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1 INTRODUCTION AND OVERVIEW

MONAHRQ®—My Own Network, powered by AHRQ—is an innovative software tool from the Agency for Healthcare Research and Quality (AHRQ). AHRQ’s mission is to improve the quality, safety, efficiency, and effectiveness of health care for all Americans. To improve health care, it is clear that we must be able to measure associated quality and costs. We must also be able to effectively communicate this information to consumers, providers, payers, and other stakeholders. Local organizations can find quality reporting efforts expensive and time consuming. Fortunately, individual organizations do not need to invent their own reporting methods.

In 2010, AHRQ addressed quality reporting needs by creating MONAHRQ software. MONAHRQ is a tool that allows any organization to quickly and easily generate a fully functional local health care reporting Web site, which the local organization then hosts. A MONAHRQ-generated Web site can provide information on topics such as hospital quality; hospital utilization, rates, and costs; and potentially avoidable hospital stays. MONAHRQ software uses local hospital discharge data, other pre-calculated measure results, and measure results from the Centers for Medicare & Medicaid Services (CMS) Hospital Compare.

The MONAHRQ software is a desktop tool, not an AHRQ service. You download the MONAHRQ software, supply your own hospital inpatient discharge data, generate the Web site onto your own computers, and host the Web site yourself. The choice is yours as to how you use the MONAHRQ software—your data on your Web site.

1.1 History of the MONAHRQ Project

The MONAHRQ project was first conceived in 2008. The project was born of two popular and widely used AHRQ products: the Healthcare Cost and Utilization Project (HCUP) and the AHRQ Quality Indicators (QIs). It has also benefitted from AHRQ’s extensive work in measurement and public reporting.

Healthcare Cost and Utilization Project: HCUP is the largest all-payer database in the United States. HCUP collects voluntarily submitted all-payer hospital administrative data from 46 States and includes 97% of all hospital discharges in the country. The HCUP project uses these data to create three national datasets and to create enriched State datasets that are used by researchers around the country. Parts of the MONAHRQ-generated reporting Web site are modeled after HCUPnet, HCUP’s online aggregate data query system.

The AHRQ Quality Indicators: The AHRQ QIs are a set of standardized healthcare quality measures that can be calculated using hospital inpatient discharge data. Approximately half of the AHRQ QIs are endorsed by the National Quality Forum (NQF). AHRQ supplies technical measure specifications and software tools with which to calculate the indicators directly from data. AHRQ provides two software tools to calculate the AHRQ QIs. The AHRQ QI software for Windows provides an intuitive, easy-to-use interface for calculating quality indicator results. The AHRQ QI software for SAS utilizes SAS statistical analysis programs (SAS Institute Inc.; Cary, NC) to calculate quality indicator results.

The first three releases of the MONAHRQ software embedded the AHRQ QI software for Windows to calculate the AHRQ QIs, including risk adjustment. The MONAHRQ 4.0 release no longer embeds the AHRQ QI software for Windows. You may provide your own pre-calculated measure results, including those from the AHRQ QI software for Windows or SAS. A brief summary of the release history of the MONAHRQ software and the features provided in each release is provided in Table 1.
### Table 1. Versions of MONAHRQ Software

<table>
<thead>
<tr>
<th>Version of MONAHRQ Software</th>
<th>Features / Enhancements</th>
</tr>
</thead>
</table>
| MONAHRQ 1.0                 | Provides the ability to load your inpatient discharge data to generate a Web site that:  
                                     - Reports hospital utilization, costs, and rates  
                                     - Calculates and reports the AHRQ Inpatient Quality Indicators (IQIs), Prevention Quality Indicators (PQIs), Pediatric Quality Indicators (PDIs), and Patient Safety Indicators (PSIs) |
| MONAHRQ 2.0                 |  
                             - Provides the ability to report CMS Hospital Compare measure results  
                             - Calculates and reports additional IQI, PQI, and PSI indicators  
                             - Provides streamlined Web page design for ease of use |
| MONAHRQ 3.0                 |  
                             - Updates the version of the embedded AHRQ QI software  
                             - Updates cost-to-charge ratio data  
                             - Calculates and reports AHRQ QI composite indicators  
                             - Reports additional CMS Hospital Compare measure results for surgical patient safety, imaging, and outpatient measures  
                             - Adds new nursing-sensitive care health topic  
                             - Adds enhanced suppression logic, including support for denominator suppression  
                             - Adds support for user-defined diagnosis-related group (DRG) and Major Diagnostic Category (MDC) groupings  
                             - Adds ability to save and reload hospital information  
                             - Adds ability to save and reload customization and configuration options |
| MONAHRQ 4.0                 |  
                             - Removes the AHRQ QI analytic code  
                             - Provides support for multiple years of cost-to-charge ratio data  
                             - Reports additional CMS Hospital Compare measures  
                             - Contains redesigned host user application |
| MONAHRQ 4.0.1               |  
                             - Adds the ability to report estimated cost savings  
                             - Contains cost-to-charge ratio data  
                             - Contains updated ZIP code data  
                             - Provide support for customizable footnotes in the Hospital Utilization and County Rates paths |

### 1.2 MONAHRQ Software Reporting Options

A MONAHRQ-generated Web site provides several options or paths for reporting Hospital Quality Ratings, Maps of Avoidable Hospital Stays, Hospital Utilization, and County Rates of Hospital Use.
1.2.1 **Hospital Quality Ratings**

**Purpose:** The Hospital Quality Ratings path can include provider-level AHRQ Quality Indicators, CMS Hospital Compare measures, and Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient survey measures. There are two subpaths. The Ratings for the Public subpath provides user-friendly information for the public. The Detailed Quality Statistics subpath is more appropriate for researchers or medical professionals. For selection and display, the measures are grouped into health topics such as “Heart Failure” or “Deaths and Readmissions.”

**Selection Options:** (1) Select hospitals by name, ZIP Code, or region; (2) Select a health topic.

**Data Display:** Results graphically show quality ratings for each indicator and hospital selected. You may drill down to view the information in a bar chart. The Detailed Statistics path provides additional statistical results such as confidence intervals, and it allows you to drill down to statistics in tabular form.

1.2.2 **Maps of Avoidable Hospital Stays**

**Purpose:** The Maps of Avoidable Hospital Stays path includes area-level AHRQ Quality Indicators. Denominators are county populations from Census data. These indicators measure the quality of community care rather than hospital care. For selection, the indicators are grouped into health topics such as “Diabetes” or “Patient Safety.”

**Selection Options:** (1) Select a health topic; (2) Select a quality indicator.

**Data Display:** Rates are shown in a map of counties. You can drill down to view the rate statistics in tabular form. Optionally, you can also show estimated cost savings for reducing avoidable hospital stays.
1.2.3 **Hospital Utilization**

**Purpose:** The Hospital Utilization path shows detailed information about hospital discharges, charges, estimated costs, and length of stay.

**Selection Options:** (1) Select hospitals by name, ZIP Code, or region; (2) Select discharges for these hospitals by condition, procedure, major diagnostic category (MDC), or diagnosis-related group (DRG).

**Data Display:** The results are displayed in sortable tables by hospital and by condition or procedure, and in tables stratified by age group, sex, payer, and race/ethnicity.

1.2.4 **County Rates of Hospital Use**

**Purpose:** The County Rates of Hospital Use path shows detailed information about numbers and rates of hospital discharges, charges, and estimated costs by county.

**Selection Options:** (1) Select hospitals by name, ZIP Code, or region; (2) Select discharges for these hospitals by condition, procedure, MDC, or DRG.

**Data Display:** The results are displayed in sortable tables by county and by condition or procedure, and in tables stratified by age group, sex, and race/ethnicity. You can also view the data in county map displays.

1.3 **Overview of Using the MONAHRQ Software**

The MONAHRQ software is easy to use and provides a step-by-step process to guide you through loading your data and creating a Web site. You will generate your own health care quality reporting Web site, as described below and depicted in Figure 1 following the description.

1. Install the MONAHRQ software.
   a. Prepare your computing environment. You need:
      i. A MONAHRQ-compatible Windows® operating system
      ii. The free Microsoft® .NET 4.0 framework
      iii. Microsoft SQL Server or the free SQL Server Express.
   b. Download and run the MONAHRQ software installation package. During this process, you will create a new MONAHRQ database or connect to an existing one. See Chapter 2 for setting permissions to install the MONAHRQ software and to create or connect to the MONAHRQ database.

2. Prepare input data files that you will load into the MONAHRQ software.
   a. Decide which health care data and/or quality measures you wish to report. Chapter 3 describes the types of data and quality measures the MONAHRQ software uses in each path in a MONAHRQ-generated Web site.
   b. Prepare the files of health care data and/or quality measures that you will import into the MONAHRQ database. These may include one or more of the following:
      i. **Inpatient discharge data.** You supply these data yourself. The MONAHRQ software helps you map your inpatient discharge data into the format required by the MONAHRQ software. The format is specified in Chapter 3.
ii. **CMS Hospital Compare measures.** These measures include the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient satisfaction survey measures. You should obtain these measures from the MONAHRQ download Web site. CMS calculates the Hospital Compare measures and makes them publicly available on the Hospital Compare Web site in downloadable database files. The MONAHRQ project obtains these downloadable database files, reformats them for import into the MONAHRQ database, and posts them on the MONAHRQ download Web site. These files are formatted by the MONAHRQ project team.

iii. **AHRQ Quality Indicators (AHRQ QIs).** You must calculate the AHRQ QIs yourself, using your own inpatient discharge data. AHRQ provides two tools that you can use to calculate the AHRQ QIs: the AHRQ QI software for Windows and the AHRQ QI software for SAS. More information about the AHRQ QIs can be found at: [http://qualityindicators.ahrq.gov](http://qualityindicators.ahrq.gov). After you calculate the AHRQ QIs, follow the instructions in this guide to save the results in a format that can be loaded into the MONAHRQ software. This format is specified in Appendices E and G.

3. **Prepare your MONAHRQ configuration files (optional).**

   The MONAHRQ software provides an intuitive, easy-to-use “wizard” interface that allows you to enter data manually. The MONAHRQ software also provides support for configuration files that remove the burden of manually entering data. The formats for these files are provided in Chapter 3. These configuration files include:
   
   a. Region definitions
   b. Hospital definitions
   c. Measure and health topic description information
   d. Host user application settings and customization options.

4. **Run the MONAHRQ software and generate your Web site.**

   a. Open the MONAHRQ software.

   b. Load your prepared health care data and quality measures into the MONAHRQ database.

   c. Provide information about reporting regions and hospitals. You can provide this information using the MONAHRQ application’s user interface screens, or you can load it from prepared files as detailed in Chapter 3.

   i. The MONAHRQ software can assign reporting regions by Dartmouth Hospital Service Area or Hospital Referral Region. You can also define custom regions.

   ii. Hospital information includes name, ZIP Code, county, reporting region, cost-to-charge ratio (optional, if you wish to override the cost-to-charge ratio data included in MONAHRQ), and CMS provider ID (optional, if you use CMS Hospital Compare measures).

   d. Select customization options for display of your Web site. These include:

      i. Banner to be displayed on each Web page
      ii. Logo image to be displayed on each Web page
      iii. Color and font styles used throughout the generated Web site.

   e. Generate your Web site. The MONAHRQ software writes the Web site files to a local directory you specify.
5. Host your generated Web site.

   a. Transfer the MONAHRQ-generated Web site to your Web server or other hosting environment: compress the Web site files, transfer them, and uncompress them—preserving directory structure. To host the MONAHRQ-generated Web site, you only need a Web server. You do not need a database connection, application server, or other special hosting environment.

   b. Customize your generated Web site (optional). The MONAHRQ software allows you to customize the logos, fonts, and colors used throughout the Web site. You may wish to implement further customizations to your MONAHRQ-generated Web site. Please refer to Chapter 5 for a description of the directory structure and files in the MONAHRQ-generated Web site and information on how to customize the site after it is generated.


   As new data become available, you may wish to refresh your Web site. You may generate a new Web site with new data for each year, or you may overwrite your existing database. Some host users refresh their existing Web site quarterly as new CMS Hospital Compare measure results become available, but they generate a completely new Web site with new discharge data and quality indicator data each year. Instructions for refreshing your Web site can be found in Chapter 6.
Figure 1. MONAHRQ Application Process Flow

Step 1: Install the MONAHRQ Software

Step 2: Prepare Data and Measures

Choose One or All Types of Data and Measures:
- Inpatient Discharge Data
- CMS Hospital Compare Measures
- AHRQ Quality Indicators

Step 3: Load Data and Measures

Step 4: Provide Definitions and Settings

Choose One or All Definition and Settings Files (Optional):
- Region Definitions
- Hospital Definitions
- Measure Descriptions
- Host User Customization Settings

Step 5: Generate Your Website

Step 6: Host Your Website
1.4 Additional Information

1.4.1 Session Logs
As you load data into the MONAHRQ software and generate a Web site, the MONAHRQ application maintains status information in a session log. The information in this log will help you or the MONAHRQ technical support staff identify any errors or problems that you may have while working with the MONAHRQ software or host user application. You can save the session log by selecting the Save Session Log button near the top of the MONAHRQ host user application Main Screen.

1.4.2 Glossary
The following terms are used throughout this guide.

Measure description information: information about quality measures that MONAHRQ uses when generating Web pages.

MONAHRQ download Web site: the MONAHRQ Web site that provides software and data downloads as well as information about MONAHRQ. It can be found at http://monahrq.ahrq.gov.

MONAHRQ end user: a visitor to a Web site generated by the MONAHRQ host user application.

MONAHRQ-generated Web site: a Web site that a MONAHRQ host user generates using the host user application.

MONAHRQ host user: an organization that downloads the MONAHRQ software and uses it to generate a reporting Web site.

MONAHRQ software: the desktop MONAHRQ software that a host user downloads and uses to generated a Web site.

1.4.3 Technical Support
If you have any questions or comments as you use MONAHRQ, do not hesitate to contact MONAHRQ Technical Assistance at MONAHRQ@ahrq.gov.
2 INSTALLATION

The MONAHRQ software is easy to install. This section provides instructions for preparing your system and installing the MONAHRQ host user application. We also discuss system requirements and additional software that may need to be installed.

2.1 Preparing Your Computing Environment

Before you begin, make sure that you or the person who is installing the MONAHRQ software has administrator privileges or rights. If a system administrator downloads the software on behalf of another user, ensure that the appropriate access privileges are granted. Administrator privileges or rights are only required during the installation.

2.1.1 System Requirements

The MONAHRQ host software is supported on the following operating systems:

- Windows XP
- Windows Server 2003 or higher
- 32- and 64-bit Windows 7.

To verify the version of your operating system, right-click on the My Computer icon on your desktop. A window will appear to indicate the version you are using.

Approximate disk space requirements for the MONAHRQ software and associated components are:

- MONAHRQ host user application: 150 MB
- Microsoft .NET Framework 4.0: 50 MB
- Microsoft SQL Server Express: 600 MB (1.5 GB for 64-bit systems)
- MONAHRQ data: requirements vary depending on the number of discharges you wish to process. About 100 MB is typical, but this can extend up to 4GB.

The MONAHRQ host user application can run on most desktop computers. We recommend the following specifications for your computer:

- 2 GHz processor speed
- 2 GB of memory.

2.1.2 Required Supporting Software

The following software is required before installing the MONAHRQ host software. These can be downloaded from the Software section of the MONAHRQ download Web site (http://monahrq.ahrq.gov/monahrq_software.shtml):

- Microsoft .NET Framework, version 4.0
- Microsoft SQL Server 2005 or higher. If the Express Edition is used Microsoft SQL Server Express Edition 2008 R2 is recommended due to its larger database size limit. This software may reside on a remote server.

Before you begin installation of these tools, you should verify whether you have a 32-bit or 64-bit system. Please refer to Appendix B for instructions on verifying this information.
2.1.2.1 Microsoft .NET Installation

Microsoft .NET is a set of standard software libraries provided by Microsoft and used by the MONAHRQ software. MONAHRQ 4.0.1 requires the 4.0 version of the .NET framework. You may already have this version installed on your computer. Please refer to Appendix C for instructions on determining the version of the Microsoft .NET framework that is installed on your system and installation instructions.

2.1.2.2 Microsoft SQL Server Installation

The MONAHRQ software is a single-user desktop application that requires a Microsoft SQL Server database to store data. Microsoft SQL Server has several editions, ranging from a free edition (Microsoft SQL Server Express Edition) to the Enterprise Edition. Microsoft SQL Server can be installed on your PC or accessed over a network. Most users prefer to use the Microsoft SQL Server Express Edition installed on their PC unless local information technology (IT) policies prohibit this setup. If you have an especially large dataset, it will be more efficient to use the full Microsoft SQL Server rather than the free Microsoft SQL Server Express Edition.

If you choose to use an SQL Server database on your desktop, you may download and install the software from the MONAHRQ download Web site at: http://monahrq.ahrq.gov/monahrq_software.shtml. If you choose to use an existing SQL Server database, contact your system or database administrator for the connection host name, login, and password that will be required to connect to the database.

As you are installing SQL Server, the installer will perform a “Setup Support Rules” check to identify any additional tools or updates that may be needed. You may be asked to install additional supporting software including a Windows Installer update or Windows Power Shell. You will need to install these tools before SQL Server can be installed. You may need to restart your computer after these auxiliary applications are installed.

You can accept the default configuration settings provided by Microsoft. You must select the following options:

- **Feature Selection.** You must install the Database Engine Services; the Management Tools-Basic is optional, but it is recommended because it provides tools for viewing and manipulating your databases. The other options are not used by the MONAHRQ software.
- **Instance Configuration.** Use Named Instance; the default is “SQLExpress”
- **Server Configuration.** Under Services→ SQL Server Database Engine→ Account Name→ select name with “System.”

Once SQL Server is installed, you may test the installation to determine if you can connect to the database, if you have installed the Management Tools. Test the installation by going to Start→ All Programs→ Microsoft SQL Server 2008 R2 (or whichever version is downloaded)→ SQL Server Management Studio. The Management Studio application will start. A login window will appear as shown in Screen 2. Verify that authentication is set to Windows Authentication. Click “Connect.” The login window will disappear. You will know that you have connected if there are no error messages and the window in Screen 3 appears.
2.1.3 Permissions

Before you begin, make sure that you have the appropriate operating system and database permissions to run the software on your computer. Please refer to Appendix D for information on verifying and setting your operating system and database permissions.
2.1.4 Optional Supporting Software

The following software is not required to run the MONAHRQ host user application.

2.1.4.1 AHRQ Quality Indicators Software

The AHRQ Quality Indicator (QI) software will only be used with MONAHRQ 4.0.1 if you choose to load pre-calculated measure results for the AHRQ QIs into MONAHRQ. AHRQ provides two software tools to calculate the AHRQ QIs. The AHRQ QI software for Windows provides an intuitive, easy-to-use interface for calculating quality indicator results. The AHRQ QI software for SAS utilizes SAS to calculate quality indicator results. MONAHRQ 4.0.1 runs separately from the AHRQ QI software. Refer to the AHRQ QI Web site for software and download information: http://qualityindicators.ahrq.gov/software/default.aspx.

2.1.4.2 Area QI Cost Calculators

To report the estimated cost savings for potentially avoidable hospital stays, AHRQ has developed the Area QI Cost Calculator for Windows and SAS. The Area QI Cost Calculators provide the estimated cost savings calculations which are displayed in the Maps of Avoidable Hospital Stays path of a MONAHRQ-generated Web site. The Area QI Cost Calculators affect only the area-level measures. Instructions for installing and running the Area QI Cost Calculators can be found in Appendix F for the Windows version and Appendix H for the SAS version.

2.1.4.3 SAS Formatting Utilities for the AHRQ Quality Indicators

If you will be loading pre-calculated measure results using the AHRQ QI software for SAS, you will need to use additional formatting utilities. You will only need to use these SAS formatting utilities for the AHRQ QIs if you will be loading the AHRQ QIs into MONAHRQ 4.0.1 using the AHRQ QI software for SAS. The utilities reformat the QI results into a format that can be imported into the MONAHRQ software. These utilities run separately from MONAHRQ 4.0.1. You can access and download these utilities from the MONAHRQ download Web site (http://monahrq.ahrq.gov/monahrq_resources.shtml). Instructions for installing and running the utilities are provided in Appendix G.

2.2 Uninstalling Previous MONAHRQ Software

If you have MONAHRQ software that is version 2.0.4 or later, you do not need to uninstall your earlier version of the MONAHRQ software. If you have previously installed version 4.0, or have an existing installation of the MONAHRQ software before version 2.0.4, you must uninstall it before installing version 4.0.1.

To uninstall a previous version of MONAHRQ software:

1. From the Windows start menu, select the Control Panel menu option.
2. Select the Add or Remove Programs menu option.
3. In the list of applications that appears, select MONAHRQ.
4. Select the Remove button.
5. Close out of the window when the removal process is complete.

2.3 Installing MONAHRQ Software

To install MONAHRQ software, run the installation package downloaded from the MONAHRQ download Web site (http://monahrq.ahrq.gov/monahrq_software.shtml). When you run the installation file, an Install Wizard will appear. You may choose to install the MONAHRQ software for "Just Me" or "Everyone." You may use either selection depending on whether you wish other users who access this computer to run the MONAHRQ software. The install package will prompt you to specify the directory in which you would like the MONAHRQ software installed. The default installation directory is C:\Program Files\AHRQ\MONAHRQv4\. Progress meters keep you informed on the progress of the setup process. A window will appear to indicate that the installation has completed successfully.
3 PREPARING STANDARD DATA FILES

The MONAHQ software allows you to load hospital inpatient discharge data, Centers for Medicare & Medicaid Services (CMS) Hospital Compare measures, and AHRQ Quality Indicator (QI) measures. This section will provide information on which data and measures are needed for each reporting path as well as information on preparing the data and measures to be loaded into the MONAHQ database. Finally, we discuss several optional files that provide configuration information.

3.1 MONAHQ Software Data and Measures

3.1.1 Reporting Paths and Their Associated Data and Measures

The MONAHQ software provides several reporting paths. Each path requires different data. You only need to load data for the paths you wish to report. Table 2 lists the components and their required data.

<table>
<thead>
<tr>
<th>MONAHQ Path</th>
<th>Data and Measures</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Quality Ratings</td>
<td>Provider-level AHRQ Quality Indicators</td>
<td>AHRQ QI software</td>
</tr>
<tr>
<td></td>
<td>CMS Hospital Compare measures</td>
<td>MONAHQ download Web site</td>
</tr>
<tr>
<td>Maps of Avoidable Hospital Stays</td>
<td>Area-level AHRQ Quality Indicators</td>
<td>AHRQ QI software</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area QI Cost Calculator</td>
</tr>
<tr>
<td>Hospital Utilization</td>
<td>Inpatient discharge data</td>
<td>Your organization</td>
</tr>
<tr>
<td>County Rates of Hospital Use</td>
<td>Inpatient discharge data</td>
<td>Your organization</td>
</tr>
</tbody>
</table>

3.1.2 Data and Measures

MONAHQ allows you to import data and measures from several sources, including inpatient discharge data, CMS Hospital Compare measures, and the AHRQ QIs.

3.1.3 Inpatient Discharge Data

MONAHQ uses inpatient discharge data that provide demographics on the patient and the provider, diagnosis codes, procedure codes, and information about the admission, payer(s), and discharge. These data are used to populate the Hospital Utilization and County Rates of Hospital Use. The software is designed for processing one calendar year of data at a time. The software will walk you through a very simple, “point and click” process for mapping your data elements and value codes.

The software accepts three common formats for your local inpatient discharge data:

- Text (comma-separated values [CSV])
- Microsoft Access database
- Microsoft Excel spreadsheet.

Two key formatting issues are:

- Each row of data represents a separate discharge record.
- Each column of data represents a single variable for all discharges.
CSV files use commas to separate the data values. If you have commas within any data values (for example, "Private, incl. HMO"), you will need to insert double quotes around each data element. An exception is the variable “Total Charge.” Many data elements in inpatient discharge data have leading zeros; if you are working from Excel, we recommend that all appropriate fields or cells be formatted as text to ensure full conversion of the data.

Input data have specific meaning according to the coding conventions in your organization. The data need to be mapped to the specific meaning used by the MONAHRQ software. The data elements in MONAHRQ are based on the coding specifications used in the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), which are similar but not identical to the Uniform Bill (UB-92/04). MONAHRQ’s Crosswalk Screen provides the opportunity to map your variable values to the values used in the software. Present on Admission is the only variable with values that are automatically mapped. Please review Table 12 (located in Appendix J) to ensure that your data are coded correctly. You may prepare your dataset in advance by using names and codes that match those in the MONAHRQ software so that the software will automatically recognize data element names and value codes.

The MONAHRQ software is designed to recognize HCUP-formatted data. If you are using these data, most data elements and data values will be mapped for you. HCUP-formatted data are not a requirement of the software. If you would like to further prepare your data, refer to Table 12. If your data elements use the same names and coding values as shown in Table 12, the process of identifying and mapping data elements will be faster. Table 12 also identifies which data elements are required and what happens if an optional element is missing.

When you prepare your data, it is not necessary to create “dummy variables” or to fill in missing values. Your input file may contain extra data that are not required; you do not need to remove extra variables. Any variables that are not used will not be imported with your data.

3.1.4 Measures

3.1.4.1 CMS Hospital Compare Measures
MONAHRQ supports reporting capabilities using the CMS Hospital Compare database. CMS currently reports these data on the Hospital Compare Web site (http://www.hospitalcompare.hhs.gov/) and makes them publicly available. The CMS Hospital Compare measures provide information on performance ratings for hospitals giving care to patients in the United States.

Recent copies of the CMS Hospital Compare database that are formatted to be compatible with the MONAHRQ software are available for download on the MONAHRQ download Web site (http://www.monahrq.ahrq.gov/monahrq_data.shtml). It is important to use the version posted on the MONAHRQ download Web site because we have made structural alterations to ensure that the data will work with the software.

The CMS Hospital Compare measures report on topics such as heart attack, heart failure, pneumonia, surgical care, and imaging. If you would like to learn more about the CMS Hospital Compare measures, visit the Hospital Compare Web site at http://www.hospitalcompare.hhs.gov/.

3.1.4.2 AHRQ Quality Indicators
The AHRQ QIs use hospital inpatient discharge data to highlight potential quality concerns, identify areas that need further study and investigation, and track changes over time. The AHRQ QIs are comprised of the Inpatient Quality Indicators (IQIs), Prevention Quality Indicators (PQIs), Pediatric Quality Indicators (PDIs), and Patient Safety Indicators (PSIs). Prior to version 4.0, MONAHRQ embedded a version of the AHRQ QI software. With version 4.0, you must calculate the measure results externally and import the results into the MONAHRQ software. More information about the AHRQ QIs, including technical
specifications and analytic methods, can be found in on the Web site: http://www.qualityindicators.ahrq.gov/.

AHRQ provides Windows and SAS versions of the AHRQ QI software. Reports generated from the AHRQ QI software for Windows can be loaded directly into the MONAHRQ software. Reports generated from the AHRQ QI software for SAS require additional formatting for use with MONAHRQ software.

Information and instructions for preparing data using the AHRQ QI software for Windows can be found in Appendix E.

Information and instructions for preparing data using the AHRQ QI software for SAS can be found in Appendix G.

After the data are prepared, they are ready to be loaded into the MONAHRQ database. Information and instructions for loading the AHRQ QIs into MONAHRQ can be found in Chapter 4.

3.2 Other Files

The MONAHRQ software provides an intuitive interface for loading data and generating a Web site. You may, however, configure several aspects of the MONAHRQ-generated Web site through the use of external files. These include measure description information, health topics and subtopics used in the Hospital Quality path, the mapping of topics to measures, and host user preferences. These files are described below.

3.2.1 Description Information for Measures and Health Topics

The MONAHRQ software provides measure description information for describing the AHRQ QIs. By default, the MONAHRQ software provides this information based on version 4.4 of the AHRQ QIs. Any database you create using this measure description information will be marked as version 4.4. You can verify the version of the measure definition information on the Program Options screen when you select to “View All Options and Settings.” In addition, the Database Manager will also log this information when a database is created or overwritten.

You may use alternate versions of the measure description information based on the version of the AHRQ QI software you use to generate your pre-calculated measure results. Measure description information for alternate versions of the AHRQ QIs can be found on the MONAHRQ Download site at: http://monahrq.ahrq.gov/monahrq_resources.shtml. To install the measure description information, download and save the installation package. When you run the installation package, you will be prompted for an installation directory. You must specify the root directory where the MONAHRQ software is installed. The files will automatically be placed in the appropriate subdirectory. Please note that the previous files will be overwritten.

Measure description information is stored in tables in the MONAHRQ database. The information is delivered in tab-delimited files that are loaded when a database is created. These files have a .DAT extension and are stored in the “BaseData” folder beneath the MONAHRQ installation folder. The file names of the tab-delimited files match the table names described in the following section. You may alter the data either before they are loaded into a database or in the database tables directly. Editing the tab-delimited files can be difficult, because the columns are not clearly delineated. SQL Server Management Studio provides a spread-sheet style interface for editing the values in each column of the table containing the metadata. Clicking the top-left corner of the table editor will highlight all data and allow them to be copied and pasted into Notepad. There, they can be saved to the tab-delimited file used by the MONAHRQ software to create new databases.
Description information for the measures is stored in the Web_Measures table. Each row contains the complete description of a single measure. Contents are loaded from a tab-delimited file (web_measures.DAT). The columns in the Web_Measures table are shown in Table 3.

Table 3. Measure Description Information File Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Unique code for the measure</td>
</tr>
<tr>
<td>MeasureType</td>
<td>Measure type defines what data apply to the measure</td>
</tr>
<tr>
<td>Source</td>
<td>Supplier of the measure (e.g., AHRQ, CMS)</td>
</tr>
<tr>
<td>ClinicalTitle</td>
<td>Clinical title of the measure as published</td>
</tr>
<tr>
<td>WebName</td>
<td>Friendly label for the measure used on Web pages</td>
</tr>
<tr>
<td>Desc</td>
<td>Brief description of the measure</td>
</tr>
<tr>
<td>Method</td>
<td>Text shown as “Additional Information” about a measure</td>
</tr>
<tr>
<td>Footnote</td>
<td>Indicates if a prescribed footnote applies to the measure</td>
</tr>
<tr>
<td>Rate_Label</td>
<td>Overriding label to use for special measures</td>
</tr>
<tr>
<td>NQF_Endorsed</td>
<td>Indicates measure is National Quality Forum (NQF) endorsed [Y/N]</td>
</tr>
<tr>
<td>NQF_ID</td>
<td>NQF endorsement number</td>
</tr>
<tr>
<td>BetterHighLow</td>
<td>Indicates whether higher [H] or lower [L] rates are desirable or if the</td>
</tr>
<tr>
<td></td>
<td>measure (e.g., volume measures) is not rated [N]</td>
</tr>
<tr>
<td>RA_Method</td>
<td>Risk Adjustment Method [no, yes, comp, obsv, mcmc, surv]</td>
</tr>
<tr>
<td>Scale_By</td>
<td>Indicates the scale of the denominator rate (e.g., 10,000)</td>
</tr>
<tr>
<td>Scale_Target</td>
<td>“People” or “Discharges”</td>
</tr>
<tr>
<td>Nat_Benchmark</td>
<td>National Rate (risk-adjusted, where applicable) that is used for “National</td>
</tr>
<tr>
<td></td>
<td>Rating”</td>
</tr>
<tr>
<td>Numerator</td>
<td>Numerator of National Rate</td>
</tr>
<tr>
<td>Denominator</td>
<td>Denominator of National Rate</td>
</tr>
<tr>
<td>Obsv_Rate</td>
<td>Observed National Rate</td>
</tr>
<tr>
<td>Peer_Benchmark</td>
<td>Input File Mean Rate used for “Peer Rating”</td>
</tr>
<tr>
<td>Imported</td>
<td>Yes/No flag indicating that data have been imported</td>
</tr>
</tbody>
</table>

The columns that may be edited are: WebName, Desc, and Method. The other columns should be correct as delivered with the MONAHRQ software and should not be changed.

Health Topics and Subtopics definitions used in the Quality paths are stored in the Web_Topics table (see Table 4). Major topics are coded with a single capital letter; subtopics have a letter + number combination, where the prefix letter indicates the parent topic. This supports the two-level categorization technique used in Provider Quality Pages. To support the single-level category groupings of the Avoidable Hospital Stays maps, a special singular topic code of “MAPS” will be used. There are currently seven map categories that are treated as subtopics: Chronic Lung Conditions, Diabetes, Heart Conditions, Other Conditions, Composites, Patient Safety, and Procedure Rates. The table has a
sequence field so that topics and subtopics can be reordered at will, which is an option that some people may wish to use. These data are loaded from a tab-delimited file (web_topics.DAT).

Table 4. Health Topics and Subtopics Description File Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Unique code (UI) for the topic (single letter) or subtopic (letter plus number separated by a period).</td>
</tr>
<tr>
<td>Name</td>
<td>Short name displayed on the MONAHRQ-generated Web pages</td>
</tr>
<tr>
<td>Title</td>
<td>Full label for the topic shown when it is selected</td>
</tr>
<tr>
<td>Method</td>
<td>Text shown as &quot;Additional Information&quot; about a topic. Must be in HTML format.</td>
</tr>
<tr>
<td>Footnote</td>
<td>Indicates if a prescribed footnote applies to the topic</td>
</tr>
<tr>
<td>Seq</td>
<td>Sequence order in which topic or subtopic is shown</td>
</tr>
<tr>
<td>Selected</td>
<td>Indicates that a host user wants this topic or subtopic</td>
</tr>
</tbody>
</table>

Topic or subtopic names and titles can be edited in this table. New topics may be added by choosing a letter that is not currently in use and then creating subtopics for that new topic. This scheme allows for 26 top-level topics and 10 subtopics within each topic. The presentation layout of a MONAHRQ-generated Web site is designed to fit these parameters. More topics or subtopics will not present well in the style that a MONAHRQ-generated Web site currently uses.

3.2.1.1 Assigning Measures to Subtopics
Assigning specific measures to these subtopics is accomplished with a mapping table named Web_Topic_Measures. Measures must be assigned to subtopics and not to top-level health topics. A measure may appear in more than one subtopic. A special Topic-Code of "MAPS" is used to support the measures of the Avoidable Hospital Stays Maps. Area-based measures can be assigned to the MAPS subtopics. The columns are listed in Table 5.

Table 5. Mapping of Quality Measures to Topics and Subtopics, Description File Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_Code</td>
<td>Code for the subtopic</td>
</tr>
<tr>
<td>M_Code</td>
<td>Code of the measure</td>
</tr>
<tr>
<td>Sequence</td>
<td>Sequence order of the measure in subtopic display</td>
</tr>
<tr>
<td>Selected</td>
<td>Indicates that the measure is selected for Web page display</td>
</tr>
</tbody>
</table>

Display of a quality measure within a subtopic can be removed by deleting the row in this table that lists that measure within the given subtopic. A quality measure can be moved from one subtopic to another by simply editing the T_Code (subtopic code) to be the desired subtopic. Quality measures can be added to a subtopic by creating a new row in this table. The contents of this table drive the MONAHRQ software screen for selecting which measures should be reported on the Web pages. The “Selected” field is set by the MONAHRQ software, although it may also be set when editing this table.
3.2.2 Region Information File
The MONAHRQ software supports searching and reporting data at the regional level. You may define your regions within the user interface or through a file-based format.

There are four fields on each line of the CSV file (see Table 6). It is assumed that the file contains a header row. The titles within the header row are ignored but provided for readability; the order of the fields within the file must be maintained. The first field must be a number that is the Region ID. The next field is the title of the region and must be enclosed in double quotes if commas appear in this field. The third field is the two-letter State code. The fourth field must be a Y (yes) or N (no) to indicate if the region is selected for reporting.

Table 6. Region Information File Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGION_ID</td>
<td>Numeric region identifier</td>
<td>Required field</td>
</tr>
<tr>
<td>REGION_NAME</td>
<td>Region name</td>
<td>Required field</td>
</tr>
<tr>
<td>STATE</td>
<td>Two-letter State identifier</td>
<td>Required field</td>
</tr>
<tr>
<td>ACTIVE</td>
<td>Flag to indicate whether this region should be reported</td>
<td>One of two values, Y or N</td>
</tr>
</tbody>
</table>

A sample regions file is included below.

```
RegionID,RegionName,State,Active
1,NorthEast,MD,Y
2,Central,MD,Y
3,South,MD,Y
4,NorthWest,MD,Y
5,Mid-Central,MD,Y
```

3.2.3 Hospital Information File
The MONAHRQ software provides the ability to customize how hospital information is displayed. It allows you to associate regions with hospitals for reporting purposes (see Table 7).

You may load hospital data from a previously created external file or a file that was previously exported from the MONAHRQ software. The file maps the hospital identifier in the data to hospital demographic data. It is assumed that the file contains a header row. The titles within the header row are ignored; the order of the fields within the file must be maintained. The format for the external file is a CSV file that lists the Hospital ID, Federal Information Processing Standards (FIPS) county code, hospital name, ZIP Code, cost-to-charge ratio (if desired), region (if desired), and CMS provider ID (if desired). If the hospital names contain commas, the names must be enclosed in double quotes. The Dartmouth Atlas Hospital Service Areas (HSAs) will automatically assign county names and regions. If you have provided your own regions, the region ID for your defined regions must map to a region ID that you provided when defining them.
### Table 7. Hospital Information File Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOSPITAL_ID</td>
<td>Hospital identifier</td>
<td>Required field</td>
</tr>
<tr>
<td>FIPS</td>
<td>FIPS State-county code</td>
<td>Not required, but must contain a value. The MONAHRQ software will determine the correct county and region from the Dartmouth Atlas HSAs.</td>
</tr>
<tr>
<td>HOSPITAL_NAME</td>
<td>Hospital name for display</td>
<td>Required field. The name can be masked using the Mask Hospital Names button.</td>
</tr>
<tr>
<td>ZIP</td>
<td>ZIP Code</td>
<td>Required field</td>
</tr>
<tr>
<td>CCR</td>
<td>Cost-to-charge ratio</td>
<td>Not required, but field must be present</td>
</tr>
<tr>
<td>REGION</td>
<td>Region identifier</td>
<td>The region identifier specified in the Define Regions step executed previously</td>
</tr>
<tr>
<td>CMS_PROVIDER</td>
<td>CMS Provider ID</td>
<td>Not required, but field must be present</td>
</tr>
</tbody>
</table>

A sample hospital file is included below.

```
DSHOSPID,FIPS,Name,ZIP,CCR,REGION,CMS_Provdr_Num
123477,24005,Facility 46,21201,0.8,3,210001
123475,24005,Facility 34,21133,0.8,3,210002
123494,24003,Facility 2,21401,0.8,4,210003
123464,24033,Facility 36,20785,1,1,210004
123456,24017,Facility 10,20646,1,1,210005
123504,24045,Facility 21,21804,1,5,210006
```

3.2.4 Host User Configuration

The MONAHRQ software allows you to save all of your configuration options in a database and load them into a new database. These configuration options include items such as the header title of the Web site and customized colors. This feature allows your settings to be brought forward from one version of the MONAHRQ software to the next, or within the same version from one database to the next. The `save` operation should be performed from a MONAHRQ database that has been run to completion, meaning that data have been loaded and a Web site has been generated. You will find the `Save Configuration Options to File` button on the Program Options screen as pictured in Screen 4.
Screen 4. Program Options

You will be prompted for the name and location of the Configuration File. It will be saved as a comma separated values (CSV) file. This file can then be loaded into another MONAHRQ database regardless of the version. These settings can be loaded from the Program Options screen for an existing database using the Load Configuration Options from File button, as seen on the previous screen shot. They can also be loaded when a database is being created from the Database Manager screen.
4  LOADING DATA AND GENERATING A WEB SITE

With your data and measures prepared, you are ready to load data into the MONAHRQ database and generate your Web site. This section will walk you through the process of creating the MONAHRQ database, loading data, and generating the Web site. Screen shots of the software with helpful hints and background information are provided.

4.1 Create a Database

The first time you run the MONAHRQ software, you will see the main screen with a special left-side panel with the title Initial Setup that guides you through the process of creating your first database. Once you complete this step (described below), the left-side panel will contain the Task Menu (Screen 7), which gives you access to all of the MONAHRQ software features. On the initial MONAHRQ software main screen (Screen 5), you may select View Session Log before launching the Database Manager or choosing an item on the regular Task Menu. This log will help you or MONAHRQ technical support identify any errors or problems that you may have while creating the Web site. Please note that you must return to the main screen to see the log.

Before loading data into the MONAHRQ database and building a Web site, you must create a database. Select Database Manager to begin creation of a database.

Screen 5. MONAHRQ Main Screen
The Database Manager (Screen 6) will appear.

**Screen 6. Database Manager**

If you are using the free SQL Server Express edition installed locally on your computer, the server name and authentication is prefilled for you (Screen 6, fields labeled 1 and 2). You will only need to enter your desired database name or accept the default of MONAHRQ. If you are using an advanced edition of SQL Server installed on a remote computer, you will need to alter the server name (field 1), change the Authentication Type (field 2) to SQL Server, and enter a username and password. Your system or database administrator can provide this information to you.

You may choose to have the MONAHRQ software create an auxiliary database to store calculations for the Hospital Utilization and County Rates of Hospital Use paths. Use this option if you feel that using a single database for all operations will exceed the maximum size of your database. SQL Express 2008 R2 has a 10GB limit, which should handle most datasets. SQL Express 2005 has a 2GB limit, which is easily exceeded with a modest sized dataset. Advanced SQL Server editions have no size limit.

If you have saved a Configuration File from a previous run of the MONAHRQ software (either version 3 or 4) and would like to load those configurations into your new database (screen label 3), use the Browse button to locate and select your Configuration File.

You must create a new database the first time you use the 4.0 version of the MONAHRQ software. When upgrading to a new version of MONAHRQ, you must also create a new database. The MONAHRQ 4.0.1 database uses different data structures than prior versions of the database.
Once you have provided the database information, select **Create or Overwrite** (screen label 4) to create the database. (Select “Yes” when prompted if you want to create or overwrite the database.) Status messages will appear in the box on the right of the screen as the steps to create the database are accomplished. When the process has finished, select **Done** to return to the main screen.

If you think that you might want to alter a MONAHRQ Web site at a later time, we suggest that you use a different database name each time you create a new SQL database. For example, if you would like to create a MONAHRQ Web site for 2009 and another Web site for 2010, you would create distinct SQL databases (e.g., MONAHRQ_2009 and MONAHRQ_2010). To alter a previously generated Web site, you will type in the name of the database and select **Switch Connection** and then **Done**.

### 4.2 Load Inpatient Discharge Data

This section will walk you step-by-step through the process of loading and analyzing your local inpatient discharge dataset. Local inpatient discharge data populates the Hospital Utilization and County Rates of Hospital Use paths of a MONAHRQ-generated Web site. Choose **Import Discharge Data** from the **Task Menu** to launch this multi-screen wizard.

![Screen 7. Task Menu](image)
Screen 8. Import Data Wizard

The Welcome screen explains the Import Data process; select **Begin** to continue.
Step 1: Select Input File Screen

Select the Browse button to locate the discharge data file to be loaded. Once you have found the appropriate file, check an option in the Import Data File Options (Specific to File Type) box:

- If applicable, check First row contains column headings.
- If you are unsure of data format, check Values are enclosed in quotes.

Select a file that contains one calendar year of inpatient discharge data. The MONAHRQ software only allows one calendar year of data to be analyzed at a time. If you have fiscal data that span two calendar years and would like to include all records in your analysis, you will need to manipulate the values in the source data for the variable Year before loading the data. You may alter the fiscal data to reflect either the later or former calendar year (e.g., 2006–2007 fiscal-year data would need to be coded as either 2006 or 2007).

Please note that the MONAHRQ software can only load data with fewer than 200 variables. Any data beyond column 200 in the input file will be ignored.

The types of file formats accepted by the MONAHRQ software are: CSV, XLSX or XLS (Excel), and ACCDB or MDB (MS Access). Users have experienced difficulty using Excel files because of the way Excel handles character fields and leading zeroes; we recommend you confirm that the Excel file has maintained the original data values before loading the file into the MONAHRQ database.
Next, select an option in the **Data Mapping and Crosswalk box:**

- If this is the first time you are loading the data (i.e., you do not have a previously created data mapping file from the AHRQ Quality Indicators software for Windows or from the MONAHRQ software, select **Data Layout Unknown**.
- You may use a data mapping file created by the AHRQ Quality Indicators software for Windows or the MONAHRQ software. If you previously loaded your data and created a data mapping file in MONAHRQ, select **Browse** to locate the .qim mapping file.
  - If you are using a .qim file, you can check **Skip data validation and mapping screens**.

Once you have completed this page, select **Next**. You can return to the previous page by using the Back button, which appears on the bottom of this page and subsequent pages.

**Step 2: Check File Readability Screen**

The MONAHRQ software will check to ensure that the data are legible and each row has the same number of columns. On the Check File Readability screen, verify the file selection shown. If correct, select the **Start** button. You may select **Stop** to terminate the process (the Start button will change to “Stop” once the checking process begins).

When the check is complete, the **Status** message will read **Finished**.

Select **Next** to continue.
Step 3: Data Mapping Screen

Once the data have been loaded, you will be asked to map your dataset to the MONAHRQ software variable names. MONAHRQ’s Data Mapping Screen provides the opportunity to map your data elements to the data elements used in the software. Although a sample of your dataset is provided on the screen, it is useful to either know your element names or have access to your data dictionary.

Data elements in your discharge data that have the same name as MONAHRQ software data elements will automatically be mapped for you. Variable names used in the MONAHRQ software are the same as those that appear in the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID). To map variables, drag and drop the variables from the MONAHRQ Variables column to the correct position in the Maps to MONAHRQ Variable column that corresponds to the Input Variable column containing your data elements (moving right to left between the columns). The MONAHRQ software requires the following in order to calculate rates and utilization data: Age, Sex, Discharge Year, Discharge Quarter, and Principal Diagnosis. All of these variables must be linked to an input file variable. The MONAHRQ software will not run without all required variables. If a variable is mapped incorrectly, simply drag the mapped variable to the correct position in the Maps to MONAHRQ Variable column or drag it back to the MONAHRQ Variable column on the right side of the screen.

All other fields are optional. The optional fields are not required, but as many variables as possible should be mapped to optimize the output. The MONAHRQ software has been programmed to “automatically guess” some of the mapping options, so it is important that you check these to ensure that they are correct.
MONAHRQ software provides the ability to import your own major diagnostic category (MDC) and diagnosis-related group (DRG) assignments. The next screen provides more information about this feature.

Please refer to Table 12 and Table 13: Present-on-Admission Coding for a complete listing of variable names, descriptions, and coding. Note that Present on Admission (POA) is automatically mapped by MONAHRQ.

**Step 3, continued: Data Mapping Screen Showing MDC and DRG Import Assignments**

The MONAHRQ software embeds an MDC-DRG grouper produced by Innovative Resources for Payors (IRP). The MONAHRQ software makes it optional to use this embedded grouper; you can now choose to load your own MDC-DRG assignments.

To override MONAHRQ’s embedded MDC-DRG grouper, include your own MDC-DRG assignments in the inpatient discharge data file that is to be loaded into MONAHRQ. If you have chosen to load your own MDC-DRG assignments, scroll to the bottom of the **Input File Variables** section and map these MDC-DRG values to MONAHRQ variables named “DRG Import” and “MDC Import.” Please note that when using your own MDC-DRG assignments, no error checking will be performed. Records with missing or incorrect MDC and DRG information will not be processed.

Once you have finished mapping elements, select **Next**.
On the Mapping Summary screen, it is important to focus on the number of unmapped required variables. **Unmapped Required MONAHRQ Variables** should have a value of zero. If this number is greater than zero, it indicates that there was a data load error or you did not crosswalk all of the required variables. In this case, examine your input file to determine if the required variables were mapped correctly and the input file format matches the mapping you specified.

Once the Unmapped Required MONAHRQ Variables number is at zero and the number of variables in the input file matches the number of input variables mapped to MONAHRQ variables, you may select **Save Report** to create an .rtf file of information on the screen.

**Note that the POA value mappings are provided on this screen.**

Select **Next** to continue.
Step 5: Check Data for Errors Screen

To check for errors within the mapped dataset, select the **Start** button on the Check Data for Errors screen. You may select **Stop** to terminate the process (the Start button will change to Stop once the checking process begins).

When the check is complete, **Status** changes to **Finished**. If there are errors, status messages will appear on the screen. Additional details are provided in the session log. Examine the error messages in the session log to determine the cause of the error. When the error in the input file has been identified and rectified, load the file again.

Select **Next** to continue.
Step 6: Data Errors Report Screen

The Data Errors Report will show the number of records affected by data errors. If a data error occurs in a required field and affects a large percentage of records, the Web pages generated may be incomplete.

Some errors may be acceptable. For example, if the Total Charges element in the input file is not a numeric value (i.e., left blank, or "none"), the software treats the variable as missing. For other elements, the acceptability of an error is based on host user discretion, such as if the error only affects a small number of records or if it occurs in a variable that is not required for the analysis. Finally, some errors may require research and/or manipulation of the input data file. If you manipulate the input data file, you will need to start the data load from the beginning.

Below are four common errors and guidelines for checking them:

- **Required Field Empty: Record will not be loaded (highlighted in red).**
  Verify that the count (indicated in the Records Affected column) is a small percentage of your discharges. If the error affects a large number of records, make sure that the variable mapping was correct (use the Back button to return to the Data Mapping screen).

- **Diagnosis Codes/Procedure Codes: Invalid value. Valid codes must be at least 3 characters (highlighted in green).**
  Verify that the count (indicated in the Records Affected column) is a small percentage of your discharges and investigate the input data values. For example, how are missing values identified?
• **Birth Weight Grams: Value less than 200.**
  Value will be changed to “Missing” and/or “Value Greater Than 7,000.”

• **Age in Days: Age is greater than zero.**
  Age in Days only applies for Age less than 1 year. If the value is greater than 365 days, it will be changed to “Missing.”

To correct errors, use the **Back** button to return to the Data Mapping screen to review and correct the mapping of MONAHRQ variables to input file variables. Once the results are to your satisfaction, select **Save Report** if you would like to create an .rtf file of information on the screen.

Select **Next** to continue.

**Step 7: Crosswalk Values Screen**

Once the data elements are loaded, the values for each element need to be identified. The MONAHRQ software makes some assumptions about the meaning of the variable values. Use your own data documentation to verify the assumed values. We recommend that each input value be reviewed to ensure that the correct value meaning was assigned to your data.

If your data are formatted in the HCUP standard or you have altered the data according to Table 12, the software will crosswalk values and meanings for you. You should still review the values and meanings for accuracy.
Please note that Present on Admission is automatically mapped by MONAHRQ. Refer to Table 12 for detailed coding information.

Once all variables have been coded, continue by selecting **Next**.

**Step 8: Loading Discharge Data Screen**

To begin loading your inpatient discharge data, select the **Start** button. You may select **Stop** to terminate the process (the Start button changes to Stop once the load process begins).

Depending on the number of records, the data load process may take a long time. When the loading process is complete, the **Status** changes to **Finished**.

Select **Next** to continue.
Step 9: Data Load Summary Screen

Once your data have finished loading, you will be taken to a Data Load Summary page. Warning messages are shown in red and green font to indicate inconsistencies with the loaded data that may affect the quality indicator calculations. You may adjust any inconsistencies in your raw data file and reload the data.

In addition, the number of records with Required field empty—Rows not loaded should be a small number. If there are substantial amounts of missing data for any given variable (or combination of variables), the overall number of discharges will decrease accordingly. For analyses with small populations, the results may be statistically unreliable.

Select Save Report to create an .rtf file of the Data Load Summary information.

Select Next to continue.
Step 10: Data Load Completed Screen

After you have reviewed the data load summary, you will be taken to a Data Load Complete page. On this page, you may save your data mapping and crosswalk information. You will be prompted to provide a file name and may choose where you want to save the file. If you have other data files that have the same variable names and same structure, you can load this mapping file to save time.

Select Done to return to the Task Menu Screen.
4.3 Load CMS Hospital Compare Measures

This section will walk you step-by-step through the process of loading the CMS Hospital Compare measures (Screen 10). These measures populate the Hospital Quality Ratings path of a MONAHRQ-generated Web site. To load the CMS Hospital Compare dataset, select Hospital Compare Data on the left menu bar. Please note that you will need to use a CMS Hospital Compare database file provided on the MONAHRQ download Web site. Alterations were made to the CMS Hospital Compare database so that it loads properly in the MONAHRQ software (http://monahrq.ahrq.gov/monahrq_data.shtml).

Screen 9. Hospital Compare Data Option in Task Menu

Screen 10. Hospital Compare Data
Use the **Browse** button to locate the CMS Hospital Compare file to be loaded. Select the State(s) on which you wish to report from the Select State(s) menu. Select **Load Data**; the message “DONE with load process, now preparing CMS Data” will appear at the bottom of the Status Messages box when the process is completed (Screen 10).

If you would like to reload data, select **Clear Existing Data**. Previously imported measure data will be cleared from the database.

Once you have completed the data load, select **Done**. You will return to the Task Menu screen.

### 4.4 Load the AHRQ Quality Indicators

This section will walk you step-by-step through the process of loading measure results exported from the AHRQ Quality Indicators (QI) software. The AHRQ QIs populate two paths of a MONAHRQ-generated Web site: the Hospital Quality Ratings path and the Maps of Avoidable Hospital Stays path. If you wish to activate the **Cost Savings** feature of the Summary Tables in the Maps of Avoidable Hospital Stays path you must download and use the Cost Estimator tool from the MONAHRQ download web site. Select **Import AHRQ QI Data** from the Task Menu to open the screen for this task.

**Screen 11. Import AHRQ QI Data Option in Task Menu**
Screen 12. Import AHRQ QI Data

Select the Browse button to locate the AHRQ QI measure results files to be loaded. Once you have found the appropriate file, select the Load Data button to load it. You can load one file at a time; a status message will be displayed after each file has been successfully loaded. The status message will denote the number of records loaded into the MONAHRQ database. Note that the AHRQ QI software gives the provider, composite, and area measure data in three separate files. If you would like to reload your measure data, select Clear Existing Data to remove existing measure data from the database.

Once you have completed the data load, select Done. You will return to the Task Menu screen.

4.5 Define Regions and Hospitals

The MONAHRQ software provides the ability to select quality measure data, hospital utilization, and county rates of hospital use at a regional level. To enable this feature, you need to define these region groupings and the hospitals contained within them. This section provides step-by-step instructions for defining your regions and hospitals. If you have loaded only area-level AHRQ QIs, you do not need to define regions and hospitals—you may proceed to Web site generation and generate a Web site with county-based data only. The process for defining hospitals will vary slightly based on the types of data you have loaded. If you load CMS Hospital Compare measures as well as provider-level AHRQ QIs, and/or inpatient discharge data, you need to link the two hospital lists by mapping your discharge hospitals to the appropriate CMS Provider ID. To start, select Define Regions & Hospitals from the Task Menu.
Screen 13. Define Regions & Hospitals Option in Task Menu

Screen 14. Define Regions and Hospitals Wizard

The first screen of this wizard is the same no matter what types of data you loaded. It explains the steps you will go through, and it notifies you about what types of data were loaded under Data Load Status. It also asks you to specify the reporting year of your data. If you have imported inpatient discharge data, it will be able to determine this year and provide you with a default; you may override it. Once you have made this selection, press the Begin button to continue to the next screen, Edit Regions, which is also consistent regardless of what data types were loaded.
4.5.1 **Define Regions for Hospital Groupings**

Screen 15. Define Regions for Hospital Groupings

Users may define regions by Dartmouth Atlas Hospital Service Area (HSA), Dartmouth Atlas Hospital Referral Region (HRR), a single region, or custom regions (see Screen 16). You may manually identify the custom regions or load custom regions from a CSV file. Begin by selecting a State from the **Choose Your State** dropdown box. Then, select the button indicating how you would like to group hospitals into regions.

If you would like to learn more about Dartmouth Atlas HRRs or HSAs, visit [http://www.dartmouthatlas.org/](http://www.dartmouthatlas.org/).

If you would like to manually define regions, type the name into the **Region Name** field and select **Add Named Region**. Repeat this process until all regions have been added. If you would like to remove a region after adding it, select the region and select the left arrow. If you chose **Load Regions from File**, refer to the following instructions. When the regions definition is complete, select **Next** to continue.
**Loading Regions From File**

The **Load Regions from File** button will open the following dialog-box:

**Screen 16. Load Regions Table**

![Load Regions Table Dialog Box]

**Load Regions Table**

Use the browse feature to locate the regions file. This file must be a comma separated text file (.csv). (Example: c:\data\regions.csv)

- [ ] Clear existing regions before loading file.

**File Format**

Regions must be on separate lines with region ID, region title, 2-letter state code, and active flag (Y/N) on each line. The title field must be enclosed in double quotes if it can contain commas. All fields must be present.

**Example**

```
0, Unknown, XX, N
1, North, MN, Y
2, South, MN, Y
```

Use the **Browse** button to select the CSV file that contains your saved region definitions. Additional information on the format of the Region Information file can be found in Chapter 3 under the section *Region Information File*. Use the **Load File** button to have the MONAHRQ software open the file and read in your region definitions. You will be notified of any errors. Click **Close** when you are finished and you will return to the Edit Regions screen. The regions from your file will appear on screen in the Selected Regions box.
4.5.2 Provide Hospital Information

The process for defining hospitals varies by the type of data loaded. If you have loaded inpatient discharge data and/or provider-level AHRQ QIs in addition to CMS Hospital Compare measures, you will encounter three screens: (1) Edit Discharge Hospital Information, (2) Link Local Inpatient Discharge and Hospital Compare Hospitals, and (3) Edit CMS Hospital Names and Assign Regions. If you have loaded only provider-level AHRQ QIs and/or inpatient discharge data, you will only see the Edit Discharge Hospital Information screen. If you have loaded only CMS Hospital Compare measures, you will only see the Edit CMS Hospital Names and Assign Regions screen.

In all cases, the final screen will be the Edit and Select Hospitals for Reporting screen.

Edit Inpatient Discharge Hospitals / Quality Indicators Hospitals (optional)

Imported inpatient discharge data and AHRQ QIs are grouped together because it is presumed that they cover the same hospitals and have the same hospital identifiers. If you loaded either type of data, the hospital identifiers were picked up during the import process and will be loaded into Screen 17. You will not see this screen if you have only loaded CMS Hospital Compare measures.

Screen 17. Edit Discharge Hospital Information

If you chose Dartmouth HSAs or HRRs, the hospital will already be assigned to a region; however, you may reassign it to a different region. If you choose to load custom regions (manually or with a file), you may use the Region dropdown box to assign each hospital to a region. The County Name and Region...
dropdown boxes are prefilled; all you need to do is select your mapping choice. You may also edit the hospital Name and ZIP Code.

To load the hospitals from a file, select the Load from File button at the bottom of the screen; it will open the following dialog-box:

**Screen 18. Load Hospital Table**

This screen provides host users the opportunity to apply demographics to each hospital in the data, such as hospital names, counties, ZIP Codes, cost-to-charge ratios, CMS provider ID, or regions. Information must be in a CSV-formatted file. Please see the section Hospital Information File in Chapter 3 for more information about the hospital input file. Select the Browse button to locate the hospital file to be loaded.

Select options on how to load the file. We recommend always checking the Overwrite existing hospital table entries box. Overwriting is important if you are loading a hospital table for a different dataset where the hospitals may be different.

If you prefer to only include hospitals with discharges, choose Cleanup hospital table. If you would like to use all hospitals in your dataset, do not select this option.
Once this step is complete, select Load File. You will get a message listing the number of records loaded. Then, choose Close to return to the previous screen, where data will be loaded automatically (as displayed in Screen 19).

**Screen 19. Edit Discharge Hospital Information**

![Screen 19. Edit Discharge Hospital Information](image)

You may edit the hospital name, ZIP Code, cost-to-charge ratios, and CMS provider ID. We recommend that you review the county and region assignment for accuracy.

You may assign a CMS provider ID manually. Once the CMS provider ID is given, select the Assign Cost to Charge Ratio button. We strongly suggest that you review the assigned cost-to-charge ratios and make any appropriate adjustments; these ratios do not limit the range of acceptable values. A ratio of zero (0) will be treated as missing on the Web site. Charges will be displayed in the Hospital Utilization path, but costs will be displayed as a dash. Alternatively, you may assign custom cost-to-charge ratios either manually or by using the option to load from a hospital file. In the Web Site Wizard, you will select to display costs or charges as available in the Web pages.

If you would like to randomly assign a masked hospital name (shown in the Name column), select Mask Hospital Names; this option will reassign all hospitals to a blinded or masked name in the form of Hospital 1, Hospital 2, etc. If you would like to unmask the name, select Unmask Hospital Names (which will appear once you have chosen to mask). Select Display Hospital List for a crosswalk of the original hospital names and the masked hospital names.
You may also save this information to your Hospital Information File by selecting **Export This Data.** This file can be used to load hospitals should you wish to generate a new reporting Web site. Once you have finished altering this page, select **Next** to continue.

**Link Local Inpatient Discharge and Hospital Compare Hospitals (optional)**

If you have loaded local inpatient discharge data and/or provider-level AHRQ QIs in addition to CMS Hospital Compare measures, you will be asked to link the hospitals by following the steps below. You will not see this screen unless you have loaded both types of provider-level quality data.

**Screen 20. Link Local Inpatient Discharge and Hospital Compare Hospitals**

This screen allows you to manually link your local inpatient discharge hospitals with available CMS Hospital Compare measure data. The available CMS Hospital Compare data are based on your State selections.

The hospitals in the “Unlinked Local Inpatient Discharge Hospital” list are those that did not link based on CMS Provider ID. Review the hospitals provided in the “CMS Hospital Compare Data” box to find any that could link. You may sort the columns for easy viewing. When you have found the correct hospital in the CMS data, either copy and paste (double click the field first) the CMS Provider ID into your local inpatient discharge data, or manually enter the number. If there are no hospitals or providers that need to be linked, the list will be empty. Select **Link and Refresh List** to save your changes.
Once you have finished altering this page, select **Next** to continue.

**Edit CMS Hospital Names and Assign Regions (optional)**

During the CMS Hospital Compare Data load, the CMS names for hospitals were read from the input data. This step allows you to edit the name and region assignments of those hospitals. **You will not see this screen unless you have loaded CMS Hospital Compare measures.**

Screen 21. Edit CMS Hospital Names and Assign Regions

The screen provides a listing of the hospitals found in the CMS Hospital Compare dataset based on your State and region selections. You may edit hospital names in this screen. Verify that the hospitals were assigned to the correct region.

Once you have finished altering this page, select **Next**.
Screen 22. Edit and Select Hospitals for Reporting

The Edit and Select Hospitals for Reporting screen allows you to select which hospitals you would like to report in your Web site. You will only see one list of hospitals if you loaded only one type of provider-level quality data (AHRQ QIs or CMS Hospital Compare). If you load both sources, you will see the three lists that are pictured in Screen 22. You may edit hospital names on this screen by double-clicking in the appropriate box on the screen. Check the Report Hospital box if you want the hospital to appear in the reports.

When you are finished, select Done. You will return to the Task Menu screen.

4.6 Generate a Web Site

Now that you have loaded your data and defined your regions and hospitals, you can generate your Web site. This section provides step-by-step instructions for building and customizing your MONAHRQ-generated Web site. The Web site options will vary slightly by the type of data loaded; these differences are noted. Choose the Generate Website item in the Task Menu to open the Generate Website screen.
Screen 23. MONAHRQ Main Screen with Generate Website Task Highlighted
Screen 24. Generate Web Pages

The Generate Website screen will be used to generate all of the Web pages that constitute a MONAHRQ-generated Web site. They can be made all at once or in portions. This capability allows you to regenerate portions of the Web site, as needed. You must complete the mandatory information about your Web site in the Set Options section of this screen before you can generate Web pages to a target folder. You must also enter the location of the Target Folder where the Web site will be created.
4.6.1 Set Options

The Set Options portion of the screen provides several options for the display of the generated Web pages.

If you would like to suppress small discharge cell sizes or hospital display thresholds, you may enter a threshold number for the numerator and/or denominator. Please refer to Appendix A for detailed information on suppression settings and rules. You must enter values in both of these fields; enter zeros if you would like to disable this feature.

You can set the height and width of the area maps or change the font size of the text by specifying values in the Map Font Size section of the screen. This will allow county numbers to appear legible on maps for States with very small counties.

Select ZIP Code Radii. You may select any number of values in the list for ZIP Code radii used to search hospitals in the hospital-level paths.

Enter the name you would like to appear in the browser in the Browser Title section. Then, enter the name you would like to appear in the banner across the top of your Web page in the Name in Site Header.

Next, select the Browse button to choose a picture of a logo for your page. The program will use the default setting for Logo Image and Image Size–Height. The page can be customized by changing these settings. You may upload any image (png, jpg, bmp, or gif) and designate the desired size.

You may wish to enlarge the size of the maps if you have counties that are geographically small. Files that are not compatible will not show in the banner/header.

You must enter a phrase to describe the year of data analyzed by MONAHRQ software in the field Timeframe Description (e.g., in 2006, from June 2006 to May 2007). This phrase will appear throughout the generated Web site. Enter a phrase in the Area Description to describe your State or region for reporting (e.g., in My State). This phrase will appear throughout the generated Web site.

4.6.2 Generate Web Pages

The Generate Web Pages portion of the screen allows you to specify a folder on your computer that will hold the generated Web site and then create the Web pages. You may also customize the look and feel of your MONAHRQ-generated Web site and select what content to include.

To begin, select the Browse button to locate a folder in which to store the Web pages as they are produced. We highly recommend creating a new folder in which to store the generated Web pages, as opposed to the Windows Desktop. A large number of Web pages will be created, so writing many files to a remote network folder would greatly slow the process. The best way to put a MONAHRQ-generated Web site in a network folder is to generate the Web pages in a local folder and then compress them into a zip-file that can be moved to the network server and extracted there.

Choose the pages you wish to generate by selecting the appropriate check boxes. If data have not been loaded for a particular set of pages, the check box will be disabled. Hospital Utilization and County Rates of Hospital Use pages require inpatient discharge data. Hospital Quality pages require AHRQ Quality Indicator (provider-level) or CMS Hospital Compare measures. Maps of Avoidable Stays pages require area-level data from the AHRQ QIs.
Customizing the Appearance and Content of the Web Site

There are three buttons in the Generate Pages section of this screen that allow you to access screens that change the appearance and content of the Web site: (1) Customize Colors and Fonts, (2) Select Provider Measures, and (3) Select Area Measures. These three actions are described in the following section.

Screen 25. Generate Pages

<table>
<thead>
<tr>
<th>Generate Pages</th>
<th>TargetFolder:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menu Pages. Images and Styles</td>
<td>Customize Colors and Fonts</td>
</tr>
<tr>
<td>Quality Indicators Pages</td>
<td>Select Provider Measures</td>
</tr>
<tr>
<td>Maps of Avoidable Stays</td>
<td>Select Area Measures</td>
</tr>
</tbody>
</table>
Use Screen 26 if you want to change the font and color settings for your generated Web pages. The buttons that allow you to change the color of either background, foreground (text), or borders will open the standard Microsoft Windows Color Selection dialog-box. The on-screen samples will show the effects of your changes. The MONAHRQ software provides basic customization for colors, fonts, and other stylistic aspects of the Web site. Chapter 5 provides additional information on customizing a MONAHRQ-generated Web site. These changes will only take effect if you make them before generating your Web site.
Screen 27. Select Provider Measures by Health Topic

The Select Provider Measures Screen (Screen 27) provides the ability to select the measures that will be reported on the Hospital Quality pages. If you have not loaded data from the AHRQ QIs or CMS Hospital Compare, this option will be disabled.

This screen lists all provider-level quality measures in individual tabs by topic and subtopic. These groupings are used in the MONAHRQ-generated Web site. The available measures will vary by the type of data loaded. If you loaded only CMS Hospital Compare measures, then only CMS Hospital Compare measures will appear. If you loaded only AHRQ QIs, then only AHRQ QIs will appear. The topics and subtopics and the measures associated with each can be customized. Please read the section titled, “3.2.1.1 Assigning Measures to Subtopics.”

All of the measures for each topic are preselected. Remove the check from the box for measures that you do not wish to show on your MONAHRQ Web site.

All measures endorsed by the National Quality Forum (NQF) are marked (*). This information is correct at the time of release. For the most current information, please visit the National Quality Forum Web site at http://www.qualityforum.org/Home.aspx. To learn more about the AHRQ QIs, visit http://www.qualityindicators.ahrq.gov/. To learn more about the CMS Hospital Compare measures, visit http://www.hospitalcompare.hhs.gov.
Screen 28. Select Area Measures by Category

The **Select Area Measures Screen** provides the ability to select area-level measures for reporting on the Maps of Avoidable Stays pages. If you have not loaded area-level data from the AHRQ QIs, this option will be disabled.

All area-level quality measures are listed by topic in tabs. These groupings are used in the MONAHRQ-generated Web site. The topics and the measures associated with each can be customized. Please read the subsection titled **Assigning Measures to Subtopics** in Chapter 3.

All of the measures for each topic are preselected. Remove the check from the box for measures that you **do not** wish to show on your MONAHRQ Web site.
Screen 29: Generate Pages—County Rates of Hospital Use and Hospital Utilization Options

If you wish to generate the County Rates of Hospital Use path, select the **County Rates Pages** box. You may select the per population denominator in the County Rates pages as 1,000, 10,000, or 100,000. It may be more appropriate to use larger denominators for larger datasets.

If you wish to generate the Hospital Utilization path, select the **Utilization Pages** box. You may opt to display charges and/or costs in the generated pages. If you choose to display costs, you must provide valid cost-to-charge ratios when defining hospitals. You may choose to compute the medians by checking the **Compute Medians** box. If this option is not selected, means will be provided. Note that the median computing process may increase processing time by 50 percent.

Once you have specified how and where your page should be created, select **Create Pages**. This process may take a considerable amount of time, depending on the size of the dataset and the page sets you have chosen. You can monitor your status in the Progress Status box. When completed, the progress status of **All Pages Written** will appear.

Select **Show Site** to view the Web site in your default browser. You may review pages at any time by opening the **index.html** page in the directory where you saved the created Web pages. If you are using Microsoft Internet Explorer, you will need to allow it to display blocked content. A description of the paths and pages generated can be found in Appendix I.

If you would like to customize the Web site further, please review customization options in the next chapter. The next chapter will also provide information on the Web site architecture that enables you to perform customizations.

Your MONAHRQ-generated Web site has now been created and can be hosted on any HTTP-compliant Web server. Please refer to Chapter 5 for more information on how to configure your Web site.
5 UNDERSTANDING YOUR MONAHRQ-GENERATED WEB SITE

Many host users may want a more customized MONAHRQ Web site than is possible using the basic functions included in MONAHRQ software. This section details the architecture of the MONAHRQ-generated Web site and provides a few helpful hints for organizations that want to customize their Web site. It should be noted that the fonts and colors of the MONAHRQ-generated Web site can easily be changed within the MONAHRQ software, as detailed in the previous chapter.

5.1 Introduction to the MONAHRQ Web Site Architecture

There are two basic types of pages: navigation and content. The navigation pages allow the Web site user to visit the different paths that lead to the different types of content pages. The navigation pages start with the home page (index.html), which provides links to the pages for the four main paths. The navigation pages are created from templates that contain the static text and images of the pages, as well as tags for dynamic elements. The pages are converted into the final navigation pages by replacing the tags for the dynamic elements of the pages with the appropriate element. The content pages do not use templates, because they contain mostly tables of data and few images and static text. However, the content pages do rely on common JavaScript components that display the header and footer of the content pages, thus allowing customization of all content pages by editing just a couple of files.

MONAHRQ version 2.0 introduced the use of the jQuery-UI public domain JavaScript libraries to achieve more advanced page functionality and layout. The jQuery core libraries are also used in many of the scripts that handle page actions. Because the MONAHRQ software does not require a Web server and the pages are very dynamic, Javascript is often used to control page formatting.

The following folders are found under the Web Site Root: css, img, js, qual, and util. There is also a set of files with extensions .html. The .html files are the navigation pages. The building blocks for both content and navigation pages are in the css, img and js folders. All content pages live in the content folders qual and util. All content HTML pages are stored three folder-levels down from the Web Site Root, so that they can all use a common path up to the Web site root to access the Cascading Style Sheet (CSS) and JavaScript files. Content is divided into two main categories: quality (qual) and utilization/rates (util); each of these categories is further divided into more levels.

You should also become familiar with the SiteTemplate folder under the MONAHRQ program installation folder C:\Program Files\AHRQ\MONAHRQv4 (on 64-bit systems it will be ...\Program Files (x86)...). It contains the templates used to generate the navigation pages as well as master copies of the CSS and JavaScript files used to create a MONAHRQ-generated Web site. If you edit the HTML in your generated Web site’s target folder and you use the MONAHRQ software to regenerate Web pages, you may accidentally overwrite those files. Thus, it is better to make the customizations in the templates of your MONAHRQ program installation (in the SiteTemplate folder) and not directly in your generated Web site.

5.1.1 Folder Structure of the Web Site

Web site Root = the target folder from the MONAHRQ Web site Wizard

- **Navigation** = other static high-level Web pages (created from templates)
- **css** = folder for Cascading Style Sheets used on the site
- **img** = folder for graphics used on the site
- **js** = folder for JavaScript source files used on the site
- **qual** = high-level folder for quality content pages
  - **cls** = mid-level folder for Hospital Quality classification tables and charts
  - **pro** = content pages for professionals
• pub = content pages for the public
• chart = content page data for charts
  ○ det = mid-level folder for quality detail pages
  ○ reg = content pages by region
  ○ PHC = mid-level folder for Avoidable Hospital Stays Maps
• maps = content pages with map images
• util = high-level folder for utilization and rates content pages
  ○ rav = mid-level folder for rates and volumes pages
    ▪ agg = content-level folder for aggregate detail pages
    ▪ cnty = content-level folder for county detail pages
    ▪ cnty* = content-level folders for county by ZIP Code detail pages
  ○ std = mid-level folder for standard utilization pages
    ▪ agg = content-level folder for aggregate detail pages
    ▪ hosp* = content-level folders for hospital detail pages
    ▪ reg* = content-level folders for regional detail pages

It is important for all content pages to exist at a consistent folder depth so that they have homogeneous callouts to the building blocks. Editing the content pages should never be necessary. The following is a list of the major navigation and static pages:

• index.html – the home page for the Web site with links to main paths
• Quality.html – the navigation page of the Quality path
• AvoidableStays.html – the navigation page of the Maps of Avoidable Stays path
• RatesMaps.html – the navigation page of the Rates of Conditions path
• Utilization.html – the navigation page of the Utilization path
• Definitions.html – the common definitions page referenced by other pages
• AboutHospitalQuality.html – a page with an overview of the complete Web site
• Methods.html – a page explaining methodology used to produce the Web site
• Methodology.html – a page explaining each of the Quality Measures
• SiteMap.html – a page showing the architecture of the Web site
• Charts.html – a driver page that displays bar charts from JavaScript data
  1
• ChartsText.html – a driver page that displays tabular charts from JavaScript data.

5.1.2 Navigation and Content Page Structure

The building blocks for a MONAHRQ Web site are Cascading Style Sheets, JavaScript files, and a folder of images. All pages, whether navigation or content pages, use these building blocks. For navigation pages, the building blocks are called out from within their templates; for content pages, the callouts to the building blocks are created as the page is written.

The img folder

This folder contains the large images that appear through the Web site, such as a copy of the user-selected logo image—the main menu images for the four basic paths. These images are referenced directly in the HTML pages.

5.1.2.1 The css folder

This folder contains Cascading Style Sheets used to apply style to your Web pages. It also has an images subfolder that contains images called out only in CSS styles. There is also a ui-lightness...

1 The bar charts and their text-rendered version (text charts are tables) are stored as data arrays in Javascript files and displayed as content pages by a heavily programmed driver page. These are the only content page types that are handled in this fashion.
subfolder that contains an images subfolder; the latter subfolder contains the images that are only used in the styling of jQuery-UI components. You should not need to make any changes in this subfolder.

5.1.2.2 The js folder
This folder contains the JavaScript source files that are used by the Web pages. There are only a few files that you may need to modify. Most of them implement logic that drives the dynamic features of the Web pages, but some are used strictly to inject common headers and footers into your Web pages—these are the ones that you may want to edit.

The control.css file is used to make MONAHRQ data paths invisible if the host user does not generate those pages. It holds the styles for the home page and menu links that cause them to display:none if the path is not generated. There is one entry in the control.css for each hidden path. The CSS style below shows how this is done. Each link to one of the data paths is given one of four classes, and any of these style classes can be set so that they do not display. Completely removing the style for class will allow it to appear on the Web pages.

```
.Qpath { display:none }
.Apath { display:none }
.Upath { display:none }
.Rpath { display:none }
```

The basic.css file holds the styles applied to both navigation and content pages. For navigation pages, it has parts that are overridden with elements in the fluid.css style sheets—depending on the choices made within the Website Wizard. The fluid.css is only created if the host user selects the Fluid style. The content.css file holds the styling for content pages and is created from a template of the same name. The jquery-ui.css file has styles for the jQuery-UI components used in various places throughout the Web site.

5.2 Customizing the Site
The Firebug Tool
The FireFox browser has a plug-in tool called FireBug. It allows you to point at any element on a Web page, right-click, and inspect that element. It displays the HTML markup behind the Web page in one pane and shows the CSS styles that apply in another pane. It tells you the exact lines that apply in all CSS files. It is an excellent way to find which CSS needs to be modified in order to customize page elements.

5.2.1 Modifying the Common Web Page Headers and Footers
To customize the headers and footers on the pages in your Web site, you will need to make changes in the following files. Make the changes in the SiteTemplate folder before generating a Web site. The navigation pages get their header and footer sections from HTML snippets that are processed to undergo tag replacement. They are then injected into the navigation pages when they are extruded to the target folder. These snippet files are not copied to the target folder; however, the JavaScript files used by content pages are copied there. These files are:

- SiteTemplate\Site_Header.html – partial html content injected at the top of navigation pages
- SiteTemplate\Site_Footer.html – partial html content injected at bottom of navigation pages
- SiteTemplate\js\header.js – JavaScript file included in all content pages to create the header
- SiteTemplate\js\footer.js – JavaScript file included in all content pages to create the footer.
You may want to test changes in the actual Web site and then move the changes to the templates. This allows you to see the results before generating a Web site. Be careful to make a copy of the changed file before regenerating it, so that you can trouble shoot anything that does not match after regenerating.

**Changing Font and Colors in a MONAHRQ-Generated Web Site**

You can change the color scheme of the generated Web site without editing the Cascading Style Sheets by hand from the Customize Colors and Fonts screen (pictured below). This screen contains options for changing the font and colors of basic components of the Web pages including the header, menu bar, buttons, and tabs. Samples are shown on the screen, but a preview of an actual Web page is very useful and will be discussed.

**Screen 30. Web Site Customization Options**

A screen shot of a sample navigation page in a MONAHRQ-generated Web site (Screen 30) explains where these options apply. Content pages follow basically the same rules.
Page Text on Page Background is exemplified by the title “Hospital Utilization” and the “Select to Open Report in New Browser Window/Tab” text.

Header Text on the Header Background is exemplified by the title “Sample MONAHRQ-generated Website” on the green background.

Footer Text on the Footer Background is exemplified by the text “2008 Data in My State” in the lower right-hand portion of the page. The MONAHRQ logo and version number are also in the footer.

The Section Title Text on the Section Title Background is exemplified by the title “Choose Hospitals” in the section box on the left and by the title “Choose Condition or Procedures” in the section box on the right. The section is inside the borders of these boxes.

Section Text on the Section Background is exemplified by the label “Search” in the section box on the right. The tan color is the background. Note that the header titles of a section are the same color as the Section Title Background; in this case, the color is medium-brown.

The buttons and tab colors are located inside the section. In the “Choose Hospitals” section box on the left, the first tab “By Hospital” is selected and gets the background color of the section. The second and fourth tabs are not selected and not being hovered over by the cursor (unseen in this screenshot). The
third tab “By Region” has the cursor over it and gets the hover color of a tab or button. Buttons share the same color as an unselected tab and get the same hover color. Because a button launches an action, it can never remain in the “selected” state. Therefore, buttons are always either the button/tab background color or hover color. The border and text colors are the same for buttons and tabs. For tabs, the color includes the border around the complete tab panel as well as the border around the tabs.

Header menus are the most complex components to customize. The text color is always the same color, but the background of the top-level menu bar items changes based on one of three conditions: inactive, active, and hover. When a menu item is selected and that navigation page is displayed, it turns the active color (in this case, medium-brown). Menu items that are not selected have a light tan background. When the user hovers over a menu item, the item becomes the hover background color. This color is not shown in this screen shot, but it would be a light brown that is darker than the light-tan inactive color and the medium-brown active color. The border color must be chosen to contrast from both the Header Background color and the Page Background color, because it touches both sections of the Web page. Likewise, the text color must stand out against all three of the top-level background colors as well as the submenu background color. Not all top-level menu bar items have submenus. The sample Header Menu Bar on the host user screen will display all of the colors so that they can be visualized before Web pages are created.

5.3 Hosting the Site

The MONAHRQ software generates a Web site consisting of a set of static Web pages and places the pages in the directory that you specified during Web site generation. The Web site can be hosted using any Web server such as Apache or Internet Information Server (IIS) and does not require an application server. The MONAHRQ software relies on client-side Cascading Style Sheets and JavaScript for its dynamic features. Although the MONAHRQ software requires a database to generate the Web site, it does not require a database to host the Web site.

To deploy your MONAHRQ-generated site, you can compress (or zip) the directory containing the generated Web site and copy it to the Web server. Be sure to maintain the directory structure as you compress and uncompress the files. Your system administrator can uncompress (or unzip) the file into the appropriate location on the Web server. Your system administrator can also provide the appropriate configuration files for the Web server that is being used to host the Web site. The configuration files needed are specific to the Web server used.

The size of a MONAHRQ-generated Web site varies based on the amount of data you have imported.

5.4 Security Issues

We have tested MONAHRQ-generated Web sites using Veracode software to ensure that there are no security vulnerabilities such as Cross Site Scripting. Because a MONAHRQ-generated Web site consists of static Web pages and does not interact with a database, the risk of security vulnerabilities such as SQL Injection is low to non-existent. A large part of security of the hosted Web site is related to the configuration and management of the hosting environment.

A MONAHRQ-generated Web site presents data only at an aggregate level, either by hospital or by county. Inpatient discharge data is used to generate static Web pages for the Web site but is not retained as part of the site itself. Hosting the Web site requires only the generated Web pages, not the inpatient discharge data used to create it. The deployed MONAHRQ-generated website does not connect to any backend database. In particular, the Web site does not connect to the MONAHRQ database into which your data and measures were loaded. To ensure that patient-level data cannot be compromised, we strongly recommend that the server used to host the Web site does not contain any patient-level data.
Maintaining confidential or sensitive data on a server or system separate from the Web server eliminates the possibility that patient-level information can be accessed should the Web server experience a security breach.

If you would like to restrict access to the Web site to only a specific group of people, you must use a Web server that has this capability. The Apache Web server has the ability to force users to login with a username and provide a password when a Web visitor attempts to access Web pages below a given folder of a Web site. Early versions of Microsoft IIS will only protect ASPX pages (dynamic application Web pages), but their most recent versions will also allow securing of static pages.

5.5 Accessibility Issues

MONAHRQ-generated Web sites have been tested for compliance with Section 508 of the Rehabilitation Act, indicating compliance with Federal Government standards for users with disabilities. Automated testing was performed using IBM Rational Policy Tester® Accessibility Edition. Testing for accessibility using a screen reader was performed using JAWS for Windows screen reading software. We have tested to ensure that MONAHRQ-generated Web sites meet Federal requirements for accessibility. Local accessibility requirements may differ. To support these requirements, we provide the ability to customize the generated Web site. We have worked with organizations to understand and respond to their specific local accessibility requirements. In some cases, we incorporated such changes into the MONAHRQ software. Should you have specific accessibility requirements, please contact us at monahrq@ahrq.gov.
6 UPDATING MONAHRQ SOFTWARE AND THE MONAHRQ-GENERATED WEB SITE

This section describes the process for upgrading MONAHRQ and refreshing your data and generated Web sites.

6.1 Upgrading the MONAHRQ Software

Beginning with MONAHRQ version 2.0.4, you do not need to uninstall older versions of MONAHRQ before installing a more recent version. If you have previously installed version 4.0, or have a version of MONAHRQ prior to version 2.0.4 on your computer, you need to uninstall it before installing version 4.0.1.

If you are upgrading to a maintenance release of MONAHRQ of the same version, you will also need to uninstall the existing MONAHRQ installation before installing a new installation. For help with the uninstallation process, please refer to Section 2.2 in Chapter 2.

6.1.1 Migrating Your MONAHRQ Database

When refreshing data in the MONAHRQ database, you may overwrite your existing MONAHRQ database.

When upgrading to a new version of the MONAHRQ software, you must create a new database. MONAHRQ 4.0.1 uses different data structures than prior versions.

6.1.2 Migrating Your Stored Preferences

MONAHRQ provides the ability to store your preferences and configuration information in a file. Please see the Program Options and Database Manager sections for more information on this feature.

6.2 Refreshing Your MONAHRQ Web Site

6.2.1 Refreshing the Quality Measures in Your MONAHRQ Web Site

The AHRQ Quality Indicators (QIs) and Centers for Medicare & Medicaid Services (CMS) Hospital Compare measures must be updated at the same time. Both import screens contain a Clear Data button that will delete all quality measures while leaving your inpatient discharge data intact. If you only want to update one of the two sources of quality measures, you must reload the existing data for the other source.

6.2.2 Refreshing Hospital Compare Measures and AHRQ QIs in Your MONAHRQ Web Site

Updated data from CMS Hospital Compare is available on a quarterly basis. You may wish to update your Web site as new data become available. There may also be updated AHRQ Quality Indicators. To update your MONAHRQ Web site, perform the following steps:

1. Obtain the latest Hospital Compare database from the MONAHRQ Web site at monahrq.ahrq.gov/monahrq_data.shtml. Please note that you cannot use the data supplied directly from the CMS Web site. The Hospital Compare database provided on the MONAHRQ Web site has been reformatted for use with MONAHRQ. If you are only updating AHRQ QIs, you will need to reload your previously loaded Hospital Compare database.

2. Run the Load Hospital Compare Data process in the host user application as directed in the section of this document titled, Load CMS Hospital Compare Measures. Be sure to select the Clear Data button before loading the new measures.

3. Load your updated AHRQ QIs. You will need to reload your original AHRQ QIs from the original files if you do not have updated AHRQ QI measure results.
4. If you have added new hospitals, you must also run the Define Regions and Hospitals wizard. See the section of this document titled, Defining Regions and Hospitals.

5. Regenerate the Quality pages of your Web site by following the instructions in the section of this document titled, Generate Website. The Generate Website screen maintains your previously selected options. You should not modify any previously selected measures unless you no longer wish to provide them on your Web site. The target folder for the updated pages should remain the same. You only need to select the checkboxes for Menu Pages, Images and Styles, Hospital Quality Pages, and Maps of Avoidable Stays. The other paths will not be affected by updates to the quality measure data. Select the Create Pages button, and all of the Quality pages for your Web site will be overwritten. Pages for the other paths will remain the same.

6.2.3 Refreshing the Inpatient Discharge Data in Your MONAHRQ-Generated Web Site

The inpatient discharge data can be reloaded into an existing MONAHRQ database by simply rerunning the Import Discharge Data wizard. Select the comma-separated value (CSV) that contains the updated data, and run through the process of loading the data. All previous inpatient discharge data are deleted before the new data are loaded. Once the reload is complete, you will need to use the Generate Website screen to recreate the Hospital Utilization and County Rates pages.
APPENDIX A. DATA SUPPRESSION IN MONAHRQ

Suppression refers to how the software handles small numbers of records available for computing rates. A simple rate is comprised of a numerator divided by a denominator. MONAHRQ offers flexibility in customizing suppression related to the denominator and numerator of a rate.

Denominator suppression is generally used to ensure a sufficient number of cases for reliability. Rating a provider on a small number of cases may not be accurate. Numerator suppression is generally used to protect privacy.

MONAHRQ provides the ability to suppress values based on a denominator threshold, a numerator threshold, or both. Denominator-based suppression takes precedence over numerator-based suppression.

The suppression logic for MONAHRQ is as follows:

1. If the denominator is below the specified denominator threshold, denominator-based suppression applies. The denominator value is displayed, but all other values (numerators and rates) are suppressed.

2. If the numerator is below the specified numerator threshold AND denominator-based suppression does not apply, numerator-based suppression applies. Rates are displayed but the numerator and denominator values are suppressed.

3. For measures that do not have a denominator, only numerator-based suppression applies.

At the option of the user, MONAHRQ also supports margin suppression as an additional numerator-related rule. Margin refers to how close the numerator is to the denominator. Margin suppression is triggered when the difference between the denominator and the numerator is below the numerator suppression threshold. For example, assume that the numerator suppression threshold is set at five. If the numerator equals 96 and the denominator equals 100, margin suppression applies.
APPENDIX B. DETERMINING YOUR SYSTEM TYPE

To determine if you have a 32-bit or 64-bit system, select My Computer from the Start Menu and select Properties. A pop-up box displaying your version of Windows will appear. If it does not say 64 bit, then your system is 32 bit. Screen 32 is an example of the Properties dialog box for a system that uses the 32-bit version.

Screen 32. Properties Dialog Box for 32-Bit Version
APPENDIX C. MICROSOFT.NET INSTALLATION

Check that the Microsoft.NET 4.0 Framework is installed on your personal computer (PC). Open the Windows Control Panel and use the Add or Remove Programs utility to get a list of software programs installed on your PC. You can access the Control Panel from the Windows Start Button via the “Settings” option. Scroll down the alphabetical list of programs until you reach Microsoft programs. Screen 33 shows .NET Framework with a service pack. There may be several entries for the Microsoft.NET Framework. For the MONAHRQ software to work properly, you will need the 4.0 version.

Screen 33: Net Framework with Service Pack

If you do not have the Microsoft .NET 4.0 Framework installed, then download the installation package from the MONAHRQ Web site (under Software, located in the left bar on the home page). Note that the same installation package works for 32-bit and 64-bit systems. Select and save the version and then run the file. Your computer will need to be restarted after installing the .NET framework.

The Microsoft .NET Framework can be downloaded from the MONAHRQ Web site (http://monahrq.ahrq.gov/monahrq_software.shtml) or the Microsoft Web site.
APPENDIX D. MONAHRQ SOFTWARE PERMISSIONS GUIDE

It is important to make sure you have full permissions to run the MONAHRQ software. The following instructions explain how to ensure that you have set the appropriate permissions in your Windows operating system and your Microsoft SQL Server instance. This process often requires you to work closely with administrator or technical personnel in your organization.

Setting Permissions in the Windows Operating System

Certain permissions must be granted to the user who will be running the MONAHRQ software. These permissions apply only to those files and directions utilized by the MONAHRQ software.

Please follow the instructions below to set your operating system permissions for proper operation.

Step 1: Find the Installation Directory

A standard MONAHRQ software installation places the software in the directory “C:\Program Files\AHRQ\MONAHRQv4\”. If an alternative installation directory location was used, you will need to modify permissions for that directory. For the following instructions, you would need to substitute the name of your alternative installation directory where the name “MONAHRQv4” appears.

Step 2: Open the Security Tab

Right click on the MONAHRQ directory to open the context menu (Screen 34).

Screen 34. Context Menu

Select Properties.

You will see a new popup window titled, MONAHRQ Properties (Screen 35).
Select the **Security** tab.

Click the **Advanced** button.

**Note:** If the security tab is not present, you will need to contact your information technology (IT) administrator for further assistance.

**Step 3 – Provide the Proper Permissions**

You will see a new popup window titled, **Advanced Security Settings for MONAHRQ** (Screen 36).

**Screen 36. Security Settings Popup Window**

Select the **Permissions** tab.

Find the entry that lists your user name in the “Permission entries” window.
Single click to highlight the entry.

Click the Edit button.

You will see a new popup window titled, Permission Entry for MONAHRQ (Screen 37).

Screen 37. Permission Entry Popup Window

Find the row entry “Full Control.”

Select the checkbox under the column labeled “Allow.”

Click the OK button to close this popup window.

NOTE: If you are unable to click “Full Control” you will need your IT administrator to provide the necessary permissions.

You will return to the popup window titled, Advanced Security Setting for MONAHRQ (Screen 38).

Screen 38. Advanced Security Setting Popup Window
Select the checkbox labeled “Replace permission entries on all child objects…”

Click the **Apply** button.

Click the **OK** button to close this popup window.

Click the **OK** button to close this popup window.

You have now successfully set the permissions in your Microsoft Windows operating system to be able to run MONAHRQ.

**Setting Permissions in MICROSOFT SQL SERVER**

MONAHRQ has been tested with the following versions of Microsoft SQL Server. *Other versions of SQL Server may not behave as expected.*

1. SQL Server 2005
2. SQL Server 2005 Express
3. SQL Server 2008
4. SQL Server 2008 Express
5. SQL Server 2008 R2 Express

Proper installation of the MONAHRQ software requires that certain permissions be provided during initial setup of the Microsoft SQL Server or SQL Server Express database. These permissions include the ability to create and drop databases.

Please follow the instructions below to set permissions in your SQL Server database for proper operation of the MONAHRQ software. These instructions apply to both SQL Server and SQL Server Express.

**Step 1: Connect to the SQL Server Instance Using SSMS**

Microsoft SQL Server Management Studio (SSMS) is the primary tool for interfacing with the SQL Server. It may be downloaded from Microsoft at the following URL:

http://download.microsoft.com/download/6/7/4/674A281B-84BF-4B49-848C-14873B22F977/SQLManagementStudio_x86_ENU.exe

You may require the assistance of your IT manager to install and use this software.

Open the SQL SSMS application and connect to the database server that was specified during installation. The default database name is “SQLEXPRESS” (Screen 39). If you changed from the default you will need to specify that server name.
Step 2: Set Database Creation Permissions

You will see a popup window titled, Microsoft Server Management Studio (Screen 40).
Right click on the name of the database server to which you are connected in order to open the context menu.

Select Properties.

You will see a new popup window titled, Server Properties plus the name of your database server (Screen 41).

Locate the “Select a page” list on the left side of the popup window.

Select Permissions.
Locate the “Logins or roles” list in the upper right portion of the popup window.

Find the entry that lists the user name indicated during the initial MONAHRQ installation.

**Single click** to highlight the entry.

Locate the “Permissions” list in the lower right portion of the popup window.

Select the **Explicit** tab.

Find the following two rows in the list:

1. “Create any database”
2. “Alter any database”

Select the **checkbox** under the column labeled “Grant” in each of these two rows.

Click the **OK** button to commit changes and close the popup window.

**Note:** If you are unable to change the permissions, please contact your IT administrator for assistance.

You have now successfully set the permissions in your SQL Server database to be able to run the MONAHRQ software.

**Additional Information**

If the person installing the MONAHRQ software is not the person who will be using MONAHRQ, or if there will be more than one MONAHRQ user on the computer, then the **System Administrator** will need to add users to the "MONAHRQ" database. This can be done with a remote SQL Server Manager or by installing a local copy of the SQL Server Management Studio Express Edition and using it to add the required users.
APPENDIX E. PREPARING DATA USING THE AHRQ QUALITY INDICATORS SOFTWARE FOR WINDOWS

The AHRQ Quality Indicator (QI) software runs statistical analysis on local inpatient discharge data to calculate the measure results. Detailed instructions for running the software can be found at: http://qualityindicators.ahrq.gov/software/default.aspx. The AHRQ QI software is provided in Windows and SAS versions. Each version provides the same information in different formats.

The MONAHRQ software can report on externally calculated measure results that are imported into MONAHRQ. The results must be supplied using a specific file format. These file formats are described in detail in Table 8, Table 9, and Table 10 within this appendix. When running the AHRQ QI software for Windows, the following reports provide measure results in the correct format:

- Provider-level reports
- Area-level reports
- Provider-level composite measure reports.

The provider-level and composite measure reports provide data for the Hospital Quality Ratings component of the MONAHRQ software. The area-level report provides data for the Maps of Avoidable Hospital Stays path of the MONAHRQ software. Composite measure data at the area level is included within the area-level reports.

NOTE: If you wish to use the cost savings estimate feature of the Maps of Avoidable Hospital Stays path it is very important that you include total charges in your discharge data when you import it into the AHRQ QI software for Windows. Because total charges is not a standard field used by the AHRQ QI software, you must map this field to the “Custom Stratifier 1” field, which is a character field in the AHRQ QI software. Thus, when preparing your discharge data, you must represent the total charges for each discharge as whole or decimal number that can be stored in a character field.

By default, the MONAHRQ software supports the Inpatient Quality Indicators (IQIs), Prevention Quality Indicators (PQIs), and Patient Safety Indicators (PSIs).

Provider-Level and Composite Measures

Data for provider-level measures are obtained through the AHRQ QI provider reports. To generate the appropriate reports, select the Provider Report Wizard within the AHRQ QI application.

Select the desired indicators. As mentioned, the MONAHRQ software supports the IQIs and PSIs for provider-level reporting. After selecting the desired measures, select the desired hospitals and date range for reporting on the subsequent screens. On the screen titled Select Stratifiers for Use with Provider Indicators, drag Hospital ID from the right hand list of stratifiers over to the box on the left (if it is not already present). Hospital ID should be selected by default. The MONAHRQ software supports only stratification by Hospital ID for provider-level measures.

The next screen will provide the option to select composite measures and update their weights. The final screen titled Additional Options for Data Analysis, allows for the selection of additional report options. Under the Report Layout section of the screen, select the options Show Indicators in Rows and Include Title in Exported Files to ensure that the report will be saved in a format that can be read by MONAHRQ.

Screen 42 indicates the appropriate options to select.
Selecting Next on the screen will run the report (Screen 43). The MONAHRQ software relies on the file format from the AHRQ QIs to import calculated measure results. The file format is documented below in Table 8.
Select the **Export All** button in the Reports screen and save the results to a file.

Screen 43. AHRQ QI Software Provider-Level Report
### Table 8. Provider-Level Indicator Input File Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module</td>
<td>Measure module such as IQI, PSI</td>
<td>1</td>
</tr>
<tr>
<td>Indicator</td>
<td>Measure identifier code</td>
<td>2</td>
</tr>
<tr>
<td>Hospital ID</td>
<td>Provider identifier</td>
<td>3</td>
</tr>
<tr>
<td>Observed Numerator</td>
<td>Numerator</td>
<td>4</td>
</tr>
<tr>
<td>Observed Denominator</td>
<td>Denominator</td>
<td>5</td>
</tr>
<tr>
<td>Observed Rate</td>
<td>Observed rate</td>
<td>6</td>
</tr>
<tr>
<td>Observed Conf Int. Low</td>
<td>Lower bound of the observed rate confidence interval</td>
<td>7</td>
</tr>
<tr>
<td>Observed Conf Int. High</td>
<td>Upper bound of the observed rate confidence interval</td>
<td>8</td>
</tr>
<tr>
<td>Expected Rate</td>
<td>Expected rate</td>
<td>9</td>
</tr>
<tr>
<td>O-E Ratio</td>
<td>Ratio of the observed and expected rates</td>
<td>10</td>
</tr>
<tr>
<td>Reference Pop Rate</td>
<td>Rate for reference population</td>
<td>11</td>
</tr>
<tr>
<td>Risk Adjusted Rate</td>
<td>Risk adjusted rate</td>
<td>12</td>
</tr>
<tr>
<td>Risk Adj Conf Int. Low</td>
<td>Lower bound of the risk adjusted rate confidence interval</td>
<td>13</td>
</tr>
<tr>
<td>Risk Adj Conf Int. High</td>
<td>Upper bound of the risk adjusted rate confidence interval</td>
<td>14</td>
</tr>
<tr>
<td>Smoothed Rate</td>
<td>Smoothed rate</td>
<td>15</td>
</tr>
</tbody>
</table>
Composite measures

The composite measure report is generated by selecting the Composites button at the bottom of the provider-level report results screen (see Screen 44).

Screen 44. AHRQ QI Software Composite Report

![Composite Report Screen]

Select the Save Report button to generate the composite provider-level report (Screen 45).
The MONAHRQ software accepts the file format provided by the AHRQ QIs. The file format is documented in Table 9.

Table 9. Composite Indicator Input File Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>composite_name</td>
<td>Measure name</td>
<td>1</td>
</tr>
<tr>
<td>Hospital ID</td>
<td>Provider identifier</td>
<td>2</td>
</tr>
<tr>
<td>COMP1</td>
<td>Composite rate</td>
<td>4</td>
</tr>
<tr>
<td>COMP1SE</td>
<td>Standard error</td>
<td>5</td>
</tr>
<tr>
<td>COMP1WHT</td>
<td>Weight</td>
<td>6</td>
</tr>
<tr>
<td>COMP1LIB</td>
<td>Lower bound of the rate confidence interval</td>
<td>7</td>
</tr>
<tr>
<td>COMP1UB</td>
<td>Upper bound of the rate confidence interval</td>
<td>8</td>
</tr>
</tbody>
</table>
**Area-Level Measures**

Data for area-level measures is obtained through the AHRQ QI area reports. To generate the appropriate reports, select the Area Report Wizard within the AHRQ QI application (Screen 46).

After choosing the desired measures, select the desired hospitals and date range for reporting on the subsequent screens. On the screen titled, **Select Stratifiers For Use With Area Indicators**, drag “County” from the right hand list of stratifiers over to the box on the left (if it is not already present). County should be selected by default. The MONAHRQ software supports only stratification by county for area-level measures.

The final screen titled, **Additional Options for Data Analysis**, allows for the selection of additional report options. Under the **Report Layout** section of the screen, select the options **Show Indicators in Rows** and **Include Title in Exported Files** to ensure that the report will be saved in a format that can be read by the MONAHRQ software.

If you wish to display estimated cost savings information in the Summary Tables for these indicators in the Maps of Avoidable Hospital Stays path of your MONAHRQ-generated Web site, after you calculate the AHRQ QI you can also use the Area QI Cost Calculator tool. This tool will process the standard exported Area Indicators file and add a total estimated costs column to the exported data file, which you will then import into MONAHRQ. The Cost Calculator tool is available for download from the Resources page of the MONAHRQ download site. Information about the Area QI Cost Calculator for Windows is provided in Appendix F.
Select the Export All button to save the results in a comma-separated values (CSV) file (Screen 47).
The MONAHRQ software accepts the file format provided by the AHRQ QIs. The file format is documented in Table 10.

Table 10
Table 10. Area-Level Indicator Input File Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module</td>
<td>Measure module such as IQI, PSI</td>
<td>1</td>
</tr>
<tr>
<td>Indicator</td>
<td>Measure identifier code</td>
<td>2</td>
</tr>
<tr>
<td>County</td>
<td>Federal Information Processing Standard (FIPS) code</td>
<td>3</td>
</tr>
<tr>
<td>Observed Numerator</td>
<td>Numerator</td>
<td>4</td>
</tr>
<tr>
<td>Observed Denominator</td>
<td>Denominator</td>
<td>5</td>
</tr>
<tr>
<td>Observed Rate</td>
<td>Observed rate</td>
<td>6</td>
</tr>
<tr>
<td>Observed Conf Int. Low</td>
<td>Lower bound of the observed rate confidence interval</td>
<td>7</td>
</tr>
<tr>
<td>Observed Conf Int. High</td>
<td>Upper bound of the observed rate confidence interval</td>
<td>8</td>
</tr>
<tr>
<td>Expected Rate</td>
<td>Expected rate</td>
<td>9</td>
</tr>
<tr>
<td>O-E Ratio</td>
<td>Ratio of the observed and expected rates</td>
<td>10</td>
</tr>
<tr>
<td>Reference Pop Rate</td>
<td>Rate for reference population</td>
<td>11</td>
</tr>
<tr>
<td>Risk Adjusted Rate</td>
<td>Risk adjusted rate</td>
<td>12</td>
</tr>
<tr>
<td>Risk Adj Conf Int. Low</td>
<td>Lower bound of the risk adjusted rate confidence interval</td>
<td>13</td>
</tr>
<tr>
<td>Risk Adj Conf Int. High</td>
<td>Upper bound of the risk adjusted rate confidence interval</td>
<td>14</td>
</tr>
<tr>
<td>Smoothed Rate</td>
<td>Smoothed rate</td>
<td>15</td>
</tr>
<tr>
<td>Total Cost</td>
<td>An optional field created by the Cost Calculator tool</td>
<td>16</td>
</tr>
</tbody>
</table>
APPENDIX F. AREA QI COST CALCULATOR FOR WINDOWS

To report the estimated cost savings for potentially avoidable hospital stays, AHRQ has developed the Area QI Cost Calculator for Windows. This tool provides estimated cost savings for the area-level AHRQ Quality Indicator modules. It outputs its results as CSV files. The output of the Cost Calculator can be imported directly into the MONAHRQ software as described in Appendix E.

If you choose to use the Area QI Cost Calculator for Windows, you may download and install it from the Resources page of the MONAHRQ download site. This software must be used with the AHRQ Quality Indicators software for Windows. It requires the Area-level QI Report files that you produce by following the steps in Appendix E. To use the Cost Calculator, your Area-level QI Report files must include a “Total Charges” field. You must have imported this field into the AHRQ QI software as part of your inpatient discharge data and mapped it to the “Custom Stratifier 1” field, as described in Appendix E. Before you import the your AHRQ QI results files into MONAHRQ, run the Cost Calculator tool in order to modify the Area-level QI Report by adding a Total Cost column to the end of every row.

The steps for using the Cost Calculator for Windows are detailed below.

1.1 Install Cost Calculator Software

To install the Area QI Cost Calculator for Windows, run the installation package downloaded from the MONAHRQ Web site (http://monahrq.ahrq.gov/monahrq_resources.shtml). When you run the installation file, an Install Wizard will appear.

Once you have installed the Cost Calculator tool, you will find the tool it in the Windows Start menu under All Programs in the Agency for Healthcare and Research and Quality folder, in its own subfolder named Area QI Cost Calculator.

1.2 Identify Input Data Files

To run this program you will need the following:

1. The Area-Level QI Report exported from the AHRQ QI software for Windows (CSV format)
2. The Quality Indicators database (discharge-level SQL file created by the AHRQ QI software for Windows data wizard)
3. The Hospital Information File from MONAHRQ, or other file containing cost-to-charge ratios (CSV format).

1.2.1 Area-Level QI Report

The Cost Calculator tool appends a Total Cost field to the AHRQ QI Area-Level Report generated by the AHRQ QI software for Windows. Costs reflect the actual costs to a hospital for services performed, while charges represent what the hospital billed for the inpatient stay. Total charges are converted to estimated costs using hospital-level cost-to-charge ratios based on hospital accounting reports from the Centers for Medicare & Medicaid Services (CMS). The Cost Calculator computes Total Cost for each QI by aggregating Area-Level QI rates and summing costs by county.
The AHRQ QI software for Windows provides three area-level reports. You will need to run the Cost Calculator on each of the reports.

1.2.2 Quality Indicators Database
During the installation of the AHRQ QI software for Windows, the installer builds the AHRQ QI database, which contains the discharge-level QI rates. Data are stored in SQL server database format, with default file name “qualityindicators.” To assign costs to county-level QI rates, the Cost Calculator must read through the intermediate data in the AHRQ QI database, aggregate that data by QI, and sum costs by county.

1.2.3 Hospital Information File
The Cost Calculator tool requires hospital-level cost-to-charge ratios to assign estimated total costs. Since the inpatient discharge data include charges rather than costs, the cost-to-charge ratios must be fed into the Cost Calculator tool. If you created a Hospital Information File when you generated the MONAHRQ Web site, you can use this file with the tool.

If you do not have a Hospital Information File in CSV format, you may create one using MONAHRQ. After loading your discharge data and/or AHRQ Provider-Level QI data into MONAHRQ, you may run the Define Regions & Hospitals step which will allow you to enter your hospital information. Instructions can be found in Chapter 4 under the section Provide Hospital Information. Once you have loaded the hospital data, select the Edit Discharge Hospital Information screen. The button labeled Export This Data at the bottom of the screen will create a Hospital Information File in CSV format.

You may also choose to load the cost-to-charge ratios from an external file. If you do so, the file must contain the fields “HOSPID” and “COST_CHARGE_RATIO.”

1.3 Prepare Cost Estimates
When you launch the Cost Calculator program you will see the following screen.
Screen 48. Area QI Cost Calculator Launch Screen

This screen contains a session log that provides a record on all activities while running the Cost Calculator.

**Step 1: Select the Area-Level QI Result File**

Enter the directory and file name for the Area-Level Quality Indicator Result File exported from the Area-Level Report wizard. You may use the **Browse** button to locate the file, which will automatically test the contents for the correct format. If you enter a file name manually the file is examined when you click the **Test File** or **Next** button. The file must contain a header row, where the first three fields are named "Module," "Indicator," and "County".
Once you have entered the file information, select **Next** to continue.

**Step 2: Select Quality Indicator Database**

Enter the SQL Server database connection information for the Quality Indicator database (server name, authentication type, database name). If the AHRQ QI software for Windows was run on the same machine, no changes are required to the default information. This file contains a *total charges* field from the input data, which was mapped to the “Custom Stratifier 1” field when the discharge data were imported into the AHRQ QI software.

Click the **Test** or **Next** button to perform a consistency check on the database. The following tests are performed:

- The database must contain a discharge_main table, which must contain *HOSPID* and *Custom1* fields, and must contain flag fields for each QI in the input area QI file.
- The discharge_main table must contain records with non-null values of *HOSPID*.
- The *Custom1* field must not contain non-numeric values other than Null or blank.
Once you have entered the file information, select **Next** to continue.

**Step 3: Select Cost-To-Charge Ratio File**

Select the CSV file containing cost-to-charge ratios for the hospitals. The ratios will be used to convert charges to costs. The file can be a Hospital Information File used with MONAHRQ, a cost-to-charge ratio file from the HCUP Central Distributor, or a user-created file with cost information. If you are reading cost data from your own file, it must contain the two fields, HOSPID and COST_CHARGE_RATIO.

The file is tested when you click the **Test** or **Next** button. The following tests are performed.

- The file must contain a HOSPID field.
- The file must contain either a COST_CHARGE_RATIO field or an APICC field (for a user-created CCR file).
- The file must contain cost-to-charge ratios for the hospitals in the AHRQ QI database.
- The user is warned if non-numeric cost-to-charge ratios are found.
- The user is warned if there are hospitals in the AHRQ QI database for which a valid cost-to-charge ratio was not found.
Once you have entered the file information, select **Next** to continue.

**Step 4: Select Output File Information**

Enter the file location for the output AHRQ QI Area-Level Report with the additional Total Cost field.
Screen 52. Output the Modified Area QI Report

When you select the Calculate Cost and Create File button, cost is calculated and the selected output file is saved with a Total Cost field added to each record of the AHRQ QI Area-Level Report file.

1.4 Technical Notes About Calculation of Total Costs by AHRQ QI

The output file will contain a total cost for each QI aggregated by county, for which there are one or more records in the discharge_main table with the QI indicator flag set. As each record of the input qualityindicators file is read, cost is calculated and added to the record before being written out.

For discharge-level rows, if the observed numerator is missing, cost is missing. If the observed numerator is zero, cost is zero. If the observed numerator is not missing or zero (0), and no records with the QI flag set for the county have a non-missing (discharge-level) cost, then cost is missing. Otherwise, mean cost is calculated as total cost divided by the number of records with non-missing costs, rounded to the nearest dollars and cents. Cost is calculated as mean cost times the observed numerator.

For the total rows for each QI, if the observed numerator is missing, cost is missing. If the observed numerator is zero, cost is zero. Otherwise, total cost and the total records with non-missing cost are aggregated over counties. If the total number of records with non-missing cost is 0, cost is missing. If the total number of records with non-missing cost is not zero, mean cost is calculated as total cost divided by the total number or records with non-missing cost rounded to the nearest cents. Cost is calculated as mean cost times the observed numerator.

Errors are reported if cost could not be calculated for any record on the file or if lines are too short to contain the observed numerator. The user is warned if there are records for which cost is missing.
APPENDIX G. PREPARING DATA USING THE AHRQ QUALITY INDICATORS SOFTWARE FOR SAS

The MONAHRQ software can display externally calculated quality measures from the AHRQ Quality Indicator (QI) software for SAS (SAS QI). The AHRQ QI results must be exported from the QI software using a specific file format. These file formats are described in detail in Table 8, Table 9, and Table 10.

The AHRQ QI software for SAS provides a set of reports for each separate module: Inpatient Quality Indicators (IQIs), Prevention Quality Indicators (PQIs), and Patient Safety Indicators (PSIs). Although MONAHRQ does not specifically support the Pediatric Quality Indicators (PDIs), two measures—Low Birth Weight Rate (PQI-09) and Injury to Neonate (PSI-17)—are calculated by the SAS QI software through the PDI module. The available sets of reports for each module are:

- IQI—Provider, Area, and Composite
- PSI—Provider, Area, and Composite
- PQI—Area
- PDI—Provider (for PSI-17), Area (for PQI-09).

The software and documentation for the AHRQ SAS QIs can be found at: http://www.qualityindicators.ahrq.gov/software/SAS.aspx

After running the desired AHRQ QI SAS modules using your inpatient hospital data, the data must be reformatted for use with the MONAHRQ software. If you wish to report estimated cost savings for potentially avoidable hospital stays, you must first use the Area QI Cost Calculator on the area-level output datasets before reformattting the data. Instructions for installing and running the Area QI Cost Calculator can be found in Appendix H.

Several SAS utilities have been developed to convert the output from the SAS QI software to a format suitable for MONAHRQ. There is a SAS formatting utility for each module and report type, as listed above. Each SAS formatting utility is QI module-specific and requires as input the SAS output files produced by the AHRQ QI module. The SAS output files must be available as permanent SAS data sets—as opposed to temporary “work” data sets—including output from the Composite runs for the IQI and PSI modules. The utilities will format the SAS files into a comma-separated value (CSV) file that can then be loaded into the MONAHRQ software. The final CSV file is identical to those used to import data from the AHRQ QI software.

Currently, MONAHRQ supports these levels of stratification: overall and hospital-level stratification for provider runs; overall and county or State-level Federal Information Processing Standard (FIPS) code stratification for area runs; and aggregate composite runs, as selected in the control file for the SAS “production” runs.

The following information details the necessary steps to create the CSV files using the AHRQ QI SAS Modules.

**IQI Module**

After completing the IQI module, download and modify the IQI-specific SAS Formatting Utilities for the AHRQ Quality Indicators from the Resources page of the MONAHRQ download Web site. The provider, composite, and area-level utility files for the IQIs are as follows:

1. IQI_Prov_V1_1.SAS
2. IQI_Comp_V1_1.SAS
3. IQI_Area_v1_1.SAS.

These utility files must be copied to the same production directory where the AHRQ IQI Module SAS jobs are stored. The SAS formatting utilities for the AHRQ IQIs depend on the IQI Module control file. Users must modify the section of code (provided below) in the IQI_Prov_V1_1.SAS, IQI_Comp_V1_1.SAS, and IQI_Area_V1_1.SAS files in order for the SAS jobs to be able to use the IQI Module control file:

FILENAME CONTROL 'C:\PATHWAY\CONTROL_IQI.SAS'; *<===USER MUST modify;

If the Area QI Cost Calculator for SAS (Appendix H) has been run, the user must specify the name of the modified rate file in the following section of IQI_Area_V1_1.SAS:

```sas
%*let Ratefile_=iqa3_cost;                   *<===USER MUST MODIFY, eg: IQa3_cost, or IQa3;
%let Ratefile_=iqa3;                         *<===USER MUST MODIFY, eg: IQa3_cost, or IQa3;
```

Once the pathway has been assigned, run the three SAS formatting utilities for the AHRQ IQIs. They should produce three separate files in the production directory:

1. IQI_Prov_V1_1_IQI_P3.csv
2. IQI_Comp_V1_1_IQI_C3.csv
3. IQI_Area_V1_1_IQI_A3.csv.

All three files can be then be loaded into MONAHRQ.

**PSI Module**

After completing the PSI module, download and modify the PSI-specific SAS Formatting Utilities for the AHRQ Quality Indicators from the Resources page of the MONAHRQ download Web site. The provider, composite, and area-level utility files for the PSIs are as follows:

1. PSI_Prov_V1_1.SAS
2. PSI_Comp_V1_1.SAS
3. PSI_Area_V1_1.SAS.

The utility files must be copied to the same production directory containing the AHRQ PSI Module SAS jobs. The SAS formatting utilities for the AHROPSIs depend on the PSI Module control file. Users must modify the section of code (provided below) in the PSI_Prov_V1_1.SAS, PSI_Comp_V1_1.SAS, and PSI_Area_V1_1.SAS files in order for the SAS jobs to be able to use the PSI Module control file:

FILENAME CONTROL 'C:\PATHWAY\CONTROL_PSI.SAS'; *<===USER MUST modify;

If the Area QI Cost Calculator for SAS (Appendix H) has been run, the user must specify the name of the modified rate file in the following section of PSI_Area_V1_1.SAS:

```sas
*==============================================*;
* CHOOSE NAME OF INCOMING RATE FILE, WITH COST *;
* OR THE STANDARD RATE FILE PRODUCED BY SASQI *
*==============================================*;
```
After completing the PQI module, download and modify the PQI-specific SAS Formatting Utilities for the AHRQ Quality Indicators from the Resources page of the MONAHRQ download Web site. The area-level utility file for the PQIs is as follows:

1. PQI_Area_V1_1.SAS.

The utility file must be copied to the same production directory where the AHRQ PQI Module SAS jobs are stored. The SAS formatting utilities for the AHRQ PQIs depends on the PQI Module control file. Users must modify the section of code (providing below) in the PQI_Area_V1_1.SAS file in order for the SAS job to be able to use the PQI Module control file:

FILENAME CONTROL 'C:\PATHWAY \CONTROL_PQI.SAS'; *<===USER MUST modify;

If the Area QI Cost Calculator for SAS (Appendix H) has been run, the user must specify the name of the modified rate file in the following section of PQI_Area_V1_1.SAS:

CHOOSE NAME OF INCOMING RATE FILE, WITH COST *

Once the pathway has been assigned, run the SAS formatting utilities for the AHRQ PQIs. This should produce one file in the production directory:

PQI_Area_V1_1_PQI_A3.csv.

This file can be loaded into MONAHRQ.

PDI Module

After completing the PDI module, download and modify the PDI-specific SAS Formatting Utilities for the AHRQ Quality Indicators from the Resources page of the MONAHRQ download Web site. The provider and area-level utility files for the PDIs are as follows:
1. PDI_Prov_V1_1.SAS
2. PDI_Area_V1_1.SAS.

The utility files must be copied to the same production directory containing the AHRQ PDI Module SAS jobs. The SAS formatting utilities for the AHRQ PDIs depend on the PDI Module control file. Users must modify the section of code (provided below) in the PDI_Prov_V1_1.SAS and PDI_Area_V1_1.SAS files in order for the SAS jobs to be able to use the PDI Module control file:

FILENAME CONTROL 'C:\PATHWAY\CONTROL\PDI.SAS'; *<===USER MUST modify;

If the Area QI Cost Calculator for SAS (Appendix H) has been run, the user must specify the name of the modified rate file in the following section of PDI_Area_V1_1.SAS:

*==============================================*
* CHOOSE NAME OF INCOMING RATE FILE, WITH COST *
* OR THE STANDARD RATE FILE PRODUCED BY SASQI *
*==============================================*
%*let Ratefile_=PDa3_cost;                         *<===USER MAY MODIFY, eg: PDa3;
%let Ratefile_=PDa3;                              *<===USER MAY MODIFY, eg: PDa3_cost;

Once the pathway has been assigned, run the two SAS formatting utilities for the AHRQ PDIs. They should produce two separate files in the production directory:

1. PDI_Prov_V1_1_PDI_P3.csv
2. PDI_Area_V1_1_PDI_A3.csv.

Both files can be loaded into MONAHRQ.

Once all SAS formatting utilities for the AHRQ QIs have been used to create the desired CSV files, the CSV files are ready to be loaded into MONAHRQ under the Import AHRQ QI Data section.

If you wish to display estimated cost savings information in the Summary Tables for these indicators in the Maps of Avoidable Hospital Stays path of your MONAHRQ-generated Web site, you can download and use the Area QI Cost Calculator tool for SAS from the MONAHRQ download Web site. This tool will process the standard exported Area Indicators file and add a total cost column to the exported data.

Information about the Area QI Cost Calculator tool for SAS is provided in Appendix H.
APPENDIX H. AREA QI COST CALCULATOR FOR SAS

To report estimated cost savings for potentially avoidable hospital stays, AHRQ has developed the Area QI Cost Calculator for SAS. The Area QI Cost Calculator for SAS produces SAS datasets for the area-level QI modules that include estimated cost savings information. The output of the Cost Calculator must be reformatted into CSV files using the SAS formatting utilities described above in Appendix G.

The steps for running the Area QI Cost Calculator for SAS are as follows:

**Step 1: Prepare the Data and Run the AHRQ QI Software for SAS**


There are some special considerations regarding your data and QI program settings:

1. Your input dataset must include the variables TOTCHG, HOSPID and KEY. The variable TOTCHG is not used by the QI software but will not cause an error. HOSPID refers to the HCUP-compatible uniform hospital identifier. The values of HOSPID should match your hospital discharge data. If you are using HCUP databases and HOSPID is not available in your data, you may need to use the HCUP Hospital crosswalk file provided with the data to obtain it.

2. It is advisable to limit your data to one state only. The Area QI Cost Calculator for SAS will attempt to assign costs to out-of-state hospitals, but there will be some undesirable side-effects. If retaining hospitals from other states is important to your analysis, one strategy is to recode out-of-state counties to the hospital county. If that is impractical, an alternate strategy is to limit out-of-state data to counties with sufficient volume to produce rates. For best results, in- or out-of-state, counties with complete discharge data should be used.

3. Be sure to request overall totals and county-level totals in the CONTROL program. When setting options in the CONTROL programs (CONTROL_PDI.SAS, CONTROL_IQI.SAS, etc.), the variable TYPELVLA (also called TYPELEV in some versions and modules) should include levels 0 and 8. For example:
   ```
   %LET TYPELVLA = IN (0,8);
   ```

4. It is acceptable to request other levels as well—e.g. `%LET TYPELVLA = IN (0,4,8,12,);”—provided 0 and 8 are always requested. Note that cost is calculated at the county-level (type 8) and overall level (type 0). These costs are applied to appropriate sub-levels; however, costs by age group, gender, etc. are not supported in MONAHRQ and will not be displayed.

**Step 2: Gather the Required Data**

You will need the following data to run the Area QI Cost Calculator for SAS:

1. The cost-to-charge ratio file. This file contains the cost-to-charge ratio for each hospital. If you created a Hospital Information File when you generated the MONAHRQ Web site, you can use this file with the tool. If you are using a Cost-to-Charge Ratio (CCR) file from the HCUP Central Distributor, the file name should follow the default naming convention ccYYYYw.sas7bdat where YYYY is the year of data being analyzed (e.g. cc2009w).
2. The SAS dataset used as input to the QI software. This file should include TOTCHG, HOSPID and KEY. Other variables in the file will be ignored, so there is no need to limit the input file to only these variables.

3. The discharge-level SAS dataset output by the indicator assignment program in the AHRQ QI module. This program reads in your input dataset and creates a new discharge-level dataset which contains quality indicator flags for each record. The program and default output name can be found in the table below (you may change the output name in the CONTROL program) (HOSPID must be added as an output variable in PQSAS1.SAS):

<table>
<thead>
<tr>
<th>QI Module</th>
<th>Indicator Assignment Program</th>
<th>Default Output File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQI Area</td>
<td>IQSAS1.SAS</td>
<td>IQ1.sas7bdat</td>
</tr>
<tr>
<td>PDI Area</td>
<td>PDSAS1.SAS</td>
<td>PDI1.Sas7bdat</td>
</tr>
<tr>
<td>PQI Area</td>
<td>PQSAS1.SAS</td>
<td>PQ1.Sas7bdat</td>
</tr>
<tr>
<td>PSI Area</td>
<td>PSSAS1.SAS</td>
<td>PSI1.Sas7bdat</td>
</tr>
</tbody>
</table>

4. The area-level SAS dataset output by the area rate program of the QI module. This program outputs a file with one record per requested area level. For example, if you requested county-level (type 8) and overall level (type 0), this file will have one total record and one record for each county. The program and default output name can be found in the table below (you may change the output name in the CONTROL program):

<table>
<thead>
<tr>
<th>QI Module</th>
<th>Indicator Assignment Program</th>
<th>Default Output File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQI Area</td>
<td>IQSASA3.SAS</td>
<td>IQA3.sas7bdat</td>
</tr>
<tr>
<td>PDI Area</td>
<td>PDSASA3.SAS</td>
<td>PDA3.Sas7bdat</td>
</tr>
<tr>
<td>PQI Area</td>
<td>PQSASA3.SAS</td>
<td>PQA3.Sas7bdat</td>
</tr>
<tr>
<td>PSI Area</td>
<td>PSSASA2.SAS</td>
<td>PSA2.Sas7bdat</td>
</tr>
</tbody>
</table>

Put all four datasets in a single directory on your local computer or server.

**Step 3: Set Up and Run the Cost Module**

Place the cost module file `costmodule.zip` in the directory from which it will be run. Uncompress and extract the files. Uncompressing the file will place program CONTROL.SAS in the directory where the file is uncompressed and create a folder called `\INCLUDES` below the directory containing CONTROL.SAS.

All options can be set in the CONTROL.SAS program. There is no need to alter the programs in the `\INCLUDES` directory.

Table 11 provides a list of options that should be set in the CONTROL.SAS file.
### Table 11: Control File Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>%let state</td>
<td>Input the two-character state postal code of choice. At the present time, the cost calculator only reports one state at a time, though it will internally calculate costs and cost-savings for all counties in the file.</td>
</tr>
<tr>
<td>%let data_yr</td>
<td>Enter the data year of the analysis file. The program assumes a single full year of data. If there are multiple years of data in your file, use one year (such as the most recent) to allow the program to run.</td>
</tr>
<tr>
<td>%let module</td>
<td>Indicate the QI module – PQI, PSI, IQI, or PDI.</td>
</tr>
<tr>
<td>%let version</td>
<td>Indicate the version of the AHRQ QI software for SAS. Versions 3.0 to 4.4 are supported at this time. For intermediate versions, such as version 3.1a and 4.1b, the letter suffix is ignored. Always specify the decimal part (e.g. version 3.0, not version 3) for correct execution of the software.</td>
</tr>
<tr>
<td>%let includes=pathname\includes</td>
<td>Replace pathname\includes with the name of the directory where the module programs are stored (e.g. %let includes=c:\work\costmodule\prog\includes).</td>
</tr>
<tr>
<td>%let input_dir=pathname</td>
<td>Replace pathname with the name of the directory where report file and output data files will be written. This can be the same as the input directory or a different directory.</td>
</tr>
<tr>
<td>%let output_dir= pathname</td>
<td>Replace pathname with the name of the directory where data files and cost-to-charge ratio file are located.</td>
</tr>
<tr>
<td>%let rate_in</td>
<td>Indicate the name of the area-level rate dataset generated by the SAS QI software, usually PQA3, IQA3, PSA2, or PDA3.</td>
</tr>
<tr>
<td>%let dsch_in</td>
<td>Indicate the name of the discharge dataset that was input to the SAS QI software. This dataset should contain the TOTCHG, KEY, and HOSPID variables.</td>
</tr>
<tr>
<td>%let qi1_in</td>
<td>Indicate the name of discharge dataset that was generated by the SAS QI software PQSAS1, PDSAS1, PSSAS1, or IQSAS1, usually named IQ1, PQ1, PD1, etc.</td>
</tr>
<tr>
<td>%let MONAHQRQ</td>
<td>Request that the software create a MONAHQRQ-compatible input dataset. This option is set to NO by default. Change to YES to create the dataset.</td>
</tr>
<tr>
<td>%let cutoff</td>
<td>Set the threshold for suppression; this is set to 10 by default (suppress cells of 10 or fewer records) to comply with HCUP small-cell disclosure requirements. Set to 0 to turn off suppression or enter a custom value.</td>
</tr>
</tbody>
</table>
USE CAUTION EDITING BELOW THE LINE. In general, the options below the dotted line should not be altered. However, `%LET VERBOSE=NO` suppresses notes on the SAS log. You may want to change to `%LET VERBOSE=YES` to examine the log file.

Once the options are set, run the Area QI Cost Calculator for SAS. Depending on the size of the data, the run should require no more than a few minutes to complete.

**Step 4: Review the Output**

The Area QI Cost Calculator for SAS will create up to three permanent files in the output directory:

1. **Rates spreadsheet XML file** – depending on the QI module used, the Area QI Cost Calculator for SAS will produce PQIrates.xml, PSIrates.xml, IQIrates.xml, and PDIrates.xml. The XML file can be opened in Microsoft Excel.

2. **Rates SAS file** – depending on the QI module used, the Area QI Cost Calculator for SAS will produce PQIrates.sas7bdat, PSIrates.sas7bdat, IQIrates.sas7bdat, or PDIrates.sas7bdat. This file is used to create the rates spreadsheet and can be used for diagnostics or input to other analyses. The file will contain out-of-state records (if present in data). Only the grand total (_type_=0) and county-level records (_type_=8) will have cost data; subgroups, such as race and sex, will be ignored.

3. **MONAHRQ file** – if you request a MONAHRQ-compatible dataset, the Area QI Cost Calculator for SAS will merge the cost data onto the QI area rate file appropriate for the module. The new file will be named the same as your input file with the suffix "_cost" added. For example, if your rate input file is PQA3.sas7bdat, the MONAHRQ file will be named PQA3_cost.sas7bdat.

**Step 5: Reformat the SAS Datasets**

Reformat the output SAS datasets using MONAHRQ’s SAS Formatting Utilities. Appendix G provides instructions on running the utilities.
The MONAHRQ home page (Screen 53) displays four distinct pathways:

1. The **Hospital Quality Ratings** path provides hospital ratings for the public and other detailed statistics.
2. The **Hospital Utilization** path allows users to compare hospitals by the number of patients they treat for different medical conditions and procedures.
3. The **Maps of Avoidable Hospital Stays** path allows users to compare counties by rates of potentially avoidable hospital stays and cost savings from reducing avoidable stays.
4. The **County Rates of Hospital Use** path allows users to compare counties by rates on inpatient medical conditions and procedures.
MONAHRQ host users can select which paths to display and customize the elements and design of the generated Web pages in the MONAHRQ software.

Hospital Quality Ratings

Screen 54: Hospital Quality—Navigation Page

In the Hospital Quality Ratings path (Screen 54), users choose hospitals by a full list of hospitals or by ZIP Code or region. If no hospitals are selected, MONAHRQ will select all hospitals by default. The user then chooses the health topic of interest for hospital.

Host users have the option to define regions, select ZIP Code radii for searching, and select which measures to report.
The Hospital Ratings table (Screen 55) classifies hospitals into one of three categories. The classification scheme varies by the measure type and the data available for each measure. Users can access detailed statistics, bar charts, and help from this page. Hospitals are compared to the nationwide average and to the average of reported hospitals in the Web site (i.e., the input file mean).

The Detailed Quality Statistics page displays the same information with two additions: (1) rates and confidence intervals (as available) are listed for each measure next to the ratings icon, and (2) an icon to access all statistics available for the selected measure (e.g., risk-adjusted rates, observed rates, confidence intervals, observations) is available in the Hospital Name header row.
Hospital ratings and benchmark values are displayed in bar charts for each measure (Screen 56). Hospitals are sorted from better to worse.
Hospital ratings and benchmark values are displayed in text charts for each measure (Screen 57). Hospitals are sorted from better to worse. To view charts as text, select the “Display charts as text” box on the previous page.
Detailed statistics are reported for the selected measure by hospital (Screen 58). All available statistics for the given measures are displayed; the available statistics vary by type of measure.
In the Hospital Utilization path (Screen 59), users choose hospitals from a full list of hospitals, or by ZIP Code, or by region. Users may generate statistics using common clinical groupers based on International Classification of Diseases, Clinical Modification (ICD-9-CM) codes, including: major diagnostic category (MDC), diagnosis-related group (DRG), Clinical Classifications Software (CCS) for diagnoses, or CCS for procedures.

This path is only available when local inpatient discharge data are loaded. Regions and ZIP Code radii are selected by host users.
The Hospital Utilization report displays number of discharges, charges, costs, and length of stay by selected clinical groups for each selected hospital (Screen 60). Users can select a condition or procedure group to access the utilization statistics by demographic groups (race/ethnicity, age group, payer, sex) for the selected hospital.

Cost is based on charges that have been adjusted to costs, using hospital-specific cost-to-charge ratios. Host users can select to show cost and charge information. Cost will not be reported if host users choose not to show charge information.
In the Maps of Avoidable Stays pathway, users choose to view maps by health topic or by selecting all maps/summary tables (Screen 61).

This path is only available when AHRQ Quality Indicator (QI) area-level data are loaded. Host users choose which measures to report.
The map displays the rate per 100,000 people for each county; lighter colors indicate a lower rate (Screen 62). Some maps include links to Quality Improvement information.
The summary table displays detailed statistics by county for the selected measure (Screen 63).
In the County Rates path (Screen 64), users can choose counties individually or combined, with common groupings provided for ICD-9-CM codes (MDC, DRG, CCS for conditions, CCS for procedures). To access maps of the data, users should select “All Counties” and a specific condition or procedure.

This path is only available when local inpatient discharge data are loaded. Host users select the denominator used in the county rates pathway as 1,000, 10,000, or 100,000.
Statistics for County Rates are reported by county (based on patient residence if this data element was loaded), and includes the number of discharges and rate of discharges (Screen 65). Rates are based on the number of hospital discharges and county population data obtained from the U.S. Census Bureau. Users may select the county code to access statistics by patient demographics (age group, race/ethnicity, sex). Users may also choose maps of counties to see the information displayed in a map format.
## APPENDIX J. MONAHRQ VARIABLE MAPPING FOR INPATIENT DISCHARGE DATA

### Table 12. Preparing Your Local Inpatient Discharge Data: Variable Mapping

<table>
<thead>
<tr>
<th>MONAHRQ Variable Name</th>
<th>Description</th>
<th>Required/Optional</th>
<th>Ramifications of Exclusion</th>
<th>Default Element Coding</th>
<th>Data Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REQUIRED FOR MONAHRQ BASIC FUNCTIONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Age in years at admission</td>
<td>Required</td>
<td>If this data element is missing, the discharge record will not be loaded.</td>
<td>Source value</td>
<td>Numeric. Convert to years; if age &lt;365 days, set value to 0. If variable does not exist, it should be calculated from Admission Date and Date of Birth.</td>
</tr>
<tr>
<td>Sex</td>
<td>Sex of patient: male/female</td>
<td>Required</td>
<td>If this data element is missing, the discharge record will not be loaded.</td>
<td>1: Male 2: Female &lt;Exclude from dataset&gt;</td>
<td>No data preparation needed. Source values, alpha or numeric, will be mapped to accepted numeric value (1, 2) or excluded during data load.</td>
</tr>
<tr>
<td>Hospital ID</td>
<td>Data source hospital number</td>
<td>Required</td>
<td>Data element used to facilitate data exploration and as a stratifier for provider-level indicators (in the quality indicator [QI] reports section). If this data element is missing, the discharge record will not be loaded.</td>
<td>Source value</td>
<td>No data preparation needed. Source values, alpha or numeric, accepted.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
</tr>
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</tr>
<tr>
<td>Discharge Year</td>
<td>Calendar year of patient’s discharge</td>
<td>Required</td>
<td>Data element used to apply the proper fiscal year coding (e.g., ICD-9-CM, CPT) and to assign the APR™ DRG Grouper version used. Discharge year should be within the range of 1997 to present year. If this data element is missing, the discharge record will be not be loaded.</td>
<td>Source value, YYYY</td>
<td>Numeric: YYYY Discharge year should be within the range of 1997 to present year.</td>
</tr>
<tr>
<td>Discharge Quarter</td>
<td>Calendar quarter of the patient’s discharge</td>
<td>Required</td>
<td>Data element used to apply the proper fiscal year coding (e.g., ICD-9-CM, CPT) and to assign the APR-DRG Grouper version used. If this data element is missing, the discharge record will be not be loaded.</td>
<td>1: January–March 2: April–June 3: July–September 4: October–December</td>
<td>If data element does not exist, it should be calculated from discharge date. Value must be numeric (1, 2, 3, 4) with no leading alpha characters.</td>
</tr>
<tr>
<td>Principal Diagnosis</td>
<td>ICD-9-CM diagnosis codes, without decimal points</td>
<td>Required</td>
<td>If this data element is missing, the discharge record will be not be loaded.</td>
<td>Source value; string value more than 5 characters will be shortened.</td>
<td>Diagnosis Code 1 is the principal diagnosis. Decimal points, if any, must be removed before loading data. Do not remove leading or trailing zeros. Similarly, you should not include additional digits when they are not required. Diagnosis codes are always 3, 4, or 5 characters long. For example, a diagnosis code of 005.89 would be input as 00589.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
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</tr>
<tr>
<td>Diagnosis Code, 2–35</td>
<td>ICD-9-CM diagnosis codes, without decimal points</td>
<td>Required – if available</td>
<td>Used in assigning MDC, DRG, and Clinical Classifications Software (CCS). Required for preparing pre-calculated AHRQ QIs rates.</td>
<td>Source value; string value more than 5 characters will be shortened.</td>
<td>Diagnosis Codes 2–35 are secondary diagnoses, and would include any External Cause of Injury codes (E-codes). Decimal points, if any, must be removed before loading data. Do not remove leading or trailing zeros. Similarly, you should not include additional digits when these are not required. Diagnosis codes are always 3, 4, or 5 characters long. Secondary diagnosis codes may include External Cause of Injury codes (E-codes).</td>
</tr>
<tr>
<td>Principal Procedure</td>
<td>ICD-9-CM procedure codes without decimals</td>
<td>Required</td>
<td>Used in assigning MDC, DRG, and CCS. Required for preparing pre-calculated AHRQ QIs rates.</td>
<td>Source value. String value more than 4 characters will be shortened.</td>
<td>Procedure Code 1 is the principal procedure. As with diagnosis codes, you should remove any decimal points; retain leading or trailing zeros; do not include additional digits when these are not required. Procedure codes are always 3 or 4 characters.</td>
</tr>
<tr>
<td>Procedure Code, 2–30</td>
<td>ICD-9-CM procedure codes without decimals</td>
<td>Required – if available</td>
<td>Used in assigning MDC, DRG, and CCS. Required for preparing pre-calculated AHRQ QIs rates.</td>
<td>Source value. String value more than 4 characters will be shortened.</td>
<td>Procedure Codes 2–30 are secondary procedures. As with diagnosis codes, you should remove any decimal points and retain leading or trailing zeros; do not include additional digits when these are not required. Procedure codes are always 3 or 4 characters.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
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<td>-----------------</td>
</tr>
<tr>
<td><strong>OPTIONAL: ALLOWS HOST USER TO IMPORT OWN DRG and MDC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRG Import</td>
<td>User-defined Diagnosis Related Group (DRG)</td>
<td>Optional</td>
<td>The embedded Innovative Resources for Payors (IRP) Grouper will assign DRG codes in effect on discharge date (year and quarter).</td>
<td></td>
<td>No error checking will be performed on the imported DRG values. If a DRG is assigned, an MDC must also be assigned.</td>
</tr>
<tr>
<td>MDC Import</td>
<td>User-defined Major Diagnostic Category (MDC)</td>
<td>Optional</td>
<td>The embedded IRP Grouper will assign MDC value in effect on discharge date (year and quarter).</td>
<td></td>
<td>No error checking will be performed on the imported MDC values. If an MDC is assigned, a DRG must also be assigned.</td>
</tr>
<tr>
<td><strong>OPTIONAL: SUPPORTS ADDITIONAL MONAHRQ FUNCTIONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of Stay</td>
<td>Number of days from admission to discharge</td>
<td>Optional</td>
<td>Statistics by length of stay will be excluded if this data element is missing.</td>
<td>Source value</td>
<td>Calculate if needed, from discharge data and admission date. Same-day stay should be set to 0.</td>
</tr>
<tr>
<td>Primary Payer</td>
<td>Expected primary payer</td>
<td>Optional</td>
<td>Statistics by payer will be excluded if this data element is missing. Records with this data element missing will be retained and the value set to Other.</td>
<td>1: Medicare 2: Medicaid 3: Private/HMO (Health Maintenance Organization) 4: Self-pay 5: No charge 6: Other 0: Missing 99: Retain value &lt;Exclude from dataset&gt;</td>
<td>Source values, alpha or numeric, can be mapped to accepted numeric value (0–6, 99) or excluded during data value mapping.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
</tr>
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<td>-----------------------</td>
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</tr>
<tr>
<td>Patient State/County Code</td>
<td>FIPS State/county code of patient's residence</td>
<td>Optional</td>
<td>If this data element is missing, the discharge record will be excluded from area rate calculations and the Website Wizard cannot create maps by showing rates of preventable hospitalization by area. We recommend analyzing the area rates at the <em>State or metro-area level</em>. Otherwise, patients who reside outside the same county as the hospital will be included in the numerator but not the denominator. The larger the geographic unit of analysis, the less likely it is that this situation will occur. If patient codes are not available, the hospital's codes can be loaded. If the hospital FIPS codes are used instead of the patient FIPS codes, the area rates must be interpreted with caution.</td>
<td>Source value</td>
<td>We recommend using the patient FIPS State/county code. The Federal Information Processing Standard (FIPS) codes may be obtained at <a href="http://www.census.gov/popest/about/geo/codes.html">http://www.census.gov/popest/about/geo/codes.html</a>.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
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<td>-----------------</td>
</tr>
<tr>
<td>Race</td>
<td>Race/ethnicity of patient</td>
<td>Optional</td>
<td>Records with this data element missing will be retained and the value set to Other. The rates and utilization paths will not be stratified by race/ethnicity if the data element is completely missing.</td>
<td>1: White 2: Black 3: Hispanic 4: Asian or Pacific Islander 5: Native American 6: Other 0: Missing 99: Retain value &lt;Exclude from dataset&gt;</td>
<td>Source values, alpha or numeric, can be mapped to accepted numeric value (0–6, 99) or excluded during data value mapping.</td>
</tr>
<tr>
<td>Total Charge</td>
<td>Total charge associated with hospital stay</td>
<td>Optional</td>
<td>If this data element is not available, cost savings associated with reducing the level of potentially avoidable hospitalizations will not be included in summary report, costs and charges will be excluded from the utilization path, and cost will be excluded from the rates.</td>
<td>Source value. Must be integer (i.e., whole numbers only).</td>
<td>Must be integer: remove dollar signs and decimals (i.e., whole numbers only).</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
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</tr>
<tr>
<td>Age in Days</td>
<td>Age in days at admission (coded only when the age in years is less than 1)</td>
<td>Optional</td>
<td>Used in the inclusion and exclusion criteria for indicators addressing neonates or neonatal conditions and in the Pediatric Quality Indicators (PQIs). If this data element is missing (and age is 0), generally, an alternative specification applies.</td>
<td>Age in days only applies for age &lt; 1. If value is greater than 365, it will be changed to Missing.</td>
<td>Numeric: 0–364</td>
</tr>
<tr>
<td>Admission Type</td>
<td>Admission type</td>
<td>Optional</td>
<td>Used in the inclusion and exclusion criteria for several PSIs and PDIs. For indicators that rely on this field, records with this data element missing will be excluded from the denominator.</td>
<td>1: Emergency 2: Urgent 3: Elective 4: Newborn 5: Trauma center 6: Other 0: Missing &lt;Exclude from dataset&gt;</td>
<td>No data preparation needed. If loading discharge data into MONAHRQ, source values, alpha or numeric, will be mapped to accepted numeric values (0–6) or excluded during data load.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
</tr>
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</tr>
</tbody>
</table>
| Admission Source      | Admission source | Optional | Used in the inclusion and exclusion criteria for several PQIs, PDIs, PSIs, and IQIs. For indicators that rely on this field, records with this data element missing will be excluded from the denominator. | 1: Emergency room  
2: Another hospital  
3: Another health facility, including long-term care  
4: Court/law enforcement  
5: Routine/birth/other  
0: Missing | No data preparation needed. If loading discharge data into MONAHRQ, source values, alpha or numeric, will be mapped to accepted numeric values (0–5) or excluded during data load. Note: Admission Source uses HCUP uniform coding, which is a collapsed version of the UB-92 specifications, effective through September 2007. The UB-92 Admission Source codes must be mapped to HCUP uniform categories. |
| Point of Origin        | Original source of admission | Optional | Used in the inclusion and exclusion criteria for several PQIs, PSIs, and IQIs. For indicators that rely on this field, records with this data element missing will be excluded from the denominator. | When Admission Type is not "newborn":  
1: Non-Health Care Facility  
2: Clinic or Physician’s Office  
4: Transfer from a Hospital  
5: Transfer from a Nursing Facility  
6: Transfer from Another Health Care Facility  
7: Emergency Room  
8: Court/Law Enforcement  
11: Transfer from | No data preparation needed. If loading discharge data into MONAHRQ, source values, alpha or numeric, will be mapped to accepted numeric values (0–8, 11–15) or excluded during data load. Note: Point of Origin coding matches the UB-04 specifications, effective beginning October 2007. |
<table>
<thead>
<tr>
<th>MONAHRQ Variable Name</th>
<th>Description</th>
<th>Required/Optional</th>
<th>Ramifications of Exclusion</th>
<th>Default Element Coding</th>
<th>Data Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point of Origin - continued</td>
<td>Another Home Health Agency 12: Readmission to Same Home Health Agency 13: Transfer from One Distinct Unit to Another Unit in Same Hospital 14: Transfer from Ambulatory Surgery Center 11: Transfer from Hospice 5: Born inside this Hospital 6: Born outside of this Hospital</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*When Admission Type is “newborn”:* 5: Born inside this Hospital 6: Born outside of this Hospital
<table>
<thead>
<tr>
<th>MONAHRQ Variable Name</th>
<th>Description</th>
<th>Required/Optional</th>
<th>Ramifications of Exclusion</th>
<th>Default Element Coding</th>
<th>Data Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birthweight in Grams</td>
<td>Birthweight for newborns</td>
<td>Optional</td>
<td>Optional data element that is passed directly to the APR-DRG Grouper in the AHRQ QI software. If this data element is not available, value will be set to default in the grouper software. This field is not used as stratification criteria; ICD-9-CM diagnosis codes are used to indicate birthweight.</td>
<td>Source value</td>
<td>If value greater is than 7,000, value will be changed to Missing because higher values are considered invalid birthweights.</td>
</tr>
<tr>
<td>Days on Mechanical Ventilator</td>
<td>Number of days the patient spent on a mechanical ventilator</td>
<td>Optional</td>
<td>Optional data element is passed directly to the APR-DRG Grouper in the AHRQ QI software. If this data element is not available, value will be set to default in the grouper software.</td>
<td>Source value</td>
<td></td>
</tr>
<tr>
<td>Days to Procedure, 1–30</td>
<td>Days from admission to procedure. Procedure 1 is the principal procedure; procedures 2–30 are secondary procedures.</td>
<td>Optional</td>
<td>Used in several PSIs and PDIs. If this data element is not available, an alternative logic applies.</td>
<td>Source value</td>
<td>If the data element does not exist, it should be calculated from the admission date and the procedure date(s). The number of Days to Procedure variables should agree with the number of procedure codes present.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
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</tr>
<tr>
<td>Discharge Disposition</td>
<td>Disposition of patient</td>
<td>Optional</td>
<td>Used in the inclusion and exclusion criteria for several PQIs, PDIs, PSIs, and IQIs. For indicators that rely on this field, records with this data element missing will be excluded from the denominator.</td>
<td>1: Routine 2: Short-term hospital 3: Skilled nursing facility 4: Intermediate care 5: Another type of facility 6: Home health care 7: Against medical advice 20: Died in the hospital 0: Missing 99: Discharged alive, destination unknown &lt;Exclude from dataset&gt;</td>
<td>No data preparation needed. If loading discharge data into MONAHRQ, source values, alpha or numeric, will be mapped to accepted numeric values (0–7, 20, 99) or excluded during data load. Note: Discharge Disposition uses HCUP uniform coding, which is a collapsed version of the UB-04 (or UB-92) specifications. The UB Discharge Disposition codes must be mapped to HCUP uniform categories.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
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</tr>
<tr>
<td>Present on Admission, 1–35</td>
<td>Flag indicating whether diagnosis was present on admission (POA)</td>
<td>Optional</td>
<td>POA data elements may eliminate false positives from PSI results. IMPORTANT: If POA flags are used in the AHRQ QI software, a different set of risk adjustment covariates and reference population rates will be applied.</td>
<td>1 = present at the time of inpatient admission; undetermined; exempt 0 = not present at the time of inpatient admission</td>
<td>POA flag should be included for all records or none of the records. Mixing records with and without POA could adversely affect the expected rates. Please see Table 13 in Appendix K for a more detailed coding explanation for POA.</td>
</tr>
<tr>
<td>Custom Stratifier, 1–3</td>
<td>Custom stratification values</td>
<td>Optional</td>
<td>Custom stratifiers can be used in the reports section of the software (e.g., a user could stratify by type of hospital—teaching or nonteaching). This data element has no effect on the generated HTML pages.</td>
<td></td>
<td>May be used with the AHRQ QI software for Windows.</td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------------------</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Key</td>
<td>Unique case identifier</td>
<td>Optional</td>
<td>If this data element is not available, users cannot link the discharge records in the Patient-Level Report back to the input data file.</td>
<td>Source value</td>
<td>Maximum length: 20 characters</td>
</tr>
<tr>
<td>Admission Date</td>
<td>Date of patient admission for identification purposes only</td>
<td>Optional</td>
<td>None</td>
<td>It is recommended that you DO NOT USE this field.</td>
<td></td>
</tr>
<tr>
<td>Date of Birth</td>
<td>Patient date of birth for identification purposes only</td>
<td>Optional</td>
<td>None</td>
<td>It is recommended that you DO NOT USE this field.</td>
<td></td>
</tr>
<tr>
<td>Discharge Date</td>
<td>Date of patient discharge for identification purposes only</td>
<td>Optional</td>
<td>None</td>
<td>It is recommended that you DO NOT USE this field.</td>
<td></td>
</tr>
<tr>
<td>MONAHRQ Variable Name</td>
<td>Description</td>
<td>Required/ Optional</td>
<td>Ramifications of Exclusion</td>
<td>Default Element Coding</td>
<td>Data Preparation</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------</td>
<td>--------------------</td>
<td>---------------------------</td>
<td>------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Patient ID</td>
<td>Patient ID or medical record number for identification purposes only</td>
<td>Optional</td>
<td>None</td>
<td>It is recommended that you DO NOT USE this field unless required for external analysis.</td>
<td>It is recommended that you DO NOT USE this field.</td>
</tr>
</tbody>
</table>
## APPENDIX K. SPECIAL CONSIDERATIONS FOR DATA ELEMENTS

### Table 13: Present-on-Admission Coding

<table>
<thead>
<tr>
<th>UB-04 Coding</th>
<th>UB-04 Description</th>
<th>AHRQ QI Data Values</th>
<th>AHRQ QI Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y – Yes</td>
<td>Present at the time of inpatient admission</td>
<td>1</td>
<td>Diagnosis present at admission</td>
</tr>
<tr>
<td>N – No</td>
<td>Not present at the time of inpatient admission</td>
<td>0</td>
<td>Diagnosis not present at admission</td>
</tr>
<tr>
<td>U – Unknown</td>
<td>Documentation is insufficient to determine if condition is present on admission (POA)</td>
<td>0</td>
<td>Diagnosis not present at admission</td>
</tr>
<tr>
<td>W – Clinically undetermined</td>
<td>Provider is unable to clinically determine whether or not condition was POA</td>
<td>1</td>
<td>Diagnosis present at admission</td>
</tr>
<tr>
<td>E – Unreported/Not used</td>
<td>Exempt from POA reporting</td>
<td>1</td>
<td>Diagnosis present at admission</td>
</tr>
<tr>
<td>1 – Yes</td>
<td>Present at the time of inpatient admission</td>
<td>1</td>
<td>Diagnosis present at admission</td>
</tr>
<tr>
<td>0 – No</td>
<td>Not present at the time of inpatient admission</td>
<td>0</td>
<td>Diagnosis not present at admission</td>
</tr>
<tr>
<td>Blank</td>
<td>Missing</td>
<td>Blank</td>
<td>Missing</td>
</tr>
</tbody>
</table>

*Note: Effective July 1, 2011, the UB-04 specifications accept values of ‘1’ for “Exempt from POA reporting.” If your data utilize this definition, apply a recode prior to building your MONAHRQ Web site.*
There are several supplemental data files embedded in the MONAHRQ software. The following provides a summary of these files, explains how the files are used in the software, and provides links for additional information.

Table 14. MONAHRQ Supplemental Files

<table>
<thead>
<tr>
<th>File</th>
<th>Where Used in MONAHRQ-Generated Web Site</th>
<th>Purpose</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-to-charge ratio files</td>
<td>Hospital Utilization Avoidable Hospital Stays</td>
<td>Estimate hospital costs based on charges.</td>
<td>Cost-to-charge-ratio files from the AHRQ Healthcare Cost and Utilization project (HCUP) (<a href="http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp">http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp</a>)</td>
</tr>
<tr>
<td>Diagnosis Related Groups (DRG)</td>
<td>Hospital Utilization County Rates</td>
<td>Assign Medicare Severity DRG (MS-DRG) and Major Diagnostic Category (MDC) groupings to each hospital discharge record. DRG and MS-DRG groupings are assigned based on discharge date.</td>
<td>Innovative Resources for Payors (IRP) DRG Grouper (through FY 2011)</td>
</tr>
<tr>
<td>Census population data</td>
<td>Avoidable Hospital Stays County Rates</td>
<td>Provide denominators for area-level calculations.</td>
<td>Included in the AHRQ Quality Indicator software for Windows; originally obtained by AHRQ from the US Census Bureau (<a href="http://www.census.gov/popest/data">http://www.census.gov/popest/data</a>)</td>
</tr>
<tr>
<td>Map Shape Files</td>
<td>Avoidable Hospital Stays County Rates</td>
<td>Provides Census boundary files for mapping software</td>
<td>Obtained from the US Census Bureau (2010 files used; <a href="http://www.census.gov/geo/www/cob/index.html">http://www.census.gov/geo/www/cob/index.html</a>)</td>
</tr>
</tbody>
</table>
| Benchmarks for AHRQ Quality Indicators | Hospital Quality Ratings                 | Provide two types of pre-calculated benchmarks for the AHRQ Quality Indicators:  
- Nationwide  
| Benchmarks for hospital utilization and county rates | Hospital Utilization County Rates | Provide two types of pre-calculated regional and national benchmarks for hospital and county rates and utilization:  
- Nationwide  
<table>
<thead>
<tr>
<th>File</th>
<th>Where Used in MONAHRQ-Generated Web Site</th>
<th>Purpose</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dartmouth Atlas Hospital Referral Region (HRR) and Hospital Service Area (HSA) files</td>
<td>Hospital Quality Ratings, Hospital Utilization</td>
<td>Map hospitals to HRR or HSA regions. These are optionally used in the Web site to select hospitals by region.</td>
<td>HRR and HSA files (accessed 2010; <a href="http://www.dartmouthatlas.org/">http://www.dartmouthatlas.org/</a>)</td>
</tr>
<tr>
<td>DRG and Clinical Classifications Software (CCS) Label Files</td>
<td>Hospital Utilization, County Rates</td>
<td>Group ICD-9-CM diagnosis and procedure codes into meaningful clinical categories. These are used in the Web site to select conditions or procedures.</td>
<td>DRG and CCS labels are obtained from HCUP (<a href="http://hcup-us.ahrq.gov/">http://hcup-us.ahrq.gov/</a>)</td>
</tr>
</tbody>
</table>