Building Infrastructure & Capacity in State and Territorial Oral Health Programs

Prepared by:
Association of State and Territorial Dental Directors (ASTDD)

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Executive Summary

The purpose of this document is to assess the resources needed and illustrate funding ranges to maintain fully effective dental public health programs at the state and territorial levels. With the public release of Healthy People 2010 (the nation's health promotion and disease prevention agenda) and the Surgeon General's Report on Oral Health, it is appropriate and timely for the 50 states, the District of Columbia, and U.S. territories (hereafter collectively referred to as "states") to lay the foundation needed to achieve the new national objectives. This document focuses on building infrastructure and capacity for dental public health programs administered by state and territorial health agencies (hereafter called "state oral health programs"). 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. Building infrastructure and capacity is a high priority for state oral health programs since this will allow the states to achieve the new national objectives and improve the oral health of Americans.

As we enter the 21st century, the American public faces significant oral health problems. The two most common oral diseases, tooth decay and periodontal ("gum") disease, continue to affect individuals throughout their life spans. Tooth decay begins early with one out of six U.S. children (17%), ages 2-4, affected. One half of the 8-year-olds (52%) and three-fourths of the 17-year-olds (78%) in America are affected by tooth decay. The burden of tooth decay is heaviest on children from low-income families with up to 80 percent of their tooth decay being untreated. Tooth decay continues to affect U.S. adults: 96 percent of adults and 99 percent of seniors 65 years of age and older have experienced tooth decay. Two out of five senior adults (44%) no longer have their natural teeth due to tooth decay and periodontal disease. In addition, more than 30,000 Americans are diagnosed with oral and pharyngeal cancer and approximately 8,000 die of these cancers each year. Consequently, oral diseases place a major burden on the public in terms of pain and suffering, poor self-esteem, cost of treatment, and lost productivity from missed work or school days. Optimal oral health would substantially improve the quality of life for U.S. children and adults.

The Healthy People 2010 (HP 2010) Oral Health Objectives identify areas to improve the oral health of all Americans during the next decade. Achieving these objectives will require linking the national objectives to state's resources and programs. State oral health programs can direct and integrate strategies and serve as the linking agent for collaboration at the federal, state and local levels. However, not every state health agency has an oral health program. Further, not all state oral health programs have sufficient resources (i.e., staff, funds, and local support) to address oral health needs. For example, an assessment by the Association of State and Territorial Dental Directors (ASTDD) in September 1999 showed that although 31 states and five territories currently have full-time state dental directors, in 20 states (including the District of Columbia), the state dental director positions are part-time or vacant. Additionally, state synopses provided by state dental directors in March 1999 showed 21 states, with populations totaling 67 million people, have two or fewer full-time equivalents staffing a state oral health program. About half of the states, with populations totaling 92 million people, have a budget of $500,000 or less for a state oral health program. Also, 25 states have less than 10 percent of their counties supported by local health departments with oral health programs.

In November 1999, a Delphi method was used to identify elements that would build infrastructure and capacity for state oral health programs to achieve HP 2010 Oral Health Objectives. The method involved surveying the ASTDD's general membership of state dental directors and state dental consultants using two consecutive questionnaires. The first questionnaire listed components of essential dental public health services, as identified in *ASTDD's Guidelines for State and Territorial Oral Health Programs*, and asked

ASTDD members to determine infrastructure and capacity elements by giving feedback on the listed elements, adding other elements, and scoring each element to indicate their level of agreement. The second questionnaire refined the list of elements (revised the wording, added new items, and deleted items not in agreement) and asked members to re-score in order to identify the top ten elements. Forty-three states (with 93% of the U.S. population) responded to the *ASTDD Delphi Survey* and identified ten essential elements that would build infrastructure and capacity for state oral health programs. These elements reflect public health functions of assessment, policy development, and assurance. The ten elements are:

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 public and vulnerable populations.

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

State oral health programs having competence in surveillance; a full-time dental director; a skilled staff; a state plan; the support of policymakers, strong public-private partnerships and competent communities; and an ability to obtain funds for services will be better prepared to achieve HP 2010 Oral Health Objectives. However, the 43 states responding to the *ASTDD Delphi Survey* reported gaps in their dental public

health infrastructure and capacity. Among these states, only 19 percent reported having a state-based oral health surveillance system; 38 percent had a state oral health improvement plan; and 48 percent had an oral health advisory committee representing a broad-based constituency. The top two needs identified by the states included an oral health surveillance system (67% of states) and leadership consisting of a state dental director and an adequate/competent staff (63%). In addition, states reported a high need for resources to build community capacity (62%) and establish health systems interventions to facilitate quality dental care (60%). Further, 40 percent of the states reported a high need for staff expertise and skills related to epidemiology.

For state oral health programs to expand infrastructure and capacity and to fill existing gaps, funding is needed. To illustrate funding needs, four state oral health programs were selected as models because they represent varying levels of program resources (budget and staffing) and different environments (state populations and state/local system structures). *Table A* compares the four state models showing differences in their state populations, number of children from low-income families, number of counties, state oral health program budgets and staffing, and number of local health departments with programs to support dental public health efforts.

Table A. A Comparison of Four State Models Used to Illustrate Funding Needs for Infrastructure & Capacity

State Characteristics	State Model #1	State Model #2	State Model #3	State Model #4
State population (in millions)	2.5	4.5	5.5	11.5
Children at or below 200% federal poverty level	400,000	700,000	500,000	1,200,000
Counties	75	15	39	88
State oral health program budget	$200,000	$1,000,000	$1,000,000	$2,900,000
State oral health program staff employees - including State dental director	1.2 FTE	11.0 FTE	3.0 FTE	19.0 FTE
Local health departments with dental programs	1	2	20	18

The state dental directors of the four models were asked to provide lower and upper budget estimates for their state oral health programs to address the ten infrastructure and capacity elements identified by the *ASTDD Delphi Survey*. Using their program experience and data, the state dental directors determined their own staffing needs and strategies. The estimated budget of these models (*Table B*) ranged from $445,000 to $4,760,000.

The different budget estimates provided by the state models show that funding required to build infrastructure and capacity will vary depending on state characteristics. Several key environmental and strategic factors influenced the budget including: (1) the HP 2010 Oral Health Objectives targeted by the state; (2) the size of the state population; (3) the local system structures which affect intervention strategies; (4) the number of employees/contractors and the expertise needed for the program core staff; (5) the amount of resources provided to communities to deliver intervention services; and (6) the level of funding, such as through grants, needed to support dental clinics serving vulnerable populations.

Table B. Illustrating Funding Needs to Build Infrastructure and Capacity for State Oral Health Programs

To Build Infrastructure and Capacity Elements	State Model #1		State Model #2		State Model #3		State Model #4	
	Annual Budget Estimates		Annual Budget Estimates		Annual Budget Estimates		Annual Budget Estimates	
	Lower $	Upper $	Lower $	Upper $	Lower $	Upper $	Lower $	Upper $
TOTAL $	445,000	722,000	1,027,000	1,651,000	2,868,000	4,449,000	3,371,000	4,760,000

Using these illustrative budget estimates, a possible range of funding needed for all 50 states, the District of Columbia, and six U.S. territories to build infrastructure and capacity for state oral health programs is between $81 million and $124 million. This is based on the assumption that a state with a similar population size as one of the state models will have the same funding needs (*Table C*).

Table C. Projected Funding Needs for All States to Build Infrastructure and Capacity for State Oral Health Programs
(N = 57 States including 50 states, the District of Columbia, and 6 U.S. territories)

State Models	Annual Estimated Budget for State Models (Lower Estimates - Upper Estimates)	* States with Similar Population Sizes	Annual Estimated Budget for All States (Lower Estimates - Upper Estimates)
#1	$445,000 - $722,000	25	$11,100,000 - $18,100,000
#2	$1,027,000 - $1,651,000	14	$14,300,000 - $23,100,000
#3	$2,868,000 - $4,449,000	9	$25,800,000 - $40,000,000
#4	$3,371,000 - $4,760,000	9	$30,300,000 - $42,800,000
All States		57	$81,500,000 - $124,000,000

** States are distributed by population sizes similar to state models*.

Yet, it is expected that funding needs will vary among the states due to differences in existing infrastructure, priorities, staffing, and strategies. Furthermore, other infrastructure and capacity needs such as evaluation (i.e., meeting performance standards), research (i.e., conducting or collaborating on population-based prevention research), and assurance of workforce functions (i.e., training to use information technology effectively), not identified as the top ten elements in this document, will also require additional resources and development. Therefore, each state should conduct its own assessment of infrastructure and capacity to determine gaps and specific funding needs for its state oral health program. Success in acquiring funds to expand infrastructure and capacity will enhance the states' effectiveness to improve the oral health of Americans.

Introduction

The purpose of this document is to assess the resources needed and illustrate funding ranges to maintain fully effective dental public health programs at the state and territorial levels. With the public release of Healthy People 2010 (the nation's health promotion and disease prevention agenda) and the Surgeon General's Report on Oral Health, it is appropriate and timely for the 50 states, the District of Columbia, and the U.S. territories (*hereafter collectively referred to as "States"*) to lay the foundation needed to achieve the new national objectives.[1,2] Healthy People 2010 (HP 2010) identifies areas to improve the oral health of all Americans during the next decade. Achieving HP 2010 Oral Health Objectives will require linking national objectives to states' resources and programs. Dental public health programs administered by state and territorial health agencies (*hereafter called "state oral health programs"*) can serve as the linking agent for collaboration at the federal, state and local levels. State oral health programs can direct and integrate oral health improvement strategies. However, not every state health agency currently has an oral health program. Further, not all state oral health programs have sufficient resources to address the need for better oral health.

This document focuses on building infrastructure and capacity for state oral health programs. 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. Recent increases in funding have contributed to expanding infrastructure and capacity in injury prevention, arthritis prevention, and environmental health. Similarly, funding is needed for state oral health programs to improve the oral health of U.S. children and adults. Building infrastructure and capacity is a high priority for state oral health programs since this will allow the states to achieve national and state oral health objectives.

The Burden of Oral Diseases in the United States

As we enter the 21st century, the American public faces significant oral health problems. The two most common oral diseases, tooth decay (caries) and periodontal ("gum") disease, continue to affect individuals across their life spans. As observed in the Third National Health and Nutrition Examination Survey, 1988-1994, tooth decay begins early with one out of six U.S. children (17%), ages 2-4 years, affected.[3] Also, one half of the 8-year-olds (52%) and three-fourths of the 17-year-olds (78%) in America are affected by tooth decay.[3] Tooth decay continues to burden U.S. adults: 96 percent of adults and 99 percent of seniors 65 years of age and older have experienced tooth decay.[4] Approximately two out of five senior adults (44%) no longer have their natural teeth due to tooth decay or periodontal disease.[5] Other serious oral health problems are seen among adults. More than 30,000 Americans are diagnosed with oral and pharyngeal cancer and approximately 8,000 die of these cancers each year.[1]

In the U.S., 500 million dental visits are made each year and an estimated $60 billion will be spent on dental services in the year 2000.[3] Yet, Americans have unmet dental treatment needs. Untreated tooth decay is high among children from low-income families; up to 80 percent of their tooth decay is untreated.[4] Significant disparities still persist among ethnic and racial groups with higher levels of tooth decay and fewer dental visits observed among minority and poor children.[1]

The burden of oral diseases can be reduced with prevention. Proven preventive measures, such as water fluoridation and dental sealants, can markedly reduce tooth decay. Yet, more than 100 million persons in the U.S. do not have access to optimally fluoridated drinking water that could reduce tooth decay up to 40 percent. Only 18 percent of children 9-11 years of age have received dental sealants, which are nearly 100 percent effective in preventing decay on chewing surfaces of teeth. Additionally, eliminating tobacco use and heavy alcohol consumption can prevent oral and pharyngeal cancers and

early diagnosis can prevent thousands of people from dying. Oral diseases place a burden on millions of Americans in terms of pain and infection, poor self-esteem, cost of treatment, and lost productivity from missed work or school days.[6] With optimal oral health, the quality of life for U.S. children and adults would be substantially improved.

Essential Dental Public Health Services

State oral health programs strive to improve oral health through public health core functions.[7] These three functions are: (1) assessment, (2) policy development, and (3) assurance. Assessment efforts evaluate and monitor the oral health status and needs of communities and populations. Policy development provides an environment to promote better oral health. Assurance activities improve the access and availability of quality oral health care, including prevention services.

These functions have been further defined into ten essential public health services by the Public Health Functions Steering Committee (listed in *Appendix A*).[8] In linking with the essential public health services, the Association of State and Territorial Dental Directors (ASTDD) has developed the *Guidelines for State and Territorial Oral Health Programs*.[9] The document identifies essential dental public health services (listed in *Appendix B*), and provides a guide to public health administrators for the development and operation of oral health programs to ensure better oral health of the public.

The pyramid of public health services, developed by the Maternal and Child Health Bureau (MCH),[10] provides another perspective of essential dental public health services. (*Page 10* has an illustration of the MCH pyramid.) The four levels of activities that form this pyramid, from the ***base to the apex***, are:

1. **Infrastructure building services** include needs assessment, surveillance, information systems, planning, policy development, applied research, training, standards development, quality management, coordination, and systems of care.

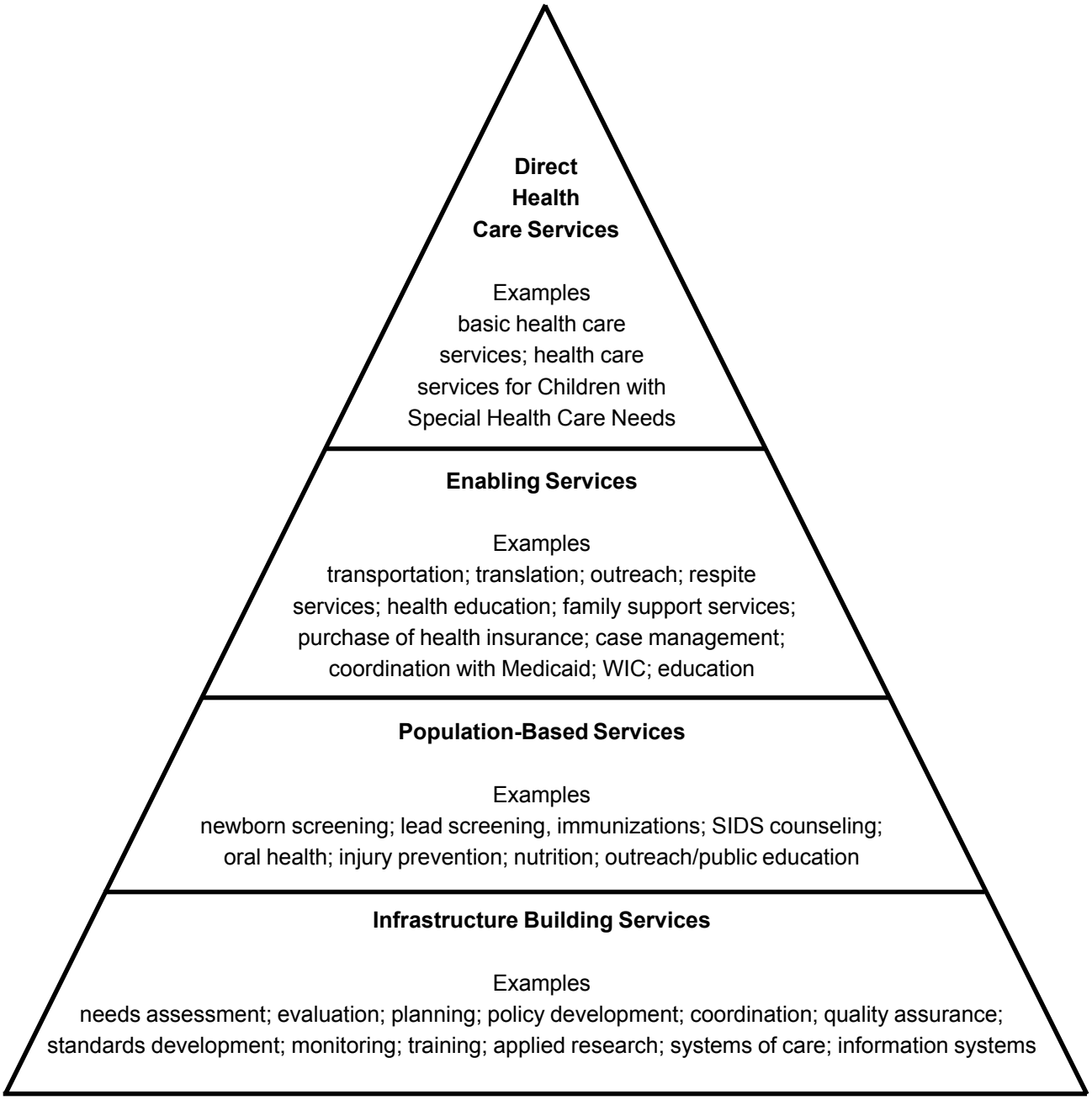
2. **Population-based services** include planning and implementing preventive interventions and personal health services for the state population. Services include disease prevention, health promotion, and statewide outreach. These services are generally available whether a person receives care in private or public systems and whether a person is insured or not.

3. **Enabling services** provide for access to basic care services and include transportation, translation services, health education, purchase of insurance, case management, and service coordination.

4. **Direct health services** are generally delivered one-on-one between a health professional and a patient in an office, clinic, or emergency room.

This MCH model illustrates that a public health foundation is established through infrastructure building and population-based services. For state oral health programs, priorities should be placed on building infrastructure and increasing capacity to deliver population-based services.

MCH Pyramid of Public Health Services



Document Overview

This document has four sections. ***Section I*** reviews the HP 2010 Oral Health Objectives and recommends linking the HP 2010 to state's oral health needs. ***Section II*** highlights and describes elements of state oral health programs that serve to build infrastructure and capacity. ***Section III*** summarizes the existing gaps reported by states and illustrates the funding needed to build infrastructure and capacity. This third section presents four state models and uses their budget estimates to demonstrate funding needs among all states. Lastly, ***Section IV*** concludes that each of the states should conduct its own assessment of infrastructure and capacity to determine gaps and specific funding needs for its state oral health program.

I . Linking Healthy People 2010 to the State's Oral Health Needs

For two decades, the U.S. Public Health Service has used health promotion and disease prevention objectives to guide efforts to improve the health of Americans. The first set of national health objectives, published in 1979 in *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention*, set 1990 targets to reduce mortality among children and adults and increase independence among older adults.[2] The second set of national objectives, Healthy People 2000 (HP 2000), was collaboratively determined by government, voluntary organizations, professionals, businesses, and individuals. Healthy People 2010 (HP 2010) is the third set of national health promotion and disease prevention objectives.[1] This new set of objectives builds on successful strategies used to meet HP 2000 objectives and lays the groundwork for emerging issues.

The Oral Health Objectives of HP 2000 focused on a range of oral diseases and conditions for the entire population and also drew attention to subpopulations at higher risk.[11] Progress has been reported in more than half of the HP 2000 Oral Health Objectives. Tooth decay is lower in children. More children are receiving dental sealants and more seniors are retaining their teeth. Yet some objectives showed little progress. For example, the number of adults ages 35-44 who had never lost a tooth from tooth decay or periodontal disease has not changed.[1]

The HP 2010 Oral Health Objectives set new targets to improve oral health status, preventive services, dental care, and oral health programs. The HP 2010 priority areas build upon the HP 2000 and expand into new areas such as increasing the use of the oral health care system and adding oral health services in school-based and community-based health centers. Also, the national objectives identify efforts needed to assure dental care for long-term care residents and to implement state-based surveillance systems. Another objective calls for an increased number of effective state and local dental public health programs directed by a dental professional with public health training.[1] (*Appendix D* includes a summary of the HP 2010 Oral Health Objectives.)

States should address the national objectives and their own state's needs when defining long-term oral health objectives. To bring about the desired outcomes for the HP 2010 Oral Health Objectives, state oral health programs can[10]:

1. Establish a vision and a set of state goals that link the HP 2010 objectives to the state's needs;

2. Utilize needs assessments to identify key oral health issues that include national, state and community perspectives;

3. Identify the environment for addressing key oral health issues;

4. Convene key players to provide input and share decision making;

5. Determine oral health priorities;

6. Identify the desired outcomes related to the priority issues; and

7. Establish state oral health objectives guided by the desired outcomes.

With the objectives established, states can then define the strategies to achieve these objectives, determine the infrastructure and capacity needed to implement the strategies, and develop the evaluation plan needed to monitor the progress towards achieving the state and HP 2010 Oral Health Objectives.

II. Elements of State Oral Health Programs to Achieve Healthy People 2010 Objectives

In November 1999, a Delphi method was used to identify elements that are perceived as critical in building infrastructure and capacity for state oral health programs to achieve HP 2010 Oral Health Objectives. The method involved surveying ASTDD's general membership of state dental directors and state dental consultants using two consecutive questionnaires.[12] The first questionnaire listed components of essential dental public health services, as identified in *ASTDD's Guidelines for State and Territorial Oral Health Programs*, and asked ASTDD members to determine infrastructure and capacity elements by giving feedback on the listed elements, adding other elements, and scoring each element to indicate their level of agreement.[9] The second questionnaire refined the list of elements (revised the wording, added new items, and deleted items not in agreement) and asked members to re-score in order to identify the top ten elements. Forty-three (43) states responded to the questionnaires and identified ten essential elements that would build infrastructure and capacity to achieve HP 2010 Oral Health Objectives. These elements reflect the public health core functions of assessment, policy development, and assurance.

This section highlights and describes these ten elements of State oral health programs:

Assessment

A. Establish and maintain a ***state-based oral health surveillance system***.

Policy Development

B. Provide ***leadership*** to address oral health problems.
C. Develop and maintain a ***state oral health improvement plan***.
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.
F. Build ***linkages*** with partners interested in reducing the burden of oral diseases.
G. Integrate, coordinate, and implement ***population based interventions***.
H. Build ***community capacity*** to implement community-level interventions.
I. Develop ***health systems interventions*** to facilitate quality dental care services.
J. Leverage ***resources*** to adequately fund public health functions.

A. Surveillance System

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.

The CDC defines public health surveillance as "the ongoing systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know."[13] A state-based oral health surveillance system should monitor oral disease status, determine trends, and identify groups that bear the greatest burden of oral diseases. Policy development and program planning should be based on valid and reliable surveillance information.[14 -17]

In the past two decades, most oral health data have been generated by large studies designed for research, rather than for ongoing surveillance. HP 2010 Oral Health Objective 21-16 calls for an oral and craniofacial health surveillance system in each state.[1]

Three issues define a surveillance system: the data that will be collected, how data will be collected, and how the data will be used. A collaborative process should be used to select which oral diseases, conditions, risk factors, services, quality of life measures, and outcomes should be under surveillance. The need for national surveillance data should also be considered. Currently, a National Public Health Surveillance System (NPHSS) is being developed. The following is the initial set of oral health indicators which has been approved by the Council of State and Territorial Epidemiologists (CSTE) to be included in the NPHSS.[18-19] The oral health indicators for the NPHSS will be further developed in the future.

1. Length of time since the last visit to the dentist or a dental clinic;
2. Length of time since the last teeth cleaning by a dentist or dental hygienist;
3. Number of permanent teeth removed because of tooth decay or gum disease;
4. Percentage of persons served by community water systems who are served with optimally fluoridated water;
5. Presence of dental sealants among K-3rd graders;
6. History of tooth decay among K-3rd graders (determined by the presence of an untreated cavity, a filling, or a missing permanent molar tooth);
7. Presence of untreated tooth decay among K-3rd graders;
8. Incidence of invasive cancer of the oral cavity or pharynx; and
9. Deaths from cancer of the oral cavity or pharynx.

Regarding the collection of data, a surveillance system should be dynamic and use simple, valid and reliable methods to collect information on an ongoing basis. A surveillance system should seek, collaborate and coordinate opportunities to collect oral health data by integrating into existing surveys already conducted by state agencies and other organizations. Several national and state surveillance systems provide such opportunities. The Behavioral Risk Factor Surveillance Systems (BRFSS) include questions on dental visits, visits for teeth cleaning, and loss of natural teeth. During the period of 1995-1998, the BRFSS oral health module questions have been used in 48 states and one U.S. territory.[20-21] The Youth Risk Behavioral Survey (YRBS) and Pregnancy Risk Assessment Monitoring System (PRAMS) also offer opportunities to collect oral health data.

Several of the oral health indicators for the NPHSS require screening children to directly observe untreated tooth decay, filled teeth, missing teeth and presence of sealants in their mouths. Tools have been developed to provide guidance in conducting screening surveys including ASTDD's *Seven Step Model for Assessing Oral Health Needs*[22] and *Basic Screening Surveys: An Approach to Monitoring Community Oral Health*.[23] Resources are needed to implement screening surveys (such as funding to train screeners, purchase equipment and supplies, and for direct data entry). State oral health programs could increase capacity to conduct screening surveys by providing training and technical assistance to local health agencies.

A surveillance system should also access and use secondary oral health data, including national and state data sources. The National Health and Nutrition Examination Survey, Water Fluoridation Reporting System, fluoridation census, state registry data on oral cancer, Medicaid dental services, and poverty levels are examples of secondary data that can contribute to an oral health surveillance system.

A surveillance system must analyze, interpret and integrate primary and secondary oral health data. This may require, in certain systems, the establishment of standardized analysis and reporting. Additionally, a surveillance system should provide timely communication of findings to responsible parties, policymakers, the professional community, and the public.[24] Several HP 2010 Public Health Infrastructure Objectives seek to ensure that HP 2010 objectives and health indicators are tracked regularly and that the public health data is made available to policy makers and the public in a timely manner.

Workshops may be needed to improve local health departments' and communities' understanding and ability to use surveillance data. Competency in using surveillance data will allow public health partners to become more skilled and confident in addressing issues and setting priorities. Planning, managing, and evaluating intervention activities are also guided by surveillance information.[25-27]

Examples of state efforts[28] to establish surveillance systems are:

1. ***North Carolina*** - The Dental Health Program has implemented a statewide oral health assessment system. Kindergarten and 5th grade children are screened annually by public health dental hygienists to collect data on decayed, missing, filled, and sealed teeth. Survey findings are disseminated and used to justify resources.

2. ***Kansas*** - The BRFSS oral health module has been expanded with additional questions to better understand oral health issues.

3. ***North Dakota*** - The state collects oral health data through the BRFSS every three years and the YRBS every two years. Additionally, the state assesses Early Childhood Caries/Baby Bottle Tooth Decay every five years. The cycle of data collection regularly updates oral health data.

4. ***Arizona*** - The Office of Oral Health has developed state, county and community profiles to standardize reporting and provide easier access of primary and secondary oral health data.

HP 2010 Oral Health Objective 21-16 calls for an oral and craniofacial health surveillance system in each state.

B. Leadership

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.

Leadership is essential in determining priorities, setting agendas, developing plans, making funding decisions, and establishing policies. Also, leadership is important in increasing awareness and raising priorities for oral health among a broad constituency. To ensure oral health leadership within a state health agency, a dental professional with public health training should serve as a full-time state dental director. The state dental director should have supervisory authority for oral health programs within the state health agency.

HP 2010 Oral Health Objective 21-17 requires that all state health agencies serving jurisdictions of 250,000 or more people have an effective dental pubic health program in place directed by a dental professional with public health training.[1] A survey conducted in 1993 found that states with full-time state dental directors carry out more oral health related assessment, policy development, and assurance activities than states with part-time directors, no directors, or no oral health program in the state health agency.[29]

An oral health unit, under the supervision of the state dental director, is also needed to ensure leadership. The location of the oral health unit within the organizational structure of the state health agency should be such that the state dental director can communicate readily with the state health official, or with the assistant or associate director responsible for preventive health services.[9]

An oral health unit should have adequate resources to effectively perform public health core functions. The oral health unit needs staff competent to perform duties related to:

- Epidemiology
- Data management
- Community development
- Coalition building
- Communications and education
- Community water fluoridation efforts
- Dental pubic health interventions
- Public policy
- Strategic planning
- Program development/management
- Budget management
- Financial analysis
- Evaluation/quality assurance
- Grant writing
- Computers and related technology
- Administrative support

A competent staff is supported by several HP 2010 Public Health Infrastructure Objectives (*Objectives 23-1, 23-8, 23-10 and 23-14*).[1] These objectives promote the need to: (1) increase competencies in the public health workforce in the essential public health services including comprehensive epidemiology services; (2) provide health agency employees with access to Internet, e-mail and other electronic information systems including computer hardware and software; and (3) provide continuing education to health agency employees to develop competency in essential public health services. Some staffing needs may be satisfied by the availability of services in other components of the state health agency.

The combined expertise of individuals in an oral health unit and the health agency will support and advance leadership efforts to improve oral health in the state. Because states vary in staff needs, each state should assess the strengths of the existing staff and determine the need for professional development, training, and/or additional expertise.

HP 2010 Oral Health Objective 21-17 requires that all state health agencies serving jurisdictions of 250,000 or more people have an effective dental public health program in place directed by a dental professional with public health training.

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

A state oral health improvement plan refers to a long-term plan developed by the state oral health program and its public health partners. The plan should set a vision for the future and have measurable outcomes. *HP 2010 Public Health Infrastructure Objective 23-12* supports the need of all states to have a state health improvement plan.[1]

The specific process by which a state plan is established may vary. However, a collaborative planning process should be used to develop the plan and include a broad range of constituents including government agencies, local health departments, communities, private organizations, providers, and consumers.

Ideally, a state plan should describe the burden of oral health diseases and the prevalence of risk factors among persons in the state and identify high-risk populations. Oral health objectives developed for the state plan should relate to needs identified by the state surveillance system and needs assessment studies.[1] In addition, the plan should provide rationales and strategies for linking HP 2010 Oral Health Objectives to the state's needs. The state plan should also select appropriate intervention strategies for target populations, establish integrated interventions, and set priorities.[30-31] Further, the plan should acknowledge the different roles and responsibilities of the state and local agencies and organizations, list the resources currently available, coordinate resources, and identify what additional resources are needed to achieve objectives. Finally, the plan should provide guidance for policy development. Such planning will contribute to the successful implementation of intervention programs.[32-33]

Resources are necessary to develop a state plan. Staff assistance and operational expenses are needed (i.e., for meetings and public hearings). Expertise is required to access needs assessment data and develop recommendations based on the data. The plan needs to be produced and distributed. Advocacy is necessary to promote the plan's recommendations. Also, resources are needed to provide regular reviews of the state plan in order to assure progress in achieving oral health objectives.

Examples of state efforts[12] to develop state oral health improvement plans are:

1. ***Massachusetts*** - The Office of Oral Health intends to use the recommendations from a State Legislative Report on Oral Health and the HP 2010 Oral Health Objectives as a framework for developing strategies to improve oral health and increase access to care by the state's residents.

2. ***Colorado*** - The Oral Health Program will utilize the recommendations from an ASTDD on-site review and HP 2010 objectives in developing a state oral health improvement plan.

The State Oral Heatlh Improvement Plan should provide rationales and strategies for linking HP 2010 Oral Health Objectives to the state's needs.

D. Developing and Promoting Policies

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

Oral health policies include legislation, regulations, ordinances, guidelines, and standards that create an environment conducive to preventing oral diseases and promoting oral health. Several HP 2010 Oral Health Objectives call for increasing prevention and access to dental care.[1] Most state oral health programs are involved at some level in policy issues related to prevention and oral health care. Policies on prevention can address water fluoridation, dental sealants, and tobacco-related issues. Policies on oral health care include resolving dental professional shortages, regulating infection control practices, and facilitating services for vulnerable populations (i.e., HIV-infected persons, low-income families, Medicaid enrollees, elderly, long-term care residents, and other special needs populations).[34] Policy development provides opportunities to integrate oral health into other health programs and improve health systems to better meet the oral health needs of children and adults.

A 1994 survey showed that 75 percent of the states reported either "active" or "some" involvement in oral health policies. States reported policy development efforts related to community water fluoridation (61%), maternal and child health programs to prevent oral disease (57%), and dental care for low-income persons (53%). Fewer states reported involvement in policies related to dental care for underserved populations such as the elderly, HIV-infected or Medicaid eligible individuals.[29]

Another area of policy development is establishing statutory authority for the state oral health program. A dental public health infrastructure could be strengthened if statutory authority is in place. A 1991 ASTDD survey of state oral health programs found strong evidence that programs were more stable in states where statutory authority exists. The level of services remained stable or increased in 93 percent of those states with clear legislative authority for dental public health programs. Of states without such statutory authority, 72 percent had declined in services.[35] In addition, *HP 2010 Public Health Infrastructure Objective 23-15* supports statutes, ordinances, and bylaws that assure the delivery of essential public health services.[1] A consortium of interested partners may help to determine the state's need for such legislative mandates.

For policy development, state oral health programs should also work with local health agencies and communities to develop and promote standards of care for population-based and personal oral health services (i.e., service coverage, compliance to regulations, and quality of care). With the basic tenet that community-based interventions should be locally developed, the state program can be involved in assuring that local interventions adhere to standards of practice such as providing training to maintain standards.[36]

State examples related to policy development[28] are:

1. ***Florida*** - The 1998 legislature provided first-time general revenue funding to expand dental services in county health departments.

2. ***Delaware*** - Legislation passed in 1998 required fluoridation of all municipal water supplies.

3. ***Maryland*** - The state obtained statutory authority in 1998 that established the Office of Oral Health in the Department of Health and Mental Hygiene and provided state funds for Medicaid dental services.

4. ***California*** - Legislation led to the fluoridation of Los Angeles.

A 1991 ASTDD survey of state oral health programs found strong evidence that programs were more stable in states where statutory authority exists.

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

Knowledge about the oral health of the population enables individuals, groups, communities, and government agencies to make informed decisions about funding, policies, and services. Various communication venues, such as oral presentations and written documents provided through electronic media, conferences, public forums, and news releases, should be utilized when consistent with communication objectives. Communications can increase the recognition of oral diseases as a major public health issue by keeping the state legislature, policymakers and other administrators informed. Efforts should also be made to educate and empower the public about current oral health problems and policies. For example, communications and education can increase public support for community water fluoridation. State oral health programs should develop strategies for communications and education that parallel their major program efforts and meet the needs of their specific state populations.

HP 2010 Public Health Infrastructure Objectives 23.2 and 23.7 call for making public health information and data related to HP 2010 objectives available to policymakers and the public.[1] A strong public health information system makes data available and accessible to community individuals and organizations. Providing electronic communications will link public health partners and offer an ongoing stream of current information to interested parties.[37-38]

Examples of state efforts[28] are:

1. ***Vermont*** - The State dental director provides monthly updates to the legislative oversight committee regarding access to dental services for children and adults in the Medicaid program.

2. ***Ohio*** - The Bureau of Oral Health Services widely distributes a state needs assessment report that includes county oral health profiles to keep more than 80 counties informed.

3. **Arizona** - The Office of Oral Health publishes an oral health newsletter with statewide distribution to raise awareness of dental public health issues.

HP 2010 Public Health Infrastructure Objectives 23.2 and 23.7 call for making public health information and data related to HP 2010 objectives available to policymakers and the public.

F. Building Linkages

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.

Oral health problems usually involve significant social and cultural factors and require many resources and partners to implement prevention services. New providers of pubic health services, such as managed care organizations, hospitals, nonprofit corporations, schools, churches, and businesses, are promising partners to improve oral health.[39] Building linkages with these partners can: (1) provide more public recognition and visibility, (2) leverage resources to expand the scope and range of services, (3) provide a more comprehensive approach to programming, (4) enhance clout in advocacy and resource development, (5) enhance competence, (6) avoid duplication of services and fill gaps in service delivery, and (7) accomplish what single members cannot. State oral health programs can build linkages to improve oral health by establishing and maintaining a state advisory committee, community coalitions, and governmental workgroups.

State Advisory Committee: A state advisory committee can guide and recommend directions for the state oral health program. The committee can provide advice on the state oral health improvement plan; support priority setting; identify needs and problems; assist in the coordination of services; and advocate for prevention programs and funding. Additionally, the committee can develop and foster collaborative relations to identify problems and implement solutions.[40-41] This committee should have broad-based input from constituency groups and could include members from health agencies, the state public health association, the state dental society, health care professional groups, consumer advocacy groups, businesses, schools, universities, and the legislature.

Community Coalitions: Community partners are needed to develop solutions to improve oral health. Community coalitions have some significant advantages over individual organizations or agencies in delivering broad-based, comprehensive interventions.[42-45] Efforts to reduce the burden of oral diseases must mobilize community-wide resources.

Governmental Workgroups: Many governments encourage collaborative approaches for programs in health and human services. Governmental workgroups could improve program efficiency, increase cooperation, and integrate and coordinate prevention services.

Examples of state efforts to build linkages[28] are:

1. ***Maryland*** - The state has an Oral Health Advisory Committee with a broad-based representation of constituents. The committee is a partnership of managed care organizations; dental managed care organizations; Medicaid; the Deputy Secretary for Health Care Policy, Finance & Regulation; Office of Oral Health; University of Maryland at Baltimore Dental School; local health departments; professional dental organizations; private dental practitioners; and the public. The committee has identified issues and developed strategies to improve provider participation and patient care in the Medicaid program.

2. ***Connecticut*** - Community workgroups, with members from the legislature, school officials, community leaders, and hospital administrators, have successfully initiated efforts to build school-based, community-based, and hospital-based dental clinics.

New providers of public health services, such as managed care organizations, hospitals, nonprofit corporations, schools, churches, and businesses, are promising partners to improve oral health.

G. Population-Based Interventions

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

State oral health programs can have greater impact on the oral health of communities and populations by implementing population-based interventions. Population-based interventions involve systems, communities, and individuals with a goal of improving oral health status, knowledge and skills of an entire population or sub-population.[46] For example, population-based interventions related to the HP 2010 Oral Health Objectives[1] may include supporting legislative initiatives for water fluoridation, facilitating community sealant programs, providing oral health promotion campaigns for the general public, and educating medical personnel about effective interventions to improve oral health.

Where appropriate, oral health interventions should be integrated into and coordinated with more broadly based programs. The rationale for the integration and coordination is to allow partnerships to develop comprehensive plans, eliminate duplication, improve efficiency, and make better use of limited resources.[47] Integrating and coordinating interventions would include positioning oral health issues and prevention activities on the agendas of other relevant programs, organizations, and advisory groups.

Several key oral health interventions, which have been proven effective,[48-49] are targeted by HP 2010:

1. ***Water Fluoridation***: More than 150 studies worldwide, spanning more than 40 years, have documented the efficacy, safety, and cost-effectiveness of community water fluoridation in preventing tooth decay.[50-54] Studies since 1980 have shown caries (tooth decay) reduction in the range of 20 percent to 40 percent. Yet, more than 100 million American children and adults do not have access to water containing enough fluoride to protect their teeth.[55] *HP 2010 Oral Health Objective 21-9* calls for 75 percent of the U.S. population served by community water systems to have optimally fluoridated water.

2. ***Dental Sealants***: Numerous clinical studies have shown 65 percent to 100 percent caries reductions with the placement of dental sealants.[56-57] Despite the effectiveness of dental sealants, less than 30 percent of U.S. children have received sealants.[5] *HP 2010 Oral Health Objective 21-8* calls for 50 percent of U.S. children to receive dental sealants on their permanent molars.

3. ***Oral and Pharyngeal Cancer:*** Prevention of high risk behaviors, which include tobacco use, is critical to reducing oral and pharyngeal cancers.[58] Only half of the persons diagnosed with oral and pharyngeal cancer are alive five years after the diagnosis.[3] Early detection is key to increasing the survival rate. *HP 2010 Oral Health Objective 21-6* proposes that half of all oral and pharyngeal cancers be detected at their earliest stage.

4. ***Personal Oral Hygiene and Professional Dental Care:*** Clinical trails have demonstrated that combined personal and professional care effectively prevented tooth decay and periodontal disease.[59] *HP 2010 Oral Health Objectives 21-1 through 21-5* seek to reduce dental caries experience, untreated dental decay, gingivitis, and periodontal disease.

Examples of population-based intervention efforts[28] are:

1. ***California*** - Public water systems with greater than 10,000 service connections are mandated by state law to fluoridate their water supplies when funds are available. The Office of Oral Health provides consultation and technical assistance to communities interested in fluoridating their water supplies and helps the communities to secure funds.

2. ***Colorado*** - The "Chopper Topper Sealant Project" is a cooperative effort between the state oral health program, Kids in Need of Dentistry, and HealthSET (Catholic Ministries) to provide sealants for school children. Following a 3-year demonstration project, the sealant project continues with funding from a foundation.

3. ***Idaho*** - The Oral Health Program participates in the Tobacco Free Idaho Alliance and collaborates with the state tobacco program. As a result, oral health promotion is integrated with tobacco cessation efforts for the youths in the state.

4. ***American Samoa*** - The U.S. territory has a public dental clinic located at the main Early Childhood Education Center (i.e., Head Start) and all new students are screened and referred to the clinic for dental care.

Integrating and coordinating interventions would include positioning oral health issues and prevention activities on the agendas of other relevant programs, organizations, and advisory groups.

Build community capacity to implement community-level interventions.

Communities can successfully plan and implement community-based interventions.[60-64] By developing human resources and creating supportive environments, communities will be better able to collectively solve problems. Building community capacity includes using community assets; increasing community skills; connecting people to build relationships and share information; having communities assume ownership of direction, action and resources; and building self-sustaining organizations.

State oral health programs can build community capacity by providing: (1) communities with needs assessment information on oral health status and resources, (2) opportunities for local planning and implementation, (3) resources to develop community-based services, and (4) local control over the allocation of resources.[60] Also, state oral health programs can provide training and technical assistance to increase skills in the community for planning and implementing preventions. State oral health programs can provide workshops on the epidemiology of oral diseases, coalition building, grant writing, and evaluation of services.[65] Training related to oral health needs and prevention services should include dental and other health providers (i.e., physicians, nurses, WIC personnel, and health educators).

Examples of state efforts[28] are:

1. ***Washington*** - The oral health program contracts with local health jurisdictions to provide oral health coordinators, develops community oral health coalitions, and has gained support from the legislature to provide local community grants for oral health.

2. ***Delaware*** - The oral health program works with a number of community partnership groups, provides them with data on dental service utilization, and encourages their participation to help increase access to care for state residents.

3. ***Illinois*** - The Division of Oral Health assists communities in determining their oral health needs and planning comprehensive oral health programs. The program provides integrated information about oral health status, existing health systems, and community resources. Grants and technical assistance are also offered to participating communities.

4. ***North Dakota*** - The oral health program provides support to the "Red River Valley Access Project", which is a collaborative effort with public, private and philanthropic groups working to develop strategies at the local level that will improve access to dental care.

By developing human resources and creating supportive environments, communities will be better able to collectively solve problems.

I. Health Systems Interventions

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

Oral diseases are not self-limiting and require professional care to restore function and health. Regular dental visits are needed for early diagnosis and treatment of oral diseases. Yet, many children and adults do not receive regular dental care services for a variety of reasons. In particular, vulnerable populations (i.e., low-income families, the homeless, Medicaid clients, HIV-infected individuals, and long-term care residents) often have limited financial resources for dental care. Health systems interventions are needed to facilitate quality dental care services for the general and vulnerable populations.

State oral health programs can contribute significantly to improving oral health through health system interventions. The state programs can provide technical assistance to health systems to improve accessibility and availability of dental care. In addition, they can support professional development by training non-dental health providers (i.e., physicians, nurses, and WIC personnel) to make the necessary referrals for early dental treatment. Further, state oral health programs can educate health systems about oral health needs and support health systems by establishing guidelines or standards of care.

Several of the following HP 2010 Oral Health Objectives[1] call for an increase in the availability of dental services and the use of the oral health care system:

1. Increase the proportion of children and adults who use the oral health care system each year (*HP 2010 Oral Health Objective 21-10*). During 1988-1994, approximately 51 percent of persons age two and older visited a dentist each year.[66]

2. Increase the proportion of long-term care residents who use the oral health care system each year (*HP 2010 Oral Health Objective 21-11*). The 1995 National Nursing Home Survey showed that only 17 percent of residents received dental care.[67]

3. Increase the proportion of children and adolescents under age 19 years at or below 200 percent of Federal poverty level who received any preventive dental services during the past year (*HP 2010 Oral Health Objective 21-12*). Only 20 percent of Medicaid children reported receiving preventive dental care in 1993.[68]

4. Increase the proportion of school-based health centers with an oral health component (*HP 2010 Oral Health Objective 21-13*). Oral health services could include fluoride mouthrinsing, dental sealants, screening, referral, and case management for treatment. The proportion of school-based health centers with an oral health component is quite low.[69]

5. Increase the proportion of local health departments and community-based health centers that have an oral health component (*HP 2010 Oral Health Objective 21-14*). More dental services, through local health departments and community-based centers, are needed in underserved areas and for low-income persons. Currently, about 60 percent of community-based health centers have an oral health component.[70]

6. Increase the proportion of states and the District of Columbia that have a system for recording and referring infants and children with cleft lips, cleft palates, and other craniofacial anomalies to craniofacial anomaly rehabilitative teams (*HP 2010 Oral Health Objective 21-15*). In 1993, only 23 States had systems for recording and referrals.[71]

Examples of state efforts to improve access to dental care[28] are:

1. ***Montana*** - The oral health program is providing an opportunity for collaborative planning through a statewide meeting. The summit meeting will develop strategies for addressing access to dental care for the underserved populations in the state.

2. ***Delaware*** - The oral health program is working closely with the state dental society and the Delaware board of dental licensing to increase the number of dentists who will accept Medicaid patients.

3. ***Iowa*** - The oral health program provides dental treatment services annually to approximately 3,600 low-income children not eligible for Title XIX. The children are referred from 26 health centers to dentists in the communities for care.

4. ***Maine*** - The oral health program is developing training modules for dental and other health providers to improve the oral health of young children.

5. ***Ohio*** - The Bureau of Oral Health Services works with Head Start programs and develops action plans to assure that children enrolled in the programs receive needed dental care. Some of the participating programs have more than 80 percent of the children completing their dental treatment.

HP 2010 Oral Health Objectives call for an increase in the availability of dental services and the use of the oral health care system.

J. Leveraging Resources

Leverage resources to adequately fund public health functions.

Resources are needed to plan, develop, and implement oral health programs at the state and community levels. Inadequate funding and staff support can lead to diffuse interventions of questionable quality that often result in undetectable social benefits. Funding for public health functions must be at a level necessary for a threshold effect.

State health agencies, local agencies, and communities all have limited funding. Increased efforts will be necessary to link programs and organizations to leverage resources. Ways to leverage resources include: (1) apply for grants, (2) establish interagency agreements, and (3) develop public-private funding strategies. Additionally, linking with partners within coalitions may offer opportunities to expand resources. Further, strategies are needed to foster state legislative and federal support for essential public health functions.

Examples of state efforts in leveraging resources[28] are:

1. ***Washington and Connecticut*** - The oral health programs in the two states received funds through the Federally-sponsored project grant program, Community Integrated Service Systems (CISS) to build local coalitions and address oral health needs in the communities.

2. ***Michigan*** - The oral health program received funding from the state mental health agency to provide dental treatment for the developmentally disabled.

3. ***Oregon*** - The Health Division, as the fiscal agent for the Early Childhood Caries Prevention Coalition, was awarded a grant from the Northwest Health Foundation to educate non-dental health providers about early childhood caries and to train dental providers on management of children ages 1-3.

4. ***Vermont*** - Medicaid reimbursement for outreach efforts delivered by school nurses created a funding source for dental hygienists to deliver preventive services in the schools. The state oral health program further supported these preventive services by providing training, curriculum and supplies to the dental hygienists.

5. ***Maryland*** - The Office of Oral Health received a grant from the Office of Child Health to conduct an oral health needs assessment of Head Start children and children with special health care needs.

Increased efforts will be necessary to link programs and organizations to leverage resources.

III. Illustrating Funding Needs to Build Infrastructure and Capacity

This section illustrates the funding needed to build infrastructure and capacity for state oral health programs. First, information is provided on the states' current need to address the infrastructure and capacity elements described in the previous section. Next, four state models representing varying levels of program resources and different state characteristics, provide a possible range of funding needs to build infrastructure and capacity.

A. States' Current Need to Build Infrastructure and Capacity

1. Differences in State Resources and Environments

Substantial differences in resources and environments are observed among the states.[28] Some states have full-time state dental directors and some have part-time or no state dental directors. Staff resources range from zero to more than 100 full-time equivalents staffing a state oral health program. Additionally, annual budgets for state oral health programs are less than $100,000 for some states and more than a million dollars for others. State populations vary widely, ranging from 500,000 to 35 million people. The number of children in each of the 50 states at or below 200 percent of federal poverty level range from 60,000 to 4.6 million.[72] Further, local support systems differ. Twenty-five states have less than 10 percent of their counties and five states have more than 50 percent of their counties supported by local health departments with oral health programs.

2. State Consensus on Building Infrastructure and Capacity for State Oral Health Programs

In November 1999, ASTDD surveyed 50 states, the District of Columbia and U.S. territories using a Delphi method to determine infrastructure and capacity for state oral health programs to achieve HP 2010 Oral Health Objectives.[12] Forty-three states, with 93 percent of the total U.S. population, responded to the *ASTDD Delphi Survey* and agreed on the top ten elements described in ***Section II***. The mean scores listed in *Table 1* show respondents' level of agreement with each item. States were also asked to select the five most important infrastructure and capacity elements for ***any*** state oral health program (*Table 1*). More than 81 percent of the states selected "leadership" and "surveillance system" among the top five priorities.

Table I. State Consensus on Infrastructure and Capacity Building Elements (N=43 States)

Infrastructure and capacity building elements	**Mean Score** 1= strongly agree 2= agree 3= disagree 4= strongly disagree	**Among the five most important for any state (% States)**
Provide leadership with a state dental director and adequate/competent staff	1.08	81.4%
Establish a state-based oral health surveillance system	1.16	81.4%
Provide oral health communications and education	1.17	58.1%
Develop a state oral health improvement plan	1.17	48.8%
Develop health systems interventions	1.27	37.2%
Leverage resources to fund public health functions	1.33	30.2%
Integrate, coordinate, and implement population-based interventions	1.36	30.2%
Build linkages with partners	1.37	27.9%
Develop/promote policies for better oral health & to improve health systems	1.27	23.3%
Build community capacity to implement community-level interventions	1.22	20.9%

Source: ASTDD Delphi Survey of Infrastructure and Capacity Building, November 1999

State oral health programs will be better prepared to achieve HP 2010 Oral Health Objectives if they possess competence in surveillance; a full-time dental director; a skilled staff; a state plan; the support of policymakers, strong public-private partnerships and competent communities; and adequate funding for services. However, the states report gaps in their dental public health infrastructure and capacity.

3. Current Gaps

a. Survey of States' Need to Build Infrastructure and Capacity

The 1999 A*STDD Delphi Survey*[12] provided an opportunity to assess current gaps. In the second round of the survey, states were asked to identify the top needs of their ***own*** state by selecting five of the infrastructures and capacity building elements listed in *Table 1*. *Table 2* shows the top needs reported by the 43 states. The highest needs reported were a surveillance system (67% of states) and leadership (63%).

Table 2. States Reporting Top Needs of Their Own State (N=43 States)

Infrastructure and capacity building elements	% States
Surveillance system	67.4%
Leadership with a dental director & adequate/competent staff	62.8%
Communications and education	51.2%
State oral health improvement plan	48.8%
Health systems interventions	46.5%
Building community capacity	46.5%
Source: ASTDD Delphi Survey of Infrastructure and Capacity Building, November 1999	

Among the states responding to the ASTDD Delphi Survey (*Table 3*), only 19 percent reported having a state-based oral health surveillance system; 38 percent had a state oral health improvement plan; 48 percent had an oral health advisory committee (build linkages); and 37 percent had statutory authority for the state oral health programs (develop policies). Some of the states are currently making efforts to establish these elements. In particular, 37 percent of the states are developing their surveillance system and 24% are developing their state plan.

Table 3. States Reporting Existing Infrastructure and Capacity Elements (N=43 States)

Elements	Yes (% States)	No (% States)	Being Developed (% States)
Surveillance system	18.6%	44.2%	37.2%
State oral health improvement plan	38.1%	38.1%	23.8%
Advisory committee (build linkages)	47.6%	42.9%	9.5%
Statutory authority (develop policies)	36.6%	58.5%	4.9%
Source: ASTDD Delphi Survey of Infrastructure and Capacity Building, November 1999			

A. States' Current Need to Build Infrastructure and Capacity

A majority of the states responding to the survey (*Table 4*) reported a high need for additional resources in the areas of building community capacity (62%) and health systems interventions (60%). One half of the responding states reported a high need for additional resources to educate policymakers and the public about oral health issues (51%) and to integrate and coordinate population-based interventions (50%).

Table 4. States Reporting Need for Additional Resources (N=43 States)

Infrastructure and capacity elements	No need (% States)	Little need (% States)	Moderate need (% States)	High need (% States)
Building community capacity	0.0%	9.5%	28.6%	61.9%
Health systems intervention	2.4%	9.5%	28.6%	59.5%
Communications and education	0.0%	7.3%	41.5%	51.2%
Population-based interventions	2.4%	7.1%	40.5%	50.0%
Develop and promote policies	10.3%	17.9%	38.5%	33.3%

Source: ASTDD Delphi Survey of Infrastructure and Capacity Building, November 1999

For selected categories of staff expertise and skills, the majority of responding states reported moderate to high needs *(Table 5)*. Forty percent of the states reported a high need for staff expertise related to epidemiology.

Table 5. States Reporting Need for Additional Staff Expertise and Skills (N=43 States)

Staff expertise and skills	No need (% States)	Little need (% States)	Moderate need (% States)	High need (% States)
Epidemiology	7.1%	11.9%	40.5%	40.5%
Community development	7.1%	9.5%	50.0%	33.3%
Strategic planning	9.5%	26.2%	38.1%	26.2%
Water fluoridation	16.7%	19.0%	35.7%	28.6%
Communications and education	2.4%	19.0%	50.0%	28.6%
Dental public health interventions	2.4%	19.0%	40.5%	38.1%

Source: ASTDD Delphi Survey of Infrastructure and Capacity Building, November 1999

b. Need for Full-Time State Dental Directors, Staff and Program Funds

A full-time state dental director is needed for leadership. In September 1999, ASTDD conducted an assessment on the full-time status of state dental directors for the 50 states, the District of Columbia, and six U.S. territories (American Samoa, Guam, Palau, Puerto Rico, Northern Mariana Islands, and Virgin Islands).[73] The assessment showed that although 31 states and five territories have full-time state dental directors, 20 states (including the District of Columbia) and one territory have part-time or vacant state dental director positions *(Table 6)*.

The ASTDD Synopsis of State Dental Public Health Programs[28] (March 1999) reported the number of full-time equivalents (FTE's) staffing state oral health programs - including the state dental director. *Table 7* shows 21 states (populations totaling 67 million people) have two or fewer FTE's staffing a State oral health program.

Oral health program budgets for the 50 states, the District of Columbia and six U.S. territories are summarized in *Table 8*. One half of the states, with populations totaling 92 million people, have a budget of $500,000 or less to support the state oral health program.

Table 6. Status of State Dental Directors as of September 1999
(N=57 States including 50 states, the District of Columbia and 6 U.S. territories)

State dental director status	50 States & DC	U.S. territories
Full-time state dental directors	31	5
Part-time state dental directors	12	——
Vacant state dental director positions	8	1

Source: ASTDD Assessment of State Dental Directors, September 1999

Table 7. Full-Time Equivalents Staffing State Oral Health Programs - Includes Dental Director
(N=57 States including 50 states, the District of Columbia and 6 U.S. territories)

# FTE's staffing state oral health program	50 States & DC	U.S. territories	Total Population (in millions)
0 - 2.0	21	——	66.9
3.0 - 5.0	14	1	63.1
6.0 - 10.0	5	——	24
11.0 - 20.0	5	——	44.5
21.0 - 30.0	2	2	3.1
30.0+	4	——	66.2
missing data	——	3	3.8

Source: ASTDD Synopsis of State Dental Public Health Programs, March 1999

Table 8 . State Oral Health Program Budgets
(N=57 States including 50 states, the District of Columbia and 6 U.S. territories)

Program Budget	50 States & DC	U.S. territories	Total Population (in millions)
< $100,000	7	——	18.4
$100,001 - $250,000	9	——	22.2
$250,001 - $500,000	9	1	51.4
$500,001 - $1,000,000	10	2	61.2
> $1,000,000	9	1	95.9
missing data	7	2	22.4

Source: ASTDD Synopsis of State Dental Public Health Programs, March 1999

B. Funding Models for States

For state oral health programs to expand infrastructure and capacity and fill existing gaps, funding is needed. Four states have been selected as models to illustrate funding needs. These four state oral health programs were chosen because they present varying levels of program resources (budget and staffing) and different environments (state populations and state/local system structures). *Table 9* compares the four state models.

Table 9. A Comparison of Four State Models Used to Illustrate Funding Needs for Infrastructure & Capacity

State Characteristics	State Model #1	State Model #2	State Model #3	State Model #4
a. State population	2,500,000	4,500,000	5,500,000	11,500,000
b. Children at or below 200% federal poverty level	400,000	700,000	500,000	1,200,000
c. Counties	75	15	39	88
d. Organizational levels in the state health agency	Dept. of Health Bureau of Public Health Programs Section of Maternal & Child Health Office of Oral Health	Dept. of Health Division of Public Health Services Bureau of Community & Family Health Office of Oral Health	Dept. of Health Office of Community & Family Health Office of Maternal & Child Health Section of Child & Adolescent Health Oral Health Program	Dept. of Health Division of Family & Community Health Services Bureau of Oral Health Services
e. State oral health program budget	$200,000	$1,000,000	$1,000,000	$2,900,000
f. State dental director	Full time	Full time	Full time	Full time
g. State oral health program staff employees – including dental director	1.2 FTE	11.0 FTE	3.0 FTE	19.0 FTE
h. State oral health program contractors	0 FTE	46.0 FTE	24.0 FTE	0.5 FTE
i. HP 2010 Oral Health Objectives the state targeted	4	8	5	10
j. Low-income dental clinics	10	16	35	80
k. Local health departments with dental programs	1	2	20	18

2. Budget Estimates

The four state models estimated a budget to build infrastructure and capacity for their oral health programs (Table 10). State dental directors of the four selected states were asked to provide lower and upper budget estimates for each infrastructure and capacity element using their program experience and data. A standardized worksheet guided the state models to project funding needs; the models determined their own staffing needs and strategies. Since no staffing or strategic requirements were placed on the infrastructure and capacity building elements, this method is meant to illustrate the total funding needs for state oral health programs rather than individual elements.

Table 10. Illustrating Funding Needs to Build Infrastructure and Capacity for State Oral Health Programs

State Model	Annual Budget Estimates	
	Lower $	Upper $
State Model #1	445,000	722,000
State Model #2	1,027,00	1,651,000
State Model #3	2,868,000	4,449,000
State Model #4	3,371,000	4,760,000

The four state models estimated the funding needed to build infrastructure and capacity for their oral health programs to be in the range of $445,000 to $4,760,000. More information on the approach used by the four state models to estimate the budget to build the ten essential infrastructure and capacity elements is provided in *Appendix E*. The models showed that funding needs can vary widely among states and reflect differences in the environments and strategies. These environmental and strategic factors include the following:

***a. HP 2010 Oral Health Objectives**:* The models targeted different numbers of HP 2010 OralHealth Objectives for their state ranging from four to ten. All four state models selected objectives related to reducing tooth decay among children and increasing water fluoridation. Yet, only two models targeted objectives to increase oral health services in school-based/community-based health centers and local health departments. The number of HP 2010 Oral Health Objectives linked to the state's needs and the specific objectives targeted will place different demands on resources.

***b. State Populations**:* The state models have populations ranging from 2.5 million to 11.5 million people. Among the 50 states and District of Columbia, state populations ranged from approximately 500,000 to 35 million people. The size of the state population affects the level of services needed.

c. Local System Structures: For the models, the number of counties in each state ranged from 15 to 88. Additionally, the percentage of counties supported by local health departments with oral health programs ranged from one percent to more than 50 percent among the four state models. Intervention strategies and service delivery will vary depending on the level of support from local system structures.

d. Core Staff: State models reported different assessments of the number of employees/contractors and the expertise needed for the core staff to support their oral health programs. In addition to a full-time state dental director, projected staffing needs ranged from two to 16 full-time equivalents. Models with larger core staff expected their staff to fully support several infrastructure and capacity building elements and budgeted little or no funding to contract additional support services. Models with smaller staff budgeted more funds to contract support services.

e. Extending Resources to Communities: State models showed different emphasis on state-level versus community-level interventions. Two models budgeted more funding to support state-level interventions and planned to support community-level interventions primarily through technical assistance and small "seed grants". The remaining two models projected less funding at the state-level but extended more resources to communities. One model budgeted $1 million in grants for local agencies and organizations to deliver intervention services each year.

f. Dental Clinics: State models varied in their strategies for health systems interventions. Two models projected funding to establish dental clinics to serve vulnerable populations and budgeted for grants ranging from $250,000 to $400,000 per clinic. The other two models planned to provide primarily technical assistance to build dental clinics and budgeted for grants of less than $50,000 per clinic.

Different environments and strategies to build infrastructure and capacity for the state oral health programs will result in different funding needs. Each of the states should determine specific strategies and funding needs for its state oral health program.

3. Illustrating Funding Needs for All States to Build Infrastructure and Capacity

Funding needs for all states to build infrastructure and capacity for state oral health programs are illustrated in *Table 11*. States are grouped with one of the four state models based on similarity of population sizes. The assumption that a state with a similar population size as one of the state models will have the same funding needs is used only as a demonstration. It is expected that many factors (e.g., environments and strategies) will impact funding needs. Using the state models' budget estimates, a possible range of funding needed for all 50 states, the District of Columbia, and six U.S. territories to build infrastructure and capacity for state oral health programs is between $81 and $124 million.

Table 11. Projected Funding Needs for All States to Build Infrastructure and Capacity for State Oral Health Programs
(N=57 States including 50 States, the District of Columbia and 6 U.S. territories)

State Models	Annual Estimated Budget for State Models (Lower Estimates - Upper Estimates)	* States with Similar Population Sizes	Annual Estimated Budget for All States (Lower Estimates - Upper Estimates) (in millions)
#1	$445,000 - $722,000	25	$11.1 - $18.1
#2	$1,027,000 - $1,651,000	14	$14.3 - $23.1
#3	$2,868,000 - 44,449,000	9	$25.8 - $40.0
#4	$3,371,000 - $4,760,000	9	$30.3 - $42.8
All States		57	$81.5 - $124

**States are distributed by population sizes similar to state models.*

IV. Conclusion

The assessment of resources needed to maintain fully effective state oral health programs provided three main conclusions:

• ***Funding is needed to build infrastructure and capacity for state oral health programs to achieve HP 2010 Oral Health Objectives and improve the oral health of Americans.***

• ***Funding needs will vary among the states due to differences in existing infrastructure, priorities, staffing, and strategies.***

• ***Each of the states should conduct its own assessment of infrastructure and capacity to determine gaps and specific funding needs for its state oral health program.***

Increased funding has recently contributed substantially to infrastructure and capacity building in injury prevention, arthritis prevention, and environmental health. Similarly, funding is needed to expand infrastructure and capacity for state oral health programs. Ten essential elements for building infrastructure and capacity have been identified in this document to better prepare states to successfully achieve HP 2010 Oral Health Objectives and improve the oral health of Americans.

Additionally, by using four state models to represent varying levels of program resources and different state characteristics, this document illustrates that the funding needed to build infrastructure and capacity for a state oral health program can range from $445,000 to $4,760,000. Using these illustrative budget estimates, a possible range of funding needed for all 50 states, the District of Columbia, and six U.S. territories is between $81 and $124 million.

The state models have also demonstrated that funding needs will vary among the states due to differences in existing infrastructure, priorities, staffing, and strategies. State personnel will need to identify gaps, select effective interventions, determine appropriate target populations, and prioritize oral health objectives. Furthermore, other infrastructure and capacity needs, such as evaluation (i.e., meeting performance standards on essential public health services), research (i.e., conducting or collaborating on population-based prevention research), and assurance of workforce functions (i.e., training to use information technology effectively), not identified as the top ten elements in this document, will also require additional resources and development. Therefore, each of the states should conduct its own assessment to determine gaps and specific funding needs to build infrastructure and capacity for its state oral health program.

Based on feedback from state dental directors, further efforts are recommended to help state oral health programs build infrastructure and capacity. They include the following:

1. Establish demonstration project grants for states to identify gaps, begin planning, and build basic foundational elements for their oral health programs.

2. Conduct evidence-based analyses of state oral health programs to identify best practices.

3. Analyze state data to establish valid funding formulas, such as cost per capita for specific intervention services, and determine appropriate target populations.

4. Expand technical support at the national and regional levels to provide guidelines and expertise for building infrastructure and capacity in states oral health programs.

With expanded infrastructure and capacity, state oral health programs are better able to monitor oral health status, address high-risk populations, increase population-based prevention activities, and extend resources to local health agencies and communities in order to implement oral health strategies. This will enhance the states' effectiveness to improve the oral health of children and adults in the U.S.

Appendix A - Essential Public Health Services

The following are essential public health services developed by the Public Health Function Steering Committee, Public Health in America:[8]

1. Monitor health status to identify community health problems.

2. Diagnose and investigate health problems and health hazards in the community.

3. Inform, educate, and empower people about health issues.

4. Mobilize community partnerships to identify and solve health problems.

5. Develop policies and plans that support individual and community health efforts.

6. Enforce laws and regulations that protect health and assure safety.

7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable.

8. Assure a competent public health and personal health care workforce.

9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.

10. Research for new insights and innovative solutions to health problems.

Appendix B - Essential Dental Health Services

The Association of State and Territorial Dental Directors's (ASTDD) *Guidelines for State and Territorial Oral Health Programs*[8] identifies the following essential dental public health services:

I. Assessment

A. Assess ***oral health status*** and needs so that problems can be identified and addressed.
B. Analyze ***determinants*** of identified oral health needs, including resources.
C. Assess the ***fluoridation status*** of water systems, and other sources of fluoride.
D. Implement an ***oral health surveillance system*** to identify, investigate, and monitor oral health problems and health hazards.

II. Policy Development

A. Develop ***plans and policies*** through a collaborative process that support individual and community oral health efforts to address oral health needs.
B. Provide ***leadership*** to address oral health problems by maintaining a strong oral health unit within the health agency.
C. Mobilize ***community partnerships*** between and among policymakers, professionals, organizations, groups, the public and others to identify and implement solutions to oral health problems.

III. Assurance

A. Inform, educate and empower ***the public*** regarding oral health problems and solutions.
B. Promote and enforce ***laws and regulations*** that protect and improve oral health, ensure safety, and assure accountability for the public's well-being.
C. ***Link people*** to needed population-based oral health services, personal oral health services, and support services and assure the availability, access, and acceptability of these services by enhancing system capacity, including directly supporting or providing services when necessary.
D. Support services and implementation of programs that focus on ***primary and secondary prevention***.
E. Assure that the ***public health and personal health work force*** has the capacity and expertise to effectively address oral health needs.
F. Evaluate ***effectiveness, accessibility, and quality*** of population-based and personal oral health services.
G. Conduct ***research and support demonstration projects*** to gain new insights and applications of innovative solutions to oral health problems.

Appendix C - Healthy People 2010 Oral Health Objectives

Objectives	Age(s)	2010 Baseline	2010 Goal
21-1 Reduce dental caries experience in children	2-4 6-8 15	18% 52% 61%	11% 42% 51%
21-2 Reduce untreated dental decay in children and adults	2-4 6-8 15 35-44	16% 29% 20% 27%	9% 21% 15% 15%
21-3 Increase adults with teeth who have never lost a tooth	35-44	31%	42%
21-4 Reduce adults who have lost all their teeth	65-74	26%	20%
21-5a Reduce gingivitis among adults	35-44	48%	41%
21-5b Reduce periodontal disease among adults	35-44	22%	14%
21-6 Increase detection Stage I oral cancer lesions	all	35%	50%
21-7 Increase number of oral cancer examinations	40+	14%	35%
21-8 Increase sealants in 8 year old first molars and in 14 year old first and second molars	8 14	23% (1st molars) 15% (1st & 2nd molars)	50% 50%
21-9 Increase persons on public water receiving fluoridated water	all	62%	75%
21-10 Increase utilization of oral health system	2+	65%	83%
21-11 Increase utilization of dental services for those in long-term facilities, e.g., nursing homes	all	19%	25%
21-12 Increase preventive dental services for poor children	0-18	20%	57%
21-13 Increase number of school-based health centers with oral health component	K-12	developmental - unknown	
21-14 Increase number of community health centers and local health departments with oral health component	all	34%	75%
21-15 Increase states with system for recording and referring orofacial clefts	all	23	51
21-16 Increase the number of states with State-based surveillance system	all	0	51
21-17 Increase the number of State & local dental programs with public health trained director	all	developmental - unknown	

Source: U.S. Department of Health and Human Services. Healthy People 2010 (Conference Edition, in Two Volumes). Washington, DC: January 2000. (http://www.health.gov/healthypeople/default.htm)

The following profile illustrates the approach used by the four state models to estimate the funding needs to build the ten essential infrastructure and capacity elements for their state oral health programs. Budget estimates listed in the profile are meant to demonstrate possible funding needs by using the projections provided by the state models.

a. Core staff

The core staff includes a full-time state dental director and staff for the oral health unit. The core staff would perform multiple functions and provide leadership and support of the ten essential infrastructure and capacity elements. The number of individuals forming the core staff will vary from state to state depending on environmental and strategic factors. One state model projected salary and benefits for a core staff of approximately 10 full-time equivalents ranging from $600,000 to $800,000 annually. Another state model projected a core staff of approximately 15 full-time equivalents and estimated salary and benefits in the range of $1 million to $1.5 million annually. It is expected that the number of persons for a core staff will vary among the states.

Additional costs related to a core staff include staff training and purchasing/maintaining communication and computer equipment for the staff. Training cost could range from $10,000 to $20,000 annually. Furthermore, equipment cost could range from $50,000 to $100,000 annually.

b. Surveillance system

This element would require data collection, analysis, and communication of surveillance findings. Projected costs include equipment and supplies for intra-oral screenings, contractors, training, travel, data entry, data analysis, and printing and distributing reports. Core staff would support surveillance activities. Some staffing needs for surveillance may be supported by other components of the state health agency, county health agencies, and communities. Additional contracted services and operation costs could require $60,000 - $80,000 annually. For states conducting oral health assessment in cycles (i.e., 5-year intervals), $100,000 - $200,000 may be needed during an active year of data collection.

c. Leadership

Leadership in determining priorities, setting agendas, developing plans, making funding decisions, and establishing policies is dependent on the talent and skills of the core staff. Leadership is needed in each of the essential infrastructure and capacity building elements. Consequently, the budget for a core staff's salary, benefits, and training supports leadership. Costs for operation may vary each year depending on activities.

d. State plan

A collaborative process in developing a state oral health improvement plan would require the support of the core staff. Additional costs could be needed for conducting conferences/planning meetings, contracting a facilitator/planner, renting an off-site meeting place, and reimbursing participants for their travel and lodging. One state model projected the cost for developing a state plan could range from $90,000 to $100,000 annually.

e. Developing and promoting policies

The core staff, particularly the state dental director, will support development and promotion of policies. Operation costs may vary each year depending on activities.

f. Communications and education

Projected costs could include contracting the services of a Webmaster to establish electronic access to oral health information and maintaining a listserv. Additionally, other costs related to communications and education could relate to conferences to present oral health needs assessment findings and other issues to policy makers and legislators, and to print and distribute oral health reports or newsletters. One state model estimated a budget ranging from $20,000 to $35,000 annually.

g. Building linkages

Building linkages through an oral health advisory committee, community coalitions, and governmental workgroups may require funding to support communications, conference calls, meetings, travel, and other group functions. One state model estimated funding needs ranging from $60,000 to $95,000 annually.

h. Integrating, coordinating, and implementing population-based interventions

Population-based interventions can be highly variable among the states. Such interventions would depend on the fluoridation status, population size, existing community-level interventions, etc. Projected costs for population-based intervention services could relate to water fluoridation, sealant placement, dental care access, fluoride mouth rinse, fluoride varnish, health fairs, spit tobacco education, and general oral hygiene education. One state model projected funding needs ranging from $250,000 to $335,000 annually.

i. Building community capacity

The number of counties varies widely among the states. The four state models showed a range of 15 to 88 counties per state. State models varied in strategies proposed to build community capacity for delivering community-level interventions. One strategy included working with local entities to determine their needs, assisting with grant writing, and analyzing community needs and resources. Another strategy included providing multiple "seed grants" to communities to develop local solutions to dental care access problems. A third strategy included contracting services with communities to provide sealants, fluoride varnish, screenings, etc. One state model estimated that $1 million to $2 million annually would be needed for contracting services or providing grants with communities.

j. Health systems interventions

Health systems interventions may include working with local health departments, community health centers, and schools to establish oral health components. Strategies could include supporting needs assessment, seeking funding, and providing consultation. Core staff could provide technical assistance and training. Other approaches may include providing grants to build community, school-based, or nursing home dental clinics. These grants could be one-time only or for multiple years. One state model projected funding needed to establish grants could range from $500,000 to $750,000 annually.

k. Leveraging resources

Leveraging resources will require support of the core staff. Grant writing could be provided by the core staff and through contracted services. One state model projected costs ranging from $10,000 to $20,000 annually to contract grant writers.

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