



All Over the Map: Elective Procedure Rates in California Vary Widely

Introduction and Background

For patients considering elective surgery or tests, location matters. The community in which a person resides is often the best predictor of the likelihood of undergoing particular elective procedures. Such procedures are considered to be “preference sensitive,” because the rate at which they are delivered is determined by the preferences of clinicians and patients. Rates can vary widely from place to place, and often the choice of treatment is determined more by the physician’s preference than the patient’s.¹

This research summary highlights the geographic variation in the rates of 13 elective procedures throughout California. The procedures studied were chosen because they are commonly performed, and/or because earlier studies have shown wide geographic variation in their rates in other parts of the country.² Though these earlier studies of variation have focused primarily on Medicare patients, this analysis is based on data from the Medicare population (both fee-for-service and managed care), as well as data on younger individuals enrolled in commercial plans, Medicaid, and the uninsured. The consistency of results across all payers makes a significant contribution to the literature documenting variation in practice.

Some examples from the findings:

- Marysville residents are at least two and a half times as likely as Inglewood residents to undergo coronary artery bypass graft surgery (CABG).

- Laguna Hills residents are two and a half times less likely as Red Bluff residents to undergo knee replacement.
- Women who live in Berkeley are at least ten times as likely as women who live in Hanford to undergo vaginal birth after c-section (VBAC).
- Women in San Francisco are half as likely as women in Redding to undergo hysterectomy.
- Ridgecrest residents are at least twice as likely as Santa Monica residents to undergo cholecystectomy (gallbladder removal surgery).

Research Methodology

The research incorporated hospitalizations and ambulatory surgery center (ASC) visits that took place between January 1, 2005 and December 31, 2009, using data collected by the California Office of Statewide Health Planning and Development (OSHPD). The researchers classified each hospitalization or visit according to the Hospital Service Area (HSA) and Hospital Referral Region (HRR) in which the patient resided (see box on page 2), using data on the patient’s residence ZIP code and definitions of HSAs and HRRs developed by the Dartmouth Atlas Project. The total number of procedures was computed for each service of interest in each area; rates of use were created by dividing by measures of the population of each area.³

The rates were adjusted to account for variations in age, sex, race/ethnicity, income, education, and insurance status of people in each area. For some procedures, rates were also adjusted for

HSA and HRRs

A hospital service area (HSA) represents a local health care market for community-based inpatient care. Usually, Medicare beneficiaries in the service area receive the majority of their inpatient care within the HSA, which can include more than one community.

A hospital referral region (HRR) represents a health care market for tertiary medical care. (A tertiary designation is based on where patients receive major cardiovascular surgical procedures and neurosurgery.) Each HRR includes at least one HSA that has a hospital or hospitals that perform major cardiovascular procedures or neurosurgery. The Medicare beneficiaries who live in an HRR get the majority of their tertiary inpatient care within the HRR.

A measure of interest was how often a patient received hospital treatment in the HSA or HRR where they lived. These “locality rates” were calculated for all of the measures based on patient discharge data, at both the HRR and HSA levels. In general, locality rates for HRRs were quite high—70% or higher in most cases. Rates for HSAs were often lower, as might be expected, as patients are more willing to travel for certain types of procedures. For some HSAs, locality rates were 0, indicating that no patients in that HSA sought care in the same HSA. One common reason for this would be that hospitals in the HSA did not provide that particular service.

the number of hospitalizations for acute myocardial infarction per 100,000 population, and the number of hospitalizations in which the patient had a diabetes diagnosis code per 100,000 population, which are thought to capture variations in important aspects of health status. Statistical techniques were used to “hold constant” these factors across areas, so that the rates reported did not vary geographically because of variations in these characteristics. As a result, the differences in procedure frequencies reported were most plausibly caused by factors other than those for which adjustments were made.

Because there is no recommended “right rate” for elective procedures, state averages are used only as the comparator

for analysis, not as a benchmark. The rates of procedures per 100,000 individuals are compared to statewide averages per 100,000 individuals. Particular attention is paid to those areas where the rate of a procedure is 50% more or less than the statewide average.

Causes of Variation

While some geographic variation in rates of procedures is expected due to differences in the prevalence of disease, much of the variation seen across California cannot be explained by illness rates. For example, in the case of elective cardiac procedures such as bypass surgery, differences in rates of heart disease did not match up with the variation in cardiac procedures. Moreover, the degree of variation in cardiac procedures is extreme. A number of communities in California were found to have procedure rates that were 150% of the state average, and some were as high as 550%—far exceeding differences in health status. Other communities have exceptionally low rates.

There are several factors underlying variation. In some cases, patients in a region may not have adequate access to care, and thus rates of certain procedures may be low. In other cases, there is no solid evidence to point clinicians to the “best” treatment option for any individual patient. For example, a 2007 systematic review found no randomized controlled trials on the benefits of surgically removing the gallbladder (cholecystectomy) for the treatment of non-symptomatic (“silent”) gallstones.⁴ The standard of care for “silent” gallstones is not to perform cholecystectomy unless symptoms develop. Even so, some physicians recommend surgery, believing that symptoms will eventually develop and that it is unwise to wait until the patient is older and may be less able to undergo surgery.⁵ The lack of evidence for this treatment option may contribute to the variation in the rates of cholecystectomy seen from place to place.

Even when medical evidence exists, physicians may differ in their approach to treatment. In the case of cardiac procedures such as angioplasty (percutaneous coronary

intervention, or PCI) and stents, there are abundant data to indicate which patients are most likely to benefit. Yet wide variation in rates of these procedures persists. Fee-for-service payment may figure into physicians' tendency to recommend one treatment versus another. A physician's opinion about whether or not to advocate surgical intervention may also vary according to his or her medical training and relationship with and reliance upon peers. One study examining cardiologists' propensity to recommend a variety of tests and procedures found that, "cardiologists with high Cardiac Intensity Scores [those more likely than their peers to order tests and invasive treatments] were more likely to report recommending a cardiac catheterization that was not clinically indicated when they thought their peers would do so than those with lower scores." This suggests that physicians who practice intensively "may be more likely than others to be influenced by peers—or that conformity to perceived practice norms is a potent influence on practice style."⁶

Clinicians' varying opinions can have a significant effect on the rate of elective tests and procedures because patients often defer treatment decisions to their clinicians in the belief that the "doctor knows best." Oftentimes, patients don't recognize that their clinicians cannot accurately "diagnose" their patients' priorities or preferences in terms of treatment choices. A recent study on patient decisionmaking found that physicians readily offered their own opinions about choosing the elective procedure for all nine medical decisions studied, and they were often less likely to ask their patients what they wanted.⁷ A study published in *Health Affairs* in 2010 found that only 34% of patients reported having had a physician discuss with them insights from scientific research.⁸ Furthermore, doctors may be hampered by their patients' reluctance to provide relevant information and ask pertinent questions. The *Health Affairs* study found that 41% of patients reported having withheld a relevant question or medical problem because they either didn't know how to raise the concern or felt the doctor was rushed.⁹

All too often, studies show, patients do not fully understand their options and the pros and cons of each. In the case of elective PCI, many patients believe incorrectly that the procedure will reduce their risk of heart attack and death.¹⁰ In other cases, patients may overestimate risk and refuse treatments that could be beneficial.¹¹

Without the patient's fully informed involvement, the clinician's own preference typically guides the choice of treatment. Their decisions may not be aligned with the treatment an informed patient would choose, provided he or she had the information needed to understand the tradeoffs involved in each choice. Variation in rates of preference-sensitive care that is not due to prevalence of disease or patient preferences is considered unwarranted.

Patterns of unwarranted variation tend to persist over time. This study found that within each California hospital referral region (HRR), certain procedures are performed more often and others less often, regardless of whether the patient is over or under age 65.¹² This phenomenon—a "surgical signature"—was first observed by John E. Wennberg, founder of the *Dartmouth Atlas*. He and other researchers have noted that because "regions with high rates of surgery in the 1990s still tend to have high rates today, the cumulative effect is to expose large numbers of patients to surgical interventions that they may or may not have wanted."¹³

There is growing agreement among clinicians that patient preferences should be central to decisions about elective care. Women with early-stage breast cancer provide a clear example. Clinical evidence suggests that either mastectomy or lumpectomy followed by radiation offers the same chance of survival. For mastectomy, the patient must weigh the physical and psychological cost of losing a breast and whether to undergo breast reconstruction. Her family history of breast cancer may influence her response as well. A lumpectomy may entail radiation and/or chemotherapy as well as a slightly higher risk of

recurrence in the same breast. With such highly personal considerations at stake, the treatment chosen should reflect the woman's values and preferences.¹⁴

Without patient participation in the decisionmaking process, some patients may be getting care they don't want while others may not receive the care they would prefer.

Potential Remedies

Use of Evidence

Better clinical guidelines can help reduce unwarranted variation, particularly if those guidelines are developed from systematic reviews or comprehensive summaries of the evidence for certain treatments from multiple studies, preferably randomized controlled clinical trials. Greater dissemination of results from comparative effectiveness research could help clinicians distinguish the relative benefits (and harms) of treatment options, and in the process help them offer better advice to patients and reduce rates of inappropriate utilization.

However, more information will not necessarily reduce unwarranted variation, as rates of elective PCI suggest. There is a large body of evidence to guide the appropriate use of this procedure, and the American College of Cardiology has developed detailed guidelines as to which patients are the most appropriate candidates.¹⁵ Yet physicians vary in their opinions about when to use it, and rates of elective PCI are among the most variable in this study.

The variability in rates of PCI highlights the important distinction between appropriateness and patient choice. The clinical guidelines are intended to ensure that only appropriate candidates undergo the procedure. Yet studies show that about half of elective PCIs are clearly appropriate and about 12% to 15% are clearly inappropriate.¹⁶

Certain organized medical practices, such as Kaiser Permanente and Intermountain Healthcare, have used the dissemination of clinical evidence and guidelines among their providers to reduce variation in procedure rates among providers.

Increasing Transparency

Increasing transparency regarding the rate of certain procedures is another potential means of curbing unwarranted variation. Wennberg has previously shown that when physicians and other clinicians know about the variation in rates of procedures, it facilitates a greater awareness of their own practice patterns in relation to other professionals and can help check overuse (and underuse) of certain treatments and procedures. For example, "Over one four-year period in the 1970s, hysterectomy rates in Lewiston [Maine] were such that over 800 more women were operated on than would have experienced surgery had the average rate for the state applied." Upon learning these data, the leadership of the hospital for the Lewiston area imposed a quota to bring the rate of hysterectomies down to the state average. By 1981, the rate at which women in Lewiston had undergone a hysterectomy declined by 45% and this rate has remained stable over time.¹⁷

While this example illustrates how transparency can change practice patterns and alter rates of procedures, increased transparency does not necessarily mean that patients are receiving the care that they want.

Shared Decisionmaking

More comparative effectiveness research and physician feedback will not fully address unwarranted variation. Even a fully informed patient who is an appropriate candidate for a procedure may not desire to undergo it. Studies suggest that a high rate does not necessarily mean that all patients who are appropriate candidates and who want the procedure are getting it, and a low rate does not mean that patients who are inappropriate candidates, or who do not want the procedure, are avoiding it.¹⁸ Thus,

the “right” rate of any preference-sensitive procedure is the rate that would be established when clinicians are following appropriateness guidelines, and patients are fully informed and engaged in the decisionmaking process. A patient’s own values and willingness to accept uncertainty in outcomes should be considered alongside the clinician’s recommendations.

One way to elicit that is through shared decisionmaking, a formal process intended to ensure that patients are informed about their options, and to encourage both patient and clinician to come to a decision together.

The Agency for Healthcare Research and Quality (AHRQ) recently launched a campaign—the Effective Health Care Program—to help patients understand and make better treatment choices.¹⁹ Patient decision aids such as printed documents, DVDs, or interactive web programs can offer balanced, evidence-based information about medical conditions, the patient’s treatment options, and the trade-offs involved in each choice.

A recent systematic review of more than 50 randomized controlled trials comparing decisions made by patients who received usual care versus patients who had access to decision aids, found that decision aids:

- Helped patients better understand their treatment options;
- Gave more of them a realistic perception of their chances of benefits and harms;
- Left them feeling more satisfied with the decision they made and less conflicted about their decisions;
- Helped them take a more active role in their medical care;
- Reduced the percentage of people who remained undecided after counseling; and
- Improved agreement between a patient’s values and the option he or she actually chose.²⁰

Studies have also found that when patients are part of the medical decisionmaking process, they often opt for more conservative (and less expensive) treatment options without compromising their health outcomes.²¹

Conclusion

Reducing the problem of unwarranted variation will require strong efforts on the part of providers, patients, and those who pay for care (health plans and government). Greater sharing of knowledge—through better understanding of clinical evidence, transparency of community level service patterns, and shared decisionmaking—can help to reduce unwarranted variation. Clinical decisionmaking tools, such as patient decision aids, can also make a difference by offering balanced, evidence-based information about medical conditions, treatment options, and the trade-offs involved in each choice.

Patients who are fully informed are on average 20% less likely to choose an invasive treatment option, with no adverse effects on health outcomes or satisfaction with their care.²² Wennberg and his colleagues estimate that approximately 25% of Medicare spending goes toward preference-sensitive treatments, mostly elective surgeries.²³ This suggests that addressing the problem of unwarranted variation in rates of elective procedures and involving patients more fully in treatment decisions could have a significant impact on overall health care spending.

ABOUT THE FOUNDATION

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MORE INFORMATION

For more information on this research and its findings, go to www.chcf.org.

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The following health care leaders were extraordinarily generous with their time and thoughtful input during the process of creating this report. Since input was sought from a broad spectrum of experts, no individual member of the advisory committee should be considered as endorsing all the conclusions contained in the report.

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