
Quality, Efficiency, and Organizational Structure

Jay B. Sterns

Physicians and their practice patterns are the largest single determinant of the level of aggregate national health care expenditures. Integrated delivery systems (organizations linking a multispecialty physician groups and acute care hospitals) appear to be more efficient than other organizational structures while providing better clinical outcomes. To determine whether a subset of hospitals was more or less efficient than the national average, we relied on data from the Dartmouth Atlas Project, which included data from 4,346 hospitals. The analysis was restricted to patients who had one or more of 12 chronic illnesses associated with a high probability of death, and the number of hospitals identified as our control group was 14, represented by 13 organizations. Based on the preliminary data, physicians operating in a multispecialty group appear to use less physician resources to care for their patients and admit less often to a hospital, thereby reducing health care expenditures. As the federal government seeks to foster more efficient health care delivery and better outcomes, it may look to the physician-led integrated delivery network as an example of an efficient and high quality model. Key words: *integrated delivery system, multispecialty physician group, acute care, cost savings, health care expenditures, Physician-Hospital Collaboration Demonstration, Dartmouth Atlas Project, physician incentives.*

THERE has been significant public discussion of the growing share of health care expenditures as a percentage of the gross national product, which is estimated at 16 percent for 2006, according to the Centers for Medicare and Medicaid Services (CMS).¹ Medicare and Medicaid expenditures represent approximately 20.6 percent of the federal budget.² Against this backdrop in the growth in federal health care expenditures, CMS announced a three-year demonstration program: the Physician-Hospital Collaboration Demonstration (PHCD).³

The purpose behind the PHCD is to examine whether allowing hospitals to provide financial incentives for physicians to support better care can improve patient outcomes without increasing costs. Hospitals under Medicare are generally paid a fixed payment per episode of care, commonly known as a diagnosis related group. The intent of the PHCD is for the hospital to pay the physician a portion of the savings resulting from quality improvement and efficiency initia-

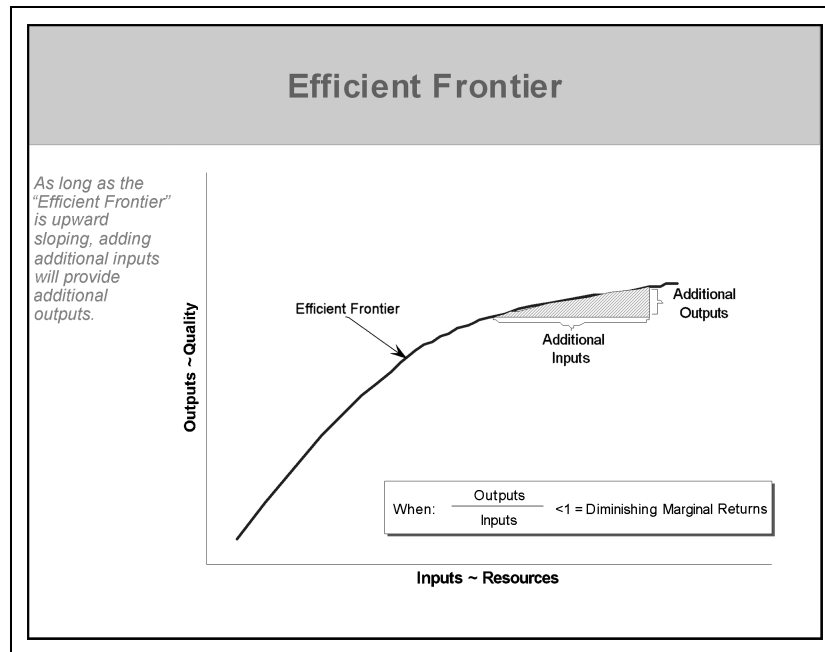
tives undertaken by the physicians.⁴ Payments would be allowed for documented, significant improvements in quality of care and savings in the overall costs of care.⁵ One of the goals of CMS is to support efforts to track and improve the overall episode of patient care, including long-term outcomes. PHCD will encompass physician groups and up to 72 hospitals in a limited number of geographic regions.⁶

One of the PHCD projects is being undertaken by a Minnesota-based multispecialty physician group, which is seeking to reduce inpatient hospitalizations for congestive heart failure. Through daily monitoring of weight and other prehospitalization risk factors, the physician group is seeking to reduce hospitalizations for its patients. A reduction in patient admissions would result

Jay B. Sterns is a Vice President in the Chicago office of Goldman, Sachs & Co. and specializes in public sector and infrastructure financing.

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Exhibit 1. Efficiency



in cost savings to CMS, while reducing Medicare payments to the affiliated hospital; however, a portion of the savings experienced by CMS would be expected to be shared by the physicians.

Premise

CMS has postulated that "the lack of alignment of incentives across different providers in the health care delivery system is often cited as a continuing obstacle to achieving optimal results in terms of quality and outcomes";⁷ however, this premise may be generally but not universally correct. Certain organizational structures are more efficient than others while providing better clinical outcomes. Specifically, integrated delivery systems (defined for these purposes as organizations comprised

of a multispecialty physician group and acute care hospital with common governance and clinical linkages) have better outcomes with less resource usage (*i.e.*, efficiency).

Efficiency, from an economic standpoint, can be viewed as the relationship of inputs and outputs as shown in Exhibit 1.

Inputs are easily measured and can be viewed as resources such as labor, supplies, or capital, and are more easily measured than outputs. In health care, output is commonly known as quality or outcome measures, which have been historically difficult to quantify.

Methodology

In attempting to compare if a subset of hospitals was more or less efficient than the

national average, we relied on data from the Dartmouth Atlas Project, which included data from 4,346 hospitals.⁸ The analysis was restricted to patients who had one or more of 12 chronic illnesses associated with a high probability of death:⁹

1. Cancer (solid tumors);
2. Lymphoma or leukemia;
3. Chronic pulmonary disease;
4. Coronary artery disease;
5. Congestive heart failure;
6. Peripheral vascular disease;
7. Severe chronic liver disease;
8. Diabetes with end-stage organ damage;
9. Chronic renal failure;
10. Nutritional deficiencies;
11. Dementia; and
12. Functional impairment.

Medicare spending was calculated for each patient based on the last two years of life, counting back from the date of death. Spending measures were adjusted for differences in age, sex, race, and the 12 chronic conditions using ordinary least squares regression.¹⁰ Ordinary least squares regression is a statistical technique that provides the “best fit” using a linear equation to a scatter plot diagram. It is the line whose sum of the squared vertical distance from the line to the observed data points is the least (minimum).¹¹

Limitations

The number of hospitals identified as our control group was 14, represented by 13 organizations. Mayo Clinic was defined as one organization, although it included two hospitals located in Rochester, Minnesota: Rochester Methodist Hospital

and Saint Mary’s Hospital. The complete list of hospitals, their locations, bed size, and utilization statistics are presented in Appendix A. The list of hospitals is not all inclusive, as it omits a number of well-recognized integrated delivery systems such as the Lahey Clinic. It also excludes certain organizational structures that have a for-profit physician organization and a non-profit hospital, such as Dean Clinic/St. Mary’s Hospital in Madison, Wisconsin. The data set also excludes organizations that are primarily managed care driven, such as Kaiser Foundation, even though there is a significant physician component to the organization. Lastly, each integrated delivery system is not necessarily a “closed system,” as physicians not affiliated with the multi-specialty clinic may be on the physician staff of the hospital with admitting privileges.

In addition, we excluded academic medical centers and their affiliated physician faculty, because they serve a mission beyond clinical care to encompass research and education. Also excluded are more recently formed physician organizations that were organized or created by a large regional health system such as Advocate Healthcare or Allina Health System. The conclusions reached here may, however, be applicable to and foreshadow the growth by hospitals of the employed physician model.

The Dartmouth Atlas Study

The Dartmouth Atlas Study included:¹²

beneficiaries enrolled in traditional (fee-for-service) Medicare who died between 1999 and 2003. . . For the hospital specific analysis, patients had to be hospitalized at least once in their last two years of life.

Appendix A. Control Group Hospitals

	Hospital	City	State	Beds ^(a)	FYE	Discharges	Patient Days	ALOS	Occupancy (%)
1.	Carle Foundation Hospital	Urbana	IL	246	06/30/05	16,999	63,744	3.75	70.99
2.	Cleveland Clinic	Cleveland	OH	993	12/31/04	54,834	313,118	5.71	86.39
3.	Dartmouth-Hitchcock Medical Center	Lebanon	NH	312	09/30/04	16,375	94,422	5.77	82.91
4.	Deaconess Billings Clinic	Billings	MT	210	06/30/04	13,202	61,869	4.69	80.72
5.	Geisinger Medical Center	Danville	PA	325	06/30/05	20,620	99,125	4.81	83.56
6.	Gunderson Lutheran Medical Center	La Crosse	WI	245	12/31/04	15,396	61,701	4.01	69.00
7.	Hamot Medical Center	Erie	PA	323	06/30/05	17,691	83,348	4.71	70.70
8.	Methodist Hospital-Park Nicollet	St. Louis Park	MN	354	12/31/04	25,529	97,554	3.82	75.50
9.	Ochsner Foundation Hospital	New Orleans	LA	390	12/31/04	20,154	104,099	5.17	73.13
10.	Rochester Methodist Hospital-Mayo	Rochester	MN	327	12/31/04	18,570	79,736	4.29	66.81
11.	Saint Mary's Hospital-Mayo	Rochester	MN	795	12/31/04	39,775	204,348	5.14	70.42
12.	Saint Mary's Medical Center	Duluth	MN	334	06/30/05	18,994	83,500	4.40	68.49
13.	Scott & White Memorial Hospital	Temple	TX	450	08/31/04	26,280	122,322	4.65	74.47
14.	Virginia Mason Medical Center	Seattle	WA	254	12/31/04	15,532	66,989	4.31	72.26

Note: All data from American Hospital Directory database

(a) Beds = General Med/Surg Beds + Special Care Beds

Claims data were used to assign each patient to the hospital used most often during the last two years of life. In the case of a tie, patients were assigned to the hospital associated with the discharge closest to the date of death.

The analysis was restricted to patients who had one or more of 12 chronic illnesses associated with a high probability of death.¹³

Physician Usage

Nine different physician input measures were reviewed. In general, the peer group had lower physician inputs versus the national average in seven of the nine measures. The range of difference was 25 percent to 10 percent; the largest percentage difference was for the "number of primary care physician visits per decedent during the last two years of life." The smallest percentage difference was for "total physician FTE inputs per 1,000 decedents during the last two years of life."

The first measure represents total primary care physician visits during the last two years of life; the second measure represents the total physician FTE labor inputs by summing the specialty-specific work relative value units (RVUs) and dividing by the average annual number of work RVUs produced by that specialty.¹⁴ In this regard, chronically ill patients had less physician contacts and, per 1,000 decedents, there were fewer physician FTE inputs. The lower physician usage ratio is, perhaps, a result of the long-term relationships that many multispecialty care physicians have with their patients and the ability of the primary care physician to manage the illness without the need for formal specialist referrals. Because of the collegial nature of multispecialty groups and common

information systems, the primary care physician can visit informally with his specialist colleagues or request a formal review of the medical record, seeking input without the need for an extensive and repetitive clinical examination. As the patient's health progressively worsened, the percentage of patients seen by 10 or more physicians by the peer group exceeded the national average by 12 percent. This could indicate that as the patient deteriorated, additional specialists were consulted, given the availability of subspecialists in the multispecialty setting.

Hospital Usage

In addition to using less physician inputs to care for the chronically ill, our peer group had lower hospital usage than the national average. Patients had 18 percent less hospital days, 34 percent less intensive care unit (ICU) days, and 19 percent less ICU days during the hospitalization in which they died. Hospital bed inputs per 1,000 decedents measures inpatient bed usage by standardizing the hospital day rate per decedent.¹⁵ Under this measure, the bed inputs were 11 percent less for our peer group than the national average and ICU bed inputs were 26 percent less for the peer group than the national average, in large part because the ICU days were 34 percent less. The later measure would indicate that the multispecialty care physician, recognizing the chronically ill condition of the patient, sought to take palliative care steps rather than aggressive medical intervention typical of an ICU patient. Significant cost savings to the medical system result from less-intensive hospitalization. Moreover, by keeping the chronically ill patient in a care environment other than in the acute care hospital, the quality of life likely improved.

Exhibit 2. Peer Group Physician Usage Versus National Average (2002–2003)

Peer Group Analysis	National Average	Percentage Difference
Total Physician Visits per Decedent During the Last Two Year of Life		
50.67	66.71	24%
Primary Care Physician Visits per Decedent During the Last Two Years of Life		
23.43	31.13	25%
Medical Specialists Visits per Decedent During the Last Two Years of Life		
22.41	29.54	24%
Total Physician FTE Inputs Per 1,000 Decedents During the Last Two Years of Life		
22.29	24.78	10%
Primary Care Physician FTE Inputs per 1,000 Decedents During the Last Two Years of Life		
7.59	10.02	24%
Medical Specialists FTE Inputs per 1,000 Decedents During the Last Two Years of Life		
8.46	9.75	13%
Hospital-Based Physician FTE Inputs per 1,000 Decedents During the Last Two Years of Life		
1.72	1.59	8%
Surgeon FTE Inputs per 1,000 Decedents During the Last Two Years of Life		
2.38	2.78	14%
Percentage of Decedents Seeing Ten or More Physicians During the Last Six Months of Life		
36.72	32.84	12%

Exhibit 3. Peer Group Hospital Usage Versus National Average (1999–2003)

Peer Group Analysis	National Average	Percentage Difference
Hospital Days per Decedent During the Last Two Years of Life		
19.70	23.93	18%
ICU Days per Decedent During the Last Two Years of Life		
3.63	5.49	34%
Percentage of Decedents Admitted to Intensive Care During the Hospitalization in Which They Died		
16.39	20.14	19%
Hospital Bed Inputs per 1,000 Decedents During the Last Two Years of Life		
58.77	65.66	11%
ICU Bed Inputs per 1,000 Decedents During the Last Two Years of Life		
11.13	15.05	26%

Payments and Reimbursement

In terms of payments, physician payments were 24 percent less for the peer group than the national average. Evaluation and man-

agement payments to physicians were 17 percent less per decedent, but reimbursement per visit was higher. Inpatient hospital reimbursement per decedent was 2 percent less for the peer group than the national average;

Exhibit 4. Peer Group Payments and Reimbursement Versus National Average

Peer Group Analysis	National Average	Percentage Difference
Physician Payments per Decedent During the Last Two Year of Life ^(a)		
\$6,902	\$9,095	24%
Evaluation and Management Payments per Decedent During the Last Two Years of Life ^(a)		
\$3,253	\$3,901	17%
Evaluation and Management Payments per Physician Visit During the Last Two Years of Life ^(a)		
\$62.74	\$58.48	(7)%
Inpatient Reimbursement per Decedent During the Last Two Years of Life ^(b)		
\$24,048	\$24,491	2%
Inpatient Reimbursement per Patient Day in Hospital During the Last Two Years of Life ^(b)		
\$1,215	\$1,023	(19)%
Outlier Payments per Decedent During the Last Two Years of Life ^(b)		
\$1,398	\$1,900	26%
Sum of Inpatient Reimbursements and Part B Payments per Decedents During the Last Two Years of Life ^(a)		
\$31,239	\$33,866	8%
Percent of Decedents Enrolled in Hospice During the Last Six Months of Life ^(b)		
28.02	26.45	(6)%

^(a)Data for the period 2000–2003.
^(b)Data for the period 1999–2003.

however, inpatient hospital reimbursement per patient day was 19 percent higher for the peer group than the national average, most likely because of the reimbursement payment add-ons resulting from graduate medical education that many of the peer group hospitals sponsor. Interestingly, even though many of the peer group hospitals have extensive teaching/residency programs, the outlier payments per decedent were 26 percent lower than the national average. When reviewing the sum of inpatient reimbursement and Part B payments to physicians, the peer group had lower costs per decedent by 8 percent; the peer group was more likely to refer patients to hospice care during the last six months of life. Again, use of hospice is another indication that the peer group practiced palliative care with its patients.

Conclusions

Physicians and their practice patterns are the largest single determinant of the level of aggregate national health care expenditures. Based on the preliminary data, physicians operating in a multispecialty group appear to use less physician resources to care for their patients and admit less often to a hospital, thereby reducing health care expenditures. As the federal government seeks to foster more efficient health care delivery and better outcomes, it may look to the physician-led integrated delivery network as an example of an efficient and high quality model. This may foreshadow the development of hospital-led multispecialty group practices as a means of reducing costs.

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