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Where oral health lives

Guidelines for State and Territorial Oral Health Programs

Association of State and Territorial Dental Directors

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Introduction and Overview

History and Purpose

The Association of State and Territorial Dental Directors (ASTDD) first developed *Guidelines for State Dental Public Health Programs* in the early 1980s and later changed the title to incorporate territories and reflect the transition from use of the term "dental health" to "oral health." Numerous individuals, national organizations and federal and state agencies participated in its development and review. The document was approved by the Association of State and Territorial Health Officials in 1985 and distributed to all states and territories. Revisions until 2010 primarily changed the title and updated the background narrative but not the actual guidelines. Links to ASTDD's Best Practices reports and state/community practice descriptions were introduced in 2006. The 2010 edition reflected updates to the entire document, while in 2013 only Part II was updated. The 2015 edition reflects updates to the entire document. Since its original release, the *Guidelines* document has been used by federal, state, territorial and local government officials and public health program administrators in grant guidance and performance measures; for development, self-assessment and formal external review of oral health programs; education of legislators, policymakers and funders; and orientation of staff and coalitions.

Relevance

Oral health issues gained renewed national focus in 2000 with the release of *Oral Health in America, A Report of the Surgeon General.* [1] This report, along with the *Healthy People Objectives for the Nation*,[2] provides a framework for the prevention of oral diseases and the promotion of oral health. The Surgeon General's Report was followed in 2003 by *A National Call to Action to Promote Oral Health*,[3] and two Institute of Medicine reports [4,5] intended to engage communities, stimulate initiatives, and expand efforts to improve oral health and eliminate oral health disparities through effective collaboration among stakeholders at all levels, including patients, health care providers, communities and policymakers. Numerous other national, state and local activities have emerged from these initiatives to fulfill former Surgeon General C. Everett Koop's statement, "You're not healthy without good oral health."[1]

Public health guidelines continue to be vital in shaping the development of effective and efficient policies, programs, services and practices at all government levels. A strong oral health program enhances the effectiveness of state health agencies in assuring and protecting the health of their residents. Oral health programs' role in describing and quantifying oral diseases, available resources, potential policies, and intersection with other health, environmental, and human services programs, assists states in addressing the overall health of the population and the community. The *Guidelines* promote the oral health program's interaction and collaboration with governmental agencies external to the state health agency and with organizations and other groups in the private, public, voluntary, and non-profit sectors. In 2009 ASTDD published a companion document, *ASTDD Competencies for State Oral Health Programs*[6] that outlines the skills needed to accomplish the roles and activities in the Guidelines.

Format

Guidelines for State and Territorial Oral Health Programs was developed to provide a framework for state and territorial oral health programs to implement the public health core functions of assessment, policy development and assurance, and the Essential Public Health

Services to Promote Oral Health. This framework is flexible to accommodate the significant variability in demographic, political, social, and economic contexts across states and territories.

Section I of this document provides background information under two headings: 1) Importance of Oral Health and Burden of Disease and 2) Oral Health Program Capacity and Infrastructure. The second portion also includes strategies for success and recommendations for state health officers and policymakers regarding state oral health program capacity and infrastructure, many taken from a 2013 publication, *State Oral Health Infrastructure and Capacity: Reflecting on Progress and Charting the Future*.[7] References are listed at the end of the section and are hyperlinked if they are available online.

Section II provides a matrix using the Core Public Health Functions of Assessment, Policy Development and Assurance as well as the Ten Essential Public Health Services to Promote Oral Health in the U.S. to show the various roles for oral health programs paired with examples of activities to accomplish the roles and links to a selection of resources to assist states. This framework allows use by any oral health program, regardless of its stage in infrastructure and capacity building.

Note: in most sections of the document, use of the term “state” also implies “U.S. territories and jurisdictions.”

SECTION I

Importance of Oral Health and the Burden of Oral Diseases

This section provides an overview of oral health disparities that highlight the need for strong state oral health programs, with a major focus on oral health promotion and population-based preventive programs.

The Importance of Oral Health

The mouth and teeth are integral to human health and well-being. As such, oral health means more than healthy teeth and gums. We use our mouths to express thoughts and feelings, to talk, sing and provide our bodies with nutrition. When we lose the functions of the mouth and teeth, we lose our health. A growing body of evidence demonstrates associations between oral diseases and systemic health.[8,9] Chronic disabling diseases and conditions such as temporomandibular joint disorders, Sjogren's syndrome, diabetes, and osteoporosis affect millions of Americans and compromise oral health and functioning. Bacterial infections of the mouth may lead to local opportunistic infections in other parts of the body. Signs of certain systemic diseases and conditions may first be manifested in the mouth. This relationship makes characteristics of the oral cavity a potential diagnostic tool for health professionals. The association between oral diseases and systemic diseases and conditions such as diabetes, cardiovascular disease, and pre-term and low birth weight deliveries is based on a growing body of research that may eventually prove vital in the ongoing debate over controlling rising health care costs and chronic disease prevention. While many of these associations are well established, whether there is a "cause and effect" relationship remains unclear. As new evidence arises, these oral-systemic linkages will present both an opportunity and a growing challenge for state oral health programs.

> ***The mouth provides a window to the health of the entire body.***

Improvement in the oral health of Americans is one of the major public health successes of this past century.[10] For example, the prevalence of tooth decay in permanent teeth has decreased for children, teens, and adults.[11] However, these improvements have not been experienced uniformly. Many still experience needless pain and suffering, have oral diseases that impact their overall health and well-being, and have financial and social costs that diminish their quality of life and burden society.

The Burden of Oral Diseases Through the Lifespan

> ***A "silent epidemic" of oral diseases is affecting our most vulnerable citizens: poor children, the elderly, and members of racial and ethnic minorities*** [12]

Oral diseases, including dental caries (tooth decay) and periodontal disease (gum disease), are progressive, cumulative and become more complex over time, affecting people at every stage of life. This creates a significant burden on individuals, public health systems and dental care systems. Many states have highlighted the impact of oral disease in state oral health burden documents or oral health fact sheets.[13]

Oral Diseases in Children (the term "children" in this document includes adolescents)

Data from the National Health and Nutrition Examination Survey (NHANES)[11,14] suggest the following trends:

- Tooth decay in primary teeth of children aged 2 to 5 years increased from 24% to 28% between 1988-1994 and 1999-2004 but declined to 23% in 2011-2012.
- Untreated dental decay among children aged 2 to 5 years increased from 16% in 1988-1994 to 19% in 1999-2004 but decreased to 10% in 2011-2012.
- The prevalence of tooth decay in the permanent teeth of children aged 6 to 11 years decreased from approximately 25% in 1988-1994 to 21% in 1999-2004 and remained steady at 21% in 2011-12.
- Untreated dental decay in the permanent teeth of children aged 6 to 11 years decreased from 9% in 1988-1994 to 6% in 2011-2012.
- Among adolescents aged 12 to 19 years, tooth decay decreased from 68% in 1988-1994 to 59% in 1999-2004. In 2011-2012, 58% of adolescents aged 12 to 19 years had tooth decay.
- Untreated dental decay among adolescents 12 to 19 years decreased from 21% in 1988-1994 to 15% in 2011-2012.

Despite decreases in decay in permanent teeth, almost 25% of children aged 2-5 years had tooth decay in their primary (baby) teeth.[14]

Oral Diseases in Adults

Data from the National Health and Nutrition Examination Survey (NHANES) reveal some changes in adult oral health related to dental decay and provide updated information on the prevalence of decay and gum disease:[11,15]

- Among seniors aged 65 years and older, the percentage with complete tooth loss (edentulism) decreased from 34% in 1988-94 to 19% in 2011-2012.
- Approximately 91% of adults aged 20–64 had dental caries in permanent teeth in 2011–2012.
- During 2011–2012, about 27% of adults aged 20–64 had untreated tooth decay in permanent teeth, similar to the percent in 1988-1994 (28%).
- The percent of adults aged 65 years and older with untreated tooth decay decreased from 28% in 1988-1994 to 19% in 2011-2012.
- In 2011-2012, about 39% of adults aged 30 years or older and 64% of adults aged 65 years and older had either moderate or severe gum disease.

According to the American Cancer Society, an estimated 39,500 new cases of oral cancer were expected in 2015.[16] Some risk factors for oral cancer, including tobacco and alcohol use, are similar to other cancers.

- These cancers are more than twice as common in men as in women.
- They are about equally common in blacks and in whites.
- In recent years, the overall rate of new cases of this disease has been stable in men and dropping slightly in women. However, there has been a recent rise in cases of oropharyngeal cancer linked to infection with human papilloma virus (HPV) in white men and women.

Oral cancer accounts for a greater percentage of U.S. cases of cancer than ovarian, cervical, thyroid, or brain cancer.[16]

- The death rate for these cancers has been decreasing over the last 30 years.
- 8,650 people in the U.S. were projected to die of oral cancer in 2015. This is 1.5% of the total deaths caused by cancer.
- Survival rates differ by race, with whites experiencing an increase in 5-year survival from 54% to 67% between 1974-77 to 2004-10. African Americans increased their 5-year survival rate from 36% in 1974-77 to 45% in 2004-2010.
- The 5- and 10-year relative survival rates for people with cancer of the oral cavity or pharynx are 63% and 51%, respectively. Less than one-third (31%) of cases are diagnosed at a local stage, for which 5-year survival is 83%.
- The incidence of cancer of the oral cavity and pharynx is ranked 8th among the top 10 sites for cancer for men.

Disparities in Oral Disease Rates Among Population Groups

Data from NHANES and the Behavioral Risk Factor Surveillance System (BRFSS) show that dental caries remains a problem for some racial and ethnic groups.[11, 14, 15, 17, 18]

Oral health disparities exist by age, ethnicity, economic status and disability status.

- 46% of Hispanic children aged 2 to 8 years had experienced decay in their primary teeth, compared with 31% of non-Hispanic white children.
- For adults aged 20-64 years, the prevalence of untreated decay was 22% among non-Hispanic whites, 42% among non-Hispanic blacks and 36% among Hispanics.

There were also economic disparities:

- More than twice as many children aged 3-5 (25%) from families with incomes below the federal poverty level (FPL) had untreated tooth decay, compared with children from families with incomes above FPL (11%).
- Among adolescents aged 13-15 years, the prevalence of protective dental sealants was lower among adolescents from families with incomes below the FPL (40%) compared with adolescents from families with incomes above FPL (53%).
- Low-income seniors (< $15,000/year) are substantially more likely to have no natural teeth (32%) compared to seniors with an income of $50,000 or more (6%).

Persons with disabilities often experience complex oral problems. According to the U.S. Census Bureau, almost 57 million people had a disability in 2010, including 5 million children under 15 years of age.[19] Almost 15% of U.S. children have special health care needs, and 23% percent of households with children include at least one child with a special health care need (CSHCN).[20]

Two telephone surveys collect national and state data on the oral health of children with special health care needs: National Survey of Children with Special Health Care Needs (2009/2010) [20] and the National Survey of Children's Health - (2011/2012)[21]

The National Survey of Children with Special Health Care Needs asked parents if their child had a preventive dental visit in the last year and if they needed other non-preventive dental services including orthodontia. While 86% reported that their CSHCN had a preventive dental visit, 27% reported a need for additional non-preventive dental services. The survey also identified the health services "needed but not received" by CSHCN and found that dental care was the second most frequently needed but not received health service (5%), exceeded only by the need for mental health services (6%).

Access to Oral Health Services

Nationally, 42 million people do not have health insurance, while 130 million do not have dental insurance [23,24]

In recent years, there have been changes in the patterns of dental care use among the U.S. population. Dental care utilization among children has been increasing due mainly to gains among lower-income children. Among working-age adults, dental care use has been declining for all income groups. As a result, the gap in percent with an annual dental visit between low-income and high-income children has narrowed while for adults it has widened.[22] Many individuals, including seniors, homeless persons, those from low socioeconomic status families, racial and ethnic minorities, non-English-speakers, homebound individuals, migrant and seasonal workers, persons with special health needs including HIV, incarcerated persons, infants and young children, have unique problems that interfere with their access to oral health services.

Limiting factors include the availability of providers, restrictive state dental practice acts, few school-based health centers that provide dental services, not having a regular source of health or dental care, not having health or dental insurance, lack of awareness of the importance of oral health by both individuals and non-dental health care providers, and cultural values and beliefs.

Dental Access and Utilization for Children

Dental care received in childhood is a major factor in preventing poor oral health in later years.

Dental care is the most prevalent unmet health need in U.S. children; 14% of 3-5 year olds and 17% of 6-9 year olds have untreated tooth decay.[17] Low-income and minority children are at greatest risk of inadequate access and poor oral health.[17,21]

Historically, utilization rates for the preschool segment of the population have been lower than for any other age group in the United States. Recently there has been a progressive increase in utilization. In 2011/2012, 55% of children aged 1-5 years and 88% of children 6-11 years had visited a dentist in the previous year.[21]

The most reliable and recent data on dental care utilization are from the 2012 Medical Expenditure Panel Survey (MEPS), a nationally representative survey that collects data on medical (and dental) expenditures and health care coverage for both individuals and households in the U.S civilian non-institutionalized population.[25] Unlike other surveys, such as the National Health Interview Survey (NHIS), MEPS involves in-home interviews and collection of expenditure and utilization data based on physical evidence of expenditures.

Findings for children under age 21 from the 2012 MEPS survey include: [22,26]

- Hispanic and non-Hispanic blacks were less likely to have visited a dentist in the last year than non-Hispanic whites (38%, 39% and 52% respectively).
- The highest-income children were more likely to have had a dental visit than the lowest-income children (61% and 35% respectively).
- The likelihood of a dental visit varied by age with approximately 20% of children under age 5 but 58% of children aged 5-17 years old having a visit.
- Children with private health insurance coverage were more likely to have visited a dentist than children with public health insurance or those with no insurance (54%, 39% and 23% respectively.)
- The percentage of children with private dental benefits was 50%, while the percentage with public benefits was 37%.
- The average dental care expenditure in 2012 for children under age 21 was $293.

Dental Access and Utilization for Adults

Findings for adults (ages 21-64) from the 2012 MEPS survey include: [22,26]

- The likelihood of having a dental visit varied by age, family income, race/ethnicity and education. While 52% of adults with high income had a visit, only half as many (21%) with low income had at least one dental visit during the year.
- Hispanic and non-Hispanic blacks were less likely to have visited a dentist in the last year than non-Hispanic whites (24%, 27% and 44% respectively).
- Adults with more than a high school education were more likely to have visited a dentist than those with less than a high school education (18% and 47% respectively).

About 56% of adults had private dental coverage and 34% of adults had no dental coverage during 2012.[22]

Among adults aged 18+ years, 67% reported having a dental visit in the past year during 2012, compared with 70% reporting a visit in the past year during 1999.[18]

Findings for older adults (ages 65 and older) from the 2012 MEPS survey[27] include:

- Approximately 44% of those aged 65+ years had at least one dental visit in the past year.
- While 60% of older adults from a high-income family had at least one dental visit during the year, about 39% of older adults from a poor or low-income family had at least one dental visit during the year.

Approximately 64% of older adults do not have any dental coverage.[22]

Workforce Issues

Where dental services are located, how many people that professionals are able to treat, whether people can afford treatment or whether there is a way to pay for their care are major factors in the access dilemma. A persistent lack of access to basic oral health care by many sectors of the population is testimony to the fact that the nation has no effective dental "safety net." According to the U.S. Health Services and Resources Administration (HRSA), it would take approximately 7,300 additional dentists to eliminate the current dental health professional shortage area designations.[27] Exacerbating the problem is a decline in the supply of dentists in recent years. Beginning in 2006, the size of the dentist workforce began declining.[28] As a result, several new dental schools have opened and the American Dental Association now projects that the number of practicing dentists per 100,000 population will increase from 61.7 in 2013 to 63.3 in 2033.[29] The dental hygiene workforce is projected to increase by 30% from 2006-2016, which may result in a fewer jobs in some areas unless the job opportunities are expanded.[30]

7,300 additional dentists are needed to eliminate the current dental health professional shortage area designations.[28]

The severity of the oral health access problem has intensified the call for policymakers to address workforce capacity and identify new solutions that meet the needs of all sectors of the U.S. population. Contemporary responses from policymakers to address access and workforce issues are occurring mostly at the state level. States with burgeoning minority populations are increasingly concerned about diversifying their health workforce to reflect the makeup of the population. State solutions have included incentives that encourage dental graduates to work in-state after they graduate and to practice in underserved communities. Regulatory changes in licensure for dental and allied dental professionals include relaxing licensing and continuing education requirements for retired volunteer dentists and expanding the scope of practice of allied dental professionals. Several efforts are underway to create new models of care.[4]

Within the next few years, state and federal public health agencies could lose up to half of their workforce to retirement, the private sector and other opportunities.[31]

Dental Care Expenditures

The societal costs of dental care are substantial and increasing. In 2013, national dental care expenditures were almost $111 billion, compared to about $62.3 billion in 2000 and $87.0 billion in 2005[32]

More than two-fifths of dental expenditures (43%) are out-of-pocket expenses, compared with only one-seventh (14%) of all personal health care expenditures.[32]

The economic burden of dental care falls more heavily on individuals than does that of medical care. Out-of-pocket dollars account for 43% of total expenditures on dental services, compared with about 14% of all personal health care expenditures. Public (federal, state and local) expenditures for dental services increased from 5% in 2000 to 7% in 2005 and 10% in 2013.[32]

Over the last decade, employer-based coverage for children has eroded, while publicly funded health insurance through Medicaid and the Children's Health Insurance Program (CHIP) has expanded to cover 37% of all children in 2013.[22]

The proportion of Medicaid dental expenditures as a percentage of all Medicaid personal health care expenditures was 2% in 2013. In that year, dental expenditures represented 4% of all personal health care expenditures.[32] In other words, as a proportion of all public and private expenditures on health care, we as a nation spend almost twice as much on dental care as Medicaid programs do.

Recent data from the 2012 MEPS reveal the following:[26]

- Among the non-institutionalized population of the US with a dental visit, the average annual expense for dental care in 2012 was about $650; compared to $560 in 2004
- The average annual expense for dental care for those with a visit was about $640 for children (<18 years) and $650 for adults (≥18 years).
- Among adults aged 21-64, average dental expenses increased from $556 in 2004 to $609 in 2012.
- Among adults aged 65 and older, average dental expenses increased from $620 in 2004 to $848 in 2012.

Risk and Protective Factors for Oral Diseases

Risk Factors

While common dental diseases such as dental caries can largely be prevented, some determinants of health such as race, age, poverty, and genetic predisposition lie outside the direct control of individuals. Several common factors prove to be more critical and to some extent controllable. These include plaque and bacterial flora; diet; saliva flow and composition; and mineral and fluoride status.

Current thinking views the caries process as a balance between pathological factors and protective factors, where the following risk factors shift the balance toward the disease process: cariogenic (causing decay) bacteria; fermentable carbohydrates; and salivary dysfunctions.[33]

Other factors such as medically compromised status, medication usage, and behavioral and lifestyle choices also influence the risk for oral diseases. Behavioral choices with high risk for 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 and well-being of the public.

Protective Factors

Featherstone[33] identifies several protective factors that promote good oral health and reduce the risk of caries. These include new antibacterial therapies under development; saliva components and flow; fluoride from extrinsic sources; and calcium and phosphate from saliva.

Daily oral hygiene routines and healthy lifestyle behaviors play an important role in preventing oral diseases. Regular preventive dental visits can reduce the development of dental diseases and facilitate early diagnosis, detection and intervention.

Community water fluoridation has been the basis for the primary prevention of dental caries for 65 years and has been recognized as one of the ten great achievements in public health of the 20th century.[34] Water fluoridation has proven an ideal public health oral disease preventive method because it is effective, safe, inexpensive, requires no behavioral change by individuals, and does not depend on access or availability of professional dental care.[35]

Topical fluorides are applied to the surfaces of the teeth (children or adults) after they have erupted into the mouth to prevent, reduce, or control tooth decay. Common sources of topical fluorides include fluoride toothpaste, mouthrinses, drinking water with optimal levels of fluorides, and concentrated gels, foams, and varnishes. Early scientific views about the beneficial effects of fluoride on reducing caries emphasized the importance of ingested fluorides. However, the current consensus based upon a growing body of scientific evidence is that, while ingested fluorides are beneficial, the major anticaries benefits of fluoride are derived from frequent topical exposures to fluoride at low concentrations. Evidence indicates that more concentrated forms of topical fluoride (e.g., professionally applied topical fluorides) provide additional benefits, particularly in children who are at elevated risk for caries development.[36,37]

Dental sealants (a plastic coating applied to teeth that protects against decay) are effective for protecting susceptible tooth surfaces and have been recommended for use for many years as an effective public health measure to prevent dental caries. If sealants were applied routinely to susceptible tooth surfaces in conjunction with appropriate use of fluoride, most tooth decay in children could be prevented.[1]The prevalence of dental sealants increased from 30% to 41% among children aged 6 to 11 years and from 38% to 43% among adolescents aged 12 to 19 years from *1999-2004 to 2011-2012*.[14]

Maintaining and Enhancing Gains

Over the past 50 years, significant progress has been made in understanding both the causes and methods for preventing common oral diseases, resulting in marked improvements in the nation's oral health. At the same time, however, marked disparities in oral health status and access to oral health services remain. To address these disparities and improve the oral health

of the public, continued support for effective oral disease prevention and oral health promotion efforts is essential.

Oral diseases affect every community, yet it is known that oral diseases and conditions can be prevented and controlled at reasonable cost through personal and population-based preventive interventions. To translate proven health promotion and disease prevention approaches into policy development, health care practice, and personal behaviors, public health agencies must have the capacity and infrastructure to perform the core public health functions and essential services. To do so, public health agencies need strong and vital oral health programs.

New research findings must be integrated with benefits from past advancements in knowledge and technology associated with the prevention, control, and treatment of oral diseases. Future developments in the delivery and financing of health services must include coordinated efforts for effective personal and population-based oral health services that can contribute positively to the oral health of all Americans. Maintaining a strong and adequately staffed and funded oral health program in state public health agencies provides the best assurance that this goal will be realized.

Oral Health Program Capacity and Infrastructure

The ASTDD report, *Building Infrastructure and Capacity in State and Oral Health Programs* provides the following definition for infrastructure and capacity. [38] "An infrastructure consists of systems, people, relationships, and the resources that would enable State oral health programs to perform public health functions. Capacity enables the development of expertise and competence and the implementation of strategies." This section of the *Guidelines* reviews:

1. The current and ever-changing status of state oral health programs, and
2. Successful strategies that help strengthen a state oral health program's infrastructure and capacity.

Federal and state statutes and regulations convey upon public health departments a high degree of responsibility for the protection of public health and the creation of a wholesome environment. These responsibilities include the achievement of equal access to quality health care at a reasonable cost. The *National Health Planning and Resources Development Act* (P.L.93-641, 1975) listed "the promotion of activities for the prevention of disease...and the provision of preventive health care services" as national priorities.[39] The very nature of these goals gives credence to the fact that health is defined in its broadest terms--inclusive of oral health. Yet *Oral Health in America: A Report of the Surgeon General* states, "The public health infrastructure for oral health is insufficient to address the needs of disadvantaged groups, and the integration of oral and general health programs is lacking".[1]

The structure of state-based public health services is undergoing significant change. Just as state health agencies vary greatly in size, structure, staffing and funding, so do state oral health programs. One frequently hears, "If you've seen one state oral health program, then you've seen one state oral health program—they were not made from cookie cutters."

Like most public health entities, a state oral health program is affected by national and local economies, new scientific research and health policy trends.

Structure and Placement of Programs

Where the oral health program is placed affects the program director's level of authority, reporting relationship, hiring process, funding and the program's focus.

Most oral health programs are housed within a state health department or a broader department of human services. The status of the "program" varies widely. In 2014, 28 states reported being classified as Programs, nine were Offices, four were Bureaus, three were Divisions, two were Sections, two were Units and there was one Branch and one Service Area.[40] Whatever the designation, most states place oral health programs or functions under a broader organizational umbrella such as maternal and child health (MCH), family health, rural health, primary care, chronic disease or disease prevention and health promotion.

In FY 2013-2014, 26 states reported having a statutory basis for their program, meaning a state law requiring an oral health program **or** the requirement for a state dental director; 46% of 50 responding states had a statutory basis for their program and 52% had a statutory requirement for the director position.[40] These are not necessarily the same states: three don't have a

statutory basis for their program, but do for the director position, while 10 have statutory basis for the program but not for the director.

Staffing

For FY 2013-2014, 45 of the 49 reporting states and the District of Columbia reported having a full-time dental director.[40] Most dental directors (67%) had served in this role for four years or less, and only four had served for 15 years or more. In recent years the turnover in state dental directors has been high, especially among new directors. Vacancy rates have fluctuated at around 10%. Some of the reasons noted for dental director turnover are inadequate understanding of and frustration with bureaucracies, inadequate compensation, inadequate support and funding from state public health administrators or the legislature, better opportunities and retirement.

Of 50 states responding to the 2015 ASTDD Synopses Survey, 40 required public health experience but only eight required a public health degree.[40] About 29% of the directors held an MPH/MSPH degree; six others held a MS, MPA, MSHA, MBA or PhD.[40] Nine states had a dental director without a dental or dental hygiene degree. Professionals being hired into state dental director positions may not have the public health experience or skills needed in today's public health environment.

Although the majority of dental director positions are full-time, many have other responsibilities in addition to administering the state oral health program. In 2013-2014, 15 directors devoted at least 20% of their time to Medicaid dental issues. [40] Many serve in an advisory capacity to other programs or state agencies. While most reported being state employees, five were appointed by the state health officer, governor or other official, one was contractual and three others had some other arrangement. The position status of a dental director can greatly influence the selection process and requirements as well as the continuity of a program if the director changes with a change in administration.

> ***Lack of continuity in state oral health program leadership is a serious problem and can interfere with long-term strategic planning and evaluation.***

The report, *Building Infrastructure and Capacity in State and Territorial Oral Health Programs,* specifies that a key infrastructure element is having leadership to address oral health problems, with a full-time state dental director and an adequately staffed oral health unit with competence to perform core public health functions.[38] Two ASTDD surveys noted in that report, one conducted in 1994 and a follow-up in 1999, demonstrated that substantially more oral health related assessment, policy development and assurance activities occur in states with a direct commitment of human resources.

> ***The presence of more activities related to the essential public health functions was found in states with full-time dental directors compared to those states with part-time directors, no directors, or no oral health program in the state health agency[38]***

Since the 1950s the American Dental Association (ADA) has urged constituent dental societies to strengthen oral health programs by: a) assuming the necessary leadership to secure funds earmarked for oral health purposes, b) fostering the appointment of a capable dental director,

and c) aiding in the establishment of a sound administrative position for the state oral health unit.[41]

Staffing patterns for oral health programs vary substantially in terms of numbers of personnel, job categories, responsibilities, level and type of education, lines of supervision, employee vs. contractor status, and job location. Most staff who work directly in the state office function in non-clinical roles such as managers, coordinators, regional consultants, public health educators, program planners or evaluators. In FY 2014-2015, 16% of responding state programs had fewer than three FTE employees and contractors (E/C); 47% had 3-9 E/C; 24% had 10-19 E/C; 12% had 20 or more E/C; two states didn't respond.[40] Higher numbers reflect those states that administer clinical programs. Programs that administer community clinics, mobile clinics or prevention programs such as school-based sealant programs often hire or contract with clinicians as well as clerical and administrative personnel. Some programs may also hire, contract with or share with other state programs an epidemiologist, statistician, evaluator, fluoridation engineer or other specialized staff.

Funding

Traditionally most state oral health activities were funded with federal Maternal and Child Health Bureau (MCHB) support. The *2015 State Synopsis*[42] shows that many states now have more diversified funding from HRSA, CDC, state general funds and foundations. Of the 49 states that provided information on source of funding, 19 (39%) reported receiving 75-100% of their funding from just one source. For nine states (18%) this source is their state; for 10 states (20%) their main source is HRSA; and for three states (6%) the source is the CDC. In the same survey, 29% of states reported decreases in their budget while 45% reported increases. Grant programs through CDC and HRSA have attempted to build the infrastructure and capacity of state oral health programs. HRSA MCHB provided $3.2 million per year in State Oral Health Collaborative Systems grants to most states from 2003 to 2007. A new cycle of Targeted State Oral Health Service System cooperative agreements started in late 2007 and provided a total of $3.2 million per year in funds to 19 states and one territory through 2011. From 2003-08 the CDC Division of Oral Health provided $3.8 million per year to 12 states and one territory for cooperative agreements to increase their oral health infrastructure; another round of funding for $4.6 million for State-Based Oral Disease Prevention Programs provided funding for 16 states starting in July 2008, which increased to $6.2 million for 20 states by 2011. A new round of funding in 2013 provided $6.2 million for 21 states.

About 40% of states still receive 75-100% of their funding from just one source. Reliance on one funding source can affect program sustainability.[42]

Strategies for Success

The 2000 ASTDD Infrastructure document highlighted resources and funding ranges needed to maintain fully effective dental public health programs at the state and territorial levels.[38] A Delphi process with state dental directors and ASTDD dental consultants identified ten essential elements (not to be confused with the Ten Essential Services to Promote Oral Health in the U.S.) under the core functions of assessment, policy development and assurance that would build infrastructure and capacity for state oral health programs (see Figure 1.)

Figure 1. Ten Essential Elements to Build Infrastructure and Capacity for State Oral Health Programs

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Assessment

A. Establish and maintain a ***state-based oral health surveillance system*** for ongoing monitoring, timely communication of findings, and the use of data to initiate and evaluate interventions.

Policy Development

B. Provide ***leadership*** to address oral health problems with a full-time State dental director and an adequately staffed oral health unit with competence to perform public health functions.

C. Develop and maintain a ***state oral health improvement plan*** and, through a collaborative process, select appropriate strategies for target populations, establish integrated interventions, and set priorities.

D. Develop and promote ***policies*** for better oral health and to improve health systems.

Assurance

E. Provide oral health ***communications and education*** to policymakers and the public to increase awareness of oral health issues.

F. Build ***linkages*** with partners interested in reducing the burden of oral diseases by establishing a state oral health advisory committee, community coalitions, and governmental workgroups.

G. Integrate, coordinate and implement ***population-based interventions for*** effective primary and secondary ***prevention*** of oral diseases and conditions.

H. Build ***community capacity*** to implement community-level interventions.

I. Develop *health systems interventions* to facilitate quality dental care services for the general and vulnerable populations.

J. Leverage *resources* to adequately fund public health functions.

HRSA adopted the ten essential elements as one of their MCHB Discretionary Grant Performance Measures (#34): "The number of States that include in their oral health plans at least five of the ten essential elements of the guidelines included in ASTDD's *Building Infrastructure & Capacity in State and Territorial Oral Health Programs*."[43] CDC's Division of Oral Health adapted these ten essential elements to create the ten components that formed the basis for their initial state infrastructure grant program:

- Leadership capacity
- Oral disease burden document
- State oral health plan
- Statewide oral health coalition

- Oral disease surveillance system
- Policy and health systems strategies
- Partnership development
- Evaluation of oral health programs
- Community water fluoridation program
- School-based/school-linked dental sealant program.

CDC then collapsed these into eight components for their next round of grantees and then to seven components for the next new round of states that had never received CDC funding.[44]

> ***The ASTDD Infrastructure project found that state oral health programs that have 1) competence in surveillance; 2) a full-time dental director and skilled staff; 3) a state oral health plan; 4) the support of policymakers, 5) strong public/private partnerships and community coalitions; and 6) an ability to obtain funds for services will be better prepared to achieve Healthy People 2010 Oral Health Objectives for their state and for the nation.[38]***

ASTDD and state oral health programs continue to make significant progress working with federal, national, state and local partners to address state infrastructure and capacity. ASTDD TA to state oral health programs using Competencies and Guidelines Assessment Tools and provides technical assistance to state health officials and coalitions for recruitment of state dental directors and staff. These efforts are in line with those of chronic disease directors and national efforts by the Council on Linkages Between Academia and Public Health Practice to update core competencies for public health professionals[45] and the Certification Exam in Public Health by the National Board of Public Health Examiners.[46]

Oral Health Surveys and Oral Health Surveillance

Since publication of the Infrastructure report, ASTDD and CDC have initiated two projects that helped create national and state surveillance systems. The Basic Screening Survey (BSS) Manual and associated training materials were developed in 1998 and revised in 2003, 2008 and 2015 as an approach to monitoring community oral health.[47] This approach uses simple screening measures for oral health status and dental care access that can be performed by either dental professionals or non-dental screeners. ASTDD consultants and CDC staff have provided technical assistance to states since 1999 on use of the BSS and creation of state surveillance systems.

> ***Collection and maintenance of oral health data in an ongoing surveillance system is critical for targeting resources and documenting gains in reducing oral health disparities, as well as tracking progress towards Healthy People objectives.***

In 2000 CDC and ASTDD created the National Oral Health Surveillance System (NOHSS) with national and state data.[48] NOHSS is designed to help public health programs monitor the burden of oral disease, use of the oral health care delivery system, and the status of community water fluoridation. As of September 2015, 46 states had submitted qualified data on the oral health of third grade children to the NOHSS.[13]

ASTDD has partnered with the Council of State and Territorial Epidemiologists (CSTE) to develop oral health surveillance resources and assess oral health epidemiology capacity. The

first resource, *State-based Oral Health Surveillance Systems: Conceptual Framework and Operational Definition,*[49] is a whitepaper highlighting the need for ongoing oral health surveillance and a core or foundational set of surveillance elements. While the whitepaper focuses on a core set of indicators, both ASTDD and CSTE recognize that some states may have the capacity to expand their surveillance system beyond the core. Because of this recognition, CSTE's chronic disease subcommittee developed a 2015 position statement that revised NOHSS to include 36 indicators covering the following topic areas – access to care, oral health outcomes, community interventions, and infrastructure.[50]

In 2013, CSTE completed an epidemiology capacity assessment (ECA) of the 50 states and the District of Columbia. ASTDD was awarded the contract to analyze the data and complete a report for chronic disease, MCH and oral health. The status of state oral health epidemiology and surveillance capacity is poor; 59% of states have no or only minimal oral health epidemiology and surveillance capacity. To improve capacity, funds must become available for additional positions, and efforts must to be made to ensure that each state has a designated lead oral health epidemiologist.[51]

Oral Health Plans

A state oral health plan is a roadmap for accomplishing the goals and objectives that have been developed by the state oral health program in collaboration with partners and stakeholders. It allows the state to compete more effectively for funding and opportunities as they arise.

In 2015, 40 State Oral Health Plans were available on the CDC website and seven oral health surveillance plans.[52] In addition, funding from HRSA, MCHB and the Office of Head Start during the past decade enabled all states to create Head Start oral health action plans in the early to mid-2000s,[53] while MCHB funding to ASTDD supported creation of state oral health action plans for Children with Special Health Care Needs (CSHCN) in 17 states during the same time period.[54] Oral health issues also are being incorporated into more state health plans and chronic disease plans.

Coalitions and Advisory Councils

The Institute of Medicine's *The Future of the Public's Health in the 21st Century* acknowledges that government public health agencies must "build and maintain partnerships with other organizations and sectors of society, working closely with communities and community-based organizations, the health care delivery system, academia, business, and the media" in order to be effective in protecting the health of the public.[55] Many state dental associations have established Dental Access Committees to bring private dental practitioners into a collaborative effort with state oral health programs and other partners to address disparities in oral health access. In 2009 the ADA formed a Public Health Advisory Committee. State dental hygienists' associations also have increased their involvement with state oral health programs, particularly as dental hygienists serve as directors of oral health programs in some states. The American Dental Hygienists' Association continues to support a Council on Public Health to help their leadership keep abreast of dental

Coalitions are important for many reasons, including integration of oral health with other health issues, developing collaborative efforts and leveraging resources.

public health issues and suggest where they can provide valuable support for national and state efforts.[56]

Most states have broad-based coalitions to support oral health promotion, prevention programs, policy development, workforce development and other efforts. According to the 2015 State Synopses, 45 states have a statewide oral health coalition.[42] A national organization, the American Network of Oral Health Coalitions, was formed to create a reliable place for state oral health coalitions to share information, ask questions, and leverage time and resources.[56] A coalition framework and many tools are available on the CDC website to assist states.[44]

Oral Health Information and Program Information

State dental directors provide data for the annual *ASTDD* Synopses of *State and Territorial Dental Public Health Programs* on demographics that relate to access to care, as well as administration, financing and breadth of state oral health programs. Some of the information is available through CDC's Oral Health Data Portal,[57] while a summary report with aggregated data is available on the ASTDD website.[42]

ASTDD has promoted integration of oral health into other health messages and programs, as well as oral health programs reinforcing general health promotion. Documents suggesting ways to collaborate with many types of organizations are included on the ASTDD website.[58] State oral health programs are in the process of developing better linkages with Chronic Disease programs, for instance, ways to collect and merge oral health status data with height and weight data (used to calculate body mass index—BMI) or joint messages about reducing risk factors for diabetes or obesity.

ASTDD has a standard operating procedure manual for state oral health program emergency preparedness and response that serves as an online tool for states.[59] Of the 49 states that answered the question on the ASTDD 2015 State Synopses, only 13 states had an emergency preparedness plan that included oral health professionals.[42] This is an important area for future program integration.

Oral Health Program Needs Assessments and Reviews

In 1986 ASTDD initiated a State Oral Health Program Review and Technical Assistance project, initially funded by HRSA, MCHB and then augmented and refined with CDC, DOH funding. Since then, ASTDD has supported teams to conduct onsite reviews in 25 states and self-studies without site visits in three other states. In 2005, the site visit protocols were formalized into a *State Oral Health Program Review Manual*,[60] based on a similar manual developed by the State and Territorial Injury Prevention Directors Association. They were updated in 2015. This program review process has been adapted by the National Association of Chronic Disease Directors.

The ASTDD Guidelines have always been an integral part of program reviews.

In 1995, ASTDD developed the *ASTDD Seven Step Model for Assessing Oral Health Needs* with funding from HRSA, MCHB.[61] States and communities have used this model extensively for planning and evaluation. ASTDD also offers focused technical assistance to states through a cadre of experienced consultants and state dental directors.

Leadership Development

ASTDD continues to promote and provide professional development opportunities for its members and others, especially through the National Oral Health Conference (NOHC).[62] Co-sponsored with the American Association of Public Health Dentistry (AAPHD) since 2000, the NOHC is the premier dental public health conference in the U.S., drawing more than 700 participants and exhibitors annually. In 2007, ASTDD launched a National Oral Health Leadership Institute (NOHLI), tailored initially for state oral health program directors, expanded in 2008 to state oral health staff and ASTDD associate members, and in 2010 to state Medicaid dental staff. Although funding is no longer available for the Institute, ASTDD still provides leadership development through webinars, workshops, the peer support program, and encouraging members to serve on the Board of Directors and as committee chairs.

Leadership development is crucial for recruiting and retaining an adequate and competent workforce and creating visionary and sustainable programs.

ASTDD has helped to facilitate national dialogue around dental public health and state oral health workforce issues. A 2004 Dental Public Health Workforce Workshop supported by CDC and HRSA brought representatives of more than 40 national organizations and federal partners together to create an action plan. [63] ASTDD supports a State Development and Enhancement Committee with representatives from key organizations, and is publishing a Best Practice Approach Report in 2015 on State Oral Health Program Workforce Capacity Development.

Best Practices

Since 1999 ASTDD has maintained a Best Practices Project. The ASTDD Best Practices Project defines a “best practice approach” as an underlying public health strategy that is supported by evidence for its impact or effectiveness (based on research, expert opinion, field lessons and theoretical rationale) and has different successful implementation methods. [64] The Website provides resource information including:

- A series of best practice approach reports
- A set of descriptive reports of successful practices
- A collection of summaries of dental public health activities submitted by states and territories.

This is the most frequently used portion of the ASTDD website.

Use of best practices will help build infrastructure and capacity for state, territorial and community oral health programs, inform development of programs and allocation of resources, and enhance the oral health of the population.

Policy Development and Advocacy

State oral health program directors and staff are constrained in their direct advocacy efforts as state government employees. They can educate policymakers about making realistic, cost-effective and evidence-based decisions, but rely on other constituents, particularly oral health coalitions, for active advocacy. ASTDD works extensively with more than 20 national organizations to advocate for oral health and dental public health issues. The ASTDD website includes a host of issue briefs, white papers and other public health resource documents that states can share with their coalitions and policymakers.[65]

Summary and Recommendations for Oral Health Program Capacity and Infrastructure

Leadership within a strong oral health program with sufficient capacity and infrastructure is important when agencies are determining priorities, setting agendas, developing plans, making funding decisions, and establishing policies, to assure oral health is included where appropriate in other state health initiatives. Health agencies play an important role in identifying, supporting, and tracking community level interventions, including disease prevention and health promotion. These interventions may include promoting and enforcing laws and regulations that protect and improve oral health, ensure safety, and assure accountability for the public's oral health and well-being.

To assure maximum efficiency and effectiveness of scarce resources, the following recommendations are made:

1. The oral health program should be used as a focal point to monitor and evaluate oral health services provided in all health programs in state government.
2. The oral health program should have at least advisory capacity with oral health services in other agencies to insure program efficiency and avoid duplication of services.
3. State oral health programs should be placed at a high enough and visible level to provide overall agency coordination and leadership, develop and carry out specific program initiatives, and represent the agency to outside organizations.
4. The location of the oral health program within the structure of the state health agency should be such that the director of the oral health program can communicate readily with the state health official, or at least with the assistant or associate director responsible for preventive health services.

In addition, five key messages emerged from the IEP report:[7]

- A successful SOHP must have diversified funding that includes funding for state and local evidence-based programs.
- A successful SOHP needs a continuous, strong, credible, forward-thinking leader.
- A successful SOHP needs a complement of staff, consultants and partners with proficiency in the *ASTDD Competencies for SOHPs.*
- A successful SOHP needs one or more broad-based coalitions that include partners with fiscal and political clout.
- A successful SOHP must have valid data (oral health status and other) to use for evaluation, high quality oral health surveillance, a state oral health plan with implementation strategies, and evidence-based programs and policies.

Policies and programs need to maximize resources and link people to needed population-based and personal oral health services. Professional expertise and capacity within the state health agency is important to effectively address identified oral health needs. Government health agencies can play an important role in ensuring that the public health and personal health work force has the expertise and sufficient capacity to appropriately meet the oral health needs of individuals and communities.

Current challenges demand genuine collaboration between local, state, and national efforts to assure effective, accessible, and high quality population-based and personal oral health care services.

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