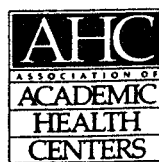


The U.S. Health Workforce

Power,
Politics, and
Policy

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*with introductory papers by
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Health Professions Substitution

A Case Study of Anesthesia

JERRY CROMWELL

Substitution in health professions is an extremely important issue, particularly in today's practice environment. For a long time, we in the health economics profession specifically, and in the nation generally, have been looking for the Holy Grail—the elusive optimal provider mix. By optimal, I mean the most cost-effective mix of provider inputs, not simply the lowest cost. As an economist, I see a number of market failures that lead to a less than optimal provider mix. These market failures can be attributed to three general causes.

The first cause is insurance. When patients are not paying the full cost of their care, they are not as price-sensitive to cost, and hence to the input mix, as they might otherwise be.

Second, is the tremendous amount of ignorance on the part of both patients and providers of the kinds of services the patients actually need and the most cost-effective provider input mix needed to provide these services. Much of the health services research in the Federal government today is devoted to research in this area.

Third, is the interesting relationship that has developed between doctors and the hospitals where they practice. Hospitals historically have been doctors' workshops where they can use all the services of the hospital basically for free. This situation has resulted in less cost-effective management of hospital resources than otherwise might be possible.

Identifying Possibilities for Physician Substitution

Research on physician substitution has been going on since the advent of Medicare and Medicaid. In some areas, extensive substitution is already going on. We know that nurses provide a significant amount of substitution

for physicians in both the office and the hospital. They are midwives, assistants at surgery, and physician extenders. An extensive number of allied health professions also contribute to substitution.

The Federal government has played a role in determining the workforce mix, primarily in support of physician and allied health education. They have also conducted a number of studies of workforce trends and productivity, research that was more prevalent in the 1970s than thereafter. But the area in which the government has affected the workforce mix most profoundly has been in its service reimbursement policies.

The private sector's role in workforce management has been relatively minor until recently. Except for the large health maintenance organizations like Kaiser Permanente, there hasn't been too much consideration in the private sector of what constitutes an optimal provider input mix. Currently, the private sector, through managed care, is starting to worry about that mix.

Anesthesia Substitution

Anesthesia is an excellent laboratory for studying substitution. Anesthesia is a traditional nursing function that has been replaced, in fair part, by physicians over the past 20 to 25 years. There are significant cost implications to the wrong provider input mix in anesthesia, simply because of the tremendous differences in cost between nurse and physician providers (Rosenbach and Cromwell 1988). Anesthesia, therefore, provides an excellent example of what can go wrong with the workforce mix when you pay for inputs (i.e., types of providers) rather than outputs (i.e., the services delivered). Federal and third-party reimbursement have paid for anesthesia inputs rather than outputs. This major flaw in the reimbursement system explains the inefficient mix we've developed in anesthesia (Cromwell and Rosenbach 1988).

There are three basic models of anesthesia practice.

1. In the solo anesthesiologist model, the physician, practicing alone, handles all the cases in the hospital. In some instances around the country, solo nurse anesthetists practice alone and handle all of the cases.
2. In the second model, a hospital has a mix of the two providers, yet each may be practicing solo on any one case depending on the case and the time of the day.
3. In the anesthesia team arrangement, a physician anesthesiologist (MDA) supervises a certified registered nurse anesthetist (CRNA).

Extent of MDA-CRNA Substitution

Significant regional differences in the mix of the two anesthesia providers leads me to believe that there are significant opportunities for provider mix improvement. In California, there are two anesthesiologists for every CRNA. In South Dakota, there are seven and a half CRNAs for every anesthesiologist (Rosenbach et al. 1988).

What do these two types of providers do in their delivery of anesthesia? The following data are based upon the federally funded Anesthesia Practice Survey, a 1986 survey of roughly 500 each of anesthesiologists and CRNAs randomly selected around the country (Rosenbach et al. 1988). To my knowledge, there is no more recent comprehensive random survey of anesthesia practice patterns.

CRNAs provide a substantial amount of anesthesia activities. They evaluate patient-risk factors in at least half (51 percent) of their cases; in more than half of their the cases (61 percent), they discuss the anesthesia plan with the patient or the family. In roughly half of their the cases (45 percent), they evaluate the patient in recovery. They administer regional anesthesia roughly a third (29 percent) of the time. They insert arterial lines about a third (36 percent) of the time, but they are much less involved in inserting other invasive monitoring devices such as central venous pressure lines and Swan-Ganz catheters. These data tell us that the CRNAs are actively involved in just about all of the major anesthesia activities.

When cases are stratified by anesthesia complexity and model of practice (e.g., solo CRNA, solo MDA), three conclusions are noteworthy, (Rosenbach et al. 1988; Rosenbach and Cromwell 1988). First, solo CRNAs are far more involved in vaginal deliveries than are anesthesiologists. Second, anesthesiologists are only slightly more likely to perform the more complex anesthesia procedures in the nation. And third, a significant percentage of solo anesthesiologists are doing simple anesthesia procedures (e.g., dilation and curettage, vaginal delivery, and hernia repair).

A favorite economic method of study is activity analysis. In the Anesthesia Practice Survey, respondents provided a daily log of roughly 4,000 operations. Figure 1 categorizes these operations in terms of percent of MDA time devoted to each case on the vertical axis; CRNA time is depicted on the horizontal axis. At the top of the vertical axis are about 1,200 cases in which the anesthesiologist was practicing alone. On the horizontal axis are about 700 cases in which the nurse anesthetist was practicing alone. The 45° line is the full-time equivalent (FTE) line, which is a one to one substitution of anesthesiologist time for CRNA time.

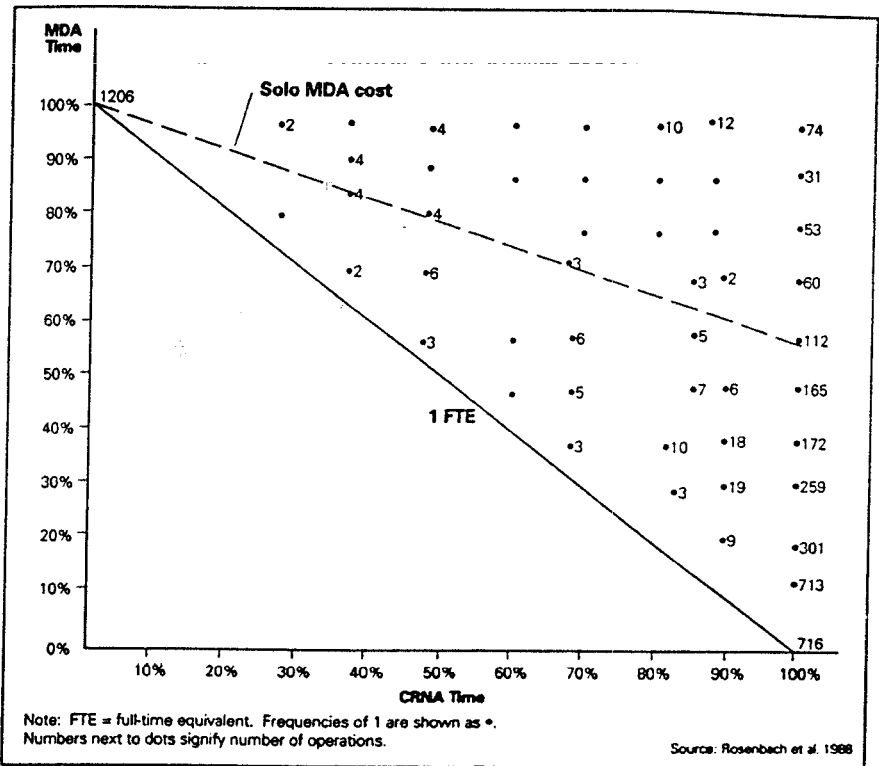


Figure 1. Percent CRNA-MDA Time (4,000 operations), 1986

All of the observations are either on these two corner points, the two solo points, or above the point where more than one FTE is on a case. All dots represent numbers of cases with more than one FTE practitioner on a case. The dashed cost line represents the solo MDA cost line. Given the relative cost difference of the two providers, the dashed line represents all of the combinations of the two providers that would be equivalent to the cost of an anesthesiologist practicing alone. Thus, all cases above the dashed line effectively cost more than an anesthesiologist practicing alone. A large proportion of cases are in the gap between the 45° FTE line and the solo MDA cost line at varying percentages of MDA-CRNA activity. The procedures that fall in the range above the MDA cost line are those in which managed care organizations, and every other payor, will seek cost-savings by changing the provider mix to get much below the MDA-cost line, and in some cases, particularly in simpler ones, to much below the MDA cost-line. It illustrates opportunities for potential professional arbitrage.

CRNA practice raises MDA productivity; it is the kind of situation that managed care organizations look at closely. The solo anesthesiologist sees an average of 3.7 patients per shift (Cromwell and Rosenbach 1990). Working in a team with a CRNA, the MDA sees 6.5 patients per shift, a 75 percent increase in the number of patients per shift (Cromwell and Rosenbach 1990). Even adjusting for the complexity of certain surgeries, there is a 63 percent greater increase in anesthesiologist productivity when the MDA works in a supervisory capacity. The anesthesiologist in a team works with a CRNA for the equivalent of more than 8 hours of CRNA time during the anesthesiologist's shift. Only about 60 percent of the procedures that the anesthesiologist does are concurrent. The other 40 percent of the time, the anesthesiologist is working on his or her own cases and is not directly supervising a CRNA. Thus there are still opportunities for additional productivity even in the team scenario.

Relative Cost of Each Provider

There have been tremendous increases in the nominal incomes of both MDAs and CRNAs. The average reported income for anesthesiologists increased roughly 80 percent during the ten-year period 1983 to 1993 (AMA 1994). The actual increase in income for CRNAs was 100 percent in this period (AANA 1988; AANA 1994).

Comparing hourly incomes, the more relevant marginal measure for economic analysis, we see some compression in the relative cost difference in ten years. In 1983, anesthesiologists cost 2.2 times what a CRNA cost (\$51.84 per MDA hour, \$23.80 per CRNA hour). The MDA cost difference has compressed somewhat to approximately 1.8 times that of a CRNA (\$87.44 to \$49.20). The compression is due to the relatively large increase in CRNA salaries over the ten years. Nevertheless, managed care organizations and government payors may take advantage of the resulting arbitrage gap.

Forecasting Shortfalls in CRNAs

In 1980, there were approximately 17,500 CRNAs and 13,000 MDAs in practice in the United States. There was some increase from 1980 to 1985 in the number of full-time equivalent CRNAs practicing. From 1985 to 1992, the supply was effectively flat at approximately 20,000 (Cromwell et al. 1991). Over that same period, there was a rapid growth in the number of anesthesiologists practicing in the United States. By the early 1990s, the number of full-time active CRNAs and MDAs was basically the same (ASA

1995; AANA 1995). Given the demonstrated opportunities for MDA-CRNA substitution, equal supplies of the two providers imply an increasingly non-cost-effective provider mix.

The main reason for the flattening in nurse anesthetist supply is the significant decline in the number of training programs. From 1981 to 1985, thirty-eight programs closed (AANA 1989). From 1986 to 1990, another twenty programs closed. During that same decade, from 1986 to 1990, the average number of graduates per year declined from almost 1,000 per year down to 633. A low point of about 575 graduates was reached in 1987. The situation has turned around in the 1990s. The number of CRNA programs has begun to rise again slowly, and the size of those programs have begun to grow again. In the period from 1990 to 1994, programs were averaging 866 graduates, and for 1996, the AANA is projecting well over 1,100 CRNA graduates (AANA 1995).

In a study for the Division of Nursing in the U.S. Health Resources and Services Administration, I analyzed the forecasted shortfall in CRNAs by the year 2000 under various low and high scenarios of CRNA supply and need (Cromwell et al. 1991).

Under any forecast, there is a significant CRNA shortfall, ranging from 6,852 to 9,816 FTEs. If one wants to move towards what is perceived to be a more economically efficient provider mix, then the shortfall of CRNAs doubles to about 18,000 to 21,000 FTEs by the year 2000. This forecasted decline in supply has concerned public policy makers as well as the private sector. Although it appears that educational institutions are responding to the shortfall, growth in CRNA supply is far below what is required to support widespread adoption of the team concept.

Factors Driving Future Demand

Some of the factors driving future demand for anesthesia providers include

- Health Care Financing Administration (HCFA) payment reductions for anesthesiologists have been going on for six to eight years in various forms. These reductions are forcing more supervision on the part of anesthesiologists so they can meet any target incomes they may have.
- There is a strong movement toward competitive bidding or bundled payment for inpatient services. In the HCFA heart bypass demonstration, the government pays a single rate for bypass surgery to seven hospitals in the country. This single rate covers both the hospital component as well as the surgeon, the anesthesiologist, and all the consult-

ing physicians in the hospital. The hospital and the physicians divide up the basic payment anyway they like. HCFA is expanding the demonstration by going into other heart procedures and are also expanding it to orthopedics. This payment method is having profound effects on the way that anesthesia is practiced in the hospitals. (Of course, private insurers have picked up on the government's lead in this bundled payment arena and negotiated bundled payment arrangements throughout the country.)

- Medicare has debated the adoption of physician diagnostic-related groups (DRG) for at least ten years. HCFA is serious about bringing inpatient physicians under the same Medicare payment incentives that the hospitals have been under for the last ten years. HCFA is setting up a demonstration to test a medical staff DRG payment system where the medical staff, along with the hospital itself, will negotiate a bundled payment for DRGs in the hospital.
- There are Medicare and state reductions in teaching support.
- There has been an aggressive shift toward managed care.

California is a great laboratory for studying arbitrage potential between managed-care and private fee-for-service organizations. The Kaiser Permanente hospitals in southern California have about 0.4 anesthesiologists for every full-time CRNA. The ratio for the rest of California is 2.6 anesthesiologists for every CRNA (Rosenbach et al. 1988). Here is a phenomenal difference in the mix of the two inputs within the same state. If the entire state went the Kaiser way in terms of the mix of the two anesthesia provider inputs, jobs for anesthesiologists in California would decline by roughly 1,200; a similar increase in CRNA jobs in California would also occur.

Occupational Power Struggles

Anesthesiologists are responding to the growing threats to their profession, their incomes, and their practices by expanding practices in order to increase their market power. They have lobbied hard against bundled payment in any kind of hospital arrangement and any kind of DRGs that would force the hospital to internalize its costs of providing anesthesia. They have also shifted strongly to solo practice so they can avoid reduced reimbursement due to concurrent care.

Shifting to solo practice requires limiting CRNA access to hospitals. Anesthesiologists have done this in two primary ways. They have limited CRNA teaching programs. (There were many complaints about anesthesi-

ologists training their competitors.) Then, anesthesiologists around the country presented the hospitals with a "them" or "us" ultimatum. A current lawsuit over CRNA dismissal in Minneapolis-St. Paul symbolizes this occupational warfare between the CRNAs and the anesthesiologists.

Hospitals will be inclined to favor the anesthesiologists over the CRNAs for the simple reason that the hospital right now is not paying for either provider; naturally, the hospital will select the anesthesiologist because of the greater training, and, prestige associated with a physician provider. It is not a cost-effective trend, but it's being forced on hospitals at this point.

Nurse anesthetists, in turn, have not been idle, but have mobilized impressive economic and political power. They've successfully lobbied Congress to not be bundled in the Medicare Part A DRG payment but, instead, to be treated separately and independently. They've lobbied Congress successfully for Medicare direct billing. They've lobbied Congress, HCFA, and the Physician Payment Review Commission for equal reimbursement—not only the ability to bill patients directly, but as independent providers billing at rates roughly comparable to anesthesiologists. They've sued hospitals that have dismissed them. They've also supported the trend toward physician DRGs, that is, internalizing in the hospital the relative costliness of the two providers in order to force the institution to make more cost-effective decisions.

Implications For Training in Anesthesia

Let me summarize five facts that are pertinent to future training decisions in anesthesia. (The first three are also relevant to training in other physician specialties.)

1. Spending in health care will slow dramatically over the next ten years.
2. The government is going to cut back on its teaching support.
3. Meaningful managed care competitive bidding will come to dominate reimbursement over the next five to eight years. A lot of experiments in managed care that have not been effective in terms of cost control in the 1980s are pretty much being weeded out. We now have much more rigorous competitive bidding in managed care.
4. Nurse anesthetists can perform nearly all the anesthesia tasks with minimal supervision and are nearly perfect substitutes for anesthesiologists.
5. Nurse anesthetists are significantly less expensive than anesthesiologists.

From these five facts, I draw four conclusions.

1. CRNAs will be in greater demand over the next ten years, and in significantly greater demand depending on how fast and how hard the public and private payors push.
2. The demand for anesthesiologists will diminish, as already has happened in California and elsewhere.
3. Anesthesiologists are going to find their responsibilities shifting significantly away from hands-on anesthesia towards supervising, concentrating on complex cases and providing other kinds of nonoperating care such as pain-care management.
4. The rate of return to specializing in anesthesia will decline. (It is probably already starting to decline.) The number of applicants will decrease as potential students realize that the future in anesthesiology is not what it was in the 1980s. The reduction in the number of slots will almost inevitably lead to a significant reduction in the number of anesthesia programs around the country.

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