

# HEALTH CARE AT THE CUTTING EDGE

The Role of Academic Health Centers  
in the Provision of Specialty Care

A Report of The Commonwealth Fund  
Task Force on Academic Health Centers

July 2000

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## CONTENTS

Prologue.....	vii
Executive Summary.....	ix
I. Introduction.....	1
II. Defining the Specialty Care Mission.....	3
III. Findings.....	9
IV. Conclusions.....	37
V. Recommendations.....	41
VI. References .....	49

## LIST OF TABLES

Table 1: Proportion of Technology-Intensive Units Provided by Hospitals.....	9
Table 2: Change in Proportion of Institutions Providing Selected Technology-Intensive Units, by Type of Hospital, 1991–97.....	10
Table 3: Examples of Ubiquitous, Common, Uncommon, and Rare Causes of Hospitalization, by Disease Type.....	12
Table 4: Decomposition of Percentage Impact of Mission-Related Costs on Total Costs, by Level of Teaching Activity.....	18
Table 5: Distribution of Principal Diagnoses Within DRG 14, Cerebrovascular Disorders.....	20
Table 6: Quality of Care in Teaching Hospitals: An Overview of Selected Studies, 1989–99.....	31

## LIST OF FIGURES

Figure 1: Percent of AHCs Providing Specialty Services, by Ownership .....	11
Figure 2: Distribution of Principal Diagnoses .....	12
Figure 3: Care of Different Types of Diagnosis, by Hospital Type.....	13
Figure 4: Percent of AIDS, High-Risk Infants, and Trauma Cases Treated in AHCs, by Type of Insurance .....	15
Figure 5: Decomposition of Hospital Costs, by Level of Teaching Activity .....	18
Figure 6: Proportion of DRGs with High Length of Stay Diagnoses Concentrated in AHC and Other Major Teaching, Other Teaching, and Non-Teaching Hospitals, 1995 .....	21
Figure 7: Percent of Patients with Cerebral Artery Occlusion with Severe, Mild, or No Comorbidities, by Hospital Type.....	22

Figure 8: Distribution of Hospitalizations of Transfer and Non-Transfer Patients, by Hospital Type, 1995.....	23
Figure 9: Transfer Patients as Percent of Total Admissions, by Hospital Type, 1988–95.....	24
Figure 10: Inpatient Mortality Rates of Patients Receiving Abdominal Aortic Aneurysm Resection, by Hospital Volume of Procedure .....	26
Figure 11: Average Charges for Patients Receiving Abdominal Aortic Aneurysm Resection, by Hospital Volume of Procedure.....	26
Figure 12: Percent of Teaching Hospital Dominant Procedures Performed in AHCs and Other Major Teaching Hospitals, by Level of Managed Care Penetration .....	28
Figure 13: Change in Average Case Mix, by Type of Hospital and Level of Competition, 1991–96.....	29

## PROLOGUE

Academic health centers (AHCs) have responded to the upheaval in the health care system by reforming the manner in which they fulfill their social missions. These missions consist of teaching, research, the provision of rare and highly specialized services, and continuous innovation in patient care.

The first report of The Commonwealth Fund Task Force on Academic Health Centers, *Leveling the Playing Field*, noted the effects of competitive health care markets on the organizational and financial underpinnings of the AHC enterprise. In the second report, *From Bench to Bedside*, the Task Force examined the status of AHCs' research mission—the accomplishments, problems, and unexploited opportunities. The report included recommendations for changes in the way that federal research funds are distributed, and at the same time called upon AHCs to improve the management of research conducted at their institutions in order to take full advantage of those funds. This third report considers the crucial role played by AHCs in the development and delivery of highly specialized, technologically complex medical services. The advancement of this patient care mission is inextricably linked to the missions of research and teaching in America's medical schools. However, to continue to operate at the forefront of knowledge and to serve as the preferred providers of specialty care, AHCs and public policymakers must confront the economic forces that tend to disperse that role.

In the view of the Task Force, sustaining the specialty care mission will require that AHCs acknowledge their responsibility for the quality and efficiency of the specialized services that they provide. Government also must recognize that when markets fail to pay the reasonable costs of these services, public policy should provide extra payments to assure their continued existence. As with other Task Force reports, our hope is that the findings and conclusions contained here will inform the discussion already under way on these matters.

We are grateful to The Commonwealth Fund for its support of this project and to the members of the Task Force and its staff for their wisdom and hard work. In the future, we hope that the Task Force will contribute to further understanding of how the nation can promote the effectiveness and efficiency with which it conducts the social missions of AHCs.

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## EXECUTIVE SUMMARY

Access to high technology and specialized care is an essential element of a balanced health care system for advanced nations. Therefore, the effects of changes in the health care economy on access to specialized services, and the cost and quality of those services, are major concerns for health policymakers. Academic health centers (AHCs), consisting of medical schools and their closely affiliated clinical facilities, play a pivotal role in the provision of specialized services, which in turn are linked inextricably with AHCs' research and educational missions.

The current, ongoing transformation of the health care system poses serious challenges to the nation's AHCs and their missions. In its two previous reports, *Leveling the Playing Field: Financing the Missions of Academic Health Centers* and *From Bench to Bedside: The Research Mission of Academic Health Centers*, The Commonwealth Fund Task Force on Academic Health Centers examined the overall financing of AHCs and the future of AHCs' research mission.<sup>1,2</sup> In this report, the Task Force examines the patient care mission of AHCs with respect to the development and delivery of highly specialized, technologically complex services.

### Defining the Specialty Care Mission

For most patients, AHCs and other teaching hospitals provide services that are similar if not identical to the care available from any large, urban hospital. Yet AHCs pay special attention to the provision of care to "medically vulnerable" patients: that is, patients who need services that are rare, highly specialized, complex, or innovative or that may not be readily available from providers in their communities. Thus, although many institutions provide some specialty care, the interactions among multiple missions make the demands placed on AHCs for such services unique:

- Specialty services in AHCs support the development of innovations in care.
- AHCs provide standby capacity for services such as burn or trauma units.
- Specialty services in AHCs are integral to the education of physicians and the next generation of physician educators.

The specialty care mission also places unique financial burdens on AHCs:

- Some specialty services, such as burn and trauma care, may involve significant standby costs.
- As institutions of last resort, AHCs often treat patients with extremely complex conditions or significant comorbidities for whom the cost of care may not be fully recognized by existing reimbursement systems.
- AHCs' educational programs and research missions demand that they provide specialty services regardless of their relative profitability.

Economic theory provides a framework on which to build policy toward specialty care. Some types of specialty care, such as simple bypass procedures, clearly resemble *private goods*. These services are offered by multiple providers to individuals who receive the vast majority of the benefits of the care. For these services, competition works reasonably well in setting prices and allocating goods. In contrast, *social goods* are those that cannot be purchased individually, and for which purchase by one confers benefits on all. Basic medical research is typically conceptualized as a social good. Social goods should be provided or substantially subsidized by government owing to the joint nature of their benefits. Some types of specialty care are *merit goods*, which provide a mixture of private and social benefits. In a free market, merit goods require some form of subsidy to assure optimum availability.

## Findings

Based on extensive review and analysis of available data, The Commonwealth Fund Task Force on Academic Health Centers has uncovered ten key findings with respect to the mission of AHCs to provide high technology and specialized health care services.

1. AHCs play an important role in assuring the availability of specialized care. Although many technology-intensive and highly specialized units are concentrated in AHCs, specialized services continue to diffuse into other institutions, creating increased competition among hospitals.
2. AHCs are the main providers and initial developers of rare procedures and treatments.
3. AHCs provide a disproportionate amount of some types of specialized services to poor and uninsured patients.



4. AHCs provide a broad range of highly specialized services. Assuring the availability of those services contributes to the higher cost of care for all services in AHCs.
5. AHC patients tend to be sicker than patients at other hospitals, yet this higher severity of illness is not captured by current reimbursement coding systems.
6. AHCs perform a valuable function in their communities by providing care to severely ill patients transferred from other facilities.
7. Concentrating highly specialized services in a smaller number of hospitals, such as AHCs and other major teaching hospitals, can improve outcomes and reduce costs.
8. Patients receiving highly specialized services represent only a small proportion of AHC patients, yet the number of procedures for which AHCs are the dominant providers is growing. Competitive markets are accelerating the concentration of certain highly specialized services in AHCs and other teaching hospitals.
9. A unique capability to provide selected specialty services can be a significant advantage to AHCs in highly competitive markets.
10. For many services, major teaching hospitals provide better quality of care than non-teaching hospitals. These differences in quality arise primarily from more consistent use of standard physician services and drugs.

## Conclusions

In reviewing the status of specialized and high technology services, the Task Force has developed a set of related principles that should guide private management and public policy with respect to AHCs.

1. The availability of high technology and specialized services is an essential characteristic of a well-balanced health care system in an advanced industrialized society.
2. Although data on the comparative costs and quality of specialized and high technology services in alternative settings are incomplete, evidence suggests that AHCs are essential and/or preferred providers of a number of such services in many markets.

3. AHCs play a vital role in research that leads to the development and improvement of high technology and specialized services and in teaching health professionals to deliver those services effectively. Therefore AHCs must continue to be involved in the provision of those services.
4. Specialized and high technology services add significantly to the costs of the institutions that provide them. Some costs may be difficult to recover fully in competitive health care markets.
5. Competition for specialized and high technology services is leading to the dispersion of some services and the concentration of others. In price-sensitive markets, profitable services will tend to locate outside AHCs and unprofitable services will tend to concentrate within AHCs.
6. Market forces alone are unlikely to ensure that all high technology and specialized services will be developed or provided in ways that appropriately balance geographic availability, cost, quality, opportunities for innovation and improvement, and opportunities for research and training.

## Recommendations

Based on the preceding findings and conclusions, the Task Force makes the following recommendations concerning the provision of high technology and specialized services at AHCs.

1. Providers of high technology and specialized services, including AHCs, should continue their efforts to reduce the costs of those services.
2. All purchasers and insurers, including employers and managed care organizations, should assure that their members have the opportunity to utilize the highest quality and most cost-effective providers of highly specialized and complex services. Where data are insufficient to identify such providers, and where an AHC is an alternative, purchasers and insurers should permit patients to choose AHCs for those services.
3. Public policymakers and private purchasers should assure that high technology and specialized services are provided in appropriate amounts and sites. This may require new regulatory interventions and the development of appropriate financial incentives for providers, including the designation of centers of excellence and selective contracting.

4. Public policymakers should strive to assure that AHCs and other providers of high technology and specialized health care services are adequately compensated but also motivated to provide those services as efficiently and effectively as possible.
  - a. Where private markets fail to pay the reasonable costs of appropriate, high-quality, cost-effective services, public policy should provide extra payments that protect the access of Americans to such care. The payments should be carefully titrated to the needs of the American people and should not lead to excess provision of services.
  - b. The Medicare program should reimburse the full, fair costs associated with providing high technology and specialized services.
  - c. The role of AHCs in providing high technology and specialized services illustrates the general requirement that payments for all services and providers be adjusted for case mix and severity of illness. Until health status adjusters are used generally, a strong rationale will persist for extra payments to cover the costs of providing high technology and specialized services in AHCs.
  - d. The disproportionate role of AHCs in providing high technology and specialized services to poor and uninsured patients illustrates the need for universal health insurance coverage. Until universal coverage exists, a strong rationale will persist for extra payments to cover the costs of providing high technology and specialized services in AHCs.
5. AHCs should be held accountable for the quality and efficiency of the high technology and specialized services they provide. Extra payments to AHCs for those services should be connected to AHCs' ability to assure quality and control costs.
  - a. All institutions receiving payments for the extra costs of high technology and specialized services should be actively involved in quality improvement activities related to those services.
  - b. AHCs receiving such payments should be actively involved in research and development to improve the effectiveness and cost-effectiveness of high technology and specialized services.

# HEALTH CARE AT THE CUTTING EDGE: THE ROLE OF ACADEMIC HEALTH CENTERS IN THE PROVISION OF SPECIALTY CARE

## I. INTRODUCTION

The United States health care system is known worldwide as a source of technologically advanced and sophisticated care. To an extent unmatched anywhere, a majority of U.S. citizens have relatively easy access to state-of-the-art, advanced care. People from around the world travel to the United States to obtain access to the high-quality care routinely available here.

The wide availability of advanced care is a characteristic of the health care system of which the United States can justifiably be proud, yet it also has certain disadvantages. Technology is expensive and contributes to the high cost of health care. Highly specialized care is clearly appropriate for treating many conditions and individuals, yet it does not necessarily translate into greater life expectancy. A number of countries have achieved enviable improvements in life expectancy while devoting a much smaller share of their economies to the health care industry (although, admittedly, these countries do not face the high rates of violence and injury that beset our society).

Many observers have criticized the U.S. health care system as fragmented and overly specialized—and, unlike other countries, the United States continues to experience a trend toward increasing specialization. These critics argue that the United States would benefit—in terms of cost, continuity, and quality of care—from greater attention to primary care and prevention. However, even if one agrees with this viewpoint, the fact remains that access to appropriate and cost-effective high technology and specialized care is an essential element of a balanced health care system in a country as advanced and wealthy as the United States. This means that policymakers must consider the effects of changes in the health care economy on access to such care, its cost, and its quality.

Academic health centers (AHCs) pursue a unique combination of social missions, including research, education, and the provision of high technology and specialized health care services.\* These missions combine to create a special role for AHCs in the development and diffusion of new technologies. In addition, the many AHCs that are public institutions serve as important sources of care to poor and uninsured patients in their communities.

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\* In this report, the term “academic health center” (AHC) generally refers to a medical school and its closely affiliated clinical facilities, of which a teaching hospital is usually most prominent. In a few instances, however, AHC refers to the major teaching hospital or hospitals owned or controlled by a medical school.

The provision of highly specialized and technologically complex services is inextricably intertwined with AHCs' research and educational missions. As principal sources of care for rare and unusual conditions, and for patients who are very seriously ill, AHCs provide stimulation for new research. Their research mission, in turn, places AHCs at the forefront of the development and testing of new technologies and clinical processes, which are applied not only to the treatment of patients with complex illnesses but also to innovations in the care of patients with more common conditions. As part of their educational missions, AHCs have principal responsibility for training new physicians in the latest technologies, while also diffusing new knowledge into the broader community through continuing education for practicing physicians.

The ongoing transformation of the health care system poses serious challenges to the nation's AHCs and their missions. In its two previous reports, *Leveling the Playing Field: Financing the Missions of Academic Health Centers* and *From Bench to Bedside: The Research Mission of Academic Health Centers*, The Commonwealth Fund Task Force on Academic Health Centers examined the overall financing of AHCs and the future of AHCs' research mission.<sup>1,2</sup> In this report, the Task Force examines the patient care mission of AHCs with respect to the development and delivery of highly specialized, technologically complex services. After defining the specialty care mission of AHCs, the report presents findings regarding this mission based on a review of available data and information and suggests a set of conclusions to guide future policy. It then makes specific recommendations regarding the support and delivery of high technology and specialized services by academic health centers.

## II. DEFINING THE SPECIALTY CARE MISSION

For most patients, AHCs and other teaching hospitals provide services that are similar if not identical to the care available from any large, urban hospital. In defining the unique characteristics of AHCs' patient care mission, however, the Task Force has identified service to "vulnerable populations" as a core "social mission" of academic health centers.<sup>3</sup> Other hospitals, particularly other major teaching institutions, may provide some care to vulnerable populations, but AHCs usually place greater emphasis on this responsibility.

The vulnerable populations served by AHCs consist of two groups. The first, the uninsured and the poor, are "financially vulnerable." Many are unable to afford health insurance, and those who are insured are usually covered under Medicaid. When seeking care, they may have to overcome language or cultural barriers. They are at higher risk for certain conditions, such as low birthweight babies, psychiatric problems, and substance abuse.

The second group, patients with special medical needs, are "medically vulnerable." They need services that are rare, highly specialized, complex, or innovative or that are not readily available from providers in their communities. Examples of these services are complex surgical care such as cardiac valve replacements, special diagnostic services such as positron emission tomography (PET), advanced burn or trauma care, many transplant services, inpatient care for AIDS, and highly sophisticated neonatal intensive care. AHCs perform a number of unique functions in the service of the medically vulnerable. AHCs are the primary sources of advanced surgical services and provide care for patients with rare diseases or comorbidities that complicate the care of otherwise simple problems. They accept transfers from less capable hospitals and provide standby capacity for critical community resources, such as trauma and burn care units.

For many types of specialty care, the contributions by AHCs are not unique. They frequently face competition from other large, urban hospitals whose capabilities may rival those of an AHC. In fact, AHCs' educational mission places them in the ironic circumstance of training their own competitors. Thus, the unique element of an AHC's specialty care mission is a matter of emphasis or degree of specialization. For example, while many hospitals have coronary care and open heart surgical units, AHCs typically use those resources to treat a somewhat different, usually sicker population of patients.

Most important, AHCs' specialty care mission is inextricably linked to their educational and research missions. The next generation of physicians and physician educators cannot be trained adequately without exposure to the latest advances in care and

technology. AHCs also have a responsibility to ensure that new approaches to care become more widely available. New techniques and procedures have a life cycle that begins as super specialized care in an AHC and moves through development, testing, and refinement before becoming part of widely available routine care. Providing care to complex or seriously ill patients may stimulate aspects of AHCs' research and lead to innovations in clinical care. The research mission also includes so-called translational research through which knowledge gained in basic science research is developed for application in patient care, both specialized and routine. Indeed, the line between the specialty care and research missions is often blurred.

Thus, although other institutions may provide some specialty care, the interactions among multiple missions make the demands placed on AHCs for specialty services unique:

- Specialty services in AHCs support the development of innovations in care.
- AHCs provide standby capacity through resources such as burn and trauma units.
- Specialty services in AHCs are integral to the education of physicians and the next generation of physician educators.
- AHCs provide back-up capabilities to care for patients with atypically complex, rare, or unusual conditions.
- Their educational and research missions demand that AHCs provide specialty services regardless of their relative profitability.

The specialty care mission also places unique financial burdens on AHCs:

- Some specialty services, such as burn units, trauma centers, and transplant programs, may involve significant standby costs.
- As institutions of last resort, AHCs often treat patients with extremely complex conditions or significant comorbidities for whom the cost of care may not be fully recognized by existing reimbursement systems.
- Insurance plans may be slow to recognize that new and innovative services are no longer experimental.

- New drugs and equipment, often first utilized in AHCs, may cost more than older technologies.
- When first introduced, new procedures and technologies can be relatively expensive. As their volume increases and they become more routine, their costs can decline significantly. As leaders in the process of innovation, AHCs have much greater involvement in the earlier stages of this economic cycle.

Traditionally, AHCs have cross-subsidized specialty care costs, as well as the costs of their educational and research missions, through earnings on routine patient care activities. In general, increasing competition in health care markets has reduced prices, threatening the availability of funds to cross-subsidize AHCs' social missions.

While competition may result in desirable social outcomes, economic theory recognizes that competitive markets do not work equally well for all goods. Economists distinguish among three types of goods and services: private goods, social goods, and merit goods.<sup>4</sup>

*Private goods* are those that can be purchased individually, have multiple providers, and can be evaluated and understood successfully by consumers. Although experts might argue about the extent of individuals' knowledge regarding the actual costs and benefits of specific health services, many health services can be placed confidently in this category.

*Social goods* are those that cannot be purchased individually, and for which purchase by one confers benefits on all. Basic medical research is typically conceptualized as a social good.

*Merit goods* are those that can be purchased individually and may provide significant benefit to an individual but also confer significant social benefits. Vaccinations are an example of merit goods. The individual purchaser obtains significant value, as he or she is protected from the disease, while society also obtains significant benefits by avoiding the cost of major epidemics if significant segments of the population are vaccinated. Thus the true value of the service is understated if one considers only the benefits accruing to the individual purchaser. Education is another example of a merit good. Young people rarely appreciate the full, long-term benefits of advanced education and might not pursue such education if forced to pay the full cost. Society as a whole, however, clearly benefits from having a well-educated population. Thus government provides significant public support



for vaccinations and education, even though substantial private benefits accrue to individual consumers.

In the case of private goods, economic theory suggests that competition will result in an optimum volume and price. Social goods should be provided, or substantially subsidized, by the government due to the joint benefits they confer. In a free market, merit goods will be under-consumed, since only a portion of their total social benefits accrue to the individual purchaser. Thus, optimal production and use of merit goods requires some level of public support.

The difficulty in applying economic arguments and the concepts of competition to the provision of specialty care is that different kinds of specialty services fall into each of the three categories. Some types of coronary care, such as simple bypass procedures, clearly resemble private goods. These services are offered by multiple providers to individuals who clearly receive the vast majority of the benefits of the care. Economic theory would suggest that, for these services, competition would lead to reduced costs and an optimal provision of care. In contrast, standby capacity is clearly a social good. The entire community benefits from assuring that burn or trauma care is available when needed, and thus such services deserve social support if they are not self-funding.

Other types of specialty care are merit goods, providing a mixture of private and social benefits. On the one hand, a patient clearly benefits when receiving treatment for a rare disease or an unusually complex procedure. On the other hand, if this same treatment is provided in the context of a research or teaching program, society benefits through the accumulation of new knowledge or growth in the number of physicians who are capable of providing it. According to economic theory, these goods would require some form of subsidy to assure optimum availability and use. In the past, subsidies for these services and activities in AHCs were provided *sub rosa* through higher payments for routine care. As price competition for routine care reduces the funds available for these subsidies, however, the need to replace them through explicit public support grows.

Thus, it should be recognized that competition for patients requiring specialty care may create significant problems for AHCs. As in the case of health insurance, where market segmentation into healthy and high-risk populations can have a significant impact on a plan's bottom line, hospitals compete for profitable patients. Some types of specialty care, such as coronary bypass surgery or pacemaker implants—high-volume services with relatively predictable outcomes—are clearly viewed as profitable. Other types of specialty services, such as burn and trauma care units with significant standby costs, are not always perceived as profitable.

The difficulty for AHCs arises from their relative inability to respond to the signals of a competitive market. To fulfill their educational and research missions, AHCs are obligated to provide a broad scope of both routine and specialty services without regard to their relative profitability. By comparison, community hospitals have a high degree of flexibility to eliminate services that are unlikely to be self-supporting. Thus, an AHC's multiple missions interact to impose special burdens on its clinical enterprise. In the absence of policies to subsidize specialty care costs, AHCs will struggle to remain in the business of providing social and merit goods while trying to support them with revenues obtained through the production and sale of private goods. The extent of this burden is difficult to disentangle from other institutional costs, yet it must be considered in any examination of the underlying costs and benefits of AHCs.

Competition in the health care market has other important implications for the provision of specialty services, including some that are potentially both beneficial and harmful. Lower payments from managed care plans, for example, will intensify financial pressure on all hospitals, causing some institutions to restrict services to those seen as profitable. Although this change would reduce access to certain types of care, it could also concentrate specialized care in fewer institutions, such as AHCs, and therefore increase both the economic efficiency of the remaining specialty care units and the quality of care provided. Tracking and understanding the implications of the changing health care market are critical first steps in assuring continued access to valuable services.

### III. FINDINGS

The ongoing transformation of the health care market poses serious challenges to academic health centers and their social missions. The growth of managed care continues to generate financial pressures that threaten to deprive AHCs of support that has traditionally sustained their mission-related activities. Efforts by managed care plans to control costs may also have a significant impact on the availability and patterns of specialty services. To clarify the effects of these changes on AHCs and their continuing ability to provide high technology and specialty care, the Task Force offers ten key findings and supporting analysis.

**Finding 1.** AHCs play an important role in assuring the availability of specialized care. Although many technology-intensive and highly specialized units are concentrated in AHCs, specialized services continue to diffuse into other institutions creating increased competition among hospitals.

AHCs and other major teaching hospitals are the predominant source of some types of specialized care, as shown in Table 1, which displays the share of specialized units offered by different types of hospitals. While AHCs represent only 2 percent of all hospitals with more than 100 beds, they account for 34 percent of all level 1 trauma care units, 22 percent of transplant programs, and 20 percent of burn units. Table 1 also shows the

Table 1: Proportion of Technology-Intensive Units Provided by Hospitals\*

	AHC Hospitals	Other Major Teaching Hospitals	Other Teaching Hospitals	Non-Teaching Hospitals
Number of hospitals	115	222	606	3,968
Percent of all hospitals	2%	5%	12%	81%
<b>HIGH TECH UNITS</b>	<b>Percent of total</b>	<b>Percent of total</b>	<b>Percent of total</b>	<b>Percent of total</b>
Level 1 trauma	34%	28%	25%	13%
Transplant	22%	20%	31%	28%
Burn units	20%	32%	26%	23%
PET scanners	18%	13%	20%	48%
Pediatric ICU	16%	18%	36%	30%
Level 1 ER	16%	19%	18%	48%
Open heart	11%	15%	34%	40%
Neonatal ICU	10%	17%	34%	39%
Angioplasty	10%	14%	31%	45%
Shock-lithotripsy	9%	9%	23%	59%
Radiation therapy	8%	14%	26%	52%
Cardiac catheterization	6%	11%	27%	56%
Single photon imaging	6%	8%	20%	66%
Cardiac ICU	5%	9%	19%	67%
MRI	5%	7%	18%	70%

\* Hospitals with more than 100 beds.

Source: AAMC analysis of American Hospital Association data, 1997.

extent to which high technology services are diffusing into non-teaching community hospitals. Non-teaching hospitals account for 70 percent of hospitals with magnetic resonance imaging units, 67 percent of cardiac ICUs, and 66 percent of single photon imaging units.

The diffusion of high technology services into community hospitals represents both a success and a problem for AHCs. On the one hand, AHCs are succeeding in their role as educators and helping to ensure that such services are widely available. On the other hand, they are producing and training their own primary competitors.

Competition for patients requiring certain highly specialized and complex services may have distinct benefits, especially if competition reduces prices without reducing quality, yet it also may have unintended negative consequences. If patients requiring highly specialized and complex care are dispersed among many hospitals, for example, the volume of care provided by any one institution may be diluted (see Table 2). Competition may also draw profitable patients away from safety net institutions and centers of research and teaching, leaving these essential hospitals financially vulnerable and limiting their ability to develop and test new innovations.

Table 2: Change in Proportion of Institutions Providing Selected Technology-Intensive Units, by Type of Hospital, 1991–97\*

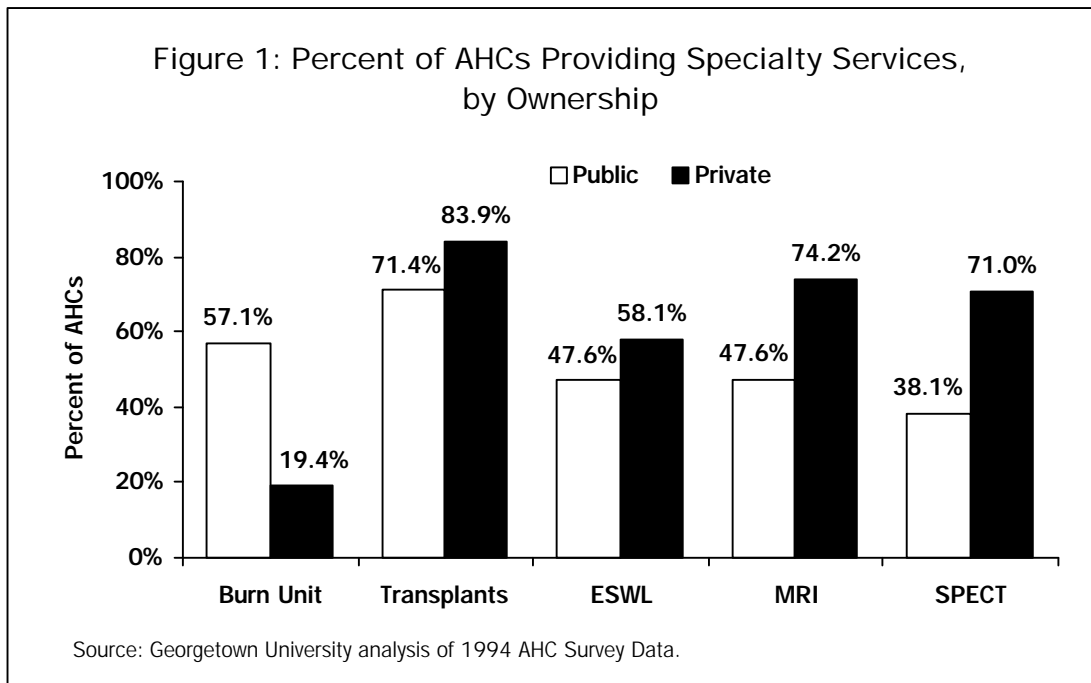
	AHC Hospitals	Other Major Teaching Hospitals	Other Teaching Hospitals	Non-Teaching Hospitals
Number of hospitals	115	222	606	3968
Percent of all hospitals	2%	5%	12%	81%
<b>HIGH TECH UNITS</b>	<b>Percent change</b>	<b>Percent change</b>	<b>Percent change</b>	<b>Percent change</b>
Level 1 trauma	6%	-11%	20%	4%
PET scanners	55%	109%	169%	107%
Open heart	-8%	-8%	8%	2%
Angioplasty	-7%	-5%	7%	-8%
Shock-lithotripsy	-8%	24%	118%	180%
Cardiac catheterization	-7%	-7%	4%	8%
Single photon imaging	14%	-3%	15%	40%
MRI	-8%	-10%	1%	79%

\* Hospitals with more than 100 beds.

Source: AAMC analysis of American Hospital Association data, 1997.

Finally, it should be noted that there are significant differences between public and private AHCs in terms of the number and type of specialized services they provide. A recent study of specialty care in 38 metropolitan areas found that public AHCs were much less likely than private AHCs to provide certain services. As shown in Figure 1, public AHCs were less likely to offer transplant services, extra-corporeal shock wave lithotripsy

(ESWL), magnetic resonance imaging (MRI), and single photon emission computed tomography (SPECT), but more likely to provide burn care.

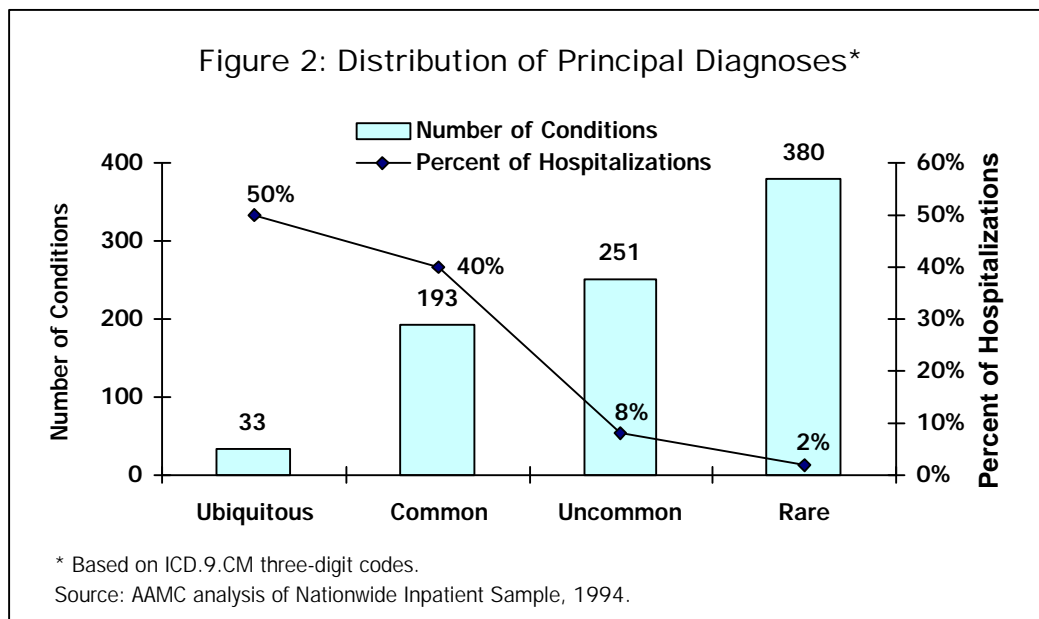


The cause of these differences is not known. It may be that public AHCs are resisting the temptation to duplicate services that are already available in their communities. Alternatively, it may be that they lack the financial resources to invest in these expensive technologies.

**Finding 2.** AHCs are the main providers and initial developers of many rare procedures and treatments.

Major teaching hospitals have long been centers of technology development and diffusion. New advances in clinical care are pioneered at these institutions, and established practices are improved. Patients with rare and complex conditions are often referred to AHCs because of their historical role as developers of leading edge technology. The resulting concentration of such patients at major teaching hospitals has significant implications for patients, society, and the institutions themselves.

A mere handful of conditions account for the majority of hospitalizations in the United States, while the rarest conditions prompt only a minute fraction. Each year, patients are hospitalized for more than 857 different conditions. As shown in Figure 2, the 33 most commonly occurring conditions (classified as “ubiquitous”) accounted for half of all hospitalizations in the United States in 1994.



The next 193 most common conditions (classified as “common”) accounted for an additional 40 percent of hospitalizations. The next 251 conditions (classified as “uncommon”) accounted for another 8 percent, and the 380 rarest conditions (classified as “rare”) accounted for only 2 percent of hospitalizations. Table 3 provides examples of conditions in each category within broad disease types. Many of the “rare” conditions represent unusual diseases, although some are relatively common conditions that only occasionally require hospital inpatient treatment.

**Table 3: Examples of Ubiquitous, Common, Uncommon, and Rare Causes of Hospitalization, by Disease Type**

Disease Type	Ubiquitous	Common	Uncommon	Rare
Neoplasms		Malignant neoplasm of trachea, bronchus, or lung	Malignant neoplasm of larynx	Malignant neoplasm of thymus, heart, or mediastinum
Diseases of the nervous system and sense organs		Epilepsy; Migraine	Multiple sclerosis; Hemiplegia	Cataplexy or narcolepsy
Diseases of the circulatory system	Heart failure; Cardiac dysrhythmias	Cardiomyopathy; Conduction disorders	Acute pericarditis; Acute or subacute endocarditis	Acute myocarditis
Diseases of the respiratory system	Asthma	Chronic bronchitis; Emphysema	Bronchiectasis	Extrinsic allergic alveolitis
Diseases of the digestive system	Cholelithiasis	Chronic liver disease or cirrhosis	Acute or subacute necrosis of liver	Intestinal malabsorption

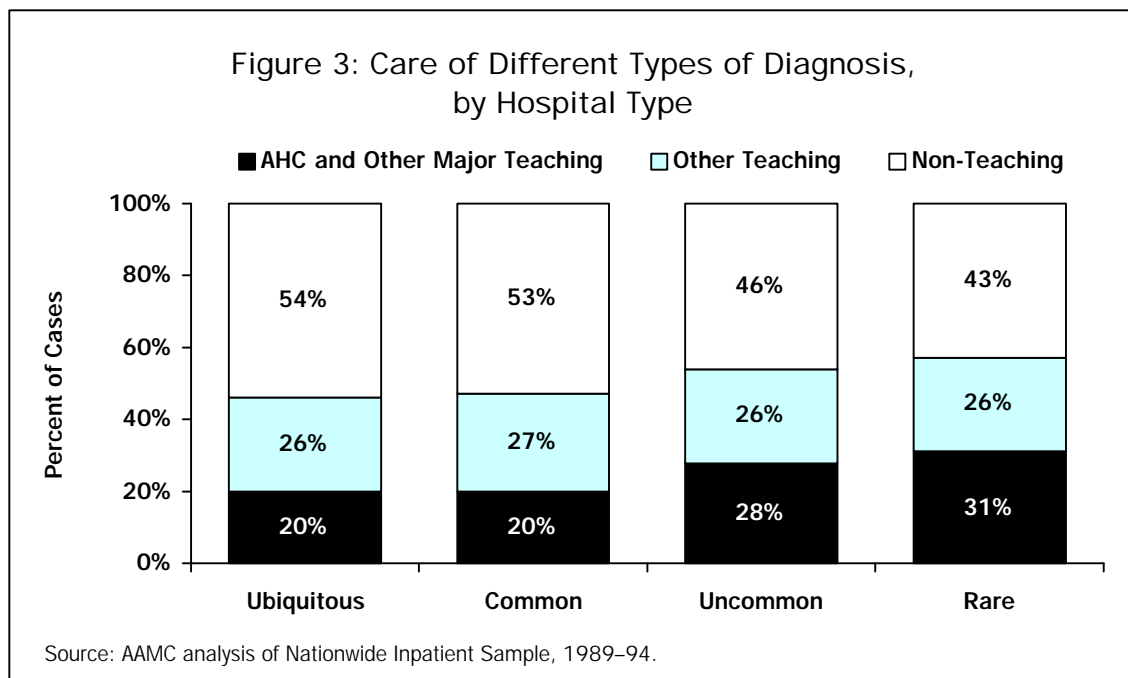
Source: AAMC analysis of the Nationwide Inpatient Sample, 1994.

Patients with uncommon or rare conditions are, on average, more severely ill than other patients and require a greater concentration of resources, as measured using the

diagnosis related group (DRG) rating system. The mean DRG weight for patients with rare conditions is 34 percent higher than for patients with ubiquitous conditions (1.45 and 1.08, respectively). Patients with rare conditions also have a higher death rate while in the hospital (3.2 percent) than patients with ubiquitous conditions (2.4 percent).

Hospitalizations for ubiquitous and common conditions occur frequently. In the United States, more than 500,000 hospitalizations for each ubiquitous condition and more than 70,000 hospitalizations for each common condition occur annually. In contrast, there are only about 10,000 hospitalizations annually for each uncommon condition and only about 1,800 hospitalizations for each rare condition. Hence, the average hospital can expect to encounter each uncommon condition only about twice a year and each rare condition only about once every three years. At such low volumes, these conditions present unique challenges for hospitals, and patients may have difficulty finding providers with the knowledge and experience to meet their special needs.

Many patients with rare conditions ultimately receive care in major teaching hospitals, so treatment of rare and uncommon conditions is consequently more concentrated in those institutions. Over a five-year period, AHCs and other major teaching hospitals cared for one-fifth of the patients with ubiquitous conditions but nearly one-third (31 percent) of patients with rare conditions (Figure 3). Approximately 5 percent of patients receiving care in teaching hospitals for rare and uncommon conditions had been transferred from other hospitals.



Despite the concentration of rare and uncommon conditions in teaching hospitals, these conditions make up only a small proportion of the total volume in these hospitals. Rare conditions account for only 3 percent of the volume of services provided by major teaching hospitals, and uncommon conditions account for another 10 percent.

Over time, the concentration of patients with rare and uncommon conditions in teaching hospitals has been increasing. From 1989 to 1994, the proportion of patients with rare conditions receiving care in AHC and other major teaching hospitals rose from 27 percent to 35 percent, while the proportion of patients with uncommon conditions increased from 26 percent to 32 percent (AAMC analysis of Nationwide Inpatient Sample, 1989–94).

**Finding 3.** AHCs provide a disproportionate amount of some types of specialized services to poor and uninsured patients.

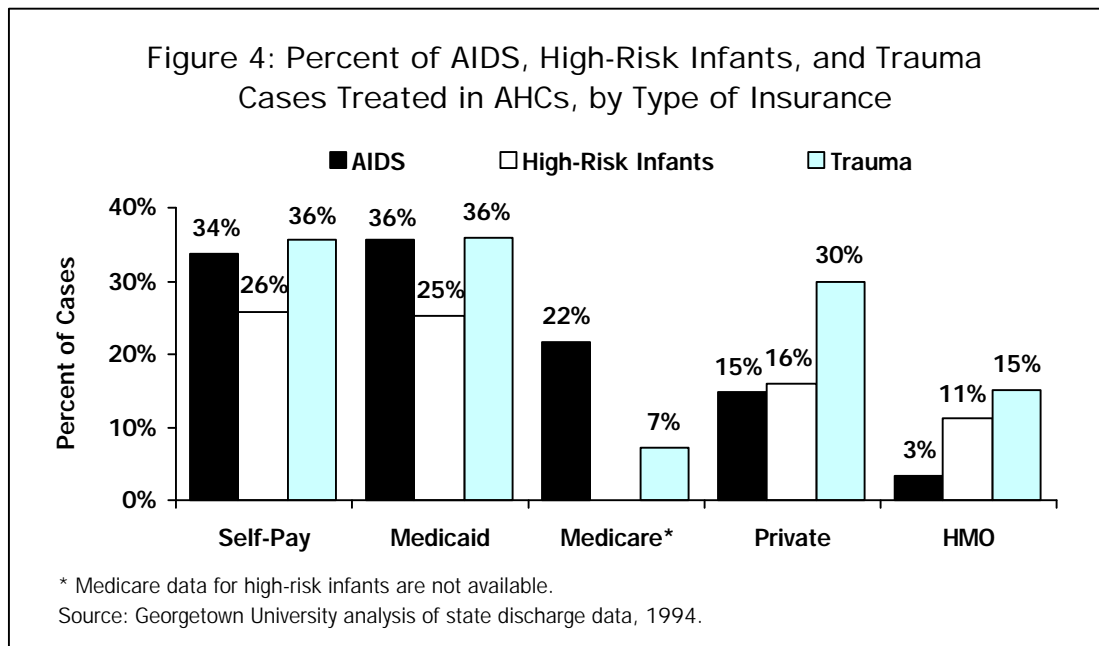
In general, research has shown that low-income, minority, and poor patients are less likely to receive specialty care than other patient groups. For example, non-whites are less likely to receive coronary bypass surgery than whites.<sup>5,6,7,8</sup> Surprisingly, however, a recent study examining patterns of care for procedures that are predominantly performed in AHCs and other teaching hospitals found that underserved populations were more likely to receive a broad range of specialty procedures.<sup>9</sup> Such procedures accounted for 15 percent of all hospitalizations among underserved patients, but only 10 percent of hospitalizations in all other groups of patients. This finding suggests that non-teaching hospitals may be avoiding these patients and steering them to AHCs and other safety net institutions to receive their care.

Minority and poor patients also wait longer to seek care. As a result, they may be sicker and need more specialized services when they eventually seek treatment. Although it could be argued that these patients would be better served by improved access to primary care, hospitals are acting in the current environment as providers of last resort in a system that sometimes fails to encourage early intervention. The finding of high use of specialty care services may also reflect higher need for specific types of care by poor patients, such as burn care and trauma services.

The care of patients with AIDS provides an example of how poor patients requiring specialty care may be channeled into AHCs. A recent study examined patterns of care in 1994 for a variety of specialized services in 38 cities with at least one AHC.<sup>9</sup> In these communities, AHCs represented 5.8 percent of hospitals and accounted for 13.3 percent of hospital beds, yet they provided more than one-quarter (26.4 percent) of all inpatient AIDS care. As shown in Figure 4, the proportion of AIDS cases treated by AHCs varied substantially by type of insurance. AHCs provided care for 36 percent of



Medicaid AIDS cases and 34 percent of uninsured (self-pay) AIDS cases, but only 3 percent of AIDS cases insured by HMOs. AHCs are also the primary providers of trauma care and high-risk infant care for patients who are either uninsured or covered by Medicaid. AHCs provided treatment for 36 percent of Medicaid trauma cases and 36 percent of uninsured trauma cases. They cared for 25 percent of Medicaid high-risk infants and 26 percent of uninsured (self-pay) high-risk infants.



The concentration of poor and uninsured patients requiring specialty care in AHCs is due in part to the role that many AHCs—and public AHCs, in particular—have accepted in providing care to the poor. In the 38 cities studied, public AHCs treated 17.1 percent of all uninsured cases and 10.4 percent of Medicaid cases, while private AHCs treated 5.1 of uninsured cases and 7.6 percent of Medicaid cases. The concentration of specialty care for poor and uninsured patients clearly goes beyond the relative concentration of poor patients in AHCs: these institutions provide care to one in five poor or uninsured cases, yet they treat one in three AIDS and trauma cases and one in four high-risk infants.

**Finding 4.** AHCs provide a broad range of highly specialized services. Assuring the availability of these services contributes to the higher cost of care for all services in AHCs.

Care in academic health centers and in other teaching hospitals is more costly than care in general community hospitals. These higher costs have been attributed to a variety of factors including the location of many AHCs in inner cities; inefficiencies related to

graduate medical education; a higher severity of illness, beyond that reflected in current reimbursement methodologies; standby costs associated with the provision of high technology, low volume services; and the need for AHC hospitals to stay in the forefront of technology.

A variety of analyses have examined the relationship between hospital cost per case and graduate medical education. These analyses have shown a significant relationship between the intensity of a hospital's teaching program, indicated by the ratio of interns and residents to beds (IRB), and costs. The indirect medical education (IME) adjustment in Medicare's prospective payment system (PPS) is based, in part, on this type of analysis. According to the most recent models estimated by MedPAC, the average cost per case increases by approximately 4.1 percent for each 0.1 increase in the IRB ratio, after controlling for case mix and other factors included in the PPS.

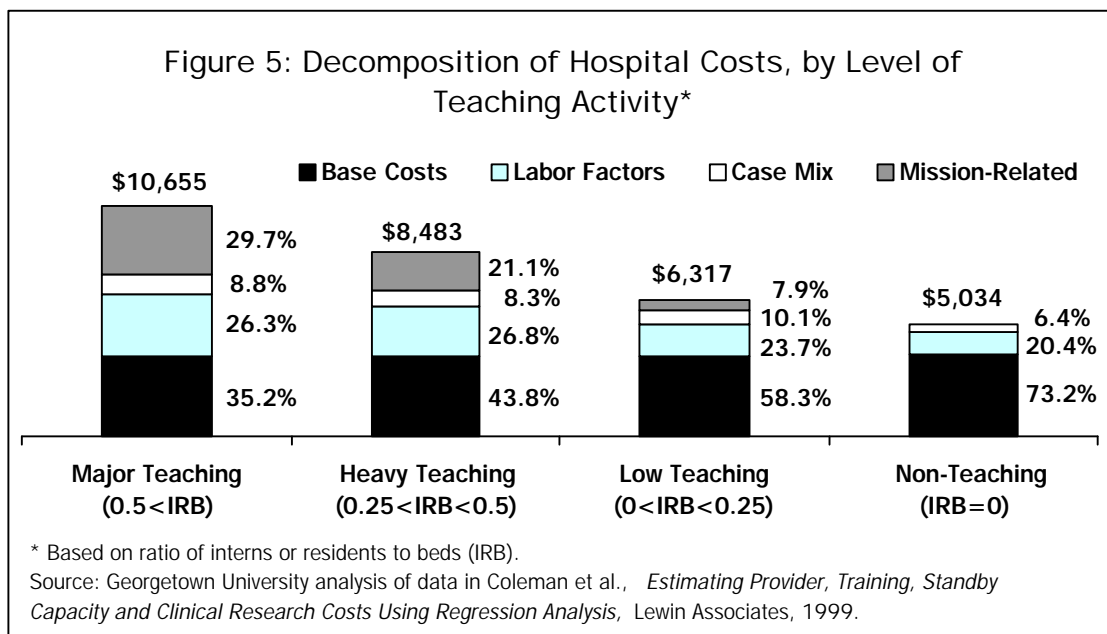
Graduate training, however, is just one factor in these costs. In its initial report, *Leveling the Playing Field*, the Task Force recommended that the formula for reimbursing hospitals under Medicare should reflect all aspects of the social missions of AHCs, including undergraduate medical education, research, and high technology services. Recent research has confirmed that the provision of specialty services, standby capacity for specialized services such as burn care, and clinical research are all related to the higher cost of care in AHCs. This research suggests that it would be possible to develop and implement a new reimbursement formula that takes these factors into account.

Coleman and colleagues, of Lewin Associates, have developed a new formulation of the traditional regression models to explore the relationship between the cost of care and AHCs' mission-related activities.<sup>10</sup> The models are based on data from a variety of sources, including Medicare cost reports, American Hospital Association annual survey data, the United Network of Organ Sharing, and the National Institutes of Health. The regressions include six classes of variables that are thought to be related to the cost of care: (1) Medicare PPS variables, such as case mix, wage index, and IRB ratio; (2) operating performance variables, such as staffing and occupancy; (3) demographic variables describing the communities served; (4) insurance variables, such as share of market insured by commercial HMOs; (5) variables measuring standby capacity; and (6) variables measuring the intensity of clinical research being conducted. The standby capacity variables signify the presence of certain specialized services or equipment, such as burn or neonatal intensive care units, certified trauma centers, or sophisticated imaging or diagnostic equipment. The clinical research variables indicate whether the hospital (or affiliated medical school) holds a General Clinical Research Center grant from NIH and total NIH research funding for the affiliated medical school.

The regression models identify significant, positive relationships between cost per case and the IRB, standby capacity, and clinical research variables. That is, all else being equal, hospitals that maintain more intense graduate medical education programs, certain types of specialized services or standby capacity, or substantial clinical research programs have higher average costs per case.

In addition, the analysis shows that, as the standby capacity and clinical research variables are added into the models, the effect of the IRB ratio on costs declines. In the model limited to PPS reimbursement variables, the coefficient for the IRB ratio was 0.464. In the “best” model (excluding nonsignificant variables), the IRB coefficient was only 0.349. This suggests that the strong relationship between the IRB ratio and hospital cost per case in models limited to PPS reimbursement variables is due in part to the fact that the IRB ratio acts as a proxy variable for standby capacity and clinical research.

Finally, findings from the regression models can be used to decompose variations in cost per case into four elements: base costs, case mix, labor factors (wages and staffing), and mission-related costs. Mission-related costs can be further subdivided into three components: graduate medical education, standby capacity, and clinical research. The results, by level of teaching activity, are shown in Figure 5. Although the order in which the decomposition is made can significantly affect the share of total costs allocated to each factor, the results clearly indicate the magnitude of the relationship between the variables and AHC costs.



There is roughly a twofold difference in average cost per case between non-teaching hospitals (\$5,034) and hospitals with the greatest intensity of teaching (\$10,655), even though the base cost per case (after controlling for the effects of case mix, labor factors, and mission-related costs) is nearly constant across all four categories.\* The mission-related variables have virtually no net impact on the cost of care in non-teaching hospitals, reducing the average cost per case by \$34. In hospitals with substantial teaching programs (IRB>0.5), including most AHCs, mission-related activities account for approximately 30 percent of total cost per case.

As shown in Table 4, medical education accounts for a large majority of the total mission-related costs in AHCs and other major teaching hospitals. Standby capacity accounts for about one-sixth of the total contribution of mission-related activities in these hospitals. Clinical research contributes only about 3 percent to the total impact of missions on costs.

Table 4: Decomposition of Percentage Impact of Mission-Related Costs on Total Costs, by Level of Teaching Activity

	Major Teaching (0.5<IRB)	Heavy Teaching (0.25<IRB<0.5)	Low Teaching (0<IRB<0.25)	Non-Teaching (IRB=0.0)
Teaching	23.3%	17.8%	6.3%	0.0%
Research	0.9%	-0.6%	-0.6%	0.2%
Standby Capacity	4.5%	3.9%	2.2%	-0.9%
Total Impact	29.7%	21.1%	7.9%	-0.7%

Source: Coleman et al., *Estimating Provider, Training, Standby Capacity and Clinical Research Costs Using Regression Analysis*, Lewin Associates, 1999.

Using economic models to examine the impact of eight high technology services on hospitals' costs per case, Reuter and colleagues produced results consistent with the work by Coleman et al.<sup>11</sup> For the eight services included in the analysis—transplants, burn care, regional trauma center, open heart surgery, cardiac catheterization laboratory, MRI, PET scanner, and lithotripsy—the cost of care increased by 1 percent for each additional service provided. When considered separately, only one of the eight services, transplants, was significantly related to costs. Thus the cumulative impact of multiple high technology services may be more important in determining a hospital's cost per case than any individual service or the standby costs associated with particular low-volume services. It may be, for example, that hospitals with substantial high technology capacity attract

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\* Coleman et al. include a small residual error factor in the decomposition. The average residual by level of teaching was very small, ranging from -\$53 in hospitals with an IRB ratio between 0.25 and 0.50 to \$31 in non-teaching hospitals. As the residual is less than 1 percent of total costs, for the sake of simplicity it is included here in base costs.

patients who are more severely ill or who have other special needs that are not accounted for by the DRG classification system.

High technology services and large graduate medical education programs are clearly related. Academic health centers tend to have both the highest ratios of interns and residents to beds and to provide, on average, the highest number of specialized services. Based on current research, however, each mission has a separate, identifiable impact on hospitals' costs.

**Finding 5.** AHC patients tend to be sicker than patients at other hospitals, yet this higher severity of illness is not captured by current reimbursement coding systems.

The system used most commonly today to account for differences in the severity of the cases treated by hospitals is the so-called diagnosis related group (DRG) system. Medicare and other payers use this relatively crude system to assess variations in the mix of cases treated by different hospitals and adjust payments accordingly. Each DRG generally comprises cases with a variety of principal diagnoses. If, within a DRG, AHCs and other teaching hospitals tend to treat a disproportionate share of cases with more complex diagnoses or cases who receive more complex procedures, then adjustments based only on the assignment of patients into that DRG would be inadequate when reimbursing teaching hospitals.

The relative severity of illness of patients treated in AHCs and other teaching hospitals is a matter of long-standing concern. Recent evidence confirms these concerns with two types of analysis: examination of the distribution of diagnoses within DRGs and examination of comorbidities.<sup>12</sup>

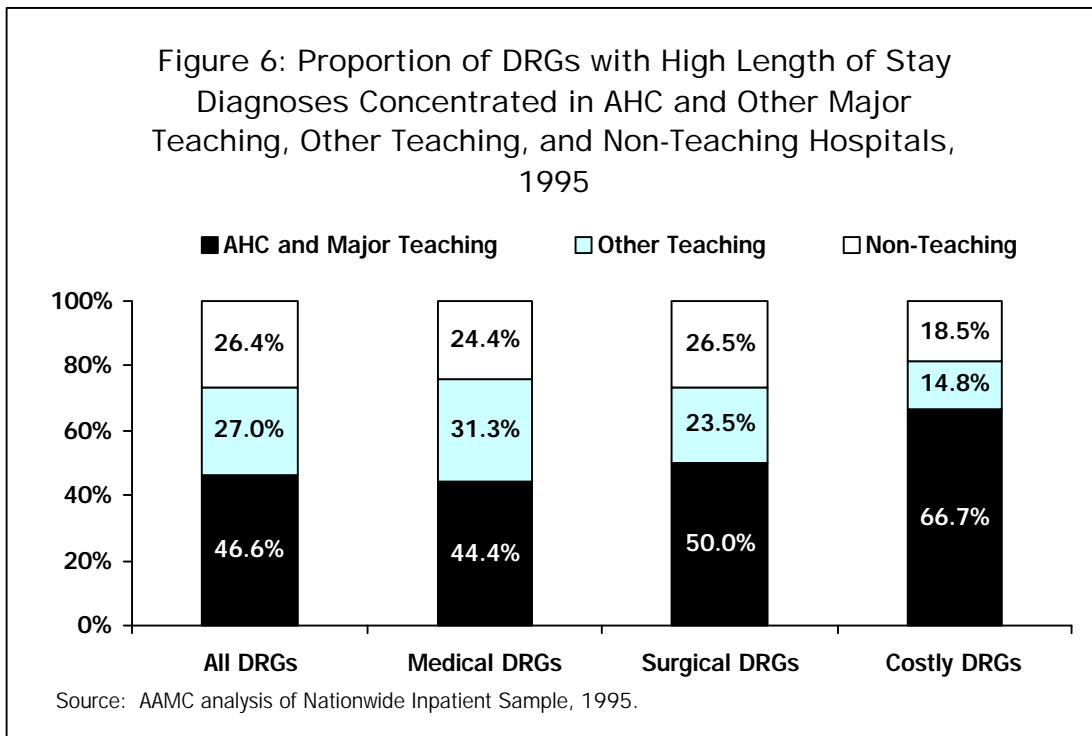
To examine variations in case mix within individual DRGs, the principal diagnoses associated with each DRG were identified. For the 333 DRGs that included more than one major diagnosis, the mean length of stay (LOS) of each principal diagnosis was calculated and classified as high, medium, or low. The distribution of these diagnoses was determined across different types of hospital. For example, Table 5 displays the results for DRG 14, cerebrovascular disorders. For this DRG, diagnoses with low mean LOS represent a higher proportion of cases in non-teaching hospitals, while diagnoses with high mean LOS are more concentrated in AHCs. Patients in AHCs are nearly twice as likely to have a long-stay diagnosis and half as likely to have a short-stay diagnosis, suggesting that AHCs expend significantly more resources to treat patients in this DRG.

Table 5: Distribution of Principal Diagnoses Within DRG 14, Cerebrovascular Disorders

Diagnoses	Mean LOS (days)	Percent Distribution of Diagnoses, by Hospital Type			
		AHC	Major Teaching	Other Teaching	Non-Teaching
Low LOS diagnoses: III-defined cerebrovascular disease Cerebral aneurysm, unruptured	5.4	12%	18%	21%	27%
Medium LOS diagnoses: Cerebral artery occlusion, unspecified; Carotid artery occlusion and stenosis Subdural hemorrhage	7.4	54%	60%	55%	54%
High LOS diagnoses: Intracerebral hemorrhage Cerebral embolism Cerebral thrombosis	10.5	34%	22%	24%	19%

Source: Nationwide Inpatient Sample, 1995.

We examined the distribution of diagnoses among three categories of hospitals: AHCs and other major teaching hospitals, other teaching hospitals, and non-teaching hospitals. If the distribution of high LOS diagnoses were random, one would expect each of these hospital categories to have the most high LOS diagnoses one-third of the time. Instead, of the 333 DRGs studied, nearly half (46.6 percent) had long-stay diagnoses that were more concentrated in AHCs (Figure 6). In a quarter of DRGs, high LOS diagnoses were concentrated in other teaching hospitals, and the remaining quarter were

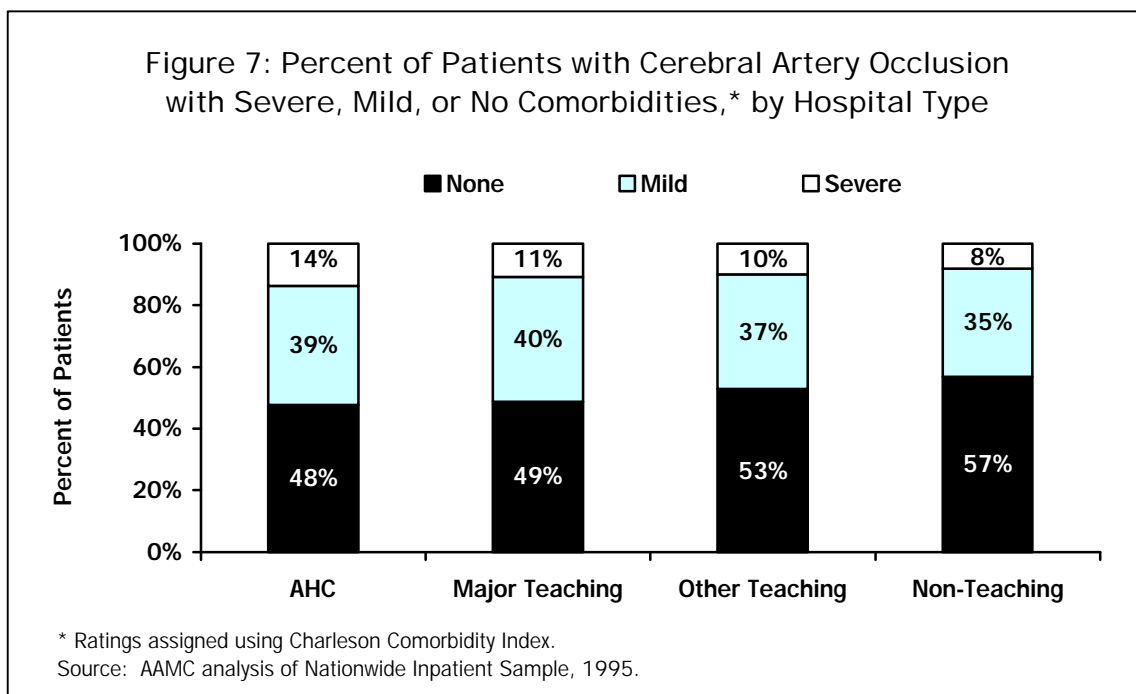


concentrated in non-teaching hospitals. This suggests that, rather than receiving a representative selection of cases within DRGs, which would require an average level of resources, AHCs tend to receive patients who are much sicker and require longer stays.

Alternatively, it may be that AHCs are less efficient at treating patients with these conditions. However, as discussed later under Finding 7, AHCs are often more efficient than community hospitals at treating patients with complex illnesses.

Overall, the average length of stay in AHCs and other major teaching hospitals is approximately one day longer than in non-teaching hospitals. About a third of this difference is explained by DRG case mix. An additional 9 percent, or about 0.1 day, can be attributed to the distribution of diagnoses within DRGs. For AHCs, this unrecognized difference in length of stay amounts to approximately \$150 per Medicare case treated.

In addition to differences among principal diagnoses within DRGs, there are also significant differences in the relative complexity of cases within DRGs among hospital types. That is, patients admitted to AHCs and major teaching hospitals have a greater incidence of comorbidities that may complicate or extend their care. Using the Charleson Comorbidity Index, it was found that patients in DRG 14 who were admitted to AHCs and had a principal diagnosis of cerebral artery occlusion had an average comorbidity index of 0.92, compared with 0.70 for patients admitted to non-teaching hospitals. As shown in Figure 7, over half of the patients in DRG 14 who were admitted to AHCs with cerebral artery occlusion had at least one comorbidity, and nearly 14 percent had a severe comorbidity. In contrast, only 43 percent of patients admitted to non-teaching hospitals had comorbidities.



A significant portion of severely ill patients rely on AHCs and other teaching hospitals for their care. The average patient in these institutions is significantly sicker than the average patient in other hospitals. Some of the differences in case mix between teaching and other hospitals are captured by DRGs, yet considerable variations in both principal diagnosis and comorbidities persist within DRGs.

**Finding 6.** AHCs perform a valuable function in their communities by providing care to severely ill patients transferred from other facilities.

Several studies have shown that patients transferred from one hospital to another are more severely ill and require more complex treatment than other patients.<sup>13,14,15,16,17,18,19,20</sup> Transfer patients use more hospital resources, generate higher charges, and suffer a higher mortality rate than other patients.<sup>12</sup> An AAMC analysis indicates that transfer patients tend to be older, are more likely to have significant comorbidities, and have a higher DRG case weight than other patients.<sup>21</sup> Transfer patients are more likely to undergo surgery and other procedures and are more likely to die while hospitalized. Their average length of stay (13 days) and average total charges (\$24,700) are approximately twice those of other patients (7 days and \$11,900, respectively).

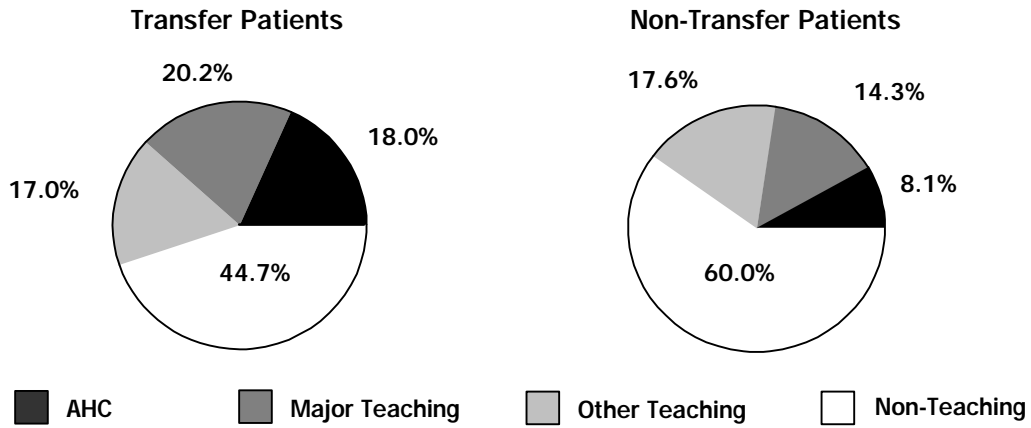
Certain conditions, notably cardiovascular and pulmonary diseases, are common among both transfer and non-transfer patients.<sup>21</sup> There is, however, a noticeable difference in the primary diagnoses of the two groups. In addition, admissions for rehabilitation and other forms of aftercare are more common among transfer patients, while admissions for back problems and biliary disease are more common among non-transfer patients.

A disproportionate number of transfer patients are admitted to AHCs and major teaching hospitals. Data from the Nationwide Inpatient Sample show that more than 40 percent of all transfer patients treated in the United States in 1995 were transferred to an AHC or other major teaching hospital (Figure 8). By contrast, these hospitals served only about one-fifth (22.4 percent) of all other patients. When transferred, charity care, self pay, and Medicaid patients are more likely than other patients to end up in teaching hospitals.

Data from the Nationwide Inpatient Sample show that, between 1989 and 1995, the incidence of transfer patients rose in all types of hospitals. As illustrated in Figure 9, AHCs experienced the greatest increase in admissions of transfer patients. During the three-year period ending in 1995, the proportion of AHCs' patients who were transfers increased by nearly 70 percent, from 4.9 percent of all patients in 1992 to 8.3 percent in 1995.

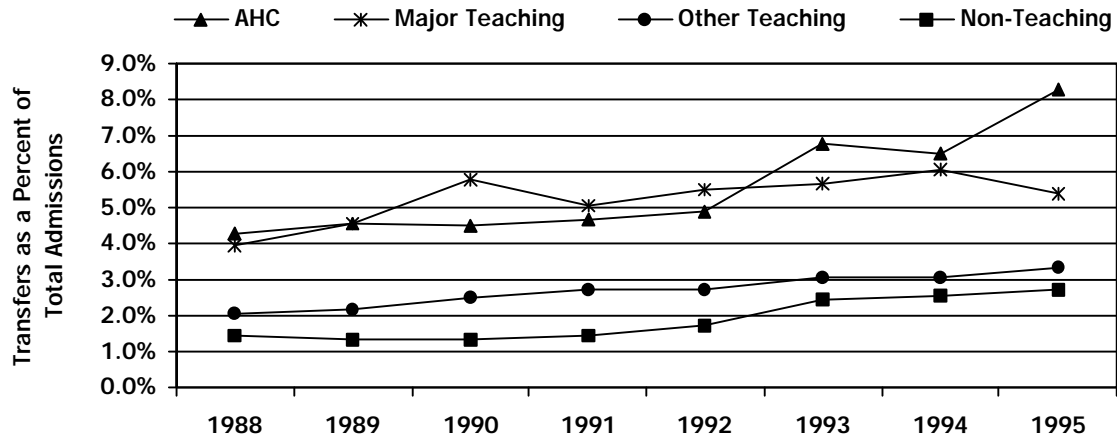


Figure 8: Distribution of Hospitalizations of Transfer and Non-Transfer Patients, by Hospital Type, 1995



Source: AAMC analysis of the Nationwide Inpatient Sample, 1995.

Figure 9: Transfer Patients as a Percent of Total Admissions, by Hospital Type, 1988-95



Source: AAMC analysis of Nationwide Inpatient Sample, 1995.

A key issue for hospitals is the level of compensation they receive for transfer patients from Medicare and other payers. Given their high concentration of transfer patients, this issue is of particular concern to AHCs. As noted above, transfer patients are sicker, have higher mortality rates, have higher and more serious comorbidities, and require a greater commitment of resources than other patients. Although it is not known whether or not these factors are fully accounted for in the DRG classification system, the higher levels of mortality and comorbidities suggest that they are not. Medicare provides

some cushion for providers through additional payments for so-called “outlier” patients, or patients with unusually high costs.\* It is not known how other payers reimburse for transfer patients.

**Finding 7.** Concentrating highly specialized services in a smaller number of hospitals, such as AHCs and other major teaching hospitals, can improve outcomes and reduce costs.

The relationship between a hospital’s volume of surgical services and post-surgical outcomes is well established. This consistent relationship has been reported in the literature for several different procedures.<sup>22,23,24</sup> For some procedures, particularly those that are technically complex, high volume is associated with several important benefits: lower inpatient mortality, fewer postoperative complications, shorter lengths of stay, and lower consumption of resources.<sup>25,26</sup> This observation, that cumulative experience in the production of goods or services leads to lower cost per unit of production, is known as the “experience effect” in the economic literature.<sup>27</sup> In health services, this effect manifests itself in reductions in resource use and improvements in outcome per surgical procedure, as volumes increase for both the surgeon and the institution.

Abdominal aortic aneurysm (AAA) resection provides a new example of the volume-quality relationship. This procedure is a complex vascular procedure, usually associated with high inpatient mortality. In recent years, average mortality for AAA nationally has been in excess of 10 percent.<sup>28</sup> Several studies have shown that hospitals that perform a higher volume of AAAs have lower inpatient mortality, fewer complications, and shorter length of stay than hospitals that perform the procedure less frequently.<sup>23,29,30</sup> Similar findings have been reported for other relatively common complex procedures, such as coronary artery bypass surgery, and for rare procedures, such as Whipple’s procedure (radical pancreaticoduodenectomy). Much of this work, however, has focused on state-specific or institution-level analyses.

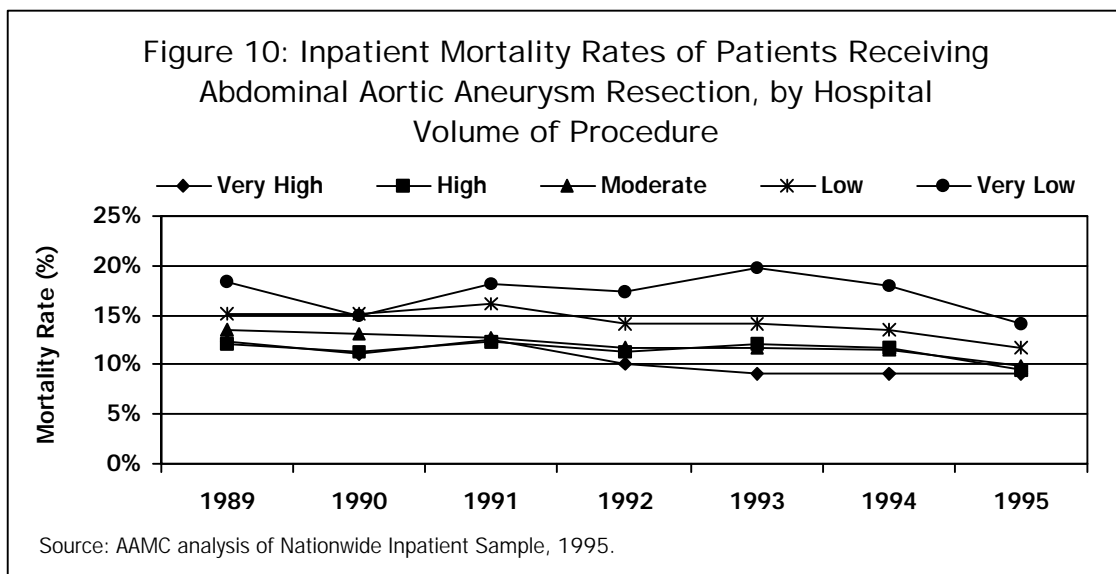
Data from the Nationwide Inpatient Sample (NIS) were used to extend these analyses to the national level and to consider hospitals’ teaching programs. NIS data show that, between 1989 and 1995, the number of AAA resections performed in the United States has been remarkably stable, numbering about 40,000 each year. During this same period, the number of hospitals where the surgery was performed fell by nearly 15 percent, from approximately 3,000 to 2,600. The largest proportional decline was among institutions with low (fewer than 12 cases per year) or moderate (13–39 cases per year)

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\* Although Medicare previously made additional payments for patients with unusually long stays or high costs, “outlier” payments for patients with long stays were phased out in fiscal year 1999.

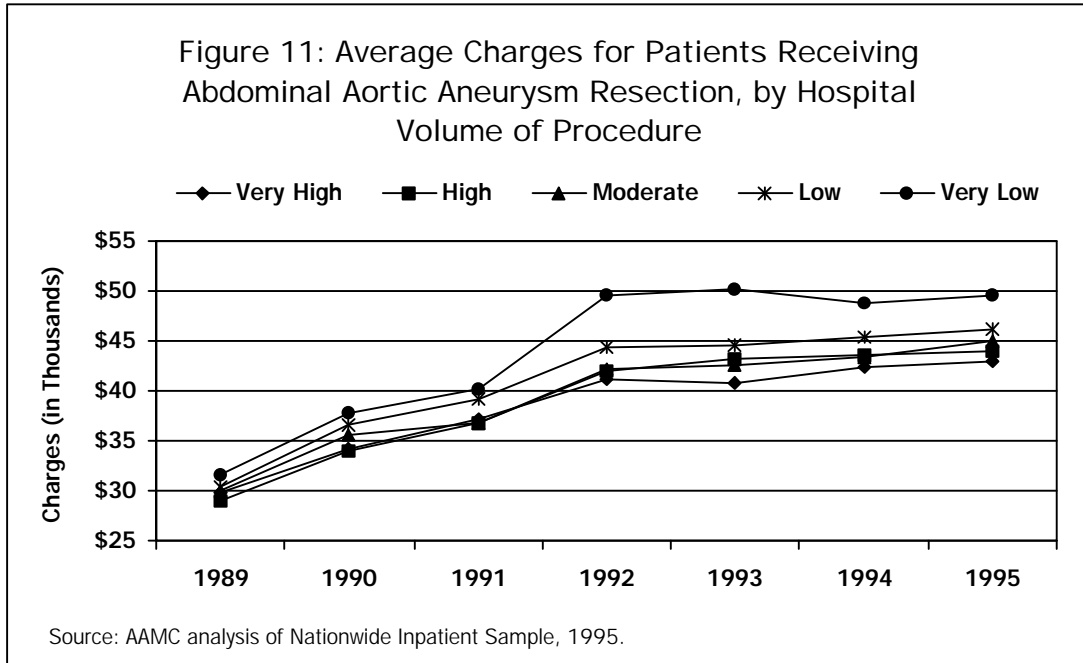
volumes of the procedure. Institutions with the highest annual volumes of AAA surgery were likely to be major teaching hospitals, while lower volume hospitals were almost all non-teaching hospitals.

Between 1989 and 1995, inpatient mortality declined nationwide among patients who had AAA surgery, from 13.5 percent to 9.5 percent. As shown in Figure 10, this decline occurred in all hospital volume categories, yet inpatient mortality was consistently lowest among the high and very high volume institutions. In 1993, inpatient mortality in the lowest volume hospitals was more than 50 percent higher than in hospitals with high volumes of this procedure.



While quality, measured on the basis of inpatient mortality, was better in high volume hospitals, these hospitals achieved this benefit with shorter stays and lower costs. Average length of stay declined nationwide, from 13.7 days in 1989 to 12.8 days in 1995. As with mortality rates, the decline in LOS was greatest in hospitals with the highest volumes of the AAA procedure, from 13.9 to 12.5 days, while average LOS in low volume hospitals remained constant at 14.2 days. As shown in Figure 11, average charges were consistently lower in institutions with higher volume for this procedure. By 1995, the average charge for this procedure in the highest volume hospitals was nearly \$6,600 (13.3 percent) lower per admission than in low volume hospitals.

These findings illustrate that higher volumes of some specialized services in AHCs and other major teaching hospitals can result in treatment at lower costs, shorter lengths of stay, and higher quality.



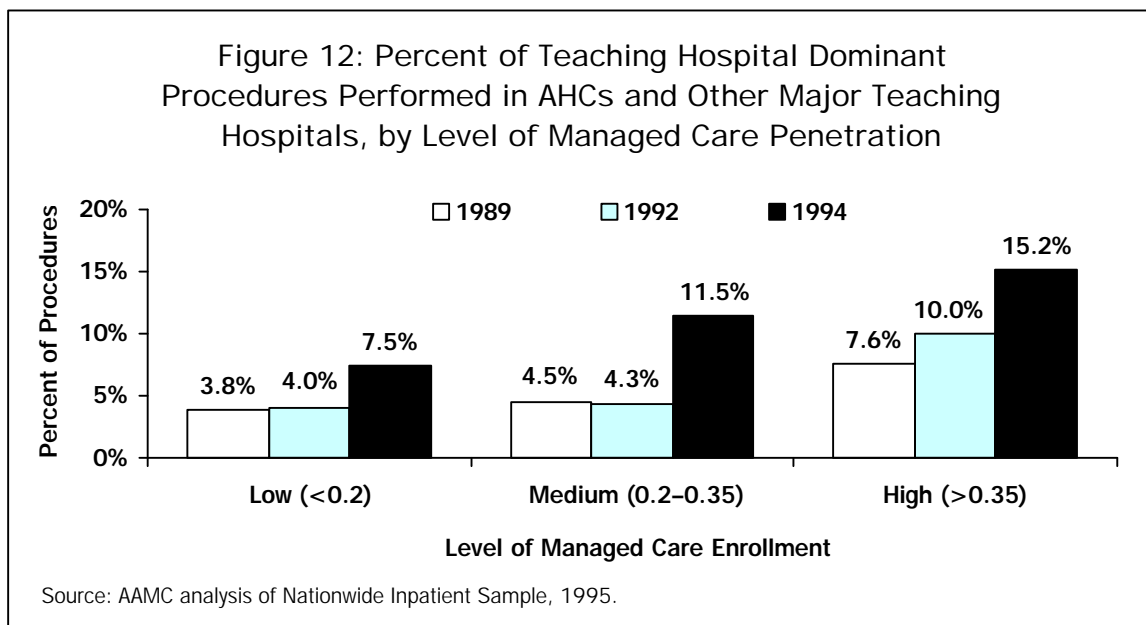
Finding 8. Patients receiving highly specialized services represent only a small proportion of AHC patients, yet the number of procedures for which AHCs are the dominant providers is growing. Competitive markets are accelerating the concentration of these highly specialized services in AHCs and other teaching hospitals.

Markets for hospital services are changing rapidly. Competition is creating financial pressures, which in turn are forcing hospitals to re-examine the mix of services they provide. In response, patterns of care for highly specialized services—services dependent on new technologies and treatments for rare and unusual conditions—are changing. Hospitals reap little benefit from seeking out patients or investing substantial sums to provide these services. As explained under finding 7, low volume hospitals are unable to match either the quality or efficiency of institutions that deliver these services in higher volumes. Previous research has shown that in competitive markets hospitals may try to establish unique niches in their markets, and that hospitals under financial pressure tend to narrow the scope of services they provide.<sup>31</sup>

More recent evidence shows that the process of increasing concentration of some types of specialized care has continued. An analysis by the Center for Assessment and Management of Change in Academic Medicine of the AAMC examined procedures that are concentrated primarily in major teaching hospitals. These procedures, defined as “teaching hospital dominant,” tend to be low volume, specialized, and technology-intensive. They include highly complex treatments involving relatively small numbers of

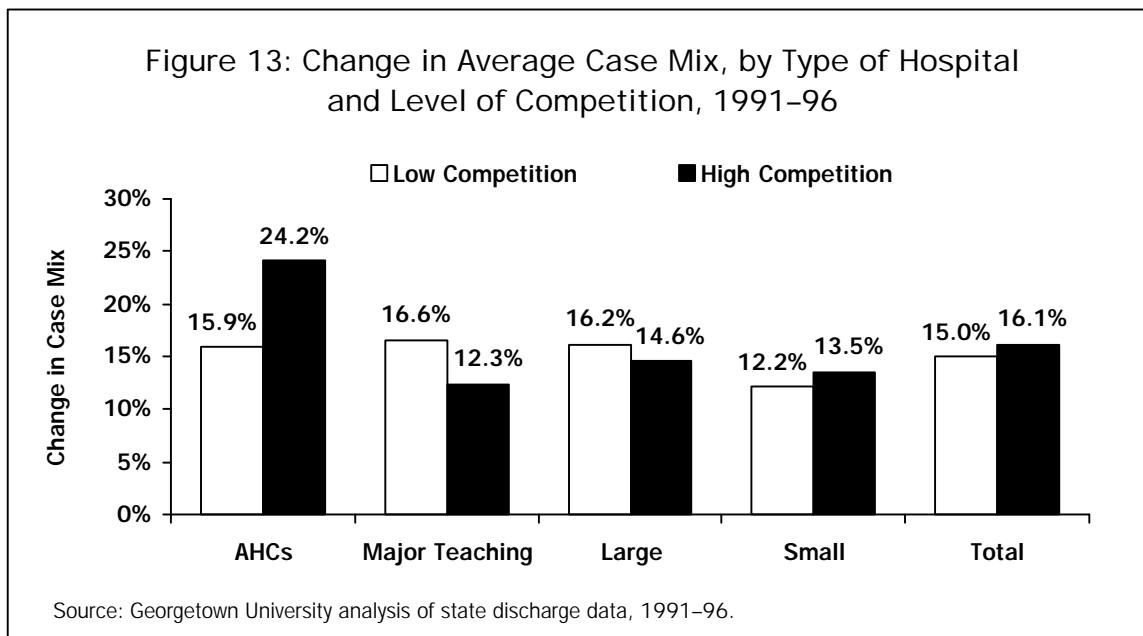
patients, such as organ transplants and reconstructive surgeries; treatments consequent to the presence of standby services, such as trauma and burn centers; and new and emerging technologies. In effect, these procedures represent the unique niches of major teaching hospitals within their markets. All other procedures are classified as “competitive” procedures. Although these constitute a substantial proportion of AHC and major teaching hospital discharges, they are commonly performed in all types of hospitals.

Examination of discharges with teaching hospital dominant procedures reveals several important changes over time. First, the number and proportion of procedures that are concentrated in major teaching hospitals are growing. In 1989, 17.3 percent of the roughly 2,500 different medical procedures were concentrated in AHCs and major teaching hospitals; by 1994, the share had increased to 29.5 percent. Second, although the overall volume of these services is relatively low, they account for a rapidly growing share of all patients in AHCs and major teaching hospitals. Patients receiving these procedures accounted for only 5 percent of admissions in major teaching hospitals in 1989 but 12 percent of admissions in 1994. Third, it appears that managed care penetration is related to the process of concentration. Teaching hospital dominant procedures account for 15 percent of admissions to AHCs and major teaching hospitals in markets with high levels of HMO penetration, but only 8 percent in areas with low levels of HMO penetration (Figure 12).



Data on average case mix also suggest that the concentration of complex care in AHCs is a general pattern across all types of patients in competitive markets. Figure 13 shows the change between 1991 and 1996 in average case mix in urban areas characterized by high and low competition in nine states, by type of hospital. In markets with relatively

low levels of competition, case mix changed at similar rates in all hospital categories, indicating no discernible trend toward increased concentration of complex care in AHCs and teaching hospitals.



The pattern in more competitive markets was very different. In these markets, the change in average case mix in AHCs was much higher than in other hospital types. Although AHCs began the period with an average case mix approximately 20 percent higher than other types of hospitals, their case mix increased over the period by 8.1 percentage points more than the average in their markets. It is interesting to note that case mix grew more slowly in other major teaching hospitals than in any other type of hospital. Additional research is needed to explain this result, but it could be due to increased competition from AHCs or institutional decisions to restrict the scope of services provided.

Changes in the concentration of specialty care raises important questions, for both AHCs and society. From the standpoint of AHCs, does this change represent an opportunity or a threat? On the one hand, institutions may use their position in the current market as a lever in negotiations with managed care plans. On the other hand, if payments do not increase to match changes in relative complexity, unprofitable cases may simply become concentrated in institutions already struggling to finance their social missions. Many hospitals are able to calculate revenue/cost relationships by DRG with some precision. Individual hospitals are doubtless using such data already to understand the mix of their clinical services. Aggregate data from teaching hospitals with sound cost-accounting programs could help answer this question and lead toward better-informed decisions about the scope of services and pricing. From society's perspective, the increased

concentration of complex cases may lead to improved quality and greater efficiency in the use of costly technology. On the other hand, if too many hospitals drop their specialty care programs, access to some types of care may become much more restricted.

Finally, although AHCs appear to have significant power in the market for some specialized services, those services still account for only a small portion of their overall business. Thus their ability to ensure the continued availability of technology-intensive services will depend in part on how well they are able to compete for routine patients. If they are not reimbursed appropriately for their costs, they may be compelled to reduce or eliminate vital services.

**Finding 9.** A unique capability to provide selected specialty services can be a significant advantage to AHCs in highly competitive markets.

Many AHCs have reputations for providing services on the cutting edge of technology. The high costs of such capabilities have traditionally been seen as a disadvantage in competitive markets, although that view is beginning to change as some AHCs learn to use their highly specialized services as a marketing advantage. AHCs have a variety of “natural” advantages that can be helpful if properly marketed to patients and payers. They possess highly trained, and sometimes famous, clinical faculty. Their biomedical research activities give them a reputation for being the first to have whatever new technologies or treatments are developed. Most AHCs maintain a standby capacity of intensive care and special services that are associated with higher quality of care for extremely complex cases.

Because highly specialized services are rare and tend to be concentrated in AHCs, community hospitals are less able than AHCs to realize economies of scale in the provision of those services. In addition, the relative infrequency of need for many specialized services affects the nature of the relationship with insurers. Even large health plans encounter relatively few of these cases and therefore have little experience in pricing them. For cases with extremely high costs, expenses may be covered under a re-insurance plan, thereby minimizing the eventual financial impact on the insurance company. As a result, the usual high level of attention to cost control and aggressive pricing may not apply, especially if there is a presumption of higher quality of care.

Case studies of five AHCs in California and Oregon, among the country's most competitive markets, have provided valuable insights into how institutions are using these advantages to their benefit. Although each AHC is following a different approach tailored to its unique history and local market characteristics, their combined experience suggests that AHCs can use their expertise in specialty care as an advantage in competitive markets.

One effective strategy has been to identify a unique market niche in providing a necessary service that is not available from other local providers. For example, several years ago the University of California at Davis (UCD) agreed to run the area's only level 1 trauma center and now is the sole provider of this service in its community. By acquiring a local public hospital, the University of California at San Diego (UCSD) became an essential community provider and the primary safety net hospital for the county.

A second strategy takes advantage of market forces by offering a product that can be performed efficiently only on a regional basis. For example, University of California at San Francisco and Stanford are the primary providers of highly specialized pediatric services (such as pediatric catheterization and pediatric hematology/oncology) for the region from Oregon to Southern California and have achieved a dramatic rise in pediatric occupancy rates. In spite of the recent collapse of a proposed merger, the two institutions are continuing to cooperate in the area of pediatric care to take advantage of their special position in the market.

As important as gaining market position is deciding how to use it effectively. It has become clear to California AHCs that market position means little without a marketing or pricing strategy. UCD has instituted pricing strategies to take advantage of its unique position as a trauma provider and has achieved a substantial margin on this service through fees charged to privately insured patients. Patients cannot anticipate using the center; many use it "out-of-plan." UCD has also leveraged its position as sole provider to negotiate contracts with health plans for referrals and other secondary and tertiary care business in exchange for better pricing on trauma care. UCSD has taken advantage of its role as the primary provider of services to indigent patients to negotiate significant increases in disproportionate share and graduate medical education payments from the state Medicaid program.

**Finding 10.** For many services, major teaching hospitals provide better quality of care than non-teaching hospitals. These differences in quality arise primarily from more consistent use of standard physician services and drugs.

Major teaching hospitals are often recognized for their contributions in the treatment of rare or severe illnesses, while their contributions to overall quality of care receive less attention. To explore this issue, a recent literature review of studies of quality of care in teaching and non-teaching hospitals was completed.<sup>32</sup> A Medline search identified all articles published from 1989 through 1999 that included at least one key word from each of the following two groups: (1) "academic medical centers," "hospitals, university," or "hospitals, teaching"; and (2) "quality of health care," "quality indicators, health care," or



“outcome and process assessment (health care).” The reviewers also checked the reference lists of the identified articles for additional relevant studies and reports.

The review focused on articles that presented original research comparing quality of care in teaching and non-teaching hospitals in the United States for conditions that often require care by specialists. A total of ten studies met these criteria (see Table 6). Almost all evaluated “major teaching hospitals” (usually defined as members of the Council of Teaching Hospitals or hospitals with greater than 0.25 residents per bed) or “teaching hospitals” in general (with any residency training programs). The selected studies included evaluations of both process and outcome measures. Some outcomes, such as mortality, are closely related to severity of illness. Process measures can be more sensitive than outcomes measures in detecting differences in quality between hospitals. They are particularly useful when process quality of care has been demonstrated to affect outcomes.

Table 6: Quality of Care in Teaching Hospitals:  
An Overview of Selected Studies, 1989–99

Outcome	Population and Data Source	Key Findings (Relative to Non-Teaching Hospitals)
<b>Studies Showing Better Quality of Care in Teaching Hospitals</b>		
1. Hartz et al., <i>NEJM</i> , 1989.	Medicare patients in 3,100 U.S. hospitals, all diagnoses, administrative data	Lower 30-day mortality in private teaching hospitals
2. Brennan et al., <i>JAMA</i> , 1991.	31,429 patients in New York, all diagnoses, medical record data	More frequent adverse events in major teaching hospitals, but less likely due to negligence
3. Keeler et al., <i>Crit Care Med</i> , 1993.	14,008 Medicare patients in 5 states, 5 common diagnoses, medical record data	Better overall quality in major teaching hospitals by process measures and lower 30-day mortality
4. Zimmerman et al., <i>Crit Care Med</i> , 1993.	15,297 patients in intensive care units of 35 U.S. hospitals, all diagnoses, prospective clinical data	Lower in-hospital mortality in major teaching hospitals
5. Rosenthal et al., <i>JAMA</i> , 1997.	89,851 patients in northeast Ohio, 6 common diagnoses, administrative data	Lower in-hospital mortality in major teaching hospitals overall and for congestive heart failure and obstructive airway disease; trend for pneumonia and gastrointestinal hemorrhage
6. Ayanian et al., <i>Health Affairs</i> , 1998.	1,767 Medicare patients in 3 states, congestive heart failure and pneumonia, medical record data	Better overall quality in major teaching hospitals by process measures, particularly physicians' cognitive care and testing

Table 6: Quality of Care in Teaching Hospitals:  
An Overview of Selected Studies, 1989–99 (continued)

Outcome	Population and Data Source	Key Findings (Relative to non-teaching hospitals)
7. AAMC Report, 1998.	U.S. patients; complex pancreatic surgery, abdominal aortic aneurysm (AAA) resection, and coronary bypass surgery; administrative data	Lower in-hospital mortality in high-volume hospitals (4/5 are major teaching hospitals for pancreatic surgery and ½ for other two procedures)
8. Chen et al., <i>NEJM</i> , 1999.	149,177 Medicare patients in U.S., acute myocardial infarction, medical record data	Greater use of beta-blockers and aspirin and lower 30-day mortality in 59 “top-ranked” major teaching hospitals in cardiology
9. Taylor et al., <i>NEJM</i> , 1999.	3,206 Medicare patients in U.S., 4 common diagnoses, administrative data	Lower long-term mortality overall and for patients with hip fracture treated in major teaching hospitals, trend for coronary heart disease
Studies Showing Similar Quality of Care in Teaching and Non-Teaching Hospitals		
1. Rosenthal et al., <i>JAMA</i> , 1997.	89,851 patients in northeast Ohio, 6 common diagnoses, administrative data	Similar in-hospital mortality for acute myocardial infarction and stroke in major teaching and non-teaching hospitals
2. Ayanian et al., <i>Health Affairs</i> , 1998.	1,767 Medicare patients in 3 states, congestive heart failure and pneumonia, medical record data	Similar quality by process measures of therapeutic care in major teaching and non-teaching hospitals
3. Whittle et al., <i>Medical Care</i> , 1998.	22,294 Medicare patients in Pennsylvania, pneumonia, administrative data	Similar 30-day mortality in teaching and non-teaching hospitals
4. Taylor et al., <i>NEJM</i> , 1999.	3,206 Medicare patients in United States, 4 common diagnoses, administrative data	Similar long-term mortality for patients with stroke and congestive heart failure in major teaching and for profit, non-teaching hospitals
Studies Showing Worse Quality of Care in Teaching Hospitals		
1. Ayanian et al., <i>Health Affairs</i> , 1998.	1,767 Medicare patients in 3 states, congestive heart failure and pneumonia, medical record data	Worse quality by process measures of nursing care in major teaching hospitals
2. Whittle et al., <i>Medical Care</i> , 1998.	22,294 Medicare patients in Pennsylvania, pneumonia, administrative data	Higher 90-day mortality in teaching hospitals

Overall, the selected studies suggest better quality of care in teaching hospitals. However, in some cases the conclusions varied within the same study depending on the clinical condition or on the aspect of care that was examined. Thus, nine of the ten studies found evidence of better quality of care in teaching hospitals than in non-teaching hospitals, four studies found similar quality, and two found some evidence of worse quality in teaching hospitals.

One study, based on a detailed review of explicit process criteria and structured chart review by physicians trained in quality assessment, found that Medicare patients hospitalized in five states during 1981–82 and 1985–86 with congestive heart failure, myocardial infarction, pneumonia, stroke, and hip fracture, received better quality of care in major teaching hospitals.<sup>33</sup> Adjusting for the greater severity of illness among patients in major teaching hospitals, these differences in quality were associated with approximately 3 fewer deaths per 100 patients (a 3 percent difference in mortality) within 30 days of admission.

A more recent study employing very similar process measures found that Medicare patients hospitalized for congestive heart failure or pneumonia in Illinois, New York, and Pennsylvania during 1991–92 experienced better overall quality in major teaching hospitals than in non-teaching hospitals.<sup>34</sup> The better quality in major teaching hospitals was associated with more consistent use of routine physician services, such as thorough history-taking and physical examinations and appropriate use of common diagnostic tests. There was evidence of better nursing care in non-teaching hospitals, although one plausible explanation is that interns and residents in major teaching hospitals assume some duties performed by nurses in non-teaching hospitals.

*U.S. News and World Report*, which regularly reports on the nation's top hospitals, recently identified the 60 U.S. hospitals rated most highly for cardiology. Of those, 59 were major teaching hospitals. A study of a national sample of Medicare patients hospitalized with myocardial infarction in 1994–95 found that adjusted 30-day mortality rates were about 15 percent lower in those 60 hospitals than in other hospitals. The mortality rate was 15.6 percent in the top hospitals, 18.5 percent in other hospitals equipped to perform invasive cardiac procedures, and 18.6 percent in hospitals without this capability.<sup>35</sup> In the latter two groups, only 19 percent and 2 percent, respectively, were major teaching hospitals. Lower mortality in the top-ranked hospitals was largely explained by their greater use of aspirin and beta blockers, not "high-tech" services such as coronary angioplasty or thrombolytic therapy. Another study of a subset of this national cohort found that differences in quality may be due to higher volumes of these procedures

in teaching hospitals. That is, teaching status was not a significant predictor of mortality after adjusting for the higher volume of teaching hospitals.<sup>36</sup>

Other investigations have also found evidence of higher quality of care in teaching hospitals after adjusting for differences in the severity of patients' illness. In a study involving 3,100 U.S. hospitals, Medicare patients hospitalized during 1984 had significantly lower 30-day mortality rates in private teaching hospitals than in non-teaching hospitals: 108 and 116 per 1,000 patients, respectively, or about a 1 percent difference in mortality.<sup>37</sup> In a prospective study of patients treated in intensive care units, mortality rates in 14 major teaching hospitals were approximately 20 percent lower than in 23 other hospitals. This study used detailed clinical data to adjust for differences in patients' risk.<sup>38</sup>

Another study examined care provided to a large cohort of patients in 30 Ohio hospitals admitted during 1991–93 for myocardial infarction, congestive heart failure, pneumonia, stroke, airway disease, and gastrointestinal hemorrhage. Risk-adjusted in-hospital mortality was 19 percent lower in the five major teaching hospitals when all conditions were combined.<sup>39</sup> When each condition was examined separately, mortality was significantly lower for patients with congestive heart failure and obstructive airway disease. Lower mortality was observed for pneumonia and gastrointestinal hemorrhage, but the differences were not statistically significant.

As previously discussed under Finding 7, higher volumes of some procedures in AHCs and major teaching hospitals account for some differences in quality between teaching and non-teaching hospitals. Hospital mortality is lower in high-volume hospitals across the United States for patients receiving complex pancreatic surgery, abdominal aortic aneurysm resection, and coronary artery bypass surgery.<sup>40</sup> About four-fifths of these high-volume hospitals are major teaching hospitals for pancreatic surgery, and about one-half are major teaching hospitals for the other two procedures, while major teaching hospitals comprise a small proportion of low- and moderate-volume hospitals.

As might be expected in such a large and diverse literature, not all studies of hospital quality of care conclude that teaching hospitals do better. For example, there were no differences in 30-day mortality between teaching and non-teaching hospitals among Medicare patients hospitalized with pneumonia in Pennsylvania during 1990, although 90-day mortality was higher in teaching hospitals.<sup>41</sup> In another study comparing mortality rates among faculty and community services in a single university hospital, significant disparities in mortality occurred during the hospital stay, but these differences virtually disappeared when the authors assessed outcomes nine months later.<sup>42</sup> Also, major teaching

hospitals may perform less well on patient-reported measures of interpersonal care,<sup>43</sup> although few data are available to assess these types of quality measures.<sup>44</sup>

In summary, major teaching hospitals have lower mortality rates than non-teaching hospitals for some conditions involving specialty care, such as heart disease and hip fracture, but not others, such as pneumonia and gastrointestinal bleeding. They may also have lower mortality rates associated with intensive care services. The mechanisms by which major teaching hospitals provide better technical quality of care and outcomes remain to be determined. Some of this difference probably arises from volume effects. Other mediators may include a greater intensity of physicians' services (from the joint efforts of residents and attending physicians) and more rapid adoption of medical innovations.

## IV. CONCLUSIONS

In reviewing the status of specialized and high technology services, the Task Force has reached several conclusions that should guide private management and public policy with respect to AHCs.

1. The availability of high technology and specialized services is an essential characteristic of a well-balanced health care system in an advanced industrialized society.

Although many believe that our health care system has put too little emphasis on preventive and primary care services and too much emphasis on high technology and specialized services in the past, the fact remains that the United States has sufficient wealth and knowledge to make appropriate high technology and specialized services available to all who need them. Since AHCs are major providers and developers of such services, public policy toward these institutions must address their unique role in assuring the availability of high quality, cost-effective specialized and high technology services.

2. Although data on the comparative costs and quality of specialized and high technology services in alternative settings are incomplete, available evidence suggests that academic health centers are essential and/or preferred providers of a number of such services in many markets.

As noted in Findings 1–3, AHCs play a disproportionate role in providing a variety of high technology services and caring for rare illnesses. Constituting only 2 percent of all hospitals, AHC facilities operate 34 percent of the nation's level 1 trauma units, 22 percent of its burn units, and 20 percent of PET scanners. AHCs account for 31 percent of admissions for the rarest conditions seen in U.S. hospitals. As noted in Finding 7, relationships between volume of services and hospital costs and outcomes suggest that the disproportionate numbers of high technology and specialized services provided in AHCs may increase the quality and reduce the costs of such services in these institutions, making AHCs the preferred providers in many communities.

3. AHCs play a vital role in research that leads to the development and improvement of high technology and specialized services and in teaching health professionals to deliver those services effectively. Therefore AHCs must continue to be involved in the provision of those services.

AHCs conduct 28 percent of all health care research and development in the United States. Uniquely positioned to apply new insights from basic biology to the care of patients,<sup>2</sup> AHCs are important sources of new diagnostics and treatments, including many

high technology and specialized services, and the primary trainers of the subspecialists who provide complex and advanced medical care. To continue to play those roles, AHCs must continue to serve sufficient numbers of patients who require innovative services.

4. Specialized and high technology services add significantly to the costs of institutions that provide them. Some costs may be difficult to recover fully in competitive health care markets.

Finding 4 presented evidence that specialized and high technology services increase the overall costs of hospitals, after controlling for such factors as volume, case mix, and local costs. The comparatively small number of cases requiring certain specialized services, and the high cost of the infrastructure required to provide them, may contribute.

Alternatively, hospitals that provide a wide range of specialized services may attract sicker patients in all diagnostic categories, thus contributing to higher costs. As noted under Finding 5, current case mix measures are imperfect and may not capture this effect.

Providing specialized services also tends to involve institutions in teaching and research on these services, which add further to costs. Whatever their source, these extra expenses are difficult to recover in competitive markets because of the pressure to price all services as close to marginal costs as possible.

5. Competition for specialized and high technology services is leading to the dispersion of some services and the concentration of others. In price-sensitive markets, profitable services will tend to locate outside AHCs and unprofitable services will tend to concentrate within AHCs.

Unlike community competitors, AHCs are often unable to drop unprofitable services without jeopardizing their research and teaching missions. For example, an inner-city AHC that discontinues its trauma center because of losses associated with uninsured victims of violence could lose accreditation for training emergency physicians, surgeons, urologists, and orthopedists. This dynamic assures that unprofitable high technology and specialized services will be maintained at AHCs. At the same time, non-teaching facilities will avidly compete for profitable high technology and specialized services, often relying on skilled physicians trained at local AHCs.

6. Market forces alone are unlikely to ensure that high technology and specialized services will be developed or provided in ways that appropriately balance geographic availability, cost, quality, opportunities for innovation and improvement, and opportunities for research and training.

High technology and specialized services have many of the properties of social and merit goods. Americans believe that if a treatment exists that can cure or ameliorate disease,

someone should provide it regardless of whether or not it is profitable to do so. Strong public sentiment also demands that all Americans—even members of geographically isolated or economically disadvantaged communities and groups—should have access to complex, costly care if they truly need it. The public also supports research and development to improve the provision of such services and the training of physicians who can deliver them with skill and efficiency. Yet markets do not reward the provision of costly care to all populations, nor do markets adequately support research, development, and training.<sup>3</sup> Therefore we cannot rely on market forces to optimize the distribution and use of high technology and specialized services.

Public policy intervention may be needed to assure that private markets offer Americans the optimal mix and location of high technology and specialized services and to assure appropriate levels of related research and teaching. Government at many levels—federal, state, and municipal—may have a legitimate role in achieving these ends. The history of government in planning and paying for high technology and specialized services is, of course, far from perfect. Health planning was tried and abandoned in many states before the health care system turned to its current reliance on market forces to allocate resources.

The challenge will be to find an appropriate balance between competitive forces and public policy—a balance that promotes efficiency, flexibility, and innovation in high technology and specialized services, but also assures equity in availability and use of such services. Achieving the best possible mix of governmental and market pressures will require continued experimentation and public-private dialogue.



## V. RECOMMENDATIONS

Based on the preceding findings and principles, the Task Force makes the following recommendations concerning the provision of high technology and specialized services in AHCs.

**Recommendation 1.** Providers of high technology and specialized services, including AHCs, should continue their efforts to reduce the costs of those services.

Finding 7 presented evidence that concentrating high technology and specialized services in a small number of providers, including AHCs, may reduce the costs of such services. The Task Force believes that additional savings, along with quality improvements, can be achieved through the use of guidelines and critical paths, techniques that have been associated with quality improvement and cost reduction in other areas. AHCs and other providers of high technology and specialized services should continuously redesign the processes of care at their institutions. To do so, they will need to create an internal capacity for research and development that can be applied to redesigning work processes within AHCs, including the provision of costly, high technology, and specialized services.

At the same time, the Task Force recognizes that the rapidly increasing cost of supplies, and especially pharmaceuticals, for AHCs and other providers limits their ability to reduce expenses. Restraining the rate of increase in expenditures on both complex and routine care will require new strategies for managing the cost of health care supplies. Developing these strategies is a challenge that the health care system must address collectively.

**Recommendation 2.** All purchasers and insurers, including employers and managed care organizations, should assure that their members have the opportunity to utilize the highest quality and most cost-effective providers of highly specialized and complex services. Where data are insufficient to identify such providers, and where an AHC is an alternative, purchasers and insurers should permit patients to choose AHCs for those services.

Until better data are available on the comparative cost-effectiveness and quality of care among alternative providers of high technology and specialized services, purchasers and payers face a dilemma about how to choose vendors of those services. Should they choose solely on the basis of price? Or should they take into account the reputation for quality of AHCs?

Although AHCs' reputations are increasingly supported by hard data, as Finding 10 demonstrates,<sup>45,46</sup> existing studies are limited to a small number of diagnoses (such as heart attack and stroke) that occur with sufficient frequency to permit convenient quality assessment. Thus, necessary evidence may not be available concerning many high technology and specialized services. For particular conditions in particular markets, non-academic providers may provide care that is comparable or superior in quality to that provided by academic providers.

In the face of such uncertainties, the Task Force believes that purchasers and insurers should permit patients and their physicians to choose to receive high technology and specialized services in an AHC. This recommendation is consistent with the increasing tendency of many employers to purchase or make available point-of-service plans for their employees. As part of this effort to assure that patients can choose the optimal sites for high technology and specialized services, purchasers and insurers should distribute the best available data on the cost and quality of services provided at alternative sites in their communities.

**Recommendation 3.** Public policymakers and private purchasers should assure that high technology and specialized services are provided in appropriate amounts and sites. This may require new regulatory interventions and the development of appropriate financial incentives for providers, including the designation of centers of excellence and selective contracting.

The Task Force recognizes that singling out categories of service for extra payments can create incentives that lead to excessive provision of care. A number of options are available to reduce this risk. One is to restrain the number of sites providing such care by designating centers of excellence within given regions and markets and targeting extra support for high technology and specialized care to these centers. Medicare has implemented center of excellence programs for several tertiary services, including coronary artery bypass grafting (CABG) and transplants.

In the future, centers of excellence should be chosen on the basis of data concerning the quality, profitability, accessibility, and cost-effectiveness of high technology and specialized services within a given region or market. In some very competitive markets, a trend toward concentrating high technology and specialized services in AHCs seems to be under way already. This may make it easier to identify centers of excellence, but it will not eliminate the need for extra payments, since some services concentrating in AHCs are economically disadvantageous. In selective contracting with centers of excellence, public and private payers should assure that actual costs, not

just marginal costs, of services are covered. In the past, marginal cost reimbursement by some payers to centers of excellence for high technology and specialized services has resulted in undercompensation of fixed costs and cost shifting onto other services and payers.

Recommendation 4. Public policymakers should strive to assure that AHCs and other providers of high technology and specialized health care services are not only adequately compensated but also motivated to provide those services as efficiently and effectively as possible.

- a. Where private markets fail to pay reasonable costs of providing appropriate, high-quality, cost-effective services, public policy should provide extra payments that protect the access of Americans to such care. The payments should be carefully titrated to the needs of the American people and should not lead to excess provision of services.

In this report and in previous work, the Task Force has noted that the social missions of AHCs often add to their costs in ways that are difficult to recover in price-sensitive markets.<sup>3</sup> Finding 4 presented evidence that involvement in the provision of high technology and specialized services contributes to the extra costs of AHCs and noted several possible explanations for those costs. Some high technology and specialized services are sufficiently rare that it is impossible to charge and collect enough to cover the full expenses from the few patients who use them. To provide such services requires supporting standby capacity—underutilized staff and equipment—that are available for the infrequent cases when they are needed. Additional contributors include unrecognized case mix and socioeconomic differences between patients receiving high technology and specialized services at AHCs and patients receiving services from other providers. Superior quality of service at AHCs may add further to these extra costs.

Whatever the reason for the extra costs, failure to cover them will have important societal consequences. It will reduce the availability of such services and/or their quality. Although relatively few individuals benefit directly from high technology and specialized services, many more benefit from the knowledge that, should they need them, the services will be reasonably accessible, both geographically and financially.

Price-competitive markets create incentives to consider the effects of providing each service on the bottom line of the organization. Maintaining standby capacity is inefficient, and cost-conscious providers have an incentive to drop it. In other industries, specialized products can often be manufactured at a distance and shipped to customers,

thus allowing geographic concentration of supply and the realization of efficiencies associated with producing higher volumes. In health care, however, patients must physically travel to the supplier. The advantages of concentrating specialized and high technology services in a few locations must be balanced against the advantages of geographic accessibility. Achieving this balance will, in the Task Force's view, require that some organizations providing specialized and high technology services receive public support for continuing to provide those services when they are unprofitable. Such extra support should rely on mechanisms discussed in Recommendation 3 and on other devices to assure that incentives to provide excess services are minimized.

- b. The Medicare program should reimburse the full, fair costs associated with providing high technology and specialized services.

A number of potential mechanisms could convey necessary support to providers that cannot recover the costs of providing essential services in competitive markets. The concentration of high technology and specialized services within AHCs and the multiple social missions (research, teaching, and care of the poor and vulnerable) they pursue in providing those services call for public policies specifically designed to preserve AHCs' ability to deliver specialized care. In the past, the Task Force has recommended the creation of an Academic Health Services Trust Fund to support all the social missions served by AHCs. The Task Force has also recommended the convening of an Academic Health Services Payment Commission to refine methods for tracking and supporting the social missions of AHCs, whether performed in AHCs or elsewhere, on an ongoing basis. These mechanisms represent reasonable steps toward fulfilling the recommendations of this report.

In addition, and whether or not policymakers support the concept of a trust fund, they should recognize that the Medicare program has an obligation to support the extra costs associated with providing high technology and specialized services in AHCs. Like all Americans, Medicare beneficiaries benefit from the availability of those services in the nation's academic health centers. Not only are Medicare beneficiaries more likely than the average American to need such care, but they also benefit, as do all citizens, from AHCs' training of professionals and from research and development that contributes to the improvement of care. Some of the extra costs associated with providing high technology and specialized services in AHCs have historically been supported through indirect medical education payments, which were designed to cover the extra costs of hospitalizing Medicare beneficiaries in teaching hospitals, including academic health centers. The role of IME payments in sustaining the high technology and specialized services provided by AHCs constitutes an additional rationale for continuing those payments at adequate levels

in the absence of more sweeping reforms in how the nation supports the social missions of AHCs.

- c. The role of AHCs in providing high technology and specialized services illustrates the general requirement that payments for all services and providers be adjusted for case mix and severity of illness. Until health status adjusters are used generally, a strong rationale will persist for extra payments to cover the costs of providing high technology and specialized services in AHCs.

Finding 5 presented evidence that patients receiving specialized and high technology services in AHCs and major teaching hospitals are sicker than patients receiving similar services in other institutions. With rare exceptions, neither public nor private payers adequately recognize these differences in case mix and severity of illness, although outlier payments are helpful in reducing burdens associated with the sickest and most expensive patients. Without appropriate adjustments, price competition will selectively disadvantage institutions that attract such patients, including AHCs.

Congress has mandated that Medicare adopt new case mix adjusters to be applied to payments for all services covered by managed care organizations. However, available case mix adjusters suffer from a number of technical limitations, and there is no certainty, as yet, that adjusters will be applied by managed care organizations to the payments they make to AHCs and other institutions likely to attract the sickest Medicare patients.<sup>47</sup> For privately insured patients, the use of case mix adjustment is exceedingly rare. Interestingly, this is true for Medicaid patients as well. Despite the widespread implementation of Medicaid managed care, few if any states use risk adjusters in paying managed care organizations or require that plans use risk adjusters in reimbursing AHCs or other providers of specialized services.<sup>48</sup>

An ideal payment system would compensate providers based on the value of the work they do. Such a system would take into account both the level of illness of patients served and the quality and cost of services rendered. Such a system would greatly reduce the need for extra payments to support the provision of high technology and specialized services at AHCs. However, until technical and political obstacles to the development and use of improved payments systems are overcome, a compelling rationale will persist for providing AHCs and other providers of high technology and specialized services with additional payments that defray the uncovered costs associated with the sicker patients they serve. Failing to do so may lead increasing numbers of AHCs to abandon important services, even as those services are increasingly concentrated in academic institutions.

The Task Force recognizes that the development of accurate and useful risk adjustment methodologies would benefit greatly from the involvement of AHCs and their faculty. The Task Force also believes that risk adjusters for measuring outcomes and quality of care, although potentially as important as adjusters for costs of care, have received too little emphasis in the past. Without outcomes-related risk adjustment, value-based purchasing will continue to be an elusive goal.

- d. The disproportionate role of AHCs in providing high technology and specialized services to poor and uninsured patients illustrates the general need for universal health insurance coverage. Until universal coverage exists, a strong rationale will persist for extra payments covering the costs of providing high technology and specialized services in AHCs.

Work by Reuter and colleagues, summarized in Finding 3, documents the disproportionate role that AHCs, especially publicly owned AHCs, play in providing high technology and specialized services to the poor and uninsured.<sup>49</sup> Such patients create cost burdens for AHCs in several ways. The poor and uninsured tend to seek care later in the course of illness than do more well-to-do patients, thus adding to the unrecognized case mix differences between patients in AHCs and other settings. Low socioeconomic status adds to the cost of illness independent of the severity of a patient's illness.<sup>50,51,52</sup> Current disproportionate share formulae do not recognize the special role that some AHCs play as magnets for uninsured and poor patients who require the most complex and costly treatments.

Universal health insurance, together with improved case mix adjusters, would compensate for this problem and greatly reduce the need for extra payments to AHCs for providing high technology and specialized services. Universal coverage is unlikely to be enacted in the foreseeable future, however, and necessary case mix adjusters are not available at this time. To sustain the safety net for the nation's most disadvantaged patients, disproportionate share payments should take into account not only the number but also the complexity of cases of the poor and uninsured patients cared for by AHCs.

Of course, the enactment of universal health insurance in the long run, and efforts to reduce the number of uninsured Americans in the short run, will benefit from continued reductions in the costs of care. Thus, pursuit of Recommendation 1 will be an important contributor to reducing the burdens on AHCs associated with providing care to the poor and uninsured.

Recommendation 5. AHCs should be held accountable for the quality and efficiency of the high technology and specialized services they provide. Extra payments to AHCs for those services should be connected to AHCs' ability to assure quality and control costs.

If the public assures that the costs of selected high technology and specialized services at AHCs are covered, then it deserves good evidence in return that funds are going to the best and most efficient providers and that the services are used appropriately. Comparative data on the cost and quality of high technology and specialized services are inadequate at the current time, making it extremely difficult for policymakers and purchasers to make intelligent choices about which facilities to use and which deserve support. AHCs and other suppliers of these services should institute rigorous performance monitoring systems to provide data on the volume of services provided; associated costs, revenues, and margins; the quality of care and service; indications for services; and accessibility to local populations. The costs of maintaining these monitoring systems should be included in payments from payers to providers and purchasers to payers.

- a. All institutions receiving payments for the extra costs of high technology and specialized services should be actively involved in quality improvement activities related to those services.

The purpose of collecting data on the performance of organizations supplying high technology and specialized services is not only to inform choice by patients and purchasers but also to promote improvement in the performance of providers. Facilities that receive extra support for the provision of unprofitable high technology and specialized services should be required to institute active programs to improve the processes and outcomes of care for such services. The presence and effectiveness of the programs could be documented by any of several existing quality review organizations, including the National Committee for Quality Assurance, the Joint Commission for the Accreditation of Health Care Organizations, or Medicare peer review organizations.

- b. AHCs receiving such payments should be actively involved in research and development to improve the effectiveness and cost-effectiveness of high technology and specialized services.

An important justification for supporting AHCs to provide high technology and specialized services is that these institutions often play a central role in research and innovation that leads to the development, improvement, and diffusion of such care. Therefore, AHCs receiving support for unprofitable high technology and specialized

services should be participating in research and development related to those types of care. AHCs should also be involved in health services and outcomes research to assess the cost-effectiveness of these services, so that patients and purchasers can make judgements about the value of such care compared with other services.



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