



Supply-Sensitive Care

There is unwarranted variation in the practice of medicine and the use of medical resources in the United States. There is underuse of effective care, misuse of preference-sensitive care, and overuse of supply-sensitive care.

Hospital beds, once built, will be used.

In the early 1960s, UCLA public health researcher Milton Roemer pointed out this relationship between the supply and use of hospital beds. Known today as Roemer's Law, it is central to understanding the phenomenon of supply-sensitive care and how a health care system's capacity helps drive how its resources are used.

What is supply-sensitive care and why is it important? It is care whose frequency of use is not determined by well-articulated medical theory, much less by scientific evidence. Supply-sensitive services include physician visits, diagnostic tests, hospitalizations and admissions to intensive care among patients with chronic illnesses. Finally, as Dartmouth Atlas Project research has demonstrated, the use of supply-sensitive care varies widely across the U.S. and is overused in many regions. This is where Roemer's law comes into play – the most important determinant of this variation is the area's supply of hospital beds, physician specialists, etc. Where there is greater capacity, more care is delivered – whether or not it is warranted.

These findings are particularly important for Medicare. With Medicare heading for a fiscal train wreck, policymakers should take note of the overuse of unwarranted hospitalization and associated physician services among Medicare patients. More than 50 percent of Medicare spending is used to buy visits to physicians, diagnostic tests and hospitalizations, mostly for patients with chronic illness. The conditions that generate the most spending are congestive heart failure, chronic lung disease and cancer. Our research shows there are *wide variations in what Medicare spends for services to treat chronically ill patients and that higher spending does not achieve better outcomes.*^{a,b,c}

The importance of managing this overuse is underscored by our studies showing that variation in the use of supply-sensitive care "explains" most of the variations in Medicare's per capita spending among U.S. regions. For instance, Medicare spending per enrollee varies almost three-fold among hospital referral regions and academic medical centers. The variation among specific hospitals is also striking. Our recent study of the 226 largest California hospitals (those with sufficient numbers of patients to allow accurate measurement of resource use) showed that Medicare spending per patient in the last two years of life ranged from \$24,722 to \$106,254.^d The potential savings are enormous. For example, over the five year period of this study

Unwarranted Variation: The Overuse, Underuse, and Misuse of Care

There is unwarranted variation in the practice of medicine and the use of medical resources in the United States. There is underuse of effective care, misuse of preference-sensitive care, and overuse of supply-sensitive care.

■ Underuse of most kinds of effective care (such as the use of beta-blockers for people who have had heart attacks and screening of diabetics for early signs of retinal disease) is very common even in hospitals considered among the "best" in the country – including some academic medical centers. The causes of underuse include discontinuity of care (which tends to grow worse when more physicians are involved in the patient's care) and the lack of systems that would facilitate the appropriate use of these services.

■ Misuse of preference-sensitive care refers to situations in which there are significant tradeoffs among the available options. Treatment choices should be based on the patient's own values (such as the choice between mastectomy and lumpectomy for early-stage breast cancer); but often they are not. Misuse results from the failure to accurately communicate the risks and benefits of the alternative treatments, and the failure to base the choice of treatment on the patient's values and preferences.

■ Overuse of supply-sensitive care is particularly apparent in the management of chronic illness (such as admitting patients with chronic conditions such as diabetes to the hospital, rather than treating them as outpatients). The cause is an overdependence on the acute care sector and a lack of the infrastructure necessary to support the management of chronically ill patients in other settings.

(1999-2003) Medicare could have saved \$1.7 billion in the Los Angeles market alone if care patterns in Los Angeles mirrored those of Sacramento.^e

Regions and academic medical centers with greater overall spending rates do not have higher quality of care; nor, perhaps surprisingly, do they have higher rates of discretionary surgery. The greater spending is largely the result of the providers in these regions using more supply-sensitive care: more physician

Supply-Sensitive Care

visits, hospitalizations, stays in ICUs and diagnostic testing and imaging. The remarkable variation in the frequency of use of these services among regions demonstrates the role capacity plays. For example, rates of primary care visits vary by a factor of about three, visits to medical specialists by more than six, and hospitalizations for cancer, chronic lung disease and congestive heart failure by more than four.

A lack of guidelines

Medical theories and medical evidence play little role in governing the frequency of use of supply-sensitive services. (This is in sharp contrast to effective care and preference-sensitive care, where clinicians have strong opinions on the need for specific interventions.) For patients at a given stage in the progression of chronic illness, medical textbooks contain no evidence-based clinical guidelines for scheduling patients for return visits, when to hospitalize or admit to intensive care, when to refer to a medical specialist, and, for most conditions, when to order a diagnostic or imaging test. As an example, the pages of the *British Medical Journal's* annual *Clinical Evidence Concise* — which describes itself as “the international source of the best available medical evidence for effective health care” — contain not a single reference as to when to hospitalize or schedule for a revisit patients with cancer, chronic lung disease or heart failure.^f

In the absence of evidence and under the generally held assumption that more is better — that is, that medical resources should be fully utilized in the management of seriously ill patients — it should not be surprising that the supply of resources governs the frequency of their use.

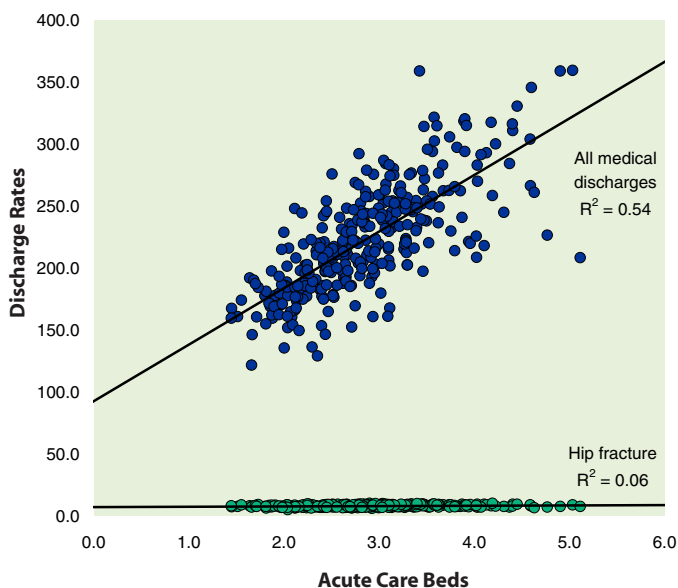


Figure 1. Association between hospital beds per 1,000 (1996) and discharges per 1,000 (1995-96) among Medicare enrollees in 306 hospital referral regions

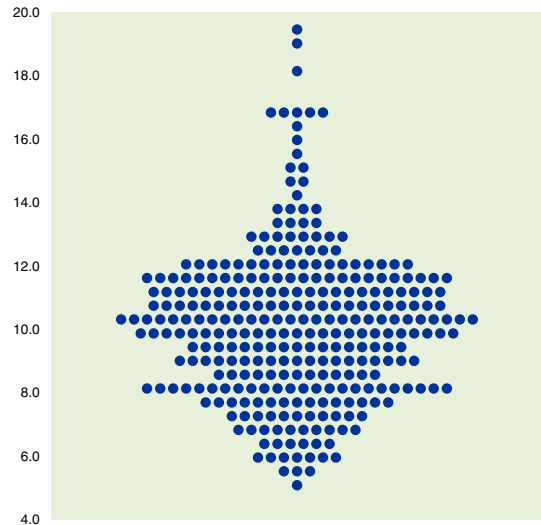


Figure 2. Patient days in hospital during the last six months of life among Medicare decedents in 306 hospital referral regions (2003)

The correlation between capacity and use

Over the years, the Dartmouth Atlas Project, led by Dr. John E. Wennberg, has consistently shown a positive association between the supply of staffed hospital beds and the rate of hospitalization for conditions that do not require surgery. Figure 1 provides a powerful demonstration of this correlation. It illustrates the supply of hospital beds per 1,000 residents and the hospitalization rate for medical (non-surgical) conditions in 306 hospital referral regions across the country. In the cases where hospitalization is clearly warranted – illustrated here with the example of the green dots for hip fractures – the hospitalization rate is similar across the country, with no correlation to the supply of hospital beds. By contrast, more than half of the variation in hospitalization rates for medical (non-surgical) conditions is associated with bed capacity.

The use of hospitals for the treatment of people with medical conditions is particularly intense during the last few months of life, and the variation among regions is striking. On average, patients living in the lowest rate regions spent about six days in hospitals, while those in the highest rate region spent twenty days, as Figure 2 illustrates. Since by definition all enrollees were dead by the end of the period, it is extremely unlikely that unmeasured differences in illness played an important role in the variation.

A similar relationship can be seen between the supply of physicians and visit rates, particularly for those specialties that spend most of their time treating chronic illness. Figure 3 illustrates the relationship between the number of cardiologists per 100,000 residents of the region and the number of visits to cardiologists

Supply-Sensitive Care

per Medicare enrollee. About half of the variation in the number of visits to cardiologists per Medicare enrollee is associated with the number of cardiologists per 100,000 residents. A similar relationship exists between the supply of internists and numbers of visits to internists.

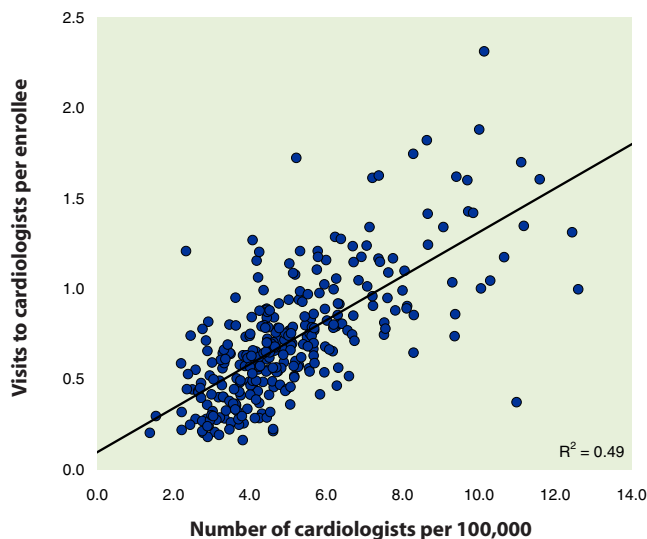


Figure 3. Association between cardiologists and visits per person to cardiologists among Medicare enrollees (1996) in 306 hospital referral regions

The basis for this association seems to be that the Medicare population constitutes a large share of the cardiologists' and internists' patient loads. Appointments to see physicians characteristically are fully "booked" — very few hours in the workweek go unfilled. Most office visits are for established patients, and the interval between revisits is dictated by the size of the physician's panel of patients. On average, regions with twice as many cardiologists per 100,000 residents will have twice as many available office-visit hours. In the absence of evidence-based guidelines on the appropriate interval between revisits, available capacity governs the frequency of revisits.

Physician visit rates among people who are in their last six months of life vary substantially. In the highest-rate region, these people had an average of more than 55 visits during their last six months; in the lowest-rate regions the average was about 14 visits (Figure 4).

Is more worse, and is less more?

The bottom-line question is whether populations receiving more supply-sensitive care have better outcomes. Do they live longer? Do they have higher quality of life? Are they more satisfied with their care? This question has received virtually no attention from academic medicine or federal agencies, such as

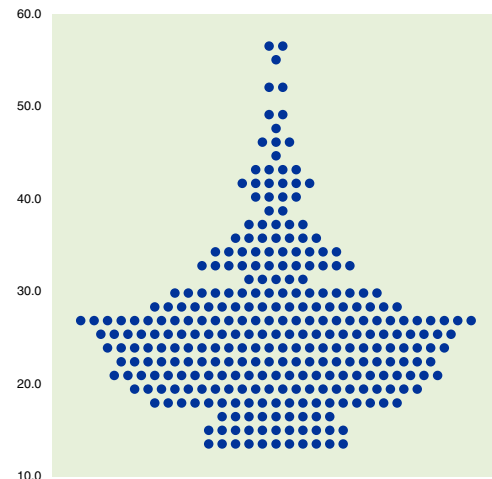


Figure 4. Total physician visits during the last six months of life among Medicare decedents in 306 hospital referral regions (2003)

the National Institutes of Health, which are responsible for the scientific basis of medicine. With the exception of a few studies of chronic disease management, patient-level studies that might shed light on the question simply haven't been done. The issue of the appropriate quantity of supply-sensitive care is only beginning to emerge as a topic for medical discourse at medical rounds and in scientific journals and textbooks.

The study by Dr. Elliott Fisher and colleagues provides a provisional answer about whether regions with greater intensity of clinical practice have better outcomes. The researchers examined the outcomes of three patient cohorts enrolled because they had a hip fracture, a heart attack or a colectomy for colon cancer. The study compared cohorts living in regions with greater care intensity to those in regions with less intensity. (The measure of care intensity was price-adjusted end-of-life spending.) The question was whether those living in regions where they are likely to receive more care had better outcomes than those living in regions where they were likely to receive less. The patients were followed for up to five years after their initial event — the hip fracture, surgery for colon cancer or heart attack. The study showed increased mortality rates in regions with greater care intensity.

To address the questions of whether patients who get more interventions have better quality of life and are happier with what they get, Fisher and colleagues examined data from CMS's ongoing Medicare Beneficiary Survey, which contains measures of functional status and patient satisfaction. The results indicated no difference between high-rate regions and low-rate regions in the level of decline in functional status or satisfaction, but in high-rate regions there was lower access to patient care.



Supply-Sensitive Care

A repetition of the study — restricting the study to patients who received their initial care at academic medical centers — had quite similar results. Academic medical centers in high-intensity regions provided more supply-sensitive services than those in low-intensity regions. For example, during the first six months following their hip fractures, patients using academic medical centers in high-spending areas had 82 percent more physician visits, 26 percent more imaging exams, 90 percent more diagnostic tests and 46 percent more minor surgery. Compared to low-intensity regions, patients with hip fractures, colon cancer and heart attacks that were loyal to academic medical centers in high-intensity regions had higher mortality rates and worse “score cards” on measures of quality.

What can be done?

Information itself can make a difference. The simple availability of information on the relative efficiency of specific health care organizations in managing chronic illness (what Arnold Milstein has called longitudinal efficiency) may stimulate payers to re-examine their provider networks by examining volume, and motivate employers to seek to move their employees toward efficient hospitals. Successful redesign along these lines would lead to net savings for employers and payers who can flexibly direct their patients to such providers. It should also assure the profitability of those health plans participating in Medicare Advantage that can make deals to send their patients to physician groups using hospitals with spending levels below the regional average.

But, ironically, traditional Medicare stands to lose unless it also can join in directing patients to efficient providers. If commercial payers steer patients away from the high-cost hospitals, the population loyal to these providers will shrink, but the available capacity of hospital beds and other resources will not. Remember Roemer’s law: so long as those beds remain in supply, they will be used. This will result in yet higher utilization rates and higher costs for supply-sensitive care and possible worse outcomes among the chronically ill Medicare patients who remain loyal to such providers.

The agenda for Medicare should include:

■ **Redirecting resources away from acute care and invest in an infrastructure that can better coordinate and integrate care outside of hospitals** — for example home health and hospice care.

■ **Re-examining economic arrangements. Pay for performance that demonstrably improves system-wide efficiency.** The current system as now constructed rewards overcare. We must reward, rather than penalize, provider organizations that successfully reduce overcare and develop broader strategies for managing their patients with chronic illness.

■ **Leading by example.** The Medicare Modernization Act directs CMS to pay all hospitals based on resources needed for “efficient care.” The measures used by Dartmouth Atlas Project studies – of spending, resource input and utilization – can help pursue this goal.

Sources

^a K. Baicker, and A. Chandra, “Medicare Spending, The Physician Workforce, and Beneficiaries Quality of Care,” *Health Affairs* 2004;Suppl Web Exclusives:W4-184-97.

^b E.S. Fisher, D.E. Wennberg, T.A. Stukel, D. Gottlieb, F.L. Lucas, and E.L. Pinder, “The Health Implications of Regional Variations in Medicare Spending: Part 1. The Content, Quality and Accessibility of Care,” *Ann Intern Med* 138 (2003):273-87;

and

E.S. Fisher, D.E. Wennberg, T.A. Stukel, D. Gottlieb, F.L. Lucas, and E.L. Pinder, “The Health Implications of Regional Variations in Medicare Spending: Part 2. Health Outcomes and Satisfaction with Care,” *Ann Intern Med* 138 (2003):288-98;

and

J.S. Skinner, E.S. Fisher, and J.E. Wennberg, “The Efficiency of Medicare,” in: Wise, DA, ed. *Analyses in the Economics of Aging*. Chicago: University of Chicago Press;2005:pp. 129-157. [With comment by Alan Garber, pp. 157-160.]

^c E.S. Fisher, D.E. Wennberg, T.A. Stukel, and D.J. Gottlieb, “Variations in the Longitudinal Efficiency of Academic Medical Centers,” *Health Affairs* 2004;Suppl Web Exclusive:VAR19-32.

^d www.dartmouthatlas.org

^e To estimate potential savings, we first multiplied the spending rate in Sacramento for inpatient and Part B services (Exhibit 3) by the number of deaths occurring in Los Angeles to predict total spending for Los Angeles if the Sacramento benchmark had applied; savings were then calculated by subtracting predicted spending from actual spending.

^f 7 British Medical Journal’s annual *Clinical Evidence Concise: Clin Evid Concise 2004*;12 BMJ Publishing Group Ltd 2004.

2007-01-15

For more information, please contact:

The Dartmouth Atlas of Health Care

Kristen Bronner, Managing Editor

35 Centerra Parkway Ste. 202, Lebanon, NH 03766

(603) 653-0826