

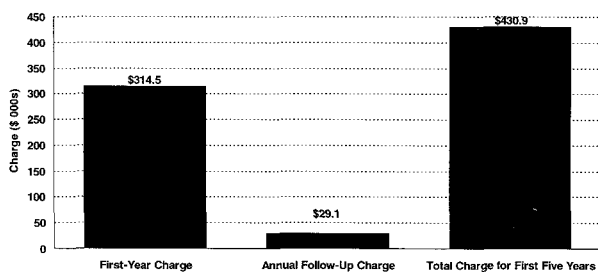
Cost containment and managed care in liver transplantation

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Introduction

Based on any criterion we choose to apply, liver transplantation remains one of the most expensive surgical procedures performed today (see fig. 1) (1). As a result, in the United States, there has been intense interest in trying to contain what many critics perceive as the “high cost” of liver transplantation (2,4).



SOURCE: Reference 44

Fig. 1. — Estimated Charges in 1996 Dollars for Liver Transplantation *Summary of National Data for the United States*. From : Hauboldt R. Cost Implications of Human Organ and Tissue Transplantation, An Update : 1996. In : Haubolt, RH, ed. Brookfield, WI : Milliman & Robertson, 1996.

Historically, fee-for-service reimbursement has provided physicians with incentives to do more than is absolutely necessary. Every test done, and every procedure ordered, simply generates additional revenue and related income. Few rewards have been associated with determining what is clinically appropriate, and to deliver care accordingly.

It is within this context that managed care has emerged as the proposed solution to a now onerous health care problem, that being, spending too much money to achieve too little (5,8). By forcing physicians and surgeons to share risk, it is assumed health care delivery will become population-based and responsive to an increasingly intrusive economic mandate.

While I understand the goals of managed care, I am uneasy with its methods (3,9,10). For example, it is unclear whether physicians are driven by the corporate bottom-line or patient interests. Critics insist the former but, to be honest, I think we can also serve the latter (11,12). Admittedly, however, “double agents” often use questionable approaches to achieve inconsistent objectives (13,14).

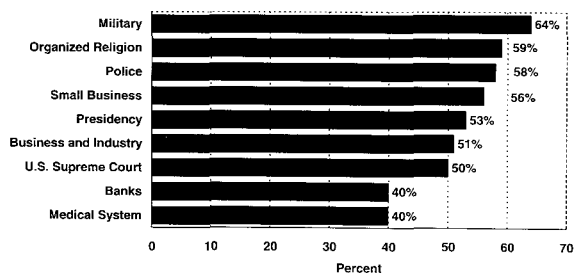
The objective of this paper is simple. I would like to consider the implications of managed care relative to our liver transplantation program at Mayo. In doing so, I will present both a broad and a narrow perspective.

Please forgive me, but I will approach the topic as if I were a businessman who must make the most efficient use of scarce resources in hopes that he can maintain a profitable product line.

Nonetheless, although few will agree, it is my personal view that patient care can be better managed with quality concerns foremost and business interests secondary. At the same time, however, I want to make it clear that what I promote is not managed care per se. Frankly, managed care, as now practiced, is bureaucratic nonsense — it is a clinician’s nightmare and an administrative pipedream.

The current environment

Public opinion polls in the U.S. clearly demonstrate a lack of confidence in major social institutions (15). As shown in fig. 2, 64% of Americans have a “great deal” or “quite a lot” of confidence in the military, but only 40% feel likewise about the medical system. Apparently, health care is on par with the banking industry.

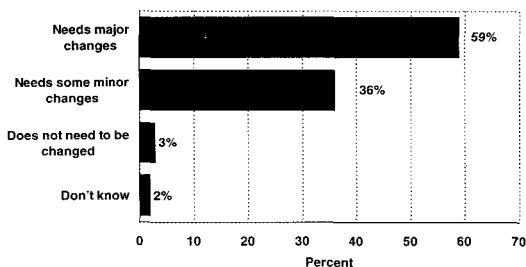


SOURCE: Reference 2

Fig. 2. — Public Confidence in Major Social Institutions (Great Deal or Quite a Lot of Confidence). From : Evans R. Organ transplantation and the inevitable debate as to what constitutes a basic health care benefit. In : Terasaki, PI and Cecka, JM, eds. *Clinical Transplants*, 1993. Los Angeles, CA : UCLA Tissue Typing Laboratory, 1994 : 359-91.

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Health care reform remains an issue, as is apparent from fig. 3, wherein 59% of the general public has stated that the health care system needs major changes (15). Only 3% appear to accept the status quo.



SOURCE: Reference 3

Fig. 3. — Need for Change in the Healthcare System. From : Evans R. Liver transplantation in a managed care environment. *Liver Transplant Su* 1995 ; 1 : 61-75.

For better or worse, health care in America has become a commodity that is usually sold competitively by providers in a given community. However, while some providers purely serve local markets, others encompass regional markets and, still others, have both a national and an international flavor.

Locally, in most major cities throughout the U.S., there has been a consolidation of markets, coupled with attempts to integrate health care delivery. Strangely, it is not obvious what has been accomplished, as institutions that were formerly allies now compete with each other. In the spirit of capitalism, some organizations have ceased to exist.

At premiere facilities in the U.S. today, liver transplantation is best described in terms of a national market, wherein relatively few transplant programs now actively compete for “centers of excellence” contracts (9,10,16-18). These contracts, based on the rhetoric of quality, and bartered on cost, are frequently offered on a grand scale.

Under contractual arrangements, patients are given some relatively limited options with respect to their choice of transplant centers. This does not mean, however, that patients are without choice. They are free to choose a non-networked facility but, in doing so,

they will assume increased financial responsibility. In other words, there are financial disincentives to use non-networked centers.

Because few patients are in a position to pay out-of-pocket for the services they require, most eventually report to participating providers. Presumably, this represents the most cost-effective option available to them.

Of course, many transplant centers do not embrace the concept of limited access based on economic disincentives. As a result, centers of excellence are often described by critics as “centers of discount”. While this may be the case in some instances, our experience with networks at the Mayo Clinic has been reasonably good.

From the perspective of a provider, however, there is one problem — market dynamics must be fully understood. And, in addition, the pricing of services must be based on actual production or accounting costs, not billing data (19,20). What we get paid today is not necessarily what we charge.

This has led providers in many markets to inflate their charges to compensate for steep discounts. Unfortunately, this approach is successful only if payment is based on discounted fee-for-service. In mature markets, with full risk capitation, exorbitant markups mean nothing, since payment is determined in advance.

At Mayo, we have become increasingly sophisticated in our efforts to understand markets and decide upon prices. Neither the fee-for-service mentality, nor managed care hyperbole is particularly helpful. Instead, we find we must apply research principles to achieve business goals. Let me illustrate the problem.

Each year the staff of a major publication in the U.S. rates hospitals and medical centers based on a variety of criteria other than cost. The *U.S. News and World Report* rating system, although flawed, is widely accepted (21). Various medical specialties are rated at an overall institutional level. Since the rating system began in 1990, Mayo has been ranked in the top ten, usually number two (see table I).

Research has shown that both quality and price are variable, but, in addition, that perception is not necessarily consistent with reality. For our purposes, I will assume that the quality ratings are accurate and, therefore, I will focus on economic issues — the very

Table I. — Names and abbreviations for the ten most highly ranked hospitals in the United States

Abbreviation	Full Name
1. Johns Hopkins	Johns Hopkins Hospital
2. Mayo	Mayo Clinic
3. Mass General	Massachusetts General Hospital
4. Duke	Duke University Medical Center
5. UCLA	UCLA Medical Center, Los Angeles
6. Cleveland Clinic	Cleveland Clinic
7. Stanford	Stanford University Hospital
8. Brigham	Brigham and Women's Hospital
9. Wash U	Barnes-Jewish Hospital, Washington University
10. UCSF	University of California at San Francisco

topic avoided by the staff of the *U.S. News and World Report*.

One indicator of the financial performance of hospitals is their case-mix and wage index adjusted gross patient revenue per adjusted admission (22). These data are summarized in fig. 4, for the top ten hospitals in the U.S. Clearly, there is marked variation, even after relevant adjustments have been made, with Mayo having the lowest overall charge per case.

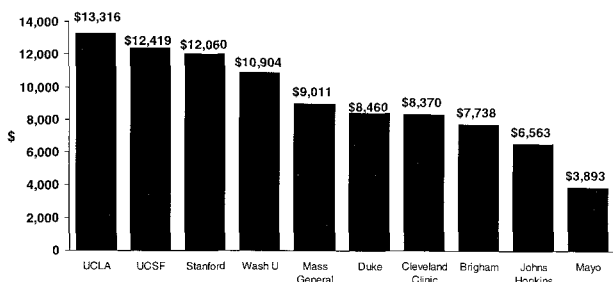


Fig. 4. — Gross Revenue Per Patient Admission After Case-Mix and Wage Adjustment (Excludes Inpatient Physician Services).

As I have noted, hospitals are no longer paid what they bill for their services. In other words, reimbursement does not equal charges. Fig. 5 summarizes the relevant reimbursement data for the same ten hospitals. Although there is still variability, the range is much smaller.

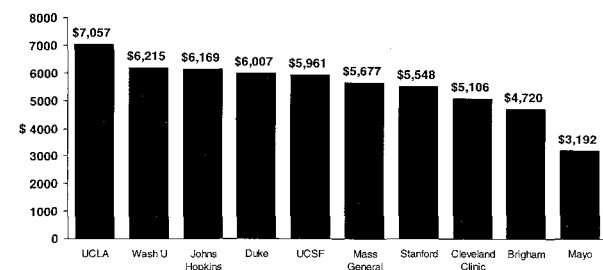


Fig. 5. — Average Reimbursement of Hospital Charges Per Patient Admission After Case-Mix and Wage Adjustment (Excludes Inpatient Physician Services).

Finally, fig. 6 underscores the low-cost position of Mayo relative to the other nine hospitals. As indicated, after adjustment for case-mix and wages, UCLA is reimbursed 121% more per case than Mayo, while the Cleveland Clinic receives a payment that is 60% higher than Mayo. In other words, if each hospital was treating a similar patient, with staff compensated equivalently, Mayo would receive the least favorable reimbursement.

Of course, these data do *not* address the issue of actual production costs, but they suggest that Mayo is a low-cost provider of hospital services. In today's market, with its emphasis on managed care, it would

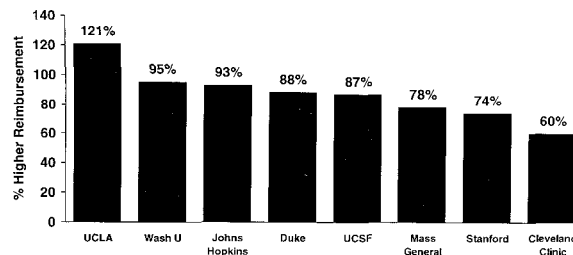


Fig. 6. — Percentage Difference in What Mayo is Reimbursed Per Hospital Admission Compared With Nine Other Hospitals (After Case-Mix and Wage Adjustment).

appear that, in a general sense, Mayo is in an enviable position to compete with other nationally recognized "centers of excellence".

Liver transplantation at Mayo

Now I would like to go from the general to the specific with, in this case, a thorough analysis of our liver transplant program which was initiated in March 1985 (23). As shown in fig. 7, 861 transplants were performed through 1997, of which 96 were retransplants.

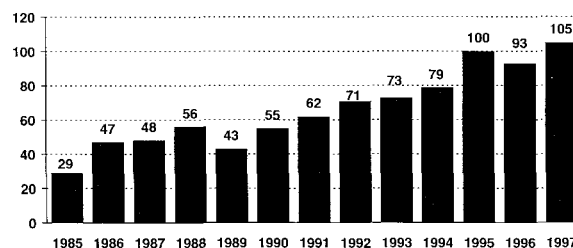


Fig. 7. — Number of Liver Transplants Performed Each Year at the Mayo Clinic, 1985-1997.

One of the more uneasy periods in the history of American medicine has been the period between 1992 and 1998. Everyone seemed to be talking about health care reform, but no one was doing much about it (24,31). Following his election, President William Clinton initiated a health reform effort that proved to be futile. In retrospect, perhaps charades would have been a more entertaining option.

It was during this time that health insurers and large employers became increasingly aggressive in their efforts to control health care costs (32-34). Gradually, attempts were made to "carve out" certain health care benefits for "micromanagement". Given their expense, most transplant procedures made the "short list".

Pricing liver transplantation services is not straightforward and, as I have noted, such services are commonly offered to a national market (9). Therefore, using various publicly available data resources, we have

Table II. — Names and abbreviations for liver transplant centers included in the analysis

Abbreviation	Full Name
1. Presbyterian (Pittsburgh)	University of Pittsburgh
2. UCLA	University of California at Los Angeles
3. UCSF	University of California at San Francisco
4. U of WI	University of Wisconsin
5. Mt. Sinai	Mt. Sinai Medical Center (New York, NY)
6. Baylor	Baylor University Medical Center (Dallas, TX)
7. Mayo	Mayo Clinic

tried to assess our relative competitive position. In this regard, relevant data for seven leading liver transplant centers (see table II) in the U.S. are displayed in fig. 8.

The data shown here include hospital charges only for Medicare patients. As indicated, physician and surgeon fees are excluded, since these data are based on a standard fee schedule. As a result, fees per se are very similar across providers, as is the actual payment for in-hospital services.

Charges, however, give us some idea of the markup within a market and, in turn, provide some insight into what private insurers might be billed for the same services. In other words, they are *not* a totally useless barometer.

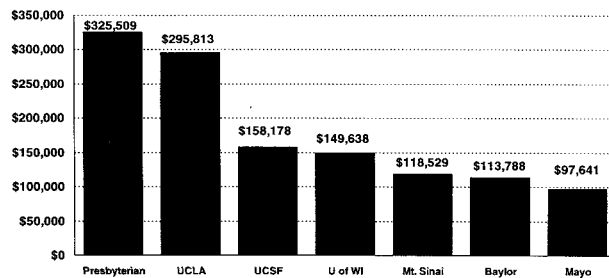


Fig. 8. — Comparative Liver Transplant Hospital Charges, 1996 (Medicare Patients Only, Excluding Inpatient Physician Services).

As indicated, in fig. 8, the average billed hospital charge for a Medicare beneficiary receiving a liver transplant at the University of Pittsburgh is 233% higher than it is at the Mayo Clinic. UCLA is also a high charge option, while charges at UCSF and the University of Wisconsin are more modest. Finally, charges at Mt. Sinai Medical Center (New York) and Baylor University (Dallas, TX) are more similar to Mayo.

Upon controlling for patient case-mix, a very interesting picture emerges, as captured in fig. 9. As shown here, charges at the University of Pittsburgh and UCLA are 65% above expected, while charges at Mayo are 56% below expected — a difference of 121%. Of course, data such as these are a source of grave concern to both public and private insurers — they clearly indicate that some centers are vastly more expensive than others. The reasons are not always clear.

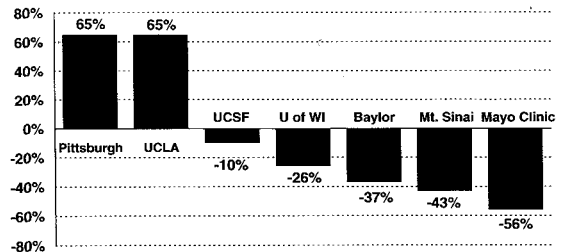


Fig. 9. — Comparative Liver Transplantation Hospital Charges, 1996 (Percent Above or Below Expected).

Because the Medicare experience in the U.S. is often considered to be atypical, we separately analyze the private market for transplant services. In the U.S., 75% of liver transplant recipients are privately insured. Therefore, to understand this market, we use yet another data source available to us through our membership in the American Association of Medical Colleges (AAMC). These data are considered proprietary and must be reported anonymously.

Fig. 10 summarizes inpatient hospital charges for seven liver transplant programs in the U.S. These data include publicly and privately insured patients. Once again, as was the case previously, charges for professional services have been excluded.

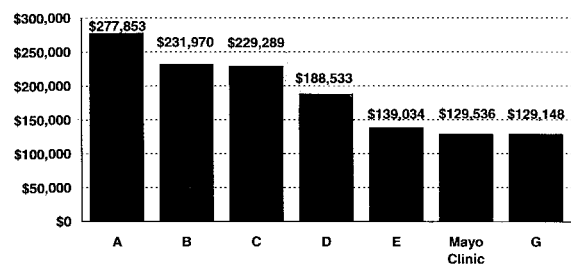


Fig. 10. — Comparative Liver Transplant Hospital Charges, 1997 (All Payers, Excluding Inpatient Physician Services).

As shown, the first three transplant centers are considerably more expensive than the last three. Mayo remains a less expensive option, but Center F has slightly lower average hospital charges.

Fig. 11 summarizes the relevant reimbursement data for each of the centers shown in fig. 10. As this slide indicates, reimbursement often falls short of billed charges. Center C is paid 69% of its billed charges,

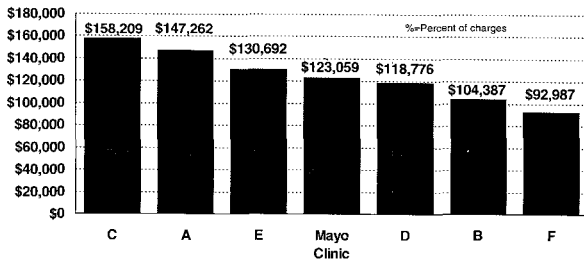


Fig. 11. — Estimated Reimbursement for Liver Transplant Hospital Charges, 1997 (All Payers, But Excluding Inpatient Physician Services).

while Center A is only paid 39% of its charges. The Mayo Clinic experience is particularly revealing, since we are reimbursed approximately 95% of the charges we bill.

Over the past several years, we have made concerted efforts to monitor the financial aspects of our liver transplant service. This is important if we are to remain competitive in the current marketplace.

The rate of national inflation for the period 1988-98 is summarized in fig. 12 (35). As shown, in 1988, the overall rate of inflation for medical services was 9.2% with Part A (hospital) inflation being 3.5% above Part B (physician) inflation. By 1995, the rate of medical inflation had converged for hospital and physician services at about 4.5%. So far, in 1998, there appears to be a slight divergence between hospital and physician services.

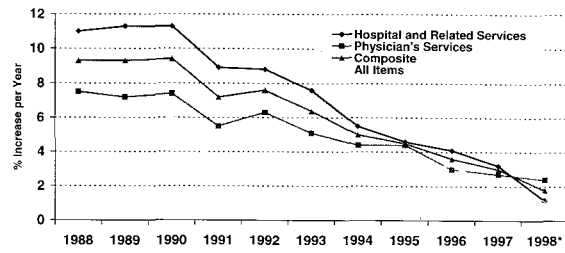
Fig. 13 summarizes actual liver transplant charges for the patients' initial stay at Mayo for the period 1987-97. Hospital, physician, and total charges are shown separately.

Surprisingly, in unadjusted dollars, charges for physician services have declined substantially. Although hospital (Part A) charges varied, in 1997 they were very similar to what they were in 1987.

Not surprisingly, therefore, our overall charge per case for liver transplantation in actual, as opposed to inflation-adjusted, dollars has remained about the same. This is, in part, due to the fact that the overall hospital length of stay for the initial transplant procedure has decreased by 86.3% since 1987, dropping from 35.4 days to 19.0 days (see fig. 14).

Fig. 15 shows the impact of an inflation adjustment, wherein all charges for the period 1987-97 are expressed in 1997 dollars. As shown, our inflation-adjusted charges for hospital services, physician services, and overall are all well below what would be expected relative to national medical inflation.

Fig. 16 starkly contrasts our actual and expected inflation-adjusted charges in 1997. As is apparent, the expected overall liver transplant charge at Mayo is \$252,400. The actual charge, including hospital services, physician fees, and donor organ acquisition expenses is \$137,500.



* 1998 reflects Jan 1 - June 30, 1998

SOURCE: Reference 35

Fig. 12. — Historical Consumer Price Index for All Urban Consumers, 1998-97. * 1998 reflects Jan 1-June 30, 1998. From : Wilson T and Gabor M. CPI Detailed Report Data for June 1998. Washington, DC : U.S. Bureau of Labor, 1998.

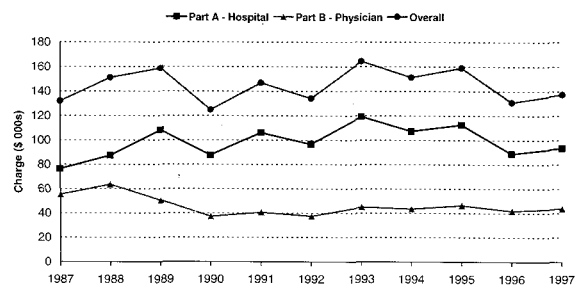


Fig. 13. — Mean Actual Charge for Entire Stay Liver Transplantation at Mayo Clinic, 1987-1997.

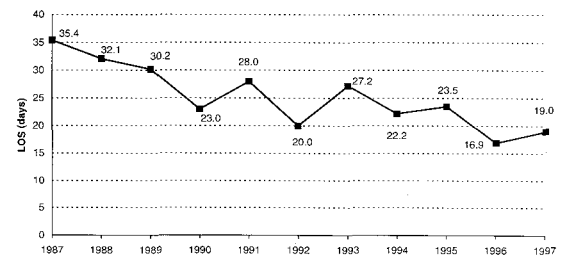
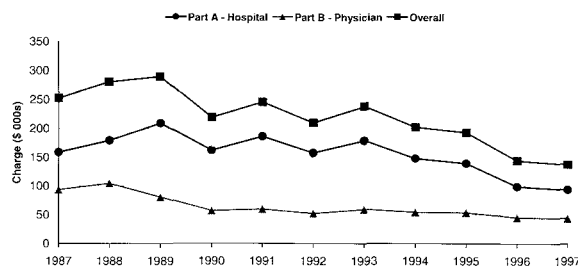


Fig. 14. — Mean Actual Length of Hospital Stay Liver Transplantation at Mayo Clinic, 1987-1997.



Note: Real dollar values calculated using CPI-U medical component indices, 1987-1997

Fig. 15. — Mean Actual Charge for Entire Stay in Real 1997 Dollars Liver Transplantation at Mayo Clinic, 1987-1997. Note : Real dollar values calculated using CPI-U medical component indices, 1987-1997.

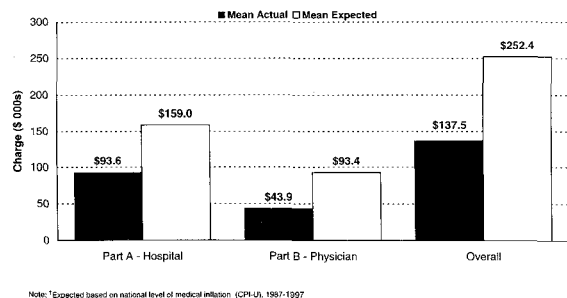


Fig. 16. — Mean Actual vs. Inflation-Adjusted Charges in 1997 Liver Transplantation at Mayo Clinic. Note: “Expected based on national level of medical inflation (CPI-U), 1987-1997.”

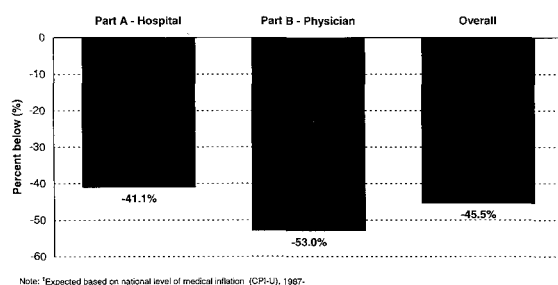


Fig. 17. — Percent Below Mean Inflation-Adjusted Charge in 1997 Liver Transplantation at Mayo Clinic. Note: “Expected based on national level of medical inflation (CPI-U), 1987-1997.”

In summary, as shown in fig. 17, overall liver transplantation charges at Mayo in 1997 were 45.5% below what we would expect given national medical inflation. Meanwhile, our Part A (hospital) charges were 41.1% below expected and our Part B (physician) charges were 53.0% below expected.

Clearly, over the past decade, liver transplantation charges at Mayo have been held in check, despite years when inflation has been rampant. This is remarkable, given the rapidly escalating costs often associated with advanced medical technology.

To sustain the present results over a decade has required us to address our production costs in an effort to “stay the course” with respect to billed charges. If our costs had increased, so would have our charges. However, with sufficient innovation in our clinical practice, we have been able to meet payer expectations, regardless of an increasingly discouraging managed care “mentality” that tends to emphasize price over quality.

Managed care analysis

Despite our best efforts, managed care remains a major source of concern. Existing contracts typically include all services provided from the date of the transplant procedure through the patient’s initial hos-

pital discharge. In addition, many contracts include an outlier per diem payment for those patients who have a protracted length of stay due to complications. Such contracts limit, to a modest extent, the level of financial risk we assume.

Not surprisingly, insurers would like us to assume more risk in hopes that they can contain even further the pre- and post-transplant expenditures associated with liver transplantation. Apparently insurers believe some transplant centers are hospitalizing patients unnecessarily in an effort to manipulate the organ allocation process (36,37). While empirical evidence is scanty, the concern is genuine, suggesting that perverse incentives are at work.

As it now stands, we feel we have responded to most of the concerns expressed by payers. We understand the expectations of managed care organizations, and we have attempted to satisfy them accordingly.

In this regard, one major actuarial firm — Milliman & Robertson — has formulated inpatient and surgical healthcare management guidelines which have become the standard for the insurance industry (38). Many providers have ignored them, while others have used them as an acceptable benchmark, or a reasonable point of departure.

Actuaries at Milliman & Robertson have attempted to characterize various aggregate patterns of patient care which reflect varying degrees of success or failure in individual patient management. The following terminology is applied to various types of health care delivery systems — loosely managed, moderately managed, well managed, and optimally managed (38).

Loosely managed care is typical of the care provided under traditional insurance coverage, even with a utilization review program. *Moderately* managed care is typical of the care provided in health maintenance organizations across the United States. *Well* managed care is typical of prepaid care provided by mature integrated delivery systems or multispecialty groups. Finally, *optimally* managed care is essentially a variation on well-managed care (39).

As I have noted previously, health care providers must be knowledgeable about the markets they serve and the patients they treat. In this regard, at Mayo, we typically distinguish between “local” and “referral” patients.

For our purposes, “local” refers to patients from the 10 counties surrounding Rochester, Minnesota, who received their liver transplant at Mayo. All other patients are designated as “referral”, regardless of their point of origin. There are many clinically significant reasons why this distinction is important.

In addition, we recognize the relevance of payer source. About half of our patients are publicly insured and the remainder have private or commercial insurance coverage. The majority of our publicly insured patients are covered by Medicare.

Fig. 18 illustrates the manner in which managed care guidelines can be applied to the *commercially insured*

patient population. The Milliman & Robertson managed care estimates for hospital length of stay are on the left, and the Mayo data on the right (38). As indicated, our lengths of hospital stay compare favorably with those for a well-managed or optimally managed delivery system.

Fig. 19 presents the same data for the Medicare patient population. In this case, no local patients received liver transplants, while referral patients had a length of stay that was more than nine (9) days shorter than that recommended by Milliman & Robertson actuaries. Thus, once again, our delivery system can, at the very least, be considered optimal.

Discussion

Despite the very positive data presented here, managed care is hardly a panacea (11,12,14). To underscore the obvious, many hospitals are in no position to radically alter the manner in which they deliver patient care. While some fine tuning may be beneficial, it is clear a great deal of work remains to be done.

In some respects, I would like to argue that the transplant community has been, and will continue to be, well-positioned to address the now draconian demands of hapless managed care organizations.

First, transplant surgeons, physicians, nurses, and allied health personnel are extremely familiar with a variety of approaches intended to standardize clinical practices.

Second, institution-specific data on the overall quality of transplant services have been publicly available for at least a decade. For example, in the U.S., the United Network of Organ Sharing has done a superb job compiling, analyzing, and reporting outcome data (40).

Third, when applied to transplant programs, the centers of excellence concept is hardly new. Many transplant programs have had extensive experience in contract negotiations with payers — payers who have sometimes placed financial concerns ahead of quality issues.

Finally, in many respects, transplantation has been on the forefront of innovative patient care management. Demand management, case management, and disease management are merely *new* concepts for established practices in the field of transplantation. In this regard, transplantation has functioned as a “proving ground” for new approaches to clinical practice management.

Nonetheless, I am afraid the jury on managed care is still out. As shown in fig. 20, Kaiser Permanente, one of the premier managed care organizations in the U.S., has and continues to sustain major financial losses.

Likewise, as is apparent in fig. 21, health maintenance organizations (HMOs) in Minnesota continue to struggle in an effort to cover their costs. In fact, in 1997, 57% of all HMOs in the U.S. reported losses that totaled nearly \$1.0 billion dollars (41,42). Indeed, when

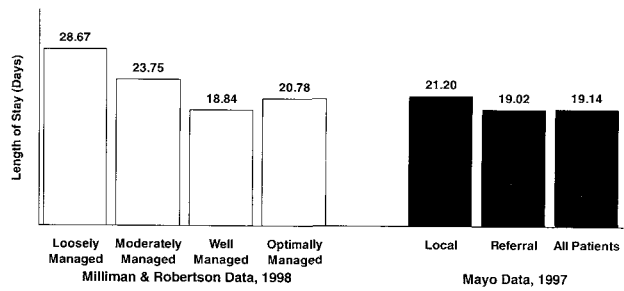


Fig. 18. — DG 107 (DRG 480) Liver Transplantation Commercial (Under 65).

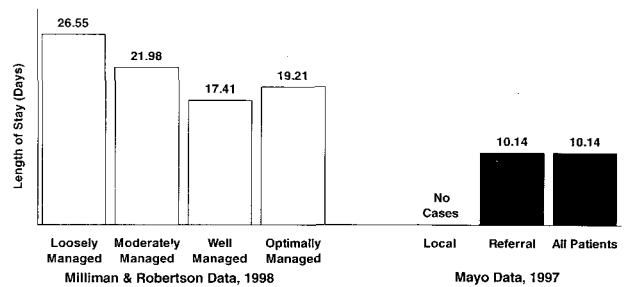


Fig. — 19 : DG 107 (DRG 480) Liver Transplantation Medicare Aged.

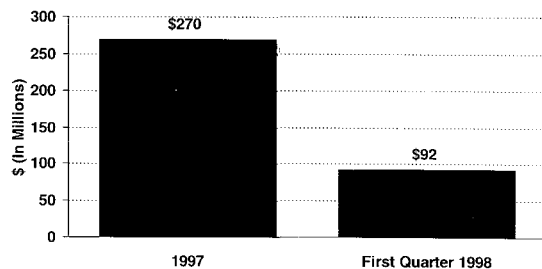


Fig. 20. — Kaiser Permanente Losses.

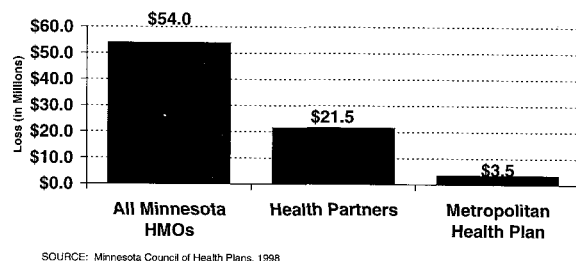
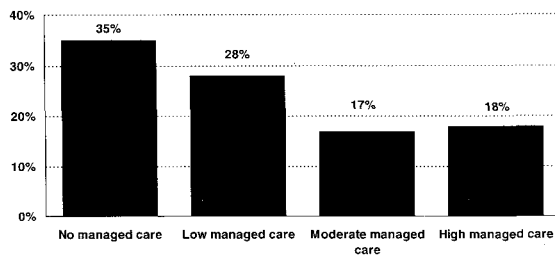


Fig. 21. — Losses Incurred By Minnesota HMOs, 1997. From : Minnesota Council of Health Plans, 1998.

something looks so bad, it is hard to imagine how it can be so good.

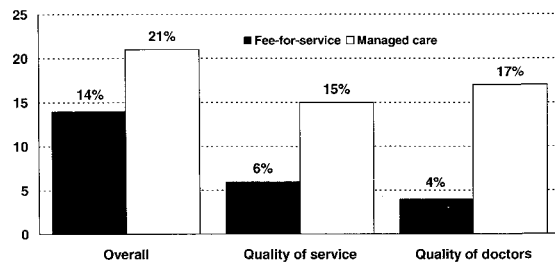
Much like war, there is a frightful human side to managed care which has begun to make its way to Hollywood. While the negative may be overstated, the positives are rarely obvious.

Physicians, many of whom have labored in the trenches for far too long, are not at all happy with the “new religion”. As shown in fig. 22, only 18% of physicians practicing in high managed care areas in the U.S. report that they are “very satisfied” with the practice of medicine, compared with 35% of physicians in areas where there is no managed care (43).



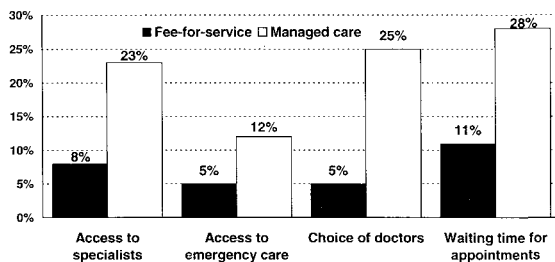
SOURCE: Reference 43.

Fig. 22. — Percentage of Physicians Very Satisfied With Overall Practice of Medicine. From : Davis K and Schoen C. Assuring quality, information, and choice in managed care. *Inquiry* 1998 ; 35 : 104-14.



SOURCE: Reference 43.

Fig. 23. — Percentage of Enrollees Rating Various Aspects of Their Health Plan as Fair or Poor. From : Davis K and Schoen C. Assuring quality, information, and choice in managed care. *Inquiry* 1998 ; 35 : 104-14.



SOURCE: Reference 43.

Fig. 24. — Percentage of Enrollees Rating Various Aspects of Their Health Plan as Fair or Poor. From : Davis K and Schoen C. Assuring quality, information, and choice in managed care. *Inquiry* 1998 ; 35 : 104-14.

Similarly, persons enrolled in managed care health plans are far more likely than persons in fee-for-service health plans to report their plan as fair or poor on a variety of dimensions, including overall quality of service, quality of doctors, access to specialists, access to emergency care, choice of doctors, and waiting time for appointments (see fig. 23 and 24) (43).

Data such as the foregoing must give us pause when we are repeatedly bludgeoned with the rhetoric of managed care. While there is more than ample evidence that we can better manage patient care, there is little data to support the conclusion that managed care is good medicine.

Too often, I am afraid, a bandwagon represents little more than a means to entertain, an opportunity to be slothful, and a source of frustration. This is particularly true when a familiar cord ends up being a sour note. Indeed, when something appears to good to be true — it probably is.

In reality, when it comes to managed care, as a means to treat patients, I am convinced that sitting on the sidelines is better than getting into the game — at least you do not find yourself contributing to a losing cause.

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