Appendix 6: METHODOLOGY FOR COMPARING HOSPITALS

The methodology for comparing hospitals is based on the average for each metric for all hospitals in the hospital's market area.

A score is established equal to the number of standard deviations away from the average for each hospital. A positive score indicates a hospital is more essential than the average for all hospitals in the area and a negative score indicates a hospital is less essential than the average.

The formula used for converting a hospital's metric on a certain variable (e.g., number of Medicaid and uninsured discharges and ER visits, occupancy rate, etc.) into its equivalent standardized value is as follows:

Standardized Score =

$$\frac{\text{(Individual Hospital Metric Value} - \text{Average for All Hospitals in the Market Area)}}{\text{Standard Deviation of the Metric for the Area}}$$

By subtracting the average of the metric for the relevant hospital market area from the observed value of the metric for a given hospital and then by dividing it by that metric's dispersion (standard deviation) across hospitals in that area, one arrives at a new variable whose average across the area must, by construction, be 0 and whose measure of dispersion (standard deviation) is 1.

If this is done for every metric, then, regardless of the size and dimension of each metric, all standardized metrics will have an across-market-area average of 0 and a dispersion (standard deviation) of 1. Because these standardized variables are now similar, one can add them up, by weighting each, to arrive at an overall weighted average score that may reflect many distinct metrics.

On the following pages in Tables 1 and 2, examples are provided of this method for standardizing two of the essentiality metrics, one that is numbers (number of Medicaid and uninsured ER visits) and one that is percentages (occupancy rate).

Table 1
Method for Standardizing Metrics Example:
Medicaid and Uninsured ED Visits

Hospital	Observed Value for Number of Medicaid and Uninsured ER Visits	Average Number of Medicaid and Uninsured ER Visits for Market Area	Observed Value less Average	Standard Deviation	Standardized Score
	A	B	C = A - B	D	E = C/D
A	5,562	13,827	-8,265	9,935	-0.83
B	5,732	13,827	-8,095	9,935	-0.81
C	6,231	13,827	-7,596	9,935	-0.76
D	6,281	13,827	-7,546	9,935	-0.76
E	7,951	13,827	-5,876	9,935	-0.59
D	9,159	13,827	-4,668	9,935	-0.47
F	11,484	13,827	-2,343	9,935	-0.24
G	12,028	13,827	-1,799	9,935	-0.18
H	15,333	13,827	1,507	9,935	0.15
I	20,500	13,827	6,674	9,935	0.67
J	31,550	13,827	17,724	9,935	1.78
K	34,107	13,827	20,281	9,935	2.04
Average	13,827				0.00
Standard Dev.	9,935				1.00

Table 2
Method for Standardizing Metrics Example:
Inpatient Occupancy Rates

Hospital	Observed Value for Occupancy Rate	Average Occupancy Rate	Observed Value less Average	Standard Deviation	Standardized Score
	A	B	C = A - B	D	E = C/D
A	47%	72%	-25%	11%	-2.33
B	59%	72%	-13%	11%	-1.25
C	68%	72%	-4%	11%	-0.39
D	70%	72%	-2%	11%	-0.19
E	70%	72%	-2%	11%	-0.15
D	74%	72%	2%	11%	0.19
F	76%	72%	4%	11%	0.36
G	78%	72%	6%	11%	0.59
H	79%	72%	7%	11%	0.67
I	82%	72%	10%	11%	0.95
J	82%	72%	10%	11%	0.96
K	83%	72%	11%	11%	1.03
Average	72%				0.00
Standard Dev.	11%				1.00

As these two example show, the variation in the observed values is very different for the two metrics: for the number of Medicaid and uninsured ER visits, the dispersion (standard deviation) is 9,935, while the dispersion for occupancy rates is 11%. However, the standardized scores in Column E account for these different dispersions in the observed values for the metrics. For example, Hospital I has 6,674 more Medicaid and uninsured ER visits than the average for all the hospitals in the market area and this yields a standardized score of .67. For the occupancy rate metric, Hospital H's occupancy rate is 7 percent greater than the average occupancy rate for all hospitals in the market area, and its standardized score is also .67. In standardized terms, both Hospital I and Hospital K are 0.67 above the average for these two different metrics. Standardizing allows for hospitals' observed values to become "unit free", thus enabling them to be added across all the essentiality metrics.

Under this method, each hospital's overall essentiality score is relative only to the other hospitals in its market area; it is not valid to compare hospitals' essentiality scores across different market areas.

The Commission used the same methodology for scoring each hospital on the three financial viability metrics, except that it compared all hospitals in the State against the statewide average for the metric rather than against the average for the market area. Since higher values of Long-term Debt to Capitalization put a hospital at greater risk, the score was inverted for that metric so that values above the average yield negative scores. Doing this allowed us to sum the scores to arrive at an overall score of each hospital's financial viability relative to other hospitals in the State.