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Commentary

Surgical Operations And Supply: Assessing Future Quality
by Ira M. Rutkow

Analyses of surgical operations and physician supply in this country raise many questions. Whether too many surgeons are being trained, and what constitutes an appropriate operative caseload for an individual surgeon and a given society, are vigorously debated. Within this discussion looms the overall problem of surgical quality. Will future surgeons be able to deliver efficient, competent, and skillful services?

Growing consumer debate over “unnecessary surgery” in the 1970s and 1980s reflected the active social change of the period. The concept that surgeons perform operations in a capricious manner and possibly according to their own financial requirement has become society’s generally accepted opinion. Whether this belief reflects recent socioeconomic changes in medicine remains unknown. This Commentary addresses some of these queries by: (1) analyzing numbers of surgical operations and physician supply statistics for two periods of time, 1970–1974 and 1979–1985; (2) reviewing past attempts to quantify and determine appropriate staffing levels; and (3) providing possible scenarios regarding the quality of future surgical health care.

Assessing Rates Of Surgery

To investigate rates of surgery, I reviewed data from the National Hospital Discharge Survey (NHDS) of the National Center for Health Statistics (NCHS). This information is obtained from patients’ medical records from a national sample of approximately 5 percent of short-stay general and specialty noninstitutional hospitals, exclusive of military and Veterans Administration facilities. Through a complex system of weighting measures, the sample data are expanded to produce national estimates of the absolute number of operations performed, by age and sex, in any given year. An extensive listing of the types of operations included in the NHDS can be found in previous studies.

Ira Rutkow is a surgeon with a doctorate in public health, and is president of The Hernia Centers of Manhattan and New Jersey, where he performs nearly 1,000 hemiorraphies each year. He has been researching and writing about surgical personnel for a number of years.
To analyze surgical personnel, numbers of surgical operations were linked with numbers of physicians who perform these operations. To accomplish this, the American Medical Association’s (AMA) annual publication Physician Characteristics and Distribution in the United States (PCD), which is derived from a physician masterfile, was consulted. Board-certified and noncertified surgeons, surgical residents, and even general practitioners who consider themselves surgeons are included in counts of surgeons. What is not known is how many are retired, in administrative roles, fellowships, and so on. However, as long as the same data source is used for all years in the study, it would not be expected that there is much distortion of the numbers.

Exhibits 1–3 show changes in numbers of surgical operations, surgeons, and surgical residents for two periods of time. A few caveats must be introduced for 1980s operative numbers. Although a surgical operation is counted in a particular specialty, this does not necessarily mean that all, or nearly all, of those operations were performed by members of that specialty (for example, there is considerable overlap in back surgery between orthopedic surgery and neurosurgery). Second, some procedures, although listed under a surgical specialty, are performed by non-

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<tbody>
<tr>
<td>General surgery</td>
<td>3,755</td>
<td>4,370</td>
<td>16%</td>
<td>4,729</td>
<td>4,753</td>
<td>1%</td>
</tr>
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<td>Obstetrics/gynecology</td>
<td>2,841</td>
<td>3,987</td>
<td>40</td>
<td>4,339</td>
<td>3,951</td>
<td>-9</td>
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<tr>
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<td>2,005</td>
<td>2,576</td>
<td>28</td>
<td>2,858</td>
<td>3,312</td>
<td>16</td>
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<tr>
<td>Urology</td>
<td>1,221</td>
<td>1,512</td>
<td>24</td>
<td>1,576</td>
<td>1,542</td>
<td>-2</td>
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<tr>
<td>Ear, nose, and throat</td>
<td>1,687</td>
<td>1,838</td>
<td>9</td>
<td>1,816</td>
<td>1,340</td>
<td>-26</td>
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<tr>
<td>Thoracic/cardiovascular</td>
<td>258</td>
<td>349</td>
<td>35</td>
<td>452</td>
<td>651</td>
<td>44</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>217</td>
<td>316</td>
<td>46</td>
<td>453</td>
<td>501</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>11,984</td>
<td>14,948</td>
<td>25%</td>
<td>16,223</td>
<td>16,050</td>
<td>-1%</td>
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<tbody>
<tr>
<td>General surgery</td>
<td>22,619</td>
<td>23,750</td>
<td>5%</td>
<td>32,059</td>
<td>38,169</td>
<td>19%</td>
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<td>Obstetrics/gynecology</td>
<td>16,357</td>
<td>17,532</td>
<td>7</td>
<td>23,963</td>
<td>30,867</td>
<td>29</td>
</tr>
<tr>
<td>Orthopedic surgery</td>
<td>7,786</td>
<td>8,950</td>
<td>15</td>
<td>12,657</td>
<td>17,166</td>
<td>36</td>
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<tr>
<td>Urology</td>
<td>4,963</td>
<td>5,455</td>
<td>10</td>
<td>7,242</td>
<td>8,836</td>
<td>22</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>4,595</td>
<td>4,828</td>
<td>5</td>
<td>6,117</td>
<td>7,267</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>58,378</td>
<td>62,801</td>
<td>8%</td>
<td>85,136</td>
<td>106,324</td>
<td>25%</td>
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### Exhibit 3

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</thead>
<tbody>
<tr>
<td>General surgery</td>
<td>6,539</td>
<td>7,354</td>
<td>12%</td>
<td>7,689</td>
<td>8,070</td>
<td>5%</td>
</tr>
<tr>
<td>Obstetrics/gynecology</td>
<td>2,655</td>
<td>3,421</td>
<td>29%</td>
<td>4,496</td>
<td>4,630</td>
<td>3%</td>
</tr>
<tr>
<td>Orthopedic surgery</td>
<td>2,015</td>
<td>2,375</td>
<td>18%</td>
<td>2,572</td>
<td>2,817</td>
<td>10%</td>
</tr>
<tr>
<td>Urology</td>
<td>1,011</td>
<td>1,117</td>
<td>10%</td>
<td>1,077</td>
<td>1,057</td>
<td>2%</td>
</tr>
<tr>
<td>Ear, nose, and throat</td>
<td>910</td>
<td>994</td>
<td>9%</td>
<td>1,038</td>
<td>1,094</td>
<td>5%</td>
</tr>
<tr>
<td>Thoracic/cardiovascular</td>
<td>271</td>
<td>296</td>
<td>9%</td>
<td>276</td>
<td>285</td>
<td>3%</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>578</td>
<td>607</td>
<td>5%</td>
<td>579</td>
<td>704</td>
<td>22%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13,979</td>
<td>16,164</td>
<td>16%</td>
<td>17,727</td>
<td>18,657</td>
<td>5%</td>
</tr>
</tbody>
</table>

surgeons (for example, family practitioners practice general and obstetric-gynecologic surgery). However, general practitioners who practice surgery or nonspecialty-trained physicians who consider themselves surgeons are having a decreasing impact on surgical health care.

**Impact of outpatient surgery.** Beginning in 1983, trends for certain specialties indicated an increasing impact of ambulatory surgery on the integrity of the NHDS and its ability to generate surgical rate data. In most instances, the NHDS includes inpatient procedures only. However, because different hospitals define inpatient and outpatient differently, a gray area exists in counting inpatient and outpatient procedures. For instance, an individual is admitted to a hospital in the morning, undergoes a hernia repair, and is discharged later that afternoon. Is that an inpatient or outpatient surgical operation? The patient occupied a hospital bed but never stayed overnight. No one seems to know how many “real” outpatient cases the NHDS has captured.

Prior to the 1980s, there were few freestanding centers, and most major surgery was conducted on an inpatient basis. Consequently, the NHDS could generate data that reflected the true incidence of “all” surgery in the nation’s hospitals. Unfortunately, that is no longer the case. By 1983, almost 400 freestanding centers were operational. In years to come, if the NHDS is to maintain its integrity, it will have to extend its database to include hospital-based outpatient as well as inpatient surgical operations, while maintaining the distinction between the two, and to include surgery performed in freestanding units.

On a practical level, this is most obvious when numbers of certain operations are examined. For example, in 1979, 579,000 inguinal hernia repairs were performed. They remained at about this level until 1985, when only 476,000 were completed. There is no reason to account for such a large decrease except that surgeons are beginning to perform hernia repairs on an ambulatory basis. Therefore, many herniorrhaphies are no longer counted in the NHDS.
The impact of outpatient surgery is more pronounced in some specialties than in others. Currently, I would estimate that 10–15 percent of the country’s total surgical operations, as defined for this article, are conducted on an outpatient basis. It should be emphasized that, even with the shift toward outpatient surgery, there is no reason to expect drastic changes in total number of surgical operations. Because the country is moving toward ambulatory surgery, overall numbers of operations will not necessarily increase. It merely suggests that the manner in which surgical health care is delivered has undergone alteration. In fact, if numbers of surgical procedures that can only be performed on an inpatient basis are analyzed, few of these operations have shown an increase over the last seven years (Exhibit 4).

In 1970, the number of NHDS operative cases per individual surgeon in the seven surgical specialties was 205. This peaked in 1974 at 238. By 1979, it had decreased to 191, and seven years later was down to 151. Although there was spectacular growth in numbers of operations during the 1960s and early 1970s, it is apparent that numbers of operations and cases per surgeon have decreased greatly over the last five to ten years. On average, a surgeon is currently performing slightly more than three major operations a week.

### Supply Of Surgeons

**Surgeons’ workloads.** Of all reports that provide surgeons a glimpse into their own professional and economic milieu, the Study on Surgical Services for the United States (SOSSUS) remains most prominent. It had its inception within the American Surgical Association (ASA) and the American College of Surgeons (ACS) in 1969–1970. It was a five-year study that surveyed 10,000 surgeons and collected data on the number of operations performed, the number of patients treated, and the number of hours worked. The study also collected data on the number of cases per surgeon and the number of operations per case. The results of the study were published in 1971 and were used to develop a model for predicting the future supply of surgeons.

### Exhibit 4


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<tr>
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</thead>
<tbody>
<tr>
<td>Cholecystectomy</td>
<td>445,000</td>
<td>482,000</td>
<td>487,000</td>
<td>475,000</td>
</tr>
<tr>
<td>Appendectomy</td>
<td>311,000</td>
<td>312,000</td>
<td>282,000</td>
<td>283,000</td>
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<tr>
<td>Mastectomy</td>
<td>112,000</td>
<td>112,000</td>
<td>116,000</td>
<td>116,000</td>
</tr>
<tr>
<td>Choledocholithotomy</td>
<td>75,000</td>
<td>92,000</td>
<td>79,000</td>
<td>88,000</td>
</tr>
<tr>
<td>Colectomy</td>
<td>64,000</td>
<td>65,000</td>
<td>71,000</td>
<td>67,000</td>
</tr>
<tr>
<td>Thyroidectomy</td>
<td>63,000</td>
<td>55,000</td>
<td>50,000</td>
<td>46,000</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>638,000</td>
<td>673,000</td>
<td>673,000</td>
<td>669,000</td>
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<tr>
<td>Cystocele-rectocele</td>
<td>175,000</td>
<td>175,000</td>
<td>150,000</td>
<td>165,000</td>
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<td>Prostatectomy</td>
<td>293,000</td>
<td>348,000</td>
<td>357,000</td>
<td>367,000</td>
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<tr>
<td>Urethral suspension</td>
<td>45,000</td>
<td>54,000</td>
<td>47,000</td>
<td>51,000</td>
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<tr>
<td>Mastoidectomy</td>
<td>27,000</td>
<td>22,000</td>
<td>21,000</td>
<td>26,000</td>
</tr>
<tr>
<td>Cranietomy</td>
<td>43,000</td>
<td>35,000</td>
<td>36,000</td>
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</table>
year effort that explored such issues as surgical personnel and individual surgeons’ caseloads. Published as a multivolume work in 1975, the SOSSUS noted a remarkably low number of operations performed yearly per surgeon. Approximately 15 percent of board-certified specialists carried out less than fifty operations a year, 31 percent between 100 and 199. Slightly over 33 percent performed 200 or more procedures. The SOSSUS concluded that far too many physicians performed surgical operations and that workloads of surgeons were much more modest than originally expected. It suggested that the total volume of operations performed in this country could be handled by a much smaller cadre of busier board-certified surgeons. It recommended cutbacks in the number of training programs and of surgeons entering practice.

Other studies corroborated the unanticipated SOSSUS results. After finding that surgeons performed four operations per week, Hughes concluded that there appeared to be underutilization of costly and highly specialized surgical skills in the United States. He suggested that reducing the numbers of surgeons in training might result in increased efficiency in the delivery of surgical health care.

Following publication of the SOSSUS, proposals to constrain surgical staffing became prominent. However, many parties, including the ACS, soon were questioning the study’s recommendations. Although a parent of the SOSSUS, the ACS challenged the accuracy of certain findings. Lacking ACS support, the SOSSUS would never achieve its intended impact on surgery in the U.S. Six years after SOSSUS was published, Williams showed that its recommendations were having no demonstrable effect, and that the number of surgeons continued to grow.

**Impact of increasing physician supply.** The generally expansionist policies for physician supply, recommended by physician supply commissions and implemented by medical schools and state and federal governments during the late 1960s and early 1970s, were beginning to have serious, unintended effects on access to and the financing of health care. Because of these concerns, the Graduate Medical Education National Advisory Committee (GMENAC) was charged with the task of reviewing training programs from the points of view of specialty maldistribution and supply problems. In GMENAC’s 1980 report, surgeons accounted for the largest percentage of the predicted physician surplus—38,600 of a 70,000 surplus by 1990. To deal with this anticipated problem, GMENAC recommended that medical school class sizes be cut and that graduates be encouraged to enter specialties in which a shortage was expected.

GMENAC and its methodology received much criticism. However, the major findings could not be easily discounted. Williams, citing deficiencies in GMENAC, recalculated the overall surplus of surgeons and found it to be 56,000. The federal government was clearly cognizant
of the approaching physician glut. Other warnings about surgeon sur-
pluses were voiced. The AMA and others supported the predictions of
oversupply, specifically of surgeons, and urged that steps be taken to
alleviate the situation. The ACS, however, remained unconvinced of
this finding, criticizing GMENAC's supply projections as "inflated" and
"not as large as initially believed."

Wherein does reality lie? Certain facts stand out. Numbers of surgical
operations are increasing less than 1 percent per year. When growth of
our aging population is taken into account, there has been an essential
plateaunng of and, for some specialties, a decrease in rates of surgery since
1975. This is contrasted with an ever-expanding supply of surgeons,
which has changed 25 percent alone over the last seven years. Essentially,
every surgical specialty has more residents on duty in 1985 than in 1979.
It would be difficult to picture a more dismal response to the urgings of
both SOSSUS and GMENAC.

Impact Of Surgeon Supply On Quality

Is the physician supply crisis upon us? I believe it is just beginning. For
the average surgeon, twelve to sixteen years pass from time of medical
school matriculation until he or she is well established in practice. There-
fore, in 1987, surgeons who are just beginning to have an impact on num-
bers of operations would have graduated from medical school in the per-
iod 1971 through 1975. If medical school enrollment did not reach its
present level (approximately 16,500 graduates each year) until shortly af-
fter 1980, then this large number of future surgeons will not affect the
health care system until well after 1990. If there is the sense of a plethora
of surgeons in 1987, then the situation will only worsen during the
remainder of this century.

Critics of this scenario contend that recent federal legislation affecting
foreign medical graduates will decrease the supply of physicians. How-
ever, this remains unclear, since the United States-born foreign medical
graduate is rapidly replacing the foreign-born foreign medical graduate.
Regardless, the fact remains that the total number of surgical residents
on duty in 1985 was greater than in 1979.

Within certain segments of organized surgery there has been a gener-
ally propagated concept that there are not too many surgeons, but too
many "other" individuals (that is, nonboard-certified and nonsurgically
trained physicians) doing surgery. This position is tenuous considering
the rapid and spectacular decline in the number of nonboard-certified
surgeons in the U.S. Nevertheless, any truth that remains in this siege
mentality should provide an even stronger stimulus to those who call for
elevating surgical standards. As Moore stated, "... we can hope that the
voluntary national surgical organizations will see the surgical surplus as a
realistic problem and face it squarely rather than adopting the juvenile view that surgeons are such wonderful people that one can never imagine a situation in which there are actually too many of them.\textsuperscript{10}

\textbf{Relationship of surgical volume and quality.} Numerous studies have documented the relation between surgical volume and surgical mortality.\textsuperscript{11} They show that surgeons, like most individuals, do best what they do most often. It is difficult to imagine that in the future a surgeon who performs just two or three major operations a week is going to maintain technical competency. How does this affect patients’ rights? If future caseloads are decreased, should surgeons be required to inform the public of their overall experience, including morbidity and mortality with particular operations?

In my opinion, the current direction of minimal increases in numbers of operations, combined with large increases in the number of practicing surgeons, will cause a crisis of unprecedented proportion. If 1987 seems bad, then 1997 might prove a disaster.

\textbf{Impact on surgical environment.} What situations may emerge from the current perplexities? As surgeons perform fewer cases, their operative skills might decline—most notably for the more complex operations. This may lead to increased morbidity and mortality. Indications for surgical operations may become less stringent, leading to “unnecessary surgery.” Finally, surgeons may be forced to practice primary care medicine to maintain their livelihood. This will further erode their technical skills and shift them into specialties for which they have received little training. In the past, the concern of the surgeon was that nonqualified physicians were practicing surgery. In the future, the concern of the internist may be that nonqualified surgeons are practicing internal medicine. Older, more established surgeons might see their practices dwindle. Concurrently, younger surgeons might not be able to secure a practice large enough to provide adequate operative experience.

Surgical operative fees are certain to climb as surgeons attempt to maintain current income levels while performing fewer operations. An oversupply of surgeons might be useful to transform this country’s delivery of health care through price competition and other economic principles. However, it can also bring about a serious decline in the quality of our country’s health care. As individual surgeons’ workloads decrease, there might be adverse effects on the overall quality of surgical care in the United States.

The current direction may produce two classes of surgeons: those who are splendid technicians and perform large numbers of surgical operations, and a dispirited and deprived group who complete little in the way of operative surgery and have a strong sense of disenfranchisement. All of this points to a potentially crippling and tragic effect on the future quality of our country’s surgical health care.
There are reassuring data, however, concerning unnecessary surgery due to supplier-induced demand for operations. It is evident, at least at present, that increasing numbers of surgeons do not necessarily drive up rates of surgical operations. Whether this remains true in the future is unknown. The worrisome part concerns surgical caseloads. The prospect of more surgeons performing fewer operations has become a major problem. Although solutions are difficult, we must achieve a proper balance of surgeons and surgery. The surgical community and the nation need to address this question head on.

NOTES

1. The author may be reached for comment at 7 Pamela Street, Marlboro, N.J. 07746.