Do midlevel providers improve the population's oral health?

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Developing an oral health care workforce that can best meet the needs and demands of the population has been debated for more than half a century. Dental caries and periodontal disease remain prevalent in the United States, and the optimal workforce to reduce this disease burden is controversial. The surgeon general's report in 2000 recognized there are profound and consequential disparities in the oral health of our citizens.[1] "Indeed," the surgeon general wrote, "what amounts to a 'silent epidemic' of dental and oral diseases is affecting some population groups."[1(p vii)] This same statement holds true in 2012.

The potential function and benefit of oral health care workforce models that incorporate midlevel providers, such as dental therapists or "dental nurses," remain a highly controversial and politically charged topic in the United States. The results of a variety of studies indicate that appropriately trained midlevel providers are capable of providing high-quality services, including irreversible procedures such as restorative care and dental extractions.[2] What is less clear is whether midlevel providers can provide these services in a cost-effective manner and whether incorporation of these providers into the workforce will result in improvement in the population's oral health.

The dental profession should look toward developing and testing new approaches to deliver services that effectively prevent oral disease and improve the oral health of the population.

This issue of The Journal of the American Dental Association features a systematic review[3] that was requested by the American Dental Association's (ADA's) House of Delegates in 2011 to assess this specific question. Readers may ask why this systematic review is necessary when there are a number of recent literature reviews on this topic. This new review differs in that it is systematic and is a critical assessment and evaluation of all research studies that address this particular clinical issue. The authors used a systematic and scientific method of locating, assembling and critically evaluating all studies on the topic. The authors cast a broad net to ensure inclusion of all relevant research. Their search of 12 databases yielded more than 7,000 references that they screened, and ultimately they examined 18 studies that addressed the clinical question and presented data that could be reviewed. According to the accepted systematic review standards in dentistry and medicine, this is a relatively large sample from which to draw conclusions. All of the included studies were observational, and none of the published studies reviewed had randomized controlled clinical trial designs.

The risk of bias in many of these studies was high owing to the nature of the design and the methodologies used. Only one study was rated as being at low risk of bias, and five had a moderate risk of bias. How can meaningful conclusions be drawn from limited evidence that overall has a high risk of bias? Data quality is just one of three components that investigators consider when developing conclusions in a systematic review.[4] The other two components are the quantity of the studies and the consistency of the results. This systematic review included 18 studies in which investigators evaluated thousands of study participants, producing results that were consistent among the studies. Thus, the authors (of whom I was one) believed strongly that their conclusions were evidence

based and supported fully by the analysis of the included studies.

Several conclusions were drawn from this systematic review of midlevel providers who perform irreversible procedures. The authors found no evidence related to the total cost of providing care, including training, salary, materials and overhead, nor to the impact on disease burden (cost effectiveness) of the different workforce models. The cost effectiveness of different workforce models has been analyzed hypothetically, but there are few actual data to support or refute cost differentials among different workforce models.[5] There is a need to contain health care expenditures and simultaneously optimize the delivery of high-quality oral health care to the population. This is a topic that the work group suggested as a high priority for future research. There were no studies in which investigators evaluated the effect of midlevel providers on other health conditions or disease increment such as periodontal disease or oral cancer. The work group found only data for dental caries, and most studies involved school-aged children.

Why did the work group compare dental therapists and dentists? Evaluation of the available data allowed two types of comparisons: across time at two or more time points, and of outcomes in patients in whom dental therapists conducted irreversible dental procedures with outcomes in patients in whom only dentists conducted irreversible procedures. The results made it clear that populations around the globe that use different workforce models—many that include midlevel providers—have benefited from reductions in dental caries across time. However, reductions in the dental caries experience are attributed to water fluoridation, use of fluoridated toothpaste, other fluoride exposures and improved knowledge of caries and its causes rather than to differences in workforce. The fact that dental patients in countries that do not use midlevel providers experienced similar decreases in caries across time supports this perspective. Comparison of outcomes in populations treated within the different workforce models provided the data that allowed the work group to conclude that dental therapists do not lower the population's dental caries increment as measured by means of prevalence or incidence. This finding means that populations served by midlevel providers who perform irreversible procedures have similar numbers of decayed, missing and filled teeth (DMFT) and decayed, missing and filled surfaces (DMFS) as do those in whom only dentists performed irreversible procedures. Dental caries is a complex disease, and study findings show that surgical intervention does not translate to prevention of future disease. Therefore, increasing the number of providers who can perform extractions and restorations does not result in greater prevention of dental caries.

Another main conclusion was that populations treated by midlevel providers experienced a decrease in untreated disease. So although the overall DMFT and DMFS scores remained similar between populations, those with midlevel providers had a decreased D component and an increased F component. On a population level, this means the disease severity and overall caries experience is not affected and continues unabated. However, at an individual level, having restored versus decayed teeth can be of benefit in terms of reducing the morbidity associated with dental caries. The data showed that the use of midlevel providers is helping neither to stem the tide of the caries epidemic nor to reduce the population's need for these services. Midlevel providers do help manage the sequelae of the disease and could decrease the negative outcomes that are well known to occur with untreated dental caries. All but one of the studies reviewed were conducted in populations outside the United States, and most involved school-aged children, which makes it tenuous to generalize the results to populations in the United States. The work group noted that diverse populations around the globe are served by midlevel providers and that these providers have evolved as a critical component of many oral health care systems.

How can information from this systematic review be used to help improve Americans' oral health? Adding a tier of oral health care providers who perform restorations and extractions can increase the number of restorations being placed and decrease the number of decayed teeth. The results of this systematic review also show that this surgical approach cannot be expected to reduce the development of dental caries or the population's overall disease burden. Having more restorations is considered by most oral health care providers as a failure in our efforts to prevent and control disease. Whether the approach of developing oral health care delivery systems that incorporate midlevel providers will meet the demand by the public is complex and depends on many issues, such as the desire for these services and the financial ability to obtain them in an oral health care delivery system that is mostly privately funded. The dental profession should look toward devel-

oping and testing new approaches to deliver services that effectively prevent oral disease and improve the oral health of the population. The ADA should continue to advocate for oral health research, as well as for an education system that will advance our ability to perform validated disease risk assessments and develop new interventions directed at diagnosing and preventing oral disease.

By requesting a systematic review on the topic of the dental workforce, the ADA House of Delegates took a critical step toward illuminating what we know and do not know regarding midlevel providers. Their action has helped clarify what some of the potential benefits and limitations of incorporating midlevel providers into the workforce might be. Importantly, alternative workforce models are being implemented despite the lack of evidence supporting the assertion that they will help prevent disease or be cost effective. Furthermore, these workforce models are being implemented without prospective plans for careful evaluation of their cost and their effect on dental disease. The results of this systematic review clearly delineate a need for high-quality research related to alternative workforce models in areas related to health outcomes, cost effectiveness and access to care, and that these issues must be studied in populations other than children so their effect and generalizability to other populations can be understood. As several new workforce models are emerging in the United States, we have an opportunity to evaluate these alternatives critically and answer the fundamental questions outlined above. The time is right to gain further insights into these critical questions, and the need to do so remains great. Knowledge gained through the results of this systematic review and those of future workforce studies will help ensure that all segments of the population benefit from the excellent disease prevention and oral health enjoyed by the majority of Americans and many populations around the globe. ■

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