Access to Care

Eye Care Provider Workforce Considerations in 2020

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The Eye Care Workforce Study reported in 1995 that “under modeling assumptions that use a work-time ratio of 1 between optometrists and ophthalmologists and between specialist and generalist ophthalmologists, a significant excess of eye care providers exists relative to both public health need and demand.”1(p1964)

The report further stated that if optometrists are the preferred primary eye care provider, ophthalmologists would be in excess under all demand scenarios and all need scenarios where the optometrist to ophthalmologist work-time ratio is greater than 0.6. No excess of ophthalmologists would exist if ophthalmologists are the preferred primary eye care provider. Data on the appropriate work-time ratio will help refine estimates of the imbalance between supply and requirements.1(p1964)

In addition, the report noted that “changes in the work-time ratio, work-hours per year per provider, care patterns for the same condition, or other factors could significantly reduce or eliminate the surplus relative to need.”1(p1964) Because of the presence of these important factors, including the effect of new technology for treating previously untreatable conditions, the report projected supply relative to only public health needs and not market demand, using a work-time ratio of 1 and holding all other factors constant, other than supply and population demographics, and only through 2000 and 2010.2

The workforce model estimated that between 2000 and 2010 there would be a 13% increase in the number of patients with cataract needing surgery. An analysis by Etzioni et al2 estimate that between 2000 and 2020 the number of surgical procedures to treat cataract will increase by 47%, not just the 15% in the first half of the 20-year period. In line with these estimates, subsequent epidemiologic projections indicate that the number of patients with chronic eye conditions such as glaucoma will increase by 50% by 2020.4

Because there are no projections for overall workforce balance beyond 2010 for eye care, and, in particular, because more recent general physician manpower studies with projections to 2020 have noted the likelihood of a physician shortage,3,5 this article updates the key factors of the eye care workforce model based on studies and data published since the Eye Care Workforce Study was reported and places their likely effects in a context of the work effort available to provide eye care for the larger number of patients needing care. At a fundamental level, having sufficient providers for care, however defined or delivered, is a critical element of providing access to care.

WORK EFFORT OF OPTOMETRISTS

The first element in enhancing our understanding of the supply of eye care providers is to examine the work effort of optometrists in greater detail. At the time of the original study, no published peer-reviewed data existed on the work effort...
and areas of emphasis of optometric care. After the Eye Care Workforce Study was published, the American Optometric Association (AAO) contracted with Abt Associates (Cambridge, Mass) to conduct an optometric workforce survey and study. In a well-designed survey of practicing optometrists, the study reported that optometrists had 113 million total patient visits in 1997, 69 million of which were for routine or well eye care, 25 million for contact lenses, and 2 million for low vision, sports vision, or vision therapy. Medical diagnosis and treatment in 1997 constituted 15 million visits, or just more than 13% of optometric care visits. The study also indicated that visits averaged 25 minutes, with a mean optometrist total work effort of 39 hours of patient contact per week, including paperwork and other office work, and travel time. By comparison, the Eye Care Workforce Study reported that for ophthalmologists 42 hours of direct patient contact per week, defined as visit duration and any direct paperwork or other work arising from that visit, but not travel time and other office work, but did not have an overall mean time per visit; rather, a more complex allocation and modeling was performed by disease group and type of visit (procedural vs evaluative), among other considerations, which was not done in the study by Abt Associates.

Nevertheless, by comparing the work hours per week, the optometric work week would be 93% of the ophthalmologist work week, for a 0.93 work-time equivalent. If we compare the average number of patients seen each week by optometrists, using all 39 hours for patient visits, which is unlikely, with that noted by the AAO in 1997 in its membership survey, we arrive at a surrogate work effort (based on the number of patients seen per week) equivalence of 0.69. If we alternatively include a figure of 10% of work time that is devoted to indirect patient care activities but included in the Abt Associates survey to bring the definitions of direct patient care time in alignment across the 2 studies, the work effort equivalence is 0.62. This significantly reduces the number of eye care providers available to provide work now and in the future under the full-time equivalent (FTE) metric.

Future projections of work effort availability are constrained, however, because no additional data on work time efforts on the part of optometrists have been published since the Abt Associates study. In addition, use of work relative value units as an alternative proxy measure carries with it a higher risk of inaccuracy because many elements of work in eye care are not covered by insurance and, thus, are not reported by insurance or claims databases with assignable work relative value units. Because such uncovered services tend to be more lucrative, there may also have been a temporal shift on the part of eye care providers to perform more of those services over time.

A related issue is the amount of work being done by optometrists in specific areas. The Abt Associates survey indicated that optometric care involved an additional 5300 optometric FTEs of routine care and an additional 5300 FTEs of optometric care for contact lenses fitting and follow-up. These 10 600 additional optometrist equivalents were not included in the prior Eye Care Workforce Study. Using the estimate of 0.62 work effort equivalence, this translates into almost 6600 ophthalmologist FTEs of additional work demand in the original workforce study. The reason for the difference is that the 1995 workforce study used preventive and well eye care visits, according to the AAO preferred practice pattern recommendations, and included overall refractive care in those well eye examinations, other than a defined amount for refractive surgery (see below).

The Abt Associates survey data thus provide critical data enabling a more refined understanding of the optometric work-related eye care workforce issues. For example, using this information to adjust the demand and supply data for eye care in the RAND Corp (Santa Monica, Calif) workforce model, we can see that the FTE demand will have risen to more than 28 000 FTEs and the supply of providers will be approximately 31 000. This would indicate that by about 2000 there was near equilibrium in the eye care workforce between demand and supply on a national level. Inasmuch as substantive geographic variation exists in provider distribution across hundreds of local markets, some markets may have begun to experience provider shortages by that time.

**CONTENT AND PATTERNS OF CURRENT CARE**

Beyond pure demographics, any assessment of future workforce balance must consider changing current care patterns that may conform better with the recommendations of the AAO Preferred Practice Patterns. Several recent studies indicate that patients with chronic eye diseases are more likely to undergo incomplete assessments, receive less diagnostic testing than recommended, miss regular follow-up appointments for care, and be treated less intensively rather than being overtreated. For example, only 50% of patients with primary open-angle glaucoma will continue to visit a physician or clinic at least once every 15 months during 5 to 7 years. To the extent that providing care in compliance with recommended practice guidelines would result in an increased frequency of provider encounters, this would further exacerbate any potential shortfall in the number of providers, assuming no change in practice efficiency. Thus, improving the process quality of the health care delivery system may well increase the workload, at least initially, of the eye health care system.

**EFFECTS OF TECHNOLOGY, NEW TREATMENTS, AND NEW DISEASES**

Using best available estimates and the input of expert advisors and consultants from the AAO in the early 1990s, the Eye Care Workforce Study also sought to incorporate estimates of the work implications of new treatments and diseases. The report cautioned about the potential instability and, thus, accuracy of such estimates, given the rapid pace of technologic innovation during the last 20 years in ophthalmology and
eye care. Such technology can simultaneously increase the workload in terms of the number of eligible patients while also either increasing or decreasing the unit time of each associated service.

An illustration is refractive surgery. The Eye Care Workforce Study estimated that in 1995 there were 31 FTEs of surgical work in refractive surgery, and fewer than 250 FTEs by 2000. Rapidly advancing technology has increased the potential patient pool, and marketing-enhanced demand has increased the total number of cases in relation to the original workforce assessment, resulting in underestimation of the workforce effect. This has been partially offset by technology-driven decreases in procedure time. Another example is the potential workload challenge provided by new therapies for neovascular age-related macular degeneration that did not exist before the last few years. Both increased demand and increased need for such procedures has resulted in more screening examinations, new diagnostic testing, new surgical procedures, and associated follow-up examinations. This clearly poses new workforce and operational challenges for ophthalmologists and the eye care system.

The effect of new technology and expertise extends across specialties within ophthalmology. Continued advances in cataract surgery have made the procedure both safer and technically faster to perform. The associated total work time for cataract surgery care may increase as the number of surgical procedures performed to treat cataract increases, but may also decrease to the extent that cataract surgery is performed more efficiently and with fewer complications (with the associated patient visits). With the gaps in care patterns noted, it is likely that new technology will have an important role in making beneficial care more accessible to patients in the United States.

**WORK EFFORT OF PROVIDERS WITH TIME**

Several factors pertaining to the training of ophthalmology residents have known or potential effects on eye care workforce projections in terms of both the number of providers and the training environment, which affects the workforce patterns of future ophthalmologists. Since the Eye Care Workforce Study was published, training programs have implemented firm 80-hour work week rule restrictions under Accreditation Council for Graduate Medical Education (ACGME) regulations. These restrictions affect workforce projections in 2 ways. First, in some institutions, resident manpower was used (in excess of the 80 hours now permitted by ACGME) as a surrogate for fully trained ophthalmologists. Limitations in resident work hours have, therefore, necessitated using other nonhousestaff providers. However, the original 1995 workforce study used physicians in training as only fractional FTEs; thus, the workforce effect in terms of service is likely to be limited. Second, the behavior and practice organization patterns implemented to accommodate these restrictions may affect the work approaches of residents that may shape their work patterns and effort as they enter the workforce, potentially reducing the amount of work per ophthalmologist with time.

Another factor is practice intensity and the rate of retirement or termination of clinical practice on the part of physicians and ophthalmologists. In general surgery, longitudinal follow-up from the University of Wisconsin, Madison, found that a full 20% of residency graduates 50 years or older had retired, either voluntarily or involuntarily. Further, with 50% of medical school classes now composed of women, the effect of women reducing their practice intensity during childbearing and childrearing years or of leaving the profession altogether will be even greater than it is today. Several studies, including the original 1995 workforce and subsequent Abt Associates studies, have concluded that, on average during their careers, female physicians in clinical practice have a practice intensity only 85% to 87% of that of male physicians. The greater number of female physicians in the future will translate into a lower number of functional clinical FTEs. If this gender equivalence were to change further in terms of individual effort, the effect will be even greater.

**PROJECTION OF SUPPLY OF ENTRANTS AND PROVIDERS**

The US population per practicing ophthalmologist did not change substantially between 1990 and 2000, with approximately 15,900 patients per ophthalmologist, according to AAO membership statistics and US Census Bureau data. During that same decade, the number of entering ophthalmology residency positions remained effectively flat at approximately 460 positions per year, and has not changed appreciably over the ensuing 5 years. The demographics have shifted, and nearly half of all ophthalmology residents are women. In comparison, approximately 1,125 optometrists graduate each year from US optometry schools.

The 1995 Eye Care Workforce Study reported results through the use of FTEs, indicating that by 2010 there will be 15,974 ophthalmologist FTEs. It also noted that there will be 33,492 optometrists, which, using a 0.62 equivalence, will mean 21,055 FTEs, for a total of 37,018 FTEs overall. Projections for 2010 and beyond are necessarily sketchy and subject to substantial revision because of uncertainties about practice patterns of women and how changes in financing and technology will affect the work effort of available providers.

What about increasing the supply of ophthalmologists? Increasing the number of ophthalmology residencies is a cumbersome process, necessitating approval from the sponsoring institution, funding commitments (generally from hospitals or medical schools that have competing fiscal priorities), and ACGME approval, and only then beginning the process of recruitment of residents to begin 18 months later. There is typically a 6-year interval between the decision to expand a residency program and graduation of these incremental residents. Therefore, a decision to increase the number of ophthalmology training positions by 20% would take longer than 2 decades to effect a 10%
change in the number of ophthalmologists in practice. Clearly, an increase in the number of training programs or in the number of trainees per program would have a nominal and substantially delayed effect on the ophthalmologic capacity to deliver eye care.

Another alternative to increasing the number of ophthalmologists is for existing providers to increase their workload. In the most recent survey of a representative sample of US ophthalmologist members of the AAO (95% of all US ophthalmologists), 52% of respondents indicated that they are interested in increasing their patient volume by 33% or more, while less than 10% want to see fewer patients. In addition, 43% of respondents still believe that, currently, there are too many ophthalmologists, compared with only 4% who believe there are not enough. Thus, increasing the workload of existing providers to their desired levels would result in a 17% increase in work availability almost immediately, if needed. This is in contrast to a 10% increase in work effort in 20 years that would result from increasing the number of residents by 20%.

Further, adopting different models of care has the potential to enhance the effective work of available ophthalmologists and optometrists. For example, Kaiser Permanente and managed care providers in the United States not only pay competitive salaries (with a large number of applicants for available positions) but provide care with physician staffing levels 22% to 37% less than current US levels, accounting for a capacity to do at least that much more work.13 While the exact numbers may not be appropriate for the entire United States, adoption of some features of such systems may further enhance the work effort of available eye care providers.

The AAO noted that the retirement rate of ophthalmologists increased during the late 1990s with the boom in the US stock market, providing greater financial wherewithal for many to retire earlier. Such accelerated retirement will, if continued, further reduce the supply of FTE providers and affect the workforce balance.

US POPULATION GROWTH

The Eye Care Workforce Study used the middle level US Census Bureau projections of the US population for its future modeling.2 The bureau conducts a census every 10 years, as required by the US Constitution. At every census there is debate about whether estimates of those who are not reached by the census should be included, a figure that can exceed several million persons. In addition, the census bureau issues interim low, high, and middle level estimates of the population annually before updating with each census. Of import for understanding the RAND bureau results is that the US Census Bureau enumeration of the US population in 2000 exceeded even the high level estimate of the mid-1990s because of greater than expected immigration and higher than expected fertility rates. Thus, on a purely demographic basis (there are more people than was estimated by the US Census Bureau), there will be greater demand for care than estimated by the Eye Care Workforce Study. To the extent that such trends continue, there will also be more demand and need than anticipated today.

CONCLUSION

Several factors coalesce to indicate that ophthalmology, as almost every medical specialty, faces substantial manpower challenges by 2020 or 2030 based on demographic trends during the next 20 years. In eye care, existing formal models from 1995 do not project beyond 2010 because of recognition of methods limitations in modeling projections based on work effort analyses. This article identifies, at least in broad terms, new data and provides greater understanding of how the new data might affect the eye care provider workforce in 2020 and 2030.

Medical progress and technological advancement create new therapeutic opportunities, resulting in a greater number of patient-provider visits. More recent analyses of optometric capacity, performed by optometric organizations and investigators, suggest less patient disease management impact on a per provider basis than ophthalmologists. In addition, ophthalmology is faced with a relatively flat supply of future ophthalmologists at least a decade into the future. Finally, eye care provider demographics with a greater number of women providers, presumably, in both optometry and ophthalmology, may further increase the gap between supply and demand for eye care services.

Faced with these challenges, innovative and imaginative solutions will need to be found. Simply increasing the number of physicians is one option, albeit with many potential disadvantages.14 Furthermore, such changes will have a delayed effect. Efficiency and effectiveness enhancements to increase work effort should be a fundamental aspect of ophthalmology’s response to a projected relative undersupply of eye care providers. Ophthalmologists today express a capacity to increase work load by at least 17%, based on available patients and financing for such patient care. As described elsewhere in this issue of the ARCHIVES, the AAO has developed a work plan to help ophthalmologists provide the care that is needed.15

Absent major demographic changes, insurance coverage or health financing changes that affect demand for care, or cures for major diseases, there will likely be a substantial amount of work for all eye care providers in 2020. As with the original eye care workforce analyses, understanding the limitations of data yields an understanding that the effect of numerous factors creates greater uncertainty with longer periods of projection into the future. Thus, while projections to 2010 are likely accurate, projections to 2020 and, in particular, 2030, carry substantially greater uncertainty. Further, projections to 2040 and 2050 are much more likely to be erroneous than correct, given the pace of change and uncertainties of life and society.

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REFERENCES


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