Assessing Indicator Rates Using Trends and Comparators

What is the purpose of this tool? This tool provides guidance on how to assess your hospital's performance on the AHRQ Quality Indicators (QIs), by examining trends in the hospital's QI rates and comparing them to the rates of other similar hospitals.

Who are the target audiences? The primary audiences for this tool are three groups of hospital staff:

- Quality and safety staff, as well as clinical and other staff (e.g., quality or patient safety officer at the hospital) involved in quality improvement work, should be involved in assessing the hospital's performance on the QIs and making decisions on priorities for improvement.
- Hospital board and management leaders need to review this information on a regular basis to monitor the hospital's performance on the QIs.
- Statisticians, data analysts, and programmers can help to develop and interpret the trend and comparator data for the hospital.

How can this tool help you? You can use this tool to support the development of trend and comparator information for comparing your hospital's current performance on the QI rates to its performance in previous years (trends) and to other hospitals (comparators). These comparisons will help identify which QIs the hospital may need to address for quality improvement, because its performance on them either is declining (or not improving) or is lower than that of its peers.

How does this tool relate to others? This tool uses rates for the AHRQ QIs, which are the output from the software that AHRQ provides for calculating these rates. Guidance for use of these software programs is provided in the tools on *IQI and PSI Rates Generated by the AHRQ SAS Programs* (Tool B.2a) and *IQI and PSI Rates Generated by the AHRQ Windows QI Software* (Tool B.2b).

You also can use the PowerPoint and Excel worksheets on data, trends, and rates (Tool B.3) to display trends and comparisons for your QI rates for presentations.

The information generated from trend and comparator analysis is used in the *Prioritization Matrix* (Tool C.1) to help guide the hospital through decisions regarding which PSIs or IQIs are most important to address in quality improvement efforts. It also can be used in the *Project Evaluation and Debriefing* (Tool D.8) and *Monitoring Progress for Sustainable Improvement* (Tool E.1)

Reviewing Your Hospital's QI Rates Over Time and Comparing Your Hospital's Rates With Other Hospitals

After calculating your hospital's QI rates, it is helpful to put your performance into context to assess how well your hospital is performing. The two most common comparisons are with your *hospital's own historic performance* (trends in rates) and with *other hospitals* (comparators). You can use this information in two important ways to improve and sustain performance on the QIs:

- To inform decisionmaking early in your quality improvement process, regarding which indicators are priorities for quality improvement actions.
- To ensure that improvements achieved by an implementation process are sustained beyond the end of that process, by tracking both trend and comparator information as part of an ongoing monitoring process

Performing Trend Analysis for the QI Rates

To conduct a trend analysis (or develop control charts) of a hospital's QI rates, calculate the rates for multiple time periods, and then plot those rates on graphs to identify any changes in rates that may be occurring over time. To have confidence that any changes in rates observed over time are real, you will need to calculate the rates for all years in the trendline using the same methods and measures. For valid trend information, it is important to be consistent over time in:

- The coding of your discharge data.
- The definitions of the QIs used.
- The calculations performed by the AHRQ QI software (using the same version for each year).
- The method used for risk adjustment (which is not currently available for v6.0 of the QI software).

The best way to achieve this consistency is to choose one method for each item and apply the method to all the years included in the trendline. Because the measurement methods for the QIs change from year to year, you will have to use the methods for one year instead of using the relevant methods for each year. At times, you will be constrained by the availability of the variables needed to calculate the rates, many of which are not available for all years (e.g., the present-on-admission variable). When this happens, it will be necessary to choose methods that are based on the data with the more limited set of variables (see below for further discussion).

Although this approach may make the rate estimates used for trending less accurate for some years, it allows you to make valid cross-year comparisons. Then you can use the correct rates for the current year for any other analyses that are relevant only to that year.

Consistency of the AHRQ definition of the QIs and AHRQ software programs. AHRQ has revised its definitions of the QIs frequently, for two reasons. The first is to incorporate into its QI definitions the annual updates made to the International Classification of Diseases, 10th Revision (ICD-10-CM) and Diagnosis-Related Group (DRG) codes. The other is to respond to new research findings regarding the validity and reliability of the QIs.

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AHRQ typically revises its QI definitions and programs each year. Therefore, the rate you calculate for one year (with the old codes) may differ from those in the following year (with the new codes). As of spring 2016, AHRQ released QI Version 6.0, which includes substantial changes. The most notable change is the lack of ability to risk adjust, as ICD-10 data availability is limited given its recent introduction.

AHRQ does not provide guidance on how to account for the changes in coding when analyzing trends. Any bias that might be created when the old codes are used to estimate the updated QIs will depend on the specific changes made. The simplest approach you can take is to choose one version of the codes and use it to calculate QI rates for all the time periods included in your trend analysis.

Analysts and staff should be particularly careful when comparing rates that were calculated using the ICD-9-CM version of the indicators with rates that were calculated using the ICD-10-CM version of the indicators, as there may be differences in the definitions that may not yield a perfect comparison. In addition, AHRQ's QI software v.6.0 does not provide the ability to risk-adjust rates.

Risk adjustment. *Risk adjustment is not currently available for AHRQ's QI software as of the v6.0 release but may be available in the future.* Once risk-adjusted data are available, when analyzing trends, it is advisable to calculate risk-adjusted QI rates to control for any changes that may occur in your patient population over time. If your patient characteristics remain stable over time, however, there is less need for risk adjustment. Different methods of risk adjustment can be used for your trend analysis. Once you select a method, it should be applied consistently to rates across your trend timeline.

Ideally, you should calculate the QI rates for at least 4 to 5 years (more if possible) up to and including the most recent year for which you have data. Once you calculate the rates, you can display them in tables or graphs. (Refer to Tool B.3, Excel worksheets for charts and PowerPoint presentation for support in displaying this information.) Observation of the trendlines will provide information on whether your rates are improving, staying about the same, or declining. You can use regression methods to estimate a line through the years of data, using an observation for each year's rate. A statistically significant coefficient on the year variable will indicate a trend.

Trendlines also can be used to identify any changes in trends for QI rates related to quality improvement efforts. In these trendlines, your original 4 to 5 years of data (or more) serve as the baseline, and then you continue to chart trends for subsequent years during and after your improvement implementation period. If the postimplementation trend shows an improvement over the baseline trend, you have identified a possible effect of your improvement efforts. You should use caution in attributing such a change in trend to your improvement efforts, however, because other factors may affect changes in rates and could confound your findings.

Comparing Your Hospital With Other Hospitals

Comparison data provide comparisons with other organizations similar to your hospital for performance measures of interest to you. The terms "comparator" and "benchmark" are often

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used interchangeably, but they are different.[i] "Comparator" is an umbrella term. A frequently used comparator is the national, regional, or practice average.

Another type of comparator is a benchmark, which connotes a level of performance that is desirable. A national, regional, or practice average also could be a benchmark, if the average is viewed as the desirable target. Depending on the metric, a benchmark is usually pegged to performance that is above average, although it depends also on how well "average" hospitals are performing.

You can use comparison data to learn how well your hospital is doing on an array of measures relative to other hospitals, and you can identify the measures for which your hospital is doing quite well and others for which its performance is lower than your peers.

There is no single answer regarding which groups of hospitals to use for comparison. To determine your hospital's performance relative to other similar hospitals, the ideal comparator would be groups of hospitals that you consider to be peers to your hospital, such as academic medical centers, rural hospitals, or community hospitals. You may decide that you want to make comparisons with several hospital groups that are important to your hospital based on mission or market strategy. However, you may wish to compare with hospitals with above average performance, and you may decide to use top-performing hospitals as your benchmark. Once you choose the comparison groups, you need to search for sources of the comparison or benchmark information.

Comparison data for the ICD-9 version of the AHRQ QIs may be found at national, State, and regional levels. National averages for 2012 are currently provided by AHRQ. This information can be found at the following Web sites:

- http://www.qualityindicators.ahrq.gov/Downloads/Modules/IQI/V50/Version_50_Benchmark_Tables_IQI.pdf
- http://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V50/Version_50_Benchmark_Tables_PSI.pdf
- http://www.qualityindicators.ahrq.gov/Downloads/Modules/PDI/V50/Version_50_Benchmark_Tables_PDI.pdf

The most recent available QI rates from AHRQ are from 2012. National averages based on ICD-10 data are not yet available.

Availability of data at the State and regional levels will vary, depending on the activities of organizations in each area. Some hospitals may rely on an outside agency, such as the State hospital association or a parent organization, to analyze their data and produce their QI rates. These organizations typically provide comparison data for those using their services. Availability

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[i] McNamara P, Shaller D, De La Mare J, et al. Confidential physician feedback reports: designing for optimal impact on performance. Rockville, MD: Agency for Healthcare Research and Quality; 2016. http://www.ahrq.gov/professionals/clinicians-providers/resources/confidreportguide/index.html. Accessed March 20, 2016.

of comparison data using ICD-10 data (particularly those that are risk adjusted) may be limited until ICD-10 codes have been in use for some time.

Check with your State or regional hospital association, or other systems in which you participate, to find out what comparative data they produce that you might use. In addition, many States now require public reporting of the QIs.

NOTE: When using average QI rates as comparators, pay attention to which version of the AHRQ QI software was used to calculate the rates. Because different versions of the QI software generate different rates, even when applied to the same dataset, you will need to ensure that the QI rates you are using were generated from the same version of the QI software that you used to calculate your hospital's rates.

Similar to the trend data, comparator information can be used early in your improvement process to help identify priority QIs for improvement, as well as later in the process to assess how much improvement is being achieved by your implementation process. For setting priorities, you can apply the comparator information to your work with the *Prioritization Worksheet* (Tool C.1). For later monitoring, it can be used with Tool D.8 (*Project Evaluation and Debriefing*) and Tool E.1 (*Monitoring Progress for Sustainable Improvement*).