Frank Catalanotto, DMD
Floridians For Dental Access
National Coalition of Dentists for Health Equity
Professor, University of Florida College of Dentistry
352-256-5909 fcatalanotto@dental.ufl.edu
Attachment 1- Biosketch
Attachment 2- Scientific literature demonstrating the quality, safety, cost effectiveness and improved health outcomes of care delivered by dental therapists
Attachment 3- Periodontal Inflammation, Alfano, M. in The Oral Health-Systemic Health Connection, A Guide to Patient Care, 2019, 2nd Edition, Glick, M, Quintessence Publishing Company

Dear Members of the Maine Education and Cultural Affairs Committee,

I am writing in strong support of LD 1026- Resolve, To Direct the University of Maine System to Establish a Dental Therapy Degree Program.

I was in Maine ten years ago testifying to you in support of the original legislation to establish dental therapy in Maine. I was thrilled at that time to see the bipartisan support for this important legislation. Thus, I was so disappointed that a dental therapy educational program was not subsequently established in Maine. This bill you are considering right now is just what the people of Maine need to improve their access to high quality, affordable, safe and cost-effective dental care. The University of Maine is the perfect school in Maine that can establish a dental therapy educational program because they already have a Commission on Dental Accreditation (CODA) approved dental hygiene educational program. This will help keep costs down and allow a rapid design and implementation of the dental therapy educational program.

There are several reasons why I am a proponent of implementing dental therapy.

1. I have studied all the published literature about dental therapy in the United States over the past two decades and I have visited dental therapists working in both Alaska and Minnesota numerous times. **ALL the published evidence to date supports the high quality, safety, and cost effectiveness of dental care provided by dental therapists**. No matter what opponents of dental therapy say in opposition, they are only expressing their personal opinions, thoughts, myths and misrepresentations- they do not have any actual evidence or documentation to support their opposition. Attachment 2 is a listing of recent United States publications about the safety, quality and cost effectiveness of dental therapy. If some groups oppose this legislation, I would urge you to ask them to provide evidence in support of their opposition. THERE IS NONE!

2. Good oral health is important for overall health but according to the Health Resources and Services Administration, over 190,000,000 Americans can't get dental care on a regular basis. In 2022, Maine had 380,414 people living in federal designated Dental Health Professional Shortage Areas (DHPSAs) (https://www.kff.org/other/state-indicator/dental-care-health-professional-shortage-areas-hpsas/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D) that would need at least 59 dentists to cover the shortfall. **This means that over 27% of Maine's total population lived in these DHPSAs** and it is very unlikely that 59 dentists

Biographical Sketch- Dr. Frank A. Catalanotto

Dr. Frank Catalanotto is the former Dean and currently a Professor in the Department of Community Dentistry and Behavioral Science at the University of Florida College of Dentistry. Dr. Catalanotto's current advocacy efforts, consulting activities and lectures are focused on the new emerging oral workforce models. He is a Vice-Chair of the new national organization – the National Coalition of Dentists for Health Equity and a Co-Chair of the National Partnership for Dental Therapy. He is the founding member of Floridians For Dental Access, a statewide oral health advocacy group. Dr. Catalanotto has been to Alaska and Minnesota to see dental therapists in action and has written several papers reviewing the quality, safety and cost effectiveness of dental therapy. The opinions he shares are his own and do not necessarily represent the official viewpoints of any organization with which he is affiliated.

would move to Maine in the next decade. That is why Maine should develop home grown dental therapists who will stay in Maine and provide quality, affordable dental care to Maine residents.

3. **In 2019, Maine had the lowest Medicaid Utilization rate in the United States, with only about 40% of Medicaid recipients/children receiving at least one dental visit in that year** (CMS-416. www.medicaid.gov/medicaid/benefits/epsdt/index.html). With a total of 117,514 Medicaid eligible children, that means that over 70,000 Medicaid eligible children in Maine did not receive any dental services that year and most likely they suffer the consequences of poor oral health including dental cavities and pain and infection.

4. The way out of poverty for poor children is education leading to better jobs. Unfortunately, an extensive science base clearly demonstrates the effects of poor oral health including dental cavities and oral pain and infection in children on academic performance (https://www.mchoralhealth.org/PDFs/learningfactsheet.pdf).

   Specifically,

   - Children with poor oral health are more likely to experience oral pain and miss school.
   - Preventing and treating children's oral health problems improves functioning, educational achievement, and psychosocial development.
   - Children with poor oral and general health are more than twice as likely to perform poorly in school.

   Since Maine has such a large percentage of the population living in DHPSAs and since Maine children enrolled in Medicaid have such poor access to dental care, it is easy to see that Maine children probably suffer many of the school performance problems noted above.

5. Oral health and systemic health. Access to oral health care and good oral health is more than just a pretty smile and fresh breath. Oral health goes beyond teeth and supporting anatomical structures; it is also a determining factor in a host of life functions. Oral health affects the ability to eat and drink, diet and nutrition, self-confidence, and social function, as well as employability, promotability, and earning potential. **More importantly, several decades of scientific publications demonstrate associations between poor oral health and multiple chronic and systemic health issues. Most notable are diabetes, cardiovascular disease, and low-birth-weight, preterm births.** The personal impact of these diseases on Maine residents without access to dental care and their subsequent dental problems only confounds their overall health. I have provided one great summary reference for this data- The Economic Impact of Periodontal Inflammation, Alfano, M. in The Oral Health-Systemic Health Connection, A Guide to Patient Care, 2019, 2nd Edition, Glick, M, Quintessence Publishing Company

6. Economic consequences of poor oral health. Numerous studies over the past two decades have clearly demonstrated the economic impact of poor oral health. I will use just two of the studies to illustrate the problem:
   Using data from the New York State Medicaid program, the researchers examined rates of emergency department use and inpatient admissions, as well as associated costs, to determine the association of preventive dental care to health care outcomes. They observed an association

between Medicaid patients receiving Preventive Dental Care (PDC) and improved overall health care outcomes, with the opposite association for patients who received emergency type oral health care without PDC. Overall health costs were also lower for patients with PDC. This is an especially important paper since it was obtained from already vulnerable Medicaid patients. Lamster, I, Wagner VL, Matson J, Proj A, Xi Y, Abel SN, Alfano MC. Dental Services and Health Outcomes in the New York State Medicaid Program. J Dent Res. 2021 Apr 21:220345211007448. doi: 10.1177/00220345211007448. Epub ahead of print. PMID: 33880960.

The Dental Trade Alliance has officially released its 2022 Oral Healthcare Can't Wait® study highlighting the significant connection between oral healthcare and the overall health of Americans (https://www.prnewswire.com/news-releases/updated-study-finds-healthcare-cost-savings-could-top-22-billion-annually-with-better-access-to-and-adoption-of-oral-healthcare-301774806.html.)

Key economic findings from the study showed:

- $7.4 billion in diabetes-related healthcare costs could be subverted by improved and regular periodontal care.
- 126 million hours of work and school absence in the country annually can be attributed to unplanned or emergency dental care.
- $22.8 billion in US healthcare costs could be saved annually with increased access to care and awareness of the importance of oral health.

"This study is an important one for the oral healthcare community, but also for the healthcare community at large," says Greg Chavez, CEO of the Dental Trade Alliance. "Research increasingly shows the connection between oral health and overall health, and these numbers illustrate that we can both save lives and save money as a country by committing to oral health advocacy." Detailed information about the study and downloadable fact sheets for patients, business owners and government officials can all be downloaded at oralhealthcarecantwait.com.

These papers demonstrate serious economic consequences for Maine residents who cannot access dental care and then suffer untreated and preventable dental problems.

In conclusion, the above referenced national and Maine data clearly demonstrate the oral health access crisis facing Maine residents and the severe consequences to children's learning, adult systemic health and economic consequences. Dental therapists are a proven way to improve access to affordable dental care. The Maine legislature should implement a dental therapy educational program to benefit the oral and systemic health of all Maine residents. I would therefore urge you to strongly support of LD 1026- Resolve, To Direct the University of Maine System to Establish a Dental Therapy Degree Program. Residents of Maine are depending on you.

ALASKA

1. Scott Wetterhall, James D. Bader, Barri B. Burrus, Jessica Y. Lee, Daniel A. Shugars, Evaluation of the Dental Health Aide Therapist Workforce Model in Alaska, Final Report, October 2010

In January 2008, the W.K. Kellogg Foundation, in collaboration with ANTHC, the Rasmuson Foundation, and the Bethel Community Services Foundation, requested that an experienced organization provide an independent, detailed, and objective evaluation of the initial implementation of the Dental Health Aide Therapist (DHAT) program. In this evaluation, we focused on the following five areas:

patient satisfaction, oral health–related quality of life, and perceived access to care;
oral health status;
clinical technical performance and performance measures;
record-based process measures and evaluation of clinical facilities; and
implementation of community-based preventive plans and programs.

The various indicators that were applied in these case studies to evaluate implementation of this program demonstrate that the five therapists who were included in this study are performing well and operating safely and appropriately within their defined scope of practice. The data indicate that the therapists who were observed are technically competent to perform these procedures within their scope of practice. The patients who were surveyed were generally very satisfied with the care they received from the therapists.

2. Wright, JT, Commentary- Do midlevel providers improve the population's oral health? JADA 144(1) http://jada.ada.org January 2013. NOTE- Dr. Wright was chair of the ADA Scientific Affairs Committee which conducted a rigorous critical review of all papers prior to 2013 about dental therapy. Their conclusions indicated that the studies done to date were relatively weak, albeit positive, and that more research needed to be done but Dr. Wright added this commentary in a response to the review.

The results of a variety of studies indicate that appropriately trained midlevel providers are capable of providing high-quality services, including irreversible procedures such as restorative care and dental extractions. What is less clear is whether midlevel providers can provide these services in a cost-effective manner and whether incorporation of these providers into the workforce will result in improvement in the population's oral health.

3.Donald L. Chi, Dane Lenaker, Lloyd Mancl, Matthew Dunbar, Michael Babb, Dental therapists linked to improved dental outcomes for Alaska Native communities in the Yukon-Kuskokwim Delta. doi: 10.1111/jphd.12263, Journal of Public Health Dentistry 78 (2018) 175–182, ISSN 0022-4006,

Objectives: Dental Health Aide Therapists (DHATs) have been part of the dental workforce in Alaska's Yukon-Kuskokwim (YK) Delta since 2006. They are trained to provide preventive and restorative care such as filling and extractions. In this study, we evaluated community-level dental outcomes associated with DHATs.

Methods: This was a secondary data analysis of Alaska Medicaid and electronic health record data for individuals in Alaska's YK Delta (2006-2015). The independent variable was the number of DHAT treatment days in each community. Child outcomes were preventive care, extractions, and general

anesthesia. Adult outcomes were preventive care and extractions. We estimated Spearman partial correlation coefficients to test our hypotheses that increased DHAT treatment days would be associated with larger proportions utilizing preventive care and smaller proportions receiving extractions at the community-level.

Results: DHAT treatment days were positively associated with preventive care utilization and negatively associated with extractions for children and adults (P<0.0001). DHAT treatment days were not associated with increased dental treatment under general anesthesia for children.

Conclusions: **Dental therapists are associated with more preventive care and fewer extractions**. State-level policies should consider dental therapists as part of a comprehensive solution to meet the dental care needs of individuals in underserved communities and help achieve health equity and social justice.

4.Donald L. Chi, Lloyd Mancl, Scarlett Hopkins Cameron L. Randall, Eliza Orr, Ellen Zahlis, Matthew Dunbar, Dane Lenaker and Michael Babb, Supply of care by dental therapists and emergency dental consultations in Alaska native communities in the Yukon-Kuskokwim delta: a mixed methods evaluation. Community Dental Health (2020) 37, 190–198, 10.1922/CDH_00022Chi09

Objectives: Examine the relationship between supply of care provided by dental therapists and emergency dental consultations in Alaska Native communities. Methods: Explanatory sequential mixed-methods study using Alaska Medicaid and electronic health record (EHR) data from the Yukon-Kuskokwim Health Corporation (YKHC), and interview data from six Alaska Native communities. From the Medicaid data, we estimated community-level dental therapy treatment days and from the EHR data we identified emergency dental consultations. We calculated Spearman partial correlation coefficients and ran confounder-adjusted models for children and adults. Interview data collected from YKHC providers (N=16) and community members (N=125) were content analysed. The quantitative and qualitative data were integrated through connecting. Results were visualized with a joint display. Results: **There were significant negative correlations between dental therapy treatment days and emergency dental consultations for children (partial rank correlation = -0.48; p<0.001) and for adults (partial rank correlation = -0.18; p=0.03).** Six pediatric themes emerged: child-focused health priorities; school-based dental programs; oral health education and preventive behaviors; dental care availability; healthier teeth; and satisfaction with care. There were four adult themes: satisfaction with care; adults as a lower priority; difficulties getting appointments; and limited scope of practice of dental therapy. Conclusions: **Alaska Native children, and to a lesser extent adults, in communities served more intensively by dental therapists have benefitted.** There are high levels of unmet dental need as evidenced by high emergency dental consultation rates. Future research should identify ways to address unmet dental needs, especially for adults.

5. Courtney M Hill, Ellen W MacLachlan, Lloyd A Mancl, Dane Lenaker, Donald L Chi, Secular trends in dental services provided by dental therapists and dentists in Southwest Alaska. J Am Dent Assoc. 2022 Dec;153(12):1145-1153. doi: 10.1016/j.adaj.2022.08.012. Epub 2022 Oct 12. PMID: 36241553 DOI: 10.1016/j.adaj.2022.08.012

Background: The goal of the study was to identify secular trends in dental service delivery between dental therapists and dentists in the Yukon-Kuskokwim Delta region of Southwest Alaska, the first area of the United States to authorize dental therapy practice.

Methods: Electronic health record transactions from the Yukon-Kuskokwim Health Corporation from 2006 through 2015 (n = 27,459) were analyzed. Five types of dental services were identified using Current Dental Terminology procedure codes: diagnostic, preventive, restorative, endodontic, and oral surgery. Main outcomes were percentages of services provided by dental therapists compared with dentists and population-level preventive oral health care.

Results: The overall number of diagnostic, preventive, and restorative services in the Yukon-Kuskokwim Delta increased. For diagnostic services, there was a 3.5% annual decrease observed for dentists and a 4.1% annual increase for dental therapists ($P < .001$). Similar trends were observed for restorative services. For preventive services, there was no change for dentists ($P = .89$) and a 4.8% annual increase for dental therapists ($P < .001$). Dental therapists were more likely than dentists to provide preventive care at the population level.

Conclusions: Dental therapists have made substantial contributions to the delivery of dental services in Alaska Native communities, particularly for population-based preventive care.

Practical implications: The study's findings indicate that there is a role for dental therapy practice in addressing poor access to oral health care in underserved communities.

6. Donald L Chi , Scarlett Hopkins, Ellen Zahlis , Cameron L Randall , Kirsten Senturia , Eliza Orr , Lloyd Mancl , Dane Lenaker. Provider and community perspectives of dental therapists in Alaska's Yukon-Kuskokwim Delta: A qualitative programme evaluation, Community Dent Oral Epidemiol. 2019 Dec;47(6):502-512.doi: 10.1111/cdoe.12492. Epub 2019 Aug 29. PMID: 31464356 DOI: 10.1111/cdoe.12492

Objectives: Dental therapists deliver preventive and basic restorative care and have been practicing since 2006 in Alaska's Yukon-Kuskokwim (YK) Delta. In this qualitative programme evaluation, we documented health providers' and community members' experiences with dental therapy. The goal of the evaluation was to develop a conceptual model of dental care delivery in Alaska Native Communities centered on dental therapists.

Methods: We developed semi-structured interview scripts and used snowball sampling to recruit 16 health providers with experience providing care in the YK Delta and 125 community members from six YK Delta Communities in 2017 and 2018. The six communities were a stratified convenience sample based on community-level exposure to dental therapists (high, medium and no exposure). Interview data were digitally recorded, transcribed, verified for accuracy and coded inductively into conceptual domains using content analytic methods.

Results: Providers believed individuals living in the YK Delta have benefited from clinic-based restorative care and community-based education provided by dental therapists. The restricted scope of dental therapy practice limits the complexity of care that may be offered to patients. However, **community members expressed high satisfaction with the quality of care provided by dental therapists**.

Community members noted more widespread knowledge and evolving norms about oral health and believed dental therapists are helping to prevent disease and improve quality of life. Participants believed access to dental care for children has improved over the years, but felt that many adults in the YK Delta continue to have unmet needs. A potential barrier to sustained programme effectiveness is low retention of dental therapists in the region, driven primarily by reports that dental therapists feel overworked, stressed and geographically isolated.

Conclusions: **Dental therapists have contributed to the dental care delivery system in Alaska's YK Delta**. Future opportunities remain within the system to address the needs of adults, develop strategies to retain dental therapists in the region and incorporate evidence-based, prevention-oriented strategies to improve oral health behaviours and reduce oral diseases.

MINNESOTA

1.Blue CM, Kaylor MB. Dental therapy practice patterns in Minnesota: a baseline study. Community Dent Oral Epidemiol. 2016; 44:458-66.

Objectives: A chronic shortage of dentists, the importance of oral health, and the lack of access to care led to the introduction of a new oral health practitioner in Minnesota, the dental therapist. Dental therapy graduates from the University of Minnesota have been in practice since 2012. To date, there has been no formal study of how they have been incorporated into dental practice. The purpose of this study was to obtain baseline knowledge of dental therapists' practice patterns in Minnesota and determine if dentists' patterns of work changed after a dental therapist was employed.

Methods: Four dental practices were sampled purposefully to obtain various practice types and geographic locations within Minnesota. Secondary data were collected from practice management software databases in each practice between January-March, 2015. Data were used to describe the work undertaken by dental therapists, the types of patients seen and payer mix. Additionally, data from 6 months before and after employment of the dental therapist were collected to determine whether dentists' practice patterns changed after a dental therapist was employed.

Results: Dental therapists were employed full-time, seeing an average of 6.8 patients per day. No distinct pattern emerged with regard to ages of patients seen by dental therapists. Dental therapists saw up to 90% of uninsured patients or patients on public assistance. Restorative services across practices comprised an average of 68% of work undertaken by dental therapists. Dentists delegated a full range of procedures within the dental therapy scope of practice indicating trust and acceptance of dental therapists. Dentists in two practices began to take on more complex dental procedures after a dental therapist joined the practice.

Conclusion: **Dental therapists are treating a high number of uninsured and underinsured patients, suggesting that they are expanding access to dental care in rural and metropolitan areas of Minnesota. Dentists appear to have an adequate workload for dental therapists and are delegating a full range of procedures within their scope of practice. Dentists performed fewer restorative and preventive procedures after a DT was hired.**

2.Langelier M, Surdu S, Moore J. The Contributions of Dental Therapists and Advanced Dental Therapists in the Dental Centers of Apple Tree Dental in Minnesota. Rensselaer, NY: Center for Health Workforce Studies, School of Public Health, SUNY Albany; August 2020.

This was a very complex study with great details about productivity. The interested reader is encouraged to read the entire study to better appreciate the contributions of dental therapists to helping Appletree increase its mission.

This study examines encounter data that include more than a quarter of a million encounters for 76,342 patients obtaining care in one of the 7 dental centers operated by Apple Tree Dental in Minnesota. Data from Apple Tree's mobile program was excluded from this study. **The study findings suggest that, at a minimum, capacity to provide services has increased across the organization, due in part to new workforce and, as a result, access to dental services at Apple Tree Dental has increased**. A previous study in Minnesota of other providers employing dental therapists found that dental therapists in those practices were expanding access to dental services in both rural and metropolitan areas of the state. The number of patients and clinicians in the Apple Tree Dental centers increased concomitant with the introduction of dental therapists to the organization.

3.Hawazin W. Elani, ; Elizabeth Mertz, Ichiro Kawachi, Comparison of Dental Care Visits Before and After Adoption of a Policy to Expand the Dental Workforce in Minnesota. JAMA Health Forum. 2022

IMPORTANCE Currently, 13 states and tribal nations have expanded their dental wōrkforce by adopting use of dental therapists. To date, there has been no evaluation of the influence of this policy on dental care use.
OBJECTIVE To assess changes in dental care use in Minnesota after the implementation of the policy to authorize dental therapists in 2009.
DESIGN, SETTING, AND PARTICIPANTS In this cross-sectional study of 2 613 716 adults aged 18 years and older, a synthetic control method was used to compare changes in dental care use after the authorization of the policy in Minnesota relative to a synthetic control of nonadopting states. Data from the Behavioral Risk Factor Surveillance System from 2006 to 2018 were analyzed. Data analysis was conducted from June 1, 2021, to December 18, 2021.
EXPOSURE Authorization of dental therapy.
MAIN OUTCOMES AND MEASURES Self-reported indicator for whether a respondent had visited a dentist or a dental clinic in the past 12 months.
RESULTS Among 2 613 716 adults aged 18 years or older, the mean (SD) age at baseline was 46.0 (17.7) years, 396 501 were women (weighted percentage, 51.3%), 503 197 were White (weighted percentage, 67.9%), 54 568 were Black (weighted percentage, 10.1%), 39 282 were Hispanic (weighted percentage, 14.5%), and 34 739 were other race (weighted percentage, 6.7%). The proportion of adults visiting a dentist before the authorization of dental therapists in Minnesota was 76.2%(95%CI, 75.0%-77.4%) in the full sample, 61.5%(95%CI, 58.4%-64.6%) for low-income adults, and 58.4%(95%CI, 53.0%-63.5%) among Medicaid-eligible adults. Authorizing dental therapists in Minnesota was associated with an increase of 7.3 percentage points (95%CI, 5.0-9.5 percentage points) in dental care use among low-income adults, a relative increase of 12.5%(95%CI, 8.6%-16.4%), and an increase of 6.2 percentage points (95%CI, 2.4-10.0 percentage points) among Medicaid-eligible adults, a relative increase of 10.5%(95%CI, 3.9%-17.0%). In addition, the policy was associated with an increase in dental visits among White

adults (low-income sample, 10.8 percentage points [95%CI, 8.5-13.0 percentage points]; Medicaid sample, 13.5 percentage points [95%CI, 9.1-17.9 percentage points]), with no corresponding increases among other racial and ethnic groups in the low-income and Medicaid population. **CONCLUSIONS AND RELEVANCE In this cross-sectional study, expanding the dental workforce through authorization of dental therapists appeared to be associated with an increase in dental visits. In Minnesota, the policy was associated with improved access to dental care among low-income adults overall. However, racial and ethnic disparities in dental use persist.**

4.Yuanyuan Laura Luo, Lisa Simon, Katy Leiviska, Danae Seyffer, Bernard Friedland, A survey of dental therapists' practice patterns and training in Minnesota. J Am Dent Assoc. 2021 Oct;152(10):813-821.doi: 10.1016/j.adaj.2021.05.004. Epub 2021 Aug 13. PMID: 34392938 DOI: 10.1016/j.adaj.2021.05.004 Background: Expansion of the dental team may play a role in increasing access to oral health care. In 2009, Minnesota became the first state to formally license dental therapists (DTs).

Methods: The authors surveyed DTs and advanced dental therapists (ADTs) in Minnesota to gain a better understanding of those who enter the profession and their motivation for doing so, as well as to solicit their opinions on the overall structure of dental therapy education and the regulatory aspects of the profession.

Results: The response rate was 53.1%. DTs and ADTs were split on whether a dental hygiene degree should be required. Primary reasons for entering dental therapy included more autonomy and a larger scope of practice. Respondents expressed a desire for broadened prescribing rights. The median annual income was in the $81,000 through $90,000 bracket.

Conclusions: Minnesota DTs and ADTs must practice in underserved communities. However, their ability to expand access to oral health care is affected by their licensure requirement, scope of practice, and prescription rights.

Practical implications: Policy makers considering dental therapy legislation must consider educational requirements and scope of practice when crafting state legislation. Broadening the scope of practice may allow for more impactful care for at-risk communities.

5.Self K, Born D, Nagy A. Dental therapy: evolving in Minnesota's safety net. Am J Public Health. 2014 Jun;104(6):e63-8. doi: 10.2105/AJPH.2014.301937. Epub 2014 Apr 17. PMID: 24825234 Free PMC article.

Objectives: We identified Minnesota's initial dental therapy employers and surveyed dental safety net providers' perceptions of dental therapy.

Methods: In July 2011, we surveyed 32 Minnesota dental safety net providers to assess their prospective views on dental therapy employment options. In October 2013, we used an employment scan to reveal characteristics of the early adopters of dental therapy.

Results: Before the availability of licensed dental therapists, safety net dental clinic directors overwhelmingly (77%) supported dental therapy. As dental therapists have become licensed over the past 2 years, the early employers of dental therapists are safety net clinics.

Conclusions: Although the concept of dental therapy remains controversial in Minnesota, it now has a firm foundation in the state's safety net clinics. Dental therapists are being used in innovative and diverse ways, so, as dental therapy continues to evolve, further research to identify best practices for incorporating dental therapists into the oral health care team is needed.

GENERAL OVERVIEW PAPERS ON DENTAL THERAPY

1. Catalanotto, FA, In Defense of Dental Therapy: An Evidence-Based Workforce Approach to Improving Access to Care, J Dent Ed. February 2019, Volume 83, Number 2 Supplement, S7- S15

This article addresses new systems and practice models in community-based dentistry. Its purpose is twofold: to identify strategies and policies that support health equity and access to care; and to identify promising efforts that serve as new models for change in the dental workforce. Dental therapy meets both of these purposes and is the major focus of this article. The fundamental premises explored are threefold. First, the dental care system in the U.S. is broken for many people who then suffer the consequences of poor oral health; this is especially true for racial and ethnic minorities and lower income populations. Second, dental therapy is a proven, safe, high-quality, cost-effective, and ethical way to improve access to oral health care and oral health in general. Third, opposition to dental therapy comes only from the leadership of organized dentistry and is without an evidence base to support objections and criticism. This article reviews each of these three premises in detail. **Based on this review, the article concludes that dental therapy is a safe, high-quality, effective, and ethical approach to improve the oral health workforce, increase access to dental care, and achieve oral health equity.**

2.Elizabeth Mertz, Aubri Kottek, Miranda Werts, Margaret Langelier, Simona Surdu, and Jean Moore, Dental Therapists in the United States Health Equity, Advancing. Med Care 2021;59: S441–S448

Background: Dental therapists (DTs) are primary care dental providers, used globally, and were introduced in the United States (US) in 2005. DTs have now been adopted in 13 states and several Tribal nations.

Objectives: The objective of this study is to qualitatively examine the drivers and outcomes of the US dental therapy movement through a health equity lens, including community engagement, implementation and dissemination, and access to oral health care.

Methods: The study compiled a comprehensive document library on the dental therapy movement including literature, grant documents, media and press, and gray literature. Key stakeholder interviews were conducted across the spectrum of engagement in the movement. Dedoose software was used for qualitative coding. Themes were assessed within a holistic model of oral health equity.

Findings: Health equity is a driving force for dental therapy adoption. Community engagement has been evident in diverse statewide coalitions. National accreditation standards for education programs that can be deployed in 3 years without an advanced degree reduces educational barriers for improving workforce diversity. Safe, high quality care, improvements in access, and patient acceptability have been well documented for DTs in practice.

Conclusion: **Having firmly taken root politically, the impact of the dental therapy movement in the US, and the long-term health impacts, will depend on the path of implementation and a sustained commitment to the health equity principle.**

3. Mathu-Muju KR. Chronicling the dental therapist movement in the United States. J Public Health Dent. 2011 Fall;71(4):278-88. doi: 10.1111/j.1752-7325.2011.00270.x. Epub 2011 May 31. PMID: 22320286 Review.

There have been three attempts to introduce dental therapists (DTs) to the US dental workforce. This account will review early failed attempts to develop DTs, the recent successful Alaska initiative, the Minnesota legislature's authorization of DTs, state dental associations' deliberations on therapists in the workforce, and the efforts of national advocacy groups, foundations, and state legislatures to promote workforce innovation. It concludes with a discussion of the opposition to therapists from elements of organized dentistry.

4. Brickle CM, Beatty SM, Thoele MJ. Minnesota Extends Oral Healthcare Delivery to Impact Population Health. J Evid Based Dent Pract. 2016 Jun;16 Suppl:68-76. doi: 10.1016/j.jebdp.2016.01.018. Epub 2016 Feb 4. PMID: 27236998

Collaborative leadership and stakeholder engagement have created the concept of dental therapist intraprofessional dental team members who are expanding and extending the reach of oral health care to help meet the public need in Minnesota.

Background and purpose: Partially owing to inadequate access to affordable oral health care, health disparities exist within Minnesota's population with significant numbers of residents lacking access to basic oral health care. Policymakers, advocacy organizations, and dental professionals recommended action to address these issues. In 2009, Minnesota became the first state government in the United States to license 2 levels of practitioners, the dental therapist and the advanced dental therapist to primarily treat underserved patients. The purpose of this article is to explain the evolution of the dental therapist and guide other constituencies toward innovative dental hygiene-based workforce models.

Methods: The evolution and educational preparation of the dental therapist and advanced dental therapist are explained in the context of a unique working relationship between educators, legislators, educational institutions, and the Minnesota Department of Health. Pivotal societal, public health, and legislative issues are described from the initial stages in 2005 until 2014 when early data are emerging regarding the impact of dental therapists.

Conclusions: Dental therapist oral health care providers are working in a variety of settings in Minnesota including community clinics, hospitals, and private practices. As of early February 2014, there were 32 licensed dental therapists, and 6 of whom also held certifications as advanced dental therapists. Initial public health impacts are positive; research regarding the benefits to the public is in its infancy. Further evaluation of outcomes will ascertain the viability of this new professional

5. 6.Brickle CM, Self KD. Dental Therapists as New Oral Health Practitioners: Increasing Access for Underserved Populations. J Dent Educ. 2017 Sep;81(9):eS65-eS72. doi: 10.21815/JDE.017.036. PMID: 28864806

The development of dental therapy in the U.S. grew from a desire to find a workforce solution for increasing access to oral health care. Worldwide, the research that supports the value of dental therapy is considerable. Introduction of educational programs in the U.S. drew on the experiences of programs in New Zealand, Australia, Canada, and the United Kingdom, with Alaska tribal communities introducing dental health aide therapists in 2003 and Minnesota authorizing dental therapy in 2009. Currently, two additional states have authorized dental therapy, and two additional tribal communities are pursuing the use of dental therapists. In all cases, the care provided by dental therapists is focused on communities and populations who experience oral health care disparities and have historically had difficulties in accessing care. This article examines the development and implementation of the dental therapy profession in the U.S. An in-depth look at dental therapy programs in Minnesota and the practice of dental therapy in Minnesota provides insight into the early implementation of this emerging profession. Initial results indicate that the addition of dental therapists to the oral health care team is increasing access to quality oral health care for underserved populations. As evidence of dental therapy's success continues to grow, mid-level dental workforce legislation is likely to be introduced by oral health advocates in other states. This article was written as part of the project "Advancing Dental Education in the 21st Century."

CHAPTER 18

The Economic Impact of Periodontal Inflammation

Michael C. Alfano, DMD, PhD

This chapter appears at the end of this second edition of *The Oral-Systemic Health Connection* because it is logical to consider the economic effects of a biologic process, a disease or set of diseases, or their various treatments after the basic aspects of the processes involved are clearly understood. Thus, I will not endeavor to repeat the explanations of specific biologic processes, treatments, and outcomes addressed earlier in this text. However, the various biologic processes and interactions have been studied for several decades, more than 10,000 papers have been written on these topics, and tens of millions of research dollars have been expended, all in the search for greater clarity in our understanding of the precise interactions of oral and systemic diseases.[1]

While not every paper has shown a clear relationship between oral infection, especially periodontal disease, and systemic health, the vast majority of the published literature supports a claim that is now virtually universally accepted: Periodontal infection *is associated* with a number of noncommunicable systemic inflammatory diseases. The goal of this chapter is to take that agreement and move the discussion from the association of periodontal disease with a number of inflammatory-based systemic diseases to the role of periodontal disease as a contributory cause of several inflammatory-based noncommunicable systemic diseases.[2–4] Once causality, even partial or contributory causality, is established, the dimensions of economic impact expand substantially.

What is a *contributory cause* of a disease? Bale et al[2] define it as follows: "A contributory cause does not require that all those who possess the contributory cause experience the disease, nor does it require that all those who are free of the contributory cause be free of the disease. It also means the contributory cause may not be necessary to experience the disease." We can clarify this explanation by using the relationship between smoking and lung cancer. A person can smoke and never get lung cancer; another person who has never smoked can get lung cancer. But in the majority of the population (80% to 90%, according to the American Lung Association[5]), smoking becomes the cause—the contributory cause—of their lung cancer.

I deliberately selected lung cancer as an example because while there is no doubt that smoking is a contributory cause of lung cancer, no randomized, double-blind, controlled trial of smoking and lung cancer has ever been performed. This is important because most researchers today insist it is impossible to say that periodontal disease is a contributory cause of noncommunicable systemic inflammatory diseases such as cardiovascular disease (CVD) or diabetes until a large, randomized, well-controlled clinical trial confirms

it. I submit that such a large, expensive, and difficult-to-control study will never be done. Indeed, based on what we have learned from the private insurance sector on this topic, which is described later in this chapter, I further submit that such a large prospective study might be unethical. Thus, by insisting on a study that will likely never be performed, the research community is potentially denying society a huge benefit from improved periodontal care driven not only by an interest in oral health but also by a desire to mitigate the effects of life-threatening diseases such as diabetes and heart disease. This benefit, as shown by the insurance studies described in the next section, consists of a significantly lower chance of hospitalization and complications from inflammatory-based systemic diseases and a potential annual savings of billions of dollars in the United States alone. It is time to consider whether it continues to be ethical to deny direct causal inference between periodontal disease and systemic disease.

The Insurance Studies: A Framework for Action

Several large, retrospective analyses of insurance data have consistently shown that individuals who receive periodontal therapy have significantly lowered costs of health care, driven primarily by fewer hospitalizations and emergency department visits.[6-9] For example, Mosen et al[6] reported significantly better hemoglobin A_{1c} (HbA_{1c}) control, a 44% reduction in hospital admissions, and a 38% reduction in emergency department visits in a population of diabetic patients who received regular dental care compared with a matched set of diabetic patients who did not receive regular dental care. Using data from United Concordia, Jeffcoat et al[7] reported a strikingly similar reduction in hospitalizations of 39.4% in a study of patients with diabetes who received periodontal care versus those who did not. The annual reduction in treatment costs for those who received periodontal treatment versus those who did not was also measured; the following systemic conditions and associated savings were reported: $2,840 annual savings with type 2 diabetes, $5,681 annual savings with cerebrovascular disease, and $1,090 annual savings with coronary artery disease.

One criticism of this type of retrospective study is that the subjects in the dental treatment groups are simply more compliant with their health care regimens. However, one of the cited studies, conducted by United Healthcare, specifically controlled for this compliance effect, and it showed the opposite effect of what might be expected.[8] Those individuals who received periodontal care and were not compliant with their medical treatment regimens had much higher annual savings. Specifically, those who received periodontal care and were not compliant with medical recommendations saved $1,849 per year compared to savings of $264 per year by those who received periodontal care and were compliant with medical recommendations. In short, both groups who had the benefit of periodontal care showed medical savings, with the noncompliant group showing much greater savings. While this study is not dispositive in proving periodontal care reduces total health care cost, it is very supportive of this relationship and mitigates the most obvious objection to such retrospective study designs. More definitive proof of the benefits of periodontal care in reducing total health care costs will be described in the next section.

All three studies cited earlier[7-9] were supported by the dental insurance industry and conducted on proprietary databases. Some would devalue the importance of two of them, though published in peer-reviewed journals, because of the sponsorship of the research. This makes the work of the team at the American Dental Association (ADA) Health Policy Institute led by Marko Vujicic more meaningful. In this study, Nasseh et al[9] used a commercially available database from Truven Health MarketScan Research to explore the effect of periodontal treatment on the health care costs

associated with newly diagnosed type 2 diabetes. One might suspect that in cases of newly diagnosed diabetes, some of the effects of the diabetic process may not yet have taken hold, potentially minimizing any salutary effect of periodontal treatment. However, the authors reported total health care savings in the periodontal treatment group of $1,799, a figure that is remarkably similar to what others have reported, even though the study was conducted on a different group of individuals at a different time using different methodologies.

In an analysis of the earlier studies plus an additional Cigna study,[10] Chávez et al[11] estimated the potential savings nationwide for the pool of Medicare patients. Their results were remarkable: When they assessed the total savings available if all Medicare patients with a history of stroke, congestive heart failure, or diabetes received periodontal care each year, the annual savings would be $19.0 billion based on the Cigna study, $18.8 billion based on the United Concordia data, and $20.4 billion based on the United Healthcare dataset. Given the different approaches, timelines, investigators, and populations used to generate these calculations, the similarities in the numbers are amazing.

While the analysis by Chávez et al[11] is impressive, it assumes that everyone who is eligible for periodontal care will receive it, and this is not at all likely. Therefore, we should look to another analysis, completed by the respected consulting firm Avalere.[12] The Avalere study took data from three of the studies discussed earlier (Cigna,[10] United Concordia,[7] and United Healthcare[8]) and added data generated by Aetna to develop a model to determine the impact of periodontal care on the cost of the Medicare program if periodontal care was made available through Medicare to anyone with type 2 diabetes, CVD, or stroke. They estimated the cost of periodontal care at $825 for initial treatment (scaling and root planing) and $250 for maintenance visits every 6 months thereafter. In addition, they assumed that only 5% of eligible individuals would seek the care in year 1 and that this number would only grow to 20% of eligible individuals seeking care by year 10. Thus, over a 10-year period, periodontal care would cost $7.2 billion. However, the projected savings, driven primarily by fewer hospitalizations for the systemic conditions during this same 10-year period, would be $70.7 billion, for a net savings of $63.5 billion over 10 years. A year-by-year analysis showed that the program generated net savings of $500 million in year 1, growing to a net savings of $12.2 billion dollars by year 10. If more people accessed the program, the savings would go up, and Avalere estimated that these positive effects would continue over the long term.

The remarkable similarity of the reports from six different insurance studies, completed at six different times by six different investigators on six different populations using somewhat different methods and definitions, makes a compelling case that the minimization of oral inflammation through periodontal care improves certain systemic diseases so that total health care costs are dramatically lowered. However, before we can complete the case that periodontal care is a contributory cause of systemic disease, some prospective data is needed. The next section reports on such prospective data. However, the proprietary nature of the next level of support requires the reader to accept the actions of the insurance sector based on verbal reports. The prospective data have not been published, most likely in an effort to retain competitive advantage in the marketplace.

The Economic Savvy of Dental Insurers

Unencumbered by traditional academic norms, which would have required large, well-controlled clinical trials of the impact of periodontal care on systemic disease, the insurance industry acted on its retrospective assessments of periodontal therapy on the costs of treating systemic disease. To be clear, the industry did not act in a vacuum

based on its own studies alone; it consulted the decades-long research enterprise that showed numerous epidemiologic associations, highly plausible biologic mechanisms, smaller clinical trials, and surrogate endpoint analyses, each of which, on balance, supported the concept that oral inflammation is a contributory cause of systemic diseases that are also driven by inflammatory processes. So how exactly did the insurance industry respond?

To answer this question requires indulgence on the part of the reader, because the information on which I base this discussion comes from personal conversations with insurance industry executives and direct observation of presentations made by industry representatives to the Centers for Medicare and Medicaid Services (CMS) and the Congressional Budget Office (CBO). In addition, due to the competitive nature of the insurance business and because the data presented can represent a proprietary advantage to one company over another, I feel obliged to protect the identities of the various presenters. Indeed, they came to the table in generous common cause with several not-for-profit organizations, including the Santa Fe Group, Oral Health America, Pacific Dental Services Foundation, and the Center for Medicare Advocacy, in an effort to shed light on their actions vis-à-vis oral and systemic health, so that the huge federal programs of Medicaid and Medicare might benefit from their real-world experiences. In sum, these individuals acted for the public good, and they and the insurance industry per se should be commended for this action.

Disclaimers aside, we can now answer the question: How exactly did the insurance industry respond? The industry responded by acting on its retrospective studies and marketing its periodontal insurance services not only for their inherent benefits to oral health, which include tooth retention, fresh breath, improved mastication, and social confidence, but also for the benefits to systemic health that include markedly lower costs for the management of diseases such as diabetes and heart disease.

As I am best able to determine, these marketing actions took several shapes. First, the dental insurers began to share their data with large corporations to convince them of the outsize value of dental insurance in terms of its ability to save money in other areas of health care. This argument resonates with corporations because most of them are self-insured, and any savings derived from the addition of periodontal services to the benefits mix delivers savings directly to the bottom line by reducing health care payments for employees who suffer from one of the inflammatory-based systemic diseases. Second, those dental insurers that were a subsidiary of a larger health insurance company began to work out reimbursement arrangements from the general health side of the parent company for cost benefits delivered by the dental company to the general health of the insured population, to be shared back with the dental company in some appropriate ratio. I am told that such funds only changed hands after those insured individuals who suffer from one of the noncommunicable diseases actually received the requisite periodontal care. Indeed, it is reported that the dental insurers would actually recruit the affected insured individuals for periodontal care and would add enticements such as waiving copayments and deductibles to enhance the chances that the affected people would seek periodontal care.

Finally, some dental insurers are reported to have taken these various processes to the next level by offering their dental/periodontal insurance services to general health insurers that did not have a dental insurer in their portfolios of companies. These arrangements presumably worked through contracts in which the general health care savings were shared via some appropriate formula between the two different insurers.

This chapter could have been written without the disclosures on insurance industry practices included in this section. Indeed, while everything to my knowledge about these practices is legal, and although nothing was told to me or observed by me in confidence,

I take some risk in dispensing with the norms of referencing for this section of the chapter even through such means as named personal communications. However, this information was included because it is important that individuals from the private insurance sector continue to be forthcoming with their data and practices so that the public insurance sector can derive the same benefits. Even more important is that the research, practice, and educational communities know of these private insurance practices because they constitute real-world, prospective confirmation that the effects of periodontal care to mitigate certain systemic diseases are, in fact, valid.

Some of the dental insurers involved have been acting in the way described earlier for more than a decade. If the effect of periodontal care to reduce total health care costs is not real, their reimbursement practices would have collapsed under their own weight because they would have failed economically a long time ago. In sum, I consider the six insurance studies summarized in the prior section and the prospective actions of the private insurance industry described in this section to be equal to or better than the proof that may have been provided by a well-controlled, large clinical trial. In a very significant way, these real-world insurance studies and the current insurance company actions are the equivalent of a phase IV trial or an N of 1 clinical trial, as eloquently defined by Curro et al.[13] Finally, this information provides the basis for the challenge to the dental research, education, and practice communities as described in the next section.

Challenge to the Dental Profession: Moving from Association to Causation

I cut my teeth in clinical research, both as an academic researcher and as an industry executive, on the value of the well-controlled clinical trial as the gold standard of evidence required prior to approving a new drug or device, accepting a surgical technique, or changing a therapeutic paradigm. Indeed, the well-executed clinical trial creates a sort of safe space for researchers and thought leaders, and in general it has served society very well to protect against sham products or outright scams through the years. However, there are many scenarios of clinical trials not serving society well. The best examples come from drug development, where side effects often go unnoticed until a given drug is delivered not hundreds or even thousands of times but tens of thousands of times; or perhaps the drug is not given for weeks or months,but for years. This does not mean that clinical trials are of no use but that they must be accompanied by continuing surveillance as in the phase IV approach or in real-world scenarios in people with comorbid disease as in the N of 1 approach.

Further assault on the value of the clinical trial can come in the form of the evidence-based review system, which can devalue scores if not hundreds of studies in a single analysis. Indeed, while the evidence-based approach has done wonders to enhance critical albeit retrospective thinking on clinical design, we are regularly confronted with the need to rethink norms of clinical care because the evidence is weak. I reiterate that the discipline of evidence-based reviews has been a good thing, but I fear that we are abusing the process and are in danger of approaching a situation in which no study is good enough to retrospectively pass muster. Indeed, when was the last time you read an evidence-based review that concluded that the evidence is strong and consistent? Continuing along the current path will have the insidious effect of further debasing science in the minds of the public, resulting in a situation in which political opinion, folklore, religion, and such are placed on an equal plane with science (eg, creationism versus evolution). While not directly related to the purpose of this chapter, I urge all who are engaged in evidence-based reviews to set their parameters and choose their words carefully lest the very purpose for which

the evidence-based process was created is marginalized, with the unintended consequence of demeaning all scientific data on all subjects.

Finally, as noted previously, although there never was a well-controlled human trial on the effects of smoking on lung cancer, it is virtually universally accepted that smoking is a contributory cause of lung cancer and that smoking affects 80% to 90% of all lung cancers. How did it become acceptable to blame smoking for lung cancer? When did the data become compelling enough to move the dialogue from association to causation? Was it the report of the Surgeon General in 1964, as referenced in chapter 1? Was it the work of Hammond and Auerbach on smoking beagles in early 1970?[14] Or was it merely the constant repetition of all of the observational data? I do not know when the relationship tipped from associative to causal, but it did tip, and it never went back, despite the efforts of the Tobacco Institute and the cigarette industry to malign the causal relationship.

I submit that it is past time for the oral health research community to tip the dialogue on the relationship between oral and systemic health from associative to causal. By clinging to a messianic belief that we cannot speak of causation until the large clinical trial is delivered, we are denying society the opportunity to benefit fully from the decrease in hospitalizations and emergency department visits that results from periodontal therapy. In particular, we are denying the large number of individuals who are on public health insurance to benefit in the way those insured by private entities are benefitting. As noted previously, when society loses the indirect systemic benefits of periodontal care, it also loses the direct benefits of oral care, including tooth retention, fresh breath, improved mastication, and the enhanced social acceptance derived therefrom.

Arguably no entity has done more to tip the discussion from association to causation than the Santa Fe Group. This group has published a statement on the relationships of oral and systemic health,[3,4] which reads as follows:

Santa Fe Group Position Statement on Oral-Systemic Interactions

After decades of research and thousands of scientific papers, the relationships between oral health, especially periodontal health, and systemic health are well known. Moreover, during the past ten years, data analysis by health economists, and public statements and actions by several large, private dental insurers have identified additional benefits of oral health by revealing that insured individuals who receive treatment for periodontal disease show fewer hospitalizations and reduced cost of care for a number of systemic diseases including diabetes, cardiovascular disease, and stroke. Therefore, the Santa Fe Group has concluded that sufficient evidence now exists that periodontal disease is a contributory cause to certain systemic diseases, and the public should benefit from this knowledge. Specifically, Medicare, Medicaid, and other public and private health insurance programs should incorporate oral health benefits as a component of comprehensive health insurance. These health benefits will not only improve oral health for its own sake, including speech, mastication and social acceptance, but will also produce substantial economic benefits and total health improvement for the public.

This Santa Fe Group statement has been published in two of the most widely read dental journals in the United States, *The Journal of the American Dental Association*[3] and the *Compendium of Continuing Education in Dentistry*[4]; moreover, it has been presented to senior leadership of the CMS and CBO. The Santa Fe Group statement has been used to solidify the importance of oral health to total health, to galvanize support for oral health from numerous not-for-profit organizations in the health care segment, to motivate the global periodontal research community to be more forthcoming, and to endeavor to convince the federal and state governments that it is foolish

to try to save money by cutting dental care benefits.

To date, the Santa Fe Group statement has generated great interest and surprisingly little open criticism. While there is much work to do, the dental, medical, and public health communities—hopefully soon joined by critical governmental agencies—are poised to promote the concept that periodontal disease is a contributory cause to many systemic health problems. Will you join this effort? Will you accept the substantial real-world experience described in the prior section? Or will you stay in the safe place of waiting for the large clinical trial that will probably never come?

What are the risks of stating that the relationship between oral and systemic health is causal as opposed to merely associative? Are we asking people to take new drugs? No. Are we suggesting a different form of periodontal therapy? No. Are there unintended consequences of periodontal care? Very few (eg, root sensitivity, rare anesthetic reactions) are reported. Even if the thesis presented herein should be disproved—and I submit that it will not—the outcome of periodontal care will still be positive. People will have better masticatory function, less chance of painful inflammatory flare-ups, fresher breath, less tooth loss, better speech, and enhanced confidence in social settings. Stated another way, there is no significant downside to delivering periodontal care, and the potential benefits, direct and indirect, in terms of total health and in terms of finance are enormous.

Reordering Priorities in Medicare and Medicaid Policy

One of the many idiosyncrasies of the historic separation of the medical and dental professions is the belief that dental care is not really health care. It is an elective service—a luxury, if you will, or even a cosmetic service that comes in near last in any priority-setting exercise for allocation of research dollars. We see this attitude play out almost every day, as many states choose not to exercise their right to provide dental care under federal Medicaid rules. We see it when states with public dental insurance, even progressive states like California, decide to eliminate dental care first as soon as there is a financial crisis. We even see it in the fact that dental infection is the only bodily infection that Medicare does not routinely cover.

This historic separation has been made worse by the dental profession's aversion to participating in public insurance programs. Practicing dentists seem to perceive the rules and guidelines that accompany programs like Medicaid and Medicare as an unwieldy intrusion on their independence. This attitude was in play even before the rise of Medicaid services, with its flawed dental reimbursement model, gave dentists good reason to resist the expansion of such programs. Indeed, dentists were opposed to Medicare when it was founded in 1965, well before they began to have difficult experiences with Medicaid reimbursement. Moreover, the ADA has had a resolution on its dockets since 1993 to expand Medicare to cover all medically necessary dental care, but it has been unwilling or unable to advance this cause for the past 25 years.

The resistance to these federal health programs is actually more principled than practical or self-serving. Nevertheless, any principles that oppose federal involvement in health care delivery must be measured against the societal failure that occurs when low-income indiv iduals are unable to afford health care. To be sure, one-off events such as Missions of Mercy and even Give Kids a Smile are worthy gestures of the charitable nature of many in the dental profession, but they do little to assist a person with an off-cycle, painful dental health problem. The dental profession cannot simply resist efforts to improve health care access; it needs to bring viable plans to the table to sustain the dignity of the profession.

One potentially viable plan for a routine dental benefit within Medicare has arisen as a joint effort of the Santa Fe Group, the DentaQuest Foundation, and Oral Health America. A key element of this plan is to parallel reimbursement practices of the private insurance sector in the belief that it makes no sense to proffer a poorly financed plan for dental coverage that no clinical provider is interested in accepting. Great credit is due to Judy Jones and her coauthors and colleagues for identifying the scope of the need for oral health care in America's aged population and for framing out a realistic approach to a dental benefit in Medicare.[11,15-19]

The work of Dr Jones and her colleagues to add a dental care benefit to Medicare will be referred to as *the Jones approach*. While it is not the only approach, it is the one on which the most information is published, and it appears to be the broadest approach in that 34 collaborators from more than two dozen agencies and institutions participated in some way.[15] Other efforts worthy of mention are the joint effort to expand the definition of *medically necessary dental care*, driven primarily by the Dental Lifeline Network and the Center for Medicare Advocacy; the economic argument articulated by Avalere[12] and used by a large coalition of health and social service organizations to foster change; and the effort of the ADA facilitated through the work of PwC Consulting, about which little is yet publically known.

The Jones approach incorporates several important principles, many of which were articulated in the Santa Fe Group symposium on this topic.[20] These principles include the incorporation of the dental benefit for all participants in Medicare; that any dental benefit should be incorporated into Medicare Part B (physician, outpatient hospital, home health, and other services) and not developed as a separate benefit; that providers should be reimbursed at rates that are comparable to private dental insurance; and that a primary, global benefit should be provided to all participants, along with an optional second-level benefit. The primary global benefit in the Jones approach has a specific focus to "prevent pain, inflammation, and infection," which was designed specifically to ensure that all participants in the Medicare oral health benefit have optimal ability to minimize the effects of oral inflammation on systemic health.[15]

The Jones approach applies to a broad dental benefit for all Medicare recipients, so it is what could be called a *net coster*. In contrast, a plan like that proposed in the Avalere report,[12] whereby only selected periodontal services are offered only to Medicare recipients who have a diagnosis of diabetes, heart disease, or stroke, is a *net saver*. Let's explore the economic differences in these approaches.

The Jones approach to a Medicare dental benefit is biphasic. The first phase, Level 1, consists of the core global benefit with a primary goal of preventing pain, inflammation, and infection. It therefore includes diagnostic, preventive, nonsurgical periodontal therapy and nonelective oral surgery, reimbursed at 70% of usual, customary, and reasonable fees with no patient copayments to increase participation. The estimated cost for this benefit is $32.01 per member per month (PMPM). Level 2 benefits under the Jones approach would include "restorative, removable, fixed, endodontic and selected implant (ie, two implants under a lower complete denture) as well as a spending cap ($1,500)."[15] Level 2 benefits would cost $31.58 PMPM in addition to the costs of the Level 1 benefits. The core global benefit would cost $16.85 billion, not including any projected savings (eg, $12.20 billion in year 10) as estimated by the Avalere analysis described later in this section. Thus, even assuming the full benefit of cost reductions from reduced hospitalizations and emergency room visits due to the periodontal care provided, because the global benefit proposed by Jones is available to all seniors, it is a net coster of $4.65 billion in year 10 ($16.85 billion minus $12.20 billion). These net costs can be mitigated (or not) based on additional premiums paid by Medicare recipients as in the current system.

The initiative of the Dental Lifeline Network and the Center for Medicare Advocacy (DLN-CMA initiative) seeks expanded dental care that is medically necessary for Medicare recipients under the currently authorized Medicare legislation. This initiative basically argues that the CMS already has the authority to expand the definition of *medically necessary dental care* by simple administrative action. At present, Medicare does pay for a very limited amount of dental care, such as eliminating oral infection in Medicare patients who are undergoing organ transplants. This initiative did not estimate the costs or the specific nature of the expanded dental benefits that might be provided, so the economic impact cannot be discussed at this time. Moreover, the petition to the CMS remains under review by the agency many months after it was submitted.

The Avalere analysis[12] is not actually an initiative but rather a report on which other initiatives are based, in full or in part. For example, the Jones approach acknowledges that the assessment by Avalere would substantially reduce the total cost of the Medicare dental benefits in her proposal. Like the DLN-CMA initiative, the Avalere analysis limits benefits to certain Medicare recipients with medical needs. However, the Avalere analysis only provides dental benefits to Medicare recipients with three specific medical conditions (ie, diabetes, heart disease, and stroke), while the DLN-CMA initiative would presumably provide dental benefits to any Medicare recipient with a medically necessary dental treatment requirement. By providing more limited dental benefits (eg, diagnosis and nonsurgical periodontal care) only to a more limited population , the Avalere analysis easily has the best outcome from a purely economic perspective. Simply, it is a net cost saver, and a substantial one at that.

Using data on the effect of periodontal care on the number of hospitalizations and emergency department visits from the insurance studies described earlier and data on Medicare costs and the numbers of Medicare recipients who have the three signature diseases (diabetes, heart disease, and stroke), Avalere estimated the savings that could be provided if a basic dental benefit consisting of nonsurgical periodontal therapy was added to Medicare. Their summary of the analysis was as follows:

> We estimate providing a periodontal disease treatment benefit will produce a savings of $63.5 billion over the period of 2016–2025 and should continue long term. This savings reflects new costs of approximately $7.2 billion from covering periodontal treatment for Medicare beneficiaries with one of the three target chronic conditions. This new spending will be offset by an estimated $70.7 billion reduction in Medicare spending, largely related to fewer hospitalizations and emergency room visits.

This analysis was actually quite conservative. For example, it assumed only a 5% uptake of the new periodontal benefit in the first year, growing to a 20% utilization of the benefit in year 10. Yet the financial outcome was a net positive beginning in the first year with $500 million in savings and grew to a net benefit of $12.2 billion in year 10. While some might argue that the Avalere analysis would only benefit a small portion of the senior population, the number of people with periodontal disease and one of the three systemic conditions is actually quite large. Indeed, in follow-up to a meeting with the CBO, it was estimated that a scenario like the one proposed by Avalere would have the potential to benefit 19 million people. This is more people than have benefited from either the Children's Health Insurance Program (CHIP) or the Affordable Care Act (ACA) insurance pools. Therefore, efforts to characterize the Avalere analysis as small in scope are inaccurate. Moreover, the Avalere analysis based the dental benefit on costs of $825 for initial treatment and $250 for biannual maintenance visits. Thus, the program delivers more than two-thirds of a typical, private insurance dental benefit in year 1 ($1,500 per year) and one-third of a private dental benefit in subsequent years.

The preventive techniques learned by seeking the periodontal benefit will likely improve the patient's other oral health problems. In addition, patients could elect to have other oral health problems treated out-of-pocket once they develop a level of comfort with the dentist who provides the basic periodontal service.

What Comes Next?

At the time of this writing, a number of collaborative efforts are underway to affect "the economic impact of periodontal inflammation" as this chapter is titled. First, more effort must be applied to educate the CMS and Congress. I have had the privilege of participating in three meetings with the CMS on this topic and one meeting with the CBO. At each meeting, the CMS participants, who sometimes represented the highest levels in the agency, were attentive and interested in the subject. In fact, it is not a stretch to say that some of them were amazed by the data set. That said, the administration has changed, as has the leadership of the CMS, and new efforts will be required to rekindle the interest in the enormous savings that could accrue to the Medicaid and Medicare programs if the agency were to act to expand dental care services, especially periodontal services.

Furthermore, as I write this, the CBO is reported to be scoring the cost/savings of a new dental benefit in Medicare. This benefit would be similar to the one in the Avalere analysis and has the potential, for example, to cover most of the costs of the CHIP program, which Congress is desperate to approve. By the time you read this, we will know if this effort was in fact successful.

To enhance the likelihood that Congress or the CMS will act to add a dental benefit to Medicare, the Santa Fe Group is funding a new program to assess whether the Medicaid population in New York State benefits from dental care in the same way that those in the private insured population benefit. Confirmation that the data from the public sector insured parallels that from the private sector insured would provide substantial evidence to prompt the federal government to act on expanded oral care coverage.

Finally, and perhaps most importantly, a large coalition of organizations guided by Eric Berger, a principal in Liberty Partners in Washington, DC, has developed a compelling community statement on this issue.[21] This statement, which is supported by 70 significant organizations from the medical, dental, social sciences, and patient advocacy sectors, is reprinted here:

Community Statement on Medicare Coverage for Medically Necessary Oral and Dental Health Therapies

The undersigned organizations are proud to join in support of Medicare coverage for medically necessary oral/dental health therapies.

It is well established that chronic diseases disproportionately impact Medicare beneficiaries and impose a substantial cost on the federal government. It is also well established that untreated oral microbial infections are closely linked to a wide range of costly chronic conditions, including diabetes, heart disease, dementia, and stroke. In addition, oral diseases have been documented by researchers and medical specialty societies as precluding, delaying, and even jeopardizing medical treatments such as organ and stem cell transplantation, heart valve repair or replacement, cancer chemotherapies, placement of orthopedic prostheses, and management of autoimmune diseases.

Despite these factors, most Medicare beneficiaries do not currently receive oral/dental care even when medically necessary for the treatment of Medicare-covered diseases. In fact, Medicare coverage extends to the treatment of all microbial infections except for those relating to the teeth and periodontium. There is simply no medical justification for this exclusion, especially in light of the broad agreement among medical specialists that such

care is integral to the medical management of numerous diseases and medical conditions. Moreover, the lack of medically necessary oral/dental care heightens the risk of costly medical complications, increasing the financial burden on Medicare, beneficiaries, and taxpayers.

At least six major insurance carriers offering dental plans provide enhanced periodontal and preventive coverage to targeted enrollees with conditions such as diabetes, heart disease, stroke, head/neck cancers, and transplants. According to some reports, such coverage has realized important benefits, including markedly lower hospitalization and emergency department admission rates as well as substantial cost reductions. On a further note, veterans getting care through the Veterans Health Administration receive medically adjunctive oral/dental treatment in many instances when a dental diagnosis affects their medical prognosis. These are all important steps forward, and medically necessary oral/dental healthcare including periodontal treatment should be provided in traditional Medicare as well.

The Medicare program and all its beneficiaries should not be without the vital clinical and fiscal benefits of coverage for medically necessary oral/dental health therapies. Given the significant potential to improve health outcomes and reduce program costs, we urge Congress and the Administration to explore options for extending such evidence-based coverage for all Medicare beneficiaries.

Signed by: AARP; Acuity Specialists; American Academy of Maxillofacial Prosthetics; American Academy of Periodontology; American Association for Dental Research; American Association of Clinical Endocrinologists; American Association of Hip and Knee Surgeons; American Autoimmune Related Diseases Association; American College of Emergency Physicians; American College of Gastroenterology; American College of Physicians; American College of Prosthodontists; American College of Rheumatology; American Dental Association; American Dental Education Association; American Dental Hygienists' Association; American Diabetes Association; American Head and Neck Society; American Kidney Fund; American Liver Foundation; American Nurses Association; American Parkinson's Disease Association; American Psychiatric Association; American Public Health Association; American Society for Radiation Oncology; American Society of Clinical Oncology; American Society of Transplant Surgeons; American Thoracic Society; Arthritis Foundation; Association of Dental Support Organizations; Association of State and Territorial Dental Directors; California Dental Association; Catholic Health Association of the United States; Center for Medicare Advocacy; Children's Dental Health Project; Crohn's and Colitis Foundation of America; Dental Lifeline Network; Dental Trade Alliance; Eating Disorders Coalition; Epilepsy Foundation; Families USA; Head and Neck Cancer Alliance; Justice in Aging; Leukemia and Lymphoma Society; Lupus Foundation of America; Medicare Rights Center; Mental Health America; National Alliance on Mental Illness; National Association of Area Agencies on Aging; National Association of Community Health Centers; National Association of Dental Plans; National Council for Behavioral Health; National Kidney Foundation; National Multiple Sclerosis Society; National Network for Oral Health Access; National Osteoporosis Foundation; National Rural Health Association; National Stroke Association; Oral Health America; Pacific Dental Services Foundation; Parkinson's Foundation; PEW Dental Campaign; Renal Physicians Association; Santa Fe Group; School-Based Health Alliance; Society for Transplant Social Workers; Support for Persons with Oral, Head, and Neck Cancer; The Gerontological Society of America; The Michael J. Fox Foundation; The Society for Thoracic Surgeons

This important statement, signed by an almost unprecedented number of organizations from across the health care spectrum, will be used in the coming year in an effort to generate an administrative solution that leverages the power of periodontal care to reduce hospitalizations and emergency room utilization. Coupled with many other efforts by these organizations and other groups, there is reason for some optimism even in a political environment that is toxic, partisan, and struggling for resources. By the time Dr Glick publishes the third edition of this book, I hope we will be able to describe a wonderful success story of improved health complemented by favorable economics.

References

1. Lamster IB. Oral conditions and systemic health. Presented at the Santa Fe Group Salon: Expanding Oral Healthcare for America's Seniors, Arlington, VA, 28–30 September 2016. https://www.youtube.com/watch?v=WE9-Agum1Y8. Accessed 30 December 2017.
2. Bale BF, Doneen AL, Vigerust DJ. High-risk periodontal pathogens contribute to the pathogenesis of atherosclerosis. Postgrad Med J 2017;93:215–220.
3. Slavkin HC, Santa Fe Group. A national imperative: Oral health services in Medicare [editorial]. J Am Dent Assoc 2017;148:281–283.
4. Alfano M. The seniors are coming! [editorial]. Compend Contin Educ Dent 2017;38:586–588.
5. American Lung Association. Health Effects of Smoking. http://www.lung.org/stop-smoking/smoking-facts/health-effects-of-smoking.html. Accessed on 30 December 2017.
6. Mosen DM, Pihlstrom DJ, Snyder JJ, Shuster E. Assessing the association between receipt of dental care, diabetes control measures and health care utilization. J Am Dent Assoc 2012;143:20–30.
7. Jeffcoat MK, Jeffcoat RL, Gladowski PA, Bramson JB, Blum JJ. Impact of periodontal therapy on general health: Evidence from insurance data for five systemic conditions. Am J Prev Med 2014;47:166–174.
8. United Healthcare. Medical Dental Integration Study: March 2013. http://www.unitedhealthgroup.com/~/media/UHG/PDF/2013/UHC-Medical-Dental-Integration-Study.ashx?la=en. Accessed 30 December 2017.
9. Nasseh K, Vujicic M, Glick M. The relationship between periodontal interventions and healthcare costs and utilization: Evidence from an integrated dental, medical, and pharmacy commercial claims database. Health Econ 2017;26:519–527.
10. Cigna. Improved Health and Lower Medical Costs: Why Good Dental Care Is Important. https://www.cigna.com/assets/docs/life-wall-library/Whygooddentalcareisimportant_whitepaper.pdf. Accessed 30 December 2017.
11. Chávez EM, Calvo JM, Jones JA. Oral Health and Older Americans: A Santa Fe Group White Paper. http://santafegroup.org/wp-content/uploads/2017/06/Oral-Health-and-Older-Americans-A-Santa-Fe-Group-White-Paper.pdf. Published June 2017. Accessed 30 December 2017.
12. Avalere Health. Evaluation of Cost Savings Associated with Periodontal Disease Treatment Benefit. http://pdsfoundation.org/downloads/Avalere_Health_Estimated_Impact_of_Medicare_Periodontal_Coverage.pdf. Accessed 30 December 2017.
13. Curro FA, Robbins DA, Naftolin F, Grill AC, Vena D, Terracio L. Person-centric clinical trials: Defining the N-of-1 clinical trial utilizing a practice-based translational network. Clin Investig (Lond) 2015;5:145–159.
14. Hammond EC, Auerbach O, Kirman D, Garfunkel L: Effects of cigarette smoking on dogs. 1. Design of experiment, mortality, and findings in lung parenchyma. Arch Environ Health 1970;21:740–753.
15. Jones JA, Monopoli M. Designing a new payment model for oral care in seniors. Compend Contin Educ Dent 2017;38:616–624.
16. Chávez EM, Hendre A. Clinical care for an aging population. Compend Contin Educ Dent 2017;38:595–602.
17. Calvo JM, Chávez EM, Jones JA. Financial roadblocks to oral health for older adults. Generations 2016;40:85–89.
18. Chávez EM, Calvo JM, Jones JA. Dental homes for older Americans: The Santa Fe Group call for removal of the dental exclusion in Medicare. Am J Public Health 2017;107(suppl 1):S41–S43.
19. Chávez EM, Calvo JM, Jones JA. The Santa Fe Group strategy: How Medicare can integrate health and oral care for older Americans. Generations 2016;40:94–99.
20. Wilentz JB, Kleinman DV, Alfano MC. Meeting commentary: Santa Fe Group Salon Expanding Oral Healthcare for America's Seniors, September 28–30, 2016. J Am Dent Assoc 2017;148:272–274.
21. Community Statement on Medicare Coverage for Medically Necessary Oral and Dental Health Therapies. https://cdn.nof.org/wp-content/uploads/2017/10/Medicare-Community-Statement.pdf. Accessed 30 December 2017.