Strategies to Improve Oral Health in States and Territories

EXECUTIVE SUMMARY

This white paper is a companion to ASTHO's Oral Health Policy Statement and provides additional background and evidence on oral health. In the statement, ASTHO identifies oral health as a priority and supports integrated and adequately resourced state and territorial oral health programs (S/TOHPs) located in each state and territorial health agency to improve health, eliminate disparities, and reduce costs.

Oral health is a vital component of overall health and well-being, yet too many adults and children continue to have poor oral health and lack access to evidence-based oral health services.[1,2] Improving oral health should be part of strategic efforts to eliminate health disparities. Oral health means more than healthy teeth and gums: dental diseases and other oral conditions affect general health status. A growing body of evidence shows that oral diseases impact overall physical health and quality of life, and more than 100 medical conditions have oral manifestations.[3] Social determinants of health (including income, education, cultural beliefs, and occupation) are strongly related to both child and adult health as well as to oral health outcomes such as tooth decay, tooth loss and oral cancer.[4,5] Increasing access to and uptake of evidence-based oral disease prevention and education services can improve oral health outcomes and reduce health disparities.

Efforts by S/TOHPs must include assuring, promoting, and leveraging sufficient funding to enhance oral health program infrastructure, expand evidence-based approaches such as community water fluoridation and school-based sealant programs, integrate oral health with primary care, and expand the dental safety net. In addition, development, implementation, and maintenance of robust, state-based oral health surveillance systems lay the foundation to monitor oral health conditions, increase access to dental care, and enhance workforce capacity and public health infrastructure.

BACKGROUND

In spite of tangible improvements in oral health status in recent decades, in some population groups oral health is still commonly identified as a significant health disparity with immediate and extensive consequences.[6] In 2000, the Office of the Surgeon General issued its landmark report, *Oral Health in America,* identifying "a silent epidemic of oral diseases… affecting our most vulnerable citizens – poor children, the elderly, and many members of racial and minority groups."[7] In the years since, additional national reports have identified areas for action and recommendations, with most recently the Institute of Medicine (IOM) releasing two companion reports in 2011: *Advancing Oral Health in America* and *Improving Access to Oral Healthcare for Vulnerable and Underserved Populations*.[8,9] Although these ambitious and comprehensive reports identified the problems and far-ranging recommendations for advancing oral health and improving access to oral healthcare, translation and implementation of those recommendations into action is still evolving.

Oral Health Conditions

The field of oral health broadly encompasses multiple conditions affecting the teeth, gums, tongue, and mouth such as tooth decay, periodontal (gum) diseases, and oral cancers. In the United States, tooth decay is one of the most common chronic health conditions:

- *Children:* Dental caries, the disease process that causes tooth decay (cavities), is *the* most common chronic disease in children and adolescents aged 6 to 19 years. It is four times more common than asthma among adolescents aged 14 to 17 years.[10] Data from the 2011–2014 National Health and Nutrition Examination Survey (NHANES) showed that 18.6 percent of children aged 5-19 years had untreated dental decay, and children and adolescents in this age group from low-income families are twice as likely (25%) to have tooth decay, compared with children from higher-income households (11%).[11] There have been improvements for young children suggesting a decrease of tooth decay in primary teeth.[12,13] However, the rate of untreated tooth decay in primary teeth was twice as high for Hispanic and non-Hispanic black children compared with non-Hispanic white children 2 to 8 years.[14]

- *Adults:* According to the CDC, more than 80 percent of adults have had decay in at least one tooth by age 34.[15] Among working age adults (aged 20–64), 91 percent had evidence of dental disease and 27 percent had untreated tooth decay.[16]

Oral cancers found in the oral cavity, pharynx, larynx, the paranasal sinuses, nasal cavity, and salivary glands are predominantly caused by one or more behavioral, environmental, cultural, and viral factors with a majority (about 75%) of these attributed to alcohol and tobacco use.[17] Although it is responsible for relatively small proportions of cancer morbidity and mortality, oral cancer is preventable through addressing common risk factors. [18,19] Studies show that an increasing proportion (approximately 60% to 70%) of oropharyngeal cancers, which comprise the tonsils, base of the tongue, soft palate, and lateral and posterior oropharyngeal walls, may be linked to the Human Papilloma Virus (HPV). The most common sexually transmitted virus and infection in the U.S., HPV can remain dormant for many years without being detected or developing into cancer. The primary focus of HPV vaccination has been on reducing cervical cancer, however it is an important prevention strategy for oral health as well, as HPV is now the leading cause of oropharyngeal cancers and rates have increased in recent years. [20,21]

Oral diseases in adults, including dental caries, periodontal (gum) diseases and oral cancer can be progressive, cumulative, and complicated by a host of chronic systemic diseases and conditions.[22,23] Evidence increasingly suggests a bi-directional association between oral health and common chronic non-communicable diseases such as diabetes, hypertension and cardiovascular diseases, as well as between periodontal diseases and complications of chronic conditions.[24,25] Similarly, evidence increasingly shows the impact of oral diseases on systemic health and quality of life. More than 100 medical conditions have oral manifestations, including nutritional deficiencies, autoimmune diseases, cardiovascular diseases, stroke, respiratory infections, diabetes and pancreatic cancer.[26] Although longer life spans and improved preventive services have resulted in longer retention of teeth, another outcome is an increasing caries and periodontal disease burden for older adults.[27]

Individually directed behaviors can help prevent common dental diseases such as dental caries. Behaviors contributing to oral diseases include poor dietary habits, frequent soda and sugary drink consumption, the use of tobacco and alcohol products, and substance abuse. Tobacco use has a devastating effect on both the general and oral health.[28] At the same time, factors such as medically compromised status, medication usage, and lifestyle choices also influence oral disease risk. Further, the

social determinants of health including socioeconomic and racial inequity can impact oral health outcomes.

Social Determinants of Health

Improving oral health should be a feature of interventions and activities to reduce health disparities at the state and territorial levels as the social determinants of health and inadequate access to dental care contribute to profound oral health disparities in the United States.[29] Data available in mid-2018 from the CDC[30] indicate that, along with data already cited:

- Overall: Non-Hispanic blacks, Hispanics, and American Indians and Alaska Natives generally have the poorest oral health of any racial and ethnic groups in the United States.

- Children and Tooth Decay: The greatest racial and ethnic disparity among children aged 2–4 years and aged 6–8 years is seen in Mexican-American and black, non-Hispanic children.

- Adults and Untreated Tooth Decay: Blacks, non-Hispanics, and Mexican-Americans aged 35–44 years' experience untreated tooth decay nearly twice as much as white, non-Hispanics.

- Tooth Decay and Education: Adults aged 35–44 years with less than a high school education experience untreated tooth decay at a rate nearly three times that of adults with at least some college education. In addition, adults aged 35–44 years with less than a high school education experience destructive periodontal (gum) disease at a rate nearly three times than that of adults with a least some college education.[31] Children of ethnic minorities and children whose primary caregiver has limited education are also less likely to have access to dental services than white children and children whose primary caregivers have had more education.[32]

There is a notable social and economic burden associated with inadequate access to dental care. Access is affected by a variety of social, cultural, economic, structural and geographic factors, including in many respects the separation of oral healthcare from overall healthcare. Most dental care in the U.S. is delivered by private practices operating as small businesses that are not connected to medical care systems or networks.

Another factor impacting dental care access is the difference between medical (health) insurance and dental insurance. Dental insurance, which is often tied to employment, is more of a subsidy to offset expenses and subject to limits; at the same time, however, it is often a significant factor or determinant of access to and utilization of oral healthcare.[33] States are required to provide dental benefits to children covered by Medicaid and the Children's Health Insurance Program (CHIP) through the Early and Periodic Screening, Diagnostic and Treatment (EPSDT) benefit, but states may choose whether to provide dental benefits for adults (and with what scope). The children's EPSDT benefit cannot be limited to emergency services.[34] In comparison, states are not required to offer dental coverage to Medicaid-enrolled adults, resulting in an uneven patchwork of dental coverage. Some states offer no dental or emergency-only dental benefits, while others have limited or extensive programs.[35] For individuals enrolled in Medicare, there is little to no coverage of dental services. Specifically, Medicare will currently only pay for dental services that are an integral part of a covered procedure. They will also pay for oral examinations, but not treatment, in preparation for surgeries or other procedures.[36] Lack of dental insurance can be a deterrent to individuals seeking routine preventive care, which may result in individuals delaying care until more serious oral health conditions present.[37]

Economic Impact of Poor Health

Poor oral health outcomes can exacerbate disparities in both health and economic well-being. Children with poor oral health may experience difficulties with learning, school attendance and socialization, and are more likely to experience problems with oral health when they reach adulthood, compared with children with better oral health. These issues are particularly challenging for those with special healthcare needs and may continue to be problems throughout their lifespan.[38]

Among adults, estimates of work hours lost that may depend on assumptions and how distinctions are made between planned and unplanned care likely underestimate the impact of dental disease in this respect. The cost of untreated conditions cannot easily be estimated. A common estimate is that employed adults lose more than 164 million hours of work each year due to oral diseases and conditions.[39] The CDC reports that on average, costs related to dental care exceed $113 billion a year, and that more than $6 billion of productivity is lost each year when people miss work because of dental problems or to get dental care.[40] Adults with untreated tooth decay or other oral diseases may be compromised in their ability to obtain or advance in education or employment. They may be less able to be productive members of society, particularly economically, if they cannot find employment because of an unattractive oral condition or cannot stay employed if they must miss work due to a dental problem or a dental-related medical problem.

Access to preventive and restorative services reduces healthcare costs. For example, preventive procedures can help prevent tooth decay in young children, particularly early childhood caries (ECC), a more virulent form of the disease. In addition, providing oral healthcare to pregnant and postpartum women is an important element of perinatal care, as it both improves oral health for the mothers and reduces the incidence of caries for their newborn children.[41] Periodontal disease can have an adverse effect on birth outcomes, affecting length of gestation and birthweight.[42] In contrast, lack of access to oral health services often leads to increased healthcare costs related to the impact of poor oral health on chronic disease and on overall health. Increased costs include but are not limited to those resulting from expensive hospital emergency department visits.[43] Emergency department dental care is generally palliative, meaning that treatment provides relief from symptoms but does not treat the condition.

Oral Health & Other Public Health Concerns

Dental pain has contributed to the opioid abuse epidemic in the U.S., resulting in tragedy for families and society, as well as increased healthcare costs. Prescribing practices for acute dental pain have been under scrutiny and alternative approaches are increasingly stressed.[44] Improving access to oral healthcare services must be part of strategies to reduce opioid abuse as well as the costly overuse of hospital emergency departments.

Another emerging area of concern is antibiotic resistance, which is an increasingly serious public health threat. Antibiotic prescriptions may be unnecessary, and may also lead to adverse health events, contributing to healthcare costs and resulting in emergency department visits. As the prescribers of approximately 13.17 percent of outpatient antibiotics,[45] dentists are among the highest prescribers of these medications and have an important role to play in strategies to manage and reduce antibiotic use.[46,47,48]

STRATEGIES AND PROMISING PRACTICES TO IMPROVE ORAL HEALTH

Given the multi-faceted factors impacting oral health, S/TOHPs are looking to support evidence-based interventions, programs and policies that improve oral health. S/TOHPs should consider programmatic and policy levers the state and territorial agency can use, how to tailor approaches based on findings from surveillance data and their state's context. In particular, S/TOHPs should structure and implement programs and interventions that are evidence-based and culturally literate and appropriate, given oral health disparities observed among African-Americans, non-Hispanic blacks, Hispanics, and American Indians and Alaska Natives.[49] Further, S/THOs should consider materials and programs that also account for the diversity of languages spoken in different communities.

Enhancing the Capacity of S/TOHPs

A significant number of states (21) do not have an ongoing and coordinated oral health surveillance system that meets the definition established by ASTDD and the Council of State and Territorial Epidemiologists[50] that allows them to (1) monitor the oral health of their residents, (2) document and monitor disparities, or (3) evaluate programs. These systems provide data that allow health officials to identify successes and areas for improvement. In 2017-2018, 54 percent (27 states) reported having a written oral health surveillance plan, a key component of any surveillance system.[51]

S/TOHPs play a critical role in improving oral health and need to have the infrastructure and capacity in every agency to robustly plan, deliver, and evaluate dental public health activities and services. Strategies and promising practices for S/THAs to consider include promoting the use of the Guidelines for State and Territorial Oral Health Programs developed by ASTDD to assist health agency officials and public health administrators develop and operate strong oral health programs. [52] The *Guidelines* present a matrix of state and territorial oral health program roles for each of the ten essential public health services, and includes examples of specific activities for each role with links to selected resources to help programs accomplish the activities as listed on the right (Figure 1).

Figure 1: 10 Essential Public Health Services to Promote Oral Health

- Assess oral health status and implement an oral health surveillance system;
- Analyze determinants of oral health and respond to health hazards in the community;
- Assess public perceptions about oral health issues and educate/empower people to achieve and maintain optimal oral health;
- Mobilize community partners to leverage resources and advocate for/act on oral health issues;
- Develop and implement policies and systematic plans that support state and community oral health efforts;
- Review, educate about and enforce laws and regulations that promote oral health and ensure safe oral health practices;
- Reduce barriers to care and assure use of personal and population-based oral health services;
- Assure an adequate and competent public and private oral health workforce;
- Evaluate effectiveness, accessibility and quality of personal and population-based oral health promotion activities and oral health services; and
- Conduct and review research for new insights and innovative solutions to oral health problems.

In order to support S/TOHP infrastructure and capacity, sustainable funding is needed for planning, developing, implementing and evaluating oral disease prevention and education services and programs, and to assure oral health surveillance systems to monitor oral health outcomes. ASTDD's annual Synopses of State Dental Public Health Programs showed that for 2017-2018, 22 states reported a decrease in total funding.[53] Promising practices include identifying diverse funding

sources and partner with non-traditional stakeholders while maintaining a stable, predictable base for core functions and general operations.

Another critical element of the S/TOHP infrastructure is robust, state– or territorial–based oral health surveillance systems that monitor oral health outcomes, access to dental care, individual risk factors and risk determinants, availability of interventions, workforce issues, public health infrastructure, and public policies.[54] For example, oral health surveillance data can be used and enhanced to conduct surveillance of behavioral risk factors and social determinants of health, as well as monitor environmental change policies related to oral health and chronic disease risk factors. Another example is to collect, use, and disseminate data on the prevalence of oral diseases and use of preventive oral health services, including school-based sealant programs. These data can be cross-referenced with data on obesity, tobacco use, diabetes, and hypertension. S/TOHPs can also collect and disseminate surveillance data for oral and oropharyngeal cancer to assess burden and trends and to identify high-risk populations. Further, in recognition of the need to address oral health disparities, S/TOHPs can monitor social and environmental factors that influence health, as well as policies that affect chronic diseases, such as those related to smoking, access to healthy foods, and community water fluoridation (CWF). As with the funding of the S/TOHP, funding these surveillance systems need to be included by state/territorial budgets and federal grants; other public or private funds may be needed to augment other funding.

Focusing on Prevention

As with other public health efforts, individual and community-based prevention activities remain a critical foundation for improving oral health outcomes. The CDC recognizes community water fluoridation (CWF) as one of ten great public health achievements of the 20th century, and this is because people of all ages who live in communities with CWF experience 25 percent fewer cavities (over a lifetime) than people who do not have access to water fluoridation, contributing to better oral and overall health and lowering healthcare costs – a positive return on investment.[55] About three-quarters of the US population on public water systems have access to fluoridated drinking water. Expanding access to CWF, as a safe and proven intervention to prevent dental decay remains an evidence-based strategy to improve oral health. Working collaboratively through partnerships and coalitions can lessen challenges to CWF."

Along with CWF, dental sealants are another technology that can prevent tooth decay. Dental sealants are thin plastic coatings applied to children's molar teeth by dental professionals, either in clinical settings or school-based settings, at targeted ages when those teeth are emerging into the mouth. Sealants are a proven method to prevent dental caries; on average, sealants protect against 80 percent of cavities for two years and continue to protect against 50 percent of cavities for up to four years.[56] However, NHANES data from 2011-2014 show only 44 percent of 6 to 11-year-olds had received dental sealants; about 7 million low-income children need sealants. The most efficient way to reach large numbers of children is through school-based dental sealant programs targeted to schools serving high percentages of low-income children. The CDC suggests that up to $300 million in dental treatment costs could be saved if those 7 million low-income children identified as needing sealants received them in school-based programs.[57] Awareness of dental sealants corresponded to disparities in sealant prevalence. S/TOHPs have an opportunity to help increase knowledge of dental sealants among low-income and racial/ethnic minority parents to help combat health disparities.[58]

The emergence of oral cancer prevention activities – such as the Oral Health Foundation's Mouth Cancer Action Month – are an example of increasingly important cross-sector collaborations linking disease prevention activities to evidence-based intervention strategies. Promotion of the HPV vaccine, for

example, can simultaneously demonstrate the potential of the impact of social marketing, as an effective communication strategy in parental acceptance of the vaccine for adolescents. Such messages can include the importance of referrals to primary care medical and dental providers for HPV vaccination, and might also form the basis of broader, community-based campaigns employing public health approaches, using risk communications techniques and message framing appropriate to the intended audiences. Engaging public health providers and provider associations in crafting messaging and outreach campaigns can further enhance its effectiveness, while also developing an important relationship between public and clinical health.

For example, collaborative partnerships and referral networks can empower an interprofessional workforce of dental and medical practitioners to promote use of the HPV vaccine for their patients and increase the rates of completion of the HPV vaccination series. A cost-effective approach to promote overall health in evidence-based interventions is to incorporate HPV-related OPC awareness strategies into oral health promotion efforts and healthcare professional academic curricula.[59]

Given the bi-directional association between oral health and common chronic non-communicable diseases, another important prevention strategy linking oral health promotion and dental disease prevention activities to evidence-based intervention strategies as outlined in the CDC's Four Domains of Chronic Disease Prevention.[60] Activities can include supporting programs and policies that expand access to and availability of healthy foods and beverages to promote healthy nutrition and reduced consumption of sugar sweetened beverages and foods to reduce the prevalence of non-communicable diseases and obesity, oral disease, and untreated tooth decay.[61]

Aligning Oral Health Activities with Primary Care

S/TOHPs are looking to bridge oral health education, prevention, and treatment interventions with primary healthcare system activities in recognition that oral health is a vital component of overall health and well-being and a critical public health issue in a state's or territory's overall strategy to improve health and eliminate health disparities.

Strategies include expanding access to and use of clinical and preventive oral health services for children and adults; defining high-impact preventive services; establishing patient/family-centered medical and dental homes; and screening for high blood pressure, diabetes and prediabetes in dental offices. High-impact preventive services include topical fluoride application, community water fluoridation, sealant application, prophylaxis (cleaning), and periodic examination by a general dentist. Evidence shows that implementing preventive practices results in substantial cost savings for both patients and payers.[62]

Supporting specific opportunities for collaboration between dental and medical providers can align oral health with primary care. Examples include working together to provide and offer patients services such as anticipatory guidance, risk assessment, early identification of disease, and bi-directional referral interventions related to oral health conditions and chronic disease. Other prime collaboration opportunities include incorporating fluoride varnish application for children into medical settings and pre-screening for pre-diabetes and hypertension into dental settings, as well as developing and implementing shared policies around the use and prescription of pain medications (i.e., opioids), antibiotics, and HPV vaccination.

Another area for coordination and collaboration between oral health and primary care is to assure that cancer survivorship initiatives address access to needed oral healthcare. As CDC's Division of Cancer Prevention and Control notes, "public health organizations have an important role in developing

approaches at multiple levels from interventions for survivors to changes in health systems policy," addressing inequities in access to medical care. Maintaining optimum oral health should be an integrated component of such efforts.[63]

Addressing Access, Health Coverage, and Delivery

As noted in the discussion on the social determinants of health, difficulties accessing oral health services can exacerbate health disparities. One strategy to reduce oral health disparities is to support oral health workforce development by monitoring and advocating for Dental Health Professional Shortage Areas (D-HPSAs) with the state/territorial primary care office and S/TOHP. Although D-HPSA status alone is insufficient to draw federal or other resources to address the need, states are still encouraged to provide and/or support dental loan repayment programs, workforce training in specific service locations, and other oral health professional development activities.[64]

Beyond workforce capacity, insurance coverage is also a factor in accessing needed oral health services. S/TOHPs can promote policies that increase access to quality oral healthcare through Medicaid and private health insurance plans. For example, state/territorial health officials and S/TOHPs can work with Medicaid agencies to develop oral health performance improvement projects and other activities to increase access to quality oral services through Medicaid.[65] Data from the Medical Expenditure Panel Survey demonstrated that when a preventive dental benefit was provided for adult Medicaid recipients, medical costs for patients with seven chronic conditions were lowered from 67 to 31 percent.[66] S/TOHPs can encourage testing of innovative workforce models and policies that allow all licensed dental providers to practice to the full extent of their education and training.[67]

Encouraging the development and establishment of dental-medical homes is another strategy to increase delivery of care and improve outcomes. A dental home, the ongoing relationship between dentist and patient that considers all aspects of oral healthcare, has been shown to improve the patient-centeredness and quality of care.[68] Evidence further suggests that the physical colocation of primary care and oral healthcare providers can improve patient health outcomes by increasing referrals to a dentist (35%), increasing screening for universal caries risks (85%), and increasing application of fluoride varnish (80%).[69] State and territorial health officials and S/TOHPs can support policies that establish dental homes. Examples of policies include allowing Medicaid to pay for periodontal services and incorporating dental services into a state's activity around accountable care organizations or innovative payment systems. Other examples focus on the use of data, specifically requiring or promoting shared data systems across providers (so patient information is accessible to both physicians and dentists) and/or requiring managed care organizations and/or Medicaid program to collect data that allow a state to study the interaction between medical and dental care.[70]

Beyond the establishment of dental-medical homes, state and health systems are considering new models to deliver care, such as utilizing dental therapists or teledentistry.[71] Dental therapists have been described as "members of the dental team in many countries, where they perform a limited number of irreversible restorative procedures," and have been used in Alaska and Minnesota to increase access to care.[72] Teledentistry pilots using telehealth modalities such as live video and store-and-forward technology are also emerging as a strategy to further increase access to care, particularly in rural areas.[73,74] S/TOHPs should look to evaluate the emerging evidence on these programs and consider priorities for other activities described here as they prioritize additional strategies to enhance oral health outcomes in their jurisdictions.

Improving oral health and reducing health disparities will require a multi-faceted approach that considers the underlying factors that contribute to poor health outcomes, ranging from the social determinants of health, behaviors, and environmental factors. S/TOHPs and their partners should consider leveraging the evidence-based strategies described as a suite of interconnected activities, rather than single strategies. Improving oral health requires dedicated resources and strategic thinking that considers both evidence-based strategies where available, as well as looking to emerging strategies that may hold promise for the future.

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