



The 4Square Cost and Efficiency Matrix: Medicare Analyses

Updated: March 2022

BSGA developed the 4Square Cost and Efficiency Matrix in 2012 to graphically compare health system performance against a national, state or market average.¹

The X-axis displays a health system's efficiency relative to the average (1.00). An index above 1.00 indicates the system is less efficient than average, while an index below 1.00 indicates the system is more efficient than average. A health system index of 1.04 indicates a system is 4% less efficient than average, while an index score of 0.95 indicates a health system is 5% more efficient than average.

The Y-axis displays a health system's quality relative to the average. An index above 1.00 indicates the system has higher quality than the average, while an index below 1.00 indicates the system has lower quality than the average. A health system index of 1.04 indicates a system has 4% higher quality than average, while an index score of 0.95 indicates a health system has 5% lower quality than average.

Hospitals with above-average efficiency and above-average quality appear in the upper right-hand quadrant of the 4Square. Hospitals with below-average efficiency and below-average quality appear in the lower left-hand quadrant.

Efficiency and quality data is collected at the individual hospital level. System-level scores are calculated by aggregating hospital scores weighted by their volume.

The efficiency and quality criteria used to create the 4Square and the date the 4Square was created are displayed below the 4Square graphic for reference.

EFFICIENCY

Hospital efficiency can be measured using a variety of sources, including All-Payer Claims Databases, local medical claims data or Medicare fee-for-service claims. In markets where there is insufficient local medical claims data, BSGA bases efficiency on Medicare's spending per beneficiary (MSPB) data, which is available for almost all hospitals that provide Medicare services in the United States.²

¹ BSGA has been measuring hospital performance since 2008; the quality dimension was added in 2012

² Notable exceptions are critical-access hospitals that typically serve rural areas and have 25 or fewer beds. Medicare reimburses these hospitals on a cost-plus model that does not lend itself to the more typical spending-per-beneficiary measure.

An MSPB episode includes all Medicare Part A and Part B claims with a start date falling between 3 days prior to an Inpatient Prospective Payment System (IPPS) hospital admission through 30 days post-hospital discharge. It does not include patients enrolled in Medicare Advantage programs.

Medicare updates the MSPB data annually. The claims dates used in the 4Square analysis are listed below the graphic.

QUALITY

When BSGA initially decided to incorporate quality into its 4Square analysis, it reviewed quality measures from a variety of sources, including The Joint Commission Quality Measures, Medicare's PPS and Value-Based Purchasing Programs, the Centers for Medicare and Medicaid Services Hospital Compare Program, the National Quality Forum, Partnership for Patients, the Commonwealth Fund's *Why not the Best?* initiative, Leapfrog and the Aligning Forces for Quality initiative.

The first quality analysis included 25 measures that were focused on three main areas: outcomes, processes and patient experience. Over the years, the number of quality measures has fluctuated as quality measures were retired or added.³ The current quality configuration includes 30 measures focused on four areas: outcomes, patient safety, processes and patient experience. The data source for all of these measures is Medicare. BSGA downloads this information twice per year (December/January and June/July) although some of the quality measures are only updated annually.⁴

BSGA calculates a hospital system index score for individual quality measures in four categories: outcomes, patient safety, patient experience and processes. The hospital's aggregate score for each category is calculated by taking the median index for all of the measures within that category.

An overall aggregate score is then calculated based on the following weighting:

- Outcomes = 55% of the total quality score
- Patient Safety = 15% of the total quality score
- Patient Experience = 15% of the total quality score
- Processes = 15% of the total quality score

BSGA places high priority on outcomes and patient safety, which together account for 70 percent of the aggregate score.⁵

MULTI-HOSPITAL HEALTH SYSTEMS

BSGA calculates aggregate efficiency and quality scores using a weighted average that is based on the patient volume of hospitals within the health system.

³ CMS has retired a number of process measures over the year as hospitals approached 100% compliance; many of the patient safety and outcomes measures have remained the same

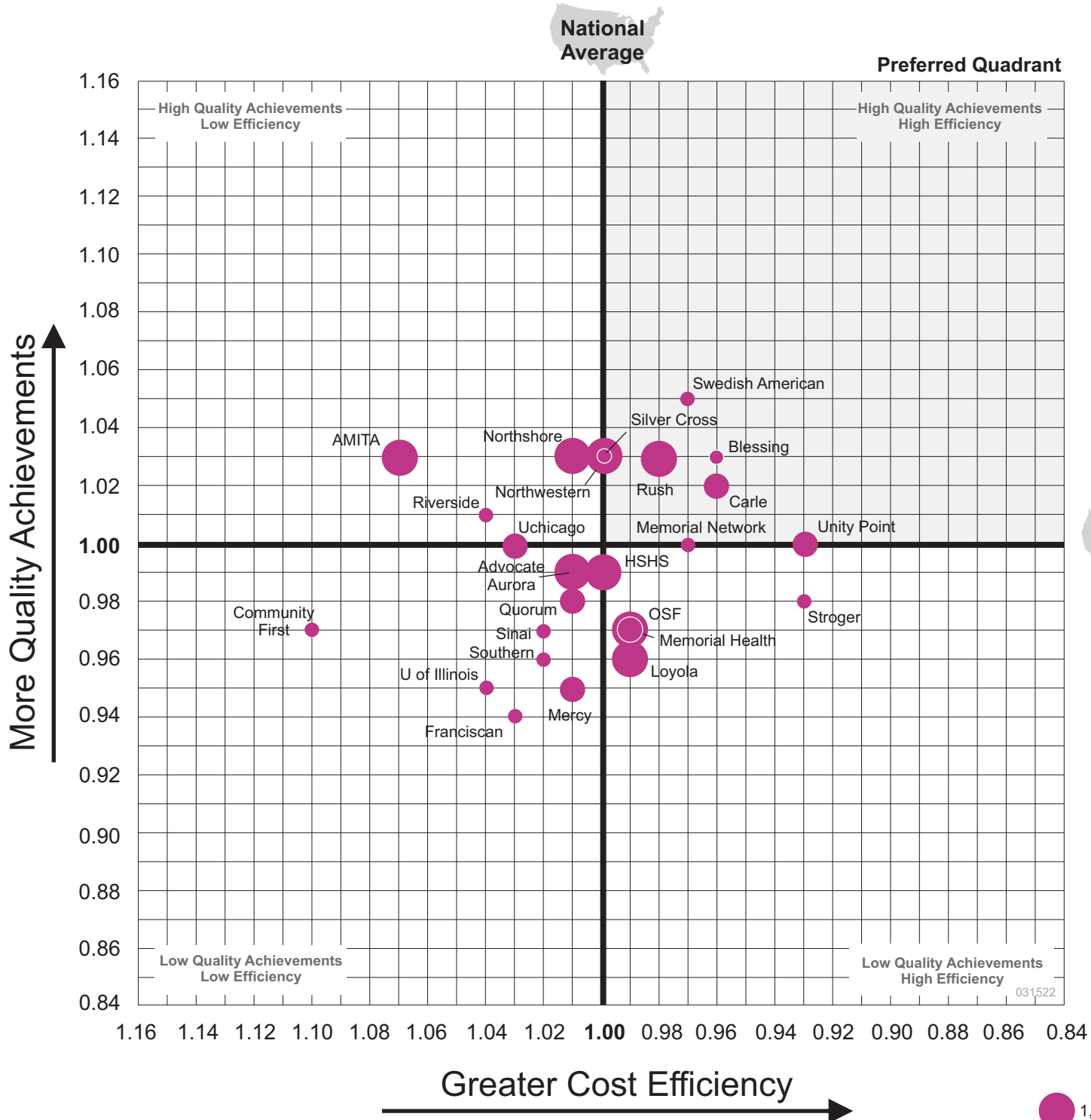
⁴ For current measure dates, please see the Appendix

⁵ Even when selecting the patient experience and process quality measures, BSGA selected measures having the most impact on outcomes.

APPENDIX

Following are the quality measures used in the July 2020 4Squares, the quality category to which they belong (outcomes, patient safety, patient experience and process), the state average score and the measure start and end dates.

MEASURE	TYPE	STATE AVERAGE	MEASURE START DATE	MEASURE END DATE
30-Day Mort HF	Outcomes	10.26	7/1/2016	6/30/2019
30-Day Mort Pneumonia	Outcomes	15.10	7/1/2016	6/30/2019
30-Day Mortality AMI	Outcomes	12.32	7/1/2016	6/30/2019
Comp Hip/Knee	Outcomes	2.42	4/1/2016	3/31/2019
PSI-6 Collapsed Lung	Safety	0.25	7/1/2017	6/30/2019
PSI-9 Post-Op Hemorrhage	Safety	2.61	7/1/2017	6/30/2019
PSI-13 Post-Op Sepsis	Safety	4.99	7/1/2017	6/30/2019
PSI-12 Post-Op Blood Clots	Safety	4.64	7/1/2017	6/30/2019
PSI-15 Cuts & Tears	Safety	1.20	7/1/2017	6/30/2019
PSI-4 Avoidable Deaths	Safety	153.29	7/1/2017	6/30/2019
30-Day Readmit HF	Outcomes	22.01	7/1/2016	6/30/2019
30-Day Readmit Pneumonia	Outcomes	17.09	7/1/2016	6/30/2019
Nurses Explain Well	Experience	75.23	1/1/2019	12/31/2019
Doctors Explain Well	Experience	73.80	1/1/2019	12/31/2019
Strong Agree Care Understood	Experience	51.63	1/1/2019	12/31/2019
Strong Agree Medication Understood	Experience	59.40	1/1/2019	12/31/2019
Strong Agree Responsibilities Understood	Experience	50.98	1/1/2019	12/31/2019
30-Day Readmit Hip/Knee	Outcomes	3.96	7/1/2016	6/30/2019
30-Day Readmit AMI	Outcomes	16.22	7/1/2016	6/30/2019
30-Day Readmit All-Cause	Outcomes	16.01	7/1/2018	6/30/2019
Unplanned Colons Readmit	Outcomes	15.57	1/1/2016	12/31/2018
CLABSI	Safety	0.62	1/1/2019	12/31/2019
CAUTI	Safety	0.69	1/1/2019	12/31/2019
C-DIFF	Safety	0.60	1/1/2019	12/31/2019
MRSA	Safety	0.70	1/1/2019	12/31/2019
Sep 1 Appropriate Care Sepsis & Shock	Process	60.12	1/1/2019	12/31/2019
PC-01 Elective Deliveries	Process	1.11	1/1/2019	12/31/2019
OP-29 Appropriate Endo/Colon	Process	91.92	1/1/2018	12/31/2018
OP-13 Cardiac Imaging Low Risk	Process	4.35	7/1/2018	6/30/2019
OP-10 Abdomen CT Contrast	Process	6.54	7/1/2018	6/30/2019
Medicare Reimbursement		1.01	1/1/2019	12/31/2019



Quality Achievement Efficiency Matrix Medicare

ILLINOIS

Health Systems & Hospitals with More than 200 Beds



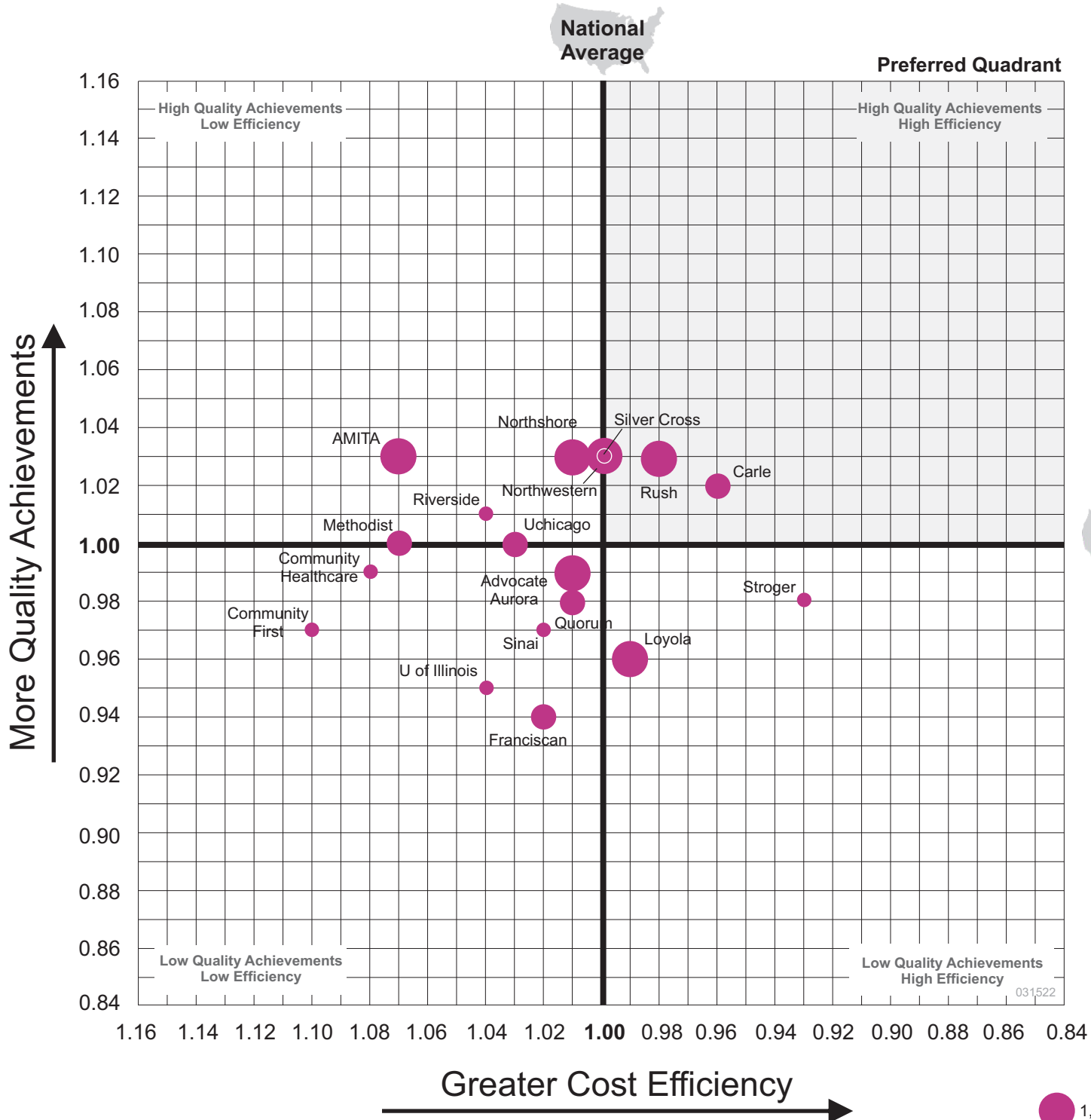
NATIONAL AVERAGE = 1.00

Quality: HCTrends analysis based on Jan. 2022 data downloads from Centers for Medicare & Medicaid Services (CMS)
Efficiency: Medicare Spending Per Beneficiary (2019)

Hospital Quality Measures:

30-Day Mortality - AMI, HF, Pneumonia; 30-Day Readmit - AMI, HF, Pneumonia, Hip/Knee Surgery, All Cause; Complication - Hip/Knee; Patient Safety - Iatrogenic Pneumothorax, Death from Surgical Complications, Post-Operative Pulmonary Embolisms or Deep-Vein Thrombosis, Post-Operative Sepsis, Post-Operative Hemorrhaging, Accidental Cuts & Tears; Patient Experience - Doctors Explain Well, Nurses Explain Well, Discharge Instructions Understood, Medication Understood, Patient Responsibilities Understood; Appropriate Care - Elective Deliveries, Endoscopy/Colonoscopy Intervals, Low-Risk Cardiac Imaging, Abdomen CT Contrast, Sepsis Care and Shock; Hospital-Acquired Infections - CLABSI, CAUTI, C-Diff, MRSA; Other - Unplanned Colonoscopy Readmit





Quality Achievement Efficiency Matrix Medicare

CHICAGO REGION

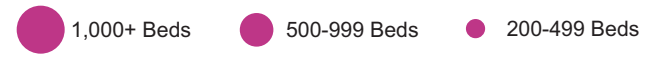
Health Systems & Hospitals with More than 200 Beds

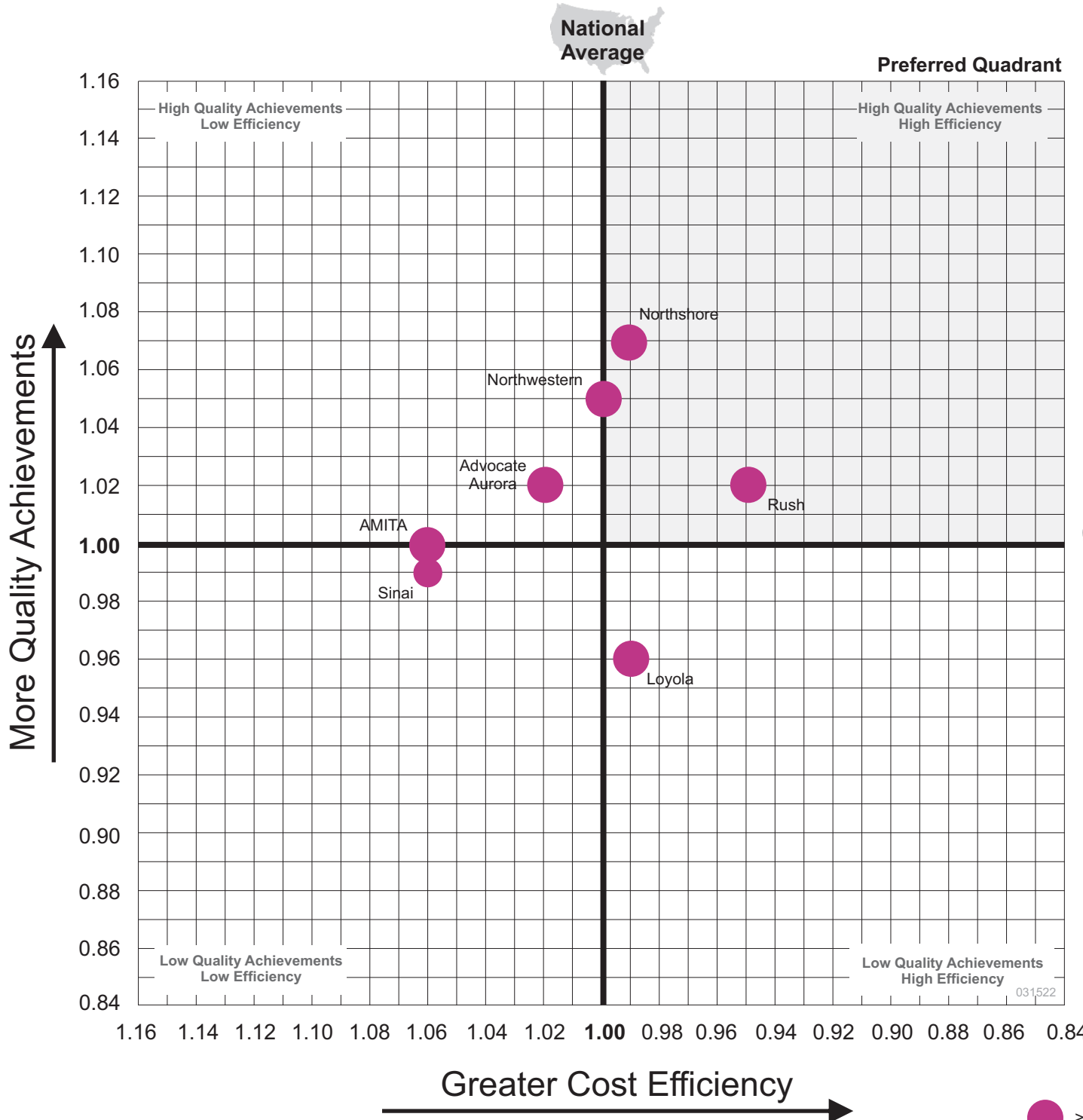


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Quality Achievement Efficiency Matrix Medicare

CENTRAL REGION

Health Systems & Hospitals with More than 100 Beds

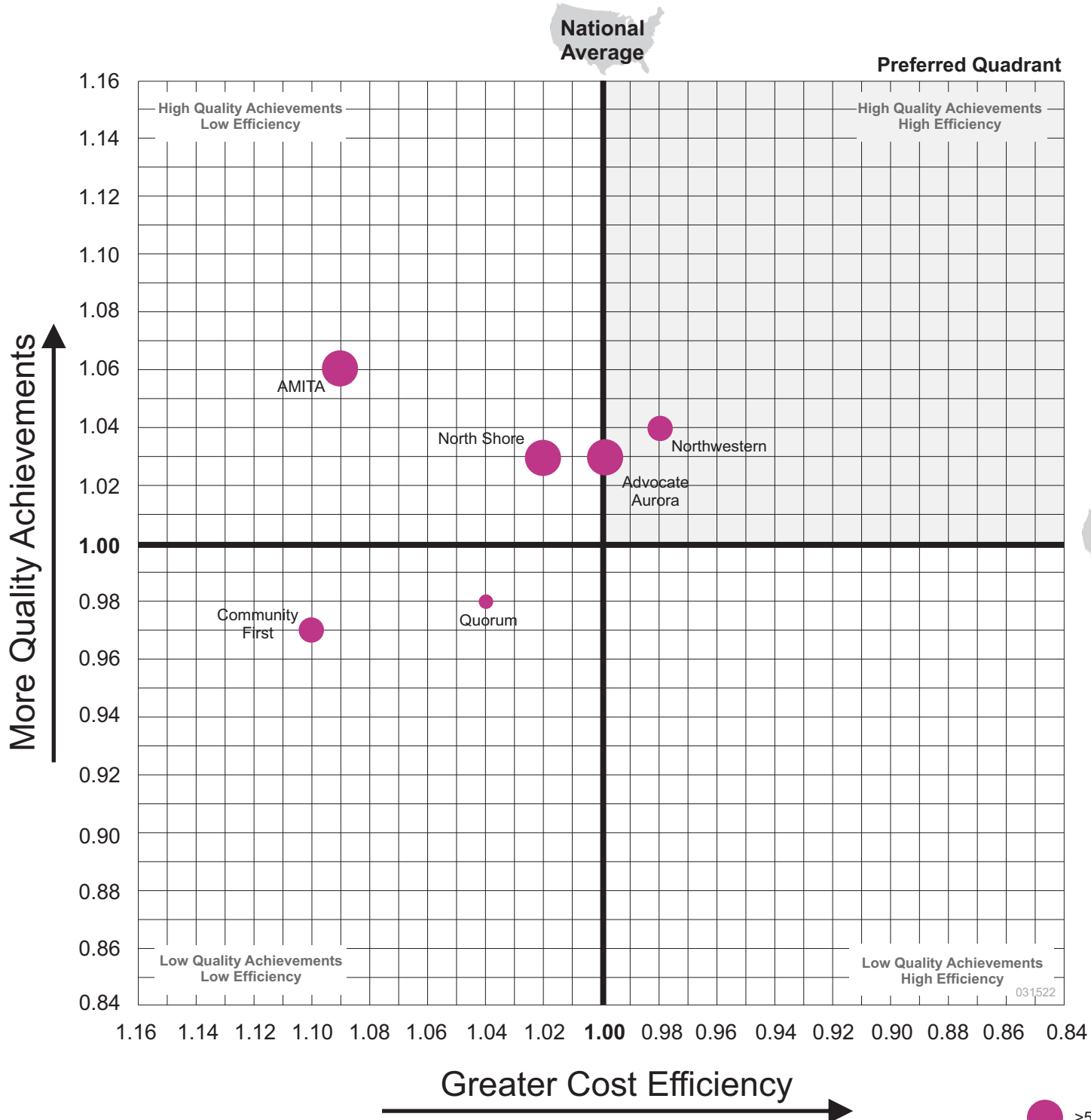


NATIONAL AVERAGE = 1.00

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● >500 Beds ● 200-499 Beds ● <200 Beds



Quality Achievement Efficiency Matrix Medicare

NORTH REGION

Health Systems & Hospitals with More than 100 Beds



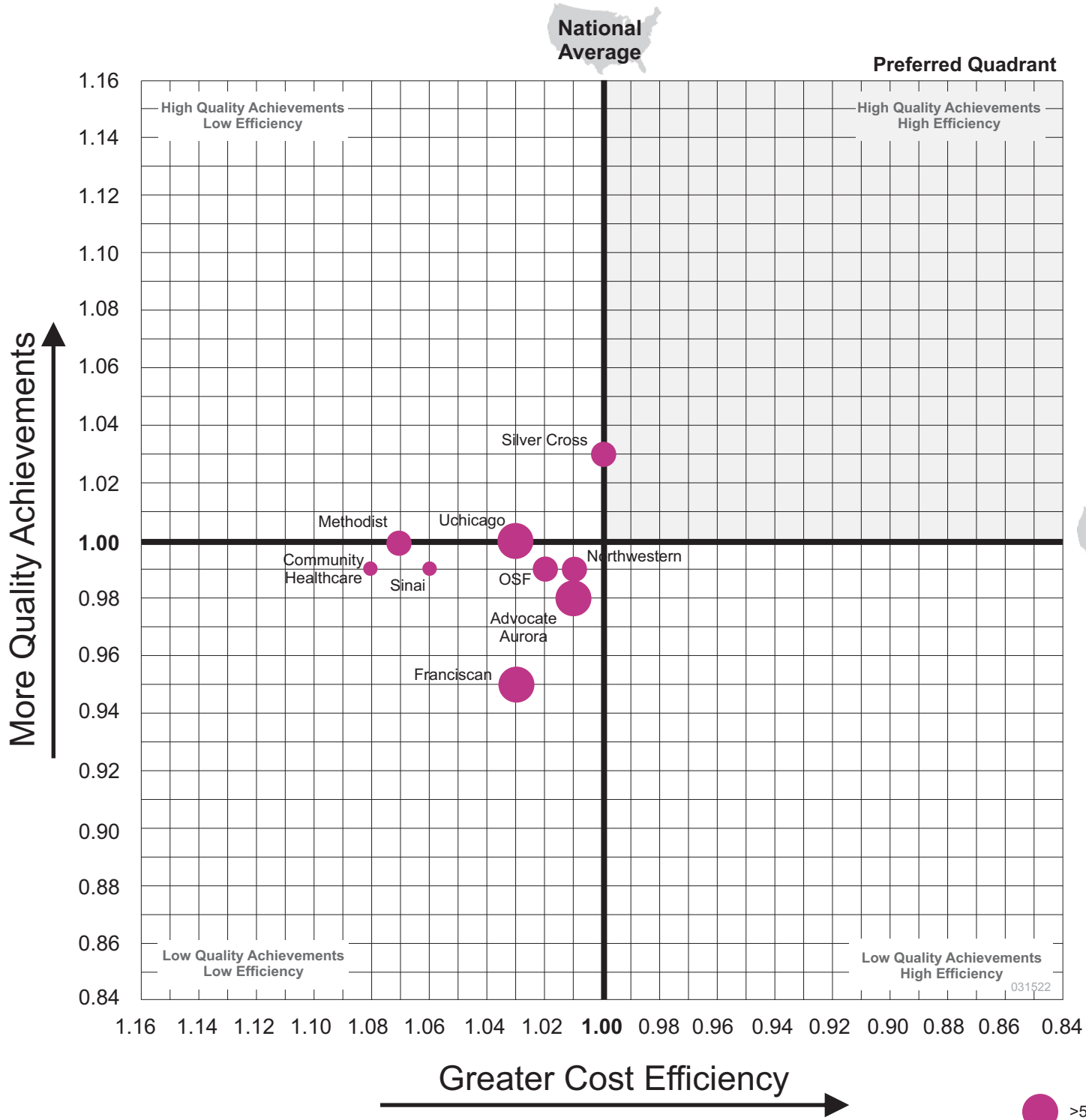
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Quality Achievement Efficiency Matrix Medicare

SOUTH REGION

Health Systems & Hospitals with More than 100 Beds



NATIONAL AVERAGE = 1.00

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Efficiency: Medicare Spending Per Beneficiary (2019)

Hospital Quality Measures:
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