

## Is Volume Related to Better Care and Lower Cost for Coronary Artery Bypass?

Auerbach AD, Hilton JF, Maselli J, et al. Case volume, quality of care, and care efficiency in coronary artery bypass surgery. *Arch Intern Med* 2010;170:1202–8.

### Study Overview

**Objective.** To examine the relationship between case volume, quality of care, and care efficiency (hospital costs and length of stay [LOS]) in coronary artery bypass patients, in particular, to determine whether case volume or quality of care is an independent driver of care efficiency.

**Design.** Observational study.

**Setting and participants.** 81,289 adult patients undergoing coronary artery bypass surgery in 164 U.S. hospitals in the Premier program from 2003 to 2005. Quality of care was assessed by whether ideal patients failed to receive recommended measures and services.

**Main outcome measures.** Cost of hospitalization and LOS.

**Main results.** After adjusting for patient and site characteristics, lowest-volume hospitals had 19.8% higher costs and lowest-volume surgeons had 3.1% higher costs. The differences in cost remained after adjusting for quality of care. There was not a consistent relationship between individual quality of care measures and costs or LOS, but patients who received perfect quality scores had a shorter LOS and lower costs than patients who had failed at least 1 of the quality measures. Modeling suggests that the relationships between volume and efficiency and quality of care and efficiency were independent of each other.

**Conclusion.** The strategies of both maximizing quality of care and avoiding lowest-volume hospitals may be useful in improving health care efficiency.

### Commentary

Improving health care efficiency is arguably the single biggest domestic policy priority for the country, yet we know very little about why some providers spend less to provide the same quality of care as other providers. Understanding the relationship between costs and quality—and ultimately, determining the factors that are associated with the delivery of high-quality care at lower costs—can be very helpful in designing policies to improve efficiency.

It is in this context that the study by Auerbach and colleagues is helpful. They studied coronary artery bypass grafting surgery (a common, expensive procedure with large variations in quality and costs) and had 2 principal findings: First, that hospitals that perform these surgeries infrequently had nearly 20% higher costs than hospitals that do not. Second, providers who were very high quality also tended to have lower costs. This led to their conclusion that both improving quality and avoiding low-volume hospitals should have a pay-off in terms of efficiency.

There are several problems with this interpretation. First, this was a study of association and not causation. Therefore, making any conclusive recommendations is difficult and the results should be interpreted in the context of other data. There is a relatively robust literature that shows that higher procedure volume is associated with both better outcomes and lower costs [1]. This may be due to the greater efficiencies gained through experience.

The prior data on quality and efficiency are much more mixed: usually, it costs more to deliver high-quality care (hiring more nurses, implementing an electronic record, etc.) [2]. Auerbach et al examined a highly atypical set of hospitals (those in the Premier program), and it might be that among these relatively high-quality hospitals, small gains in quality are due to factors other than spending. The relationship between quality and costs was weak and inconsistent—and making recommendations based on these results seems risky at best.

### Applications for Clinical Practice

This study adds yet more evidence that for major surgical procedures like coronary artery bypass, avoiding the lowest-volume hospitals will both improve outcomes and lower costs. Clinicians, especially cardiologists who often make referrals for cardiac surgery, should take these results to heart. Quality improvement as a strategy to lower costs seems far less straightforward and unnecessary. The bottom line is that improving quality lowers morbidity and mortality for patients. It is an important goal unto itself—and need not be justified for any potential cost savings that might or might not emerge.

—Review by Ashish K. Jha, MD, MPH

### References

1. Birkmeyer JD, Stukel TA, Siewers AE, et al. Surgeon volume and operative mortality in the United States. *N Engl J Med* 2003; 349:2117-27.
2. Jha AK, Orav EJ, Dobson A, et al. Measuring efficiency: the association of hospital costs and quality of care. *Health Aff (Project Hope)* 2009;28:897-906.