Sustainability Guide Part 1: Processes for updating measure and website content

Contents

Introduction

The Sustainability Guide (Guide) outlines the processes by which current and future users of the MONAHRQ software (Host Users) can maintain and update the measures, included data sources, and content of their MONAHRQ-generated website. This guide is based on the processes used by the MONAHRQ team at the Agency for Healthcare Research and Quality to maintain and update MONAHRQ. This Guide addresses how to:

- Review, analyze and edit existing measures and datasets under consideration using standard criteria;
- Document key information about measures and datasets;
- Assign new measures to a health topic and subtopic; and
- Create plain language labels and descriptions for new measures.

To keep the MONAHRQ software up-to-date, it is important to review the current measures, datasets, and website content within your MONAHRQ-generated website on a regular basis. For instance, a measure may no longer be supported within a dataset, an infographic fact could become outdated based on more recent research findings, or a URL that links to a different website may no longer function. This Guide explains how to determine if measures from the following sources included in MONAHRQ need updating:

- AHRQ Quality Indicators (AHRQ QIs)
- Centers for Medicare & Medicaid Services (CMS) Hospital Compare dataset
- CMS Nursing Home Compare dataset
- CMS Physician Compare dataset
- Nursing Home Consumer Assessment of Healthcare Providers & Systems (NH CAHPS)
- CAHPS Clinician & Group Survey (CG CAHPS)
- Healthcare Effectiveness Data and Information Set (HEDIS)

Additionally, newly available sources of datasets and measures should be reviewed to determine if additional content should be integrated into MONAHRQ. For example, within the last few years, MONAHRQ has been updated to include additional datasets from Nursing Home Compare, Physician Compare, CG CAHPS, and NH CAHPS. The Hospital Compare dataset is also regularly updated with new measures being added and unsupported measures removed.

Lastly, the Guide provides information on how to update the content of your MONAHRQ-generated website, including the health topic infographics and the sections that describe the website, such as “About this Site,” “Resources” and “About the Quality Ratings”.

The information provided in this Guide should be used in coordination with other MONAHRQ user guides, including:

- Host User Guide 7—The Host User Guide provides detailed instructions on how to install the MONAHRQ software, load your data, and generate a reporting website. We strongly recommend you follow the MONAHRQ Host User Guide during installation.

- Quick Start Guide 7—The Quick Start Guide highlights changes from MONAHRQ 6.0 Build 2. It is designed to guide Host Users as they upgrade their software to MONAHRQ 7 or install MONAHRQ for the first time.
- Measure List 7—The Measure List is an easy-to-reference spreadsheet listing all of the measures available in MONAHRQ 7. The Measure List reflects the default measure label that is provided in MONAHRQ 7.
- Release Notes 7—The Release Notes reflect information on the specific changes in addition to the information about the new features and changes in the newest version of MONAHRQ.
- Fact Sheet 7—The Fact Sheet is an overview of MONAHRQ 7 and its capabilities.

Throughout this Guide, the above resources are referenced as needed to provide additional information or detail.

Updates to current MONAHRQ datasets, source data, and measures

This section explains the process of reviewing which measures need updating within the current MONAHRQ 7 datasets, source data, and measures including AHRQ QIs, CMS Hospital Compare, CMS Nursing Home Compare, NH CAHPS, CG CAHPS, and HEDIS.

Host Users should follow the steps laid out below to review the original measure source data for changes to the measure definitions or the inclusion/exclusion of measures to provide End Users with the most current and up-to-date health care quality reports. In the first step, each dataset, source data or measures are reviewed to determine if there are updates to the included measures. Updates to the included measures can consist of the original source steward changing the measure definitions, or retiring old measures. For example, in 2015, HEDIS changed the diabetes blood pressure control measure from <140/80 mm Hg to <140/90 mm Hg based on the updated guidelines from the Joint National Committee. In addition, HEDIS retired the LDL-C screening and control as quality measures for comprehensive diabetes care because it was no longer part of the American College of Cardiology/American Heart Association clinical practice guidelines for blood cholesterol treatment. In the second step, new measures that were not previously available from the source are reviewed based on a standard criteria to decide if they should be included within MONAHRQ. Each of these criteria is detailed below. Appendix C provides the approximate level of effort needed to complete the updates based on the time and technical skill required for each activity.

Step 1. Reviewing datasets for updates

To determine what additional or new measures may be available for each dataset, the Host User should compare the MONAHRQ Measure List 7 to the list of measures on the datasets stewards' website. The Host User should note any differences between the measure lists.

Exhibit 1 below provides information for each of the sources of MONAHRQ measures or datasets, including the steward, additional considerations when reviewing the list, and the steward's website.

Exhibit 1. Reviewing updates to current MONAHRQ datasets and measures

Dataset or Measures	Steward	Additional considerations when reviewing	Website
AHRQ QIs	AHRQ	Not all of the QIs are currently included in MONAHRQ – see Measure List 7 for a detailed list of current measures. Host Users produce AHRQ QI rates, which can be updated in MONAHRQ on an annual basis.	www.qualityindicators.ahrq.gov
Hospital Compare	CMS	Not all of the Hospital Compare measures are included in MONAHRQ – see Measure List 7 for a detailed list of current measures. CMS updates the Hospital Compare measures and datasets regularly. Some updates to the Hospital Compare measures will impact the methodology for calculating hospital star ratings. It is useful to subscribe to newsletters from CMS about Hospital Compare, which include updates to datasets and methodology. When adding a new measure in MONAHRQ, make sure that the new measure fits well into one of the existing comparison methodologies. See appendix B for hospital comparison methodologies used in MONAHRQ	www.medicare.gov/hospitalcompare/Data/Data-Updated.html
Nursing Home Compare	CMS	Updates to the Nursing Home Compare measures may impact the methodology for calculating nursing home star ratings. It is useful to subscribe to newsletters from CMS about Nursing Home Compare, which include updates to datasets and methodology.	www.medicare.gov/NursingHomeCompare/Data/Current-Data-Collection-Period.html
NH CAHPS	AHRQ	Host Users upload their own data into MONAHRQ and can refresh the data on a regular basis.	www.ahrq.gov/cahps/surveys-guidance/nh/about/index.html
Physician Compare	CMS	The Physician Compare data used within MONAHRQ does not include any quality measures. The physician profile includes addresses, specialties, Medicare assignment, board certification, participation in quality programs, gender, education, medical group, and hospital information. The information on Physician Compare comes primarily from the Provider, Enrollment, Chain, and Ownership System. PECOS data is checked against Medicare claims data. It can take 3-6 months for	https://www.medicare.gov/physiciancompare/staticpages/about physiciancompare/about.html

Dataset or Measures	Steward	Additional considerations when reviewing	Website
		new physicians, other health care professionals, and group practices to be added to Physician Compare after they enroll in Medicare. Host Users should check Physician Compare regularly to find new listings and update existing listings.	
CG CAHPS	AHRQ	MONAHRQ currently uses CG CAHPS 2.0. AHRQ regularly updates the CAHPS survey. Host Users should monitor AHRQs CG CAHPS website for updated versions. Host Users upload their own data into MONAHRQ and can refresh the data on a regular basis. .	www.ahrq.gov/cahps/surveys-guidance/cg/about/index.html
HEDIS	National Committee for Quality Assurance (NCQA)	The HEDIS measures included in MONAHRQ focus on those that appear to be more useful for consumer decision making versus those used for clinical quality improvement. See Measure List 7 for a detailed list of HEDIS measures included in MONAHRQ 7. Comprehensive HEDIS measure information is available for purchase from NCQA. Some updated information about HEDIS measures is available online, including why measures have been retired, changes to measure inclusion or exclusion criteria, and changes in how the measures are calculated measure calculations. Host users provide the relevant data for the HEDIS measures and can refresh the data on a regular basis.	http://www.ncqa.org/hedis-quality-measurement/hedis-measures

Step 2. Deciding to add or remove measures being reported in MONAHRQ

Host Users of MONARHQ are able to decide which of the current measures to include in the reports in your MONAHRQ-generated website. For detailed instructions on how to remove any of the measures from displaying in your MONAHRQ reports, review Chapter 6, Section 2 – Add, Edit, or Remove Topics/Conditions and Subtopics in the Host User Guide 7.

Host Users should note that not all measures from sources of measures or datasets listed in Exhibit 1 have been included in MONAHRQ, as information overload can hinder understanding of comparative reports: the more information present, the more difficulty End Users[1] have using the information. When deciding which measures to include in your MONAHRQ-generated

[1]An End User is a person who accesses a website report generated by MONAHRQ.

website as an option for reporting, the MONAHRQ AHRQ team used standard criteria to evaluate the reliability, usefulness, and relevance of measures to End Users.

Criteria for reviewing measures for inclusion

1. Availability of data
2. Evidence-base or endorsement
3. Variation in data results
4. Interest in measures by key audiences

Ultimately, when deciding whether to add a measure to MONAHRQ, these criteria can provide a general sense of the measure's potential value and concerns. You may want to use these criteria along with your understanding of what is most important to the key audiences of your MONAHRQ-generated website to determine which measures are the best to include. The following sections describe how to apply the four criteria when deciding whether to add new measures that can be reported in your MONAHRQ-generated website.

Availability of data for a given measure

One hindrance to creating accurate health care quality reports is the need for a large volume of reliable and standardized health care data to populate the quality measures. Data can be unavailable or unreliable for several reasons, including lack of access to data, reporting errors, small sample size, and the amount of provider-to-provider variation. As a result, certain providers—particularly those with a limited number of staff members or health information technology resources—are at greater risk of having the quality measure results not accurately reflect the quality of care being provided. It is important to review your available data to determine if there are enough data points (e.g. observations) to ensure that the calculated measure results are reliable. Note that MONAHRQ will display the statement "Not Enough Data to Report" when the amount of data underlying the result is very small. Host Users can decide to include or exclude measures on a case by case basis based on their knowledge of the data that they will have available for the dataset or measures to report on their MONAHRQ website.

Comparative reports of health care quality may be of limited use for your website or report End Users if many of the measure results associated with each provider are labelled as "Not Enough Data to Report." For example, research has shown that consumers may react negatively when no data is available to report[2]. You should consider the impact of data availability on the reliability and validity of the performance measures results, in addition to the report's perceived relevance to your website or reporting End Users when determining which new measures to include.

Evidence-based or endorsement

Examining the evidence base for a measure is important to determine if a measure is reliable. Frequently this is done by examining whether a measure has been endorsed by the National Quality Forum (NQF). NQF uses a rigorous process for assessing measures for endorsement.

[2] American Institutes for Research (2012) Present missing data clearly. Robert Wood Johnson Foundation

Determining whether a measure is NQF-endorsed is done by checking the NQF Quality Positioning System database. Even if a measure has been considered but was not endorsed by NQF, the information in the NQF database is useful to learn about any methodological concerns with a specific measure. Measures are periodically reviewed by NQF and other organizations, therefore, you may want to check the NQF database at least annually to see if there have been any updates to address previous concerns.

Variation in the results being presented

It is important to review the measure results for variation to ensure that the comparative report will be useful for End Users. Comparative reports may lose their value when the measure results do not vary significantly across providers. For instance, if all providers clustered tightly together in their performance, the comparative report does not distinguish one provider as better than the other. This may not be useful for End Users who are trying to distinguish the differences in quality performance among providers.

Interest in measures by key audiences

The last criteria addresses whether or not End Users will be interested in the measures that are being considered for inclusion in the MONAHRQ reports. This will be a judgment call based on your understanding of the target audiences or End Users for your MONAHRQ-generated website. For example, if consumers will be the primary End User, consider whether consumers will find the measures relevant to their concerns and typical decisions. For more information on this topic, see the resource list at the end of this Guide.

Removing measures that are no longer supported

In addition to reviewing whether there are measures to add, you should determine if any measures should be removed because the measure has been retired or is no longer used by the original measure source (e.g., AHRQ, CMS, HEDIS). A measure may be retired or removed from a dataset if there is evidence that the measure is no longer a valid quality measure or may no longer be accurate. For example, a measure may no longer be valid or accurate due to changes in administrative coding for related health conditions and/or procedures, or due to changes in its inclusion or exclusion criteria. If you find that a measure has been retired, consider removing it from your MONAHRQ site.

Step 3. Incorporating new measures into existing datasets

Measure attributes

Once a decision has been made to add a new measure into MONAHRQ and associated with an existing dataset, certain information is required so the MONAHRQ software appropriately integrates and correctly displays the measure. Exhibit 2 below details the information needed for each added measure.

Exhibit 2: New Measure Attributes

Attribute	Where the information is found	Example
Measure ID	May be assigned as part of the source dataset	MORT-30-COPD
Measure Name	Measure specification	COPD 30-day mortality rate
Measurement type	Measure specification	Outcome
Scoring	Measure specification	Lower score is better
Scale	Measure specification	Percent, 100
Risk-Adjustment	Measure specification	Yes
NQF-endorsement	NQF Quality Positioning System database	Yes
NQF Endorsement Number	NQF Quality Positioning System database	NQF #1893

In addition to this information, each measure needs to be assigned to a MONAHRQ health topic and subtopic. Each new measure also needs a plain language label and description.

Hospital measure topic and subtopic

The MONAHRQ hospital quality measures are organized into health topics or by information that is likely of interest to End Users. Health topics group together similar health conditions (e.g. heart failure) or content (e.g. imaging), considering what would be most useful to the End Users. Any new hospital quality measure will need to be assigned to both a health topic and a relevant subtopic. Exhibit 3 lists the descriptions of the health topics available in MONAHRQ 7 from which you can select when adding a new measure:

Exhibit 3: MONAHRQ 7 Health topics

Health Topic	Content Description
Childbirth	Ratings about care for new mothers and newborns including information about how often and when C-sections and vaginal births occur.
COPD (Chronic Obstructive Pulmonary Disease)	Ratings about treatment for people who have certain lung diseases that block airflow and make it hard to breathe. Two types of COPD are chronic bronchitis and emphysema.
Combined quality and safety rating	Ratings that combine more than one measure result into a single score. Composite ratings provide a summary of quality or performance.
Emergency department (ED)	Ratings about care that people received when they visited a hospital's emergency department.
Health Care Cost and Quality	Displays of cost and quality in the same report. Higher costs do not necessarily mean that a provider is offering higher-quality care. Health care quality is doing the right thing, at the right time, in the right way. By considering both together, you can find a provider who offers high quality care at an affordable cost.
Heart attack and chest pain	Ratings about heart attack care. A heart attack, also called an acute myocardial infarction (AMI), happens when the arteries leading to the heart become blocked and the blood supply slows or stops.

Health Topic	Content Description
Heart failure	Ratings about care for heart failure. Heart failure or congestive heart failure is a weakening of the heart's pumping power that prevents the body from getting enough oxygen and nutrients to meet its needs.
Heart surgeries and procedures	Ratings about surgeries and procedures related to the heart such as angioplasty and coronary bypass surgery.
Hip and knee replacement surgery	Ratings about surgeries that use artificial joints to replace hips and knees to relieve pain and restore function.
Imaging	Ratings about whether magnetic resonance imaging (MRI) and computerized tomography (CT scans) were performed safely and only when needed.
Infections	Ratings about how well hospitals keep patients from getting diseases while in the hospital. Healthcare surgeries or procedures can leave you exposed to germs that cause new infections. These germs can be spread from patient to patient on unclean hands of healthcare workers or through unclean equipment.
Patient safety	Ratings about how safe the hospital is for patients. Many medical mistakes can be prevented when hospital staff take the right steps.
Patient survey results	Ratings from the HCAHPS. HCAHPS is a national, standardized survey of hospital patients that asks patients about their experiences during a recent hospital stay.
Pneumonia	Ratings about pneumonia care. Pneumonia is a serious lung infection that can cause difficulty breathing, fever, cough, and fatigue.
Stroke	Ratings about stroke care. A stroke happens when the blood supply to the brain stops. This topic includes carotid endarterectomy surgery, an operation intended to prevent stroke.
Surgeries for Specific Health Conditions	Ratings about surgeries other than heart surgery, such as brain surgery (craniotomy) and gallbladder removal surgery.
Surgical patient safety	Ratings about how safe the hospital is for patients having surgery. Many medical complications can be avoided if patients receive the right care before, during, and after surgery.

Within each health topic, hospital quality measures are grouped by the aspects of health care quality that they measure. Some subtopics are specific to a health topic (e.g. infections resulting from hospital care are under the “Infections” topic) while others are used across health topics (e.g. results of care).

The three most common subtopics included under the health topics on MONAHRQ are:

- **Recommended care:** Information on how many patients received the care they needed such as the right medicine, surgery, or advice. These ratings are sometimes called process measures.

- **Results of care:** Information about patients' health while being cared for in the hospital or after leaving the hospital. These ratings are sometimes called outcome measures.

- **Practice patterns:** Information about the types of care provided in the hospital such as information about the numbers and types of surgeries or procedures a hospital performs.

A full list of the MONAHRQ health topics and subtopics are provided in Appendix A.

In addition, the existing labels of the health topics and subtopics can be edited by Host Users. Editing or changing the health topic or subtopic label may be helpful when Host Users add new measures within a health topic or subtopic so the label better reflects the updated content. A different label can also be used to better reflect local conditions or understanding of the content. To see how to customize or edit health topic or subtopic labels for your MONAHRQ-generated website, review Chapter 6, Section 1 – Managing and Customizing Measures in the Host User Guide 7.

Creating plain language labels and descriptions

End Users of your MONAHRQ-generated reports are not likely to use quality measure results if they do not understand them. Therefore, for any website or reports intended for use by consumers, it is necessary that each measure be described in a way that eliminates clinical jargon and makes sense to people who do not have medical training. A measure such as "*Obstetric Trauma Rate - Vaginal Delivery Without Instrument*" can be explained as "*How often women who give birth vaginally, without forceps or vacuum, get a serious vaginal tear*." Using plain language reduces complexity and enhances the relevance of the measure information to your End Users, without sacrificing its meaning.

Similarly, a plain language measure description can provide additional information to the End User about how to interpret the measure result and its relevance to quality. Continuing the example above, the description for the Obstetric Trauma Rate says, "*How often a woman experiences a tear (trauma) to her perineum - the area between her vagina and rectum - while giving birth. Such tears, which can happen even when medical instruments are not used, are often preventable.*"

More guidance on creating plain language content can be found in the Additional Resources section below.

How to update website content

Content within a MONAHRQ-generated website needs to be reviewed and updated on a regular basis. Information within the health topic infographics may become outdated as new research findings become available. Content within the "About This Site" page may need updating as new datasets and measures are added or if the methodology for calculating scores is updated. Links to external websites need to be checked to ensure that the links still lead to the correct content. If not, the information can be removed or replaced.

The health topic infographics combine basic information about diseases, conditions and health measurement, along with practical advice for consumers. The goal of the infographics is to provide basic information in an engaging manner, to help consumers understand why certain

measure results in MONAHRQ-generated websites or reports might be important to consider as they choose a health care provider or work with their current providers.

Text in the health topic infographics is adapted from credible, trustworthy sources, including the National Library of Medicine' Medline Plus website, the National Institutes of Health, the Centers for Disease Control and Prevention, and the Agency for Healthcare Research and Quality. While most of the text in the infographics is unlikely to become outdated, some infographics include statistics about risk factors or prevalence of certain conditions that could become obsolete or inaccurate over time.

Facts and statistics in the infographics generally have footnotes identifying the source material. The sources listed in the footnotes should be checked to see if a more recent version is available. For example, sources such as the CDC's morbidity and mortality data are updated annually. Using information from federal agencies or from reputable sources such as medical specialty societies will help ensure that infographic text remains accurate, unbiased and trusted. Chapter 8, Section 5.3 – Customizing Your Website – Website Pages Tab in the Host User Guide 7 describes the process for how to update the facts for an existing topic.

Step 4. Updating the content that describes the website

As you update any datasets, measures, and methodologies, it is possible that parallel changes will be needed on the "About This Site" section on the consumer version of the MONAHRQ-generated website and the "Resources" and "About the Quality Ratings" sections on the professional version of the MONAHRQ-generated website. These parts of the MONAHRQ-generated websites describe the datasets, measures, and methodologies in an easy-to-understand, plain language format. This content is essential to providing transparency and building trust in the website information.

Step 5. Updating external website links

The "About This Site" section on the consumer version of the MONAHRQ-generated website and the "Resources" and "About the Quality Ratings" sections on the professional version of the MONAHRQ-generated website provide information and links to additional resources about health care quality and the measures being used. Consumers and professionals can use these resources to understand health care quality, why it is important, and how to use quality ratings.

The links within the text of each topic should be checked regularly to ensure that they are still valid and link to the correct external website. If a link goes to a website or resource that is no longer available, search for an updated link on the target website or a suitable replacement. For example, if the link connects to an invalid AHRQ page, search the AHRQ website first for related content. If an appropriate page cannot be found on the target website, search for another credible, trustworthy source for similar content, such as other federal agencies or reputable medical sources. Reputable sources ensure that the information provided is evidence-based and unbiased, and builds End Users' trust in the website.

It may be difficult to find a replacement link. If a replacement link cannot be found, the outdated link and associated text should be removed.

Resources

Best practices in public reporting of quality

AHRQ's TalkingQuality website – Guidance for developers of public reports on health care quality regarding how to produce comparative information that is understandable and useful to consumers.

AHRQ's Building the Science of Public Reporting grants research findings – A special issue of *Health Services Research* that highlights the findings from AHRQ-funded research on the science of public reporting.

Lessons Learned from Aligning Forces for Quality (AF4Q) – Lessons learned from the Robert Wood Johnson Foundations' AF4Q sites about how to accurately measure and publicly report the quality of care delivered by local medical practices.

Information about health care quality datasets and measures

AHRQ Quality Indicators - The AHRQ QIs are measures of health care quality that make use of readily available hospital inpatient administrative data. The AHRQ QIs include quality indicators for prevention, inpatient care, patient safety and pediatrics. MONAHRQ-generated websites and reports display measure results calculated by the AHRQ QI software version 4.5 using hospital discharge data.

CMS Hospital Compare - CMS publicly reports a range of hospital quality ratings on its website, Hospital Compare. More than 4,500 U.S. hospitals report performance information to Hospital Compare.

CMS Nursing Home Compare - Nursing Home Compare collects information about 15,000+ Medicare and Medicaid-certified nursing homes across the country. Nursing home quality ratings are based on the following information: (1) health and safety inspections conducted by a state agency at least once a year in each nursing home; and (2) regular assessments, conducted by each nursing home, covering residents' health, physical functioning, mental status and general well-being.

AHRQ Nursing Home Survey (NH-CAHPS) - NH-CAHPS provides information on the experiences of nursing home residents and their family members.

AHRQ Clinician & Group Survey (CG-CAHPS) - CG-CAHPS asks patients to rate their recent experiences with their doctors and the staff in their doctors' medical group.

NCQA Healthcare Effectiveness Data and Information Set - HEDIS measures report the percentage of patients receiving the appropriate care from their medical practice for health issues such as diabetes, asthma, and high blood pressure.

National Quality Forum Quality Positioning System - NQF's measure search tool displays NQF-endorsed measures by measure title or number, as well as by condition, care setting, or

measure steward. The NQF Reports Directory provides reports regarding measure endorsement, measure use, and establishing national healthcare priorities. Endorsement Summaries provide basic details on newly endorsed measures, measures that were considered but not endorsed, various ways in which measures can be used, and the measure gaps that need to be filled.

Appendix A. Full list of hospital topics and subtopics

MONAHRQ 7 topics	MONAHRQ 7 Subtopics
Childbirth	Practice Patterns
	Results of Care
Combined quality and safety ratings	Deaths
	Patient Safety
COPD (Chronic Obstructive Pulmonary Disease)	Results of Care
Emergency department (ED)	Waiting times
Health care cost and quality	Heart Surgeries and Procedures
	Hip replacement surgery
Heart attack and chest pain	Recommended Care - Inpatient
	Recommended Care - Outpatient
	Results of Care
Heart failure	Recommended Care
	Results of Care
Heart surgeries and procedures	Recommended Care
	Results of Care
Hip or knee replacement surgery	Results of Care
Imaging	Practice Patterns
Infections	Infections resulting from hospital care
Patient safety	Results of Care - Complications
	Results of Care - Deaths
Patient survey results	Communication
	Environment
	Satisfaction Overall
Pneumonia	Recommended Care
	Results of Care
Stroke	Results of Care
Surgeries for specific health conditions	Practice Patterns
	Recommended Care
	Results of Care - Deaths
Surgical patient safety	Recommended Care After Surgery
	Recommended Care Before Surgery
	Results of Care

Appendix B. Hospital Comparison Methodology

MONAHRQ's hospital quality component includes measures from two sources, namely AHRQ's QI and CMS's Hospital Compare. A hospital is rated as better than average, average, or below average on a measure in MONAHRQ by comparing to national or regional average/benchmark. Its method of comparing the quality measures of individual hospitals with National or regional benchmark is thus a mix of the two sources.

For AHRQ QI measure. MONAHRQ compares the measure's risk-adjusted rate (with 95% CI) for a hospital with national or regional average. Some quick notes: 1. QI measures are generally

rates, e.g. mortality rate after hip fracture, and volume of conditions/surgical procedures (not compared in MONAHRQ); 2. Measure results (rates) of individual hospital are risk adjusted and have 95% confidence intervals; 3. Either national average or regional average of a measure is a rate without CI; 4. National average is obtained using SID of 44 states. QI project releases the national average for each measure regularly; 5. Regional average is a calculated as a mean of the risk adjusted rates or observed rates (depending upon the measure type) of the hospitals in the geographical context, e.g. state. Assuming higher rate is better,

Hospital is better than average if the measure's CI lower bound > national average
Hospital is below average if the measure's CI upper bound < national estimate
Hospital is average if national average is within the measure's CI upper bound and lower bound.

For CMS Hospital Compare measures. Three different measures types are handled differently in MOAHRQ. Data on individual hospital and national average/benchmark come from the Hospital Compare data downloaded from CMS website. Regional average/benchmark is calculated by MONAHRQ. Assuming higher rate/number is better,

First, Patient Experience and Process Measures – CMS doesn't provide high and low CI values at the hospital level. So, national/regional benchmark high and low cutoff is computed such that, the rate associated with top 10th percentile across all hospitals in the nation forms the higher cutoff and the national point average is the lower cutoff value. So, top 10% is rated as better than average, those scored below national average point is rated as below average, and the rest is average.

Second, Outcome measures – These are rates with 95% CI. MONAHRQ compares risk-adjusted rate (95% CI, e.g. mortality rate after hip fracture as 16.4% with upper bound 19.8 and lower bound 13.5) of a hospital with national/regional point average. If the national point average is within the high and low CIs, this hospital is rated as average; if the hospital's CI lower bound > National/regional point average, this hospital is rated as better than average; if the hospital's CI upper bound < national/regional average, it is rated as below average.

Third, ratio measure – MONAHRQ includes only one ratio measure, HAI-1-SIR. CMS reports ratios without confidence interval. National benchmark is set as 1, a hospital is rated as better than average if its ratio is lower than 1; as below average if its ratio is higher than 1; and as average if its ratio equals to 1.

For the measures that are **Lower rate is better,** the "Better" and "Below" comparison logic is simply reversed. Average logic remains the same.

Appendix C: Level of effort required to complete updates

The following provides Host Users with an approximate level of effort needed to complete the updates based on the time and technical skill required for each activity.

Steps	Level of effort considerations	Level of Effort	
		Time	**Technical skill**
Step 1. Reviewing datasets for updates	The knowledge needed to understand the datasets and measures requires a low level of effort. However, reviewing comparisons between the existing measures list and new lists in the source datasets/measures can take a lot of time. Specific dataset or measure considerations in Exhibit 1.	High	Low
Step 2. Deciding to add or remove measures being reported in MONAHRQ	**2.1 Availability of data** For the availability of data for a given measure, a high level of knowledge of what is in the Host Users data is required. This requires the time and expertise to program the data and review the results to make a determination about the availability.	Medium	High
	2.2 Evidence-base or endorsement Evidence-based or endorsement requires a low amount of time to check the NQF Quality Positioning System database for NQF endorsement. However, some understanding about the measures may be useful in reviewing how specific measures have been changed or updated.	Low	Medium
	2.3 Variation in data results For the variation in the results being presented, a high level of knowledge of what is in the Host Users data is required. This requires the time and expertise to program the data and review the results to make a determination about the availability.	Medium	High
	2.4 Interest in measures by key audiences Interest in measures by key audiences requires a low amount of time, but requires an understanding of the End Users when making this determination.	Low	Medium

Step 3. Incorporating new measures into existing datasets	Making the decision for where to include new measure in the health topic and subtopic is a low level of effort and requires an understanding of the existing health topics and subtopics in MONAHRQ. Editing, changing or adding a health topic or subtopic label is also a low level of effort. Any new health topics and subtopics will require plain language descriptions that necessitates an expertise and understanding in how to create plain language content. The resources provided in this document on plain language materials should be referred to for this step.	Low to Medium	Medium to High
Step 4. Updating the content that describes the website	The updated content that describes the website needs to be written in plain language for End Users. Updating the content also requires an understanding of the methodologies for any new datasets or measures.	Medium	Medium
Step 5. Updating external website links	Checking the existing links is a low amount of time that only requires that the links are clicked on and making sure that they connect to the correct external website content. Additional technical expertise might be needed if links need to be replaced to ensure that the new links provide the same type of content as previously provided.	Low	Low