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Is Hospital Volume the Way to Measure Quality Outcomes?

Hospitals and other health care facilities perform a wide variety of procedures on patients annually. The number of procedures a hospital performs is the "volume" for that procedure. When a procedure is done on an emergency basis, the patient will almost always choose a nearby hospital, without regard to quality outcomes. But for non-emergent procedures, is volume a good predictor of quality outcomes? Is a patient's outcome likely to be better at a high volume hospital (HVH) than at a low volume hospital (LVH)? Are there better predictors of patient outcomes? This paper will begin to address these health care quality and patient safety questions.

The case for volume - There have been hundreds of studies about the impacts of volume on hospital effectiveness, offering somewhat conflicting views. Generally though, the scientific studies conclude that volume is important for some procedures and for certain patient groups. There may be some merit to the adage "practice makes perfect."

For instance, there are a number of studies suggesting patients who are at high risk have lower mortality rates when cardiovascular procedures, pancreatic surgery, heart transplants, heart surgery on children, repair of weak spots or tears in the abdominal part of the aorta, and surgery on a cancerous esophagus are performed at HVHs. In fact, there is research indicating that a patient's risk of dying could be reduced by more than 30 percent for some procedures at HVHs.

If volume were the only measure of quality, referrals for selected procedures might be focused on a smaller number of HVHs. This might lead to improved economies of scale for these facilities, improved outcomes, lower costs, and lower employee lost-work time, disabilities and deaths. But what happens when HVHs have poor patient outcomes?

Is volume the best measure? The association between volume and outcomes appears to be a complex issue. A number of studies base their conclusions upon the mortality rates among patients in high volume and low volume hospitals. Mortality rate, the likelihood to survive the procedure, is not the only indicator of quality outcomes – and may not be the best indicator. Other indicators include likelihood of experiencing complications (complication rates), probability that a patient may be readmitted to the hospital (readmission rates), and lengths of stay. Furthermore, results in the volume studies are often not "risk-adjusted." Risk adjustment takes into account a patient's degree of illness upon his/her admission to the hospital, and is a necessary component for an apples-to-apples comparison.

Patient volume alone may not be an appropriate determinant for quality since there may be LVHs that provide excellent care for patients. Simply because the number of cases may be too small statistically to qualify as a HVH, does not mean the quality of care will be sub-par in every LVH. Furthermore, LVHs may play a pivotal role in providing community-based care, particularly pre- and post-tertiary care, and particularly in rural areas.

Some researchers suggest that volume may sometimes be a "proxy" for other underlying quality indicators – in other words, volume may be a substitute for more precise, but difficult-to-capture quality measures. At

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least one researcher has suggested that hospitals review their entire process of care and identify the precise attributes associated with quality. He suggests that all hospitals, high volume and low volume, implement those quality changes into routine practice nationwide.

Volume-driven referrals could produce negative impacts. According to a report prepared for the Agency for Healthcare Research and Quality (AHRQ), potential drawbacks include the following list: requiring high volumes will impede entry of new competitors into the marketplace; HVHs may achieve contractual leverage thus leading to price inflation; counting the number of procedures may lead to incentives to perform procedures that are not appropriate; and there may be resistance by providers to engage in quality measurement activities. Patients would have their own set of concerns. AHRQ says these include: preference for services located near home; loss of access to care in areas where low-volume services are discontinued; high-volume hospitals may have difficulty handling the additional caseload as a result of evidence-based referrals; and LVHs may be unable to transfer unstable patients to high-volume centers.

How should purchasers judge quality? Following the release of the Institute of Medicine report on medical errors, a consortium of Fortune 500 companies and other large private and public health care purchasers formed *The Leapfrog Group* in 2000. Leapfrog has begun examining medical system processes and offers advice to purchasers in metropolitan areas about volume. (http://www.leapfroggroup.org/consumer_intro2.htm)

Leapfrog focuses on "Evidence-based Hospital Referrals (EHR)." EHR encourages patients who need complex procedures to utilize hospitals that perform a high volume of these procedures, and Leapfrog sets volume standards for some procedures, encouraging patients to utilize HVHs for those procedures.

Importantly, The Leapfrog Group also acknowledges there is a better way to measure quality outcomes. Leapfrog offers this general advice: "In geographical areas where scientifically rigorous, risk-adjusted hospital-specific outcomes are publicly reported, direct measures of performance will replace hospital volume as the EHR standard." While Leapfrog was unable to implement quality measurements nationwide (because few states tabulate the measures) PHC4 *does* offer more advanced outcome measurements statewide in Pennsylvania.

Only a handful of states offer information to consumers about hospital volume. Pennsylvania purchasers and consumers have access to valuable information beyond volume, including performance and risk-adjusted outcomes for more than 70 clinical conditions and procedures for every hospital in the state in our PHC4 *Hospital Performance Report* (HPR). To view the HPR on these clinical conditions, visit our Web site at: http://phc4.org/reports/hpr00/default.htm

Risk-adjusted mortality rates, complication rates, readmission rates, and length-of-stay are typically better than volumes as an indicator of quality outcomes - in both HVHs and LVHs. While volume can sometimes be an indicator of quality outcomes, these other measures taken together are more likely indicators of quality outcomes. PHC4 has data on these other measures.

What is the purchaser role? While endeavoring to decrease health care costs and improve quality by evaluating complex health care issues such as volume-related outcomes, purchasers can facilitate informed decision-making by making employees aware that outcomes may vary by hospital, and that information is available about hospital outcomes. Employees need education about the importance of quality outcomes and the value of outcome measurements, including complication and readmission rates, mortality rates, lengths of stay, and volumes. Purchasers may not want to direct patients to a particular hospital for a particular procedure. However, Pennsylvania purchasers can identify hospitals with the best outcomes, using PHC4 data, and can develop incentives that will act as an inducement for patients to utilize the best-quality facilities.

PHC4 has developed a small bibliography of some of the studies about volume and quality. Go online to www.phc4.org for the bibliography, or contact us.

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