Managing for Survival

How Successful Academic Medical Centers Cope with Harsh Environments

Albert P. Williams, Grace M. Carter, Glenn T. Hammons, Dennis Pointer
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PREFACE

This research was undertaken to synthesize lessons from the strategies that academic medical centers have used to achieve their objectives in harsh environments. To identify effective strategies and the attendant lessons, RAND studied six centers that had been selected by an expert panel as being successful despite the unusual harshness of their environments.

Preparation of this report was funded by a Public Health Service contract from the Office of the Assistant Secretary for Health, Department of Health and Human Services. The work was performed under a project entitled "Managing for Survival: An Evaluation of the Strategic Steps Being Taken by Academic Medical Centers to Assure Their Institutional Survival."

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This report should be of particular interest to administration and faculty of academic medical centers who are concerned with how their institutions adapt to changing environments. It should also be informative to government policymakers and others who provide funding for the programs of academic medicine or who otherwise seek to influence their activities.
SUMMARY

This study extracts lessons from the strategies of academic medical centers (AMCs) that have been successful in achieving their objectives, despite the harsh environments in which they operate. The experiences of AMCs that thrive in harsh environments are more likely to be instructive to other AMCs than are those from institutions operating in benign environments. This fact motivated the design of this study, which concentrates on success gained by coping with environmental adversity.

The U.S. health care delivery system is rapidly undergoing a series of changes that impinge on the viability and welfare of academic medical centers. If AMCs fail to adapt to these changes, they will leave a gap in our national health care system or require external assistance. Academic medical centers train our health manpower; they are largely responsible for creating the stock of basic and applied biomedical knowledge that supports technological development, they are the primary sites for the provision of tertiary care services, and they deliver a large portion of the care received by indigents.

For the purposes of this study, we define an AMC to be successful if outside experts believed it to be achieving the goals it set for itself, as opposed to some externally set standard. Centers vary from one to another in the emphasis they place on particular goals, but all major goals pertain to one or more of the three missions of education, research, and patient care. We do not presume that one mission is more or less important than another.

ENVIRONMENTAL DIFFICULTIES

The sources of environmental difficulty for academic medical centers are generally well known. They include:

- **Changes in payer demands.** Government and private third party payers are facing increased pressure to control the rate of expenditures in the health insurance plans they administer. AMC hospitals that enjoyed the luxury of generous reimbursement for high cost, high quality care must increasingly respond to demands for more cost consciousness.

- **Changes in methods of reimbursement.** Changes in payer demands have affected reimbursement mechanisms. All acute care hospitals have had to deal with Medicare’s change from
cost-based reimbursement to the Prospective Payment System (PPS), but that is only the most sweeping of the many changes that have occurred in hospital reimbursement. Others include preferred provider organizations (PPOs), competitive bidding for indigent care, and the growth in contracted rates for hospitalizing patients from health maintenance organizations (HMOs). As a matter of policy, Medicare PPS made special provisions to compensate teaching hospitals for their higher costs of care. However, other systems have generally not established a clear-cut policy in this area, and Medicare has recently reduced its payments for these “indirect costs of medical education.”

- Changes in health industry structure. In recent years, vertically and horizontally integrated health care delivery systems have grown rapidly in both the for-profit and not-for-profit domains. The resulting new organizational entities have made it increasingly difficult for the more traditional, autonomous teaching hospitals and faculty practice groups to maintain their market positions.

- Changes in practice patterns. The growth in physician supply has meant a growth in the number of specialists and subspecialists outside AMCs. Nonteaching hospitals are increasingly well-staffed with qualified physicians who believe they need not refer difficult cases to AMCs for secondary and tertiary care.

- Changes in demand for medical education. The increased supply—many say oversupply—of physicians promises to make medical education less attractive to prospective medical school applicants and financing of medical education less attractive to traditional funders, particularly state governments. In addition, the demographic effects of the “baby bust” will reduce the medical school age cohort by over 20 percent by the mid-1990s.

- Increased competition for research funding. Total federal funding for biomedical research has remained fairly stable in real (inflation-adjusted) terms. However, the competition for those funds has increased sharply because the increases in numbers of both medical schools and basic and applied biomedical researchers who apply for funding.

METHODS

We used readily available data to characterize the harshness of the environments of each of the nation’s AMCs mainly in terms of the
difficulty they face in obtaining needed financial resources. Harshness was measured by the availability of general support for the medical school, state funding of care for the indigent, and competitiveness of the medical care marketplace. Selection of the dimensions themselves and associated variables was constrained by the availability of consistent data for all centers and by the recovery of those data. We used standard linear methods to create the dimensions from the constituent variables and to develop a measure of overall environmental harshness. Although the concept of environmental harshness is somewhat subjective, by using consistent, objective data to construct these dimensions, we provided a framework for considering environmental characteristics.

Expert advisors were given the list of AMCs, ranked according to harshness, and each selected the six or so they viewed as most successful. From the recommendations of these outside advisors, we chose a set of six medical schools for site visits: Washington University in St. Louis, University of Louisville, University of Texas Southwestern Medical School, University of Minnesota, University of Utah, and Rush University.

During the site visits, we conducted structured interviews with AMC managers, including the central administration, department heads, and managers of affiliated hospitals. The interviews allowed us to assess the relative harshness of the six environments on various dimensions, to judge how successful each AMC was in its own terms, and to understand strategies that each participant institution perceived to have contributed to its success.

After completion of the site visits, we reassessed our study methods to determine how well they served the study objectives. We concluded that our methods for measuring the relative harshness of AMC environments were somewhat flawed. The flaws did not stem so much from the conceptualization of the measures as from the limitations of the data we used to construct them. Most important, the only comprehensive information base for measuring the generosity of funding for indigent care contains out-of-date state-level data on the Medicaid program; thus, information on other state and local government-funded indigent care programs, which may be of greater importance to some AMCs than Medicaid, was omitted. Categorical data on the state support for medical education and endowment appeared to understated the amount of funding available to support broad medical education programs in some AMCs. Supply side measures of the local medical care market conditions did not always accurately reflect the actual competitive pressures an AMC faces, but that may be due to the center's effective coping strategies.
Our site visits may have given us a positively biased impression of the accomplishments of the six sample AMCs, but we could also see many objective indicators of their success in coping with environmental adversity. Moreover, we found evidence that each AMC had adapted its behavior to deal with specific problems it had identified in its environment, and there were some consistent patterns among effective strategies across all six sites.

FINDINGS

This study provides a basis for cautious generalizations about broad organizational strategies that are likely to contribute to the future “success” of AMCs. Our findings are organized under lessons and observations. For lessons, we have seen enough evidence across the six centers to conclude that what we found is not a sampling artifact and we have a reasonable basis for inferring that these findings are causally related to success. Our observations pertain to characteristics that reflect the AMCs’ organizational strategies, but we (not necessarily others) are unwilling to draw causal inferences on that basis.

Case study methods have inherent limitations, and this brief study of only six centers has specific limitations. This study might arguably be called a study at one point in time, but we have obtained as much longitudinal information as possible from our interviews. We have dealt with these limitations by moving a potential “lesson” to a finding - if we believe it might be sensitive to the particular sample of institutions we studied or to the limited information we were able to obtain.

Lessons

We identify seven lessons that we believe can be learned from the six academic medical centers. Academic medical centers differ considerably in the emphasis they place on particular goals within the broad categories of education, research, and patient care. Their interest and ability to pursue particular goals depend on such factors as institutional history, local and state politics, the local economy. We recognize this diversity in goals and capabilities of AMCs and present these lessons as basic principles, not as detailed prescriptions.

Entrepreneurship. This term has strong activist connotations: organizing, managing, promoting, assuming the risk for an enterprise or an activity. There are numerous examples of the past and present importance of entrepreneurship in the success of each of the six centers we studied, and it is observed at many levels in a center: the
individual faculty member, the academic department, the teaching hospital, the medical school, the center-wide leadership. At each level, individuals and groups need to respond opportunistically to the resources available in the environment at any particular time. This does not imply that long-run goals should be sacrificed to short-run expedience, but it does require attitudes and behavior that make the best of the current changing situation.

Governance. Effective governance systems strike a delicate balance between promoting independent initiative and facilitating coordination of center-wide activity and collective action. Independence can be readily promoted at the medical school level by granting autonomy to department heads in such areas as faculty compensation and space allocation. It is more problematic to place sufficient unobtrusive restrictions on departmental autonomy to facilitate concerted action, such as a Center’s bid for an HMO contract. Each AMC in this study has increased its centralized authority and its capacity for coordinated and collective action to deal with problems that are specific to its environment and the need for organizational change.

There is no optimal authority or governance structure for all centers because governance is inevitably affected by institutional culture and history. Innocuous steps or arrangements to facilitate collective action (e.g., centralized billing for professional services) in one center will be anathema in another. The most serious problems of governance usually revolve around clinical matters—i.e., the relationship of the medical school to its major teaching hospital(s) or the control of faculty practice activity and earnings. The need for coordination between clinical and basic science departments is also growing as research on clinical problems requires ever more input from the basic science disciplines and as clinicians have to obtain basic science training in order to compete effectively for NIH grants. Rapidly changing environments, such as those in which most AMCs operate, create many intra- and inter-organizational conflicts. Perhaps the best indicator of sound governance is the system’s capacity to resolve new conflicts quickly, efficiently, and effectively. A major conflict, if allowed to simmer, distracts leaders at multiple levels from what can and needs to be done.

Management of Faculty-Generated Revenue. A successful academic medical center must maintain strong incentives for individual faculty members and their departments to generate income but must also develop means to “tax” some of this income—particularly practice income—to foster broad center goals. However, a faculty practice plan will be counterproductive if it imposes too large a tax.
In almost all academic medical centers, a large proportion of revenue is generated from the patient care activities of clinical faculty; and in the more research-intensive centers, it is generated from the research grants and contracts of both clinical and basic science faculty.

Plans differ considerably from center to center, but centers that successfully manage faculty-generated revenue provide some fairly simple lessons. First, the individual faculty member should accept personal responsibility for generating revenue that can be used to support his own salary and research and also to promote broader department and center goals. Second, the faculty member's compensation should directly reflect the quantity and quality of his output. Third, the inherent variation in earning potential across departments and subunits should be acknowledged and partially offset by the reallocation of practice revenue or the differential allocation of other hard money. Finally, there should be a consensus that the management mechanisms are understandable and fair to the interested parties.

Tenure. Productivity, adaptation, and renewal are facilitated by limiting the explicit and implicit rights of faculty tenure. Tenure can easily protect an individual's academic rank without guaranteeing his current salary. In many centers, an effective mechanism is a compensation plan that is composed of two or more parts. One part is fixed by virtue of rank, is often paid from hard money accounts, and may constitute even less than half of total compensation. The other part is determined by the faculty member's current contributions to departmental and center objectives.

Tenure does not provide explicit rights to a particular office or research space. However, in many medical schools, there appear to be implicit tenure rights in space that lead to inefficient utilization.

Although tenure may usefully protect a faculty member's academic appointment to the point of retirement, it should be more limited for those in administrative positions—deans, department heads, division heads. A renewable contract term for administrators, perhaps five years, allows enough time to identify problems, develop solutions, embark on new ventures, and learn their consequences. It also protects administrators from premature judgments about their effectiveness during a learning period.

Strategic Use of Resources. An AMC must generally commit many resources to a department or division to rejuvenate it or to change its direction. It is often difficult to recruit a new leader for a department without making such a commitment, particularly when the unit he is being asked to lead is regarded as having performed poorly in the past. The command over extraordinary resources gives the new head credibility, authority, and the financial means to pursue the new goal. And
the most desirable candidates usually demand discretionary start-up funds or additional research space.

Because the resource requirements are usually beyond what normal budgets permit, the dean or the vice president must often set priorities to solve problems sequentially. This may require a painful strategic decision to commit resources in a fairly lavish manner to one unit while temporarily allowing another to languish or wither.

The Patient Base. To be successful in the current health care environment, every AMC must sustain a campaign to ensure an adequate patient base to support its programs. The most direct and pressing concerns regarding a patient base are usually financial. If fewer patients are treated in the center’s facilities, patient care revenues to the hospital and medical staff fall concomitantly, threatening the center’s financial viability.

The most common and direct approach to ensuring an adequate patient base focuses on “market share.” Strategies for affecting market share depend on many factors, including the local environment, the particular center’s needs, and its philosophy. Each center in our study approaches the task in two or more ways. Centers often need to build new physical facilities or undertake major renovations to attract private “full pay” patients. With the growth of prepaid health care systems, AMCs have formed links with existing prepaid plans or established their own.

By a combination of efforts the six centers we studied have managed to maintain and, in some instances, to expand their patient bases in markets where demand for care has been shrinking and supply has been increasing. Their success clearly owes much to their unstinting and aggressive efforts at marketing.

Cost Containment. Academic medical centers need to engage in active programs of cost containment and demonstrate their effectiveness. Insurers, PPOs, HMOs, and other payers for health care generally assume that any major teaching hospital or faculty practice group will be a high-cost provider. Because of these common perceptions, an AMC must bear the burden of proof that it can provide care at competitive prices, whether seeking a contract with an HMO or PPO or defending an appropriation request of state or local government. Although only one—perhaps two—of the six centers that we studied operates in an environment of what could be regarded as “cutthroat” price competition, each faces and has responded to strong incentives for cost control.
Observations

In addition to the seven lessons that we draw from our study of successful centers, we observe five attributes that all six have in common. Each "observation" pertains to the way these centers have coped with environmental problems. Although we have insufficient evidence to draw inferences about their relationship to success, these "observations" are worthy of consideration.

Medical Education. None of the six centers seemed particularly concerned about the need to take steps to maintain the quality of their undergraduate medical education programs, and we found no evidence of decline. Although five of the six schools had experienced a decline in the number of medical school applicants in recent years, none believed that it had seen a decline in the quality of either its applicants or its admitted classes. Moreover, none of the six centers seemed predisposed to undertake a major reform of their undergraduate medical education curriculum, which may reflect the higher priority accorded to other center-wide initiatives.

Long-Range Planning. All six centers engage in long-range planning as a standard practice and credit this planning for their successful responses to environmental change. None has a comprehensive master plan; instead, their planning has been stimulated by the anticipation or realization of specific problems. It is hard to determine ex post how much of a particular success is due to planning and how much to ongoing, adaptive response to a changing situation. Planning has at least one positive and immediate outcome: It reflects and generates confidence and enthusiasm.

The For-Profits. The for-profit part of the health care industry is no longer seen in doctrinaire terms by the leadership of any of the six centers we studied. Each has some important relationship with a for-profit entity or has its own for-profit subsidiary. It is too soon to assess the long-term consequences of academic medicine's pragmatic stance toward corporate medical care and technological development. There are some trepidations about the danger of the "medical industrial complex," but these do not stand in the way of considering new ventures and relationships.

Community Relations. Each center we studied appears to maintain a good relationship with the community in which it is located, which it attributes to very conscious attention to community relations, in addition to its performance as an academic and health care institution. We believe (but cannot prove) that these efforts have yielded large returns for the six centers in our study. At a minimum, they contribute to a good aura for the centers; they also increase the number of people who believe they have a stake in the center's future success.
Physical Facilities. Major improvements in physical facilities are credited as important contributors to the success of each center we studied. Each has recently completed or is currently undertaking major building or refurbishment programs, and each of the medical centers is housed in an impressive physical plant. Their new buildings can be seen as an important contributor to success, or as a badge of success. It is certainly better to be housed in new buildings than in old ones, but we do not know what level of debt burden a center should be willing to assume to gain that advantage or, more broadly, the priority a center should attach to physical facilities compared with other uses of discretionary funds.

CONCLUSIONS

This study sought to identify academic medical centers that were successfully pursuing their objectives, that were operating in unusually harsh environments, and whose successes could provide useful lessons to the larger academic medical community. We believe we have substantially met the first and third objectives, but we are less certain about the second. Our measures of environmental harshness are not conceptually flawed, but the data we used to construct the measures were too crude and incomplete to reflect all the features of an AMC's environment that affect its ability to pursue its objectives.

The lessons we draw from the experiences of the six AMCs we studied would be more impressive if we could confirm that their successes were achieved despite their having to operate in extraordinarily harsh environments. In fact, each of the six clearly faces considerable local challenges, and none operates in a benign environment; but we are less certain than we would wish that any one of the six faces more environmental adversity than another center ranked “better off” on our adversity scale. Nonetheless, we are confident that the lessons to be learned from these clearly successful centers have general applicability, because of the consistency of their application and their positive effects across all six centers.

We have one overarching conclusion regarding effective strategies for coping with environments: Other things being equal, academic medical centers that have more integration and coordination and less subunit autonomy will be better able to achieve their objectives in the difficult environment of the future. This was probably an implicit assumption of this study's sponsor, which gave the project the title “Managing for Survival.” The problem is how to achieve integration and coordination without stifling the initiative, creativity, and responsibility that are
crucial to the education, research, and patient care functions of academic medicine.

All seven specific lessons we have synthesized from our study have a common theme in that they pertain to promotion of effective coordinated action. Entrepreneurship remains an essential attribute for survival, but it now needs to occur at the group and center—not so much the individual—level. The lessons of governance demonstrate the importance of control mechanisms that can resolve conflict and promote coordination. Managing faculty-generated revenue requires both strong incentives for individual performance and acceptance of the individual’s responsibility to support organizational objectives on an ability-to-pay basis. The restrictions on tenure we propose are designed to facilitate needed organizational change without infringing on accepted academic prerogatives. The strategic use of resources epitomizes the sort of decision that a center’s leadership must make in which the interests of one unit must be sacrificed in the interests of the whole. Maintaining the patient base for medical education and containing health care costs must be accepted and pursued as broad organizational objectives; success requires more cooperative action and more sacrifice of narrow subunit interests than has been characteristic of much of academic medicine.
ACKNOWLEDGMENTS

This research could not have been undertaken without the cooperation of the six academic medical centers that were selected for study: the Washington University Medical Center, the University of Louisville Health Sciences Center, the University of Texas Health Sciences Center at Dallas, the University of Utah Medical Center, the Health Sciences Center of the University of Minnesota, and the Rush-Presbyterian-St. Luke’s Medical Center. We were granted extensive interviews with the senior university officials responsible for each of the six centers, the deans and administrators of their component medical schools, selected clinical and basic science department chairmen, and the chief executive officers of their major teaching hospitals. We want to acknowledge the generosity in giving us their time and insights and honoring us with their candor. Their numbers are too large to list. However, we do want to express our particular debt to the one or more senior persons who were instrumental in approving and arranging our access at each center: M. Kenton King, Donald R. Kmetz, Kern Wildenthal, Don E. Detmer, Cecil O. Samuelson, David M. Brown, Neal A. Vanselow, Leon M. Henikoff, Henry R. Russe, and Wayne Lerner. They also provided constructive criticism on earlier drafts of this report and were especially attentive in ensuring that our descriptions of their centers were factually correct.

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I. INTRODUCTION

The purpose of the study reported here is to extract lessons from the successful strategies of selected academic medical centers (AMCs) in coping with their environments. It is generally agreed that AMCs must be well managed and efficient in their use of resources to succeed in their current environments. By examining how some selected medical schools have succeeded, we hope to discern how others could profit by following their example and to inform policymakers about how their decisions affect all AMCs.

The U.S. health care delivery system is undergoing a series of changes that impinge on the viability and welfare of academic medical centers. To the extent that AMCs fail to adapt to their new environments, they will leave a gap in our national health care system or require external assistance. Academic medical centers train our health manpower; they are largely responsible for creating the stock of basic and applied biomedical knowledge that supports technological development, they are the primary sites for the provision of tertiary care services, and they deliver a large portion of the care received by indigents.

For the purposes of this study, we defined an AMC to be “successful” if it is achieving the goals it set for itself, not some externally determined standard. Although centers vary in the emphasis they place on particular goals, all the major goals pertain to one or more of the three missions of teaching, patient care, and research. We do not presume that one mission is more important than another, for example that a research-intensive center is more successful than one emphasizing patient care.

The extent to which an AMC accomplishes its goals depends in part on the environment in which it operates. Lessons gleaned from AMCs that thrive in harsh environments are likely to be more useful to other AMCs than those from institutions operating in benign environments. This fact motivated the design of this study, which concentrates on success gained by coping with environmental adversity.

We conducted the study in the following sequence: Readily available data were used to characterize the harshness of the environments of each of the nation’s AMCs mainly in terms of the difficulty they are expected to face in obtaining financial resources (Sec. III presents a complete description of methodology). Expert advisors selected those AMCs they viewed as most successful from a list of AMCs in harsher environments. We then chose a set of six medical schools for site
visits. During these visits, we conducted structured interviews with AMC managers, including the central administration, department heads, and managers of affiliated hospitals. The six AMCs are: Washington University in St. Louis, University of Louisville, University of Texas Southwestern Medical School, University of Minnesota, University of Utah, and Rush University.

The site visits allowed us to learn the strategies that each participant institution perceived to have contributed to its success. We have synthesized this information to identify the strategies that appeared to work across all or most of the sites. In our synthesis, we felt more confident in judging a strategy as effective when we could reconstruct the history of its implementation and observe the dynamics of how it was positively affecting operations.

The background for our study is found in Sec. II, which describes the changes in the environment that are adversely affecting AMCs and discusses criteria for measuring success. Our methodology is described in Sec. III, including site selection and interview protocol. Section IV contains brief descriptions of each of the six centers. Section V presents the results of our study in the form of seven findings and five observations. The last section contains our conclusions concerning AMC management and the characteristics that were correlated with success.
II. BACKGROUND

For a brief period from the late 1960s through the early 1970s, the federal government assumed a substantial responsibility for the overall financial health of the nation's academic medical centers. This went beyond the government's long-term interest in supporting programs of academic medicine such as biomedical research and training. During this period, the size of the academic medical establishment grew sharply, and its dependence on funding from government programs increased. This dependence naturally led to vulnerability.

The implications of this vulnerability became more apparent as the policy environment changed. In the mid-1970s, political leaders began to question how effectively the tax dollars given to academic medicine were being used to support public policy objectives, which were shifting from matters of aggregate physician supply to ones involving geographic and specialty maldistribution, and from ensuring access to care to the control of health care costs. By 1975, the federal government had begun to reduce its direct capitation funding for medical education, and the biomedical research was being stressed by budget stringency. Academic medicine was becoming steadily more dependent on revenue generated from patient care at a time of rising public commitment to the control of spiraling health care costs.

By the end of the decade, some health policy analysts were questioning the wisdom of academic medicine's heavy reliance on federal support (Reinhardt, 1980). Whatever the wisdom of past policies, there was a clear consensus that a return to generous federal funding was unlikely in the 1980s (Ebert and Brown, 1983; Rogers, 1980). This was as true for biomedical research, where the federal government had a long history of generous funding, as for the more recent health manpower education programs (Fredrickson, 1981). As important as the loss of capitation support was to medical schools, its perceived effects paled in the face of concern over changes in hospital payment systems and the general move toward price competition in the health care delivery system (Ebert, 1985; Ginsberg, 1985; Relman, 1984). It was easy to imagine how academic medical centers might be unable to cope with pressure from cost-conscious payers for medical care, although the adverse effects of cost containment seemed likely to vary greatly across different types of institutions (Schwartz, Newhouse, and Williams, 1985).
As academic medical centers faced the prospect of having to function in increasingly harsh environments, their leaders began to reassess institutional priorities (Ebert, 1985; Institute of Medicine, 1983). Many felt that the governance structure of centers would need to change (Ebert and Brown, 1983; Hastings and Crispell, 1980; Heyssel, 1984; Rogers, 1980). Although there was a consensus that centers needed to adapt to their changed circumstances, there were no widely accepted prescriptions for doing so.

This study accepts the premise that academic medical centers have faced and are continuing to face more and more difficulties because of changes in their environments. Some difficulties are posed by national policy changes, some by states, and others by changes in the local health care markets where AMCs must compete with other providers. The nature of these changes are generally well known in the policy and academic communities. We summarize the most important changes under six broad headings: changes in payer demands, changes in methods of reimbursement, changes in industry structure, changes in medical practice patterns, changes in the demand for medical education, and greater competition for research funding.

CHANGES IN PAYER DEMANDS

All payers (the federal government, state governments, employers, and insurance companies) need to reduce the rate of increase in their expenditures, improve the predictability of year-to-year expenditures, and shift financial risks to providers and consumers. These demands have precipitated a shift in the emphasis of public and private policy: from improving the access to and increasing the quantity and quality of health care services, to containing the utilization and cost of such services. Quality and access are still very important, but utilization control and cost containment take precedence. Traditionally, AMCs have assumed a leadership role in improving health care quantity, quality, and access. Thus, a tension exists between the demands of payers and the traditional mission or orientation of the academic medical center.

CHANGES IN METHODS OF REIMBURSEMENT

An alteration in payer demands has caused significant changes in the way providers are reimbursed. The basis of payment is changing from incurred costs or charges to mandated (as in the case of the Medicare Prospective Payment System—PPS) or negotiated (e.g., Preferred Provider Organization arrangements or Health Maintenance
Organization contracting) prices. In the past, providers were retrospectively reimbursed for individual items of service; providers are often now being paid for highly aggregated products (e.g., a discharged patient within a broad diagnostic category), the prices for which are set prospectively. Although the Medicare PPS makes special incremental payments for teaching hospitals, these payments were reduced in 1986.

The ultimate extension of these three trends is capitation, in which a provider or group of providers assumes responsibility for the full range of required medical services to an enrollee in return for a fixed (capitated) payment. As a consequence, it is becoming more difficult for provider organizations to transfer financial risk to others; they must assume and manage it themselves. Government controls that were primarily prescriptive and prohibitive are being replaced by mechanisms that structure economic incentives, increasing competition in the industry. Given such dynamics, health service organizations must seek to optimize, rather than maximize, the amount of care provided to a given patient. Specific prices for defined products paid prospectively in a highly competitive market tend to isolate the provision of direct patient care from other closely associated activities (teaching, research, and the provision of partly compensated or uncompensated care) traditionally undertaken by academic medical centers. That is, purchasers want to constrain or eliminate cross-specialists and pay providers for a pure health care product that their beneficiaries receive.

The emerging aggressiveness of buyers in this regard upsets a delicate pattern of cross-subsidies that has developed over the years and served important social needs. To compete effectively with other providers in a prospectively priced reimbursement environment, AMCs are being forced to eliminate the costs associated with related activities from the prices they charge for direct patient care. In this sense, the AMC faces a dilemma: If the cost of associated activities is loaded into the price of the "pure health care product," they are not competitive; if such costs are eliminated without other sources of funding for they support, these activities vital to the functioning of an AMC will atrophy. Affiliated community teaching hospitals, facing the same reimbursement incentives, may be less willing to participate in undergraduate and graduate medical education programs unless they are reimbursed for their costs. In the absence of such compensation, teaching programs not essential for economic survival may be eliminated or decreased in scope and magnitude.
CHANGES IN INDUSTRY STRUCTURE

The health care industry is moving from being composed almost entirely of autonomous providers—hospitals, doctors, etc.—toward large, more diverse organizational forms, including several horizontally and vertically integrated health service delivery systems. These systems are not only delivering health care services but are also assuming the financial risk of providing comprehensive care packages to designated populations through their own health maintenance organizations (HMOs) and preferred provider organizations (PPOs) and by contracting with third party payers and brokers. These integrated systems have strong financial incentives to keep patients within their boundaries and to redefine or limit the scope and amount of tertiary care services provided. The more they retain patients, the less is the demand for primary and secondary (both inpatient and outpatient) care provided by academic medical centers. Additionally, such systems will provide tertiary care services themselves or begin to limit coverage for such services. Such trends will threaten the financial and patient care base of many academic medical centers.

CHANGES IN MEDICAL PRACTICE PATTERNS

Until quite recently, the practice of medicine was subject to a fairly precise and dichotomous division of labor. Community-based practitioners provided primary and some secondary medical services; the faculty of academic medical centers provided much secondary and virtually all tertiary services. This division of labor has become blurred because of the combined effect of two factors: more practicing physicians (the result of expansion in schools, larger class sizes, and physician in-migration) and a greater proportion of medical school graduates pursuing specialty and subspecialty residency training. As the physician-to-population ratio has increased, the market for medical services has become much more competitive, and physicians have attempted to retain (rather than refer) patients. Additionally, community-based specialists and subspecialists are now successfully competing for patients requiring tertiary care, thus eroding the once secure base of academic physicians and medical centers.
CHANGES IN THE DEMAND FOR MEDICAL EDUCATION

The demand for medical education is undergoing change in significant ways, partly because of the perceived (if not actual) oversupply of physicians. Potential applicants believe there has been a reduction in the return on investment in medical education. Neither the federal government nor state governments are appropriating funds to expand medical school capacity. Similarly, public funding of scholarships and student loans has become scarce. Further, the "baby bust" of the 1960s is causing a sharp decline in the size of the age cohort that traditionally attended medical school. As a consequence of these trends, medical schools will face erosion of their student applicant pool (in terms of both quantity and quality) and concomitant reduction in their "hard money" financial base.

INCREASED COMPETITION FOR RESEARCH FUNDING

Inflation-adjusted federal support for biomedical research has remained fairly constant. However, there is greater competition for such funding because of increases in the numbers of medical schools and of basic and applied biomedical researchers. As a consequence, the pool of biomedical research funding per institution and per researcher has considerably declined. One can expect more and more disparity in research funding among institutions and researchers.

Given these trends, the consensus is that AMC's must be well managed. Therefore, they must carefully examine their strategies for coping with much different and considerably harsher operating environments.
III. METHODS

This project was designed to study a select group of academic medical centers (defined as a medical school and its major affiliated teaching hospitals) that were judged to be successful despite the relative harshness of their operating environments. The method employed had three interrelated components. First, all academic medical centers in the United States were arrayed in terms of the harshness of their environments. Second, a panel of experts identified the most successful academic medical centers operating in the harshest environments. Third, we chose six academic medical centers so identified for site visits and more in-depth study.

DETERMINATION OF ENVIRONMENTAL HARSHNESS

Although all academic medical centers are subject to many of the same forces (described previously), the characteristics of their immediate operating environment can vary considerably. Some AMCs operate in fairly hospitable environments; others function in environments that can only be described as harsh. Our study's objectives required us to assess relative environmental harshness. To do so, we conceptualized three dimensions on which each center's environment might vary in terms of harshness and that could be constructed from data that were available on all or nearly all AMCs: Availability of general support for the medical school, state funding of care for the indigent, and competitiveness of the medical care marketplace. Environmental harshness is conceptually quite subjective. However, we used objective data for these dimensions, and we provided an internally consistent framework for examining environmental characteristics. The availability of consistent data for all centers and the recovery of those data shaped these dimensions.

The three dimensions and the proxy variables used to measure them are described below. Subsequently we discuss some of the limitations that became apparent in the course of our site work.
General Medical School Support

This dimension was quantified with two variables: state support the school received for medical education, and endowment income. We selected these variables to capture the magnitude of general funding for both state-supported and private medical schools. Although state support is public data, endowment income is not. The Association of American Medical Colleges (AAMC) collects such information in its annual survey.

To protect the confidentiality of the information, the AAMC computed (by school) the sum of annual state support and endowment income per full-time equivalent (FTE) medical student. A score of the sum was computed, called a “Z” score, and all schools were placed in categories according to these integer scores. That is, all schools between the mean and one standard deviation above the mean were in one category, the schools between one and two standard deviations above the mean were in another, etc.

State Funding of Indigent Care

This dimension captures the relative generosity of the environments with respect to providing medical care for the indigent. Unfortunately, only Medicaid data were available for all medical centers. Therefore, other state, county, and local government expenditures for public assistance medical care are not included in this measure of generosity.

To construct this dimension of indigent care funding, we divided Medicaid expenditures by state (for 1983) by the number of individuals in that state below the poverty line. Fiscal year 1983 (10/82–9/83) was the most recent year for which HCFA could supply data. The state was the smallest political unit for which comparable and reasonably accurate data were available. Thus, for AMCs that draw a high proportion of their indigent patients from several states, this measure will be somewhat distorted, even for Medicaid.

Medical Marketplace Competitiveness

We constructed four proxy variables to capture the degree of competitiveness of the environment in which the AMC was located:

- The average percentage of beds in all hospitals in the Standard Metropolitan Statistical Area (SMSA) that were empty during 1982,
- The average percentage of beds in tertiary hospitals in the SMSA that were empty during 1982 (we used AHA data on facilities and services offered to specify tertiary hospitals),
• The log of the ratio of the number of physicians to population in the Metropolitan Statistical Area where the AMC was located, and
• A dummy variable indicating whether the area surrounding the MSA was rural or urban.

Using factor analysis, we constructed a single index number from the four variables. Several factor analyses produced rank orderings of academic medical centers that were quite similar to each other; the results were therefore not very sensitive to modest changes in the specification of the factor analysis. The resulting index of competitiveness increased with total and tertiary empty bed rate and decreased with a higher ratio of physicians to population; the index was higher for SMSAs surrounded by rural areas.

Summary Measures

We calculated a standardized ("Z") score for all academic medical for each of the three dimensions. The three "Z" scores were summed to construct a general measure of environmental hostility. Appendix A presents data on the dimensions used to construct the measure of environmental harshness for all U.S. academic medical centers.

SELECTION OF STUDY SITES

Those AMCs in the bottom third of the array of summed "Z" scores (general support, state funding of indigent care, and medical market competition) were deemed to be operating in the harshest environments. We convened a nine-person panel of nongovernment experts familiar with academic medical centers. They included representatives from medical schools, private consulting, investment banking, foundations, the Association of Academic Health Centers, the Association of American Medical Colleges, and the Liaison Council on Medical Education.

We first asked the panel if our dimensions of competitiveness seemed sensible and if the resulting ranking of centers according to environmental harshness seemed plausible. They reacted positively to both questions but indicated some reservations regarding the implication of unavailability of some important data that might reflect environmental harshness.

The panel then identified not more than five AMCs that (in their opinion) were the most successful from among the one-third of the medical centers appearing in the harshest environments. They also
recommended other medical centers that they judged were functioning with unusual success but that our measures had not shown to be among the one-third with the harshest environments. Each expert was asked to restrict the total number of choices to about six centers.

As might be expected, the experts did not have a complete consensus, although four of the six sample centers appeared on five or more of the nine lists. We selected two centers just above the cutoff for the harshest third of environments because persuasive cases were made for their inclusion by two or more experts and because they provided other factors such as a balance between state and private institutions, geographic spread, relationships with for-profit affiliations, etc. One center originally chosen refused to participate but a substitute center did agree to participate.

The six centers studied were Washington University (St. Louis), University of Utah (Salt Lake City), University of Minnesota (Minneapolis), Rush (Chicago), University of Texas-Southwestern (Dallas), and the University of Louisville. Each had been picked by several of our experts. Texas and Minnesota were picked from outside the "harshest third," but they were just outside the boundary.

SITE VISITS

Three or more members of the research team visited each study site academic medical center. The objective was to determine those characteristics (mission or goals, strategies, structure, and functioning) that were most associated with the institution's success and its probability of surviving and thriving in the future. In each instance, the site visit lasted two days.

We conducted interviews with each major officer of each medical center and its affiliated hospitals, including the medical school dean, the chief financial officer, the dean for student affairs, the chairman of a sample of clinical and basic science departments, an officer of the university containing the academic medical center, and the chief executive officers of major affiliated teaching hospitals.

Interview guides were prepared for each of the major offices listing the kind of information we wished to obtain from each person. Appendix B reproduces these interview outlines. No attempt was made to ask questions in a standardized format. When possible, at least two of our team attended each interview so that one person could record the interview while the other asked the questions.
METHODOLOGICAL REASSESSMENT

The design of this study necessarily rested on some inherently subjective assessments, which required validation. In conducting each of the six site visits, we assessed the validity of our methods for conceptualizing and measuring environmental harshness and selecting academic medical centers that were successfully coping with that environment (those that had a high probability of surviving, if not actually thriving, in the years ahead). The results of the assessment are reported below.

Success

Each of the AMCs selected and visited by the site study team was judged to be successful. Although there was great diversity among the sites, each AMC demonstrated a very high level of performance in accomplishing its core missions. All pursued goals of undergraduate teaching, graduate teaching, basic biomedical research, applied or developmental clinical research, and the provision of health care services. However, as expected, the importance and priority accorded to each of these goals and the specification of objectives that flowed from them varied considerably across the sites.

Environmental Harshness

The methodology for measuring the relative harshness of the environments that academic medical centers face was somewhat flawed. The flaws seemed to stem not so much from the conceptualization of our three dimensions as from the limitation of the data we had available to construct them.

We ascertained three problems with our approach: First, Medicaid funding, the only available data, was a poor proxy for the degree of state generosity regarding care for the indigent. Such data did not reflect the nature or extent of funding that other state and local programs provided. For three of the six centers in our study, these programs considerably mitigated the low level of funding by the state's Medicaid program. Second, categorical data provided by the AAMC that combined state support for medical education and endowment income did not seem to present an accurate picture of the relative availability of resources. In several instances, the degree of general support from endowment resources seemed likely to have been understated. Although the confidentiality of these data preclude any analysis of the reason for this apparent understatement, we suspect it may be due to endowments of individual units of a center (e.g.,
departments, teaching hospitals), that are not captured in AAMC data. Finally, the degree of competitiveness of the local medical care marketplace is not totally reflected by the supply side data that we used to quantify this dimension (e.g., physician-to-population ratio, the percentage of total and tertiary hospital beds that were vacant). Although these data do seem to characterize the potential competitiveness of a local health care market, they do not necessarily provide a reliable indicator of the degree of competition that has actually developed between academic and community providers.

Adaptive Behavior

All six sites perceived significant changes in their environments and the need to alter their strategies. What one does depends upon what one sees; what one sees depends upon where one stands. All of the six centers were standing in different places than they had been in the past, seeing things differently. They possessed both strategic vision and a capacity to change according to what they perceived the future required.

All the sites appreciated that changes in the pattern of health care delivery and financing presented the most critical problems for AMCs. Therefore, the greatest alterations in strategy would be required in the area of patient care service rather than teaching and research. In this sense, the teaching hospital (whether owned or affiliated) represents the most problematic and vulnerable component of the academic medical center.

The future of any organization depends ultimately on two things: the environment and the ability of the organization to cope with its challenges. Poorly functioning organizations can survive for a long time if the environment is benign or lush. In the past, the success of academic medical centers was virtually guaranteed because of a hospitable operating environment, but that situation has changed dramatically. Although this study initially examined strategic positioning given significant changes in the environment, it is clear that AMCs must improve the effectiveness and efficiency of their internal operating systems if they are to survive and thrive.

The Uncertain Future

After studying six "successful" centers, selected with the advice of our advisors, we share the experts' general optimism about their future. However, some of the success is still a matter of promise rather than reality. Although each of the six study sites was responding in an
innovative and dynamic fashion to the incentives, contingencies, and constraints of a new (and much harsher) environment, it is not clear how successful these responses will ultimately prove to be. The process of response is no less impressive for this uncertainty.
IV. CENTER DESCRIPTIONS

Each of the six academic medical centers we studied operates in a unique environment, and each has a different approach to attaining its organizational goals. Although the goals of each involve education, research, and patient care, the centers emphasize different goals and define them differently. Moreover, each of the six has a distinct institutional heritage and culture, which influence both their explicit objectives and the way they seek to achieve them.

A short sketch of each center will give the reader a sense of the problems each faces in its environment and the general approach each has taken to solve them. The tone of this section may seem unduly complimentary. There are two possible explanations: One is that, during our site visits, we were looking for the causes of success, and we were less attentive to the centers’ shortcomings. Another is that the six are, in fact, extraordinarily successful in coping with their environments. In any case, this section provides background for understanding our results; the bases for our results are discussed in the Sec. V.

THE UNIVERSITY OF LOUISVILLE HEALTH SCIENCES CENTER

The University of Louisville Health Sciences Center (ULHSC) has undergone major changes since the early 1960s, replacing what many of the academic medical community viewed as a period of minimal growth. Several bold decisions were important factors in creating this revitalization. In 1983, the University of Louisville School of Medicine (ULSM) became the first medical school in the country to contract with a for-profit corporation to lease its major teaching hospital. So far the relationship between ULSM and Humana has been a success, as evidenced by the satisfaction of the faculty and students and by the profitability of the hospital. This success was facilitated by organizational changes, by the terms for the support of indigent care negotiated with the lease, and by Humana’s concern for the city of Louisville as its headquarters. At the time, some saw the contract with Humana Inc. as a risky solution to a serious problem. Other schools are now implementing variants of this arrangement.

The School of Medicine traces its roots back to 1837 before it became part of the University of Louisville in 1846. It was a private school until 1970, when the university became part of the Kentucky
system of higher education. New basic science facilities were constructed in the same year. The medical school had prided itself in providing good training for practicing physicians, but it did not have a strong research reputation. Its main clinical facilities were based in Louisville General Hospital (LGH), a county hospital with a dilapidated physical plant, a setting that attracted only charity patients.

In the late 1970s, the state agreed to pay for a new hospital, and in 1978, the university assumed responsibility for administering the old hospital, which was a tremendous financial drain. Funds from the university's foundation were required to support hospital operations. In addition, because of the poor facilities, the hospital had virtually no paying patients, which limited the faculty's ability to raise funds through fee-for-service practice. The poor clinical facilities and limited opportunities also made it very difficult to recruit faculty, particularly in the hospital-based specialties.

In the 1980–1981 school year, Dr. Donald C. Swain was named University President and Dr. Donald R. Kmetz was named Dean and later Vice President for Hospital Affairs. Getting the hospital expenses under control was a top priority. The school's new top management formed a separate corporation, the University of Louisville Hospital, Inc., and awarded a contract for managing LGH to a California firm as a temporary arrangement until the new building opened.

Negotiations for managing the new hospital were originally begun with a not-for-profit corporation that runs two of Louisville's major affiliates, and that corporation made a formal proposal. However, the offer was superseded by an offer from Humana Inc. to lease the hospital on terms that the state, county, and school perceived to be more advantageous. To ensure that the faculty concurred, the school administration held a referendum by mail; 81 percent of the faculty voted, with 76 percent in favor. The contract was signed January 1983, and the building was opened in May of the same year.

The financial terms of the final agreement were that: (1) Humana would lease the hospital "at market value" ($6.5 million per year in 1985); (2) the University of Louisville would receive 20 percent of the pre-tax profits from the operation of the hospital and the annual interest on $4 million; and (3) the state, county, and city would provide a charitable trust fund to support indigent care at the hospital.

The hospital, now known as Humana Hospital University or HHU, receives approximately $20 million annually to support indigent inpatient care. The amount is indexed to the lower of the increase in the Consumer Price Index or the increase in the tax revenues of the state, county, and city. Of this amount, 90 percent is for the care of indigents from Jefferson County, the rest for indigents from elsewhere in
the state. The money is paid to the hospital at a rate of 95 percent of charges for indigents until the budget runs out. The hospital must provide all hospital care required by all indigents in Jefferson County and must continue to provide this care even after the payments are exhausted.

The reimbursement rate of 95 percent of charges is generous compared with rates paid by typical indigent care plans. So far, the hospital has not been seriously burdened by the arrangement. Although the hospital has no obligation to non-Jefferson County residents beyond providing them with approximately $2 million worth of care at the 95 percent of charges rate, Humana has so far chosen to accept all applicants.

The changes in the funding arrangements for the university hospital have improved the financial environment of the school. State funding for medical education is about at the national average on a per-student basis. The University of Louisville has recently instituted a major fund drive to improve its endowment, and the School of Medicine benefited with numerous endowed chairs. Opportunities for generating income through faculty fee-for-service practice are growing with the new hospital's increased prosperity. Compensation for indigent care is no longer a serious problem for the university hospital. It is, however, a serious problem for the affiliated children's hospital, which receives none of the funds from the charitable trust for Jefferson County residents.

During this period of revitalization, the school's central administration has placed considerable emphasis on improving the management and leadership within the School of Medicine. Ten new departmental chairmen have been hired since the early 1980s. This new leadership is expected to place greater emphasis on research and to improve the overall quality of the medical education program.

The ULSM governance structure places much operational authority at the level of the departmental chair. For example, the dean has no direct control of faculty practice income, although the practice plan "taxes" this income. Many of the department chairmen control their departments' "Professional Services Corporations" and in this way control salary supplementation for those faculty they view as "dead wood."

The hospital managers and faculty leaders hold regular planning meetings together to review the hospital budget, and these are credited with lowering conflicts between the faculty and HHU. Humana has demonstrated a willingness to purchase equipment such as a magnetic resonance imager needed for the academic programs, even though it may not yield as high a rate of return as other possible investments.
Humana also continues to purchase tertiary care equipment for its other hospitals in the Louisville area. In some instances, they have acquired advanced technology, such as the heart transplant program, before HHU; and there is considerable competition among members of the chain. Most of the profits from hospital activities received by the university have so far been given to the School of Medicine, which has distributed part of them to the academic programs of departments that contributed to hospital earnings. This acts as an incentive to support the hospital with private patients.

Although Louisville General Hospital used to care almost entirely for indigent patients, the new hospital has reached the point where 25 percent of the cases are from commercial payers, and the level is still rising. The success of HHU in competing for paying patients has introduced a strain in the relationship between ULSM and its other affiliated hospitals. The relationship with the children's hospital is further strained by the fact that it provides essentially all the care for Jefferson County's indigent children but receives no money from the charitable trust given to HHU, although the children's hospital will receive a direct state allocation. The relationship is important to the school because the children's hospital is the home of the ULSM Pediatric Department. Moreover, the children's hospital and some other hospitals provide subspecialty training that is not available at HHU.

The primary goal of the undergraduate teaching program is to produce clinicians for Kentucky. In 1985, almost 95 percent of the entering class of 124 were Kentucky residents. In 1982, ULSM decreased its class size by 12 percent. Since then the number of in-state applicants has declined slightly, but there has been no corresponding decline in the quality of applicants.

The graduate medical education program has made a dramatic recovery from the state it had reached in the late 1970s, when LGH was staffed largely by foreign medical school graduates, and at least one residency program lost its accreditation. Now all the residency programs are fully accredited, most departmental programs obtain residents who are graduates of American schools, and some departments are quite successful in getting their preferred residency candidates in the National Residency Matching Program.

The quality and quantity of biomedical research at ULSM vary greatly from department to department. Several newly appointed department chairmen have exercised considerable ingenuity in building a research program from very modest beginnings. For example, the new chairman of physiology was attracted to Louisville in 1981 by its urban setting, good physical plant, and the package of support in terms of average teaching load and growth dollars. Because the state did not
supply adequate funds for equipment or supplies, he postponed filling some positions and used the salary money to purchase research equipment. He also encouraged the older faculty to take their sabbaticals to update their skills, which simultaneously freed that part of the salary paid by the host institution, and he used those funds to purchase research supplies. He successfully campaigned for increased support for the Kentucky Heart Association, whose budget benefits research throughout the state. Finally, he has successfully encouraged collaborative research with other ULSM departments. The chairmen of other departments have also demonstrated this entrepreneurial spirit. The chairman of the pharmacology department developed consulting relationships with various for-profit companies interested in environmental toxicology to build a research base.

The major innovation at ULSM is, of course, its relationship with Humana. However, HHU and the school also continue to innovate in the areas of cost containment and marketing. In particular, Humana is credited with efficiency gains in managing the hospital by: (1) substituting technology for labor; (2) instituting productivity standards and an evaluation system that forced personnel to perform or leave (e.g., performance incentives, patient satisfaction questionnaires); (3) expanding volume to spread costs (from 50 to 78 percent occupancy); and (4) by holding “economic rounds” to encourage clinical faculty and residents to cut costs and by providing doctors with information about DRG-adjusted costs. Volume was expanded partly through new product development, which has been occurring at a rate of approximately one per month—e.g., a tertiary diabetes unit, an artificial ear, and an electrophysiology lab. Outreach efforts include a program in which tapes of weekly conferences are sent to outlying hospitals and other programs where physicians call in and get advice from faculty members (and learn to send their tertiary referrals to HHU). In cooperation with Humana, the Department of Medicine has opened two primary care offices in Indiana as a means of obtaining additional patients.

In summary, there are numerous indications of Louisville’s success in improving its education, research, and patient care programs and in creating the excitement of achievement. A new university hospital now complements the attractive buildings of the medical school campus that was built in the early 1970s. However, changes extend well beyond the physical plant. The governance structure has undergone a major overhaul, which may be as important as the innovative relationship between the University and Humana Inc. The experiment with the for-profit hospital industry appears to be a success so far. The academic leaders of ULHSC have until now found the need for cost-effective medical practice within the hospital to be compatible with
other academic goals. This new leadership has rejuvenated many departments within the school, although some weaknesses remain. ULSM is clearly on the rise and, perhaps most important, it is preoccupied with realizing its potential rather than with not succumbing to its problems.

THE UNIVERSITY OF MINNESOTA HEALTH SCIENCES CENTER

The University of Minnesota Medical School (UMMS) and its major teaching hospitals have a long tradition of excellence in education, research, and patient care. The people of Minnesota see the Medical Center as an important resource, the source of new physicians for the state, the court of last resort in patient care, and a contributor to economic growth in the state. It is located in Minneapolis, one of the most competitive medical care markets in the United States. The state has a tradition of generous indigent care funding and the school benefits from having two modern, well-funded municipal hospitals as major teaching affiliates. Still, the major problem for the UMMS and its affiliated hospitals is to compete in a very tight market without sacrificing research or educational excellence. A major new building and renovation program on the main campus are regarded as central to a satisfactory solution, and new joint ventures with private industry are being explored.

Founded in 1888, the UMMS was among the first state medical schools regarded as being in the top tier of academic medical institutions. By the 1970s, however, the age of the physical plant had become a problem, and the University Hospital was neither well-designed nor well-sized for its natural place in the local market.

The University of Minnesota is regarded with pride by the state, and its citizens have long supported education. As the primary source of physician education and training in Minnesota, UMMS enjoys substantial, though not generous, financial support from the state. The people of Minnesota also have a strong commitment to social services. State and local governments provide so much financial support for medical care of the poor that neither hospitals nor physicians in Minneapolis hesitate to provide care for these patients.

The medical care market in the Twin Cities of Minneapolis and St. Paul is very competitive, and the statewide referral market is becoming more so. Almost half of the population of the Twin Cities belongs to one or another large prepaid system of care (HMO) or managed care (PPO). Hospital use has fallen considerably in recent years, and
occupancy rates are low. There is intense competition for a share of the shrinking inpatient care market. The full-time faculty of UMMS and University Hospital, the university-owned principal teaching hospital, have traditionally specialized in tertiary care. For University Hospital to remain viable and the UMMS to generate patient care revenue to support its programs, the hospital must compete for referrals from the large HMOs in the Twin Cities and from physicians throughout the state.

A new 432-bed University Hospital has just been completed, although 168 beds remain in the older portion and are planned for renovation. The new hospital replaces a much larger, older facility, has all the latest equipment, and is designed to enhance the ability of University Hospital and UMMS to compete for patient referrals. The new hospital must also service a very large debt; to manage this and remain competitive, the administration will have to function at a very high level of efficiency and maintain high occupancy rates.

The governance of the Medical Center is highly integrated and centralized. The Dean appoints the heads of the departments of the School of Medicine for one-year terms, and the Dean and head of the University Hospital report to the Vice President for Health Sciences (VPHS). The VPHS reports to the President of the University and to the Board of Regents appointed by the legislature. Although this structure implies considerable central authority, in fact most authority and control over resources lie with the department heads and head of the hospital. Space in the medical school had been controlled by departments but is now controlled by the Dean. Appropriated funds from the state pass through the offices of the VPHS and the Dean and on to the departments. The Dean determines the specific allocation. He has the authority, upon consultation, to reallocate the funds among the departments. However, nearly all revenue from patient care remains in the divisions and departments that generate it; the Dean receives only a small fraction.

The Director of University Hospital reports to the VPHS, but also interacts directly with the university’s Regents through a separate Hospital Board of Governors. Collective or integrated action by the department heads and the University Hospital is fostered through the personal persuasion of the Dean and VPHS, and through a strong tradition of cooperation at the university.

The full-time faculty of UMMS is the medical staff of University Hospital, and department heads function as clinical chiefs of staff. Pressure to compete effectively in patient care increases with the need for cooperation among the departments and the hospital. University of Minnesota Clinical Associates (UMCA), an association of UMMS faculty who are clinical staff at University Hospital, was recently
formed to represent the faculty in negotiations with prepaid health care systems for referral care. UMCA's Board of Directors consists of department heads or their designees and the Dean. This arrangement continues the tradition of granting authority to department heads.

The School of Medicine is affiliated with several hospitals for clinical training of medical students. Major affiliates include the Veterans Administration Hospital and two county hospitals in the Twin Cities, Hennepin County Medical Center in Minneapolis and St. Paul-Ramsey Medical Center in St. Paul. The two county hospitals have excellent physical facilities and their own medical staffs, who are eligible for faculty appointments at the School of Medicine. The strong state and local support for medical care of the poor provides a sound financial base for these hospitals, and each competes well for Medicare and private pay patients as well as persons whose care is paid through Medicaid and state and local programs. These hospitals cooperate with the School of Medicine in training medical students but compete with University Hospital for tertiary patient care.

The entering class at UMMS is 200 students, more than 95 percent from Minnesota. That number represents a decrease of first-year class size from 240 since 1981. In addition, about 45 students transfer to the School of Medicine for clinical training after completing two years of pre-clinical instruction at University of Minnesota-Duluth. The reduction of matriculants was motivated by concern about excess physician supply and the budget; the academic quality of the applicants has remained high.

The clinical facilities of several affiliated hospitals, including those mentioned above, are necessary to provide clinical training for this large class of students. The affiliated hospitals view the students as important to the quality of their patient care and residency training programs; the state compensates them for each medical student trained. Each of the major affiliated hospitals has several residency programs; some residents are shared with University Hospital, and others are based entirely at the affiliated hospital. Residency programs at University Hospital generally are designed to train subspecialists, and less specialized training programs are at affiliated hospitals. A large Family Medicine residency program funded by state appropriations to the University of Minnesota is based primarily at affiliated hospitals.

Faculty of basic science and many clinical departments at UMMS carry out substantial funded research programs, and several departments have strong Ph.D. and postdoctoral training programs. The school has recently begun exploring possibilities for mutually beneficial relationships with biotechnology firms in the metropolitan area. These relationships would provide research support and foster cooperative research.
In summary, the UMMS has long been a center of excellence. There are now strong pressures on the faculty and the affiliated hospitals, especially the university-owned principal teaching hospital, to adapt to the competitive medical care market in the Twin Cities and the state. Fortunately, this pressure is not exacerbated by large financial losses in indigent care, because the state of Minnesota and its local governments are fairly generous funders of care for their modest-sized indigent population. The School of Medicine (through UMCA) and the University Hospital are participating in an HMO based in rural Minnesota and are negotiating to provide referral services to other prepaid care organizations. The challenge is to become competitive in this patient care market without compromising excellence in research and education.

RUSH-PRESBYTERIAN-ST. LUKE'S MEDICAL CENTER

Patient care has the position of primacy among the goals of Rush-Presbyterian-St. Luke’s Medical Center (RPSLMC) in Chicago. The philosophy of the Center is that service and education of health professionals must be approached conjointly in a single organizational structure and under common leadership if each is to have the desired effect on the other. There is a long tradition of medical education in the Center, but Rush Medical College (RMC), in its current form, is only 15 years old. Biomedical research was emphasized from the beginning in basic science departments but only recently in clinical departments. RPSLMC has always provided excellent clinical care, a financial incentive system that emphasizes patient care, and an organizational structure that allows the leadership to solve problems quickly and to capitalize on opportunities. A strong, centralized administrative structure has facilitated innovative responses to opportunities in the regional and local health care markets.

The original Rush Medical College was founded in 1837 and closed in 1942. It was reopened in 1971 as part of Rush University, which consists of the medical college, graduate school, nursing school, and college of the health sciences. The new university was built on the foundation of the prosperous medical center of Presbyterian-St. Luke’s Hospital. One of the motivations for reestablishing the school was to improve the hospital’s patient care. RPSLMC was fed for its first dozen years by Dr. James Campbell, who established the medical center’s strong integrated administrative structure.

RPSLMC, which is located in central Chicago, competes with five other medical schools to provide tertiary care services to the
metropolitan population. The Center is also regarded by many as their source of inpatient care, because they have associations with Presbyterian-St. Luke's Hospital that predate the reestablishment of the medical school. Although the Illinois Medicaid program is not very generous, RPSLMC is somewhat insulated from the pressures of indigent care by the presence nearby of Cook County Hospital.

The organization of RPSLMC is in two tiers, one of generalists and the other of specialists with clear functional responsibilities. The first tier contains the President of the Medical Center, who is chief executive officer of the corporation and President of Rush University and Presbyterian-St. Luke's Hospital. This tier also has a senior vice president and treasurer. All other corporate officers are in the second tier and have specific functional responsibilities that are different in scope from those of most medical centers. The Vice President, Medical Affairs, is also the RMC Dean and is responsible for all activities that relate to physicians. The Vice President, Administration, has responsibility for all materials and space, whether in the hospital, medical school, or other schools. The Vice President, Academic Resources, is Dean of both the Graduate College and the College of Health Sciences. The Vice President, Nursing Affairs, has responsibility for all nursing activities, including both education and practice. The Vice President, Prepaid Health Programs, is also President, Anchor Corporation. Other functional activities are organized under the Vice President, Finance, and the Vice President, Philanthropy and Communication.

RPSLMC's central administration is limited by rules that protect the individual faculty and other employees of the center. The central administration controls the financial resources of all the subsidiary units, including funds generated by the hospital, other care organizations operated by the corporation (such as the Anchor HMO), tuition, state funds for education, and some endowment. This centralized control allows the administration to build up chosen departments and reward those who are especially productive.

The central administration receives very little of the faculty practice income and exercises little control over its allocation. Having been only recently established in a large, existing medical center, the RPSLMC is deeply rooted in the traditions of independent practice. Largely as a consequence of these traditions, there are some 38 different practice plans, some with only one physician. The plans obviously follow department boundaries, and at least one department does not have a formal plan. Strong personal financial incentives are regarded as important for the efficient practice of medicine, and the handling of practice income reflects this tradition. The faculty practice plans are viewed more as conveniences for physicians than as
mechanisms for generating income for the school, but at least one of the school's leaders sees missed opportunities in this arrangement.

When it was recreated in 1971, the medical college established a tradition that department chairmen have tenure in their position until they reach the age of 65. This has caused some problems, and the new Dean has modified this tradition by specifying a five year contract for the department chairmen he has appointed.

Department chairmen have authority over all important matters of department management, with the exception of medical practice revenue, which varies across departments. However, the system generally encourages chairmen to exercise their entrepreneurial talent to the fullest extent. For example, the school provides a fixed amount of salary money, but the chairperson can hire as many faculty on soft money as he wishes.

Although it has deep roots in private practice, Presbyterian-St. Luke's Hospital provides a lot of tertiary services and is one of the premier teaching hospitals in the Chicago area. Many of its faculty act as private physicians of individual patients, and most of the Center's patients can pay for the services they receive. The quality of the nursing services is a point of particular pride. The occupancy rate of over 75 percent testifies to the success of the hospital in competing for patients in a very over-bedded city, where occupancy rates below 60 percent are common.

RPSLMC has some 17 affiliated hospitals, and it utilizes two for considerable parts of its teaching program. Christ Hospital is a prosperous suburban hospital that offers some tertiary services and is the home of the Rush Family Practice residency. Mt. Sinai Hospital, in a low income neighborhood nearby, is used both for undergraduate teaching and as a site for the Pediatrics residency program operated jointly with Rush.

Rush Medical College is primarily concerned with the training of practitioners. Its students have about average MCAT scores, and about 90 percent come from Illinois. The size of the applicant pool is drooping, but more slowly than the national rate. The quality of applicants is unchanged, perhaps because of the Center's growing reputation.

Rush has begun an initiative or experiment in education during the pre-clinical years, using a sample of the first year class. The program is based on self-study of case materials followed by small group discussions to explicate the basic science issues related to the case. A longitudinal evaluation of the program is being planned with the regular students as controls. The initiative for the experiment came from the office for undergraduate education.
As might be expected, RPSLMC has developed a graduate medical education program on its large patient base of fairly well-insured people. The strong emphasis on patient care as the first priority, together with the orientation toward the independent practitioner and the small indigent patient population, means that residents are more closely supervised than is typical of academic medical centers. This is true in PSLH as well as in the affiliated hospitals that are central to some of the specialty training programs.

Research is seen as an important component for ensuring the hospital's reputation for tertiary care. In part because of Dr. Campbell's view that Ph.D.s (rather than M.D.s) were the appropriate people to do research, the research tends to be concentrated in the basic science departments. Several of the clinical departments have hired Ph.D.s to work in their departments. The number of M.D.s in research is growing, but the reward system does not favor them over other clinical faculty who are excellent teachers or clinicians but who have no research credentials.

Although the physical plant of RPSLMC is large and modern, there appears to be a shortage of research space, which some faculty regard as a constraint on growth in research and research training. The basic science departments have better research facilities than the clinical departments, reflecting the priority given to the former during the 1970s and early 1980s. However, the success of the basic science research effort has led to space shortages there too.

Center resources have been targeted to build up the basic science departments by improving research facilities. The department chair is of course responsible for selecting faculty who are capable of obtaining extramural research funds and choosing a growth strategy. In biochemistry, for example, the departmental program was built around work in a single research problem area (arthritis). The Chairman hired only people who had done work in the area, but in doing so, he was still able to cover the major subspecialty areas in biochemistry. This concentration enabled him to focus his fund raising and develop a fine reputation.

Recently, RPSLMC entered into a joint venture with the University of Illinois to create Chicago Technology Park, a not-for-profit corporation designed to stimulate high technology ventures in medicine and biotechnology. About a year ago, construction was begun on the Park's new research center, which is being funded by the state.

As part of its effort to increase its patient base, RPSLMC has engaged in several innovative efforts. It founded the Anchor Health Maintenance Organization in 1971 for its employees. This HMO, which was one of the first to be established by an academic medical
center, is a separate company that reports directly to the President of RPSLMC. It now has about 120,000 people enrolled and has enjoyed steady growth. RPSLMC has also founded a corporate health center to provide services (e.g., physical examinations, wellness programs) to firms in the financial district and several industrial clinics. It is in the planning phase for a preferred provider organization and a new prepaid system based in physicians' offices.

In summary, Rush Presbyterian-St. Luke's Medical Center accomplishes its primary goals of excellent patient care and teaching by means of a corporate management system that centrally controls resources and applies them strategically. It rewards entrepreneurs at the department and individual levels. The university's operations are integrated with the medical center to a greater extent than is usually the case. The practice plan and the faculty reward structure encourage clinical activity and teaching, rather than treating these goals as of less value than research. Although its research enterprise is of moderate size, its efforts are being crowned with extramural support. The importance of individual entrepreneurs is apparent even in curriculum reforms, which appear to be the work of dedicated individuals rather than the more usual committee.

UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT DALLAS

The University of Texas Southwestern Medical School has risen from very modest beginnings in the 1940s and 1950s to a place of national prominence. Its academic reputation has grown steadily since the early 1960s. The physical facilities of the University of Texas Health Science Center at Dallas are modern architectural showpieces, and Parkland Memorial Hospital is attractive for a county hospital. There is ample evidence that the Center has benefited from generous state funding, which not only paid for many of its buildings but buffered the clinical faculty from the low revenue potential of a county hospital with a large indigent patient burden. Although the state's generosity clearly facilitated its accomplishments, Southwestern's success also appears to owe much to the vision and direction of its early leaders, who were committed to high academic standards.

Southwestern Medical College, founded in 1943 as a private institution, became part of the University of Texas system in 1949. In the early 1950s, its educational facilities comprised a few dilapidated buildings and quonset huts; Parkland Memorial Hospital was antiquated. Oil revenues provided the funds for much of the entire University's—
not just Southwestern's—major building program, and Dallas's vigorous economic growth enabled the county to rebuild Parkland Memorial Hospital on a new site in 1954. Moreover, the medical school's growing reputation and the political effectiveness of its leaders at the state and local levels also appear to have improved its appropriations.

As it upgraded its physical plant, Southwestern—most notably, the Chairman of the Department of Medicine—followed an unusual course in pursuit of academic excellence by filling faculty and administrative positions from the cream of its own graduating classes. Outstanding medical students were selected and counseled regarding the training they should take to enable them to achieve their potential in academic medicine and biomedical research. In most cases, this meant that they were advised to obtain training elsewhere at prestigious institutions, but each was promised an attractive faculty appointment at Southwestern if he completed the prescribed plan. Among those who followed this course are the current Dean, the Administrator of Parkland Hospital, and a 1985 Nobel laureate. Another extraordinary characteristic of Southwestern is the continuity in some of its key leadership positions. Donald Seldin became Chairman of Medicine in 1952; Charles Sprague became Dean in 1967 and subsequently President of the Health Sciences Center when it was founded in 1972.

As in most medical schools, academic excellence occurred unevenly across departments. Medicine led the way, and as a condition of turning down prestigious offers elsewhere, its chairman obtained a commitment from the parent university administration to invest what was needed to develop first rate basic science departments. At present there appear to be no weak departments; a few are clearly outstanding.

Southwestern operates in a fiscal environment of stark contrasts. On the patient care side, the state legislature provides meager support for Medicaid, but the county is quite generous in its funding of Parkland Hospital and the care for its indigent population. County funds are provided almost exclusively for hospital costs, and little is available to reimburse the faculty physicians for the care they render. The state has historically provided generous support as well as capital building funds, but recent legislation calls for raising tuition sharply—to among the highest in the country for nonresidents. The faculty has been quite successful in competing for federal, state, and private research funds. This is fortunate because of limited opportunities for faculty to augment salaries from clinical earnings.

Southwestern enjoys considerable autonomy within the larger University of Texas system, and its internal governance system appears to be well suited to its environment. With respect to medical

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school matters, the President has delegated much of his authority to
the Dean. The Dean selects department chairmen and allocates space
to departments. He also has well-established (and recently exercised)
authority to remove chairmen.

During their tenure, department chairmen have considerable auton-
omy. They receive a lump sum amount of state funds for department
salaries from the Dean and are free to allocate that as they choose.
They can set individual faculty salaries within broad limits, and they
determine the structure of the faculty practice plan. For example,
some practice plans fix salaries at the beginning of the year; others
have a fixed component and a variable component that depends on the
amount of practice earnings the faculty member generates. The
department chairman is also permitted to accumulate reserves over
time.

Parkland Memorial Hospital is widely respected for the quality of
care its staff provides, but it is not a place where the middle and upper
income strata go for care, except for trauma and a few highly special-
ized tertiary care services. The major teaching program at the VA
Hospital further emphasizes the medical school’s concentration on care
for indigent patients. To be sure, the other three major teaching hospi-
tals have predominantly full pay patient populations (Children’s Medi-
cal Center, St. Paul Hospital, and Baylor University Hospital), but the
size and scope of those teaching programs are much smaller than pro-
grams at Parkland.

Southwestern is trying to change its patient mix somewhat by build-
ing a small adjoining private hospital that will be managed in coopera-
tion with Parkland but limited to referred patients. This represents an
important addition to the Medical Center’s heretofore successful strate-
gy, which encouraged the full-time faculty to concentrate on research
and indigent patient care and kept them largely out of referred-patient
care. There is some anxiety that this move might affect the research
focus of the faculty and create “town-gown” problems. However, con-
cern over maintaining a balanced teaching program and generating an
on-campus outlet for specialists whose practices need referred patients
for academic or salary-supplementation reasons have taken precedence;
a firm decision to maintain an undiminished commitment to research
and to Parkland Hospital has allayed much of the anxiety.

Southwestern’s undergraduate medical education program follows a
fairly traditional curriculum and has a good reputation. State law
requires that 90 percent of each admitted medical class must be Texas
residents, and the school is very competitive with the state’s other
schools for resident applicants. The 19 out-of-state residents admitted
to the 1985–86 class were selected from an applicant pool of 810, hence
have outstanding academic credentials. The low tuition ($300 per year for residents, $900 per year for nonresidents) at Southwestern and Texas' other public medical schools has attracted high quality out-of-state applicants and kept many of the academically best-prepared state residents from electing to attend prestigious private medical schools outside the state. However, if a legislatively mandated increase of tuition to upward of $5000 for residents and $20,000 for nonresidents is implemented, it could greatly reduce the academic quality of the applicant pool, hence the medical student body.

Southwestern attracts high quality house staff because of its prestige in biomedical research, its excellent clinical facilities, and the high level of patient care responsibility that residents have in its major teaching hospitals. Residents who wish to pursue academic careers are attracted by the school's research reputation, well-funded fellowship and postdoctoral programs, and an NIH-funded M.D.-Ph.D. training program.

The Center has a Graduate School of Biomedical Sciences with its own dean, but its faculty also have appointments in the medical school, which passes on their tenure. The Center's leaders would like to improve the quality and increase the size of the basic science graduate programs. However, they regard it as a disadvantage not to have an associated undergraduate college as a "feeder" source.

Southwestern is trying to use its biomedical research strength to develop joint ventures in the private sector, which will generate income to support its academic programs. This effort, which is akin to those of some other research-intensive medical schools, reflects the pragmatic, entrepreneurial spirit of the Center's administrative and research leadership. However, it is still too soon to judge how effectively Southwestern can translate its success in competing for traditional research grants into contractual and other relationships with for-profit institutions in order to generate discretionary income.

In summary, the University of Texas Southwestern Medical School has effectively pursued the goal of academic excellence and risen within three decades from obscurity to a place of national prominence. Although its major teaching hospitals have not afforded much opportunity for its clinical faculty to generate patient care revenue, generous state appropriations have provided a good "hard money" base allowing faculty to concentrate on research and compete for grants. This state funding and the school's effective political leadership at the local level have turned the county hospital-based clinical training program from a liability into an asset. Southwestern has followed an unusual strategy of building its leadership from within. The success of this strategy and the overall success of the school undoubtedly owes much to the extraordinary vision and continuity of its early leadership.
UNIVERSITY OF UTAH HEALTH SCIENCES CENTER

The University of Utah Health Sciences Center (UHHSC) has a highly integrated organizational structure, which is well suited to respond to opportunities for new initiatives. Despite the degree of centralized control that the Vice President of Health Sciences can exercise, a great deal of authority is delegated to the medical school dean and to department heads. Indeed the successes of the school and the center owe much to the effective manner in which departmental and individual entrepreneurship have been promoted. With only modest state funding, UHHSC has had to develop a strong position in a very tight market, where it must compete with a large, integrated health care corporation.

The Salt Lake City location makes UHHSC seem unique in some respects. The history and the large Mormon population in the city influence the cultural as well as the religious character of the city and provide an uncommon degree of community cohesion. However, outsiders may easily overstate the uniqueness of the location and this influence on the health care market.

The University of Utah School of Medicine (UUSM) was founded in 1905 as a two-year school and was expanded to four years in 1943. At that juncture, the state and the school faced a major decision of whether to close what was viewed as a marginal educational enterprise or to try to develop a high-quality four-year school. In effect, the state agreed “to permit” the expansion and upgrading. Unable to provide much funding for these purposes, the state allowed the school considerable maneuvering room to generate resources through its own devices. Bureaucratic constraints were minimized, and the entrepreneurial patient care and research development activities were strongly encouraged.

The Center is located on the campus of the University of Utah campus in the foothills near downtown Salt Lake City. It includes the schools of nursing, medicine, health, and pharmacy; health sciences library and several centers for special studies; and the University Hospital. Major affiliated teaching facilities of the Medical School include Latter Day Saints Hospital and Primary Childrens Hospital (both owned and operated by Intermountain Health Care, Inc.) and the Veterans Administration Medical Center. UHHSC is adjacent to a large research park, which houses several private companies that are involved in joint ventures with the University.

The organizational structure of UHHSC centralizes responsibility in the office of the Vice President for Health Sciences (VPHS). Four deans report to him (Medicine, Nursing, Pharmacy, and Health), along
with various institute or center directors and the Executive Director of University Hospital. University Hospital has a board of directors of which the VPHS is chairman. The governance and operating structure of the Center is undergoing change as it develops ways to facilitate the commercial development of basic and applied research taking place in the Center and to exploit service capabilities profitably.

The Medical School is still in a growth phase; a good deal of faculty recruitment is taking place and research funding is increasing. The school has 541 full-time equivalent faculty. State funding, which accounts for only about 16 percent of revenues, comes to the school in a single appropriation (not identified for a specific use). This provides maximum flexibility in the internal allocation of “hard money.”

The dean apportions these state funds to each department without earmarking and controls the allocation of space. The Dean has apparently used the small amount of available state funding selectively to nourish specific areas, rather than allocating monies evenly across the departments. The Dean’s authority is not limited to his control over budget allocations and space. He appoints chairmen for indefinite terms with definite reviews and is capable of removing them for poor performance. Additionally, tenure decisions lie largely outside the “home department.” Both of these mechanisms provide considerable opportunity for the Dean to remove “dead wood” and to structure incentives that encourage and reward performance in support of center goals.

Chairmen have a good deal of managerial autonomy within their departments. Each department has its own separately organized and managed practice plan, but all are subject to university audit and control procedures. However, the Dean retains only 2 percent or 4 percent of revenue depending on type of plan chosen by department (7 percent is charged for billing). As an example of departmental autonomy, there is a clinical faculty track that is recognized by the University and is used by some chairmen but not others. Faculty salaries across all departments average 50 percent guaranteed base and 50 percent incentive (based on research or patient care productivity).

UHHSC serves the health care market of the intermountain region (approximately a tenth of the land area of the United States) rather than just Salt Lake City or the State of Utah. In this area there are two major players: Intermountain Health Care, Inc. (IHC), formed when the Latter Day Saints church got out of owning hospitals and turned them over to IHC; and the University of Utah Hospital. Approximately 20 to 25 percent of the Salt Lake City population is currently enrolled in HMOs or PPOs. Most community physicians are reported to be working at about 75 percent of the capacity of last year.
Utah has the lowest average length of inpatient stay in the nation; the average hospital occupancy rate in the state is 55 percent. Medicaid pays for inpatient care according to a DRG-based formula, which averages about 70 percent of charges for University Hospital.

University Hospital operates fairly autonomously with regard to the university. The hospital receives only 3 percent of its budget from the state, which accounts for about 80 percent of the direct cost of graduate medical education. The state funded the major share of construction of a high-quality physical facility (both hospital and center), consequently the hospital has a minimal long-term debt. The strategy of the hospital is to position itself as a main provider of tertiary care in the intermountain region.

The major affiliated teaching hospitals of the UUHSC are the Veteran’s Hospital, LDS Hospital, and Primary Children’s, the last two of which are owned and operated IHC.

LDS Hospital is larger than University Hospital and regards itself as a strong competitor of University in providing such tertiary care services as open heart surgery. Because it is the flagship of IHC, LDS has a natural referral base of all other IHC hospitals located throughout the intermountain region, facilitated by its close association with the LDS Church. LDS believes that it needs the university affiliation to accomplish its teaching mission (a very high priority) and as a mechanism to attract high-quality subspecialty physicians to its staff. Competition and collaboration among the two hospitals is a delicate balance. The first formal affiliation agreement between the two institutions was signed only last year.

Primary Children’s Hospital (PCH) serves as the primary pediatric referral hospital for the entire intermountain region. Its nearest competition is in Boise (Idaho) and Denver. The hospital’s occupancy rate (1985) averaged 85 percent, compared with 45 percent for children’s hospitals nationwide. Negotiations have been completed and construction has begun on a new autonomous 200-bed PCH facility on the UUHSC campus. The two facilities have operated with a very high level of collaboration and cooperation for some time. An affiliation agreement has been in effect since 1977. The Chairman of Pediatrics at UUHSC is medical director at Primary Children’s; all chiefs of service at the hospital plus all physicians in the Pediatric Department must have University appointments. PCH operated a totally integrated residency program with the Medical School.

The UUSM enrolled 100 new medical students in 1985, 81 from Utah and 19 from out of state. The school is required to admit at least 75 Utah residents each year, but the number usually exceeds the minimum because of the academic quality of in-state applicants (which
is attributed to the high status of medical careers and an emphasis on education in the Mormon culture). The school also has a special agreement with Idaho and Wyoming to accept five and 10 students. The school had plans to expand class size to 150 entering students, but those plans have been shelved.

UUHSC has a large graduate medical education program relative to its size. It is able to compete well for residents, particularly in programs that are integrated across major affiliates.

UUHSC is now the “jewel in the crown” of the University of Utah as regards research. Fully 52 percent of the university’s grant revenue is generated by this one unit. The center has one of the original nine recipients of major grants from the Howard Hughes Medical Institute and was an early leader in human genetics research. Recently, the Center gained international recognition for its work in artificial heart design, development, and implantation.

UUHSC was among the first academic medical centers to take the initiative to enhance cooperation between private companies and faculty researchers. Adjacent to and owned or controlled by the University is a “research park” that currently houses 37 companies. This park provides the site and package of incentives for faculty to develop new ideas commercially.

UUHSC has also taken a very entrepreneurial approach to patient care. The hospital’s entrepreneurship is reflected in the contracts it has negotiated to provide tertiary care to local and regional prepaid health care plans. To sustain and augment its ability to deliver primary care to low income populations on state contracts and to strengthen its position in Salt Lake City’s primary care market, the Center has received a $1.2 million grant from the Robert Wood Johnson Foundation to develop a health maintenance organization (“UCare”) as a joint venture with Blue Cross/Blue Shield.

In summary, geographic isolation, a spectacular setting on the bench of the Wasatch range, a demographic composition characterized by youth, and a dominant local religion combine to make the UUHSC environment unusual, but UUHSC also has dealt effectively with many of the problems that pervade the academic medical community. In the absence of generous state funding, UUHSC has made the most of an organizational structure facilitating incentive systems that promote entrepreneurship.

THE WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

The Washington University School of Medicine (WUSM) was formed in 1899 with the union of the first two medical schools estab-
lished west of the Mississippi River: the St. Louis Medical College and the Missouri Medical College. Today, its modern physical plant includes the Edward Mallinckrodt Institute of Radiology, the Howard Hughes Medical Institute, the Irene Walter Johnson Institute of Rehabilitation, and the Biomedical Computer Laboratory. The school has had several Nobel Laureates serve on its faculty. It has been one of the country's top research institutions for at least five decades.

The Washington University School of Medicine is part of the Washington University Medical Center (WUMC), a confederation that also includes Barnes Hospital, Jewish Hospital, Children's Hospital, Barnard Hospital, Washington University School of Dental Medicine, and the Central Institute for the Deaf. Most of the Center's buildings are modern and are located in a neighborhood that is becoming increasingly attractive. All of the Center's hospitals are private nonprofit entities. They have been well supported by the community, but they receive no direct government subsidies. The Medical Center is one of St. Louis's most prized institutions, and many prominent people in metropolitan St. Louis have contributed generously to its buildings and to the endowments of its various components.

WUMC is located two miles from the other campus of Washington University in a part of St. Louis that was central city, a considerable distance from the suburbs that have prospered during the past two decades. The Center's hospitals rely heavily on full pay patients for their livelihood, so they depend on their prestige and reputations of high quality patient care to attract patients. The wealthy of St. Louis come to WUMC for their patient care, and the Center receives tertiary care referrals from throughout the region.

Although St. Louis has a large number of empty hospital beds and a high ratio of physicians to its population, WUMC does not appear to have felt a great deal of competitive pressure as yet. Neither does there appear to be much "town-gown" tension. This is probably because many of the city's private physicians play a major role in the Center's teaching and patient care. Moreover, because the full-time faculty have traditionally accorded biomedical research top priority and have limited themselves largely to tertiary care consultations, there has probably been little actual competition for patients with the city's private physicians.

The Washington University School of Medicine and its three major private hospital affiliates have been extraordinarily successful in
raising building and endowment funds. Their national reputation has clearly contributed to that success during the last decade or so, particularly in obtaining funding from large pharmaceutical and medical technology firms. But this cannot fully explain the longstanding generosity of local benefactors. For many years St. Louis's most successful citizens have served on one or more of the boards of the Centers' institutions and contributed generously of their money and business acumen. There is a clear sense that the city's civic leaders have adopted these private institutions and made an unwritten commitment to their financial health.

The leadership of WUMC has fostered this adoption over the years. The current Chancellor of the University, Dr. William Danforth, was formerly Vice Chancellor for Medical Affairs and is a member of one of the city's most prominent families. The senior faculty see that their capacity to preserve the school's research-oriented tradition depends on their entrepreneurial ability as well as their scientific productivity.

The WUMC comprises independent corporate entities, and its governance is a loosely linked confederation. Many of the Center's buildings are connected physically, but that probably gives a false impression of organizational cohesion. The Center has thrived on autonomy at many levels, within and between its component institutions. The WUMC has its own board of directors, headed by the University's Vice Chancellor for Medical Affairs and comprising members of the boards of the seven constituent organizations. The WUMC board has made important decisions in the past that have required considerable resource inputs, but to obtain these it has had to assess the member organizations. Major decisions require consensus, but that has apparently been achieved with ease in the past.

Governance of the Washington University School of Medicine allows for extraordinary subunit autonomy, which cannot be explained by the corporate independence that may account for the WUMC confederation. The school's major decisions are made by an "Executive Faculty," which meets monthly and comprises all the academic department heads plus three elected members. The Dean presides over this Executive Faculty, and he is also elected annually by a vote of its members. The committee approves all faculty appointments and promotions, curriculum changes, and all policy matters. Conflict within the committee is minimized; a measure of this is that the current dean's tenure is the longest in the United States. When a potentially contentious issue arises, the interested parties try to, and usually do, resolve it before bringing it to the committee.

Department heads have a great deal of autonomy within this system, particularly in the use of financial and space resources. Department
clinical practice income is "taxed" by the central administration, but the Dean reallocates much of this revenue back to the department that generates it, along with funds from tuition and other "hard money" sources. The departments are permitted to retain financial reserves and to raise endowment and other special purpose funds. The department heads submit their department salary budgets to the Dean for approval, but disapprovals are rare. The chief limitation on departmental autonomy is the requirement that an interdepartmental committee approve all faculty personnel decisions. However, this is viewed as a mechanism for maintaining the school's high research standards.

WUMC's hospitals have almost 2000 beds among them. Each has a region-wide reputation for high quality tertiary care and is regarded as having first class graduate medical education programs. Their relationships with the medical school are set forth in legal contracts of long duration, over 50 years in the case of Barnes. The hospitals depend on private physicians (volunteer faculty) for a large proportion of their admissions, and their status within the Center is high relative to many other tertiary care centers. The physical facilities of these hospitals are a mix of modern and recently refurbished older buildings; St. Louis Children's Hospital has a completely new building. Although Children's has suffered from low occupancy rates in recent years, as have many other children's hospitals, Barnes and Jewish have maintained rates well above 80 percent. Competition with suburban hospitals is strong for paying patients, but the Center's hospitals appear to be maintaining a strong market share.

WUSM maintains limited affiliations with the St. Louis Regional Medical Center and with the Veterans Administration Medical Center, but the indigent patient populations of Jewish and Barnes are small for major teaching institutions. There is only a moderate adverse effect on WUMC because of Missouri's low reimbursement for Medicaid.

Washington University draws its medical school class from a national applicant pool, competing with the country's other top medical schools for the most academically qualified applicants. Although it admits students from each region in roughly equal proportions, each class tends to have larger proportions of students from the central region, because of the predisposition of applicants from other regions to prefer medical schools closer to their homes. WUSM has a strong combined M.D.-Ph.D. program, hence attracts many research-oriented medical students.

WUMC graduate medical education programs attract top graduates from around the country, a large proportion of whom plan careers in academic medicine. The large patient base and the Center's research reputation are major attractions. Many clinical fellows come to the
Center to take advantage of its strong subspecialty training programs and heavy emphasis on tertiary care.

WUSM has pursued research excellence as its first priority for many years, and the payoffs have been substantial. It is a major recipient of NIH funding, but its success in obtaining private research funding has been even more impressive. The school was in the forefront of academic medicine's efforts to forge constructive relationships with large pharmaceutical and medical technology firms. Funding from Mallinckrodt and Monsanto are only the most prominent examples of WUSM's success in this area.

Although the academic departments have a great deal of autonomy, there appears to be an unusually high degree of research collaboration across department lines. Researchers from different clinical departments frequently work together, as well as with basic science faculty. Although basic science graduate students are accepted for study in a particular department, the Ph.D. degree program is integrated over all departments. The doctoral students work under the direction of the faculty whose research is closest to their interests.

The structure of WUMC encourages entrepreneurship of a decentralized nature, and there are many examples of successful ventures by individuals and organizational subunits. However, the Center has also demonstrated a capacity for unified action. It decided to form a prepaid health care organization well before HMOs had begun to experience rapid growth; a large insurance company has recently entered into a joint venture to market this prepaid plan nationally. Perhaps the most impressive example of long-range planning and concerted action was the WUMC board's decision to form a redevelopment corporation to protect the neighborhood around the Center from the urban blight that had struck much of the central city. Starting with modest financial capital but considerable business acumen of board members, the corporation began to buy, refurbish, and then sell buildings in successive rings around the Center's core. By doing so, WUMC has protected itself from the decay of its immediate neighborhood, which could have made its hospitals unattractive to the private paying patients on whom its livelihood depends.

In summary, Washington University Medical Center has successfully sustained its long-term commitment to biomedical science. It has also continued to solidify its financial position, despite its location in a seemingly harsh environment. Clearly, WUMC's substantial human and financial resource endowments helped to insulate it from the economic problems that afflicted St. Louis in the past, the severe competition for biomedical research funds, and the competition in the local medical marketplace. But their success also owes much to effective use
of these resources and strategic decisions that anticipated problems and opportunities. The highly decentralized nature of the formal governance system seems peculiar, particularly in light of the concerted initiatives that WUMC has been able to undertake, but it has clearly passed the tests of the last two decades.
V. RESULTS

We believe this admittedly limited study provides a basis for cautious generalizations about broad organizational strategies that are likely to contribute to the future "success" of academic medical centers. Rather than belaboring each of our results with caveats, we have organized them under two headings. The first contains those we are confident enough to label lessons. For these we believe we have seen enough evidence across the six centers to conclude that these lessons are not a sampling artifact and that there is a reasonable basis for inferring causality. These are not lessons that we presume to be "teaching" but rather ones we believe can be learned from the way the six centers in our study confronted and resolved problems.

Under a second heading is a discussion of findings on the basis of which we—but not necessarily others—are unwilling to draw causal inferences. Indeed, some of the centers may regard the findings as more central to their success than items listed as lessons.

We acknowledge the inherent limitations of case study methods in general, and the particular limitations of brief studies of only six centers out of a population of 122.\(^1\) We have dealt with this limitation by moving a potential "lesson" to a finding if we believe it might be sensitive to the particular sample of institutions we studied or the limited information we were able to obtain. We also recognize our study might arguably be called a study at one point in time—a cross-sectional study that precludes inferences about causation. We have dealt with this by obtaining as much longitudinal information as possible from our interviews—e.g., how a particular problem was solved as a result of a particular action or how that problem could not be solved without the removal of a particular impediment. Here again, a conclusion was classified as a finding if it did not pass our subjective assessment that we could not judge some causal linkage to success from longitudinal information.

LESSONS

We have distilled seven lessons from the six centers' successes that we believe can help other AMCs cope with environmental problems

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\(^1\)This population includes only four-year medical schools in the continental United States and Hawaii, with their major teaching affiliates.
and still achieve their objectives. Academic medical centers differ considerably in the emphasis they place on particular goals within the broad categories of education, research, and patient care. Their interest in and ability to pursue certain goals depend on such factors as institutional history; local and state politics; the local economy; and their human, physical, and fiscal capital endowments. Recognizing this diversity in goals and capabilities, we present lessons as basic principles, the pursuit of which is conducive to success, and not as detailed prescriptions.

**Entrepreneurship**

Entrepreneurship enables an organization to take advantage of the opportunities and deal with the stress presented by its environment. To some in academic medicine entrepreneurship has a negative connotation, because it implies that financial gain should be the first priority. That is not the sense in which we use the term. Rather we emphasize its activist connotations: organizing, managing, promoting, assuming the risk for an enterprise or an activity. We find numerous examples of the past and present importance of entrepreneurship in the success of each of the six centers we studied.

In the best of circumstances, entrepreneurship is observed at many levels in a center: the individual faculty member, the academic department, the teaching hospital, the medical school, the center-wide leadership. At each level individuals and groups need to respond opportunistically to the resources that are available in the environment at any particular time. This does not imply that long-run goals should be sacrificed to short-run expedients, but it does require attitudes and behavior that make the best of the current changing situation.

The benefits of entrepreneurship are evident in research and education programs as well as in patient care. A few examples illustrate its importance.

- The Washington University School of Medicine, anticipating the decline of its surrounding neighborhood, created a redevelopment corporation to buy, refurbish, and sell the buildings in an expanding circle around its academic buildings and hospitals. Starting with very modest capital resources but

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2Entrepreneur comes from the French verb *entreprendre*, to undertake. Webster defines an entrepreneur as “the organizer of an economic venture, especially one who organizes, owns, manages, and assumes the risk of a business . . . one that organizes, promotes, or manages an enterprise or activity of any kind.” *Webster’s Third New International Dictionary*, Unabridged, G. & C. Merriam Company, Springfield, 1961.
considerable business expertise of its directors, the corporation reinvested the proceeds of each sale to expand its corridor to the point where the Center is well insulated from the urban blight that would otherwise have gradually made its hospitals unattractive to paying patients.

- The University of Texas Health Science Center at Dallas has obtained a large multi-year grant from the Hartford Foundation to foster joint ventures with private corporations in the biotechnology area and, in cooperation with community business leaders, established a for-profit technology transfer company that was initially capitalized at $12 million. This is designed to serve the dual role of providing researchers the means for exploiting the commercial potential of their discoveries while remaining on the faculty and generating discretionary revenue for the Center.

- Rush-Presbyterian-St. Luke's Medical Center established an HMO as a separate company within the corporate structure of the medical center in 1971, some years before such ventures were popular. It has now grown to an enrollment of 120,000 and is a model for the entry of academic medicine into prepaid care.

- As an example of departmental autonomy, there is a clinical faculty track that is recognized by the University of Utah Health Sciences Center and is used by some chairmen but not others. Faculty members in this track assume major departmental burdens in education and patient care but are not expected to do the substantial amount of research that would be required for promotion in the regular faculty track. These clinical faculty also generate income for the department through the faculty group practice.

Apart from these examples, the most successful faculty members in each center are usually also effective entrepreneurs. They have assumed responsibility for promoting their research interests and obtaining funds to support them; they have not been reluctant to enter new areas or to accommodate to funding realities imposed by the outside world.

**Governance**

The most effective governance systems strike a delicate balance between promoting independent initiative and facilitating coordination of center-wide activity and collective action. Although this statement
seems obvious, it is problematic to achieve consensus within a center regarding when the balance has been achieved or how best to restore it when it has been disturbed. Independence can readily be promoted at the medical school level by granting autonomy to department heads in important areas (e.g., setting the structure of the practice plan, allocating space, setting faculty salary levels), and all six centers we studied characterized their department heads as having considerable autonomy. It is more problematic to place sufficient unobtrusive restrictions on departmental autonomy to facilitate concerted action that enables a center to respond positively to the stresses and opportunities of its environment.

It would be foolish for outsiders to try to specify an optimal authority or governance structure for any particular center, much less for all centers. Governance is inevitably affected by institutional culture and history, the importance of which outsiders cannot easily assess. Certain seemingly innocuous steps that facilitate a collective response to market opportunities come to symbolize the loss of departmental autonomy. For example, central billing for professional services offers economies of scale and is conducive to, if not essential for, a center’s negotiating contracts with prepaid health care systems or preferred provider organizations; yet departments have bitterly resisted central billing in more than one center because of perceived threats to autonomy. In other instances, department heads have insisted that the central administration not be permitted to inspect or audit the accounts of their practice plans, even though they are required to provide a percentage of net earnings to support the medical school-wide budget.

It is generally more difficult to organize and coordinate collective action involving both the academic departments and teaching hospitals than action that involves departments alone. In most academic medical centers, the principal teaching hospital is a separate corporate entity, which is not subordinate to a center-wide chief executive officer (CEO). Such autonomy makes center-wide coordination of many patient care programs inherently difficult. Even when the principal teaching hospital is subordinate to the center’s CEO, conflicts between objectives of hospital administrators and those of department heads or the dean often inhibit the development of a center-wide response.

Footnote: Three of the six centers we studied—Minnesota, Rush, and Utah—have principal teaching hospitals that report to the CEO of the center. We use the term “principal” to refer to a hospital that clearly provides the most important clinical teaching facilities; in a few centers, it is impossible to identify one such hospital. Almost all AMCs have at least one “major teaching hospital” that is formally entirely autonomous. Its CEO does not report to the same authority as does the medical school.
At least for the next decade, effective governance will probably require the loss of some subunit autonomy in most centers. By contrast, greater subunit autonomy was a positive factor in dealing with many of the opportunities of the 1970s and early 1980s. In the last decade and a half, the departmental group practice plan grew to be a major revenue source for academic medicine, and it was generally exploited by increasing the autonomy of the clinical departments, often at the expense of the central administration. During this period, many medical schools with “strict full time” faculty had to imbue their academic clinicians with the importance of generating income from their patients to support their own salaries and the broader objectives of their departments. Schools with largely “geographic full time” faculty had to bring these quasi-independent clinicians into group practices that would generate enough surplus revenue to support departmental programs. Some small portion of the net income from practice plans was almost always set aside for center-wide activities, but this sometimes gave departments a sense that they were supporting the school rather than vice versa.

Similarly, many teaching hospitals developed a sense of independence that sometimes bordered on alienation from the medical schools with which they were affiliated. They saw their occupancy rates and their costs much affected by the clinical faculty’s delivery patterns and the medical education programs. However, they often were insulated from these effects by cost-based reimbursement and charge paying patients. Only very recently have prospective payment, the growth of HMOs, the negotiation of preferred provider contracts, and the growing cost consciousness among consumers and payers created a pressing need for coordinated responses by teaching hospitals and clinical faculty to the medical care market.

The need for coordination has also increased in the biomedical research area, across basic science departments, and between basic science and clinical departments; and it has done so because of both scientific and funding realities. Although during the 1980s a vocal minority has been arguing that the traditional basic science departmental boundaries are not conducive to effective undergraduate medical education, there is now general agreement that departmental distinctions have little meaning at the frontiers of biomedical research. Thus, basic science doctoral students and, to an even greater degree, postdoctoral fellows cannot be effectively compartmentalized into the

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4In this context, we use the term “subunits” broadly to include both the major organizational elements of an AMC—teaching hospitals, the medical school, major research institutes—as well as consistent parts of these organizations—academic departments, divisions within departments, etc.
traditional basic science disciplines. The basic science content of “clinical” biomedical research has increased to a point that it is difficult for physician researchers to get grants without earning a Ph.D., having extensive postdoctoral training in basic science, or having a basic scientist collaborator.

The University of Utah Health Sciences Center has a formal organizational structure and established lines of authority that greatly facilitate its responding to new opportunities. The principal teaching hospital administrator and the medical school dean report to a single center-wide vice president. The dean has well-established authority with regard to the selection and removal of department heads who undergo rigorous five-year reviews (see below under “Tenure”). Yet department heads have considerable authority over the allocation of resources.

The central administration of the University of Texas Health Science Center at Dallas also has similarly well-established authority over department heads in matters that affect the whole center, but departments enjoy autonomy in other matters. Unlike its Utah counterpart, the Vice President at the University of Texas Health Science Center at Dallas has no direct authority over the principal teaching hospital, which is not owned by the university. Nonetheless, this teaching hospital and the medical school seem to have a well-established pattern of consultation and concerted action.

The governance systems of the other centers vary considerably on the dimensions of central authority. The Washington University School of Medicine gives what appears to be the least formal authority to its central administration. All its teaching hospitals are independent corporate entities, and the dean is elected for a one-year term every year by the Executive Faculty, composed mainly of department heads. Hence, governance is of necessity by consensus, which seems to have been achieved with surprising ease in the past. However, the Washington University School of Medicine is currently in the midst of a self-study of governance, in part because they are concerned that the circumstances enabling them to achieve consensus in the past may not persist in the future.

In many ways, Rush-Presbyterian-St. Luke’s Medical Center has a governance system that seems well suited for developing and implementing center-wide initiatives. However, two historical factors inhibit the freedom of the central administration. One is the tradition of tenure for department heads up to the point of their retirement. The other is a strong history of private practice academic medicine that has resulted in some 35 independent faculty practice plans. Both can impede change, the former because of resistant departmental leadership and the latter because of the difficulty of coordination.
The constraints imposed by the parent university are sometimes cited as problems for an academic medical center. However, we heard almost no complaints of such problems in the centers we studied. Perhaps this is an artifact of our particular sample, which included one free-standing institution and another remote health-sciences-only campus of a large university.

In sum, a sound governance system facilitates the effective response of the center as a whole, or a constituent unit, to the opportunities and problems it faces. Clearly, this can be achieved with many different organizational forms and with differing degrees of subunit autonomy, but the term autonomy can be misleading if it refers simply to formal organizational structure. In fact, behavior, not structure, is what matters; a center cannot thrive in a difficult environment if subunits try to respond, react, and develop independently of the whole. Perhaps the best indicator of sound governance is the system’s capacity to resolve conflict efficiently and effectively. Resolution can occur in many ways, from executive fiat to abandoning a controversial proposal to removing the resistant parties. If a major conflict is allowed to simmer for a sustained period, it distracts leaders at multiple levels from what can and needs to be done. However, if resolution of conflict can be achieved only by forgoing an attractive opportunity, a center’s governance structure must be viewed as flawed.

Management of Faculty-Generated Revenue

In almost all AMCs a large proportion of revenue is generated from the patient care activities of clinical faculty and, in the more research-intensive centers, from the research grants and contracts of both clinical and basic science faculty. As discussed above, entrepreneurship is important to faculty success in patient care and research, but peculiarities of the markets for both usually make a pure laissez faire policy inappropriate. We doubt that any medical school dean would value the contributions of his individual clinical faculty or departments mainly in terms of the patient care earnings they can generate. Similarly, probably no dean would be willing to terminate all the research projects that are unable to command external funding. Consequently, a successful academic medical center must maintain strong incentives for individual faculty members and their departments to generate income but also develop means to “tax” some of this income—particularly practice income—to foster broader center goals.

Each of the six centers we studied has one or more such taxing mechanisms, but they vary widely in their structure, the rate at which individual faculty earnings are taxed, the uniformity across
departments, and their effects on faculty incentives. The proportion of patient care earnings that are placed at the dean's disposal can give a misleading picture of his control over resources. Most notably, if a school has substantial "hard money" resources and the dean is free to allocate them differentially across departments, he can compensate for a low tax rate on practice earnings. For example, a dean might either heavily tax high earning departments, such as ophthalmology and radiology, in order to support, say, pediatrics. Or he might tax all practice earnings lightly, but allocate a disproportionate amount of hard money to the departments with lower earning potential.

Just as the dean needs a mechanism to compensate for the disparity in earning power across departments, the department head needs a means to use department funds to compensate for disparity in practice earning capacity across individuals within a department. The disparity may occur because of the differences in earning power of subspecialties within a department (e.g., gastroenterology versus infectious diseases within internal medicine) or because a potentially high earning specialist has been encouraged to spend more time on research than in patient care. In some departments the very presence of the reallocation mechanism keeps all the faculty from spending too much of their effort on patient care at the expense of their research and education responsibilities.

There are very few external sources of funds for some kinds of clinical research (for example, research to develop and test surgical procedures, or on new imaging technologies). Hence, some department heads find that they must fund a considerable amount of the department's research from practice earnings if they are to involve most of the faculty in research of some kind.

If faculty practice earnings are taxed excessively, faculty involvement in patient care drops below levels that are required to support the medical school financially, to keep teaching hospital occupancy rates acceptably high, and to attract the patient mix needed for educational programs. Although we did not evaluate each of the many practice plans in the six centers studied, we heard of no complaints that practice plans had erred in the direction of overtaxation.

It is illegal to use federal research funds to pay costs unrelated to the purposes of the grant; therefore, there is no legitimate basis for "taxing" research revenue for broader purposes. However, the reimbursement of indirect costs provides a means by which a research activity can pay its fair share of overall support costs and reduce the financial burden on the central administration. Indirect costs are no less real for being indirect, and it seems appropriate that a center and its constituent parts benefit directly from their reimbursement, rather than having them go into some large university fund.
In sum, there are some fairly simple lessons from centers that successfully manage faculty-generated revenue. First, the individual faculty member should accept personal responsibility for generating some of the revenue that can be used to support his own salary and research but also to promote broader department and center goals. Second, the faculty member’s compensation should in some obvious and direct measure reflect the quantity and quality of his output. Third, the inherent variation in earning potential across departments and subunits should be acknowledged and partially offset by the reallocation of practice revenue or the differential allocation of other hard money. Finally, there should be a consensus that the management mechanisms are understandable and fair to the interested parties.

Tenure

Productivity, adaptation, and renewal are facilitated by limiting the explicit and implicit rights of faculty tenure. Although the threats to academic freedom, which tenure was designed to protect, seem slight in academic medicine, we do not propose that the tenure system be eliminated. We could scarcely do so on the basis of our study, because all six centers have tenure systems. However, they differ in the guarantees that tenure provides, and there are clear examples where extensive rights of particular tenure systems have led to inefficient use of resources and the decline of departments and programs.

Tenure can easily protect an individual’s academic rank without guaranteeing his current salary. In many centers, the means for doing so is a compensation plan composed of two or more parts. One part is fixed by virtue of rank, is often paid from hard money accounts, and may constitute even less than half of total compensation. The amount of the other part is determined by the faculty member’s current contributions to departmental and center objectives. For clinical faculty, the variable part may be largely determined by practice earnings; but as discussed above, research productivity should also be rewarded, particularly when it produces salary support through grants. For basic science faculty, a somewhat larger portion is usually fixed, but it is still desirable to include a component that depends on productivity, usually in research. The variable part of compensation can be determined by a formula or an annual assessment by the faculty member’s superior. However it is determined, all parties should clearly understand the link between the amount of variable compensation and productivity before the fact.

\(^5\)This is consistent with the first principle outlined in the preceding section—i.e., that faculty members should accept responsibility for generating some of the revenue to cover their salaries.
One of the problems that the Dean of the University of Louisville Health Sciences Center had to overcome was a tenure system that guaranteed full salaries, even to clinicians. As a consequence, the rejuvenation of several weak departments was impeded, and large amounts of scarce hard money resources were wasted on senior faculty who contributed little. This system has been changed to remove the full salary guarantee, but the changes have not been applied retroactively. The Dean and some new department heads continue to use their management skills and to expend considerable time overcoming this flaw.

Tenure was probably never intended to apply to research space. However, in many medical schools, there appear to be unwritten tenure rights in space. Specifically, once a tenured faculty member is allotted research space, that remains his space until he retires or relinquishes it voluntarily. In such circumstances, some research space is inevitably underutilized, while other researchers are forced to work inefficiently in cramped quarters.

Although tenure may usefully protect a faculty member's academic appointment to the point of retirement, the tenure rights of administrators—deans, department heads, division heads—should be limited. That is, their rights to tenure in connection with their academic rank should not extend to their administrative positions. The experiences of the six centers suggest that this is done most effectively by limited term, renewable contracts. The annual election of the Dean of the Washington University School of Medicine constitutes an extreme version of time-limited tenure for administrators; a more common and generally more reasonable contract term is five years. This allows enough time for administrators to identify problems, develop solutions, embark on new ventures, and learn their consequences; and it protects them from premature judgments about their effectiveness during a learning period. The end of a term forces an assessment of the administrator's effectiveness and provides a face-saving way to resign; if his performance has been good, the contract renewal validates his performance and provides a stimulus for considering new initiatives.

Having had to deal with the problems of tenured department heads who no longer lead effectively, the Dean of Rush Medical College has instituted rigorous five-year reviews for all department heads. The new appointees welcome this change, see the period as appropriate in length and concept, and express confidence that they will be evaluated fairly and reappointed.

If administrators serve "at the pleasure" of their superiors (if they have no tenure) or if they have very short contracts, in theory, they can be removed more easily and quickly than when they are under
long-term contracts. Ironically, this does not appear to be the case. One year is too short a period for in-depth evaluation of an administrator's performance, and systematic evaluation cannot be a continuous process. As a consequence, the removal of a department head under those circumstances is tantamount to "firing," which is organizationally and personally more difficult than simply not renewing a longer term contract.

**Strategic Use of Resources**

It is generally necessary for an AMC to commit a large increment of resources to a department or division to rejuvenate it or change its direction. Moreover, it is often difficult to recruit a new department head without making such a commitment, particularly when the unit he is being asked to lead is regarded as having performed poorly in the past. The command over extraordinary resources gives the new (sometimes old) department or division head credibility, authority, and the financial means to pursue the new goal. Even if a center is recruiting to fill the vacancy at the head of a department that has functioned well, the most desirable candidates for the job usually demand discretionary start-up funds or additional research space.

From the early 1960s through the mid-1970s, academic medicine was in a period of rapid growth, fueled by generous federal and state appropriations. Then more than now, a center was likely to have funded unfilled positions that a dean could offer to an incoming head. In most centers, the administration must husband resources very carefully to rebuild a faltering department or establish a new unit, usually at the expense of other needs.

To varying degrees, each of the six centers has had to make strategic funding decisions where one or more pressing unmet needs were consciously left unfilled to provide enough funds to stimulate the rejuvenation of a flagging department or division. This is particularly striking at the University of Louisville Health Sciences Center, which has been in the midst of a major academic rebuilding program for several years. The dean quickly realized he had to make conscious choices about which departments to rebuild first, providing fairly extensive start-up funds to the new head of one department, while an acting head remained for several years in another that was faltering. The result has been very successful but admittedly uneven rejuvenation of departments. However, if the limited resources available had been applied more evenly across departments, the center would almost certainly not have been able to recruit new leadership of the quality it now has.
The major rebuilding effort of the University of Louisville Health Sciences Center provides a particularly stark but by no means isolated example of how very scarce resources are applied strategically. Recently the University of Minnesota Health Sciences Center began a phased remodeling of an old building to create new research space. The first of this space to become available was consciously allocated to the new head of a department along with five new faculty positions. This major infusion of leadership, space, and money has strikingly rejuvenated the department. When the University of Texas Health Science Center at Dallas decided to create a new basic science department to exploit a particular research strength, it husbanded resources very carefully to achieve a critical mass; the head of a successful clinical department even transferred an endowed chair to the new department.

In short, success in rejuvenating old units and creating new ones requires a commitment of medical center resources beyond what normal budgets permit. Thus, the medical school dean or the center vice president must usually set priorities to solve problems sequentially. This often requires painful strategic decisions to commit resources in a lavish manner to one unit while temporarily allowing another to languish or wither.

The Patient Base

To be successful in the current health care environment, every AMC must sustain a campaign to ensure an adequate patient base to support its programs. Multiple forces are at work to erode the patient base of academic medicine, and several factors are reducing the overall rate of growth in medical care expenditures. A longer term secular decline in the length of hospital stay was accelerated by the recent implementation of the Medicare Prospective Payment System. This has been accompanied by a modest but unexpected decline in Medicare admissions. Hospital admissions rates have also been reduced by a growing tendency to perform what were heretofore inpatient procedures in outpatient settings (e.g., lens extraction, arthroscopic surgery) and the growing popularity of prepaid health care programs. Academic medical centers must also compete with community hospitals staffed by recent graduates who are well-trained in specialties and subspecialties.

The most direct and pressing concerns regarding a patient base are usually financial. If the center’s facilities treat fewer patients, patient care revenue to the hospital and medical staff falls concomitantly. This threatens the financial viability of the teaching hospital(s) and reduces the resources available to support faculty compensation.
Changes in the size and composition of the patient base also present problems for undergraduate and graduate medical education programs. Sociodemographic factors affect the availability and suitability of patients for teaching. For example, in obstetrics, birth rates tend to be higher among lower socioeconomic groups, and women with full insurance are not predisposed to go to clinical faculty for prenatal care or to teaching hospitals for normal delivery. The incidence of particular diseases is also affected by sociodemographics; well-trained physicians need to gain experience dealing with patients of different socioeconomic backgrounds before entering practice.

Most current biomedical research is not greatly constrained by the nature of an AMC's patient population. One exception is research involving clinical trials of treatment regimens and diagnostic devices.

The most common and direct approach to ensuring an adequate patient base focuses on "market share." The appropriateness of any particular approach to the problems of market share depends on many factors, including the local environment, the particular center's needs, and its philosophy. The six centers in our study are approaching the task in two or more ways. We cite examples of several broad types of approaches without any certainty that they will all be successful, but they nonetheless reflect the dynamism of these six centers in dealing with a persistent problem.

A fairly common approach to maintaining market share is to build new physical facilities or to undertake major renovations. Because teaching hospitals typically treat a smaller proportion of private "full pay" patients than community hospitals and many teaching hospitals are owned by state or local government, their buildings are often older and their amenities inferior to their community hospital competitors. Each of the six centers has been or is currently engaged in a major building program, but three examples seem particularly apt to the concerns of this study:

- The University of Louisville Health Sciences Center's major teaching hospital, originally a county-owned facility, has just moved into a new building, which is designed to attract private patients as well as its traditional lower income patients. The Commonwealth of Kentucky, which now owns the hospital, has leased it to a large proprietary chain, whose profitability (in this particular case) depends on expanding the private patient base. Thus far, this appears to have been a highly successful effort to broaden the patient base and increase revenues.

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6 Market share is usually distinct from but not entirely unrelated to concerns over the costs or prices of care in teaching settings, which we discuss below.
• The University of Minnesota Health Sciences Center's principal teaching hospital was housed in an old, oversized building. The hospital has taken the extraordinary step of accepting a very large debt burden to build a smaller, more modern facility. It hopes this new facility will firmly establish its regional dominance in the tertiary care referral market on the basis of amenities as well as the technical aspects of care.

• The University of Texas Health Science Center at Dallas has raised the capital and is in the process of building a small, private hospital that adjoins its principal, county-owned teaching hospital. This facility is being designed specifically to provide amenities that will attract private full pay patients and will exploit economies of scale by a cooperative arrangement with the adjacent county hospital. This arrangement will also retain for the clinical faculty all the present advantages of physical proximity to their other patients as well as to their education and research facilities.

With the growth of prepaid health care systems, it is natural for some academic medical centers to form links with prepaid plans or to try to establish their own health maintenance organizations. As yet, only a few such academically based HMOs are unequivocally successful; two are owned by centers in our sample:

• The Washington University School of Medicine established an HMO at the urging of one of its faculty leaders in 1969. After some early difficulties, it has achieved substantial success. Perhaps the best measure of this success is that it has become part of a 50-50 joint venture with a major private insurance company that will market it nationwide.

• Rush-Presbyterian-St. Luke's Medical Center, as mentioned above, was an early and successful entrant into the prepaid health care market.

In these instances and in others (e.g., the Harvard Community Health Plan) the mainstream clinical faculty of the medical center have only modest involvement in providing primary and secondary care to the prepaid patient population. Rather, the HMO is regarded more as a subsidiary that generates some patient revenue and provides limited teaching opportunities, but it is most important as a source of referral patients.

An AMC may also increase its access to prepaid group patients without owning or operating an HMO by negotiating contracts for referral services with individual prepaid groups. Several of the centers
in our study have done so aggressively. For example, the University of Utah Health Sciences Center has negotiated contracts to provide specific tertiary care services for large regional prepaid health plans, including patients from neighboring states. As a part of their larger effort to encourage regional referrals, the center has established a medical air transport service. Another of the center's major teaching hospital affiliates is the "flagship hospital" of IHC, a large regional health care conglomerate with hospitals, PPOs, HMOs, etc. This affiliation assures a substantial number of tertiary care referrals for teaching and research activities of the health sciences center.

In short, by a combination of efforts the six centers we studied have managed to maintain and in isolated instances to expand their patient bases in markets where demand for care has been shrinking and supply has been increasing. They have done so by multiple means, and no particular one can be identified as universally effective. However, their success owes much to their unstinting and aggressive efforts at marketing.

Cost Containment

The future financial viability of all health care providers will increasingly depend on effective cost containment. Health care payment systems at all levels are providing increasing incentives for providers to control their costs. The Medicare PPS provides the most prominent example of such incentive changes. Academic providers may experience particularly strong pressures to control costs.

Academic medical centers are widely regarded as high-cost providers of care, and payers of health care (insurers, PPOs, HMOs, etc.) generally assume that a major teaching hospital or faculty practice group will be a high-cost provider. These assumptions are not well founded in sophisticated empirical analysis, and there are many ways in which simple studies are biased to show higher costs in teaching hospitals. Nonetheless, because of common perceptions, academic medicine must always bear the burden of proof that it can provide care at competitive prices, whether seeking a contract with an HMO or PPO or defending an appropriation request of state or local government.

Each of the centers we have studied has pursued hospital cost control vigorously and successfully. Each has done better financially

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7There are two persistent problems. One is that teaching hospital costs contain stipends for residents who provide services that physicians bill separately and hence are excluded from nonteaching hospital costs. The second is the failure of studies to account for the fact that most major teaching hospitals have disproportionate numbers of very sick patients—even within a diagnostic group.
under PPS than under the old cost-based reimbursement system, but each also has a stake in controlling cost that extends well beyond Medicare. As described above, two of the centers own large HMOs, which have to be price competitive with other prepaid plans in their market area. Two of the other four centers have small prepaid plans, and another is negotiating to develop one through a large joint venture.

Two of the six centers have a county hospital as their principal teaching hospital. Both of these hospitals get a fixed annual budget for providing care to an expanding indigent population base. Remaining within these budgets requires careful control of hospital costs. The incentives for cost control may be strongest at the University of Louisville Health Sciences Center, because the proprietary chain that manages the hospital has entered into a multi-year contract to provide care to a specified indigent population for an annual fixed sum (adjusted annually for general inflation). If costs exceed the fixed sum, the chain loses money; if the contract amount exceeds the costs, the chain makes a profit.

Although only one—perhaps two—of the six centers that we studied operates in an environment of what could be regarded as “cutthroat” price competition, each faces and has responded to strong incentives for cost control. We believe their financial successes on the patient care front owe much to the effectiveness of these efforts.

FINDINGS

In addition to the seven lessons that we draw from our study of successful centers, we observe five attributes that they have in common. Each pertains to the way these centers have coped with environmental problems, and hence some might draw inferences about their relationship to success. We are unwilling to do so because we believe the evidence is insufficient. Nonetheless, these “findings” are worthy of consideration.

Medical Education

None of the six centers seemed particularly concerned about the need to take steps to maintain the quality of their undergraduate medical education programs, and we found no evidence of decline. This was somewhat surprising in view of the factors that could adversely affect the quality of the medical school applicant pool. Demographics alone seem certain to reduce the medical school applicant pool; the age cohort of 22 year olds will decrease by about 25 percent in the period between 1983 and 1995. The leveling off and slight decline in real
incomes of physicians might be expected to decrease interest in medical careers. Moreover, prospective medical students might be put off by the pervasive comments about the growing frustrations of a medical practice—e.g., the pressures of competition, the more demanding patient, the rise in malpractice insurance costs, and the higher incidence of malpractice claims.

Although five of the six schools had experienced a decline in the number of medical school applicants in recent years, none believed that they had seen a decline in the quality of either applicants or their admitted classes. Only the University of Minnesota Health Sciences Center has reduced its class size by a significant degree, and this was not motivated by a decline in applicant quality. This could be a reflection of the overall success of these medical centers, but it also appears consistent with national trends. Data on the qualifications of accepted applicants to all medical schools are mixed as regards the academic quality of new entering classes.\(^5\) There has been a slight downward trend in the number of entering students with “A” averages, but no increase in the number with “C” averages. The average scores of accepted applicants on the Medical College Admission Test (MCAT) has risen somewhat during recent years. Therefore, it is not surprising that “successful” centers perceive no particular problems with their entering classes.

None of the six centers is currently undertaking a major reform of the undergraduate medical education curriculum. This inaction on curriculum reform might seem to run counter to a recent national task force report that sees “pressures [for curricular reform] to which we should accommodate with vigor and deliberate determination lest critical and irreversible damage be done.”\(^6\) For some schools, this inactivity on the curriculum front may not indicate so much self-satisfaction with current curricula as it reflects the higher priority accorded to other center-wide initiatives. The University of Minnesota Health Sciences Center had already adopted what it regards as the most important recommendation of the task force report several years ago. Thus, for a mix of reasons, the six centers we studied seem to feel no particularly pressing needs on the undergraduate medical education fronts. They judge their current medical school classes to be as strong as ever or stronger. None would argue that its curriculum is perfect, but neither do they see the advantages of major reform as outweighing the costs in the near term.

\(^{5}\)Crowley, Etzel, and Peterson, 1985.

\(^{6}\)Association of American Medical Colleges, 1984, p. 2.
Long-Range Planning

All six centers engage in long-range planning as standard practice, and they credit this planning for their successful responses to environmental change. However, no center pretends to have a comprehensive master plan. Instead their response has been stimulated by the anticipation or realization of a specific problem.

Like the centers, we are predisposed to believe that effective long-range planning contributed greatly to their success, but we are not sufficiently certain to include it as one of our lessons. In particular, it is hard to determine ex post how much of a particular success is due to planning and how much to adaptive response to a changing situation. We also recognize that outsiders are unlikely to hear much about planning failures after the fact.

We can readily point to examples of major success cited above that were the derived outcomes in long-range plans. Several are particularly notable:

- The Washington University School of Medicine's creation of a redevelopment corporation to reverse the decline of its surrounding neighborhood,
- Rush-Presbyterian-St. Luke's Medical Center's establishment of an HMO, and
- The University of Texas Health Science Center at Dallas's highly selective identification and guidance of outstanding medical students to be groomed for research and administrative leadership positions.

Each of these turned out well and, as far as we can tell, as planned. An in-depth longitudinal study—better yet, a prospective study—might enable us to ascertain the extent to which long-range planning enables an AMC to achieve its goals, but this was not within the resource constraints of our present study. However, we can identify a positive and immediate outcome of planning: It reflects and generates confidence and enthusiasm.

The For-Profit Sector

The for-profit part of the health care industry is no longer seen in doctrinaire terms by the leadership of any of the six centers we studied. We cannot be sure how much these attitudes have changed in recent years, but we suspect that the change has been substantial. Each of the six has a close and considerable relationship with a for-profit entity or has its own for-profit subsidiary.
Many people who are generally familiar with academic medical centers might judge the University of Louisville Health Sciences Center as being the most closely aligned with the for-profit health care industry. Certainly, that center’s future is closely linked to the success of the proprietary hospital chain’s management of its principal teaching hospital, but other centers have relations with large for-profit operations that are more extensive and of longer duration.

The University of Utah Health Sciences Center has a long-term relationship with private firms in a local research park, and two of its affiliated teaching hospitals are owned by a large health care conglomerate. The Washington University School of Medicine has developed multiple relationships with pharmaceutical and medical technology firms, which increase its research funding support and enhance access to researchers at the cutting edge of biomedical science.

More recently, the University of Texas Health Science Center at Dallas and the University of Minnesota Health Sciences Center are developing alliances with high technology firms. Each sees these as offering important avenues for the commercialization of research advances.

It is too soon to assess the long-term consequences of academic medicine’s new receptivity to business relations with for-profit firms. It is clear that many centers—all six we studied—have adopted a pragmatic stance toward corporate medical care. There are some trepidations about the danger of the “medical industrial complex,” but these do not stand in the way of considering new ventures and relationships.10

Community Relations

Each of the six centers we studied appears to maintain a good relationship with the community in which it is located, and it attributes this to conscious attention to community relations, in addition to its performance as an academic and health care institution. Rush-Presbyterian-St. Luke’s Medical Center even formally accords “community service” the status of an output along with education, research, and patient care. None of the six appears to have an adversarial relationship with its surrounding community, as has been the case with some academic medical centers.

As with long-range planning, it is hard to determine the significance of community relations activities for an academic medical center’s success. We are predisposed to believe that such efforts are important,

10Relman, 1980.
and particular successes seem to be quite plausibly the fruits of wellorchestrated community relations.

At least several of the six centers are the obvious subjects of great local pride, which has tangible financial consequences. The Washington University School of Medicine has been extraordinarily successful in raising endowment funds from the wealthy business interests in its metropolitan area. The University of Texas Health Science Center at Dallas has on occasion appealed successfully for community support to increase funding for the county hospital that is its principal teaching hospital. In each instance, a loss of community support would clearly be costly, but it is difficult to attribute success to community relations activities, per se.

In short, we believe but cannot prove that the conscious efforts to improve and maintain good community relations have yielded large returns for the six centers in our study. At a minimum, their efforts contribute to a good aura for the centers; they also increase the number of people who feel they have a stake in the centers' future success.

Physical Facilities

Major improvements in physical facilities are credited as important contributors to the success of each of the six centers we studied. Each has recently completed or is currently undertaking a major building or refurbishment program. Each center has obviously placed a higher priority on buildings; we have no basis for doubting their judgments, and there are obvious advantages to impressive physical facilities.

On the patient care side, a pleasant physical environment is important to a hospital's ability to attract patients—particularly full-pay patients. This may be especially true for city or county-owned hospitals, which can all too easily become dingy, depressing places, notwithstanding the high quality of care they provide. For example, the physical appearance of the sparkling new university hospital of the University of Louisville Health Sciences Center may be at least as important as the management innovations of the proprietary chain in attracting nonindigent patients. The Washington University School of Medicine's success in the local health care environment owes much to the pleasant, modern appearance of its building as well as to its redevelopment of the surrounding area.

Academic faculty are clearly attracted by the quality and quantity of research space that a center can offer. Four of the six centers we studied have made major recent investments to upgrade research space, and the other two have done considerable refurbishing. Each believes, and we agree, that they could not have achieved their current stan-
ards of research if they had not been able to offer their researchers attractive facilities.

In sum, each of the medical centers is housed in impressive physical plants. Their new buildings can be seen as important contributors to their success, or they can be seen as an indicator or badge of success. We are inclined more to the former than the latter view, but our study methods do not enable us to make a confident distinction between the two. We are certain that it is better to be housed in new buildings than in old ones, but we do not know what level of debt burden a center should be willing to assume in order to gain that advantage.
VI. CONCLUSIONS

The purpose of this study was to identify academic medical centers that were successfully pursuing their objectives, that were operating in unusually harsh environments, and whose successes could provide useful lessons to the larger academic medical community. We are confident that the first and third objectives were substantially met, although the generalizability and applicability of the lessons to the broader community will be a matter of some disagreement. We are much less certain that our measures of environmental harshness were sensitive to the characteristics that most strongly affect the centers' ability to function effectively.

The reasons for seeking to measure environmental harshness are straightforward: Success is more impressive if it comes in the face of adversity. In addition, the study was motivated by the federal government's concern that, in general, academic medical centers were having to operate in hostile environments and public policy was substantially responsible for this change.

Our measures of environmental harshness were not conceptually flawed; rather the data were simply too crude or incomplete to measure all the features of an environment that materially affect an AMC's ability to function effectively. The unavailability of comprehensive information on funding for care of the poor meant that we had to rely on only Medicaid data, which were themselves out of date. Upon visiting the six centers, we discovered that the generosity of the state Medicaid program was sometimes an unimportant aspect of funding of care for indigent or low-income patients. Local government, sometimes with state support, determines to a much greater extent whether some major teaching facilities have adequate funding for the indigent care they are expected to provide.

We sought to measure general support for medical education. However, we were given only broad categorical data on the combination of endowment and state support for medical education, because of the AAMC's commitment to protect the confidentiality of endowment data. Although we have no reason to believe that these data were inaccurate or that having data only in broad categories should have been a problem, these categories did not seem to be a sensitive measure of the amount of unrestricted funding available for the support of education. In particular, department and hospital endowment funds appear to provide direct or indirect relief to the medical education budgets of some medical centers.
Competition for patients—particularly full-pay patients—is becoming an important matter for all AMCs, and we are reasonably comfortable with the data we used to measure supply side features of the medical marketplace of the metropolitan area in which each AMC is located. However, these data could not be expected to measure competitiveness in the smaller (or larger) areas from which the centers draw most of their patients, or to be sensitive to some important differences in the demand for care that were not reflected in aggregate population numbers.

In general, our impressionistic view was that each of the six centers' environments was somewhat less harsh than we expected on the basis of our preliminary analysis, but clearly none was located on "easy street." Of course, we did not validate our impressions by comparing them with other centers that were not studied. These impressions of less harsh environments may, in fact, be reflections of the successful coping strategies of the six centers we studied. This is a plausible explanation for the absence of "cutthroat" competition in some medical markets with apparent excess supplies of hospital beds and doctors; maintaining good relations between "gown" and "town" doctors depends largely on the actions of the former.

We acknowledge the limitations imposed by our having studied six successful centers that operated in harsh environments; these six are a sample from only one cell of a four-cell matrix. Why, then, do we believe that we have identified some effective strategies for coping with environmental adversity—particularly if we admit that our measures of environmental harshness may not have been as sensitive as we had hoped? One reason is that we are confident we have identified some attributes of success that are consistent across all six centers in this study. A second is that some of these lessons have been "learned the hard way" by one or more of the six. Third, although the lessons were intuitively appealing to us, we were encouraged by the receptivity to them by our expert advisors and by reviewers within the six centers. Finally, the applicability of the lessons is not limited to those centers that operate in particularly harsh environments.

There is one one overarching conclusion of our study: Other things equal, academic medical centers that have more integration and coordination and less subunit autonomy will be better able to achieve their objectives in the difficult environment of the future. This was probably an implicit assumption of this study's sponsor, because they gave the project the title "Managing for Survival." The term "managing" implies coordination of related activities and integration of functions that substantially impinge on one another. Our study team was also probably predisposed to believe that more and better management of
most AMCs would facilitate the achievement of their objectives in the future. In any case, our study certainly caused us to conclude that integration and coordination are and will be important ingredients for success. The problem is how to achieve these without stifling the initiative, creativity, and responsibility that are crucial to the education, research, and patient care functions of academic medicine.

The seven lessons that we have synthesized from our study have a common theme in that all pertain to the promotion of effective coordinated action. All imply that organizational subunits of a center—an academic department or division, a teaching hospital, a research institute, or even the medical school—need to be attentive to the consequences of their actions for other subunits, and in general, most important actions cannot be undertaken without the active cooperation of one or more other subunits. Entrepreneurship has long been an essential attribute for success. Whereas in the past individual entrepreneurship was often well-rewarded—even sometimes to the exclusion of joint activity—successful entrepreneurship now will require organizational and management skills, not just good ideas and a willingness to take risks.

The lessons of successful governance demonstrate the importance of control mechanisms that facilitate conflict resolution and promote coordination. In the absence of these mechanisms, the normal competition for organizational resources, together with the added tensions of “hard times,” can lead a center to dissipate the energy it needs to respond to environmental challenges or internal disputes. Unfortunately, it is impossible to prescribe an optimal governance system for any particular center because success depends on institutional history and culture, and an effective authority structure may depend as much on implicit as explicit principles.

Faculty-generated revenue has been essential to the financial viability of U.S. academic medical centers throughout the modern era, but only in the last two decades has it become important to manage that revenue at the center level. Effective management requires strong incentives for individual performance and acceptance by the individual of his responsibility to support organizational objectives on the basis of an ability to pay. No center can achieve its potential with a completely laissez faire policy toward faculty earnings, whether generated from clinical practice or from research.

If the explicit and implicit privileges of its tenure system are not restricted, an AMC will almost surely be unable to undertake needed organizational change. However, the traditional prerogatives of academic tenure can be preserved within the needed restrictions. The most important restriction requires that tenure in administrative
positions depends on meeting ongoing performance standards, which seem best reviewed at times of contract renewal. Research space should be allocated on the basis of current need and performance, not squatters’ rights, and tenured faculty should face the same incentives for generating revenue as other faculty.

Even the leadership of the most financially secure centers will face situations in which they must employ their resources strategically, sacrificing the interests of one or more units in the interests of the whole. An effective governance system and the entrepreneur’s willingness to accept risk help the leadership make such strategic decisions, but it is also important that there be a broad consensus that such actions are essential to the long-term health of a center.

The actions needed to maintain an adequate patient base exemplify the need for coordination and cooperation in an academic medical center. Indeed, the most common concern of the six centers in our study was ensuring that they maintain the desired number and mix of patients in their teaching institutions. With growing competition in the medical marketplace, regulatory pressures on reimbursement, and a secular decline in hospitalization rates and the length of stay, the clinical faculty increasingly will have to work together and with the administrations of teaching hospitals and clinics to maintain and increase their share of the medical care market.

Cost containment is clearly a means to the end of maintaining an adequate patient base, but in combination with quality assurance, it is also an end in itself. Care in teaching hospitals is widely perceived to be more expensive than in other hospitals, and the preponderance of empirical evidence from admittedly imperfect measures supports this conclusion. Arguments about sicker patients and higher quality notwithstanding, payers are becoming less willing to pay what they perceive to be large differentials for care in academic medical centers. Individual clinical faculty members can do much to teach and practice cost containment, but overall efficiency in the provision of care cannot be achieved without a concerted centerwide effort to use medical technology and other resources prudently.

We observed common characteristics of the six centers that reflect the ways they have coped with environmental adversity, but we cannot ascertain that these were instrumental in their success. We were struck that none of the six seemed concerned about maintaining the quality of their undergraduate medical education programs—perhaps because each had evidence that it was maintaining or improving quality despite an overall decline in the number of applicants. The other four observations reflected activities that were common to all six centers, and that might or might not have been instrumental to their success.
These include the attention that each gave to community relations and to long-range planning. None saw the for-profit segment of the health care sector in doctrinaire terms, and each had been attentive to improving the quality of its physical plant and had been quite successful in doing so.

In sum, we believe that we have identified attributes of six academic medical centers that facilitated their achievements and caused them to be identified by our expert panel as “successful.” From these attributes we have synthesized some “lessons” that other centers might usefully learn. We cannot be certain that learning these lessons will enable other centers to achieve their objectives in the face of present or future adversity, or for that matter just how important they were to the successes of our six sample centers. We are confident that the lessons can have a positive effect on a center’s ability to function effectively in its environment, and we believe that most environments will become progressively less benign in the near term future.
Appendix A

MEASURES OF ENVIRONMENTAL HARSNESS FOR MEDICAL SCHOOLS
(The larger the positive number, the harsher the environment)

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NOTE: The following five schools are omitted from the list because of incomplete data. All but Arizona failed to report endowment income to the AAMC. Arizona had no Medicaid program in 1983. Scores on the other variables are as noted.

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*Environmental harshness is the average of three indicators: Medicaid benefits per member of the poverty population, the factor score describing the degree of competition in the medical market place, and the availability of hard money for medical education. The AAMC provided data on the availability of hard money for medical education on a confidential basis.
Appendix B

INTERVIEW OUTLINES

Senior University Official Responsible for
the Academic Medical Center

1. How would you characterize the governance structure of the academic medical center? Specifically, is there a hierarchical framework in which major education, research, and patient care programs and institutions fit, or is their relationship largely cooperative in nature? In the more common mixed case, which relationships are hierarchical and which cooperative (e.g., basic science vs. clinical departments, owned teaching hospital vs. others)?

2. How do the various components of the center relate to the parent university in terms of governance and control of funds?

3. How does the governance structure relate to the sources and control of funds?

4. What are the main sources of power/influence used by the top leadership of the Center (e.g., control of "hard money," appointments of clinical chiefs of service)? Where leadership is shared, who exercises what power, singularly or jointly?

5. What roles do the major teaching hospitals play in the local and/or regional health care delivery system?

6. By our measures, the environment of this academic medical center appears to be relatively hostile. In what respects do you feel this description fits the environment for your major teaching hospital(s)?

7. Why do you think this center was selected as one that is coping well with adversity? Specifically, what factors do you regard as key to this success in the patient care area? What factors could upset this success?

8. Are "town-gown" difficulties a significant factor in your environment? How are they ameliorated?
9. What kinds of residents and fellows do you seek to train (e.g., what mix of specialists and generalists, what proportion of trainees for academic medicine and research)? Has this changed in recent years?

10. Does your applicant pool provide sufficient numbers of candidates suitable to these goals? Are you able to compete effectively for those candidates?

11. Have you recently changed or are you considering changes in the sizes or orientation (e.g., from training subspecialists to more generalists in internal medicine) of your graduate medical training programs? If so, what factors motivate these changes?

12. Are clinical facilities currently available for residency and fellowship training adequate? If any changes have been made or considered in clinical training facilities, what are the motivations for change? Have there been or do you anticipate pressures for reducing training positions or changing the types of positions?

13. What is your broad strategy for biomedical research activity? For example, do you seek broad participation by all departments or a select few? Do you place equal emphasis on research in basic science and clinical departments? Do you emphasize interdisciplinary or interdepartmental research?

14. How has this strategy changed, if at all, in recent years? Have the changes been by design or necessity?

Medical School Dean

1. How would you characterize the governance structure of the academic medical center? Specifically, is there a hierarchical framework in which major education, research, and patient care programs and institutions fit, or is their relationship largely cooperative in nature? In the more common mixed case, which relationships are hierarchical and which cooperative (e.g., basic science vs. clinical departments, owned teaching hospital vs. others)?

2. How do the various components of the center relate to the parent university in terms of governance and control of funds?
3. How does the governance structure relate to the sources and control of funds?

4. What are the main sources of power/influence used by the top leadership of the Center (e.g., control of "hard money," appointments of clinical chiefs of service)? Where leadership is shared, who exercises what power, singularly or jointly?

5. How autonomous are departments? Does this vary across and/or within basic science and clinical departments? What accounts for this variance?

6. How much control does the central administration exercise over the activities and patient care revenue generated by the clinical faculty? What are the mechanisms of control? Are substantial amounts of practice revenue diverted to center wide functions?

7. What roles do the teaching hospitals play in the local and/or regional health care delivery system?

8. By our measures, the environment of this academic medical center appears to be relatively hostile. In what respects do you feel this description fits the environment for your major teaching hospital(s)?

9. Why do you think this center was selected as one that is coping well with adversity? Specifically, what factors do you regard as key to this success in the patient care area? What factors could upset this success?

10. Describe any cooperative/joint ventures being undertaken by the hospital(s) and the medical school or its clinical faculty.

11. What mechanisms are in place to coordinate goal/strategy formulation between the hospital(s) and the medical school?

12. What is the basic structure of the clinical faculty's practice plan(s)? How has this changed, if at all, over the past ten years or so?

13. How are the tensions between the demands of clinical practice and the demands of teaching and research managed by the departments? By individual faculty?

14. What are the main sources of cooperation, competition, and conflict between the clinical faculty and the administration of the major teaching hospital(s)? Does this differ considerably across the various teaching hospitals?
15. What are the mechanisms of control and cooperation for more loosely affiliated hospitals? For example, do major clinical appointments have to be approved by the leadership of the academic medical center?

16. Are clinical faculty, as individuals or groups, actively involved in innovative programs to expand/retain the patient base? For example, are clinical faculty involved in HMOs, PPOs, or other new delivery system variants?

17. Are "town-gown" difficulties a significant factor in your environment? How are they ameliorated?

18. What kinds of residents and fellows do you seek to train (e.g., what mix of specialists and generalists, what proportion of trainees for academic medicine and research)? Has this changed in recent years?

19. Does your applicant pool provide sufficient numbers of candidates suitable to these goals? Are you able to compete effectively for those candidates?

20. Have you recently changed or are you considering changes in the sizes or orientation (e.g., from training subspecialists to more generalists in internal medicine) of your graduate medical training programs? If so, what factors motivate these changes?

21. Are clinical facilities currently available for residency and fellowship training adequate? If any changes been made or considered in clinical training facilities, what are the motivations for change? Have there been or do you anticipate pressures for reducing training positions or changing the types of positions?

22. What kinds of medical students do you seek to train (e.g., a mix of primary care and specialty practitioners, a large proportion of academic physicians and researchers, physicians who will practice in the state)? Has this changed in recent years?

23. Does your applicant pool provide an excess or a shortage of such medical students? Do you feel that you compete effectively for the kinds of medical students you want? Has this changed in recent years?

24. Have you recently changed or are you considering changes in the size of the medical education program? If so, what motivated these changes?
25. Have you recently made or are you currently making significant changes in the medical education curriculum? If so, what is the nature of the changes and what are the purposes?

26. Are you satisfied with the facilities currently available for clinical training of your medical students? Have you taken any actions to change these facilities? Do you contemplate any such actions in the future?

27. To what kinds of graduate medical education programs do your medical students “match”? Are you generally satisfied with those “matches”? Are your students satisfied?

28. What is your broad strategy for biomedical research activity? For example, do you seek broad participation by all departments or a select few? Do you place equal emphasis on research in basic science and clinical departments? Do you emphasize interdisciplinary or interdepartmental research?

29. How has this strategy changed, if at all, in recent years? Have the changes been by design or necessity?

30. How is your research funding distributed across major sources of support (NIH, private foundations, industry sources, self-funding from clinical revenue, other)?

31. Has the amount or distribution of research support changed significantly in recent years? Have you recently embarked upon any major research initiatives (e.g., cooperative arrangements with pharmaceutical firms)?

32. In any particular research area, have you encountered special problems or opportunities (e.g., discontinuation or establishment of a major program project or center)?

33. What kinds of formal or quasi-formal research training programs do you have (e.g., MD/PhD, basic science PhD, basic science and clinical Post Doc offering, etc.)?

**Chief Financial Officer of the Medical School**

1. How do the various components of the center relate to the parent university in terms of governance and control of funds?
2. How does the governance structure relate to the sources and control of funds?

3. How much control does the central administration exercise over the activities and patient care revenue generated by the clinical faculty? What are the mechanisms of control? Are substantial amounts of practice revenue diverted to center wide functions?

4. What is the basic structure of the clinical faculty's practice plan(s)? How has this changed, if at all, over the past ten years or so?

5. How is your research funding distributed across major sources of support (NIH, private foundations, industry sources, self-funding from clinical revenue, other)?

6. Has the amount or distribution of research support changed significantly in recent years? Have you recently embarked upon any major research initiatives (e.g., cooperative arrangements with pharmaceutical firms)?

7. How separate is the funding of research training from that of research?

Associate Dean for Student Affairs

1. What kinds of medical students do you seek to train (e.g., a mix of primary care and specialty practitioners, a large proportion of academic physicians and researchers, physicians who will practice in the state)? Has this changed in recent years?

2. Does your applicant pool provide an excess or a shortage of such medical students? Do you feel that you compete effectively for the kinds of medical students you want? Has this changed in recent years?

3. Have you recently changed or are you considering changes in the size of the medical education program? If so, what motivated these changes?

4. Have you recently made or are you currently making significant changes in the medical education curriculum? If so, what is the nature of the changes and what are the purposes?
5. Are you satisfied with the facilities currently available for clinical training of your medical students? Have you taken any actions to change these facilities? Do you contemplate any such actions in the future?

6. To what kinds of graduate medical education programs do your medical students “match”? Are you generally satisfied with those “matches”? Are your students satisfied?

Clinical Department Chairman

1. What are the main sources of power/influence used by the top leadership of the Center (e.g., control of “hard money,” appointments of clinical chiefs of service)? Where leadership is shared, who exercises what power, singularly or jointly?

2. How autonomous are departments? Does this vary across and/or within basic science and clinical departments? What accounts for this variance?

3. How much control does the central administration exercise over the activities and patient care revenue generated by the clinical faculty? What are the mechanisms of control? Are substantial amounts of practice revenue diverted to center wide functions?

4. What strategies are being undertaken/contemplated to increase the cost-effectiveness of medical practice (by faculty/medical staff) in the hospital?

5. Describe any cooperative/joint ventures being undertaken by the hospital and the medical school or its clinical faculty.

6. What is the basic structure of the clinical faculty’s practice plan(s)? How has this changed, if at all, over the past ten years or so?

7. How are the tensions between the demands of clinical practice and the demands of teaching and research managed by the departments? By individual faculty?

8. What are the main sources of cooperation, competition, and conflict between the clinical faculty and the administration of
the major teaching hospital(s)? Does this differ considerably across the various teaching hospitals?

9. Are clinical faculty, as individuals or groups, actively involved in innovative programs to expand/retain the patient base? For example, are clinical faculty involved in HMOs, PPOs, or other new delivery system variants?

10. Are "town-gown" difficulties a significant factor in your environment? How are they ameliorated?

11. What kinds of residents and fellows do you seek to train (e.g., what mix of specialists and generalists, what proportion of trainees for academic medicine and research)? Has this changed in recent years?

12. Does your applicant pool provide sufficient numbers of candidates suitable to these goals? Are you able to compete effectively for those candidates?

13. Have you recently changed or are you considering changes in the sizes or orientation (e.g., from training subspecialists to more generalists in internal medicine) of your graduate medical training programs? If so, what factors motivate these changes?

14. Are clinical facilities currently available for residency and fellowship training adequate? If any changes have been made or considered in clinical training facilities, what are the motivations for change? Have there been or do you anticipate pressures for reducing training positions or changing the types of positions?

15. To what kinds of positions do your trainees go upon completion of their programs? Are these positions consistent with your goals? Are the trainees satisfied with the positions? Have there been changes in placement recently?

16. What kinds of formal or quasi-formal research training programs do you have (e.g., MD/PhD, basic science PhD, basic science and clinical Post Doc offering, etc.)?

17. How separate is the funding of research training from that of research?

18. Are your research training programs constrained by funding, supply of qualified candidates, by policy?
19. To what extent is research training folded into clinical fellowship programs?

20. How successful have your research trainees been in obtaining research positions?

**Basic Science Department Chairman**

1. What are the main sources of power/influence used by the top leadership of the Center (e.g., control of "hard money," appointments of clinical chiefs of service)? Where leadership is shared, who exercises what power, singularly or jointly?

2. How autonomous are departments? Does this vary across and/or within basic science and clinical departments? What accounts for this variance?

3. What kinds of formal or quasi-formal research training programs do you have (e.g., MD/PhD, basic science PhD, basic science and clinical Post Doc offering, etc.)?

4. How separate is the funding of research training from that of research?

5. Are your research training programs constrained by funding, supply of qualified candidates, by policy?

6. How successful have your research trainees been in obtaining research positions?

**Chief Executive Officer of Major Teaching Hospital(s)**

1. How would you characterize the governance structure of the academic medical center? Specifically, is there a hierarchical framework in which major education, research, and patient care programs and institutions fit, or is their relationship largely cooperative in nature? In the more common mixed case, which relationships are hierarchical and which cooperative (e.g., basic science vs. clinical departments, owned teaching hospital vs. others)?
2. Describe (in very general terms) the organizational structure of the hospital, its relationship to the medical school and the university.

3. What role does this teaching hospital play in the local and/or regional health care delivery system?

4. By our measures, the environment of this academic medical center appears to be relatively hostile. In what respects do you feel this description fits the environment for your hospital?

5. Why do you think this center was selected as one that is coping well with adversity? Specifically, what factors do you regard as key to this success in the patient care area? What factors could upset this success?

6. What strategies are being pursued to maintain/expand the market share of the hospital? How are you going about insuring that the hospital's product line (case mix) provides an adequate teaching base while maximizing net revenue?

7. What is the nature of your competitive environment? What strategies are you successfully employing vis a vis the competition?

8. What are the major (external/environmental) opportunities available to the hospital? What is being done to take advantage of them?

9. Describe the nature of any alternative delivery and/or financing arrangements being undertaken by the hospital.

10. What strategies are being undertaken/contemplated to increase the cost-effectiveness of medical practice (by faculty/medical staff) in the hospital?

11. What strategies are being pursued to minimize fixed costs? Variable costs?

12. From the hospital's perspective, what are the biggest assets of the relationship to the medical school? What are the biggest liabilities?

13. Describe any cooperative/joint ventures being undertaken by the hospital and the medical school or its clinical faculty.

14. What mechanisms are in place to coordinate goal/strategy formulation between the hospital and the medical school?
15. What are the main sources of cooperation, competition, and conflict between the clinical faculty and the administration of the major teaching hospital(s)? Does this differ considerably across the various teaching hospitals?
Appendix C

SELECTED DATA ON SIX SAMPLE ACADEMIC MEDICAL CENTERS

Table C.1
SAMPLE ACADEMIC MEDICAL CENTERS

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<td>28</td>
<td>23</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>Population to physician ratio in SMSA</td>
<td>663</td>
<td>515</td>
<td>493</td>
<td>486</td>
<td>534</td>
<td>549</td>
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Table C.2
SAMPLE MEDICAL SCHOOLS

<table>
<thead>
<tr>
<th></th>
<th>Texas</th>
<th>Louisville</th>
<th>Minn</th>
<th>Rush</th>
<th>Utah</th>
<th>Wash U.</th>
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<tbody>
<tr>
<td>Auspices of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>medical school</td>
<td>public</td>
<td>public</td>
<td>public</td>
<td>private</td>
<td>public</td>
<td>private</td>
</tr>
<tr>
<td>Year founded</td>
<td>1883</td>
<td>1888</td>
<td>1837</td>
<td>1905</td>
<td>1899</td>
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</tr>
<tr>
<td>Entering class size</td>
<td>207</td>
<td>124</td>
<td>223</td>
<td>120</td>
<td>100</td>
<td>120</td>
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<tr>
<td>Graduating class size</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Acceptance percentage/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>instate</td>
<td>10.24</td>
<td>25.33</td>
<td>31.85</td>
<td>8.64</td>
<td>28.95</td>
<td>7.69</td>
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<tr>
<td>Acceptance percentage/</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>outstate</td>
<td>2.34</td>
<td>2.36</td>
<td>2.65</td>
<td>0.85</td>
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<td>1.89</td>
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<td>National Institutes</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>of Health funded</td>
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</tr>
<tr>
<td>research support</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(FY 1985) (in</td>
<td>27,185</td>
<td>797</td>
<td>29,017</td>
<td>4,982</td>
<td>14,912</td>
<td>45,928</td>
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<td>thousands)</td>
<td></td>
<td></td>
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<td>Approximate ranking</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>(NIH funded research</td>
<td>20</td>
<td>NA</td>
<td>19</td>
<td>NA</td>
<td>NA</td>
<td>9</td>
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<tr>
<td>support) (FY 1984)</td>
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Specialty</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIM</td>
<td>Allergy and Immunology</td>
</tr>
<tr>
<td>AM</td>
<td>Aerospace Medicine</td>
</tr>
<tr>
<td>AN</td>
<td>Anesthesiology</td>
</tr>
<tr>
<td>BBK</td>
<td>Blood Banking</td>
</tr>
<tr>
<td>CHP</td>
<td>Child Psychiatry</td>
</tr>
<tr>
<td>CRS</td>
<td>Colon &amp; Rectal Surgery</td>
</tr>
<tr>
<td>D</td>
<td>Dermatology</td>
</tr>
<tr>
<td>DP</td>
<td>Dermopathology</td>
</tr>
<tr>
<td>DR</td>
<td>Diagnostic Radiology</td>
</tr>
<tr>
<td>EM</td>
<td>Emergency Medicine</td>
</tr>
<tr>
<td>FOP</td>
<td>Forensic Pathology</td>
</tr>
<tr>
<td>FP</td>
<td>Family Practice</td>
</tr>
<tr>
<td>GPM</td>
<td>General Prev. Medicine</td>
</tr>
<tr>
<td>GS</td>
<td>General Surgery</td>
</tr>
<tr>
<td>IM</td>
<td>Internal Medicine</td>
</tr>
<tr>
<td>N</td>
<td>Neurology</td>
</tr>
<tr>
<td>NM</td>
<td>Nuclear Medicine</td>
</tr>
<tr>
<td>NP</td>
<td>Neuropathology</td>
</tr>
<tr>
<td>NR</td>
<td>Diagnostic Radiology</td>
</tr>
<tr>
<td>NS</td>
<td>Neurosurgery</td>
</tr>
<tr>
<td>OBG</td>
<td>Obstetrics/Gynecology</td>
</tr>
<tr>
<td>OM</td>
<td>Occupational Medicine</td>
</tr>
<tr>
<td>OPH</td>
<td>Ophthalmology</td>
</tr>
<tr>
<td>ORS</td>
<td>Orthopedic Surgery</td>
</tr>
<tr>
<td>OTO</td>
<td>Otolaryngology</td>
</tr>
<tr>
<td>P</td>
<td>Psychiatry</td>
</tr>
<tr>
<td>PD</td>
<td>Pediatrics</td>
</tr>
<tr>
<td>PDA</td>
<td>Pediatric Allergy</td>
</tr>
<tr>
<td>PDC</td>
<td>Pediatric Cardiology</td>
</tr>
<tr>
<td>PDS</td>
<td>Pediatric Surgery</td>
</tr>
<tr>
<td>PH</td>
<td>Public Health</td>
</tr>
<tr>
<td>PM</td>
<td>Physical Medicine and Rehabilitation</td>
</tr>
<tr>
<td>PS</td>
<td>Plastic Surgery</td>
</tr>
<tr>
<td>PTH</td>
<td>Pathology</td>
</tr>
<tr>
<td>TR</td>
<td>Therapeutic Radiology</td>
</tr>
<tr>
<td>TRS</td>
<td>Transitional</td>
</tr>
<tr>
<td>TS</td>
<td>Thoracic Surgery</td>
</tr>
</tbody>
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### Table C.4

**HOSPITAL DATA SUMMARY OF PRIMARY TEACHING AFFILIATES: THE UNIVERSITY OF LOUISVILLE HEALTH SCIENCES CENTER**

<table>
<thead>
<tr>
<th>Ownership/control</th>
<th>Humans Hospital University</th>
<th>Kosair-Childrens Hospital</th>
<th>Veterans Administration Medical Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed</td>
<td>404</td>
<td>543</td>
<td>363</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>63.90%</td>
<td>76.90%</td>
<td>81.70%</td>
</tr>
<tr>
<td>Average length of stay</td>
<td>7.62</td>
<td>7.64</td>
<td>14.25</td>
</tr>
<tr>
<td>Total expense per admission</td>
<td>$4283.59</td>
<td>$5657.80</td>
<td></td>
</tr>
</tbody>
</table>

**Specialties in which residencies are offered:**
- AIM, AN, D, OP, EM, FP, IM, NS, ORS, OTO, PTH, PD, PS, PS, P, DR, TR, GS, TS, U


### Table C.5

**HOSPITAL DATA SUMMARY OF PRIMARY TEACHING AFFILIATES: THE UNIVERSITY OF MINNESOTA HEALTH SCIENCES CENTER**

<table>
<thead>
<tr>
<th>Ownership/control</th>
<th>Hennepin County Medical Center</th>
<th>University of Minnesota St. Paul-Ramsey Medical Center</th>
<th>Veterans Hospital and Clinics</th>
<th>Administration Medical Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed</td>
<td>394</td>
<td>345</td>
<td>721</td>
<td>711</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>71.90%</td>
<td>65.00%</td>
<td>78.90%</td>
<td></td>
</tr>
<tr>
<td>Average length of stay</td>
<td>6.98</td>
<td>6.31</td>
<td></td>
<td>9.97</td>
</tr>
<tr>
<td>Total expense per admission</td>
<td>$8978.84</td>
<td>$5577.54</td>
<td>$4948.79</td>
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</tr>
</tbody>
</table>

**Specialties in which residencies are offered:**
- AIM, AN, D, EM, FP, IM, NS, N, OBG, OPH, ORS, OTO, PTH, PD, PS, PS, P, DR, TR, GS, TS, U

Table C.6

HOSPITAL DATA SUMMARY OF PRIMARY TEACHING AFFILIATES: RUSH-PRESBYTERIAN-ST. LUKE'S MEDICAL CENTER

<table>
<thead>
<tr>
<th>Ownership/control</th>
<th>Mount Sinai Hospital Medical Center</th>
<th>Rush-Presbyterian-St. Luke's Medical Center</th>
<th>Christ Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds</td>
<td>478</td>
<td>1205</td>
<td>873</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>59.80%</td>
<td>75.80%</td>
<td>71.40%</td>
</tr>
<tr>
<td>Average length of stay</td>
<td>8.97</td>
<td>9.69</td>
<td>8.28</td>
</tr>
<tr>
<td>Total expense per admission</td>
<td>$5534.14</td>
<td>—</td>
<td>$4480.82</td>
</tr>
</tbody>
</table>

Specialties in which residencies are offered:
- IM, N, OBG, PTH,
- P, DR, TR, GS, U
- OTO, PTH, PD, PS,
- P, DR, NK, TR,
- GS, TS, U

Table C.7

HOSPITAL DATA SUMMARY OF PRIMARY TEACHING AFFILIATES: UNIVERSITY OF TEXAS HEALTH SCIENCES CENTER AT DALLAS

<table>
<thead>
<tr>
<th>Ownership/control</th>
<th>Baylor University Medical Center</th>
<th>Children's Medical Center of Dallas</th>
<th>Parkland Memorial Hospital</th>
<th>Veterans Administration Medical Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds</td>
<td>1147</td>
<td>155</td>
<td>835</td>
<td>679</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>73.10%</td>
<td>77.20%</td>
<td>79.20%</td>
<td>81.70%</td>
</tr>
<tr>
<td>Average length of stay</td>
<td>7.24</td>
<td>4.68</td>
<td>7.91</td>
<td>11.61</td>
</tr>
<tr>
<td>Total expense per admission</td>
<td>$3474.26</td>
<td>$3419.48</td>
<td>$3875.84</td>
<td>$4653.18</td>
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</tbody>
</table>

Specialties in which residencies are offered:
- AN, IM, CRS,
- OBG, ORS, PTH,
- P, DR, GS, U
- TRN

- AIM, AN, D, PP,
- IF, NS, N, NM,
- OTO, ORS, TR,
- DR, GS, U

Table C.8

HOSPITAL DATA SUMMARY OF PRIMARY TEACHING AFFILIATES:
UNIVERSITY OF UTAH HEALTH SCIENCES CENTER

<table>
<thead>
<tr>
<th>Ownership/control</th>
<th>Primary Children LDS Hospital</th>
<th>University of Utah Medical Center</th>
<th>Veterans Administration Center</th>
<th>Medical Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds</td>
<td>465</td>
<td>164</td>
<td>370</td>
<td>398</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>69.80%</td>
<td>77.00%</td>
<td>74.60%</td>
<td>74.40%</td>
</tr>
<tr>
<td>Average length of stay</td>
<td>5.62</td>
<td>8.56</td>
<td>8.35</td>
<td>9.88</td>
</tr>
<tr>
<td>Total expense per admission</td>
<td>$4035.14</td>
<td>$6353.85</td>
<td>$5491.75</td>
<td>$5218.44</td>
</tr>
<tr>
<td>Specialties in which residencies are offered</td>
<td>AN, IM, OBG, PTH, ORS</td>
<td>AN, NS, ORS, PTH, ORS, OBG, OPH, P, DR, TS</td>
<td>AN, FP, IM, NS, OBG, OPH, PD, OTO, OTH, ORS, OTO, PTH, ORS, OTO, PTH, TR, TS, U</td>
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Table C.9

HOSPITAL DATA SUMMARY OF PRIMARY TEACHING AFFILIATES:
THE WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

<table>
<thead>
<tr>
<th>Ownership/control</th>
<th>Barnes Hospital</th>
<th>Jewish Hospital</th>
<th>Veterans Childrens' Hospital</th>
<th>Administration Medical Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds</td>
<td>1073</td>
<td>596</td>
<td>235</td>
<td>921</td>
</tr>
<tr>
<td>Occupancy rate</td>
<td>78.80%</td>
<td>77.30%</td>
<td>61.80%</td>
<td>83.20%</td>
</tr>
<tr>
<td>Average length of stay</td>
<td>8.71</td>
<td>9.14</td>
<td>6.78</td>
<td>15.81 of stay</td>
</tr>
<tr>
<td>Total expense per admission</td>
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<td>$6365.80</td>
<td>$4775.20</td>
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<tr>
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<td>AIM, CRS, IM, OBG, OTO, PTH, TR, TS, U</td>
<td>AN, IM, NS, AN, IM, NS, P, DR, GS, TR, TS, U</td>
<td></td>
</tr>
</tbody>
</table>

REFERENCES


