

Public and Private Patients in Jerusalem Hospitals: Who Operates on Whom?

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Abstract

Background: Debate continues in Israel as to whether to allow patients in public hospitals to choose their physician in return for an additional, out-of-pocket payment. One argument against this arrangement is that the most senior physicians will devote most of their time to private patients and not be sufficiently available to public patients with complex cases.

Objectives: To analyze the patterns of surgical seniority in Jerusalem hospitals from a number of perspectives, including the extent to which: a) opting for private care increases the likelihood of being treated by a very senior surgeon; b) public patients undergoing complex operations are being treated by very senior surgeons, c) the most senior surgeons allocate a significant portion of their time to private patients.

Methods: Demographic and clinical data were retrieved from the operating room records of three of the public hospitals in Jerusalem for all 38,840 operations performed in 2001. Of them, roughly 6000 (16%) were performed privately. Operations were classified as "most complex," "moderately complex" and "least complex" by averaging the independent ratings of eight medical and surgical experts. The surgeon's seniority was graded as "tenured" (tenured board-certified specialists, including department heads), "senior" (non-tenured board-certified specialists), and "residents." For each operation, we considered the seniority of the lead surgeon and of the most senior surgeon on the surgical team.

Results: The lead surgeon was of tenured rank in 99% of the most complex private cases and 74% of the most complex public cases, in 93% of the moderately complex private and 35% of the moderately complex public cases, and in 92% of the least complex private and 32% of the least complex public cases. The surgical team included a tenured physician in 97%, 66%, and 53% of the most complex, moderately complex, and least complex public operations, respectively. In both private and public cases, a board-certified (tenured or senior) specialist was a member of the surgical team for almost all of the most complex and moderately complex operations. On average, over half of the operations in which the lead surgeon was a department head were performed on public patients. Among tenured surgeons, those who spent more hours than their colleagues leading private operations also tended, on average, to spend more hours leading public operations.

Conclusions: Private patients have an advantage over public patients in terms of the seniority of the lead surgeon. However, there is also substantial involvement of very senior surgeons in the treatment of public patients, particularly in those cases that are most complex.

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SHARAP (the Hebrew acronym for Private Medical Service) is a private care program that allows patients in certain Israeli hospitals to choose their physician in return for an additional payment¹. This contrasts with the usual situation, where the full cost of the care is covered by the patient's health management organization² and the hospital and/or department head decides which physician will oversee a patient's care. At present, only public, non-government hospitals offer private care; the most active and well-known in this regard are the public hospitals in Jerusalem. Private care is most often sought for surgical operations and for visits to hospital outpatient clinics.

Debate continues in Israel regarding whether to allow private care in government hospitals. This issue was taken up by the Netanyahu Commission in 1988 [1], was debated periodically throughout the 1990s, was the subject of discussions and conferences during the first years of the new millennium [2], and was a focus of the Amora Commission Report [3] released in 2002. Similar debates are taking place in other countries that provide universal health insurance coverage [4-6].

While the emphases of the policy debate have shifted over time, the arguments have largely remained the same. The main arguments in favor of allowing private care are that patients should have freedom of choice of physician, that private care would increase the availability of senior physicians in government hospitals (many of whom might otherwise leave mid-day to work in a private hospital), and that private care would bring much-needed revenue to government hospitals. The main arguments against private care are that it creates an inequitable system of care, reduces the access of public patients to senior surgeons, significantly increases national health expenditures, and patients lack the information they need to make wise choices about private care [2].

Despite the duration and intensity of the debate, until recently few empiric data were available on private care. This article seeks to inform the private care debate on the extent to

1 Historically, patients paid for SHARAP care completely on an out-of-pocket basis. Increasingly, the additional payments are being partially covered by supplemental insurance programs.

2 Israel has a national health insurance system that guarantees universal coverage and choice among four competing HMOs.

which: a) opting for private care increases the likelihood of being cared for by a very senior surgeon, b) public patients undergoing complex operations are being treated by very senior surgeons, c) the most senior surgeons allocate a significant portion of their time to private patients.

This analysis is relevant to the private care debate for three reasons. First, previous studies have shown that surgical experience is associated with improved surgical outcomes [7,8] and it is likely that surgical seniority is correlated with accumulated surgical experience. Hence, if private care patients are treated by more senior surgeons than are public care patients, differences may arise in the quality of care, suggesting that private care indeed contributes to inequality in healthcare. Second, if senior physicians are devoting a large proportion of their time to relatively simple – but private and hence profitable – cases, which could just as well be handled by less senior physicians, then scarce surgical expertise may not have been allocated efficiently. Finally, the issue of seniority is related to informed decision-making by patients. As demonstrated in the only published empiric study of private care to date [9], the most common reason cited by patients for paying for private care is to secure a more competent physician and hence higher quality care. However, to date, patients have lacked systematic information about the seniority of the physicians who care for them in the public setting.

Study context and international relevance

This paper is part of a broader study of private care in Jerusalem [10]. Other components of the study are examining the case-mix of private care and the financial accessibility of private care. The public-private mix in healthcare is the subject of intense policy debate in many countries, particularly in Europe, and much has been published on this subject [4-6,11]. For example, in the United Kingdom, some analysts are calling for the expansion of independent private hospitals in the coming years, while others have voiced concern that this might lure physician time away from National Health Service hospitals [12]. However, few in-depth empiric comparisons of public and private inpatient care are available [13,14]. Accordingly, in both its methodology and its findings, the present study could make an important contribution to the international literature on the public-private mix in inpatient care.

The study is also relevant to countries such as the United States, where most patients are insured via private health insurance. The poor in the U.S. are insured by Medicaid, a federal-state program that tends to pay hospitals and physicians at a lower rate than private insurers. It would be important to explore whether, in the U.S., there are significant differences in surgical seniority between operations for poor and non-poor patients, after controlling for case-mix, and, in particular, whether poor patients in need of very complex operations are treated by sufficiently senior surgeons. The methodology developed in this paper could be useful in that regard, though the findings for the U.S. are likely to be quite different from the findings for Israel and other countries with national health insurance systems.

Methods

Data sources

The study is based on the electronic operating room records for all operations conducted in the three major public hospitals in Jerusalem in 2001. The database included demographic, clinical and treatment information on 38,840 operations, roughly 6000 (16%) of which were conducted privately. Almost 12,000 operations were conducted at Shaare Zedek Medical Center, where the private care rate was 13%. Approximately 16,000 were conducted at the Hadassah Medical Organization's Ein Kerem hospital, where the private care rate was 20%, and approximately 9000 operations were conducted at Hadassah's Mount Scopus hospital, where the private care rate was 12%.

Categories of surgical competence

The medical literature suggests that the characteristics of surgeons and surgical teams that correlate with competence – i.e., improved surgical outcomes – include the number of years of experience a surgeon has accumulated [7,8,15-17], the number of times a surgeon has conducted a given operation [18,19], and “volume,” i.e., the frequency with which the surgeon and the surgical team conduct the given operation within a defined period [20-22]. In general, experienced surgeons have better surgical outcomes than do residents with relatively little experience. However, mixed specialist-resident teams generally do as well as specialist-only teams [21-23], even though a resident often functions as the lead surgeon³ of a mixed team. Apparently, surgical outcome is determined primarily by the seniority of the most senior member of the surgical team rather than by the seniority of the lead surgeon.

In this study we used rank as an indicator of surgical competence, distinguishing among three ranks: “tenured” (that is, tenured board-certified specialists, including department heads), “senior” (non-tenured board-certified specialists), and “residents” (physicians who are neither tenured nor board-certified).⁴ Surgeons of a tenured rank perform more years of experience compared to younger specialists, and both of them have more experience compared to residents. Experience is probably also a matter of the number of times a surgeon has performed a particular operation. For example, a resident may have accumulated extensive experience only with regard to the most common operations,

³ The “lead surgeon” is the physician who is on record as being the first surgeon or leader of the surgical team. However, the first surgeon is not necessarily the most experienced surgeon on the team. For example, residents are required to act as lead surgeons in a given number and type of cases in order to receive board certification, and so are often recorded as the “lead surgeon,” even though they are still receiving the real-time guidance of a more senior member of the surgical team.

⁴ Board certification as a specialist is granted upon successful completion of a residency and specialty boards; thus our “resident” category includes some surgeons who have completed their residencies but have not yet passed their specialty boards. Tenure is usually granted only after 5 years of work as a board-certified specialist, and only to physicians who have significant clinical and research accomplishments.

while board-certified but non-tenured specialists may have accumulated adequate experience with most operations, although not necessarily with the least frequent or most complicated ones. Some operations are so infrequent and/or technically complicated as to require that surgeons complete a fellowship or subspecialty training at a medical center that specializes in the relevant field in order to gain experience. Almost all surgeons of tenured rank have done fellowships or subspecialty training, usually soon after the surgeon has completed his residency.

Our analysis included department heads and other tenured physicians in the same category since they do not necessarily differ in competence. However, because the public believes department heads to be more competent, we sometimes refer to them separately. For each operation, we considered the rank of both the lead surgeon (as many *patients* believe this to be the primary determinant of quality of care) and the most senior surgeon on the surgical team (as many *physicians* believe this to be the primary determinant of quality).

It should be borne in mind that the analysis is limited to operating room activity, which accounts for only part of surgeons' work time; surgeons also work many hours on the wards, in outpatient clinics, and in other settings. This is particularly true of the most senior surgeons – all the more so of department heads – who have significant research, teaching, and administrative responsibilities.

Complexity scores

We defined the "complexity" of a given operation as the extent to which the involvement of a more senior and experienced surgeon would increase the likelihood of a successful outcome. We developed a "complexity index" based on assessments by 8 Israeli medical and surgical experts of 166 types of operation, which accounted for 64% of all the operations performed in 2001. Based on their assessments, operations were grouped into three complexity levels: most complex, moderately complex and least complex; and these accounted, respectively, for 4%, 33% and 63% of all operations. Inter-rater agreement was high (Cronbach's alpha = 0.92).

Results

Lead surgeon

The lead surgeon was of tenured rank in 99% of the most complex private cases and 74% of the most complex public cases, in 93% of the moderately complex private and 35% of the moderately complex public cases, and in 92% of the least complex private and 32% of the least complex public cases. The lead surgeon was a resident in 23% of the least complex public cases⁵ [Table 1].

⁵ Hospital managers have indicated that this may be an underestimate of the percentage of cases in which a resident served as lead surgeon. The operating room records may not be completely accurate regarding which surgeon in the team was the lead surgeon.

Table 1. The rank of the lead surgeon and of the most senior surgeon on the surgical team for private and public operations performed at three hospitals in Jerusalem in 2001, by complexity of the operation (in %)

	Most complex		Moderately complex		Least complex	
	Public	Private	Public	Private	Public	Private
Lead surgeon						
Tenured	74	99	35	93	32	92
Senior	10	1	41	5	45	7
Resident	16	0	24	2	23	1
Total	100	100	100	100	100	100
Most senior surgeon on surgical team						
Tenured	97	100	66	97	53	94
Senior	1	0	31	3	38	6
Resident	2	0	4	0	9	0
Total	100	100	100	100	100	100

Since the data set includes the entire population rather than a sample, no tests of significance are reported.

Table 2. Surgical case load, by rank of the lead surgeon and type of case

Surgeon's seniority	Public operations	Private operations	Total operations	Percentage of private operations
Tenured	9994	4897	14,891	33
Senior	11,053	313	11,366	2
Resident	5943	91	6034	1
Total	26,990	5301	32,291	16

The most senior member of the surgical team

In 97% of the most complex public cases, a tenured surgeon was a member of the operating team. The situation was somewhat different with regard to cases of moderate complexity: In approximately two-thirds of the public operations performed in all the hospitals studied, the most senior member of the surgical team was a tenured surgeon.

Virtually all moderately and highly complex operations, whether performed publicly or privately, were found to involve board-certified specialists as part of the operating team. The 2–4% of all such operations that appear to have been handled by residents alone may actually reflect recording errors; at any rate they are an exception.

Case load

Table 2 shows the extent to which private care cases accounted for the case load of lead surgeons with differing levels of seniority. Private care accounted for 33% of the case load of tenured surgeons. Approximately 46% of these cases were of low complexity, and 43% of moderate complexity.⁶

⁶ Note that among private cases, the least complex operations lasted an average of 0.8 hours, while the moderate and most complex operations lasted an average of 1.5 and 3.1 hours, respectively. Thus, while the most complex cases accounted for only 11% of the private operations, they accounted for 23% of private operating time.

Hour at which the operations were completed

As indicated in Table 3, over 40% of the public operations and almost 40% of the private operations were completed after 2 p.m. but before 6 a.m. The findings were similar with regard to operations led by surgeons of tenured rank. Moreover, the extent to which tenured surgeons were involved in the most complex public cases (either as lead surgeon as the most senior member of the surgical team) did not vary significantly by time of day. For example, they served as lead surgeon in 76% of such operations completed between 2 p.m. and 6 p.m., compared with 77% of such operations completed between 6 a.m. and 10 a.m.

Department heads

Of all of the cases in which a department head served as the lead surgeon, 46% were private and 54% were public [Table 4]. When we examined this issue from a different angle, we found that the lead surgeon was much more likely to be a department head in private cases (45%) than in public cases (12%). This discrepancy was particularly striking in the most complex cases, in which department heads served as the lead surgeon in 91% of the private cases compared to 28% of the public cases. In moderately complex cases, department heads served as the lead surgeon in 36% of the private cases and only 9% of the public cases.

Substantial variation was found in how department heads divided their operating room time between public and private care. Four of the 57 department heads in this study devoted an exceptional percentage of their case load as lead surgeons – over 75% each, and an average of 84% – to private operations. Moreover, even if we take into account all the public operations in which they participated (whether as lead surgeon or not), private operations accounted, on average, for two-thirds of all of the operations in which these four department heads participated.

Discussion

Several criteria can be used to assess the extent to which the pattern of surgical seniority in Jerusalem hospitals is deemed to be satisfactory, reflecting different conceptual approaches to the issue [10]. In light of the study's findings, it is clear that any overall assessment of SHARAP performance with regard to surgical seniority will depend on the weights assigned to the various criteria chosen. Moreover, this might well depend on whether the surgeons' performance is measured against some clinical or ethical ideal, or against the pattern of surgical seniority that would prevail in the absence of SHARAP. It should be noted that many hospitals that do not allow SHARAP allow their surgeons to conduct operations for paying patients in private facilities during "off hours." This is believed to significantly reduce the time spent by such physicians in the public hospital.

Public-private differences in the pattern of seniority

One major finding of this paper is that the extent of difference in the patterns of surgical seniority in public and private care depends on whether one focuses on the lead surgeon or the most senior member of the surgical team. The seniority of the

Table 3. Distribution of operations, by hour of the day at which they were completed (in %)

	Hour at which operation was completed				Total
	6 a.m. to 10 a.m.	10 a.m. to 2 p.m.	2 p.m. to 6 p.m.	6 p.m. to 6 a.m.	
All operations					
Public	17	39	23	21	100
Private	17	44	23	16	100
Total	17	40	23	20	100
Operations in which the lead surgeon was a tenured physician					
Public	20	41	25	14	100
Private	17	44	23	16	100
Total	19	43	24	14	100

Table 4. The surgical case load of department heads who also served as the lead surgeons, by complexity of the operation and type of case

Complexity	Public operations	Private operations	Total operations	Percentage of private operations
Most complex	184	344	528	65
Moderately complex	446	546	992	55
Least complex	1198	655	1853	35
Total	1828	1545	3373	46

lead surgeon is considerably greater in private operations than in public operations of comparable complexity. However, the gap between private and public operations is smaller when we examine the seniority of the most senior member of the surgical team, and with regard to the most complex operations there is no gap at all.

Nonetheless, it may be that even in such cases patients can increase the likelihood of a successful operation by opting for private care. It may be that in the private track, in contrast to the public track, patients benefit from the involvement of the one or two tenured surgeons with the most experience/expertise in their specific operations. Their success rates may be greater than those of other tenured surgeons. Our study did not distinguish among tenured surgeons with regard to the extent to which they had experience with particular operations.

Another key finding was that, even with regard to the second measure – that is, the extent to which surgeons of tenured rank participate in surgical teams – there are differences between private and public operations of moderate or low complexity. If the involvement of a tenured surgeon indeed increases the likelihood of surgical success in these types of operations, then our findings may suggest that, on average, private and public patients are receiving care of a different quality.

A significant issue in assessing the impact of private care on the pattern of surgical seniority is whether the existence of the SHARAP program leads to an increase or decrease in the involvement of the most senior surgeons in public care. In other words, does the time that they devote to private care come at

the expense of the time they devote to public care, or does their participation in the SHARAP program increase the total amount of time they spend at the non-profit hospital? The available data do not permit a full and conclusive answer to this question. However, the study team was able to determine that, among surgeons of tenured rank, those surgeons who spent more hours than their colleagues leading private operations also tended, on average, to spend more hours leading public operations as well (correlation coefficient = +0.20). The positive correlation between public and private operating hours persists even after controlling for department, hospital, and whether the surgeon is a department head.

In interpreting these results, it should be kept in mind that during this period there was an opportunity for senior surgeons to earn additional fee-for-service income in the public track for certain operations carried out in the late afternoon. In an effort to reduce waiting lists, the Ministry of Health allowed the HMOs to contract with hospitals for operations at a special rate and the hospitals were, in turn, allowed to pay the surgeons involved at a special rate. In this arrangement the patient does not pick the surgeon. This arrangement, which continues to this day, no doubt increases senior surgical involvement in the public track and may also have reduced their involvement in the private track.

Surgical seniority in complex public cases

Another significant finding of this study was that a tenured surgeon participated in almost all operations of high complexity and two-thirds of the public operations of moderate complexity.⁷ This suggests that, in general, a reasonably good standard of senior physician involvement is being maintained in the public service; some might even characterize the standard of care as very good.

Moreover, the finding that all the hospitals in the study succeeded in ensuring the presence of a tenured surgeon at virtually all the most complex operations suggests that this is an attainable standard of quality. Medical leaders should consider whether this should indeed be the standard of care for the most complex operations (and perhaps some types of moderately complex operation, as well) in all hospitals.

The distinction between "lead surgeon" and "most senior member of the surgical team" has important implications for the training of residents and recently certified specialists. These young surgeons need to observe and then work under the guidance of a surgical expert if they are to learn surgical skills and become certified as specialists themselves. By creating teams in which the lead surgeon is a resident or a recently certified specialist, but which also include more experienced surgeons, hospitals offer younger surgeons an important learning opportunity without compromising the quality of care. Indeed, it has

been reported that various surgical interventions performed by supervised surgical residents have the same outcomes as with experienced surgeons [22-25].

Accordingly, it is important that the medical community share with the public its belief that quality is determined by the seniority of the most senior member of a surgical team, and not by the seniority of the lead surgeon. Similarly, the public should be reassured that in complex cases, a tenured and board-certified surgeon will be participating on the surgical team, even if the patient has not paid for private care.

The time allocation of individual surgeons

Another key study finding was that while most senior surgeons dedicate at least half of their operating room time to public care, a small number of surgeons (all of whom are department heads) dedicate over 75% of their operating room time to the care of private patients. This latter finding should concern both opponents and proponents of private care. If market forces prevent hospital directors from addressing these concerns on their own, then it may be appropriate for the government to include measures to prevent these excesses in any future set of regulations it promulgates regarding SHARAP.

The roles of differential case payments and second-shift payments

In Israeli hospitals, most of the surgeons and other physicians work as salaried employees of the hospitals (rather than as attending physicians), and their monthly salary is generally not affected by their level of activity. However, surgeons who operate after the regular working hours (i.e., in the late afternoon, evening and night) do receive fee-for-service payments for public operations carried out during those shifts [2]. Hospitals usually ask the most senior physicians to perform the operations during these later shifts, since they are primarily operations of the type for which the HMOs pay the hospitals special differential case payments (which tend to be more lucrative than the usual per diem payments), and hospitals are eager to compete for this business.⁸ This raises the question of whether the involvement of senior surgeons in complex public sector operations can be attributed to the fee-for-service payments available during late shifts. The study findings suggest that this is probably not the case, since the involvement of tenured surgeons in complex public cases did not vary over the course of the day; they were not concentrated during the later shifts when the surgeons could receive fee-for-service payments.

However, it should be noted that while the surgeons do not receive any special fee-for-service payments during the morning shift, the hospitals do receive differential case payments for certain types of operations, irrespective of when they are performed. Moreover, 85% of the most complex operations (as opposed to 22% of the moderately complex operations) involve

⁷ By definition, the seniority of the surgeon is least crucial in the least complex operations, and therefore affects equality and health to a smaller extent than does the absence of a senior surgeon from complex operations.

⁸ Note that despite the special HMO payments to the hospitals or the special hospital payments to the surgeons, these operations involve public patients since the patients are not required to make any out-of-pocket payments.

types of operations for which special differential case payments have been established. As a result, the hospitals may informally be encouraging tenured surgeons to handle these cases, with the financial considerations reinforcing the clinical considerations.

Selected findings from a coastal hospital

In a related study based on the methodology employed in this paper, Gur Ofer and colleagues are analyzing operating room data from the Tel Aviv Sourasky Medical Center, using data from both 2001 and 2003. That hospital had a small SHARAP program in 2001 (approximately 4% of operations were conducted privately); by 2003 the SHARAP program had been disbanded. That analysis has not been completed and will be published separately, but some preliminary findings are presented here as a contrast with the Jerusalem SHARAP findings.

The Tel Aviv study found that in both 2001 and 2003 approximately 40% of public operations led by tenured surgeons at the Tel Aviv Medical Center were conducted during the second or third shifts. This suggests that the existence of a SHARAP program is not a necessary condition for keeping many tenured surgeons in public hospitals after the morning shift; it may be enough to maintain an extensive "sessions" program. Note that "sessions" accounted for 4% of all the hospital's operations in 2001 and 11% of these operations in 2003.

The Tel Aviv study also found that in 2003 a tenured surgeon was the lead in 98% of complex public operations, compared with 74% in the Jerusalem SHARAP study. At first glance, this might suggest that the existence of SHARAP reduces the involvement of tenured surgeons as lead surgeons in the most complex operations. However, such a conclusion would be unwarranted as other differences between the hospitals could account for this finding. Moreover, at the Tel Aviv hospital the same 98% was obtained in 2001 – when the hospital was operating a SHARAP program.

Study limitations and the need for further research

This study focused on hospitals in Jerusalem, which have a long tradition of self-regulated private care [10]. It is not clear whether our findings would pertain if private care were introduced on a large scale and for an extended period in all government hospitals elsewhere in Israel. It would be useful to examine the seniority of surgeons in public sector operations in a wide range of government hospitals during the late 1990s, when these hospitals also offered private care programs. It would also be useful to analyze the surgical seniority patterns in those hospitals during the subsequent period, when private care was prohibited, and leading surgeons could operate privately only in private hospitals. Such an analysis should consider how many hours per week a surgeon dedicates to public care, how much of it takes place in the operating room, and what percentage it constitutes of the surgeon's total operating room time.

Although a surgeon's experience has been shown to improve surgical outcome, information is scant regarding which operations are associated with the greatest benefit from seniority. Neither is it clear which operations offer benefits from seniority so large as to justify substantial financial outlays in order to secure the

care of a very senior surgeon. It is unlikely that consistent and comparable empiric data on the benefits of seniority in a range of operations will become available in the foreseeable future. In the absence of such data, it would be helpful to solicit the professional judgment of medical experts as to which operations would benefit substantially from the involvement of a very senior surgeon, and which operations would benefit little or not at all from such involvement. In particular, it would be useful to explore whether the involvement of a surgeon of tenured rank is necessary to ensure high standards of quality in the most complex operations.

In addition, further research is needed on whether there is a difference in the quality of operations conducted by department heads, as compared to those conducted by other tenured surgeons. On the one hand, a surgeon is often appointed to be a department head because of his or her excellence as a manager and/or researcher, rather than his clinical proficiency. Moreover, even when the department head is the department's most proficient clinician overall, others in the department may be more proficient than he is in certain types of operation, in which they have specialized. Nevertheless, when seeking private care, at least some of the public appears to believe that the department head is the surgeon of choice. This might explain why department heads were found to be the lead surgeon in 91% of the most complex private operations. It may be helpful for patients to consult with their primary care physicians (or some other physician they know and trust) about when it is, and is not, worthwhile to engage a department head as the lead surgeon (as well as about the more general issue of when it is worthwhile to pursue private care).

Further research is also needed to explore why some of the most senior surgeons dedicate a significant amount of their time to relatively simple operations. While financial considerations clearly play a role, there may be other factors as well. Similarly, more research is needed to explore whether the time that the most senior surgeons dedicate to private operations is spent at the expense of the time they would otherwise dedicate to public operations, or (as suggested by our initial analysis) reflects an increase in the amount of time that the surgeons work overall.

Finally, we note that the study did not compare health outcomes for private and public patients – in part because the hospital data do not contain the information required for such an analysis. This is a worthy topic for future research by quality of care experts.

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