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## **Effective Responses to Market Entry by Specialty Hospitals and Ambulatory Surgery Centers**

**Final Report – July 2008**

### **I. Introduction**

The objective of this research project is to identify, assess and estimate the effect of competitor entry in select service lines on the ability of general hospitals to continue to maintain the scope, quantity, and quality of services. The effect of market entry by specialty hospitals and ambulatory surgical centers on incumbent general community hospitals is a topic of current debate (Guterman 2006), yet its impact on the management of health care delivery by general hospitals is not well understood.

Single-specialty hospitals and ambulatory surgery centers aim to attract primarily patients suited for standard, low risk procedures, exposing incumbent hospitals to disproportionately many high-risk patients with complex care requirements. To become operational, specialized entrants also need to attract physicians and other personnel, frequently by drawing away staff from incumbent hospitals. Under the current prospective payment system based on diagnosis groups, incumbent general community hospitals may see their ability to cross-subsidize unprofitable services compromised if the least complex, and therefore least costly, cases are diverted away from them and staff can threaten to defect to the new competitor.

General hospitals are faced with rigid administered prices set by public payers (e.g. Medicaid and Medicare) and prices negotiated with private payers. The financial viability of these hospitals and their ability to fulfill their mission depend on the balance they strike between providing profitable and unprofitable services. Entry of specialty hospitals into profitable service lines has the potential of upsetting this balance. Specifically, general hospitals' vulnerability to the cream-skimming of profitable patients and services

may force them to reduce the provision of unprofitable services. For instance, cardiology and cardiovascular surgery DRGs account for 25-40% of the average community hospital's net revenue (Casalino et al., 2003) and entry by an aggressive competitor will put this revenue at risk.

Concurrent with new competitive pressures, a tight regulatory environment, and growing numbers of uninsured and indigent patients, general hospitals are expected to continue providing community benefits. Local, state, and federal governments eager to increase tax revenues have put increasing pressure on hospitals, especially private nonprofit ones, to expand and fulfill their mission (David and Helmchen, 2006).

In addition to limiting further general hospitals' scope for generating revenue, new competitors raise general hospitals' cost by expanding surgeons' outside options and thus forcing general hospitals to divert resources away from the provision of unprofitable services and toward the recruitment and retention of staff (Burns, Walston et al. 2001; Burns, Alexander, et al. 2001; Dobson and Randall 2005). In this sense, entry by specialty hospitals and physician-owned ambulatory surgery centers will alter the bargaining power of physicians vis-à-vis incumbent general hospitals.

At the same time, the bargaining power among physicians *within* hospitals has changed as well, as not all physician specialties represented in the hospital have seen their outside options expand at the same rate: gastroenterology, orthopedics, ophthalmology, gynecology, ear, nose, and throat, and podiatry in particular have been able to take advantage of the reimbursement-driven profitability of their services by establishing physician-owned facilities.

Provider competition will typically lead to lower prices, benefiting consumers. At the same time, however, lower prices may compromise general hospitals' ability to cross-subsidize and thereby maintain unprofitable, yet socially desirable service lines. Thus, entry by specialty hospitals may complicate incumbent hospitals' relationships with physicians in all service lines.

## **II. Literature Review**

The Centers for Medicare and Medicaid Services (CMS) defines a specialty hospital as either: (1) a hospital where more than two-thirds of Medicare inpatients fall into no more than two Major Diagnostic Categories (MDCs), which encompass a range of similar Diagnosis-Related Groups (DRGs), or (2) a hospital where two thirds or more of Medicare claims are from surgical DRGs (McClellan, 2005).

The Government Accountability Office (GAO, 2003) identified nearly 100 stand-alone specialty hospitals in three major categories: cardiac (17 hospitals), orthopedic (36), surgical (22). Women's hospitals and other types of specialty hospitals made up the remainder.

Specialty hospitals tend to be concentrated in states that lack certificate-of-need (CON) laws; all specialty hospitals are located in 28 states, with two-thirds located in just 7 states (GAO, 2003). In addition, specialty hospitals tend to be located in high-growth metropolitan areas that lack a dominant community hospital, and that have a large, single-specialty physician practice group (Casalino et al., 2003).

In terms of profitability, the GAO found that the profit margins for Medicare beneficiary claims were roughly equivalent across specialty and community hospitals in 2001 (9.4% and 8.9% respectively). However, specialty hospitals were significantly more profitable when all payer types were considered (GAO 2003; Iglehart, 2005). Most stand-alone specialty hospitals are for-profit entities and many are at least partially owned by physicians.

Physician ownership of specialty hospitals poses a significant organizational and financial challenge for general hospitals that compete in the same market. First, physician-owners are a major source of patient referrals (which critics suggest promotes physician-induced demand). Second, physician-owners have a stake in the financial performance of the hospital, providing an incentive to improve quality and efficiency while at the same time controlling costs. Cardiac specialty hospitals in particular have a

higher percentage of physician ownership on average than other types of specialty hospitals (Cromwell et al., 2005; McClellan, 2005).

While the major themes of the specialty hospital debate center on the impact of specialty hospitals on cost, quality and access to care, very little empirical research has been conducted to date on the impact of specialty hospitals on local market competition and cross-subsidization in community hospitals.

Specialty hospitals treat a lower percentage of severely ill patients as compared to community hospitals (GAO, 2003). The Medicare Payment Advisory Commission (MedPAC) concurred with the GAO's findings and concluded that specialty hospitals did not have lower costs. MedPAC also found that specialty hospitals had limited if any impact on the financial health of community hospitals, as compared to those community hospitals that did not experience specialty hospital entry (MedPAC, 2005). CMS reached similar conclusions, for example that cardiac specialty hospitals treat less severely ill patients than their community hospital competitors

Mitchell (2005) looked at six years of Medicare inpatient discharge data from Arizona and concluded that physician-owned cardiac specialty hospitals treat higher volumes of more profitable DRGs, higher percentages of lower-severity cases, and have a greater percentage of privately insured patients compared to competing community hospitals. In their editorial on Mitchell (2005), Hadley and Zuckerman (2005) acknowledge that physicians' responses to financial incentives noted in Mitchell's study should not be surprising. Hadley and Zuckerman also claim to identify the real problem: that if specialty hospitals threaten the ability of general hospitals to achieve their social missions, then the appropriate action is not to curb the financial incentives of physician-ownership, but rather to find new and improved means of measuring and funding not-for-profit community hospitals' social missions. However, in neither study do the authors offer experimental evidence regarding the impact of specialty hospitals on community benefit or the cross-subsidization of less profitable services in community hospitals.

Cromwell et al. (2005) and Greenwald et al. (2006) combined retrospective data with field interviews from 2003 and found that (1) physician-owners of specialty hospitals were more likely to refer patients to their own facilities, (2) specialty hospitals treat on average a less severely ill patient population as compared to community hospitals, (3) quality of care at specialty hospitals was equal to or better than care at competing community hospitals, and (4) the burden from uncompensated care plus taxes for specialty hospitals exceeded that of not-for-profit hospitals' "community benefit" contributions (in percentage terms).

Cram et al. (2005) investigated quality, outcome and volume differences in cardiac revascularization in specialty and general hospitals. Analyzing differences in Medicare inpatient claims data, the authors found that the superior outcomes in percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG) procedures in cardiac specialty hospitals were attributable to higher procedural volumes and healthier patients. Stensland and Winter (2006) applied a differences-in-differences methodology to evaluate the impact of physician-ownership of cardiac specialty hospitals on surgery volume. They found that "the differences in growth rates between high- and low-profit surgeries were usually not large enough for us to conclude that hospital ownership by physicians is associated with higher use." Barro et al. (2005) employed a differences-in-differences empirical strategy to evaluate the effects of cardiac specialty hospitals on the costs, outcomes, and procedural intensities of cardiac care in local hospital markets. Using Hospital Referral Regions (HRRs) as the base unit of comparison, they modeled "how time trends in expenditures and outcomes in hospital referral regions (HRRs) in which a specialty hospital opened in 1997 or 1998 ("treatment" HRRs) differ from trends in HRRs in which no specialty hospital opened ("control" HRRs)" to determine differences between cardiac specialty and community hospital care, as well as to estimate the spillover effects of specialty hospital entry.

These empirical studies provide us with examples of study design and limitations, but do not preempt the merits of our investigation into the effects of specialty hospital entry on

the volume and cost of less profitable, yet socially desirable, community hospital-provided services.

Compared with the case of single specialty hospitals, the literature on Ambulatory Surgical Centers (ASCs) is scarce. ASCs are at the center of an accelerating movement from inpatient models to outpatient models of patient care (Becker & Biala, 2000). This shift stems in large part from the advances of medical technology that have significantly decreased hospital length of stay. Surgeries that once were performed in an 8-hour span and required several days of recovery can now be performed within 90 minutes and permit the patient to return home on the day that he or she was admitted. As a result, an increasing proportion of surgeries can now be performed on an outpatient basis in which the patient does not require an overnight stay in the hospital. Prior to the 1990's, over 75% of outpatient surgical procedures occurred within hospital-based settings (Barney, 1996; Nelson & Winter, 1982).

A growing share of these outpatient surgeries is being performed at physician offices and ambulatory surgery centers. In fact, these two types of facilities now handle over 50% of all outpatient procedures. As a result, the number of ambulatory surgery centers in the US has grown at an astounding rate. From 1992 to 2002, the number of ASCs increased from 1,530 to an estimated 3,570 facilities (Baker, 2002).

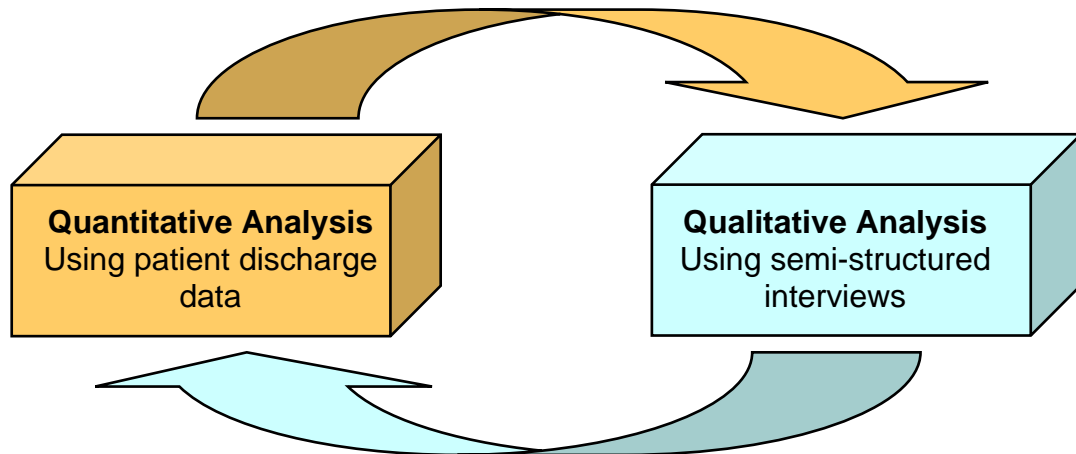
Individual surgery centers may perform surgeries in a variety of specialties or dedicate their services to one specialty. In fact, 53% of all surgery centers specialize in a single specialty while 47% provide services in multiple specialties (Verispan, 2006).

### III. Research Design

The complex interplay between growing physician entrepreneurship, the demands of community stakeholders at risk of neglect, and hospital strategies to deal with both calls for a research design that combines elements of qualitative and quantitative analysis.

Our qualitative analysis was based on in-depth semi-structured interviews with the leadership of both CHMR member and non-member hospitals. These interviews have provided valuable insight on how hospital executives in select markets responded to the new competitive challenges of emerging specialty facilities and the effectiveness of these responses. The interviews emphasized the changing relationship between hospitals and specialist as well as primary care networks. To accomplish that, we conducted similar interviews to assess the potential of other market developments, such as minute clinics, that may, in time, upset the traditional equilibrium in markets (see section IV of this report).

Figure 1: Research Design



As seen from Figure 1, the interviews provided the necessary orientation for the quantitative part of the project, which consisted of statistical analysis of large data sets. The insight generated by the qualitative analysis has informed the selection and interpretation of variables used in the econometric estimation procedures and aid in drawing actionable inferences from the estimation results. In addition, the quantitative analysis identified empirical regularities in selected markets (see section V of this report).

#### **IV. Qualitative Analysis**

The qualitative analysis is based on semi-structured interviews with seven health systems and two specialty corporations operating in several different states. Systems included Sutter Health, John Muir Health, Lehigh Valley Health Network, Carondelet/Ascension Health, Tucson Medical Center, Rush University Medical Center, Catholic Healthcare West, MedCath Corporation, and MinuteClinic. We conducted the interviews with both lay executives (chief executive officer, chief operating officer, chief financial officer, VP for strategy, VP for business development, VP for physician affairs) and clinical executives (chief medical officer, VP for clinical integration, and chiefs of cardiology, psychiatric, and burn unit services). The interviews lasted 45-60 minutes and followed a written protocol developed by the researchers in concert with CHMR members (see Appendix). The protocol questions focused on the impact in local hospital markets of single specialty hospitals, ambulatory surgery centers, and retail clinics.

##### *Impact of Single Specialty Hospitals (SSHs)*

There was no uniformity of opinion among the interview respondents regarding the impact of single specialty hospitals (SSHs) on incumbents in local hospital markets. The potential impact of SSHs seems to depend on who is setting them up. Freestanding SSHs set up by outside corporations appear to be less threatening to local hospitals, for several reasons. One problem these hospitals encounter is the presence of CON laws; another problem is the high cost of construction of new plant (e.g., in California). By contrast, competitor hospitals which set up SSHs as part of a joint-venture with their physicians are viewed as a major threat. This is because such ventures might entice specialists on the hospital's medical staff to relocate their offices closer to the SSH site and thereby minimize the specialist's travel distance between inpatient and outpatient settings. Most respondents indicated that they had not developed their own SSH or responded vigorously to the entry of a freestanding SSH (e.g., via economic credentialing of their specialists). Some did indicate that their pursuit of other ventures (e.g., ambulatory surgery centers for orthopedics) might eventually develop into a SSH.



### *Impact of Ambulatory Surgery Centers (ASCs)*

Unlike SSHs, ambulatory surgery centers (ASCs) are commonly viewed as a competitive threat in local hospital markets. ASCs are believed to cream-skim the privately-insured patients and less-difficult cases. Incumbent hospitals commonly report that it takes them considerable time to back-fill the excess capacity in their outpatient operating rooms. To do so, they often must recruit new surgeons to the community. ASCs pose another threat as well: the potential to diversify beyond the ASC into a larger healthcare campus (offering diagnostic, rehabilitation, or health promotion services) that can attract away the hospital's medical staff. There is also the threat that ASCs can develop and SSH and thereby combine inpatient and outpatient services on a single campus. However, ASCs are not a threat to all hospitals. Academic medical centers and large teaching hospitals do not see ASCs, with their lower severity-of-illness patients, attracting their core business. Nevertheless, most respondents indicated that their institutions had developed one or more ASCs of their own, typically in partnership with physicians on their medical staff. In general, their sentiment was it was better to lose a portion of the outpatient surgery business than lose it all.

### *Impact of Retail Clinics*

Retail clinics, finally, are also not viewed by interview respondents as a threat since they focus on primary care. Indeed, there are three types of hospital reactions to such clinics: deny (dismiss), ally, and do-it-yourself. Currently, the majority of retail clinic business is found in systems operated by pharmacy chains such as CVS/MinuteClinic. Such systems have been forced to retrench in recent months and scale back their expansion plans. By contrast, hospital systems in both urban and rural areas are developing their own retail clinic networks. Such networks can have the advantage of relieving the congestion in the hospital's emergency room and in the offices of the hospital's affiliated primary care physicians. This network strategy is not risk-free, however. There is considerable opposition to retail clinics voiced by pediatricians. There is also the issue of whether hospitals have any capabilities in retail services. At present, the systems have no real data on how well these operations are faring.

**V. Quantitative Analysis**

The quantitative analysis focuses on estimating the effect of cardiac specialty hospital entry in early 2000 in Arizona on the number of discharges in a number of Major Diagnostic Categories from incumbent hospitals that remained open.

To identify the relevant specialty hospitals, we began with broad, government-sponsored research studies to identify the general categories of specialty hospitals (cardiac, orthopedic, surgical, women’s, etc.) along with the approximate number of facilities in each (GAO 2003). From there, we decided to narrow our focus to cardiac specialty hospitals because these tend to be larger (measured by number of beds), treat more patients (based on average daily census) and have a greater degree of homogeneity as a group. To identify the complete universe of stand-alone cardiac specialty hospitals, we began with the 10 facilities owned and/or managed by the for-profit, investor-owned MedCath Corporation. From MedCath’s 2005 10-K filing, we were able to obtain information on location, size (# beds, operating suites, catheterization labs, etc.), ownership (% owned by physicians) and opening date.

We chose to analyze the experience of Arizona because two cardiac specialty hospitals began treating patients at about the same time and because these two markets seem geographically well-delineated and distinct from other markets.

Table 1: Hospitals in Phoenix / Mesa 1998-2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
<i>Total</i>	17	15	16	17	17	18	18	18	17
<u>Ownership Type</u>									
General Hospital	17	15	15	16	16	16	16	16	15
Gov	1	1	1	1	1	1	1	1	1
Nongov non-profit	10	9	8	8	8	8	8	9	9
Nongov for-profit	6	5	6	7	7	7	7	6	5
Specialty Hospital	0	0	1	1	1	2	2	2	2
<u>Number of Beds</u>									
< 100	3	2	3	2	2	3	2	1	1
100 – 200	4	4	4	6	6	6	6	6	6
200 – 400	6	5	5	5	5	5	6	7	6
> 400	4	4	4	4	4	4	4	4	4
<i>Teaching Hospital</i>	3	3	3	3	3	3	3	3	3
<i>Med School Affiliation</i>	4	4	4	5	5	5	5	5	5

Table 1 shows the number of hospitals by category in each year from 1998 to 2006. For the purpose of this analysis, we treat the Phoenix and Mesa markets as one, since the two cities are adjacent to each other. There are close to twenty hospitals in this market with one government run facility and the remainder split almost evenly between private not-for-profit and private for-profit facilities. Two specialty heart hospitals operate in this market; *Arizona Heart Hospital* (Phoenix), which entered in 2000, and *Banner Baywood Heart Hospital* (Mesa), which entered in 2003. Looking at the number of beds per hospital, it appears that entry by the two cardiac hospitals did not affect the number of large hospitals (>400), but rather impacted the number of small hospitals.

Table 2: Hospitals in Tucson 1998-2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
<i>Total</i>	8	8	8	8	8	8	9	8	7
<u>Ownership Type</u>									
General Hospital	8	8	7	7	7	7	8	7	6
Gov	1	1	1	1	1	1	1	1	1
Nongov , non-profit	4	4	4	4	4	4	4	4	4
Nongov, for-profit	3	3	2	2	2	2	3	2	1
Specialty Hospital	0	0	1	1	1	1	1	1	1
<u>Number of Beds</u>									
< 100	1	1	1	1	1	2	3	1	1
100 – 200	3	3	3	3	2	1	1	1	1
200 – 400	3	3	3	3	3	3	3	5	4
> 400	1	1	1	1	2	2	2	1	1
<i>Teaching Hospital</i>	1	1	1	1	1	1	1	1	1
<i>Med School Affiliation</i>	3	3	3	3	3	3	3	3	3

Table 2 shows the number of hospitals by category in each year from 1998 to 2006 for the Tucson market. The number of hospitals is about half the number in the combined Phoenix – Mesa market. *Tucson Heart Hospital* entered in 2000.

As outlined in the grant proposal, we chose the state of Arizona to evaluate the effect of entry by single specialty hospitals because this state experienced specialty entry by a

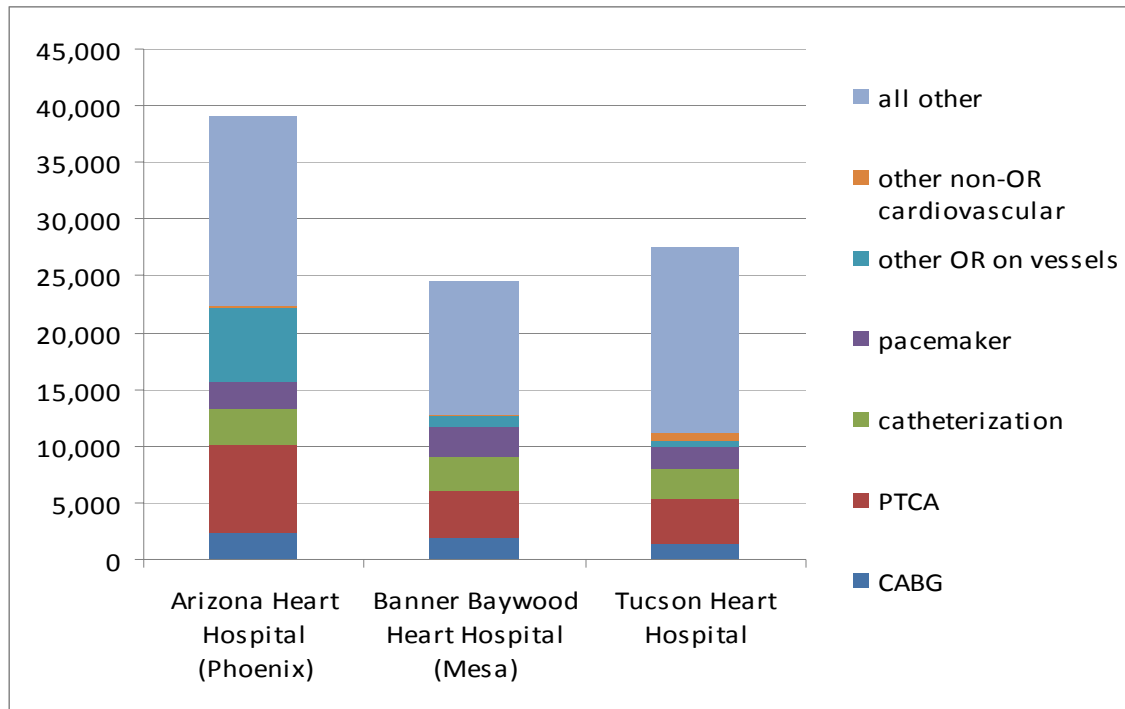
variety of hospital systems at various points in time and in geographically distinct markets, making it suitable for a detailed, yet robust study. To this end, we acquired the State Inpatient Database (SID), which consists of the inpatient discharge abstracts from all hospitals in Arizona of all patients discharged between 1998 and 2006. We linked the SID files to data from the American Hospital Association Annual Survey of Hospitals to incorporate hospital-specific covariates such as ownership status, service type, and number of beds.

To rule out competing explanations for any effect of entry by specialized providers on the provision of uncontested services, we supplemented these data sets with additional variables, such as demographic composition, crime, unemployment and poverty rates, that affect the demand for uncontested services. These variables were drawn from the U.S. Census Bureau Population Estimates, Uniform Crime Reports, Local Area Unemployment Statistics, and the U.S. Census Bureau Small Area Income and Poverty Estimates.

After reviewing the literature, we have concluded that current studies are limited in their validity because they compare markets that experienced entry to markets that did not. But in their location decisions, forward-looking potential entrants evaluate very carefully and strategically their likely prospects of success if they decide to start offering services in a given market. Thus, the markets that new competitors select to enter are not randomly chosen. These markets may differ systematically from markets that are not selected for entry. Moreover, some markets did not experience entry because they were never under consideration for entry while other markets did not experience entry because entry was successfully deterred. Current studies fail to distinguish between these two reasons why some markets did not experience entry and therefore risk understating the true effect of entry on the provision of uncontested services by incumbent hospitals. By contrast, we will compare only hospitals within a given market and thereby reduce the bias inherent in multi-market comparison studies.

Figure 2 presents the distribution of procedures performed at each of the three cardiac specialty hospitals under study. We use the categories from the Clinical Classifications Software for Services and Procedures (AHRQ 2006).

Figure 2: Procedures Performed at AZ Cardiac Specialty Hospitals, 2000-2006



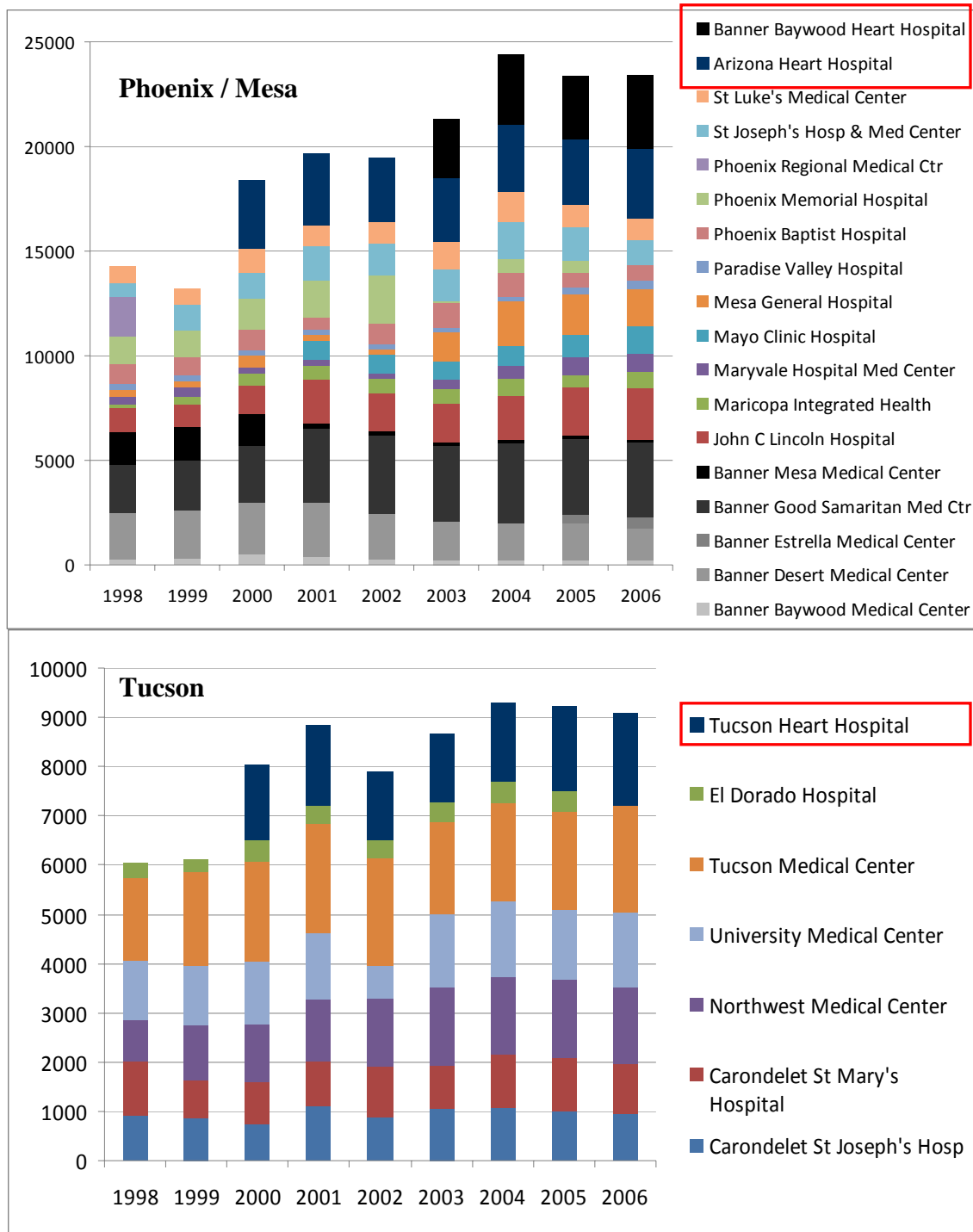
The figure focuses on the six procedures that were among the top five at at least one cardiac specialty hospital:

- coronary artery bypass graft (CABG)
- percutaneous transluminal coronary angioplasty (PTCA)
- diagnostic cardiac catheterization or coronary arteriography,
- insertion, revision, replacement, or removal of cardiac pacemaker or cardioverter,
- other operating room (OR) procedures on vessels other than head and neck, and
- other non-OR therapeutic cardiovascular procedures.

These procedures account for about half of all heart related discharges, with PTCA being the largest category. In addition, these were the key procedures that single-specialty hospitals used to directly compete with incumbent general hospitals.

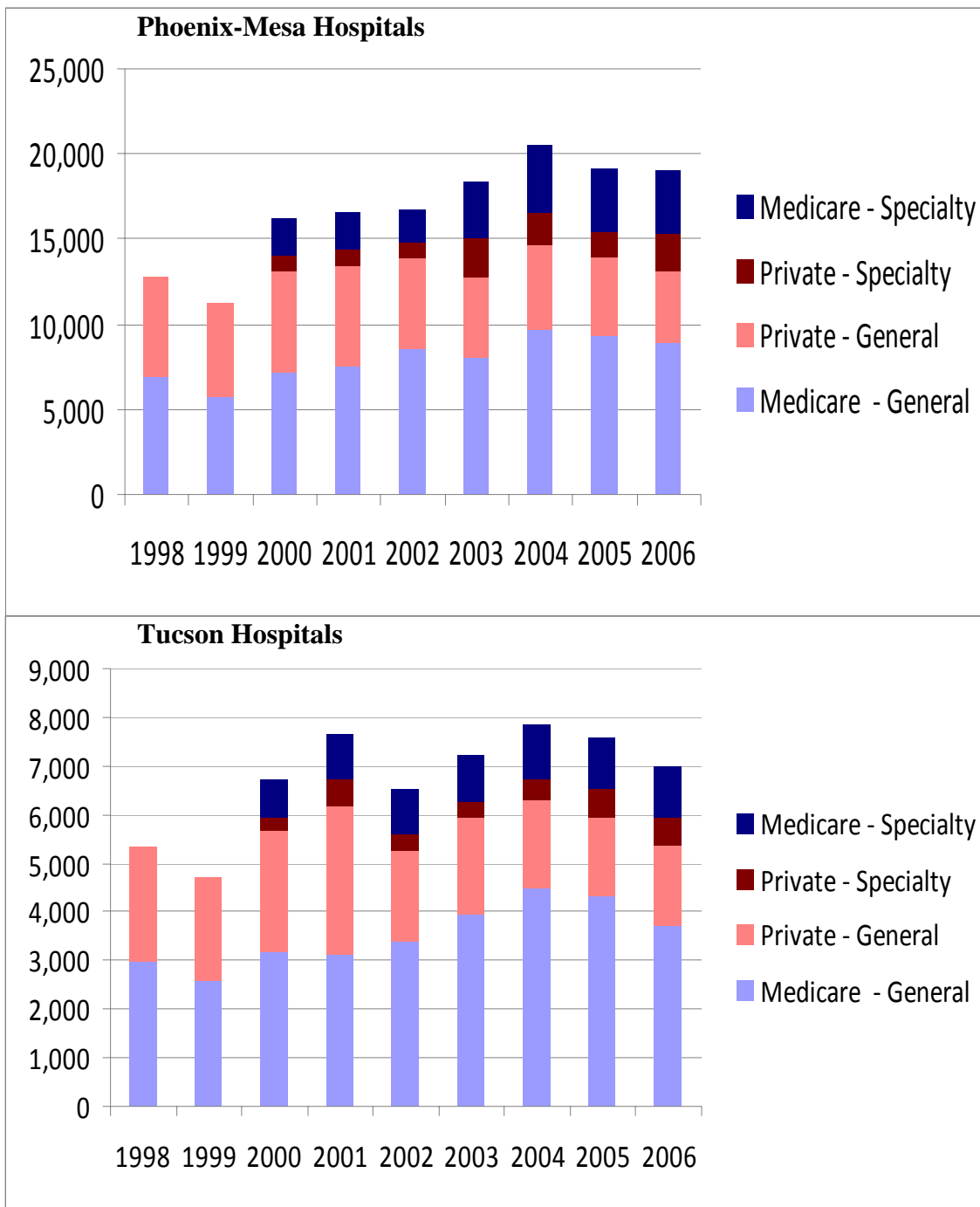
From the upper panel of Figure 3, we see that the single specialty hospitals absorbed all the growth of the Phoenix market. It is possible that the single specialty hospitals generated this growth in the first place, either by identifying unmet demand or through inducement (commonly referred to as “supplier-induced demand”).

Figure 3: Top 5 Cardiac Procedures at General and Single-Specialty Hospitals 1998-2006



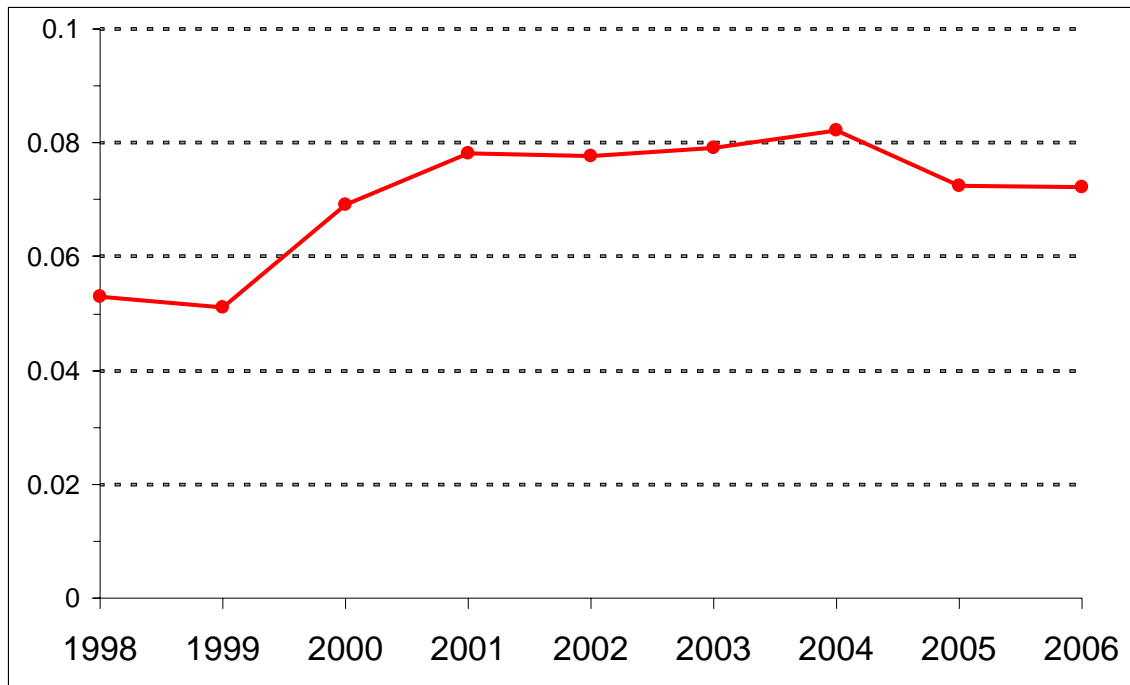
While some of the Banner hospitals (bottom 5 hospitals in the upper panel) were not Banner hospitals from the start of the study period, they were absorbed by Banner over the course of the period under study. It appears that Banner was not able to retain its absolute number and market share of the top 5 cardiac procedures after Arizona Heart Hospital entered in 2000. So they fought back and built their own heart hospital. A similar pattern emerges from the analysis of the Tucson market (lower panel), as any growth was captured by the specialty hospital.

Figure 4: Primary Payers of Cardiac Patients at, 1998-2006



When discharges are broken out by payer, we observe that any growth of Medicare and private-payer patient populations was absorbed by the single specialty hospitals. While general hospitals did not see a decline, one might suspect that the counterfactual was growth. Hence, entry by the single specialty hospital may have prevented general hospitals from taking advantage of growth opportunities for a highly lucrative segment of cardiac patients. The same trend repeats itself in the Tucson market (lower panel).

Figure 5: Fraction Receiving Cardiac Procedure, by Year 65 Years or Older, Tucson



To separate between a response to demographic trends and supplier induced demand, we computed the fraction of population over 65 years that received cardiac procedure in the Tucson market between 1998 and 2006. In 1999, about 5% of individuals received a cardiac procedure, whereas in 2001 (after the entry of the single specialty hospital) about 8% of individuals over 65 received one. This share persists for four years before it drops slightly to 7% in 2005-2006. The steep increase between 1999 and 2001 is not consistent with the demographic path of aging which slowly rises throughout this period.

The interviews that form the basis of our qualitative analysis also enhanced our quantitative analysis. Specifically, current studies, which rely on large, highly abstract



data sets, have difficulty pinning down the precise dates of market entry by specialized providers, i.e. the point in time when a new competitor had become fully operational and therefore was able to draw patients away from incumbent providers. We have been using the interviews to elicit the exact dates of entry – information that is essential for obtaining meaningful estimates. Similarly, current studies that rely on abstract data sets frequently do not properly account for the complex ownership structures of new competitors and the contractual arrangements that they enter into with local physicians. We have been using the interviews to form an accurate understanding of these issues – again, information that is too often overlooked by current studies, yet is essential for drawing correct inferences.

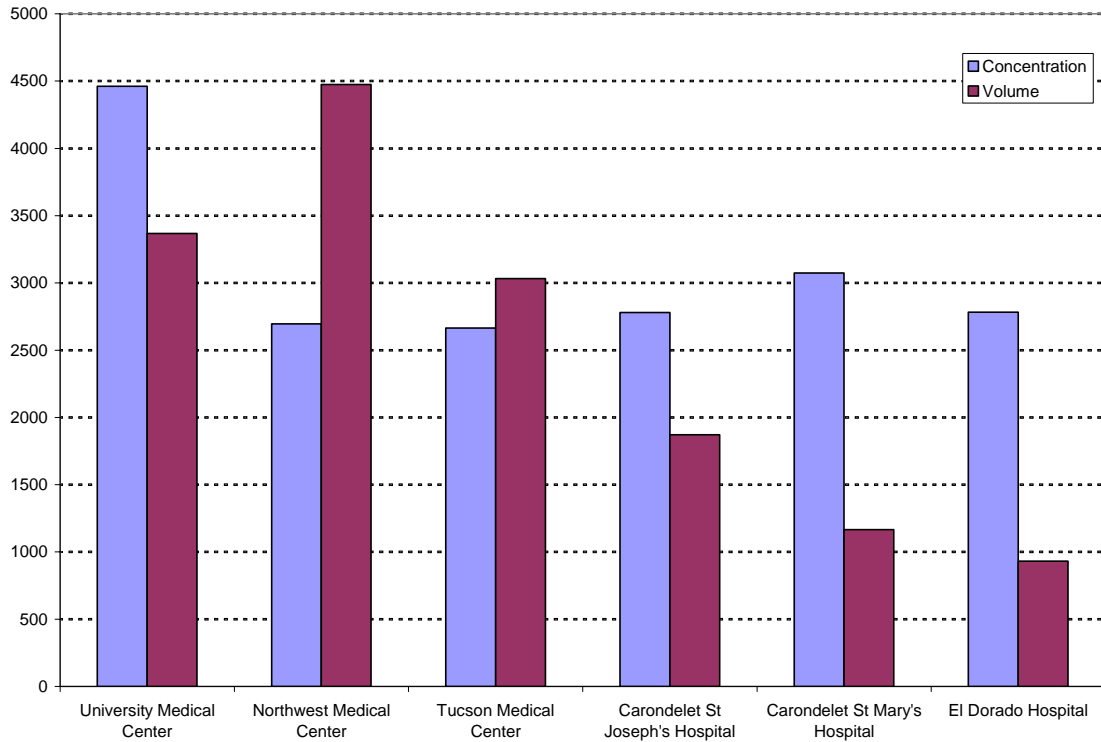
We estimate the effect of specialized-provider entry by comparing incumbent hospitals that operate in the same market but vary in their exposure to the entering single specialty hospital. Specifically, we constructed the following two measures of exposure to the risk of losing profitable patients to an entering specialty hospital as follows:

$$\text{Volume Index: } \frac{1}{N_h} \sum_{p=1}^{N_h} \text{Procedures}_{ph} \cdot \text{Procedures}_p$$

$$\text{Concentration Index: } \frac{\sum_{\text{most loyal } p} \text{Procedures}_{ph}}{\text{Procedures}_h}$$

The volume index is each physician’s average hospital-level volume, denoted  $\text{Procedures}_{ph}$ , weighted by their market-level volume, denoted by  $\text{Procedures}_p$ . The concentration index is the share of all procedures performed at hospital  $h$  by the “most loyal” physicians in that hospital. We posit that hospital  $h$ ’s exposure to a potential single specialty entrant increases when the average provider in hospital  $h$  generates a high volume outside the hospital, and the smaller the share of procedure performed by its most loyal physicians.

Figure 6: concentration and volume indexes for the pre-2000 (entry) period



Exposure is weaker the lower the volume index is and the higher the concentration index is. Figure 6 shows that the most exposed hospital was Northwest Medical Center, as it had the highest volume index score and the lowest concentration index score in the city. In this context, it is worth noting that the single specialty hospital chose to locate close to Northwest Medical Center and further away from the other five hospitals.

To identify the effect of entry on the provision of uncontested services, we divided incumbent hospitals in the two markets into two groups:

- a “treatment group”, which includes hospitals that were strongly exposed to the risk of losing profitable patients to physician-owned competitors, and
- a “control group”, which includes hospitals that did not or were only weakly exposed to the risk of losing profitable patients to entering specialty facilities.

To filter out any underlying trends that may have affected the behavior of general hospitals even in the absence of entry by specialty hospitals, we subtracted the average change between the pre-entry and post-entry periods in discharges in 24 non-cardiac

Major Diagnostic Categories from general hospitals that were exposed to specialty-hospital entry (the treatment group) from the average change over the same span of time in discharges in the same MDCs from general hospitals that were not or only weakly exposed (control group).

In the following equation, we use the “difference-in-differences” estimator (Bertrand et al. 2004, Buchmueller et al. 2006) shown as the coefficient  $\gamma$  of the interaction term between the  $EXP_h$  dummy variable and the  $ENTRY_{mt}$  dummy variable. The difference-in-differences estimator subtracts from the change observed for the treatment group any time trend that is observed for the control group and that presumably affects the treatment group in the same way. In the context of the current study, this estimation technique allows us to net out any time trends that we observe for the strongly exposed hospitals but that affected the weakly exposed hospitals in the same way.

To estimate the effect of entry on incumbent hospitals’ provision of uncontested services we estimate the following equation:

$$UNCONTESTED_{hmt} = \alpha_{mt} + \beta_h + \gamma(EXP_h \times ENTRY_{mt}) + \phi EXP_h + \mu ENTRY_{mt} + Z_{hmt}\Gamma + u_{hmt}$$

Where  $UNCONTESTED_{hmt}$  measures the provision of uncontested service by hospital  $h$  in market  $m$  at time  $t$ ;  $EXP_h$  measures the degree to which the incumbent hospital  $h$  is exposed to entry; and  $ENTRY_{mt}$  indicates the year of entry in market  $m$ . In addition,  $\alpha_{mt}$  accounts for time-varying market-specific effects;  $\beta_h$  accounts for time-invariant hospital effects;  $\gamma$  measures the effect of being exposed to entry on the provision of the uncontested service; and  $Z_{hmt}$  accounts for time-varying hospital- and market-specific effects. By construction, each hospital’s exposure measure,  $EXP_h$  is time-invariant.

Results show that, compared to general hospitals at no or low risk of losing cardiac patients to specialty hospitals, general hospitals at high risk experienced a slower growth of discharges of patients whose Major Diagnostic Category related to the following

services: trauma, HIV, psychiatry, substance abuse treatment, detoxification, and burn care.

Figure 7: Discharges from General Hospitals, by Major Diagnostic Category 1998-2006

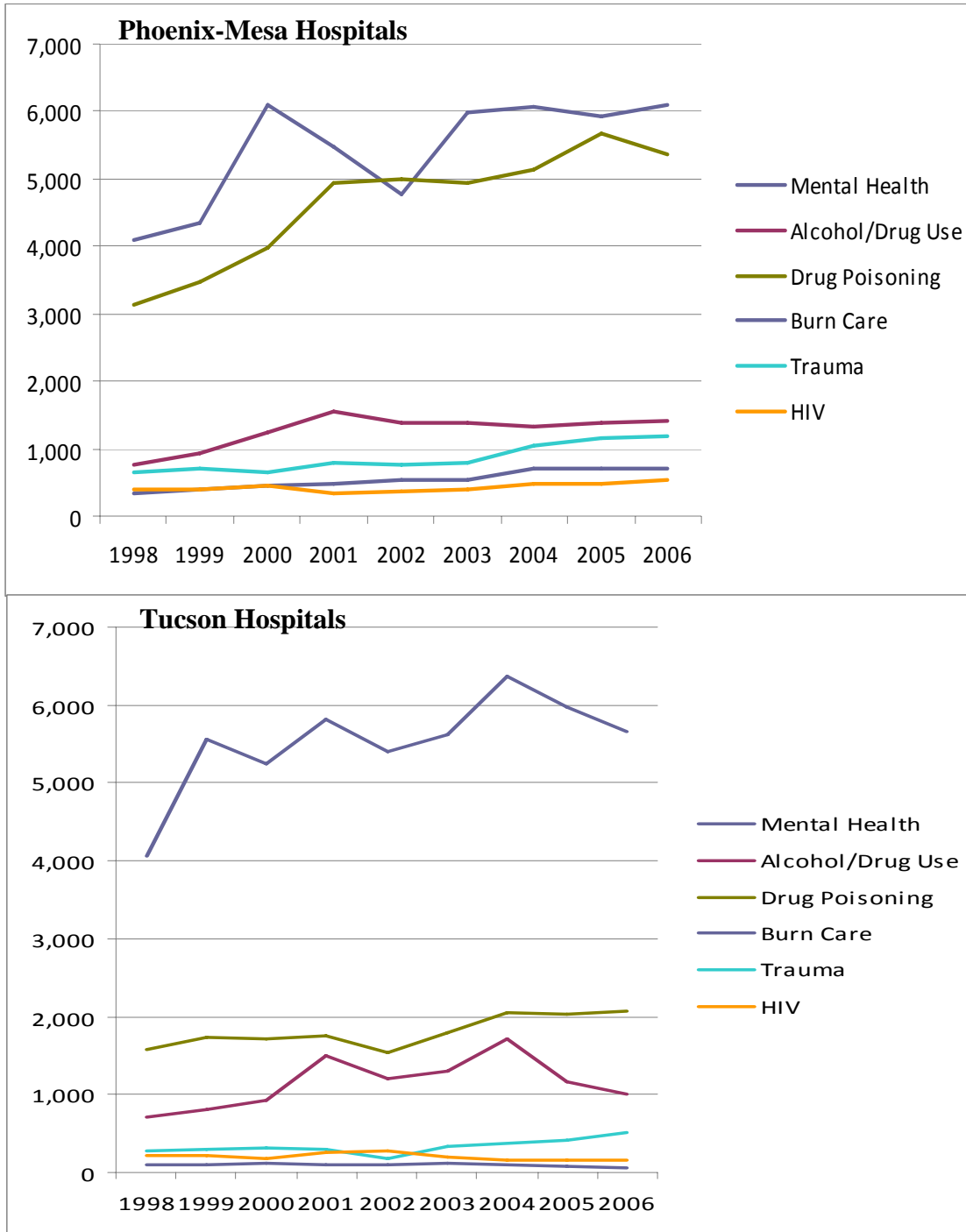


Figure 7 demonstrates a slight increase in uncontested (and potentially unprofitable) service prior to entry by single specialty hospitals. However, post entry, these trends flatten out or even decline.

These results are consistent with economic theory, which predicts that in response to competitive pressure targeted at the hospital's revenue sources, the hospital will reduce its provision of unprofitable mission-related services. The results are also in line with the findings by Horwitz (2005), who studied the relative profitability of various procedures across hospital ownership types (for-profit, not-for-profit, and government). Horwitz concluded that cardiac catheterizations and open heart surgeries are profitable across all types, but that inpatient psychiatric services (including drug and alcohol treatment programs) are not profitable for any hospital category.

## **VI. Discussion**

The expansion of profit-generating opportunities outside the hospital has enabled a number of physician specialties to negotiate significantly better compensation. Faced with the prospect of losing business to competing physician-owned facilities that offer the same services, incumbent hospitals have opted to enter into profit-sharing joint ventures with physicians who threaten to divert all their referrals to competing facilities or to bid for exclusive access to these physicians' services by hiring them at competitive rates (Berenson et al. 2006). Instead of accommodating physician demands, some hospitals have attempted to deter the emergence of competitor facilities in their markets by negotiating exclusive contracts with payers and discounting those services at greatest risk of out-migration. Our interviews indicated that general hospitals, in a number of cases, have responded to entry of specialty hospitals by tightening the relationship with "feeder" primary care practices that will send patients to their facilities in return for valuable operating room time, by negotiating exclusive managed care contracts with insurers, by providing lucrative "management" subcontracts with inpatient specialists, by opening their own heart and orthopedic "centers of excellence" on the hospital campus for specialists, and by building physician offices on campus. Regardless of the response chosen, however, incumbent hospitals are faced with a permanent loss of revenue from their most profitable service lines.

Although it is clear that the possibility of entry by specialty hospitals and ambulatory surgical centers can pose a significant challenge to the financial resilience and mission-fulfillment capability of incumbent general hospitals, it is not at all clear if and how general hospitals should reconfigure the scope, quantity and quality of their other, uncontested service lines in response to a threat of entry. The reaction by incumbent general hospitals to entry by specialty hospitals and ambulatory surgical centers on dimensions other than the type of care provided by the new competitor is not well documented and not well understood.

The effect of physician-owned competitor facilities on uncontested service lines is already visible in the reorganization of emergency department (ED) call duties currently

under way in many general hospitals. Not only is the emergence of physician-owned facilities siphoning off revenues from profitable service lines but it is also reducing the readiness of physicians to devote time to ED calls. The growing use of hospitalists further reduces the frequency with which outside physicians spend time at the hospital, thereby increasing hospitals' reliance on their salaried physicians whose bargaining power, and thus pay, increases as a result.

In addition to modifying the type, quantity, and quality of services other than those offered by the entering specialty hospital, incumbent hospitals may be forced to intensify bill collections, reduce the provision of uncompensated care across all services, lower the number of full-time equivalents (FTEs) on staff, and shift resources and managerial effort to retention of pricing power.

Apart from sporadic accounts of the response by general hospitals to entry by specialty hospitals, this is the first study to present systematic evidence on response strategies that incumbent providers adopt in the face of actual entry and their effectiveness. It is also the first study to examine systematically how general hospitals reconfigure their operations to avoid the threat of entry in the first place. We hope that this report provides a first step towards understanding some of these reactions by general hospitals.

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## **Appendix. Interview Protocol**

### *Semi-Structured Interview of Physician Network Development Executives*

1. General Introductions (purpose of the study, researcher bios)
2. Have you had a single-specialty hospital enter your market?
  - a. Describe it (name, kind of specialty, entry date, how has it developed over time)
  - b. Reasons for entry / non-entry
  - c. What impact has that had over time?
  - d. How have you responded?
  - e. What impact has the entry had on your relations with your medical staff?
  - f. How would we identify this impact and your reaction in the data?
  - g. If there was an impact, what was your strategy to deal with this?
3. Repeat Question 2 for ASCs
4. What are your least profitable services?
  - a. Why are they not so profitable?
  - b. How do you finance these (low-profitability) services?
  - c. What impact did entry of single-specialty hospitals have on the way you offered these services? (Did the competition lead you to tinker with these services?)
  - d. Repeat c. for ASCs
5. Besides the single-specialty hospitals and ASCs, what are general stressors that threaten your relationships with your physicians (primary care and specialists)?
  - a. What is the hospital dealing with these threats?
6. What's your general view of minute clinics as a competitive threat?

### *Semi-Structured Interview of Physicians (Most Active Cardiologist or Orthopedic Surgeon, Chief of "Unprofitable" Unit or Division)*

1. Are all the responses implemented by the hospital to salvage physician-hospital relations working?
2. What would work well?
3. How has service delivery changed at the front line (volume / number of patients, kind of patients, staff layoffs, etc.)?
4. Have you thought of "defecting" to the competing venture or of setting up a competing venture on your own?
5. What's your general view of specialty hospitals, ASCs, minute clinics and what is their impact on your hospital?