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Shared Decision-Making and the Orthopaedic Workforce

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Studies of physician workforce need a standard of an appropriately sized workforce to compare projections. Although many studies use average rates of healthcare use as a standard, regional benchmarks provide a pragmatic alternative approach to estimating a reasonably sized physician workforce and avoid many of the problems of needs- and demand-based planning. Wide geographic variations in the rates of many procedures, unexplained by differences in population characteristics, suggest that supply-induced demand or physician practice style or both may be the major determinates of the rates for these procedures. In the current study, the authors explore some of these differences in orthopaedic procedure rates and their implications for workforce planning. For example, the rates of hip fracture are fairly uniform across geographic regions, whereas the rates of spine surgery vary sixfold and the rates of spinal fusion vary 10-fold. Shared decision-making is the process of giving patients informed choices about their treatment options based on current best evidence. Careful studies of treatment effectiveness and shared decision-making hold the promise of allowing patients' preferences and values to determine the right rate of healthcare use. These rates could allow workforce projections to be compared with optimal benchmarks for future planning.

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Since the 1970s, the clinically active physician workforce has increased rapidly; this rapid growth has been particularly pronounced among specialists. The increasing workforce has spawned numerous physician-manpower studies and concerns of physician oversupply.[1–4,11,14–17,20–22,24] Although there are some disagreements among different physician-manpower studies regarding the future supply of physicians, these differences are small. Estimates of physician requirements, however, vary markedly from study to study.[1,4,7,10,11,18,19,21,29]

Traditional methods for estimating physician requirements include needs-based and demand-based planning. Needs-based planning relies on expert opinion to estimate the number of physicians needed to deliver necessary health services to the population. This approach assumes that the relationship between physician supply, the delivery of healthcare services, and health outcomes is known or can be determined through research. However, the complexity of many medical problems, the rapid pace of technologic change, and the slow pace of outcomes research cast serious doubt on this assumption.[27] Demand-based planning uses current use as an indicator of physician requirements. Even extremely meticulous studies of

demand-based requirements, such as the recent orthopaedic workforce study performed by the Rand Corporation,[15] operate under the assumption that the current rates of use are the right rates. Such an approach perpetuates the status quo and ignores the marked geographic variation in physician supply and healthcare use.[26]

Studies of small area variation have found marked differences in procedure rates that are not explained by population demand.[23,25,28] In the current study, the authors explore some of these differences in orthopaedic procedure rates and their implications for workforce planning. The idea of workforce benchmarking, or using the actual deployment of physicians serving the population of a geographic area as a benchmark, is introduced. Benchmarking provides a pragmatic alternative approach to estimating a reasonably sized physician workforce and avoids many of the problems of needs- and demand-based planning.[10] Regional benchmarks offer an advantage over benchmarks based on Health Maintenance Organizations' staffing patterns, which require adjustments for out-of-plan use, potentially differing burden of disease between Health Maintenance Organizations' enrollees and the general population, and differing work habits of Health Maintenance Organizations' physicians.[12,13,24]

Variations in Practice

The model that patient need determines the level of use in a community seems to hold only for a few conditions. These conditions are severe enough that patients uniformly seek medical care, are overt enough that physicians can readily and reliably diagnose them, and have a clear consensus on the most appropriate therapy. For example, age-adjusted rates of fracture of the femoral neck or intertrochanteric fractures vary little among regions, from a low of five per 1000 to a high of 10.8 per 1000.[25] Furthermore, the differences in rates have a clear geographic pattern suggesting that the differences probably are attributable to population factors (Fig 1).

Compare the data on hip fractures with data on spinal disorders, for which much less consensus exists about the proper role of surgery.[9] The rates of overall spine surgery vary more than sixfold across geographic regions, from a low of 1.4 per 1000 to a high of 8.6 per 1000.[25] The appropriate indications for the subset of spinal surgeries involving fusion are particularly controversial.[6] Not surprisingly, the rates of spinal fusion are even more variable than spine surgery in general, varying 10-fold from a low of 0.3 per 1000 to a high of 3 per 1000. Figure 2 shows the increasing variability of hip fractures, spinal surgery, and spinal fusion.

A map of the rates of spinal fusion also shows a different geographic pattern than the map for hip fracture (Figure 3). The rates of spinal fusion are much more haphazard than for hip fracture—areas with very high rates often are immediately adjacent to areas with low rates. This pattern suggests that the variability stems from physicians' practice styles rather than characteristics of the population. The rates of spinal fusion are not only variable, but also are increasing rapidly. Although the overall rates of spine surgery have increased approximately 40% in the past 5 years, the rates of spinal fusion have increased 70% and the rates of instrumented fusions have more than doubled.[25]

These remarkable variations in practice highlight the fundamental problem with using average levels of use as a proxy for the healthcare needs of a population. One can be relatively confident about how many orthopaedic surgeons would be needed to repair fractured hips, but how many are needed to perform spinal fusions? Even though it is not known which rate is the right rate for many procedures, one can be sure that they cannot all be right. Workforce requirements are inextricably linked to fundamental questions about the costs, risks, and benefits of alternative forms of treatment and the preferences of well-informed patients regarding those treatments.

Variations in the Orthopaedic Workforce

The supply of orthopaedic surgeons available to the populations of different regions also varies markedly. Based on data supplied by

Fig 1. Map showing the ratios of the rates of treatment for hip fractures by hospital referral region in the United States in 1996 to 1997. (Copyright the Trustees of Dartmouth College 2000. Reprinted with permission from Weinstein J, Birkmeyer J: The Dartmouth Atlas of Musculoskeletal Health Care. Chicago, American Hospital Association Press 2–58, 2000.)

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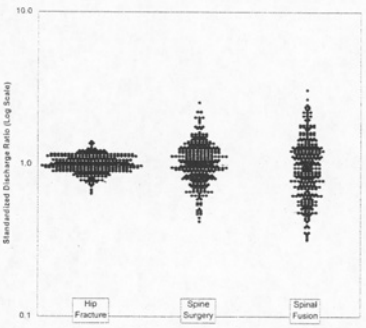

Fig 2. Graph showing the ratios of rates of treatment for hip fractures, all spinal surgery, and spinal fusions among hospital referral regions in the United States. A long scale, centered about the national average (1.0), was used for clarity.

the American Medical Association and American Osteopathic Association physician files, there were approximately 18,600 clinically active orthopaedic surgeons in 1996.[25] The ratios of the number of orthopaedic surgeons per population served varied, however, from a low of 2.8 per 100,000 in the McAllen, TX hospital referral region to a high of 12.1 per 100,000 in Sun City, AZ; Chicago, IL, with 5.4 orthopaedic surgeons per 100,000 has less than ½ as many orthopaedic surgeons as Sun City, AZ.[25]

The wide variation in physician supply across regions makes benchmarking an attractive strategy for workforce planning. A geographic region with an efficiently sized workforce that delivers high quality healthcare can be chosen as a regional benchmark. The actual deployment of orthopaedic surgeons to this population then serves as a guide for choosing a reasonably sized workforce. This benchmark also can serve as a guide against which to compare the projected future workforce.

Figure 4 shows an example of a workforce model based on benchmarking that was developed for the Dartmouth Atlas of Musculoskeletal Health Care.[25] The projected workforce represents a dynamic equilibrium between the current supply, the annual number of new physicians entering the workforce, and the number of physicians who leave the workforce because of death, retirement, or the pursuit of alternative activities such as teaching, administration, or research. The benchmark levels are age- and gender-adjusted to reflect the aging of the population in the future.

Figure 4 shows several important points. First, the average per capita supply of orthopaedic surgeons is expected to increase slightly between the years 2000 and 2010, consistent with other workforce projections.[15] Second, the aging population only has a small impact on the age-adjusted benchmark levels of supply. Third, Figure 4 shows how a benchmark might be used in workforce projections. Chicago, with approximately 5.4 orthopaedic surgeons per 100,000 residents, might serve as a reasonable benchmark for an adequate supply of orthopaedic surgeons. Starting with an average national supply of orthopaedic surgeons of approximately seven per 100,000, one would need to decrease the number of residency trainees in half to reach the Chicago

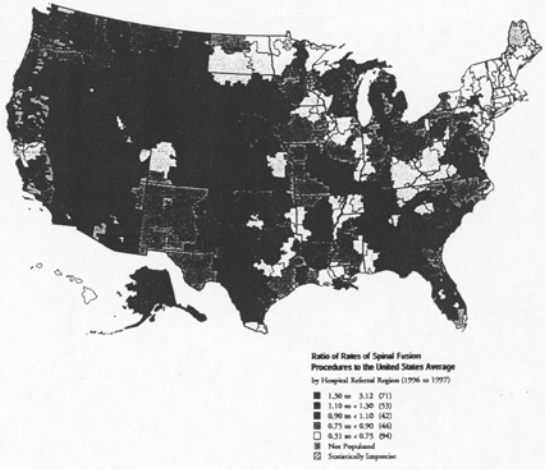

Fig 3. Map showing the ratios of the rates of spinal fusion by hospital referral region in the United States from 1996 to 1997. (Copyright the Trustees of Dartmouth College 2000. Reprinted with permission from Weinstein J, Birkmeyer J: The Dartmouth Atlas of Musculoskeletal Health Care. Chicago, American Hospital Association Press 2–58, 2000.)

Fig 4. Graph of the projected orthopaedic surgery workforce to the year 2010, and alternative projections based on a doubling, or halving of the number of graduate medical education (GME) training positions. For reference, the current supplies of orthopaedic surgeons in Chicago, IL and Sun City, AZ, adjusted to account for the aging population, are included. (Copyright the Trustees of Dartmouth College 2000. Reprint with permission from Weinstein J, Birkmeyer J: The Dartmouth Atlas of Musculoskeletal Health Care. Chicago, American Hospital Association Press 2–58, 2000.

benchmark by the year 2010. More strikingly, the supply of orthopaedic surgeons in a high rate area, Sun City, AZ, was included to help put the variation in workforce supply into context. Even if the number of trainees in orthopaedic surgery were doubled, the national workforce would not be close to the supply of orthopaedic surgeons currently practicing in Sun City, even after 15 years.

Implications

The relationship between variations in the supply of orthopaedic surgeons and the rates of orthopaedic procedures does not seem to be straightforward. For low-variation procedures, physician supply does not have an effect on procedure rates. Rates of hospitalization for patients with hip fractures are nearly identical in McAllen, Chicago, and Sun City despite the approximate sixfold difference in workforce supply.[25] For other high-variation procedures, there may be a direct relationship between physician supply and procedure rates. The rates of total knee replacement and spinal surgery are approximately twice as high in Sun City as in Chicago, matching the differences in workforce supply.[25] It is possible that the greater workforce supply in Sun City is responsible for the increased procedure rates, either by being available to respond to needs that remain unmet in Chicago, or by supply-induced demand. For still other high-variation procedures, procedures rates are less related to physician supply than to local practice style. The rates of spinal fusions, for example, are 10-fold higher in Provo, UT than in Worcester, MA despite a greater number of orthopaedic surgeons in Worcester.[25] This may reflect "surgical signatures" in which only certain specific types of procedures are more common in a given region. Surgical signatures reflect the practice patterns of individual physicians and the local medical culture rather than differences in need, demand, supply, or the overall aggressiveness of intervention in a region.

Whether the variation in procedures is related to supply-induced demand or to surgical signatures, they show an underlying problem about patient choice. The delegation of treatment decisions to physicians sets up a dynamic in which the preferences of the providers carry more weight than the preferences of the patients. Although this system works well when the treatment choices and their effect on outcomes are clear, such as for hip fracture, it breaks down when the choices and outcomes are less clear, such as with spine surgery.

Shared Decision-Making

When there is a paucity of evidence-based outcomes data, then the preferences of informed patients seem the most appropriate gauge for

deciding what the proper rate of different interventions should be. Studies of shared decision-making in patients with prostate disease suggest that procedure rates may decrease dramatically when patients are educated and allowed to participate actively in the choice of care.[8] Deyo et al[5] reported similar results for lumbar spine disc surgery. Patients randomly assigned to see an interactive videodisc regarding the choice between surgical and nonsurgical therapies for herniated discs thought they were better informed and were 30% less likely to choose surgery, a difference that was statistically significant. Patients shown a similar video regarding surgery for spinal stenosis were somewhat more likely to choose surgery, although this increase was not statistically significant. Outcomes were similar for patients who watched the video and patients who did not watch the video, which suggests that the chosen rates of surgery were not inappropriate.

Widespread emphasis of informing patients, eliciting their preferences, and involving them in the choice of therapy represents a potentially powerful tool for adjusting the rates of procedures and addressing some of the problems uncovered in studies of geographic variation. An important prerequisite for successful shared decision-making is gathering evidence-based outcome data with which to educate patients so that their choices are as informed as possible. Clinical trials that are well done can provide one important step in developing more consensus about the efficacy of different procedures. Rapidly advancing technologies, and scientific and financial limitations, however, will ensure that only a small proportion of interventions will be tested thoroughly in randomized clinical trials. Ongoing outcomes assessment obtained in the course of clinical care could allow for comparisons across regions with differing procedure rates to help determine which rate is right.

Informing patients, performing outcomes research, lifelong learning, and building the infrastructure necessary to improve the quality of medical care demand extensive investments of time and energy. The future of the medical profession will depend on physicians' abilities to adapt to change and improve the way work is done. Workforce policies focused solely on the number of physicians will overlook the crucial issues of how physicians spend their time. A larger workforce need not result in increased rates of procedures or hospitalizations if the proper financial incentives exist to make the important nonclinical work necessary to better understand and improve healthcare part of what that workforce does. For example, if orthopaedic surgeons devoted 20% of their time to these efforts, the excess workforce capacity above the Chicago benchmark would disappear. The fundamental question regarding physician manpower is not "How many physicians are there?" but rather "What do (and should) those physicians do?"

Professional organizations such as the American Academy of Orthopaedics, the American Board of Orthopaedics, and the Residency Review Committees can plan future needs in training the next generation of orthopedists. Some variation in practice and differing practice styles are normal and should not be expected to change. However, what must change are the large variations where decisions are unsupported by the scientific literature and the provider and not the patient drive the variation.

Appropriate use of resources suggest that there is ample supply of orthopaedists and the use of tools such as shared decision-making will become more and more common as technology enables patients to be better informed. Orthopaedic surgeons should take the lead in offering their patients informed choice, as opposed to, informed consent. The efforts in clinical and basic research to improve physicians' abilities to offer patients the information they need to make the right choice must continue, so that the right rate can be used as a benchmark.

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