AHRQ Quality Indicators[TM]

QUALITY INDICATORS[™] SOFTWARE INSTRUCTIONS, WINDOWS[®] APPLICATION (WinQI)
Version 5.0
Corresponds With Version 5.0 (Technical Specifications)

Prepared for:

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Abstract

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ (QIs) were developed specifically to meet the short-term needs for information on health care quality using standardized, user-friendly methods and existing sources of 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 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 Version 5.0 and WinQI Version 5.0. Both the SAS QI v5.0 and WinQI v5.0 software are available as either 32-bit or 64-bit applications. The 32-bit applications are targeted for Windows XP operating systems, and the 64-bit applications are targeted for Windows 7 and Windows 8 operating systems.

Table 1. Differences Between SAS QI v5.0 and WinQI v5.0 (Corresponds with v5.0 of *Technical Specifications*)

SAS QI v5.0	WinQI v5.0
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 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 are 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.
Condition-specific denominators can be used in place of overall population denominators for diabetes-related PQIs using data from the CDC National Diabetes Surveillance System,	Condition-specific denominators are not available for any of the PQIs.
	Suppresses expected rate, risk-adjusted rate, and smoothed rate of PDI 06 RACHS-1 Pediatric Heart Surgery Mortality Rate.

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CDC: Centers for Disease Control and Prevention; PDI: Pediatric Quality Indicator; PQI: Prevention Quality Indicator; QI: Quality Indicator; RACHS: risk adjustment for congenital heart surgery; WinQI: QI Windows®

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 yearly changes based on the International Classification of Diseases, Ninth revision, Clinical Modification (ICD-9-CM), Medicare Severity Diagnosis-Related Groups (MS-DRGs), and Major Diagnostic Categories (MDC); an updated version of the 3M™ All Patient Refined Diagnosis-Related Group (APR-DRG) grouper; new 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-9-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 can be found in the Inpatient Quality Indicator v5.0 Benchmark Data Tables, Pediatric Quality Indicator v5.0 Benchmark Data Tables, Prevention Quality Indicator v5.0 Benchmark Data Tables, and Patient Safety Indicator v5.0 Benchmark Data Tables documents. See Appendix A for links to these documents as well as additional documentation on the AHRQ QIs.

Figure 1. Characteristics of AHRQ QI Modules

IQIs	PDIs	PQIs	PSIs
• *Volume* of certain intensive, high-technology, or highly complex procedures for which evidence suggests that institutions performing more of these procedures may have better outcomes • *Mortality* for inpatient procedures and for inpatient conditions • *Utilization* indicators, which examine procedures whose use varies significantly across hospitals and for which questions have been raised about overuse, underuse, or misuse	• Selected indicators from the other three modules with adaptations for use among children and neonates to reflect **quality of care inside hospitals**, as well as **geographic areas**, and to **identify potentially avoidable hospitalizations**	• **Potential health care quality problem areas** that might need further investigation • Measure of **primary care access** or outpatient services in a community using patient data found in a typical hospital discharge abstract	• **Potentially preventable complications** and iatrogenic events for patients treated in hospitals • **Screening tool** for problems that patients experience as a result of exposure to the health care system and that are likely amenable to prevention by changes at the system or provider level

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

This document contains instructions for the WinQI v5.0 software, which is provided for download on the AHRQ QI Web site (http://www.qualityindicators.ahrq.gov/Software/WinQI.aspx). The software calculates 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 XP, Windows 7, and Windows 8 operating systems. AHRQ's goal, by making this tool publicly available, is to assist users in producing information on health care quality more cost effectively.

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 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.

Acknowledgments

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ (QIs) program uses the Healthcare Cost and Utilization Project (HCUP) 2012 State Inpatient Databases (SID) to compute reference population data. HCUP is a family of health care 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 health care 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 health care 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 SID:

Alaska State Hospital & Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
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 and Hospitals
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 MHA…An Association of Montana Health Care Providers
Nebraska Hospital Association

Nevada Department of Health and Human Services
New Hampshire Department of Health and 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 Health Policy and Research
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Budget & Control Board
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 Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

For more information on HCUP, visit http://www.hcup-us.ahrq.gov.

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1.0 Installation

1.1 Before You Begin

1. 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.†

2. Check your system for minimum requirements (see Section 1.2).

3. Uninstall any previous versions of the Quality Indicators™ Windows (WinQI) software by going to **My Computer** and choosing **Add/Remove Programs** in Windows XP or **Uninstall or change programs** in Windows 7 and Windows 8. Then, reboot your computer to complete the uninstall step. You should **not** uninstall Microsoft® .NET Framework or SQL Server® Express if you already have them.

1.2 Hardware and Software Requirements

The WinQI software has been tested on the following configuration:

- 32-bit Microsoft Windows 2000 and Windows XP

- 64-bit Microsoft Windows 7 and Windows 8

- .NET Framework Version 4.0 and above

- Microsoft SQL Server Express 2005, 2008, and 2012 (Note: If the dataset contains more than about 4.5 million discharge records, then 2008 or 2012 is required.)

Approximate disk space requirements

- Microsoft .NET Framework v4.0: 850 MB

- Microsoft SQL Server Express 2005: 1.0 GB

- WinQI application: 123 MB

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† 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 2008 or 2012 is required.

1.3   Installation Process

The installation process is depicted in Figure 2.

Figure 2. Installation Process
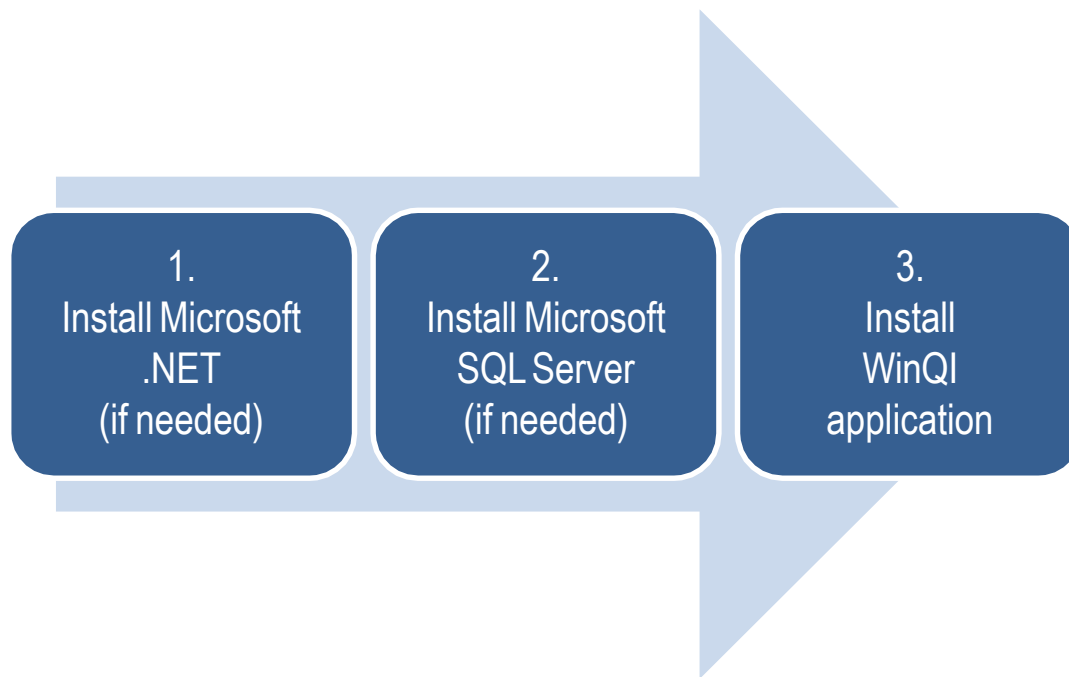
1.3.1 Step 1: Microsoft .NET Installation

WinQI requires Microsoft .NET Framework v4.0 or higher. This is similar to the requirement for WinQI v4.3 but represents a change from earlier versions of WinQI, which required only .NET Framework v2.0.

Before you begin:

To check whether your system already has the Microsoft .NET Framework v4.0 installed, go to Control Panel and select Programs and Features (Windows 7 and Windows 8) or Add/Remove Programs (Windows XP).

To install:

1. Click **Microsoft .NET Framework** on the WinQI Download Page (http://www.qualityindicators.ahrq.gov/Software/WinQI.aspx). This will take you to the .NET download Web site.

2. Click the <**Download**> button, choose to <**Save**> it to your desktop, and then <**Run**> it.

3. The program prompts you for confirmation and asks you to accept a license agreement. Afterwards, the installation will proceed on its own.

4. If you already have .NET v4.0 installed, the program will prompt you to <**Repair**> or <**Remove**>. Just click <**Cancel**>.

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 as long as it is 2005 or later, although the 2008 or 2012 editions are required for datasets larger than 4 GB (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 will prefer to use SQL Server 2008 or 2012 Express Edition installed on their PC 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 2008 or 2012 Express Editions are recommended for WinQI. A download is provided on the WinQI software page of the AHRQ QI Web site. See Table 2 for guidance on when you will need to download SQL Server.

Table 2. User Configurations & 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.
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 600MB free disk space...	Download SQL Server 2008 or 2012 Express Editions,

To install SQL Server 2012 Express Edition:

1. Click **SQL Server 2012 Express Edition** on the WinQI download page. This will take you to the SQL Server download Web site.

2. Choose the <**Download**> button for the file called SQLEXPR_x64_ENU.exe (Windows 7/8 64-bit) or SQLEXPR_x86_ENU.exe (Windows XP/7/8 32-bit). Then choose <**Run**>, or <**Save**> it to your desktop and then <**Run**> it.

3. If you are running Windows 7 or Windows 8, you will see a User Access Control Panel prompt asking you if 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.

To install SQL Server 2008 Express Edition:

1. Click **SQL Server 2008 Express Edition** on the WinQI download page. This will take you to the SQL Server download Web site.

2. Choose the <**Download**> button for the file called SQLEXPR_x64_ENU.exe (Windows 7/8 64-bit) or SQLEXPR_x86_ENU.exe (Windows XP/7/8 32-bit). Then choose <**Run**>, or <**Save**> it to your desktop and then <**Run**> it.

3. If you are running Windows 7 or Windows 8, you will see a **User Access Control Panel** prompt, asking you if 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 under Windows XP:

1. Click **Combined Quality Indicators Modules Software for Windows** on the WinQI download page.

2. Select the download that corresponds to the operating system and system type that you are using; e.g., Windows 7 64-bit or Windows XP 32-bit. To determine this on your local computer, choose **Start → Programs → Accessories → System Tools → System Information**. If you will run the software under a 32-bit operating system, then you must install WinQI 32-bit. If you will run the software under a 64-bit operating system, then you must install WinQI 64-bit.

3. Accept the 3M™ APR-DRG software license agreement. If you choose not to accept the agreement, you may download a version of the software that does not include the 3M™ APR-DRG grouper.

4. Click <**Save**> to download the application to your desktop.

5. You will then be prompted with a screen to <**Run**> the application. If you are running Windows XP, choose <**Run**> and continue to the next step.

6. Click <**Next**>, accept the terms in the license agreement, and click <**Next**>.

7. Choose the directory in which to install the software, and click <**Next**>.

8. On the Database Server screen, enter the location and name of the SQL Server instance that was created during installation of SQL Server. If you are using an existing SQL Server instance, specify its location and name. If a default installation was performed, then this location will be ".\SQLEXPRESS." Also, check the item associated with the standard Windows authentication process.

9. Click <**Next**> to begin the installation. The installer will build the QI database and install files, and then it will run the "PopLoader" program to install the population table. Ensure that a message window appears showing the status of the "PopLoader" program as it loads records from the population file.

10. At the Microsoft Visual C++ download wizard page, review and accept the license agreement, and click <**Next**>. If you already have the Microsoft Visual C++ Library installed and a dialog box appears asking whether to uninstall or repair the installation, click <**Repair**>.

11. Click <**Finish**> when the program has completed. This completes the installation of the **WinQI** software.

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

To install under Windows 7 and Windows 8:

1. Click **Combined Quality Indicators Modules Software for Windows** on the [WinQI download page](). If you will run the software under a 64-bit operating system, then you must install WinQI 64-bit.

2. Accept the 3M™ APR-DRG software license agreement.

3. Click <**Save**> to download the application to your desktop.

4. Double-click on the **Quality Indicators** icon on your desktop to <**Run**>.

5. At the wizard welcome page, click <**Next**>, then again accept the terms in the 3M™ APR-DRG software license agreement, and click <**Next**>.

6. Choose the destination folder in which to install the software, and click <**Next**>.

7. On the Database Server screen, enter the location and name of the SQL Server instance that was created during installation of SQL Server. If you are using an existing SQL Server instance, specify its location and name. If a default installation was performed, then this location will be ".\SQLEXPRESS." Also, check the item associated with the standard Windows authentication process.

8. Click <**Next**> to begin the installation. The installer will build the QI database and install files, and then it will run the "PopLoader" program to install the US Census population table. Ensure that a message window appears showing the status of the "PopLoader" program as it loads records from the US Census population file.

9. At the Microsoft Visual C++ download wizard page, review and accept the license agreement, and click <**Next**>. If you already have the Microsoft Visual C++ Library installed and a dialog box appears asking whether to uninstall or repair the installation, click <**Repair**>.

10. Click <**Finish**> when the program has completed. This completes the installation of the **WinQI** software.

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

2.0 Overview of the WinQI Software

This document describes the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ Windows® (WinQI) software (Version 5.0), 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.

2.1 Reference Populations

When applicable, the software calculates risk-adjusted and expected rates using a reference population that is an aggregation of 2012 discharges from all of 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 Web site (http://www.ahrq.gov/data/hcup/).

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 v5.0 software. The risk-adjusted rates for the provider-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 one another. 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 v5.0 software.

2.2 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 2.1). You cannot use this program unless you provide your own administrative discharge data to analyze. The data requirements and specifications are in Appendix A.

In addition to the reference population rates, the software also 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 can be modified by the user before generating a composite report, as described in Section 6.12).

2.3 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 since 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 8.4).

For provider-level indicators, the expected rate takes into account the age, sex, comorbidities, severity, 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 6.13). The risk-adjusted rate calculated by the software is the observed rate divided by the expected rate times the reference population rate.[‡] 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.[§]

2.4   Using the WinQI Software for Analysis

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

2.4.1 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, click on <**Patient Level Report**> (see Section 6.3) on the Main screen and select an indicator to view all the cases flagged for that indicator. This tool can be useful for selecting cases for chart review and further study.

Double-click on an individual case to get more information about that case. The Case Details screen (see Section 6.4) 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, Ninth revision, Clinical Modification codes contributed to this assignment).

2.4.2 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.

[‡] The reference population rate is only used in the calculation of the risk-adjusted rate 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.

[§] See the Quality Indicator Empirical Methods, Revised November 2014 report.

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 can be used to identify areas and opportunities for quality improvement.

2.5   Other Documentation

The QIs are separated into four modules: Patient Safety Indicators (PSIs), Inpatient Quality Indicators (IQIs), PQIs, and 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®** syntax and instructions, as well as a list of the coding changes made for each fiscal year by module (see change logs and release notes for details on WinQI v5.0 and SASQI v5.0).

2.6   WinQI Flowchart

Figure 3 illustrates how the WinQI software is used.

** 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 their products. The SAS Institute, Inc., has no affiliation with AHRQ or involvement in the development of the AHRQ QIs.

Figure 3. Data Flow Diagram for AHRQ WinQI
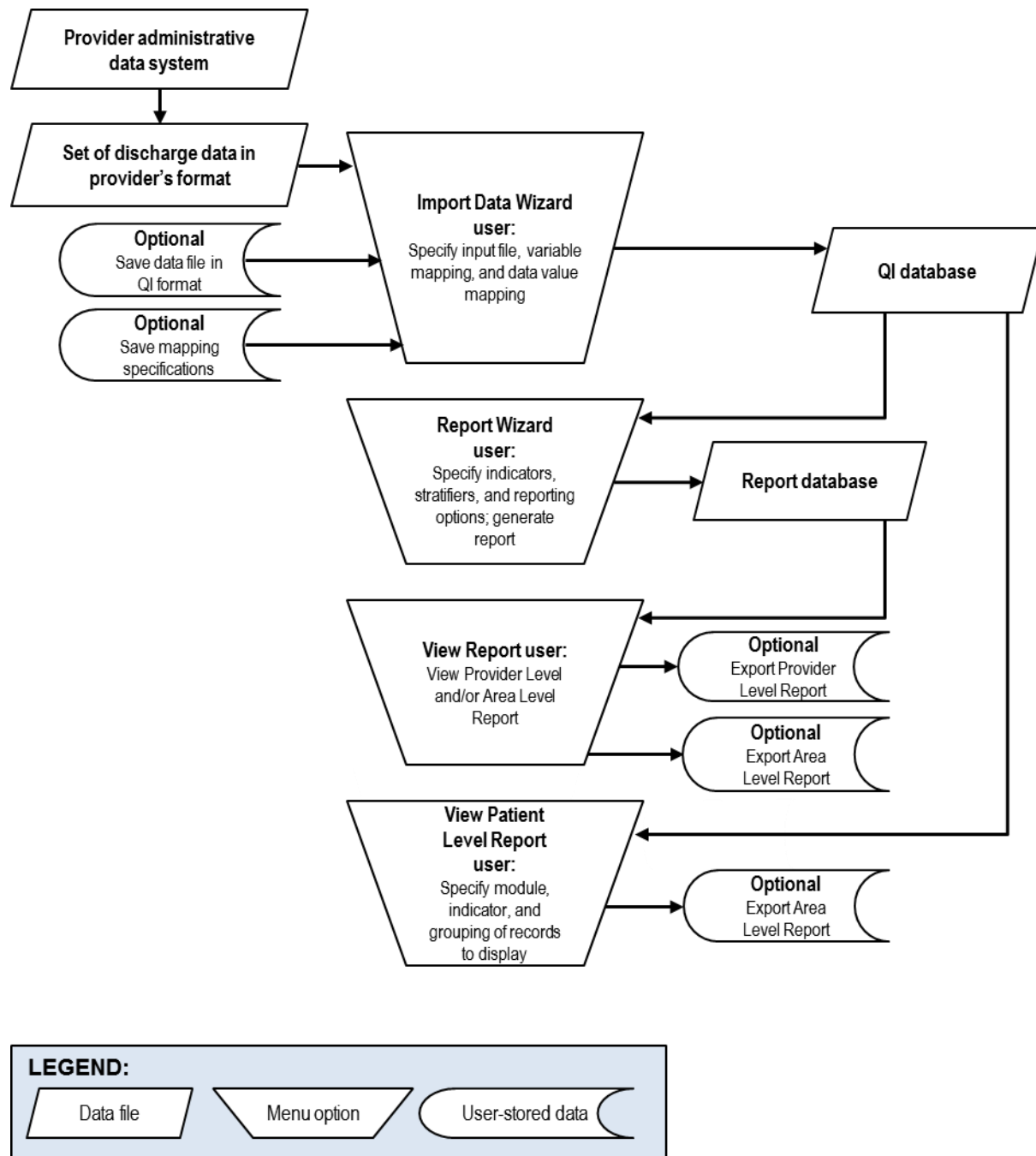
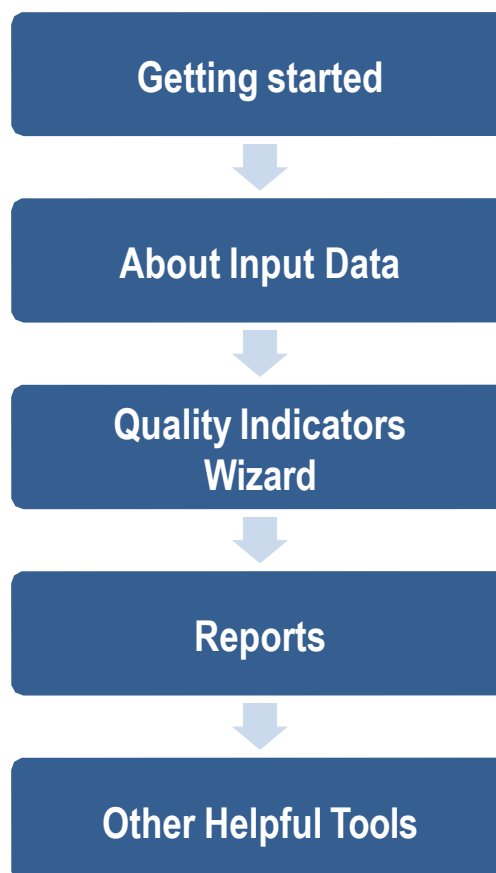# 3.0   Getting Started

3.1   Using WinQI

3.1.1   How do I start the WinQI software?

Click on your computer's <**Start**> button, point to **Programs**, point to the **Agency for Healthcare Research and Quality** folder, point to the **AHRQ Quality Indicators** folder, and then click on **AHRQ Quality Indicators**.

3.1.2   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

```
        ┌──────────────────────────┐
        │     Getting started       │
        └──────────────────────────┘
                     ↓
        ┌──────────────────────────┐
        │     About Input Data      │
        └──────────────────────────┘
                     ↓
        ┌──────────────────────────┐
        │    Quality Indicators     │
        │         Wizard            │
        └──────────────────────────┘
                     ↓
        ┌──────────────────────────┐
        │         Reports           │
        └──────────────────────────┘
                     ↓
        ┌──────────────────────────┐
        │    Other Helpful Tools    │
        └──────────────────────────┘
```

Most of these sections show screen shots of each process step for each software function. The discussion of each screen's capabilities includes answers to the questions, "What is this screen for?"; "How is this screen organized?"; and "What should I do here?"

Timesaving tips and other questions may also be included in the discussion.

3.2   Main Screen

3.2.1 What is this screen for?

This screen (Screenshot 1) provides access to all features of the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ Windows® (WinQI) software.

Screenshot 1. WinQI Main Screen

3.2.2 How is this screen organized?

3.2.2.1   QI Session Log

The QI Session Log (see Section 7.1) keeps a record of all actions performed by the application. During the data check, some helpful error messages are written to the log about some of the invalid values found. See Section 5.7 for more information.

2 ### 3.2.2.2   Menu Bar Data

Data

- <**Import Data Wizard**>—launches the Import Data Wizard that walks you through the process of loading your data.
- <**Export Data**>—accesses the screen that allows you to save the processed data in the QI format and to save the data mapping that was generated using the Import Data Wizard, with flags and comorbidities.

Reports

- <**Area Report Wizard**>—launches the Wizard that walks you through the process of creating a new rate report based on geographic regions such as counties.
- <**Provider Report Wizard**>—launches the Wizard that walks you through the process of creating a new rate report based on health care providers, such as hospitals.
- <**View Saved Reports**>—accesses the screen that displays the latest run report created using the Report Wizard.
- <**Quick Report**>—shows the total numerator and, where applicable, the denominator and observed rate for each indicator. Also shows the overall population rate of indicators for which risk adjustment is applied.
- <**Patient Level Report**>—accesses a tool that allows you to view all discharge records associated with a selected indicator. This report uses the data that were prepared using the Import Data Wizard.

Tools

- <**Program Options**>—allows you to save the Session Log and change database connection and other system settings.
- <**Data Load Report**>—displays the Data Load Summary screen at the end of the Import Data Wizard.
- <**Save QI Session Log**>—allows you to save the Session Log window to a file. It is often helpful to include a copy of the Session Log if you contact the AHRQ QIs support team via email with questions.
- <**Hospital Table**>—allows you to change the county code or provide a name for hospitals in the data file. This table can be loaded from an external file and /or edited.

Help

- <**Using QI Application**>—accesses the application Help system.
- <**QI Website**>—launches the QIs Web site.
- <**Contact QI Support**>—displays the contact information for the QIs support team.

> ***Exit***
>
> - <**Exit Program**>—closes WinQI.

3.2.3 What should I do here?

Click one of the options in the Menu bar. You will need to use the Import Data Wizard to load your discharge records before you will get any results using any of the other items.

3.2.4 What data are recorded in the Session Log?

The Session Log provides a record of all activities during the session. It also records any errors that might be generated during the session. This information can be useful when trying to solve problems.

3.2.5 How can I save the data in the Session Log?

A cumulative QI Session Log is stored automatically in a text file that has the ".log" extension. The location of this file can be changed (see Section 7.1.1.2).

There is also a <**Save QI Session Log**> control on the Main screen. 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.

A third way to save the Session Log data is to select the text to be saved, press Control-c to copy the text, and then paste the saved text into a document using menu options or Control-v. When contacting AHRQ QI support, please only include the relevant portions of your log file.

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

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

3.2.7 What if I forget to save a report?

The report will stay in memory until you use the Report Wizard to generate a new report. You can use the <**View Report**> option to access the report, and then use the <**Export All**> button on that screen to save the report to a file.

3.2.8 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 (see Section 7.1.1.2) and a copy of your column mapping—either the .qim mapping file or the contents of the Mapping Quick Check screen (see Section 5.6).

4.0 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.

4.1 Questions on Input Data

4.1.1 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, starting with selecting **Import Data Wizard** from the menu on the left-hand side. The graphical user interface will guide you through the steps to load data, generate reports, and review cases.

4.1.2 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 provider, diagnosis codes, procedure codes, and information about the admission, payer, and discharge.

4.1.3 What format should the data be in?

Two key formatting issues 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 Import Data 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 these flags).

4.1.4 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 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.

4.1.5   What data must be included?

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

4.1.6   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 (see Section 5.5) in the Quality Indicators Wizard to determine the consequences of leaving out any variable.

4.1.7   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 provider-level indicators using whatever custom grouping you wish. However, the application can only use variables in the first 200 fields of your data, so you should be sure that all required variables are in the first 200 fields.

4.1.8   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, it is generally easier and less error-prone to include column headers.

4.1.9   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 to the WinQI application. For example, the WinQI disposition value for "died" is "20."

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.

There are four types of data elements:
◆ **Numbers;**
◆ **Dates;**
◆ **Strings; and**
◆ **Mapped variables.**

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

CSV 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 4.1.4, 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.

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

Yes. You can switch the delimiter to Tabs on the Program Options screen in the Quality Indicators Wizard.

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

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 5.5) in the Quality Indicators 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 exceeds 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.

4.1.13 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) rely on results, such as the risk-of-mortality subclass, determined by the 3M™ 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. The optional limited license grouper available with the AHRQ WinQI software is "multiversion;" i.e., Versions 20, 23–30, 32, 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, Ninth revision, Clinical Modification mapping to Version 32.

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/.

5.0   Import Data Wizard

The Import Data Wizard (Screenshot 2) walks you through the process of preparing data for calculating all of the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators™ (QIs), calculates the values for the QIs, and then allows you to save the resulting data for later use. You select the <**Import Data Wizard**> from the menu on the left-hand side of the Main screen in the Quality Indicators Windows® (WinQI) software.

Screenshot 2. Import Data Wizard

Saving the data is optional. You can use the QI data immediately and in subsequent sessions to generate reports. The data will not be discarded or overwritten until the next time you run the wizard. You can save the data for use in an external program at any time by selecting the <**Export Data**> option on the application menu. See Appendix C for a list of all the variables in the export file. The wizard also provides the option to save the specifications for mapping your data variables to the QI variables. This option can save time the next time you import data files that have the same structure.

5.1 Welcome to the Import Data Wizard

5.1.1 What is this screen for?

This screen (Screenshot 3) introduces the Quality Indicators Wizard.

Screenshot 3. Quality Indicators Wizard Introduction
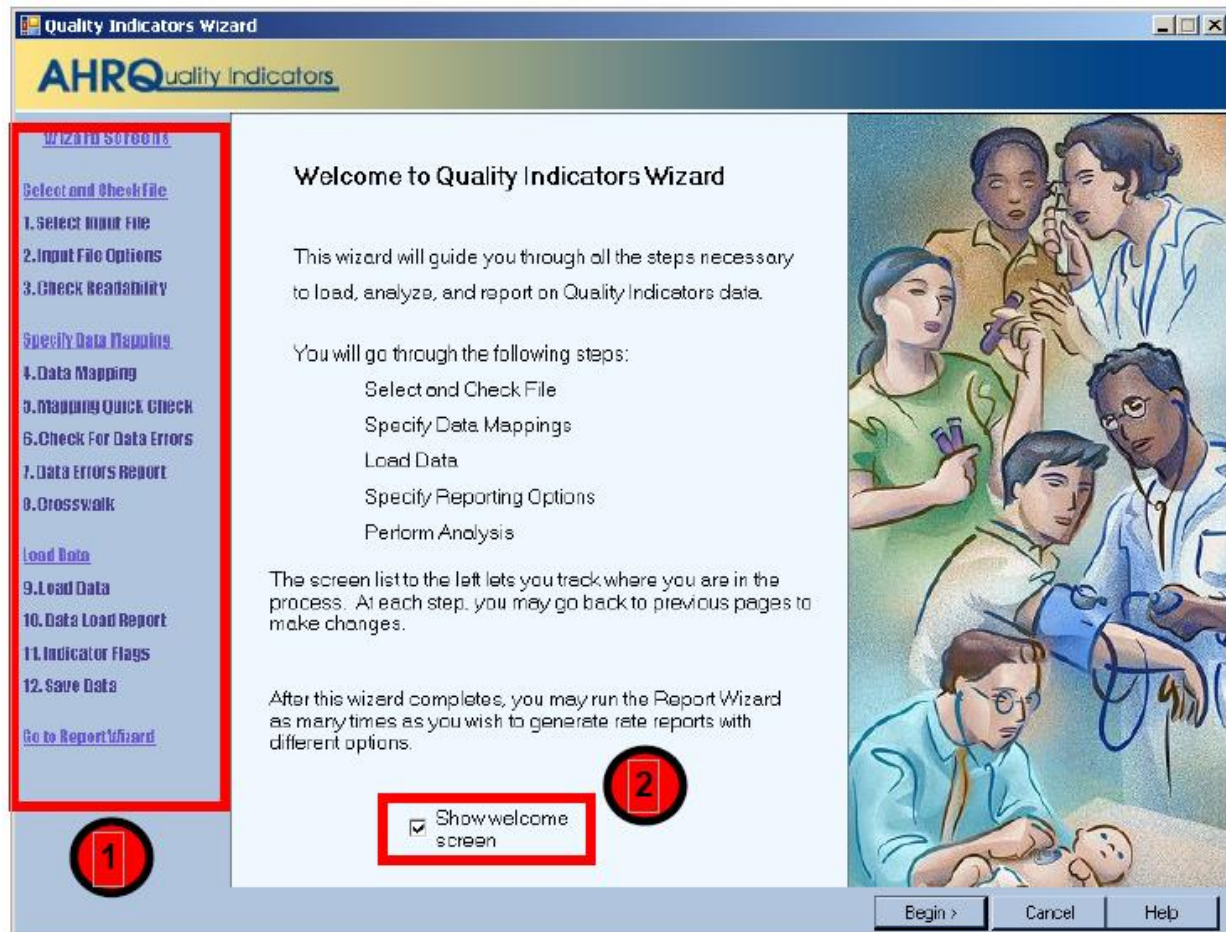
5.1.2 How is this screen organized?

①   **5.1.2.1 Wizard Screens**

This area lists the names of all screens in the WinQI software. This list is displayed on every screen in the wizard. As you progress through the wizard, the title of the current screen will be highlighted in red.

②   **5.1.2.2 "Show Welcome Screen" Checkbox**

If you uncheck this box, the next time you open the QI Wizard it will skip this screen and proceed directly to the **Select Input File** screen.

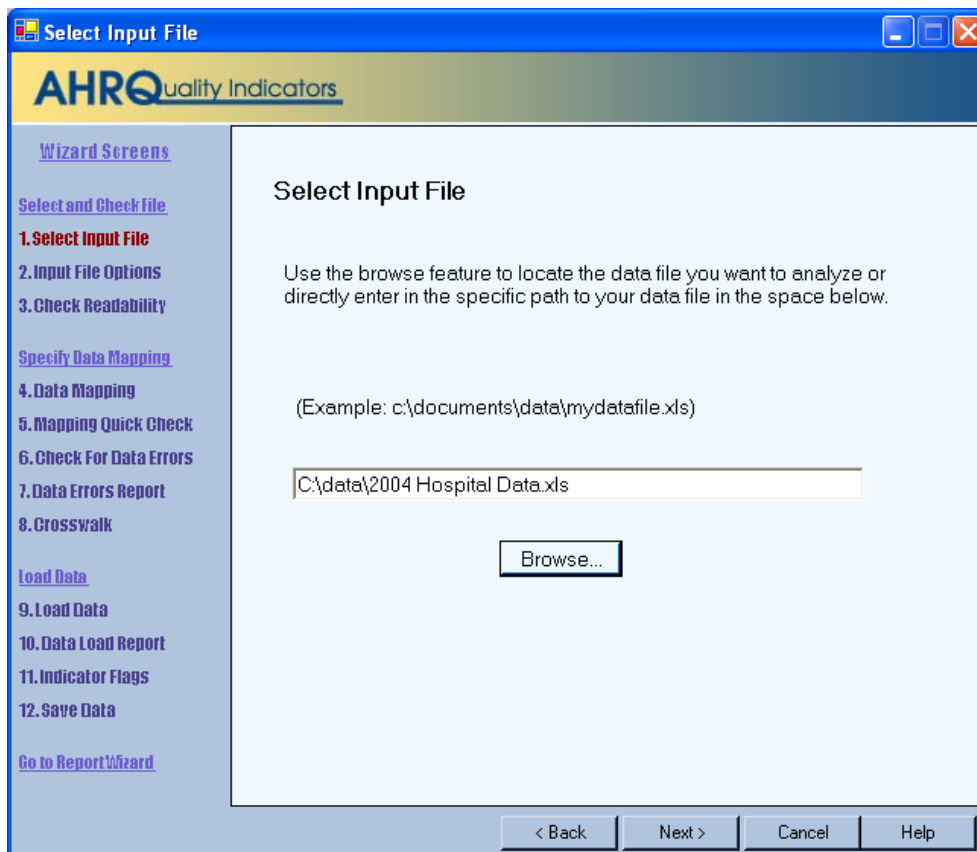### 5.1.3 What should I do here?

Click the <**Begin**> button to proceed to the first wizard screen. If you click the <**Cancel**> button on any screen, the wizard will close.

5.2   Select Input File

5.2.1 What is this screen for?

Use this screen (Screenshot 4) to specify the data file you want to load.

Screenshot 4. Select Input File

5.2.2 How is this screen organized?

The file name field displays the name of the data file selected for loading. This field will be blank the first time you use the wizard. In subsequent sessions, the wizard will default to the most recent data file loaded, displaying the complete path to the file. The file must have a .csv, .mdb, or .xls extension.

5.2.3 What should I do here?

Use the <**Browse**> button to locate and select the data file you wish to load. Click the <**Next**> button after a file has been selected.

5.3   Input File Options

5.3.1 What is this screen for?

Use this screen (Screenshot 5) 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 Quality Indicators Wizard. See the description below for more information on mapping files.

Screenshot 5. Input File Options

5.3.2 How is this screen organized?

1   **5.3.2.1   Additional Options For: <Filename>**

The title of the screen displays the name of the file you selected on the Select Input File screen. The selections available in this area depend on the type of file you selected.

Access file (.mdb)

- You will be prompted to <**Select Table**> to use for the input data.

Excel file (.xls)

- You will be prompted to <**Select Worksheet**> to use for the input data. Column headers are required input for Excel files.

Comma-separated value file (.csv)

- Checkboxes are provided for you to select whether the first row of the file contains column headers and whether values are enclosed in quotes.

(2) **5.3.2.2 APR-DRG Grouper**

This section provides options for either using the built-in limited license 3M™ All Patient Refined Diagnosis-Related Group (APR-DRG) grouper or mapping the APR-DRG, severity-of-illness (not used), risk-of-mortality, and risk-of-mortality data elements from the input data file. If you use the built-in APR-DRG grouper, your file must have the discharge year and quarter.

(3) **5.3.2.3   Data Mapping and Crosswalk**

This section provides options to use a mapping file that was created in a previous session. Doing so allows you to skip several steps in the Data Import Wizard. Note that the mapping file will work properly across different data files only if those data files have the same structure (same variables in the same order and the same crosswalk). A mapping file should not be used in this section if it was created from a data file with a different structure than the one being analyzed here.

5.3.3 What should I do here?

5.3.3.1   Specify Table or Worksheet

Options available in this section depend on the type of file selected for loading. If an Access or Excel file was selected for loading, use the drop-down menu to select which of the worksheets (Excel) or tables (Access) to use.

5.3.3.2 Select Options for CSV Files

Check the box labeled "First row contains column headers" if the first row of your file contains variable names rather than data. By default, the option is checked. (This option is also displayed for Excel files, but it may not be unchecked.)

If your data values are enclosed in quotation marks, click the box labeled "Values are enclosed in quotes" to have the quotation marks removed when the file is loaded (double-quotes only).

5.3.3.3 Specify Mapping Method

Data elements in your file need to be mapped to the QI format. The program uses a mapping shortcuts table to automatically match input variables in your data to variables used by the WinQI software; e.g., "ASOURCE" is mapped to "Admission Source."

If you choose "My data are in an unknown format," the wizard will step you through the process of specifying your data format. Once you have completed the wizard, you can save the data mapping for reuse.

If you have a saved mapping file that you want to load, refer to the directions in Section 5.3.4. If you use a mapping file, you have the option of skipping the validation and mapping steps and jumping directly to the data load.

You can save time by editing the mapping shortcuts table to increase the number of automatic matches made by the program. To do so, click the <**Edit Mapper Shortcuts**> button. After you are finished, close the screen, leave "My data are in an unknown format" selected, and proceed.

5.3.3.4 Select a Mapping File

By default, the "My data are in an unknown format" radio button is selected. If you have a saved mapping file that you want to load, refer to the directions in Section 5.3.4. If you use a mapping file, you have the option of skipping the validation and mapping steps and jumping directly to the data load.

5.3.4 Timesaving Tips

Once you have been through the Quality Indicators Wizard and created and saved a mapping of your variables, you can reuse those specifications with other data files that have the same variables in the same order. Click the "Use a mapping specified in a file" radio button, and use the <**Browse**> button to locate and select the data file you wish to load. The mapping files have a .qim extension.

Mapping files may be used in three ways:

1. With a mapping file, you may bypass the Data Validation, Data Mapping, and Crosswalk screens. To do so, click the checkbox labeled "Skip validation and mapping screens."

2. You may use a mapping file that does not perfectly match your input data specification. Make sure that "Skip validation and mapping screens" is **not** checked. This option will allow you to add any additional information.

3. You may import data directly from the command line[††] using a mapping file. There are two types of mapping files.

4. "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.

5. "By Name" mapping files can only be used 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.

5.3.5 Other Questions

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

The Quality Indicators Wizard requires alphanumeric column headings for Excel files. You should make sure that all of 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, Ninth revision, Clinical Modification (ICD-9-CM) codes that look like numbers but are not purely numeric.

5.3.5.2   Why are alphabetical column headers so important for Excel?

The driver that reads Excel files examines the first few rows of the file to "guess" 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-9-CM codes mixed with E- or V-codes.
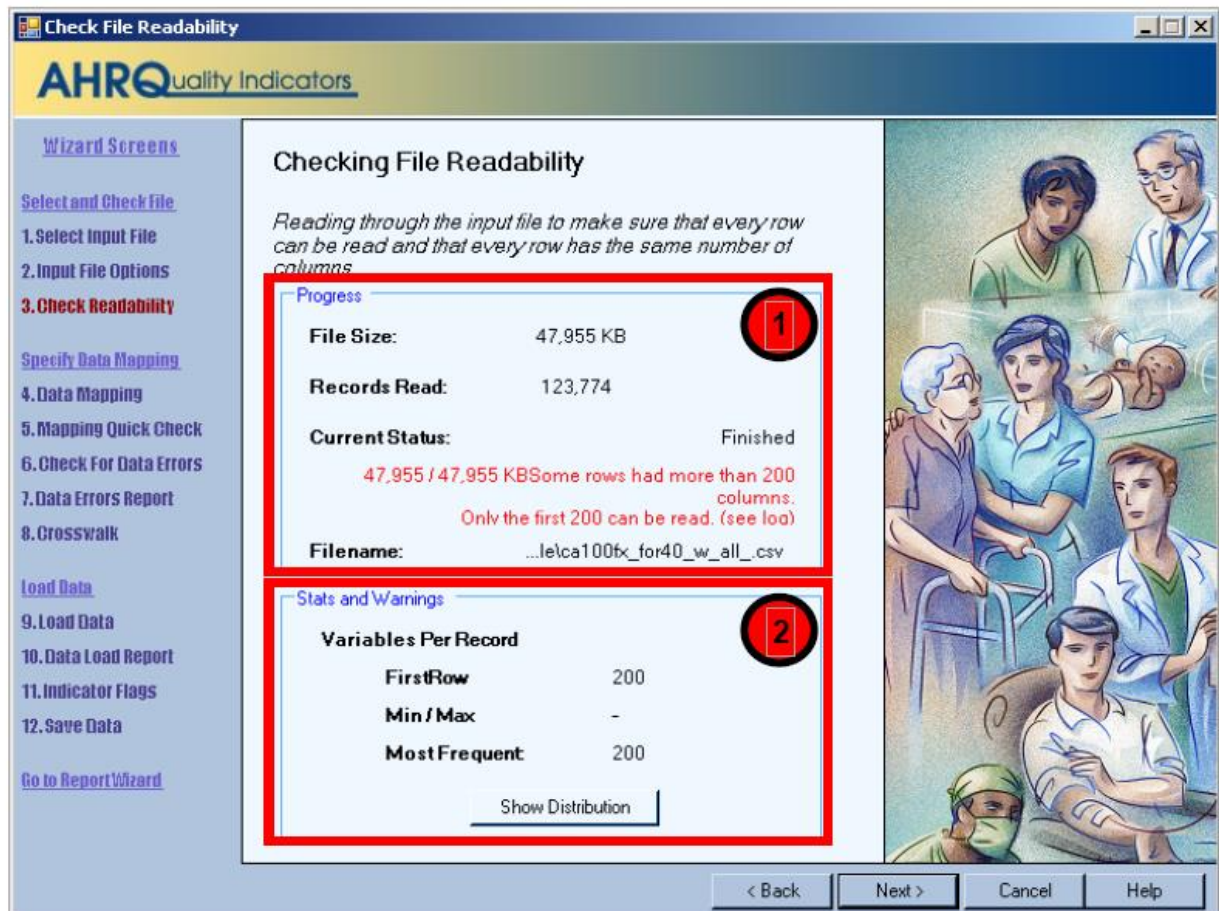

[††] Advanced users who wish to use this feature may contact AHRQ QI support for more information.

5.4   Check Readability

5.4.1 What is this screen for?

This screen (Screenshot 6) displays the progress and results of a scan of the data to verify that the data can be read by the application.

Screenshot 6. Check File Readability

5.4.2 How is this screen organized?

① #### 5.4.2.1   Progress

This area displays the file name and size on entry. The number of records read increases incrementally as the readability check progresses, and the "Current Status" value will change from "Reading file" to "Finished" on completion.

② #### 5.4.2.2   Stats and Warnings

This area displays a report on the variables found per record.

5.4.3 What should I do here?

Pay attention to the number of variables found in your file. Normally, all rows will contain the same number of variables. If there are numbers displayed next to "Min/Max," some rows have more variables than others. Check to make sure that the correct data file has been specified and that the file has not become corrupted.

When you click the <**Show Distribution**> button, the Quality Indicators Wizard displays a table showing the number of rows found for each different set of column numbers. Ideally, there should be only one row in this table. In other words, every row should have the same number of variables. If this is not the case, then either some of the rows have extra values or some rows have values missing. The popup window also shows the row number of the first row with each count of values. This window can be helpful in figuring out where and why a file became corrupted.

5.5   Data Mapping

5.5.1 What is this screen for?

This screen (Screenshot 7) lets you map variables used by the WinQI software to the variables in your input file.

Screenshot 7. Data Mapping

5.5.2 How is this screen organized?

1 5.5.2.1   Input File Variables

Lists the names of all variables found in your data file along with the position of each variable (the column number) within each row. Note that your input data may contain variables that do not correspond to variables used by the WinQI software. For example, the screenshot above represents an input data file with the variables DISCWT, PCTPOA, ASCHED, AWEEKEND, and DISPUNIFORM. None of these variables are used by the WinQI software.

2 5.5.2.2   Variables Used by WinQI Software

Lists the names of all QI variables (see Appendix A) that have not been mapped to one of your data input file variables. If any required variables have not been mapped,

the title "Required" will appear above those variable names and the title "Optional" will appear above the other variable names. Once all required variables have been mapped (all the remaining variables are optional), these titles are not displayed.

③ 5.5.2.3   Sample View of Input File Data

The contents of the first 50 rows in your data file are listed in this section.

5.5.3 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 aren't sure how one of your variables matches up to a QI variable, look at the **Sample View** of your data to see what values are stored in the variable.

> 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 View**, and 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.

5.5.4 Timesaving Tips

5.5.4.1   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 be matched up automatically.

5.5.4.2   Data Mapper Shortcuts

Other column names can be matched 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.

5.5.5 Other Questions

5.5.5.1   What is the difference between "required" and "optional" variables?

Certain 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 of these variables. Other variables are

used for optional reporting features, such as expected rates and particular stratifiers. If you leave these variables unmapped, they will be treated as blanks in every record.

5.5.5.2   What if I have extra variables in my file?

Just leave the data mapping blank for variables that aren't used. These variables will not be imported and will not affect the QI calculations.

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

Normally, you should correct your input file to get the best results possible.

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

Just 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.

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

You may only use up to 35 diagnosis 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, be careful to make sure that the procedures and procedure day fields are appropriately matched.

5.5.5.6   What is the proper format for diagnosis codes?

Diagnosis codes are always three, four, or five characters long. The first 3 digits range from "001" to "999." Some diagnoses require a fourth or even a fifth digit to be a valid code. V-codes and E-codes may also be supplied in the diagnosis fields. V-codes range from "V01" to "V85," and E-codes range from "E800" to "E999." V-codes and E-codes may also require additional digits. In all cases, you must remove the decimal point before loading the data.

The WinQI software does 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-9-CM codes.

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

5.5.5.7   What is the proper format for ICD-9 procedure codes?

Procedure codes are always two, three, or four characters. The first two digits range from "00" to "99," and they may require third or fourth digits to be valid codes. 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. Procedure codes are always numbers.

5.5.5.8   What are the data elements "Days on Mechanical Ventilation" and "Birth Weight in Grams" used for?

These data elements are optional inputs into the limited license 3M™ APR-DRG grouper.

5.5.5.9 Why does my data view display quotation marks?

On an earlier screen, Input File Options, there is a checkbox labeled "Values are enclosed in quotes" Go back and enable this option in order to automatically remove the quotation marks.

5.5.5.10 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.

5.5.5.11 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.

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

If you intend to use the area-level rates, we recommend that you 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 then recommend that you analyze the area rates at the State or metropolitan area level. Otherwise, patients that reside outside the same county as the hospital will be included in the numerator but not the denominator. The larger the geographic unit of analysis, the less likely it is that this situation will occur. However, if the hospital FIPS State/county code is used instead of the patient FIPS State/county code, the area rates must still be interpreted with caution.

5.5.5.13 Can custom stratifiers be used for personal information?

Custom stratifiers are intended for grouping records; they are not intended to store 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 slower and require more disk space. You can instead save information in the "Key" field or in the "Patient ID" field.

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

The "Key" field is intended to distinguish discharge records, while 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 only included in the Export Data screen. Additionally, patient ID is stored in a separate table and requires additional disk space. The "Key" field and "Patient ID" can be used for tracking or printing results, but the software does not link records belonging to the same patient.

5.5.5.15 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.

5.6 Mapping Quick Check

5.6.1 What is this screen for?

This screen (Screenshot 8) provides a double check of the mapping of QI variables to input file variables.

It shows the set of variables from the opposite perspective from the previous screen (Screenshot 7).

Screenshot 8. Mapping Quick Check

5.6.2 How is this screen organized?

① 5.6.2.1 Progress

This area displays counts of mapped and unmapped variables and data warnings.

② 5.6.2.2 Stats and Warnings

This area displays two columns of variables and warning messages. QI variables are listed on the left, and variable names from your input data file are listed in the right-hand column of variables. Warnings, if any, are displayed to the right of the name of the variable to which they apply.

5.6.3 What should I do here?

Scan the list of warning messages to see if anything needs to be corrected. You may return to the **Data Mapping** screen to correct mappings, or you may need to load a different file. If there are any "Unmapped Required QI Variables" messages, you will not be able to proceed further through the wizard.

5.7   Check for Data Errors

5.7.1 What is this screen for?

On this screen (Screenshot 9), the program scans your file for errors and potential errors in your data. At the same time, it creates a list of values needed for the Crosswalk screen.

Screenshot 9. Check for Data Errors
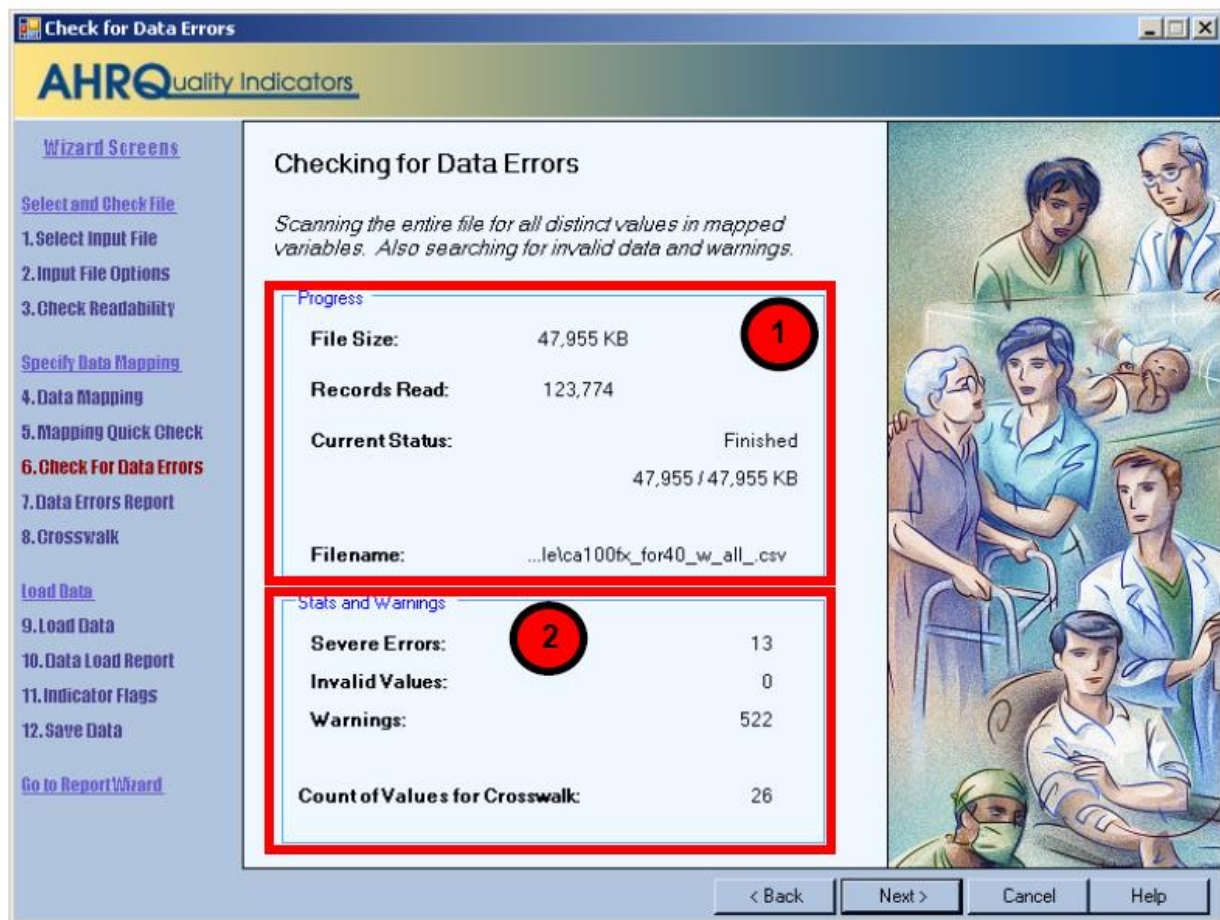
5.7.2 How is this screen organized?

1 5.7.2.1 Progress

This area lets you know how far along the read has progressed within your file. The number of records read increases incrementally as the check progresses. The "Current Status" value will change from "Reading file" to "Finished" upon completion.

2 5.7.2.2 Stats and Warnings

This area displays a report on the number of errors, invalid values, and warnings found. Ideally, these values should all be "0." The number of unique values found for the six Crosswalk variables is also displayed. This count is usually in the mid-20s; however, it will vary among different institutions. It should be fairly consistent, however, when the same data source is polled for different time periods. A sharply higher or lower value can be an indication of a mismatched variable.

5.7.3 What should I do here?

There are no user actions on this screen. When the data check finishes, click the <**Next**> button.

5.8   Data Errors Report

5.8.1 What is this screen for?

This screen (Screenshot 10) displays information about the values stored in your input data file.

Screenshot 10. Data Errors Report

5.8.2 How is this screen organized?

1 5.8.2.1 Warnings and Errors

If there are any warnings or errors found during the check, the column (variable) name, number of records affected, and the message will be displayed.

2

5.8.2.2 *Variables*

This area lists the QI variable names under "Column," along with the number and percent of missing values for each. Some of the warnings, such as missing diagnosis, are not important because different records will have different numbers of diagnosis codes.

5.8.3 What should I do here?

If there are errors in the data values, you may need to edit the data or select a different input file. 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.

Click the <**Nex**t> button to proceed.

5.8.4 Warnings

The screen checks for several different types of data errors such as missing data, invalid numbers, and numbers out of range (such as "Age in Days" over 365).

5.8.5 Timesaving Tip

Use caution when saving a data file using Excel, because the program sometimes tries to "simplify" numbers and remove leading or trailing zeros from ICD-9-CM codes.

5.8.6 Other Questions

5.8.6.1   How can I find out what rows had problems?

Formatting errors due to individual values on records are written to the QI Session Log (see Section 7.1). You can view the error messages along with the line number if you view the Session Log. Figure 5 shows an example screenshot of lines printed to the Session Log.

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
```

5.8.6.2 Do the "Number Missing" and "% Missing" columns denote errors?

This section of the report shows how many rows do not contain a value for each variable. The 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.

5.8.6.3 Does the program check for invalid ICD-9-CM codes?

No. The program only verifies that data are in the correct format; it does not check the reasonableness of the data. A three- to five-character string will be accepted as a diagnosis code regardless of whether it "looks like" an ICD-9-CM code. Users should verify the quality of their discharge data by some other means before loading the file with this program.

5.8.6.4 Why does it check for leading zeros in ICD-9-CM codes?

QI users often use a spreadsheet program such as Excel to calculate some fields prior to loading data into the WinQI software. Frequently, the spreadsheet will reformat text 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 QI are unaffected and some are incorrect.

Since most diagnosis codes do not have leading zeros, it is certainly possible a data file will not have any leading zeros in a column. If you see a message "Column of ICD-9-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 will all happen to not having 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 prior to importing the file into the Quality Indicators Wizard.

5.9 Crosswalk—Map Input Values to QI Values

5.9.1 What is this screen for?

This screen (Screenshot 11) allows you to update the mapping between data values that occur in your input file and those that are expected by this program for six critical QI variables.

Screenshot 11. Crosswalk—Map Input Values to QI Values

5.9.2 How is this screen organized?

A separate area is provided for each of the six variables. Within each area, the following lists are displayed:

1 #### 5.9.2.1 Input Value

This column lists each unique value found in the input data file for that variable.

2 #### 5.9.2.2 Count of Occurrences

This column lists the number of times that value occurred.

3 #### 5.9.2.3 QI Value

This area lists the QI value proposed to correspond to the Input Value. Warning messages, if any, are displayed to the right of the "QI Value" column.

5.9.3   What should I do here?

Compare the Input Value to the proposed QI Value. In particular, look for warning messages that read "Case will be excluded from analysis set."

You may reassign any input value to a value that is already known to the WinQI software. For example, the WinQI software uses "1" for male and "2" for female, but your input file may have them reversed, or it may not use numbers at all.

To specify a different QI value, click the arrow next to the QI Value, and select one from the drop-down menu.

When you have completed the value mapping, click <**Next**> to proceed with the data load.

5.9.4   Other Choices

In addition to the recognized QI values, you may also use the following:

- <**Exclude From Dataset**>. All cases with the particular value will not be loaded at all. This option allows you to remove invalid cases from analysis. It is also a useful way to "filter out" cases and limit your analysis to a particular subpopulation that you are studying.

- <**Map to Missing**>. This option is the default choice, which leaves the field blank in the QI data for any cases with this value. See the comments in Section 5.9.5.1 for more information.

- <**Retain Value**>. This option leaves the value in the variable as is. This option may be particularly useful if your data have different values for the race variable since it will allow you to stratify by those races instead of the built-in values.

Using <**Retain Value**> or <**Map to Missing**> will result in the value not being used in the indicator analysis. This choice will have a different effect on each indicator for each field. Take note of the warning messages onscreen, and review the comments in the Data Elements table in the documentation.

All three choices may not be available for some variables depending on how they are used in the application.

5.9.5   Other Questions

5.9.5.1   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 provider-level and area-level indicators differently. For provider

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.

5.9.5.2   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.

5.10   Load Data

5.10.1 What is this screen for?

On this screen (Screenshot 12), the program reads the input file, translating data as necessary and getting ready to run the indicators. Depending on the size of the file, this may take anywhere from a few seconds to several minutes.

Screenshot 12. Loading Discharge Data
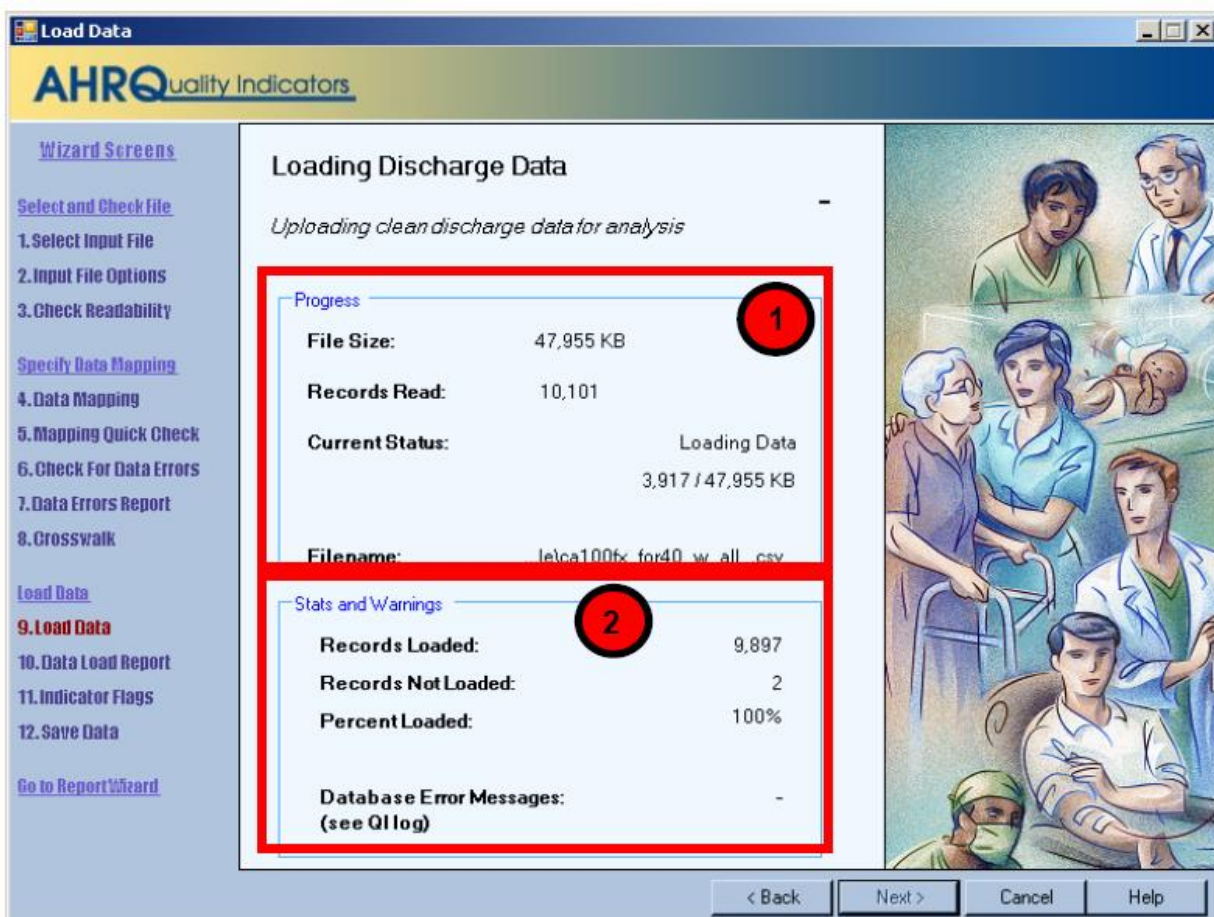
5.10.2 How is this screen organized?

1 ### 5.10.2.1 Progress

The number of records read increases incrementally as the check progresses, and the "Current Status" value will change from "Reading file" to "Finished" on completion.

2 ### 5.10.2.2 Stats and Warnings

This area displays running totals of the number of records loaded, records not loaded (for any reason), and percent loaded. The wizard also displays the number of error messages generated.

5.10.3 What should I do here?

Check the values displayed next to "Records Loaded" and "Records Not Loaded" to confirm that they match your expectations.

Confirm that "-" appears next to "Database Error Messages."

If the number of records loaded looks correct and "-" appears next to "Database Error Messages," click <**Next**> to proceed.

5.10.4 Questions

5.10.4.1   Why are records "not loaded"?

There are several reasons this might be true. Records may be excluded because you specified <**Exclude From Dataset**> in the Crosswalk screen. They may also 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 following screen.

5.10.4.2   What should I do if no records were loaded?

If no records were loaded, click <**Back**> to return to the Crosswalk screen, and correct the value settings for records excluded from analysis. If you have errors in your data file, then you may need to edit the file and restart the Data Input Wizard.

5.10.4.3   What should I do if there is a number displayed next to "Database Error Messages"?

Database errors can be caused by unanticipated data within your input file, by external causes such as a network failure between your computer and your database server, or by errors in the WinQI software.

Click <**Cancel**> to close the wizard. The **QI Session Log** will then be visible. Click the <**Save QI Session Log**> link on the main menu, and send a copy of the Session Log to AHRQ QIs support.

5.11 Data Load Report

5.11.1 What is this screen for?

This screen (Screenshot 13) provides confirmation that the file was loaded and gives a summary of any errors found.

Screenshot 13. Data Load Report

5.11.2 How is this screen organized?

1 5.11.2.1 Data Load Summary

This area displays total statistics for the file.

2 ### 5.11.2.2 Record Warnings

This area displays warning messages that apply to values found in some of the records. The number of affected records will be displayed, along with the "Column" name and warning message. You may have more than one warning message.

3 ### 5.11.2.3 File Warnings

This area displays warning messages that apply to a particular variable over all records in the file.

4 ### 5.11.2.4 *Variables*

This area displays statistics about all the QI variables, including the number and percent missing values and the minimum and maximum values found.

5.11.3 What should I do here?

Scan this report to verify that your data were loaded correctly.

5.11.4 Other Questions

5.11.4.1 Doesn't this tell me the same information as the previous reports?

The previous reports tell 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.

5.12 Generate Indicator Flags

5.12.1 What is this screen for?

This screen (Screenshot 14) does the QI analysis of your data. It scans your entire input for cases of interest in each of the indicators and calculates expected rates based on demographic information and comorbidities for each case.

For thousands of cases, this may take several minutes. For millions of cases, this may take several hours to complete.

Screenshot 14. Generating Indicator Flags
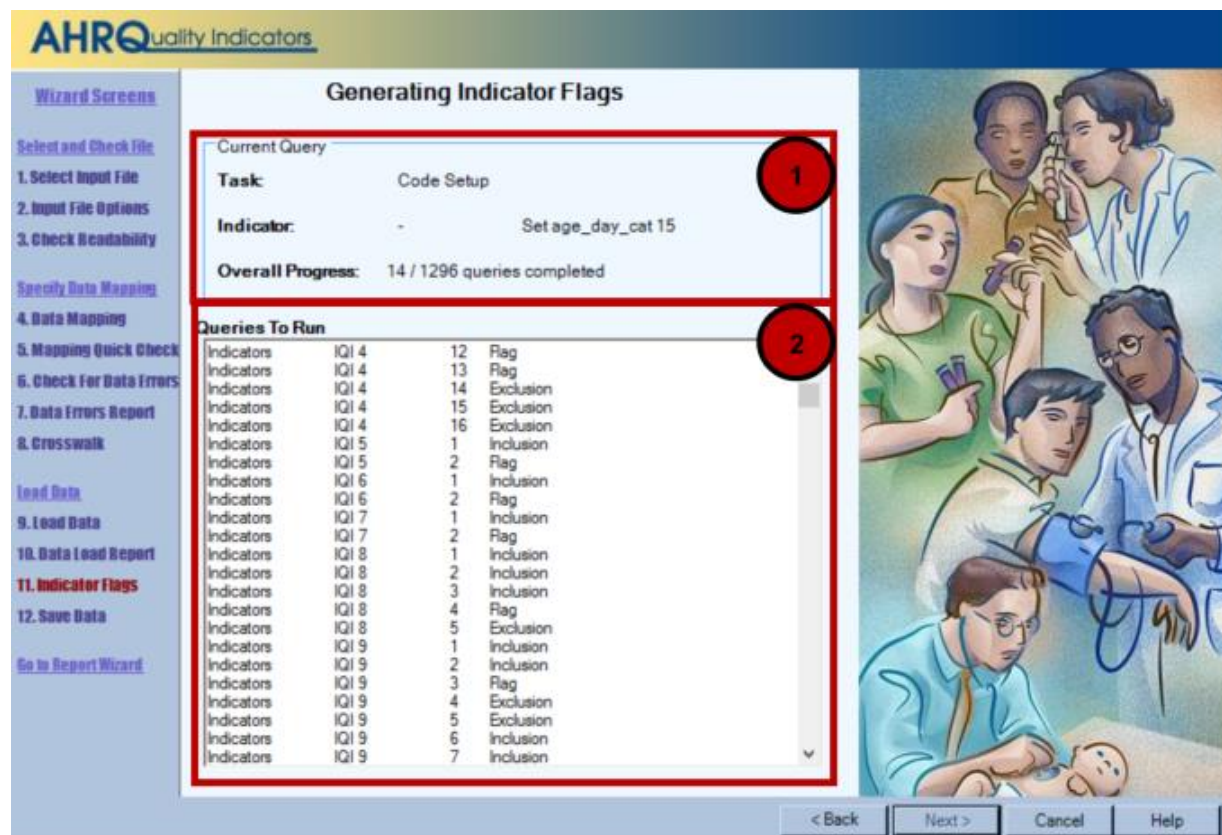
5.12.2 How is this screen organized?

1   **5.12.2.1**   **Current Query**

This area tracks the analysis progress.

2   **5.12.2.2**   **Queries To Run**

This area displays a list of all the work that the WinQI software is doing. Queries correspond to specific inclusion or exclusion rules listed in the *Technical Specifications* for each indicator. This information may also be helpful to AHRQ QIs support if you have questions about your results.

5.12.3 What should I do here?

Be patient; some indicators are complex and the analysis may take several minutes or even hours. The <**Next**> button will be unavailable until all the queries have been run.

5.12.4 Other Questions

5.12.4.1   What's a "Query"?

This term is an instruction to the database. There is roughly one query per inclusion or exclusion rule listed in the AHRQ QI *Technical Specifications*.

5.12.4.2   What should I do if I get an error?

If you have an SQL error on this screen, your entire results should be considered invalid.

Check the QI Session Log (see Section 7.1) 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 AHRQ QI support for assistance.

5.12.4.3   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 each query is permitted to run on the Program Options screen. The default setting for "Indicator Query Timeout" is 7,200 seconds (2 hours). Normally, this is more than sufficient, but for very large datasets, you may need to increase this value. This timeout is the maximum allowed time for each query to complete without error; most queries will run much faster.

5.12.4.4   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.

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

You only need to generate indicator flags once. The results are then summarized for quick reporting. Once this screen has completed, you may use the **Report Wizard** multiple times to prepare reports that display as many or as few indicators as you wish. The entire indicator flagging analysis must run before you can generate any reports.

5.13   Save Data and Mapping

5.13.1 What is this screen for?

This screen (Screenshot 15) lets you export your data at a discharge level for analysis in other programs. It also lets you save your data mapping for use with additional files in the same format.

Screenshot 15. Save Data and Mapping

5.13.2 How is this screen organized?

1   **5.13.2.1**   **Save Data**

This area lets you save your cleaned and translated data in a CSV file, along with indicator results.

2   **5.13.2.2**   **Save Data Mapping**

This area provides the option to save the mapping of variables and values (crosswalk).

5.13.3 What should I do here?

5.13.3.1   Save Data

Use the checkboxes to indicate the data you want to include in the file (see Section 5.13.4), and then click the <**Save Data**> button. You will be prompted to provide a file name and may choose where you want to save the file.

5.13.3.2   Save Data Mapping

Click the <**Save Mapping**> button. You will be prompted to provide a file name and may choose where you want to save the file. If you have other data files that have the same variable names and same structure, you can load this mapping file to save time.

5.13.4 Export File Options

- **Discharge Data.** Check this option to include the formatted discharge data that you imported into the WinQI application.

- **Procedure and Diagnosis Codes.** Check this option to include the ICD-9-CM procedure and diagnosis codes that you imported into the WinQI application.

- **Indicator Flags.** Check this option to include a column for each indicator in your output file. That column will contain the following values:

    "1"—outcome of interest. Case is included in the numerator and the denominator.

    "0"—population at risk. Case is included in the denominator but not the numerator.

    "Missing"—case is not included in either total, which may be because the case is not of interest at all for that indicator (e.g., males for a female-only indicator); or, it may have been excluded for a particular reason (see the *Technical Specifications*).

- **Adult and Pediatric Comorbidities.** Check this option to include a column for each of the comorbidity definitions. Adult comorbidities are based in part on the AHRQ Comorbidity Software and are used in risk adjustment. See the *Guide to Patient Safety Indicators (*http://www.qualityindicators.ahrq.gov/downloads/modules/psi/v31/psi_guide_v31.pdf) for more information. Pediatric comorbidities are used in pediatric risk adjustment.

- **Discharge Level Predicted Probabilities.** Check this option to include the predicted probability for each case based on demographics, comorbidities, and risk-of-mortality ratings for each case in the population at risk.

- **Patient Identifier Data.** Check this option to include the following fields: Patient ID, Birth Date, Admit Date, and Discharge Date. These fields are only recommended if they are required for your analysis. This checkbox is disabled if those fields have not been loaded.

- **Temporary Flag Variables.** Check this option to include some additional fields used in the calculation of the Patient Safety Indicators and Pediatric Quality Indicators.

5.13.5 Mapping File Options

- **Recognize Columns By Column Name**—Use this option if you have other data files to import that have column names identical to column names in this data file.

- **Recognize Columns By Position**—Use this option if you need to import text or Excel files that have the same columns in the same order as this data file. Text files do not require column headings.

5.13.6 Other Questions

5.13.6.1 Why would I want to save my data?

You can reload this file later for the purpose of generating reports. You can also import the resulting QI dataset into other programs.

5.13.6.2 Why would I want to save my data mapping?

Once you have been through the wizard and created and saved a mapping of your variables, you can reuse those specifications with other data files that have the same variable names.

5.13.6.3 Should I save mappings "By Name" or "By Position"?

If you do not have column names in your file, then your only option is to save mappings by position. If you do have column names, these will be ignored in future files if "By Position" is selected. You may use either; however, "By Name" mappings are generally less error-prone if your source file is changed.

5.14 Data Load Completed

5.14.1 What is this screen for?

This screen lets you know that the process of using the Quality Indicators Wizard is complete.

5.14.2 What should I do here?

Click the <**Close Window**> control.

6.0 Reports

6.1 Report Basics

6.1.1 What kinds of reports can I generate?

The Quality Indicators™ Windows® (WinQI) software provides several types of reports. The list in Table 3 specifies the kinds of reports that WinQI can generate and the instruction manual sections that cover them.

Table 3. Types of Reports Provided by WinQI Software

QUICK REPORT ON INPUT DATA	
Section 6.2	Quick Report
PATIENT-LEVEL REPORT	
Section 6.3	Patient Level Report
Section 6.4	Case Details
Section 6.5	Quality Indicators Reporting Wizard
PROVIDER-LEVEL RATES REPORT	
Section 6.6	Select Indicators
Section 6.7	Select Hospitals (Provider)
Section 6.8	Select Date Range (Provider)
Section 6.10	Select Stratifiers for Use With Provider Indicators
Section 6.12	Select Composite Indicators and Weights
Section 6.13	Additional Options for Data Analysis
Section 6.14	Generate Report
Section 6.15	View Saved Reports
AREA-LEVEL RATES REPORTS	
Section 6.6	Select Indicators
Section 6.9	Select Date Range (Area)
Section 6.11	Select Stratifiers for Use With Area Indicators
Section 6.12	Select Composite Indicators and Weights
Section 6.13	Additional Options for Data Analysis
Section 6.14	Generate Report
Section 6.15	View Saved Reports
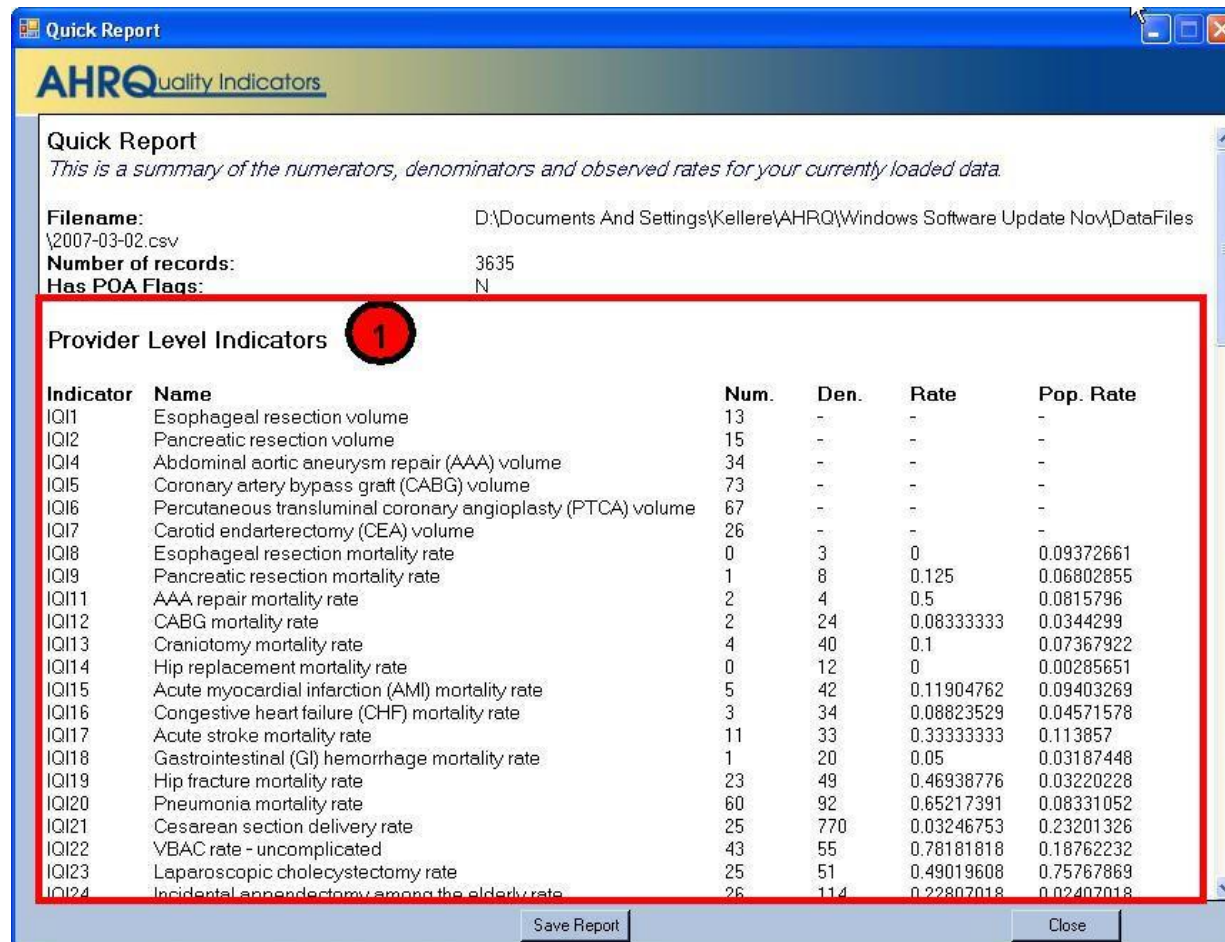
6.2 Quick Report

The Quick Report screen (Screenshot 16 and Screenshot 17) can be accessed from the main menu after data have been loaded.

6.2.1 What is this screen for?

This screen allows you to view the overall observed rates for your input file without going through the Report Wizard. The report serves as a quick check to see if your data appear to have been loaded properly.

Screenshot 16. Quick Report (Provider Level Indicators)

Screenshot 17. Quick Report (Area Level Indicators)

6.2.2 How is this screen organized?

1   ### 6.2.2.1   Provider Level Indicators

This area displays the observed numerator, denominator, observed rate, and population rate for all provider-level indicators.

- **Num.** This term is the numerator for the observed rate. It is defined as the total number of cases that do meet the inclusion criteria as well as the flag criteria but do not meet the exclusion criteria.

- **Den.** 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.

- **Rate.** This term is the observed rate for the indicator. This term is equal to the numerator divided by the denominator (Num/Den).

- **Pop. Rate.** This term is the overall rate for this indicator in the reference population. The reference population is pooled discharges from the 2012 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.

(2) 6.2.2.2   Area Level Indicators

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

- **Num.** This term is the numerator for the observed rate. It is defined as the total number of cases that do meet the inclusion criteria as well as the flag criteria but do not meet the exclusion criteria.

- **Pop. Rate.** This term is the overall rate for this indicator in the reference population. The reference population is pooled discharges from the 2012 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.

6.2.3 What should I do here?

The provider-level indicators are displayed first. Use the scroll bar to see the area-level indicators. You can use this screen to verify that your data have been loaded properly before you go through the Report Wizard. This report can be saved in Rich Text Format (RTF) using the <**Save Report**> button.

6.2.4 Other Questions

6.2.4.1   Why is the Population Rate inappropriate for comparison?

The population rate is based on the reference population, which is based on the universe of hospital discharges in 45 States (see Acknowledgments). It would only be fair to compare your observed rate with the population rate 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 by the Report Wizard (see Section 6.5 and Section 8.4). If you are using data from a State, the State rate is included when you do a provider report as a total for all hospitals with the indicator. The State rate can be compared with the population rate or individual hospital rates.

6.2.4.2   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 by the Report Wizard.

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

It is necessary to go through the Report Wizard 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.

6.3 Patient Level Report

6.3.1 What is this screen for?

This screen (Screenshot 18) provides a view of the individual cases flagged for each indicator. This screen can be useful for exploring which cases were actually included in the numerator and denominators for each indicator.

Screenshot 18. Patient Level Report

6.3.2 How is this screen organized?

① **6.3.2.1   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. The options available under **Display** to select the grouping of records are as follows:

- **Population at Risk**—All records that are included in the denominator of the selected indicator.

- **Outcome of Interest**—All records that are included in the numerator of the selected indicator.

- **Population at Risk Before Exclusions**—All records that were initially flagged for inclusion in the denominator of the selected indicator.

- **Outcome of Interest Before Exclusions**—All records that were included in the numerator of the selected indicator, as well as cases that were excluded from the denominator. For more information on exclusions, see the appropriate *Technical Specifications* found on the AHRQ QIs Web site.

- **All discharges**—All records in the data file.

② **6.3.2.2   Case Details Control**

The area to the left of each row functions as a control to access the Case Details screen for the discharge record displayed in that row.

③ **6.3.2.3   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.

④ **6.3.2.4   Page Controls**

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

6.3.3 What should I do here?

Find the indicator that you are interested in by selecting the **Module** and then the **Indicator** from the drop-down lists. 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).

"Population at Risk" is selected for <**Display**> by default, so after an <**Indicator**> is selected, all records that were included in the denominator for the selected indicator are displayed. 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.

Use the <**Export All**> button to export all records in the report.

You may drill into any one row of this report to show exactly why any particular case was flagged for this indicator. Double-click to the left of the row to open the Case Details screen (see Section 6.4).

6.3.4 Other Questions

6.3.4.1   What data are displayed?

Columns displayed on all reports include "Row in File," "Key," "Age," "Sex," "MDC," "DRG," "Num," "Den," and "Pred. Probability." 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.

An additional column, "Excluded," appears on the exported file when any of the last three options is selected from the <**Display** > drop-down menu.

A value of "X" in the "Excluded" column indicates that the record was excluded.

6.3.4.2   What is the predicted probability?

The predicted probability is the probability that the outcome of interest will occur for each case in the population at risk.

6.3.4.3   How can I see why a case was flagged?

Double-click on the case and open up the Case Details screen (see Section 6.4).

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

6.3.4.4 How is the predicted probability calculated?

The predicted probability is calculated from various factors such as the age, sex, diagnoses, and procedures on each discharge record. Open the Case Details screen for that case to view the predicted probability value in that case (see Section 6.4).

6.4 Case Details

6.4.1 What is this screen for?

This screen (Screenshot 19), accessed by double-clicking to the left of a row on the **Patient Level Report**, lets you see exactly why a particular case was or was not flagged for a particular indicator.

Screenshot 19. Case Details

Use the scrollbar to view the entire report. For this case, the full report is shown in Screenshot 20 and Screenshot 21.

Screenshot 20. Case Details—Full Report

Window titled "IQI21 Case Details - Row 134"

Inclusion Rules

Inclusion 1
DRG matches a DRG in set PRBRTHG
Comments: "All Births (Population at Risk)"
Inclusion 1 Result = False

Inclusion 2
MS-DRG matches a MS-DRG in set PRBRT2G
Comments: "All Births (Population at Risk)"
775   Vaginal delivery w/o complicating diagnoses
Inclusion 2 Result = True

Case meets denominator inclusion criteria before exclusion

Exclusion Rules

Exclusion 1
Any Diagnosis above matches a Diagnosis in set PRCSECD
Comments: "Breech delivery, Preterm, Fetal Death, Multiple Birth Diagnosis Codes"
Exclusion 1 Result = False

Exclusion 2
Any Procedure above matches a Procedure in set PRCSE3P
Comments: "ICD-9-CM Procedure Codes"
Exclusion 2 Result = False

Case is not excluded

Save Report   Close Window   Help

Screenshot 21. Case Details—Full Report (cont.)
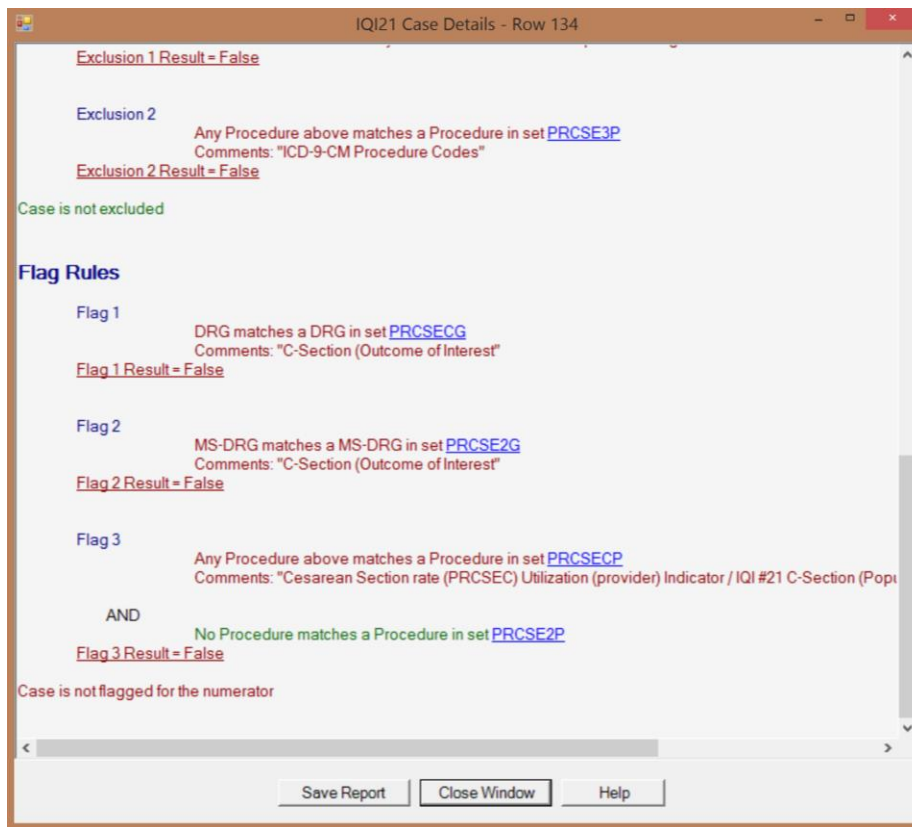
6.4.2 How is this screen organized?

6.4.2.1 Case Details

This area displays information from the discharge record that may be used in some indicators (see Screenshot 19).

6.4.2.2 Inclusion Rules

This area displays the rules for including a case in the denominator of this indicator (see Screenshot 19 and Screenshot 20).

6.4.2.3 Exclusion Rules

This area displays the rules for excluding a case from both the numerator and denominator of this indicator (see Screenshot 20 and Screenshot 21).

6.4.2.4 Flag Rules

This area displays the rules for including this case in the numerator of this indicator (see Screenshot 21).

6.4.3 What should I do here?

You can view one case using the scrollbar to display the entire report. Save this report as an RTF file that can be emailed or printed. You may also copy and paste from this screen using Ctrl+A (select all) and Ctrl+C (copy).

Click on any underlined set name to get a list of all the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) procedure codes, ICD-9-CM diagnosis codes, or Medicare Severity Diagnosis-Related Groups (MS-DRGs) that apply (see Section 7.4).

6.4.4 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-9-CM codes and descriptions will be displayed along with the rule.

6.4.5 Example

In the examples shown in Screenshot 19, Screenshot 20, and Screenshot 21, 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 of the exclusion rules, and it thus 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. Since no flag rule is true, the case is not flagged for inclusion in the numerator.

6.4.6 Other Questions

6.4.6.1   What does ORPROC mean?

The ICD-9-CM 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*.

6.4.6.2   What happens if there are two inclusion rules?

If there are two inclusion rules for an indicator, "Inclusion rule 1" and "Inclusion rule 2," then the case will be included if either (or both) of the two rules is satisfied.

This rule is not the same as a rule having multiple conditions; e.g., a required primary diagnosis AND an age comparison. All parts of a single rule must be true for the rule to be satisfied.

6.4.6.3 How is the predicated probability calculated?

The predicted probability is calculated from the covariates that apply to this case.

6.4.7 Other Questions

6.4.7.1 What is the predicted probability?

The predicted probability is the probability that an outcome will occur for a particular case that is at risk for that outcome. This probability is based on a logistic regression model applied to the population at risk in the reference population (containing approximately 30 million discharges).

6.4.7.2 How is the expected rate related to the predicted probability?

The expected rate for a group of cases is the average predicted probability of the cases. (Some QIs documentation refers to the predicted probability as the "case-level expected rate.")

6.4.7.3 What other covariates are applicable to this indicator?

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

Prevention Quality Indicator (PQI) Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V50/Parameter_Estimates_PQI_50.pdf

IQI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/IQI/V50/Parameter_Estimates_IQI_50.pdf.pdf

PSI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V50/Parameter_Estimates_PSI_50.pdf

PDI Module:
http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/Parameter_Estimates_PDI_50_Final.pdf

6.4.7.4 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.

6.5   Quality Indicators Reporting Wizard

6.5.1 What is this screen for?

This screen (Screenshot 22) introduces the Report Wizard. The Report Wizard has been separated into two wizards, tailored for the area- and provider-level indicators. The WinQI software provides Report Wizards that allow users to do the following:

- Select QIs to include in a report;

- Select the hospitals, quarters, and/or years by which you wish to select records;

- Select stratifiers;

- Select additional options for data analysis; and

- Generate and view provider-level and area-level reports.

Screenshot 22. Quality Indicators Reporting Wizard
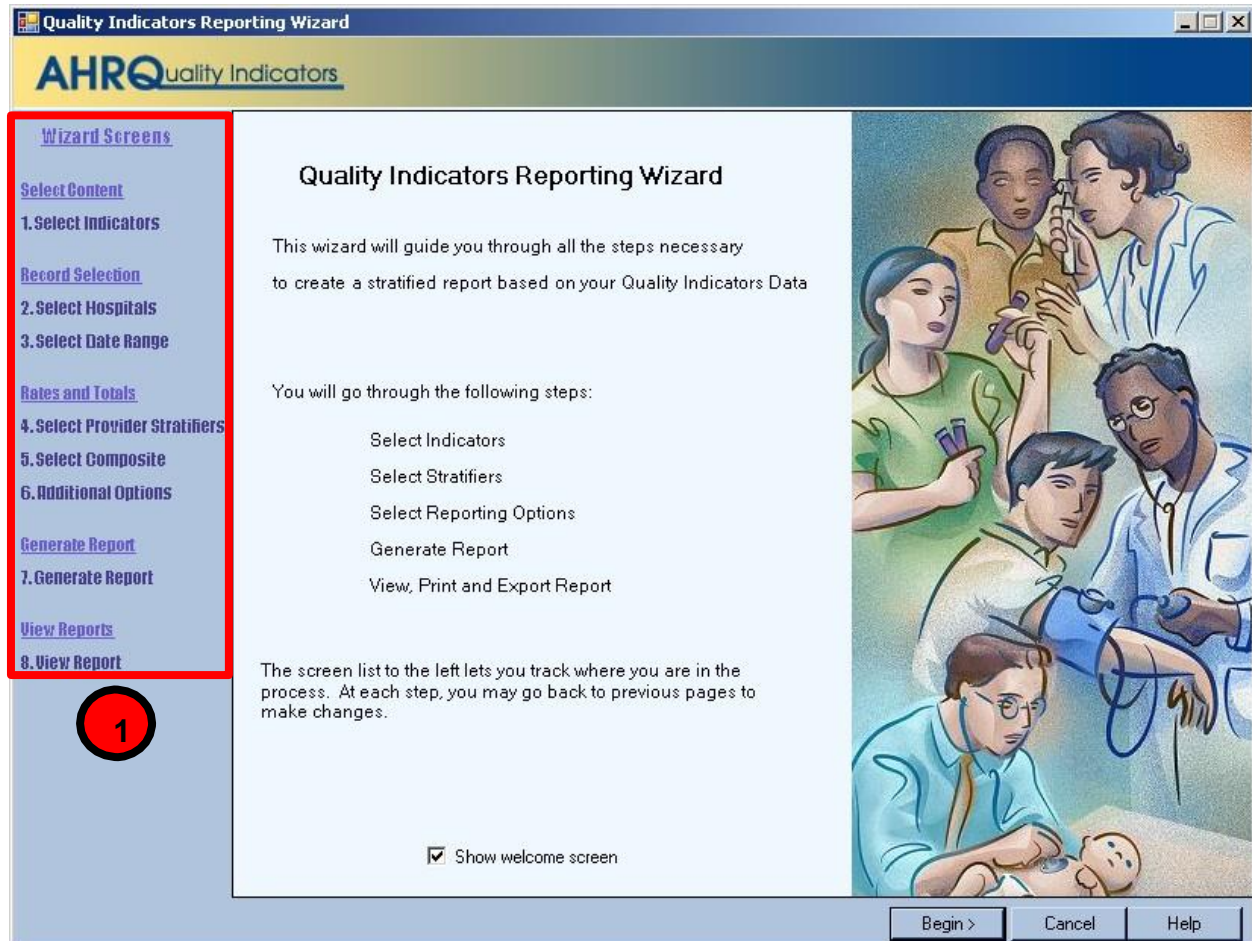
6.5.2 How is this screen organized?

① **6.5.2.1** **Wizard Screens**

The Wizard Screens area lists the names of all screens in the Quality Indicators Reporting Wizard. This list is displayed on the left side of every screen in the wizard. The current screen will be highlighted in red as you progress through the wizard.

6.5.3 What should I do here?

Click the <**Begin**> button to proceed to the first Report Wizard screen. If you click the <**Cancel**> button on any screen, the wizard will close.

6.6 Select Indicators

6.6.1 What is this screen for?

Use this screen to specify the indicators to include in the report. Beginning with WinQI Version 4.5, six provider-level indicators have been stratified into two to five mutually exclusive sub-indicators:

- IQI 02 Pancreatic Resection Volume
- IQI 04 Abdominal Aortic Aneurysm (AAA) Repair Volume
- 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 then 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 Introduced in Version 4.5

MODULE AND NUMBER ON SELECTION SCREEN	INDICATOR TITLE
IQI2	IQI 02 Pancreatic Resection Volume
IQI201	IQI 2A Pancreatic Resection Volume – Stratum A
IQI202	IQI 2B Pancreatic Resection Volume – Stratum B
IQI4	IQI 04 Abdominal Aortic Aneurysm (AAA) Repair Volume
IQI401	IQI 4A Abdominal Aortic Aneurysm (AAA) Repair Volume – Stratum A
IQI402	IQI 4B Abdominal Aortic Aneurysm (AAA) Repair Volume – Stratum B
IQI403	IQI 4C Abdominal Aortic Aneurysm (AAA) Repair Volume – Stratum C
IQI404	IQI 4D Abdominal Aortic Aneurysm (AAA) Repair Volume – Stratum D
IQI9	IQI 09 Pancreatic Resection Mortality Rate
IQI901	IQI 9A Pancreatic Resection Mortality Rate – Stratum A
IQI902	IQI 9B Pancreatic Resection Mortality Rate – Stratum B
IQI11	IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate
IQI111	IQI 11A Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate – Stratum A
IQI112	IQI 11B Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate – Stratum B
IQI113	IQI 11C Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate – Stratum C
IQI114	IQI 11D Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate – Stratum D
IQI17	IQI 17 Acute Stroke Mortality Rate
IQI171	IQI 17A Acute Stroke Mortality Rate – Stratum A
IQI172	IQI 17B Acute Stroke Mortality Rate – Stratum B
IQI173	IQI 17C Acute Stroke Mortality Rate – Stratum C
PSI4	PSI 04 Death Rate among Surgical Inpatients with Serious Treatable Complications
PSI42	PSI 4A Death Rate among Surgical Inpatients with Serious Treatable Complications – Stratum A
PSI43	PSI 4B Death Rate among Surgical Inpatients with Serious Treatable Complications – Stratum B
PSI44	PSI 4C Death Rate among Surgical Inpatients with Serious Treatable Complications – Stratum C
PSI45	PSI 4D Death Rate among Surgical Inpatients with Serious Treatable Complications – Stratum D
PSI46	PSI 4E Death Rate among Surgical Inpatients with Serious Treatable Complications – Stratum E

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. In the event that a discharge record meets the denominator criteria for several strata, the software assigns the record to the one (and only one) candidate stratum whose outcome is most prevalent in the reference population.

For IQI 02 and 09, strata are prioritized to ensure mutual exclusivity by determining whether the criteria for stratum A is met and, if not, testing whether the criteria for stratum B are met. The mutual exclusivity prioritization for IQI 02 and IQI 09 is as follows:

STRATUM A: PANCREATIC CANCER
STRATUM B: BENIGN

For IQI 04 and IQI 11, the mutual exclusivity prioritization is as follows (listed from highest mortality to lowest mortality):

STRATUM A: OPEN – RUPTURED
STRATUM C: ENDOVASCULAR – RUPTURED
STRATUM B: OPEN – UNRUPTURED
STRATUM D: ENDOVASCULAR – UNRUPTURED

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

STRATUM B: INTRACEREBRAL HEMORRHAGE
STRATUM A: SUBARACHNOID HEMORRHAGE
STRATUM C: ISCHEMIC STROKE

For PSI 04, the mutual exclusivity prioritization is as follows:

STRATUM D: SHOCK/CARDIAC ARREST
STRATUM C: SEPSIS
STRATUM B: PNEUMONIA
STRATUM A: DVT/PE
STRATUM E: GI HEMORRHAGE/ACUTE ULCER

Screenshot 23. Selecting Indicators
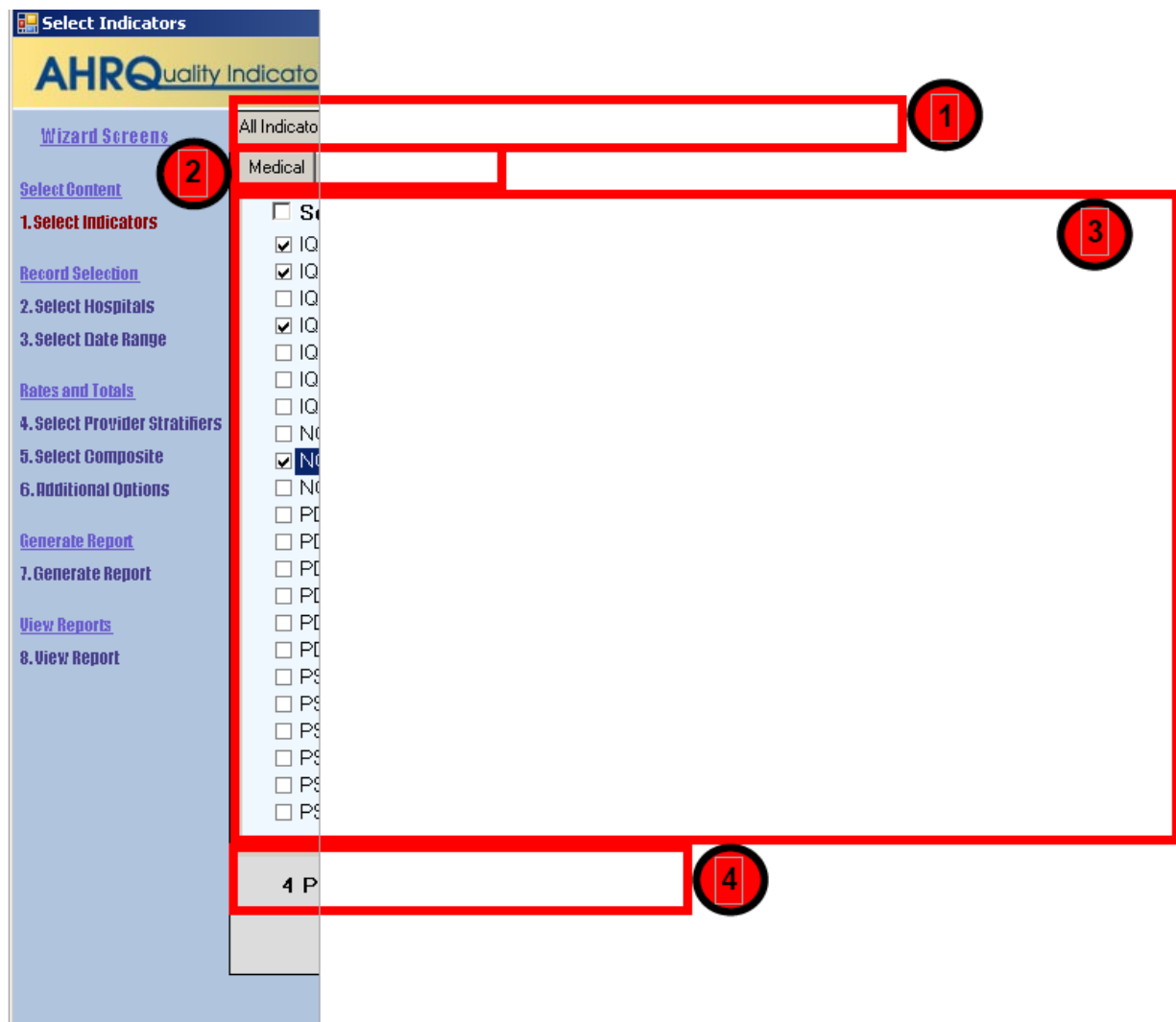
6.6.2 How is this screen organized?

Indicators are organized according to categories that may be of interest to different types of researchers. Each indicator is listed in several different tabs. The available tabs, subtabs, and choices are geared to the type of report—area or provider. Stratified indicators will also appear on this screen and are labeled accordingly; e.g., Stratum A, Stratum B, etc.

> NOTE: If you have used the Report Wizard previously, all of your selections have been saved. To specify a new group of Indicators, use the <**Clear All**> button before proceeding.

① 6.6.2.1   Top-Level Tabs

- **All Indicators**—quick access to all the PSIs, PDIs, IQIs, and PQIs (area-level only).

- **By Condition**—pages for indicators that are grouped by the particular condition.

- **By Demographic**—pages for each of several interesting demographic groupings.

- **By Module**—the traditional way of finding indicators; separate pages for the PSIs, IQIs, PQIs, and PDIs.

- **By Procedure Type**—separate pages for indicators related to medical, surgical, and obstetric cases.

- **Composite Measures**—the area-level composite measures.[‡‡]

② 6.6.2.2   Subtabs

The <**All Indicators**> tab has no subtabs. Each of the other tabs contains a number of pages as described above that are accessed via the subtabs.

③ 6.6.2.3   Indicators

Each page (subtab) contains a list of indicators with checkboxes. There is also a checkbox above the list that can be used to select all indicators on the page.

④ 6.6.2.4   Selection Summary Information

This area displays the total number and type (provider or area) of indicators selected on all pages.

[‡‡] Provider-level composite measures can be selected on a different screen.

6.6.3 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.

Click one of the subtabs to select the page that lists the indicators for the selected topic.

Click the checkbox to select or deselect an indicator. You may also select or deselect all the indicators on a page at one time using the "Select All…" checkbox.

Use the selection summary information at the bottom of the screen to track the number of indicators selected.

Click the <**Clear All**> button to deselect all indicators on all pages. Click <**Next**> when the desired indicators have been selected.

6.6.4 Timesaving Tips

6.6.4.1 Selecting Everything

Click on "All Indicators," and check all modules on this page to get all the available indicators.

6.6.4.2 Currently Selected

The number of indicators currently selected is displayed at the bottom of the page.

6.6.4.3 Clearing a Page

Click the "Select All…" checkbox to select the entire page, and then click it again to unselect the entire page.

6.6.4.4 Clear All

Each time you run the Report Wizard, your previous selection of indicators is automatically selected. Just click the <**Clear All**> button to clear the checkboxes on all pages if you want to start from scratch.

6.6.5 Other Questions

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

Area- and provider-level indicators pertain to different populations and are now completely separated into two different wizards.

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

You don't need to run the Report Wizard to see the individual cases for each indicator. After you have run the Import Data Wizard, you can view the cases using the Patient Level Report option (see Section 6.3).

6.7   Select Hospitals (Provider Reports Only)

6.7.1 What is this screen for?

This screen (Screenshot 24) lets you limit the discharge records that will be included in your report. There will be a list displayed of all of the States represented in the input data, and each hospital is listed under the State.

Screenshot 24. Selecting Hospitals
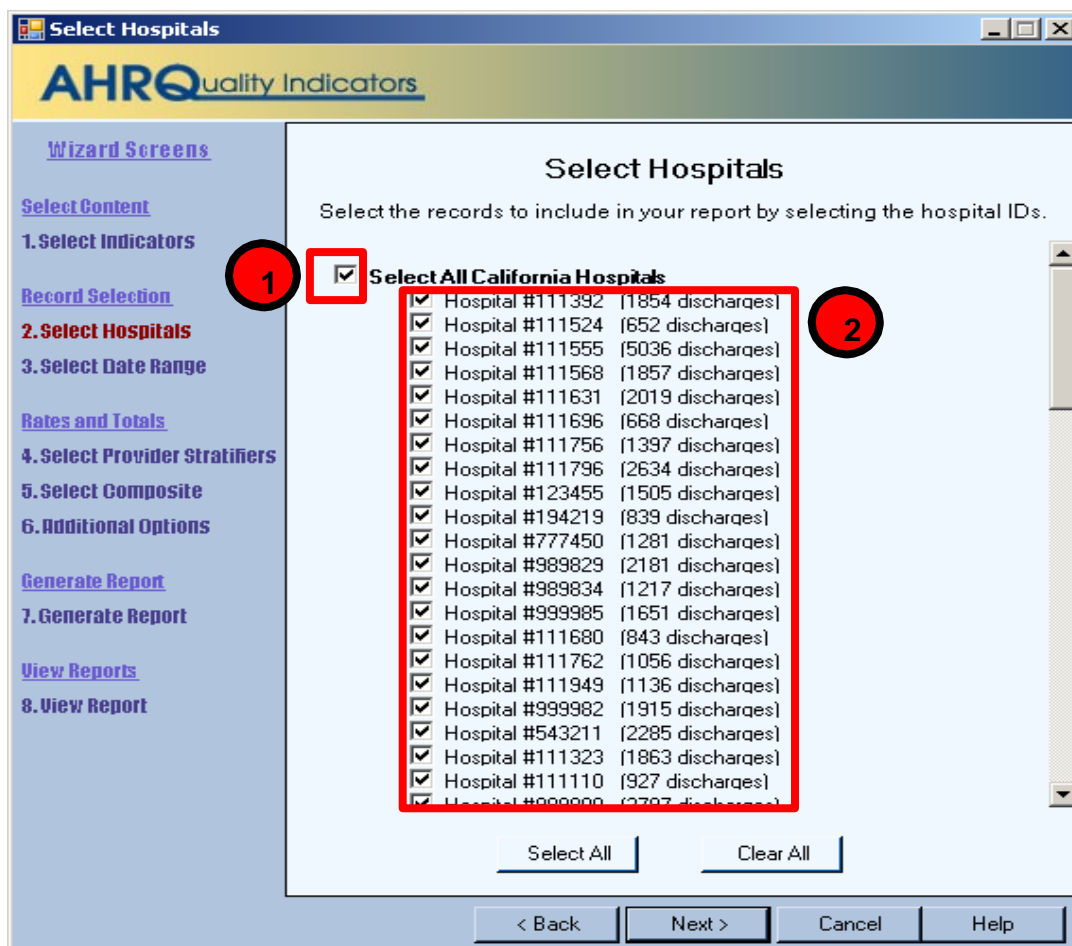
6.7.2 How is this screen organized?

1   6.7.2.1   States in Input Data

Checkboxes allow you to select (or deselect) all the hospitals in a State at once.

2   6.7.2.2   Hospitals in Each State

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

6.7.3 What should I do here?

Check the States and hospitals you want to include in your report.

6.7.4 Other Questions

6.7.4.1   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 read for that hospital. You may change the hospital county code (see Section 7.2).

6.7.4.2   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 provider-level reports with different data without having to edit and reload your data file.

6.8   Select Date Range (Provider Reports)

6.8.1 What is this screen for?

This screen (Screenshot 25) allows you to limit the discharge records you wish to include on your report to only those that occurred during the selected quarters.

Screenshot 25. Selecting a Date Range (Provider Report)

6.8.2 How is this screen organized?

1   **6.8.2.1**   **Discharge Year**

Each year represented in the input data is listed.

2   **6.8.2.2**   **Quarters**

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

6.8.3 What should I do here?

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

6.8.4 Other Questions

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

A "rolling year" report is a report 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).

The Report Wizard cannot generate this report in a single pass since each discharge record would have to be included in the total for different quarters. However, you can run the Report Wizard 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.

6.8.4.2   What if I have discharge records without a discharge year or quarter data in my file?

Any records that do not have year or quarter will be listed under "Missing Year" and "Missing Quarter." You may select these just like any other selection for year and quarter. Note that discharge records missing these values will be excluded from the measure computations.

6.9   Select Date Range (Area Reports)

6.9.1 What is this screen for?

This screen (Screenshot 26) allows you to limit the discharge records you wish to include on your report to only those that occurred during the selected quarters. Additionally, in this screen you may select a different denominator for each year.

Screenshot 26. Selecting a Date Range (Area Report)

6.9.2 How is this screen organized?

1   **6.9.2.1   Discharge Year**

Each year represented in the input data is listed.

2   **6.9.2.2   *Quarters***

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

3   **6.9.2.3   Numerator and Denominator**

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

6.9.3 What should I do here?

Select the checkboxes next to the 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]**—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 only have a partial year's data.

- **Population from a different year**—You may specify a different year's population 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.

6.9.4 Other Questions

6.9.4.1   What if I have discharge records without a discharge year or quarter data in my file?

Any records that do not have year or quarter will be listed under "Missing Year" and "Missing Quarter." You may select these just like any other selection for year and quarter. Note that discharge records missing these values will be excluded from the measure computations.

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

The program first gets a list of all of 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. These 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 get the observed rate grouped by the selected stratifiers.

6.9.4.3   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.

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

This option may be appropriate in 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 "2006," but a few are incorrectly recorded as "206." If you select "County population for 2006" as the denominator for the 2006 records and "None" as denominator for the "206" records, the total numerator will include all records and the total denominator will include the population for 2006. (If you stratify by year, then the numerator cases will be separated and "206" 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.

6.9.4.5   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 only select 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.

6.9.4.6   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, and 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.

6.10   Select Stratifiers for Use With Provider Indicators

6.10.1 What is this screen for?

This screen (Screenshot 27) is used to build a hierarchy of stratification for provider-level indicators.

Screenshot 27. Selecting Provider Stratifiers
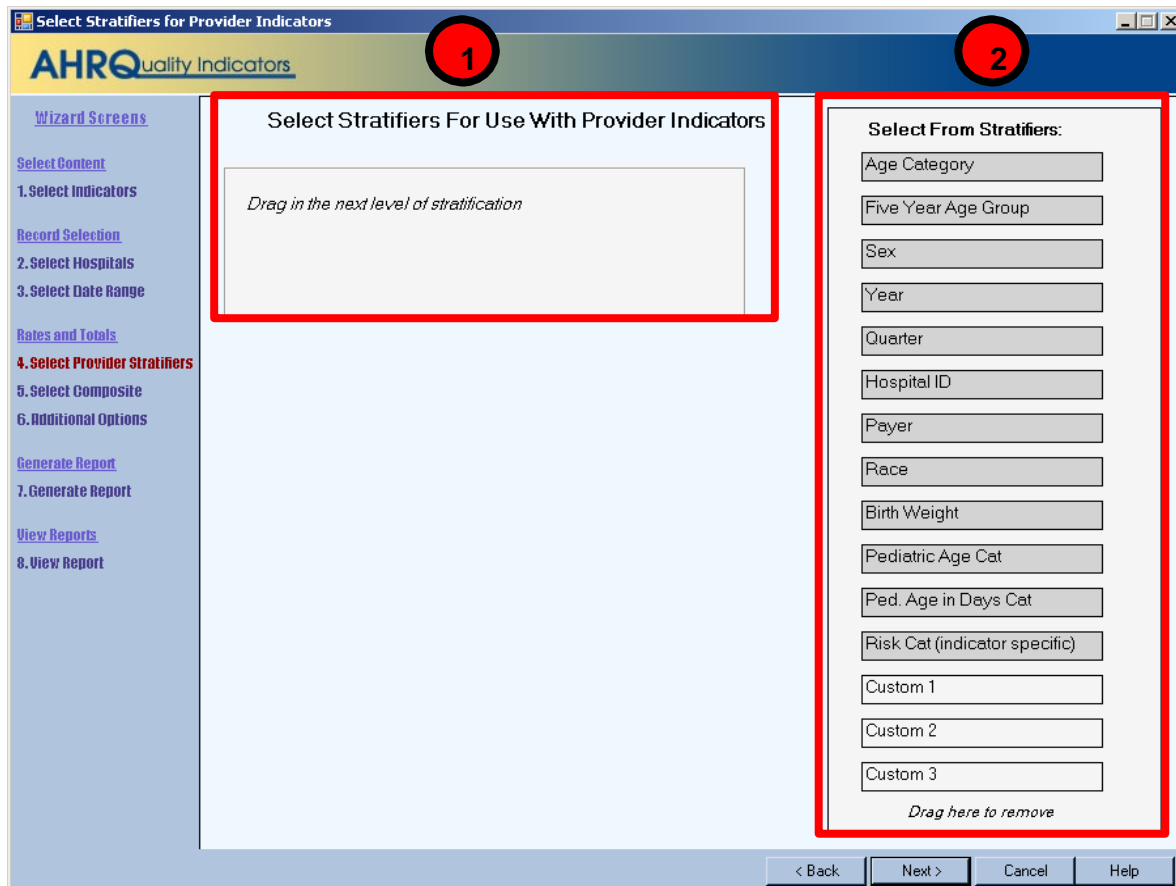
6.10.2 How is this screen organized?

1   **6.10.2.1   Selected Stratifiers**

Displays the provider-level stratifiers currently selected, in the hierarchical order in which they will be sorted.

2   **6.10.2.2   Select From Stratifiers**

This area displays a list of stratifiers that can be used for reports on provider-level indicators.

6.10.3 What should I do here?

Click on a stratifier box, drag it to the "Selected Stratifiers" area, and drop it in the desired position.

To remove a selected stratifier, click and drag it back to the bottom of 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.

Stratifiers that were not used during the data load will be displayed. You can see the number of distinct values in a stratifier by pointing to the column name with your mouse.

6.10.4 Other Questions

6.10.4.1   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.

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

Do not select any stratifiers.

6.10.4.3   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.

6.10.4.4   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 provider, 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.

6.10.4.5   How many stratifiers may I select?

You may not select more than 10 stratifiers. In practice, you will generally not want more than a few stratifiers. Selecting too many will subdivide your populations and reduce the statistical significance of the calculated rates.

6.10.4.6   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. Each field will only be enabled if you provided a data mapping on the Data Mapping screen (see Section 5.5). Common custom stratifiers are physician name and hospital type.

6.10.4.7 How large will my report be?

You can get 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.

6.11 Select Stratifiers for Use With Area Indicators

6.11.1 What is this screen for?

This screen (Screenshot 28) is used to build a hierarchy of stratification for area-level indicators.

Screenshot 28. Selecting Area Stratifiers
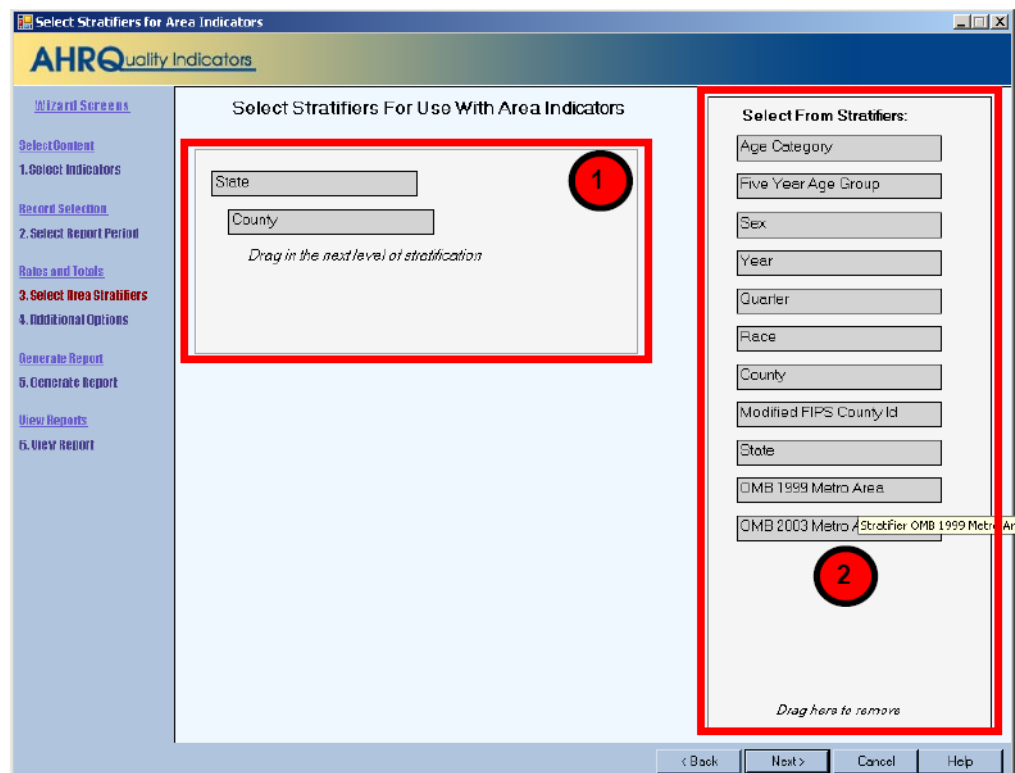
6.11.2 How is this screen organized?

1 6.11.2.1 Selected Stratifiers

This area displays the area-level stratifiers currently selected in the hierarchical order in which they will be sorted.

② **6.11.2.2** **Select From Stratifiers**

This area displays a list of stratifiers that can be used for reports on area-level indicators.

6.11.3 What should I do here?

Click on a stratifier box, drag it to the selected stratifiers' area, and drop it in the desired position.

To remove a selected stratifier, click and drag it back to the bottom of 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.

6.11.4 Timesaving Tips

Hover the mouse over a stratifier, and a tool tip will display the number of different values there are in your data.

6.11.5 Other Questions

6.11.5.1 What's the difference between provider- 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."

6.11.5.2 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.

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

Do not select any stratifiers.

6.11.5.4 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.

6.11.5.5 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 provider, 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.

6.11.5.6 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.

6.11.5.7 What are the definitions of the metro areas?

The Office of Management and Budget defines metropolitan and micropolitan statistical areas. Refer to http://www.census.gov/population/metro/ for more information.

6.11.5.8 What is the Modified Federal Information Processing Standards (FIPS) stratifier?

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.itl.nist.gov/fipspubs/fip55-3.htm.

6.12 Select Composite Indicators and Weights

6.12.1 What is this screen for?

This screen (Screenshot 29) lets you select whether to include the composite measures and, if so, what weight to assign to each indicator that makes up the composite.[§§]

[§§] See the User Guide Composite Measure report for PQIs, IQIs, PSIs, or PDIs for information on the weights.

Screenshot 29. Selecting Composite Indicators and Weights

6.12.2 How is this screen organized?

1 **6.12.2.1** **Measures and Components**

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

2 **6.12.2.2** **Weights for Component Indicators**

A field for the relative weight appears next to each indicator.

6.12.3 What should I do here?

Check the composite measures 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 zero to exclude the indicator from the composite altogether. However, the weights for each of the component QIs must be between zero and one, and the weights across the entire component QIs must sum to one. Also, you must assign weights to every component QI, including weights of zero for all component QIs that are to be excluded from the composite.

6.12.4 Other Questions

6.12.4.1 How are the composite measures calculated?

The provider 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.

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

The most likely cause is that you did not select "Calculate Smoothed Rates" on the Additional Options for Data Analysis screen (see Section 6.13). If smoothed rates are blank, then the above formula will result in a missing value.

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

The AHRQ QI 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 the respective QI resource pages.

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

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

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

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

6.13 Additional Options for Data Analysis

6.13.1 What is this screen for?

This screen (Screenshot 30) lets you choose additional options before generating reports.

Screenshot 30. Additional Options for Data Analysis

6.13.2 How is this screen organized?

① ### 6.13.2.1   Rates

This area provides checkboxes to select which columns you want included in your report. You may also decide whether or not to include the overall totals for each indicator here. If the Composite Measures have been selected, be sure to select "Smoothed Rates."

② ### 6.13.2.2   Scaling

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

(3) **6.13.2.3** **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) **6.13.2.4** **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.

(5) **6.13.2.5** **Geography Stratifiers**

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

(6) **6.13.2.6** **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").

(7) **6.13.2.7** **Report Title**

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

6.13.3 What should I do here?

Change any of the options for your report here.

6.13.4 Other Questions

6.13.4.1 What are the definitions of observed, risk-adjusted, smoothed, expected, and reference population rates?

Table 5 provides definitions for the observed, risk-adjusted, smoothed, expected, and reference population rates reported by the software. For more information, see Section 8.4.

It should be noted that if the reference population rate is not selected, then users should disable reporting of the expected rate and observed/expected ratio (see following section). If not, the software will report erroneous values for the expected rate and observed/expected ratio.

Table 5. Definition of Rates Reported by Software

TYPE OF RATE	DEFINITION
Observed	The rates as initially calculated applying the indicator definitions (see Section 8.4) 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 provider'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 2.1).
Risk-adjusted	The estimated performance of providers or areas if those providers 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 providers 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 providers or areas with a small numbers of cases.

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

6.13.4.2   What is the 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 performance is as expected. A ratio over one is performance that is higher (usually worse) than expected, and a ratio less than one is performance that is lower (usually better) than expected.

6.13.4.3   Why is the risk-adjusted rate disabled?

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

The risk-adjusted rate is only appropriate 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 only based on a segment of the population.

6.13.4.4   What are the recommended rate units?

The AHRQ WinQI application calculates rates as raw rates. In the Report Wizard, users may report rates using optional multipliers in order 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.

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 x multiplier	25.5 per 1,000

6.13.4.5 What are the recommended multipliers?

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

Table 7. Recommended Multipliers for Different Categories of Indicators

PROVIDER OR AREA	TYPE OF INDICATOR	EXAMPLE	RECOMMENDED MULTIPLIER
Area	Avoidable hospitalization	PQI 08 Heart Failure Admission Rate	100,000
Area	Potentially preventable adverse event	PSI 23 Central Venous Catheter-Related Blood Stream Infection Rate	100,000
Area	Utilization	IQI 26 Coronary Artery Bypass Graft (CABG) Rate	100,000
Provider	Mortality	IQI 15 Acute Myocardial Infarction (AMI) Mortality Rate	1,000
Provider	Potentially preventable adverse event	PSI 03 Pressure Ulcer Rate	1,000
Provider	Utilization	IQI 22 Vaginal Birth After Cesarean (VBAC) Delivery Rate, Uncomplicated	1,000
Provider	Volume	IQI 05 Coronary Artery Bypass Graft (CABG) Volume	None

6.13.4.6 What does cell suppression mean?

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.

6.13.4.7 Why are some rates disabled?

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, and so, only the numerators, denominators, and observed rates are reported.

6.14   Generate Report

6.14.1 What is this screen for?

This screen (Screenshot 31) displays the progress of the process as your report is generated.

Screenshot 31. Generating a Report
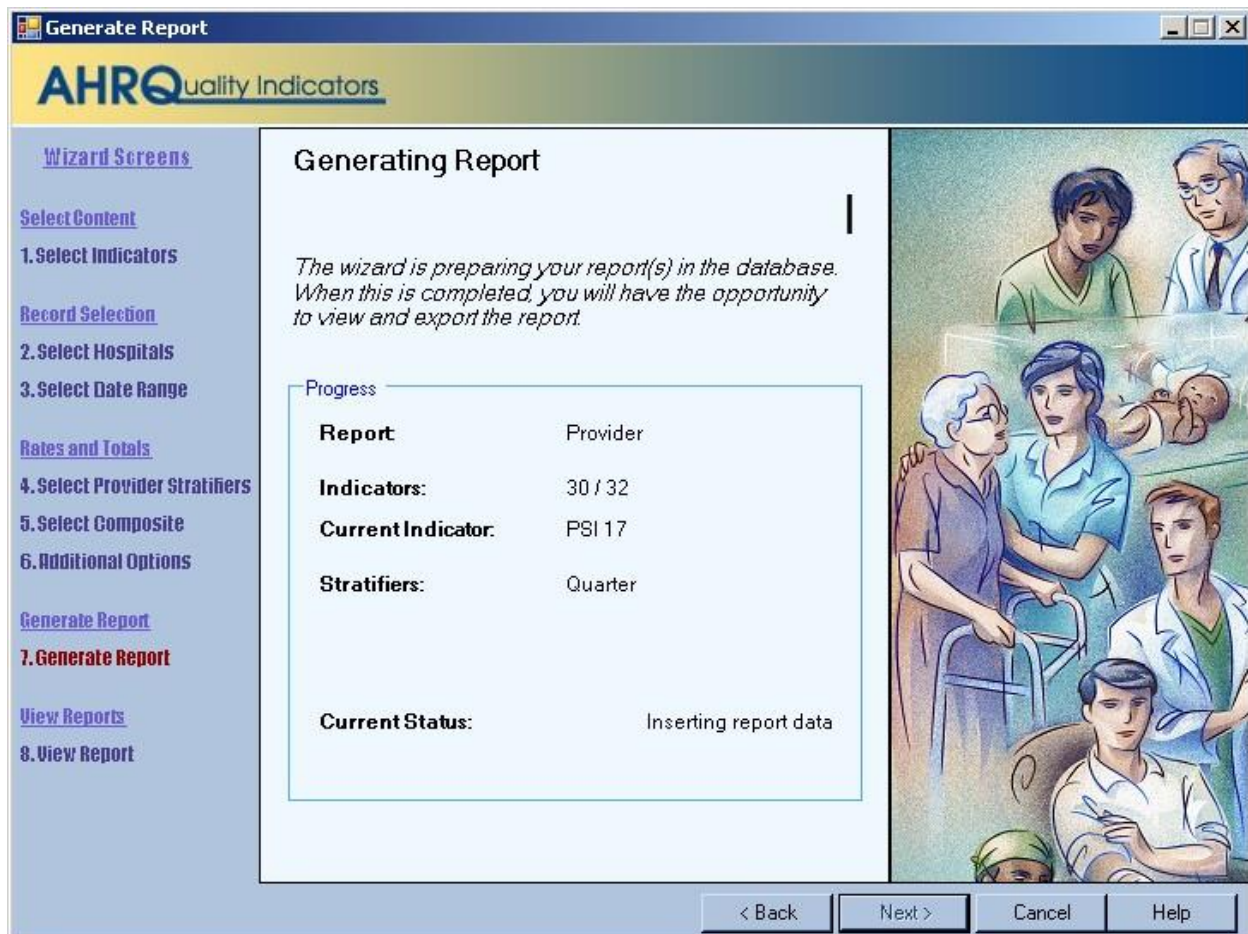
6.14.2 How is this screen organized?

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

6.14.3 What should I do here?

There are no user actions on this screen. Wait for the processing to complete, and then click <**Next**>.

After the report has been generated, you are finished with the Report Wizard. When you click <**Next**>, you will go directly to the View Report screen (see Section 6.1.5). This report can be viewed later from the main window using the <**View Saved Report**> menu item. The report will be saved until you generate another report.

6.15   View Saved Reports

6.15.1 What is this screen for?

This screen (Screenshot 32) displays the area- and provider-level reports that have been generated through the Report Wizard. The last generated report is shown. You can access this window from the main menu, or you may access it as the last screen of the Report Wizard. Once a report has been generated, it stays in the database until another report is generated. Export the report to save the data permanently. See Appendix C for detailed information about the export format.

Screenshot 32. View Saved Reports

Indicator	Name	Observed Numerator	Observed Denominator	Observed Rate	Expected Rate	O/E Ratio	Refer Pop.
IQI 1	IQI 1 Esophageal Resecti	3	-	-	-	-	
IQI 2	IQI 2 Pancreatic Resectio	4	-	-	-	-	
IQI 4	IQI 4 Abdominal Aortic An	5	-	-	-	-	
IQI 5	IQI 5 Coronary Artery Byp	156	-	-	-	-	
IQI 6	IQI 6 Percutaneous Coron	126	-	-	-	-	
IQI 7	IQI 7 Carotid Endarterecto	5	-	-	-	-	
IQI 8	IQI 8 Esophageal Resecti	0	3	0.000000	0.020766	0.000000	0.050
IQI 9	IQI 9 Pancreatic Resectio	0	4	0.000000	0.008383	0.000000	0.034
IQI 11	IQI 11 Abdominal Aortic A	0	3	0.000000	0.000494	0.000000	0.041
IQI 12	IQI 12 Coronary Artery By	0	156	0.000000	0.011496	0.000000	0.025
IQI 13	IQI 13 Craniotomy Mortalit	-	-	-	-	-	0.057
IQI 14	IQI 14 Hip Replacement	0	39	0.000000	0.000160	0.000000	0.000
IQI 15	IQI 15 Acute Myocardial I	0	127	0.000000	0.015452	0.000000	0.060
IQI 16	IQI 16 Heart Failure Morta	0	270	0.000000	0.007489	0.000000	0.033
IQI 17	IQI 17 Acute Stroke Morta	0	147	0.000000	0.031813	0.000000	0.091
IQI 18	IQI 18 Gastrointestinal He	0	69	0.000000	0.008988	0.000000	0.024
IQI 19	IQI 19 Hip Fracture Mortal	0	74	0.000000	0.009665	0.000000	0.027
IQI 20	IQI 20 Pneumonia Mortalit	0	184	0.000000	0.005749	0.000000	0.040
IQI 21	IQI 21 Cesarean Delivery	164	1077	0.152275	0.300059	0.507482	0.300
IQI 22	IQI 22 Vaginal Birth After	50	121	0.413223	0.090570	4.562489	0.090

6.15.2 How is this screen organized?

① 6.15.2.1 **Report**

Provides the following information about the displayed report:

- Title of the report.
- Source Data—complete path to the data file that was used to generate the report.
- Date Created—date and time the report was generated.
- Rows in Report—total number of rows in report being displayed.
- Rates Per—the report scale; depends on the level of report displayed.
  - Area-level report = "case"
  - Provider-level report = "population"

② 6.15.2.2 *Controls*

This section of the screen provides options for report display, including the following:

- <**Select Report**>—shows the type of report displayed: "Area" or "Provider." (Since only one report is stored at a time, this control has no action.)
- <**Rows Per Page**>—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.
- <**Show Indicator Definitions Window**>—opens a window that displays the names and definition for the indicators selected for the report.

③ 6.15.2.3 **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[***]

- Risk Adj Conf Int Low

- Risk Adj Conf Int High

④ 6.15.2.4 Page Controls

The buttons at the bottom of the Reports screen can be used to export the report and to navigate between pages in the report.

6.15.3 What should I do here?

If the report requires more than one page, you may use the <**Next Page**> and <**Previous Page**> buttons to see more data.

Use the <**Export All**> button to save the report in .csv format that can be read by Excel and other programs.

To see more records, use the Page Controls, or use the <**Rows Per Page**> control at the top of the screen.

6.15.4 Timesaving Tip

You can cut and paste directly from the data grid in this report into other applications such as Excel.

6.15.5 Other Questions

6.15.5.1 I sorted the data, but when I went to the next page the data were not sorted. Why?

The report is sorted in order of the stratifier selected. If you want a different ordering, you should rebuild the report with a different order of stratification. You can also adjust the <**Rows Per Page**> control to include your entire report and temporarily sort it that way.

6.16 Composite Report

6.16.1 What is this screen for?

This screen (Screenshot 33) displays rates (or ratios) for provider-level composite indicators. The screen can be accessed by clicking the "Composites" button on the Provider Level report.

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

Screenshot 33. Composite Report

composite_name	COMP1	COMP1VAR	COMP1SE	COMP1WHT	COMP1LB	COMP1UB
IQI Proc	0.9479927	0.0477931	0.2186164	73.6860	0.5195045	1.3764809
IQI Cond	0.8088844	0.0207073	0.1439004	167.8804	0.5268396	1.0909291
PSI Comp	1.5183365	0.0379109	0.1947071	5346.7268	1.1367105	1.8999625
Ped Safety	0.9313118	0.3353393	0.5790849	352.6911	-0.2036946	2.0663182

Save Report   Close

6.16.2 How is this screen organized?

1 **6.16.2.1   Report**

This area provides the following information about the displayed report:

- Title of the report.
- Date and time the report was 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_name");
- Composite rate or ratio ("COMP1");
- Variance ("COMP1VAR");

- Standard error ("COMP1SE");

- Weight ("COMP1WHT");

- Lower bound of the rate/ratio confidence interval ("COMP1LB"); and

- Upper bound of the rate/ratio confidence interval ("COMP1UB").

2 **6.16.2.2   Page Controls**

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

7.0 Helpful Tools

The Quality Indicators™ Windows® (WinQI) software includes several helpful tools (Figure 6). Many of these tools are menu options listed under Tools on the Main screen. A few of those tools are discussed in more detail here.

Figure 6. Tools
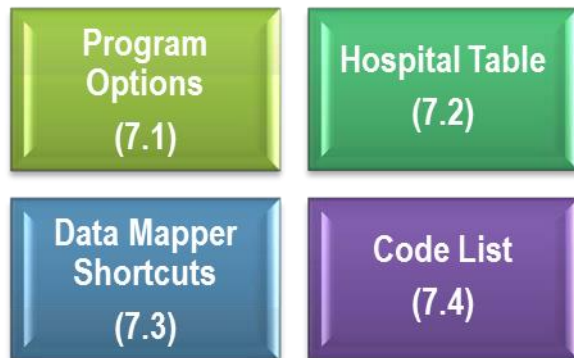
7.1 Program Options

7.1.1 What is this screen for?

This screen (Screenshot 34), accessed by clicking the <**Program Options**> control under **Tools** on the Main screen, allows you to change your database options and to save the Session Log.

Screenshot 34. Change Database Options

① **7.1.1.1   Database**

You may change the database connection information here. This change should only be done 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 would not contain the tables necessary for the program to run.

② **7.1.1.2   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) QI support, 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.

(3)   **7.1.1.3   Text Files**

You may change the separator between the values in a row of data to Tab instead of Comma.

(4)   **7.1.1.4   Import Options**

Used by the 3M™ All Patient Refined Diagnosis-Related Group (APR-DRG) grouper. The default value of five should be used in most cases. Do not modify this value without consulting 3M APR-DRG grouper documentation.

(5)   **7.1.1.5   Performance**

It is not recommended that you change any of these settings without consulting the AHRQ QI support. 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 AHRQ QI support.

(6)   **7.1.1.6   Hospitals**

You may change the maximum number of hospitals shown on the "Select Hospitals" portion of the Provider Report Wizard. While setting this number higher will result in more user control, it will slow the report generation process.

7.1.2 What should I do here?

It is recommended that you do not change the database options unless your database administrator instructs you to do so. If you wish to change the location for the Session Log, use the options under "Logging" to do so.

7.2 Hospital Table

7.2.1 What is this screen for?

This screen (Screenshot 35), accessed by accessed by clicking the <**Hospital Table**> control under "Tools" on the Main screen, allows you to specify a name and to change the county code for any hospital in the input data.

Screenshot 35. Edit Hospital Table

1	7.2.2.1	ID and Name

This area lists each of the hospital ID numbers and provides a field for entering the hospital name.

2	7.2.2.2	Discharges

This area displays the number of discharge records from the corresponding hospital.

③ **7.2.2.3** **County Code and County Name**

> This area displays the county code for the corresponding hospital in a field that can be edited and the county name associated with the displayed county code.

7.2.3 What should I do here?

You can type a name for a hospital in the field next to the ID. You can replace the county code for a hospital with a different county code. The hospital data can be loaded from an external data file.

7.3 Data Mapper Shortcuts

7.3.1 What is this screen for?

This screen (Screenshot 36), accessed by clicking the <**Edit Mapper Shortcuts**> button on the Additional Options screen, allows you to map variables in the Data Mapper screen. If you load similar files but do not use a mapping file, this can save effort in the Quality Indicators Wizard.

Screenshot 36. Data Mapper Shortcuts
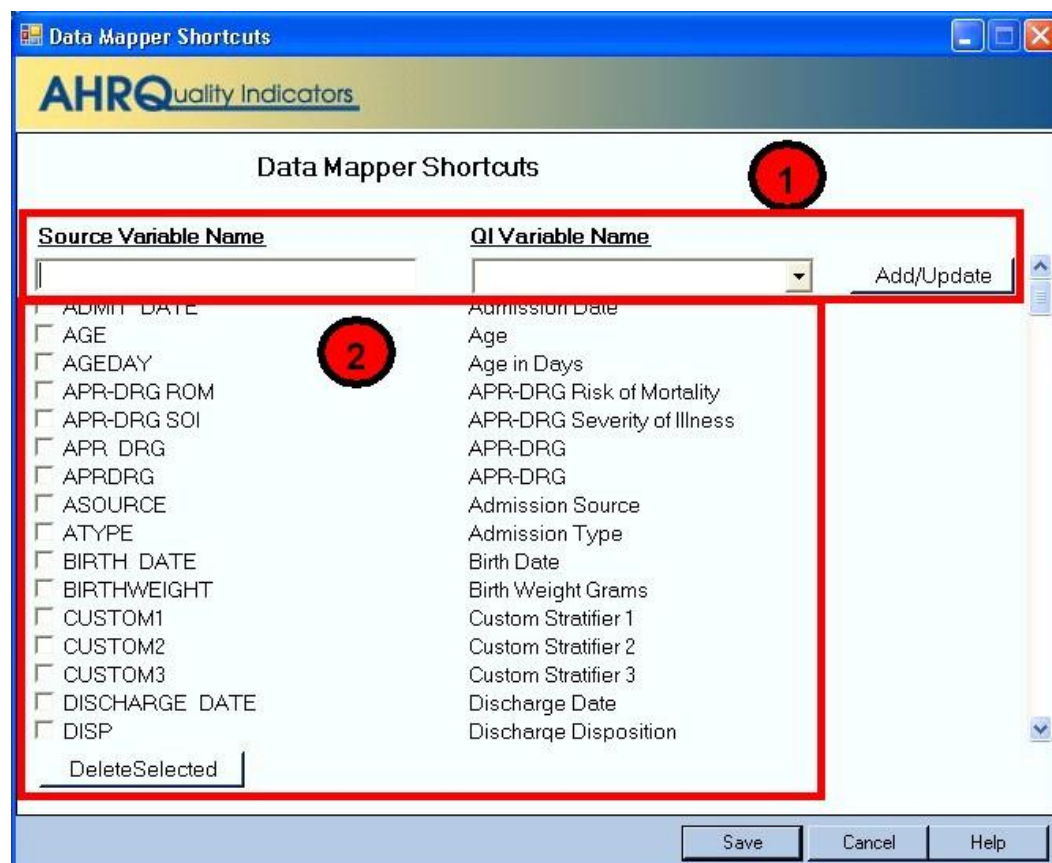
7.3.2 How is this screen organized?

① **7.3.2.1**   **Mapping Controls**

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

② **7.3.2.2**   **Mapped Variables**

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

7.3.3 What should I do here?

To delete the association between a source variable and 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 a QI 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.

7.4   Code List

7.4.1 What is this screen for?

This is a popup window (Screenshot 37) that displays the International Classification of Diseases, Ninth revision, Clinical Modification (ICD-9-CM) codes or Medicare Severity (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 37. Code List
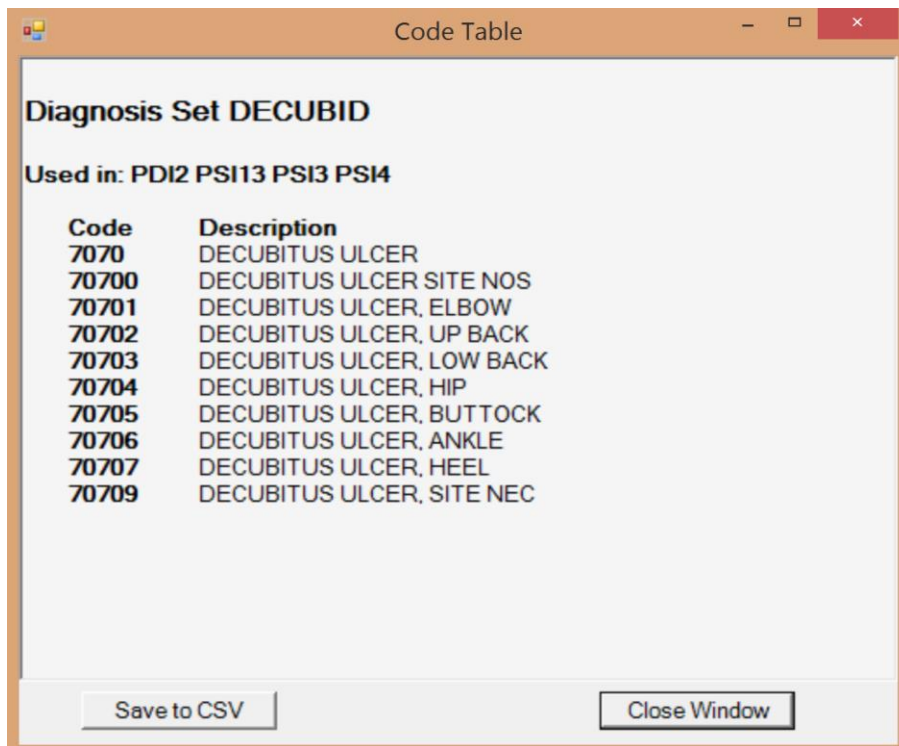
7.4.2 How is this screen organized?

① **7.4.2.1** **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 **7.4.2.2** *Used In*

This area displays the indicators that directly use this set of codes.

③ **7.4.2.3** **List of Codes**

This area displays the list of MS-DRG or ICD-9-CM codes. Where available, the descriptions of each code are listed.

④ **7.4.2.4** **Save to CSV**

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.

7.4.3 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 to CSV**> button to save this list.

7.4.4 Other Questions

7.4.4.1 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.

8.0   Technical Questions

This section provides answers to frequently asked questions about the Quality Indicators™ Windows® (WinQI) software, data security and privacy, input data, specifying and viewing reports, and using different types of QI rates.

8.1   Software Installation and Data Security

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

The 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 are available for download 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 8.2). 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 Web site for more information:

8.1.2   How many discharges can be processed?

The WinQI software is only limited 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 (10 million for SQL Server 2008 R2). 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.

8.1.3   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 AHRQ 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.

8.1.4   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 AHRQ QI support team by emailing qisupport@ahrq.hhs.gov.

8.1.5   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.

8.1.6   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 QI definitions, and all five may be omitted if desired. The field "Key" 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 Version 4.1. For maximum patient privacy, it is not recommended that you import these fields at all unless required for your analysis.

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

The "Key" data element is optional and is not used in the AHRQ QIs 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 provide 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 AHRQ QIs. The "Key" data element is not required to be unique.

8.1.8   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 Quality Indicators 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 provider-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 Import Data 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 Import Data 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 provider-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 page.

8.1.9 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 7 or Windows 8, the file is located at "C:\Program Files (x86)\Microsoft SQL Server\MSSQL.X\MSSQL\Data" and should be called "qualityindicators.mdf." If using Windows XP or an older version of Windows, the file will be located at "C:\Program Files\Microsoft SQL Server\MSSQL.X\MSSQL\Data."

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 on "How do I customize SQL Server?" in Section 8.1.13.

8.1.10 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 any 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.

8.1.11 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 the SQL Server?" in Section 8.1.13.

8.1.12 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 the SQL Server?" in Section 8.1.13.

8.1.13 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.

8.1.14 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 7.1.

8.2   Input Data

8.2.1   What is the difference between this specification and the Uniform Bill 04 (UB-04) specification?

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 the 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.

8.2.2   What if my ICD-9-CM codes are in a different format?

You will need to translate your ICD-9-CM 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.

8.2.3   Please give examples of correct ICD-9-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 where 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.

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

Though the MS-DRG is not technically 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.

8.2.5   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.

8.2.6 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 only permits its use for the calculation of IQI expected rates. APR-DRG values are only calculated for the minority of discharge records where it is required. The exported data file will therefore not contain APR-DRG data for all records.

8.2.7 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.

8.2.8 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.

8.2.9 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 where they seek care.

8.2.10 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 since the hip fracture cannot be attributed to the operating room. Alternate specifications exist for each indicator if "Days to Procedure" data are not loaded.

8.2.11 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.

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

See Section 4.0. 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.

8.2.13 What about "Present on Admission"?

"Present on Admission" (POA) fields were first incorporated in the QIs in Version 3.1.

In general, cases where the outcome of interest is present on admission will be excluded from the denominator, as 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 prior 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 has been discontinued to estimate the prevalence of conditions when POA data are missing. When using the WinQI v5.0 software, the user must specify whether the input data has POA information or not by mapping the POA variables in the input file to the corresponding QI variables. Beginning with fiscal year 2008 (October 1, 2007), the UB-04 data specification manual includes a POA indicator. 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 or not using the following criteria:

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

- The diagnosis code is expected to have present on admission reported based on ICD-9-CM coding guidelines and the associated POA value is either "Y" for present on admission or "W" for clinically undetermined.

- The diagnosis code is exempt from POA reporting according to the ICD-9-CM coding guidelines.

In all other cases, the diagnosis is identified as not present on admission. This includes cases in which POA information is unavailable; i.e., the data field on the record is blank.

If POA information is unavailable on the input data, it is assumed 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.

8.2.14 What about "Do not Resuscitate"?

"Do not Resuscitate" ("DNR") status is not imported nor used in the AHRQ QIs because it is not universally available or applied in a uniformly unbiased manner. Risk-adjusted and expected rates take into account the overall health of the inpatient population.

8.2.15 What is the purpose of the patient identification fields?

The fields "Date of Birth," "Admission Date," "Discharge Date," and "Patient ID" are passthrough 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 interests of preserving privacy, they should not be used if these are not required for your study.

8.2.16 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 passthrough fields.

8.2.17 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.

8.2.18 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 found at http://www.hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.

8.3 Specifying and Viewing Reports

8.3.1 Can provider-level and area-level reports be combined?

No. Rates are expressed differently. Area-level indicators use the population of the county as the denominator. Provider-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.

8.3.2 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).

8.3.3 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.

8.3.4 What happens if a new report is generated?

The existing set of reports will be overwritten.

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

Immediately following generation, a report can be exported to a .csv or .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.

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

Use the Patient Level Report (see Section 6.3).

8.3.7 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 6.4).

8.4 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 AHRQ QI Web site.

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, and so, only the numerators, denominators, and observed rates are reported.

8.4.1 Observed Rate

If the user's primary interest is to identify cases for further followup 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 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.

8.4.2 Expected Rate

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

The expected rate is the rate the provider would have if it performed the same as the reference population given the provider'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 provider 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 provider performed better than the reference population. Users may want to focus on these indicators for identifying best practices.

8.4.3 Population Rate

Users can also compare the expected rate to the population rate reported in the v5.0 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 QI Web site for each module. If the population rate is higher than the expected rate, then the provider's case mix is less severe than the reference population. If the population rate is lower than the expected rate, then the provider'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 provider's case mix. This is the provider's risk-adjusted rate.

If the provider 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 provider 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 provider would have if it had the same case-mix as the reference population given the provider's actual performance.

8.4.4 Risk-Adjusted Rate

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

Risk   adjusted Rate = (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.

8.4.5 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 provider'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 where the differences are more likely to persist.

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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 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 QI rates. For the area-level indicators,[2] all the input data values must be mapped to one of the listed values. For provider-level indicators, user-defined values may be retained.
Sex (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 (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. For provider-level indicators, user-defined values may be retained.
Patient State/County Code (FIPS)	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/popest/about/geo/codes.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 up to 12 characters	Hospital identification number	Used to facilitate data exploration and possible troubleshooting. May also be selected as a stratifier for provider-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 health care 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). PSI 10, 11, 13, and 17 and PDI 08 and 09 will be affected if admission type values are missing. Used for PQIs in newborn definition. Not used for IQIs.
Admission Source (SOURCE)	Admission source	Numeric	1 = ER 2 = another hospital 3 = another facility, incl. 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).
POINTOFORIG INUB04 (PORIGIN)	Point of origin	Numeric	4 = transfer from a hospital 5 = transfer from an SNF or ICF 6 = transfer from another health care 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.
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.
APR-DRG (APRDRG)	APR-DRG category	Numeric	3M™ APR-DRG software	Optional. Currently the AHRQ WinQI software uses a multiversion‖ (i.e., Versions 20, 23–30, 32) 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.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
APR-DRG Severity of Illness (SEVERITY)	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. 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)	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 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.
XAPR-DRG Risk of Mortality (XRISKMORT)	APR-DRG mortality score excluding diagnoses that are not present on admission	Numeric	3M™ APR-DRG software risk-of-mortality score	Optional. Currently the AHRQ WinQI software uses APR-DRG Versions 20, 23–30, 32 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, and PDIs.
Diagnosis Related Group (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 (DRGVER)	DRG version	Numeric	Version of Federal (CMS) DRG grouper	For example, Version 25 for FY 2008 or Version 32 for FY 2015.
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-9-CM diagnosis code. Diagnosis 1 is the principal diagnosis.	String; three, four, or five characters (do not include decimal point)	Diagnosis code	Required field for processing any indicator analysis. Valid codes range from 001 to 999 in the first three digits. Some diagnoses require fourth and fifth digits. Decimal points, if any, must be removed before loading data. If this data element is missing, the discharge record will be excluded from the analysis.
Diagnosis Code 2– Diagnosis Code 35 (DX2–DX35) (up to 34 fields)	ICD-9-CM diagnosis codes or E-codes. Diagnosis codes 2–35 are secondary diagnoses.	String, three, four, or five characters (do not include decimal point)	Diagnosis codes	NOTE: Seven of the PSIs rely on E-codes. If the dataset contains E-codes in user-defined variables, these variables should be remapped to secondary diagnosis codes. See instructions for using the Data Mapping screen in the Quality Indicators Wizard. Diagnosis codes may also contain V-codes.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Present on Admission 1– Present on Admission 35 (DXPOA1– DXPOA35) (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. POA flags associated with E-codes can be mapped to these variables.
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-9-CM procedure codes. Procedure code 1 is the principal procedure.	String; two, three, or four 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.
	ICD-9-CM procedure codes. Procedure codes 2–30 are secondary procedures.	String; two, three, or four 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[5]	It is expected that the number of days-to-procedure variables agrees with the number of procedure codes present. Valid values may be negative or zero. Only applies 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.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
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	Number of days the patient spent on a mechanical ventilator	Numeric		Optional data element that is passed directly to the APR-DRG grouper.
Birthweight in Grams (BWEIGHT)	Birthweight for newborns	Numeric		Optional data element that is passed directly to the APR-DRG grouper. This field is not used for pediatric birthweight categories. ICD-9-CM diagnosis codes are used to indicate birthweight.
Date of Birth (BDATE)	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 (ADATE)	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.
Discharge Date (DDATE)	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 (PATID)	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-9-CM: International Classification of Diseases, Ninth 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. Provider-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 5.5.5.12.

[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 Provider-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, incl. 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 be 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.
	Pediatric Age Category	Pediatric age category in years at admission	Numeric range		<1 year, 1–2, 3–5, 6–12, 13–17

VARIABLE GROUP	VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
	Pediatric Age In Days	Pediatric age category in days at admission	Numeric range		0–28, 29–60, 61–90, 91–365 days
	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 provider'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		
	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 providers 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 providers 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 Provider-Level Composite Indicator Report

VARIABLE GROUP	VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Composite_name	Composite indicator name for provider-level composites		Text	IQI Proc (IQI90 - Mortality for Selected Procedures) IQI Cond (IQI91 - Mortality for Selected Conditions) PSI Comp (PSI90 - Patient Safety for Selected Indicators) Ped Safety (PDI19 - Pediatric Patient Safety for	

VARIABLE GROUP	VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
				Selected Indicators)	
COMP1	Indicator rate or ratio		Numeric		
COMPVAR1	Variance		Numeric		
COMP1SE	Standard error		Numeric		
COMP1WHT	Weight		Numeric		
COMP1LB	Lower bound	Lower bound of the rate/ratio confidence interval	Numeric		
COMP1UB	Upper bound	Upper bound of the rate/ratio confidence interval	Numeric		

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	
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	

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
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 provider'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		
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 multivariate signal extraction (MSX)	Numeric		MSX smoothing estimates the effect of random differences in the observed rate across providers or areas. In essence, smoothing describes how persistent a rate would be from year

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
				to year. Smoothing is a useful tool to "level the playing field" for providers or areas with a small number of cases.

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 provider-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, incl. HMO 4 = self-pay 5 = no charge 6 = other	Used to stratify the AHRQ QI rates. Not used for the area-level indicators. For provider-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/popest/about/geo/codes.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 health care 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, incl. 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 multiversionll (i.e., Versions 20, 23–30, 32) 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, and 32. 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, and 32 to risk-adjust the IQIs. Not used for PQIs, PSIs, or PDIs.
XPR-DRG Risk of Mortality	APR-DRG mortality score excluding diagnoses that are not present on admission	Numeric	3M™ APR-DRG risk-of-mortality score	Currently, the AHRQ WinQI software uses APR-DRG Versions 20, 23–30, and 32 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 health care 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.
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.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
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 = 2500+ grams 8 = 2000–2499 grams 7 = 1750–1999 grams 6 = 1500–1749 grams 5 = 1250–1499 grams 4 = 1000–1249 grams 3 = 750–999 grams 2 = 500–749 grams 1 = <500 grams	Only included if "Temporary Flag Variables" is selected during export.
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.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
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 http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/Parameter_Estimates_PDI_50_Final.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 http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/Parameter_Estimates_PDI_50_Final.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 http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/Parameter_Estimates_PDI_50_Final.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.
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.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
pdi2_risk_cat	Risk category stratification for PDI 02	Numeric	1 = low 2 = high (see *Technical Specifications* at http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/TechSpecs/PDI_02_Pressure_Ulcer_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.
pdi11_risk_cat	Risk category stratification for PDI 11	Numeric	1, 2, 3, 4, or 9 (see *Technical Specifications* at http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/TechSpecs/PDI_11_Postoperative_Wound_Dehiscence_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-9-CM diagnosis code; diagnosis 1 is the principal diagnosis	String; three, four, or five characters	Diagnosis code	Valid codes range from 001 to 999 in the first three digits. Some diagnoses require fourth and fifth digits.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Diagnosis Code 2– Diagnosis Code 35 (DX2–DX35)	ICD-9-CM diagnosis codes; diagnosis codes 2–35 are secondary diagnoses	String; three, four, or five characters	Diagnosis codes	NOTE: Seven of the PSIs rely on E-codes. See Appendix A.
Principal Procedure (PR1)	ICD-9-CM procedure codes; procedure code 1 is the principal procedure	String; two, three, or four 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-9-CM procedure codes; procedure codes 2–30 are secondary procedures	String; two, three, or four 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. Only applies 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.
IQIxx_expected PQIxx_expected PSIxx_expected PDIxx_expected	Predicted value (i.e., probability of the outcome of interest given demographics, comorbidities, and risk of mortality) for appropriate QIs	numeric (float); value between 0 and 1		Only included if "Discharge Level Predicted Probabilities" is selected during export.
AIDS	Comorbidity category code flag: acquired immune deficiency syndrome	numeric	1 = true 0 = false	Used in risk adjustment.
ALCOHOL	Comorbidity category code flag: alcohol abuse	numeric	1 = true 0 = false	Used in risk adjustment.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
ANEMDEF	Comorbidity category code flag: deficiency anemia	numeric	1 = true 0 = false	Used in risk adjustment.
ARTH	Comorbidity category code flag: rheumatoid arthritis/collagen vas	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.
CHF	Comorbidity category code flag: congestive heart failure	numeric	1 = true 0 = false	Used in risk adjustment.
CHRNLUNG	Comorbidity category code flag: chronic pulmonary disease	numeric	1 = true 0 = false	Used in risk adjustment.
COAG	Coagulopathy flag	numeric	1 = true 0 = false	Used in risk adjustment.
DEPRESS	Comorbidity category code flag: depression	numeric	1 = true 0 = false	Used in risk adjustment.
DM	Comorbidity category code flag: diabetes without chronic complications	numeric	1 = true 0 = false	Used in risk adjustment.
DMCX	Comorbidity category code flag: diabetes with chronic complications	numeric	1 = true 0 = false	Used in risk adjustment.
DRUG	Comorbidity category code flag: drug abuse	numeric	1 = true 0 = false	Used in risk adjustment.
HTN_C	Comorbidity category code flag: hypertension	numeric	1 = true 0 = false	Used in risk adjustment.
HYPOTHY	Comorbidity category code flag: hypothyroidism	numeric	1 = true 0 = false	Used in risk adjustment.
LIVER	Comorbidity category code flag: liver disease	numeric	1 = true 0 = false	Used in risk adjustment.
LYMPH	Comorbidity category code flag: lymphoma	numeric	1 = true 0 = false	Used in risk adjustment.
LYTES		numeric	1=true 0=false	Used in risk adjustment.
METS	Comorbidity category code flag: metastatic cancer	numeric	1=true 0=false	Used in risk adjustment.
NEURO	Comorbidity category code flag: other neurological disorders	numeric	1=true 0=false	Used in risk adjustment.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
OBESE	Comorbidity category code flag: obesity	numeric	1 = true 0 = false	Used in risk adjustment.
PARA	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.
PSYCH	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.
RENLFAIL	Comorbidity category code flag: renal failure	numeric	1 = true 0 = false	Used in risk adjustment.
TUMOR	Comorbidity category code flag: solid tumor without metastasis	numeric	1 = true 0 = false	Used in risk adjustment.
ULCER	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.
CCSxx	CCS categories	numeric		AHRQ Clinical Classification Software categories used in risk adjustment for PDIs

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-9-CM: International Classification of Diseases, Ninth 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. Provider-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.