Access to dental care for low-income patients (at <300 percent of the Federal Poverty Level) is a serious national problem. Most of those patients do not have adequate personal wealth or private or public dental insurance to purchase private sector dental care. As a result, they have relatively low utilization rates and high levels of oral disease morbidity and disability compared to middle- and upper-income populations.¹

One strategy for reducing access and health disparities is to lower the unit cost of providing services by substituting lower for higher cost labor. All things being equal, this should make care more affordable, increasing the demand for services and utilization rates. This is one rationale behind physicians’ use of physician assistants and nurse practitioners. Dentists also have a long history of increasing their efficiency by delegating tasks to dental assistants, expanded function dental assistants, dental hygienists, and laboratory technicians.

Recently, a new type of dental mid-level provider has become part of the oral health care delivery system in some areas of the United States, so that dental health aide therapists now provide care in tribal areas of Alaska and in Minnesota.² Internationally, dental therapists are practicing in many developed countries, including the United Kingdom, Australia, Canada, New Zealand, and the Netherlands. Although the training and roles of dental therapists differ among countries, all dental therapists extend the capacity of dentists, especially in underserved areas, primarily by providing common diagnostic, preventive, and restorative services.

The goal of this study was to examine the potential impact of dental therapists’ treating children on the productivity and finances of delivery organizations and, in turn, on reducing access disparities. This examination includes the development of an economic model that community clinics and private practices can use to estimate the financial impact of dental therapists. The results are presented in four related articles published in this issue. This article, the first, reviews the relevant dental therapy literature and examines the magnitude of the access problem.
for low-income children since these two issues apply to all delivery systems. The second article examines the relevant outcomes for dental therapists’ providing care to children in Federally Qualified Health Centers (FQHCs). The third article looks at these same issues in FQHC-operated school-based delivery systems, and the final article estimates the impact of dental therapists employed in private general practices, providing care to children and adults.

**Dental Therapists**

**Training, Supervision, and Services**

In the Alaska program, dental therapists were formerly educated in the New Zealand “Dental Nurse” program, but now they spend a year in coursework at the University of Washington School of Medicine DENTEX program and a second year of clinical training in a tribal dental clinic in Bethel, Alaska. At the end of the two years, they are required to complete a supervised clinical preceptorship for three months or 400 hours. Graduates are then eligible for certification as a dental therapist.3

Minnesota has established three types of dental therapy training programs. The University of Minnesota School of Dentistry offers both a four-year baccalaureate and a three-year master’s program. The bachelor’s degree program is designed for students who have at least one year of college (included in the forty-month program). The master’s program is for students with a B.A. or B.S. degree. In addition, in its Advanced Dental Therapist Program, Metropolitan State University (located in Minneapolis and in affiliation with Normandale Community College) offers a two-year master’s degree for students with a B.S. or B.A. degree in dental hygiene.2,3 The latter program allows dental therapists to provide a modestly broader scope of services and to work in a collaborative arrangement with dentists. In Minnesota, dental therapists are required to primarily provide care to underserved adults and children.

The Alaskan dental therapists and advanced dental therapists work under general dentist supervision. That is, the supervising dentist is not physically present in the same location but is available electronically. The two types of therapists trained at the University of Minnesota work under indirect supervision, i.e., the supervising dentist is present in the same facility but not necessarily the same room.

The services provided by the three types of dental therapists are similar and include examinations, preventive services, local anesthesia, restoration of deciduous and permanent teeth, and extractions. Dental therapists are not allowed to scale below the gum line. A detailed list of services for each type appears in Table 1.1

**Evaluation**

The literature on the impact of dental therapists on the quality of care, patient satisfaction, and practice/clinic finances is limited. Indeed, there are no randomized controlled trials comparing dental therapists and dentists in terms of these and other outcomes in the United States. For that matter, few studies have examined these issues for U.S. private or public sector dentists.

Most research data on dental therapists come from other countries. In New Zealand, Great Britain, and Australia, dental therapists started working in publicly run school clinics, but now are also employed in private practices and hospitals. In the latter facilities, they treat both children and adults and usually work under indirect or general dentist supervision. The total numbers of dental therapists in Great Britain, Australia, and New Zealand are estimated to be 700, 1,300, and 700, respectively.4,5 These countries have far fewer dental hygienists per dentist than in the United States and Canada.4 Previous articles have reviewed the history of dental therapy programs in these and other countries, including the United States.4,14 Other research has reported the following: the majority (57 percent) of the public would allow dental therapists to restore their teeth;15 patients treated by dental therapists and dentists were equally satisfied;1,6-18 dental therapists reported being underutilized by dentists (e.g., they can treat more complex patients);19-23 dental therapists often worked part-time in multiple private practices;17-19,22 many dental therapists feel underpaid, especially relative to dental hygienists;17,19,22-24 and dually qualified hygienists and therapists working in private practices appear to spend most of their time providing hygiene services, making it difficult for them to maintain their therapist skills.19,20,22,24

Studies conducted in Australia and New Zealand have compared the technical quality of restorations placed by dental therapists and dentists and reported no statistically significant differences.25-27 Preliminary results from the Alaskan dental therapists’ experience also found high patient and commu-
and clinics reported no consistent change in net revenues.\textsuperscript{33,34} In contrast, a privately published economic modeling exercise estimated that one dually qualified dental hygienist-dental therapist can increase the annual net income of solo general dental practitioners by 52 percent (from $337,242 to $511,446).\textsuperscript{35}

In terms of impact on oral health, some data are available from New Zealand, where dental therapists provide most care to children up to twelve years of age. Community satisfaction and comparable (to dentists) technical quality of restorations and patient records.\textsuperscript{18,28,29}

Limited information is available on the economic impact of dental therapists, and the published research is not rigorous methodologically. In Great Britain, reports have noted that dental therapists do not generate surplus net income for private practitioners.\textsuperscript{30-32} Multiple studies of nurse practitioners and physician assistants employed in medical practices

\begin{table}
\centering
\caption{Scope of practice for dental therapists in Alaska (AK) and Minnesota (MN)}
\begin{tabular}{lccc}
\hline
\textbf{Service Category} & \textbf{AK Dental Health Aide Therapist} & \textbf{MN Advanced Dental Therapist} & \textbf{MN Basic Dental Therapist} \\
\hline
\textbf{Evaluation and Preventive Services} & & & \\
Examination/assessment/inspection & yes & yes & no \\
Dental radiography & yes & yes & yes \\
Provide, dispense, administer select medications & no & yes & no \\
Counseling & yes & yes & yes \\
Cleaning above the gum line & yes & yes & polish \\
Fluoride application & yes & yes & yes \\
Sealant placement & yes & yes & yes \\
Cleaning below the gum line (scaling) & no & no & no \\
Space maintainers & yes & yes & yes \\
\textbf{Basic Restorative Services} & & & \\
Temporary restoration/ART technique & yes & yes & yes (general supervision) \\
Isolation & yes & yes & yes (general supervision) \\
Injection of local anesthetic & yes & yes & yes \\
Tooth preparation (drilling primary and permanent teeth) & yes & yes & yes \\
Tooth restoration (filling primary and permanent teeth) & yes & yes & yes \\
Primary tooth SSC (preformed cap) & yes & yes & yes \\
Primary tooth pulpotomy (a nerve treatment) & yes & yes & yes \\
\textbf{Surgical Services} & & & \\
Extract primary teeth (uncomplicated) & yes & yes & yes \\
Extract permanent teeth (conditional uncomplicated) & yes & yes & no \\
Other surgical care & no & no & no \\
\textbf{Advanced Restorative Services} & & & \\
Periodontal treatment (gums) & no & no & no \\
Endodontic treatment (root canals) & no & no & no \\
Fixed prosthetic treatment & no & no & no \\
Removable prosthetic treatment & no & no & no \\
Orthodontic treatment & no & no & no \\
\textbf{Adjunct Services} & & & \\
Community level oral health programming and promotion & yes & yes & yes \\
Care coordination & yes & yes & yes \\
Population assessment & no & yes & yes \\
Research & no & yes & yes \\
\hline
\end{tabular}
\end{table}

\textit{Note:} Level of supervision for AK Dental Health Aide Therapist and for MN Advanced Dental Therapist is general/collaborative. Level of supervision for MN Basic Dental Therapist is indirect except as noted.

In large part, this accounts for the relatively low fee that Medicaid enrollees pay. Dental fees are 30 to 50 percent of market fees. Generally, states with Medicaid eligibility standards that are less restrictive have higher Medicaid utilization rates.

The appropriate target utilization rate for Medicaid-eligible children is an open question and is a social and political rather than scientific issue. Is it the 66 percent seen for privately insured children; the 46 percent reported in national studies for children from middle-income families; or 56 percent, the utilization rate reported for children from upper-income families? If the goal were to increase Medicaid/CHIP utilization rates to 60 percent—a midpoint among the three levels for children from other socioeconomic groups—then 20.2 million of the 33.8 million enrolled children need to have at least one annual dental visit. Currently, about 40 percent or 13.5 million Medicaid/CHIP-enrolled children access dental care each year. To achieve a 60 percent utilization rate, another 6.7 million children need to be provided with dental care.

A related issue is the oral health of low-income Medicaid/CHIP-enrolled children. In many states, children from families up to 250 percent of the Federal Poverty Level (FPL) are eligible for enrollment. The key issue is what percentage of these children have untreated caries. The appropriate target utilization rate for Medicaid-eligible children is an open question and is a social and political rather than a scientific issue. Is it the 66 percent seen for privately insured children; the 46 percent reported in national studies for children from middle-income families; or 56 percent, the utilization rate reported for children from upper-income families? If the goal were to increase Medicaid/CHIP utilization rates to 60 percent—a midpoint among the three levels for children from other socioeconomic groups—then 20.2 million of the 33.8 million enrolled children need to have at least one annual dental visit. Currently, about 40 percent or 13.5 million Medicaid/CHIP-enrolled children access dental care each year. To achieve a 60 percent utilization rate, another 6.7 million children need to be provided with dental care.

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### Access Problem

As of 2009, 33.8 million children in the United States were enrolled in Medicaid and the Children’s Health Insurance Program (CHIP), but with the recent economic downturn, this is probably an underestimate of the current number. Another 5.4 million low-income children are eligible for Medicaid benefits but are not enrolled in the program. Also, in several states, Medicaid eligibility standards are so restrictive that a large percentage of poor children are not eligible for the program. The bottom line is that the number of children who should be Medicaid/CHIP-eligible is probably close to 40 million.

All states are required to provide dental care to Medicaid-enrolled children. Nationally, utilization rates (one or more visits to a dentist per year) average 40 percent but vary by state. Generally, states with relatively high Medicaid fees (relative to market fees) have higher utilization rates. For example, Vermont Medicaid dental fees are in the 50th percentile of market fees, 90 percent of dentists participate in the program, and over 50 percent of eligible children have a dental visit annually. In most states, Medicaid dental fees are 30 to 50 percent of market fees. In large part, this accounts for the relatively low
The access disparity problem for children indicates that enrollment in Medicaid and CHIP is now about 33.8 million and there are perhaps another seven million low-income children who are eligible but not enrolled in Medicaid/CHIP. Only 40 percent of Medicaid-eligible children are receiving dental visits annually; in large part, this appears related to low reimbursement rates.

National oral health survey data indicate that low-income children have more untreated decayed teeth than children from wealthier families. Still, only 35 percent of poor children appear to need dentist-level services. Most low-income children who do not have untreated decayed teeth can be managed by dental hygienists who provide periodic screenings and preventive services. To reach utilization rates seen in middle- and upper-income families, another 6.7 million children need to receive care.

The key questions are these: What impact will dental therapists employed in community clinics, school-based programs, and private practices have on reducing access disparities, and will employment of dental therapists reduce per patient expenses? These issues are addressed in the next three articles.

### Discussion

Our literature review suggests that dental therapists are providing routine dental services to adults and children in many developed countries and have been introduced in the United States. Overall, the evaluation literature is limited, and the few studies available report on a convenience sample of a small group of dental therapists or delivery settings that employ dental therapists. Much more research is needed on the operation of public and private sector dental care delivery systems and the role of dental therapists and other personnel.

The major contribution of dental therapists appears to be providing dental services to children in school-based dental care systems and community clinics. Indeed, in New Zealand and some areas of Australia, dental therapists in school-based clinics provide most of the oral health care that children receive. In several countries, dental therapists work in private practitioner offices, but so far, the number employed in this setting appears limited. The reasons for this are unclear, but some research has indicated that private dentists find it difficult to cover dental therapist-generated practice expenses. In Australia and Great Britain, many dental therapists are also qualified as dental hygienists, and at least in private practices, they appear to mainly provide hygiene services. Studies of the impact of nurse practitioners and physician assistants have indicated that they increased the supply of medical services but had little or no impact on reducing the unit cost of care.

Dental therapists are just getting started in the United States. They are mainly employed in frontier areas of Alaska that are difficult to staff with dentists. The employment of dental therapists in Minnesota is in an early stage of development, and it is premature to come to any conclusions on the organizations that will employ them and their impact on access and expenditures.

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### Acknowledgments

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**Table 2. Percentages of children with untreated caries in permanent teeth by Federal Poverty Level (FPL) and age, 1999–2004**

<table>
<thead>
<tr>
<th>Age</th>
<th>Less Than 100% FPL</th>
<th>100% to 199% FPL</th>
<th>200% or Greater FPL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–11 years</td>
<td>11.7%</td>
<td>11.9%</td>
<td>3.5%</td>
</tr>
<tr>
<td>12–19 years</td>
<td>27.1%</td>
<td>27.0%</td>
<td>12.8%</td>
</tr>
</tbody>
</table>

REFERENCES


