

**RESEARCH BRIEF**

# ASSOCIATIONS BETWEEN SUPPLY AND PHARMACY SERVICE INTENSITY, SYSTEM MEMBERSHIP, AND HOSPITAL PERFORMANCE

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# OVERVIEW

The goal of this research was to evaluate how variability on pharmacy and supply intensity (spending) correlates with hospital system membership and with variability on hospital performance. We found that:

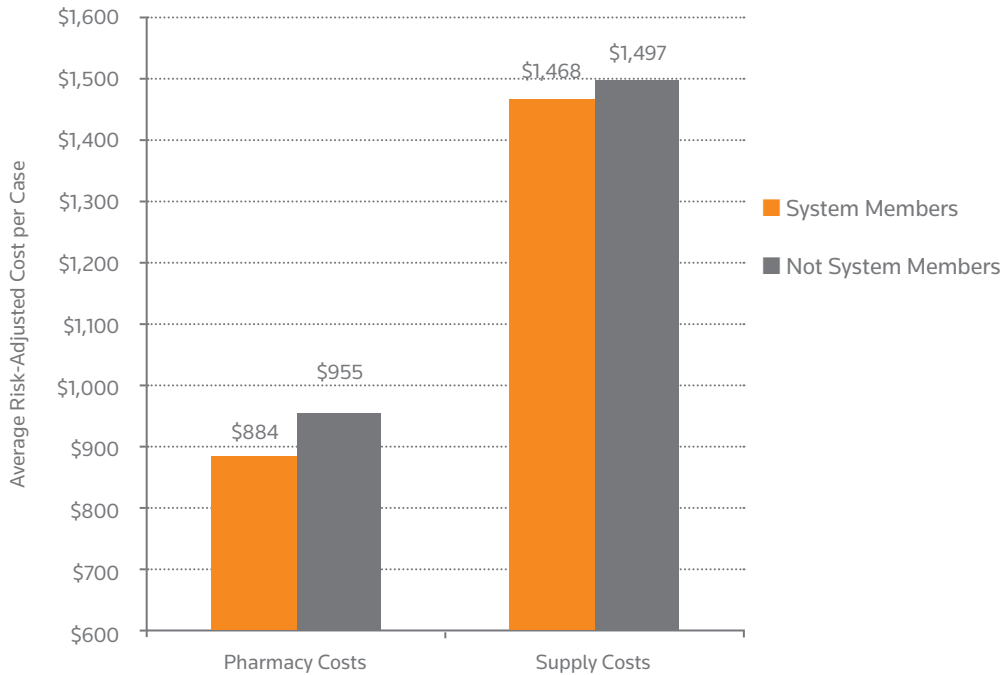
- Hospitals that belong to a system spend less on pharmacy.
- Top-performing hospitals are more likely to belong to a hospital system.
- Higher performing hospitals (the *Thomson Reuters 100 Top Hospitals*<sup>®</sup> award winners) have lower pharmacy and supply costs.
- Hospitals that spend less on pharmacy and supplies have better performance on some other measures of quality.

## KEY FINDINGS

### SYSTEM MEMBERSHIP CORRELATES WITH PHARMACY AND SUPPLY COSTS

- Hospitals that were members of a system had lower pharmacy costs than hospitals that were not part of a system. The system member hospitals had pharmacy costs that were about 7.4 percent lower than hospitals that were not members of a system. (The average risk-adjusted pharmacy costs were \$955 per case for facilities that were not members of a system and \$884 per case for hospitals that were members of a system.) The difference was statistically significant ( $p < 0.0001$ ). See Figure 1.
- For supply costs, the difference between hospitals that were members (average risk-adjusted cost per case: \$1,468) was not much less than for hospitals that were not system members (\$1,497), and the difference was not statistically significant ( $p = 0.4073$ ). See Figure 1.

**Figure 1. Hospitals That Are System Members Spend Less on Pharmacy and Supplies\***

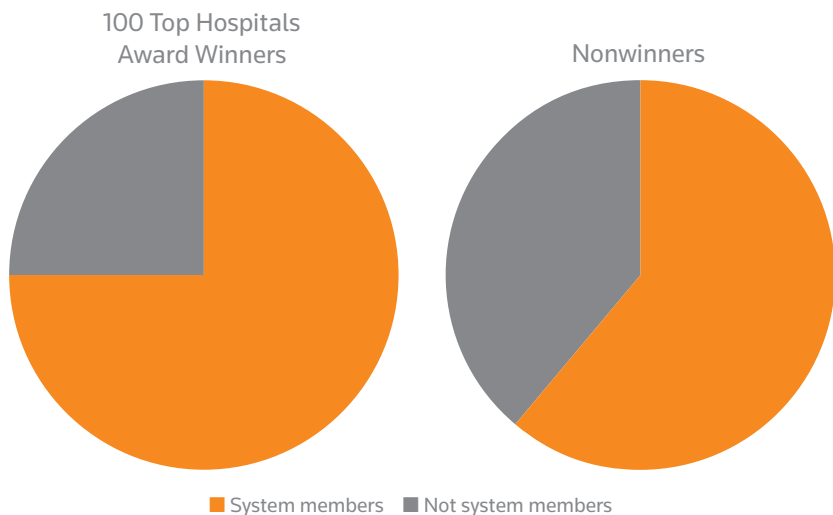


\*Difference in pharmacy spending is statistically significant; difference in supply spending is not.

## SYSTEM MEMBERSHIP CORRELATES WITH TOP PERFORMANCE

100 Top Hospitals award winners were more likely to be members of hospital systems. Of the winning hospitals, 75 percent were system members. Only 61 percent of the nonwinners were members of systems. This difference was statistically significant ( $p = 0.0056$ ). After adjustment for class and census division, the winners were almost twice as likely to be members of a system than nonwinners. See Figure 2.

**Figure 2. Top-Performing Hospitals Are More Likely to Be Part of a System**



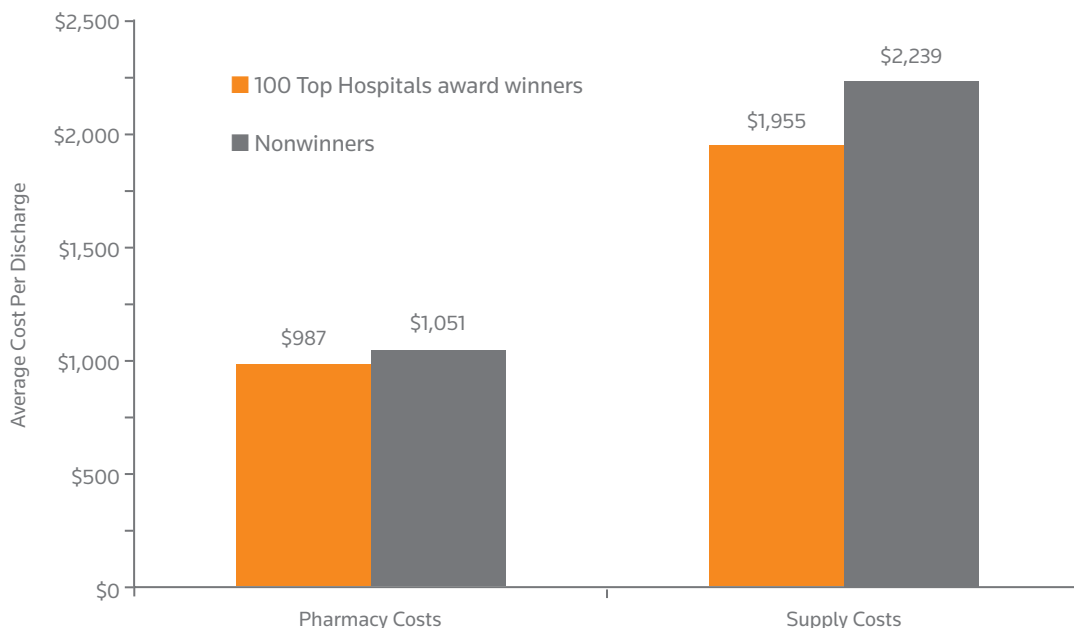
## HOW PHARMACY AND SUPPLY SPENDING RELATES TO HOSPITAL PERFORMANCE

We compared hospital case-mix and severity-adjusted pharmacy and supply intensity (which look at what is spent on these services versus what would be expected, given patient severity) with the national balanced scorecard performance measures used in Thomson Reuters 100 Top Hospitals study.

### Spending at Top Performers Versus Peers

The risk-adjusted cost estimates for pharmacy and supply services are lower for the higher performing hospitals. The Thomson Reuters 100 Top Hospitals award winners spent about 13 percent less for supply costs than nonwinning hospitals. Likewise, the top performers spent about 6 percent less for pharmacy costs. See Figure 3.

**Figure 3. Top-Performing Hospitals Spend Less on Pharmacy and Supplies**



## Pharmacy Intensity and Other Performance Measures

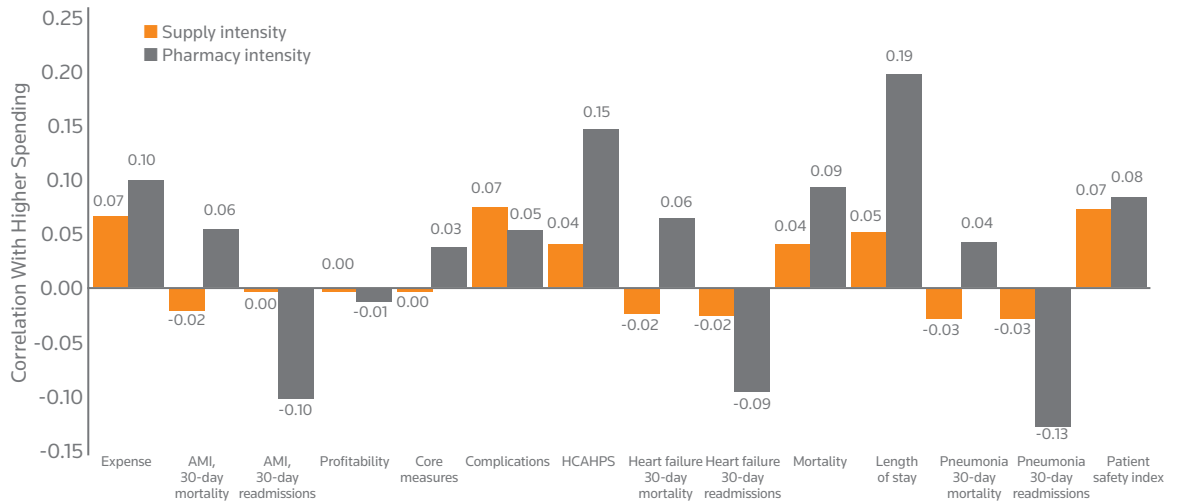
- Lower pharmacy intensity (higher efficiency) significantly related to lower inpatient and post-discharge mortality and lower complications.
- Lower pharmacy intensity is significantly related to better patient safety.
- Lower pharmacy intensity is significantly related to shorter patient stays and lower inpatient expenses per discharge.
- HCAHPS scores of favorable patient perceptions of care are associated with higher spending on pharmacy.
- Higher pharmacy intensities are related to lower 30-day readmissions.

## Supply Intensity and Other Performance Measures

- Lower supply intensity (higher efficiency) is significantly related to lower inpatient mortality and lower complications.
- Lower supply intensity is significantly related to better patient safety.
- Lower supply intensity is significantly related to shorter patient stays and lower inpatient expenses per discharge.
- HCAHPS scores of favorable patient perceptions of care are associated with higher spending on supplies.
- Higher supply intensities are related to lower 30-day readmissions.

These findings are illustrated in Figure 4.

**Figure 4. Lower Spending on Pharmacy and Supplies Correlated With Better Performance on Certain Measures of Quality**



SOURCE: Thomson Reuters

Note: Positive correlations indicate that as pharmacy and supply intensity (spending) increase, the *100 Top Hospitals* rank increases. Note that an increasing *100 Top Hospitals* rank indicates poorer performance, whereas a lower rank indicates better performance.

# METHODOLOGY AND DATA SOURCES

This research used federal fiscal years 2008 and 2009 MedPAR and Thomson Reuters Projected Inpatient Database (PIDB) statistics from 3,607 hospitals. These data include the facilities in the *100 Top Hospitals 2011* study. That study had extensive hospital performance measures that provided a solid basis for assessing the associations between pharmacy intensity (PI), supply intensity (SI), and hospital performance.

The detailed methodology for the Thomson Reuters PI and SI estimates can be found in a separate document.<sup>1</sup> Briefly, federal fiscal year 2009 all-payer data from the PIDB were used as nationally normative reference data for estimating Centers for Medicare and Medicaid Services (CMS) Medicare Severity-Diagnosis Related Group (MS-DRG)-specific median hospital costs for pharmacy and supply services. The ratios of costs to charges by revenue center from the Medicare Cost Reports were used to estimate costs.<sup>2</sup> The CMS MS-DRG was used to adjust for case-mix and severity for purposes of cost estimation.

Median costs estimated separately for pharmacy (revenue center codes 6 and 7) and supply services (revenue center codes 8, 16, and 17) from the normative data were then assigned by MS-DRG to both all-payer (PIDB) and MedPAR data to compute hospital-level performance on risk-adjusted PI and SI. The hospital-specific measure of risk-adjusted PI was computed by calculating the ratio of observed to expected pharmacy costs and multiplying the quotient by the grand mean for pharmacy costs. The SI was computed similarly, using the corresponding revenue center code for supply cost.

For the system membership analysis, we used the American Hospital Association variable for system membership to examine how the PI and SI scores were associated. We adjusted data for hospital class (major teaching; teaching; large, medium, and small community hospitals) and census division.

## IMPLICATIONS

This research found that higher performing hospitals spend less on pharmacy and supplies. Further, it shows that hospitals exhibiting efficiency in pharmacy and supply costs, either through lower service intensity or higher use of less expensive products or materials or both, demonstrate better performance on certain measures of hospital performance (inpatient mortality, complications, patient safety, length of stay, and expenses). This may ultimately suggest that hospitals don't necessarily need to spend more on pharmacy and supplies to have better outcomes in general.

On the other hand, higher pharmacy and supply intensity was correlated with lower 30-day readmissions and with higher overall patient satisfaction (HCAHPS) ratings. The latter result may reflect the fact that some of the HCAHPS survey instrument items ask about pain management and medication instructions from caregivers.

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<sup>1</sup> Foster DA. Hospital-Specific Intensity Scores for Pharmaceutical Services and Supplies. Thomson Reuters. May 2010.

<sup>2</sup> Shwartz M, Young DW, Siegrist R. The ratio of costs to charges: how good a basis for estimating costs? *INQUIRY* 32: 476-81 (Winter 1995/96).

