Native areas.

The modified FIPS stratifier aggregates the independent cities with the counties that surround them. This table can be viewed at http://www.nist.gov/itl/fips.cfm.

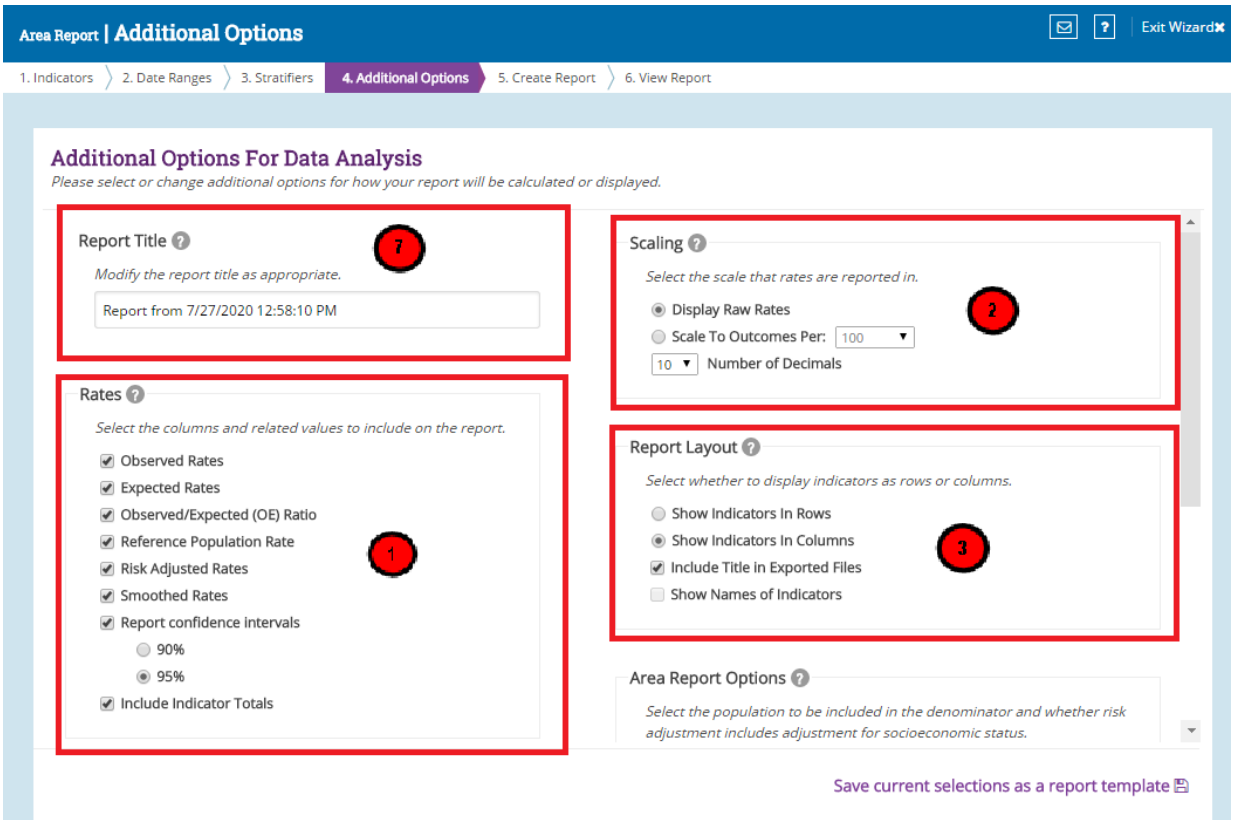
You no longer need to use the modified FIPS codes assignment for area denominators. However, that option is still available. In the modified FIPS codes, certain independent cities (e.g., Baltimore City, Carson City, and St. Louis City), and areas within Hawaii and Virginia, are assigned to different area groupings in the modified FIPS categories.

12.3.4 Select additional options for data analysis

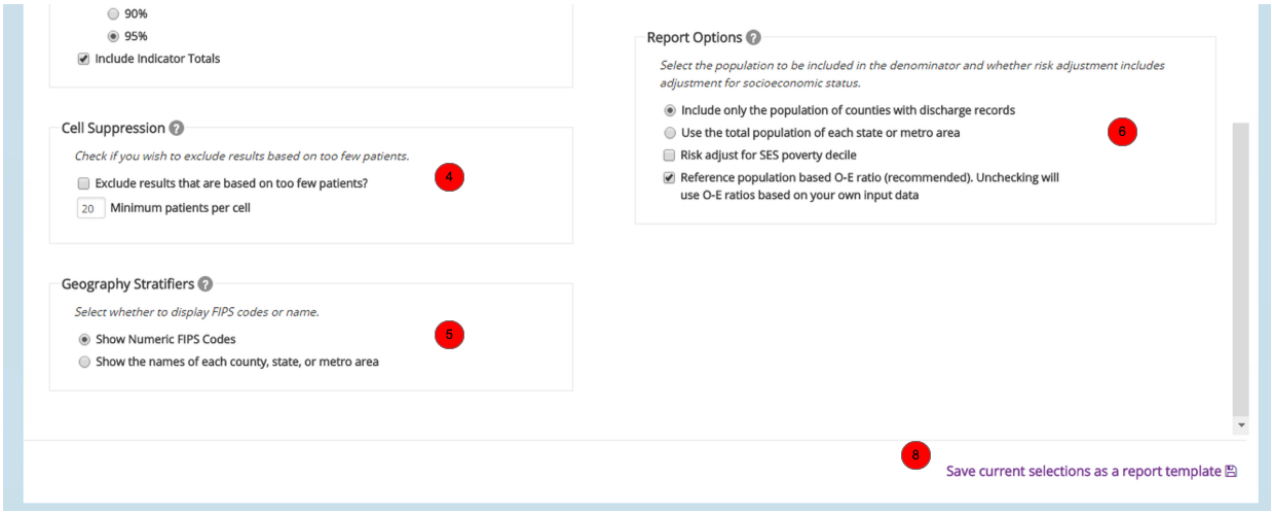
12.3.4.1 What is this screen for?

This screen (Screenshots 33 and 34) lets you choose additional calculation and display options before generating reports.

Screenshot 33: Select Additional Options for Data Analysis



Screenshot 34: Select Additional Options for Data Analysis



Screenshot 35: Select Additional Options for Data Analysis

12.3.4.2 How is this screen organized?

1 12.3.4.2.1 Rates

This area provides checkboxes to select which rate values you want to include in your report. You may also decide whether to include the overall totals for each indicator here. If the composite measures have been selected, be sure to select **Smoothed Rates**. Please note that if the reference population rate is not selected, then you should disable reporting of the expected rate and observed/expected ratio (see the following section). If this reporting feature is not disabled, the software will report erroneous values for the expected rate and observed/expected ratio. The observed/expected ratio is the observed rate divided by the expected rate. This ratio is the most appropriate benchmark of performance. A ratio of one indicates that performance is as expected. A ratio over one signifies that performance is higher (usually worse) than expected, and a ratio less than one indicates that performance is lower (usually better) than expected.

Table 5 provides provides definitions for the raw rate, multiplier, and reported rate as used in the software.

Table 5. Definition of Rates Reported by Software

TYPE OF RATE	DEFINITION
Observed	The rates as initially calculated applying the indicator definitions (see Section 9.4) to the set of data for the numerator (outcome of interest) and denominator (population at risk).
Expected	Rates that assume an "average" performance for each patient group based on the reference population but the hospital's actual case mix. The reference population is based on all States participating in the most recently available HCUP SID.
Reference population	The rate for the current reference population (see Section 11.4.4.2).
Risk-adjusted	The estimated performance of hospitals or areas if those hospitals or areas had an "average" case mix. This average case mix is estimated using proportional indirect standardization: risk-adjusted rate=(observed rate/expected rate)×reference population rate.
Smoothed	Estimated using multivariate signal extraction (MSX). MSX smoothing estimates the effect of random differences in the observed rate across hospitals or areas. In essence, smoothing describes how persistent a rate would be from year to year. Smoothing is a useful tool to "level the playing field" for hospitals or areas with a small number of cases.

HCUP=Healthcare Cost and Utilization Project; MSX=multivariate signal extraction; SID=State Inpatient Databases.

The AHRQ WinQI application calculates rates as raw rates. When creating your reports, you may report rates using optional multipliers to facilitate interpretation and analysis and to compare user rates to published national rates. Recommended multipliers are based on having rates expressed in whole numbers per multiplier units rather than decimal fractions. Please select the desired multipliers in the **Scaling** section of the **Additional Options** screen.

Table 6 provides definitions for the raw rate, multiplier, and reported rate as used in the software.

Table 6. Rate Unit Definitions

TERM	DEFINITION	EXAMPLE
Raw rate	Numerator divided by denominator	0.0255
Multiplier	A unit of "per X"	1,000
Reported rate	Raw rate × multiplier	25.5 per 1,000

The risk-adjusted rate is disabled if certain stratifiers are selected. Change your stratification to enable risk-adjusted rates.

The risk-adjusted rate is appropriate only at the hospital level or above. Age and sex are attributes of the patients that affect the expected outcome. Thus, it would be inappropriate to calculate a risk-adjusted rate based on the total reference population but observed rates and expected rates that are based only on a segment of the population.

Beginning with WinQI v4.5, the software no longer reports expected rates, risk-adjusted rates, and smoothed rates for the following measures: IQI 21 Cesarean Delivery Rate, Uncomplicated; IQI 22

Vaginal Birth After Cesarean (VBAC) Delivery Rate, Uncomplicated; IQI 23 Laparoscopic Cholecystectomy Rate; IQI 24 Incidental Appendectomy in the Elderly Rate; IQI 25 Bilateral Cardiac Catheterization Rate; IQI 33 Primary Cesarean Delivery Rate, Uncomplicated; IQI 34 Vaginal Birth After Cesarean (VBAC) Rate, All; PSI 17 Birth Trauma Rate–Injury to Neonate; PSI 18 Obstetric Trauma Rate–Vaginal Delivery With Instrument; and PSI 19 Obstetric Trauma Rate–Vaginal Delivery Without Instrument. These measures are not risk-adjusted; therefore, only the numerators, denominators, and observed rates are reported.

Note: The hospital-level PDIs are now risk adjusted starting in version v2020.

2 12.3.4.2.2 Scaling

This area allows you to select the scale on which rates are reported and the number of decimal places to use.

Table 7 provides the recommended multiplier for the different categories of WinQI. For more information, consult the *Technical Specifications* for a specific indictor.

Table 7. Recommended Multipliers for Different Categories of Indicators

HOSPITAL OR AREA	TYPE OF INDICATOR	EXAMPLE	RECOMMENDED MULTIPLIER
Area	Avoidable hospitalization	PQI 08 Heart Failure Admission Rate	100,000
expHospital	Mortality	IQI 15 Acute Myocardial Infarction (AMI) Mortality Rate	1,000
Hospital	Potentially preventable adverse event	PSI 03 Pressure Ulcer Rate	1,000
Hospital	Utilization	IQI 22 Vaginal Birth After Cesarean (VBAC) Delivery Rate, Uncomplicated	1,000

3 12.3.4.2.3 Report layout

This area allows you to select whether to display the indicators as rows (creating a long report format) or as columns (creating a wide report format). You may also select whether to include the title when exporting the report.

4 12.3.4.2.4 Cell suppression

This area provides the option to “blank out” rates for cells that are based on a small population or a small number of cases.

In performance measurement work, it is often recommended that rates be suppressed (i.e., not reported) when there are fewer than 20 cases in the denominator. This exclusion rule helps to protect the identities of hospitals and patients.

Rates will be suppressed (set to null) in the resulting report if:

- There are fewer than *N* people or cases in the denominator (where *N* is the value you supply for "Cell size to suppress");
- There are fewer than *N* cases of interest in the numerator; and
- There are fewer than *N* cases that are in the denominator less the numerator.

5 12.3.4.2.5 Geography stratifiers

This area allows you to select whether to display FIPS codes or the name of the county, State, or metro area.

6 12.3.4.2.6 Area report options

This area allows you to select the population to be included in the denominator and whether risk adjustment of area rates includes adjustment for socioeconomic status ("SES").

Additionally, starting with v2020, you can choose the O-E ratio you want to use for risk adjusting your rates. Note that logistic regression models to build risk adjustment models for QIs that need risk adjustment. For complicated risk adjustment models, the national HCUP reference population observed rate may not be exactly same as the average of predicted event rates. In the modeling process, we assessed model calibration properties, but the O-E ratio (observed rate to expected rate ratio) may not be exactly equal to 1. In software development (not part of the publicly released software), we multiplied the predicted rate for each discharge by this constant (O-E ratio) to make sure the new predicted rates are perfectly calibrated to the observed rates. To be consistent, we included the national O-E ratio that was calculated based on our reference population in the AHRQ software v2020. We also now provide to users the options of calibrating to the reference population or to users' populations.

- Checked: Uses reference population-based O-E ratio. This is recommended in most situations, and it is also the default choice in the software.
- Unchecked: Uses users' own population-based O-E ratio. This option is kept in the software for users who want to calibrate the predicted rates to users' population.

7 12.3.4.2.7 Report title

This area allows you to change the default report title, which includes the date and time the report was generated.

12.3.4.3 What should I do here?

Change any of the options for your report on this screen. If you would like to save all the current report selections (including selections made on previous screens) as a template, click on the "Save current selections as a report template" link and provide a name and description for the template. The template will then begin to appear on the "My Templates" section of the home page.

Click **<Next>** to proceed to creating the report with all your selected criteria.

8 12.3.4.2.8 Save as a report template

This link allows you to save your current report selections as a template. This is saved on your home screen. This will allow you to quickly run your report without going through the selection process.

12.3.4.3 What should I do here?

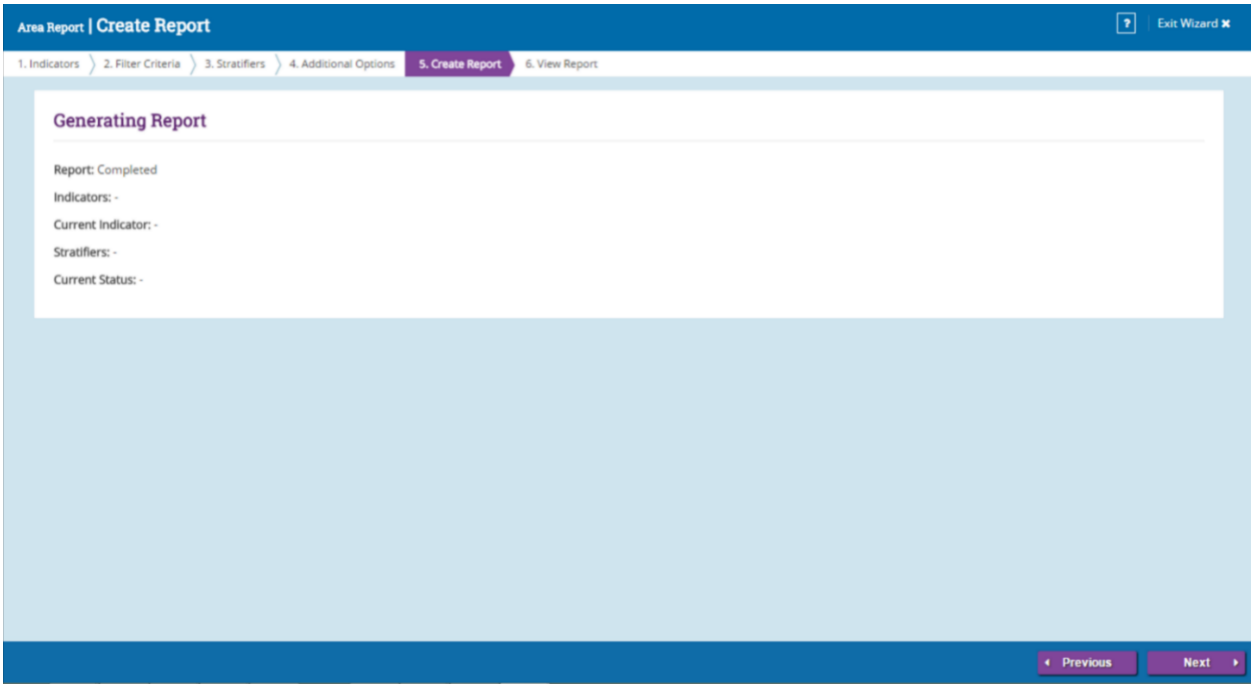
Click <**Save current selections as a report template**> link to enter your report template name and description. Once entered, proceed to save (Screenshot 35).

12.3.5 Create report

12.3.5.1 What is this screen for?

This screen (Screenshot 36) displays the progress of your report as it is created. When the process is complete, you may view the report.

Screenshot 36: Create Report



12.3.5.2 How is this screen organized?

The window displays its current processing status so that you can track its progress.

12.3.5.3 What should I do here?

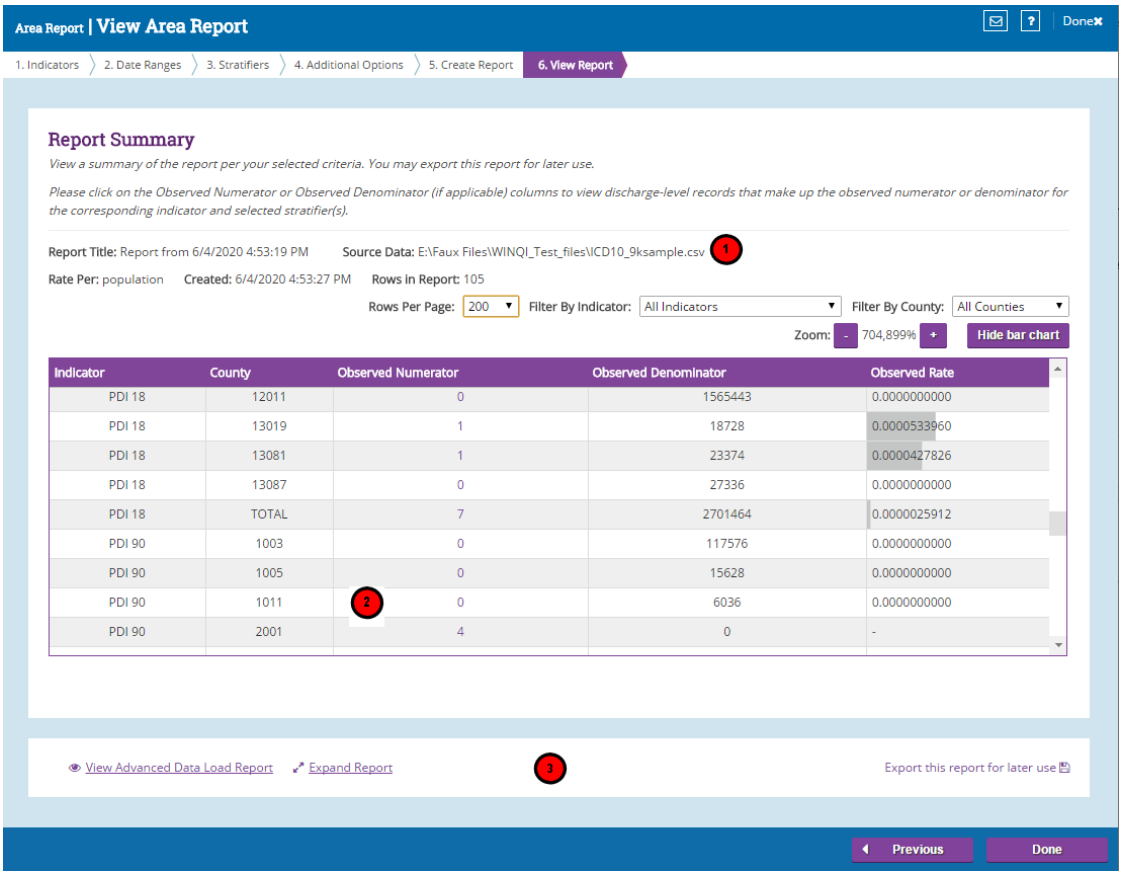
You don't need to do anything on this screen until the processing is complete. Once the progress bar has reached 100 percent, click <**Next**> to view the report. This report can be viewed later from the main window using the <My Exports >section. The report will be saved until you generate another report.

12.3.6 View report

12.3.6.1 What is this screen for?

This screen (Screenshot 37) displays the area- and hospital-level reports that have been generated. The last report that was generated is shown. You can access this window from the main menu, or you may access it immediately after creating a report. Once a report has been generated, it stays in the database until another report is generated. You can export the report to save the data permanently. See Appendix C for detailed information about the export format.

Screenshot 37: View Report



12.3.6.2 How is this screen organized?

1 12.3.6.2.1 Report summary

The report provides the following information about the displayed report:

- **Source Data**—The complete path to the data file that was used to generate the report.
- **Rates Per**—The report scale; depends on the level of report displayed. You will see different bar sizes depending on the magnitude of the rate.
  - Area-level report = "case"
  - Hospital-level report = "population"
- **Date Created**—The date and time the report was generated.
- **Rows in Report**—The total number of rows being displayed in the report.
- **Rows per page**—The <Rows per Page> control defines the maximum number of rows displayed per page while viewing the report online. The default of 20 allows you to view the report without scrolling; a different value may be more appropriate for a faster computer or if you wish to sort the data.
- **Filter by Indicator**—If you are interested only in a specific indicator(s), you can check to see whether issues in your data could impact this indicator(s). You can search by one indicator at a time from the drop-down list. Only indicators for the selected modules will be shown.
- **Filter by Hospital (or Filter by County)**—This is a new feature in v2019 of the software. You can filter the report data by hospital or county.
- **For Hospital Report**—By All Hospitals (default) or a single hospital.
- **For Area Report**—By All Counties (default) or a single county.
- **Hide Bar Chart** or **Show Bar Chart**—A bar chart view has been added as of the v2018 version of the software. The bar chart view allows you to see a visual comparison of the relative magnitude of the different indicators.
- **Zoom (+** or **− %)**—This allows you to zoom the bar charts in or out to gain a better comparative understanding of the bar chart numbers.

12.3.6.2.2 Report window

The large area in the center of the **Reports** screen displays the report data. Data displayed may include any of the following columns:

- Indicator
- Stratifier(s)
- Observed Numerator
- Observed Denominator
- Observed Rate
- Expected Rate
- O/E Ratio
- Population Rate
- Risk-Adjusted Rate

- Smoothed Rate[5]
- Risk Adj Conf Int Low
- Risk Adj Conf Int High

12.3.6.2.3 Screen controls

The <**Export this report for later use**> link at the top and bottom of the screen can be used to export the report in CSV, XLSX, PDF, JSON and TSV formats so that it can be read by Excel or other programs. The report will then begin to appear in the "My Exports" section of the home page.

The <**View Advanced Data Load Report**> link will bring up the Advanced Data load report. You may want to explore this report if you want to get a better sense of data issues in your dataset that may have had an impact on one or more indicator rates. Data issues may be due to issues with any of the following: not mapping certain fields, missing or erroneous data values, or explicit user instructions during crosswalk. Impact may be on indicator logic, risk adjustment, and/or grouping (stratification) of reports. See Section 9.10.5 for further detail on the Advanced Data Load Report.

The <**Expand Report**> link will expand the data section of the report to a full-screen view.

If you would like to go back and make changes to the **Additional Options for Data Analysis** screen, click the <**Previous**> button. If you are satisfied with the report, click <**Done**>.

12.3.6.3What should I do here?

If the report requires more than one page, you may use the <**Next Page**> and <**Previous Page**> buttons under the report to see more data. Alternatively, you can go directly to a specific page number. Expand the data section by clicking the <**Expand Report**> link.

To see more records, use the **Page Controls**, or use the <**Rows per Page**> control at the top of the screen. To change the data filter, you may select a different filter criterion in the **Filter by Hospital** (or **Filter by County**) drop-down box. Click on **Hide Bar Chart** or **Show Bar Chart** to change the bar chart view. Zoom the bar chart in or out by changing the corresponding percent number.

12.3.6.4 Other questions

12.3.6.4.1 My report has missing values for the composite measures. Why?

Missing values for the composite measures can be attributed to any of the following issues:

1. **Calculate Smoothed Rates** was not selected on the **Additional Options for Data Analysis** screen. If smoothed rates are blank, then the composite rates will result in a missing value.

[5] Smoothed rates will not be calculated for strata within stratified indicators. Only the overall indicator will have smoothed rates.

2. All component measures that contribute to the composite measures were not selected. If any of the necessary component measures are left out, this will result in a missing value.
3. The necessary stratifiers were not selected. **Selected Year and Quarter** will produce composite measures. Any stratifiers chosen outside of the measures will result in missing values.

12.4 Hospital-Level Report

This section explains the process for creating a hospital report from your data. The Hospital-Level Report shows calculated QI rates for hospital-level indicators. Hospital-level indicators address questions such as the following: "Did the patient experience an adverse quality-related event while in the care of a specific healthcare hospital?" Or "did the patient have an inpatient procedure for which there are questions of overuse, underuse, or misuse?" You can refer to the *Empirical Methods* document (https://qualityindicators.ahrq.gov/Downloads/Resources/Publications/2021/Empirical_Methods_2021.pdf) for more information on calculating hospital-level rates.

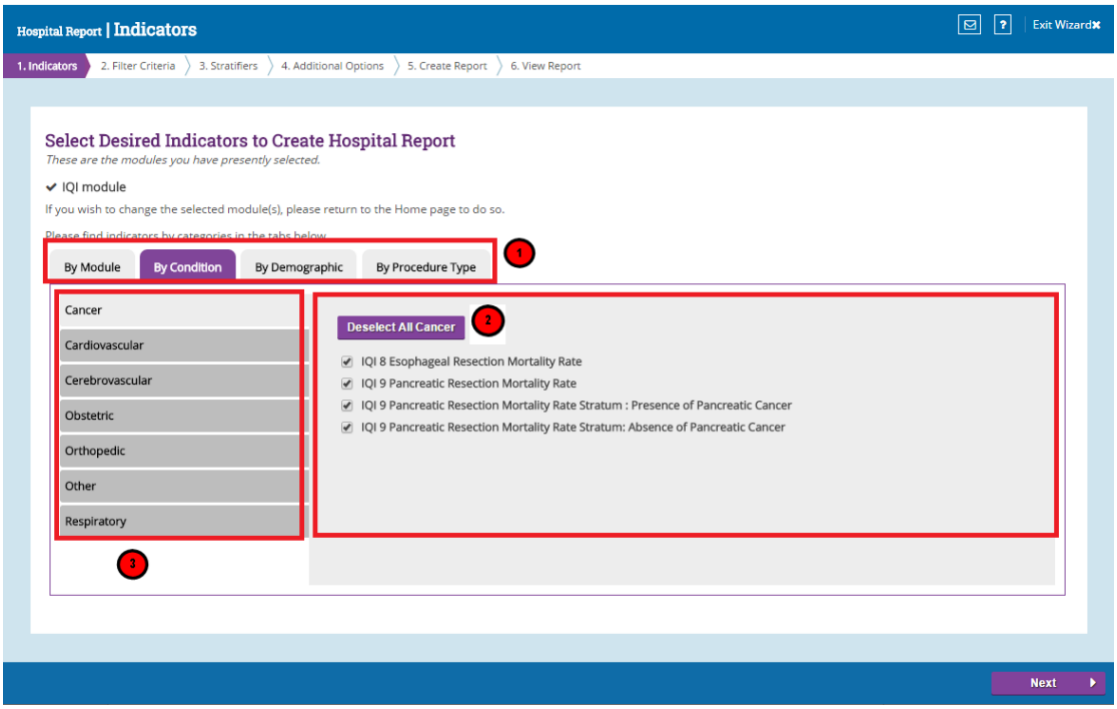
When calculating the report, you may select specific indicators and filter or group them by specific criteria. Details are presented in the sections that follow. The steps for running this report include the following:

- Select Indicators
- Select Filter Criteria (Hospitals, Date Range, and Composite Measures)
- Select Stratifiers
- Additional Options for Data Analysis
- Create Report
- Display Report

12.4.1 Select indicators

Use this screen (Screenshot 38) to specify the indicators to include in the report.

Screenshot 38: Select Indicators (Hospital Report)



12.4.1.1 How is this screen organized?

Indicators are organized according to categories that may be of interest to different types of users. Each indicator is listed in several different tabs. Stratified indicators will also appear on this screen and are labeled accordingly (e.g., Stratum A, Stratum B, etc.).

> NOTE: If you have created reports previously, <u>all</u> of your selections have been saved. To specify a new group of indicators, deselect and select the indicators as desired.

1 12.4.1.1.1 Top-level tabs

- **By Module**—The traditional way of finding indicators; separate tabs for the PSIs, IQIs, PQIs, and PDIs. Only those modules that you selected on the earlier screen will be shown here.
- **By Condition**—Screens for indicators that are grouped by the particular condition.
- **By Demographic**—Screens for each of several interesting demographic groupings.
- **By Procedure Type**—Separate screens for indicators related to medical, surgical, and obstetric cases.

2 12.4.1.1.2 Subtabs

Each of the tabs contains a number of screens, as described in the preceding section, that are accessed via the subtabs.

3 12.4.1.1.3 Indicators

Each screen (subtab) contains a list of indicators with checkboxes. All indicators apply to that category and subcategory. For example, the **Cardiovascular** subtab under the **By Condition** tab lists all area-level indicators for the cardiovascular condition for the selected modules.

12.4.1.2 What should I do here?

Click on one of the tabs in the top row to select a category. When a tab in the top row is clicked, subtabs are displayed below the main tabs.

Select the indicators for which you would like to run a report. You can use the tabs and subtabs to locate specific indicators. There is no need to search through all the tabs if you know exactly which indicators you are looking for. Instead, it may be more useful to search in the **By Module** tab.

Click <**Next**> when the desired indicators and composites have been selected.

12.4.1.3 Other questions

12.4.1.3.1 Why can't I find an indicator that used to be on this screen?

Area- and hospital-level indicators pertain to different populations and are separated into two completely different processes. You will see only area-level indicators under Area-Level Report. Additionally, only indicators for the modules you have chosen will appear on this screen. If you would like to view indicators for a different module, you will need to return to the main screen and generate indicators for additional modules.

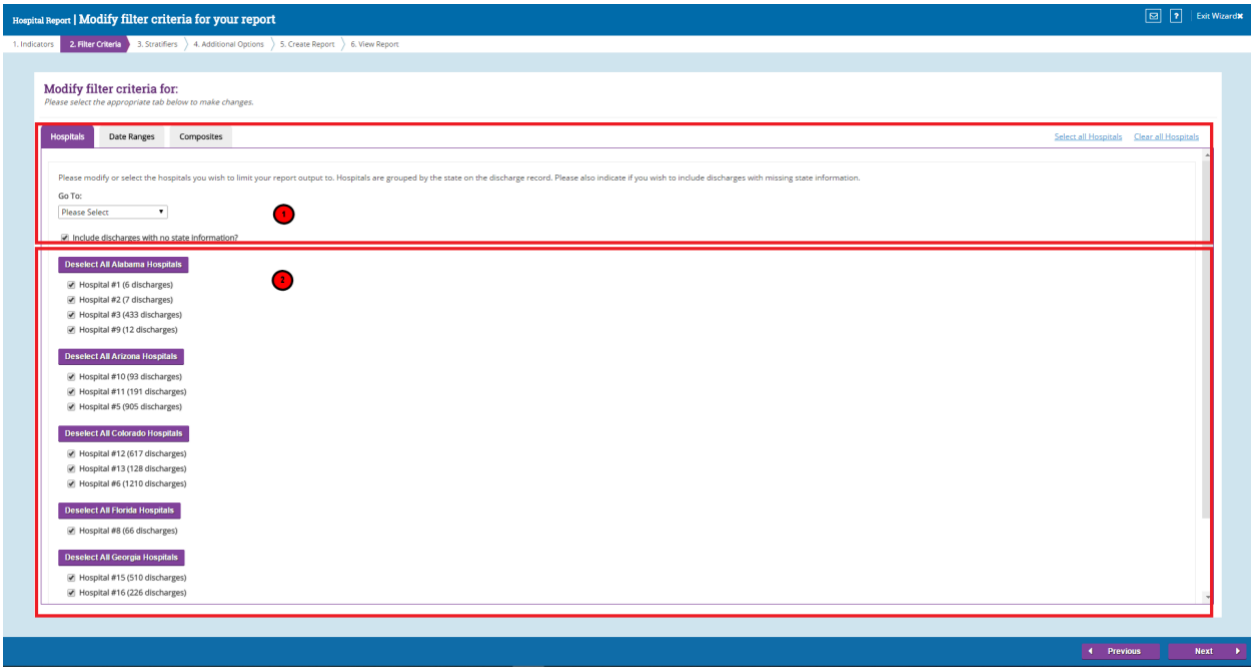
12.4.1.3.2 What if I just want to see the cases for each indicator?

You don't need to create a full report to see the individual cases for each indicator. After you have imported your data file, you can view the cases using the Patient-Level Report option (see Section 12.6).

12.4.2 Select filter criteria (hospital reports only)

This screen (Screenshot 39) lets you limit the discharge records that will be included in your report. Using the tabs on the screen, you can select hospitals, date ranges, and composite measures to include in your report.

Screenshot 39: Select Filter Criteria (Hospital Reports)



12.4.2.1 Select hospitals

When the Hospitals tab is selected, the screen will display a list of all the States represented in the input data, and each hospital will be listed under the State.

12.4.2.1.1 How is this screen organized?

1 *12.4.2.1.1.1 States in input data*

Checkboxes allow you to select (or deselect) all the hospitals in a State at once. If you are interested in hospitals in a specific State, you should deselect all State hospitals and then use the <**Jump To**> control to choose the State in which you are interested and select all hospitals in that State.

2 *12.4.2.1.1.2 Hospitals in each State*

The hospitals and number of discharges are displayed here under their State.

12.4.2.1.2 What should I do here?

Check the States and hospitals you want to include in your report. By default, all hospitals in all States will be selected. For each of the tabs, there will be a **Clear All** and a **Select All** option. These controls are a quick way to deselect all hospitals and select the few in which you are interested. The next time you log in to the application to run a hospital report, the selections you chose in the previous session will be the new default selections.

12.4.2.1.3 Other questions

12.4.2.1.3.1 How is the hospital's State determined?

During the data load, the program collects a list of hospitals from the **Hospital ID** and **Patient State/County Code** from the discharge records. The default hospital county is the first county (in the **Patient State/County** field) read for that hospital. You may change the hospital county code by going to the Hospital Table Screen (Main Menu (top right corner) > Hospital Table).

12.4.2.1.3.2 What is done with records from hospitals that are not checked?

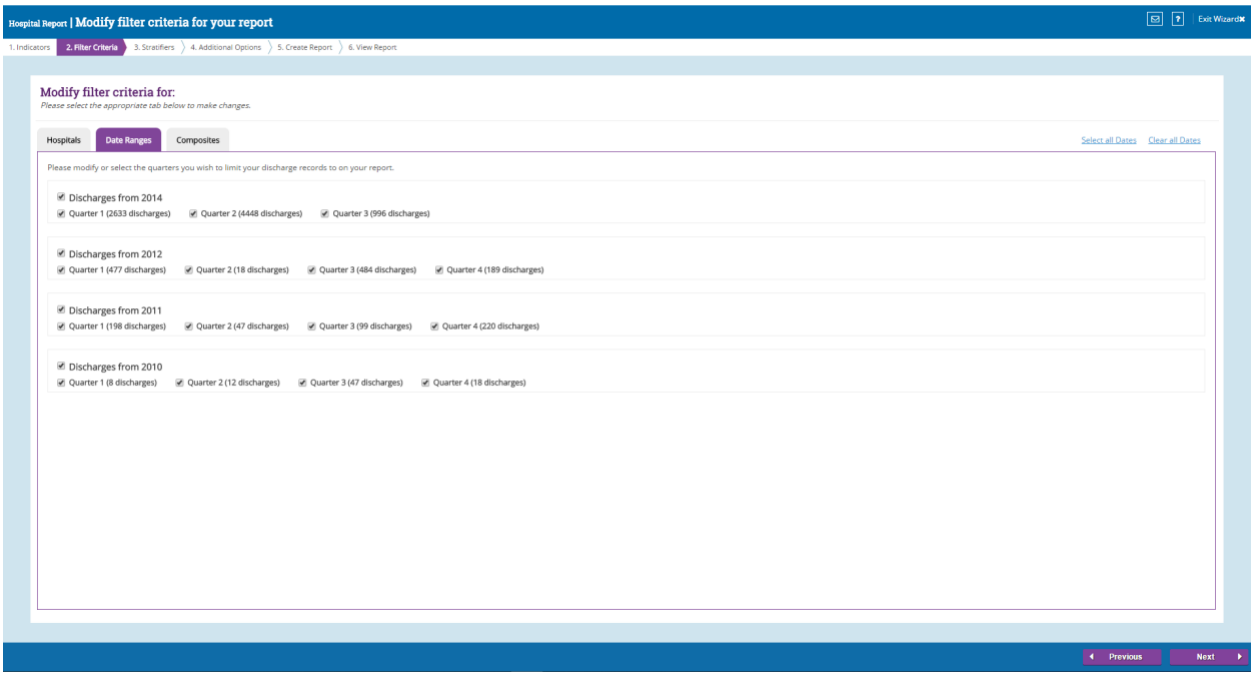
These discharge records will not be included in your report. This feature allows you to generate different hospital-level reports with different data without having to edit and reload your data file.

12.4.2.2 Select date range (hospital reports)

12.4.2.2.1 What is this screen for?

When the **Date Ranges** tab is selected (Screenshot 40), you can limit the discharge records you wish to include in your report to only those discharges that occurred during the selected quarters.

Screenshot 40: Select Date Range (Hospital Reports)



12.4.2.2.2 How is this screen organized?

12.4.2.2.2.1 Discharge year

Each year represented in the input data is listed.

12.4.2.2.2.2 Quarters

The quarters for each year in the input data are listed under the corresponding year.

12.4.2.2.3 What should I do here?

Select the checkboxes next to the quarters that you wish to include in your report.

12.4.2.2.4 Other questions

12.4.2.2.4.1 How can I generate a "rolling year" report?

A "rolling year" report is one in which the results reported for each quarter include the previous three quarters of data (e.g., 2003 Q1 includes discharges from 2003 Q1 and 2002 Q2–Q4; 2003 Q2 includes discharges from 2003 Q1–Q2 and 2002 Q3–Q4).

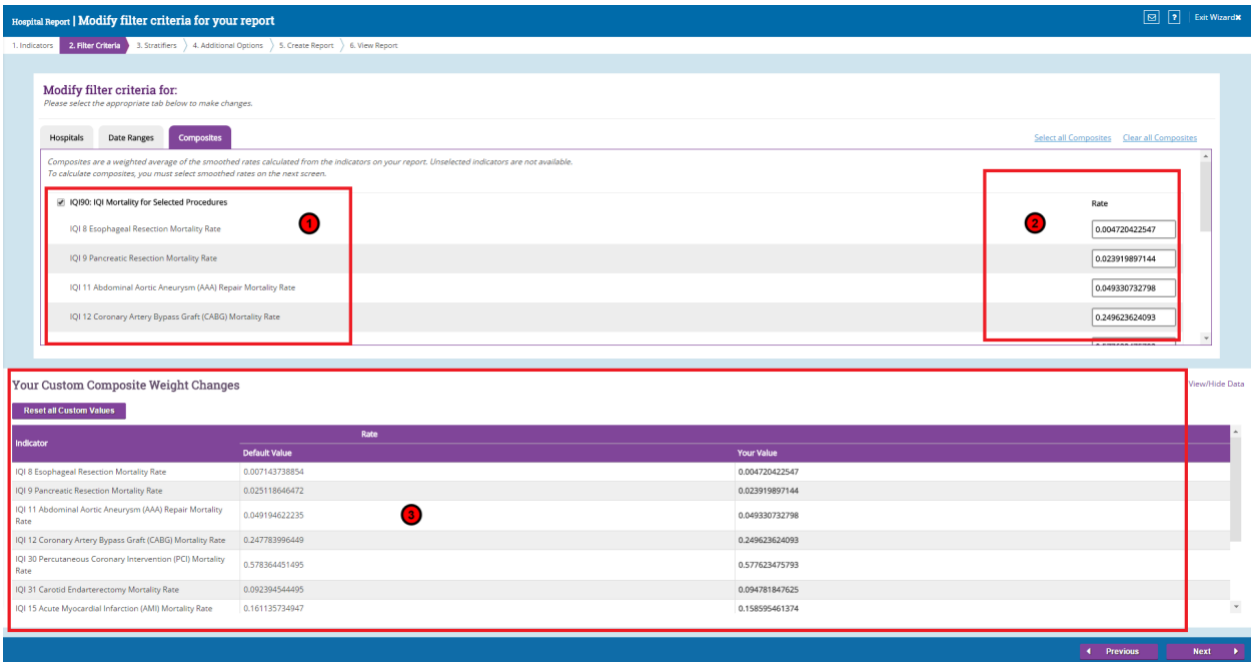
You cannot generate this report in a single pass because each discharge record would have to be included in the total for different quarters. However, you can run through the reports process several times and select a different rolling set of quarters for each report. (Do not select "Year" or "Quarter" as stratifiers.) You will still need to merge these reports using a spreadsheet program.

12.4.2.3 Composite measures (hospital reports)

When the **Composites** tab is selected (Screenshot 41), you can choose whether to include the composite measures and, if so, what weight to assign to each indicator that makes up the composite. Composite measures are weighted averages of individual component measures.

Note: This tab will not be present in v2019 of the software because this version does not include risk-adjusted rates.

Screenshot 41: Composite Measures (Hospital Reports)



12.4.2.3.1 How is this screen organized?

1 *12.4.2.3.1.1 Measures and components*

A checkbox appears next to each of the composite measures. The indicators comprising the composite measure are listed below each composite measure name.

2 *12.4.2.3.1.2 Weights for component indicators*

A field for the relative weight appears next to each indicator. You have the ability to make changes to the composite weights. Please do so with deliberation. If you change a weight, the total (for the indicator with POA and for the indicator without POA) must still add up to 1.

3 *12.4.2.3.1.3 Your custom composite weight changes*

This area displays the default weight and the new weight for any value you have changed. If you did not make any changes to the default values, you will not see this section.

12.4.2.3.2 What should I do here?

Check the composite measures that you wish to include in your report. You may increase or decrease the weight assigned to each indicator as desired, or you can set the weight to 0 to exclude the indicator from the composite altogether. However, the weights for each of the component QIs must be between 0 and 1, and the weights across the entire component QIs must sum to 1. Also, you must assign weights to every component QI, including weights of 0 for all component QIs that are to be excluded from the composite. Changing weights is generally not recommended. Please do so with deliberation.

If you would like to reset the composite measures back to the default weights, click on the <**Reset all Custom Values**> control.

12.4.2.3.3 Other questions

12.4.2.3.3.1 How are the composite measures calculated?

The hospital-level composite measures are calculated from the following formula:

$$\frac{\sum_1^n Smoothed\ rate_i \times Weight_i}{Population\ rate_i \times \sum_1^n Weight_i}$$

where $i = 1, 2 \ldots n$, where n is the number of indicators composing the composite measure.

12.4.2.3.3.2 My report has missing values for the composite measures. Why?

Missing values for the composite measures can be attributed to any of the following issues:

1. **Calculate Smoothed Rates** was not selected on the **Additional Options for Data Analysis** screen (see Section 12.3.4). If smoothed rates are blank, then the formula shown above will result in a missing value.
2. All component measures that contribute to the composite measures were not selected. If any of the necessary component measures are left out, this will result in a missing value.
3. The necessary stratifiers were not selected. Selected Year and Quarter will produce composite measures. Any stratifiers chosen outside of these stratifiers will result in missing values.

12.4.2.3.3.3 Where can I find more information about the use of composite measures?

The WinQI team conducted several workgroups on composite measures, one for each of the QI modules (PQIs, IQIs, PSIs, PDIs). The reports from these workgroups can be downloaded from their respective QI resource screens.

PQI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/v2021/PQI_Composite_Development.pdf

IQI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/IQI/v2021/IQI_Composite_Development.pdf

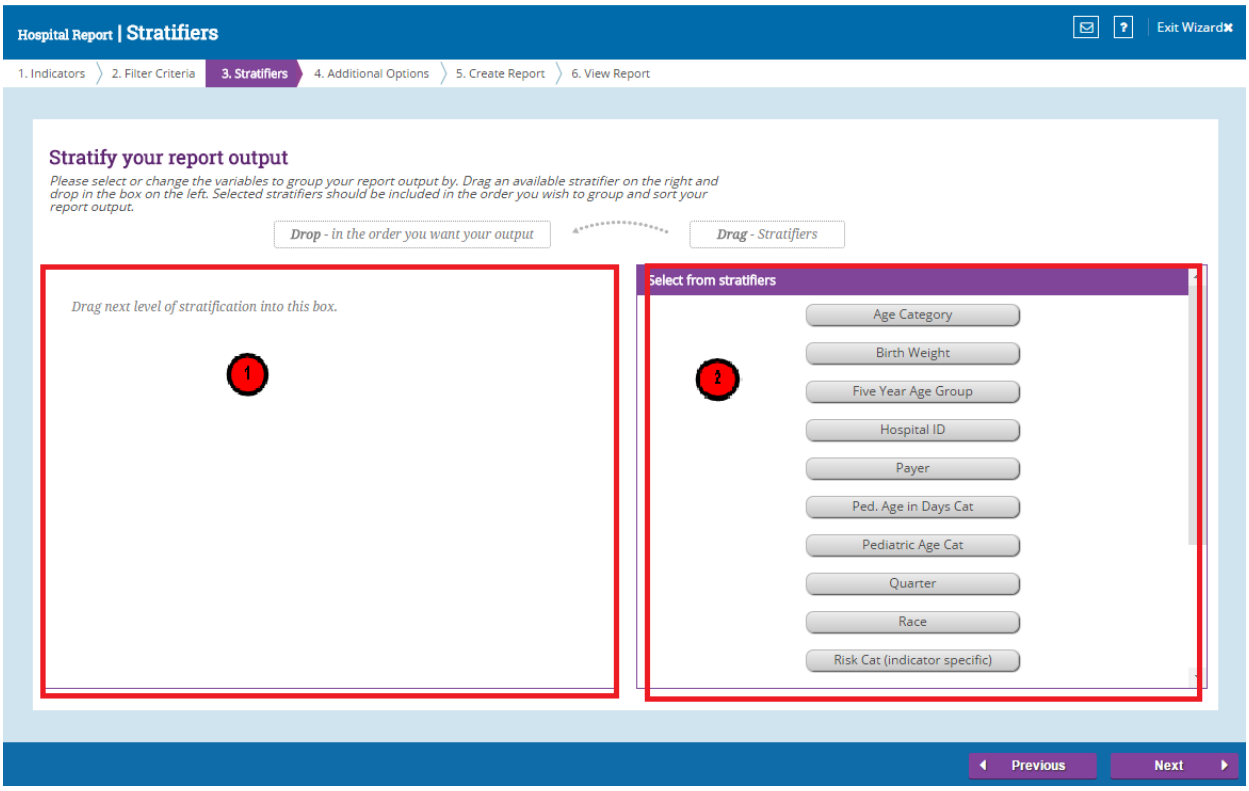
PSI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/v2021/PSI_Composite_Development.pdf

PDI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/v2021/PDI_Composite_Development.pdf

12.4.3 Select stratifiers for use with hospital indicators

This screen (Screenshot 42) is used to build a hierarchy of stratification (grouping) for hospital-level indicators. On this screen, you will indicate to the WinQI software what variables according to which you want your report output grouped. You will also indicate the order of the “group by” variables.

Screenshot 42: Select Stratifiers (Hospital Reports)



12.4.3.1 How is this screen organized?

12.4.3.1.1 Selected stratifiers

Displays the hospital-level stratifiers (variables by which to group the report) currently selected, in the hierarchical order in which they will be sorted.

12.4.3.1.2 Select from stratifiers

This area displays a list of available stratifiers (variables by which to group the report) that can be used for reports on hospital-level indicators.

12.4.3.2 What should I do here?

Click on a desired stratifier in the "Select from Stratifiers" box, drag it to the selected stratifiers area, and drop it in the desired position. Hospital-level stratifiers include the following: Age category, Five-year age group, Sex, Year, Quarter, Hospital ID, Payer, Race, Birth weight, Pediatric age category, Pediatric age in days category, Risk category (indicator specific), Custom 1, Custom 2, Custom 3. Of these columns, only those that are available in the input file (and mapped to QI variables) are available for stratification.

To remove a selected stratifier, click and drag it back to the **Select from stratifiers** list.

To reposition a stratifier, click and drag it up or down in the list of selected stratifiers. You will see a line that shows you where the stratifier will be placed.

The risk adjustment process for the Hospital report has changed in v2021. The risk adjustment stratified report will be calculated and displayed differently with different stratifications selected by you.

- Overall or/and Hospital for Hospital Report — If no stratifier (i.e., Overall) or Hospital is selected by you then it computes and displays risk-adjusted rates, smoothed rates, and corresponding variance estimates
- Age or/and Sex stratification combination — Only risk adjusted rates and variance are calculated. Note that the risk-adjusted rates are calculated as observed over estimated (O/E) ratio. In the "View Report" screen, you will see warning message "*For more granular stratification that include age or sex as stratifiers, the risk-adjusted rates are suppressed from the output. Note that any stratification that includes age or sex are not supported because these factors are included as covariates in risk adjustment.*"
- Any other stratification combination — Only risk adjusted rates and variance are calculated. Note that the risk-adjusted rates are calculated as O/E ratio. In the View Report screen, you will see warning message "*For more granular stratification that include stratifiers other than age or sex, only risk-adjusted rates and variance are calculated.*"

12.4.3.2.1 What is a "stratifier"?

A stratifier is how your data will be broken down. In database parlance, this is equivalent to an item in a "group by" clause.

12.4.3.2.2 What if I just want the totals for each indicator?

Do not select any stratifiers.

12.4.3.2.3 Does the order matter?

Yes. It determines the order in which the stratifiers are listed in the reports and the order in which the rows are grouped/sorted.

12.4.3.2.4 How do I know which stratifiers to select?

Select stratifiers that will provide you with useful information. For example, if you are from a single hospital, selecting the stratifier "Hospital ID" will not provide you with any useful information. If your data do not separate patients by race, then the "Race" stratifier will be of no use.

12.4.3.2.5 How many stratifiers may I select?

You may select no more than 10 stratifiers. In practice, you generally will not want more than a few stratifiers. Selecting too many will subdivide your populations and reduce the statistical significance of the calculated rates.

12.4.3.2.6 What are "Custom 1," "Custom 2," and "Custom 3"? Why can't I select them?

These are custom stratifiers that may contain any information you wish to aggregate your data by. Each field will be enabled only if you provided a data mapping on the **Data Mapping** screen (see Section 9.4). Common custom stratifiers are physician name and hospital type.

12.4.3.2.7 How large will my report be?

You can obtain a rough estimate of the number of rows in your file by multiplying the number of distinct values for each of your selected stratifiers. The number of values will be shown in a tool tip when you point to the stratifier name in the right panel with your mouse. If you are doing a hospital report with 120 hospitals and 14 indicators, the report will be 1,680 rows for the hospital/indicator combinations plus 14 additional rows for the indictor totals for all the hospitals. Reports can be exported to and from the report generator and loaded into other software such as Excel. Only a limited number of lines can be viewed at one time in a report.

12.4.4 Additional options for data analysis

Please see Section 12.3.4, Additional Options for Data Analysis.

Report options for hospital reports are the same as the area report options, with some exceptions.

Starting with v2021, within the hospital report you can now indicate if MDC values are included in your discharge data. The following options are available:

- Data has MDC from MS-DRG grouper (default option): rates are not suppressed in the hospital report.
- Data does not have MDC: selecting this option will suppress the risk-adjusted and composite rates in the hospital report. This is not applicable to PDI's hospital-level indicators.

12.4.5 Create report

Please see Section 12 for information on how to create your report.

12.4.6 View report

Please see Section 12.3.6 for information on how to view your report.

12.5 Composite report

12.5.1 What is this screen for?

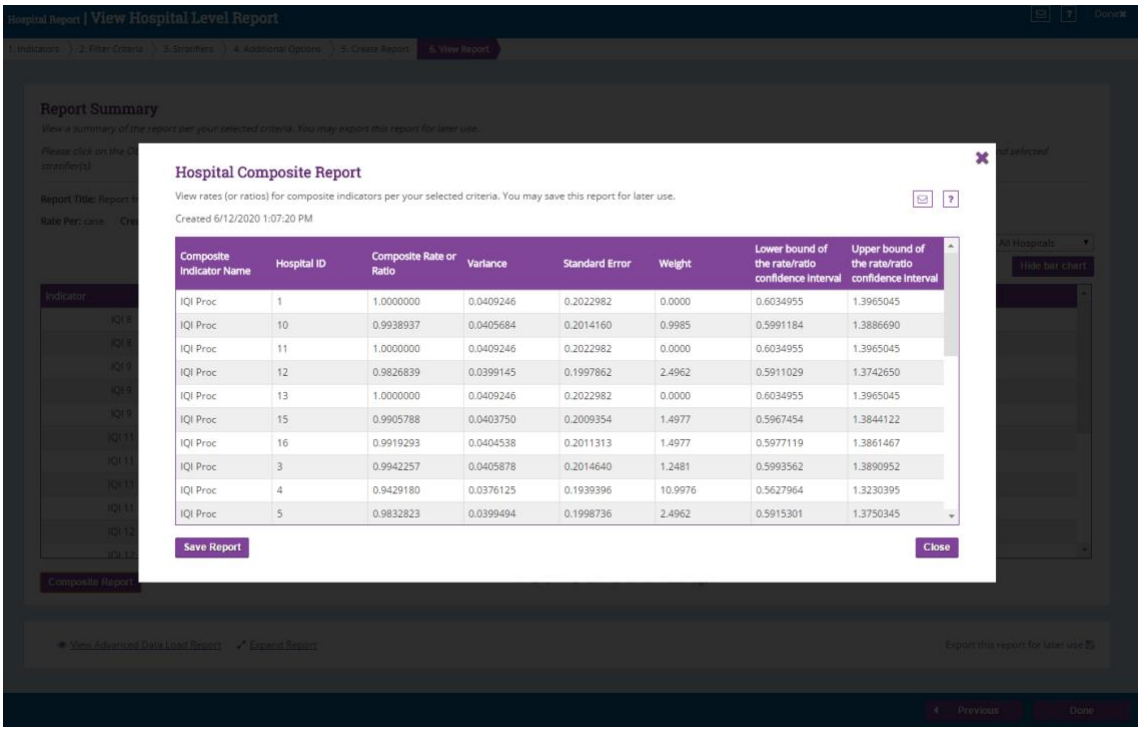
This screen (Screenshot 43) displays rates (or ratios) for hospital-level composite indicators. The screen can be accessed by clicking the <**Composites**> button on the Hospital-Level Report.

The composite report shows calculated rates for hospital-level composite measures. A composite measure can be defined as a weighted average of its corresponding component indicators.

Composite measures are defined for each module. Please see the **Technical Specifications** screen on the WinQI website for a definition of all composite measures.

The *Empirical Methods* document (https://qualityindicators.ahrq.gov/Downloads/Resources/Publications/2021/Empirical_Methods_2021.pdf) provides a detailed explanation of how composite measures are estimated. Rates shown on the composite report screen are arranged by stratifiers selected by you on previous screens.

Screenshot 43: Composite Report



Composite Indicator Name	Hospital ID	Composite Rate or Ratio	Variance	Standard Error	Weight	Lower bound of the rate/ratio confidence interval	Upper bound of the rate/ratio confidence interval
IQI Proc	1	1.0000000	0.0409246	0.2022982	0.0000	0.6034955	1.3965045
IQI Proc	10	0.9938937	0.0405684	0.2014160	0.9985	0.5991184	1.3886690
IQI Proc	11	1.0000000	0.0409246	0.2022982	0.0000	0.6034955	1.3965045
IQI Proc	12	0.9826839	0.0399145	0.1997862	2.4962	0.5911029	1.3742650
IQI Proc	13	1.0000000	0.0409246	0.2022982	0.0000	0.6034955	1.3965045
IQI Proc	15	0.9905788	0.0403750	0.2009354	1.4977	0.5967454	1.3844122
IQI Proc	16	0.9919293	0.0404538	0.2011313	1.4977	0.5977119	1.3861467
IQI Proc	3	0.9942257	0.0405878	0.2014640	1.2481	0.5993562	1.3890952
IQI Proc	4	0.9429180	0.0376125	0.1939396	10.9976	0.5627964	1.3230395
IQI Proc	5	0.9832823	0.0399494	0.1998736	2.4962	0.5915301	1.3750345

12.5.2 How is this screen organized?

12.5.2.1Report

At the top of the screen, the following information is provided about the displayed report:

- Title of the report
- Date and time the report was exported and generated

The large area in the center of the **Reports** screen displays the report data. Data are displayed in the following columns:

- Composite indicator name;
- Composite rate or ratio;
- Variance;

- Standard error;
- Weight;
- Lower bound of the rate/ratio confidence interval ; and
- Upper bound of the rate/ratio confidence interval.

12.5.2.2 Screen controls

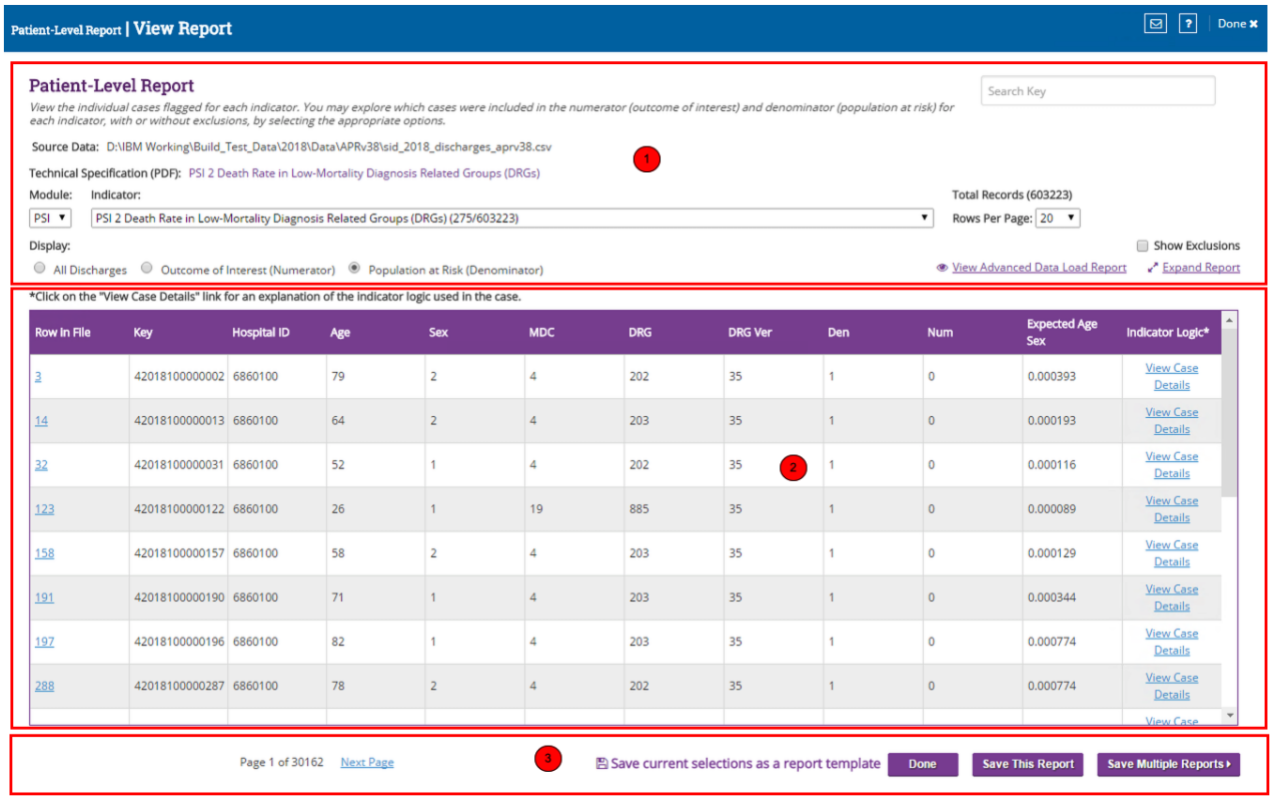
The buttons at the bottom of the **Reports** screen can be used to export the report and to close the report window.

12.6 Patient-Level Report

12.6.1 What is this screen for?

This screen (Screenshot 44) provides a view of the individual cases flagged for each indicator. This screen can be useful for exploring which cases actually were included in the numerator and denominator for each indicator. There are two ways to access this report: by (1) drilling down on the observed numerator or observed denominator of a record on the area-level report or hospital-level report, or (2) creating the patient-level report by selecting a module on the **Home** screen.

Screenshot 44: Patient-Level Report



12.6.2 How is this screen organized?

12.6.2.1 Report controls

Controls at the top of the screen allow you to select a QI module, an indicator from that module, a grouping of records to display, and the number of rows per page to display in the report.

- **Technical Specification (PDF)** —Allows you to download the technical specification pdf for the selected Indicator. Technical Specification document explains the calculations used to formulate each indicator, including a brief description of the measure, numerator and denominator information, and details on cases that should be excluded from calculations. This document is also available directly on the AHRQ QI website: https://www.qualityindicators.ahrq.gov/Default.aspx
- **Module**—Allows you to choose the modules for which you would like to view information. You will be able to choose between only those modules for which you have already generated indicators. When drilling down from the area-level report or hospital-level report, the selected module cannot be changed.
- **Indicator**—Allows you to choose a specific indicator for which to view records. When drilling down from the area-level report or hospital-level report, the selected indicator cannot be changed.
- **Total Records**—Displays the total number of records the report contains for a particular indicator.
- **Rows per Page**—This control defines the maximum number of rows displayed per page while viewing the report online. The default of 20 rows allows you to view the report without scrolling; a different value may be more appropriate for a faster computer or if you wish to sort the data.
- **Outcome of Interest**—All records that are included in the numerator of the selected indicator.
- **Population at Risk**—All records that are included in the denominator of the selected indicator.
- **All Discharges**—All records loaded in the database for the data file.
- **Show Exclusions**—Show numerator (outcome of interest) or denominator (population at risk) records with exclusions. “With exclusions” shows corresponding records before any exclusion rules are applied.

12.6.2.2 Report area

This area displays a list of the actual discharges meeting the criteria of the **Report Controls** selections. The **Key** field and several other useful identifying columns are included.

12.6.2.3 Screen controls

Buttons at the bottom of the screen allow you to export the records and to navigate between screens of data in the Patient-Level Report.

12.6.3 What should I do here?

Find the indicator in which you are interested by selecting the **Module** and then the **Indicator** from the drop-down lists. When drilling down from the area-level report or hospital-level report, **the selected module or indicator cannot be changed. The drop-down list of indicators shows the** number of cases included in the numerator, as well as the number of cases in the denominator (the denominator does not apply to all indicators).

Outcome of Interest is selected for display by default, so after an <**Indicator**> is selected, all records that were included for the selected indicator are displayed. You can select a different value for display if desired.

You may quickly search for a particular case by entering its **Key** value in the **Search** box and then selecting **All Discharges**. Records are returned if your search term can be found anywhere in the **Key** value.

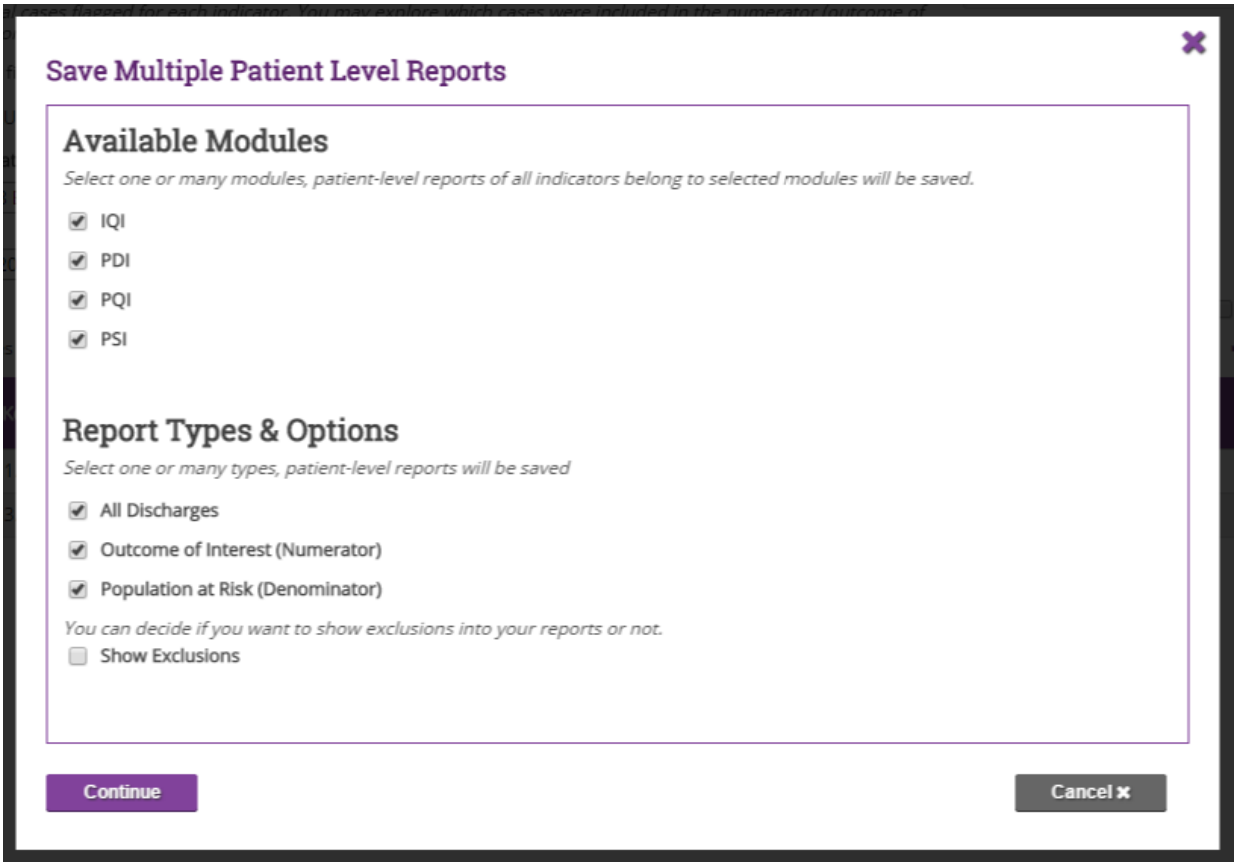
Click on the <**Save This Report**> button to export all records in the report.

You may drill into any one row of this report to show the reasons that any particular case was flagged for this indicator. Click on the **Row in File** or **View Case Details** field to open the **Case Details** screen (see Section 12.7).

12.6.4 Save multiple reports

This screen (Screenshot 45) will let you save a patient-level report for all indicators for one or more modules. You can also select which type of information you want to be included in the report (numerator, denominator, etc.).

Screenshot 45: Save Multiple Patient-Level Reports



12.6.5 Other questions

12.6.5.1 What data are displayed?

Columns displayed on all reports include "Row in File," "Key," "Age," "Sex," "MDC," "DRG," "Num," and "Den." A value of "1" under "Num" or "Den" indicates that the record was included in the rate calculation of the selected indicator, and "0" indicates the record was not included.

12.6.5.2 How can I see why a case was flagged?

Click on the "Row in File" or "View Case Details" under the "Indicator Logic" column to open the **Case Details** screen (see Section 12.7).

NOTE: Records excluded from the Population at Risk (denominator) are, by definition, also excluded from the Outcome of Interest (numerator). In all QIs, the numerator is a subset of the denominator.

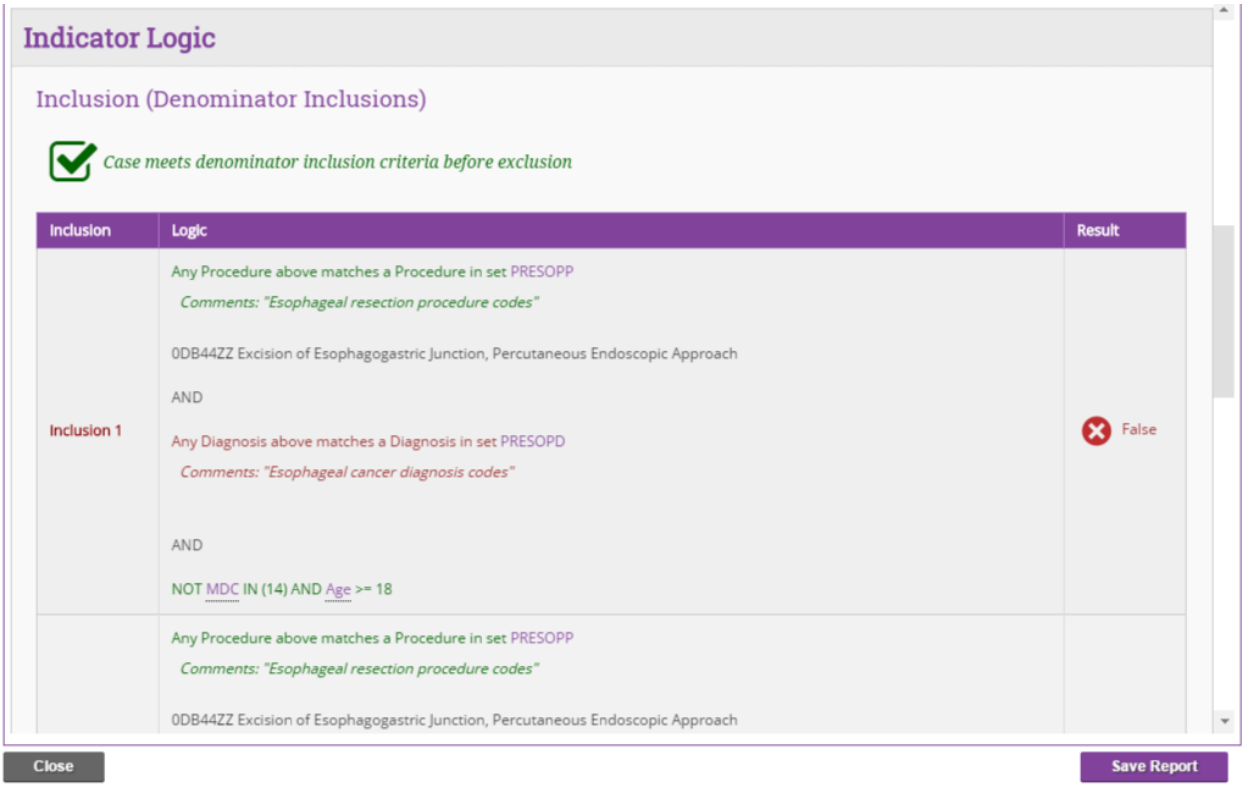
12.7 Case details

12.7.1 What is this screen for?

This screen (Screenshot 46), accessed by clicking on the specific row number or **View Case Details** link on the Patient-Level Report, lets you see exactly why a particular case was or was not flagged for a particular indicator. Starting in WinQI v2018, this report has been enhanced to

include both a classic view (that existed in previous releases) and a tabular view (an organized and searchable view).

Screenshot 46: Case Details



12.7.2 How is this screen organized?

12.7.2.1 Case details

This area displays information from the discharge record that may be used in some indicators.

12.7.2.2 Inclusion rules

This area displays the rules for including a case in the denominator of this indicator.

12.7.2.3 Exclusion rules

This area displays the rules for excluding a case from both the numerator and denominator of this indicator.

12.7.2.4 Flag rules

This area displays the rules for including this case in the numerator of this indicator.

12.7.2.5 Tabular and classic views

The tabular view helps you to search and find a specific code (within procedure code, diagnosis code, MDC, or MS-DRG) in the case details and to filter by numerator or denominator inclusions or exclusions. The classic view shows you all information and does not have a search function.

12.7.3 What should I do here?

In the tabular view, you can search for a specific code within procedure code, diagnosis code, MDC, or MS-DRG and filter by numerator or denominator inclusions or exclusions.

You can view the details of one case using the scroll bar to display the entire report. Save this report as a rich text format (.rtf) file that can be emailed or printed.

Click on any underlined set name to retrieve a list of all the *International Classification of Diseases, 10th Revision, Clinical Modification* (ICD-10-CM) procedure codes, ICD-10-CM diagnosis codes, or Medicare Severity Diagnosis-Related Groups (MS-DRGs) that apply.

12.7.4 What data are displayed?

The number and complexity of rules vary per indicator. Each rule may be based on a list of procedures, a list of MS-DRGs, a list of diagnoses, or a Boolean expression. See the *Technical Specifications* applicable to this indicator to interpret each rule. If there are procedure or diagnosis codes that match any of the lists referenced, the ICD-10-CM codes and descriptions will be displayed along with the rule.

12.7.5 Example

In the example shown in Screenshot 46, the following information can be seen for Inpatient Quality Indicator (IQI) 21:

- **Inclusion Rules:** This case is “true” for inclusion rule 2 and is therefore included in the denominator of IQI 21. The inclusion rule specifies that the case has MS-DRG matching an MS-DRG in set PRBRT2G. The set name can be clicked to see a list of codes that comprise the set.
- **Exclusion Rules:** This case is “false” for all the exclusion rules; thus, it remains in the denominator.
- **Flag Rules:** This case is “false” for all flag rules. In order to satisfy the indicator, it is necessary that at least one of the flag rules is true. Because no flag rule is true, the case is not flagged for inclusion in the numerator.

12.7.6 Other questions

12.7.6.1 What does ORPROC mean?

The ICD codes for operating room (OR) procedures are denoted by "ORPROC." This term may be helpful in interpreting some of the exclusion rules for some Patient Safety Indicators (PSIs) and Pediatric Quality Indicators (PDIs). The complete list of OR procedures can be found in the QIs *Technical Specifications*.

12.7.6.2 What other covariates are applicable to this indicator?

You may view the entire table of covariates for each QI module on the AHRQ QIs website. See the parameter estimates link per module:

PQI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/v2021/PQI_Composite_Development.pdf

IQI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/IQI/v2021/IQI_Composite_Development.pdf

PSI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/v2021/PSI_Composite_Development.pdf

PDI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/v2021/PDI_Composite_Development.pdf

12.7.6.3 How can an individual covariate be interpreted?

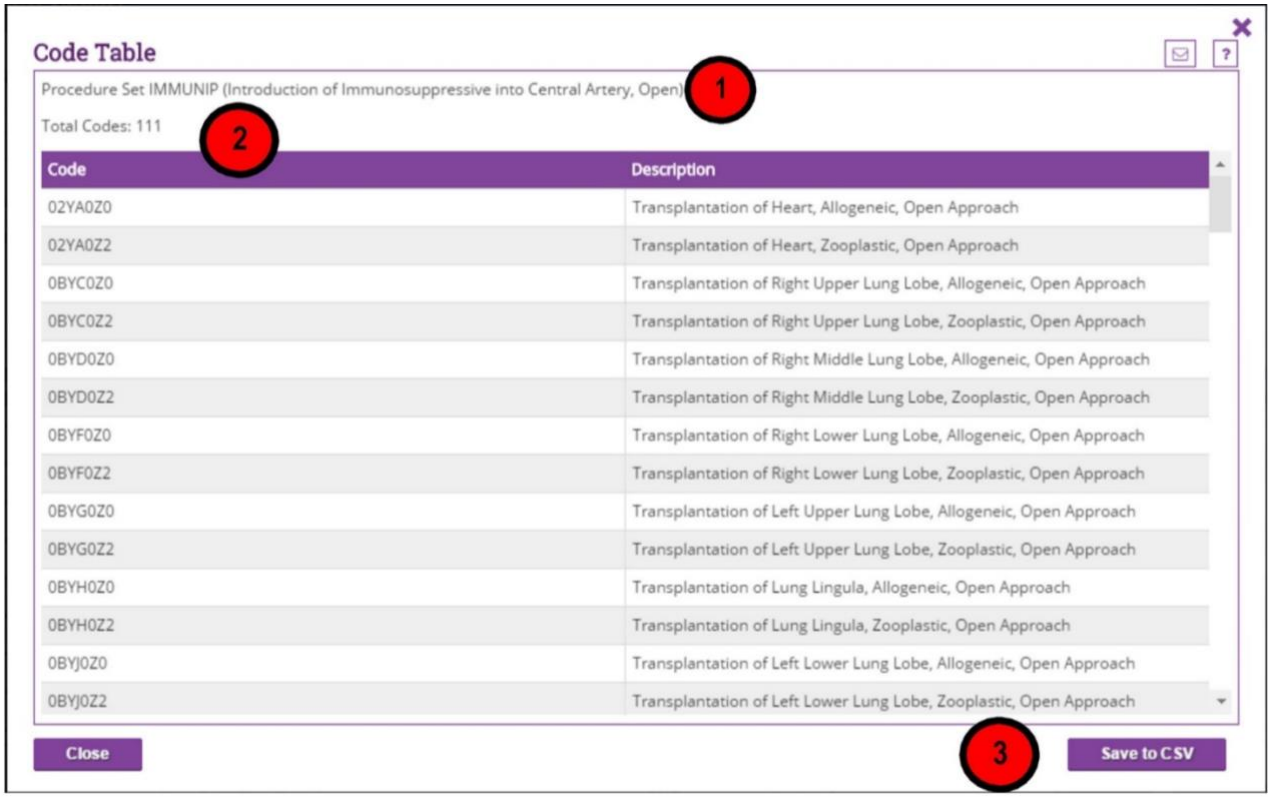
You can often see the relative importance of different covariates from the magnitude of the coefficient; however, individual covariates are not intended to be interpreted in isolation.

12.8 Code list

12.8.1 What is this screen for?

This is a popup window (Screenshot 47) that displays the ICD codes or MS–DRGs that are used in indicator definitions. You can view these lists by clicking on the blue links on the **Case Details** screen. Each set corresponds to a list of codes that can be found in the *Technical Specifications*.

Screenshot 47: Code List



12.8.2 How is this screen organized?

1 *12.8.2.1 Set name*

This area displays the name for this set of codes. This set of codes corresponds to the SAS® format name in the formats library.

2 *12.8.2.2 List of codes*

This area displays the list of MS-DRG or ICD-10-CM codes. Where available, the descriptions of each code are listed.

3 *12.8.2.3 Save the list*

This option allows you to save a list of codes to a separate file that can be used with other programs.

NOTE: Indicators that indirectly make use of a set of codes are not listed. Lists that are indirectly used include the list of surgical DRGs and operating room procedures.

12.8.3 What should I do here?

You can scroll through a list of codes here. Also, if you wish to import the list into another program, you may click on the <**Save**> button to save this list.

12.8.4 Other questions

12.8.4.1 What is the significance of the name?

The name of each "code set" corresponds to the same set of codes in the SAS format library. This name is a succinct way of referring to a group of codes that may be used by more than one indicator.

13. Helpful Tools

The Quality Indicators™ Windows® (WinQI) software includes several helpful tools. These are discussed in more detail here:

13.1 Program options

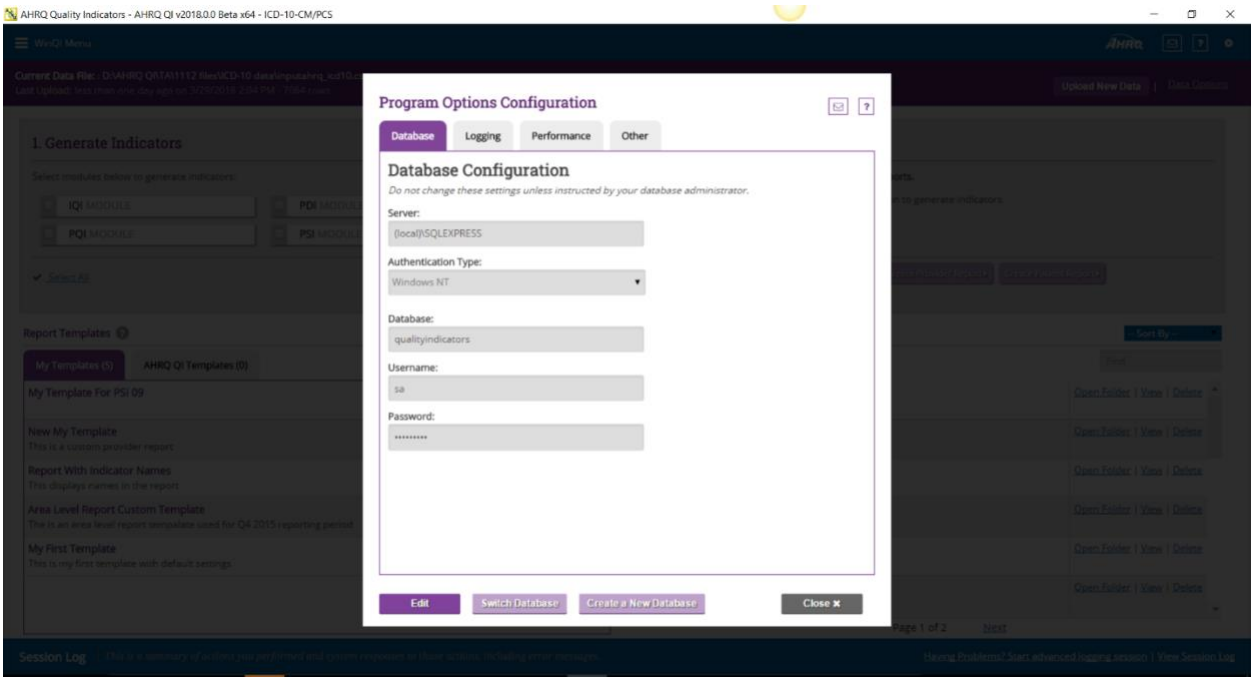
13.1.1 What is this screen for?

This screen (Screenshots 48–51), accessed by clicking the <**Program Options**> control under Tools on the **Home** screen, allows you to change your database options and to save the Session Log.

13.1.2 How is the screen organized?

13.1.2.1 Database

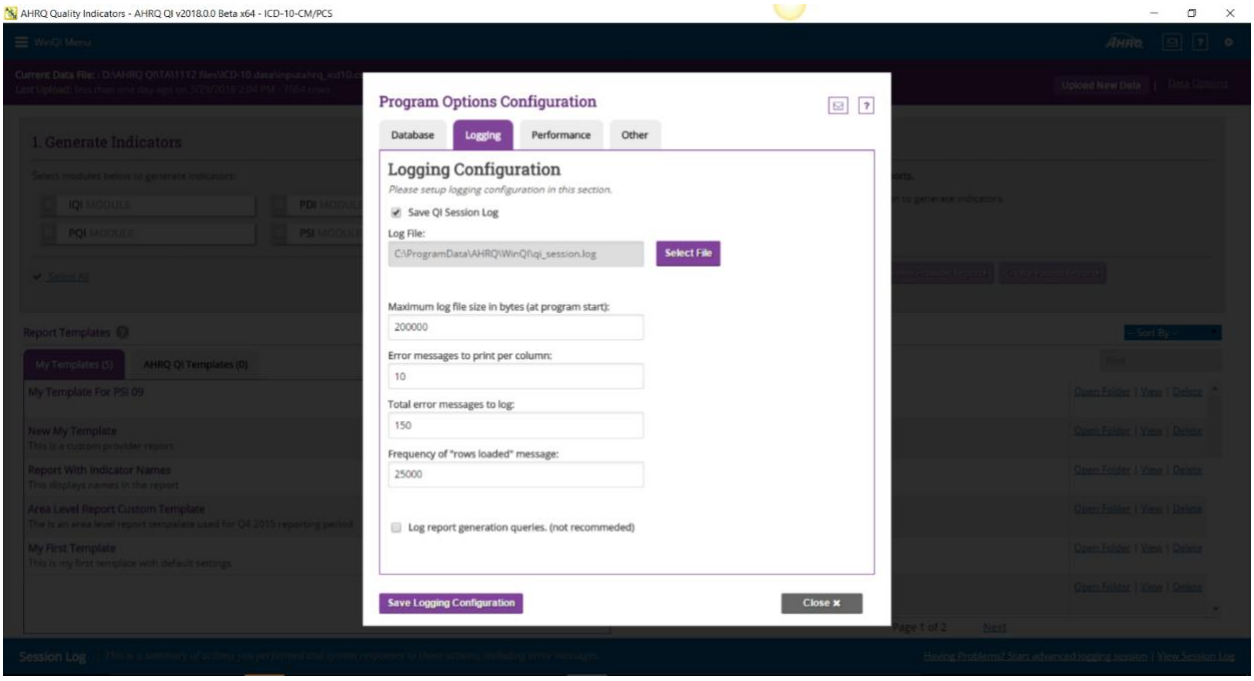
Screenshot 48: Program Options (Database)



You may change the database connection information here. This change should be made only when your database password has changed or if the database server has been renamed. Only make changes if you are instructed to do so by your database administrator. You cannot simply change to a blank database because it will not contain the tables necessary for the program to run. It is recommended that you not change the database options unless your database administrator instructs you to do so.

13.1.2.2 Logging

Screenshot 49: Program Options (Logging)



Specify a file to save the information written to the WinQI Session Log. The Session Log will be appended to the specified file until the file reaches 200 KB. At 200 KB, the file will be truncated and started again. When writing to the Agency for Healthcare Research and Quality (AHRQ) QIs support team, please include the relevant portions of your Session Log.

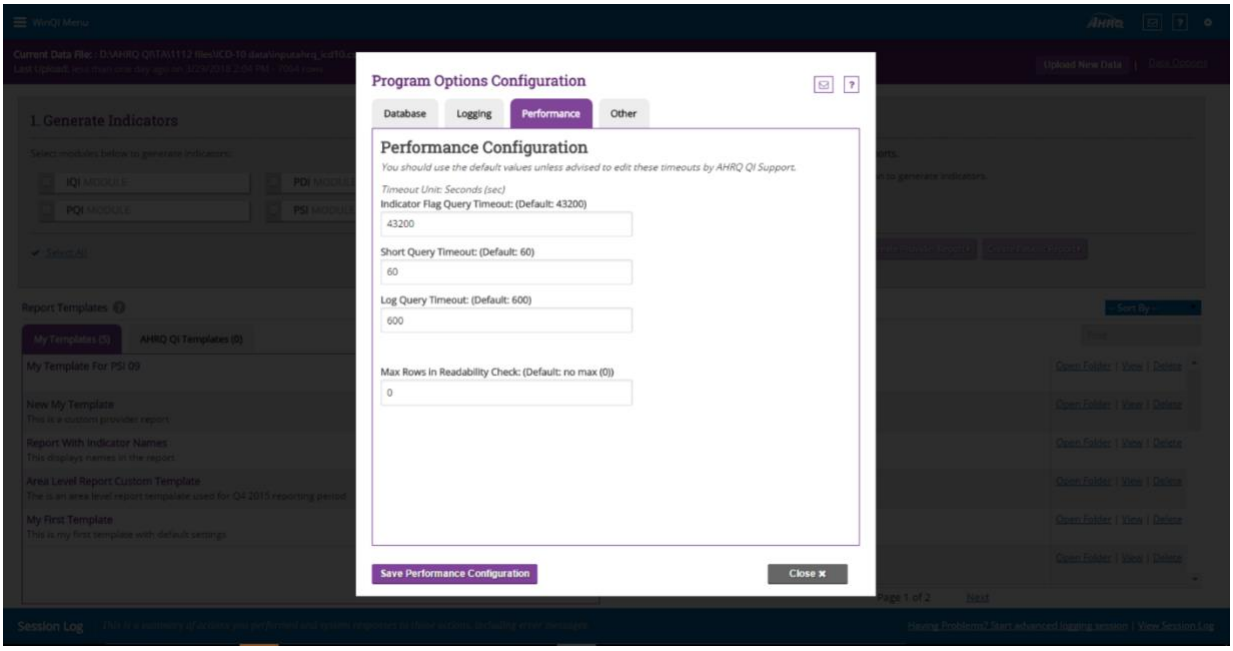
During the data error check screen, messages will be written to the log if certain types of data errors are found—for example, an invalid number in a numeric column. This option may be helpful if you wish to make corrections to your input file. You may adjust the number of errors saved.

If you wish to change the location for the Session Log, use the options under “Logging” to do so.

Selecting this menu option allows you to specify a different location (such as your desktop) to save a snapshot of the log information for the current session. This information is saved as an .rtf file.

13.1.2.3 Performance

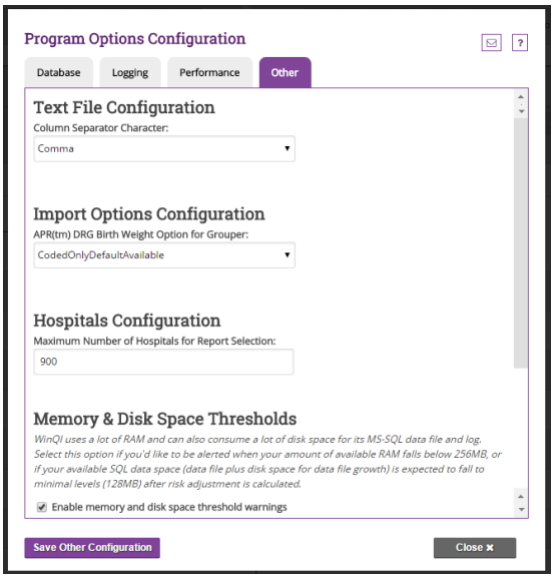
Screenshot 50: Program Options (Performance)



It is not recommended that you change any of these settings without consulting the WinQI support team. One user requested that a change be made to the WinQI software to increase the connection time before a timeout occurs. This change was not made, and it is an example of the type of issue that should be discussed with the WinQI support team.

13.1.2.4 Others

Screenshot 51: Program Options (Other)



- Text File Configuration: You may change the separator between the values in a row of data to "Tab" instead of "Comma."
- Import Options Configuration: Apr-DRG birth weight options for the built-in 3M's DRG grouper.
- Hospital Configuration: You may change the maximum number of hospitals shown on the "Select Hospitals" portion of the Hospital Report Wizard. While setting this number higher will result in more user control, it will slow the report generation process.
- Memory & Disk Space Thresholds: WinQI uses a lot of RAM and can also consumes substantial disk space for its MS-SQL data file and log depending on the size of your input data. Select this option if you'd like to be alerted when your amount of available RAM falls below 256MB, or if your available SQL data space (data file plus disk space for data file growth) is expected to fall to minimal levels (128MB) at the completion of the risk adjustment process. This feature provides you a way to monitor and log your machine's utilization. These resource utilization related warnings are also logged in the session log.
- WinQI URL: Provides you a URL, which you can use to run WinQI on your browser. Note that the WinQI software needs to be running on your machine for this URL to work.
- API Documentation URL: Provides you the link to the API documentation WinQI offers.

13.2 Automation script

The automation script (Screenshot 52) allows you to assemble a series of functions through WinQI and then run them in an automated manner either through WinQI or via the command line. Scripts may also be scheduled to run at a predefined time. You configure certain parameters once from the WinQI user interface to generate the automation script, and following that, can run the software without having to open the user interface. This feature is useful for users who run the software frequently with the same parameters (name/location/structure of input file, name/structure of mapping file, modules, etc.) and are comfortable using the command line instead of the user interface.

The user interface to generate the automation script is accessible from the Tools menu. Once the automation script is generated, it can be run from the command prompt from within the WinQI application directory.

The syntax to run the automation script from the command prompt is

ahrqautomation -automationfile <**file path/filename**>

where "**file path/filename**" is the .ahrq automation script and the directory path

Example:

ahrqautomation -automationfile "c:\automationscipt_05102016.ahrq"

Automation scripts(.ahrq) may be "Basic" or "Record and Play."

Starting in v2021 WinQI, the WinQI installer will also install WinQI as a service, named AHRQ Service. This feature will allow users with admin privileges on the machine to run WinQI as a service. Unlike previous versions, admins can now run automation scripts in the background through the command line without needing to keep the WinQI desktop application up and running. Users will be able to Start the Service as part of the automation command if the service is not already running. Automation runs using the service will have a separate session log, which can be typically found under: C:\ProgramData\AHRQ\WinQI

The syntax to run the automation script from the command prompt(as admin) is

ahrqserviceautomation -automationfile <**file path/filename**>

where **"file path/filename"** is the .ahrq automation script and the directory path

Example:

ahrqserviceautomation –automationfile "c:\automationscipt_05102016.ahrq"

Note: Automation scripts(.ahrq) can be generated either by using "Basic" or "Record and Play." Automation methods.

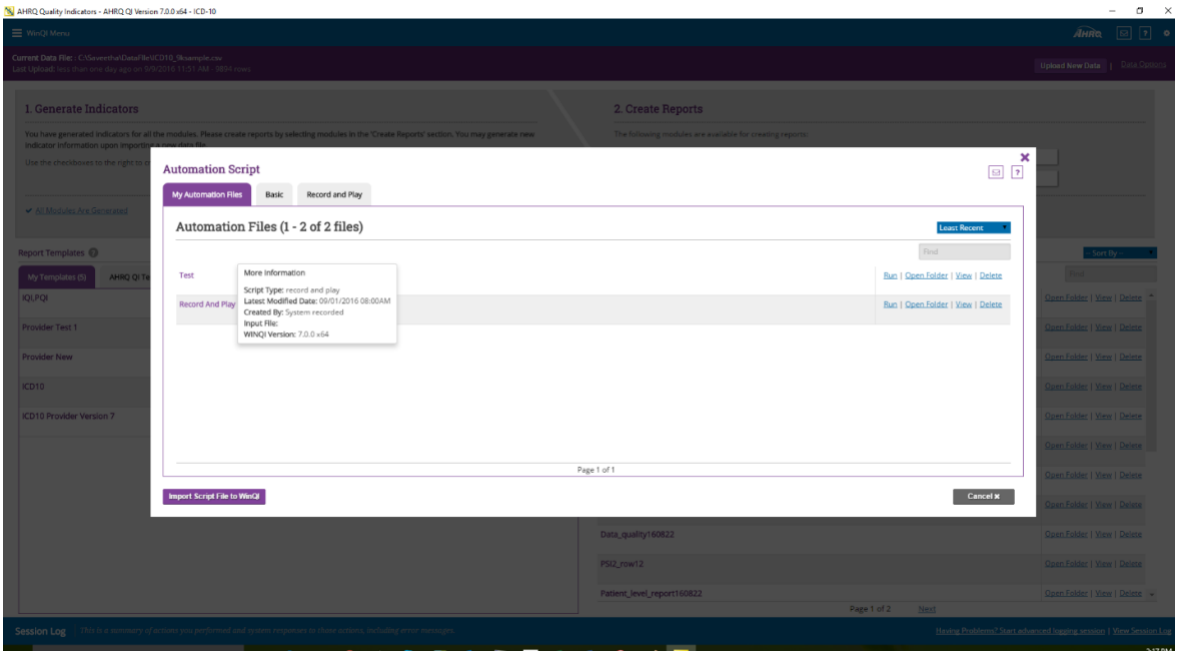
Each of the automation script types and all the tabs of the Automation Script feature are described in further detail below.

13.2.1 My automation files

13.2.1.1 What is this screen for?

This screen shows all automation scripts you have previously created. You may view their details, run them, or delete them from here. You may also import an externally creat ed script file.

Screenshot 52: Automation Script: My Automation Files



13.2.1.2 How is this screen organized?

This screen has the following parts:

1. **Sort By**—If you have multiple script files, you can sort them by date created (most recent first or least recent first) or alphabetical order (A–Z or Z–A).
2. **Find**—You can find a specific script file by typing in part of the name or description.
3. **More Information**—Hovering over the name of the file will enable you to see more information about that script file, such as the script type (Basic or Record and Play), the latest modified date, how the script file was created (shows "System Generated" if created by the user or shows "User Imported" if imported into WinQI by the user), the input file in which it was created, and the WinQI version with which it was created.
4. **Run**—This will run the corresponding script file in WinQI.
5. **Open Folder**—This will open the folder where the corresponding script file is saved.
6. **View**—This will open the script file to allow you to view the automation script. You may also make minor edits if you want to change some parameters. Please make any changes with care because any changes you make may render the script unusable by WinQI.
7. **Delete**—This will delete the script file previously created.
8. **Import Script File to WinQI**—By clicking this button, you can import a script file created by another user of WinQI. This will create an entry for the script in your **My Automation Files**

screen with type **User Imported**. You can then run this script or view and edit it just like one of the scripts you created.

13.2.1.3 What should I do here?

Locate the script file you wish to work with. Then you may execute the script by clicking the corresponding **<Run>** link. You may also **<View>**, **<Edit>**, or **<Delete>** the script. Click the "Import Script File to WinQI" button and follow the prompts to import an externally created script file into your WinQI installation.

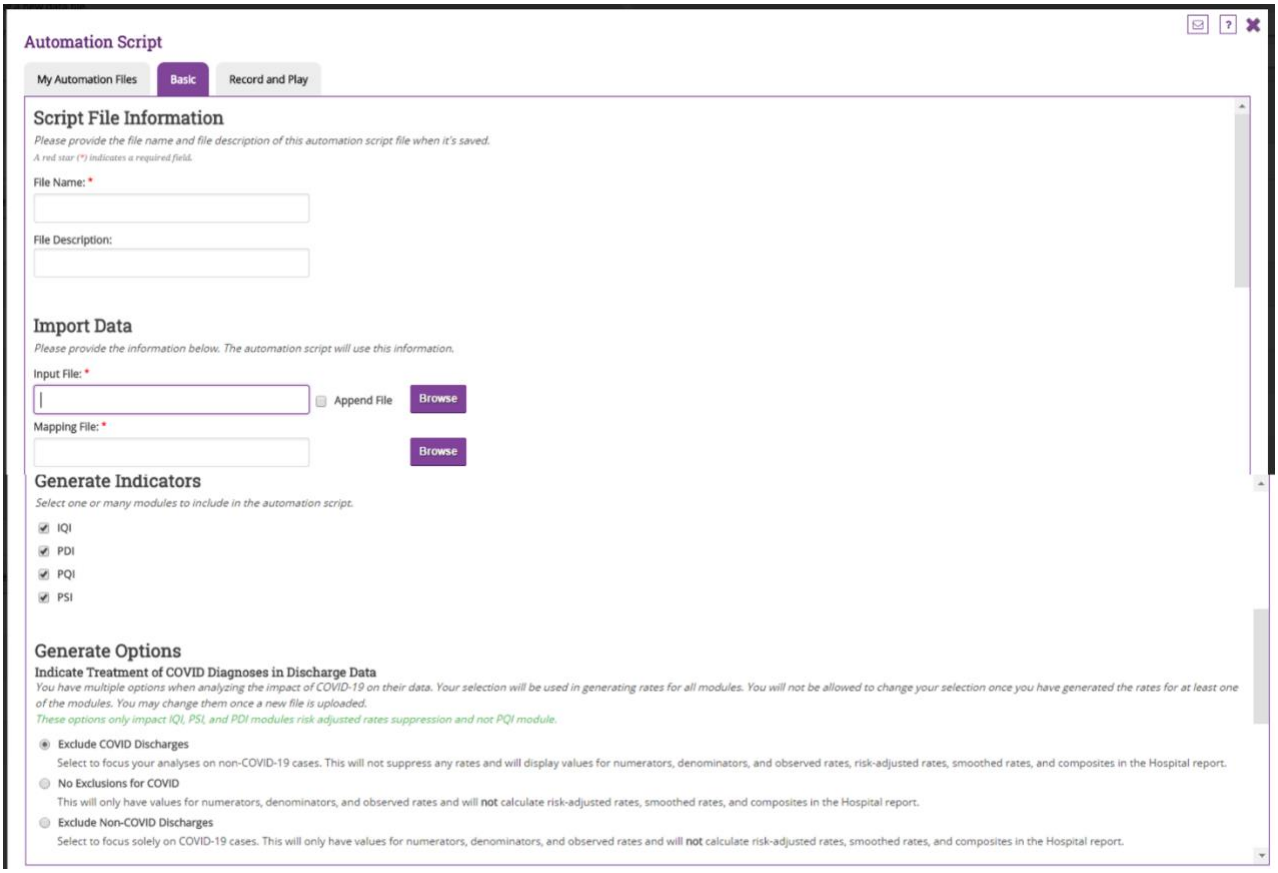
13.2.2 Basic

13.2.2.1 What is this screen for?

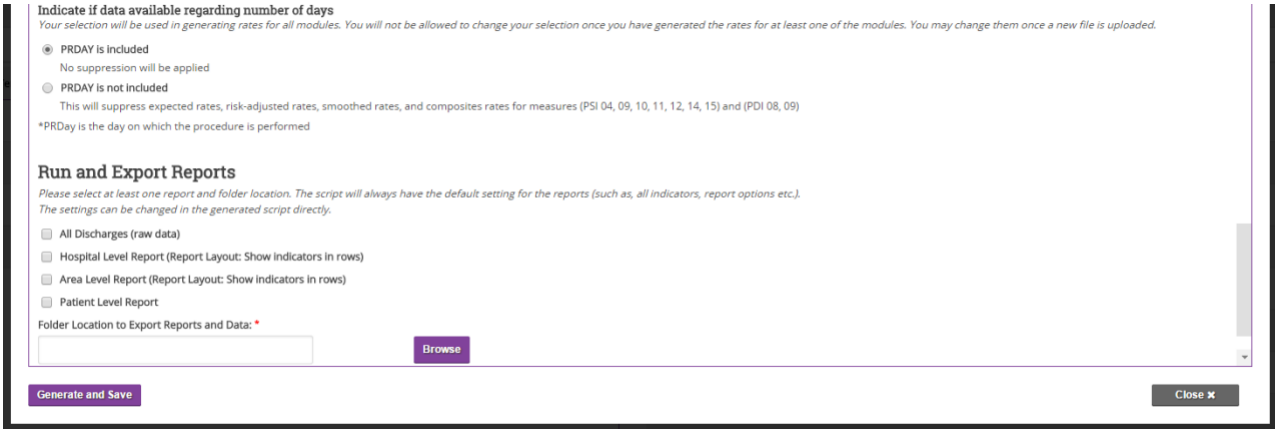
The automation script (Screenshot 53a and 53b) allows you to run the WinQI software to import data, generate rates, and create reports through the command line. You configure certain parameters once from the WinQI user interface to generate the automation script; afterward, you can run the software without having to open the user interface. This feature is useful for users who run the software frequently with the same parameters (name/location/structure of input file, name/structure of mapping file, modules, etc.) and are comfortable using the command line instead of the user interface.

This screen allows you to configure certain parameters (settings) and generate the Automation script. The script will be generated with the given settings on this screen like the input file, mapping file, modules to generate indicators for, and reports to export.

Screenshot 53a: Automation Script: Basic



Screenshot 53b: Automation Script: Basic



13.2.2.2 How is this screen organized?

The screen has three sections as described in the following sections.

13.2.2.2.1 Import data

Select your input file and the corresponding mapping file. Use the <**Browse**> button to navigate to and select the appropriate files. Please note that the mapping file should be correct for the selected input file. You must specify both the input file and mapping file in order to generate the automation script.

Starting with WinQI v2021, you can create a basic automation script where you can choose to append your input data. Checking the Append File checkbox will append input file specified in the basic automation script to your existing uploaded data in WinQI. The system will use the combined file to generate the rates.

13.2.2.2.2 Generate indicators

PSI, IQI, PQI, and PDI are available to select. The selected modules will be included in the automation script, and when the script is run, only the indicators for the selected modules will be generated. At least one module is required to be selected in order to generate the script.

Starting with WinQI v2021, basic automation script includes "Generate Options". Refer to the Generate Options section 11.2.13.2.2.2.3 Export raw data and reports

This section allows you to select the reports to be exported and the folder where you want to save these exports. At least one export from "All Discharges," "Hospital-Level Report," and "Area-Level Report" must be selected. The output folder must be specified as well. Please browse to and select the appropriate folder.

13.2.2.3 What should I do here?

Click the <**Browse**> button and select an appropriate input file. Once you have selected the input file, click on the <**Browse**> button to select an appropriate mapping file that matches the data structure of your input file. Only Quality Indicators Mapping (.qim) files can be selected. These files can be produced from the WinQI software after importing a data file and specifying corresponding data mapping one time through the user interface. After selecting the mapping file, please select the module(s) to generate indicators using the automation script. At least one module must be selected.

At the end, choose the reports you would like to export from the automation script and the location where you would like to export them. At least one report needs to be selected.

Once you have entered the required information, click the "Generate and Save" button. Browse the folder where you want to save the generated automation script. The Automation script will be saved at the selected location. Run this script from the command prompt or from within the WinQI application directory.

Below is the syntax of the command to run the automation script from the command prompt.

Option 1: With WinQI desktop application up and running on your machine

ahrqautomation -automationfile < file path/filename>

Example:

ahrqautomation -automationfile "c:\myfolder\automationscipt_05102016.ahrq"

Option 2: Using WinQI as a service (AHRQ Service) – only included in v2021

The syntax to run the automation script from the command prompt(as admin) is

ahrqserviceautomation -automationfile <file path/filename>

Example:

ahrqserviceautomation –automationfile "c:\my folder\automationscipt_05102016.ahrq"

You will be able to confirm the automation run by verifying the service session log in the directory C:\ProgramData\AHRQ\WinQI\qi_session _service. If you would like to use the desktop application, they will need to open Services menu and turn off the AHRQ Service from the list.

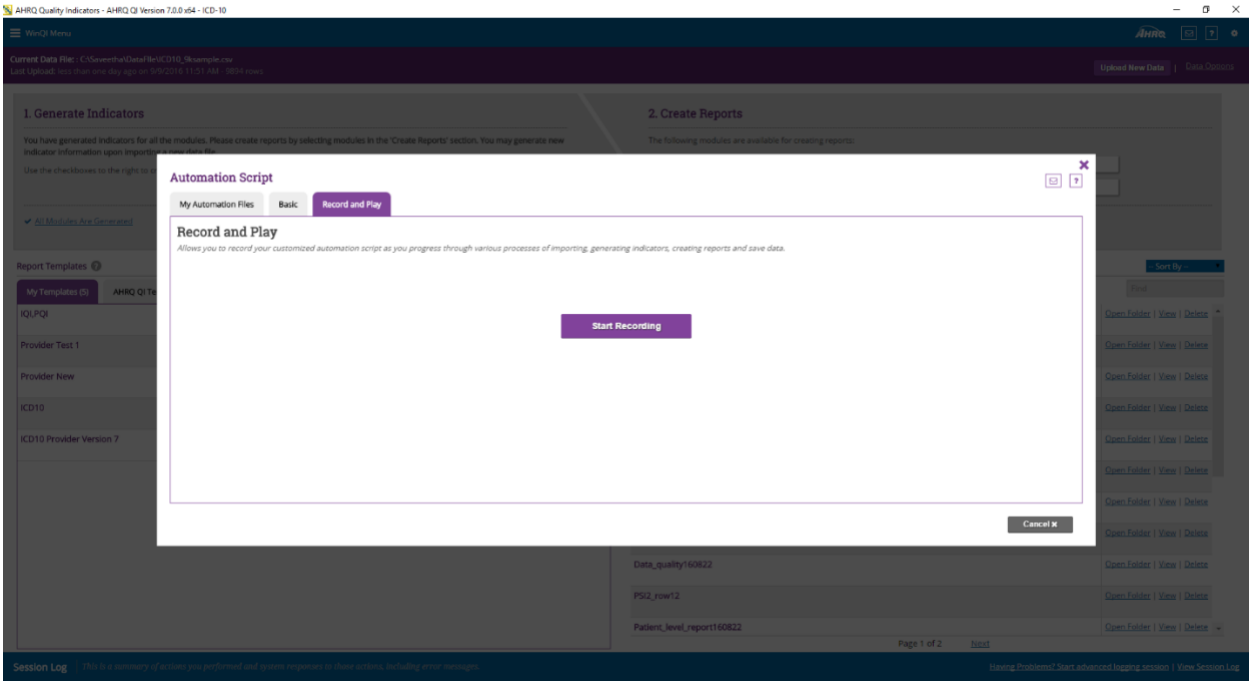
13.2.3 Record and play

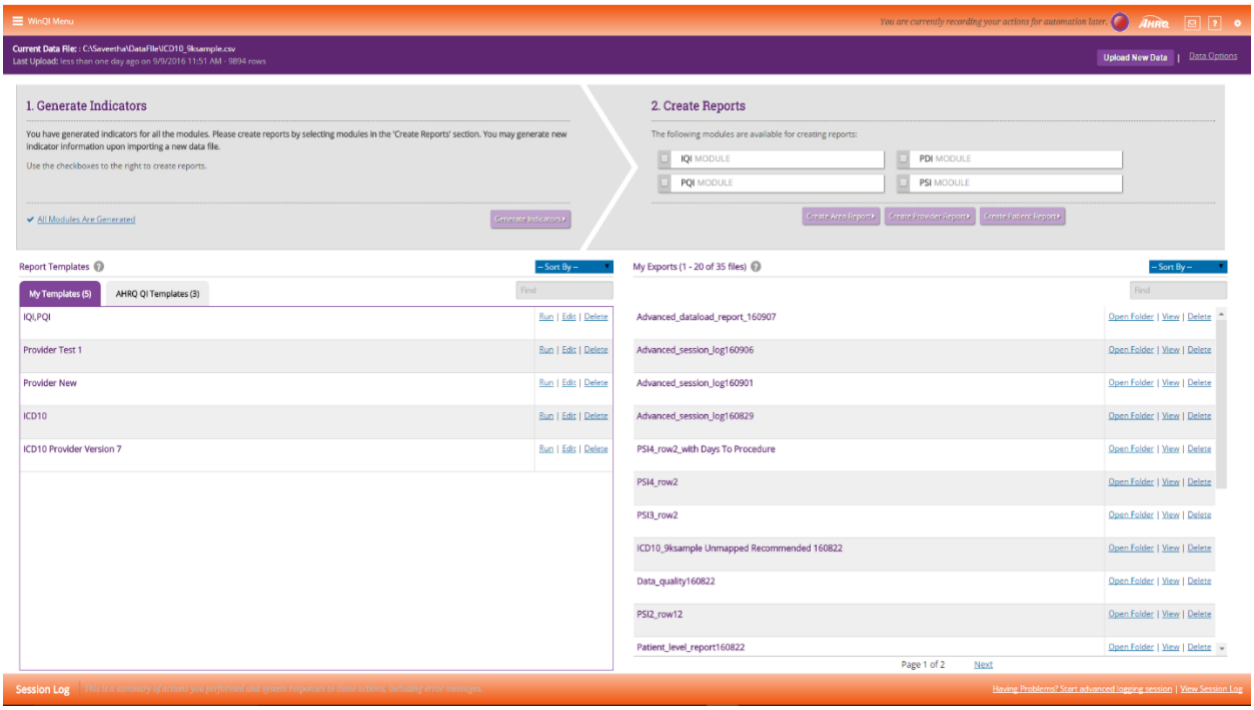
13.2.3.1 What is this screen for?

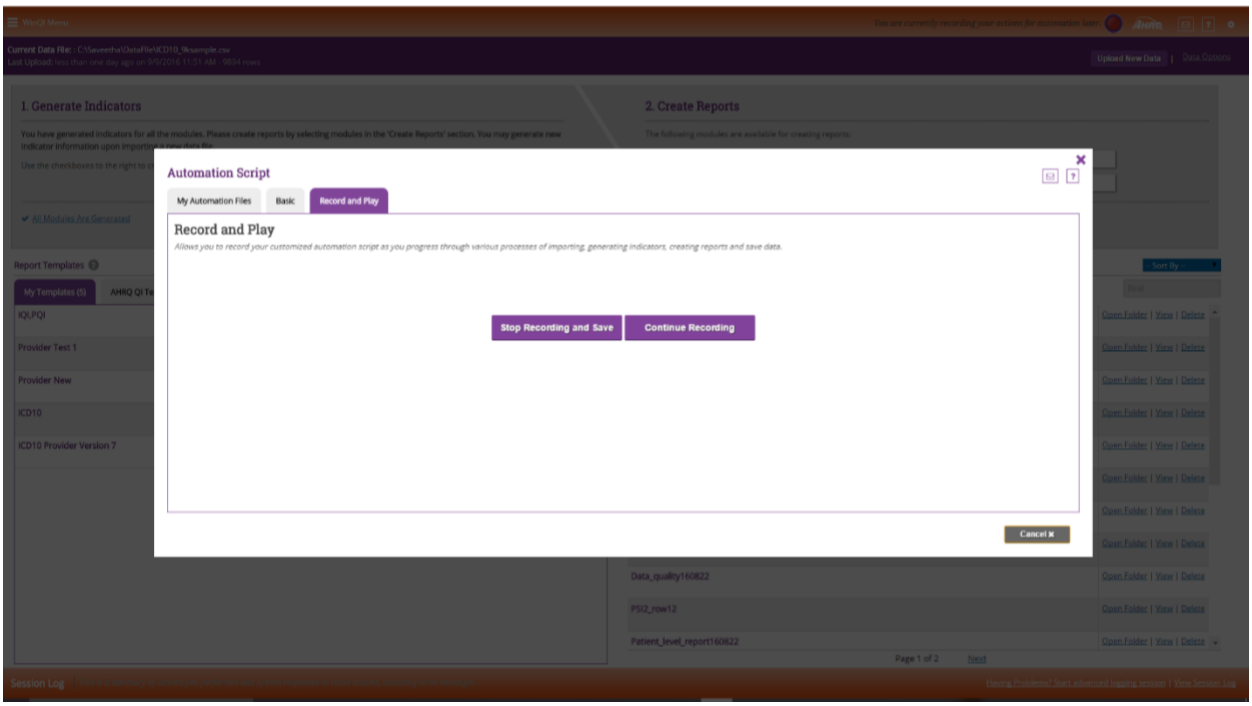
On this screen (Screenshot 54), you can start the recording to create a customized automation script. Beginning such a recording will record all the actions that you subsequently perform on WinQI related to importing a file, generating indicators, and/or running reports, which you can save as an automation script for later execution through WinQI.

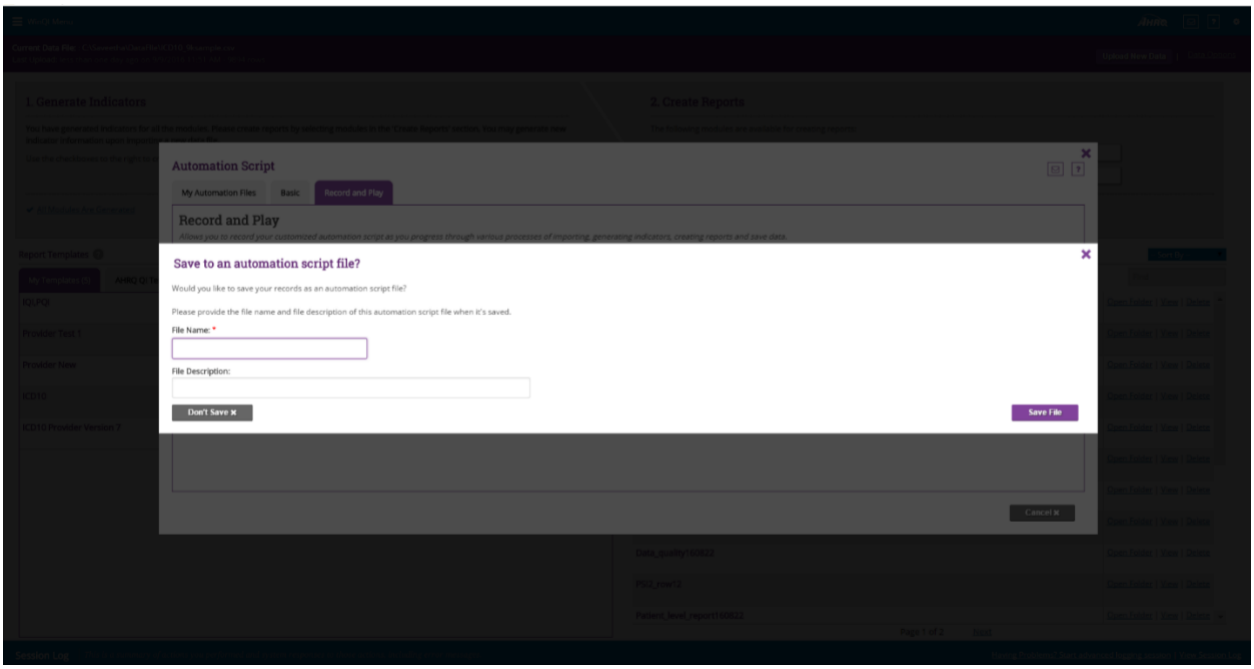
Note: In versions of WinQI prior to v2019, there was a potential issue when recording your script using the "record and play" function with your smaller dataset where the selection criteria may go out of range when the script is used with a different (larger) dataset. In v2019, WinQI ignores your selections by default, but you can choose to override it. For example, if you had only females in your dataset used to generate the initial automation script, when using this script to run it with a larger dataset having both male and female data, this would have caused a data out of range issue because of your selections in the crosswalk screen. This issue has been fixed in v2019.

Screenshot 54: Automation Script: Record and Play (Shows multiple screens in the process)









13.2.3.2 How is this screen organized?

There are multiple screens and hence multiple steps in this process. The steps are as follows:

1. Click the <**Start Recording**> button.
2. Click and continue to perform your actions in the application, such as, import file, run report, etc.

3. Perform your actions.
4. Click the red <**Stop Recording**> button located at the top right.
5. Click the <**Stop and Save Recording**> button to stop and save your recording or <**Continue Recording**> if you want to continue recording.
6. Provide the file name and a file description for the recording. This file will then begin showing on your **My Automation Files** screen.

13.2.3.3 What should I do here?

Click on <**Start Recording**> to begin the recording. Once you begin the recording, the header and footer change to a different color until you click the corresponding <**Stop Recording**> button (see the screenshot above). After completing your actions and then clicking the <**Stop Recording**> button, be sure to save the recording by clicking on <**Stop Recording and Save**> and provide a file name and description. In order to continue recording instead of stopping, click on <**Continue Recording**>.

13.2.3.3 Advance logging

Starting in version 7.0 of the WinQI software, when you turn on the WinQI tool feature, the WinQI software will record details of your actions (including the corresponding timestamp) and the corresponding system responses in the Session log. Saving and sending this session log to the WinQI support team will provide useful information to the team in troubleshooting any issues you may be encountering.

The Advanced logging has 4 steps:

1. **Turning on the advanced logging**—Please turn on the advanced logging before commencing your activities. Advanced logging may be turned on by

a. Clicking the “Turn on Advanced Logging” feature under the top Tools menu if you have not yet imported a data file, or

b. Clicking the “Having problems? Start advanced logging session” link on the Session log footer line.

2. **Perform your actions**—Once you turn advanced logging on, you can perform the actions you intend to (where you are experiencing issues).

3. **Turning off (ending) the advanced logging**—Once you complete the sequence of steps you wish to perform, you can turn off advanced logging by clicking “Turn off Advanced Logging” in the top Tools menu or by clicking “End Advanced Logging” in the Session log footer line.

4. **Saving your session log**—Upon ending the advanced logging, you will be prompted to save the session log or cancel and continue with the advanced logging. If done, please be sure to save the

session log and give it a meaningful description. Once saved, you will be presented with an option of sending the advanced session log to WinQI support in an email. This will open the installed email client in your machine so you can send the email and will also attach the normal and advanced session log. This advance session log file will also appear in your “My Exports” section on the WinQI Home screen. Email this session log to the QI Support email box.

14. Software Installation and Data Security

14.1 What software needs to be purchased in order to run the Quality Indicators™?

The Quality Indicators™ Windows® (WinQI) software is provided free of charge by the Agency for Healthcare Research and Quality (AHRQ) and is available for download from http://www.qualityindicators.ahrq.gov/software/default.aspx.

No additional software is required for purchase in order to use the WinQI software. The software does require Microsoft® .NET Framework and Microsoft SQL Server. Both can be downloaded along with the WinQI application.

To calculate risk-adjusted rates for some of the Inpatient Quality Indicators (IQIs), the 3M™ All Patient Refined Diagnosis-Related Group (APR-DRG) grouper must be used (see Section 9.2.2.5). A limited license version of the 3M™ APR-DRG system can be installed at no cost with the AHRQ WinQI software. If users prefer, they may use their own copy of the software to preprocess the data. However, the user must run the grouper software twice—once with all diagnosis codes, and once excluding diagnosis codes not present on admission. Full versions of the product are available commercially. See the 3M™ website for more information: https://www.3m.com/3M/en_US/company-us/.

14.2 How many discharges can be processed?

The WinQI software is limited only by the SQL Server maximum database size. For Express Edition installations, the limit is 4 GB (10 GB for SQL Server 2008 R2), which comes to approximately 4 million discharge records. There is no limit to the database size in a full version of SQL Server.

Users who have access to a Microsoft SQL Server for data storage may be limited by any local hardware or storage allocations, which may be controlled by your local information technology (IT) office. Users should check with their local database administrator.

14.2.1 What type of data is required by the AHRQ WinQI software?

The AHRQ WinQI software is provided with no data. The AHRQ WinQI software is a tool that calculates the QIs based on an input data file containing discharge-level data from your organization. The software populates an SQL Server database with the data elements and data values in a format expected by the indicator logic. See the Input Data Dictionary (Appendix A) for detailed descriptions of each required data element.

14.2.2 What information is collected by AHRQ?

No user registration is required to run this software. AHRQ does not collect or store data from users of this software. Users who wish to provide feedback may contact the WinQI support team by emailing QIsupport@ahrq.hhs.gov.

14.2.3 What kind of individually identifiable health information is required by the AHRQ WinQI software?

The AHRQ WinQI software does not require any direct identifiers. However, the software does require detailed information for each discharge, including demographic data elements, like age and gender, and relevant diagnosis and procedure codes. Use of this information must comply with the Health Insurance Portability and Accountability Act privacy and security policies of your organization.

14.2.4 What fields contain personal identifying information?

There are five optional data elements to help identify particular cases. None of these fields is used in any quality indicator (QI) definitions, and all five may be omitted if desired. The **Key** field is printed on the Patient-Level Report and on the Case Details Report. There are four other fields that are not displayed at all within the WinQI application but can be included on the data import and the data export to identify cases as part of other analyses. These are **Date of Birth**, **Admit Date**, **Discharge Date**, and **Medical Record Number/Patient ID**. These four fields were introduced in v4.1. For maximum patient privacy, it is recommended that you not import these fields at all unless required for your analysis.

14.2.5 What information is stored in the "Key" data element?

The **Key** data element is optional and is not used in the WinQI flagging or rate calculation. The Key data element could be left blank or populated with a blind identifier for each discharge or patient, a medical record number, or a random sequence number. The intent is to give quality improvement staff the ability to conduct further analysis on individual cases that are flagged for specific indicators. The Key data element may be populated with any text, or it may be left unmapped in the **Data Mapping** screen without affecting the flagging or rate calculation of the QIs. The Key data element is not required to be unique.

14.2.6 What types of data files are used or generated by the AHRQ WinQI software?

The AHRQ WinQI software uses or generates the following types of files:

- **Input Data File**—The discharge-level file that the user prepares outside the AHRQ WinQI software for loading with the Data Import Wizard. After the data load has completed, this file is no longer required.
- **Patient-Level Report**—Users may export a file from the **Patient-Level Report** screen that contains the discharge-level indicator flags for the selected indicator and basic demographic data for each patient. This report allows users to see which cases were excluded, if desired.

- **Stratified Rate Report**—Users may export a file from the **View Report** screen that contains the stratified rates for selected area-level or hospital-level indicators. When the report is generated, users may select not to report rates with less than a specified number of cases in the numerator.
- **Case Details Report**—Users may save a copy of this report as a rich text format (RTF) file for later viewing. This contains individual medical information.
- **Data Load Reports**—Users may choose to save copies of the Data Load reports in RTF. These reports contain descriptive statistics about the input file and do not contain personal information.
- **Export QI File**—After using the Data Import Wizard, users may export a file that includes only those data elements used by the AHRQ WinQI software as well as the indicator flags for each record. This file may be exported from the wizard or by using the <**Export Data**> option on the Main Menu. See Appendix C for a list of all the variables included in the exported data file.
- **Database Files**—Each time the user runs the Data Import Wizard, the discharge-level data are populated into a SQL Server database, which stores data in its own database file. Each time the Report Wizard is used, the resulting area-level and/or hospital-level reports are stored in the SQL Server database. These are overwritten the next time the user runs the wizard.
- **QI Session Log**—This is a log of debugging information generated by the software. You may change the location of this file in the **Program Options** screen.

14.2.7 Where is the SQL Server database file located?

The SQL Server database file may be located on the same personal computer (PC) as the AHRQ WinQI software, or it may be located on a remote server, depending on the options the administrator selected when installing the AHRQ WinQI software.

If the administrator elected to install the SQL Server instance locally, then the SQL Server database is physically located on the user's hard drive. If using Windows 8, the file is located at "C:\Program Files (x86)\Microsoft SQL Server\MSSQL.X\MSSQL\Data" and should be called "qualityindicators.mdf."

In either case, the file is machine readable only and the location may be changed. However, care must be taken to secure the database system and database files as appropriate given applicable medical information privacy laws, regulations, and policies. See the question "How do I customize SQL Server?" in Section 14.2.11.

14.2.8 Does the AHRQ WinQI Software require any data sharing or internet connection?

No. The AHRQ WinQI software does not share data with any other computer and does not require an internet connection. Moreover, if the administrator selects a local database on the user's PC, it is not necessary to have any network connection at all.

14.2.9 What sort of password protection is used by the AHRQ WinQI Software?

The AHRQ WinQI software relies on the Windows authentication and permissions of the local PC. See the local IT administrator for the relevant policies and procedures.

Also, see the question on "How do I customize SQL Server?" in Section 14.2.11.

14.2.10 What permissions are required to install and run the AHRQ WinQI software?

The AHRQ WinQI software must be installed by a user with Windows administrator access. All users with access to the PC may run the AHRQ WinQI software after it is installed. If the SQL Server database is installed with Windows NT authentication, then only users with sufficient access will be able to run the software. See the answer to "How do I customize SQL Server?" in Section 14.2.11.

14.2.11 How do I customize SQL Server?

SQL Server can be configured using various tools such as the "Configuration Manager" and "SQL Server Management Studio Express." These are free tools provided by Microsoft that allow users to add/modify accounts, change database names, create backups, etc. It is generally advised to seek the help of your IT staff before attempting to modify permissions and other connection settings in SQL Server.

14.2.12 Can I change the database password?

Yes. You may specify a different database password when you install the program or by specifying the login information to use in the "Database" section in "Program Options." See Section 13.1.

14.3 Input data

14.3.1 What is the difference between these specifications and the Uniform Bill 04 (UB-04) specifications?

The data elements in the AHRQ QIs are based on the coding specifications used in the State Inpatient Databases (SID) in the Healthcare Cost and Utilization Project (HCUP). The SID coding specifications are similar to those of UB-04 but not identical. For data elements used in the AHRQ QIs, crosswalks between the SID and UB-04 coding specifications are included in the SID documentation available at http://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.

14.3.2 What if my ICD codes are in a different format?

You will need to translate your ICD codes into the required format for the software to interpret them properly. The software uses exact text comparison of procedure and diagnosis codes with the list of expected values to indicate each condition. If leading or trailing zeros are missing from the input file, the codes will not match.

14.3.3 Please give examples of correct ICD-10-CM codes.

Consider "011.0," a tuberculosis diagnosis. The required format for the WinQI software is "0110," which is the complete code with the decimal point removed. The following are incorrect:

- "011.0"—wrong because the decimal point must be removed.
- "110"—wrong because the leading zero has been lost. This code would be interpreted as "110."—this is a completely different family of diseases.
- "011"—wrong because the required fourth digit is missing. This is not a complete diagnosis code.

In cases in which a specific fourth or fifth digit is required by the ICD-9-CM definition, the complete code is required by the AHRQ QI definitions. For example, "8081" (acetabulum fracture) is a complete code; however, "8084" is not a complete code without a fifth digit that indicates the location of the fracture. These codes are used to exclude trauma cases and could result in inflated rates for some Patient Safety Indicators (PSIs).

Similarly, you should not include additional digits where they are not required. In the previous example, the incorrect code "80810" will not match the correct "8081" code.

Procedure codes are handled in the same manner as diagnosis codes except that procedure codes have one fewer digit. Valid diagnosis codes are a minimum of three digits, with fourth or fifth digits required for some diagnoses. Valid procedure codes are a minimum of two digits, with third or fourth digits required for some procedures.

14.3.4 Must Centers for Medicare & Medicaid Services or MS-DRG grouper software be run before the data load?

Although the MS-DRG technically is not required to run the software, without it the risk-adjusted results for the PSIs and Pediatric Quality Indicators (PDIs) will be problematic and surgical MS-DRGs will not be identified. To ensure that the correct MS-DRG version is mapped, the MS-DRG version should be provided and mapped.

14.3.5 Must the 3M APR-DRG grouper software be run before the data load?

No. APR-DRG variables are used for IQI risk adjustment. A limited licensed grouper is packaged with this software and can be run during the data load. Users who already have APR-DRG values in their input file may choose to use those values instead.

14.3.6 Why might it be preferable to run the 3M APR-DRG grouper prior to the data load?

The license agreement for the limited license 3M™ APR-DRG grouper permits its use only for the calculation of IQI expected rates. APR-DRG values are calculated only for the minority of discharge records in which it is required. The exported data file will therefore not contain APR-DRG data for all records.

14.3.7 Can external cause of injury codes (E-codes) be placed in diagnosis columns other than Dx31 through Dx35?

Yes. You may place E-codes in any diagnosis column except the primary diagnosis.

Diagnoses 31–35 were created as a convenience to allow up to 30 diagnoses as well as up to 5 E-codes.

14.3.8 Can I use ZIP Code™ instead of Patient State/County Code?

No. In order to calculate rates for area-level indicators, the WinQI software contains a table of population figures for each county. If you do not have valid State/county codes, the population cannot be used for the denominator of area rates. If you are not interested in area rates, you can leave out the State/county code.

14.3.9 Why is the patient's State/County preferred to the hospital's State/County code?

Area-level indicators are designed to measure overall quality of care and access to care within the health system of a geographic area, such as a county. Patients in the numerator for an area-level indicator should be counted with the denominator based on the county in which they reside, and this location may not necessarily be the county in which they seek care.

14.3.10 What if my data don't contain "Days to Procedure"?

The days-to-procedure variables are used to determine the proper ordering of procedures relative to the operating room procedures. For example, PSI 08 excludes hip fracture repairs that occurred before any other operating room procedure because the hip fracture cannot be attributed to the operating room. Alternate specifications exist for each indicator if "Days to Procedure" data are not loaded.

14.3.11 What if I can't determine the correct crosswalk for a variable?

Consult the SID documentation (http://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp) for a detailed discussion of each data element. Also, check the AHRQ QI *Technical Specifications* for the indicators in which you are interested. For most of the mapped variables, only a few of the crosswalk values are of interest to the WinQI software. For example, disposition codes of 2 and 20 are referenced in the logic of some indicators to identify transfers to another short-term hospital and patients who died in the hospital.

14.3.12 Shouldn't "Admission Source = 4" indicate transfers instead of 2?

It is important that the crosswalk for this variable be set to the SID specification. If your data are in an alternate format, you can change the crosswalk during the data load.

14.3.13 What about "Present on Admission"?

"Present on Admission" (POA) fields were first incorporated in the QIs in v3.1. The present-on-admission indicator in hospital administrative data distinguishes medical conditions that are

present when patients enter the hospital (i.e., comorbidities or preexisting conditions) from those that first occur during the hospital stay (complications or in-hospital adverse events). Beginning with FY 2008 (October 1, 2007), the UB-04 data specification manual includes a POA indicator.

POA indicators can be reported with principal and secondary diagnoses, in addition to external cause of injury codes. The coding guidelines for POA are available online in Appendix I of the ICD-10-CM Official Guidelines for Coding and Reporting (https://www.cdc.gov/nchs/data/icd/10cmguidelines-FY2020_final.pdf).

The reporting of POA indicators may vary by hospital. For example, the Centers for Medicare & Medicaid Services (CMS) considers certain types of hospitals exempt from POA reporting. Some examples include critical access hospitals, children's hospitals, and cancer hospitals. Although these hospitals may be exempt from reporting POA data to CMS, State-specific mandates may require POA reporting. Users should be knowledgeable about the POA reporting requirements and practices of hospitals represented in the input data file.

The ICD-10-CM *Official Guidelines for Coding and Reporting* identify some diagnoses that are exempt from POA reporting for one of the following reasons: (1) they represent circumstances regarding the healthcare encounter, (2) they indicate factors influencing health status that do not represent a current disease or injury, or (3) they are always present on admission. Some examples of the exempt diagnosis codes include old myocardial infarction, normal delivery, congenital anomalies, "V" diagnosis codes indicating a history of disease, and external cause of injury codes specific to accidents. For the diagnoses that are exempt from POA reporting, starting in WinQI v2018, the software assumes that the diagnosis is present on admission and did not occur during the hospital stay.

In general, cases in which the outcome of interest is present on admission will be excluded from the denominator, because these cases are no longer in the population at risk of having the outcome of interest occur during the hospitalization.

The use of POA fields can uniformly impact PSI and PDI rates by reducing the times that "false-positives" occur—diagnoses being identified as complications from the current hospitalization instead of a previous hospitalization or preexisting comorbidities. Prior to WinQI v5.0, if you did not use POA data, an estimation procedure was used to adjust the prevalence of the outcome of interest and covariates for risk adjustment. In WinQI v5.0, the use of the Prediction Module was discontinued to estimate the prevalence of conditions when POA data are missing. When using the WinQI software, the user must specify whether the input data have POA information by mapping the POA variables in the input file to the corresponding QI variables. The POA data may impact the prevalence of the outcome of interest and the risk-adjusted rates by excluding secondary diagnoses coded as complications from the identification of covariates. If the user's input file does not include POA data and the user does not map the POA variables, the WinQI software will assume the outcome of interest occurred in the hospital.

If POA information is available on the input data, it is used to identify whether a diagnosis is present on admission using the following criteria.

The diagnosis is identified as present on admission if either of the following conditions exists:

- The diagnosis code is expected to have "present on admission" reported based on ICD-10-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-10-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 (e.g., the data field on the record is blank).

If POA information on the input data is unavailable, it is assumed that the diagnosis is not present on admission for all nonexempt diagnoses. For the diagnoses that are exempt from POA reporting, the software assumes that the diagnosis is present on admission and did not occur during the hospital stay.

14.3.14 What about "Do not Resuscitate"?

"Do not Resuscitate" ("DNR") status is neither imported nor used in the WinQI because it is not universally available or applied in a uniformly unbiased manner. For risk adjustment, starting in v2021, risk factor is added for Do Not Resuscitate (DNR) that is Present On Admission (POA) to PSI mortality indicators.

14.3.15 What is the purpose of the patient identification fields?

The fields "Date of Birth," "Admission Date," "Discharge Date," and "Patient ID" are pass-through fields in the WinQI application. These are available to identify patients in the QI export file as part of other studies, such as the Collaborative Validation Pilot. In the interest of preserving privacy, they should not be used if these are not required for your study.

14.3.16 Can length of stay be calculated from the admission and discharge dates?

No. "Length of Stay" data must be present in the input file. "Admission Date" and "Discharge Date" are only pass-through fields.

14.3.17 What is length of stay for a same-day discharge?

Length of stay should be "0" if the patient is discharged on the same day as admission.

14.3.18 My State has different crosswalk values. How can I determine the mapping?

If your State participates in HCUP SID, you may wish to consult the State-specific HCUP documentation at http://www.hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.

14.4 Specifying and viewing reports

14.4.1 Can hospital-level and area-level reports be combined?

No. Rates are expressed differently. Area-level indicators use the population of the county as the denominator. Hospital-level indicators use the total number of at-risk patient discharge records as the denominator. The stratifiers available for reporting are limited by the information appropriate to each group.

14.4.2 Can I stratify area-level Indicators by hospital?

No. Area-level indicators are designed to measure potentially avoidable hospitalizations for the residents of a county. Although it could be possible to classify patients by the hospital they went to (stratify a numerator), it is not possible to classify the residents by the hospital they did not go to (stratify the denominator).

14.4.3 Can reports be viewed after closing the Report Wizard?

Yes. The "View Report" option on the main menu opens the **Reports** screen, displaying the data from the last set of reports generated using the Report Wizard.

14.4.4 What happens if a new report is generated?

The existing set of reports will be overwritten.

14.4.5 Is there a way to save reports for later viewing?

Immediately following generation, a report can be exported to a comma-separated value format (CSV) or text (.txt) file and viewed in other software such as Microsoft Excel. After a different report is generated, there is no way to view an earlier report from within the WinQI software.

14.4.6 How can I get a list of cases that contributed to my rate for an indicator?

Use the Patient-Level Report (see Section 12.6).

14.4.7 Why was a particular case flagged by a particular indicator?

Use the Case Details Report to show you the definition of an indicator and how it is applied to a case (see Section 12.7).

14.4.8 Using different types of QI rates

When should you use the observed, expected, risk-adjusted, and/or smoothed rates generated by the AHRQ WinQI software? Here are some guidelines. For additional information, see the technical documentation on the WinQI website.

Note that beginning with WinQI v4.5, the software no longer reports expected rates, risk- adjusted rates, and smoothed rates for the following measures: IQI 21 Cesarean Delivery Rate, Uncomplicated; IQI 22 Vaginal Birth After Cesarean (VBAC) Delivery Rate, Uncomplicated; IQI

23 Laparoscopic Cholecystectomy Rate; IQI 24 Incidental Appendectomy in the Elderly Rate; IQI 25 Bilateral Cardiac Catheterization Rate; IQI 33 Primary Cesarean Delivery Rate, Uncomplicated; IQI 34 Vaginal Birth After Cesarean (VBAC) Rate, All; PSI 17 Birth Trauma Rate–Injury to Neonate; PSI 18 Obstetric Trauma Rate–Vaginal Delivery With Instrument; and PSI 19 Obstetric Trauma Rate–Vaginal Delivery Without Instrument. These measures are not risk-adjusted; therefore, only the numerators, denominators, and observed rates are reported.

14.4.9 Observed rate

If the user's primary interest is to identify cases for further follow-up and quality improvement, then the observed rate would help to identify them. The observed rate is the raw rate generated by the WinQI software from the data that the user provided. Areas for improvement can be identified by the magnitude of the observed rate compared to available benchmarks and/or by the number of patients affected.

Additional breakdowns by the default patient characteristics used in stratified rates (e.g., age, gender, or payer) can further identify the target population. Target populations can also be identified by user-defined patient characteristics supplemented to the case/discharge-level flags. Trend data can be used to measure change in the rate over time.

14.4.10 Expected rate

Another approach to identifying areas on which to focus is to compare the observed and expected rates.

The expected rate is the rate the hospital would have if it performed the same as the reference population given the hospital's actual case mix (e.g., age, gender, MS-DRG, and comorbidity categories).

If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0, or observed minus expected is positive), then the implication is that the hospital performed worse than the reference population for that particular indicator. Users may want to focus on these indicators for quality improvement.

If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0, or observed minus expected is negative), then the implication is that the hospital performed better than the reference population. Users may want to focus on these indicators for identifying best practices.

14.4.11 Population rate

Users can also compare the expected rate to the population rate reported in the v6.0 Benchmark Data Tables to determine how their case mix compares to the reference population. The population rate refers to the overall rate for the reference population. The reference population is defined in the Benchmark Data Tables documents available on the AHRQ QIs website for each module. If

the population rate is higher than the expected rate, then the hospital's case mix is less severe than the reference population. If the population rate is lower than the expected rate, then the hospital's case mix is more severe than the reference population.

We use this difference between the population rate and the expected rate to "adjust" the observed rate to account for the difference between the case mix of the reference population and the hospital's case mix. This is the hospital's risk-adjusted rate.

If the hospital has a less severe case mix, then the adjustment is positive (population rate > expected rate), and the risk-adjusted rate is higher than the observed rate. If the hospital has a more severe case mix, then the adjustment is negative (population rate < expected rate), and the risk-adjusted rate is lower than the observed rate. The risk-adjusted rate is the rate the hospital would have if it had the same case mix as the reference population given the hospital's actual performance.

14.4.12 Risk-adjusted rate

The AHRQ QIs use indirect standardization to calculate the risk-adjusted rate:

Risk-adjusted *R*ate = (Observed Rate ÷ Expected Rate) ∗ Reference Population Rate]

$$Risk - adjusted\ rate = \frac{observed\ rate}{expected\ rate} \times reference\ population\ rate$$

Note that for the reference population, the observed rate equals the expected rate equals the reference population rate equals the risk-adjusted rate. A risk-adjusted rate is the rate the hospital would have if it had an average case mix. In other words, it holds the hospital's performance on the QI constant and compares that to an average case mix.

14.4.13 Smoothed rate

Finally, users can compare the risk-adjusted rate to the smoothed, or "reliability adjusted," rate to determine whether this difference between the risk-adjusted rate and reference population rate is likely to remain in the next measurement period. Smoothed rates are weighted averages of the population rate and the risk-adjusted rate, where the weight reflects the reliability of the hospital's risk-adjusted rate.

A ratio (smoothed rate − population rate) / (risk-adjusted rate − population rate) greater than 0.80 suggests the difference is likely to persist (whether the difference is positive or negative). A ratio of less than 0.80 suggests that the difference may be due in part to random differences in patient characteristics (patient characteristics that are not observed and controlled for in the risk adjustment model). In general, users may want to focus on areas in which the differences are more likely to persist.

15. User Support

Technical assistance for the Quality Indicators™ (QI) software is available through an electronic user support system monitored by the Agency for Healthcare Research and Quality (AHRQ) QIs support team. The same email address may be used to communicate to AHRQ any suggestions for QI enhancements, general questions, and any QI-related comments you may have. AHRQ welcomes your feedback. The email address for user support and feedback is QIsupport@ahrq.hhs.gov.

AHRQ offers a listserv to keep you informed of changes or updates to the QIs. The listserv is also used to make announcements about new tools and resources and to distribute other QI-related information. This is a free service. Follow the process described below to begin receiving important QI information. All you need is a computer, internet access, and an email address. The listserv operates like other electronic distribution lists.

To register for the listserv, click on this link https://subscriptions.ahrq.gov/accounts/USAHRQ/subscriber/new?topic_id=USAHRQ_39 or follow the following process:

1. Send an email message to listserv@qualityindicators.ahrq.gov.
2. In the subject line, type **Subscribe**.
3. In the body of the message, type **sub Quality_Indicators-L** and **your full name**. For example: **sub Quality_Indicators-L John Doe**.
4. You will receive a message confirming that you are enrolled.

If you have any questions, contact the AHRQ QI support team at QIsupport@ahrq.hhs.gov. You should receive an automatic response email message confirming receipt. If you do not receive a confirmation message, please call (301) 427-1949.

Appendix A: WinQI Input Data Dictionary

Table A.1. WinQI Input Data Dictionary

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Key (KEY)	Sequence number; unique case identifier	String of up to 20 characters	User-defined unique numeric identifier for each discharge record	Not required by the AHRQ WinQI software but available to allow users to link the discharge records in the Patient-Level Report back to the input data
Age (AGE)	Age in years at admission	Numeric	Age in years	If this data element is missing, the discharge record will be excluded from the analysis.
Age in Days (AGEDAY)	Age in days at admission (coded only when the age in years is less than 1)	Numeric 0–364[1] days	Age in days	Used in the inclusion and exclusion criteria for several indicators. If this data element is missing (and age is 0), then generally an alternative specification applies.
Race (RACE)	Race of patient	Numeric	1=White 2=Black 3=Hispanic 4=Asian or Pacific Islander 5=Native American 6=other	Used to stratify the AHRQ Quality Indicator™ (QI) rates. For the area-level indicators,[2] all the input data values must be mapped to one of the listed values. For hospital-level indicators, user-defined values may be retained.
Sex (SEX or GENDER)	Gender of patient	Numeric	1=male 2=female	If this data element is missing, the discharge record will be excluded from the analysis.
Primary Payer (PAY1)	Expected primary payer, uniform	Numeric	1=Medicare 2=Medicaid 3=private, incl. HMO 4=self-pay 5=no charge 6=other	Used to stratify the AHRQ QI rates. Not used for the area-level indicators. The values of 1–5 are used directly in the QI software. All other payer codes are mapped to an "other" category. This data element is used to stratify only the hospital-level IQIs (01 to 25 and 30 to 34); hospital-level PDIs (01 to 13); and hospital-level PSIs (02 to 19).
Patient State/County Code (HOSPSTCO or PSTCO)	FIPS State/county code of patient's residence (Use hospital's State/county if the patient's is unavailable; however, patient's is recommended.[3])	Numeric; two-digit State code followed by three-digit county code (ssccc)	Modified FIPS State/county code[4]	Available at https://www.census.gov/library/reference/code-lists/ansi/ansi-codes-for-states.html. If this data element is missing, the discharge record will be excluded from area-level rate calculations. This variable may be renamed in the future to reflect the preference for the location of the patient rather than the hospital.
Hospital ID (HOSPID)	Data source hospital ID	String of up to 12 characters	Hospital identification number	Used to facilitate data exploration and possible troubleshooting. May also be selected as a stratifier for hospital-level indicators.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Discharge Disposition (DISP)	Disposition of patient	Numeric	1=routine 2=short-term hospital 3=SNF 4=intermediate care 5=another type of facility 6=home healthcare 7=against medical advice 20=died in the hospital	The values 2 and 20 are referenced by the QI code (to identify transfers to another short-term hospital and patients who died in the hospital). Values 1 through 7 and 20 are used in APR-DRG assignment. Other values are recoded to missing by the software unless the user explicitly recodes them in the Crosswalk screen. This convention is different from the AHRQ QI SAS® application. Not used for PQIs.
Admission Type (ATYPE)	Admission type	Numeric	1=emergency 2=urgent 3=elective 4=newborn 5=delivery (1988–1997) 5=not used (1998–2002) 5=trauma center (2003–) 6=other	The values 3 and 4 are referenced by the AHRQ QI code (to identify elective surgeries and newborn admissions). PSIs 10, 11, 13, and 17 and PDIs 08 and 09 will be affected if admission type values are missing. Used for PQIs in newborn definition. Not used for IQIs.
Admission Source (ASOURCE)	Admission source	Numeric	1=ER 2=another hospital 3=another facility, including LTC 4=court/law enforcement 5=routine/birth/other	The values 2 and 3 are referenced by the PSI, IQI, PQI, and PDI code (to identify transfers from another hospital or facility).
POINTOFORIGINUB04 (POINTOFORIGIN04)	Point of origin	Numeric	4=transfer from a hospital 5=transfer from an SNF or ICF 6=transfer from another healthcare facility 15 (UB04 “F”)=transfer from hospice IF ATYPE=4, then: 5=born inside this hospital 6=born outside of this hospital	Only these values are used by the QI programs.
Length of Stay (LOS)	Length of stay	Numeric	Number of days from admission to discharge	Same-day discharges are coded as 0 days stay. Not used for PQIs or IQIs.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
APR-DRG (APRDRG or APR_DRG)	APR-DRG category	Numeric	3M™ APR-DRG software	Optional. Currently the AHRQ WinQI software uses a multiversion (i.e., Versions 20, 23–30, 32, 33) APR-DRG grouper to risk-adjust the IQIs. A free version of the software is packaged with this program and can be run during the data load. Not used for PQIs, PSIs, or PDIs.
APR-DRG Severity of Illness (SEVERITY or APR-DRG SOI)	APR-DRG severity score	Numeric	3M™ APR-DRG software severity score	Optional. Currently the AHRQ WinQI software uses APR-DRG Versions 20, 23–29, 32, 33. A free version of the software is packaged with this program and can be run during the data load. Not used for IQIs, PQIs, PSIs, or PDIs.
APR-DRG Risk of Mortality (RISKMORT or APR-DRG ROM)	APR-DRG risk-of-mortality score	Numeric	3M™ APR-DRG software risk-of-mortality score	Optional. Currently the AHRQ WinQI software uses APR-DRG Versions 20, 23–30, 32, 33 to risk-adjust the IQIs. A free version of the software is packaged with this program and can be run during the data load. Not used for PQIs, PSIs, or PDIs.
Diagnosis Related Group (DRG or MS_DRG)	MS-DRG	Numeric	DRG from Federal (CMS) grouper	Required for generating most indicators. For Version 24 and earlier, this is the CMS DRG. For Version 25 and later, this is the MS-DRG.
Diagnosis-Related Group Version (DRG_VER)	DRG version	Numeric	Version of Federal (CMS) DRG grouper	For example, Version 25 for FY 2008 or Version 33 for FY 2016.
Major Diagnostic Category (MDC)	Major Diagnostic Category	Numeric	DRG from Federal (CMS) grouper	Required for processing. WinQI generates it if not passed by the user, but DRG value is required for WinQI to assign MDC.
Principal Diagnosis (DX1)	ICD-10-CM diagnosis code. Diagnosis 1 is the principal diagnosis.	For ICD-10-CM - String; three to seven characters (do not include decimal point)	Diagnosis code	Required field for processing any indicator analysis. If this data element is missing, the discharge record will be excluded from the analysis.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Diagnosis Code 2–Diagnosis Code 35 (DX2–DX35) (up to 34 fields). ECODE1 through ECODE5 for E-codes in Diagnosis Code 31 through 35.	ICD-10-CM diagnosis codes or E-codes. Diagnosis codes 2–35 are secondary diagnoses.	For ICD-10-CM - String; three to seven characters (do not include decimal point)	Diagnosis codes	
Present on Admission 1–Present on Admission 35 (DXATADMIT1 or POA 1–DXATADMIT35 or POA 35) (up to 35 fields)	POA indicator for each diagnosis code	String	"Y" and "W" indicate present at the time of inpatient admission. "N," "U," "0," "E," and "1" indicate not present at the time of inpatient admission. In v5.0 and higher, a blank POA value is interpreted as indicating that the corresponding diagnosis was not present on admission unless the diagnosis code is exempt from POA reporting.	These are equivalent to the DXATADMITn fields in the UB-04 specification. Having the POA fields may eliminate "false-positives" from PSI and PDI results.
Principal Procedure 10.1 (PR1) 10.2 Procedure Code 2–Procedure Code 30 10.3 (PR2–PR30) 10.4 (up to 29 different columns)	ICD-10-CM procedure codes. Procedure code 1 is the principal procedure.	For ICD-10 String; three to seven characters (do not include decimal point)	Procedure code	Decimal points, if any, must be removed before loading data.
	ICD-10-CM procedure codes. Procedure codes 2–30 are secondary procedures.	For ICD-10 String; three to seven characters (do not include decimal point)	Procedure codes	Include up to 30 procedures. It is not necessary to have 30.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Days to Procedure 1–Days to Procedure 30 (PRDAY1–PRDAY30) (up to 30 fields)	Days from admission to procedure Procedure 1 is the principal procedure; procedures 2–30 are secondary procedures.	Numeric	Days from admission to procedure[5]	It is expected that the number of days-to-procedure variables agree with the number of procedure codes present. Valid values may be negative or zero. Applies only to PSI and PDI postoperative patient safety indicators.
Year (YEAR)	The patient's year of discharge. For example, a patient discharged on July 7, 2004, would have a discharge year of 2004.	Numeric	YYYY Discharge year should be within the range of 1997 to present year.	Required data element and used to apply the proper fiscal year coding and to assign the APR-DRG if the limited license grouper is used. If this data element is missing, the discharge record will be excluded from the analysis.
Discharge Quarter (DQTR)	The calendar quarter of the patient's discharge. For example, a patient discharged on July 7, 2004 would have a discharge quarter of 3.	Numeric	1=January–March 2=April–June 3=July–September 4=October–December	Required data element and used to apply the proper fiscal year coding and to assign the APR-DRG if the limited license grouper is used. If this data element is missing, the discharge record will be excluded from the analysis.
Custom Stratifier 1– Custom Stratifier 3	Custom stratification values	String; 1–20 characters	Any custom value you wish to stratify by	This can be used for a variety of purposes (e.g., groups of hospitals or groups of records with a hospital).
Days on Mechanical Ventilator (DMV)	Number of days the patient spent on a mechanical ventilator	Numeric		Optional data element that is passed directly to the APR-DRG grouper.
Birth weight in Grams (BIRTHWEIGHT)	Birthweight for newborns	Numeric		Optional data element that is passed directly to the APR-DRG grouper. This field is not used for pediatric birth weight categories. ICD-10-CM diagnosis codes are used to indicate birth weight.
Date of Birth (BIRTH_DATE)	Patient date of birth	Date	MM/DD/YYYY	Optional (NOT RECOMMENDED). For identification purposes only on the data export. It is not recommended that you use this field unless required for external analysis.
Admission Date (ADMIT_DATE)	Date of patient admission	Date	MM/DD/YYYY	Optional (NOT RECOMMENDED). For identification purposes only on the data export. It is not recommended that you use this field unless required for external analysis.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Discharge Date (DISCHARGE_DATE)	Date of patient discharge	Date	MM/DD/YYYY	Optional (NOT RECOMMENDED). For identification purposes only on the data export. It is not recommended that you use this field unless required for external analysis.
Patient ID (PATIENT_ID)	Patient ID or medical record number	String; 1–20 characters		Optional (NOT RECOMMENDED). For identification purposes only on the data export. It is not recommended that you use this field unless required for external analysis.

AHRQ=Agency for Healthcare Research and Quality; APR-DRG=All Patient Refined Diagnosis-Related Group; CMS=Centers for Medicare & Medicaid Services; E-code=external cause of injury code; ER=emergency room; FIPS=Federal Information Processing Standards; FY=fiscal year; HMO=health maintenance organization; ICD-10-CM=International Classification of Diseases, 10th Revision, Clinical Modification; ICF=intermediate care facility; IQIs=Inpatient Quality Indicators; LTC=long-term care; MS-DRG=Medicare Severity Diagnosis-Related Group; PDIs=Pediatric Quality Indicators; POA=present on admission; PQIs=Prevention Quality Indicators; PSIs=Patient Safety Indicators; QI=Quality Indicators™; SNF=skilled nursing facility; UB-04=Uniform Bill 04; WinQI=Quality Indicators Windows®.

[1] The 365-day range is to allow for leap years.

[2] Area-level indicators are all the PQIs, IQIs 26–29, PDIs 14–18, and PSIs 21–27. Hospital-level indicators are IQIs 01–25 and 30–34, PDIs 01–13, Neonatal Quality Indicators (NQIs) 01–03, and PSIs 02–19.

[3] See "How should I map my data element for the patient's location?" in Section 9.4.

[4] Federal Information Processing Standard, as defined by the U.S. Department of Commerce, National Institute of Standards and Technology (formerly National Bureau of Standards). Note: Certain independent cities (Baltimore City, Carson City, and St. Louis City), and areas within Hawaii and Virginia, are assigned to different area groupings in the Modified FIPS categories as compared to the U.S. Census Bureau groupings. The AHRQ QI software uses the Modified FIPS code assignment of these areas. Failure to use the Modified FIPS codes assignment will result in the use of incorrect denominator estimates for area-level indicators.

[5] Variables Days to Procedure 1 to Days to Procedure 30 are defined as the number of days from date of admission to date of procedure for each procedure. For example, if the patient was admitted on June 15 and had two procedures—the principal procedure on June 15 and a second procedure on June 18—then the value of Days to Procedure 1 would be zero (0) and the value of Days to Procedure 2 would be three (3). For more information, consult the Healthcare Cost and Utilization Project data documentation at http://www.hcup-us.ahrq.gov/db/vars/prdayn/nisnote.jsp.

Appendix B: WinQI Output Report Dictionary

Table B.1. WinQI Hospital-Level Indicator Output

VARIABLE GROUP	VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Indicator Identification (present if the user chooses to show indicators in rows)	Module	Indicator module identifier	Text	One of IQIs, PDIs, PQIs, or PSIs	
	Indicator Number	Identifier of the indicator within the module	Numeric		
	Name	Full name of the indicator	Text		
Stratifiers (the user may select between 0 and 10 of these variables in any order)	Age Category	Age category in years at admission	Numeric range	#–# OR "TOTAL"	Age categories as defined in benchmark tables (0–17, 18–39, 40–64, 65–74, 75+)
	Five Year Age Group	5-year age group in years at admission	Numeric range	#–# years	00–04, 05–09, 10–14, 15–17, 18–24, 25–29, and so on, ending with 85+
	Sex	Gender of patient	Numeric	1=male 2=female	
	Year	Year of discharge	Numeric		
	Quarter	Quarter of discharge	Numeric	1–4	
	Hospital ID	Data source hospital ID	Text	Up to 12 characters	
	Payer	Expected primary payer, uniform	Numeric	1=Medicare 2=Medicaid 3=private, including HMO 4=self-pay 5=no charge 6=other	If user had a value outside of these predefined values in the input file and user selects “Retain value” on the Crosswalk screen, then the retained value will also be reported on stratification. If user maps to “Missing” on the Crosswalk screen, then “0” will be reported.
	Race	Race of patient	Numeric	1=White 2=Black 3=Hispanic 4=Asian or Pacific Islander 5=Native American 6=other	If user had a value outside of these predefined values in the input file and user selects “Retain value” on the Crosswalk screen, then the retained value will be reported on stratification. If user maps to “Missing,” then “0” will be reported.

VARIABLE GROUP	VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
	Pediatric Age Category	Pediatric age category in years at admission	Numeric range		<1 year, 1–2, 3–5, 6–12, 13–17
	Pediatric Age in Days	Pediatric age category in days at admission	Numeric range		0–28, 29–60, 61–90, 91–365 days
Stratifiers (the user may select between 0 and 10 of these variables in any order) (continued)	Risk Category				The categories are indicator specific.
	Custom 1	Custom stratifier 1	Text	Up to 20 characters	
	Custom 2	Custom stratifier 2	Text	Up to 20 characters	
	Custom 3	Custom stratifier 3	Text	Up to 20 characters	
Calculated Values (always present, column names are prefixed with module and indicator number when the user chooses to show indicators in columns)	Observed Numerator	The number of discharge records included in the numerator (outcome of interest) as defined for the indicator	Numeric		
	Observed Denominator	The number of discharge records included in the denominator (population at risk) as defined for the indicator	Numeric		
	Observed Rate	The rate (observed numerator/observed denominator) as defined for the indicator	Numeric		
	Expected Rate	Rate calculated by assuming an "average" performance for each patient group based on the reference population, but with the hospital's actual case mix	Numeric		The reference population is based on all States participating in the most recently available HCUP SID.
	O-E Ratio	The ratio of the observed to the expected rate	Numeric		
	Reference Pop Rate	The rate for the current reference population	Numeric		

VARIABLE GROUP	VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
	Risk-Adjusted Rate	The estimated rate calculated by adjusting to an "average" case mix	Numeric		This average case mix is estimated using proportional indirect standardization: risk-adjusted rate=(observed rate/expected rate)×reference population rate.
	Risk Adj Conf Int. Low	The lower confidence bound of the risk-adjusted rate	Numeric		
Calculated Values (always present, column names are prefixed with module and indicator number when the user chooses to show indicators in columns) (continued)	Risk Adj Conf Int. High	The upper confidence bound of the risk-adjusted rate	Numeric		
	Smoothed Rate	The smoothed rate calculated using multivariate signal extraction (MSX)	Numeric		MSX smoothing estimates the effect of random differences in the observed rate across hospitals or areas. In essence, smoothing describes how persistent a rate would be from year to year. Smoothing is a useful tool to "level the playing field" for hospitals or areas with a small number of cases.

HCUP=Healthcare Cost and Utilization Project; HMO=health maintenance organization; IQIs=Inpatient Quality Indicators; MSX=multivariate signal extraction; PDIs=Pediatric Quality Indicators; PQIs=Prevention Quality Indicators; PSIs=Patient Safety Indicators; SID=State Inpatient Databases.

Table B.2. WinQI Hospital-Level Composite Indicator Report

VARIABLE GROUP	VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Composite Indicator Name	Composite indicator name for hospital-level composites		Text	IQI Proc (IQI90 - Mortality for Selected Procedures) IQI Cond (IQI91 - Mortality for Selected Conditions) PSI Comp (PSI90 - Patient Safety for	

VARIABLE GROUP	VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
				Selected Indicators) Ped Safety (PDI19 - Pediatric Patient Safety for Selected Indicators)	
Hospital ID	Hospital ID		Numeric		
Composite Rate or Ratio	Indicator rate or ratio		Numeric		
Variance	Variance		Numeric		
Standard Error	Standard error		Numeric		
Weight	Weight		Numeric		
Lower bound of the rate/ratio confidence interval	Lower bound	Lower bound of the rate/ratio confidence interval	Numeric		
Upper bound of the rate/ratio confidence interval	Upper bound	Upper bound of the rate/ratio confidence interval	Numeric		

COMP1=indicator rate or ratio; COMP1LB=lower bound ; COMP1SE=standard error; COMP1UB=upper bound; COMPVAR1=variance; COMP1WHT=weight; IQI=Inpatient Quality Indicator; PSI=Patient Safety Indicator.

Table B.3. WinQI Area-Level Indicator Output

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Module	Indicator module identifier	Text	One of IQIs, PDIs, PQIs, or PSIs	
Indicator Number	Identifier of the indicator within the module	Numeric		
Name	Full name of the indicator	Text		
Age Category	Age category in years at admission	Numeric range	#–# OR "TOTAL"	Age categories as defined in benchmark tables (0–17, 18–39, 40–64, 65–74, 75+)
Five Year Age Group	5-year age group in years at admission	Numeric range	#–# Years	00–04, 05–09, 10–14, 15–17, 18–24, 25–29, and so on, to 85+
Sex	Gender of patient	Numeric	1=male 2=female	
Year	Year of discharge	Numeric		
Quarter	Quarter of discharge	Numeric	1–4	

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Race	Race of patient	Numeric	1=White 2=Black 3=Hispanic 4=Asian or Pacific Islander 5=Native American 6=other	If user had a value outside of these predefined values in the input file and user selects "Retain value" on the Crosswalk screen, then the retained value will be reported on stratification. If user had mapped to "Missing," then "0" will be reported.
County	County FIPS code (with independent areas left separate)	Numeric	Five-digit numeric identifier	
Modified FIPS County ID	County FIPS code (with independent areas combined)	Numeric	Five-digit numeric identifier	
State	State FIPS code	Numeric	Two-digit numeric identifier	
OMB 1999 Metro Area	OMB 1999 metropolitan statistical area identifier	Numeric	Five-digit numeric CBSA identifier	
OMB 2003 Metro Area	OMB 2003 metropolitan statistical area identifier	Numeric	Five-digit numeric CBSA identifier	
Observed Numerator	The number of discharge records included in the numerator (outcome of interest) as defined for the indicator	Numeric		
Observed Denominator	The number of discharge records included in the denominator (population at risk) as defined for the indicator	Numeric		
Observed Rate	The rate (observed numerator/observed denominator) as defined for the indicator	Numeric		
Expected Rate	Rate calculated by assuming an "average" performance for each patient group based on the reference population, but with the hospital's actual case mix	Numeric		The reference population is based on all States participating in the most recently available HCUP SID databases.
O-E Ratio	The ratio of the observed to the expected rate	Numeric		
Reference Pop Rate	The rate for the current reference population	Numeric		

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Risk-Adjusted Rate	The estimated rate calculated by adjusting to an "average" case mix	Numeric		This average case mix is estimated using proportional indirect standardization: risk-adjusted rate=(observed rate/expected rate)×reference population rate.
Risk Adj Conf Int. Low	The lower confidence bound of the risk-adjusted rate	Numeric		
Risk Adj Conf Int. High	The upper confidence bound of the risk-adjusted rate	Numeric		
Smoothed Rate	The smoothed rate calculated using MSX	Numeric		MSX smoothing estimates the effect of random differences in the observed rate across hospitals or areas. In essence, smoothing describes how persistent a rate would be from year to year. Smoothing is a useful tool to "level the playing field" for hospitals or areas with a small number of cases.

CBSA= Core Based Statistical Area; FIPS= Federal Information Processing Standards; HCUP=Healthcare Cost and Utilization Project; IQIs=Inpatient Quality Indicators; MSX=multivariate signal extraction; OMB=Office of Management and Budget; PDIs=Pediatric Quality Indicators; PQIs=Patient Quality Indicators; or PSIs=Patient Safety Indicators; SID=State Inpatient Databases.

Appendix C: WinQI Export Data Dictionary

Table C.1. WinQI Export Data Dictionary

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Key				
Age	Age in years at admission	Numeric	Age in years	If this data element is missing, the discharge record will be excluded from the analysis.
Age in Days	Age in days at admission (coded only when the age in years is less than 1)	Numeric (0–364[1] days)	Age in days	Used in the inclusion and exclusion criteria for several indicators. If this data element is missing (and age is 0), then generally an alternative specification applies.
Race	Race of patient	Numeric	1=White 2=Black 3=Hispanic 4=Asian or Pacific Islander 5=Native American 6=other	Used to stratify the AHRQ QI rates. For the area-level indicators,[2] all the input data values must be mapped to one of the listed values. For hospital-level indicators, user-defined values may be retained.
Sex	Gender of patient	Numeric	1=male 2=female	If this data element is missing, the discharge record will be excluded from the analysis.
Primary Payer	Expected primary payer, uniform	Numeric	1=Medicare 2=Medicaid 3=private, including HMO 4=self-pay 5=no charge 6=other	Used to stratify the AHRQ QI rates. Not used for the area-level indicators. For hospital-level indicators, user-defined values may be retained.
Patient State/County Code	FIPS State/county code of patient's residence	Numeric; two-digit State code followed by three-digit county code (ssccc)	Modified FIPS State/county code[3]	Available at https://www.census.gov/library/reference/code-lists/ansi/ansi-codes-for-states.html
Hospital ID	Data source hospital ID	String; up to 12 characters	Hospital identification number	Used to facilitate data exploration and stratification.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Discharge Disposition	Disposition of patient	Numeric	1=routine 2=short-term hospital 3=SNF 4=ICF 5=another type of facility 6=home healthcare 7=against medical advice 20=died in the hospital	The values 2 and 20 are referenced by the QI code (to identify transfers to another short-term hospital and patients who died in the hospital). Values 1 through 7 and 20 are used in APR-DRG assignment. Other values are recoded to missing by the software unless the user explicitly recodes them in the Crosswalk screen. This convention is different from the AHRQ SAS® QI application. Not used for PQIs.
Admission Type	Admission type	Numeric	1=emergency 2=urgent 3=elective 4=newborn 5=delivery (1988–1997) 5=not used (1998–2002) 5=trauma center (2003) 6=other	The values “3” and “4” are referenced by the AHRQ QI code (to identify elective surgeries and newborn admissions). PSIs 10, 11, 13, and 17 and PDIs 08 and 09 will be affected if admission type values are missing. Used for PQIs in newborn definition. Not used in IQIs.
Admission Source	Admission source	Numeric	1=ER 2=another hospital 3=another facility, including LTC 4=court/law enforcement 5=routine/birth/other	The values “2” and “3” are referenced by the PSI, IQI, PQI and PDI code (to identify transfers from another hospital or facility).
Length of Stay	Length of stay	Numeric	Number of days from admission to discharge	Same-day discharges are coded as “0” days stay. Not used for PQIs and IQIs.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
APR-DRG	APR-DRG category	Numeric	3M™ APR-DRG software	Optional. Currently, the AHRQ WinQI software uses a multiversion (i.e., Versions 20, 23–30, 32, 33) APR-DRG to risk- adjust the IQIs. Not used for PQIs, PSIs, or PDIs.
APR-DRG Severity of Illness	APR-DRG severity score	Numeric	3M™ APR-DRG severity score	Currently, the AHRQ WinQI software uses APR-DRG Versions 20, 23–29, 32, and 33. Not used for IQIs, PQIs, PSIs, or PDIs.
APR-DRG Risk of Mortality	APR-DRG mortality score	Numeric	3M™ APR-DRG risk-of-mortality score	Currently, the AHRQ WinQI software uses APR-DRG Versions 20, 23–30, 32, and 33 to risk-adjust the IQIs. Not used for PQIs, PSIs, or PDIs.
DRG Version	Diagnosis-Related Group version	Numeric	Version of Federal (CMS) DRG grouper	For example, Version 25 for FY 2008
Diagnosis Related Group	Diagnosis-Related Group	Numeric	DRG from Federal (CMS) grouper	For Version 24 and earlier, this is the CMS DRG. For Version 25 and later, this is the MS-DRG.
MS DRG	Diagnosis-Related Group	Numeric	DRG from Federal (CMS) grouper	This replaces CMS DRG for DRG Version 25 and later. DRG value is copied to MS-DRG, and DRG value is correspondingly set to blank in the export file.
Discharge Year	The patient's year of discharge. For example, a patient discharged on July 7, 2004, would have a discharge year of 2004.	Numeric	YYYY Discharge year should be within the range of 1997 to present year.	Used to apply the proper fiscal year coding and to assign the APR-DRG if the limited license grouper is used.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Discharge Quarter	The calendar quarter of the patient's discharge. For example, a patient discharged on July 7, 2004, would have a discharge quarter of 3.	Numeric	1=January–March 2=April–June 3=July–September 4=October–December	Required data element and used to apply the proper fiscal year coding and to assign the APR-DRG if the limited license grouper is used.
Days on Mech Ventilator	Number of days the patient spent on a mechanical ventilator	Numeric		Data element that is passed directly to the APR-DRG grouper
Birth Weight Grams				
Custom Stratifier 1–Custom Stratifier 3	Custom stratification values	String; 1–20 characters	The value as was specified on the input file for the corresponding stratifier	
Patient ID	Patient ID or medical record number	String; 1–20 characters		For identification purposes only on the data export for external analysis
Discharge Date	Date of patient discharge	Date	MM/DD/YYYY	For identification purposes only on the data export for external analysis
Point of Origin	Point of origin	Numeric	4=transfer from a hospital 5=transfer from an SNF or ICF 6=transfer from another healthcare facility IF ATYPE=4, then: 5=born inside this hospital 6=born outside of this hospital	Only these values are used by the QI programs.
ICD VER	ICD version number; calculated based on year and quarter	Numeric	Values range from 12 (1994) to 32 (2015)	http://www.who.int/classifications/icd/en/
has_medical_drg	Indicator flag denoting whether discharge has Diagnosis-Related Group: Medical	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
has_surgical_drg	Indicator flag denoting whether discharge has Diagnosis-Related Group: Surgical	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
has_adult_drg	Indicator flag denoting whether discharge has Diagnosis-Related Group: Adult	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
has_or_proc	Indicator flag denoting whether discharge has an operating room procedure	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
has_pediatric_or_proc	Indicator flag denoting whether discharge has an operating room procedure: Pediatric	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
has_pediatric_medical _drg	Indicator flag denoting whether discharge has Diagnosis-Related Group: Pediatric Medical	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
is_neonate	Indicator flag denoting whether discharge is neonate	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
is_newborn	Indicator flag denoting whether discharge is newborn	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
mdc	Major Diagnostic Category	Numeric	If this is not provided in the input file, then the value of MDC is calculated based on the value of DRG.	Only included if "Temporary Flag Variables" is selected during export.
bwhtcat	Birth weight category	Numeric	9=2,500+ grams 8=2,000–2,499 grams 7=1,750–1,999 grams 6=1,500–1,749 grams 5=1,250–1,499 grams 4=1,000–1,249 grams 3=750–999 grams 2=500–749 grams 1=<500 grams	Only included if "Temporary Flag Variables" is selected during export.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
OR_Procedure_Count	Total number of procedures on the discharge that are also on the Operating Room Procedures list	Numeric		Only included if "Temporary Flag Variables" is selected during export.
Cardiac_Count	Count of total cardiac procedures	Numeric		Only included if "Temporary Flag Variables" is selected during export.
Cardiac_PDA	Indicator flag that denotes if any cardiac procedure is performed	Numeric	0=False 1=True	Only included if "Temporary Flag Variables" is selected during export.
hpd1	Accidental puncture or laceration rate Risk category for PDI 01	Numeric	1, 2, 3, 4, 5, 6, 7 (See https://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V2019/Parameter_Estimates_PDI_v2019.pdf for definitions)	Only included if "Temporary Flag Variables" is selected during export.
hpd6	Risk category for PDI 06; RACHS-1 risk category	Numeric	1, 2, 3, 4, 5, 6 (See https://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V2019/Parameter_Estimates_PDI_v2019.pdf for definitions)	Only included if "Temporary Flag Variables" is selected during export.
hpd10	Risk category for PDI 10	Numeric	1=low 2=intermediate 3=high (See https://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V2019/Parameter_Estimates_PDI_v2019.pdf for definitions)	Only included if "Temporary Flag Variables" is selected during export.
rachs_multiple	Flag indicating multiple heart surgeries; used to identify RACHS risk category	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
premature_mdx4d	Flag indicating premature infant	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.
strcabn	Indicator flag for noncardiac structural anomalies	Numeric	1=true	Only included if "Temporary Flag Variables" is selected during export.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
pdi1_risk_cat	Risk category stratification for PDI 01	Numeric	1, 2, 3, 4, 5, 6, or 9 (see *Technical Specifications* at http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/TechSpecs/PDI_01_Accidental_Puncture_or_Laceration_Rate.pdf)	Only included if "Temporary Flag Variables" is selected during export.
pdi8_risk_cat	Risk category stratification for PDI 08	Numeric	1=low 2=high (see *Technical Specifications* at http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/TechSpecs/PDI_08_Perioperative_Hemorrhage_or_Hematoma_Rate.pdf)	Only included if "Temporary Flag Variables" is selected during export.
pdi10_risk_cat	Risk category stratification for PDI 10	Numeric	1, 2, 3, 4, or 9 (see *Technical Specifications* at http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/TechSpecs/PDI_10_Postoperative_Sepsis_Rate.pdf)	Only included if "Temporary Flag Variables" is selected during export.
pdi12_risk_cat	Risk category stratification for PDI 12	Numeric	1=low 2=intermediate 3=high (see *Technical Specifications* at http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/TechSpecs/PDI_12_Central_Venous_Catheter-Related_Blood_Stream_Infection_Rate.pdf)	Only included if "Temporary Flag Variables" is selected during export.
Principal Diagnosis (DX1)	ICD-10-CM diagnosis code; diagnosis 1 is the principal diagnosis	For ICD-10-CM - String; three to seven characters	Diagnosis code	Valid codes range from 001 to 999 in the first three digits. Some diagnoses require fourth and fifth digits.
Diagnosis Code 2–Diagnosis Code 35 (DX2–DX35)	ICD-10-CM diagnosis codes; diagnosis codes 2–35 are secondary diagnoses	For ICD-10-CM - String; three to seven characters	Diagnosis codes	

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Principal Procedure (PR1)	ICD-10-CM procedure codes; procedure code 1 is the principal procedure	For ICD-10-CM - String; three to seven characters (do not include decimal point)	Procedure code	Valid codes range from 00 to 99 in the first two digits and may require a third or fourth digit. Decimal points, if any, must be removed before loading data.
Procedure Code 2–Procedure Code 30 (PR2–PR30) (up to 29 different columns)	ICD-10-CM procedure codes; procedure codes 2–30 are secondary procedures	For ICD-10-CM - String; three to seven characters (do not include decimal point)	Procedure codes	Include up to 30 procedures. It is not necessary to have 30.
Days to Procedure 1–Days to Procedure 30 (PRDAY1–PRDAY30) (up to 30 fields)	Days from admission to procedure. Procedure 1 is the principal procedure; procedures 2–30 are secondary procedures.	Numeric	Days from admission to procedure[4]	It is expected that the number of days-to-procedure variables agree with the number of procedure codes present. Valid values may be negative or zero. Applies only to PSI and PDI postoperative patient safety indicators.
IQIxx PQIxx PSIxx PDIxx	Indicator flag values for appropriate QIs	Boolean (0,1, or null)	1=true (flagged for numerator) 0=false (not flagged for numerator; included in denominator) Null=not flagged for denominator or numerator	Only included if "Indicator Flags" is selected during export.
POAxxx	Flag value for discharge level POA	Boolean (0,1, or null)	1=true 0= false Null=not flagged	Only included if "Present on Admission" indicator flags under the discharge level is selected during export.
IQIxx_expected PQIxx_expected PDIxx_expected PSIxx_expected	Expected value (i.e., expected outcome of interest given demographics, comorbidities, and risk of mortality) for appropriate QIs	Numeric	Discharge level expected rates	Only included if "Discharge level expected rate" is selected during export
AIDS	Comorbidity category code flag: acquired immune deficiency syndrome	numeric	1=true 0=false	Used in risk adjustment

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
ALCOHOL	Comorbidity category code flag: alcohol abuse	numeric	1=true 0=false	Used in risk adjustment
ANEMDEF	Comorbidity category code flag: deficiency anemia	numeric	1=true 0=false	Used in risk adjustment
ARTH	Comorbidity category code flag: arthopathies	numeric	1=true 0=false	Used in risk adjustment
BLDLOSS	Comorbidity category code flag: chronic blood loss anemia	numeric	1=true 0=false	Used in risk adjustment
CANCER_LEUK	Comorbidity category code flag: leukemia	numeric	1=true 0=false	Used in risk adjustment
CANCER_LYMPH	Comorbidity category code flag: lymphoma	numeric	1=true 0=false	Used in risk adjustment
CANCER_METS	Comorbidity category code flag: metastatic cancer	numeric	1=true 0=false	Used in risk adjustment
CANCER_NSITU	Comorbidity category code flag: solid tumor without metastasis, in situ	numeric	1=true 0=false	Used in risk adjustment
CANCER_SOLID	Comorbidity category code flag: solid tumor without metastasis, maglignant	numeric	1=true 0=false	Used in risk adjustment
CBVD	Comorbidity category code flag: cerebrovascular disease	numeric	1=true 0=false	Used in risk adjustment
CHF	Comorbidity category code flag: congestive heart failure	numeric	1=true 0=false	Used in risk adjustment
COAG	Comorbidity category code flag: Coagulopathy	numeric	1=true 0=false	Used in risk adjustment
DEMENTIA	Comorbidity category code flag: dementia	numeric	1=true 0=false	Used in risk adjustment
DEPRESS	Comorbidity category code flag: depression	numeric	1=true 0=false	Used in risk adjustment

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
DIAB_CX	Comorbidity category code flag: diabetes with chronic complications	numeric	1=true 0=false	Used in risk adjustment
DIAB_UNCX	Comorbidity category code flag: diabetes without chronic complications	numeric	1=true 0=false	Used in risk adjustment
DRUG_ABUSE	Comorbidity category code flag: drug abuse	numeric	1=true 0=false	Used in risk adjustment
HTN_CX	Comorbidity category code flag: hypertension, complicated	numeric	1=true 0=false	Used in risk adjustment
HTN_UNCX	Comorbidity category code flag: hypertension, uncomplicated	numeric	1=true 0=false	Used in risk adjustment
LIVER_MLD	Comorbidity category code flag: liver disease, mild	numeric	1=true 0=false	Used in risk adjustment
LIVER_SEV	Comorbidity category code flag: liver disease, moderate to sever	numeric	1=true 0=false	Used in risk adjustment
LUNG_CHRONIC	Comorbidity category code flag: chronic pulmonary disease	numeric	1=true 0=false	Used in risk adjustment
LUNG_MOVT	Comorbidity category code flag: neurological disorders affecting movement	numeric	1=true 0=false	Used in risk adjustment
NEURO_OTH	Comorbidity category code flag: other neurological disorders	numeric	1=true 0=false	Used in risk adjustment
NEURO_SEIZ	Comorbidity category code flag: seizures and epilepsy	numeric	1=true 0=false	Used in risk adjustment
OBESE	Comorbidity category code flag: obesity	numeric	1=true 0=false	Used in risk adjustment

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
PARALYSIS	Comorbidity category code flag: paralysis	numeric	1=true 0=false	Used in risk adjustment
PERIVASC	Comorbidity category code flag: peripheral vascular disease	numeric	1=true 0=false	Used in risk adjustment
PSYCHOSES	Comorbidity category code flag: psychoses	numeric	1=true 0=false	Used in risk adjustment
PULMCIRC	Comorbidity category code flag: pulmonary circulation disease	numeric	1=true 0=false	Used in risk adjustment
RENLFL_MOD	Comorbidity category code flag: renal failure, moderate	numeric	1=true 0=false	Used in risk adjustment
RENLFL_SEV	Comorbidity category code flag: renal failure, severe	numeric	1=true 0=false	Used in risk adjustment
THYROID_HYPO	Comorbidity category code flag: hypothyroidism	numeric	1=true 0=false	Used in risk adjustment
THYROID_OTH	Comorbidity category code flag: other thyroid disorders	numeric	1=true 0=false	Used in risk adjustment
ULCER_PEPTIC	Comorbidity category code flag: peptic ulcer disease x bleeding	numeric	1=true 0=false	Used in risk adjustment
VALVE	Comorbidity category code flag: valvular disease	numeric	1=true 0=false	Used in risk adjustment
WGHTLOSS	Comorbidity category code flag: weight loss	numeric	1=true 0=false	Used in risk adjustment
DNR	Comorbidity category code flag: do not resuscitate	numeric	1=true 0=false	Used in risk adjustment

AHRQ=Agency for Healthcare Research and Quality; APR-DRG=All Patient Refined Diagnosis-Related Group; CCS=Clinical Classifications Software; CMS=Centers for Medicare & Medicaid Services; E-code=external cause of injury code; ER=emergency room; FIPS=Federal Information Processing Standards; FY=fiscal year; HMO=health maintenance organization; ICD-10-CM=International Classification of Diseases, 10th Revision, Clinical Modification; ICF=intermediate care facility; IQIs=Inpatient Quality Indicators; LTC=long-term care; MDC=Major Diagnostic Category; MS-DRG=Medicare Severity Diagnosis-Related Group; PDIs= Pediatric Quality Indicators; PQIs=Prevention Quality Indicators; PSIs=Patient Safety Indicators; QI=Quality Indicators; RACHS=risk adjustment for congenital heart surgery; SNF=skilled nursing facility; WinQI=Quality Indicators Windows®.

[1] The 365-day range is to allow for leap years.

[2] Area-level indicators are all the PQIs, IQIs 26–29, PDIs 14–18, and PSIs 21–27. Hospital-level indicators are IQIs 01–25 and 30–34, PDIs 01–13, Neonatal Quality Indicators (NQIs) 01–03, and PSIs 02–19.

[3] Federal Information Processing Standards, as defined by the U.S. Department of Commerce, National Institute of Standards and Technology (formerly National Bureau of Standards). Note: Certain independent cities (Baltimore City, Carson City, and St. Louis City), and areas within Hawaii and Virginia, are assigned to different area groupings in the Modified FIPS categories as compared to the U.S. Census Bureau groupings. The AHRQ QI software uses the Modified FIPS code assignment of these areas. Failure to use the Modified FIPS codes assignment will result in the use of incorrect denominator estimates for area-level indicators.

[4] Variables Days to Procedure 1 to Days to Procedure 30 are defined as the number of days from date of admission to date of procedure for each procedure. For example, if the patient was admitted on June 15 and had two procedures—the principal procedure on June 15 and a second procedure on June 18—then the value of Days to Procedure 1 would be zero (0) and the value of Days to Procedure 2 would be three (3). For more information, consult the Healthcare Cost and Utilization Project data documentation at http://www.hcup-us.ahrq.gov/db/vars/prdayn/nisnote.jsp.

Appendix D: Links

The following links may be helpful to users of the AHRQ Quality Indicators™:

Inpatient Quality Indicators:
http://www.qualityindicators.ahrq.gov/modules/iqi_resources.aspx

Pediatric Quality Indicators:
http://www.qualityindicators.ahrq.gov/modules/pdi_resources.aspx

Prevention Quality Indicators:
http://www.qualityindicators.ahrq.gov/modules/pqi_resources.aspx

Patient Safety Indicators:
http://www.qualityindicators.ahrq.gov/modules/psi_resources.aspx

AHRQ Quality Indicators™ Software:
http://www.qualityindicators.ahrq.gov/software/default.aspx

Table D.1. AHRQ Quality Indicators Version 2021 Documents and Software

TITLE	DESCRIPTION
IQI Technical Specifications PDI Technical Specifications PQI Technical Specifications PSI Technical Specifications	Provide detailed definitions of each indicator (including composites), including all ICD-10-CM and MS-DRG codes that are included in or excluded from the numerator and denominator. Note that exclusions from the denominator are automatically applied to the numerator.
IQI v2021 Benchmark Data Tables	These documents provide the average volume, hospital rate, and population rate, as appropriate, for each indicator.
PDI v2021 Benchmark Data Tables	
PQI v2021 Benchmark Data Tables	
PSI v2021 Benchmark Data Tables	
Log of Changes to IQI Documents and Software Log of Changes to PDI Documents and Software Log of Changes to PQI Documents and Software Log of Changes to PSI Documents and Software	The Change Log document provides a cumulative summary of all changes to the software, software documentation, and other documents made since the release of version 2.1 of the software in March 2003. This document also summarizes changes to indicator definitions resulting from all fiscal year changes to ICD-10-CM coding and MS-DRG changes. Changes to indicator specifications that were not a result of new ICD-10-CM and MS-DRG codes are also described in the Change Log.
IQI Risk Adjustment Coefficient Tables	Tables for each indicator provide the stratification and coefficients used to calculate the risk-adjusted rate for each stratum.
PDI Risk Adjustment Coefficient Tables	
PQI Risk Adjustment Coefficient Tables	
PSI Risk Adjustment Coefficient Tables	

Quality Indicators Software Instructions	This software documentation provides detailed instructions on how to use the WinQI version of the software, including data preparation, calculation of the rates, and interpretation of output.
AHRQ QI Population File	Population data that are constructed from public-use Census data and provided for use with the Quality Indicators syntax for area-level
Version v2021 Listserv announcement (Release Note)	This document announces the release of v2021 of the WinQI software and documentation and provides a summary of changes and links to relevant screens.
IQI User Guide: Composite Measures PDI User Guide: Composite Measures PQI User Guide: Composite Measures PSI User Guide: Composite Measures IQI User Guide: Composite Measures	These user guides provide technical overviews of the composite measures.

SAS QI Software Version 2021

The SAS QI software (SAS IQI software, SAS PQI software, SAS PSI software, and SAS PDI software) v2021 calculates rates for the respective AHRQ QI modules. It is available at http://www.qualityindicators.ahrq.gov/software/default.aspx. The SAW QI software requires the SAS statistical program distributed by the SAS Institute Inc. The company may be contacted directly regarding the licensing of its products: http://www.sas.com.

Additional Documents

A number of documents are cataloged within the Archive section of the AHRQ QIs web page for historical purposes: http://www.qualityindicators.ahrq.gov/Archive/default.aspx.

Additional documents may be accessed at the AHRQ Quality Indicator Resources web page: http://www.qualityindicators.ahrq.gov/modules/Default.aspx.

Examples of documents available at this link include the following:

- AHRQ QI Measure Development, Implementation, and Retirement
- ICD-9-CM to ICD-10-CM/PCS Conversion of AHRQ QI, March 2011
- AHRQ QI Empirical Methods, July 2021

Other documents, including newsletter archives, can be viewed or downloaded from the AHRQ QI News web pages: http://www.qualityindicators.ahrq.gov/news/default.aspx and http://www.qualityindicators.ahrq.gov/Archive/News.aspx.

Other Tools and Information

QI rates can be calculated using the modified Federal Information Processing Standards (FIPS) State/county codes. A list of codes is available at https://www.census.gov/library/reference/code-lists/ansi/ansi-codes-for-states.html.

AHRQ provides a free, online query system based on HCUP data that provides access to health statistics and information on hospital stays at the national, regional, and State levels. It is available at http://hcupnet.ahrq.gov/.

Information on the 3M™ APR-DRG system is available at http://solutions.3m.com/wps/portal/3M/en_US/3M_Health_Information_Systems/HIS/?WT.mc_id=www.3m.com/us/healthcare/his/.

The CDC National Diabetes Surveillance System provides State-level estimates of diabetes prevalence by age: https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html.

Appendix E: Hospital-Level and Area-Level Indicators

Table E.1. List of Hospital-Level Indicators

Note: In v2019, some hospital- and area-level indicators are retired. Few indicators were retired in v2021 and the table below contains the most up-to-date list.

INDICATOR NAME
IQI 08 Esophageal Resection Mortality Rate
IQI 09 Pancreatic Resection Mortality Rate
IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate
IQI 12 Coronary Artery Bypass Graft (CABG) Mortality Rate
IQI 15 Acute Myocardial Infarction (AMI) Mortality Rate
IQI 16 Heart Failure Mortality Rate
IQI 17 Acute Stroke Mortality Rate
IQI 18 Gastrointestinal Hemorrhage Mortality Rate
IQI 19 Hip Fracture Mortality Rate
IQI 20 Pneumonia Mortality Rate
IQI 21 Cesarean Delivery Rate, Uncomplicated
IQI 22 Vaginal Birth After Cesarean (VBAC) Delivery Rate, Uncomplicated
IQI 30 Percutaneous Coronary Intervention (PCI) Mortality Rate
IQI 31 Carotid Endarterectomy Mortality Rate
IQI 33 Primary Cesarean Delivery Rate, Uncomplicated
IQI 90 Mortality for Selected Procedures
IQI 91 Mortality for Selected Conditions
NQI 03 Neonatal Blood Stream Infection Rate
PDI 01 Accidental Puncture or Laceration Rate
PDI 05 Iatrogenic Pneumothorax Rate
PDI 08 Perioperative Hemorrhage or Hematoma Rate
PDI 09 Postoperative Respiratory Failure Rate
PDI 10 Postoperative Sepsis Rate
PDI 12 Central Venous Catheter-Related Blood Stream Infection Rate
PSI 02 Death Rate in Low-Mortality Diagnosis Related Groups (DRGs)
PSI 03 Pressure Ulcer Rate
PSI 04 Death Rate among Surgical Inpatients with Serious Treatable Complications
PSI 05 Retained Surgical Item or Unretrieved Device Fragment Count
PSI 06 Iatrogenic Pneumothorax Rate
PSI 07 Central Venous Catheter-Related Blood Stream Infection Rate
PSI 08 In-hospital Fall with Hip Fracture Rate
PSI 09 Perioperative Hemorrhage or Hematoma Rate

INDICATOR NAME
PSI 10 Postoperative Acute Kidney Injury Requiring Dialysis Rate
PSI 11 Postoperative Respiratory Failure Rate
PSI 12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate
PSI 13 Postoperative Sepsis Rate
PSI 14 Postoperative Wound Dehiscence Rate
PSI 15 Abdominopelvic Accidental Puncture or Laceration Rate
PSI 17 Birth Trauma Rate – Injury to Neonate
PSI 18 Obstetric Trauma Rate – Vaginal Delivery With Instrument
PSI 19 Obstetric Trauma Rate – Vaginal Delivery Without Instrument
PSI 90 Patient Safety and Adverse Events Composite

Table E.2. List of Area-Level Indicators

INDICATOR NAME
PDI 14 Asthma Admission Rate
PDI 15 Diabetes Short-Term Complications Admission Rate
PDI 16 Gastroenteritis Admission Rate
PDI 18 Urinary Tract Infection Admission Rate
PDI 90 Pediatric Quality Overall Composite
PDI 91 Pediatric Quality Acute Composite
PDI 92 Pediatric Quality Chronic Composite
PQI 01 Diabetes Short-Term Complications Admission Rate
PQI 03 Diabetes Long-Term Complications Admission Rate
PQI 05 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate
PQI 07 Hypertension Admission Rate
PQI 08 Heart Failure Admission Rate
PQI 11 Bacterial Pneumonia Admission Rate
PQI 12 Urinary Tract Infection Admission Rate
PQI 14 Uncontrolled Diabetes Admission Rate
PQI 15 Asthma in Younger Adults Admission Rate
PQI 16 Lower-Extremity Amputation among Patients with Diabetes Rate
PQI 90 Prevention Quality Overall Composite
PQI 91 Prevention Quality Acute Composite
PQI 92 Prevention Quality Chronic Composite
PQI 93 Prevention Quality Diabetes Composite (Numerator)

NQI 02 is temporarily suppressed in v2020.
PQI 13 has been removed since v6.0, and PQI 93 has been added since v6.0.
IQI 32 and IQI 34 are retired in v2021.

In v2021, two indicators were retired. In v2019 of the software, the following indicators were retired:

Version 2021

- **Two Inpatient Quality Indicators (IQIs)**
  - IQI 32 Acute Myocardial Infarction (AMI) Mortality Rate, Without Transfer Cases
  - IQI 34 Vaginal Birth After Cesarean (VBAC) Rate, All

Version 2019

- **Eight Inpatient Quality Indicators (IQIs)**
  - IQI 01 (Esophageal Resection Volume)
  - IQI 02 (Pancreatic Resection Volume)
  - IQI 04 (Abdominal Aortic Aneurysm (AAA) Repair Volume)
  - IQI 05 (Coronary Artery Bypass Graft (CABG) Volume)
  - IQI 06 (Percutaneous Coronary Intervention (PCI) Volume)
  - IQI 07 (Carotid Endarterectomy Volume)
  - IQI 13 (Craniotomy Mortality Rate)
  - IQI 14 (Hip Replacement Mortality Rate)
- **Nine Pediatric Quality Indicators (PDIs)**
  - NQI 01 (Neonatal Iatrogenic Pneumothorax Rate)
  - PDI 02 (Pressure Ulcer Rate)
  - PDI 03 (Retained Surgical Item or Unretrieved Device Fragment Count)
  - PDI 06 (RACHS-1 Pediatric Heart Surgery Mortality Rate)
  - PDI 07 (RACHS-1 Pediatric Heart Surgery Volume)
  - PDI 11 (Postoperative Wound Dehiscence Rate)
  - PDI 13 (Transfusion Reaction Count)
  - PDI 17 (Perforated Appendix Admission Rate)
  - PDI 19 (Pediatric Safety for Selected Indicators Composite)
- **One Patient Safety Indicator (PSI)**
  - PSI 16 (Transfusion Reaction Count)
- **Three Prevention Quality Indicators (PQIs)**
  - PQI 02 (Perforated Appendix Admission Rate)
  - PQI 09 (Low Birth Weight Rate)
  - PQI 10 (Dehydration Admission Rate)