

The Transition from Excess Capacity to Strained Capacity in U.S. Hospitals

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After many years of concern about excess hospital capacity, a growing perception exists that the capacity of some hospitals now seems constrained. This article explores the reasons behind this changing perception, looking at the longitudinal data and in-depth interviews for hospitals in four study sites monitored by the Community Tracking Study of the Center for Studying Health System Change. Notwithstanding the differences for individual hospitals, we observed that adjustments to the supply of hospital services tend to be slow and out of sync with changes in the demand for hospital services. Those hospitals reporting capacity problems are often teaching hospitals, located near previously closed facilities or in population growth areas. These findings suggest therefore that approaches to dealing with capacity problems might best focus on better matching individual hospitals' supply and demand adjustments.

Keywords: Hospitals, changing demand, changing capacity.

DURING THE 1980S AND 1990S, RESEARCHERS AND policymakers generally agreed that hospitals had substantial excess inpatient capacity (Ennis, Schoenbaum, and Keeler 2000; Gaynor and Anderson 1995; Green 2002; Keeler and Ying 1996; Madden 1999). Between 1980 and 1995, hospital inpatient admissions declined by approximately 15 percent, and occupancy rates nationwide fell from

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about 76 to 63 percent (American Hospital Association 2005). Certainly, no one expects a hospital to be completely full all the time, as it must maintain a reserve or standby capacity to deal with unanticipated health needs (Friedman 1999; Gaynor and Anderson 1995; Joskow 1980). Furthermore, some excess hospital capacity is desirable because it provides leverage to third-party payers in their rate negotiations with hospitals (Zwanziger, Melnick, and Bamezai 1994). In the late 1990s, however, the general perception was that the U.S. health system had several thousand unneeded hospital beds that, if closed, could reduce the nation's health expenditures on hospital care (Madden 1999).

In the last few years, however, reports of strained hospital capacity have been increasing, including reports of patients being held in one hospital unit because there were no beds available in a unit more appropriate to their needs and of hospitals temporarily closing their emergency departments because they were unable to accept more patients. One particular concern has been the growing number of emergency department diversions, in which ambulances are instructed to bypass particular hospitals, especially because this could have a domino effect in the community (California HealthCare Foundation 2002; Shute and Marcus 2001). Evidence of the rising rates of emergency department diversion was found in round 3 of the Community Tracking Study (CTS), which was conducted by the Center for Studying Health System Change in 2000 and 2001. The CTS researchers reported that hospitals frequently were bypassed because they could not admit emergency patients due to the lack of medical/surgical floor beds or intensive care unit (ICU) beds (Brewster and Felland 2004; Brewster, Rudell, and Lesser 2001). A study of emergency room overcrowding by the General Accounting Office (2003) yielded similar findings, suggesting that strained capacity in various hospital units led to backups in emergency departments. Increasingly, the news media and hospital advisory groups raised the possibility that hospitals might need to expand rather than reduce their capacity (Abelson 2002; Health Care Advisory Board 2001; Japsen 2003; Kirchheimer 2001; Peterson 2001).

This article examines why the capacity of some hospitals in the U.S. health system appears to be constrained and how they have responded to it. In addition, given that hospital occupancy rates nationwide are still relatively low, averaging about 66 percent in 2003 (American Hospital Association 2005), it is important to understand why perceptions of strained capacity exist at all. Presumably, some hospitals may be at

the limit of their capacity and others are not. Which facilities view themselves as constrained, and why do they seem to have capacity problems? How have these perceptions shaped their actions? Answers to these questions will help hospital executives, policymakers, and community leaders better understand and respond to these problems.

We examined data collected through the CTS for certain study markets. The CTS is an ideal platform for examining the preceding questions because it tracked key events and data longitudinally over the period in which perceptions about hospital capacity changed. The CTS began its intensive study of twelve markets in 1995/96, at which time most hospital executives and community leaders believed that hospitals had much unneeded capacity. As concerns about strained capacity began to materialize in round 3 of the CTS in 2000/01, interviews with community stakeholders included questions about capacity problems. Similar issues were included in round 4 of the study, in 2002/03.

A number of CTS publications have explored the issue of hospital capacity. Two CTS issue briefs examined emergency department diversions and how their occurrence and severity had changed over time (Brewster and Felland 2004; Brewster, Rudell, and Lesser 2001). Bazzoli and her colleagues (2003) looked at the degree to which specific hospital services were viewed as constrained and what contributed to these problems. They found that those service areas perceived as highly strained were the emergency department, medical/surgical ICU beds, and general medical/surgical beds. The main contributing factors reported by the CTS respondents were nursing and other personnel shortages and an insufficient supply of beds. The primary contribution of this article is an exploration of the specific ways in which these contributing factors arose, namely, what events led to these conditions. In addition, we looked at the relationships among various contributing factors, with our longitudinal approach revealing insights not identified in prior work. One of our main findings was that hospitals adjusted their capacity slowly in response to recent increases in service demand because they were having problems staffing existing beds, let alone new ones. Also, they may have been prevented by physical space or regulation from adding new beds.

We begin by describing the conceptual framework and study design for our analysis. Then we discuss the four sites selected for our in-depth study and the rationale for choosing them and examine each of the four sites longitudinally. The article concludes with cross-cutting

lessons for the four sites and considers their management and policy implications.

Conceptual Framework

Our analysis examined two phenomena: (1) the reasons why hospitals perceive capacity constraints and (2) the factors that affect their responses to these problems. To understand the former, we must consider how hospitals choose their service capacity given the demand conditions they face. Some operations research studies in the 1970s and 1980s used queuing models to examine this decision-making process (Joskow 1980; Mulligan 1985; Shonick 1970, 1972). The basic premise was that because hospitals were uncertain about the demand for their services, they tried to provide capacity not only to meet the expected number of people who would require care on a typical day but also to have sufficient standby or reserve capacity to meet a larger than expected demand. In particular, Joskow (1980) suggested that hospitals had some target probability of turning patients away, which they preferred not to exceed. This uncertain demand led hospitals to maintain some excess capacity so that they would not be full all the time. Several reasons were offered for this behavior. Gaynor and Anderson (1995) discussed hospitals' commitment to meeting the community's needs given their nonprofit mission and, more generally, their concerns about market share, reputation, and future demand. Friedman and Pauly (1983) considered hospitals' desire to avoid overstressing their staff and resources in periods of unusually high demand because this would result in costs due to poor staff morale and turnover. Models in industrial organization economics offer another rationale, that a profit-maximizing firm in a market with few competitors maintains some excess capacity so that it can absorb additional business that it may receive if competitors set higher than expected prices (Benoit and Krishna 1987).

Over time, hospitals may observe that they are not meeting their target turnaway probability because demand conditions have changed. Joskow (1980, 430) identified five factors affecting a hospital's demand conditions: (1) the population's size and demographic characteristics, (2) the prices charged for services, (3) the population's insurance coverage, (4) the number of physicians, and (5) the quality and scope of the hospital's services. Expanding this basic framework, we note that

the second and third items are related because consumers face limited out-of-pocket prices given the typically generous insurance coverage for hospital services. In addition, in the last two decades, health plans have been trying to influence consumer demand by means of utilization review procedures, selective contracting, and provider payment arrangements. Small-area variation research has also made clear that not only the number of physicians but also their dominant practice styles may affect the demand for a hospital's services. Finally, within a particular market, one hospital will experience shifts in its demand if other hospitals close or change their service mix. Overall, the changes in demand for the reasons just noted affect a hospital's perception of whether it has too much, too little, or sufficient available capacity.

If a hospital believes that it does not have optimal capacity, it is likely to adjust its supply of services. Maintaining too much capacity can entail costs that may not be compensated by existing payment methods and thus may detract from a hospital's viability. Too little capacity means that the hospital is turning away too many patients. The literature on supply adjustments indicates that these adjustments, whether they involve either increases or decreases, can be quite costly for a firm and thus are likely to be made slowly (Dhrymes 1969; Peel and Walker 1978). Furthermore, Peel and Walker (1978) suggested that if an input is rationed or constrained in the market, increases in the supply of services might be very difficult and perhaps imperceptible in the short run. Certainly, the persistent shortage of nurses is an important issue for hospitals in this regard. Also, regulation in the form of Certificate of Need (CON) can affect hospitals' capacity adjustment due to its inherent rationing function and also the expense and time required to obtain CON approval. Conversely, hospitals not constrained by CON may feel compelled to respond quickly if they observe competitors adding or modernizing their capacity because they want to maintain their legitimacy and reputation in the market (Joskow 1980). We will refer to these conceptual insights as we examine what happened in our study markets.

Study Design

The data for our analysis came primarily from the Community Tracking Study. Starting in 1995/96, the CTS tracked changes in the health care systems of sixty randomly selected and nationally representative

communities in the United States, as defined by the CTS based on the geographic boundaries of large metropolitan statistical areas (MSAs) with populations of 200,000 or more (for the history and design of the CTS, see Lesser and Ginsburg 2003). The CTS randomly selected twelve of these sixty study sites for intensive study, which included biennial site visits to each community to conduct fifty to ninety interviews with major local stakeholders, the continuous collection and analysis of primary and secondary data on the markets, and the monitoring of local newspapers and business publications for articles on changes in the community's health system.

The CTS has continuously monitored hospital markets in each of its twelve intensive study sites, including changes in service volume, market share, and organizational changes such as closures and mergers. In part, it does this by tracking data in secondary sources, such as the American Hospital Association's annual survey. In addition, these areas are often discussed during the CTS's site interviews. As we noted earlier, in round 3 of the CTS (2000/01), community representatives were concerned about emergency department diversions, and thus questions were added to the interview protocols to assess the extent of the problem and the factors influencing it. The broader issue of hospital capacity constraints was chosen for intensive study in round 4 (2002/03) because emergency department diversions in round 3 appeared to be symptomatic of the strained capacity in a number of hospital units and departments.

Specific questions about capacity constraints and their contributing factors were included in our semistructured interview protocols for four different hospital informants: chief executive officer, chief medical officer, vice president/director of patient services, and nursing or human resource executive. In each of the twelve CTS communities, we conducted interviews at two to three multihospital health systems or major freestanding hospitals. Although the full set of specific-capacity questions varied by informant type, we asked the following questions of all informants:

To what extent has your hospital (or the hospitals in your system) experienced capacity constraints in the past year?

In what specific service lines, units, or patient care departments has your hospital (or hospitals in your system) experienced capacity problems? (Asked of all hospital informants, with the vice president/director of patient services being asked additional questions about the frequency and severity of these problems)

What are the major factors that have caused capacity problems in your hospital (or hospitals in your system)? (Asked of all informants, with the vice president/director of patient services and the nursing or human resource executive being asked more questions on how these factors contribute to the problem)

How is your hospital currently responding to capacity problems? (Asked of all hospital informants, with the nursing or human resource executive being asked more questions about staffing recruitment and retention strategies)

Have there been any community-led efforts to address capacity problems?

The capacity constraint questions typically took ten to thirty minutes of interviews that generally lasted for a total of sixty to ninety minutes. In addition to hospital representatives, we also asked medical directors of local physician organizations and network executives of health plans certain capacity constraint questions, but generally these focused on markets and not specific hospitals.

Two members of the research team conducted each CTS interview, with one person responsible for asking the questions and any follow-up, and the other person responsible for taking notes. The note taker usually prepared the first draft of interview notes, which followed the natural flow of the interview in regard to the questions asked and the answers given. The person who led the questioning also took some notes during the interview and read and commented on the draft interview notes. The two team members identified any discrepancies and resolved them. If necessary, the interviewees were recontacted for resolution. All the interviews were entered as formatted documents in an ATLAS.ti database (Scientific Software Development 2002). These documents were then read by CTS team members who coded the relevant content using a set of codes developed by the research team before the interviews.

Our analysis followed well-established case study analytic techniques (Ragin 1999a, 1999b; Yin 1994, 1999), which generally had three steps. First, chunks of interview data were retrieved through ATLAS.ti by either associated code or question number. These data chunks included the respondent's name, organizational affiliation, and informant type; the specific question number that elicited the response; and the relevant paragraphs of the response associated with the question or code. Second, these data chunks were reviewed by the research team members, who related them based on common themes or similarities in the

responses. If necessary, these reduced data were displayed in figures or spreadsheets to facilitate comparisons and research team discussions. Finally, conclusions were drawn using techniques intended to maximize validity, such as triangulating across different respondents and confirming conclusions with other sources of data. In regard to triangulation, we generally found that the responses of respondents in the same hospital had a high degree of concordance, which was not surprising, since they all were typically members of the hospital's senior management team.¹

It is important to recognize that despite the use of these analytical techniques, the interview responses were largely based on perception. Although an interviewee's views might be strongly held and shared by other respondents in his or her hospital, others in the community might hold very different views. Our use of perception-based information was justified, though, because there is little agreement on objective standards for measuring hospital capacity constraints. Traditionally, researchers have relied on occupancy rates, but as Joskow (1980) pointed out, these can be misleading because they vary substantially by day of the week and month of the year. Furthermore, given their typical construction on a facilitywide basis, occupancy rates are simplistic in that they assume that one type of bed (e.g., an ICU bed) can substitute for another (e.g., a maternity or pediatric bed). In addition, it is important to recognize that hospitals base their decisions on their perceptions (whether accurate or not) of themselves, their competitors, and their market environments. We did try to use secondary sources of data wherever possible to confirm the interview responses. These secondary sources included the CTS's regular household survey on consumer health access, insurance coverage, and health service use and also data from secondary sources such as the American Hospital Association, InterStudy, and the U.S. Census Bureau. We also examined quarterly tracking reports of local health-related news and business stories. These sources added validity because they allowed us to corroborate comments about changing hospital use and events in the market.

Our analysis focused on four specific CTS sites: Boston, Cleveland, Miami, and Phoenix. We chose these sites because they represented major metropolitan areas with a diversity of hospital resources, including teaching and nonteaching hospitals, a range of ownership types, and both large tertiary facilities and smaller community hospitals. This diversity allowed us to assess which types of hospitals were experiencing

capacity constraints. All four sites were identified in round 3 of the CTS as having problems with emergency department diversion. For example, Brewster, Rudell, and Lesser (2001) noted that at least two hospitals a day in Boston closed their emergency departments and sent patients to other facilities, and one hospital in Cleveland was reported as routinely being on bypass twelve hours a day. These four cities were also included in a General Accounting Office (2003) report on emergency department overcrowding.

Table 1 summarizes relevant data across the full CTS study period for the four study markets and also for large metropolitan areas overall. The data make clear that the four selected markets differed in a variety of demographic factors relevant to health service demand as well as patterns of hospital use. Perhaps most notable is that the populations of Miami and Phoenix grew rapidly between 1996 and 2003. Miami and Phoenix also had relatively larger proportions of uninsured and racial minorities. Looking specifically at hospital service use, we found that Boston, Cleveland, and Miami had similar rates of growth in total hospital admissions, ranging from 9.3 to 13.9 percent, whereas Phoenix grew more than 40 percent because of its large population influx. Emergency visits were up in all four cities, with Cleveland having the lowest growth (12.6 percent) and increases in Miami and Phoenix (30.6 percent and 54.9 percent, respectively) that were well above the large metropolitan area rate. The number of staffed and setup hospital beds in all communities, except Phoenix, declined. For Boston, Cleveland, and Miami, the drop in number of beds coupled with the growth in inpatient admissions led to a 7.2 to 9.8 percent rise in occupancy rates. Despite Phoenix's 16 percent increase in staffed hospital beds, its occupancy rate rose 8.2 percent citywide. Table 1 also shows the growth in hospital staffing, both in total and specifically for registered nurses (RNs). Both categories of personnel grew, with the exception of the total number of personnel in Miami. The growth in number of RNs generally was higher than that of total personnel.

The data in table 1 also reveal an important limitation of our study, in that our selected markets differed relative to large metropolitan areas generally. Accordingly, our results may not be generalizable to these markets. Of course, case study research is not intended to provide generalizable findings in the way that is typically sought through statistical analysis. As Yin noted (1994, 1999), one purpose of case study research is to generate hypotheses that can serve as a basis for future data collection

TABLE 1
Demographic and Hospital Service Use Characteristics of Communities Studied

	Boston	Cleveland	Miami	Phoenix	Large Metropolitan Areas
Demographic Characteristics					
Population, 1996 (millions):	4.4	2.2	2.1	2.8	n/a
Percent change, 1996 to 2003:	+4.8	+1.4	+9.4	+25.2	n/a
Percent population age 65+, 1996-97:	13.9	15.0	15.1	13.9	11.8
Change in percent, 1996-97 to 2002-03:	-1.2	-1.4	-0.7	-1.1	-1.7
Percent population uninsured, 1996-97:	9.1	8.5	23.6	16.0	13.7
Change in percent, 1996-97 to 2003:	-3.7	-0.7	-0.8	-2.8	-0.1
Percent population unemployed, 1997:	3.4	4.8	7.1	3.0	4.9
Change in percent, 1997 to 2003:	+1.8	+1.9	+0.1	+2.0	+1.1
Percent minority population, 1996-97:	15.1	24.6	77.8	28.1	31.8
Change in percent, 1996-97 to 2003:	+3.2	-1.3	+1.1	+4.7	+2.3
Hospital Service Use, Capacity, and Personnel					
Hospital admissions, 1996 (thousands):	489.2	291.1	289.8	270.0	21,692.2
Percent change, 1996 to 2003:	+11.9	+13.9	+9.3	+43.2	+12.4
Emergency room visits, 1996 (thousands):	1,716.0	897.3	599.9	686.7	60,905.6
Percent change, 1996 to 2003:	+19.8	+12.6	+30.6	+54.9	+18.8
Hospital beds, 1996:	10,685	7,445	7,703	5,762	528,856
Percent change, 1996 to 2003:	-5.1	-3.6	-12.0	+16.0	-5.7
Hospital occupancy rate, 1996 (%):	67.7	59.7	61.4	59.9	62.1
Change in percent, 1996 to 2003:	+7.2	+7.6	+9.8	+8.2	+6.5
Total hospital FTEs, 1996:	76,047	40,185	33,552	26,301	2,537,645
Percent change, 1996 to 2003:	+17.0	+16.5	-0.5	+18.2	+7.5
Total FTE RNs, 1996:	15,956	9,917	9,122	7,262	630,074
Percent change, 1996 to 2003:	+19.3	+16.9	+4.8	+28.4	+13.3

Note: Demographic data follow the Center for Studying Health System Change standard in which large metropolitan areas have populations of 200,000 or more. For the hospital service use data we use AHA classifications based on MSA size with populations of 250,000 or more.
Sources: For population size, age, and racial/ethnic composition, see U.S. Census Bureau 2006; for unemployment statistics, see U.S. Bureau of Labor Statistics 2006; for insurance status, see CTS Household Survey (Strouse, Carlson, and Hall 2003); and for hospital admissions and emergency room visits, see AHA hospital data aggregated to the MSA level (American Hospital Association 2005).

and empirical studies. We view this as the primary contribution of our study, given existing research.

Study Findings

Table 2 provides information about the hospital market structure in place in the study sites during round 4 of the CTS. Each site had a number of multihospital systems in operation that together made up 50 to nearly 90 percent of the hospitals operating in each market. Three of the sites had a dominant health system in terms of the market share of discharges: Partners HealthCare in Boston (20.1 percent), Cleveland Clinic Health System in Cleveland (40.1 percent), and Banner Health Arizona in Phoenix (31.7 percent). Miami had four large systems with similar market shares. Many of the health systems have major teaching hospitals, such as Massachusetts General Hospital and Brigham and Women's Hospital in Partners HealthCare, Boston; the Cleveland Clinic Foundation Hospital in the Cleveland Clinic Health System; Jackson Memorial Hospital in the Jackson Health System, Miami; and Good Samaritan Regional Medical Center in Banner Health Arizona. However, some systems are composed strictly of community hospitals, such as Caritas Christi Health Care in Boston and Lake Hospital System in Cleveland.

The remainder of this section discusses each study site. We begin each discussion in the early 1990s when the concerns were largely about excess rather than strained capacity. This sets the stage for the events that led to the perception of hospitals' capacity problems and their responses.

Boston

Several factors in the 1990s triggered reductions in Boston's hospital capacity. The first of these pressures was the rate deregulation of the Massachusetts hospital industry in the early 1990s. With the demise of rate setting, hospitals had to increase their efficiency. For many, this meant that they could no longer maintain expensive excess capacity, which led them either to close or to convert unused beds to other uses.

By the mid-1990s, Boston's hospitals were also becoming concerned about high HMO enrollment. In 1996, the HMOs' market share in

TABLE 2
General Acute Care Hospital Market Structure in Communities Studied, 2002

	<i>Multihospital System</i>	Staffed Beds	Control	System Market Share (%)
Boston	<i>CareGroup Healthcare System</i>	794	<i>Nongovernment, nonprofit, not church operated</i>	9.8
	Beth Israel Deaconess Medical Center	526 ^a		
	Deaconess-Glover Hospital	190		
	Mount Auburn Hospital	78		
	New England Baptist Hospital	1317	<i>Church owned and operated</i>	10.9
	<i>Caritas Christi Health Care</i>	307		
	Caritas Norwood Hospital	197		
	Caritas Carney Hospital	231		
	Caritas Good Samaritan Medical Center	230		
	Holy Family Hospital and Medical Center	102		
	St. Anne's Hospital	250		
	Caritas St. Elizabeth's Medical Center	235	<i>Nongovernment, nonprofit, not church operated</i>	3.3
	<i>Hallmark Health System</i>	235 ^a		
	Lawrence Memorial of Medford			
	Melrose-Wakefield Hospital			
	Malden Medical Center			
	<i>Northeast Health System</i>	258	<i>Nongovernment, nonprofit, not church operated</i>	2.8
	Addison Gilbert Hospital	258 ^a		
	Beverly Hospital	3669	<i>Nongovernment, nonprofit, not church operated</i>	20.1
	<i>Partners HealthCare</i>	719		
	Brigham and Women's Hospital	104		
	Faulkner Hospital	875		
	Massachusetts General Hospital	247		
	Newton-Wellesley Hospital	260		
	Salem Hospital (North Shore Medical Center)	147		
	Union Hospital (North Shore Medical Center)			

<i>SouthCoast Hospitals Group</i>					
Charlton Memorial Hospital	786				
St. Luke's Hospital	786 ^a				5.7
Tobey Hospital					
Lahey Clinic Hospital	269				
Tufts–New England Medical Center	374				
Boston Medical Center	417				
<i>Cleveland Clinic Health System</i>	3072				40.1
Cleveland Clinic Foundation Hospital	999				
Euclid Hospital	219				
Fairview General Hospital	405				
Hillcrest Hospital	358				
Huron Hospital	182				
Lakewood Hospital	286				
Lutheran Hospital	204				
Marymount Hospital	199				
South Pointe Hospital	220				
<i>Lake Hospital System</i>	337				5.0
LakeEast Hospital	337 ^a				
LakeWest Hospital					
<i>University Hospitals Health System (UHHS)</i>	904				21.0
UHHS Bedford Medical Center	95				
UHHS Brown Memorial Hospital	25				
UHHS Geauga Regional Hospital	126				
UHHS Memorial Hospital	25				
UHHS Richmond Heights Hospital	100				
UHHS St. Michael's Hospital	151				
University Hospitals of Cleveland	382				

(Continued)

TABLE 2—Continued

	<i>Multihospital System/ System or Independent Hospital</i>	Staffed Beds	Control	System Market Share (%)
	<i>UHHS/CSA Joint Venture</i>	371 ^a		
	St. John West Shore Hospital			
	St. Vincent Charity Hospital			
	MetroHealth Medical Center	967	Nongovernment, nonprofit, not church operated	
	Parma Community General Hospital	303	County owned and operated	
Miami	<i>Baptist Health System</i>	991	Nongovernment, nonprofit, not church operated	17.2
	Baptist Hospital of Miami	551		
	Homestead Hospital	104		
	South Miami Hospital	336		
	Doctor's Hospital	162		
	<i>HCA</i>	1244		
	Aventura Hospital and Medical Center	407	Investor-owned corporation	14.1
	Cedars Medical Center	515		
	Kendall Regional Medical Center	322		
	<i>Jackson Health System</i>	2072	County owned and operated	17.2
	Jackson Memorial Hospital	1839		
	Jackson South Community Hospital	233		
	<i>Tenet Health System</i>	1347	Investor-owned corporation	17.8
	Coral Gables Hospital	188		
	Hialeah Hospital	220		
	North Shore Medical Center	357		
	Palmetto General Hospital	190		
	Parkway Regional Medical Center	392		
	Mt. Sinai Medical Center and Miami Heart Institute	756	Nongovernment, nonprofit, not church operated	
	Pan American Hospital	146	Nongovernment, nonprofit, not church operated	

Phoenix	<i>Banner Health Arizona</i>	2146	Nongovernment, nonprofit, not church operated	31.7
	Valley Lutheran Hospital	239		
	Desert Samaritan Medical Center	663		
	Good Samaritan Regional Medical Center	572		
	Mesa Lutheran Hospital	320		
	Thunderbird Samaritan Medical Center	352		
	<i>Catholic Healthcare West</i>	703	Church owned and operated	10.2
	Chandler Regional Hospital	147		
	St. Joseph's Hospital & Medical Center	556		
	<i>Lasis Healthcare</i>	478	Investor-owned corporation	4.5
	Mesa General Hospital Medical Center	143		
	St. Luke's Medical Center	225		
	Tempe St. Luke's Hospital	110		
	<i>John C. Lincoln Health Network</i>	395		
	John C. Lincoln Hospital—North Mountain	268	Nongovernment, nonprofit, not church operated	5.0
	John C. Lincoln Hospital—Deer Valley	127		
	<i>Scottsdale Healthcare</i>	527	Nongovernment, nonprofit, not church operated	9.2
	Scottsdale Healthcare—Osborne	285		
	Scottsdale Healthcare—Shea	242		
	<i>San Health Corporation</i>	598		
	Del E. Webb Memorial Hospital	255	Nongovernment, nonprofit, not church operated	6.7
	Walter O. Boswell Memorial Hospital	343		

(Continued)

TABLE 2—Continued

<i>Multihospital System^a</i>	System or Independent Hospital	Staffed Beds	Control	System Market Share (%)
<i>Vanguard Health System</i>		775	<i>Investor-owned corporation</i>	17.7
	Arrowhead Community Hospital & Medical Center	115		
	Maryvale Hospital & Medical Center	175		
	Paradise Valley Hospital	142		
	Phoenix Baptist Hospital & Medical Center	216		
	Phoenix Memorial Hospital	127		
	Maricopa Integrated Health	482	County owned and operated	
	Mayo Clinic Hospital	196	Nongovernment, nonprofit, not church operated	
	Casa Grande Regional Medical Center	244	Nongovernment, nonprofit, not church operated	
	Wickenburg Regional Medical Center	15		

Note: *Italicized* data refer to multihospital systems and their associated characteristics, such as number of hospital beds and system market share. The sum of individual bed counts for all hospitals in a system equals the system's bed count. In some instances, the AHA reports combined bed data for multiple hospitals, which is reflected in the table as a combined entry (e.g., 235 beds for the three Hallmark Health System hospitals in Boston).

^aBed count equals total beds for this hospital and those listed below it, which lack staffed bed data.

Source: American Hospital Association annual survey data.

Boston was 43.6 percent, compared with a national large metropolitan average of 27.8 percent. Boston's hospitals believed that the wide-scale use of global capitation was imminent and that selective contracting would steer more care away from the academic centers to traditional acute care hospitals in the community. The major hospital systems in Boston began to plan for hospital downsizing and service restructuring in their teaching and community hospitals. These plans included expanding certain core services at the teaching hospitals (e.g., cardiology, cardiac surgery, oncology, and orthopedics) and expanding traditional hospital services at system community hospitals (e.g., maternity care, elective orthopedic services, ophthalmology, psychiatric services, and postacute services).

Another event that strained Boston hospitals was cutbacks in Medicare payments that resulted from the 1997 Balanced Budget Act (BBA). Although the BBA affected hospitals nationwide, Boston with its five teaching hospitals was especially hard hit given their high cost of care. Subsequent refinements of the BBA relaxed its provisions, but through 2000, Boston's hospitals generally reported financial losses that they attributed to this legislation. The CareGroup hospital system was especially affected, with its flagship, Beth Israel Deaconess Medical Center, incurring large financial losses. These losses stifled plans to restructure services at Beth Israel Deaconess, and CareGroup instead had to focus on cutting rather than converting hospital capacity.

Overall, the hospital downsizing during this period led to the elimination of many staffed beds at Boston's hospitals and health systems. By 2000, Partners HealthCare system had eliminated 200 to 250 staffed beds; CareGroup Healthcare System, 250 staffed beds; and Boston Medical Center, nearly 150. In total, these cuts represented a 15 percent reduction in these institutions' overall staffed bed stock.

However, one of the pressures that Boston's hospitals believed would reduce their demand—the growing influence of HMOs on patterns of care—never fully materialized. Global capitation did not become dominant; less restrictive HMO products gained popularity; and the demand for hospital care remained strong, especially at the academic teaching hospitals. Evidence of strained capacity in Boston's teaching hospitals first became evident in the early 2000s, most notably the greater number of emergency department diversions. Hospital respondents believed that this partly reflected higher demand for emergency services as managed care organizations lost their ability to control the use of these

services. Another factor was the reduced available capacity given prior bed closures.

Hospitals reported that the frequency of emergency department diversions fell in 2003 compared with 2001, and they attributed this to the reopening of previously closed beds and better capacity management. But the urban teaching hospitals still reported a wide range of inpatient and outpatient capacity constraints given the strong preferences of Boston's residents for these facilities. In fact, a study reported in the *Boston Globe* (Kowalczyk 2000) indicated that on average, Massachusetts residents used teaching hospitals three times more often than did the rest of the nation. Moreover, the *Boston Globe* (Kowalczyk 2001) reported that the market share of teaching hospitals had risen from 34 to 42 percent since 1990.

The growth in demand for Massachusetts General Hospital was especially large, with a 4.4 percent increase in inpatient admissions between 2001 and 2002. In the early 2000s, demand at Beth Israel Deaconess Medical Center was more variable, given the operational problems at its hospital system that were publicized in the local press, but it also experienced a 3.1 percent increase in admissions between 2001 and 2002. Hospital systems began to rethink their earlier plans to rearrange services across their hospitals given this rise in demand. In fact, Partners HealthCare reopened and staffed 200 inpatient beds that it had previously closed in the mid-1990s.

The urban teaching hospitals in Boston have responded in different ways to these capacity problems. Besides adding beds, Partners HealthCare implemented a strategy of retaining volume within the system by directing the care of certain patients to its community hospital partners. CON limits on hospital expansion plus the physical limits of trying to expand capacity at the downtown teaching hospitals likely precipitated this strategy. At one hospital to which services were redirected, occupancy rates expanded from around 60 percent to 80 to 90 percent. Beth Israel Deaconess Medical Center, however, viewed the influx of volume as a way to improve its financial position, by keeping tight control of costs and capacity use. The hospital instituted internal procedures to facilitate throughput, such as having daily bed meetings to assess capacity, having senior administrators make rounds to determine where beds could open, and continuously monitoring bed availability. In contrast, Boston Medical Center relied primarily on expanding its bed capacity in response to its problems. It added twenty-two medical/surgical telemetry

beds and an urgent care center where it directs emergency department patients who are not in need of immediate care. It also was studying ways to reduce emergency department diversions by more careful scheduling of elective surgeries to ensure a more even use of existing capacity and to reduce the number of backups and canceled procedures.

Overall, the capacity problems in Boston's teaching hospitals arose after they pared back the supply of services in response to the pressures of the 1990s. But one of these pressures, the dominance and growth of HMOs, did not have the anticipated effect on consumer demand. As a result, the teaching hospitals were soon in the position of having insufficient capacity, and by 2002/03, their reported occupancy rates had risen from around 85 to 100 percent. Generally, Boston's hospital respondents did not identify staffing shortages as contributing to these capacity problems. In fact, they reported nurse vacancy rates of around 3 to 5 percent, which was substantially lower than the 11 percent rate reported statewide for Massachusetts in 2000 (HRSA 2002). The respondents commented that shortages might not be a problem for Boston due to the presence of numerous health training programs in the community.

Cleveland

Throughout most of the 1990s, the perception of many Cleveland stakeholders was that the market had too much hospital capacity. Even though hospitals like the Cleveland Clinic Foundation Hospital attracted admissions from both around the United States and abroad, the marketwide hospital occupancy rate in the community was only 59.7 percent in 1996, compared with the large metropolitan average of 62.1 percent (table 1).

Beginning in 1999, some hospitals in the market closed. In that year, St. Luke's Medical Center shut its acute care hospital, and in March 2000, Mt. Sinai Medical Center—University Circle closed. Shortly afterward, the national hospital management company that closed Mt. Sinai Medical Center—University Circle announced plans to close two more Cleveland hospitals, but they remained open due to community outcry and the actions of two of the community's large hospital systems. In all, the two hospitals that closed had about 600 to 700 staffed beds, which was about 9 percent of the market's capacity.

The immediate effect of the closures was to shift hospital service demand to the remaining hospitals, especially those in downtown Cleveland that were located near the two closed hospitals. Hospital occupancy

rates increased citywide from 58.7 percent in 1998 to 62.5 percent in 2001. The number of visits to the emergency departments of the remaining hospitals increased to absorb the 77,000 visits per year that the two closed hospitals had once provided. Hospital respondents reported that as a result, the frequency of ambulance diversions in 2001 rose by 400 percent over that in 1998.

Many respondents felt that the backup of patients in hospitals' emergency rooms was caused not only by the closure of the two hospitals but also by a shortage of ICU beds. ICU beds were often in short supply because of problems in moving patients elsewhere within a hospital. Sometimes these problems resulted because all available beds were full, and sometimes they were due to difficulties in getting physicians to complete orders to transfer patients to other units. In addition, the number of ICU beds available was limited because of the shortage of critical care nurses in the community.

In response to the shifting demand and the perceived strains on their existing capacity, hospitals in the Cleveland community began to expand their inpatient units and emergency departments. The Cleveland Clinic Health System (CCHS) reopened maternity services at one of its system hospitals that was located near the closed hospitals. This hospital had not offered maternity services for nearly thirty years. The CCHS also added operating rooms, emergency department space, and critical care beds to this hospital. Before the hospitals closed, the number of emergency room visits to this CCHS hospital had fallen by almost 50 percent, a drop that essentially was reversed. The CCHS also increased inpatient capacity at two other of its system hospitals, raising the number of staffed beds at one by 150 (a 43 percent increase). Another CCHS hospital expanded surgical services, ICU capacity, and imaging services after a reported 20 percent increase in patient volume.

Other hospitals in the market not affiliated with the CCHS also reported growth in their patient volume after the hospital closures. Metro-Health Medical Center had more emergency visits and subsequently doubled its emergency department capacity. St. Michael's Hospital, which was originally slotted for closure but then was acquired by University Hospitals Health System (UHHS), reported a 15 percent increase in emergency room use and a 5 percent increase in inpatient use after the two hospitals closed. The UHHS doubled the hospital's emergency department space to handle the greater volume of patients. Parma Community General Hospital also increased its ICU and ED capacity after the two hospitals closed.

The Cleveland hospital respondents also noted several initiatives by the hospitals to improve throughput and better manage their capacity, especially to reduce bottlenecks in the ED, improve information about bed availability, and improve management of transitions from acute to subacute and postacute services. Many felt, however, that these efforts to better manage capacity were minor in comparison to the principal strategy of expanding hospital capacity in the service areas. The hospitals' focus on expansion rather than capacity management may have been prompted by the lack of CON oversight of hospital expansions in Ohio.

The expansion of capacity may be ending in Cleveland, however. In late 2003, the UHHS closed St. Michael's Hospital, despite its earlier investments to expand its capacity. The use of this facility declined sharply in 2003, with the daily census falling to twenty-five patients in this 151-bed facility. In addition, Deaconess Hospital, a small physician-owned hospital in the market, filed for bankruptcy in 2003 and subsequently closed. Given sharp declines in use for these two facilities, it is unclear whether the market will undergo the kinds of demand shifts created when other hospitals closed in 1999 and 2000.

Overall, the initial hospital closures appeared to have been the reason for the subsequent perceived capacity problems in Cleveland, especially at those hospitals near the closed facilities. These closures shifted demand and led to overworked emergency departments. Although the shortages of nurses and other personnel were reported to be factors limiting the supply of services, these comments pertained to specialized services. It is important to note that before the hospital closures, the general perception was that Cleveland had a lot of excess capacity. The shift of care to the remaining facilities led relatively quickly to concerns about strained capacity, and within two years of the closures, approximately half the closed beds had been replaced by additions.

Miami

A major factor that affected Miami's hospital capacity in the mid-1990s was the dominance of HMOs in the market and their influence on the demand for hospital services. In 1996, the market share of Miami's HMOs was 52.9 percent, almost double the large metropolitan area average of 27.8 percent. Declines in inpatient admissions and lengths of stay as a result of HMO dominance eventually led hospitals to reduce the number of beds they staffed.

Then a series of events in the late 1990s made hospitals in the community realize that their capacity was being strained. First, the consumer backlash against HMOs was believed to have increased the demand for inpatient services as health plans relaxed utilization management controls and offered more open access. At the same time, some hospitals in the market were expanding their national and international marketing to attract patients in high-margin service lines. During this period too, the demand for charity care continued to grow, and problems in Florida's long-term care industry led to backups of patients in hospitals caused by the reduced availability of nursing home beds.

By 1999, hospital capacity problems also were apparent in the severely overcrowded emergency departments. Emergency department diversions had become so common in downtown Miami that its largest ambulance service stopped honoring hospitals' requests to go elsewhere, thereby forcing emergency departments to accept ambulance patients even when staffed beds were not available. During 2002, Baptist Hospital of Miami reported that all its staffed beds were frequently occupied and that it often had twenty to fifty patients in its emergency department awaiting beds.

Also in 2002, hospitals reported that their capacity problems were further complicated by the rising cost of malpractice liability insurance. They believed that the higher insurance rates in Miami were prompting more physicians to refer patients to hospital emergency departments rather than treating them in their offices. Liability fears also were believed to motivate emergency department physicians to admit patients rather than to treat them as outpatients and release them. Another contributing factor noted was a state law limiting an insurer's ability to deny coverage for hospital admissions when patients were admitted from an emergency department.

The worst problems with strained capacity were at Jackson Memorial Hospital, Baptist Hospital of Miami, and Pan American Hospital. Jackson Memorial Hospital is a safety-net hospital that attracts a large number of uninsured patients. Baptist Hospital's reputation for high-quality services in the community was the reason for the greater demand for its services. Pan American Hospital was trying to build a strong reputation with the area's growing Hispanic community, which was a factor in the increasing demand for its services.

In response to these capacity problems, the hospitals decided to reopen beds that they had stopped staffing when the demand was declining.

These efforts, however, started just as the shortages of nurses and other health professionals became apparent. The strained Miami hospitals therefore began to focus on addressing the nursing shortage. In addition to stepping up international recruitment, hospitals began providing nursing scholarships and support to nursing school faculty to increase the number of new graduates. Baptist Health System created its Center for Excellence in Nursing, which, it reported, helped reduce the nurse vacancy rates from 10 to 4 percent. Jackson Memorial also began a program to reduce patients' length of stay and increase throughput by having nurses follow up with the patients after discharge.

In 2002, the Florida legislation enacted licensing measures to help reduce the nursing shortage. This legislation was intended to make it easier for nurses moving to Florida from other states and U.S. territories to obtain a nursing license. The state also established a variety of scholarships and loan-forgiveness programs to encourage more people to enter the nursing profession. By early 2003, these hospital and state initiatives had reduced the statewide shortage of nurses to about 10 percent, from almost 16 percent in 2001. In addition, hospitals reported that the turnover of nurses had slowed. But the hospitals continued to report difficulty filling specialized nursing positions, such as those in critical care units.

Miami's hospitals also wanted to increase the number of beds they could operate given growth in demand. By 2004, each major hospital system had made CON applications to add critical care, telemetry, medical/surgical or emergency department capacity and to construct new hospitals. At that time, the state's strict CON regulation required hospital systems to use licensed capacity not currently in service at existing hospitals to accommodate the added bed capacity. Some hospitals argued that CON deregulation would allow them to add beds more quickly in response to the community's growing needs, but other hospitals supported the CON process to thwart the buildup of capacity that could lead to a bidding war for limited hospital staff. In June 2004, Governor Jeb Bush signed legislation that deregulated the state's hospital industry, allowing existing hospitals to increase the number of their beds for acute care and other units.

Overall, Miami's hospital capacity problems appear to have stemmed from increases in the demand for services at a time when, given staffing shortages, the hospitals had a limited ability to expand their supply. In addition, the hospitals were limited in their ability to increase the

number of beds they could operate, owing to Florida's strict CON regulation.

Phoenix

In the early 1990s, the Phoenix market was perceived to have excess hospital capacity because the state lacked CON legislation to regulate hospital growth and expansion. As HMOs' market share grew, Phoenix's hospitals reacted to actual and anticipated reductions in the demand for their services by maintaining the same number of staffed beds even while the area's population continued to grow. As a result, the number of staffed hospital beds per 1,000 population in Phoenix was only 1.9 in 2001, compared with the large metropolitan average of 2.5.

As it did in other communities, the backlash against managed care in Phoenix led to greater demand for hospital services. Table 1 data indicate that increased hospital services use in Phoenix in fact exceeded its rate of population growth. Specifically, Phoenix's population grew by 25.2 percent from 1996 to 2003, whereas inpatient admissions grew by 43.2 percent and emergency visits by 54.9 percent.

Phoenix's hospitals had difficulty adding capacity in response to this growing demand because the increase in demand coincided with the onset of the nursing shortage. Because local training programs and recruitment efforts were unable to attract enough nurses to keep pace, the number of vacant nursing positions in Phoenix, and across Arizona generally, reportedly rose dramatically. In addition, some respondents commented that the opening of two new hospitals in the Phoenix area had created a bidding war for hospital personnel.

The extent to which the capacity of Phoenix's hospitals was constrained varied. The three teaching hospitals, Good Samaritan Regional Medical Center, St. Joseph's Hospital & Medical Center, and the county's safety-net hospital, Maricopa Integrated Health, receive patients from throughout the state of Arizona. But Good Samaritan reported that its capacity was not particularly constrained because it was able to put more hospital beds back in service in response to increased demand. To do so, however, required that the hospital use temporary-agency nurses, who were reported to represent as much as 20 percent of its nursing positions during 2003. Another Banner Health Arizona hospital, though, was recently downsized because of declining demand due to its proximity to three other Banner hospitals. Similarly, in Scottsdale only one of

the two Scottsdale Health hospitals reported capacity problems. Also, in the downtown area, some nonteaching hospitals continue to have low occupancy rates. These hospitals are housed in older facilities, which may make them less attractive to physicians and patients.

Phoenix's hospital systems and the community have responded to the shortage of nurses and other health care staff with a variety of strategies. Hospitals have begun working with local high schools, colleges, and universities to attract people to health care professions. They also have established a fast-track nursing program for people with an undergraduate degree. Several hospitals have joined with community colleges, providing them with funds to help open new nurse-training programs. At the state level, legislation was passed in 2002 to establish a five-year plan to double the number of nurses graduating in Arizona. Recently, legislators approved more than \$40 million in funding for nurse-training programs at Arizona's three state universities. To help expand faculty, the Arizona Hospital and Healthcare Association has begun offering scholarships to encourage more nurses to seek advanced degrees. Unlike Miami's efforts, most of these strategies focus on increasing the future rather than the current supply of available nurses. Accordingly, staff shortages will likely persist in Phoenix for a number of years.

Overall, capacity constraints in Phoenix appear to be due more to a shortage of nurses and other health care personnel than to a shortage of hospital beds. Hospitals do not seem to have enough staff to open beds to keep pace with the area's increasing population, unless they rely on expensive temporary-agency nurses. In addition, the lack of CON allows hospitals to build new facilities in locations within the metropolitan statistical area where the population is growing, which further raises the demand for hospital personnel at a time when their supply is limited.

Cross-Cutting Lessons and Implications

Our conceptual framework provided a basis for understanding how hospitals make decisions about their capacity and why they may believe that they have too much or too little capacity at a point in time. Joskow (1980) noted a set of factors affecting the demand for a hospital's services and thus its perceptions and decisions about service capacity: (1) the size and demographic characteristics of the population, (2) the prices charged for services, (3) the extent of the population's insurance coverage, (4) the

number of physicians, and (5) the hospital's quality and scope of services. We expanded on these by emphasizing the importance of the changing health insurance market, local physician practice patterns, and shifts in demand in a market over time.

Our examination of hospitals in the four selected CTS markets suggests that many of these factors influenced hospitals' perceptions of the adequacy of their capacity. Miami and Phoenix were particularly affected by increasing population growth leading to greater demand for hospital services. In addition, changes in the insurance environment in Boston, Miami, and Phoenix, notably the managed care backlash of the 1990s, likely led to increases in demand. Boston's teaching hospitals also appeared to have reduced their service capacity too much given initial expectations of HMO effects in their market that were subsequently proven wrong. Although Cleveland's hospitals were not influenced by these factors per se, some of them had an increase in demand after two local hospitals closed. Thus, the experiences of the hospitals in these four markets indicate that population growth, insurance market changes, and demand shifts shaped their thinking about the adequacy of their capacity.

Two other factors were components of the conceptual framework: physician supply and/or practice patterns and the quality or scope of a hospital's services. Our evidence for the first of these was more limited than that for the other factors. In Miami, hospital respondents suggested that malpractice concerns were altering physicians' treatment decisions, causing them to refer patients to the emergency department more often than they previously did or to admit them rather than treat them as outpatients. Hospital respondents in other communities did not raise this issue. Our research design did not allow us to assess changes in the quality and scope of services offered over time, but we did observe that teaching institutions tended to report more capacity problems.

We also examined theories of supply adjustment to better understand what might affect the pace at which firms change their supply of services. These theories emphasize that because change is expensive, it is likely to be slow. This certainly was true for the communities we examined. In all four communities, occupancy rates initially were low and there was a perception of excess capacity, but it took time for the pressure to mount before hospitals began to reduce their bed capacity. As demand began to rise, however, these actions had to be reversed. In Cleveland, most of the hospitals that expanded capacity were near the hospitals that had closed. In Boston, Miami, and Phoenix, hospitals decided to reopen and staff

previously closed beds, and in Miami and Phoenix, hospitals added new beds. The shortage of RNs, however, slowed the addition of capacity in Miami and Phoenix.

As we noted earlier, the findings for the four markets we studied cannot be generalized to other communities given the specific features of these markets. But this is not an analytical concern, because the objectives of case study research are to find new insights and develop new hypotheses to guide future broad-based data collection and empirical testing (Yin 1994, 1999). We need more research to determine whether some of our observations hold in additional case studies and in empirical analysis. Specifically, how well are demand changes and supply changes matched for individual hospitals, and what may account for any deviations? What are the relative impacts of CON and staff shortages on the speed of supply adjustments? Are supply adjustments in response to growing demand more rapid in communities that have made progress in increasing the supply of nurses?

Although preliminary, our research offers some important insights for policy and management. In regard to policy, CON's planning efforts are prominent when one considers the state's role in affecting hospitals' supply of services. Existing empirical evidence and market observations suggest that CON has not had a substantial effect on hospitals' expansion or cost of care (Conover and Sloan 1998; Mayo and MacFarland 1989; Solomon 1998). Our findings also provide mixed evidence for the value of CON in rationalizing changes in capacity in health markets. On the positive side, the hurdles of obtaining CON approval may force hospitals to think of approaches other than bed expansion to deal with their capacity problems. These include making better use of existing capacity throughout the hospital system, as observed in Boston, or by improving hospital throughput. But if CON simply slows the inevitable, namely, the expansion of beds, its long-term effect on hospitals will be minimal. In particular, it is noteworthy that all hospital systems in the Miami market had CON applications to expand their bed capacity, which were being reviewed during round 4 of the Community Tracking Study.

States can also help increase the supply of nursing and other hospital personnel, which was clear in both Miami and Phoenix. The efforts by the state of Florida, along with those of its hospitals, appear to have quickly boosted the supply of nurses. The state's actions included providing nursing scholarships and loan-forgiveness programs and easing licensure requirements for nurses moving to Florida from other states.

Certainly, both short-term and long-term strategies are needed to address immediate nurse shortages and to educate new nurses to replace an aging workforce.

From a management perspective, the events in Cleveland are perhaps most telling and should serve as a warning to hospitals that simply building new capacity in response to greater demand may not be the answer. The Cleveland market presented few obstacles to hospitals in expanding capacity, but capacity built does not necessarily mean capacity utilized, especially if underlying demand expectations prove to be wrong. An unanticipated decline in use can leave hospitals or their parent systems with costly new capacity that cannot be supported financially.

Given this uncertainty, hospitals may be better served by coupling better capacity management with limited expansion in particular service lines and geographic areas of a market. The strategies of strained Boston hospitals are particularly interesting in this regard, namely, their considering how they could shift volume around a system's hospitals to better use their existing capacity and more tightly manage care. Another advantage of better capacity management, both within hospitals and across hospitals in a system, is that it enables a more rapid adjustment of supply to meet the fluctuations of demand.

Several other avenues of research would improve our understanding of the changing hospital environment and capacity. First, are we just beginning to see broad shifts in capacity from small, peripheral institutions to major institutions? What are the characteristics of those hospitals gaining demand and those losing it? For those who advocate a market-driven health system, these questions may not seem very relevant because shifts in demand simply reflect shifts in consumer preferences. However, as Salit, Fass, and Nowak (2002) noted, hospitals less used may be geographically isolated or serve a large disadvantaged population. This raises the question of whether market forces can deal equitably with hospital capacity issues. Second, how has the pace of supply adjustments changed over time, and have some factors led to slower adjustments? How have competing demands on hospital resources, such as the need to invest in information technology, affected the pace at which capacity adjustments are made? What influence does the payer environment have? Although our study did not address these questions, they are important to hospital managers and policymakers considering how to deal with imbalances in hospital service supply and demand.

Endnote

1. Differences in interviewees' responses typically reflected their role in the hospital. For example, some vice presidents for human resources were not certain which of their hospital's service lines or departments were most constrained. Also, the vice president/director for patient services sometimes claimed that the emergency department had the largest capacity problems, whereas the nursing executive might say that the ICU was the biggest problem. We resolved this difference by determining which response was given most often.

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