Denying Access to Life-Saving Technologies

Budgetary Implications of a Moral Dilemma

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Amidst the crossfire of health care reform proposals, there is broad support for "universal coverage"—medical insurance coverage for all Americans irrespective of preexisting conditions, employment circumstances, or ability to pay. The Clinton plan summarily addressed the issue of who will be covered by ignoring the outcries of advocates for illegal immigrants and capitulating to corporate demands regarding pre-65 retirees; now it must figure out who will pay the bill for this new entitlement. Given the public antipathy toward new taxes, indirect taxes—price controls, employer mandates, community rating (an enforced cross-subsidy scheme), and state mandates—have taken center stage as the financing mechanisms of choice. Each of these approaches would reduce consumer choice and price sensitivity. While all eyes are focused on financing, only sporadic attention has been paid (e.g., in the case of mammograms) to the contents of the proposed standard benefits package.

Until recently, legislators have been unwilling to restrict access to medical services, particularly in life-threatening situations. Nevertheless, the combination of government-controlled universal coverage and absence of price signals must inevitably result in non-price rationing, whether surreptitiously (through "managed" care, physician "extenders," or queues) or explicitly through benefit limits. In what may be a shadow of things to come, the new administration's first major health policy change was to approve a Medicaid waiver for Oregon, which sought to resolve its looming Medicaid budget crisis by imposing explicit rationing guidelines. Ominously, the Oregon program has been called "an excellent prototype for a national health-care program."

The Oregon Experiment

Oregon began denying Medicaid coverage for

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organ transplants in the late 1980s. The national media coverage occasioned by the subsequent death of a young boy denied a bone-marrow transplant, along with state Medicaid expenditures that were exploding at a rate of 25 percent a year, led to state legislation requiring that Medicaid benefits be rationalized through the ranking of health services "by priority, from the most important to the least important, representing the comparative benefits of each service to the entire population to be served." The operational rule for assigning funding priority quickly became "the greatest health benefit for the greatest number." Because of the political nature of this decision, it is not surprising that the numerical strength of constituents was central to the rationing process. Importantly, the resulting Medicaid "standard benefits package" was to also serve as the basis for a "pay-or-play" employer insurance coverage mandate enacted in 1989; triggered by the federal waiver, employers must provide insurance similar to the Medicaid package by 1995.

Oregon's legislative mandate clearly gave precedence to high-volume, relatively low-cost medical therapies at the expense of low-volume, high-cost treatments, medical effectiveness held constant. Expensive high-tech, surgical and life-saving interventions have been targeted as a principal cause of the explosive growth in both Medicaid and private insurance spending. Given the heated moral debate surrounding the potential rationing of life-saving services, it is essential that one understand the extent to which growth in the use of new technologies has contributed to the current medical care crisis. While it is obvious that shifting resources from high-cost to low-cost treatments can promote the political objective of benefitting the many at the expense of the few, it is less clear whether such a policy, implemented on a widespread basis in both the public and private sectors, would significantly slow the explosive growth in overall health care costs.

In fact, many "big-ticket" technological innovations are cost-saving and risk-reducing substitutes for alternative treatments. While the hospital costs associated with an organ transplant will significantly exceed the average cost of a hospital stay (by as much as a factor of 30), it has been shown that even these "heroic" life-saving interventions can be cost-saving in the long run. Thus, for example, kidney transplants—at an average cost of $65,000 to $80,000—save the federal Medicare end-stage renal program up to $45,000 a year in dialysis expenses. Clearly, the alternative to high-tech, life-saving interventions may not always be a quick, low-cost death but, rather, expensive, long-term medical or pharmacologic treatments. This is not to deny that prevention may prove to be the least cost approach of all.

Big Ticket, Little Ticket

To what extent will reining in big-ticket treatments alleviate the health care crisis? As a first approximation of their contribution to overall medical expenditure growth, let us look at a disaggregated profile of trends in Maryland inpatient hospital services for the 10-year period 1982-91. Nationally, hospital services are the largest category of health care expenditure, accounting for almost 50 percent of medical outlays in 1993; moreover, they are predicted to grow by over 12 percent in 1994. Despite the existence of a Medicare prospective payment system for hospital care, hospital inflation rose at the rate of 9.2 percent in 1992, compared to an overall rate of 7.2 percent for medical care. Maryland was the first state to introduce an all-payer hospital ratesetting system and has been acknowledged as the most effective in controlling costs: in 1992, its average cost per admission was 15 percent less than the U.S. average.

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Maryland is an ideal state for tracking medical resource trends because (1) its all-payer ratesetting system sets hospital rates so that treatment charges reflect "reasonable" resource costs rather than cost-shifting markups or discounts; (2) case-mix information is available for all payer groups, thereby assuring adequate data for all treatments; (3) as a Medicare-waivered state, non-Medicare payers in Maryland were

Table 1

DRGs Ranked by Average Charge and Total Charges: Maryland

1982

By Average Charge:

DRG 302: Kidney Transplant
DRG 457: Extensive Burns
DRG 002: Craniotomy for Trauma
DRG 104: Cardiac Valve Procedure with cardiac catheterization
DRG 105: Cardiac Valve Procedure without cardiac catheterization
DRG 106: Coronary Bypass with cardiac catheterization
DRG 406: Myeloproliferative Disorder with o.r. procedures
DRG 191: Major Pancreas, Liver, and Shunt procedures
DRG 400: Lymphoma or Leukemia with o.r. procedures
DRG 107: Coronary Bypass without cardiac catheterization

Number of cases: 3092
Average Charge per case: $18,116
Percent of Total Charges: 3.3

By Total Charge:

DRG 373: Vaginal Delivery without complication
DRG 127: Heart Failure & Shock
DRG 014: Specific Cerebrovascular Disorder.
DRG 148: Major Small & Large Bowel procedures
DRG 430: Psychoses
DRG 243: Medical Back Problems
DRG 122: Circulatory Disorders with AMI
DRG 140: Angina Pectoris
DRG 371: Caesarean Section without complication
DRG 355: Nonradical Hysterectomy

Number of Cases: 106,176
Average Charge per case: $2,666
Percent of Total Charges: 15

1991

By Average Charge:

DRG 480*: Liver Transplant
DRG 481*: Bone Marrow Transplant
DRG 472*: Extensive Burns with o.r. procedures
DRG 483*: Tracheostomy excluding mouth/larynx/pharynx disorders
DRG 103: Heart Transplant
DRG 302: Kidney Transplant
DRG 473*: Acute Leukemia without o.r. procedures
DRG 104: Cardiac Valve Procedure with cardiac catheterization
DRG 484*: Craniotomy for Multiple Trauma
DRG 105: Cardiac Valve Procedure without cardiac catheterization

Number of cases: 2741
Average Charge per case: $68,428
Percent of Total Charges: 6.1

Number of cases excluding DRG 483: 1441
Average Charge per case excluding DRG 483: $52,097
Percent of Total Charges excluding DRG 483: 2.5

By Total Charge:

DRG 483*: Tracheostomy excluding mouth/larynx pharynx disorder
DRG 430: Psychoses
DRG 373: Vaginal Delivery without complication
DRG 209: Major Joint & Limb Reattach, lower extremities
DRG 127: Heart Failure & Shock
DRG 148: Major Small & Large Bowel procedures
DRG 014: Specific Cerebrovascular Disorder
DRG 089: Simple Pneumonia & Pleurisy
DRG 121: Circulatory Disorders with AMI
DRG 107: Coronary Bypass without cardiac catheterization

Number of Cases: 108,634
Average Charge per case: $6,350
Percent of Total Charges: 22.6

Number of Cases excluding DRG 483: 107,334
Average Charge per case excluding DRG 483: $5,378
Percent of Total Charges excluding DRG 483: 19.0

*DRG did not exist in 1982

nosis-related groups (DRGs) for all payers, ranked by average charge per case in 1982 and 1991. Clearly high-technology, life-saving surgeries dominate the list with one notable exception: DRG 483 (which did not exist in 1982) encompasses patients on life-support who are receiving nonsurgical life-extending treatment.

To understand the relationship of high-tech DRGs to total hospital costs, a parallel ranking of DRGs is presented by total charges (average charge weighted by the number of patients). At the top of the list in 1991, life-extending treatment DRG 483 accounted for over 3.6 percent of hospital charges. The psychiatric diagnosis "Psychoses" moved from fifth ranked in 1982 to second ranked in 1991, accounting for 2.9 percent of expenditures. Notably, the average charge for the 10 most expensive diagnoses (excluding DRG 483) nearly tripled over the period, while only doubling for diagnoses topping the total charge list. Still, the expensive diagnoses accounted for just 2.5 percent of charges in 1991, a drop from 3.3 percent in 1982.

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unaffected by the cost-shifting in charges that arose as a result of the federal Prospective Payment System; and (4) it is home to two major academic medical centers—The Johns Hopkins Medical Institutions and the University of Maryland—which assures a maximum rate of diffusion for new medical technologies.

Before turning to specific high-technology innovations, it may be useful to get an overview of the Maryland hospital sector in terms of "big ticket" treatments. Table 1 lists the top 10 diag-

Is High-Tech the Problem?

Many factors influence how new medical technologies are used, including diffusion rates, the emergence of complementary or substitute technologies, changing demographics that influence medical demand, and available financing. The growth in organ transplantation occurred several years after the technique was first performed, advanced by the discovery of cyclosporin, an immunosuppressive therapy, and improvements in tissue typing. Those innovations increased one-year survival rates dramatically, to over 95 percent for kidney transplants and over 80 percent for heart recipients; cyclosporin alone is credited with improving the five-year survival rate of liver recipients from 19 percent to almost 70 percent. While the following analysis focuses on the cost of high-tech interventions that were

introduced primarily in the past two decades, each technology will be at a different point in its course of diffusion. One should expect that the introduction of new techniques will generate a variable stream of expenditures (total and per patient) as they progress from the experimental stages, reaping economies of scale and benefitting from improved outcomes.

Given the imperfect taxonomy of disease and treatment, the identification of new, life-saving technologies is admittedly imprecise. The "products" of those technologies—patients to whom the technique is applied—can be isolated by determining their corresponding DRG case-mix assignment. Using this approach, the following groups of DRGs were determined to be dominated by new, primarily surgical, life-saving techniques developed in the 1970s-80s: burn (DRGs 456-458, 472); cardia procedures (DRGs 104-111, 115-116); premature neonates (DRGs 385-387); neurosurgery (DRGs 1-4, 49, 484); and transplantation (DRGs 103, 302, 480, 481). All patients in those DRGs are treated as beneficiaries of the new technologies even if, ex post, they did not survive. While patients in other DRGs have obviously benefitted from advances in diagnostic and surgical methods, the DRGs that have been selected reflect the cutting edge of medical technology where new innovations have made a significant difference between life and death. Not surprisingly, those DRGs dominated the average charge per case lists for the entire period of analysis.

Table 2

Cost of Live-Saving Technologies, Maryland, 1982-1991

	#Cases	Total Charges (in $000s)	Average Charge	Percent of Average Charge	Percent of Total Charge
1982					
BURNS	287	$ 3,577	$ 12,463	446%	0.21%
CARDIAC	5,434	$ 70,726	$ 13,015	465%	4.21%
NEONATES	2,140	$ 19,669	$ 9,191	329%	1.17%
NEURO SURGERY	2,297	$ 32,625	$ 14,203	508%	1.95%
ORGAN TRANSPLANTS	74	$ 2,713	$ 36,665	1,312%	0.16%
TOTAL	10,232	$129,310	$ 12,638	452%	7.70%
1991					
BURNS	195	$ 5,999	$ 30,765	621%	0.19%
CARDIAC	7,175	$150,477	$ 20,972	423%	4.83%
NEONATES	4,464	$ 60,906	$ 13,644	275%	1.95%
NEURO SURGERY	2,812	$ 45,520	$ 16,188	327%	1.46%
ORGAN TRANSPLANTS	319	$ 31,090	$ 97,462	1,967%	0.99%
TOTAL	14,965	$293,992	$ 19,645	396%	9.42%
1982-91					
Growth rates	46%	127%	55%	- 12%	22%

As Table 2 indicates, patients in those five high-tech categories of care accounted for 7.7 percent of total inpatient charges in Maryland in 1982. Their average charge was 4.5 times the average charge for all inpatients in the state. Cardiac procedures dominated in total volume and total charges, a reflection of its late stage of technological diffusion and medical demand. Organ transplants (primarily kidney) were clearly the most resource-intensive, exhibiting an average charge 13 times as high as the overall average for the state. One would expect that associated physician expenses, which are excluded from the analysis, would follow a parallel trend. (Post-discharge medical and pharmaceutical costs, which are likewise omitted, will vary significantly with the specific treatment.)

When the same volume and expenditure data are considered for 1991, one finds a marked increase (46 percent) in the use of life-saving technologies (accompanied by more favorable clinical outcomes) during the 1980s. The growth rate was greatest for organ transplantation (a four-fold increase), primarily due to the introduction of

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heart, liver, and bone marrow transplants during the period. Obviously, the initially low level of use of such experimental techniques must, by definition, result in seemingly explosive growth rates at the point at which they are introduced into clinical practice. Kidney transplants, which were performed in 1982, grew only 58 percent over the 10-year period, limited by a scarcity of organs. The number of premature neonates with problems more than doubled, driven by adolescent pregnancies, substance abuse, and poor prenatal care.

When the five categories are considered together, greater use was accompanied by an increase in average charge, thereby leading to an increase in total charges of 127 percent. Growth in cardiac procedures accounted for the greatest part of the expenditure rise, with a 32 percent increase in volume and a 61 percent increase in average charge (which trailed the overall growth in average charges of 77 percent); this relative improvement in average charge is an expected result as a technology diffuses, reaps economies of scale, and benefits from increased competition by providers. Likewise, the average charge for kidney transplants, the oldest available transplant technology, increased at a slower rate (40 percent) than hospital cases overall, reducing its relative cost from 13 times average to just under 10.

Table 3

Cost of Psychiatric and Substance Abuse, Maryland, 1982-1991

	Number of Cases	Total Charges (in $000s)	Average Charge	Percent of Average Charge	Percent of Total Charges
1982					
Psychiatric					
All cases:	13,541	$ 57,867	$ 4,273	153%	3.45%
Medicaid	2,302	$ 8,890	$ 3,862	159%	5.45%
Substance Abuse					
All cases:	6,492	$ 12,298	$ 1,894	68%	0.73%
Medicaid:	1,306	$ 2,579	$ 1,975	81%	1.58%
Total					
All cases:	20,033	$ 70,165	$ 3,502	125%	4.18%
Medicaid:	3,608	$ 11,469	$ 3,179	131%	7.03%
1991					
Psychiatric					
All cases:	20,829	$126,825	$ 6,089	123%	4.07%
Medicaid:	6,487	$ 41,893	$ 6,458	145%	9.15%
Substance Abuse					
All cases:	17,331	$ 34,141	$ 1,970	40%	1.10%
Medicaid:	9,808	$ 18,244	$ 1,860	42%	3.98%
Total					
All cases:	38,160	$160,966	$ 4,218	85%	5.17%
Medicaid:	16,295	$ 60,137	$ 3,691	83%	13.13%
1982-91					
Growth rates					
All cases:	90%	129%	20%	- 47%	24%
Medicaid:	352%	424%	16%	- 63%	87%

Despite an absolute growth in expenditures of 127 percent (from $129 million to $294 million), life-saving technologies did not significantly alter the overall composition of hospital services, exhibiting less than a 2 percent increase in share of inpatient charges. This result is particularly striking given the fact that over the period, a large volume of short-stay, low-charge cases were shifted from the inpatient to outpatient setting—inpatient surgical cases dropped almost 20 percent—and lengths of stay reduced significantly for many remaining inpatient diagnoses.

Trends in Little-Ticket Care

In order to compare the budgetary impact of big-ticket versus little-ticket cases, a parallel analysis was performed for psychiatric and substance abuse DRGs (DRGs 424-432 and DRGs 433-437, respectively). These DRGs, whose average cost per case ranges from 40 percent to 150 percent of the overall hospital average, are clearly representative of little-ticket, low-tech, high-volume cases. DRG 430—Psychoses—consistently ranked in the top ten DRGs by total charges from 1982-91, attaining the number two rank by the end of the period; still, the average charge for DRG 430 was only 27 percent higher than the overall average in 1991. Importantly, because Maryland held a Medicare waiver, its psychiatric costs and utilization patterns were unaffected by biases created by Prospective Payment System reimbursement methods.

As Table 3 indicates, the number of psychiatric and substance abuse cases almost doubled between 1982 and 1991, with total charges increasing by 129 percent. Quite strikingly, total Medicaid expenditures on such care grew an astronomical 424 percent (2.4 times the overall growth in Medicaid hospital charges), largely due to a 352 percent increase in utilization. While the share of hospital charges for this care grew by only 1 percent for all payers, it exploded

from 7.03 percent to 13.13 percent for Medicaid patients. Ominously, preliminary 1992 data reveal an additional 24 percent increase in Medicaid psychiatric and substance abuse outlays, and an 11 percent increase for all cases.

Since the Medicaid program absorbs almost half of all new state appropriations, policymakers will obviously need to examine high-volume, little-ticket medical services if they are to restore fiscal order. The Oregon Medicaid proposal, which highlighted low-volume, big-ticket care, failed to recognize the primary determinant of budgetary impact—volume. This issue will become even more important with the enactment of universal coverage, which will extend insurance coverage to approximately 10 million individuals living below the poverty line who may be expected to exhibit health characteristics not unlike the Medicaid population.

Conclusion

Because new life-saving technologies show high costs per case, they have been readily cast as the culprits in explaining escalating medical expenditures. Moreover, they have been easy political targets for those who wish to benefit the many at the expense of the few. But such interventions have not grossly outpaced growth in other inpatient medical services, and have maintained a surprisingly stable share of hospital costs. Thus, they cannot alone account for the rapid acceleration in overall hospital and medical costs experienced during the 1980s, nor can denial of access to them be expected to significantly stem further increases. In fact, life-extending interventions rank first in total expense, while high-volume, low-cost treatments (surgical, medical, and diagnostic) represent a substantial share of medical outlays. The introduction of medical savings accounts—which focus on non-catastrophic medical care—would significantly enhance the use of those latter interventions by increasing consumer price sensitivity.

Once considered "heroic", life-saving technologies have demonstrated a remarkable improvement in survival rates (and slowdown in average cost growth) as they diffuse over time; in addition, they can significantly reduce the use of costly medical alternatives (e.g., in the case of kidney transplants). Certainly, medical technology assessment of such high-tech, big-ticket innovations can be a cost-effective tool for promoting fiscal responsibility. In this spirit, the American College of Cardiology, through its development of guidelines for pacemaker implantation, has made an important contribution to the efficient use of high-cost cardiac technology. As such guidelines evolve, the medical appropriateness of high-cost applications will be increasingly assured. Still, policymakers will have to assess whether the budgetary savings from denying access to medically appropriate interventions outweigh the political cost of such moral compromises. Whether Oregon's "benefit the many" rationing philosophy will dominate future medical care allocation schemes remains to be seen; ironically, public "consensus" led legislators there to include transplants in their final benefits package.

Selected Readings

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