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Patterns of Decline Among Inpatient Procedures

SYNOPSIS

THIS PAPER EXPLORES how the new financial incentives and organizational structures that prevail in the hospital industry have affected the mix of services provided by hospitals.

Using data from the Agency for Health Care Policy and Research's Healthcare Cost and Utilization Project, the authors studied the 150 procedures that were most frequently performed on inpatients in 1980. They found that (a) 37 of the 150 procedures declined in use more than 40 percent by 1987, (b) patients that continued to receive one of the 37 procedures in 1987 on an inpatient basis tended to be more severely ill than in 1980, and (c) rates of decline were disproportionately large for Medicaid recipients.

Three main factors have contributed to the decline in inpatient use of these procedures. Most important has been the shift from inpatient to outpatient settings, a result of new technologies and pressures from reimbursement mechanisms and utilization review policies. Some procedures have been replaced by less invasive, more effective approaches. Other procedures are now considered ineffective by the medical community and have been largely abandoned as a result.

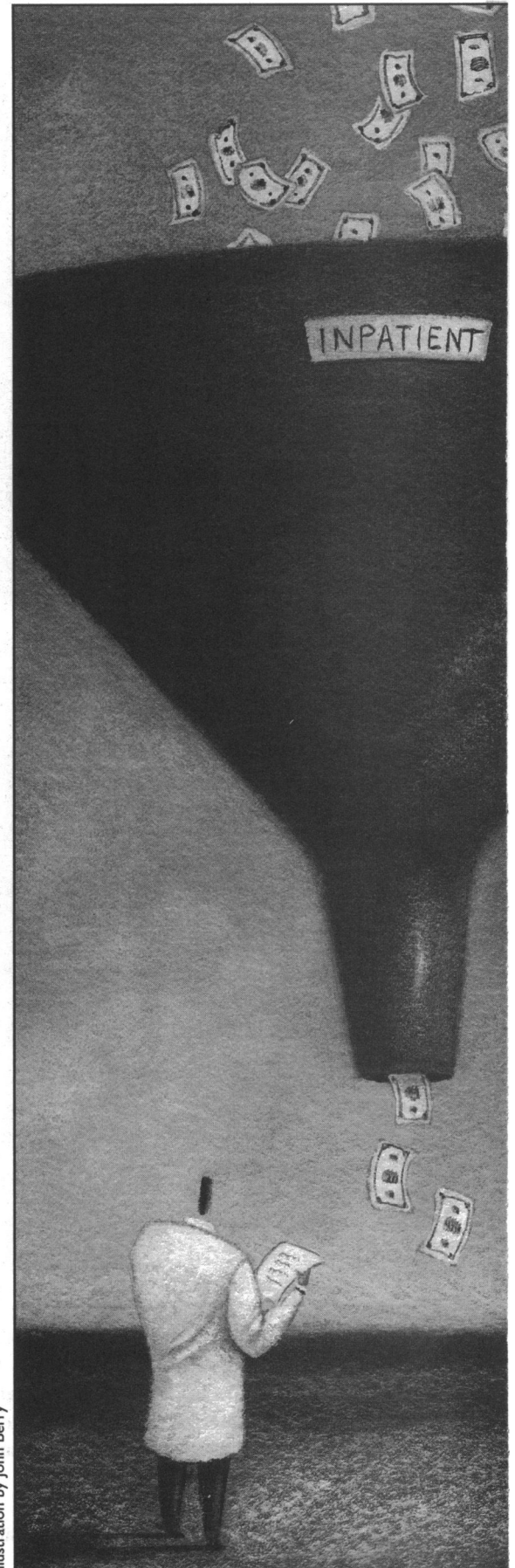


Illustration by John Berry



Over the last decade, the hospital industry changed radically in response to unprecedented pressures from the Federal Government and private purchasers of medical care. These pressures came from many different directions.

For example, the Medicare Prospective Payment System (PPS) was introduced in the early 1980s, and this system was used to transfer the financial risk for inefficient service delivery to hospitals. Private payers adopted a variety of programs to cut hospital costs and encourage more efficient delivery of services. Competition from ambulatory service centers and the expansion of managed care reinforced incentives for hospitals to compete on the basis of price, quality, and convenience. Integrated delivery systems have restructured clinical decision-making processes as well as the environment in which clinical services are delivered. Advances in technology and medicine have expanded the potential of health care providers while rendering some technologies obsolete and discrediting others.

These events have caused a dramatic change in the mix of procedures that are performed in hospitals; many procedures are now rarely performed in hospital. Other procedures are now commonly done on an outpatient basis. The chart illustrates this trend. Outpatient surgery increased from 16 percent of all hospital surgeries in 1980 to 44 percent in 1987. By 1993, the majority of surgeries performed by hospitals took place in an outpatient setting.

The scope of changes in hospital services are reflected in data from Healthcare Cost and Utilization Project (HCUP-2) of the Public Health Service's the Agency for Health Care Policy and Research (1). Of the 150 most frequent inpatient procedures in 1980, 37 declined in use by more than 40 percent as of 1987. In 1980, these 37 procedures accounted for approximately 17 percent of all inpatient principal procedures performed by the hospitals in the HCUP-2 study sample. In 1987, they accounted for only 5 percent.

Some of these procedures have been replaced by less invasive, more effective approaches. Others are now considered ineffective by the medical community and have been largely abandoned as a result. But the most prominent reason for the decline in inpatient procedures was their shift to outpatient settings, which, according to table 1, pertains to 33 of the 37 procedures. The shift of institutional medical care from inpatient to outpatient settings has been swift and far-reaching. It is due to pressures from reimbursement mechanisms and utilization policies as well as advances in technology.

Reimbursement Mechanism Pressures

Many experts, such as Wolcott, for example (2), have long argued in favor of increased use of outpatient settings to limit patients' exposure to iatrogenic and nosocomial diseases. However, many interventions that could have been

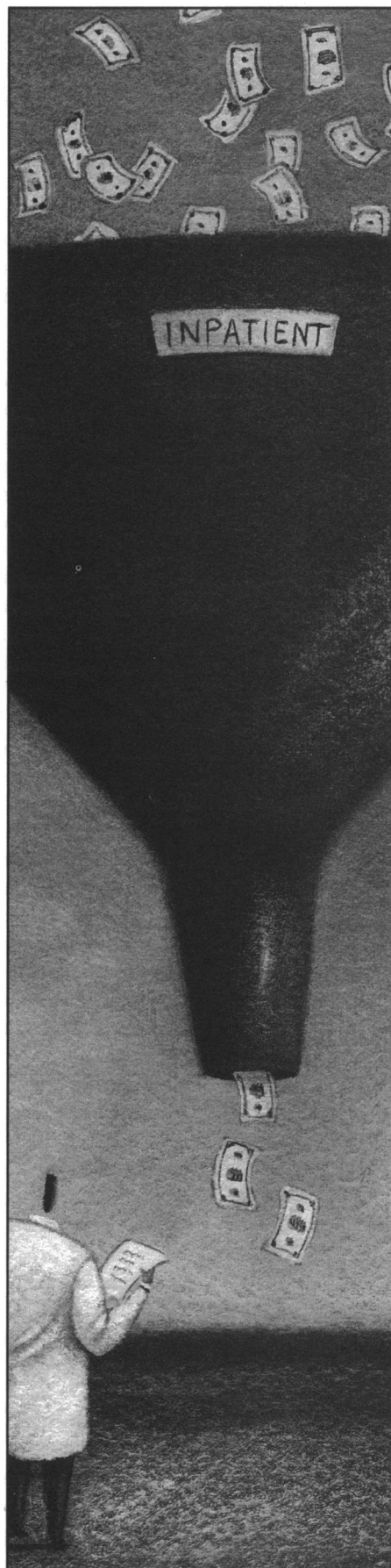
performed for years safely and effectively on an outpatient basis remained inpatient procedures. It was not until new reimbursement policies encouraged treatment in outpatient settings that a significant shift occurred.

Before these policy changes, some providers could not receive third-party payment for outpatient care. Medicare, for example, did not reimburse freestanding ambulatory surgical centers for facility charges until the early 1980s (3,4). Others providers simply found that outpatient care was less well insured than the same services provided on an inpatient basis. It was quite common for insurance companies to provide more generous coverage for inpatient services, which were often reimbursed at 100 percent, than for outpatient care, which was subject to substantial deductibles and coinsurance. These payment policies changed during the 1980s. The shift to outpatient settings was further reinforced by managed care provisions in many insurance contracts and by insurers' increasing tendency to reduce cost sharing for services provided in outpatient settings.

The Role of Technology

Perhaps in part because financial arrangements were changing to facilitate the delivery of clinical procedures on an outpatient basis, a number of technological changes have taken place that make outpatient treatment quicker, safer, and more effective (3). Shorter-acting anesthetics are now available. The diffusion of arthroscopes, laparoscopes, and lasers has caused many surgical procedures to become less invasive and traumatic, drastically shortening recuperation periods and, in many cases, obviating the need for hospitalization.

Intracapsular lens extraction is a procedure that illustrates how shifts to outpatient settings were motivated by financial considerations and facilitated by technological improvements. This procedure is used to treat cataracts and can be done by freezing (cryoex-



traction) or by suction (erysiphake extraction).

Although approximately 270,000 of these procedures were performed on inpatients nationwide in 1980, fewer than 8,000 were performed on inpatients in 1987. Most moved to outpatient settings because hospitals considered Medicare reimbursement for inpatient procedures too low under the Prospective Payment System instituted in 1983 (5). However, the movement to outpatient settings was aided by the advent of new, quicker, and safer laser techniques (3).

The Role of Medical Practice

A handful of procedures declined significantly in use between 1980 and 1987 primarily because of changes in medical practice. These procedures were either replaced by other, mostly new, procedures or were abandoned because they were no longer deemed effective. Procedures that declined in use at least partly for these reasons account for 9 of the 37 procedures listed in our study.

Radioisotope scan of the brain and the pituitary is an example of a procedure that was replaced by a new technology. Commonly used during the early 1970s to investigate causes of headaches, visual field defects, and hyper- and hyposecretion of pituitary hormones, to diagnose suspected cancers, and to screen patients with vague neurologic symptoms, it had been replaced as a best practice technique at the end of the decade by the CT scan (6-9). In 1980, 317,000 inpatients received cerebral scans; in 1987, only 14,000 were performed.

Vagotomy, a treatment for ulcers that involves cutting the vagus nerve to reduce the secretion of gastric acids, is an example of a procedure that is no longer necessary or effective in most cases. Even as its efficacy was being questioned in the clinical literature, new pharmaceutical therapies such as cimetidine were introduced to replace this major surgery for many indications (8). Approximately 26,000 vagotomies were performed nation-

Table 1: Hospital weighted mean procedure rates per 1,000 inpatients, rates of decline, and reason for decline, 1980–87

ICD-9-CM Code	Procedure	1980 Mean	Mean percent decline	Reasons for decline	
		Rate per 1,000	1980–87	Outpatient	Other
04.07	Peripheral nerve excision ¹	1.84	55	X	
04.43	Carpal tunnel release	3.93	76	X	...
06.39	Other partial thyroidectomy ¹	1.09	39	X	...
13.19	Intracapsular lens extraction ¹	20.14	97	X	...
20.01	Myringotomy with intubation	13.60	70	X	...
23.19	Surgical tooth extraction ¹	18.56	80	X	...
28.3	Tonsillectomy, adenoidectomy	13.07	48	X	Practice change
44.00	Vagotomy ²	1.15	49	...	Replaced
44.15	Open gastric biopsy	7.25	74	...	Replaced
48.23	Rigid proctosigmoidoscopy	22.40	67	X	Replaced
48.25	Open rectal biopsy	1.64	66	X	...
49.12	Anal fistulectomy	1.62	48	X	...
49.3	Local destruction of anal lesion ¹	4.59	52	X	...
58.6	Urethral dilation	13.49	49	X	...
62.5	Orchiopexy	1.18	46	X	...
63.1	Excision of spermatic varicocele	2.10	61	X	...
67.12	Cervical biopsy ¹	13.25	86	X	...
67.2	Conization of cervix	3.25	76	X	...
67.39	Destruction of cervical lesion ¹	1.64	70	X	...
69.09	D & C ¹	35.06	79	X	...
72.1	Low forceps operation with episiotomy	26.87	52	...	Practice change
77.59	Bunionectomy ¹	5.28	50	X	...
80.16	Other arthroscopy-knee	3.85	66	X	...
80.6	Excision of semilunar cartilage of knee	8.61	68	X	...
82.21	Excision of lesion of tendon sheath of hand	2.32	90	X	...
85.12	Open breast biopsy	4.70	49	X	...
85.21	Local excision of breast lesion	6.01	67	X	...
86.21	Excision of pilonidal cyst or sinus	1.94	57	X	...
86.23	Nail removal	1.42	49	X	...
86.3	Other local skin destruction or excision	11.14	49	X	...
86.51	Replantation of scalp	1.99	72	...	Other
87.59	Biliary tract X-ray ¹	42.02	92	X	Replaced
87.62	Upper gastrointestinal series	73.58	68	X	Replaced
87.73	Intravenous pyelogram	57.97	71	X	Replaced
92.02	Liver scan, radioisotope function study	25.78	75	X	...
92.11	Radioisotope cerebral scan	30.77	97	X	Replaced
97.71	Intrauterine device removal	2.14	84	X	Reduced need

¹Not elsewhere classified.

²Not otherwise specified.

Each hospital's rate of decline is the percent change from 1980 to 1987 in the number of procedures per 1,000 admissions. Each mean is weighted by the number of times the procedure was performed in 1980. Weighting prevents hospitals with low volumes in 1980 from unduly affecting the analysis. That is, a decline from 200 to 100 procedures is more important than a decline from four to two, even though both are 50-percent reductions.

SOURCE: Health care cost and utilization project.

Of the 150 most common procedures in 1980, 37 declined by at least 40 percent in frequency of occurrence by 1987. Most of these procedures are now performed predominantly in outpatient settings.

Table 2: Hospital mean charge, length of stay (LOS), mortality and severity, by procedure, 1980 and 1987

Code	Label	Mean total charge for hospitalization (1984 dollars)		Mean LOS (days)		Mean mortality rate		Proportion of cases Stage 3 or greater ¹	
		1980	1987	1980	1987	1980	1987	1980	1987
		04.07	Peripheral nerve excision ²	\$1,574	\$3,536	5	4	0.00	0.00
04.43	Carpal tunnel release	1,751	3,318	3	4	0.00	0.00	0.04	0.10
06.39	Other partial thyroidectomy ²	2,854	2,802	6	4	0.00	0.00	0.05	0.09
13.19	Intracapsular lens extraction ²	2,321	3,291	4	5	0.00	0.00	0.05	0.15
20.01	Myringotomy with intubation	1,072	3,957	2	3	0.00	0.00	0.01	0.06
23.19	Surgical tooth extraction ²	2,393	4,995	12	7	0.01	0.00	0.09	0.19
28.3	Tonsillectomy, adenoidectomy	1,012	1,283	2	1	0.00	0.00	0.00	0.03
44.00	Vagotomy ³	11,202	13,037	20	17	0.06	0.11	0.34	0.56
44.15	Open gastric biopsy	5,303	6,295	13	12	0.04	0.06	0.29	0.52
48.23	Rigid proctosigmoidoscopy	3,762	5,104	9	9	0.02	0.03	0.17	0.30
48.25	Open rectal biopsy	5,290	6,182	14	13	0.03	0.03	0.25	0.40
49.12	Anal fistulectomy	2,000	1,768	5	3	0.00	0.00	0.01	0.03
49.3	Local Destruction of anal lesion ²	1,987	2,109	5	4	0.00	0.00	0.03	0.06
58.6	Urethral dilation	3,653	4,438	8	8	0.01	0.02	0.66	0.66
62.5	Orchiopexy	1,533	2,176	3	2	0.00	0.00	0.03	0.03
63.1	Excision of spermatic varicocele	1,780	2,202	4	3	0.00	0.00	0.03	0.08
67.12	Cervical biopsy ²	2,220	3,964	4	7	0.00	0.01	0.07	0.21
67.2	Conization of cervix	1,613	2,761	3	4	0.00	0.00	0.03	0.05
67.39	Destruction of cervical lesion ²	1,425	2,840	3	5	0.00	0.00	0.04	0.11
69.09	D & C ²	1,746	2,625	3	4	0.00	0.00	0.03	0.12
72.1	Low forceps operation with episiotomy	1,422	1,566	4	3	0.00	0.00	0.02	0.04
77.59	Bunionectomy ²	2,579	2,437	6	4	0.00	0.00	0.01	0.04
80.16	Other arthrotomy-knee	3,315	5,352	7	9	0.00	0.00	0.03	0.11
80.6	Excision of the semilunar cartilage of the knee	2,429	2,514	6	3	0.00	0.00	0.01	0.03
82.21	Excision of lesion of tendon sheath of hand	1,298	3,457	2	5	0.00	0.00	0.01	0.04
85.12	Open breast biopsy	2,910	3,570	6	6	0.00	0.01	0.07	0.16
85.21	Local excision breast lesion	1,913	3,160	4	5	0.00	0.00	0.05	0.14
86.21	Excision of pilonidal cyst or sinus	1,650	1,785	4	3	0.00	0.00	0.01	0.01
86.23	Nail removal	2,798	4,904	8	12	0.00	0.01	0.09	0.22
86.3	Other local skin destruction or excision	2,733	3,976	7	7	0.00	0.01	0.08	0.16
86.51	Replantation of scalp	3,143	5,217	7	8	0.01	0.03	0.12	0.16
87.59	Biliary tract X-ray ²	3,260	4,088	9	8	0.01	0.01	0.19	0.25
87.62	Upper gastrointestinal series	4,653	4,100	10	8	0.02	0.02	0.24	0.35
87.73	Intravenous pyelogram	4,266	3,731	9	7	0.01	0.01	0.20	0.21
92.02	Liver scan, radioisotope function study	5,431	5,967	13	10	0.06	0.05	0.43	0.48
92.11	Radioisotope cerebral scan	5,186	5,723	13	11	0.05	0.14	0.41	0.62
97.71	Intrauterine device removal	1,601	3,480	3	5	0.00	0.00	0.02	0.11

¹Severity measures from disease staging clinical classification system (10).

²Not elsewhere classified.

³Not otherwise specified.

SOURCE: Health care cost and utilization project.

Patients for whom one of the 37 study procedures was performed on an inpatient basis tended to be sicker in 1987 than in 1980. This table reports mean values in 1980 and 1987 for total charge in real (1984) dollars, length of stay, proportion of patients who died during their stay, and proportion of patients with a disease stage of 3 or greater.

wide in 1980, and about 13,000 in 1987.

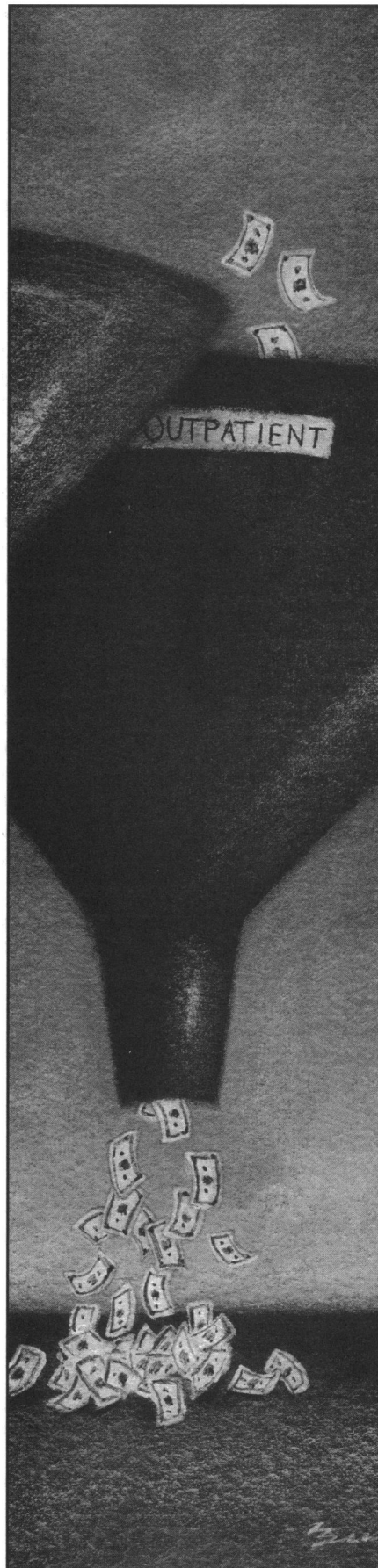
Inpatients More Severely Ill

Table 2 summarizes the mean total hospital charges in 1984 dollars, length of stay, mortality rate, and severity rate for discharges in 1980 and 1987 for each of the 37 procedures identified previously. The severity measure is based on the Disease Staging Clinical Classification System and represents the proportion of patients for a given diagnosis with a disease stage of 3 or higher (including death). Stage 3 is characterized by "multiple site involvement, generalized systemic involvement, poor prognosis" (10).

Table 2 suggests that inpatients who received these procedures in 1987 were more severely ill on average than their counterparts in 1980 because the proportion of patients with a stage of 3 or higher stayed the same or increased for all 37 study procedures.

Table 3 summarizes the information presented in table 2, displaying 1980 and 1987 average total hospital charge, length of stay, mortality rate, and proportion with disease stage 3 or greater for the 37 procedures. According to table 3, real total charges in 1984 dollars for inpatients given one of these procedures increased 17 percent over the period studied. By comparison, real average expense per hospital admission reported by the American Hospital Association increased 11 percent over the same period (11,12).

Table 3 also shows that average length of stay for these patients declined 13 percent, which is less than expected on the basis of general industry trends. Farley, for example, found that overall case mix adjusted length of stay, or length of stay holding case mix constant, declined 20 percent between 1980 and 1985 alone. Table 3 also shows that the overall mortality rate and the proportion with stage 3 or higher increased almost 50 percent between 1980 and 1987 for the 37 procedures included in this study.



Taken together, these results suggest that the patients hospitalized for these procedures in 1987 were more severely ill than those hospitalized in 1980 for the same reasons. These findings suggest that the shift to outpatient care has been clinically rational in the sense that healthier patients are more likely to be treated on an outpatient basis than patients with more serious conditions. However, this finding has important implications for reimbursement. Patients who are now being treated as inpatients appear to have more complicated and costly illnesses. If insurers do not take this factor into account, their reimbursement policies may well discourage hospitals from treating difficult cases and compromise access for people who are most in need of medical treatment.

Medicaid Patients Shifted

The data also reveal that rates of decline differed by type of insurance coverage. Of the 21 procedures for which insurance coverage significantly affected rates of decline, rates of decline for Medicaid patients were highest or among the highest in 14 of them. All 14 declined because they shifted to the outpatient setting. Medicaid patients may be unusually good candidates for outpatient treatment because they tend to be younger and less severely ill, but other factors may have contributed to this pattern. In the 1980s, Medicaid on average paid about 92 percent of the actual costs of inpatient care, while Medicare paid between 95 and 101 percent of costs, and most private insurers paid well over 100 percent (13).

This differential in reimbursement rates may have given hospitals an incentive to shift Medicaid recipients to outpatient settings. Although Medicare's PPS, implemented in 1984, provided hospitals with the same incentive and was a factor in moving Medicare beneficiaries to outpatient settings, it is now clear that payment rates in the

Table 3: Overall mean charge, length of stay (LOS), mortality, and severity in 1980 and 1987 and percentage of change¹

Category	1980	1987	Percent change
Mean total charge (1984 dollars).....	\$3,342	\$3,923	17
Mean length of stay (days).....	7.87	6.82	-13
Mean mortality rate.....	0.014	0.021	45
Mean proportion with disease stage 3 or greater.....	0.175	0.253	45

¹Percent change of the weighted mean value.

SOURCE: Healthcare Cost and Utilization Project.

The more serious nature of cases in 1987, compared to 1980, based on higher average charge, small declines in length of stay compared to industry averages, higher inpatient mortality rates, and greater proportions of patients in disease stages indicating extensive disease progression.

early years of PPS were very generous and probably did not provide as strong an incentive as the chronic underpayment by Medicaid (14,15).

Hospital Type Not a Factor

We analyzed whether hospital characteristics such as teaching status, ownership, or size had any systematic effect on rates of decline in the use of inpatient procedures. Would teaching hospitals, for example, be quicker to abandon ineffective and outdated procedures than investor-owned hospitals? Although hospitals reduced the use of these 37 procedures at different rates, and some even increased the use of certain procedures over the study period, we did not find that hospital characteristics had any systematic effect on rates of decline in use of the procedures we studied.

Implications for the Future

Hospitals reacted strongly during the 1980s to changes in the incentives for treating inpatients. These reactions are reflected not only in the widely reported decline in length of stay over the period but also in the types of procedures performed on an inpatient basis and in the severity of inpatients' illnesses. It is important to understand the adjustments that hospitals made to help predict how they may respond to future developments. If anything, the hospital environment now is even more challenging than it was in the 1980s.

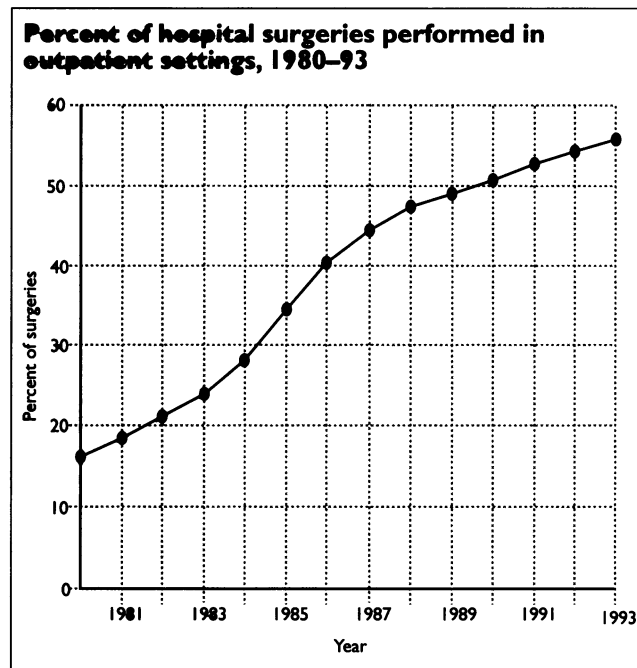
One interesting aspect of these changes is that financial incentives have had a relatively greater impact on hospitals than technological changes. Many of the procedures that have seen a radical shift to the outpatient setting could have been performed there in the early 1970s; financial incentives

were critical in their shift. The effects of technology and financial incentives are intertwined; as incentives promote efficiencies, technologies will be developed that promote the attainment of those efficiencies.

Given the magnitude of the changes that took place in the 1980s and the accelerated pace at which further changes are occurring in the 1990s, policies such as the Prospective Payment System that were adopted in the 1980s to promote efficiency must be closely monitored to determine whether they still promote the goals for which they were designed. Hospitals are more efficient than they were in the 1970s. They also contain sicker, older patients needing costlier treatment than when many of these policies were developed. Continued squeezing to promote efficiency may begin to have unforeseen effects on the care of inpatients; ultimately, clinical effectiveness could be compromised.

There is anecdotal evidence that this may be happening. A recent Washington Post article links the decline in average length of stay for normal child birth, which has fallen from four days in 1970 to 24 hours today, to increases in rates of jaundice, dehydration, and other serious problems that require infants to be readmitted (16). This problem has already received a response from legislatures in two States, Maryland and New Jersey, which will soon have laws requiring insurers to cover extra stays or home care for new mothers. As another example, a recent New York Times article (17) describes layoffs in New York hospitals necessitated by budget cuts and links these layoffs to increases in bedsores and late delivery of medications. It is unlikely that this problem will be addressed by State legislatures any time soon.

Nor is it entirely clear that it should be. Statutory



Outpatient surgery, as a percent of all hospital-based surgery, increased from 16% in 1980 to 55% in 1993.

requirements for staffing hospitals, just like requiring coverage for specific lengths of stay in the case of maternity admissions, increase costs and insurance premiums. As premiums go up, fewer people can afford coverage, and it is inevitable that larger fractions of the population will become uninsured.

Although efforts to contain costs may be starting to move beyond the fat and into the muscle of the health care system, many Americans continue to believe that health care takes up a disproportionate share of the nation's budget. As recent Congressional debate over health care reform and budget priorities has illustrated, society has competing social needs, which include improving education, reducing violent crime, and improving the safety of the highways. As the Federal Government begins to deal with the financial problems of the Medicare program and as government at all levels rethinks social priorities, further reductions in health spending are inevitable. Decisions about how to accomplish these reductions will be difficult because much of the easy work has been done.

Dr. Duffy is with the Maryland State Health Services Cost Review Commission and Dr. Farley is vice president of H.S.S., Inc. This paper was written while both authors were members of the Center for Intramural Research, Agency for Health Care Policy and Research.

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Tearsheet requests to Dr. Sarah Duffy, Health Services Cost Review Commission, 4201 Patterson Ave., 2nd Floor, Baltimore, MD 21215-2299.

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