AHRQ Quality Indicators Software Instructions, Emergency Department Prevention Quality Indicators (ED PQI Beta) Windows® Application v2023

Prepared for:

Agency for Healthcare Research and Quality
U.S. Department of Health and Human Services
5600 Fishers Ln
Rockville, MD 20857
https://qualityindicators.ahrq.gov/

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Table of Contents

List of Tables

List of Screenshots

Installation

1.1 Before You Begin

You will need Administrator permission to install the software. If you don't have administrator permissions, you may need information technology (IT) support when installing the software. You will need to download the latest ED PQI Windows installer. Please check your system to ensure it meets the minimum requirements (see next section).

The ED PQI architecture allows you to run the v2023 ED PQI Beta software on a browser, such as Internet Explorer (IE), Google Chrome, Firefox, etc. This will enable users to access the ED PQI Beta software not only on a machine running MS Windows operating systems (OS), but also Apple Mac OS. For users to access the ED PQI software on a Mac machine, the ED PQI software must be installed on a server and ports opened for users to access the application using a URL on a browser. Detailed instructions appear below in (section 1.3).

1.2 Hardware and software requirements

The ED PQI Beta software has been tested on the following configuration:

- 64-bit Microsoft Windows 8, 10, and 11
- .NET Core 7
- Internet Browser, (e.g., Google Chrome [recommended]), Firefox, Edge)

Approximate disk space requirements:

- ED PQI Application: 325 MB
- ED PQI data: 100 MB is typical, but it can go up to 10 GB, depending on the number of discharge records you wish to process.

1.3 Installation process

ED PQI can be installed in two ways:

1. **Desktop Installation**: ED PQI Beta be installed on a desktop using the installer.

2. **Server installation for access via browser remotely**: Application is installed on the server. It provides users the ability to access the application on their desktop via a browser (requires server administrators' help in setting it up). See section 1.1.2.

1.1.1. Desktop Installation

The installation for ED PQI Beta is a two-step simple process:

To Install:

Step 1: Download the ED PQI Beta Installer from the AHRQ QI website

Step 2: Extract the downloaded installer and double-click the setup file – "edpqi-setup_v2023.exe". You may choose where you want to install ED PQI Beta. The default installation location is "*C:\Program Files (x86)\ED PQI*"

Note: this does **NOT** require you to uninstall any previous versions of WinQI you may have installed on your machine. ED PQI Beta. can be installed and run in parallel to WinQI on your desktop.

After installation, launch the application:

Once installed, there are two ways to access the application:

1. Option 1: Double click the ED PQI icon on your desktop or via the Start menu on your computer.
2. Option 2: Go to "C:\Program Files (x86)\ED PQI\1.0" and double-click on "cloudqi.exe" (file type: application).

This will open the application on your default browser, such as Google Chrome, Firefox, and IE.

If the browser does not launch by itself, you can also open a browser (preferably Google Chrome) and go to the following URL: http://localhost:5003. This will load ED PQI Beta on your browser.

1.1.2. Server Installation

This installation process is similar to a desktop installation, as described in section 1.1.1 above. However, in this case, the installation is performed on a server. It is recommended that you

reach out to your server administrators for assistance. This setup allows you to access the application on your desktop through a browser by using a specific URL.

To ensure successful access, it is crucial that your server administrators open port 5003 to enable you to reach the URL from your desktop. Collaborate with your administrators to have the application installed on a Windows server. It's important to note that a service account can be utilized for this installation, and your administrator should be aware of this requirement.

After Installation, accessing the application remotely:

Once installed, your administrator will provide you the URL of this application, which will look something like this – http://[IP or Domain]:5003/. You will have to use a browser, preferably Google Chrome, to access this application.

Background

The Emergency Department Prevention Quality Indicators (ED PQI) module of the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators (QIs) reflects quality of care measures to highlight potential quality concerns, identify areas that need further study and investigation, and track changes over time. They identify conditions for which access to quality ambulatory care can reduce the likelihood of hospital admission. The data required for measuring these indicators come from hospital inpatient and outpatient ED records (administrative data), which are readily available within hospitals or from many state data organizations. The AHRQ QI software is intended to be used with data that cover an entire patient population (e.g., all inpatient and outpatient ED records from a hospital in a year) or that were sampled from a patient population using a simple random sample. The residential population data used to construct denominators for the area-level utilization indicators are from the U.S. Census Bureau (see *2023 Population File for Use with AHRQ Quality Indicators*).

The ED PQI software generates observed, expected, risk-adjusted, and smoothed rates across the modules for most indicators. Observed rates are the raw rates, which are the number of hospitalizations for the condition of interest divided by the number of individuals who live in the geographic area who are at risk for the condition. Expected and risk-adjusted rates both acknowledge that areas of the country are unique and differ in two important ways from the representative profile observed in the reference population. First, there is heterogeneity in the care that is available, in the community resources, or in exposures from the environment. Second, most areas differ in the demographic composition of their residents. The expected rate is that which would prevail if heterogeneity from sources other than demographics were removed, but local demographic characteristics were allowed to vary. The risk-adjusted rate then uses the difference between the rate observed in a given area and that expected rate to project the rate that would result in the reference population if local differences other than demographic prevailed.

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

The risk-adjusted rate answers the question, “What rate of admissions is expected if the standard of care applied to local residents were applied to the reference population?” (i.e., locally observed performance on a representative mix of patients from the reference population). If the risk-adjusted rate is higher than the reference rate (or if observed rates are higher than expected rates), it means that the admission rate for a given geographical area is worse than expected based on the experience of patients in the reference population with a similar distribution of characteristics.

Risk adjustment permits the rate for a given geographic area to be compared with the rate for the reference population.

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

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

Overview of the ED PQI Beta Software

This document describes the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators Windows® ED PQI Beta software Version v2023, a free tool that allows users to run AHRQ QI analyses with data that they provide. Anyone who has access to administrative inpatient and outpatient data can run this software.

3.1 Reference populations

When applicable, the software calculates risk-adjusted and expected rates using a reference population that is an aggregation of FY 2021 inpatient and outpatients from all the States that participate in the Healthcare Cost and Utilization Project (HCUP) State Emergency Department Databases (SEDD). For additional information on HCUP and SEDD, see AHRQ's HCUP website (https://www.ahrq.gov/research/data/hcup/index.html). For states included in the reference population, see the ED PQI Empirical Methods document.

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 ED PQI Beta v2023 software. The risk-adjusted rates for the area-level indicators will reflect the age and sex distribution in the reference population rather than the distribution for the areas in the user's data. This approach will allow risk-adjusted rates produced by various users to be compared directly to the reference population. The regression coefficients were derived from the HCUP SEDD and, for area-level indicators, U.S. Census data. The code to generate these reference population coefficients is not part of the ED PQI software.

3.2 Data included

The ED PQI Beta software does not include data for any individual hospitals or groups of hospitals.

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

In addition to the reference population rates, the software includes risk adjustment coefficients and model parameters (e.g., signal variance estimates) based on a statistical analysis of the reference population. These data are populated in the respective tables of the QI database during installation and generally cannot be modified.

3.3 Benchmarks

Having calculated an observed rate for an indicator, the obvious next question is, "How do these rates compare to others?" Users typically want comparisons with other hospitals or a national rate. However, neither of these is generally appropriate given that hospitals vary in the patients they treat. For example, it would not be fair to compare mortality rates from a hospital that specializes in high-risk cases to an "average" hospital, nor would it be reasonable to compare a hospital that

serves a largely elderly population with one that serves a more balanced area. An appropriate benchmark for a hospital is necessarily specific to the demographics and the types of cases it receives.

For most purposes, the most useful check is to compare the observed rate with the expected rate calculated from the same group of cases. The ED PQI Beta software calculates these rates (see Section 11.3).

For area-level indicators included in ED PQI, the expected rate takes into account the mix of age and sex in each area. The ED PQI Beta 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 (PQEs). The risk-adjusted rate calculated by the software is the observed rate divided by the expected rate times the reference population rate.[1] 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]

3.4 Using the ED PQI Beta software for analysis

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

3.4.1 Reviewing individual cases

The ED PQI Beta software includes tools to review the individual cases that are selected for each indicator. Once you have loaded your data and generated indicators for specific modules, select the module you would like to analyze and click <**Create Patient Report**> (see Section 11.4) on the **Home** screen under the **Create Reports** section of the screen. Then select the desired indicator on the **Patient-Level Report** screen. This tool can be useful for selecting cases for chart review and further study.

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

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

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

3.4.2 Stratification

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

3.5 Other documentation

Documentation for the PQE measures is available separately in technical specifications that include details on inclusion and exclusion criteria.

Each technical specifications document provides the codes for specific diagnoses, other criteria that are used to construct the denominator and numerator from discharge records, and the logical conditions under which records would be excluded.

For additional details on ED PQI background please see the SAS QI Software Instructions Document.

Getting Started

4.1 Using ED PQI

4.1.1 How do I start the ED PQI Beta software?

For Windows 8 and above, click on your computer's <**Start**> button and type "ED PQI" to find the installed software on your computer. Once you see the "ED PQI" Desktop App icon, click on it to launch the application. The software will open in a browser.

4.1.2 How do I use this instruction manual?

The main part of this manual is organized into the sections shown in Figure 1.

Figure 1. Data Flow Diagram for How to Use This Manual

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

ED PQI Beta Intelligent Installer

5.1 What is this screen for?

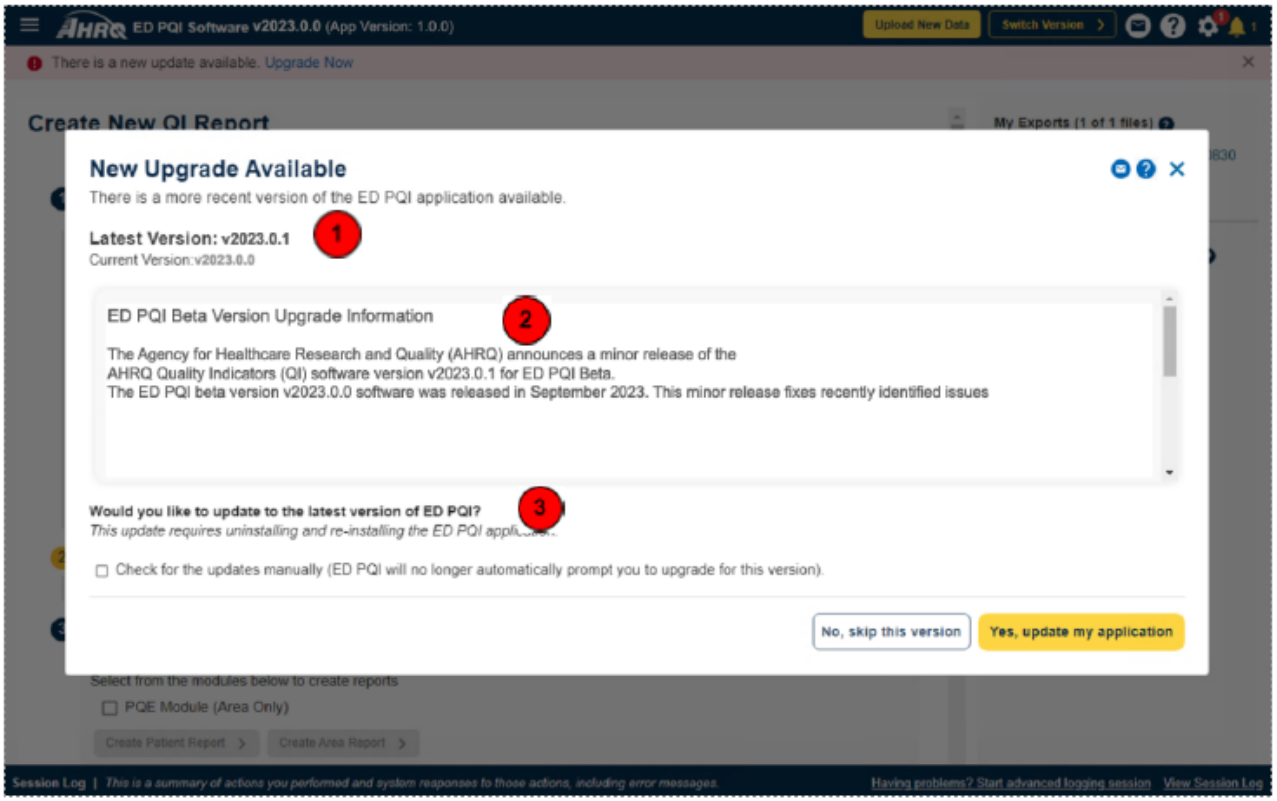
The setup of this screen closely resembles that of WinQI. This particular feature is designed for users who have already installed the ED PQI application. It is essential to have an internet connection for this feature to function properly. If a higher version of ED PQI than the one you are currently using is available, the software will notify you about the existence of the newer version. It will display the features offered in the latest version and inquire whether you would like to upgrade your software at that point. Should you choose to proceed with the upgrade, the software will handle the update process for you. However, if you already have the most recent version installed and no further updates are available, the software will direct you to the home screen.

ED PQI automatically searches for updates and notifies you when a new version becomes available. There are two distinct types of updates offered in ED PQI:

1. **Application version update:** This process entails updating the software instance installed on your computer. These updates may include the addition of new features, bug fixes, and other enhancements to the software. You will receive notifications regarding the availability of these updates, and it is recommended that you opt in for them. Upon choosing to update, the application will close and reinstall the software on your computer, ensuring that you have the latest version with all the improvements.

2. **Data version updates:** These updates specifically pertain to fiscal year updates for the AHRQ QI software. An example of a data version update would be transitioning from v2023 to a more recent version. To incorporate these updates, you will simply switch to the corresponding fiscal year updated version from within the application.

Screenshot 1: New Version Notification Screen



5.2 How is this screen organized?

1

5.2.1 Latest version

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

2

5.2.2 Release notes

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

3

Would you like to upgrade to the latest version?

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

4

5.2.3 Check for upgrades manually

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

5.3 What should I do here?

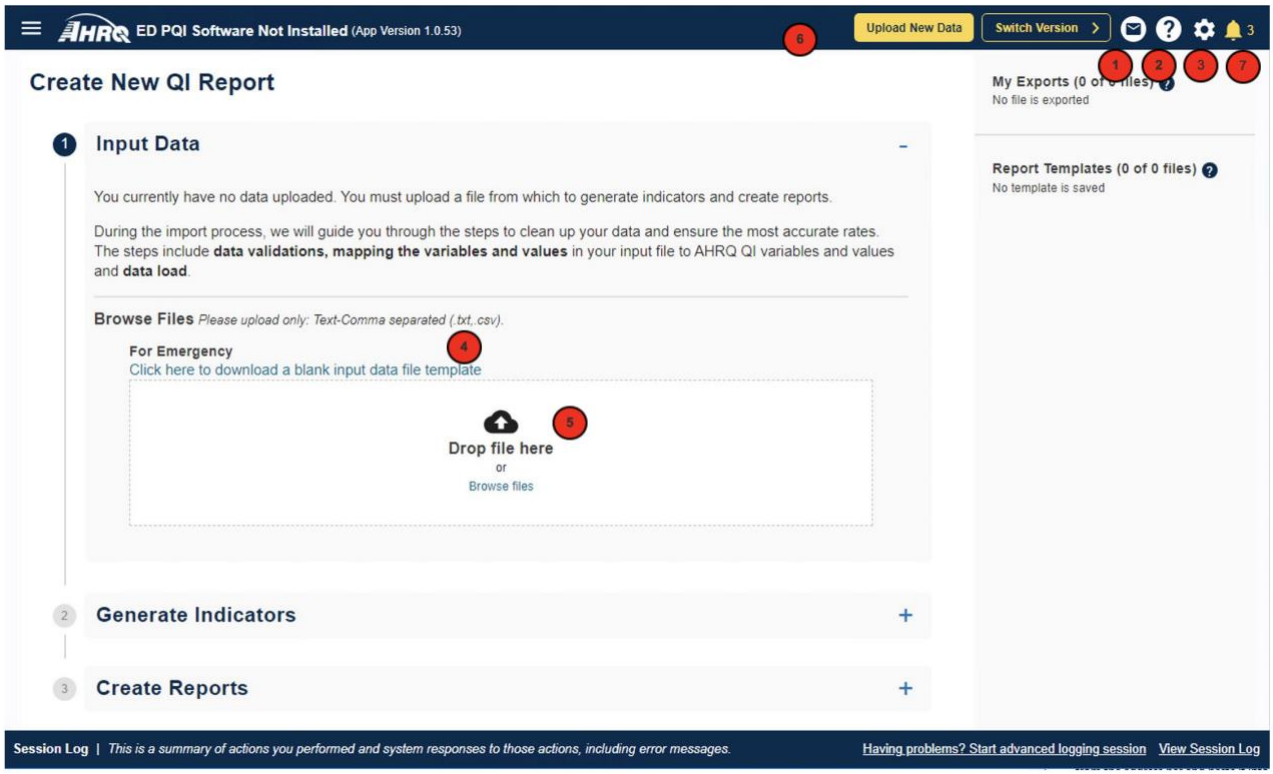
If a newer version of the software is available, read the features of the newest release and determine whether or not it will be helpful to upgrade now. In general, we recommend that you install the latest version of the software because certain technical issues may also have been resolved in the newer version.

ED PQI Home Screen

6.1 What is this screen for?

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

Screenshot 2: Home Screen (Create New QI Report)



6.2 How is this screen organized?

1 6.2.1 Contact QI support

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

2 6.2.2 Help

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

3 6.2.3 Settings

This icon will bring up a menu containing several helpful tools that are available to you throughout the application. Please see Section 12 for a description of the available tools.

4 6.2.4 Input Data

Clicking the link "Click here to download a blank input data file template" will allow you to download a blank input data file (.csv) to setup your data for ED PQI. Please refer to the ED PQI input data format in Appendix A.

5 6.2.5 Browse to Files

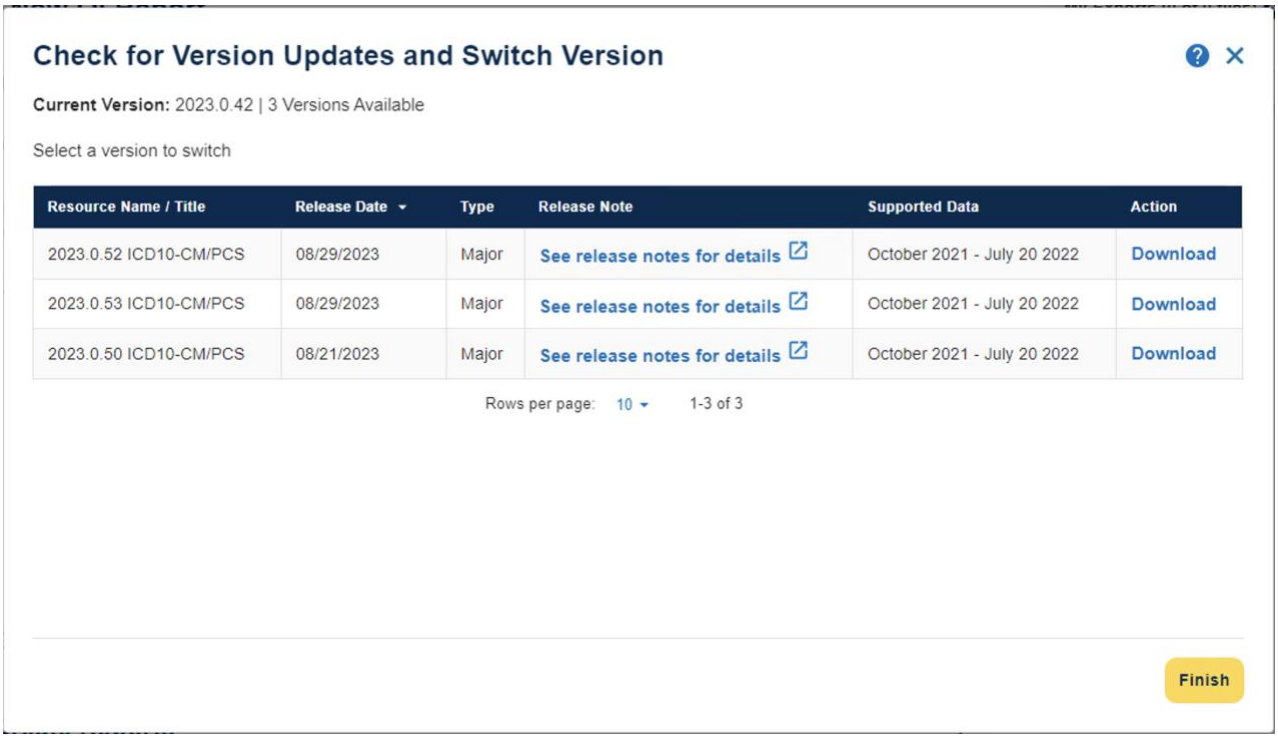
You have two options in the section to upload your file. Either drag and drop your file in the <**Drop file here**> section or click on the <**Browse files**> link to navigate to your file on your hard drive. Please upload only the following: comma-separated text (.txt, .csv).

6 6.2.6 Upload New Data

Clicking the <Upload New Data> button is another way to upload your data file. It will allow you to navigate to your file on your hard drive and upload.

7 6.2.7 Notification Icon

This bell icon notifies you of any new version updates available for you to download and install. The number displayed next to the bell icon shows you the total number of version updates available to you.



By clicking on the <**Notification**> bell icon, a new panel will be displayed, presenting notifications regarding any newly released data versions (specifically fiscal year updates). The number displayed on the bell icon indicates the count of available but not yet downloaded data versions.

In ED PQI, a convenient feature allows users to effortlessly update the current data version without the need to reinstall the software. On the home screen, the bell notification icon provides essential information, such as the date of the currently in-use version, and notifications of any new version updates ready for download. If a new version is available, this window will also furnish details, such as the name of the resource available, the release date, any associated release notes, and the date the data supports.

6.2.7.1 *Download*

Whenever a new data version becomes available, it will be displayed in the notification window, prompting you to download it. By clicking on the <**Download**> link, you can retrieve the new version and have it ready for switching on your computer. To update your currently installed version and utilize the new data version, simply click on the <**Switch to this version**> button. This will seamlessly transition your system to the specified data version, such as v2023.

6.2.8 Switch Version

Located at the top of the screen, you will find the crucial <**Switch Version**> button. When clicked, a pop-up window will appear, displaying all available versions of the software you are currently using, ready for download. For instance, if you are currently using version 2023.0.0 but wish to obtain version 2023.0.1, if it has been released, you can leverage this feature to acquire the desired version.

In the event that a new version is indeed available, switching to it is a breeze. Simply click on the any <**Download**> link in the action column and watch that space for a status update as the file downloads. Once the process is complete, the original <**Download**> link will be replaced by a <**Switch to this Version**> button. By clicking on this button, your current version will be updated to the new version you have just downloaded. After clicking the <**Finish**> in the bottom right of the window, the application process will be successfully completed, and your new software will be updated and ready for immediate use.

About Input Data

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

7.1 Questions on input data

7.1.1 Where do I begin?

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

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

The software uses readily available hospital inpatient (hospital) and outpatient (ED) administrative data that provide demographics on the patient; diagnosis codes; and information about the admission and treat-and-release.

7.1.3 What format should the data be in?

The software accepts a common data format:

- **Text (comma-separated)**

Two formatting issues to keep in mind are that

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

If the data file meets these requirements, the **Data Import Wizard** will assist users in transforming their data into the QI data format (see Appendix C for a definition of each field).

7.1.4 What is the easiest format to work with?

Use a comma-separated value format (.csv or CSV) and use the variable names in the **Data Elements** table as column headers. For each *mapped* variable in the **Data Elements** table, use the numeric values listed. None of these suggestions are mandatory, but they will simplify data import.

Note that the .CSV format can be problematic for international users who might use commas to denote the decimal place in numeric fields. The ED PQI Beta 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.

7.1.5 What data must be included?

The ED PQI Input Data Dictionary (see Appendix A) lists the data that should be included for each record.

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

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

The ED PQI Beta software, in the beta phase doesn't allow you to import additional data.

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

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

7.1.9 What are the different data types?

There are four types of data elements:

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

Numeric and string values must match the format specified.

Mapped variables have specific meanings according to the coding conventions in your organization, and they have specific meanings in the ED PQI Beta application. For example, the ED PQI's DIED_VISIT=1 if coded for dying in the ED

Your data do not have to use "1" to mean "dying in ED", but in order for the ED PQI application to calculate PQE indicators, you will need to provide the translation in the **Crosswalk** screen.

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

Comma-separated value format files use commas to separate the data values. If you have commas within any data values, 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 7.1.4, the CSV format can be problematic for international users who might use commas to denote the decimal place in numeric fields. The ED PQI Beta 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.

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

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

Import Data File

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

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

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

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

8.1 Specify input file

8.1.1 What is this screen for?

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

8.1.2 How is this screen organized?

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

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

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

8.1.3 What should I do here?

To upload your file, type the full path name or browse to and select the appropriate file to upload (Screenshot 7). Only one file can be uploaded at a time. Your file has to be in the CSV format. A blank input data file template can be downloaded from this screen by clicking the "Click here to download a blank input data file template" link.

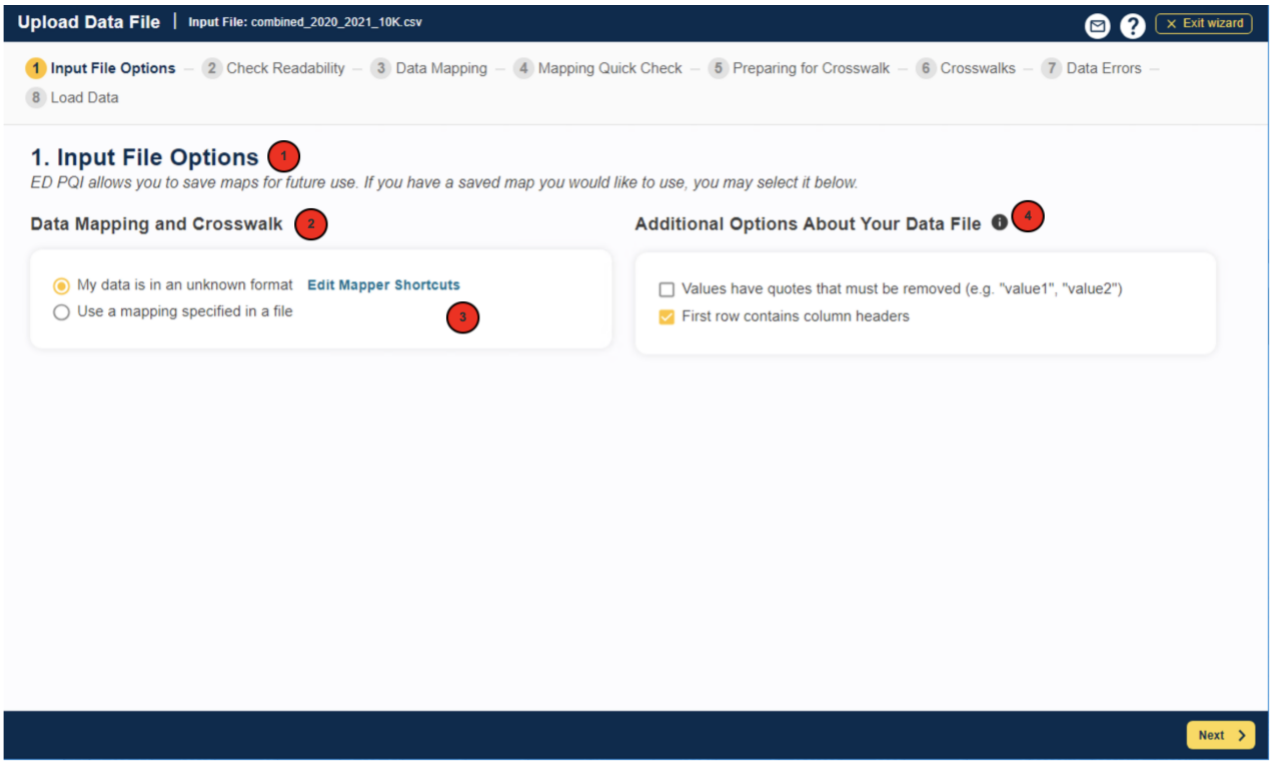
- Text–Comma separated (.txt, .csv)

8.2 Input File options

8.2.1 What is this screen for?

Use this screen (Screenshot 3) to provide information about your data format. You may also specify a mapping file on this screen. A mapping file describes the contents of your file to the application. See the description in Section 8.2.2.2 for more information on mapping files.

Screenshot 3: Input File Options



8.2.2 How is this screen organized?

1

8.2.2.1 Navigation

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

The screen is separated into three sections: “Data Mapping and Crosswalk,” Additional Options about Your Data File,” and “,” each of which are described below.

2

8.2.2.2 Data Mapping and Crosswalk

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

specifications with other data files in future sessions. Using a saved mapping file enables you to save time on the import process.

There are two types of mapping files:

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

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

A saved mapping file may be used in two ways:

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

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

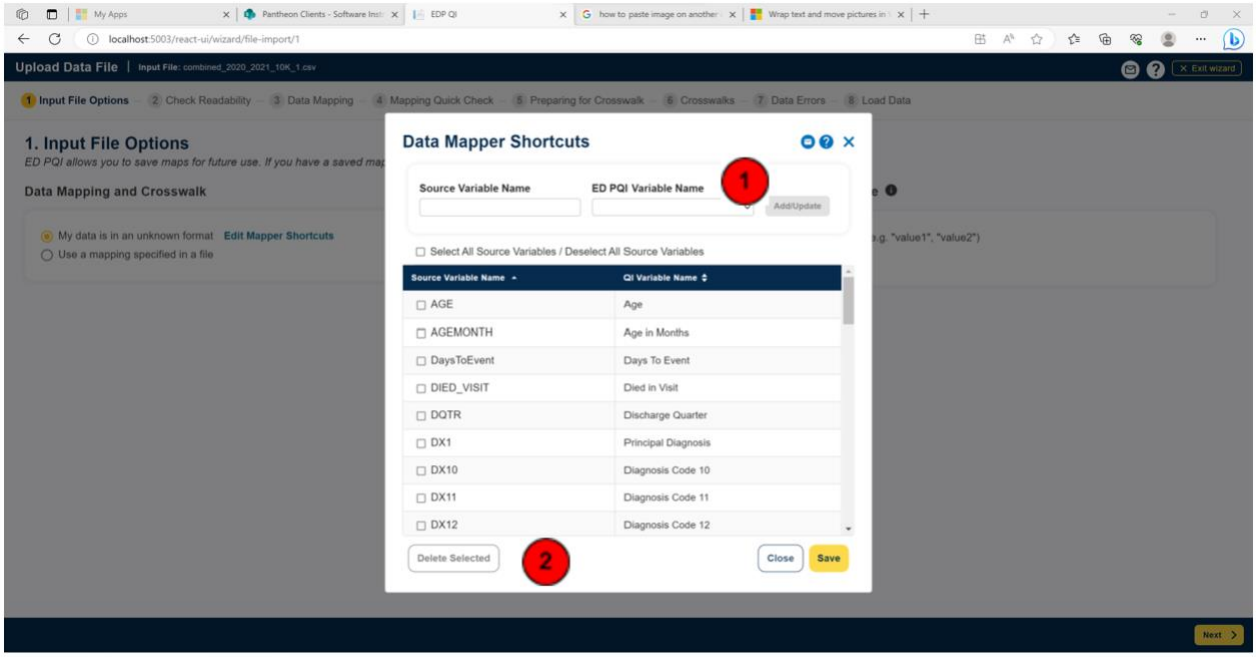
8.2.2.3 Data Mapper Shortcuts

8.2.2.3.1 What is this screen for?

This screen (Screenshot 4), accessed by clicking the <Edit Mapper Shortcuts> button on the Input File Options: Data Mapping and Crosswalk screen, allows you to map variables in the Data

Mapper Shortcuts screen. If you load similar files but do not use a mapping file, this can save effort in the Data Import Wizard.

Screenshot 4: Data Mapper Shortcuts



8.2.2.3.2 How is this screen organized?

1 *8.2.2.3.2.1 Mapping controls*

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

2 *8.2.2.3.2.2 Mapped variables*

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

8.2.2.3.2.3 What should I do here?

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

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

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

4 *8.2.2.4 Additional Options About Your Data File*

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

8.2.3 What should I do here?

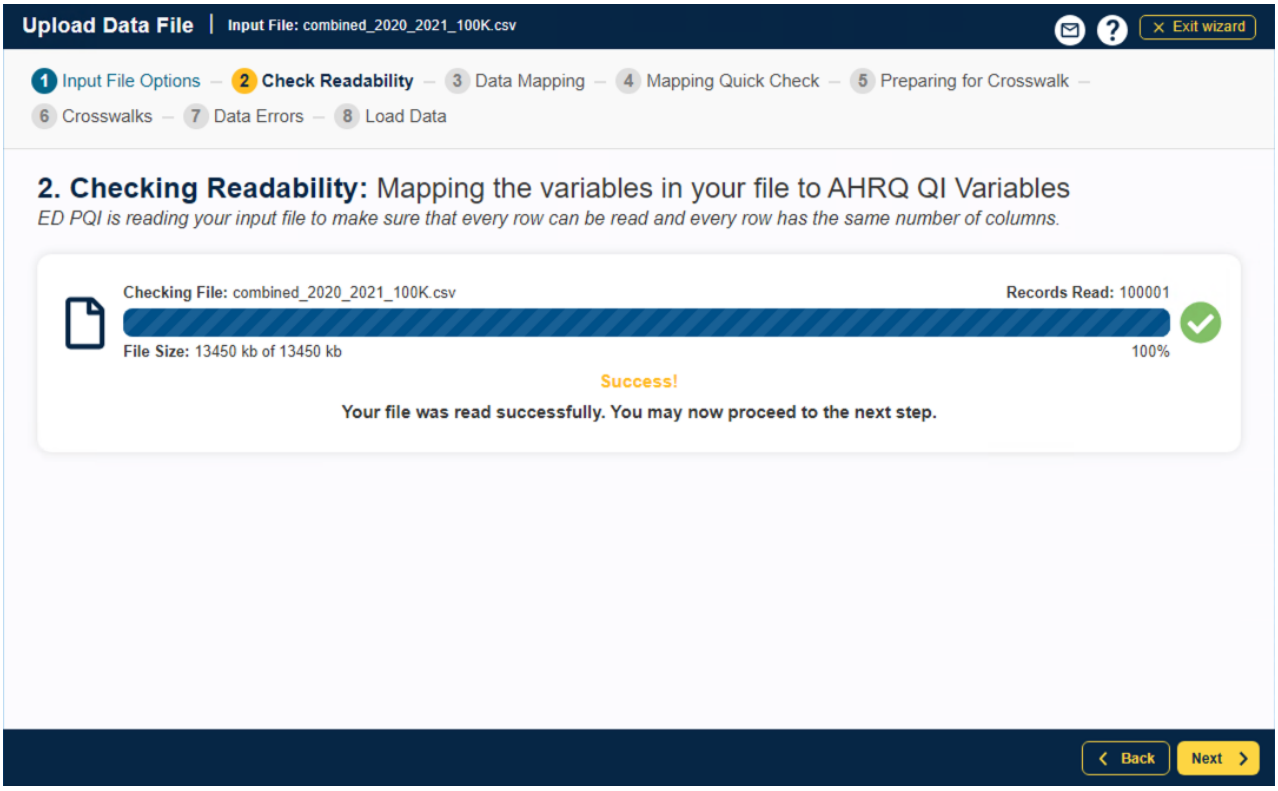
Select the information you would like to provide about your data file. If you have provided all the necessary information, click the <**Next**> button to continue to the **Check Readability** step.

8.3 Check file readability

8.3.1 What is this screen for?

This screen (Screenshot 5) displays the application's progress as it scans your input data file to ensure that each row can be read. It is important to ensure that the file is in a readable format prior to performing any further processing.

Screenshot 5: Check Readability



8.3.2 How is this screen organized?

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

8.3.3 What should I do here?

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

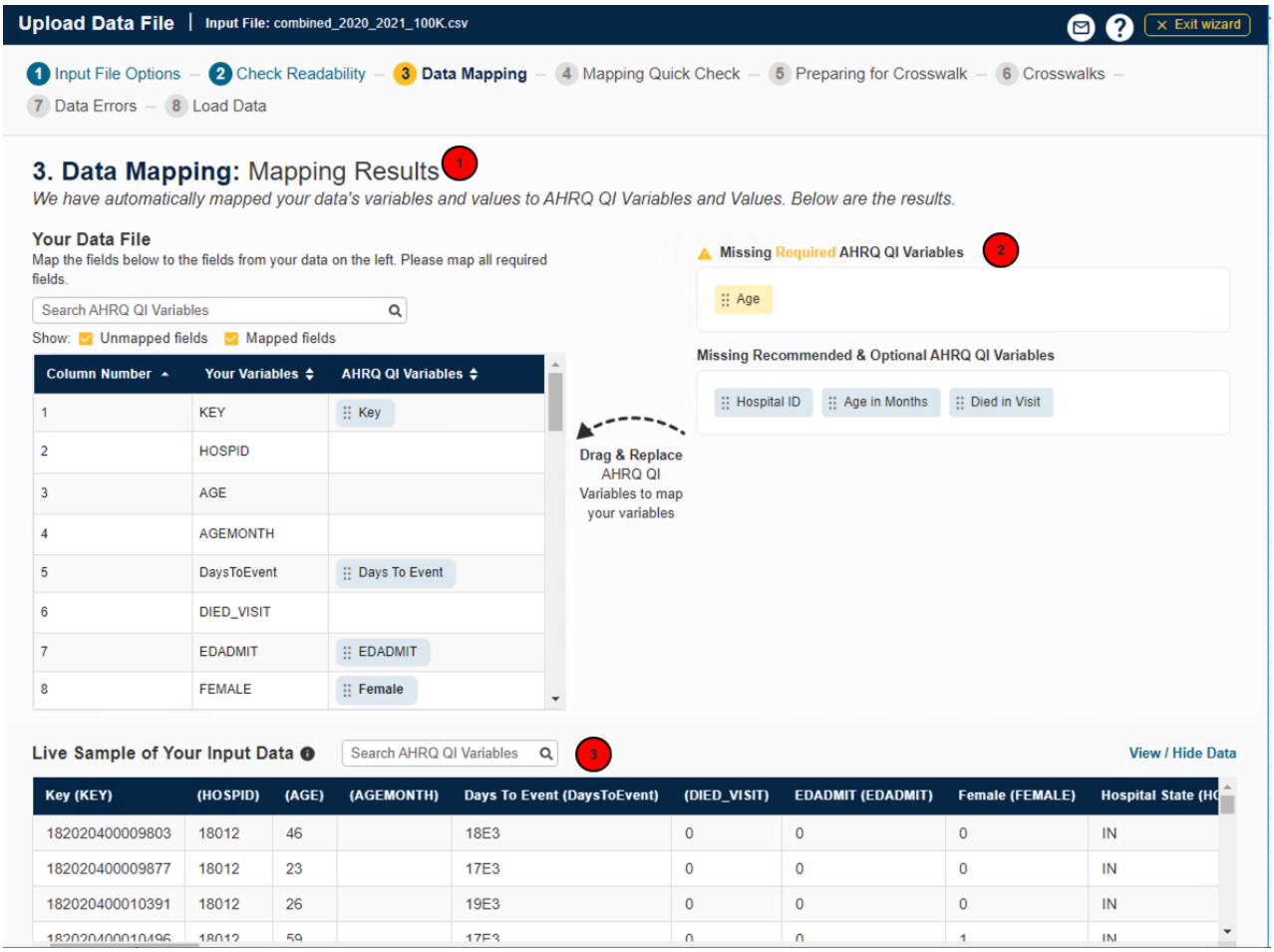
Once the scan is complete and you have confirmed that no readability errors were found, click the <**Next**> button to continue to the **Data Mapping** step.

8.4 Data mapping

8.4.1 What is this screen for?

This screen (Screenshot 6) allows you to map variables from your data input file to the ED PQI variables. This is important for the ED PQI Beta software to know how to process your data. If you have uploaded a mapping file in the **Select File Options** portion of the process, the variables on this screen will be mapped accordingly. If the column names in your input file match the names of the input variables as specified in the Input Data Dictionary (see Appendix A), the auto-mapper will map the variables according to the column headers.

Screenshot 6: Data Mapping



8.4.2 How is this screen organized?

The screen is divided into four sections: Your Data File, Missing Required AHRQ QI variables, Missing Recommended & Optional AHRQ QI Variables, and Live Sample of Your Input Data, each of which are described below.

1

8.4.2.1 Your Data File

This section lists the names of all variables found in your data file, along with the position of each variable (the column number) within each row. The view will default to show all variables

(mapped and unmapped); however, you can change the view by clicking the filters to the right of the **Show** field Be sure to find all unmapped variables and map them to the appropriate QI variable. The **Search AHRQ QI Variables** field option allows you to search for a specific field by typing the first few letters of the variable into the text box. You can also sort the fields by column number, input variable name, or QI variable name. Note that your input data may contain variables that do not correspond to variables used by the ED PQI Beta software.

2

8.4.2.2 Missing Required AHRQ QI variables

This section lists the names of any required QI variables that have not been mapped to one of your data input file variables. Required variables (see Appendix A for a listing of the names of all QI variables) must be mapped in order for you to continue through the import process. The required variables include the following:

- Age
- Sex
- Year
- Patient State/County Code
- Resident
- Principal Diagnosis

8.4.2.3 Missing Recommended & Optional AHRQ QI Variables

This section shows the names of any missing recommended or optional QI variables that have not been mapped to one of your data input file variables.

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

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

Recommended variables include the following:

- Length of Stay
- Age in Months

- Secondary Diagnosis Codes
- Died in Visit
- ED Admit
- Discharge Quarter
- Visit Link
- Days to Event
- Hospital ID

3

8.4.2.4 Live Sample of Your Input Data

This section displays a snapshot of the first 50 rows of your input file to give you an idea of the data that appear in each column. This data view is provided to aid you in mapping the QI variables to the appropriate variable in the input file. You can locate specific columns from your input file by typing part of the column name into the **Search AHRQ QI Variables** field. As you change which QI variables are mapped and unmapped, the corresponding header will update in this section. You have the ability to hide these data by clicking on the <**View/Hide Data**> button.

8.4.3 What should I do here?

To map a QI variable to the variable in your data file, drag it from either **Missing Required AHRQ QI Variables or Missing Recommended & Optional AHRQ QI Variables** to the **Your Data File** list on the left, and drop it next to the corresponding variable name in your input data file. Remove a mapping by dragging the QI variable back to either of the variable trays on the right.

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

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

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

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

8.4.4 Time-saving tips

8.4.4.1 Select variable names

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

8.4.4.2 Data mapper shortcuts

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

For fields that are indexed, such as Diagnosis Codes (DX1, DX2, DX3), it can take a long time for users to finish mapping one at a time. ED PQI Beta software contains a feature in which the system intelligently senses the indexed fields. After the user completes the first drag-and-drop of one of the indexed fields, it does the following:

1. Asks whether the user wants all other field names (i.e., all secondary diagnosis) to be mapped automatically.
2. If the user chooses <**Yes**>, the system tries to guess the rest of the unmapped, indexed fields in the input file by matching the name.
3. Once identified, the system auto-maps all of these indexed, unmapped fields.
4. The user can choose <**No**> and manually map each field if necessary.

8.4.5 Other questions

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

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

8.4.5.2 What if I have extra variables in my file?

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

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

The QI calculations are based on the data inputs for mapped variables in your file. For best results, correct any issues identified during the import process and populate any blank fields with the

proper inputs, if available. Normally, you should correct your input file to get the best results possible.

8.4.5.4 What if I have fewer than 35 diagnoses?

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

8.4.5.5 What if I have more than 35 diagnoses?

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

8.4.5.6 What is the proper format for diagnosis codes?

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

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

The ED PQI Beta software runs an exact textual comparison of all codes. Therefore, it is important not to pad any additional characters (such as trailing zeros) to the right of ICD-10-CM codes. Similarly, if the rightmost and/or leftmost character is a zero, you should not remove this zero because it will change the meaning of the code.

8.4.5.7 Why does my data view display quotation marks?

This indicates that your input data are separated by quotation marks. To remove the quotes, access the **Input File Options** screen and enable the checkbox labeled <**Values have quotes that must be removed (e.g., "value1", "value2")**>. Selecting this checkbox will remove the quotation marks in your data upon import.

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

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

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

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

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

The metropolitan area definitions are from three different sources:

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

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

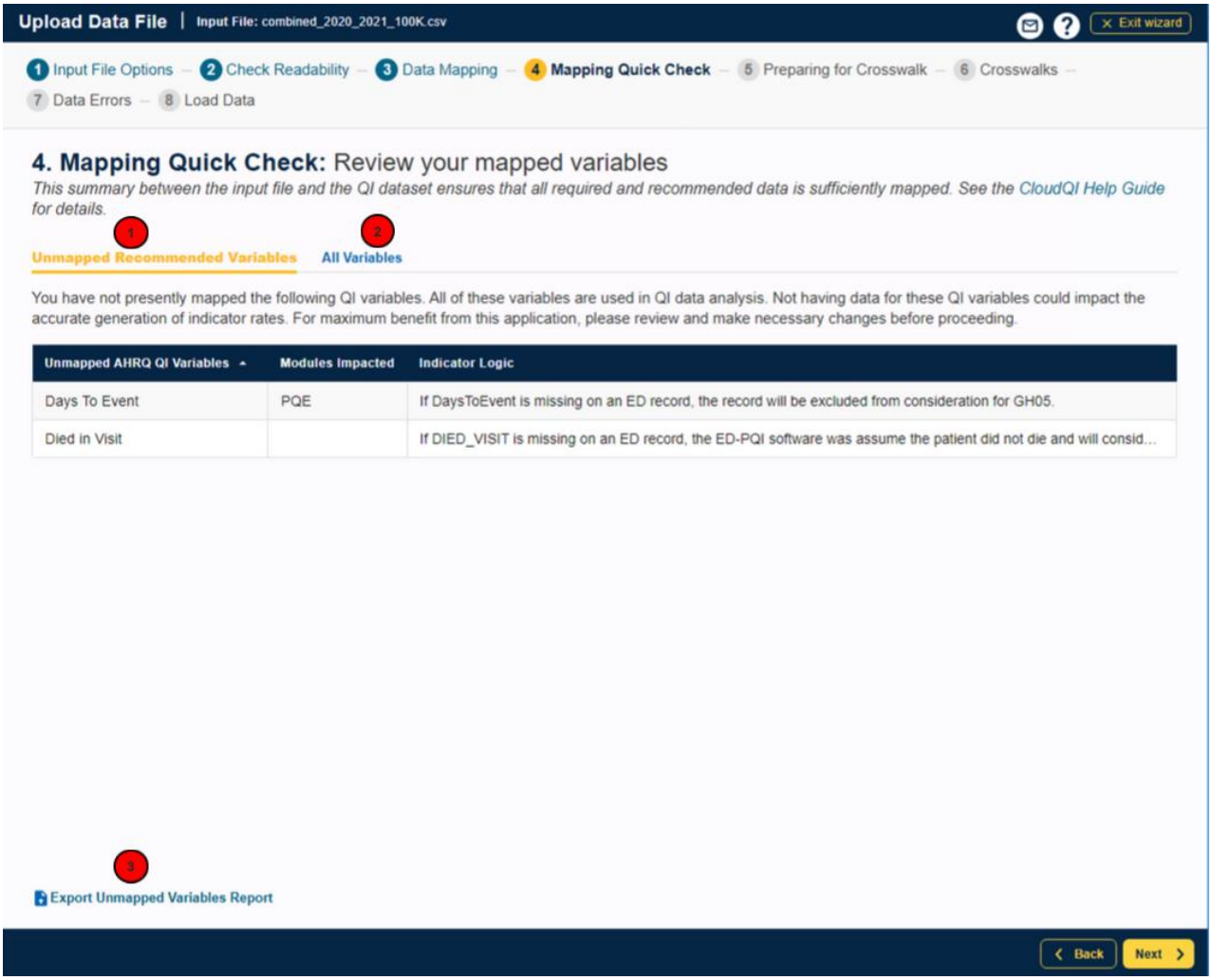
No. The software is intended to be used with data that cover an entire patient population (e.g., all inpatient and outpatient population in a year) or that were sampled from a patient population using simple random sampling. The software does not support weighted QI estimates or standard errors for weighted 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.

8.5 Mapping Quick Check

8.5.1 What is this screen for?

This screen (Screenshot 7) summarizes the information from your data input file so that you have a clear understanding of which QI variables have been mapped to your input variables and which have not been mapped. Unmapped recommended variables, in particular, are called out because the QI analysis may not be accurate unless these variables are included and mapped. This screen will help you see what impact unmapped variables in your file will have, and whether you wish to continue without mapping those variables or whether you wish to go back and map these variables before continuing.

Screenshot 7: Mapping Quick Check



8.5.2 How is this screen organized?

1

8.5.2.1 Unmapped recommended variables

In the **Unmapped Recommended Variables** tab, you can see which QI modules and indicators are impacted by each unmapped recommended variable and learn more about whether or not each variable affects indicator logic or risk adjustment. Click on the text in any field under the **Modules**

Impacted or **Indicator Logic** columns for more information about the impacts of each QI variable in calculating observed and/or risk-adjusted rates. To know more about what a "recommended variable" is, see Section 8.4.5.1. Although the software will not stop you from moving forward without including and mapping all the recommended variables, it is highly recommended that you do so to allow for the most accurate reporting.

Click the **Export Unmapped Variables Report** link at the bottom of this screen to export a report to your computer that contains all of your unmapped variables.

2 *8.5.2.2 All variables*

By clicking the **All Variables** tab, you will see the full set of mapped and unmapped variables. Click the <**Export All Variables Mapping Status Report**> link at the bottom of this screen to export a report to your computer that contains all variables' mapping status.

8.5.2.2.1 What should I do here?

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

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

3 8.5.2.3 Export unmapped variables report

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

8.6 Preparing for crosswalk

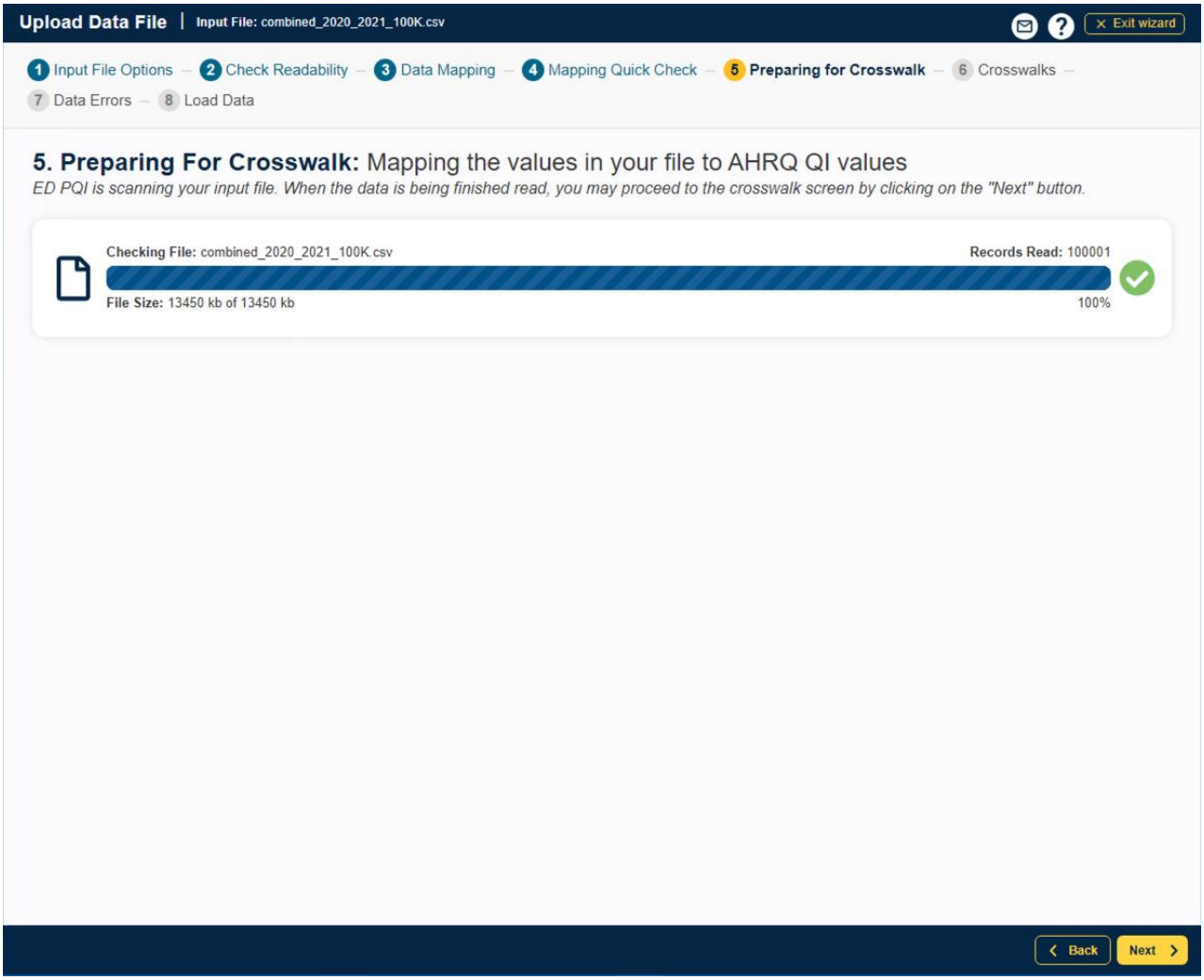
8.6.1 What is this screen for?

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

8.6.2 How is this screen organized?

As Screenshot 8 shows, the progress bar indicates the percentage of your input file that has been read by the application. You can also use the number of records read or the status to gauge completeness of the readability check. When the scan is complete, a green check mark will appear to the right of the progress bar, and a "100%" will appear just below it.

Screenshot 8: Preparing for Crosswalk



8.6.3 What should I do here?

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

8.7 Crosswalks

8.7.1 What is this screen for?

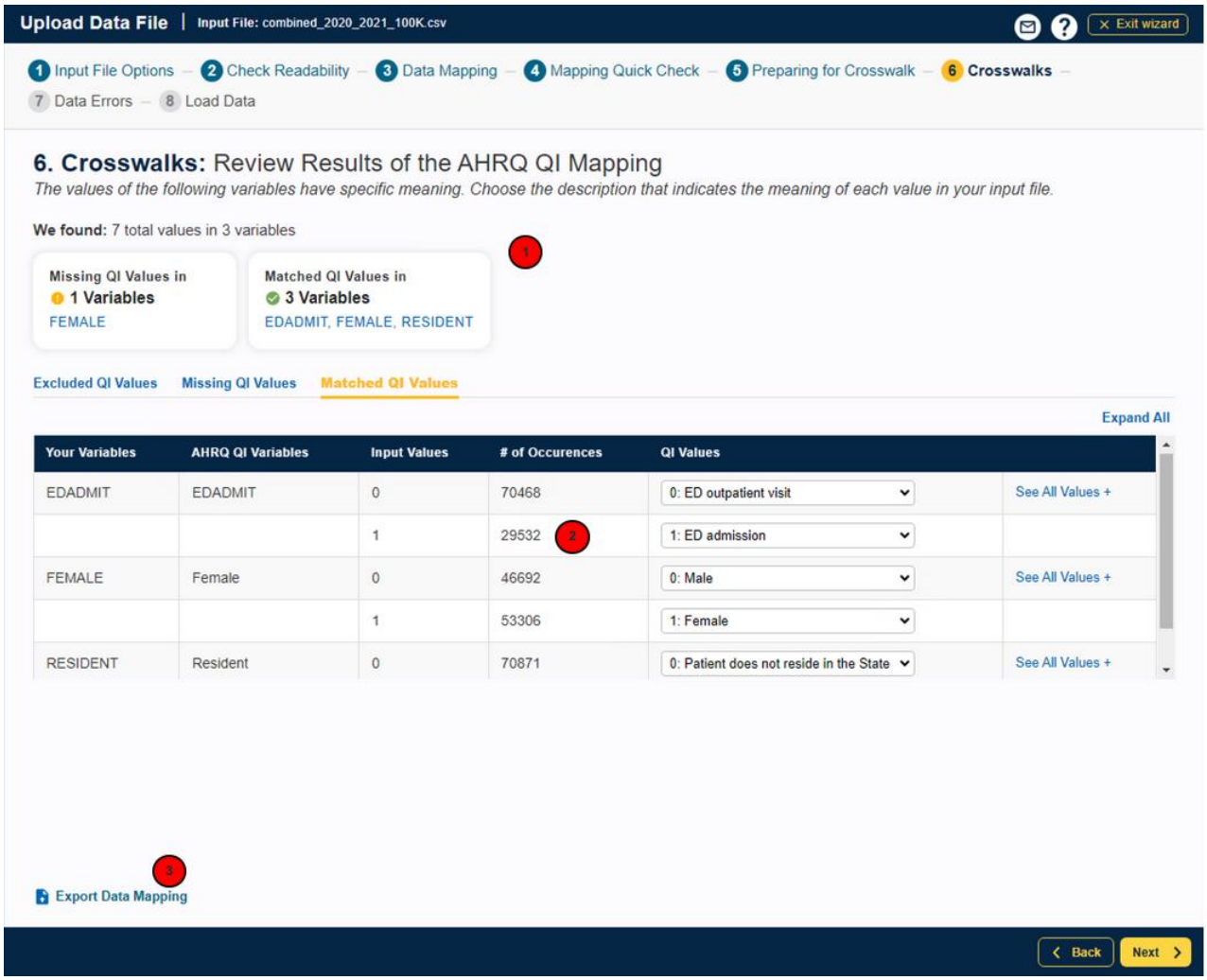
The purpose of this screen (Screenshot 9) is to allow you to review and confirm the crosswalk of the values in your input file to the values used by the ED PQI Beta software for the following variables:

- Sex

- EDADMIT
- Resident
- Died in Visit

For more information about the values used by the ED PQI [Beta] software, please refer to the ED PQI Input Data Dictionary in Appendix A.

Screenshot 9: Crosswalks



8.7.2 How is this screen organized?

1

8.7.2.1 Input variables, occurrences, and QI value

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

2 *8.7.2.2 Filters to jump to a specific value or variable*

Just above the table are three sections that have variable links that allow the user to jump to the selected variable in the "Excluded QI Variables," "Missing QI Variables," or "Matched QI Variables." tabs. In addition, this screen also displays the total number of variables in the crosswalk and the total number of distinct values in those variables.

3 8.7.2.3 Export data mapping

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

8.7.3 What should I do here?

The ED PQI [Beta] software assigns specific meaning to these values and processes them a certain way, so it is important that the values accurately reflect their intended meaning (refer to the Input Data Dictionary in Appendix A for more information about each variable and corresponding values). Compare the input value to the proposed QI value. Where an input value is not a valid QI value (or may be blank), the software may assign it by default to either "Missing" or "Excluded," based on the severity of having an invalid value for that variable. Please review each mapped variable and make changes if necessary. To specify a different QI value, click the arrow next to the QI value, and select one from the drop-down menu.

Before moving on to the next step in the import process, you may export your map settings by clicking the <**Export Data Mapping**> button; choose to either "Recognize Columns By Position" or "Recognize Columns By Column Name" by selecting the appropriate radio button. Mapping selections from **Input File Options**, **Data Mapping**, and **Crosswalk** screens will be included in the export. The mapping file can be used to specify the data structure of a future input file and save time in the import process.

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

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

8.7.4 Other questions

8.7.4.1 What effect does <Map to Missing> have?

Missing values affect different variables in different ways. Records with missing values for sex will not be loaded. You may map values to missing for fields, but this will affect the assignment for some indicators.

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

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

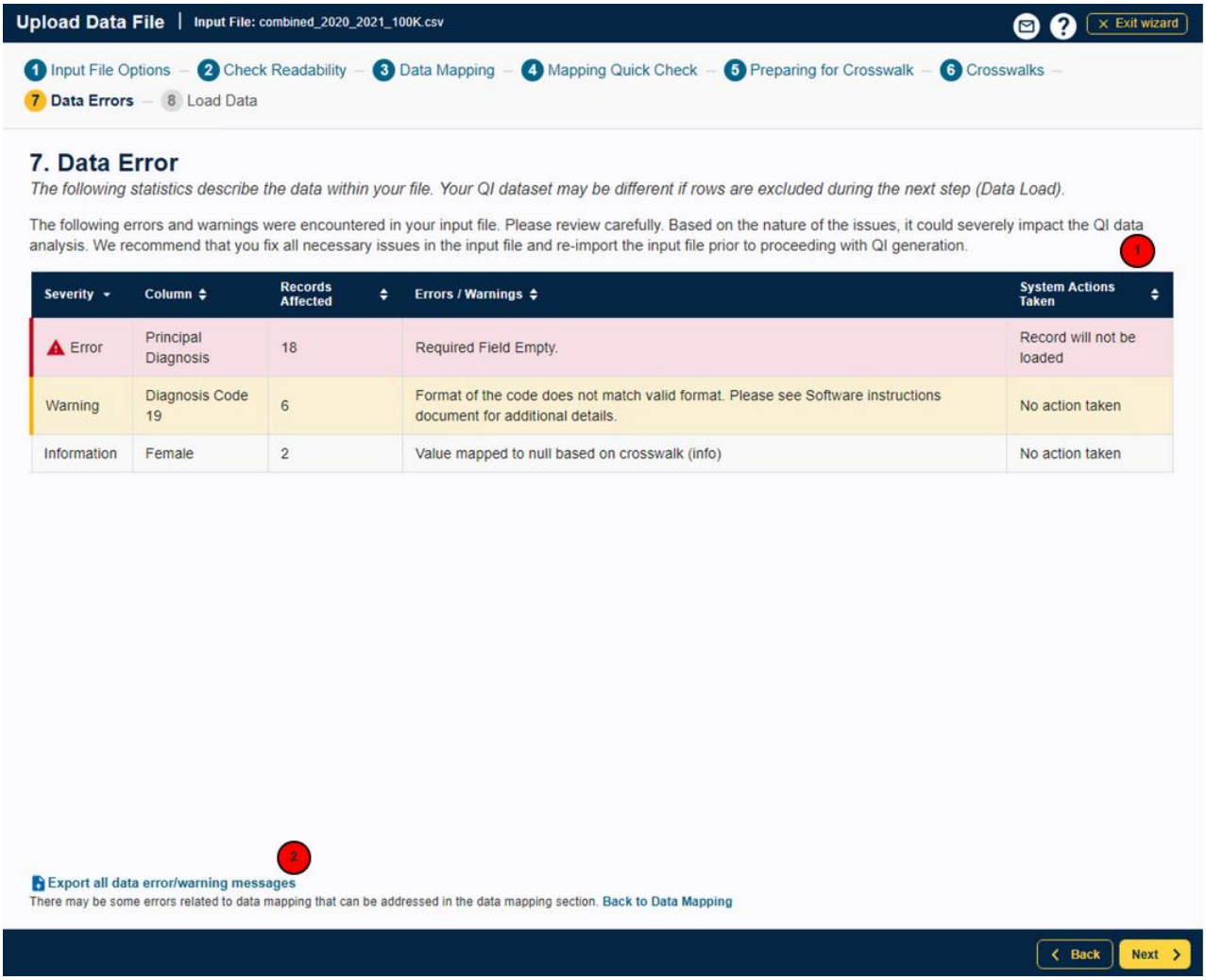
You can also use this option to limit your analysis to a particular population of interest. For example, to get female-only rate reports, you can exclude all males.

8.8 Data errors

8.8.1 What is this screen for?

Prior to loading the data, this screen (Screenshot 10) identifies any data errors your input file contains. You may want to review the number and severity of errors to determine whether you want to continue with the data load process or exit the process at this time and fix the data issues before loading the data.

Screenshot 10: Data Error



8.8.2 How is this screen organized?

1

8.8.2.1 Error/Warnings

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

2

8.8.2.2 Export all data error/warning messages

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

8.8.3 What should I do here?

Review the error messages (and the corresponding action that will be taken by the system) to see the impact of each error and decide whether you would like to continue through the import process or go back and fix the issues. Know your data. The warnings provided are intended to catch common errors. However, depending on the typical case mix and coding conventions in your institution, these warnings may or may not be significant. If you decide to move forward without addressing the errors or warnings, the system may change the value set to "missing" or exclude the record from analysis based on the severity of the issue. We recommend that you fix all necessary issues and reimport the updated file to ensure greater accuracy of the QI results.

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

8.8.4 Other questions

8.8.4.1 How can I find out which rows had problems?

Formatting errors due to individual values on records are written to the QI Session Log (see Section 9.2.9). You can view the error messages along with the line number if you view the **QI Session Log**. Figure 2 shows a screenshot of lines printed to the session log. The **QI Session Log** may be accessed from the **Home** screen in the **Tools** section.

Figure 2. 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
```

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

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

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

QI users often use a spreadsheet program such as Excel to calculate some fields before loading data into the ED PQI [Beta] software. Frequently, the spreadsheet will reformat text that it considers

numbers into the simplest format. For example, it may remove a leading zero that it considers unnecessary from "04567," thus changing the code to "4567." This is a completely different diagnosis code and will result in errors in your QI results.

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

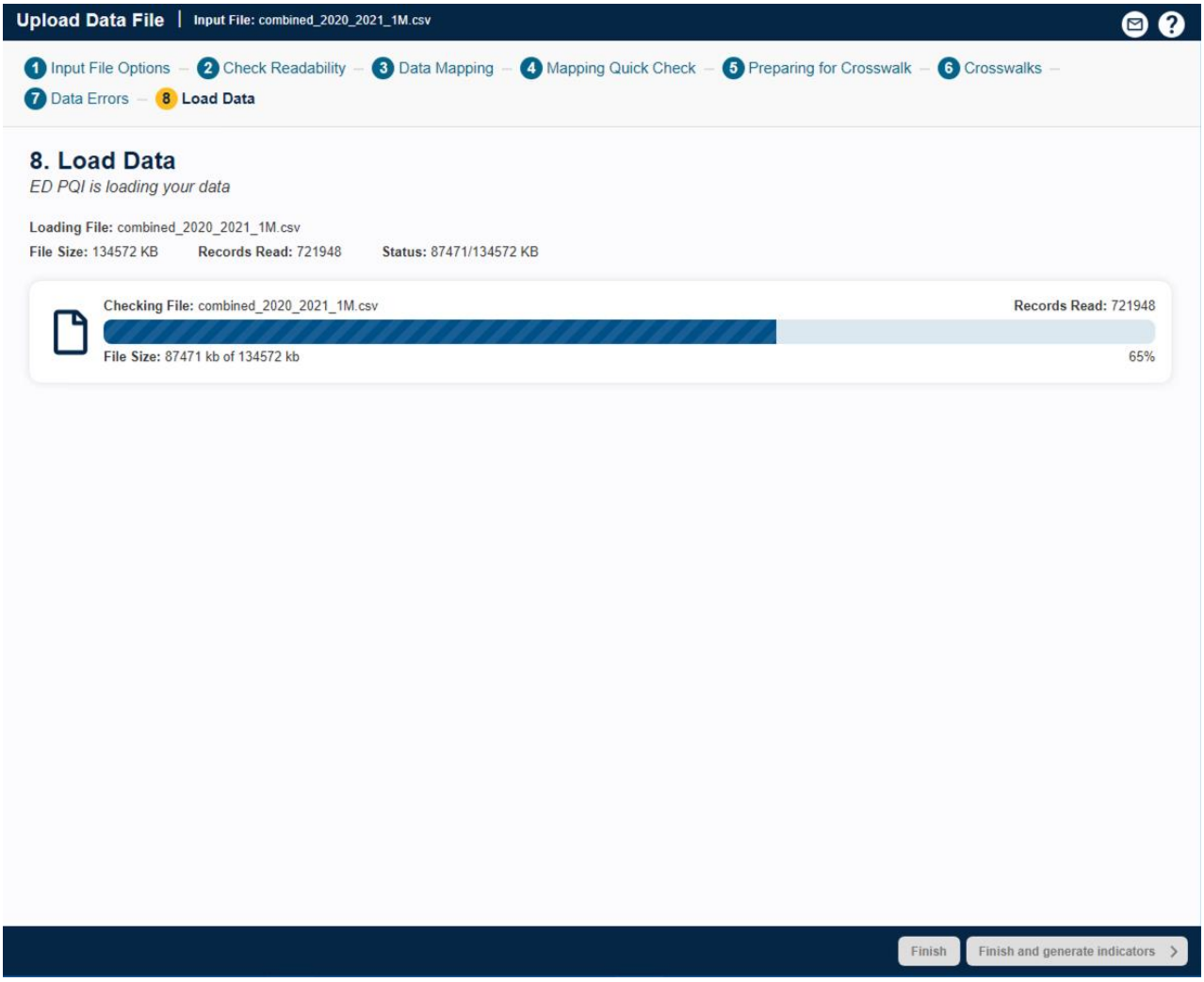
Because most diagnosis codes do not have leading zeros, it is certainly possible that a data file will not have any leading zeros in a column. If you see the message "Column of ICD-10-CM codes does not have any leading zeros (warning)," consider the number of diagnosis codes involved. The more codes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

8.9 Load data

8.9.1 What is this screen for?

This screen (Screenshot 11) displays a progress bar as your data are loaded into the application. A progress bar will appear, and when it is complete, the Load Data screen will appear, and it will show some statistics of the loaded data plus any data errors that were encountered during the loading process.

Screenshot 11: Load Data



8.9.2 How is this screen organized?

8.9.2.1 Progress

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

8.9.3 What should I do here?

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

8.9.4 Other questions

8.9.4.1 Why are rows "excluded"?

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

8.9.4.2 What should I do if no rows were loaded?

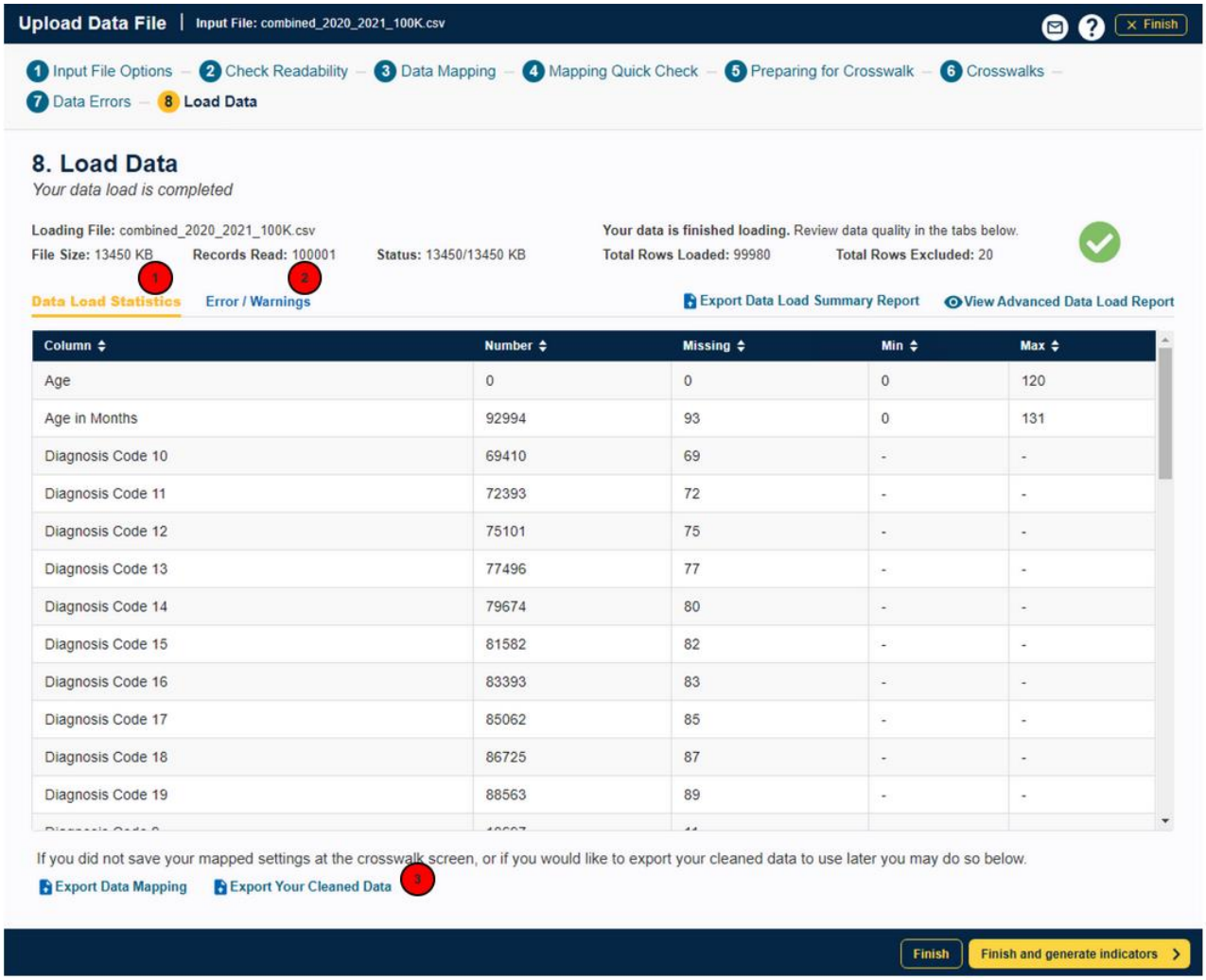
If no rows were loaded, click <**Previous**> to return to the **Crosswalk** screen, and correct the value settings for rows excluded from analysis. If you have errors in your data file, then you may need to exit the import process, edit the file, and restart the import process.

8.10 Load data report

8.10.1 What are these screens for?

These screens (Screenshot 12) provide statistics of the data load process and summarize any errors or warnings encountered during the data load.

Screenshot 12: Data Load Statistics



8.10.2 How are these screens organized?

1 *8.10.2.1 Data Load Statistics*

This screen (Screenshot 16) will give you an idea of what the information in your imported data file looks like and a snapshot view of the data loaded in the QI database. When viewing the information under **Data Load Statistics**, you will see a list of QI variables as well as the number and percentage of records missing that value and the minimum and maximum values for each variable. This information should be checked for reasonableness based on your own knowledge of your data. For example, a file that has only adult patients should show 100 percent missing for "Age in Days," but a file containing a mix of adults and children should reflect this mix by having "Age in Days" for every child under 1 year old. You can also export a summary of the Load Data process by clicking the <**Export Data Load Summary Report**> link at the top of the table. Additionally, you can also view the advanced data load report by clicking on the link <**View**

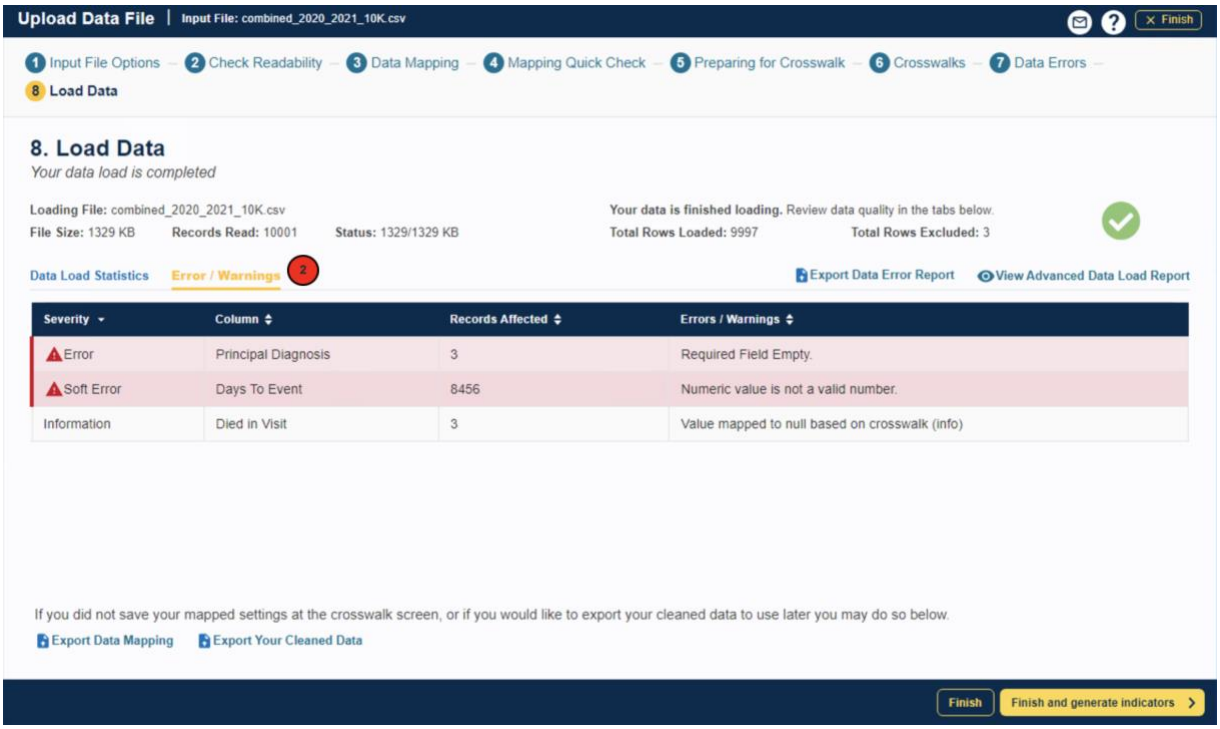
Advanced Data Load Report> at the top of the table. The advanced data load report is a summary of data issues that could impact your reports. See Section 8.10.5.2 for details.

2

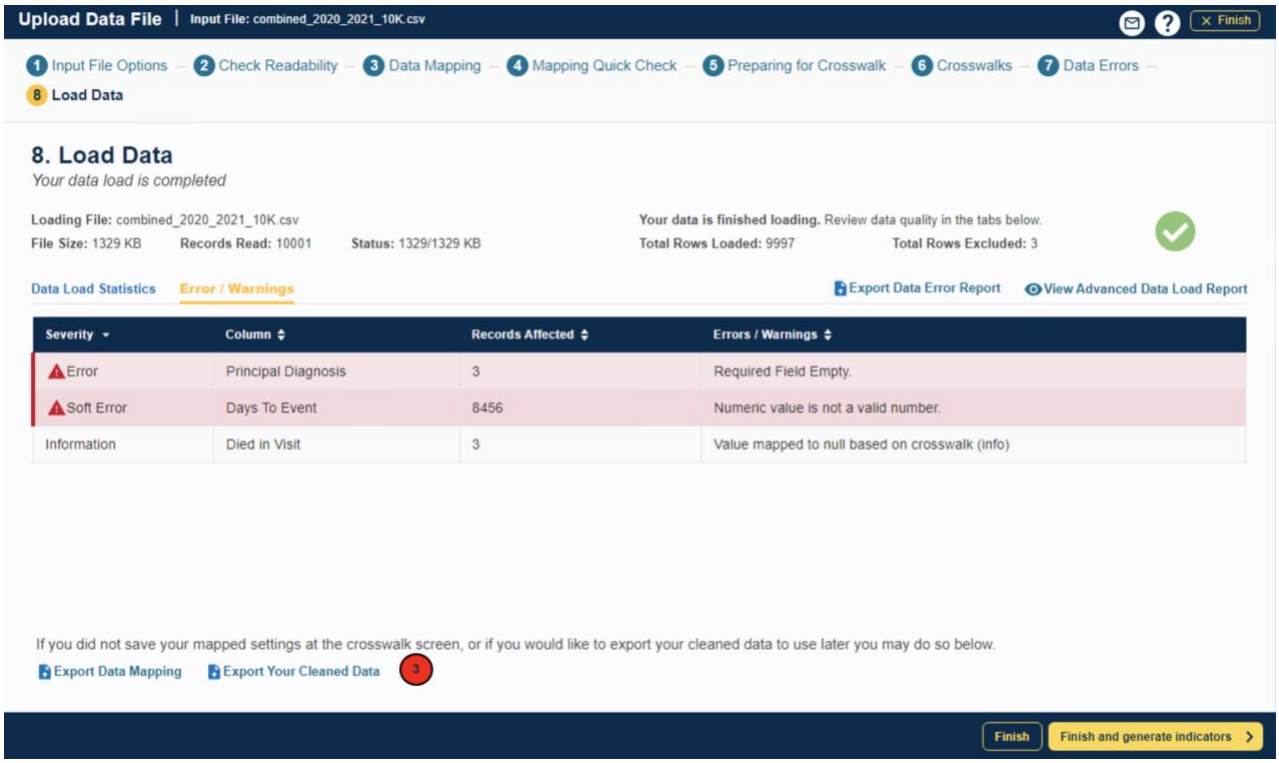
8.10.2.2 Errors and Warnings

Errors/Warnings (Screenshots 13 and 14) shows the data errors in the input file and what (if any) action was taken by the application when loading the corresponding records. Based on the severity of the error, certain records may get excluded from the dataset entirely, or the values of certain variables may be set to missing.

Screenshot 13: Errors and Warnings



Screenshot 14: Errors and Warnings



3 8.10.3 What should I do here?

Scan this report to verify that your data were loaded correctly. You can export a summary of the data error report by clicking the <**Export Data Error Report**> link at the top of the table. You may also export the data that were loaded into the database by clicking the < **Export your cleaned data** > link at the bottom of the table. For a description of the exported data, please see the Export Data Dictionary in Appendix C.

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

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

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

8.10.4 Other questions

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

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

8.10.5 Advanced Data Load Report

8.10.5.1 What is this screen for?

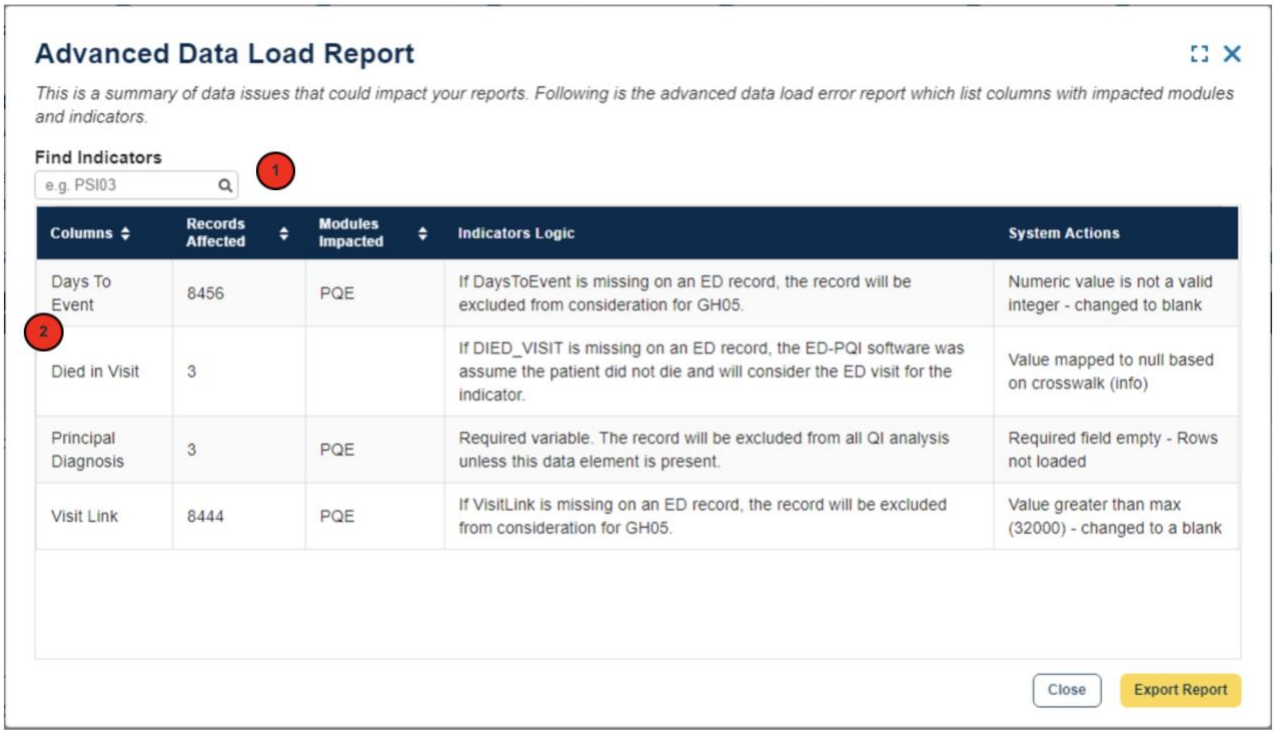
Following loading of the data, you can run this report to get a better sense of data issues in your dataset and what (if any) impact it will have on your reports and the indicator numbers included in the reports. Data issues may be due to issues with not mapping certain fields, missing or erroneous data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

This report may be retrieved from the following places:

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

8.10.5.2 How is this screen organized?

Screenshot 15: Advanced Data Load Report



1 8.10.5.2.1 Find Indicators

If you are interested only in specific indicator(s), you can check whether issues in your data could impact this indicator(s). You can search by one indicator at a time. Please type the name of the indicator without spaces (e.g., “PQE01”).

2 8.10.5.2.3 Columns and related impact

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

8.10.5.3 What should I do here?

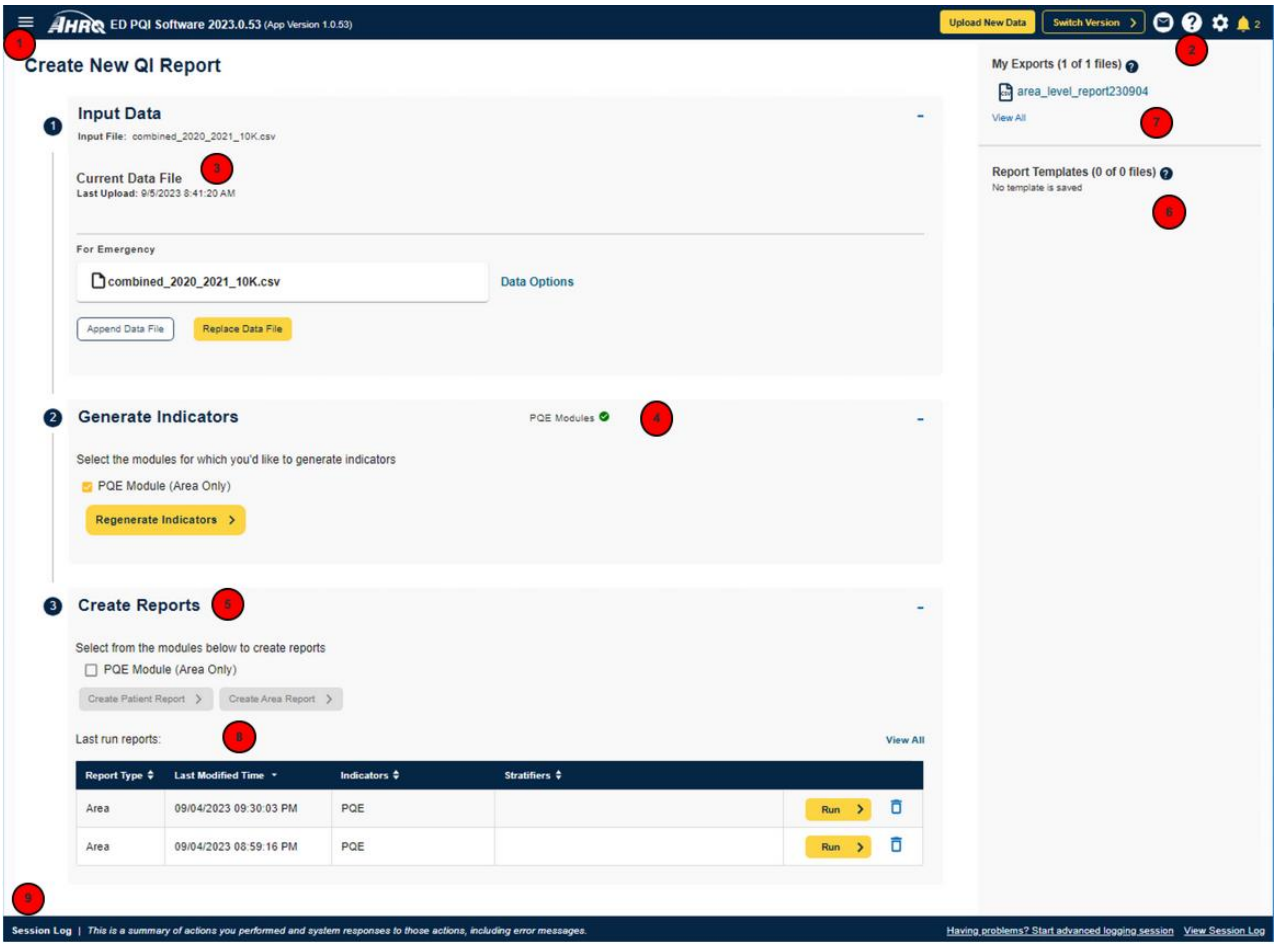
Review the nature of the issues and the corresponding system action taken for all modules/indicators in which you are interested. You can export the advanced data validation report by clicking on the **Export Report** link in the lower right of the "Advanced Data Load Report" screen. Depending on the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

Home Screen (After Data Import)

9.1 What is this screen for?

This screen (Screenshot 16) is what you will see after you have imported and saved a data file.

Screenshot 16: Home Screen (After Data Import)



9.2 How is this screen organized?

9.2.1 Home Screen Options

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

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

  - » **Append Data File**: Allows you to append your newly imported file instead of replacing your currently saved data. This allows you to do rolling updates to your input data. The system will use the combined file to regenerate the rates. It is recommended that you limit your combined input data file to less than 10 million cases to avoid adversely impacting the performance of the software. Note that only .CSV files are supported for appending files.
  - » **Replace Data File**: Allows you to replace your currently saved data with the newly imported file. The rates must be regenerated after replacing the input file
- **Export Data:** Allows you to export the processed data currently saved in the database and in the QI format that was generated during the import process. You will be asked to select what types of fields to include in your export file.
- **View Data Load Summary:** Displays the Data Load Report that appears at the end of the import file process for the data currently loaded in the database.
- **View Advanced Data Load Report:** Allows you to view a summary of data issues in your data file, corresponding action taken by the system (if any), and potential impact on indicator rates or grouping.
- **Export Data Mapping File:** Allows you to export the data mapping file if you have not done so during the data import process. The Data Mapping file can be re-used where you don't need to manually map your variables to ED PQI variables.

- **Indicators**——This will allow you to do one of the following:
  - **Generate Indicators**: Allows you to generate indicators for the PQE module if indicators have not yet been generated.
  - **Regenerate Indicators**: Allows you to regenerate indicators if they have been previously generated.

- **Reports**—This section will be enabled once the indicators have been generated. This section allows you to create one of the following reports as long as you have generated indicators for one or more modules. You may also view the Hospital or Area Report that was last run:
  - Create Area Report
  - Create Patient-Level Report

2 9.2.2 Help

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

3 9.2.3 Current Data File

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

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

Use the <**Append Data File>** button and browse for the appropriate file to combine your new input data file with the existing data in ED PQI when importing files. This requires you to use the .csv file format for importing in your data. Clicking the "Append File" checkbox when importing your input data file will combine your data. You can continue to append files. Once combined, you will be required to re-generate your QI rates.

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

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

You can also choose to append a new data file to the existing one by using the <**Append Data File>** button and browsing for the appropriate file.

It is recommended that you keep an eye on the size of the combined data in ED PQI, as the larger the input data becomes, the more resources are required to run ED PQI. ED PQI is tested with a maximum of 8 million rows input data file and depending upon the resources (memory and disk space) in your machine/database server, a larger file can cause ED PQI to slowdown and may eventually stop processing.

The <**Data Options**> link to the right of the filename will provide you with the following options:

- View Data Load Summary
- View Advanced Data Load Report
- Export Data
- Export Data Mapping File

4 9.2.4 Generate Indicators

This section allows you to generate indicators for the module(s) that have not yet been generated. Click the,<+> sign to the right of the **Generate Indicators** header to expand the section. Choose the module(s) for which you would like to generate indicators or click <**Select All**>; then click the <**Generate Indicators**> button to begin the Generate Indicators process. Please see Section 10 for a detailed description of the Generate Indicators process.

5 9.2.5 Create Reports

This section allows you to create reports for any module for which indicators have already been generated. Click the,<+> sign to the right of the **Create Reports** header to expand the section.

From here, you can create an Area Report, Hospital Report, or Patient Report. You can also view any previously run reports by clicking on an individual report's name in the "Last run reports" table. Note that you will not be able to continue with the Create Reports process until you have generated indicators.

6

9.2.6 Report templates

This section shows report templates that you can use to create new reports rather than going through the **Reports Wizard**. Report templates may be either "AHRQ QI Templates" (that is, predefined by the software) or "My Templates" (that is, defined by you when previously creating a report). Report templates save you time because you don't have to navigate through the whole Reports Wizard each time you want to run a report. Report templates are also carried from one version of the software to the next. When you generate a particular report the first time, you can save those parameters as a template (on the **Additional Options** screen) and run the template in the future to create the report with the same parameters. You can save as many report templates as you like (do so if you are generating reports with different selection criteria, groupings, etc.). Make sure to name the template appropriately and provide a description that will help you recollect the parameters of that report.

The Report Templates section will provide the following information:

The name and description of the report. Hover over any filename to see the following information on that report:

- Report Type (Area)
- Last Modified (My Templates only)
- Input File (My Templates only)
- ED PQI Version

9.2.6.1. What can I do here?

- Click the Report Template Title to run a report based on it.
- Click the "**View All**" link to open the "My Templates" window.
- Run link—Clicking on this link will start the process of generating the report by loading the parameters in the corresponding report template. You will be taken to the Create Report screen. When the report is finished generating, you may proceed to view the report summary by clicking <Next>. Please note that the <Run> link will be available only if the basic, underlying criteria for the report have been met. For example, if the report template is based on the PSI module and you have not yet generated indicators for the PSI module with your current input file, then the <Run> link will not be available for the corresponding template.

- Edit link—Clicking on this link will load all the parameters for the corresponding report template and will position you on the first screen of the Report Wizard. Navigate through the wizard screens and change any parameters you wish to change. Remember to save the new template (you may overwrite the current template or save it as a new template) before creating the report with the revised template. You cannot overwrite an AHRQ QI template. If you make any changes to an AHRQ QI template, you can only save it as a new template (which will then appear in your My Templates tab). Please note that the <Edit> link will be available only if the basic, underlying criteria for the report have been met. For example, if the report template is based on the PSI module and you have not yet generated indicators for the PSI module with your current input file, then the <Edit> link will not be available for the corresponding template.
- You can sort report templates in alphabetical order (A–Z or Z–A), by Selected Module, or by date (most recent or least recent) by clicking the column header.
- You can search for a particular template by typing a partial name or description in the Find Template box.

7 9.2.7 My Exports

The **My Exports** section provides one central place in which you can see all the reports or other data files you have exported through the ED PQI Beta software. Files are listed in order of most recently exported.

Hover over any filename to see the following information on that export:

- File Type
- Export Date
- Input File
- ED PQI Version

9.2.7.1 What can I do here?

- Click on any filename in the list to open it.
- Click on the <**View All>** link to bring up the "**My Exports**" screen. From there, you can sort, download, or delete any export reports you may have.
- You can also search for a particular exported file by typing a partial name or description in the **Find Export** search box.

8 9.2.8 Last Run Reports Table

This section allows you to run previously run reports or any saved report templates.

- Run link—Clicking on this link (in the **Last run reports** table) will start the process of generating the report by loading the parameters in the corresponding report template. You will be taken to the **Create Report** screen. When the report is finished generating, you may proceed to view the report summary by clicking <**Next**>. Please note that the <**Run**> link will be available only if the basic, underlying criteria for the report have been met. For example, if the report template is based on the PSI module and you have not yet generated indicators for the PSI module with your current input file, then the <**Run**> link will not be available for the corresponding template.

- Click the **"Trash"** icon to delete that report.

9 9.2.9 Session Log

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

There are several ways to save your Session Log:

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

9.3 What should I do here?

Click one of the options in the left menu bar on the main screen. You can upload new data generate indicators and create reports based on the current data import file. You can select "Check for Upgrades" to verify if there are any current updates for the application. If so, you will be prompted to upgrade or keep the existing ED PQI version.

9.4 Other questions

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

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

9.4.2 What if I forget to save a report?

The latest report will stay in the database until you go through the Create Reports process to generate a new report. If your report has been generated at least once, you can use the <My Exports> section on the Home screen to find the report, and then click on its title to download it.

9.4.3 What if I have a problem?

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

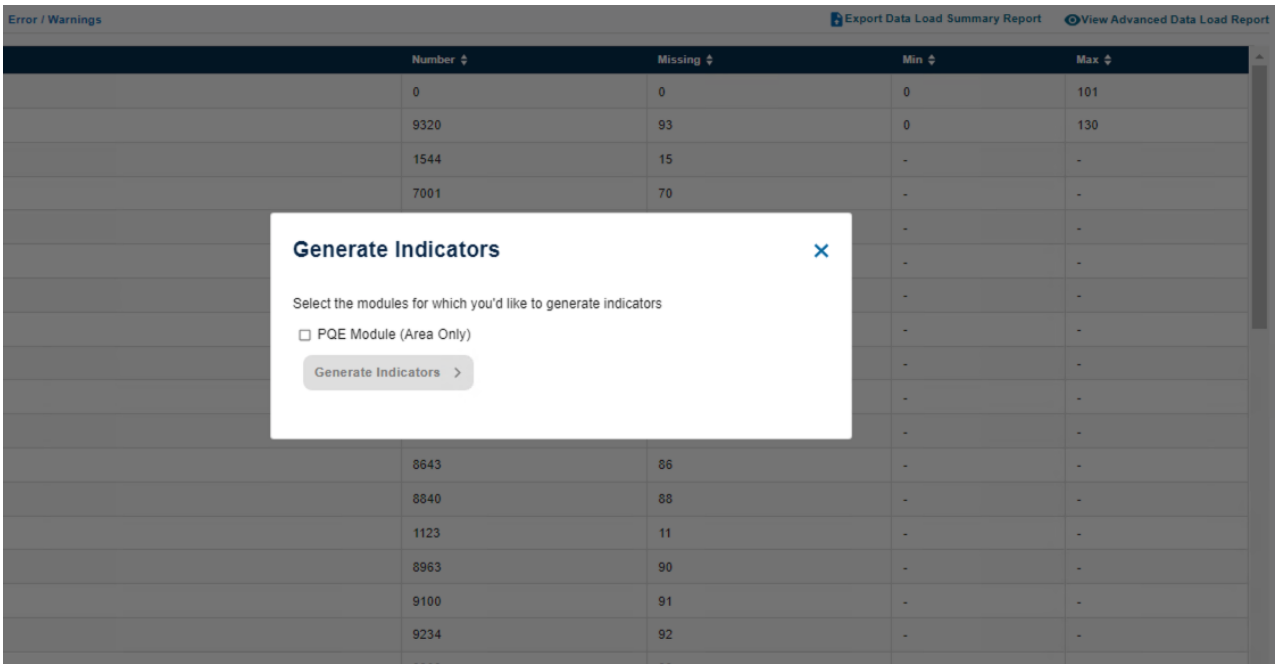
Generate Indicators

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

The process of generating indicators includes the following steps:

- **Generate Indicators**—Generates the indicators for the PQE module you have chosen to analyze.
- **Regenerate Indicators**—Regenerates the indicators if they have been previously generated.
- **Display Quick Report**—Shows the total numerator and, where applicable, the denominator and observed rate for each indicator.

Screenshot 17: Select Modules To Generate Indicators



10.1.1 How is this screen organized?

Option for **PQE** will appear with a checkbox.

10.1.2 What should I do here?

You have the option to generate indicators for the PQE module.

The application does not allow you to generate individual indicators within a module. If you are interested in a specific indicator (for example 01), you must generate all PQE indicators. However, when you begin creating reports, you will have the option to select specific indicators.

Once you have selected the PQE module, click the <**Generate Indicators**> button to begin the Generate Indicators process.

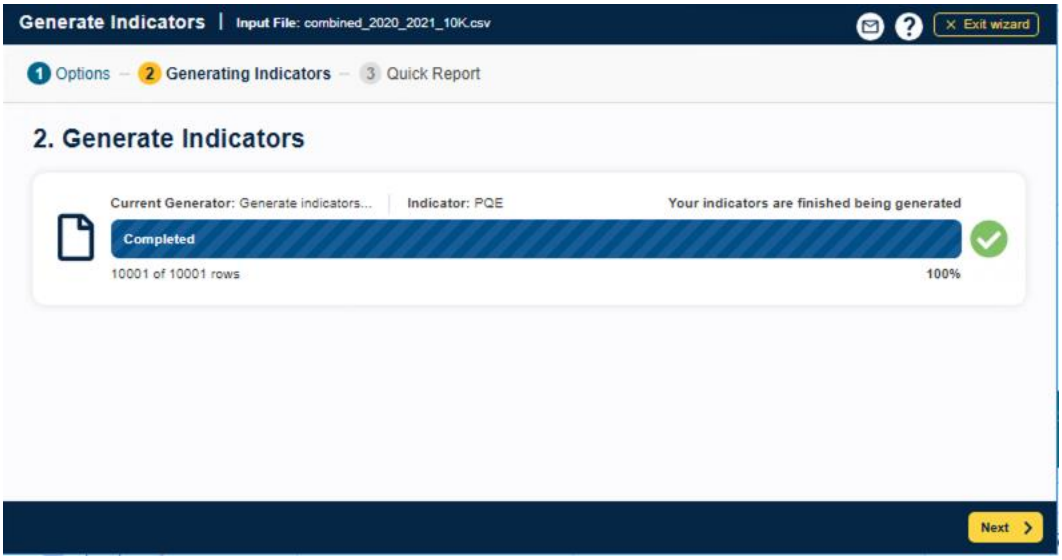
10.2 Generate Options

10.3 Generate Indicators

10.3.1 What is this screen for?

This screen (Screenshot 18) shows progress as the application works to generate indicators for the ED PQI module you selected in the **Select the modules for which you'd like to generate indicators** step. Generating indicators is a multistep process, and it can take a few minutes to several hours based on the size of your input file.

Screenshot 18: Generate Indicators



10.3.2 How is this screen organized?

10.3.2.1 Progress

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

10.3.3 What should I do here?

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

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

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

10.4 Other questions

10.4.1 What should I do if I get an error?

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

Check the QI Session Log to see what the error was. Errors should be sent to the ED PQI support team for assistance.

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

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

10.5 Display Quick Report

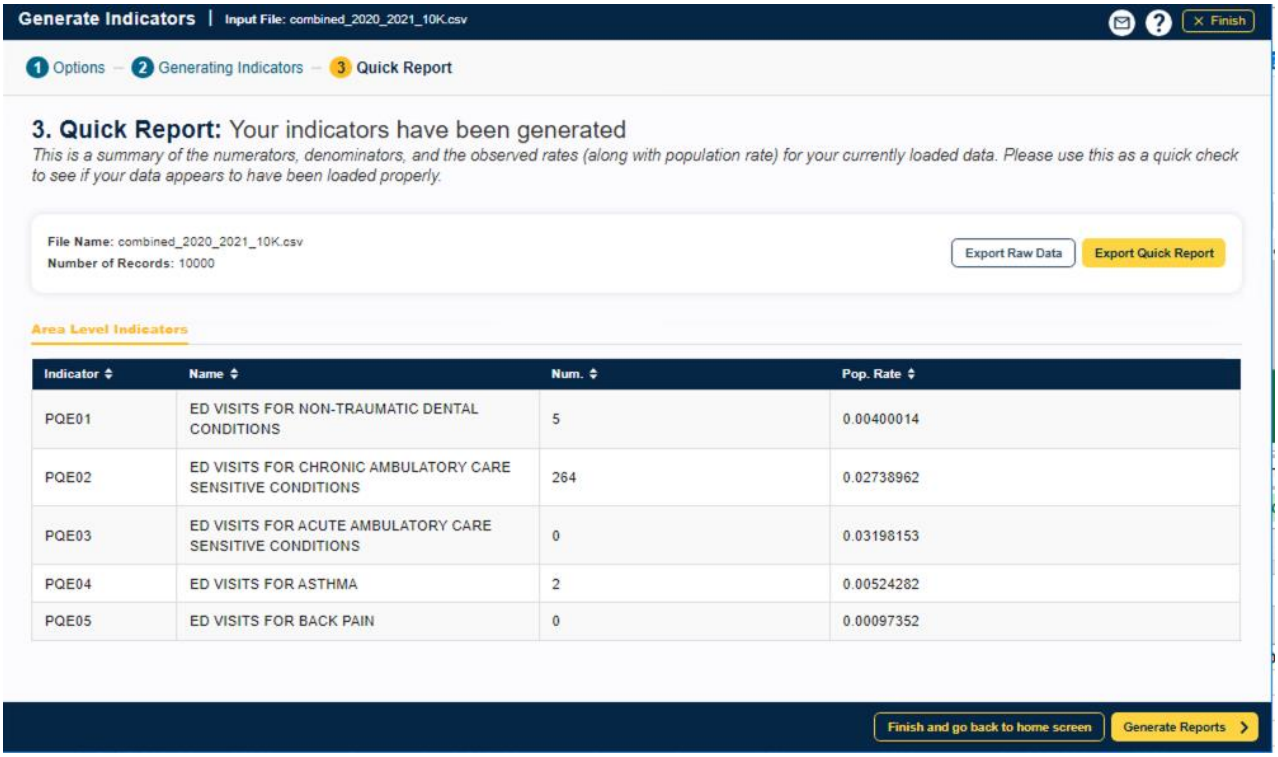
10.5.1 What are these screens for?

The purpose of the **Quick Report** screen (Screenshot 19) is to give you an understanding of how your data translates into a report and allows you to check to see whether your data appear to have loaded properly.

10.5.2 How are these screens organized?

10.5.2.1 Area-level indicators

Screenshot 19: Area-Level Indicators



10.5.3 What should I do here?

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

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

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

10.5.4 Other questions

10.5.4.1 Why is the population rate inappropriate for comparison?

The population rate is based on the reference population, which itself is based on the universe of hospital cases in 45 States. It would be fair to compare your observed rate with the population rate only if your hospital(s) perfectly matched the average demographics and severity of cases in this sample. A more appropriate rate with which to compare is the expected rate, which can be calculated during the Create Reports process. If you are using data from a State, the State rate is included when you run a hospital report as a total for all hospitals with the indicator. The State rate can be compared with the population rate or individual hospital rates.

10.5.4.2 Why is the population rate displayed?

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

10.5.4.3 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 input files will contain a few out-of-State cases that can inflate the total population counts if the proper stratifiers are not selected.

Create Reports

11.1 Report basics

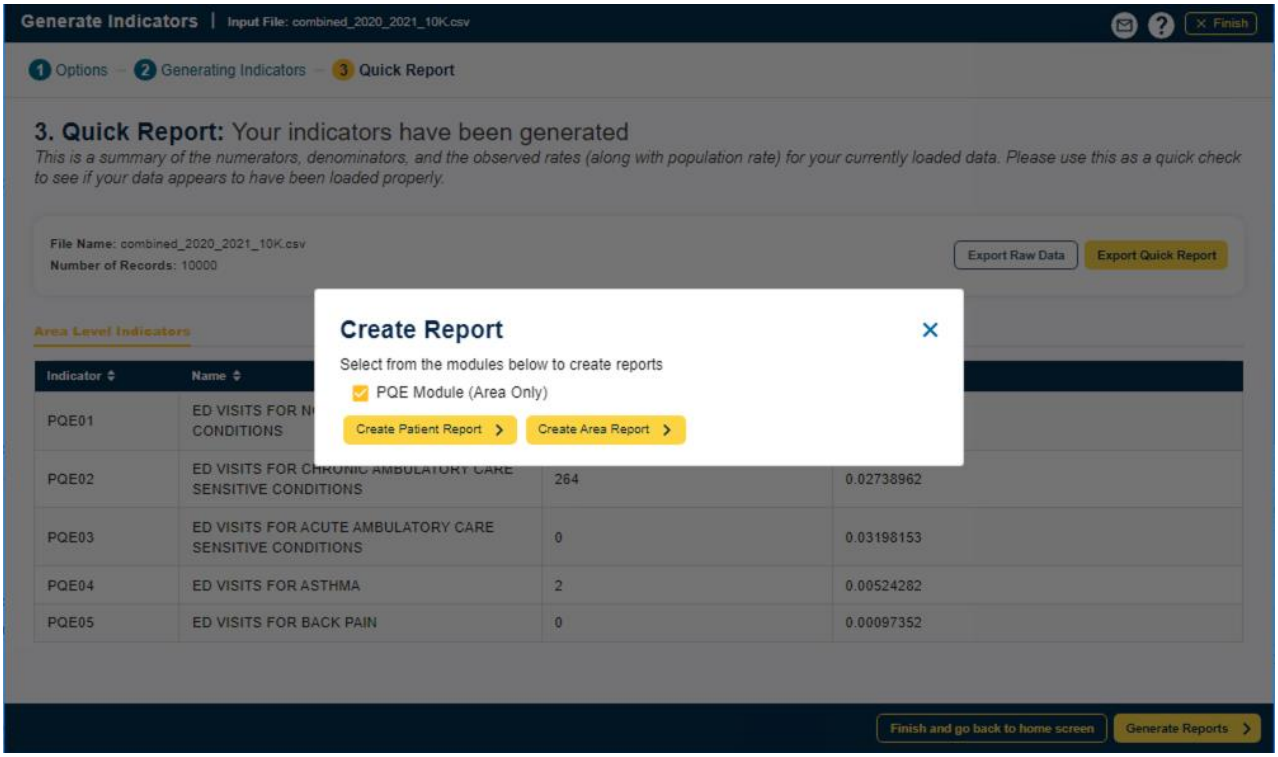
This section describes the type of reports the Quality Indicators Windows® ED PQI Beta software provides and walks you through the process of generating each report. The reports you can create include the **Area Report**, **Patient-Level Report**, **Case-Level Details Report**, and **Quick Report**.

The **Create Reports** screen (Screenshot 20) allows you to choose the type of report you would like to create and select the module(s) for which you would like to create the report. You can reach this screen in two ways: by continuing on to Create Reports immediately after you have finished generating indicators or by choosing your reports and module(s) on the Home page after indicators have been generated during follow-on sessions.

The ED PQI Beta software provides reporting that takes you through the following steps:

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

Screenshot 20: Create Reports



11.2 What kinds of reports can I generate?

The ED PQI Beta software provides several types of reports. Table 1 lists the kinds of reports that ED PQI can generate and the sections in the instruction manual that discuss them.

Table 1. Types of Reports Provided by ED PQI Software

SECTION NUMBER	SOFTWARE COMMAND/DESCRIPTION
AREA-LEVEL RATES REPORT	
Section 11.3.1	Select Indicators
Section 11.3.2	Select Date Range
Section 11.3.3	Select Stratifiers for Use With Area Indicators
Section 11.3.4	Additional Options for Data Analysis
Section 11.3.5	Create Report
Section 11.3.6	View Report
PATIENT-LEVEL REPORT	
Section 11.4	Patient Level Report
Section 11.5	Case Details
QUICK REPORT ON INPUT DATA	
Section 10.5	Quick Report

11.3 Area-Level Report

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

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

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

11.3.1 Select indicators (Area-Level Report)

Use this screen (Screenshot 27) to specify the indicators to include in the report. You can also select whether or not to include the composite measures.

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

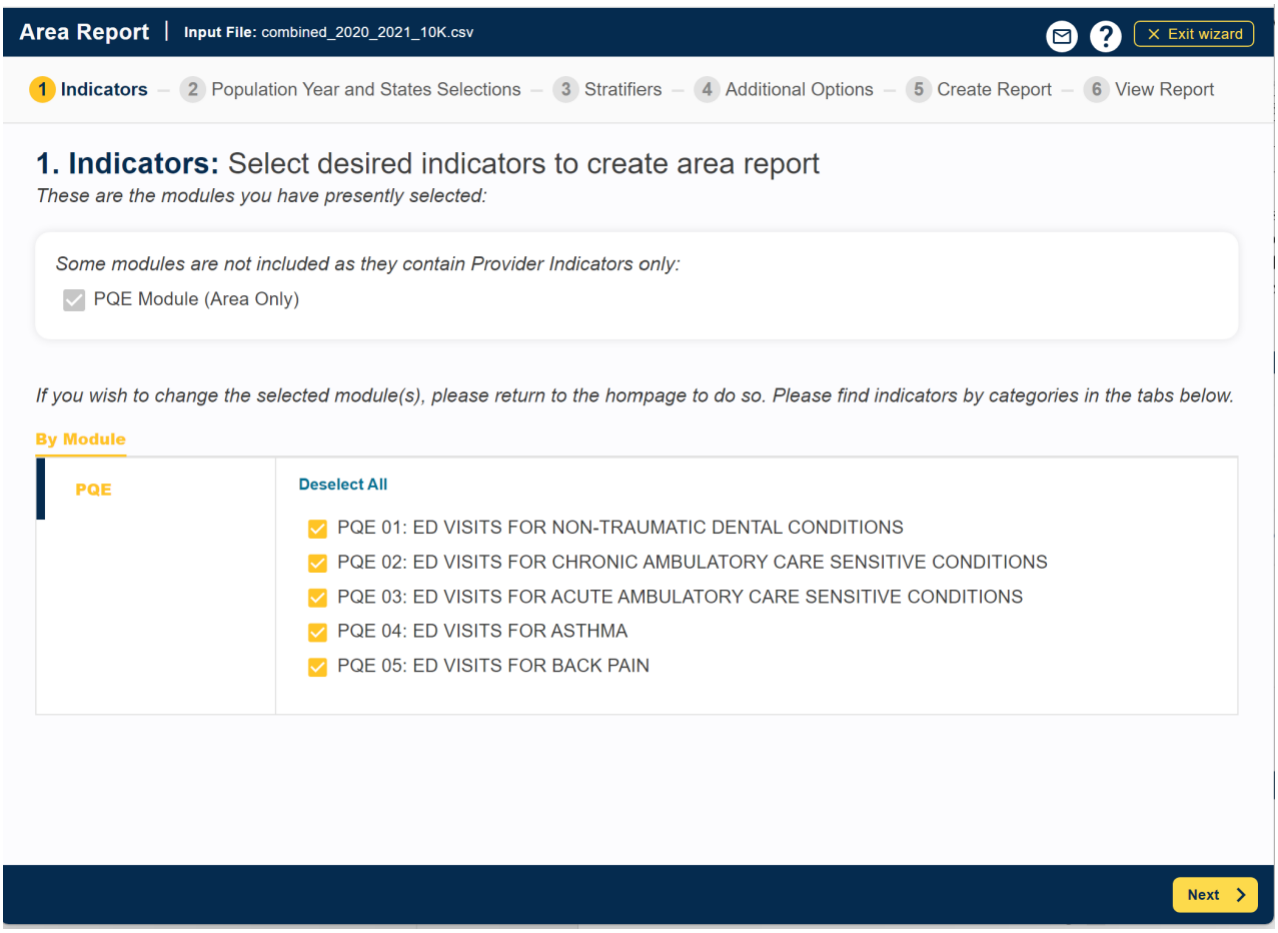
Indicators on this screen are listed by module and then by number. Strata results are listed by module and number of the overall indicator, followed by another number matching the order of the strata (i.e., "1" for stratum A, "2" for stratum B, etc.). Table 2 lists the stratified indicators, the strata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

Table 2. List of Stratified Indicators in Version 2023

MODULE AND NUMBER ON SELECTION SCREEN	INDICATOR TITLE
PQE 01	PQE 01 ED Visits for Non-Traumatic Dental Conditions
PQE 02	PQE 02 ED Visits for Chronic Ambulatory Care Sensitive Conditions
PQE 03	PQE 03 ED Visits for Acute Ambulatory Care Sensitive Conditions
PQE 04	PQE 04 ED Visits for Asthma
PQE 05	PQE 05 ED Visits for Back Pain

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

Screenshot 21: Select Indicators (Area-Level Report)



11.3.1.1 How is this screen organized?

`All indicators for the PQE module are listed.

The Select All or Deselect All button can be used to select or deselect all indicators.

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

11.3.1.2 What should I do here?

Select the indicators for which you would like to run a report.

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

11.3.1.3 Time-saving tips

11.3.1.3.1 Selecting/deselecting everything

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

11.3.1.3.2 Clearing a Screen

Click the <**Select All**> link to select the entire screen. It will then change to a <**Deselect All**> link – click that link to deselect the entire screen.

11.3.1.4 Other questions

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

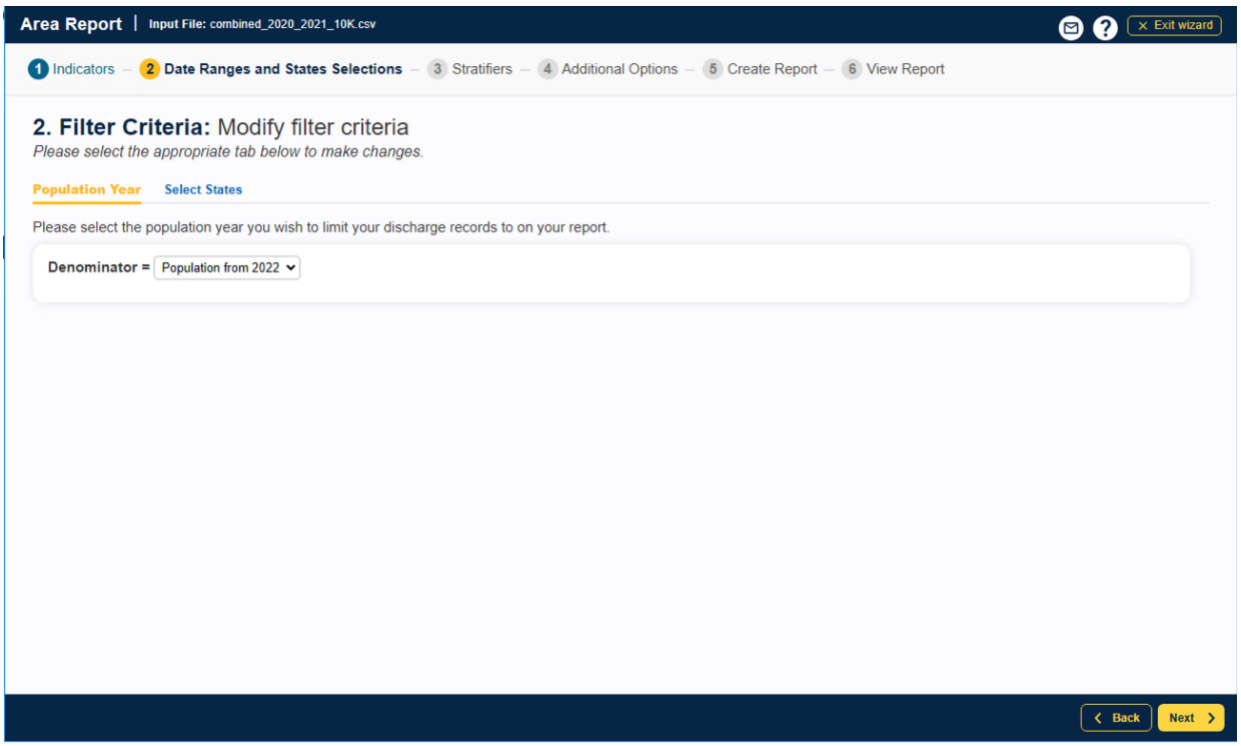
You don't need to go through the full reports process to see the individual cases for each indicator. After you have imported your data file, you can view the cases using the **Patient-Level Report** option (see Section 11.4).

11.3.2 Select date range (area reports)

11.3.2.1 What is this screen for?

This screen (Screenshot 22) allows you to limit the records you wish to include in your report to only those records that occurred during the selected quarters. Additionally, in this screen, you may select a different denominator for your report.

Screenshot 22: Select Date Range (Area Reports)



11.3.2.2 How is this screen organized?

11.3.2.2.1 Discharge year

The year represented in the input data is listed.

11.3.2.3 What should I do here?

Select the year for which you have data in your input file.

11.3.2.2.4 State

The states with VisitLink field's data included in your input file are selected by default. This is needed for calculating PQE 05 - ED Visits for Back Pain. You can update the selection by adding and removing states per your needs.

11.3.2.5 What should I do here?

Select the States for which you have the VisitLink data in your input file.

11.3.2.6 Other questions

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

The program first gets a list of all the year value 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.

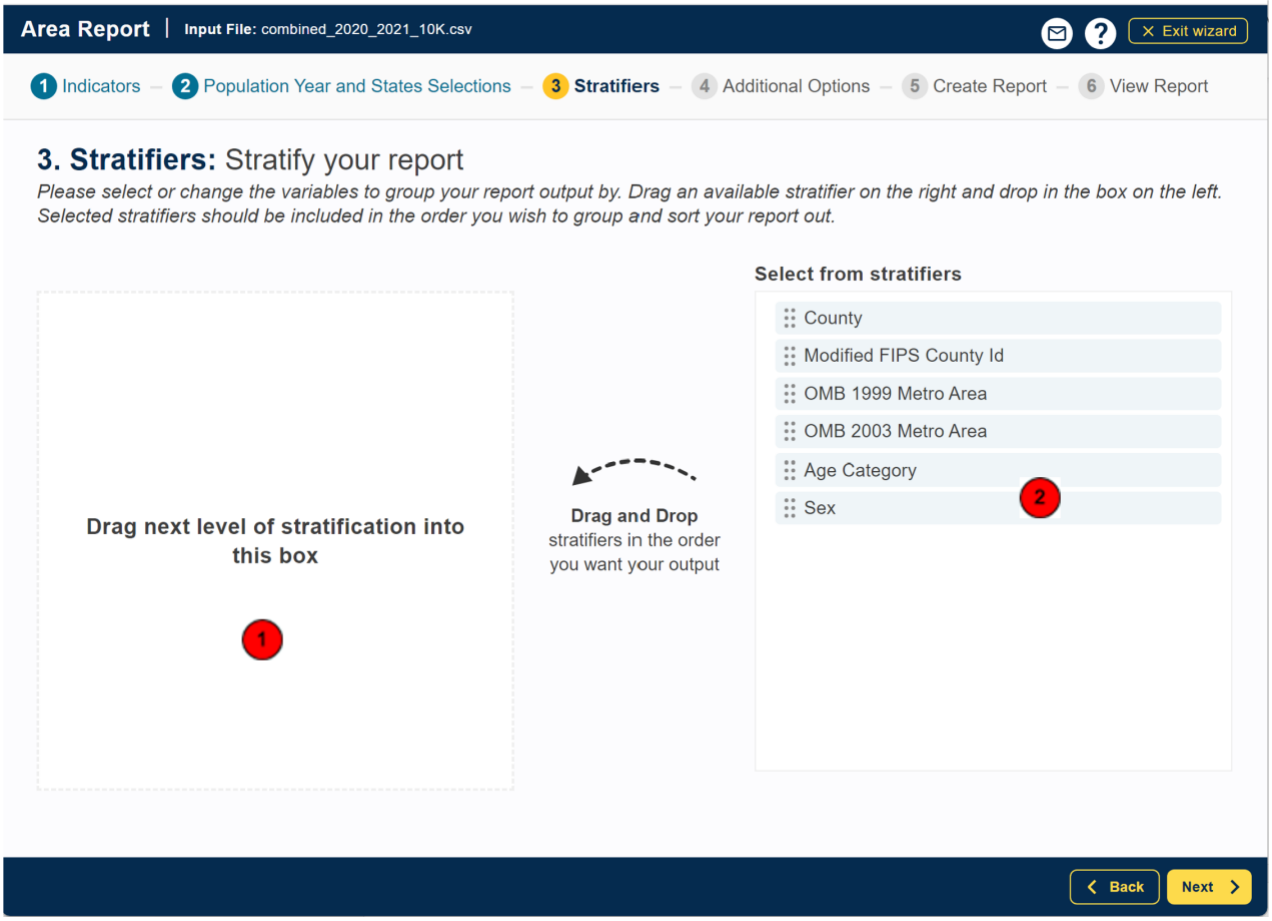
For the denominator, the program totals the Census population that you have selected for each year. The Census population figures are also grouped by the selected stratifiers. The indicator numerators and denominators are joined together to obtain the observed rate grouped by the selected stratifiers.

11.3.3 Select stratifiers for use with area indicators

11.3.3.1 What is this screen for?

This screen (Screenshot 23) is used to build a hierarchy of stratification for area-level indicators. On this screen, you will indicate to the ED PQI software what variables you want your report output grouped by. You will also indicate the order of the “group by” variables.

Screenshot 23: Select Stratifiers (Area Reports)



11.3.3.2 How is this screen organized?

1 11.3.3.2.1 Selected stratifiers

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

2 11.3.3.2.2 Select from stratifiers

This area displays a list of available stratifiers (variables by which to group the report) that can be used for reports on area-level indicators. Hover over each stratifier to see the number of distinct values in your data that relate to that stratifier.

11.3.3.3 What should I do here?

Click on a desired stratifier in the **Select from Stratifiers** box, drag it to the selected stratifiers area, and drop it in the desired position. Area stratifiers are as follows: Age Category, Sex, County, Modified FIPS County ID, OMB 1999 Metro area, and OMB 2003 Metro area. Only those

variables that are in your input file and that have been mapped to QI variables will be available for stratification.

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

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

The risk-adjustment stratification report will be calculated and displayed differently with different stratification selected by the user.

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

11.3.3.4 Other questions

11.3.3.4.1 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.

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

Do not select any stratifiers.

11.3.3.4.3 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.

11.3.3.4.4 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 hospital, selecting a single stratifier for "County" will not provide you with any useful information.

11.3.3.4.5 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"** under <Graphic Stratifiers> on the **Additional Options for Data Analysis** screen. The county will be the patient county of residence.

11.3.3.4.6 What are the definitions of the metro areas?

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

11.3.3.4.7 What is the Modified Federal Information Processing Standards stratifier?

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

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

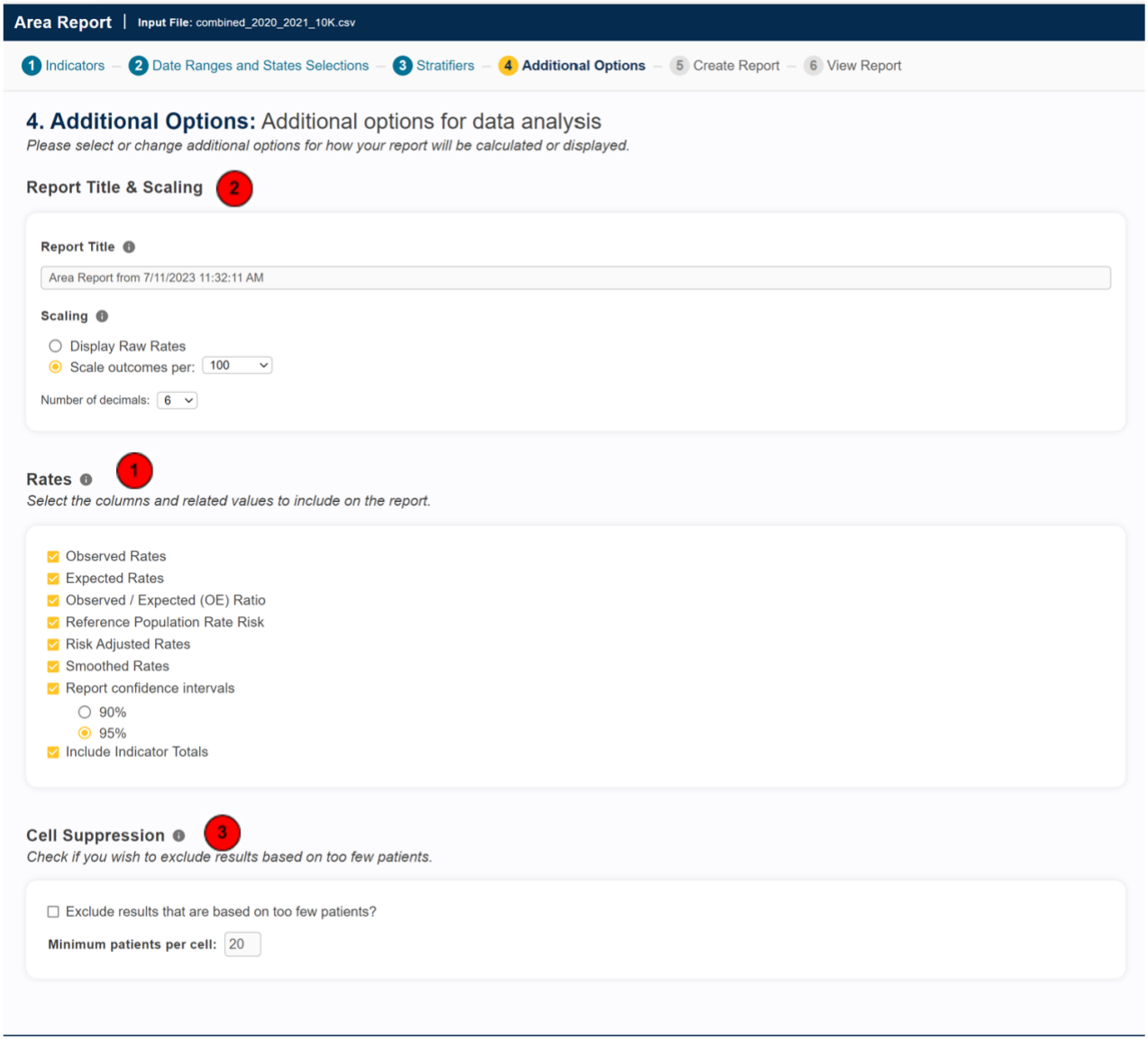
You no longer need to use the modified FIPS codes assignment for area denominators. However, that option is still available. In the modified FIPS codes, certain independent cities (e.g., Baltimore City, Carson City, and St. Louis City), and areas within Hawaii and Virginia, are assigned to different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

11.3.4 Select additional options for data analysis

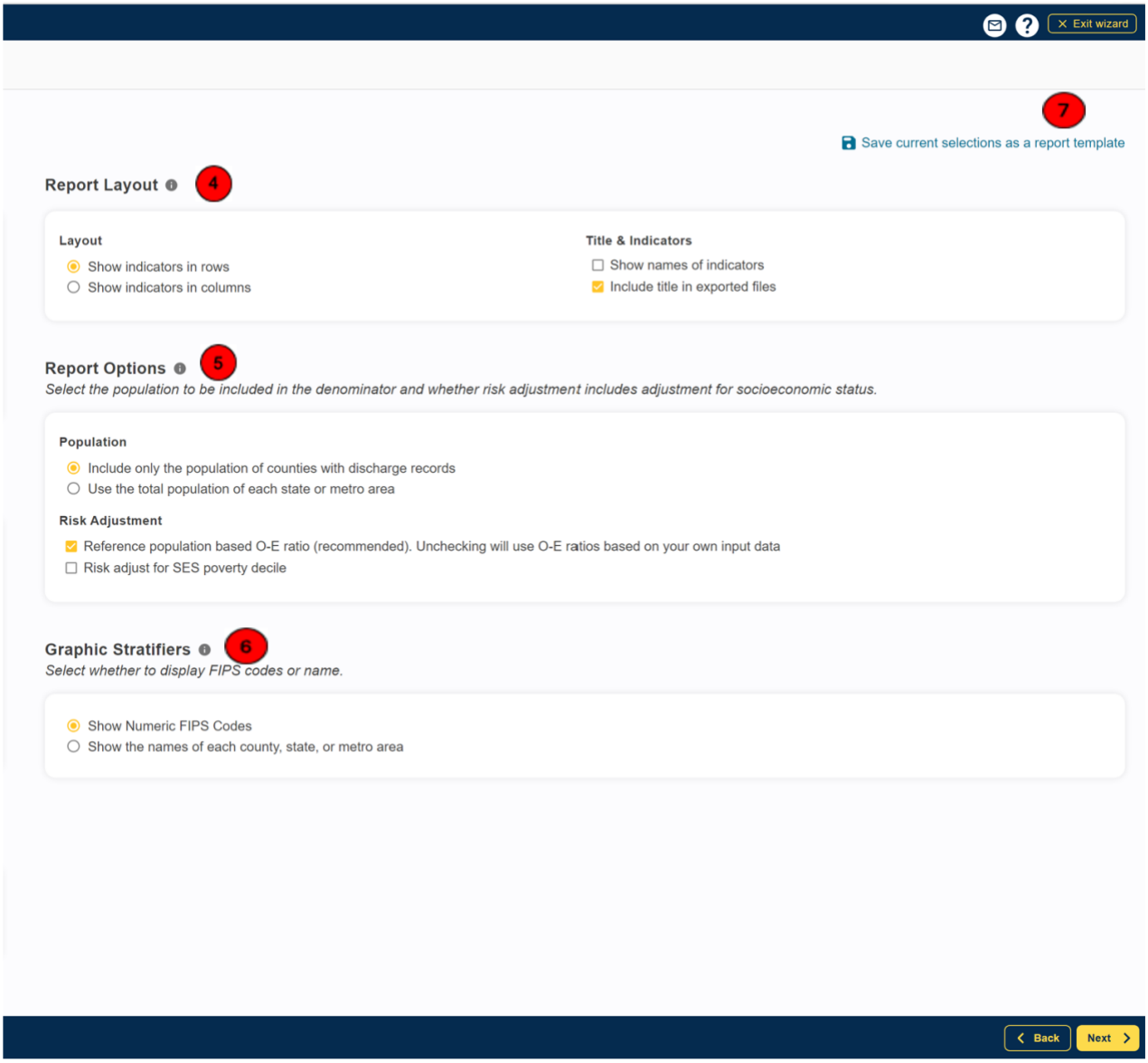
11.3.4.1 What is this screen for?

This screen (Screenshots 24 and 25) lets you choose additional calculation and display options before generating reports.

Screenshot 24: Select Additional Options for Data Analysis



Screenshot 25: Select Additional Options for Data Analysis



11.3.4.2 How is this screen organized?

1 11.3.4.2.1 Rates

This area provides checkboxes to select which rate values you want to include in your report. You may also decide whether to include the overall totals for each indicator here. If the composite

measures have been selected, be sure to select **Smoothed Rates**. Please note that if the reference population rate is not selected, then you should disable reporting of the expected rate and observed/expected ratio (see the following section). If this reporting feature is not disabled, the software will report erroneous values for the expected rate and observed/expected ratio. The observed/expected ratio is the observed rate divided by the expected rate. This ratio is the most appropriate benchmark of performance. A ratio of one indicates that performance is as expected. A ratio over one signifies that performance is higher (usually worse) than expected, and a ratio less than one indicates that performance is lower (usually better) than expected.

Table 3 provides definitions for the raw rate, multiplier, and reported rate as used in the software.

Table 3. 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 hospital's actual case mix. The reference population is based on all States participating in the most recently available HCUPSEDD.
Reference population	The rate for the current reference population (see Section 13.3.9).
Risk-adjusted	The estimated performance of hospitals or areas if those hospitals or areas had an "average" case mix. This average case mix is estimated using proportional indirect standardization: risk-adjusted rate = (observed rate/expected rate)×reference population rate.
Smoothed	Estimated using multivariate signal extraction (MSX). MSX smoothing estimates the effect of random differences in the observed rate across hospitals or areas. In essence, smoothing describes how persistent a rate would be from year to year. Smoothing is a useful tool to "level the playing field" for hospitals or areas with a small number of cases.

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

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

Table 4 provides definitions for the raw rate, multiplier, and reported rate as used in the software.

Table 4. Rate Unit Definitions

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

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

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

2

11.3.4.2.2 Report Title and Scaling

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

You can also change the default report title here, which includes the date and time the report was generated.

Table 5 provides the recommended multiplier for the different categories of ED PQI. For more information, consult the *Technical Specifications* for a specific indictor.

Table 5. Recommended Multipliers for Different Categories of Indicators

HOSPITAL OR AREA	TYPE OF INDICATOR	EXAMPLE	RECOMMENDED MULTIPLIER
Area	Avoidable ED Visit	PQE 04 ED Visits for Asthma	100,000

3

11.3.4.2.3 Cell suppression

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

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

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

- There are fewer than *N* people or cases in the denominator (where *N* is the value you supply for "Minimum patients per cell"); and
- 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.

4 11.3.4.2.4 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 and show the names of indicators when exporting the report.

5 11.3.4.2.5 Report Options

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

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

- Reference population based O-E ratio (recommended). Unchecking will use O-E ratios based on your own input data: Uses reference population-based O-E ratio. This is recommended in most situations, and it is also the default choice in the software.
- Risk adjust for SES poverty decile: Uses users' own population-based O-E ratio. This option is kept in the software for users who want to calibrate the predicted rates to users' population.

6 11.3.4.2.6 Geographic Stratifiers

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

11.3.4.3 What should I do here?

Change any of the options for your report on this screen. If you would like to save all the current report selections (including selections made on previous screens) as a template, click on the "Save

current selections as a report template" link and provide a name and description for the template. The template will then begin to appear on the "My Templates" section of the home page.

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

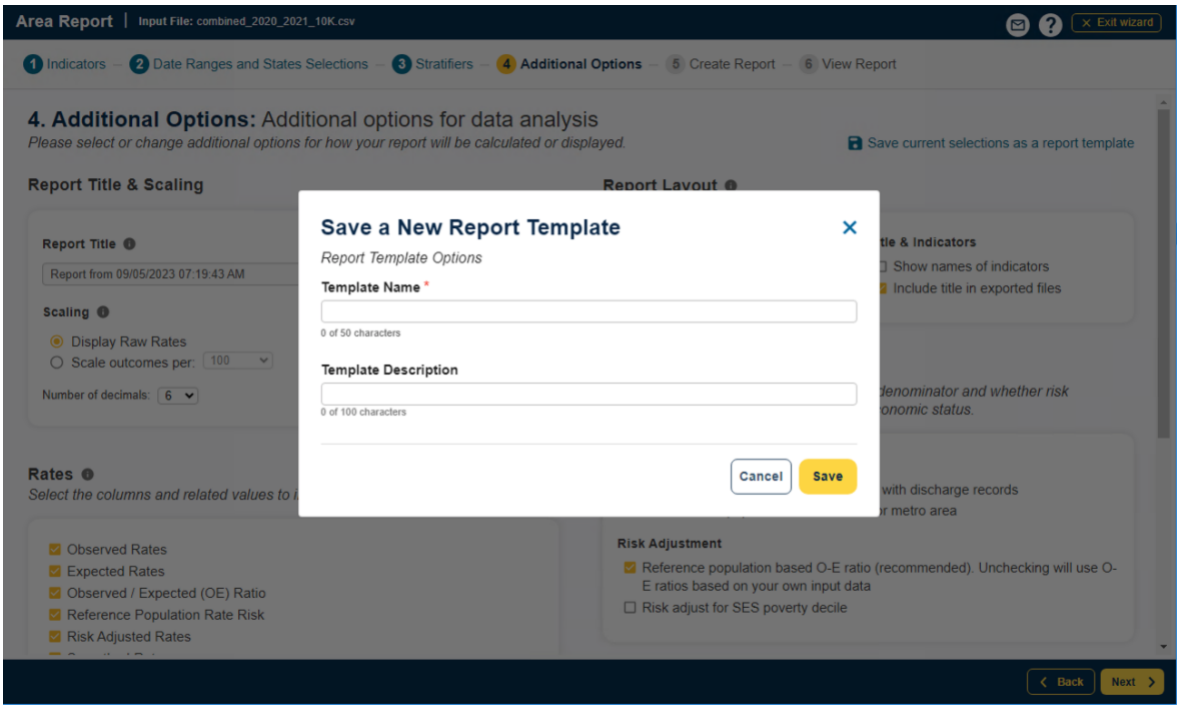
7 11.3.4.2.7 Save as a report template

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

11.3.4.3 What should I do here?

Click <**Save current selections as a report template**> link to enter your report template name and description. Once entered, proceed to save (Screenshot 26).

Screenshot 26: Save a New Report Template

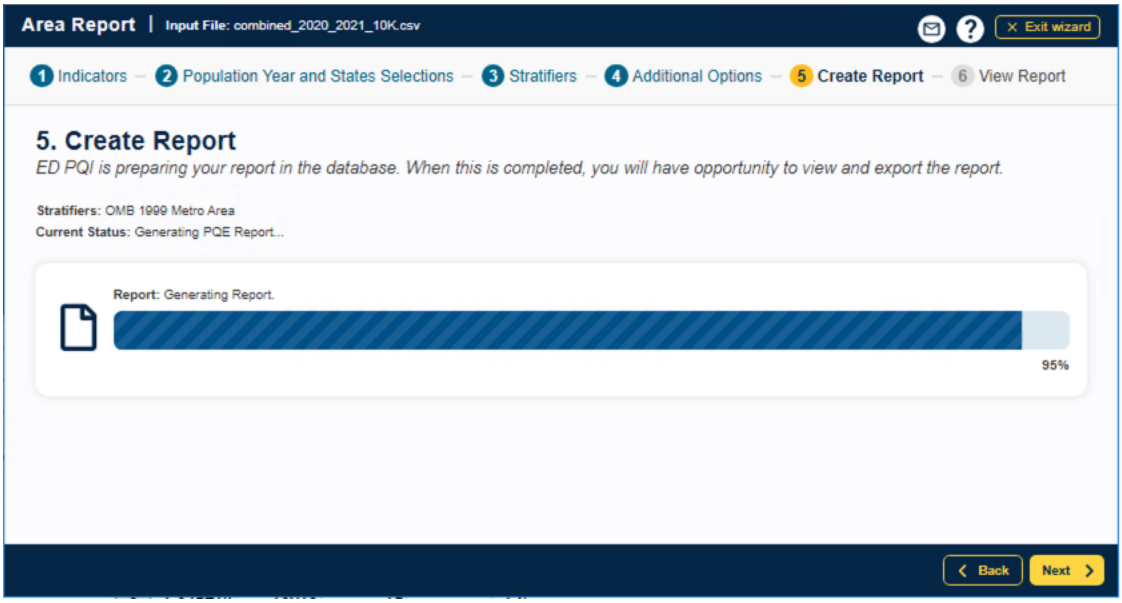


11.3.5 Create report

11.3.5.1 What is this screen for?

This screen (Screenshot 27) displays the progress of your report as it is created. When the process is complete, you may view the report.

Screenshot 27: Create Report



11.3.5.2 How is this screen organized?

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

11.3.5.3 What should I do here?

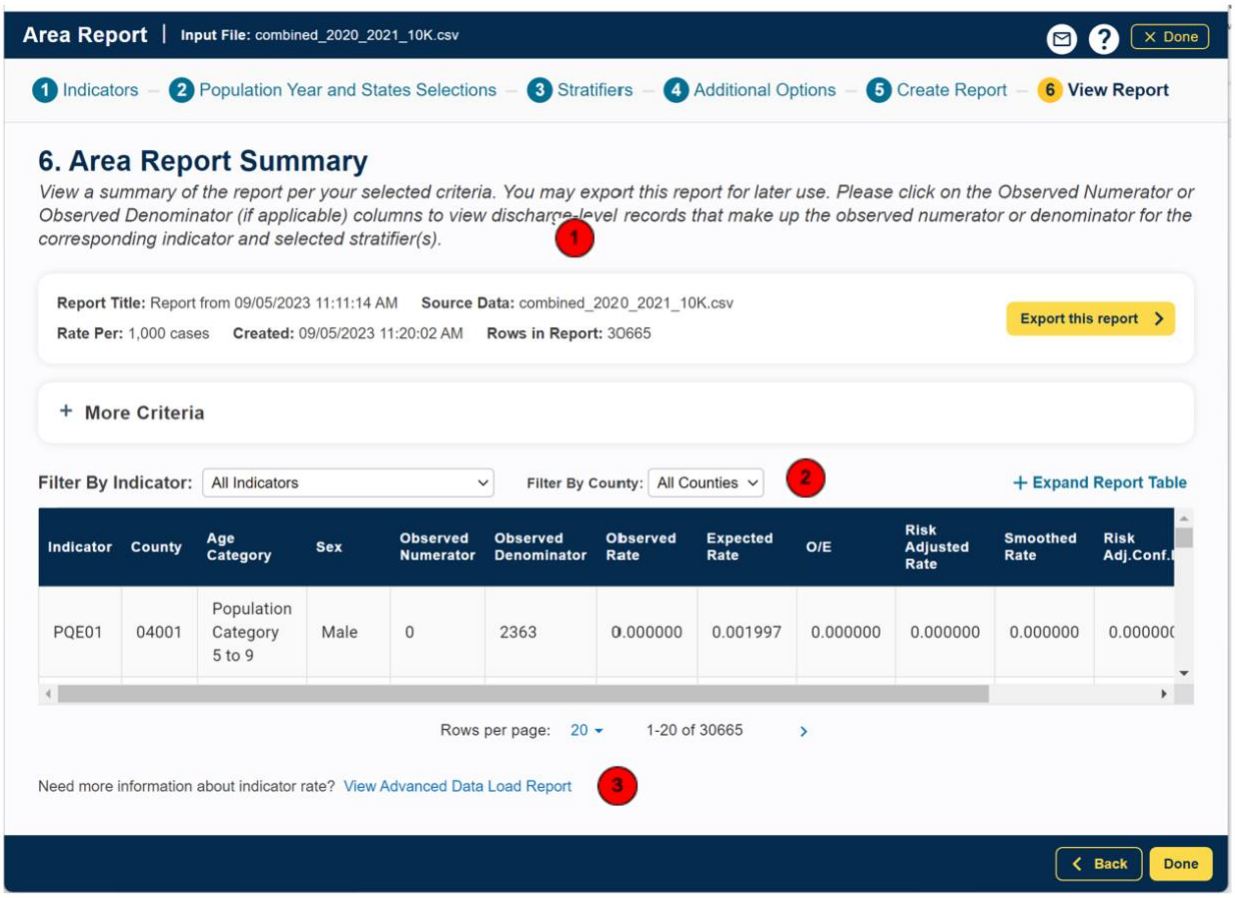
You don't need to do anything on this screen until the processing is complete. Once the progress bar has reached 100 percent, click <**Next**> to view the report. This report can be viewed later from the main window using the <My Exports> section. The report will be saved until you generate another report.

11.3.6 View report

11.3.6.1 What is this screen for?

This screen (Screenshot 28) displays the area- and hospital-level reports that have been generated. The last report that was generated is shown. You can access this window from the main menu, or you may access it immediately after creating a report. Once a report has been generated, it stays in the database until another report is generated. You can export the report to save the data permanently. See Appendix C for detailed information about the export format.

Screenshot 28: View Report



11.3.6.2 How is this screen organized?

1

11.3.6.2.1 Report summary

The report provides the following information about the displayed report:

- **Report Title**
- **Source Data**—The data file that was used to generate the report
- **Treatment of COVID Diagnoses**—How this report handles COVID diagnoses
- **Rates Per**—The report scale; depends on the level of report displayed. You will see different bar sizes depending on the magnitude of the rate.
  - Area-level report = "population"
- **Created**—The date and time the report was generated.
- **Rows in Report**—The total number of rows being displayed in the report.

- **Filter by Indicator**—If you are interested only in a specific indicator(s), you can check to see whether issues in your data could impact this indicator(s). You can search by one indicator at a time from the drop-down list. Only indicators for the selected modules will be shown.
- **Filter by County**— You can filter the report data by county.
- **For Area Report**—By All Counties (default) or a single county.

2

11.3.6.2.2 Report window

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

- Indicator
- Age Category
- Sex
- OMB 2003 Metro Area
- Observed Numerator
- Observed Denominator
- Observed Rate
- Expected Rate
- O/E Ratio
- Risk-Adjusted Rate
- Smoothed Rate[3]
- Risk Adj Conf Int Low
- Risk Adj Conf Int High

3

11.3.6.2.3 Screen controls

The <**Export this report**> link can be used to export the report in CSV format so that it can be read by Excel or other programs. The report will then begin to appear in the "My Exports" section of the home page.

The <**View Advanced Data Load Report**> link will bring up the Advanced Data load report. You may want to explore this report if you want to get a better sense of data issues in your dataset that may have had an impact on one or more indicator rates. Data issues may be due to issues with any of the following: not mapping certain fields, missing or erroneous data values, or explicit user instructions during crosswalk. Impact may be on indicator logic, risk adjustment, and/or grouping (stratification) of reports. See Section 8.10.5 for further detail on the Advanced Data Load Report.

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

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

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

11.3.6.3 What should I do here?

To see more records, use the **Page Controls**, or use the <**Rows per Page**> control under the data table. To change the data filter, you may select a different filter criterion in the **Filter by Hospital** (or **Filter by County**) drop-down box.

11.3.6.4 Other questions

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

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

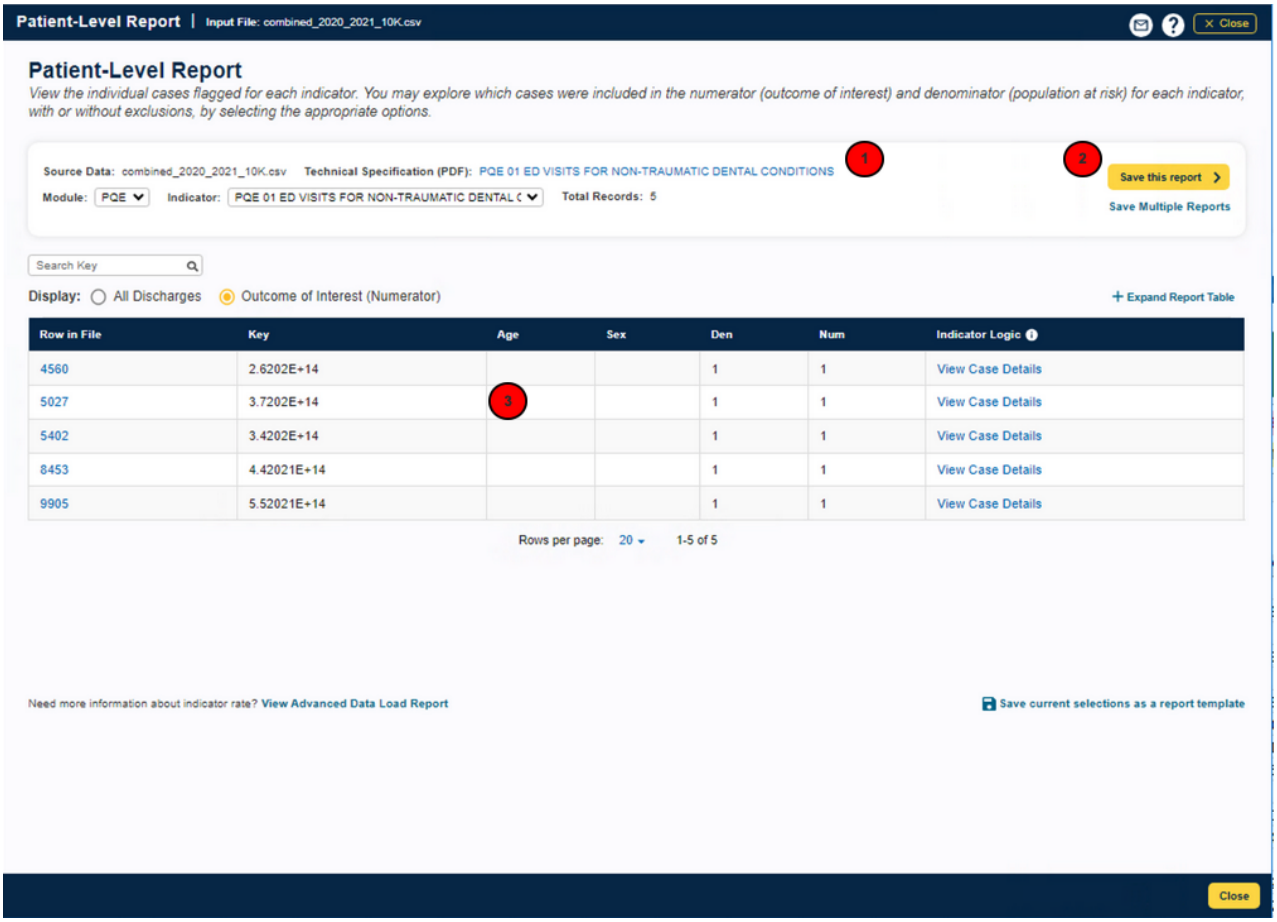
1. **Calculate Smoothed Rates** was not selected on t Modified FIPS County ID, OMB 1999 Metro area, and OMB 2003 Metro area he **Additional Options for Data Analysis** screen. If smoothed rates are blank, then the composite rates will result in a missing value.
2. All component measures that contribute to the composite measures were not selected. If any of the necessary component measures are left out, this will result in a missing value.
3. The necessary stratifiers were not selected. **Selected Year and Quarter** will produce composite measures. Any stratifiers chosen outside of the measures will result in missing values.

11.4 Patient-Level Report

11.4.1 What is this screen for?

This screen (Screenshot 29) provides a view of the individual cases flagged for each indicator. This screen can be useful for exploring which cases actually were included in the numerator and denominator for each indicator. There are two ways to access this report: by (1) drilling down on the observed numerator or observed denominator of a record on the area-level report, or (2) creating the patient-level report on the **Home** screen.

Screenshot 29: Patient-Level Report



11.4.2 How is this screen organized?

1

11.4.2.1 Report controls

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

- **Technical Specification (PDF)** —Allows you to download the technical specification pdf for the selected Indicator. Technical Specification document explains the calculations used to formulate each indicator, including a brief description of the measure, numerator and denominator information, and details on cases that should be excluded from calculations. This document is also available directly on the AHRQ QI website: https://qualityindicators.ahrq.gov/measures/ED_PQI_TechSpec
- **Module**—Allows you to choose the module for which you would like to view information. You will be able to choose between only those modules for which you have already generated indicators. When drilling down from the area-level report, the selected module cannot be changed.

- **Indicator**—Allows you to choose a specific indicator for which to view records. When drilling down from the area-level report, the selected indicator cannot be changed.
- **Total Records**—Displays the total number of records the report contains for a particular indicator.
- **Search Key Field**—Allows you to enter a search term to search the data in the table below.
- **Rows per Page**—This control defines the maximum number of rows displayed per page while viewing the report online. The default of 20 rows allows you to view the report without scrolling; a different value may be more appropriate for a faster computer or if you wish to sort the data.
- **All Discharges**—All records loaded in the system for the data file.
- **Outcome of Interest (Numerator)**—All records that are included in the numerator of the selected indicator.
- **All Discharges**—All records loaded in the database for the data file.
- **Expand Report Table**—Allows you to expand the table below to show more rows in one view.

2 *11.4.2.2 Screen controls*

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

3 *11.4.2.3 Report area*

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

11.4.3 What should I do here?

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

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

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

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

You may drill into any one row of this report to show the reasons that any particular case was flagged for this indicator. Click on the **Row in File** or **View Case Details** field to open the **Case Details** screen (see Section 11.5).

11.4.4 Save Multiple Reports

This screen (Screenshot 30) will let you save a patient-level report for all indicators for one or more modules. You can also select which type of information you want to include in the report (numerator, denominator, etc.).

Screenshot 30: Save Multiple Patient-Level Reports

11.4.5 Other questions

11.4.5.1 What data are displayed?

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

11.4.5.2 How can I see why a case was flagged?

Click on the “Row in File” or “View Case Details” under the “Indicator Logic” column to open the **Case Details** screen (see Section 11.5).

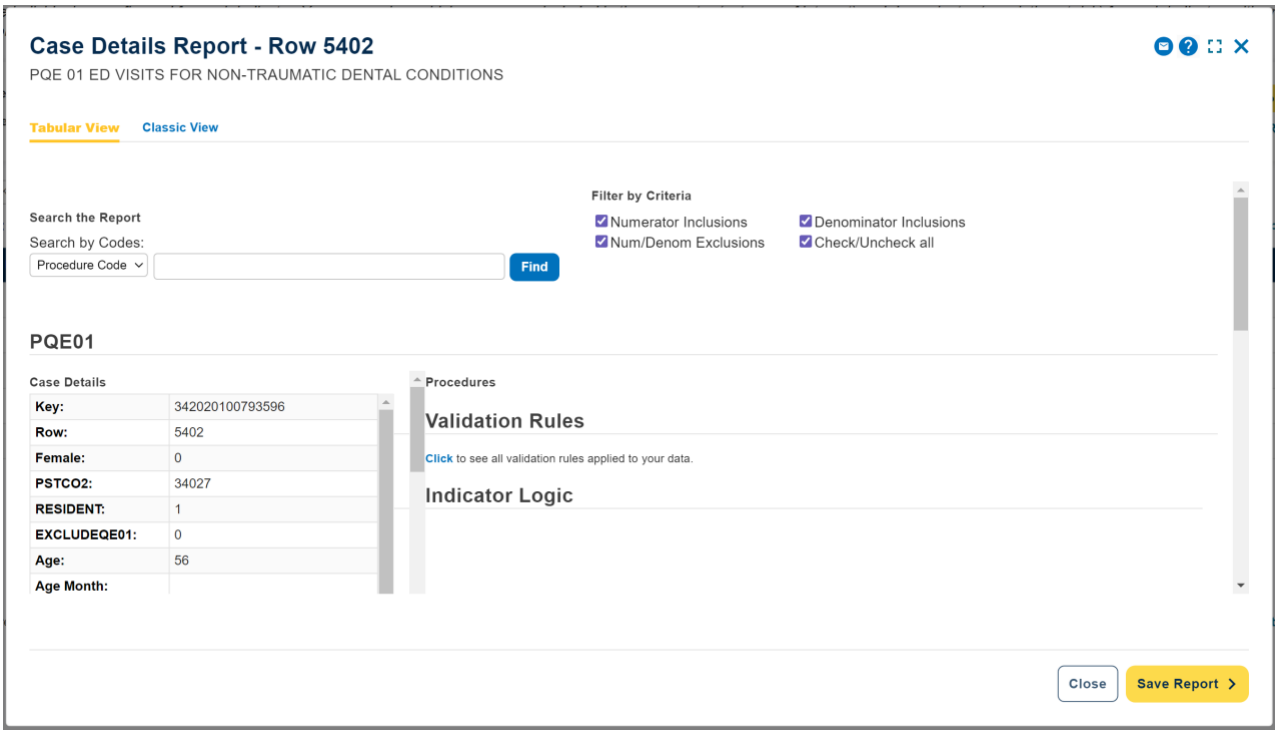
NOTE: Records excluded from the Population at Risk (denominator) are, by definition, also excluded from the Outcome of Interest (numerator). In all QIs, the numerator is a subset of the denominator.

11.5 Case details

11.5.1 What is this screen for?

This screen (Screenshot 31), accessed by clicking on the specific row number or **View Case Details** link on the Patient-Level Report, lets you see exactly why a particular case was or was not flagged for a particular indicator.

Screenshot 31: Case Details



11.5.2 How is this screen organized?

11.5.2.1 Case details

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

11.5.2.2 Inclusion rules

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

11.5.2.3 Exclusion rules

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

11.5.2.4 Flag rules

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

11.5.2.5 Tabular and classic views

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

11.5.3 What should I do here?

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

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

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

11.5.4 What data are displayed?

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

11.5.5 Other questions

11.5.5.1 What other covariates are applicable to this indicator?

You may view the entire table of covariates for each PQE module on the AHRQ QI website. See the parameter estimates link - https://qualityindicators.ahrq.gov/Downloads/Modules/ED_PQI/V2023/Parameter_Estimates_ED_PQI_v2023.pdf :

11.5.5.2 How can an individual covariate be interpreted?

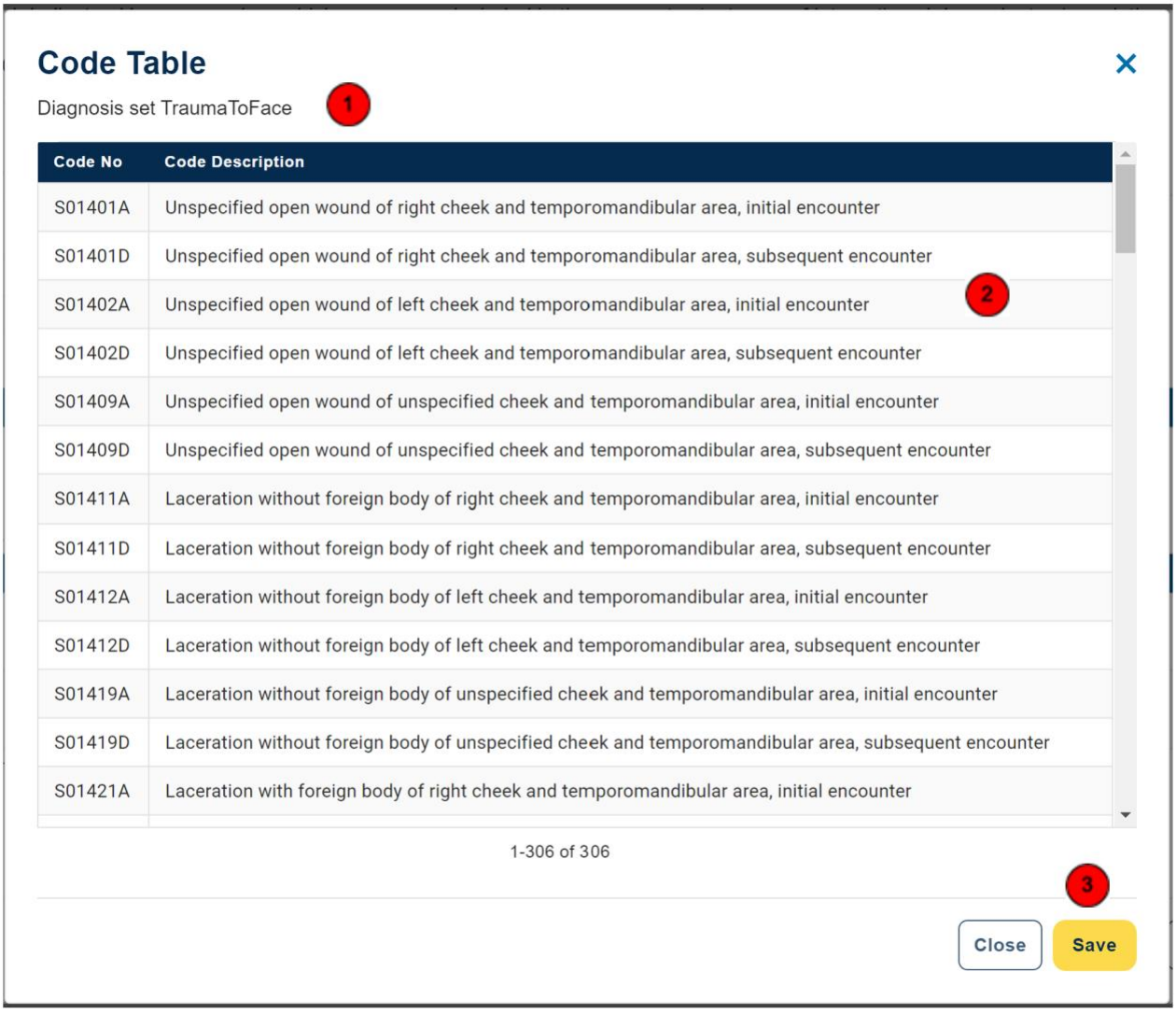
You can often see the relative importance of different covariates from the magnitude of the coefficient; however, individual covariates are not intended to be interpreted in isolation.

11.6 Code list

11.6.1 What is this screen for?

This is a popup window (Screenshot 32) that displays the ICD codes \ 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 32: Code List



11.6.2 How is this screen organized?

1

11.6.2.1 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 *11.6.2.2 List of codes*

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

3 *11.6.2.3 Save the list*

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

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

11.6.3 What should I do here?

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

11.6.4 Other questions

11.6.4.1 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.

Helpful Tools

The Quality Indicators Windows® ED PQI Beta software includes several helpful tools. These are discussed in more detail here:

12.1 Program options

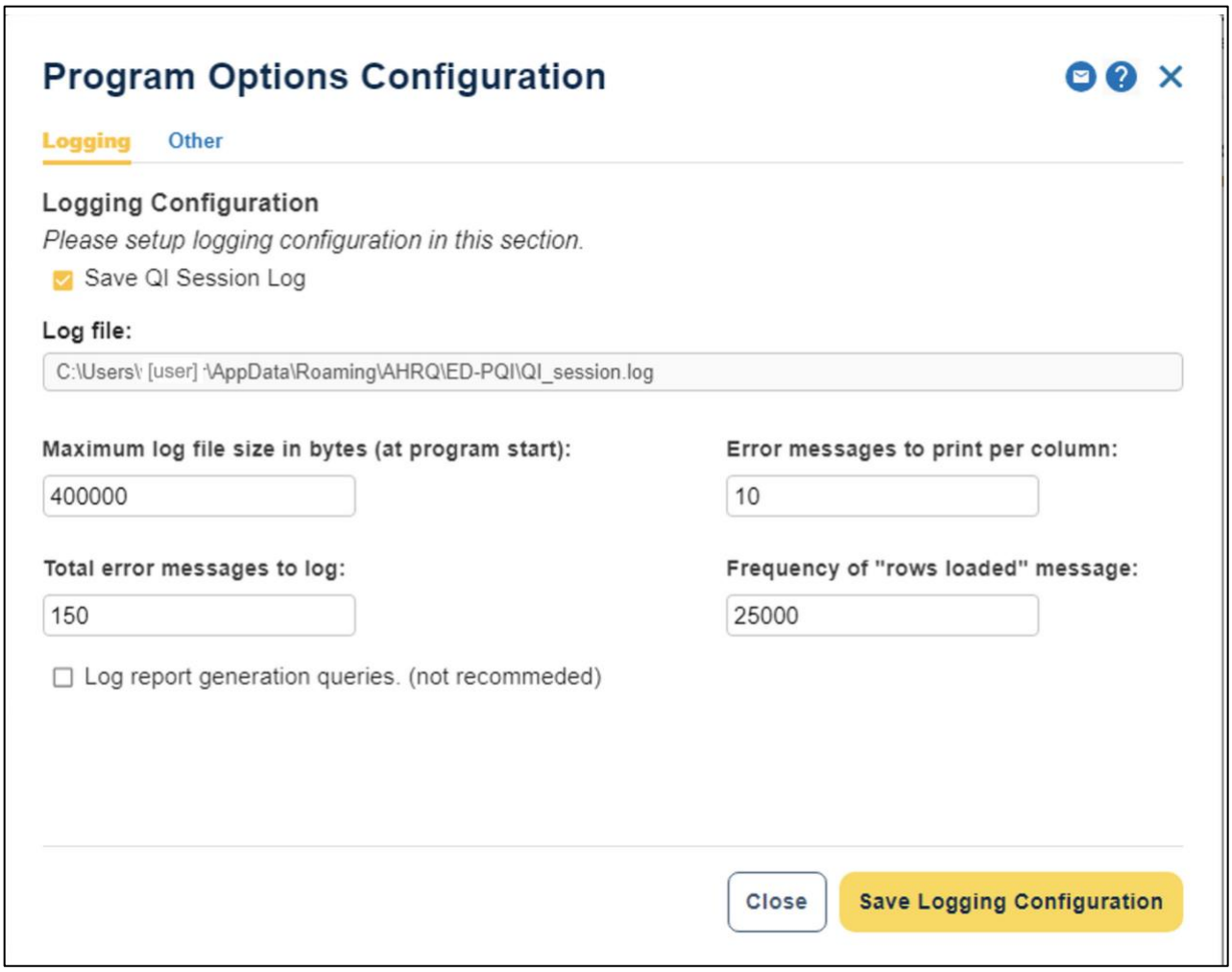
12.1.1 What is this screen for?

This screen (Screenshots 33-34), accessed by clicking the <**Program Options**> control under Tools on the **Home** screen, allows you to change your Logging options and to save the Session Log.

12.1.2 How is the screen organized?

12.1.2.1 Logging

Screenshot 33: Program Options (Logging)



Specify a file to save the information written to the ED PQI Session Log. The Session Log will be appended to the specified file until the file reaches 400 KB. At 400 KB, the file will be truncated and started again. When writing to the Agency for Healthcare Research and Quality (AHRQ) QIs support team, please include the relevant portions of your Session Log.

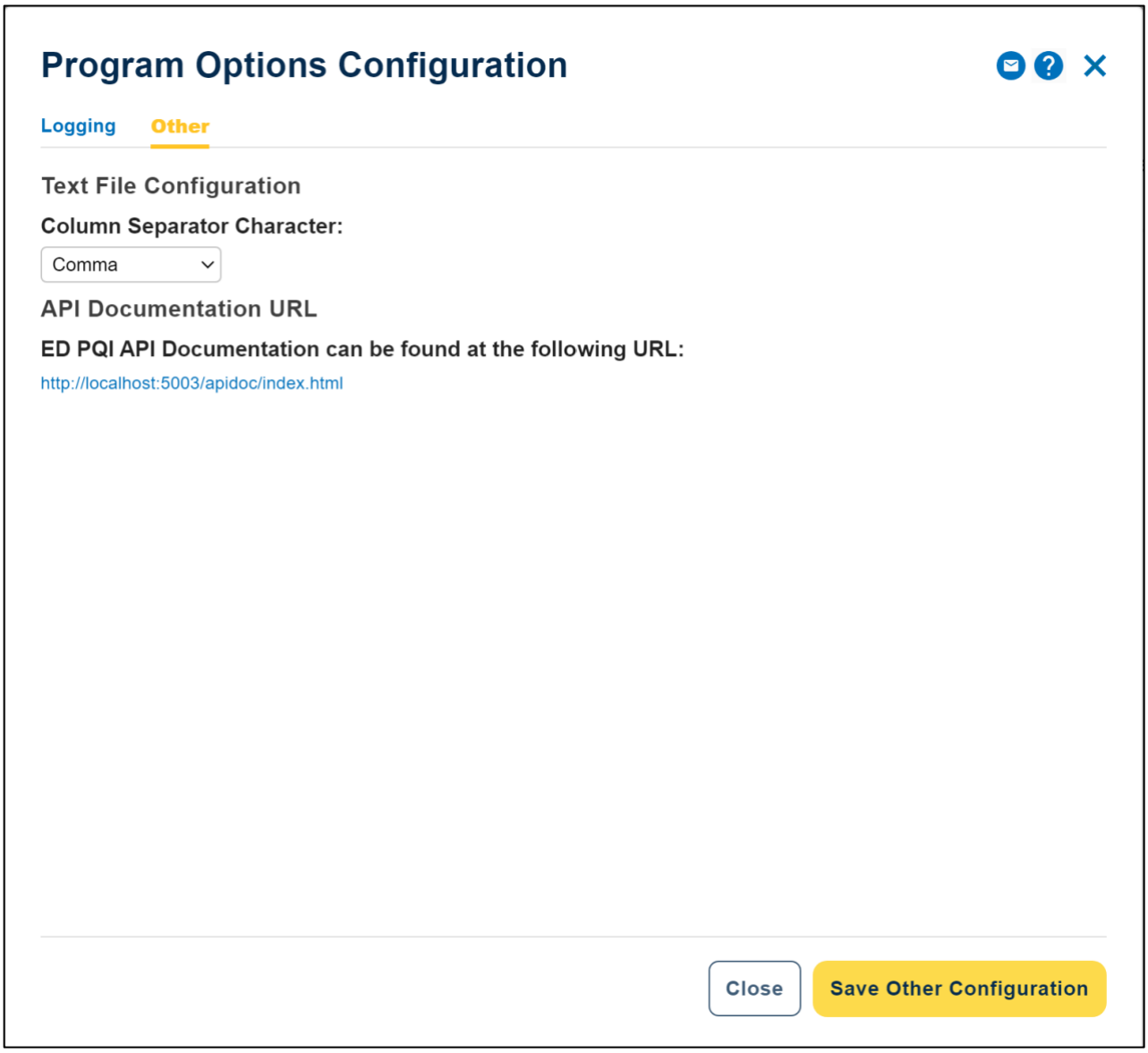
During the data error check screen, messages will be written to the log if certain types of data errors are found—for example, an invalid number in a numeric column. This option may be helpful if you wish to make corrections to your input file. You may adjust the number of errors saved.

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

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

12.1.2.2 Others

Screenshot 34: Program Options (Other)



- Text File Configuration: You may change the separator between the values in a row of data to "Tab" instead of "Comma."

12.2 Automation script

The automation script (Screenshot 35) allows you to assemble a series of functions through ED PQI and then run them in an automated manner either through ED PQI or via the command line. Scripts may also be scheduled to run at a predefined time. You configure certain parameters once from the ED PQI user interface to generate the automation script, and following that, can run the

software without having to open the user interface. This feature is useful for users who run the software frequently with the same parameters (name/location/structure of input file, name/structure of mapping file, modules, etc.) and are comfortable using the command line instead of the user interface.

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

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

C:\Program Files (x86)\ED PQI\1.0\cloudqi.exe -automationfile <**file path/filename**>

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

Example:

C:\Program Files (x86)\ED PQI\1.0\cloudqi.exe -automationfile "c:\automationscipt_05102016.ahrq"

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

Users can call the automation batch files on the command prompt with parameters. This is useful in overriding the values initially set up in the automation script file. The syntax for this command with parameters is:

C:\Program Files (x86)\ED PQI\1.0\cloudqi.exe -automationfile <**file path/filename** -input < **file path/filename of the input file** > -mapping <**file path/filename of the mapping file (.qim)**> -exportloc < **export folder path** >

Example:

C:\Program Files (x86)\ED PQI\1.0\cloudqi.exe –automationfile "c:\automationscipt_05102016.ahrq" -input "c:\dev\ \my_input_file.csv" -mapping "c:\dev\qi_mapping.qim" -exportloc "c:\dev\export"

If no parameter is provided, the batch file will process the default information in the automation script file.

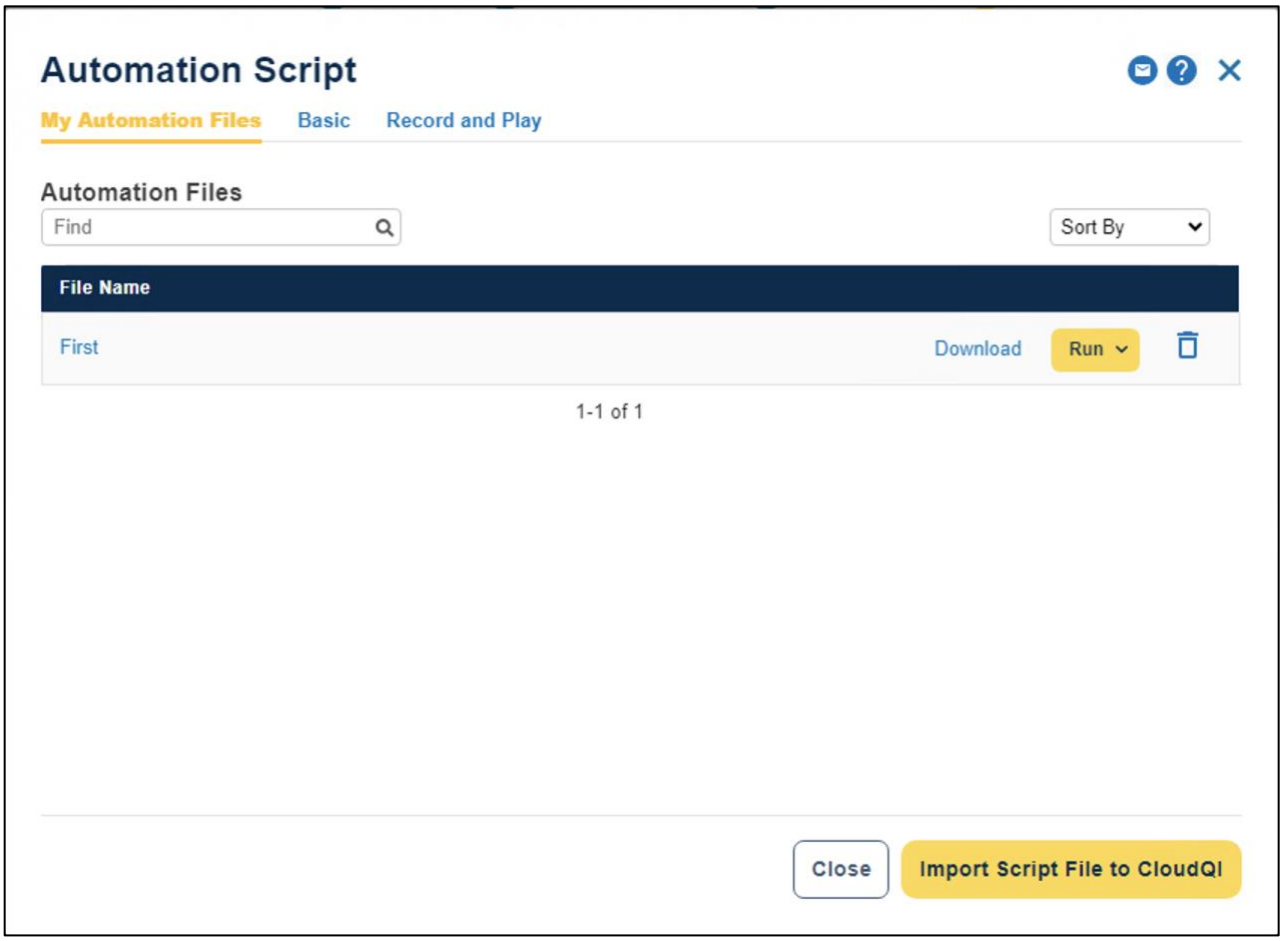
Each of the automation script types and all the tabs of the Automation Script feature are described in further detail below.

12.2.1 My automation files

12.2.1.1 What is this screen for?

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

Screenshot 35: Automation Script: My Automation Files



12.2.1.2 How is this screen organized?

This screen has the following parts:

1. **Sort By**—If you have multiple script files, you can sort them by date created (most recent first or least recent first) or alphabetical order (A–Z or Z–A).
2. **Find**—You can find a specific script file by typing in part of the name or description.
3. **More Information**—Hovering over the name of the file will enable you to see more information about that script file, such as the script type (Basic or Record and Play), the latest modified date, how the script file was created (shows "System Generated" if created by the user or shows "User Imported" if imported into ED PQI by the user), the input file in which it was created, and the ED PQI version with which it was created.
4. **Download** – This will download the script to your hard drive.

5. **Run**—This will run the corresponding script file in ED PQI. There are three options to run your script.
    - Run in the Application
    - Run from Command Line
6. **Delete**—This will delete the script file previously created.
7. **Import Script File to ED PQI**—By clicking this button, you can import a script file created by another user of ED PQI. This will create an entry for the script in your **My Automation Files** screen with type **User Imported**. You can then run this script or view and edit it just like one of the scripts you created.

12.2.1.3 What should I do here?

Locate the script file you wish to work with. Then you may execute the script by clicking the corresponding **<Run>** link. Click the "Import Script File to ED PQI" button and follow the prompts to import an externally created script file into your ED PQI installation.

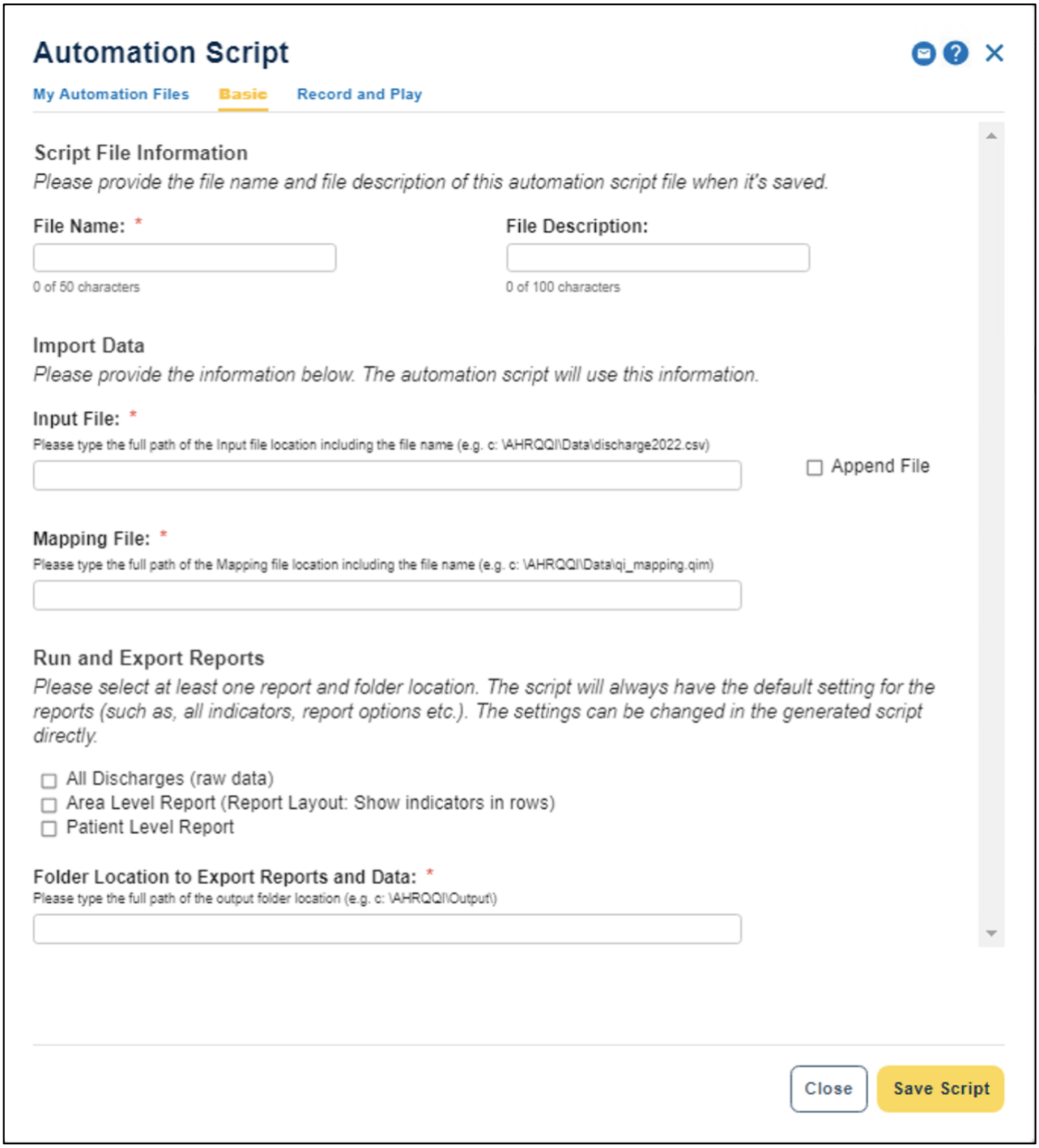
12.2.2 Basic

12.2.2.1 What is this screen for?

The automation script (Screenshot 36) allows you to run the ED PQI software to import data, generate rates, and create reports through the command line. You configure certain parameters once from the ED PQI user interface to generate the automation script; afterward, you can run the software without having to open the user interface. This feature is useful for users who run the software frequently with the same parameters (name/location/structure of input file, name/structure of mapping file, modules, etc.) and are comfortable using the command line instead of the user interface.

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

Screenshot 36: Automation Script: Basic



12.2.2.2 How is this screen organized?

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

12.2.2.2.1 Script File Information

Enter a File Name for your script in the <**File Name**> field and then enter a description of your file in the **<File Description>** field.

12.2.2.2.2 Import Data

Enter your input file location/name and the corresponding mapping file location/name. Enter the full path (including the file name) of the Input and Mapping Files in the corresponding fields. Please note that the mapping file should be correct for the selected input file. You must specify both the input file and mapping file in order to generate the automation script.

You can create a basic automation script where you can choose to append your input data. Checking the <**Append File**> checkbox will append input file specified in the basic automation script to your existing uploaded data in ED PQI. The system will use the combined file to generate the rates.

12.2.2.3 What should I do here?

Enter the complete file path for your input file and an appropriately match mapping file.
Only Quality Indicators Mapping (.qim) files can be selected. These files can be produced from the ED PQI software after importing a data file and specifying corresponding data mapping one time through the user interface. After entering the mapping file, please select the module(s) to generate indicators using the automation script. At least one module must be selected.

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

Once you have entered the required information, click the “Save” button. Browse the folder where you want to save the generated automation script. The Automation script will be saved at the selected location. Run this script from the command prompt or from within the ED PQI application. See Section 12.2 for details on calling the automation script files with command prompt.

12.2.3 Record and play

12.2.3.1 What is this screen for?

On this screen (Screenshot 37), you can start the recording to create a customized automation script. Beginning such a recording will record all the actions that you subsequently perform on ED PQI related to importing a file, generating indicators, and/or running reports, which you can save as an automation script for later execution through ED PQI.

Note:

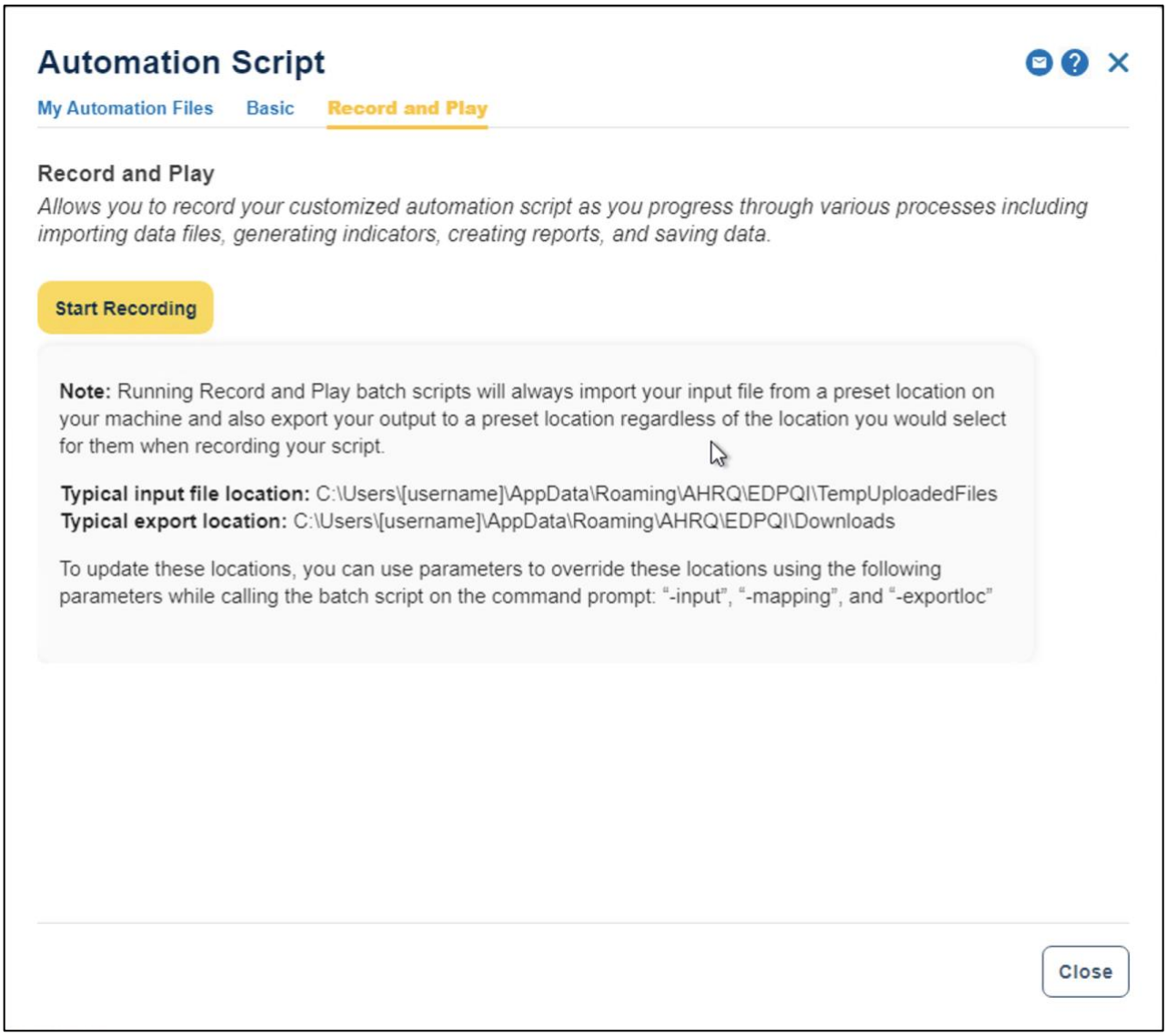
Running Record and Play batch scripts will always import your input file from a preset location on your machine and also export your output to a preset location regardless of the location you may have selected for them when recording your script.

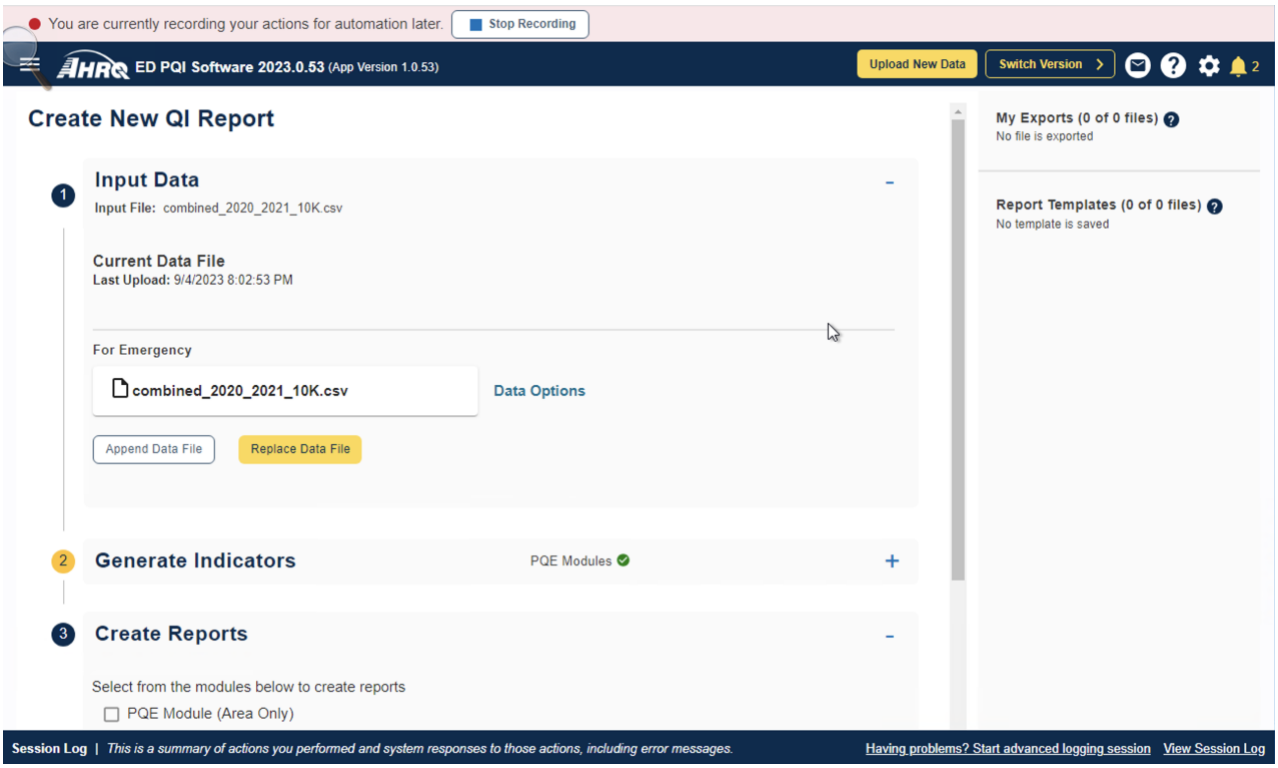
As a process, your input file is first uploaded to a temp folder [Typically: *C:\Users\[username]\AppData\Roaming\AHRQ\ED PQI\TempUploadedFiles*] before processing.

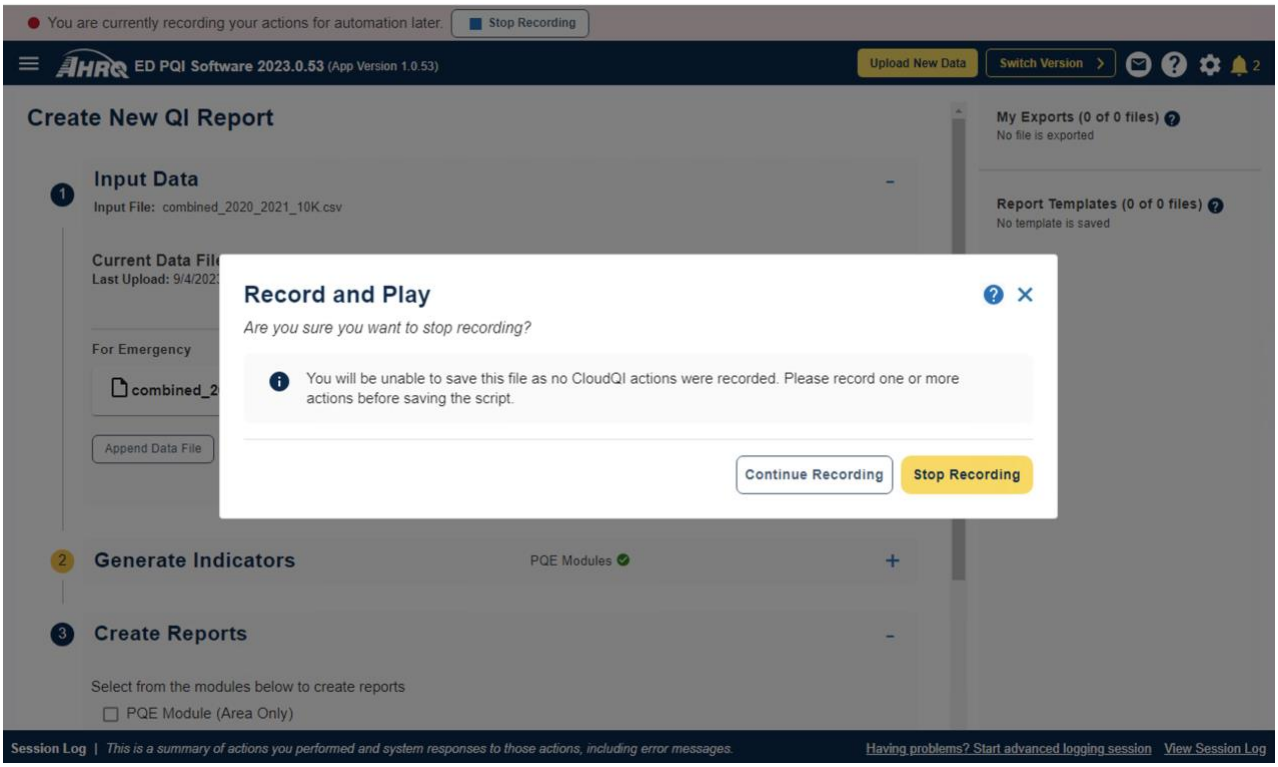
Similarly, your output file is exported to a pre-fixed location [Typically: C:\Users*[username]*\AppData\Roaming\AHRQ\ED PQI\Downloads] independent of your selected location.

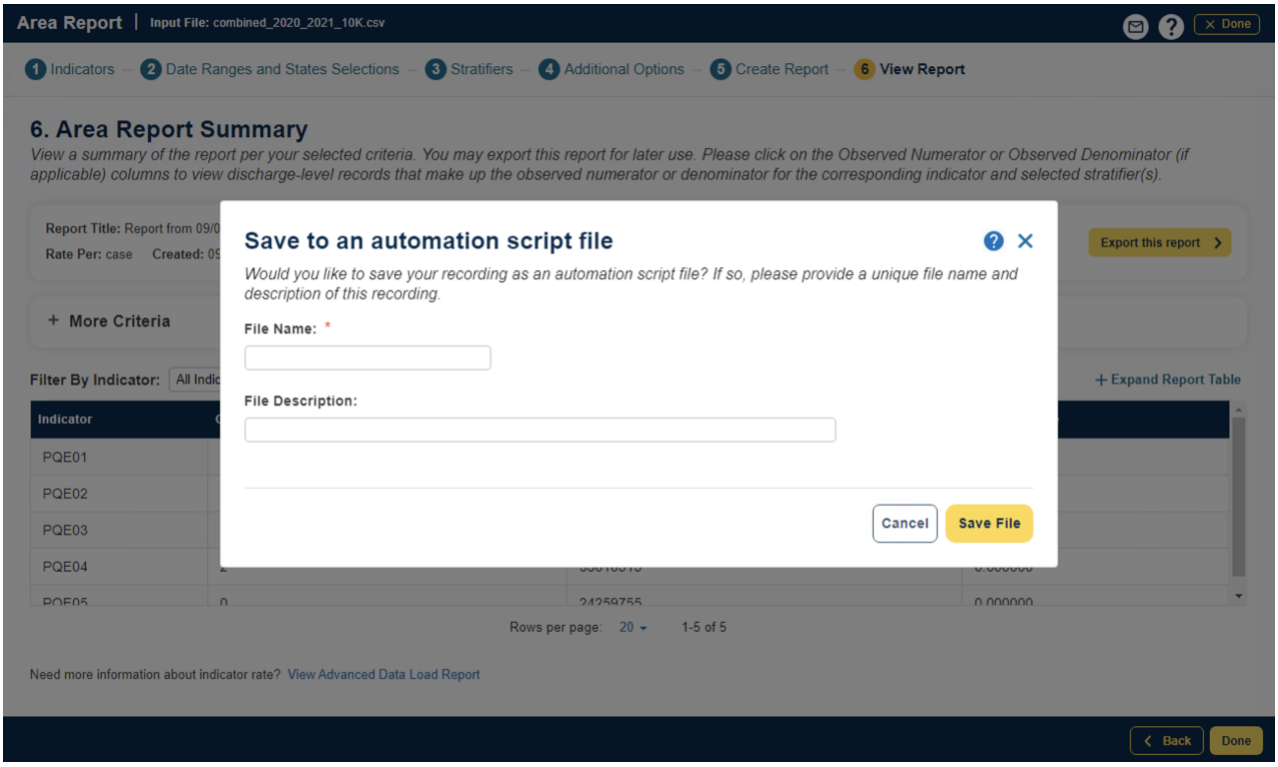
If you need to update these locations, you can update them in the automation script file and save it. The new location will be used in future runs. Alternatively, you can use parameters to override these locations using the following parameters while calling the batch script on command prompt: “-input”, “-mapping”, and “-exportloc” (see Section 12.2 for details on how to use these parameters)

Screenshot 37: Automation Script: Record and Play (Shows multiple screens in the process)




You are currently recording your actions for automation later.
Stop Recording
ED PQI Software 2023.0.53 (App Version 1.0.53)
Upload New Data
Switch Version
Create New QI Report
Input Data
Input File: combined_2020_2021_10K.csv
Current Data File
Last Upload: 9/4/2023 8:02:53 PM
For Emergency
combined_2020_2021_10K.csv
Data Options
Append Data File
Replace Data File
Generate Indicators
PQE Modules
Create Reports
Select from the modules below to create reports
PQE Module (Area Only)
My Exports (0 of 0 files)
No file is exported
Report Templates (0 of 0 files)
No template is saved
Session Log | This is a summary of actions you performed and system responses to those actions, including error messages.
Having problems? Start advanced logging session
View Session Log


You are currently recording your actions for automation later.
Stop Recording
ED PQI Software 2023.0.53 (App Version 1.0.53)
Upload New Data
Switch Version
Create New QI Report
Input Data
Input File: combined_2020_2021_10K.csv
Record and Play
Are you sure you want to stop recording?
You will be unable to save this file as no CloudQI actions were recorded. Please record one or more actions before saving the script.
Continue Recording
Stop Recording
Generate Indicators
PQE Modules
Create Reports
Select from the modules below to create reports
PQE Module (Area Only)
My Exports (0 of 0 files)
No file is exported
Report Templates (0 of 0 files)
No template is saved
Session Log | This is a summary of actions you performed and system responses to those actions, including error messages.
Having problems? Start advanced logging session
View Session Log



12.2.3.2 How is this screen organized?

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

1. Click the <**Start Recording**> button.
2. Click and continue to perform your actions in the application, such as, import file, run report, etc.
3. Perform your actions.
4. Click the blue and white <**Stop Recording**> button located at the top of your screen.
5. Click the <**Continue Recording**> if you want to continue recording or the <**Stop Recording** > button to stop recording.
6. Provide the file name and a file description for the recording. This file will then begin showing on your **My Automation Files** screen.

12.2.3.3 What should I do here?

Click on <**Start Recording**> to begin the recording. Once you begin the recording, a pink bar will appear at the top of the page indicating that a recording is in progress until you click the corresponding <**Stop Recording**> button (see the screenshot above). After completing your

actions and clicking the <**Stop Recording**> button, be sure to save the recording by clicking on <**Stop Recording and Save**> and provide a file name and description. To continue recording rather than instead of stopping, click on <**Continue Recording**>.

12.2.3.4 Advance logging

When you turn on the advance logging feature, the ED PQI [Beta] software will record details of your actions (including the corresponding timestamp) and the corresponding system responses in the Session log. Saving and sending this session log to the ED PQI support team will provide useful information to the team in troubleshooting any issues you may be encountering.

The Advanced logging has 4 steps:

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

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

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

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

3. **Turning off (ending) the advanced logging**—Once you complete the sequence of steps you wish to perform, you can turn off advanced logging by clicking "Turn off Advanced Logging" in the top Tools menu or by clicking "End Advanced Logging Session" in the Session log footer line.4. **Saving your session log**—Upon ending the advanced logging, you will be asked to confirm how you want to proceed: choose either the <Cancel> button to continue your advanced logging session or click the button to "Turn Off Advanced Logging."

You will then be prompted to save the session log file. Please be sure to give it a meaningful file name and description. Once saved, you will be presented with an option of sending the advanced session log to ED PQI support in an email. This will open the installed email client in your machine so you can send the email and will also attach the normal and advanced session log. This advanced session log file will also appear in your "My Exports" section on the ED PQI Home screen. Email this session log to the QI Support email box.

Software Installation and Data Security

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

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

No additional software is required for purchase in order to use the ED PQI software. The software does require Microsoft® .NET Framework. The ED PQI installation process checks and installs the Framework if it is not installed.

13.1.1 What type of data is required by the AHRQ ED PQI software?

The AHRQ ED PQI Beta software is provided with no data. The AHRQ ED PQI software is a tool that calculates the QIs based on an input data file containing inpatient and outpatient data from your organization. See the Input Data Dictionary (Appendix A) for detailed descriptions of each required data element.

13.1.2 What information is collected by AHRQ?

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

13.1.3 What kind of individually identifiable health information is required by the AHRQ ED PQI software?

The AHRQ ED PQI Beta software does not require any direct identifiers. However, the software does require detailed information for each case, 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.

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

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

13.1.5 What types of data files are used or generated by the AHRQ ED PQI Beta software?

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

- **Input Data File**—The inpatient and outpatient combined file that the user prepares outside the AHRQ ED PQI Beta software for loading with the Data Import Wizard. After the data load has completed, this file is no longer required.
- **Patient-Level Report**—Users may export a file from the **Patient-Level Report** screen that contains the discharge-level indicator flags for the selected indicator and basic demographic data for each patient. This report allows users to see which cases were excluded, if desired.
- **Stratified Rate Report**—Users may export a file from the **View Report** screen that contains the stratified rates for selected area-level indicators. When the report is generated, users may select not to report rates with less than a specified number of cases in the numerator.
- **Case Details Report**—Users may save a copy of this report as a rich text format (RTF) file for later viewing. This contains individual medical information.
- **Data Load Reports**—Users may choose to save copies of the Data Load reports in RTF. These reports contain descriptive statistics about the input file and do not contain personal information.
- **Export QI File**—After using the Data Import Wizard, users may export a file that includes only those data elements used by the AHRQ ED PQI software as well as the indicator flags for each record. This file may be exported from the wizard or by using the <**Export Data**> option on the Main Menu. See Appendix C for a list of all the variables included in the exported data file.
- **Database Files**—Each time the user runs the Data Import Wizard, the data are populated into a database, which stores data in its own database file. Each time the Report Wizard is used, the resulting area-level report is stored in the 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 can view the location of this file in the **Program Options Configuration** screen under the Logging tab.

13.1.6 Does the AHRQ ED PQI Beta Software require any data sharing or internet connection?

No. The AHRQ ED PQI Beta software does not share data with any other computer and does not require an internet connection.

13.1.7 What sort of password protection is used by the AHRQ ED PQI Beta Software?

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

13.1.8 What permissions are required to install and run the AHRQ ED PQI Beta software?

The AHRQ ED PQI Beta software must be installed by a user with Windows administrator access. All users with access to the PC may run the AHRQ ED PQI Beta software after it is installed.

13.2 Input data

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

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

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

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

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

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

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

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

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

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

No. In order to calculate rates for area-level indicators, the ED PQI Beta 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.

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

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

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

Consult the SEDD documentation (https://hcup-us.ahrq.gov/db/state/sedddbdocumentation.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 ED PQI Beta software.

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

If your State participates in HCUP SEDD you may wish to consult the State-specific HCUP documentation athttps://hcup-us.ahrq.gov/db/state/sedddbdocumentation.jsp.

13.3 Specifying and viewing reports

13.3.1 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.

13.3.1 Can reports be viewed after closing the Report Wizard?

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

13.3.2 What happens if a new report is generated?

A new report will be saved and be available to use under the "View Saved Report" screen.

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

Immediately following generation, a report can be exported to a comma-separated value format (CSV) or text (.txt) file and viewed in other software such as Microsoft Excel. After a different report is generated, alternatively, to view an earlier report, use the "View Saved Report" screen from within the ED PQI Beta software.

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

Use the Patient-Level Report (see Section 11.4).

13.3.5 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 11.5).

13.3.6 Using different types of QI rates

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

13.3.7 Observed rate

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

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

13.3.8 Expected rate

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

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

If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0, or observed minus expected is positive), then the implication is that the hospital

performed worse than the reference population for that particular indicator. Users may want to focus on these indicators for quality improvement.

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

13.3.9 Population rate

Users can also compare the expected rate to the population rate reported in the v6.0 Benchmark Data Tables to determine how their case mix compares to the reference population. The population rate refers to the overall rate for the reference population. The reference population is defined in the Benchmark Data Tables documents available on the AHRQ QI website for each module. If the population rate is higher than the expected rate, then the hospital's case mix is less severe than the reference population. If the population rate is lower than the expected rate, then the hospital's case mix is more severe than the reference population.

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

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

13.3.10 Risk-adjusted rate

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

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

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

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

13.3.11 Smoothed rate

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

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

User Support

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

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

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

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

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

Appendix A: ED PQI Input Data Dictionary

Table 6. ED PQI Input Data Dictionary

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Key (KEY)	Unique case identifier	String of up to 20 characters	User-defined unique identifier for each record	Not required by the AHRQ ED PQI software but available to allow users to link the 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 record will be excluded from the analysis.
Age in Months (AGEMONTH)	Age in months at admission (coded only when the age in years is less than 1)	Numeric 0–11 months	Age in months	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.
Sex (FEMALE)	Gender of patient	Numeric	0=male 1=female	If this data element is missing, the record will be excluded from the analysis.
Patient State/County Code (PSTCO2)	FIPS State/county code of patient's residence (Use hospital's State/county if the patient's is unavailable; however, patient's is recommended.[3])	Numeric; two-digit State code followed by three-digit county code (ssccc)	Modified FIPS State/county code[4]	Available at https://www.census.gov/library/reference/code-lists/ansi/ansi-codes-for-states.html. If this data element is missing, the record will be excluded from area-level rate calculations. This variable may be renamed in the future to reflect the preference for the location of the patient rather than the hospital.
Hospital ID (HOSPID)	Data source hospital ID	String of up to 12 characters	Hospital identification number	Used to facilitate data exploration and possible troubleshooting.
Principal Diagnosis (DX1)	ICD-10-CM diagnosis code. Diagnosis 1 is the principal diagnosis.	For ICD-10-CM - String; three to seven characters (do not include decimal point)	Diagnosis code	Required field for processing any indicator analysis. If this data element is missing, the record will be excluded from the analysis.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Diagnosis Code 2–Diagnosis Code 35 (DX2–DX35) (up to 34 fields).	ICD-10-CM Diagnosis codes 2–35 are secondary diagnoses.	For ICD-10-CM - String; three to seven characters (do not include decimal point)	Diagnosis codes	
Year (YEAR)	The patient's year of the case. For example, a patient record on July 7, 2023, would have a year of 2023.	Numeric	YYYY Record year should be within the range of 2023 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 record will be excluded from the analysis.
Discharge Quarter (DQTR)	The calendar quarter of the patient's record. For example, a patient record on July 7, 2023, would have a 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 record will be excluded from the analysis.
ED Admit (EDADMIT)	Emergency Department Admission	Numeric		If an Inpatient admission originated in ED, set this value to 1 otherwise 0.
VisitLink	Visit Link	Numeric		Unique number that identifies an individual. Used to track ED visits for the same patient across ED facilities and time. See Appendix G for details.
DIED_VISIT	Indicates in hospital death	Numeric	0 - did not die, 1 - died in ED, 2 - died in the hospital after admission from the ED	
RESIDENT	Identifies residents	Numeric	0 - Patient does not reside in the State in which the emergency department is located, 1 - Patient resides in the same State in which the emergency department is located	
DaysToEvent	Days To Event	Numeric		Used to determine the timing between ED visits. See Appendix G for details.

Appendix B: ED PQI Output Report Dictionary

Table 7. ED PQI Area-Level Indicator Output

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
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+)
Sex	Gender of patient	Numeric	1=male 2=female	
County	County FIPS code (with independent areas left separate)	Numeric	Five-digit numeric identifier	
Modified FIPS County ID	County FIPS code (with independent areas combined)	Numeric	Five-digit numeric identifier	
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 records included in the numerator (outcome of interest) as defined for the indicator	Numeric		
Observed Denominator	The number of records included in the denominator (population at risk) as defined for the indicator	Numeric		
Observed Rate	The rate (observed numerator/observed denominator) as defined for the indicator	Numeric		
Expected Rate	Rate calculated by assuming an “average” performance for each patient group based on the reference population, but with the hospital’s actual case mix	Numeric		The reference population is based on all States participating in the most recently available HCUP SID databases.
O-E Ratio	The ratio of the observed to the expected rate	Numeric		

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 hospitals or areas. In essence, smoothing describes how persistent a rate would be from year to year. Smoothing is a useful tool to "level the playing field" for hospitals or areas with a small number of cases.

Appendix C: ED PQI Export Data Dictionary

Table 8. ED PQI 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 record will be excluded from the analysis.
Age in Months	Age in months	Numeric (1–11[1] months)	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.
Sex	Gender of patient	Numeric	1=male 2=female	If this data element is missing, the record will be excluded from the analysis.
Patient State/County Code	FIPS State/county code of patient's residence	Numeric; two-digit State code followed by three-digit county code (ssccc)	Modified FIPS State/county code[3]	Available at https://www.census.gov/library/reference/code-lists/ansi/ansi-codes-for-states.html
Hospital ID	Data source hospital ID	String; up to 12 characters	Hospital identification number	Used to facilitate data exploration and stratification.
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.
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.
Principal Diagnosis (DX1)	ICD-10-CM diagnosis code; diagnosis 1 is the principal diagnosis	For ICD-10-CM - String; three to seven characters	Diagnosis code	Valid codes range from 001 to 999 in the first three digits. Some diagnoses require fourth and fifth digits.

VARIABLE NAME	DESCRIPTION	FORMAT	VALUE DESCRIPTION	COMMENTS
Diagnosis Code 2–Diagnosis Code 12 (DX2–DX12)	ICD-10-CM diagnosis codes; diagnosis codes 2–35 are secondary diagnoses	For ICD-10-CM - String; three to seven characters	Diagnosis codes	
PQExx	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 numerator	Only included if "Indicator Flags" is selected during export
EXCLUDEQExx	Flag value for discharge level exclusion	Numeric	values>0 are excluded records for various criteria, the purpose is to tally counts later. Only records with value=0 will be considered for numerator (and denominator for some).	

Appendix D: Links

The following links may be helpful to users of the AHRQ Quality Indicators:

Emergency Department Prevention Quality Indicators: Is there a new link for ED PQI?
https://qualityindicators.ahrq.gov/modules/pqe_resources.aspx

AHRQ Quality Indicators Software:
https://qualityindicators.ahrq.gov/software/qi

Table D.1. AHRQ Quality Indicators Version 2023 Documents and Software

TITLE	DESCRIPTION
PQE Technical Specifications	Provide detailed definitions of each indicator (including composites), including all ICD-10-CM and MS-DRG codes that are included in or excluded from the numerator and denominator. Note that exclusions from the denominator are automatically applied to the numerator.
PQE v2023 Benchmark Data Tables	These documents provide the average volume, hospital rate, and population rate, as appropriate, for each indicator.
PQE Risk Adjustment Coefficient Tables	Tables for each indicator provide the stratification and coefficients used to calculate the risk-adjusted rate for each stratum.
Quality Indicators Software Instructions	This software documentation provides detailed instructions on how to use the ED PQI version of the software, including data preparation, calculation of the rates, and interpretation of output.
AHRQ QI Population File	Population data that are constructed from public-use Census data and provided for use with the Quality Indicators syntax for area-level

SAS QI Software Version 2023

The SAS QI ED PQI software v2023 calculates rates for the respective AHRQ QI modules. It is available at https://qualityindicators.ahrq.gov/software/qi_resources.. The SAS QI software requires the SAS statistical program distributed by the SAS Institute Inc. The company may be contacted directly regarding the licensing of its products: http://www.sas.com.

Additional Documents

A number of documents are cataloged within the Archive section of the AHRQ QIs web page for historical purposes: https://qualityindicators.ahrq.gov/Archive/default.aspx.

Additional documents may be accessed at the AHRQ Quality Indicator Measures page:
https://qualityindicators.ahrq.gov/measures/qi_resources

Other Tools and Information

QI rates can be calculated using the modified Federal Information Processing Standards (FIPS) State/county codes. A list of codes is available at https://www.census.gov/library/reference/code-lists/ansi/ansi-codes-for-states.html.

AHRQ provides a free, online query system based on HCUP data that provides access to health statistics and information on hospital stays at the national, regional, and State levels. It is available at http://hcupnet.ahrq.gov/.

The CDC National Diabetes Surveillance System provides State-level estimates of diabetes prevalence by age: https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html.

Appendix E: Area-Level Indicators

Table E.1. List of Area-Level Indicators

INDICATOR NAME
PQE 01 ED Visits for Non-Traumatic Dental Conditions
PQE 02 ED Visits for Chronic Ambulatory Care Sensitive Conditions
PQE 03 ED Visits for Acute Ambulatory Care Sensitive Conditions
PQE 04 ED Visits for Asthma
PQE 05 ED Visits for Back Pain

Appendix F: Creating an Input File for the ED PQI Software

This appendix describes how to prepare the data for input into the ED PQI software. It explains how to create an *ED input file* by selecting ED records from data files that contain all inpatient (hospital) and outpatient (ED) records.

Creating an ED Input File for the ED PQI Beta Software

Many organizations collect and store records for inpatient (hospital) stays separate from records from outpatient ED visits. To create an ED input file, admissions originating in the ED from the broader inpatient data file must be identified, as must outpatient ED visits (e.g., treat and release or transfers) from the broader outpatient file. The two are then combined into one ED input file.

Selecting ED Admissions from a Broader Inpatient Data File

Inpatient admissions originating in the ED can be identified from evidence of ED services in the inpatient record. The following is a list of data elements possibly coded on inpatient data that would indicate evidence of ED services, each of which can be used to identify such records. Definitions for these data elements are available in the National Uniform Billing Committee (NUBC) Official Uniform Billing 2004 (UB-04) Data Specifications Manual (available at http://www.nubc.org). Not all data elements will be available in all data. The list of data elements is divided by those often coded on inpatient data and possibly coded on inpatient data.

- Data Elements often coded on inpatient data
  - Revenue center code of 450–459 indicating ED services
  - Another charge field indicating a positive emergency department charge, if revenue center codes are not available
  - Condition Code of P7 (NUBC preferred coding for public reporting as of July 1, 2010)
  - Point of origin of ED, value 7 (NUBC preferred coding from October 1, 2007 to June 30, 2010)
  - Admission source of ED, value 7 (NUBC preferred coding prior to October 1, 2007)
- Data Elements possibly coded on inpatient data
  - Physician's Current Procedural Terminology (CPT) procedure code of 99281–99285 indicating ED physician services reported on record.

If an inpatient record has any one of the above pieces of evidence of ED services, it should be considered an ED admission record and selected out of the broader inpatient file.

To indicate these inpatient records in the ED PQI input file, add the variable EDADMIT (numeric length 3) to the data file and set the value to 1 to indicate an ED admission record.

Selecting ED Outpatient Visits from a Broader Outpatient Data File

Outpatient ED visits can be identified by evidence of ED services on the outpatient record. The following is a list of data elements coded on outpatient data that would indicate evidence of ED services. Definitions for

these data elements are available in the NUBC Official UB-04 Data Specifications Manual. The list of data elements is divided by those often coded on outpatient data and possibly coded on outpatient data:

- Data Elements often coded on outpatient data
  - Revenue center code of 450–459 indicating ED services
  - Another charge field indicating a positive emergency department charge, if revenue center codes are not available
  - Physician's Current Procedural Terminology (CPT) procedure code of 99281–99285 indicating ED physician services reported on record.
- Data Elements possibly coded on outpatient data
  - Condition Code of P7 (NUBC preferred coding for public reporting as of July 1, 2010)
  - Point of origin of ED, value 7 (NUBC preferred coding from October 1, 2007, to June 30, 2010)
  - Admission source of ED, value 7 (NUBC preferred coding prior to October 1, 2007).

If an outpatient record has any one of the above pieces of evidence of ED services, it should be considered an ED outpatient visit record and selected out of the broader outpatient file. Add the variable EDADMIT (numeric length 3) to the data file and set the value to 0 to indicate the record is not an ED admission.

Creating an ED Input File from Extracted Records for ED Admissions and ED Outpatient Visits

After adding the data elements specified to each of the ED extracts, combine the records for ED admissions and ED outpatient visits into one ED input file. The data element EDADMIT distinguishes the two types of data with the value 1 for ED admission records and the value 0 for ED outpatient visits. Records with EDADMIT = 0 or 1 can be included in PQE rate calculations.

Another requirement for inclusion is that the hospital state and the patient's state of residence are the same. This match is indicated by the variable RESIDENT, which is 1 if the two match and 0 if they do not. Another variable, DIED_VISIT is used to restrict the set of visits to those from which the patient is discharged alive (DIED_VISIT=0), instead of dying in the ED (DIED_VISIT=1) or as an inpatient (DIED_VISIT=2).

Appendix G: Variables Needed to Track Multiple ED Visits for a Patient

One of the ED PQI indicators, Visits for Back Pain (PQE 05), requires the use of "revisit" variables that can track patients across EDs over time and identify the days between visits. As described in Appendix F, the input data to the ED PQI Beta software are "encounter-level" files, meaning that each record in the file represents one ED encounter. Thus, if the same individual visited the ED multiple times in a given year, the input file includes a separate record for each ED visit.

To identify multiple visits and calculate the number of days between them as specified for PQE 05, the software requires two data elements. These elements can be created easily, if the data set already includes a unique patient identifier and admission date:

- **visitLink** must be a numeric variable that uniquely identifies an individual. If there is already a patient identifier on the administrative database, just convert it to a numeric variable and rename it visitLink.
- **daysToEvent** is a numeric variable that identifies the date of the ED encounter. The variable can be defined as a numeric variable representing the number of days between an arbitrary starting date and a visit admission date, as long as the same starting date is used for all of the individual's visits.

The number of days between ED visits is the difference of **daysToEvent** between two selected visits for a unique **visitLink**. More information on these variables and how they can be created using HCUP data is available on the HCUP User Support Web site (http://www.hcup-us.ahrq.gov/toolssoftware/revisit/revisit.jsp).

The HCUP Web site has two Methods Series Reports specific to readmission and revisit analyses:

- Report #2012-04: *Overview of Key Readmission Measures and Methods* describes 12 key measures of hospital readmissions
- Report #2011-01: *Methodological Issues when Studying Readmissions and Revisits using Hospital Administrative Data* discusses challenges encountered when designing a readmission analysis using hospital administrative data.

Both reports are available at https://www.hcup-us.ahrq.gov/reports/methods/methods.jsp.