CALCULATING THE COMPLICATIONS, MORTALITY AND OVERALL QUALITY INDEX
CENTERS OF EXCELLENCE℠ /HOSPITAL VALUE TOOL

This document contains additional information on calculating the Complications, Mortality and Overall Quality Index. These measures are used in the CIGNA HealthCare (CIGNA) 2009-2010 Centers of Excellence℠ /Hospital Value Tool hospital evaluation methodology used to determine the quality and cost efficiency display in the CIGNA provider directory available on both www.cigna.com and www.MyCIGNA.com. The 2009-2010 information is available on the provider directory beginning November 16, 2009.

Quality is assessed using procedure specific complications and mortality data supplied by WebMD. The complication rate is severity adjusted and reflects the most common complications by procedure. While the mortality rate, also severity adjusted, reflects the incidence of death after a procedure or treatment for a condition.

To compare these measures in an equitable way, each is converted to an index that compares the hospital’s score to the nationwide average for the procedure/condition. Once the index is calculated, the measures are combined with the Leapfrog index and the CMS index using a weighting system to calculate the overall quality index which is used to determine the number of outcomes stars (1 to 3) a hospital will receive for the procedure/condition.

The Quality Index, a composite score of a hospital’s quality, is based on the development of a Leapfrog index, a complications index, a mortality index and a Centers for Medicare and Medicare Services (CMS) index. The complications, mortality, Leapfrog, and CMS indices are calculated, compared and re-calibrated to 1.0 using the national average for all hospitals for that procedure. The complications, mortality and CMS indices are calculated as follows:

Complications Index = Actual complications rate (%) per procedure by hospital divided by the Average complications rate (%) per procedure for all hospitals (severity adjusted).  
Mortality Index = Actual mortality rate (%) per condition by hospital divided by the Average mortality rate (%) per condition for all hospitals (severity adjusted).  
CMS Index = Average of CMS Measures divided by the national average for the CMS Measures Example: A hospital’s complication rate for CABG % is 10% and the national average for all hospitals for CABG complications is 8% = 10 divided by 8 = 1.25 complications index

Once the actual percentage rate is divided by the average rate, any data point that exceeds 1.5 or is less than .5 will be brought up or down to these thresholds. This method (winsorizing) helps normalize the data and decrease the occurrence of data extremes caused by outliers.

Example: A hospital’s complication rate for Cardiac Cath is 5% and the national average for all hospitals for CABG complications is 15% = 5 divided by 15 = .33 which is automatically assigned to .5 since it was below the lower threshold.

Indices less than 1.0 indicate better scores than the national average while indices greater than 1.0 indicate worse scores than the national average.
The Quality Index is calculated as follows:

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\text{Quality Index} = (\text{Complications Index}) \times (\text{Complications weighting}) + (\text{Mortality Index}) \times (\text{Mortality Weighting}) + (\text{Leapfrog Index}) \times (\text{Leapfrog weighting}) + (\text{CMS Index}) \times (\text{CMS Weighting})
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The Quality Index distribution around the average will determine the quality category for display.

- Bottom 5% - One Quality Star (*)
- Middle 50% - Two Quality Stars (**)
- Top 45% - Three Quality Stars (***)

To ensure hospital data is annually stable, a stable volume threshold is established. This threshold helps mitigate the variation in the hospital rankings from year to year and provides a volume baseline that can be used when comparing data in future years.

Volume has been suggested to be an indirect indicator of quality. There is evidence that suggests that “hospitals performing more of certain intensive, high-technology, or highly complex procedures may have better outcomes for those procedures” (AHRQ IQI Guide, V 2.1, Rev 4, Dec 22, 2004). Having credible volume thresholds helps ensure that hospitals that have “suspect” or “questionable” quality due to low volumes are eliminated from consideration since lower volumes of admissions lead to more variation in the outcomes of those admissions.

In an effort to reduce this variation, the threshold was developed using the Centers of Excellence (COE) hospital data from the 2006 and 2007 COE projects. The mortality and complication rates for all hospitals included in the 2005-2006 COE were compared to the mortality and complication rates for the same hospitals in the 2006-2007 COE data. The volume threshold was set at 100 and the R-Squared computed on the mortality or complication index. If the R-Squared was greater than .4 and created 10 or more events (volume * complications percent or volume * mortality percent), the volume was assumed to be stable. If the R-Squared was less than .4, the volume threshold was increased by 100 and the R-Square re-run; this process continued until the R-Square is above .4. However, if the r-square does not appear that it will exceed .4 and the procedure will not yield at least 10 events after increasing the volume past 800 admissions, or if the number of hospitals eligible for ranking was low (100-200 hospitals nationwide), the mortality or complications measure for that procedure would not be used.

To view the CIGNA 2009-2010 Centers of Excellence SM/Hospital Value Tool hospital evaluation methodology, visit the CIGNA for Health Care Professionals secure website at www.cignaforhcp.com, and click on ‘Resources’.