



Expanding the Dental Safety Net: A First Look at How Dental Therapists Can Help

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Introduction

More than 15 million U.S. children, primarily from low-income families, go without seeing a dentist each year, and the consequences are costly, not only for them but for society as well.¹ Studies show this lack of care contributes to a significant number of missed school days, frequent trips to emergency rooms, and worsened job prospects as adults.²

Many underserved children, especially those in inner-city and rural areas, cannot get the care they need because there are not enough dental providers in their communities overall, nor enough who accept publicly insured patients. Forty-seven million Americans live in areas that are federally designated as having dentist shortages.³ A 2009 survey found that in 25 states, fewer than half of dentists treated Medicaid-enrolled patients.⁴ Dentists frequently cite low reimbursement rates and cumbersome administrative requirements as reasons for not participating in Medicaid.⁵

For state and federal policy makers, ensuring that all communities have enough access to dental care is a major challenge—and one that is about to grow even larger. Under the Affordable Care Act, millions more children will gain dental coverage by 2014, mostly through Medicaid and the Children's Health Insurance Program. Whether their coverage translates into care depends greatly on what state and federal leaders do today to strengthen our nation's dental care delivery system. Even without this dramatic expansion of coverage, increasing access to care for at-risk populations is already a major challenge facing states.

A new Pew-sponsored analysis by a University of Connecticut research team has taken a first look at how one type of provider,⁶ dental therapists, could be deployed in Federally Qualified Health Centers (FQHCs)—community clinics that receive special subsidies to serve Medicaid patients—to improve the availability of care and save taxpayers money. While the vast majority of dental services in America are delivered through private practices, many publicly insured families rely on FQHCs. In 2010,

FQHCs provided dental care to more than 3.7 million patients nationwide.⁷

Assessing the potential impact of dental therapists on FQHCs is increasingly important, as legislators in a number of states are considering deploying new providers in safety-net settings. In 2009, a Minnesota law created dental therapists and advanced dental therapists specifically to provide care in underserved areas and safety-net settings.⁸

The University of Connecticut researchers evaluated the ability of dental therapists to increase cost-effectiveness and patient capacity in two types of FQHC settings: existing “fixed-site” clinics and mobile school-based programs. If space were available in FQHCs, the findings for fixed-site settings showed that adding dental therapists could yield modest cost savings—between 3 percent and 6 percent—and increase the capacity of FQHCs to serve approximately 112,000 (6 percent) more children.⁹

The study found greater potential gains by deploying dental therapists in FQHC-operated school-based programs. Specifically, the study estimates that dental therapists working in school-based programs could provide access to care for 6.7 million Medicaid-eligible children.¹⁰ The analysis also suggests that this significant increase in access could be realized for a cost of approximately \$1.8 billion — just one half of 1 percent of combined state and federal 2009 Medicaid spending.¹¹ Given current estimates of dental care utilization, this increase would be sufficient to raise Medicaid-enrolled children's utilization rate by nearly 20 percent, bringing it in line with that of privately ensured children.¹²

Policy makers should consider that this analysis was conservative in its assumptions and narrow in scope. This is the first study of its kind, and further research is needed to reaffirm and expand on the findings, to consider a broader scope of practice for new providers, and to evaluate whether these findings apply to other types of allied dental practitioners, such as dental assistants and dental hygienists. (See page 13 for more information.) For example, the University of Connecticut study assumed that dental therapists would only care for children and

would perform a scope of services that is less than the services they are trained to offer. In addition, the study focused primarily on the

potential cost savings associated with deploying these new providers, omitting other possible benefits.

What Is a Dental Therapist?

The study notes: "Dentists... have a long history of increasing their productivity and efficiency by delegating tasks and services to dental assistants, expanded function dental assistants, dental hygienists, and laboratory technicians." These professionals are known as "allied providers."

Dental therapists are another type of allied provider, trained to deliver routine dental care, including education, prevention and restorative services. They have been used for decades in other countries, mainly in schools and public health settings. In Great Britain and Canada, they treat both adults and children, and some work in private practices with dentists.ⁱ In New Zealand, they deliver care almost exclusively to children through school-based clinics.ⁱⁱ

Dental therapists can be trained and licensed in less time than dentists. This is a crucial point. Although some dental therapist licensure proposals have required four years of training, the researchers determined that "the value of training dental therapists for four or more years" would lead to "decreased FQHC savings, [and] extended training offers no advantage over two year trained dental therapists, unless they have additional skills."

In the U.S., dental therapists work in Alaska where they deliver care to underserved indigenous communities. Additionally, in 2009, Minnesota became the first state to approve a dental therapist and advanced dental therapist.ⁱⁱⁱ In a number of states, other new provider models are being considered, including:

- Community Dental Health Coordinator — Educators and community health workers focused on supporting the proper use of dental services by low-income populations.^{iv}
- Advanced Dental Hygiene Practitioner — Dental hygienists with additional training who could assess risk for dental disease, educate patients, provide primary care services including prevention and basic restorations, and refer patients to dentists for more complex procedures.^v

For more information on allied dental provider models see Pew's 2009 report "Help Wanted: A Policy Maker's Guide to New Dental Providers."^{vi}

ⁱ Table 2 of Nash DA, Friedman JW, Kardos TB, Karods R, Schwarz E, Satur J, Berg DC, Nasruddin J, Davenport EG, Nagel RI, "Dental therapists a global perspective," *International Dental Journal* 58 (2001): 61-70.

ⁱⁱ Fulton JT, "Experiment in dental care: results of New Zealand's use of school dental nurses," Geneva, Switzerland: World Health Organization, (1951); National Advisory Committee on Health and Disability, "Improving child oral health and reducing oral health inequalities: report to the Minister from the Public Health Advisory Committee," Wellington, New Zealand: National Health Committee (2003); Walsh J, "International patterns oral health care--example of New Zealand," *Harvard Dental Alumni Bulletin* (1968).

ⁱⁱⁱ Pew Center on the States, "The Cost of Delay: State Dental Policies Fail One in Five Children," (February 2010): 8.

^{iv} American Dental Association, "Community Dental Health Coordinators," accessed February 9, 2011, <http://www.ada.org/cdhc.aspx>.

^v American Dental Association, "Advanced Dental Hygiene Practitioner Resource Packet," (2009), accessed May 17, 2011, <http://www.sfdada.org/web/pdf/ga/ADA%20adhp%20Resource%20package.pdf>.

^{vi} Pew Center on the States, "A Policy Maker's Guide to New Dental Providers," (2009), accessed November 15, 2011, http://www.pewcenteronthestates.org/report_detail.aspx?id=52478.

An Overview of FQHC Dental Services

The nation's dental safety net is comprised of clinics located in Federally Qualified Health Centers, other community health centers, hospitals, schools, health departments, and other social service agencies.¹³ FQHCs are clinics that receive special federal grant funding from the Department of Health and Human Services to provide primary care, which includes dental services at many locations. Many FQHCs also operate mobile facilities that use portable equipment to deliver care to patients in schools, eldercare facilities, and other off-site locations with large populations of safety-net patients.

FQHCs must be located in underserved areas, charge patients based on their ability to pay and be governed by a community board that includes patients. These clinics form the backbone of the dental safety net for individuals with nowhere else to go. Because they serve mostly low-income and uninsured patients, FQHCs receive enhanced reimbursements from state Medicaid programs.¹⁴

In considering the potential impact of dental therapists on FQHCs, the researchers first assessed the present circumstances of these clinics and their off-site programs:

- About 1,100 FQHC clinics operate in the United States with 820 providing dental services.¹⁵
- FQHCs employ approximately 9,400 full-time dental providers: roughly 2,800 dentists, 1,140 hygienists, and 5,400 other providers including dental assistants and aides.¹⁶
- Compared to private practices, FQHCs have fewer treatment rooms, hygienists, and assistants per dentist, and lower rates of productivity:
 - The typical FQHC dental clinic has an average of five or fewer patient chairs, two or fewer dentists, and one

part-time hygienist.¹⁷ The study notes that “currently, most clinics employ about .5 hygienists per dentist” versus an average of 1.5 in most private practices.

- Another study in Connecticut found that on average FQHCs were 45 percent less productive than private practices, due to these space and staffing limitations.¹⁸
- FQHC school-based, mobile, and other off-site programs already exist in several states, including Connecticut and New Hampshire, but most states and communities still do not invest in these proven delivery models.¹⁹
- As of 2010, FQHC dental clinics provided care for over 3.7 million patients nationwide.²⁰

FQHC Dental Clinics in the Affordable Care Act

FQHCs are a key venue for states seeking to extend health services to underserved Americans. With the recent Supreme Court ruling on the Affordable Care Act, that population will expand further to include the millions of additional children who will acquire dental insurance under the law.²¹ The Act appropriated new funding to support these clinics, improve their operating efficiency, expand facilities, purchase equipment and develop alternative ways to deliver care to children, including:

- \$11 billion to expand FQHC facilities over the next five years;
- \$1.5 billion to expand the National Health Service Corps, which provides loan repayment for professionals, including dentists and hygienists, in exchange for service at FQHCs; and
- \$230 million to enable medical and dental students to work in FQHCs during their initial training programs.²²

Specific FQHCs Considered in the Analysis

For this analysis, researchers issued a nationwide call for FQHCs interested in being part of a national study of clinical and financial operations. Participating clinics were required to have 12 months of electronic dental records. (See Methodology on page 15 for more information). These findings are based on responses from a non-random sample 19 participating FQHC clinics in 12 states.²³ This is the first study of its kind, and while the economic model, methodology and interpretation of research findings were guided by an expert advisory panel and peer reviewed, due to the small number of FQHCs sampled, further research is needed to gauge if results are generalizable to FQHCs nationwide. (For a further breakdown of participating clinic characteristics and the extent to which they reflect clinics nationally, see Table 1.)

The researchers report that the sample clinics were disproportionately larger than typical FQHCs, in terms of the number of treatment rooms, dentists, and staff. However, federal data are not available to provide a detailed comparison between the sample clinics and FQHCs generally. Across these clinics, children accounted for about half of all patients, and public insurance sources of Medicaid and SCHIP (State Children’s Health Insurance Program) were the major payment source, constituting 71 percent of revenues. Though the sample informed the development of the parameters used in the economic model, the specific cost reduction and utilization-rate increases are based on data from Connecticut and Wisconsin FQHCs, due to the size and quality of their available data, which was more robust than clinics from other responding states.

Table 1: Characteristics of a Sample of 19 FQHC Fixed-Site Dental Clinicsⁱ

Characteristic	Average	Range
Space and Staffing		
Treatment Rooms	9.7	3-28
Square Feet	5,517	1,200-17,755
FTE Dentists	3.0	1.0-7.4
FTE Hygienists	2.3	0.2-7.1
FTE Other Staff	5.7	0.8-24.7
Patient Age		
0-6	17%	3.6-55.2
7-12	17%	8.7-29.4
13-18	13%	7.6-19.03
19-20	2%	1.2-3.8
21-45	27%	0.8-40.0
46-64	16%	0.1-28.2
65+	8%	0.0-15.8
Payers		
Medicaid/CHIP	71%	50.6-99.4
Private Insurance	9%	0.3-19.7
Self-Pay/Sliding-fee	18%	0.2-30.7
Other Public Insurance Programs ⁱⁱ	3%	0.0-10.3
Output		
Patients	3,138	299-9,416
Visits	6,416	456-23,062

ⁱ The 19 FQHCs that were studied provided dental care in 53 different sites, including schools and social service agencies. Additional care was offered through mobile dental programs.

ⁱⁱ Other public insurance programs including TRICARE and state and local insurance programs such as Massachusetts’ Commonwealth Plan

Dental Therapists & Fixed-Site FQHC Clinics

The analysis first considered the impact of deploying dental therapists in existing, fixed-site FQHC dental clinics and found modest effects:

- Adding dental therapists to fixed-site FQHCs nationwide could increase the clinics' capacity enough to serve approximately 6 percent—about 112,000—more children than they did in 2010.²⁴
- The average FQHC could employ a dental therapist at an annual cost that is \$10,500 lower than the expense of paying a dentist. Savings were calculated using the formulas described in the Methodology on page 15. The savings derive exclusively from the difference in wages between dentists and dental therapists.
- Based on an analysis of five clinics, selected by the researchers to include a range of sizes (see Exhibit 2.), assigning routine restorative procedures to dental therapists saves an estimated 3 percent to 6 percent of the cost of all services provided to children.²⁵

The size of these access gains and cost savings reflect a combination of factors:

- As noted on page 6 above, FQHC fixed-site dental clinics have well-documented issues inhibiting their productivity, including limited space in which to provide dental services and fewer auxiliary staff, such as hygienists and dental assistants, than private dentists.
- The research team's economic model makes two noteworthy assumptions—namely, that dental therapists would:
 - Treat only children. The researchers made this assumption for two reasons. First, children are more likely than adults to need the types of services, such as basic fillings, that dental therapists provide. Second, Medicaid is required to cover dental care for children but not adults,

meaning that FQHCs are more likely to collect reimbursements for dental therapists' work with children.

- Perform only restorative procedures. The researchers' model only factored in the value of dental therapists doing fillings and simple extractions because they can provide these services at a lower cost than higher-paid dentists. However, these two procedures account for just 17 percent of all the dental services children received in the FQHCs studied. By contrast, the study notes all the procedures—including diagnostic and preventive—that dental therapists could potentially perform would amount to roughly 92 percent of dental services that children seen in FQHCs require, and about 86 percent of the revenue generated by the services provided to kids. (See Exhibit A in the Appendix for a comparison of services assigned to therapists in the analysis with a set of services therapists could perform.)

Currently in other settings, the role of dental therapists does incorporate this broader scope of work. In Alaska, they perform both preventive and routine restorative procedures on children and adults. Minnesota also permits dental therapists and advanced dental therapists to perform a wider range of procedures and to serve all age groups.

The study also notes that dental therapists could help rural FQHCs deal with persistent staff vacancies. A 2006 study found that 26 percent of rural clinics had open dentist positions, and as of 2010, research showed that figure had risen to 39 percent.²⁶ Dental therapists could help fill the gap left by this provider shortage.

Additional research is needed to evaluate the cost-effectiveness and potential impact on clinic productivity if all allied providers deliver their full scope of services for all patients. For example, this would mean dental therapists perform *both* preventive and restorative procedures and hygienists provide more preventive services.

Table 2: Savings Produced by Dental Therapists in Different FQHC Clinicsⁱ

Variables	Clinic A	Clinic B	Clinic C	Clinic D	Clinic E
Chairs	3	6	8	17	13
FTE Dentists	1	2	2.9	4.4	4.9
FTE Hygienists	1	1	1.2	5	6
Total Patients (adults plus children)	1,503	3,593	4,872	4,793	7,315
Child patients (age 18 and under)	359	1,432	2,912	1,709	2,463
Revenue /Gross Billing (all patients)	\$816,890	\$1,126,004	\$1,885,304	\$2,838,192	\$4,059,469
Value of All Services Provided to Children	\$128,003	\$263,086	\$774,374	\$688,658	\$1,024,327
Number of Children's Services Assignable to Dental Therapists ⁱⁱ	341	341	2,067	1,139	1,668
Value of Services Assignable to Dental therapists [†]	\$48,869	\$57,376	\$306,163	\$163,080	\$255,885
Dentist's Share of the Value of Services Assignable to Dental Therapists (30% of total value)	\$14,661	\$17,213	\$91,849	\$48,226	\$76,765
Savings from using Dental Therapists to Provide These Services (Dentist's wage minus Therapist's wage)	\$7,330	\$8,606	\$45,924	\$24,462	\$38,383
Savings from using Dental Therapists (Savings Divided by Value of All Services Provided to Children)	5.73%	3.27%	5.93%	3.55%	3.75%

ⁱ It is assumed that the average visit takes 30 minutes.

ⁱⁱ Children 18 years and younger

Minnesota Enacts First State Law Licensing New Allied Providers

In May 2009, Minnesota became the first state in the nation to approve the licensing of new oral health practitioners—a dental therapist and advanced dental therapist—who will perform a role similar to a nurse practitioner working in the medical field. Dental therapists are licensed to perform such procedures as filling cavities and removing loose teeth, as well as preventive services like applying fluoride and sealants to teeth. Policy makers in other states are looking at Minnesota’s law and the role of allied providers generally as one way to address the lack of dental providers available to care for millions of Americans, particularly the poor and uninsured.

Minnesota legislators were compelled to action by evidence that too many children were not receiving routine care and that taxpayers were shouldering significant costs as a result. For example, one analysis found that among school children in a Minneapolis suburb, “roughly one out of four students showed visible dental health needs that required direct referral to a dentist.” Of those with unmet needs, about half had toothaches or other oral pain.ⁱ A study of seven hospitals in the Minneapolis-St. Paul area found that patients made more than 10,000 trips to the emergency room for dental problems, such as toothaches or abscesses, at a cost of nearly \$5 million—mostly paid by public insurance programs. In addition, of those who went to the emergency room for dental-related problems, nearly 20 percent went more than once.ⁱⁱ

Minnesota lawmakers expect the use of dental therapists and advanced dental therapists to benefit patients and taxpayers in ways similar to those seen in other countries. One study of four consecutive graduating classes of dental therapists in Canada showed that, when accounting for training, employment costs, and the annual value of services provided, these practitioners paid for themselves in an average of only three-and-a-half years.ⁱⁱⁱ Similarly, studies in Great Britain found that dental therapists can provide more than a third of the procedures performed by dentists.^{iv} By providing basic preventive and restorative services, dental therapists can free up dentists to maximize the use of their expertise and carry out more complex procedures.^v

ⁱ Colleen Brickle, RDH RF EdD, Dean of Health Sciences at Normandale Community College, email correspondence with Pew Center on the States, June 17, 2010.

ⁱⁱ E. Davis, A. Deinard, and E. Maiga, “Doctor, My Tooth Hurts: The Costs of Incomplete Dental Care in the Emergency Room,” *Journal of Public Health Dentistry* (Summer 2010): 1-6.

ⁱⁱⁱ C. Quinonez, “The Political Economy of Dentistry in Canada,” (2009), accessed Sept. 7, 2011, https://tspace.library.utoronto.ca/bitstream/1807/17818/1/Quinonez_Carlos_R_200906_PhD_thesis.pdf.

^{iv} R.V. Harris, A. Haycox, “The role of team dentistry in improving access to dental care in the UK.” *British Dental Journal* 190 (2001): 353-356.

^v B. Edelstein, “Training New Dental Health Providers in the U.S.” Columbia University and Children’s Dental Health Project (2009, updated 2010). accessed March 30, 2012 <http://www.cdhp.org/system/files/Executive%20Summary%20-%20Training%20New%20Dental%20Health%20Providers%20Edelstein%20Revised%202010.pdf/>.

Dental Therapists & School-Based Dental Care Programs

FQHCs in several states have made use of mobile programs — typically staffed by a hygienist and a dentist — that travel to schools and other off-site locations to deliver basic care to children. However, this strategy has not been widely implemented. These programs have certain advantages in delivering care to underserved populations, including lower overhead and fewer constraints on physical space. This latter point is particularly important as the high cost of building new treatment rooms is frequently cited as a major barrier to expanding FQHC fixed-site clinics.²⁷

Research shows that school-based programs are not only highly cost-effective but also very efficient with respect to patient care. Based upon reduced costs and higher efficiency, one study estimated that the cost of delivering care in a school was 40 percent lower than providing the same services in a traditional delivery system.²⁸

Evidence also indicates that school-based programs can more reliably reach low-income children than fixed-site clinics because these programs bring dental services directly to the patients, especially those in need of routine preventive and restorative services. However, FQHCs frequently have great difficulty recruiting and retaining dentists to work even part-time in schools, which has contributed to the limited use of this delivery model.

Among the most promising findings from the University of Connecticut study is that dental therapists have the potential to dramatically improve access to care via FQHC-run school-based programs. The researchers estimated that deploying dental therapists in these programs could make dental care available to 6.7 million additional Medicaid-eligible children²⁹ at significantly reduced costs:

- This increase in the number of Medicaid-enrolled children receiving dental visits would be sufficient to raise Medicaid-enrolled children's utilization of dental care from 40 percent, according to 2009 data, to roughly 59 percent, a rate comparable to that of privately insured children.³⁰

- The dental needs of approximately 90 percent of children could be met through school-based programs. Only about 10 percent of children are estimated to have behavioral, medical, or advanced dental health problems requiring a referral to a dentist.³¹
- Needed restorative care could be delivered at a savings of more than \$100,000 per 10,000 patients served, compared to the cost of the same services from private dentists. (See Appendix A for details.)
- Using dental therapists rather than dentists to provide most restorative services offered through school-based programs could save nearly \$94 million in program costs.³²
- This expansion could be realized at relatively little cost to taxpayers — about \$1.8 billion, nationally — equivalent to .5 percent of total state and federal 2009 Medicaid spending.³³

To realize the potential of school-based programs, however, several challenges will need to be addressed, not least of which is significantly expanding this model around the country. To support that expansion, states will need to authorize the training and licensing of a sufficient core of dental therapists. Although the overall costs of school-based programs are lower than fixed-site or private settings, these programs have significant start-up costs. They also need to secure permission from schools and parents and must have billing systems in place for children who have multiple sources of insurance.³⁴ FQHCs already have the administration and billing structures to support the activities of these programs, but they must ensure the mobile teams have the necessary resources and training to operate effectively away from the health centers.

Connecticut's Pioneering Mobile Programs

In several states, FQHCs are already using allied providers in school-based programs to increase children's access to dental care. In Connecticut, Community Health Center, Inc. (CHC), an independent, nonprofit FQHC organization, has been providing mobile dental services to schoolchildren since 2002. The program includes both prevention and treatment, with mobile teams that deliver approximately 10,000 patient visits to over 7,900 children in 170 locations.

Preventive services such as exams, cleanings, fluoride treatments, x-rays and sealantsⁱ are provided using portable equipment at a start-up cost of \$30,000. Some teams may choose enhancements to the equipment, such as electronic records and digital radiography, to improve patient safety and care coordination, enable consultations with offsite providers, and automate data collection, but these improvements also increase the base cost.

The program has increased the number of patients served, and their dental health has improved significantly. A snapshot of one of the mobile program, in New Britain, CT shows the growth and the positive results:

- Between 2006-2010, cleanings rose from 500 to 1,200 and number of sealants placed increased from 75 to 300; and
- According to screening data by Tunxis Community College hygiene program, between 2003-2008, untreated decay dropped from 33 to 25 percent while the presence of sealants rose from 17 to 24 percent.

Not every child receiving preventative services has decay, and restorative needs vary widely. But on average, about 35 percent of children need some form of restorative care. In individual schools, the need can be much higher and more complex, even reaching 70 percent.

Early on, CHC determined that one of the most serious challenges to effectively improving children's dental health was ensuring they received needed treatment when referred to a dentist by the mobile team. According to an evaluation of the program, all the children needing care were referred, but less than 20 percent of referred children actually received needed treatment.ⁱⁱ

Despite the best efforts of the care coordinators to schedule appointments, the same barriers that prevented these children from establishing a dental home in the first place were keeping them from accessing needed restorative care. At that point, CHC began a pilot for delivery of restorative services at one school; the initial pilot revealed that in some schools a completion rate close to 90 percent was possible. In the months following, a pediatric dentist was hired in the Enfield school system, and less than six months later, a treatment completion rate of 70 percent was achieved, with more than 100 children receiving restorative care.

CHC continues to use this model and has employed a part-time dentist in another location where 57 percent of the children need follow-up care, and initial results show that the treatment completion rate was at over 56 percent within a few months.

The advantage of delivering the restorative care at schools is clear, and CHC plans to continue. However, this delivery model does pose challenges. In particular, the addition of a dentist to provide restorative care, even on a part-time basis, to each mobile team imposes significant additional costs on the program. Further, finding dentists to staff the mobile restorative team has been difficult in certain areas of the state.

Operating the mobile dental program effectively requires coordinating many activities. The biggest challenge is program administration, oversight, and ensuring that data is reported uniformly. CHC has addressed these issues by adapting internal management policies and introducing new organizational tools, such as fully integrated health records and digital radiographs. Stakeholders include the CHC, local school boards, private-practice doctors, Head Start administrators and community partners who work together to manage scheduling of services and follow-up, student enrollment, and community outreach, as well as tracking outcomes. This collaboration has helped Connecticut successfully improve the dental health of children statewide.ⁱⁱⁱ

ⁱ Dental sealants are clear plastic coatings applied to the chewing surfaces of molars that prevent food and bacteria from gathering in the deep grooves of back teeth.

ⁱⁱ Pew Center on the States interview with M. Drozdowski Maule, "Mobile Dental Services at Community Health Center, Inc." (October 23 2010).

ⁱⁱⁱ Ibid.

More Research Is Needed on Allied Providers in the Safety Net

The University of Connecticut analysis breaks new and important ground, but leaves many critical questions unanswered. It should serve as a catalyst for further examination of the roles allied providers can play in expanding access to care in safety-net settings.

This study is a simulation, and the researchers note, “it is not based on empirical information from the actual operation of [dental therapist]s working in FQHC clinics and school programs.” Using data from a small sample of FQHC dental clinics, the study provides estimates of the likely impact of dental therapists on both costs and availability of care. Although basic information is available on the number and types of services to children, many questions remain about how FQHCs will use dental therapists.

The research team also notes other opportunities to measure the impact of dental therapists, including:

1. providing care in nursing homes, homeless shelters, prisons, and other institutions;
2. operating satellite clinics in rural areas; and
3. cross-training dental therapists as dental hygienists and/or as expanded function dental assistants.

The impact of dental therapists could also be assessed by having dental hygienists screen underserved patients in off-site facilities and refer to dental therapists those patients with additional needs for care that therapists can fulfill.

Policy Implications

In light of these findings, Pew makes the following policy recommendations:

1. State policy makers should:
 - a. Expand the dental workforce to enable FQHCs to care for more underserved patients, considering a variety of new models, including dental therapists;
 - b. Create demonstration programs to deploy allied providers in safety-net settings and evaluate their impact on access using actual, rather than estimated, data;
 - c. Train FQHC dentists to work with new providers in ways that maximize efficiency and build similar training into dental school curricula;
 - d. Ensure that Medicaid reimbursement is available for the services performed by allied providers; and
 - e. Support programs that bring dental services to schools or other settings that are closer to low-income patients.
2. Federal policy makers should direct public dental health funds to expand space and install needed equipment to enable FQHCs to hire allied providers.
3. Foundations, universities, and other funders should sponsor research to fully explore the potential of allied providers in safety-net settings, including:
 - a. The potential for dental therapists to improve access to care for adults in FQHCs;
 - b. The potential cost savings for FQHCs or other providers when dental therapists provide both preventive and restorative procedures; and
 - c. The ways allied providers might increase access and reduce costs in settings outside the four walls of FQHCs.

Conclusion

Too few dentists are serving poor, rural, and inner-city communities. In addition, publicly insured children already lag far behind higher-income and privately insured kids in getting actual care. The Affordable Care Act will provide millions more children with public dental coverage by 2014, and many of them will be seeking care from safety-net providers like FQHCs. States must work with FQHCs to identify ways to fill this unmet need for dental care.

While more research is needed, these findings suggest that dental therapists—and possibly other allied providers—can help FQHCs improve the availability of care for underserved children across the country. The practitioners can help improve capacity and efficiency at fixed-site clinics, as well as expand the use of school-based dental care programs, whose promise has been demonstrated in Connecticut.

The potential to serve millions more children at a comparatively low cost presents a critical opportunity for states to address their access problems, while preparing for the increasing demand for dental care that is anticipated from the Affordable Care Act.

As they seek effective policy strategies to ensure that Medicaid-eligible and other underserved children can get the dental care they need, policy makers should explore the ways deployment of dental therapists can help FQHC settings both expand access to care and save taxpayer dollars.

Appendix A: Methodology and Cost Model

In cooperation with the National Network for Oral Health Access (NNOHA), FQHC dental clinics were asked to participate in a national study of FQHC clinical and financial operations. The convenience sample of FQHCs was based largely on recommendations from NNOHA leaders and volunteers from NNOHA membership. Special effort was made to gather data from California, Connecticut, Maine, and Wisconsin, given the size and quality of FQHC data in those states. A clinic was eligible to participate if it had 12 months of electronic records and the ability to provide researchers with the following information:

- patient visits (date, clinic, provider, and patient numbers, patient age, dental services (ADA codes), payer, and charge(s) per visit or per service;
- description of clinic operations (provider and staff types, number and annual hours, number of treatment rooms (operatories), and clinic square feet; and
- clinic finances (revenues from grants, patient care by payer, other sources and expenses by expense category).

The study data comes from a convenience sample of the participating FQHCs. Data were available on 19 FQHCs and 53 delivery sites, representing FQHCs in 12 states. The clinics sampled represent a very small proportion of the approximately 820 FQHCs that provide dental care, nationwide. The sample clinics were larger (e.g., treatment rooms, dentists, staff) than average FQHCs. FQHCs in California, Connecticut, Maine and Wisconsin showed substantial differences in staffing, facilities and adult Medicaid coverage, but all received Medicaid per visit reimbursement rates, ranging from \$100 to \$300. Though the national sample informed the development of the parameters of the economic model, the specific cost reduction and utilization rate increases are based on data from Connecticut and Wisconsin FQHCs, due to the size and quality of their available data. Further research is needed to determine if the results of this study are generalizable to FQHCs nationwide.

Cost Reduction Economic Model

This section presents the specification of the model for estimating the overall reduction in the cost of services provided to children by dental therapists within the four-walls of FQHC dental clinics or FQHC operated school programs. The same model applies to both settings. The economic model, methodology and interpretation of research findings were guided by an advisory panel of experts and reviewed in depth by a peer reviewer.

The proposed economic model assumes that efficiently run clinics will have the lowest paid qualified person provide specific services. Accordingly, it is assumed that dental therapists with two years of training and six to 12 months of supervised clinical activity will have higher wages than two-year trained dental hygienists. As such, hygienists will provide most screening and preventive services. The economic variables used in the model include the market price of dental services, frequency of dental therapist services, dentists and dental therapist wage rates, dentist(s) cost share in the production of dental services, dental therapist hours worked per year, and children treated per year. Dentist and dental therapist wage rates were set initially as \$80 and \$40 per hour, respectively.

First, the value of all dental services provided to children (individuals under 19 years of age) in a delivery site is determined. This value (V) is the sum of the product of the frequency of all dental procedures times their corresponding prices. That is:

$$(1) V = \sum P_i * Q_i$$

Where P_i is the market price of dental service i and Q_i the number of dental services i .

Second, the number and types of services to be provided by dental therapists (DTs) and their market value are determined (see Exhibit A). The latter is the sum of the product of the frequency of DT services times their corresponding prices. DTs are assumed to provide three categories of dental services (Exhibit A): Diagnostic (K), Preventive (L) and Other (M). As a result, their market value (V_D) is:

$$(2) V_D = \sum P_K * Q_K + \sum P_L * Q_L + \sum P_M * Q_M.$$

Third, V_D is the value of dental services provided by dental assistants, hygienists, and dentists. In addition, their services are produced by a combination with other inputs (e.g., space, supplies, equipment, utilities). The contribution of dental assistants (K_{DA}), dental hygienists (K_H), and dentists (K_D) in the value of these services is the relevant dimension of this analysis. Initial values, K_{DA} , K_H , and K_D are set equal to 50, 50, and 30 percent, respectively. The value contributed to V_D by dental assistants, dental hygienists, and dentists (C_D) is given by:

$$(3) C_D = K_{DA} * \Sigma P_K * Q_K + K_H \Sigma P_L * Q_L + K_D \Sigma P_M * Q_M.$$

Since FQHCs are nonprofit organizations, it is assumed that their annual revenues are equal to costs. This equality also holds for children services. Consequently, C_D represents the gross billings (revenue), as well as the costs associated with those dental services.

Fourth, the cost of Q_K , Q_L , and Q_M dental services produced by DTs is estimated. The assumption is that DTs can produce these services as effectively as their current providers. The cost of these services (C_{DT}) reflects the wage rate of DTs (W_{DT}) rather than that of dental assistants (W_{DA}), dental hygienists (W_H), or dentists (W_D), respectively. This is given by:

$$(4) C_{DT} = K_{DA} * \Sigma P_K * Q_K * W_{DT} / W_{DA} + K_H * \Sigma P_L * Q_L * W_{DT} / W_H + K_D * \Sigma P_M * Q_M * W_{DT} / W_D.$$

The potential reduction in costs (savings) from using DTs is the difference between the present cost of these services (C_D) and the cost associated with the use of DTs (C_{DT}). The value of the potential savings (S_{DT}) is defined as:

$$(5) S_{DT} = [C_D - C_{DT}] = K_{DA} * \Sigma P_K * Q_K (W_{DA} - W_{DT}) / W_{DA} + K_H * \Sigma P_L * Q_L * (W_H - W_{DT}) / W_H + K_D * \Sigma P_M * Q_M * (W_D - W_{DT}) / W_D.$$

Given that $W_D > W_{DT} > W_H > W_{DA}$, the first and second part of equation (8) are negative. In other words, having DTs replace dental assistants or dental hygienists does not lower the cost of children's dental services. On the contrary, the cost of children's services increases. The only positive reduction in

costs (savings) emerge from the substitution of dentists by DTs. Putting it differently, the potential savings generated by DTs (S_{DT}) are:

$$(6) S_{DT} = K_D * \Sigma P_M * Q_M * (W_D - W_{DT}) / W_D.$$

The percentage of potential savings of the total value of child dental services is defined as:

$$(7) \%S = S_{DT} / V$$

Economic Model Application

FQHC Fixed-site Clinic - This section gives a step-by-step process to estimate the absolute and relative reduction in the cost of dental care for children generated from the substitution of a general dentist by a DT in FQHC dental clinics. The model does not consider the impact of DTs who treat both children and adults. More specifically, this section describes the information needed to complete formulae (6) and (7):

$$(6) S_{DT} = K_D * \Sigma P_M * Q_M * (W_D - W_{DT}) / W_D.$$

$$(7) \%S = S_{DT} / \Sigma P_i * Q_i$$

K_D is the cost share of dentists in the production of children's services listed in Table A. FQHCs can approximate this value (K_D) by calculating the following ratio: Annual dentists' salaries and fringe benefits divided by annual total FQHC dental expenses. The data can come from one site or all sites.

P_M , P_i are the market prices corresponding to the procedures listed in Table A and all procedures for children, respectively. The prices for services provided to FQHC patients with private insurance was used to calculate the market value of all procedures for children ($\Sigma P_i * Q_i$), as well as the market value of the procedures in Table A ($\Sigma P_M * Q_M$). Alternatively, researchers can use the ADA published national fees.

Q_M , Q_i are the frequency of dental procedures corresponding to the procedures listed in Table 2 and all procedures for children, respectively. FQHCs may generate the frequency of each of these procedures for individuals under 19 years of age from their data.

W_D , the wage rate of dentists is calculated by taking the annual salaries and fringe benefits of all dentists (part-time and full-time) and

dividing by the annual total number of hours worked. Finally, W_{DT} is the wage rate (salary plus fringe benefits per hour) of DTs. To calculate the potential reduction in costs (S_{DT}), different wage rates may be tried. Following the above, both S_{DT} and %S are easily estimated.

FQHC School Program - The economic model for estimating the financial impact of DTs on FQHC run school programs is:

$$(6) S_{DT} = K_D * \Sigma P_M * Q_M * (W_D - W_{DT}) / W_D.$$

As before, assume K_D is equal to 30 percent. To estimate P_M times Q_M , assume that the FQHC operates the program in 100 public schools and that 100 children receive care in each school. Thus, 10,000 children participate in the program. From epidemiological studies and practical experience, 35 percent of these children (3,500) will need restorations or other dentist-level services. From epidemiological studies the average child with untreated caries needs two teeth restored. This comes to a total of 7,000 restorations (3,500 children X 2 restorations). Also, assume that all other required services (e.g., extractions, pulpotomies) are the equivalent of 1,000 restorations for a total of 8,000

restorations. From experience, dentists can provide 90 percent of the restorations (7,200) in schools using portable equipment. Assume that DTs can provide 80 percent of these restorations (6,480) in schools. If the market value of a restoration is \$120, then $P_m \times Q_M$ comes to \$777,600 (6,480X\$120).

With dentists making \$80 per hour and DTs \$40 per hour, $W_D - W_{DT} / W_D$ is .5. Putting all these values into the economic model results in:

$$S_{DT} = K_D * \Sigma P_M * Q_M * (W_D - W_{DT}) / W_D$$

$$S_{DT} = .3X\$777,600X.5 = \$116,640$$

The upper boundary estimate of DT savings is \$116,640 per 10,000 children. The time dentists spend supervising DTs is subtracted from this amount and is assumed to be 20 minutes per day.³⁵ Assuming DTs can complete a restoration in 30 minutes, the 6,480 restorations will take about 462 days to complete. At \$80/hour the cost of supervision is \$12,320 (154 hours X \$80 per hour), reducing the savings to \$104,320 per 10,000 children.

Table 3: Frequency and Market Value of Children’s Dental Services that Could Be Provided by Dental Therapists in a Large Connecticut FQHC

Procedure Code	Code Description	Frequency	Market Value	Percentage of Total Procedures	Percentage of Total Market Value
	Diagnostic	7,426	\$273,144	18.59%	10.27%
D0210	X-Ray (full mouth series)	74	\$8,176	0.19%	0.31%
D0220	30PA X-Ray (single film)	1,407	\$32,938	3.52%	1.24%
D0230	Additional Film	317	\$5,811	0.79%	0.22%
D0240	Occlusal Film	503	\$17,605	1.26%	0.66%
D0270	Bitewing X-Ray (single)	73	\$1,679	0.18%	0.06%
D0272	Bitewing X-Ray - 2	3,840	\$141,850	9.61%	5.33%
D0274	Bitewing X-Ray - 4	1,163	\$60,476	2.91%	2.27%
D0330	Panorex Film	49	\$4,610	0.12%	0.17%
	Preventive	22,313	\$1,020,461	55.85%	38.36%
D0120	Periodic Examination	2,533	\$105,069	6.34%	3.95%
D0140	Limited Oral Evaluation	1,677	\$96,595	4.20%	3.63%
D1110	Prophylaxis, Adult	226	\$17,547	0.57%	0.66%
D1120	Prophylaxis, Child	8,425	\$485,786	21.09%	18.26%
D1203	Topical Fluoride Adult	7,895	\$235,745	19.76%	8.86%
D1204	Topical Fluoride	53	\$1,628	0.13%	0.06%
D1351	Sealant per tooth	1,449	\$64,799	3.63%	2.44%
D1510	Space Maintainer	50	\$12,968	0.13%	0.49%
D1550	Space Maintainer, Recement	5	\$325	0.01%	0.01%
	Other	6,823	\$999,604	17.08%	37.58%
D2140*	Amalgam-one surface	758	\$83,645	1.90%	3.14%
D2150*	Amalgam-two surface	926	\$127,825	2.32%	4.81%
D2330*	Resin, 1 surface, anterior	261	\$34,269	0.65%	1.29%
D2331*	Resin, 2 surface, anterior	193	\$31,173	0.48%	1.17%
D2391*	Resin-based composite - one surface,	2,226	\$320,121	5.57%	12.03%
D2392*	Resin-based composite - two	1,063	\$197,038	2.66%	7.41%
D2930*	Stainless steel crown, primary tooth	121	\$26,281	0.30%	0.99%
D3110*	Pulp cap direct	1	\$64	0.00%	0.00%
D3120*	Pulp cap indirect	4	\$254	0.01%	0.01%
D3220*	Pulpotomy - excluding final	249	\$37,821	0.62%	1.42%
D7140*	Extraction (elevation and/or forceps)	1,021	\$141,112	2.56%	5.30%
	Dental Therapist Services Included in	6,823	\$999,604	17.08%	37.58%
	ALL Dental Therapist Services	36,562	\$2,293,209	91.52%	86.21%
	All Children’s Services**	39,951	\$2,660,020	100%	100%

*Service included in estimate of dental therapist savings.

**Includes services (not shown) provided by dentists that are outside dental therapists’ scope of practice (e.g., root canal therapy).

Endnotes

1 This figure counts children age one to 18 eligible for the Early and Periodic Screening, Diagnosis & Treatment benefit. United States. Dept. of Health and Human Services. & Centers for Medicare and Medicaid Services. (2012). Annual EPSDT Participation Report, Form CMS-416 (National) Fiscal Year: 2010. Retrieved June 11, 2012, from <http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Benefits/Downloads/EPSDT2010National.zip>.

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therapists for dentists, and the results showed that average costs fell but that overall costs rose since more care was delivered. FQHCs saw 3,750,481 dental patients in 2010. The University of Connecticut researchers estimated that roughly 50 percent of FQHC dental patients are children age 18 or younger. Thus, Pew estimated that 1,875,241 dental patients were children. The University of Connecticut researchers estimated that dental therapists would allow FQHCs to see an additional 112,000 children or a 5.97 percent increase. See: Health Resources and Services Administration, "2010 National Report," (2011), pg 49. Accessed December 12, 2011, http://bphc.hrsa.gov/uds/doc/2010/National_Universal.pdf. Beazoglou, T., Bailit, H., DeVitto, J., McGowan, T., Myne-Joslin, V. "Impact of Dental Therapists on Productivity and Finances: II. Federally Qualified Health Center" (2012) *Journal of Dental Education* (in press); H. Bailit, T. Beazoglou, J. DeVitto, T. McGowan, V. Myne-Joslin, "Economic Models of Dental Therapists: Federally Qualified Health Centers," (2011) Report to the Pew Center on the States; Email communication with Howard Bailit November 22, 2011.

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11 It is estimated that it would cost \$1.8 billion to provide care for 6.7 million children in school settings. It is estimated that total federal and state Medicaid spending in FY 2009 is \$366,471,017,061. \$1.8 billion represents 0.047% of this spending. Bailit, H., Beazoglou, T., DeVitto, J., McGowan, T., Myne-Joslin, V., "Impact of Dental Therapists on Productivity and Finances: III. FQHC Run School-Based Dental Care Programs." (2012) *Journal of Dental Education* (in press); Kaiser Family Foundation. "State Health Facts." Accessed February 15, 2012 <http://www.statehealthfacts.org/comparemaptable.jsp?ind=177&cat=4>

12 It is estimated that the dental utilization rate of privately insured children is 58 percent in 2006 (AHRQ, 2008). In this case, 'Medicaid-enrolled children' refers to those 0-20 who are eligible for Early Periodic Screening, Diagnostic and Treatment (EPSDT). Out of 33,826,914 total 2009 EPSDT eligible Medicaid-enrolled children, 40 percent or 13,402,543 received dental services. This figure counts children ages birth to 20. Data from the 48 reporting states and the District of Columbia were supplemented with reports obtained directly from Michigan and Oregon. If 6.7 million additional children received services, the utilization rate for Medicaid enrolled EPSDT eligible children would be 59 percent. See: Agency for Healthcare Research and Quality, "Statistical Brief #221: Dental Coverage of Children and Young Adults under Age 21, United States, 1996 and 2006." (2008). Accessed February 28, 2012.

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The Pew Children's Dental Campaign works to promote policies that will help millions of children maintain healthy teeth, get the care they need, and come to school ready to learn.

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