

ORIGINAL RESEARCH

Effects of a proposed rural dental school on regional dental workforce and access to care

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ABSTRACT

Introduction: Southwest Virginia is a rural, low-income region with a relatively small dentist workforce and poor oral health outcomes. The opening of a dental school in the region has been proposed by policy-makers as one approach to improving the size of the dentist workforce and oral health outcomes.

Methods: A policy simulation was conducted to assess how a hypothetical dental school in rural Southwest Virginia would affect the availability of dentists and utilization levels of dental services. The simulation focuses on two channels through which the dental school would most likely affect the region. First, the number of graduates who are expected to remain in the region was varied, based on the extensiveness of the education pipeline used to attract local students. Second, the number of patients treated in the dental school clinic under different dental school clinical models, including the traditional model, a patient-centered clinic model and a community-based clinic model, was varied in the simulation to obtain a range of additional dentists and utilization rates under differing dental school models.

Results: Under a set of plausible assumptions, the low yield scenario (ie private school with a traditional clinic) would result in three additional dentists residing in the region and a total of 8090 additional underserved patients receiving care. Under the high yield scenario (ie dental pipeline program with community based clinics) nine new dentists would reside in the region and as many as 18 054 underserved patients would receive care. Even with the high yield scenario and the strong assumption that these patients would not otherwise access care, the utilization rate increases to 68.9% from its current 60.1%.

Conclusions: While the new dental school in Southwest Virginia would increase the dentist workforce and utilization rates, the high cost combined with the continued low rate of dental utilization suggests that there may be more effective alternatives to



improving oral health in rural areas. Alternative policies that have shown considerable promise in expanding access to disadvantaged populations include virtual dental homes, enhanced Medicaid reimbursement programs, and school-based dental care systems.

Key words: access to health care, dental school, rural health services, USA, Virginia.

Introduction

Oral health is an important quality of life indicator and has systemic effects on general health¹. Yet, dental care utilization and oral health outcomes in much of rural America are well below the rest of the nation, making it the fifth most important US rural health concern^{2,3}. One approach that states have taken to ameliorate this problem is to fund dental education as a means to increase the supply of dentists. In 2000, 36 states had public dental schools⁴. Beyond increasing the total number of dentists, states are also looking at ways to attract dentists to rural and underserved areas. The focus of this study was to examine how a dental school in rural Southwest Virginia would influence the supply of dentists and dental utilization in that region. It may serve as a model for the expected impact of a dental school in other rural areas of the country.

The Southwest Virginia region is a rural, mountainous area consisting of seven counties and covering 8342 km² (3221 miles²) with approximately 205 000 residents (Fig1). Only 28% of the population lives in high density areas containing 1000 or more residents 1.6 km² (1 mile²) compared with the state average of 72.2%⁵. The low density, combined with the fact that the region has a low ratio of dentists to population (19 private practice dentists per 100 000 residents in 2007 compared with 53 and 54 for Virginia and the USA, respectively), means that individuals must travel further to reach their dentist⁶.

Children and adults in Southwest Virginia experience relatively poorer oral health outcomes than either the state or nation. The Virginia Department of Health statewide screening of 8000 third graders in 2009 found that, by every measure, children in

Southwest Virginia had poorer oral health outcomes by statistically significant margins⁷. Statewide, 15.4% of third-grade children had untreated caries, while 34.4% in Southwest Virginia had untreated caries⁷. Similarly, adult oral health is poorer in Southwest Virginia than the state average. Southwest Virginia adults who had visited a dentist or dental clinic within the past year for any reason ranged from 52.7% to 60.1%, between 1999 and 2008 compared with a Virginia utilization rate ranging from 70.7% to 76.4% and the national rate ranging from 69.8% to 71.3%⁸.

The low dental utilization does not appear to be due to a lack of interest in obtaining dental care. When dental services are provided at no or a reduced cost, a large number of people in the region attend. Since the Mission of Mercy (MOM), a foundation that provides free dental services, was founded in 2000, 46 500 patients have received free dental care across the state⁹. Many of those have been at the Remote Area Medical Clinics (RAM) held annually in the Southwest Virginia towns of Wise and Grundy, where dental care is among the most popular services. The 'Smiles for Children' program, which is Virginia's Medicaid dental program, also has had success at enrolling children in Southwest Virginia, having a higher rate of children enrolled than the rest of the state. Regional clinics that provide reduced price services, such as the Southwest Virginia Regional Dental Center and Clinch River Health Services, have long waitlists for dental services.

In an effort to expand the size of the dental workforce, increase dental service utilization and ultimately improve oral health outcomes in the region, one proposed policy intervention is to create a dental school in the Southwest region. The focus of this study was to examine a proposal for a dental school as a part of the University of Virginia's College at Wise, a four-year liberal arts school that draws the majority of its students from the Southwest region.

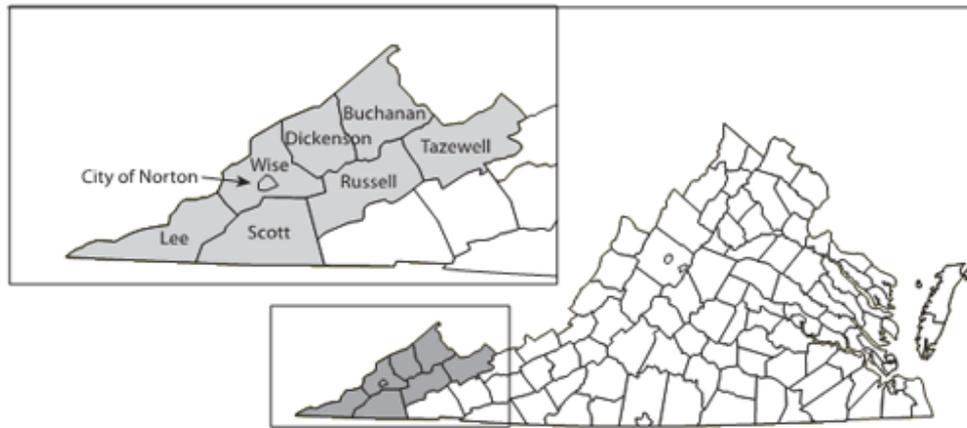


Figure 1: Map of Southwest Virginia.

Method

Dental schools come in many different sizes and configurations. To examine the likely effect of the proposed school in Southwest Virginia, a hypothetical dental school was developed under plausible assumptions as a baseline. A policy simulation was conducted by focusing on two different channels through which the dental school would likely affect the regional dental workforce and dental service utilization. First, some graduates are expected to be retained and supplement the local dental workforce. Second, students in the clinical phase of the pre-doctoral program and residents in a general dentistry residency program will provide clinical dental services to area patients. Dental clinical faculty who provide services intramurally (through the dental school) or extramurally (in private practice setting) offer a third channel for a dental school to contribute to the local labor force. Faculty member services provided to private patients is assumed to be fixed under the different policy simulations.

Baseline dental school

As a baseline, a class size of 50 students was assumed, for a total of 200 students in the pre-doctoral program. A 50 student class size is the median for a cohort of recent and

planned or proposed peer institutions with an institutional emphasis on rural public dentistry. The size of the residency program was assumed to be 24 postdoctoral residents, which is comparable to the dental program at nearby West Virginia University. It was also assumed that faculty perform fee-for-service dentistry once a week either within the program or in an extramural private practice, which is a typical allowance for most dental schools.

The simulation required several additional assumptions, which were drawn from current practice or from available studies. First, based on American Dental Association (ADA) data, academic attrition (for financial, academic, and other reasons) started at 2.5% in the first year and falls in later years¹⁰. Therefore, the graduating cohort is somewhat smaller than the first-year cohort. Second, the graduates choosing to settle in the region were drawn from the ranks of graduates who already resided in the Southwest region when they entered the program. Based on estimates from prior studies, it was assumed that 25% to 30% of local resident dental graduates will remain in the region^{11,12}. Third, additions to the local dentist supply do not displace existing dental practices; they are a net rather than gross addition to the stock of dentists available in the region.



Fourth, dental school graduates who initially locate in the region would be subject to a risk of out-migration. Data from the 2009 US Census showed that the average Virginia resident with a professional degree had a 3% per year out-migration rate due to normal life-cycle and economic reasons (eg marriage/divorce, career changes, change of practice location, illness/retirement)¹³. While re-locations to other regions of the state occur at a higher frequency of 5%, there were no estimated migration rates for particular multi-county regions such as Southwestern Virginia. The conservative estimate of only a 2% out-migration reflects a stronger regional attachment of local graduates.

Finally, clinical faculty would contribute to the availability of dental services through faculty practices housed in the dental schools or in practices outside the school¹⁴. According to Bailit et al, faculty practices primarily treat insured and fee-paying middle and upper income patients¹⁵. Therefore, they have an effect on regional workforce levels but have little impact on utilization by the underserved. The model assumed that full-time faculty members who are dentists generally work one day per week seeing their own patients. The school is expected to employ 37 faculty members, which is comparable to the student-to-faculty ratios at other US dental schools. Therefore, the faculty members would add the equivalent of 7.4 dentists to the regional workforce. Of these, approximately 60% would be specialists, resulting in a contribution of 4.4 specialists and three generalists.

Educational pipeline

The number of local dental school graduates who are expected to stay in the region depends to a great extent on the number of people from the region who attend the school¹⁶. Three different levels of representation (low, medium, and high) of Southwest Virginia students in the dental school were examined (Table 1). The first scenario assumed that the dental school enrolls students from the region in the same proportion as Virginia Commonwealth University's (VCU) School of Dentistry, or 1.78% of each entering class is from the Southwest region. This level of representation was based on records from VCU showing a total of eight first-time students from Southwest Virginia out of a total of 450 students for the entering classes from fall 2005 to fall of 2009. At first glance, it may seem reasonable to conclude that a

dental school in the region would naturally have a higher draw from the region than is currently true of VCU. However, the cost of attending the schools would be comparable and VCU, with its established reputation would still draw some of the qualified students from the region. So, even if there were more applicants due to the visibility of a regional program, admission would be competitive and eligible students would have choices about where to attend.

The second scenario assumed a lower percentage of Southwest Virginia residents enrolled in the dental school, based on the likelihood that the school would not receive an operational subsidy from the state and would need to charge tuition comparable to private dental schools. The VCU receives an annual state appropriation that reduces tuition costs. Therefore, a low 0.875% of each incoming class comes from Southwest Virginia, almost half the level of VCU, was assumed. The third scenario assumed that a successful regional dental education pipeline program is established, which raises the percentage of Southwest students at the school to 2.5%, roughly the same percentage as the region's share of the total state population.

To simulate the effect of the increased number of local dental school graduates on regional dental utilization rates, several additional assumptions were required. Dentist productivity, which depends on a variety of factors including hours worked, number of operatories, number of auxiliaries etc^{11,17} was assumed to resemble that of the average dental practice in the region. To provide a more detailed and current picture of dentists practicing in the region, a Dental Needs Survey was conducted, in which 54 dentists operating in the region, and a random selection based on diverse geographic locations of 54 dentists practicing elsewhere in the state, were surveyed¹⁸. Results were based on a 51% response rate. The dentists who responded to the patient and dental visit questions and dental staff questions treated 1406 patients per full-time equivalent dentist per year. Therefore, each graduate who remained in the region was assumed to generate this number of patients, as well as treating the same percentage of indigent/Medicaid patients as the statewide average of 8%, as reported by respondents to the survey. Finally, it was assumed that all dentists retire after practicing for 35 years, an estimate consistent with an average retirement age of 62 years¹⁹.



Table 1: Dental school simulation scenarios

Category	Scenarios	Description	Major feature
Educational pipeline	Low percentage of students from region	Private institution with high tuition and no pipeline program	Relatively low matriculation of students from region
	Medium percentage of students from region	Public institution with subsidized tuition and no pipeline program	Matriculation rate of students from region similar to existing public institution
	High percentage of students from region	Public institution with subsidized tuition and pipeline program	Relatively high matriculation of students from region
Clinical operations	Traditional dental school clinic	Clinic based at school	Relatively small volume of clinical patients at one location
	Patient centered care clinic	Clinic based at school that operates like private practice	Relatively high volume of clinical patients at one location
	Community based clinic	Clinical experiences based in community such as community health centers and private practices	Relatively high volume of clinical patients at multiple locations

Clinic models

The second pathway by which a dental school could affect regional dental health outcomes is through clinical services to patients. Three competing models for dental school clinical education were examined (Table 1): (i) the traditional dental school clinic; (ii) the patient-centered clinic; and (iii) the community-based clinic. Each model has a different mix of clinical care volume, revenue, clinical skill development, cost-effectiveness, and quality of patient care. These clinical models served as scenarios for estimating the relative magnitudes of their effects on dental health services in the Southwest region.

Traditional dental school clinics: Dental school clinics are set up as teaching laboratories. Students typically treat patients while faculty observe. Faculty do not treat patients. The typical fourth year student sees two patients a day, and many patients must make multiple visits for more complicated procedures. As a result, typical clinics see relatively few patients. The low volume of services provided and the generally low income of the patients mean that dental clinics do not generate enough income to cover costs. As a result, clinics often require subsidies in the range of \$40,000–50,000/chair per year²⁰.

Patient-centered clinics: This dental school model makes patient care rather than student education the central focus of

the clinic²⁰. Faculty, students and residents provide care in a delivery system similar to private practices, with auxiliary staff and increased attention paid to customer service and program financial viability. Relative to the traditional model, there is increased emphasis on improving clinic capacity utilization, for example by introducing modern clinic management methods, operating evening and weekend hours throughout the year, and scheduling shorter appointments²⁰. These types of clinics generate lower net costs and give the faculty an opportunity to participate in clinics on an intramural basis for research or as a source of income to supplement their teaching salary.

Community-based clinics: The key feature of this teaching model is the assignment of students to community clinics and private practices for multiple-week clinical rotations²¹. First introduced by the University of Colorado, this model has since spread to other institutions. Evidence suggests that students in community settings are much more productive than the traditional clinical model because of the availability of auxiliary staff²¹. Bailit et al estimated that students in community-based clinics are three to four times more productive than when they are in traditional dental school clinics²¹. Bean et al found a similar productivity boost: students conducted twice as many procedures in less than half the time²¹. Overall, students can expect to treat six to eight patients each day at community-based clinics^{21,22}. Given that



patient-centered and community-based clinics are relatively new, further research is needed on the effect of these clinic models on student training, and quality of care data would be useful.

Comparing the clinic models

In order to estimate the effects of these clinical scenarios, some parameters were adopted from an analysis of the expansion of dental safety net options from Bailit et al and an analysis of the dental safety net^{23,24}. These studies assumed that all patients treated by the clinic based students and residents are low-income patients, based on the preponderance of such patients in dental school clinics. Typical clinical charges are less than half of what is charged by a private practice, with uncompensated care an estimated 15 to 16% of the cost of all care provided by the clinic²⁵. Faculty time in the student clinics is assumed to be restricted to instructing and assisting. For simplicity, resident productivity is assumed to be unaffected by the clinical model and will extrapolate from resident productivity patterns observed for pediatric dentistry and advanced education in general dentistry (AEGD) residents at the University of Connecticut School of Dental Medicine in Farmington. Each resident saw, on average, 415 patients during the year of the study, resulting in approximately 9960 patients who would be treated by a dental school clinic (24 residents at 415 patients per year each). Student clinic productivity depends critically on the clinical model, with patient-centered and community-based clinics being roughly three times more productive.

The number of patients treated for the baseline dental school using a traditional clinical model was estimated based on a reported 2 927 250 patient visits to US dental schools in 2008–2009 and an average of 13 visits per patient during the year as reported by Bailit et al (this slightly overestimates productivity in a traditional clinic since some patient-centered and community clinic activities generate the patient counts)²³. Bailit et al further estimated that senior dental students generate 75% of clinical patient contacts and junior students the remaining 25%. Based on a national headcount of 4906 seniors and 4960 juniors during the 2008–2009 school year, this implies that a senior student will treat

approximately 34 patients and a junior student approximately 11 patients. Junior and senior cohorts of 49 each (accounting for attrition from an entering cohort of 50) would treat 2243 patients each year. Under the patient-centered and community-based model the number treated would be considerably higher. Bailit et al estimated that senior students would provide 60 days of care per year, treat seven patients per day, and have repeat visits per patient approaching 2.3. Under these high functioning clinic scenarios, an estimated 8948 patients ([49 senior students x 60 days x 7 patients per day]/2.3 visits per patient) could be treated each year.

Not all underserved patients would be expected to come from Southwest Virginia. In order to estimate the number of patients from within the region, the population potential of the Southwest region was compared to the population potential of counties with mean population centers (or population centroids) within 97 km (60 miles) of the population centroid for Wise County (where the dental school is assumed to be based). The regional population share is 63.3%, which is used in the traditional and patient-centered clinical scenarios. For the community-based model, the students and residents are assumed to be dispersed to locations throughout the region but have a much higher local share (90%) of patients due to restrictions on serving patients outside of the service area for the clinic.

Ethics approval

This study was reviewed by the University of Virginia Institutional Review Board and received exempt status.

Results

Results vary by both the education pipeline and clinical models scenarios. The education pipeline component of the simulation reveals a large difference in the cumulative number of dentists who can be expected to remain in the region under different recruitment scenarios. In the first three columns of Table 2, the results are shown for the three local dental student enrollment scenarios: (i) the dental pipeline with high enrollment; (ii) VCU



equivalent enrollment; (iii) and low enrollment under a private school funding model. The cumulative effect varies from a low of three to a high of nine dentists from 2020 to 2053. The last three columns show the estimated number of underserved patients who receive care as a result of the supply increase. Under the best-case scenario (dental pipeline), an estimated 1037 additional underserved patients receive dental care in 2053. Under the low uptake scenario (private school tuition), an estimated 363 additional underserved patients receive care.

Results for the clinical model component of the simulation (Table 3) reveal a stark difference in number of Southwest Virginia patients served, ranging from 7727 under the traditional clinic model to 17 017 under the community-based model.

Combining the results of the dental pipeline and the clinic model, the range of possible outcomes for the number of additional dentists resulting from faculty who also practice privately, the number of graduates who choose to remain in the region, the number of newly served residents, and the dental utilization rate that could be expected in the region are shown (Table 4). In a low yield scenario (ie private school with a traditional clinic), potentially 8090 underserved patients (363 treated by graduate dentists and 7727 treated within the clinic) would receive care. The medium-yield scenario, with the patient-centered model and the percentage of students from the Southwest region equivalent to the percentage from Southwest Virginia who attend VCU, would result in 12 711 underserved patients receiving treatment. In a high yield scenario (ie dental pipeline program with community based clinics) could result in as many as 18 054 underserved patients receiving care.

Even with the high yield scenario and the strong assumption that these patients would not otherwise access care, the utilization rate increases from its current 60.1% to 68.9%. This level still falls well below the rates observed both in USA (71.3%) and statewide (75.2%). Under the low-end scenario, the increase of 8090 patients treated would only translate into an increase in the dental utilization rate to 64%.

Evaluation of the effect of clinical services on utilization rates depends on the extent that services offered by dental school

clinics displace services currently offered to patients on public insurance or pro bono to those without insurance. Displacement of the latter would tend to improve profitability of existing practices while displacement of the former could have the opposite effect. The Dental Needs Survey reveals a difference in the environment that dentists in Southwest Virginia work in and indicates that the region could accommodate the additional dentist workforce that results from the policy simulations. Southwest region dentists were more likely to perceive a regional disparity in providers and a need for policy assistance. In the Southwest region 28% of dentists indicated that they thought there were an inadequate number of dental providers in the region to meet demand for dental services, versus none of the dentists from elsewhere. One-quarter of Southwest region dentists reported that they had difficulty hiring dentist associates versus none in the Virginia benchmark group.

Discussion

One goal of building a dental school in Southwest Virginia is to increase the regional supply of dentists. In order to improve the prospects for retaining graduates it is important to have students from the region enter the dental pipeline. Two factors that are likely to limit the increase in dental graduates remaining in the region are the high tuition costs arising from attending an unsubsidized dental school program and the shortage of a qualified pool of applicants with adequate academic preparation. The average first-year in-state tuition of a state-supported school is \$20,725 compared with a private unsubsidized school at \$46,504²⁶. Debt incurred from attending state-supported schools (private and public) is \$142,671 compared with \$204,734 for private unsupported schools²⁷. The high cost helps explain the relatively high socioeconomic backgrounds of new dentists. Of dentists graduating in 2008, 42.9% were from families with incomes of \$100,000 or more compared with only 21.2% from families with incomes of \$50,000 or less²⁷. The comparable figures for Southwest Virginia residents in these income categories are 8.4% and 60.5%, respectively. It is not clear that many residents would have both the ability and the economic resources to attend a regional dental school.



Table 2: Number of clinical patients served

Year	Southwest dentists - <i>N</i>			Underserved residents - <i>N</i>		
	Dental pipeline	VCU equivalent	Private school	Dental pipeline	VCU equivalent	Private school
2020	1	1	0	81	58	28
2025	2	2	1	270	192	94
2030	4	3	1	440	313	154
2035	5	4	2	595	423	208
2040	7	5	2	734	522	257
2045	8	5	3	860	612	301
2050	9	6	3	974	693	341
2053	9	7	3	1037	737	363

VCU, Virginia Commonwealth University.

Table 3: Cumulative effects of dental school graduates on regional dentist supply and underserved patients

Variable	Model		
	1 Traditional	2 Patient centered	3 Community based
Residents	9960	9960	9960
Pre-doctoral students	2243	8948	8948
Total	12 203	18 908	18 908
SW Region patients	7727	11 974	17 017

SW, Southwest.

Table 4: Dental school workforce and utilization impacts by scenario

Scenario	Traditional		Patient centered		Community based	
	Clinical faculty	Dental graduates	Clinical faculty	Dental graduates	Clinical faculty	Dental graduates
	Newly served	Utilization	Newly served	Utilization	Newly served	Utilization
Dental pipeline	7.4	9	7.4	9	7.4	9
	8764	64.0%	13 011	66.4%	18 054	68.9%
VCU equivalent	7.4	7	7.4	7	7.4	7
	8464	64.2%	12 711	66.1%	17 754	68.7%
Private school	7.4	3	7.4	3	7.4	3
	8090	64.0%	12,337	66.1%	17 380	68.5%

VCU, Virginia Commonwealth University.

Entrance into dental school is highly competitive, typically requiring students to have a 3.5 grade-point average or higher from a selective undergraduate institution. The region has a significantly lower portion of the population that has

graduated from high school or college than the national or state average. Census data from the 2005–2009 American Community Survey show that 85.8% of Virginia’s adults are high school graduates, compared with 70.8% for the



Southwest region. Similar disparities exist for adults with a bachelor's degree, where Virginia's average is 33.4% and the Southwest region average is 11.5%. Therefore, central to building the supply of dentists is providing sufficient financial support to regional dental students and building up the education pipeline to ensure that students are prepared for entry and successful completion of dental school.

A second goal of a dental school is to increase utilization rates, particularly among low-income residents. Dental schools clinics benefit lower income residents because they are able to provide dental services at a lower cost than private sector providers. First, students and residents offer their services below private rates to ensure that they receive adequate experience under the supervision of instructors. Second, federal funds for Graduate Medical Education (GME) help cover the costs of training dental residents. Third, dental schools may partner with organizations such as Federally Qualified Healthcare Centers (FQHCs), which receive federal funds to operate their clinical programs. Finally, Virginia may choose to modify existing laws to allow dental schools access to federal Medicaid matches for the administrative expenses of running their clinical programs, as has been done in other states¹⁵.

In addition to the estimated increases in dentist supply and utilization, the establishment of a regional dental school can have several other positive (albeit difficult to measure) benefits. First, dental schools may create new continuing education curricular opportunities for the area's dental workforce that would enable providers to improve their skills, knowledge, and patient care. Second, a dental school could serve as a demonstration laboratory and technology transfer center that disseminates information about new management methods, technology, and procedures in dentistry, helping to improve dentist productivity in the region. Third, a dental school could stimulate a greater level of public awareness about oral health care through both formal public outreach programs and a larger number of healthcare educators providing leadership roles in the community.

There are also some barriers to establishing a dental school that are unique to rural regions. One obstacle would include the high cost of establishing the necessary administrative and academic infrastructure and physical plant at an institution without existing accredited graduate/professional level health programs (eg a medical school). There may also be additional costs to operating a school-based clinic in a low-density rural region. The longer travel distances could present a challenge to attracting clinical patients, particularly during certain times of the day and seasons of the year (eg winter storm events). The result could be increased recruitment, marketing, and transportation costs. The lower oral health literacy levels among vulnerable populations in the region could also mean more resources may need to be dedicated to oral health literacy programming and outreach.

Finally, a Southwest dental school would also face hurdles recruiting qualified faculty. There is already a growing number of faculty vacancies at existing dental schools, a problem likely to become more pronounced in coming years with a sizeable increase in the number of dental schools, an aging faculty workforce, and continued or growing disparities between private dentists and dental school faculty salaries²⁷⁻²⁹. Faculty recruitment may be a formidable challenge, particularly for two-earner families where occupational matches in a rural region can be more challenging than for larger metro areas with thicker labor markets³⁰. Furthermore, faculty members would have a more difficult time establishing extramural practices in the community because of a lack of sufficient demand in close proximity to the school.

Given the formidable challenges in building a dental school in a rural region, combined with the potentially low benefits, it is worth considering whether there are more cost-effective ways to improve oral health in the region. Bailit and D'Adamo discuss a number of oral health interventions that appear promising³¹. Iowa's 'I-Smile program', for example, has developed a virtual dental home for children where regional dental hygiene coordinators coordinate care among health agencies, families, and dental offices. Enhanced Medicaid reimbursement programs have proven in a number



of states that they can significantly increase utilization rates, although not to the level of private insurance. Finally, Bailit and D'Adamo found school-based dental care programs using mobile FQHCs dental units, as is done in central Connecticut, is potentially the best way to overcome the cultural and transportation barriers to utilizing dental services faced by low-income children³¹. It would be worth exploring further the costs and benefits of these and similar programs relative to what is likely to be achieved by a dental school.

Conclusion

A new dental school in Southwest Virginia would result in an increase in the dentist workforce and utilization rates. The number of dentists who are likely to remain in the region is a function of the percent of students who are from Southwest Virginia. The representation of Southwest students in the entering class will depend on both the cost of the local dental school, as well as the educational preparation available in the region. While increasing the dental workforce will increase utilization rates, the bulk of the utilization impacts would result from the clinical training of students and residents and is sensitive to the configuration of clinical operations. Ultimately, a dental school would lead to an improvement in dental utilization levels, but would leave the region below US and statewide benchmarks.

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