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DENTAL PUBLIC HEALTH (R COLLINS, SECTION EDITOR)

Current Status of Adding Dental Therapists to the Oral Health Workforce in the United States

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Abstract Dental therapists are members of the oral health care workforce in over 50 countries of the world. Until recently, they have not participated as members of the professional dental team in the USA. It was not until the publication of *Oral Health in America: A Report of the Surgeon General* in 2000, describing the significant problem of access to dental care, that the issue of dental therapists emerged in the USA in a significant manner. Details of the development of dental therapists in the workforce in the USA through 2011 were previously chronicled by Mathu-Muju. Since then, there has been a major increase in interest and licensing of dental therapists in a number of states. This article updates the dental therapist movement to the present time. The literature and activities of the movement will be reviewed by the categories of research, education, and legislation/practice, as well as analytical essays and commentaries.

Keywords Dental therapists · Advocacy · Access to care · Education · Legislation

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Introduction

Dental therapists are members of the oral health care workforce in over 50 countries around the world [1, 2••, 3••]. Until recently they have not participated on the professional dental team in the USA. In 1971, Friedman published an advocacy article in the *Journal of the American Dental Association* describing the success of school dental therapists (then designated school dental nurses) in caring for New Zealand's children since their development in 1921 [4]. Subsequently, it was demonstrated that dental hygienists could be taught to effectively provide dental care for children comparable to that of the New Zealand school dental nurse [5–7]. However, it was not until the publication of *Oral Health in America: A Report of the Surgeon General* in 2000, describing the significant problem of access to dental care, that the issue of dental therapists re-emerged in a significant manner [8].

Following the Surgeon General's report, a small group of individuals consisting of dental educators and public health dentists, met at the Forsyth Institute to discuss the potential of introducing dental therapists to the oral health workforce in the USA [9–11]. Realizing the impediment created by state boards of dentistry in keeping with the opposition of "organized dentistry," the group approached the Indian Health Service (IHS), resulting in the training of dental therapists to practice on federal reserves outside the jurisdiction of the state licensing boards. Under the leadership efforts of the IHS in Alaska and the Alaska Native Tribal Health Consortium (ANTHC), Alaskan students have been trained and deployed as dental therapists to provide care in tribal communities. Subsequently, legislation was passed in MN, and more recently in ME, authorizing the practice of dental therapists. Currently, there are two training programs for dental therapists located in MN and one program based in AK. A

number of other state legislatures are now considering allowing the practice of dental therapists.

Mathu-Muju has chronicled details of the emergence of dental therapists in the workforce in the USA through 2011 [12]. This article updates the dental therapist movement through to the present time. The literature and activities of the movement will be reviewed by the categories of research, education, and legislation/practice, as well as analytical essays and commentaries.

Research

Research regarding dental therapists since 2011 includes several literature reviews and empirical studies from AK and MN. In April of 2012, the Kellogg Foundation released a monograph that reviewed 1100 documents from 54 countries throughout the world utilizing dental therapists [2••, 3••]. The monograph concluded that they improve access to care for children and provide quality care with effective results. A further review of international programs provided evidence that dental therapists practicing in schools are a cost-effective model of caring for children [13].

In 2013, the American Dental Association (ADA) released a systematic review of 13 studies on oral health outcomes resulting from the integration of dental therapists into the workforce. When dental therapists are part of the workforce, the ADA review concluded that there was a decrease in untreated caries compared with that in populations in which dentists provided all treatment [14, 15].

A series of articles using a rudimentary theoretical economic model inferred that school-based programs for children employing dental therapists have potential to reduce access disparities as well as the cost of care/child in the USA [16–19].

Finally, a systematic review of 23 articles from six industrialized nations determined that dental therapists safely and competently perform the limited set of irreversible procedures that fall within their scope of practice [20].

As the first practicing dental therapists in the USA, Alaskan dental therapists have been subject to intense interest and scrutiny. Bader, et al., published an assessment comparing the quality of stainless steel crowns, amalgam, and composite restorations performed by dentists to that of dental therapists [21••]. The study found that dental therapists provide technically competent restorative treatment, with no significant differences in outcomes from that of dentists treating the same population.

Wetterhall reviewed the benefits of dental therapists providing culturally competent care for native Alaskans [22]. Alaskan native caregivers were queried about their perceptions of dental therapists and the dental care provided to their children. The families were very satisfied with the dental care and valued the presence of dental therapists in their communities. In contrast, the long-standing Indian Health Service model of an itinerant dentist flying in for limited time periods was felt to result in less access to care, worsening disease levels, and fostered expectations that dental care was only sought for pain. Unlike the continuous presence of dental therapists living in Alaskan communities, this peripatetic model hindered education and prevention.

Williard, the director of the Dental Health Aide Therapist (DHAT) program in AK, conducted telephone interviews with four DHATs, their supervising dentists, and district dental directors. She concluded that dental therapists practice as part of a care team with direct, indirect, and general supervision and that the mandatory preceptorship and group practice model ensure safe and competent care within therapists' scope of practice [23].

A survey regarding the practice of dentistry for the twenty first century was conducted of leaders in dentistry. The group was almost evenly divided on the topic of whether or not dental therapists would improve access to care, with half strongly agreeing/agreeing and the other half being neutral [24].

Empirical findings have been published from data collected in MN, the first state to integrate dental therapists into the private practice delivery model. A study of dentists' opinions toward dental therapists was published just prior to dental therapists beginning practice in MN. Interestingly, 62 % of Minnesota dentists, versus 37 % of non-Minnesota dentists, thought dental therapists would increase access to care for underserved populations. Thirty-nine percent of dentists believed that hiring a dental therapist would free up their time to focus on more complex procedures. Generally, dentists with previous experience working with other expanded function dental personnel had more positive attitudes toward dental therapists [25].

In 2014, The Pew Charitable Trusts released the results of its study to determine whether dental therapists could be integrated effectively into private practices and expand care to underserved populations without placing a private practice at financial risk. The records of two practices were examined; a Minnesota practice with a 1-year history of employing a dental therapist and a Saskatchewan practice with a 30-year history of employing a dental therapist. The findings indicated that significant numbers of underserved patients were able to obtain care in both of these practices, with both practices benefitting financially. Furthermore, by employing dental therapists to perform routine restorative care, dentists were able to focus on completing more complex, revenue-generating care [26].

The Minnesota Board of Dentistry, in consultation with the Minnesota Department of Health and Department of Human Services, reported to the Minnesota Legislature on the early impact of dental therapists in MN [27]. Fifteen clinics employing dental therapists participated in the evaluation.

The majority (84 %) of patients served by dental therapists were enrolled in public health insurance programs, thus fulfilling statutory intent by caring for predominantly low-income and underserved populations. The clinics reported personnel cost savings, increased dental team productivity, and high patient satisfaction with dental therapist services. Dental therapists were demonstrated to be practicing safely. The report's recommendations included continued documentation of the best practices of dental therapists in MN in order to disseminate lessons learned to encourage prospective employers to hire dental therapists.

Education

The establishment of three different programs for training dental therapists in the USA, in the absence of nationally recognized educational standards, triggered the attention of various individuals and national organizations. The American Association of Public Health Dentistry (AAPHD) convened a panel of academics, as well as representatives from the three US training programs, with the goal of developing a uniform vision of dental therapy practice [28]. The panel reviewed issues surrounding curriculum content, career pathways, program accreditation, and licensure of dental therapists relative to state practice acts [28]. The recommendations were disseminated in a special issue of the *Journal of Public Health Dentistry*. The panel outlined a 2-year post-secondary curriculum that could be applied in a variety of educational settings and recommended that educational leadership of the program include a licensed dentist until a cohort of dental therapist academics becomes established [28–30]. It was noted that, internationally, 3-year training programs for a dually qualified dental therapist/hygienist are now developing in some countries that have had traditional 2-year programs for dental therapists [31]. The utility of creating career pathways for dental therapists and hygienists was endorsed as another efficient and economically prudent route to expand the dental workforce [32]. Community Catalyst, a national non-profit consumer advocacy organization, released a report in 2013 that essentially mirrored the recommendations of the AAPHD panel [33].

The Commission on Dental Accreditation (CODA) is recognized by the US Department of Education as the sole agency to accredit dental and dental-related education programs conducted at the post-secondary level. Concerns that education standards for dental therapists would be defined by individual state agencies or other accrediting entities, as well as the resulting fragmentation of the accreditation process for dental educational programs, was the impetus for CODA to develop and release "Accreditation Standards for Dental Therapy Education Programs" in August, 2015 [34, 35••]. The new standards stipulate that the curriculum must include at least three academic years of full-time instruction, or equivalent, at the post-secondary college level. Qualifications for a program director include being either a licensed dentist or licensed dental therapist with a master's degree who were graduates from a CODA-accredited program. Currently, no dental therapy programs in the USA are accredited. Due to the need to develop accreditation materials, it is estimated that the earliest a dental therapist training program could be accredited is January, 2017 [35••].

Legislation and Practice

In 2003, the Alaska Native Tribal Health Consortium (ANTHC) sent six students to New Zealand to train to become dental therapists, with four completing the program and returning to practice in AK under the auspices of the ANTHC. Subsequently, three cohorts of students were trained in New Zealand. In 2007, training of dental therapists for the ANTHC was established in AK through an arrangement with MEDEX, the Northwest Physician Assistant Training Program of the University of Washington. However, a new academic home for the program is being developed with an Alaskan-based tribal college, thus permitting CODA accreditation and the awarding of an associate degree. The ANTHC training program currently accepts 5–8 students/year, which requires 2 years of training plus a preceptorship. Plans exist to expand the program to 12 entering students. Thirty dental therapists now practice in Alaska, with five currently in preceptorships. The official US Public Health Service personnel designation for these individuals is Dental Health Aide Therapists (DHAT). (Personal communication, Mary Williard, March, 2016).

In 2009, the State of Minnesota became the first state to pass legislation permitting the training of dental therapists, with limits on where they can work. (In AK, dental therapists are only permitted to practice in native Alaskan tribal communities under the auspices of the ANTHC.) Two training programs exist in MN. A cooperative program between Metropolitan State University and Normandale Community College trains dental hygienists in dental therapist skills, awarding a Master of Science in Advanced Dental Therapy. At the University of Minnesota, the former Master of Dental Therapy program has now evolved into an integrated Bachelor of Dental Hygiene/Master of Dental Therapy program as of the class entering in the fall of 2016. The original Bachelor of Dental Therapy program has been discontinued. Currently, there are 58 dental therapists practicing in MN. (Personal Communication, Colleen Brickle, February, 2016).

Subsequent to the authorization of dental therapists in MN, public advocacy groups in several additional states initiated strategies to address the lack of access to dental care in their states. Both the W.K. Kellogg Foundation, through a grant to

the organization Community Catalyst, and the Pew Foundation's Children Dental Health Project have supported several of these efforts with funding. States actively considering dental therapists include the following: ME, WA, OR, NM, KS, VT, and OH.

ME's legislature passed "An Act to Improve Access to Oral Health Care" in April, 2014 [36]. With bipartisan support, the bill authorizes dental hygienists/therapists to perform dental procedures typically included in the profile of practice of the international dental therapist. As of this time, no training program had been initiated in ME and no dental hygienists/therapists are currently practicing there.

Legislation promoting dental therapists has been introduced in the Washington legislature for several years. In the 2016 legislative session, Senate Bill 5465, "The Dental Access Bill," was introduced and received a public hearing in January [37]. However, no further action has taken place as of this writing. The Washington Dental Association is strongly opposed to the dental therapist legislation, believing the state does not need new providers to address the lack of access to dental care. Rather, the association has taken the position that the problem could be resolved by increasing Medicaid reimbursement to dentists.

In early 2016, the Swinomish Indian Tribal Community in Puget Sound hired a dental therapist trained in AK to begin providing dental care for their community of 3000 individuals. The Swinomish Chairman said, "We have developed a tribal approach to solve a tribal problem. The solution will help our people immediately address their oral health needs in ways that have not been possible..." [38] However, Medicaid reimbursement for dental care by dental therapists in the lower 48 states is not yet permitted. This is the result of an amendment inserted into Title X (Reauthorization of the Indian Health Care Improvement Act) of the Patient Protection and Affordable Care Act of 2010 as a consequence of lobbying by the American Dental Association [39]. The Swinomish community will instead fund the program with tribal resources.

The State of Oregon passed legislation in 2011 that was signed into law by the governor in August of that year, permitting the development of pilot programs employing dental therapists under the auspices of the Oregon Health Authority [40]. The Coquille Tribe and the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians will have members of their tribes trained as dental therapists. These initiatives are receiving funding support from the W.K. Kellogg Foundation, the Pew Foundation, and the Northwest Portland Area Indian Health Board. One tribal member is currently being trained in the Alaska program and is expected to return to practice in the summer of 2017. A dental therapist from Alaska is expected to be employed by the tribes in the summer of 2016 [40].

Vermonters for Oral Health Care have been advocating for the introduction of dental therapists in VT for a number of years. The organization's efforts have been resisted by the Vermont State Dental Association. In 2016, enabling legislation (Senate Bill 20) is being opposed by the Vermont Dental Association [41]. The bill references the individual with the typical duties of a dental therapist as a "dental practitioner." The "dental practitioner" must be a licensed dental hygienist who has received additional training by an institution accredited to train dentists or dental hygienists. Dental practitioners may practice under general supervision, but only with a collaborative agreement with a dentist, and only after having 400 h of direct supervision by a dentist. As of this writing, the bill is in committee.

In late 2015, legislators in NM reached a compromise between the supporters and opponents of dental therapists' legislation, House Bill 191 [42]. The compromise would permit the expansion of the practice of dental hygienists to include dental therapy. The hygienist must have completed a training program in dental therapy accredited by the Commission on Dental Accreditation. Hygienists practicing as therapists must practice with a collaborative agreement with a dentist. As of March 2016, the bill is still in committee.

The Kansas Dental Project has been successful in having new legislation introduced in 2016 to establish the practice of dental therapists in the state [43]. Senate Bill 413 incorporates the educational standards adopted by the Commission on Dental Accreditation in August of 2015. In the proposed legislation, dental therapists can work under direct supervision or general supervision. Before dental therapists can practice under general supervision, they must complete 500 h of practice under the direct supervision of a dentist. As of this writing, the bill has been referred to the Senate Committee on Public Health and Welfare.

In OH, the movement to add dental therapists to the workforce is being led by Dental Access Now under the umbrella of the Universal Health Care Action Network (UHCAN). A poll of 800 voters taken in February 2016, indicated that two thirds of Ohioans support changing the law to allow dental therapists to practice in the state. Currently, no legislation has been introduced in OH, although legislation is reportedly being drafted for introduction in the 2016 legislative session [44].

Legislation has been introduced in the US Congress that would provide for comprehensive reform in dental care. In 2013, Vermont Senator Bernie Sanders re-introduced the Comprehensive Dental Reform Act of 2012 as S.B 1522 [45]. He had held hearings on the bill in February, 2012. Among the many provisions of the Act would be creating demonstration projects for training and employment of

alternative dental health care providers (assumed to be dental therapists) by Veterans Affairs, Department of Defense, Bureau of Prisons, and the Indian Health Service. A companion bill has been introduced in the 2015–2016 Congress in the House of Representatives, H.R. 1055: Comprehensive Dental Reform Act of 2015, by Representative Elijah Cummings of MD [46]. It was referred to the House Subcommittee on Military Personnel in November of 2015; no subsequent action has occurred.

Analytical Essays and Commentaries

MN was the first state to enact legislation permitting the practice of dental therapists. A group of individuals at the University of Minnesota subsequently published three articles in the *Journal of Dental Education* regarding their early experience with the education of dental therapists. The inaugural class of ten dental therapist students had personality traits that would prove to be critical to their success as dental therapists, including a strong service orientation [47]. A survey of dental students at MN's dental school indicated they had minimal knowledge of dental therapists and were generally neutral or uncertain in their attitudes toward this new member of the oral health workforce [48]. A survey of the dental school faculty found that faculty members believe dentists have a personal obligation to care for the underserved, but did not believe that dental therapists should be a part of the solution to access to care [49].

Two commentaries relative to dental therapists as "mid-level providers" have been published in the *Journal of Health Care for the Poor and Underserved*. One article advanced reasons for and against the addition of "mid-level providers" to the oral health workforce, concluding that the proposal should receive serious consideration [50]. The second article identified mid-level providers as advanced dental hygiene practitioners, community dental health coordinators, dental health aide therapists, and dental therapists. These authors concluded that "based on reports from the medical and dental literature, there is reason to believe that these new workforce models have the potential to effectively, safely, and efficiently contribute to the U.S. oral health care delivery system, particularly in dental safety net programs and non-profit community based practices whose primary mission is caring for the underserved." [51]

Three dental hygienists discussed the "Development and Status of the Advanced Dental Hygiene Practitioner" in the *Journal of Dental Hygiene* [52]. They reviewed the background for developing an advanced dental hygiene practitioner, which is a dental hygienist with the added skill set associated with the international dental therapist. They contend the need for a master's degree for the ADHP: "... is important to move dental hygiene closer to the norm of other health professionals with comparable responsibilities. To earn respect, societal trust and professional accountability...the ADHP must present educational credentials similar to other mid-level providers, i.e., the nurse practitioner, physical therapist and occupational therapist." [52]

In an issue of the *California Dental Journal* devoted to access to care, Nagel reviewed the "Development and Implementation of the Dental Health Aide Therapist in Alaska," [53] concluding that dental therapists can effectively extend the ability of dentists to provide care for those living in remote villages of rural AK. In the same issue, Friedman reviewed the history and current status of the dental therapist internationally. He concluded by stating: "Not only do dental therapists provide necessary care to the underserved population, they have potential to enable dentists to practice at a higher level of proficiency and efficiency." [54]

In 2013, *Health Affairs* published "In Alaska, Reaching into Remote Corners to Provide Care." [55] The article was written by Conan Murat, a member of the original cohort of six students from AK (all but one a Native Alaskan) who enrolled in New Zealand's 2-year dental therapist program in 2003. These students eventually became the first dental therapists to practice in the USA. The article is a personal narrative of his positive experiences working in remote AK caring for members of his community.

Edelstein raised the question as to whether the addition of dental therapists to the oral health workforce constitutes a "disruptive innovation." He reviews the concept of a "disruptive innovation" as well as statements of both proponents and opponents of dental therapists. He concludes by stating: "Whether dental therapists will constitute a disruptive innovation will only be determined retrospectively." [56] Friedman responded to Edelstein in a letter to the editor of the *American Journal of Public Health* [57]. He argued that the introduction of mid-level providers in medicine have not disrupted the practice of medicine nor harmed the practice or income of physicians. He also challenged Edelstein for approvingly citing opponents of dental therapists who made statements demonstrated to be false.

Bertolami, the Dean of the New York University College of Dentistry, raised the question in an editorial in the *American Journal of Public Health* as to whether there is a problem in access to dental care [58]. He agreed a serious problem does indeed exist. He also acknowledged that dental therapists have been demonstrated to provide safe, effective, quality care. However, he did not concede that the introduction of dental therapists would necessarily improve access to care. Among

his concerns was that "rather than finding employment in clinics, schools, and other community-oriented facilities, dental therapists could be hijacked—at considerably better pay—into a fully corporatized model of dental care, one unlikely to be attractive to the needs of the underserved or only incidentally so."

Nash, Friedman, and Mathu-Muju have been among the leaders in advocating for dental therapists in the workforce, specifically for the utilization of dental therapists in school-based programs. Both together and independently, they have authored a number of articles commenting on the dental therapist movement and promoting adoption of dental therapists into the US workforce. In *Nexus*, the alumni/ae magazine of the NYU College of Dentistry, Nash argued that it was a professional imperative in caring for the oral health of America's children [59]. Friedman and Mathu-Muju in the *American Journal of Public Health* stated that dental therapists improve access to oral health care for underserved children [60]. They cited the strong opposition of organized dentistry while pointing out the success of the early work of dental therapists in AK and MN. After documenting the economic value of utilizing dental therapists, they argued that the most effective use of dental therapists would be in schools, as has been the international tradition. Also in the *American Journal of Public Health*, Muju, Friedman, and Nash contrasted the care of children in countries using therapists in public, school-based programs with the US approach of using dentists in a private practice model [13]. Among their conclusions was that the cost of providing care in a market-driven economy of dentists in private practice is excessively expensive in comparison with the international model of publicly funded, school-based programs. In the most recent publication of these three individuals, they advocated for school-based care by dental therapists in the *Journal of School Health* [61••].

Conclusion

The US movement to adapt the acclaimed work of the international dental therapist to the oral health workforce is still in its infancy. Yet, in spite of the aggressive opposition of organized dentistry, the movement is growing and expanding as individuals, activists, and policy makers understand the role that dental therapists can play in improving access to care, particularly for children.

Compliance with Ethical Standards

Conflict of Interest Kavita R. Mathu-Muju, Jay W. Friedman, and David A. Nash declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

References

Papers of particular interest, published recently, have been highlighted as:
•• Of major importance

1. Nash DA, Friedman JW, Kardos TB, et al. Dental therapists: a global perspective. Int Dent J. 2008;58:61–70.
2.•• Nash, DA, Friedman JW, Mathu-Muju KR, et al. A review of the global literature on dental therapists: In the context of the movement to add dental therapists to the oral health workforce in the United States. W.K. Kellogg https://www.wkkf.org/resource-directory/resource/2012/04/nash-dental-therapist-literature-review. Accessed March 8, 2016. **This monograph documents the global literature on dental therapists from their inception.**
3.•• Nash DA, Friedman JW, Mathu-Muju KR, et al. A review of the global literature on dental therapists. Community Dent Oral Epidemiol. 2014;41:1–10. **This article summarized the above monograph for the published dental literature.**
4. Friedman JW. The New Zealand School Dental Nurse Service: a lesson in radical conservatism. J Am Dent Assoc. 1972;85(3):609–17.
5. Lobene RR, Kerr A. The Forsyth experiment: an alternative system for dental care. Cambridge: Harvard University Press; 1979.
6. Spohn EE, Chiswell LR, Davison DD. University of Kentucky experimental expanded duties dental hygiene project. Lexington: College of Dentistry, University of Kentucky; 1975.
7. Sisty NL. University of Iowa experimental program in dental hygiene. Dent Hyg. 1973;47(2):79–81.
8. U.S. Department of Health and Human Services. Oral health in America: a report of the Surgeon General. National Institute of Dental and Craniofacial Research. National Institutes of Health. Rockville, Maryland: U.S. Department of Health and Human Services; 2000.
9. Nash DA, Nagel RJ. A brief history and current status of a dental therapy initiative in the United States. J Dent Educ. 2005;69:857–9.
10. Nash DA. Developing a pediatric oral health therapists to help address oral disparities among children. J Dent Educ. 2004;68:7–19.
11. Nash DA, Nagel RJ. Confronting oral health disparities among American Indian/Alaska Native children: the pediatric oral health therapists. Am J Public Health. 2005;95(8):1325–9.
12. Mathu-Muju KR. Chronicling the dental therapist movement in the United States. J Public Health Dent. 2011;71:278–88.
13. Mathu-Muju KR, Friedman JW, Nash DA. Oral health care for children using dental therapists in public, school-based programs, contrasted with that of the United States, using dentists in a private practice model. Am J Public Health. 2013;103(9):e7–13.
14. Wright JT et al. A systematic review of oral health outcomes produced by dental teams incorporating midlevel providers. J Am Dent Assoc. 2013;144(1):75–91.
15. Wright JT et al. Do midlevel providers improve the population's oral health? J Am Dent Assoc. 2013;144(1):92–4.
16. Bailit HL et al. Impact of dental therapists on productivity and finances: I. literature review. J Dent Educ. 2012;76(8):1061–7.
17. Beazoglou et al. Impact of dental therapists on productivity and finances: II. Federally qualified health center. J Dent Educ. 2012;76(8):1068–76.
18. Beazoglou TJ et al. Dental therapists in general dental practices: an economic evaluation. J Dent Educ. 2012;76(8):1082–91.
19. Bailit HL et al. Impact of dental therapists on productivity and finances: III. FQHC-run, school-based dental care programs in Connecticut. J Dent Educ. 2012;76(8):1077–81.

20. Phillips E, Shaefer HL. Dental therapists: evidence of technical competence. J Dent Res. 2013;92(suppl):115–9.
21.•• Bader JD et al. Clinical technical performance of dental therapists in Alaska. J Am Dent Assoc. 2011;142(3):322–6. **First major evaluation of the clinical performance of dental therapists in Alaska.**
22. Wetterhall S et al. Cultural context in the effort to improve oral health among Alaska native people: the dental health aide therapist model. Am J Public Health. 2011;101(10): 1836–40.
23. Williard ME, Fauteux N. Dentists provide effective supervision of Alaska's dental health aide therapists in a variety of settings. J Public Health Dent. 2011;71:S27–33.
24. Lamster IR, Formicola A. A summary of the 2010 dunning symposium: the practice of dentistry for the 21st century. J Public Health Dent. 2011;71:S34–7.
25. Blue CM et al. Utilization of nondentist providers and attitudes toward new provider models: finding from the National Dental Practice-based Research Network. J Public Health Dent. 2013;73(3):237–44.
26. Gehshan S, et al. Expanding the dental team: studies of two private practices. A report from the Pew Charitable Trusts. 2014; February: 20 pages.
27. Minnesota Board of Dentistry. Early impacts of dental therapists in Minnesota: report to the Minnesota Legislature. 2014; February: 38 pages.
28. Evans C. Guest editorial—introduction to the special issue. J Public Health Dent. 2011;71:S1–2.
29. Evans C. The principles, competencies, and curriculum for educating dental therapists: a report of the American Association of Public Health Dentistry Panel. J Public Health Dent. 2011;71:S9–19.
30. Licari FW, Evans CA. Recommended standards for dental therapy education programs in the United States: a summary of critical issues. J Public Health Dent. 2014;74(3):257–60.
31. Edelstein BL. Training new dental health providers in the United States. J Public Health Dent. 2011;71:S3–8.
32. Yoder K. Navigating career pathways—dental therapists in the workforce: a report of the career path subcommittee. J Public Health Dent. 2011;71:S38–41.
33. Community Catalyst. Recommended standards for dental therapy education programs in the United States: advisory panel report and recommendations. October, 2013. 19 pages.
34. American Dental Association. CODA votes to establish accreditation process for dental therapy education. Chicago: American Dental Association News; 2015.
35.•• Commission of Dental Accreditation. Accreditation Standards for Dental Therapy Education Programs. Chicago, 2015. http://www.ada.org/~/media/CODA/Files/dt.pdf?la=en. Accessed March 8, 2016. **Initial accreditation standards for dental therapists in the United States.**
36. American Dental Education Association. Governor of Maine signs dental hygiene therapy bill into law. May 5, 2014. American Dental Association. Washington, D.C. http://www.adea.org/Blog.aspx?id=23932&blogid=20132. Accessed March 8, 2016.
37. Children's Health Alliance. Voices for access to dental care. January 29, 2016. Children's Health Alliance, Seattle, Washington. http://www.childrensalliance.org/no-kidding-blog/voices-access-dental-care. Accessed March 8, 2016.
38. Indian Country. Swinomish hires dental aide therapist in Washington state, ADA objects. January 7, 2016. Indian Country; Today Media Network.com. http://indiancountrytodaymedianetwork.com/2016/01/07/swinomish-hires-dental-aide-therapist-washington-state-ada-objects-162983. Accessed March 8, 2016.
39. Batliner TS. American Indian and Alaska Native access to oral health care: a potential solution. J Health Care Poor Underserved. 2016;27:1–10.
40. Indian Country. Oregon approves Coos Bay tribes to integrate mid-level native dental therapists. February 10, 2016. Indian Country; Today Media Network.com. http://indiancountrytodaymedianetwork.com/2016/02/10/oregon-approves-coos-bay-tribes-integrate-mid-level-native-dental-therapists-163372. Accessed March 8, 2016.
41. Vermont General Assembly. S. 20: An act relating to establishing and regulating dental therapists. Vermont General Assembly, Montpelier, Vermont. http://legislature.vermont.gov/bill/QuickSearch/2016?SearchBy=bill&SearchBills=dental+therapist&SearchLegislators=&SearchCommittees=. Accessed March 8, 2016.
42. New Mexico Legislature. HB 191: Dental health act changes & therapists. New Mexico Legislature, Santa Fe, New Mexico. http://www.nmlegis.gov/lcs/legislation.aspx?chamber=H&legtype=B&legno=191&year=16. Accessed March 8, 2016.
43. Kansas Legislature. SB 413: Licensure of dental therapists. Kansas Legislature, Topeka, Kansas. http://www.kslegislature.org/li/b2015_16/measures/sb413/ http://www.kslegislature.org/li/b2015_16/measures/sb413/. Accessed March 8, 2016.
44. Public News Service—Ohio. Poll puts some teeth into efforts to expand Ohio's dental team. March 2, 2016. Public News Service—Ohio. http://www.publicnewsservice.org/2016-03-02/health-issues/poll-puts-some-teeth-into-efforts-to-expand-ohios-dental-team/a50648-1. Accessed March 8, 2016.
45. U.S. Congress. S.B. 1522: Comprehensive dental reform act of 2013. https://www.congress.gov/bill/113th-congress/senate-bill/152. Accessed March 8, 2016.
46. U.S. Congress. H.B. 1055. Comprehensive dental reform act of 2015. https://www.congress.gov/bill/114th-congress/house-bill/1055. Accessed March 8, 2016.
47. Blue CM, Lopez N. Towards building the oral health care workforce: who are the new dental therapists? J Dent Educ. 2011;75(10): 36–45.
48. Blue CM et al. Beginning the socialization to a new workforce model: dental students' preliminary knowledge of and attitudes about the role of the dental therapists. J Dent Educ. 2011;75(11): 1465–75.
49. Lopez N et al. Dental school faculty perceptions and attitudes toward the new dental therapy model. J Dent Educ. 2012;76(4):383–94.
50. Shaefer HL, Miller M. Improving access to oral health care services among underserved populations in the U.S.: is there a role for mid-level providers? J Health Care Poor Underserved. 2011;22:740–4.
51. Rodriguez TE, Galka AL, Lacy ES, Pellegrini AD, Sweier DG, Romito LM. Can mid-level providers be a benefit to the American public? J Health Care Poor Underserved. 2013;24(2): 892–906.
52. Stolberg RL, Brickle CM, Barby MM. Development and status of the advanced dental hygiene practitioner. J Dent Hyg. 2011;85(2): 83–91.
53. Nagel RJ. The development and implementation of dental health aide therapists in Alaska. J Calif Dent. 2011;39(1):31.
54. Friedman JW. The international dental therapist: history and current status. J Calif Dent Assoc. 2011;39(1):23–9.
55. Murat C. In Alaska, reaching into remote corners to provide dental care. Health Aff. 2013;32(11):2047–50.
56. Edelstein BE. Examining whether dental therapists constitute a disruptive innovation in US dentistry. Am J Public Health. 2011;101(10):1831–5.

57. Friedman JW. Dental therapists are a positive innovation. Am J Public Health. 2012; 102(3).
58. Bertolami CN. Access to care: is there a problem? Am J Public Health. 2011;101(10):1817.
59. Nash DA. A professional imperative: caring for the oral health of America's children. Nexus: a publication of the College of Dentistry; New York University. Summer, 2011: 35–39
60. Friedman JW, Mathu-Muju KR. Dental therapists; improving access to oral health care for underserved children. Am J Public Health. 2014;104(6):1005–9.
61.•• Nash DA, Mathu-Muju KR, Friedman JW. Ensuring access to oral health care for children: school-based care by dental therapists—a commentary. J Sch Health. 2015;85(10):659–62. **This article describes the advantages of a school-based model of care utilizing dental therapists.**