State-Based Oral Health Surveillance Systems

Conceptual Framework and Operational Definition

October 2013

Prepared by:

Association of State & Territorial Dental Directors

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Prepared for:

Council of State & Territorial Epidemiologists

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EXECUTIVE SUMMARY

The public health implications of poor oral health status are vast. Poor oral health impacts a person's ability to eat, speak, work, communicate and learn. Although most oral diseases and conditions are preventable, virtually all adults – and many children – have experienced some oral disease. Serious oral health disparities exist by race, age, geography and income. The costs of oral disease treatment are significant. The Centers for Disease Control and Prevention (CDC) recommends that health-related events (in this case oral diseases and conditions) be considered for surveillance if they affect many people, require large expenditures of resources, are largely preventable, and are of public health importance. Based on these criteria, oral health outcomes, associated health behaviors, and other factors linked to oral health should be included in state-based public health surveillance systems.

In the 20th century, oral health surveillance was primarily the domain of the federal government. A few states collected oral health status data, but no state had a comprehensive system for oral health surveillance. The development of state-based oral health surveillance systems began in 1998-1999 when the Council of State and Territorial Epidemiologists (CSTE) approved nine oral health indicators for public health surveillance. The website hosting these indicators, the National Oral Health Surveillance System (NOHSS), was launched jointly by CDC and the Association of State and Territorial Dental Directors (ASTDD) in 2001.

Upon release of the Healthy People 2020 (HP2020) objectives, ASTDD formed a NOHSS workgroup of state dental directors and epidemiologists from ASTDD, CDC and CSTE. The workgroup was tasked with reviewing the original NOHSS indicators for alignment with HP2020 objectives and assessing whether state data sources were available for these or related objectives. In 2012, CSTE approved position statements submitted by the workgroup requesting that a wider array of state-level indicators be included in NOHSS and that CSTE develop a new operational definition for HP2020 Objective OH-16 "Increase the number of states and the District of Columbia that have an oral and craniofacial health surveillance system".

The current operational definition for this objective, developed originally for HP2010, is the number of states with surveillance data for at least six of the nine possible surveillance databases with oral health information. Since Objective OH-16 was developed, however, the public health surveillance framework has been transformed by a variety of external factors: new information technologies, new data sources, and an expanded view of what constitutes oral health and adequate oral health surveillance. Public health leaders recognize that oral health surveillance should address a variety of conditions, risk factors and external influences; employ a variety of methods and data sources; and go beyond basic disease

reporting. In addition, it must address the overarching purpose of surveillance: providing ***actionable information to guide public health policy and programs***. Because of this, the revised definition is broad-based, covering a variety of oral diseases and conditions, along with access to dental care and community water fluoridation. Moreover, it includes an oral health surveillance plan, a core or foundational set of surveillance elements for a state oral health surveillance system, and timely, public availability of actionable data. The definition, we hope, will encourage states to expand their oral health surveillance systems to include a wider variety of indicators, based on state needs and resources.

Proposed New Operational Definition for HP2020 OH-16

This operational definition is a core or foundational set of surveillance elements. We encourage states to expand their oral health surveillance system to include a wider variety of indicators based on the needs and resources of the individual state. Number of states and the District of Columbia that have all of the following ten items.

- A written oral health surveillance plan that was developed or updated within the previous five years.
- Oral health status data for a representative sample of third grade children meeting criteria for inclusion in NOHSS. Data must have been collected within the previous five years.
- Permanent tooth loss data for adults obtained within the previous two years.
- Annual data on oral and pharyngeal cancer incidence and mortality.
- Annual data on the percent of Medicaid- and CHIP-enrolled children who had a dental visit in the previous year.
- Data on the percent of children 1-17 years who had a dental visit in the previous year, obtained every four years.
- Data on the percent of adults (≥18 years) and adults with diabetes who had a dental visit in the previous year, obtained within the previous two years.
- Data on the fluoridation status of public water systems within the state, updated every two years.
- Annual data on state oral health programs and the environment in which they operate, including workforce and infrastructure indicators, submitted to the Annual Synopses of State and Territorial Dental Public Health Programs.
- Publicly available, actionable data to guide public health policy and programs disseminated in a timely manner. This may take the form of an oral disease burden document, publicly available reports, or a web-based interface providing information on the oral health of the state's population developed or updated within the previous five years.

INTRODUCTION

The 1988 Institute of Medicine (IOM) report on the future of public health outlines three core functions for public health: assessment, policy development and assurance.[1] In that report (updated in 2003), the IOM recommended that every public health agency regularly and systematically collect, assemble, analyze, and disseminate information on community health status to carry out the assessment function. Public health agencies accomplish this task through public health surveillance – the ongoing, systematic collection, analysis and interpretation of health data.[2] Surveillance is essential for planning, implementing, and evaluating public health practice and, ideally, is closely integrated with data dissemination to public health decision makers and other stakeholders.[3] Indeed, the overarching purpose of public health surveillance is to provide ***actionable health information to guide public health policy and programs***.[4] Although the initial focus of public health surveillance in the United States was infectious disease, today it is also apt to encompass burdensome chronic illnesses, such as cancer and diabetes, as well as disease risk factors like cigarette smoking, alcohol consumption and health care access and usage.

A public health surveillance ***system*** is defined by the purpose of the data collected, rather than the data itself.[3] Thus, good data collection does not, in and of itself, constitute a good surveillance system. Planning, standardization, data analysis and interpretation, rapid data dissemination and communication, ongoing system evaluation, and use of data for public health programming are equally important system components. In this context, the purpose of an oral health surveillance system is to use data to protect and promote population-wide oral health.

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In the 20th century, oral health surveillance was primarily the domain of the federal government. A few states collected oral health status data, but no state had a comprehensive system for oral health surveillance. The development of state-based oral health surveillance systems began in 1998-1999 when the Council of State and Territorial Epidemiologists (CSTE) approved nine oral health indicators for public health surveillance:

- Dental visit within the past year, teeth cleaning within the past year, and total tooth loss among adults based on data from the Behavioral Risk Factor Surveillance System (BRFSS).
- Incidence of and mortality from oral and pharyngeal cancers based on data from the National Cancer Institute's (NCI's) Surveillance, Epidemiology and End Results (SEER)

database and the Centers for Disease Control and Prevention's (CDC's) National Program of Cancer Registries (NPCR).

- Dental caries, untreated tooth decay, and presence of dental sealants among students in kindergarten through Grade 3 based on data from the Basic Screening Survey (BSS), a standard oral health screening protocol used by states.
- Percentage of the population served by public water systems with optimally fluoridated water based on data from CDC's Water Fluoridation Reporting System (WFRS).[5]

The website hosting these indicators, the National Oral Health Surveillance System (NOHSS) – www.cdc.gov/nohss – was launched jointly by CDC and the Association of State and Territorial Dental Directors (ASTDD) in 2001 with adult and water fluoridation indicator data for all states; child indicators were added later. As of April 2013, 43 states had submitted indicator data for 3rd grade students.

Upon release of the Healthy People 2020 (HP2020) objectives, ASTDD formed a NOHSS workgroup of state dental directors and epidemiologists from ASTDD, CDC and CSTE. The workgroup was tasked with reviewing the original, nine NOHSS oral health indicators for alignment with HP2020 objectives and assessing whether state data sources were available for these or related objectives. In 2012, the workgroup submitted a position statement to CSTE requesting that a wider array of state-level indicators be included in NOHSS[6] and that CSTE approve three developmental indicators, including the number of states with an oral health surveillance system.[7]

This paper provides (1) an overview of oral and craniofacial health surveillance at national and state levels, including components of a state oral health surveillance system (SOHSS), (2) an overview of the development and revision of NOHSS and of other national public health surveillance initiatives, (3) a new operational definition for HP2020 Objective OH-16 (*Increase the number of states and DC that have an oral and craniofacial health surveillance system*), and (4) a discussion of future potential changes and directions for oral health surveillance systems.

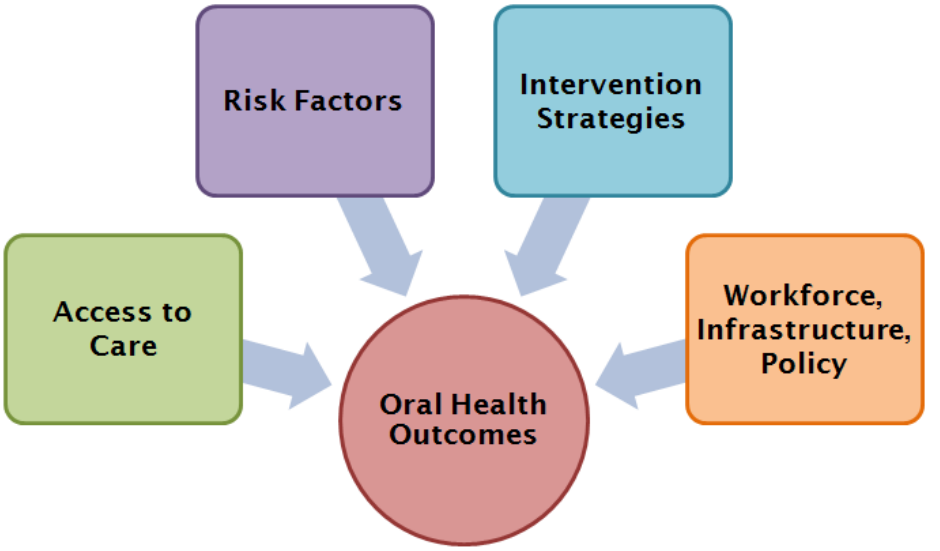
Oral Health: General Overview & Public Health Importance

The 2000 report, *Oral Health in America: A Report of the Surgeon General*, states that oral health is more than healthy teeth. It means being free of chronic oral-facial pain, oral and pharyngeal (throat) cancers, oral soft tissue lesions, cleft lip or other birth defects, oral injuries due to sports-related trauma or other abuse, and scores of other diseases and disorders that affect the oral, dental, and craniofacial tissues.[8] The report notes that oral

health is integral to general health and stresses the importance of good oral health at both the individual and population levels.

In the United States, the two most common oral diseases are dental caries (tooth decay) and periodontal (gum) disease. Although less common, oral and pharyngeal cancers, orofacial clefts (cleft lip and cleft palate), malocclusion, oral-facial pain, and other oral health problems can severely affect general health and quality of life. For example, poor oral health impacts the ability to eat, communicate and learn, and affects how we look and interact with others, sometimes making it difficult to find jobs where public interaction is important.

Each oral disease or condition, also referred to as an oral health outcome, is influenced by a variety of factors, including access to dental care, individual risk factors and risk determinants, availability of interventions, and workforce issues, public health infrastructure and public policies (See Figure 1). Following is a brief overview of the major oral health outcomes including common risk factors and intervention strategies.



Note: The colors associated with each of the factors are used throughout the document.

Figure 1. Factors Impacting Oral Health Outcomes

Dental caries has been described as the single most common chronic childhood disease.[8] In 1999-2004, approximately 28% of children 2-5 years of age and 54% of children 6-9 years of age had experienced dental caries in at least one primary or permanent tooth.[9] The impact of caries accumulates over time; of those 50-64 years of age, 96% had caries experience.[9] In 2009-2010, 14% of children aged 3-5 years and 17% of children aged 6-9 years had untreated dental decay.[10] Perhaps unsurprisingly, both dental caries experience and untreated

dental decay are generally higher in low-income and minority populations, representing a significant health disparity.

Yet effective preventive intervention strategies for dental caries exist. Caries prevalence and severity can be reduced by appropriate use of fluorides through community water fluoridation, personal or professional topical fluoride applications and use of fluoridated toothpaste. CDC has recognized community water fluoridation as one of ten great public health achievements of the 20th century, yet not everyone has access to fluoridated water.[11] Dental sealants are another effective intervention, preventing caries development in the pits and fissures of molar teeth.[12] Dental sealants can be applied in dental offices or community settings (e.g., schools), yet far too few children are benefiting from this proven preventive service; in 2009-2010, only 32% of 6-9 year olds and 51% of 13-15 year olds had dental sealants on at least one permanent molar.[10]

To reduce the prevalence of untreated dental decay, all individuals, regardless of income or dental insurance coverage, must have access to restorative dental care. Access to dental care, in turn, is influenced by infrastructure, workforce and policy factors, including availability of low-cost clinics, dentist-to-population ratio, percent of dentists accepting government-funded dental insurance, and reimbursement rates for government-funded programs.

Periodontal disease is another common public health problem in the United States. More than 47% of adults 30 years and older have destructive periodontal disease (periodontitis) with 39% having moderate or severe periodontitis, characterized by loss of the bony structure supporting the teeth and resulting in partial or total tooth loss. Among adults aged 65 years and older, nearly two thirds (64%) have either moderate or severe periodontitis.[13] As with caries, substantial oral health disparities exist. The prevalence of periodontitis is higher in men, Mexican Americans, adults with less than a high school education, adults below 100% of the Federal Poverty Level and current smokers.[13] An estimated 42% of periodontitis cases in the U.S. adult population is attributed to current cigarette smoking and 11% to former smoking. Among current smokers, 75% of their periodontitis is attributable to smoking.[14] Thus, the primary intervention strategy for periodontitis is tobacco cessation.

Although substantially less common than caries and periodontitis, oral and pharyngeal cancers and orofacial clefts have a significant impact on the health care system and are candidates for public health surveillance. In 2013 alone, researchers predict that 29,620 men and 11,760 women will be diagnosed with cancer of the oral cavity or pharynx, and 7,890 men and women will die of such cancers.[15] Based on 2007-2009 rates, 1 in 93 people born today will be diagnosed with oral or pharyngeal cancer at some point in their life.[16] Oral and pharyngeal cancer incidence and mortality rates are higher for males than for females and for

Hispanic and black males than for white males. Most oral cancers are related to tobacco use, alcohol use or both. Currently, the primary prevention strategies are tobacco cessation and no more than moderate alcohol consumption. Research is emerging, however, about the increasing oropharyngeal cancer prevalence associated with human papillomavirus (HPV), particularly the Type 16 virus.[17,18]

For reporting purposes, orofacial clefts are generally classified as either (1) cleft palate without cleft lip or (2) cleft lip with and without cleft palate. Based on 2004–2006 data from 14 birth defects tracking programs, the estimated incidence of cleft palate without cleft lip is 1 in 1,574 live US births (2,651 cases annually), and the incidence of cleft lip with or without cleft palate is 1 in 940 live births (4,437 cases annually).[19] Orofacial clefts in the U.S. are most common among American Indian and Asian children. Risk factors include family history and maternal use of tobacco, alcohol and street drugs during pregnancy. Prevention strategies include tobacco, alcohol and drug cessation during the prenatal period.

As previously mentioned, oral health disparities are profound in the United States. Children in lower-income families have higher dental caries rates than non-poor children; low-income adults and children receive fewer dental services than the population as a whole; minority populations have worse oral health than the U.S. population in general; and rural residents have worse oral health than urban residents.[8] These disparities start in childhood and persist throughout the lifecycle. In addition, low-income and minority populations are less likely to access the dental care system on a regular basis.

Limited or infrequent access to dental care contributes to poor oral health. Unfortunately, about 55% of children aged 2–17 years did not visit a dentist in 2008, with black (60%) and Hispanic children (57%) being more likely to have not visited a dentist compared with white children (54%).[20] For adults 18 years and older, about 69% report having had a dental visit within the past year, with substantial disparities by education, income and race/ethnicity. For those with an annual income less than $15,000, only 46% had a dental visit compared with 81% of those with an income of $50,000 or more.[21] In 2007, an estimated 6% of the population did not get or delayed getting needed dental care, higher than the percent for medical care or prescription medicines.[22]

The cost of treating dental disease is significant, with relatively few funds spent in the public sector. In 2010, expenditures for dental services was $83.1 billion, with the majority being paid out-of-pocket (48%) or by private insurance (43%).[23] According to the Centers for Medicare & Medicaid Services (CMS), spending for dental services increased in 2011 to $108.4 billion, with out-of-pocket spending accounting for approximately 40% of all dental spending.[24] Among adults, the rate of those uninsured for oral health care is more than twice the rate of those uninsured for medical care: 36% versus 15%.[25,26]

In summary, the public health implications of poor oral health status are vast. Poor oral health impacts a person's ability to eat, speak, work, communicate and learn. Although most oral diseases and conditions are preventable, virtually all adults—and many children—have experienced some oral disease. Serious oral health disparities exist by race, age, geography and income. The costs of oral disease treatment are significant and the majority of those costs are paid out-of-pocket or through private insurance.

CDC guidelines for evaluating public health surveillance systems recommend that health-related events (in this case oral diseases and conditions) be considered for surveillance if they affect many people, require large expenditures of resources, are largely preventable, and are of public health importance.[27] Based on these criteria, oral health outcomes, associated health behaviors, and other factors linked to oral health should be included in public health surveillance systems.

Oral Health Surveillance: A Historical Perspective

As public health surveillance in the United States evolved, each level of government – local, state and federal – developed a distinct role. Local health jurisdictions are generally responsible for infectious disease surveillance, as they are the contact point for notifiable disease reporting, case investigations, and control interventions. Responsibility for noninfectious disease surveillance tends to lie at the state level, because noninfectious disease interventions are often long-term, statewide, and resource-intensive (requiring the expertise to handle the large and complex data sets used for this type of surveillance). The federal government is responsible for monitoring national trends, maintaining national surveillance systems, coordinating multistate responses, supporting state-based surveys, and interfacing with the World Health Organization on global health concerns.[4]

> *Oral health outcomes, health promoting or damaging behaviors, and other factors associated with oral health should be included in a state's public health surveillance system.*

Based on the non-communicable nature of oral health outcomes, ***oral health monitoring falls within the domain of state government***, with federal agencies responsible for monitoring national trends. Prior to the turn of the 21st century, however, state-based oral health surveillance systems were virtually nonexistent. Although nationwide estimates of oral disease prevalence were available from national surveys, such as the National Health and Nutrition Examination Survey (NHANES), state estimates were unavailable, due to complex reasons detailed elsewhere.[28]

Recognizing that states lacked the data and resources necessary for oral health surveillance, ASTDD partnered with CDC's Division of Oral Health (DOH) to create a set of tools and other resources to support states as they develop, implement, and evaluate oral health surveillance systems. Detailed information on the initial development of state and national oral health surveillance systems through 2008 has been published elsewhere; therefore, we present only a brief historical overview here (See sidebar).[5] Of note, CSTE is the organization responsible for defining and recommending which diseases and conditions should be reportable within states and which of these should be voluntarily reported to CDC.

The oral health indicators approved by CSTE in 1998–1999 for inclusion in the National Public Health Surveillance System became the initial framework for NOHSS, which was established to help state oral health programs meet expectations for routinely documenting population needs and program impact.[5] The overall NOHSS "program" addresses all aspects of defining, operating, and evaluating a public health surveillance system, and its website is but one component of this program, designed as a data dissemination

Historical Overview of Oral Health Surveillance

- 1994: BRFSS coordinators approve an optional, four-question oral health module.
- 1996: ASTDD publishes *Seven-Step Model for Needs Assessment,* a guidance document describing the conduct of oral health ne*eds assessments at the state level.*
- 1998–1999: A workgroup begins shaping the purpose and operation of the NOHSS.
- 1998: CSTE approves two oral health indicators – oral and pharyngeal cancer incidence and mortality – for inclusion in the National Public Health Surveillance System.[29]
- 1999: ASTDD publishes the Basic Screening Survey protocol, providing guidance to states on cost-efficient collection of oral health outcomes data.
- 1999: CSTE approves seven additional oral health indicators for inclusion in the National Public Health Surveillance System – dental visits, teeth cleaning, edentulism, fluoridation status and, for children in K–3rd grade, dental caries experience, untreated tooth decay and dental sealants.[30,31]
- 1999: Three oral health indicators – dental visit, teeth cleaning and tooth loss – are approved for the BRFSS emerging core questionnaire (and added to the rotating core starting in 2002).
- 2001: CSTE launches the NOHSS website (housing oral health indicator data) with adult oral health and water fluoridation indicators for all states.
- 2002: CSTE approves 97 Chronic Disease Indicators, including five oral health indicators – dental visit, teeth cleaning, edentulism, and oral and pharyngeal cancer incidence and mortality rates.[32]
- 2006: An additional indicator – loss of six or more teeth among older adults – is added to the NOHSS website.
- 2012: CSTE approves 12 new or revised oral health indicators, plus three developmental indicators, for inclusion in NOHSS.[6,7] Teeth cleaning was removed from the BRFSS rotating core questionnaire.
- 2013: During revision of the national Chronic Disease Indicators, CSTE expands the number of oral health indicators to include dental visit (1–17 years, ≥18 years, diabetic adults), preventive dental visit (1–17 years and prenatal), oral health services at federally qualified health centers (FQHCs), edentulism (≥65 years), six or more teeth lost (≥65 years), no tooth loss (18–64 years), water fluoridation, and oral and pharyngeal cancer incidence and mortality rates.[33]

tool for state and national oral health surveillance indicators.

More than a dozen years have passed since the first U.S. oral health indicators were established. CSTE, CDC, and ASTDD agreed to revisit these indicators and to continuously improve NOHSS as a resource for planning, implementing and evaluating oral health activities. Stakeholders recognized that state oral health programs would need additional support to fully integrate the data collected into a viable state-based oral health surveillance system and then to use that data for public health purposes.

Healthy People 2020 and the 2012 NOHSS Indicator Revision

Healthy People is a national initiative, led by the U.S. Department of Health and Human Services, whose core feature is a set of measurable, science-based, ten-year national health objectives. The objectives were first established in 1979 for the following decade (Healthy People 1990) and updated as Healthy People 2000, Healthy People 2010, and Healthy People 2020. The initiative is based on the principle that ***setting national objectives and monitoring progress can motivate state and local action***.

Oral health is one of the 42 Healthy People 2020 (HP2020) topic areas, and the overall goal is to "prevent and control oral and craniofacial diseases, conditions, and injuries, and improve access to preventive services and dental care." The 17 objectives within the oral health topic area address oral health of children, adolescents, and adults; access to preventive services; oral health interventions; monitoring and surveillance systems; public health infrastructure; and oral and pharyngeal cancer. In addition, there are two oral health objectives in the access to health services topic area (relating to dental insurance and ability to obtain dental care), one in the cancer topic area, and one in the diabetes topic area (See Appendix 1). A key criterion for all HP2020 objectives is availability of a ***national data source*** for monitoring progress. However, for most of the oral health objectives, the associated national data source does not produce state estimates. For example, NHANES is the data source for prevalence of dental caries experience among children 6-9 years of age, but does not produce state estimates. Some states have adapted at least a few of these national objectives as part of their oral health improvement plan and overall state Healthy People plan. Unfortunately, there is no publically available document comparing state Healthy People oral health objectives.

The release of HP2020 objectives, along with the availability of new state-level data sources and improved understanding of the conceptual framework for surveillance systems, prompted the formation of a workgroup of state dental directors and epidemiologists from ASTDD, CDC and CSTE. This workgroup was tasked with reviewing the original, CSTE-approved NOHSS indicators for alignment with HP2020 objectives and assessing whether state data sources were available for these or related objectives. Several potential new data sources were

considered: FQHC electronic health records, private sector electronic health records, vital statistics data, Medicaid and Children's Health Insurance Program (CHIP) data, Pregnancy Risk Assessment Monitoring System (PRAMS) data, National Survey of Children's Health (NSCH) data, and information about school-based health centers among others. In addition, ASTDD developed new BSS instruments for states collecting health status data on preschool children, vulnerable older adults or other groups that might not be included in other data sources. In 2012, the workgroup submitted two position statements to CSTE requesting that a wider array of state-level indicators be included in NOHSS.

The two position statements were approved by CSTE.[6,7] One outlined new and revised NOHSS indicators that either align with HP2020 or have a viable state-level data source (See Table 1 and Appendix 2). The second position statement called for further development of three emerging indicators: (1) dentist participation in Medicaid, (2) jurisdictions with 250,000 or more persons and Indian Health Service regions with 30,000 or more persons with an oral health program directed by a dental professional, and (3) number of states with an oral health surveillance system. It also recommended revising the operational definition of an oral health surveillance system. Both position statements considered recent revisions to CSTE's surveillance framework to reflect health care reform, advances in health information technology, and the development of population health and quality measures under the guidance of the nonprofit National Quality Forum.

To avoid confusion, it is important to keep in mind that NOHSS indicators are geared toward state-level surveillance, while HP2020 oral health objectives are geared toward national-level surveillance. Although the two indicator sets are similar, they are not identical; data sources (and thus target populations), data collection methods, and indicator definitions

Table 1. Indicators Approved by CSTE for Inclusion in NOHSS, 2012

Oral Health Outcomes

- Prevalence of caries experience (Head Start, kindergarten, 3rd grade)
- Prevalence of untreated tooth decay (Head Start, kindergarten, 3rd grade, vulnerable older adults)
- Percentage of population with dental treatment needs (Head Start, kindergarten, 3rd grade, vulnerable older adults)
- Tooth loss (complete tooth loss ≥65 years, loss of 6 or more teeth ≥65 years)
- Oral and pharyngeal cancer (incidence and mortality)

Access to Care

- Dental visit in past year (1–17 years, ≥18 years, FQHC patients, adults with diabetes)
- Percentage of population with a preventive dental visit in the past year (Medicaid and CHIP enrolled children)
- Percentage of population with dental sealants (3rd grade, Medicaid-enrolled children ages 6–9 or 10–14)
- Percentage of population with a dental treatment visit in the past year (Medicaid- and CHIP-enrolled children)
- Teeth cleaning (≥18 years, pregnant women)

Intervention Strategies

- Water fluoridation
- Percentage of school-based health centers that provide sealants, dental treatment services, topical fluoride

sometimes differ. For example, the HP2020 objective for dental caries experience in children aged 3-5 relies on NHANES data, while the corresponding NOHSS indicator assesses dental caries experience in Head Start children and relies on data from a state oral health survey. Appendix 3 compares HP2020 objectives, target populations and data sources with those for analogous NOHSS indicators.

The components of oral health surveillance systems will continue to evolve as methods for tracking oral disease status directly become widely available. Already, the Consortium for Oral Health Research and Informatics – an alliance of dental schools – is considered a potentially major source of diagnostic and treatment services data. The Dental Quality Alliance – established by the American Dental Association to develop performance measures for oral health care – is another valuable partner and resource. Ultimately, however, public health efforts must go beyond direct measurement of oral health conditions. ASTDD, CSTE, and CDC must continue to monitor other sources that provide proxy data for oral health status, data on oral health co-morbidities, or data on oral health risk factors.

Building a State Oral Health Surveillance System

> **Take Home Message**
>
> *There is no value to a surveillance system unless the information is used for actions that prevent or control disease.*

A state-based oral health surveillance system (SOHSS) should provide information necessary for public health decision-making by routinely collecting data on health outcomes, access to care, risk factors and intervention strategies for the whole population, representative samples of the population, or priority subpopulations. In addition, a SOHSS should consider collecting information on the oral health workforce and infrastructure and policies impacting oral health outcomes. A SOHSS can access data from existing sources, supplemented by additional information to fill data gaps.

Surveillance systems are not just data collection systems. They must include mechanisms to communicate findings to those responsible for programmatic and policy decisions and to the public, and to assure data are used to inform and evaluate public health measures to prevent and control oral diseases and conditions. The NOHSS indicators are one tool states can use when developing a surveillance system.

According to *ASTDD's Best Practice Report on State Based Oral Health Surveillance Systems*, a state oral health surveillance system should accomplish several tasks:[34]

- Define a clear purpose and objectives relating to the use of surveillance data for public health action.
- Include a core set of measures/indicators (e.g., prevalence of important oral conditions or risk factors, access to dental care, etc.) to serve as benchmarks for assessing progress in achieving good oral health.
- Analyze trends, when multiple years of data are available.
- Communicate surveillance data to decision makers and to the public in a timely manner that enables the target audience to readily understand the implications of the information.
- Strive to assure that surveillance data is used to improve the oral health of state residents.
- Use the *Updated Guidelines for Evaluating Public Health Surveillance Systems* to ensure that oral health is being monitored efficiently and effectively.[27]

One of the first steps in developing a new oral health surveillance system or updating an existing system is to produce an ***oral health surveillance plan*** – a written roadmap for establishing, maintaining, and evaluating a surveillance system. The plan should clearly define the system's purpose, objectives, indicators, data sources, target population(s), required operating resources, data collection schedule and protocol, data analysis methods, intended data usages and dissemination protocols, privacy and confidentiality practices, and evaluation protocol. In general, a surveillance plan should describe practices that assure a SOHSS is readily able to adopt new methods, captures information about populations at highest risk, is able to link health outcomes data with data on co-morbidities and risk factors, and is sustainable.

When developing a state oral health surveillance system (or any public health surveillance system), it is important to consider the entire "surveillance cycle" (See Figure 2). Surveillance begins with planning and system design, then moves to data collection, analysis and interpretation. The next step in the cycle is dissemination/communication, followed by the application of surveillance findings to public health activities. The surveillance system must be evaluated at each step and *in total* before starting the process anew. The entire surveillance process requires individuals with expertise in epidemiology and/or biostatistics, public health dentistry, writing and graphic arts, and evaluation. A team effort is important not only because it brings together individuals with different perspectives and skills, but also because it fosters partnerships that will be useful for the development and implementation of programmatic activities. The necessary expertise may be found within the health department or obtained through voluntary or contractual relationships with universities or other groups.

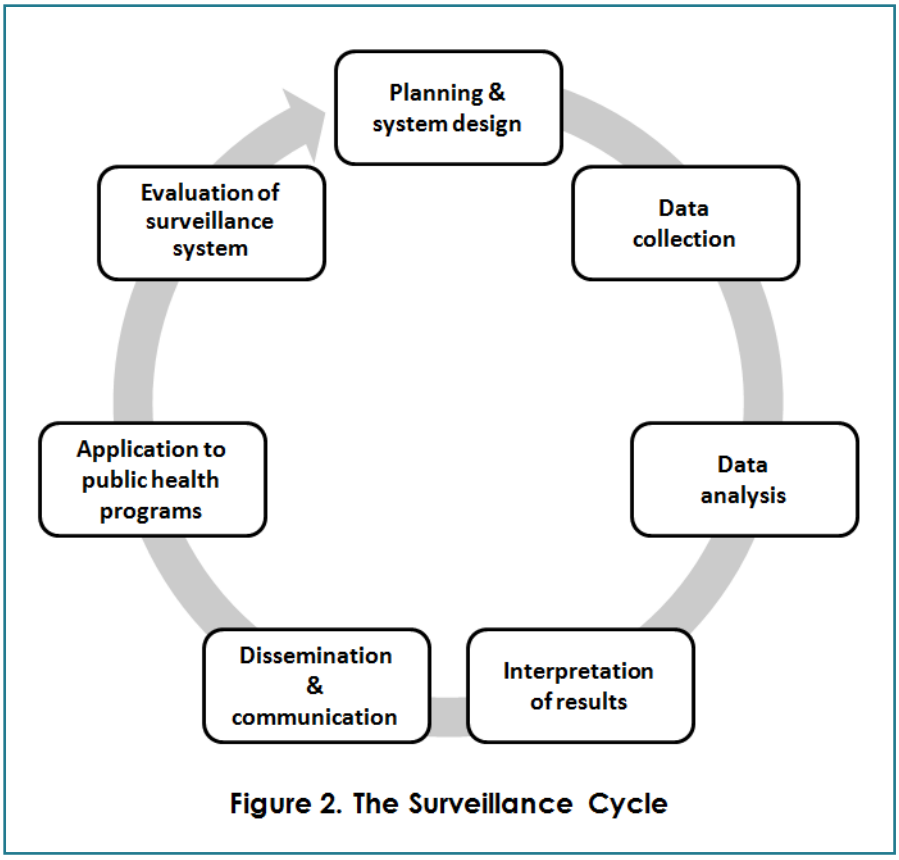


Figure 2. The Surveillance Cycle

The challenges of sustainability require close attention to infrastructure building and to the application of cost-effective strategies and widely embraced public health principles. To successfully meet these challenges, states must routinely and vigorously ***evaluate surveillance systems***.[4] According to the CSTE Surveillance Strategy Group, surveillance evaluation encompasses four major activities: (1) deciding which conditions to place under surveillance, (2) assessing the value of different data sources for surveillance, (3) measuring the effectiveness, including costs, of each surveillance system and the techniques used, and (4) assessing the usefulness of surveillance data for prevention and policy development.[4]

Indicators and Data Sources for a State Oral Health Surveillance System

As mentioned above, the ultimate purpose of a SOHSS is to ***inform activities to protect and promote the oral health of the population***. Oral health, in turn, depends upon the prevention/reduction of a range of problems, from dental caries to pharyngeal cancer. Oral health diseases and conditions are influenced by a variety of factors including, but not limited to, individual behaviors and risk factors, intervention strategies, access to dental care, dental care infrastructure and workforce, and public policies. At a minimum, a comprehensive SOHSS should include (for each target population) information about oral health outcomes, risk factors, access to community-based interventions, and use of the oral health care system.

When developing a SOHSS, it is essential that the guiding principles for public health surveillance be considered.[4] A SOHSS should: (1) provide actionable information to guide public health policy and programs, (2) be periodically evaluated, (3) collect high-quality data in the least expensive manner possible and (4) ensure personal confidentiality and privacy.

Figure 3 depicts a framework for indicators that could be included in a SOHSS – the current NOHSS indicators, plus additional indicators that a state may opt to include. Although the indicators and data sources listed are not necessarily exhaustive, they run the gamut from risk factors to oral health outcomes and from infrastructure to policy. Additional data sources may be available to individual states (e.g., survey data from state dental professional associations). By using this framework each state will have the ability to customize their SOHSS to meet the needs, resources and priorities of the state.

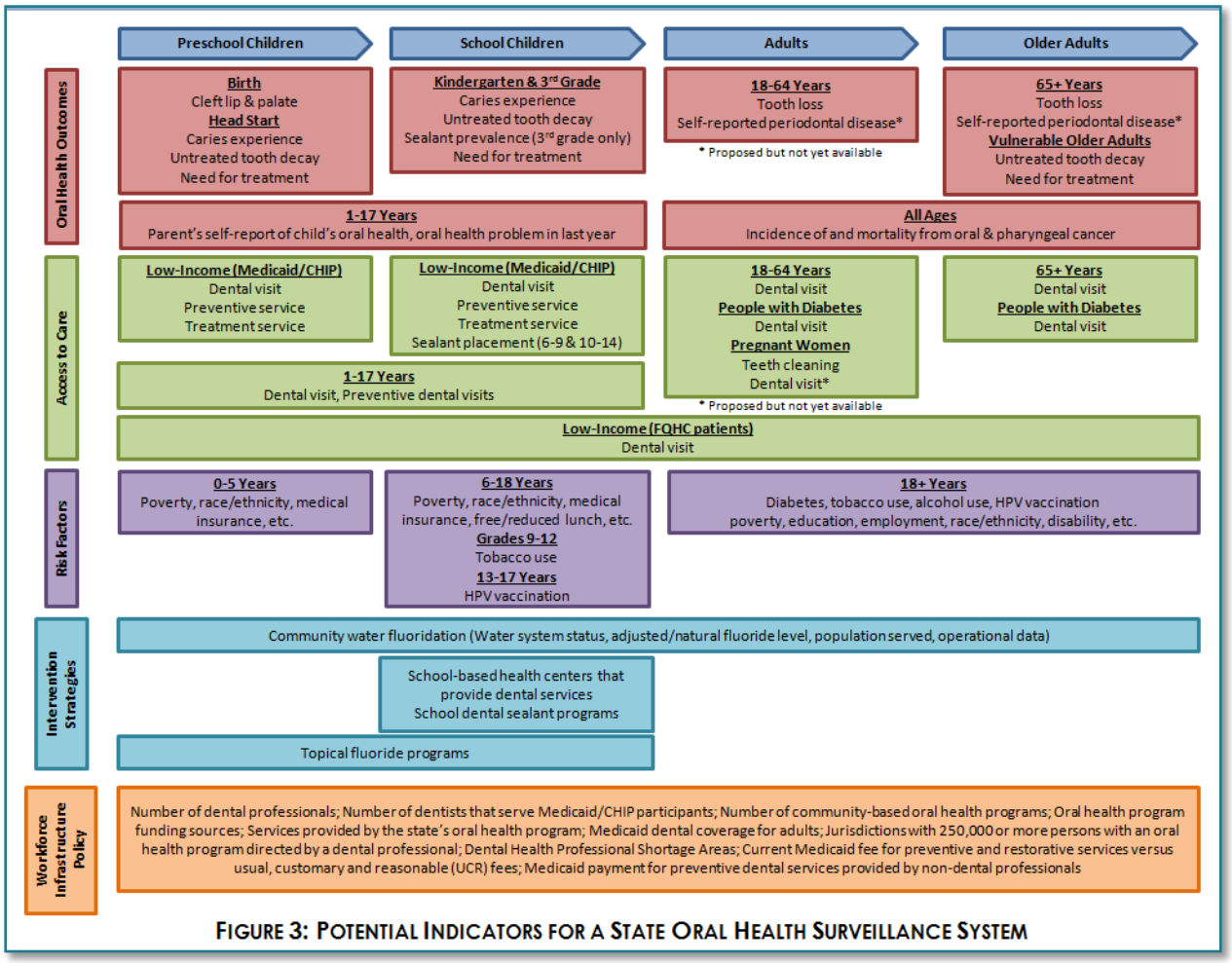


FIGURE 3: POTENTIAL INDICATORS FOR A STATE ORAL HEALTH SURVEILLANCE SYSTEM

An overview of the sources and data collection methods for the indicators outlined in Figure 3 follows. Web links for these data sources are listed in Appendix 4, and the oral health questions included in surveys with state-level data comprises Appendix 5. Appendix 6 is a graphic showing SOHSS indicators by data source.

Oral Health Outcome Indicators and Data Sources

Information on the incidence of orofacial clefts is available from state birth defect registries. Although most states have a birth defect registry, such registries vary by types of defects tracked, how defects are detected, and how the information is used. The National Birth Defects Prevention Network – a volunteer-based organization that maintains a national network of state and population-based birth defects programs – generates nation estimates based on pooled data from states with active birth defect surveillance systems.

The principal data source for the Head Start, kindergarten and 3rd grade oral health outcome indicators is the BSS, which requires primary data collection in a manner that meets criteria for inclusion in the NOHSS. The BSS provides high quality prevalence data for caries experience, untreated dental decay, need for dental treatment and dental sealants (3rd grade only) in a cost-effective manner. Because dental caries is a chronic disease, frequent reporting is not essential. The minimum recommended timeframe for BSS data collection for surveillance purposes is every five years, but some states may opt to collect BSS data more frequently to fulfill grant requirements (e.g., reporting for the Title V Block Grant or competitive CDC oral health cooperative agreements). The BSS also is used to collect data on prevalence of untreated decay and need for dental treatment among vulnerable older adults, defined as congregate meal site participants and long-term care facility residents. For BSS data to be included in NOHSS, they must meet the inclusion criteria and be submitted to ASTDD by the state health agency or its representative. See the ASTDD website (www.astdd.org/basic-screening-survey-tool) for additional information on the BSS protocol and NOHSS inclusion criteria.

Information on need for dental treatment among Head Start children with a dental examination is available from the Office of Head Start Program Information Report (PIR). PIR data are self-reported by Head Start programs and compiled annually for use at the federal, regional, state and local levels. Need for preventive or restorative dental treatment is based on the examining dentist's opinion, and there are no standard definitions.

The NSCH, sponsored by the Maternal and Child Health Bureau of the Health Resources and Services Administration (HRSA) and conducted by CDC's National Center for Health Statistics (NCHS), State and Local Area Integrated Telephone Survey program, collects data on the physical and emotional health of children ages 0-17 years of age. It includes several oral health questions, including parents' perception of their child's oral health and whether or not the child had an oral health problem in the last 12 months. The NSCH generally is conducted every four years.

A question on tooth loss due to dental caries or periodontal disease is included in the BRFSS's rotating core (conducted in even-numbered years). Because of its broad focus on health behaviors, the BRFSS enables users to determine relationships between oral health and co-morbidities and risk factors, such as diabetes and tobacco use. CDC is now piloting a set of questions that may be added to the BRFSS to estimate prevalence of periodontal disease.

Data on the oral and pharyngeal cancer incidence and mortality are available from NCI's SEER Program, CDC's NPCR, state cancer registries, and state vital statistics. SEER collects information on cancer incidence, prevalence and survival from specific geographic areas representing 28% of the U.S. population. It compiles reports for the geographic areas, plus cancer mortality for the entire country. NPCR collects data from state-based cancer registries on the occurrence of cancer; the type, extent, and location of the cancer; and the initial treatment. NPCR supports central cancer registries in 45 states, the District of Columbia, Puerto Rico, and the U.S. Pacific Islands. These data represent 96% of the U.S. population.

Access to Care Indicators and Data Sources

Information on annual dental visits, preventive dental service visits, dental treatment visits, and dental sealant placement is available for Medicaid- and CHIP-enrolled children. This information can be obtained from CMS (Form CMS-416) and, where appropriate, the CHIP Annual Report Template System. Data are generally reported on an annual basis.

The NSCH includes two oral health questions relating to access to care: dental visit in the last 12 months and preventive dental care in the past 12 months. The NSCH is generally conducted every four years. Likewise, the latest National Survey of Children with Special Health Care Needs includes questions about dental utilization during the last 12 months and need for preventive and other dental services.

Data sources for dental visits in adults (including adults with diabetes) and teeth cleaning for pregnant women are BRFSS (dental visit) and PRAMS or a PRAMS-like survey. The BRFSS rotating core includes a question about time since last dental visit and is available for all states. A BRFSS question on teeth cleaning was last asked in 2010 and discontinued in 2012. PRAMS, a surveillance project of the CDC and state health departments, collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy. Teeth cleaning in the 12 months *before* pregnancy was added to the PRAMS core questionnaire starting in Phase 6 (2009-2011). A question on dental visit *during* pregnancy was added to the PRAMS core starting in Phase 7 (2012-2015). As of April 2013, 40 states and New York City participate in PRAMS, representing approximately 78% of all U.S. live births. Most states collect PRAMS data on an annual basis.

The number of patients who received any health service and who received a dental service at FQHCs is reported each year by HRSA-funded health center grantees. These data are available from HRSA's Uniform Data System.

Risk Factor Indicators and Data Sources

There are five primary sources for state-level information on oral disease risk factors: the U.S. Census, U.S. Department of Education, Youth Risk Behavior Surveillance System (YRBSS), BRFSS and the National Immunization Survey (NIS). The Census provides detailed state and local information on a variety of oral disease risk factors, including race/ethnicity, socioeconomic status, education, employment, medical insurance coverage for low-income children, and geographic location. The Department of Education's National Center for Education Statistics (NCES) provides information on children enrolled in public and private schools at the county, state and national levels, including race/ethnicity, participation in the free or reduced- price school lunch program and limited English proficiency. NCES data are updated annually but generally lag by two school years.

YRBSS monitors health-risk behaviors that contribute to the leading causes of death and disability among youth and adults including, but not limited to, tobacco use, alcohol and other drug use, and unhealthy dietary behaviors. Each of these is a risk factor for oral disease. The 2011 YRBSS included a national school-based survey conducted by CDC, 47 state surveys, six territorial surveys, two tribal government surveys and 22 local surveys conducted among students in Grades 9-12. Data are updated in odd numbered years. In addition to the high school YRBSS, some jurisdictions have conducted a middle school YRBSS. In 2011, 14 states, 13 cities, and two territories obtained weighted data for their middle school YRBSS. There is no national middle school YRBSS.

BRFSS monitors health status and health-risk behaviors of non-institutionalized adults 18 years or older. Information associated with oral health includes overall health status, diabetes, alcohol and tobacco use, disability, and human papillomavirus (HPV) vaccination. (HPV is associated with oropharyngeal cancer, a certain type of oral and pharyngeal cancer, although there are no data to suggest that HPV vaccination is effective in preventing oropharyngeal cancer.) Data are updated annually.

Information on HPV vaccination coverage among adolescents 13-17 years is available from NIS, a list-assisted random-digit-dialing telephone survey, followed by a mailed survey to children's immunization providers. NIS is sponsored by the National Center for Immunizations and Respiratory Diseases (NCIRD) and conducted jointly by NCIRD and the NCHS.

Intervention Strategy Indicators and Data Sources

The Water Fluoridation Reporting System (WFRS) is the primary data source for monitoring community water fluoridation. It is an online tool that helps states manage the quality of their water fluoridation programs and collects data on the percentage of the U.S. population served by community water systems with optimally fluoridated drinking water. As of April 2013, approximately 40 states post community water system fluoridation data on CDC's 'My Water's Fluoride' website. Information on the percent of the population receiving fluoridated drinking water is reported every two years.

The National Census conducted by the School-Based Health Alliance (SBHA), formerly known as the National Assembly on School-Based Health Care, is a national survey of school-based, school-linked and mobile health centers. This online survey provides data about health center demographics, staffing, services, policies, utilization, financing, prevention activities, and clinical policies. State-specific data reports related to school-based health care are developed by state health agencies or SBHA affiliates and can be found on their websites. The National Census is conducted every three years.

The principal data source for information on state-funded or state-administered school-based or school-linked dental sealant programs and topical fluoride programs is the ASTDD Annual Synopses of State and Territorial Dental Public Health Programs (Synopses), which requires either primary data collection by the state health agency or reporting by local health jurisdictions to the state health agency. The Synopses are updated annually by the state health agency.

Workforce, Infrastructure and Policy Indicators and Data Sources

The ASTDD Synopses is the principal data source for the workforce, infrastructure and policy indicators. Relevant collected data include number of licensed dentists and dental hygienists, number dentists serving Medicaid/CHIP participants, Medicaid dental coverage for adults, number of community-based oral health programs, oral health program funding sources, extent of services provided directly by the state's oral health program, and jurisdictions with 250,000 or more persons with an oral health program directed by a dental public health professional. Again, the Synopses are updated annually.

A list of dental health professional shortage area (HPSA) designations by county, state and type of designation is available from HRSA. Information on the percent of a state's population residing in a dental HPSA is available from the Henry J. Kaiser Family Foundation, which describes itself as a leader in health policy analysis.

Information on Medicaid fee structures and payment for preventive dental services provided by non-dental professionals is available from a state's Medicaid agency.

Data Sources for HP2020 Oral Health Objectives

Data sources for national HP2020 objectives differ from those for state-based NOHSS indicators. NHANES is the primary data source for the HP2020 oral health outcomes objectives, including dental caries experience, untreated dental decay, dental sealants, permanent tooth loss, and moderate or severe periodontitis. It is also the source for dental office preventive interventions for adults, such as tobacco cessation counseling, oral cancer screening and testing or referral for glycemic control. The Medical Expenditure Panel Survey provides data on dental visit within the past year and preventive dental service in the last year for low-income children. As with the state indicators, the National Census conducted by the National Assembly on School-Based Health Care provides information on school-based health centers. The Uniform Data Set provides information on FQHCs with dental programs and FQHC patients with a dental visit. As previously indicated, WFRS is the source for community water fluoridation at both the national and state levels. Information pertaining to oral and pharyngeal cancer incidence and mortality is available from SEER, NPCR, and the National Vital Statistics System. ASTDD's Synopses is the data source for states with craniofacial anomaly monitoring and referral systems along with local health department information. Finally, the Indian Health Service provides information on Indian Health Service/tribal jurisdictions with a dental program.

Operational Definition for HP2020 Objective OH-16

HP2020 Objective OH-16 – to "increase the number of states and the District of Columbia that have an oral and craniofacial health surveillance system" – deserves special mention. The current operational definition for this oral health objective, developed originally for HP2010, is the number of states and the District of Columbia with surveillance data for at least six of the nine possible surveillance databases with oral health information (i.e., BRFSS, YRBSS, PRAMS/PRAMS-like systems, children's oral health data meeting NOHSS criteria, ASTDD Synopses, state cancer registry/NCI SEER, orofacial cleft data, Medicaid dental claims data, and WFRS). In 2009, 32 of the 51 jurisdictions met this operational definition and 19 did not. The HP2020 target is for all 50 states and the District of Columbia to have an oral health surveillance system.

Since Objective OH-16 was developed, however, the public health surveillance framework has been transformed by a variety of external factors: new information technologies, health care

reform, new data sources, and an expanded view of what constitutes oral health and adequate oral health surveillance. Public health leaders recognize that oral health surveillance should address a variety of conditions, risk factors and external influences; employ a variety of methods and data sources; and go beyond basic disease reporting. In addition, it must address the overarching purpose of surveillance: providing ***actionable information to guide public health policy and programs***. The changed health landscape has both increased the need for oral health surveillance data to support decision-making and program evaluation and enhanced the capability of state oral health programs to conduct surveillance, as CDC and HRSA funding and ASTDD technical assistance become more widely available.

To keep pace with technological and policy developments, we propose a new operational definition for monitoring progress toward OH-16 (See Figure 4). Because the ultimate purpose of an oral health surveillance system is ***data usage***, rather than just data collection, the proposed revision is broad-based, covering a variety of oral diseases and conditions, along with access to dental care and community water fluoridation. Moreover, it includes an oral health surveillance plan, a core or foundational set of surveillance elements for a state oral health surveillance system (not to be confused with a surveillance system for the state's ***oral health program***), and timely, public availability of actionable data.

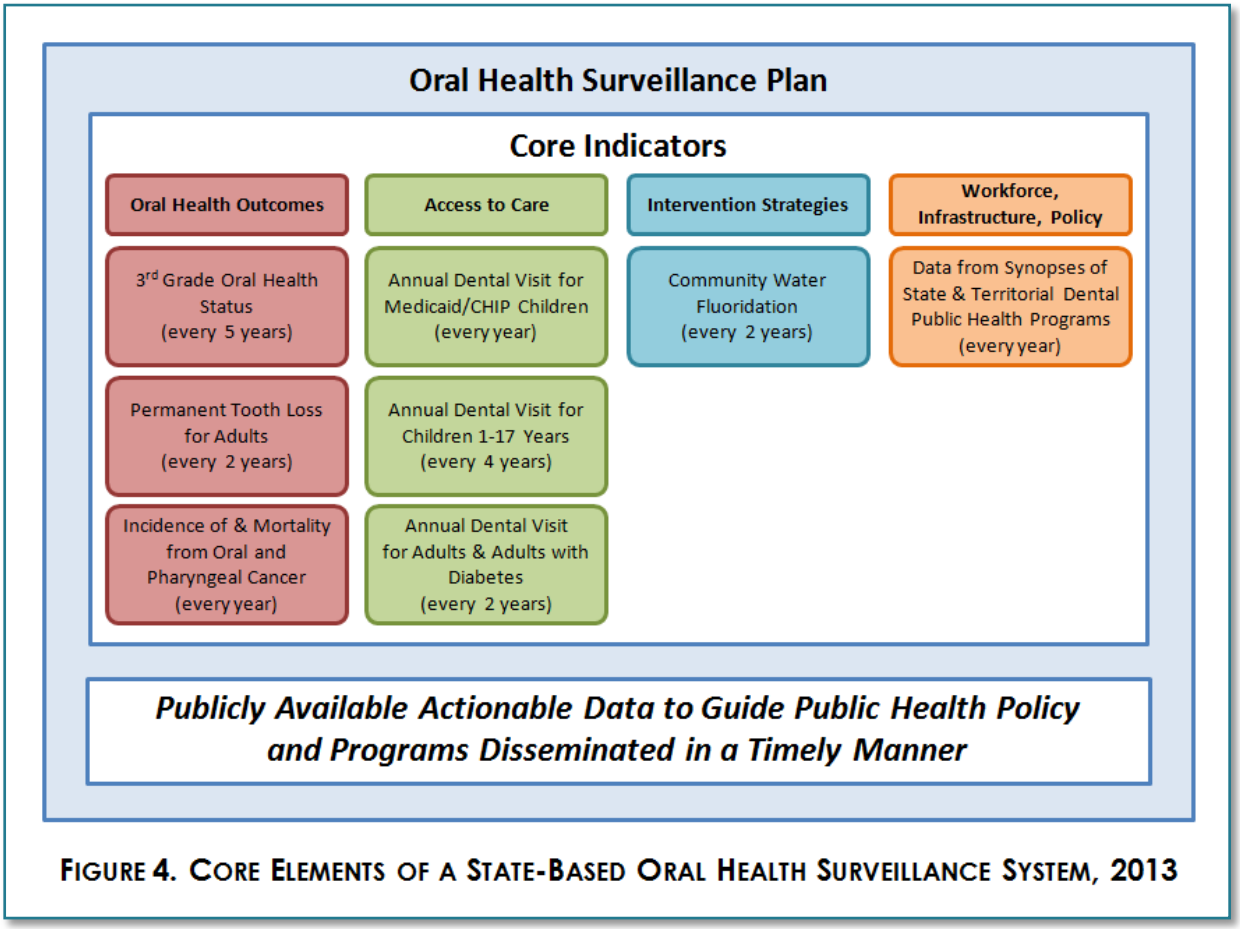


FIGURE 4. CORE ELEMENTS OF A STATE-BASED ORAL HEALTH SURVEILLANCE SYSTEM, 2013

The definition, we hope, will encourage states to expand their oral health surveillance systems to include a wider variety of indicators, including risk factor indicators, based on state needs and resources. Some indicators, such as children's oral health status, may be monitored by the oral health program, while others, such as oral and pharyngeal cancer incidence, may be monitored by the cancer prevention program. Regardless, the state dental director should take the lead in coordinating oral health surveillance activities.

Proposed New Operational Definition for HP2020 OH-16

This operational definition is a core or foundational set of surveillance elements. We encourage states to expand their oral health surveillance system to include a wider variety of indicators based on the needs and resources of the individual state. Number of states and the District of Columbia that have all of the following ten items.

- A written oral health surveillance plan that was developed or updated within the previous five years. The plan should include the following components: purpose, objective, prioritized indicators and their definitions, data sources and target populations, data collection/analysis methods and frequency, plan to ensure data confidentiality and quality, and a plan for data dissemination and evaluation. Source for monitoring OH-16: ASTDD Synopses.
- Oral health status data for a representative sample of third grade children, including prevalence of caries experience, untreated tooth decay, and dental sealants meeting criteria for inclusion in NOHSS. Data must have been collected within the previous five years. Source for monitoring OH-16: NOHSS
- Permanent tooth loss data for adults obtained within the previous two years. Source for monitoring OH-16: BRFSS.
- Annual data on oral and pharyngeal cancer incidence and mortality. Source for monitoring OH-16: Cancer registries, NPCR, SEER and vital statistics data.
- Annual data on the percent of Medicaid- and CHIP-enrolled children who had a dental visit within the past year. Source for monitoring OH-16: CMS Form CMS-416 and, where appropriate, CHIP Annual Report Template System.
- Data on the percent of children 1-17 years who had a dental visit within the past year, obtained every four years. Source for monitoring OH-16: NSCH.
- Data on the percent of adults (≥18 years) and adults with diabetes who had a dental visit within the past year, obtained within the previous two years. Source for monitoring OH-16: BRFSS.
- Data on the fluoridation status of public water systems within the state, updated every two years. Source for monitoring OH-16: WFRS.
- Annual data on state oral health programs and the environment in which they operate, including workforce and infrastructure indicators, submitted to the Annual Synopses of State and Territorial Dental Public Health Programs. Source for monitoring OH-16: Synopses.

- Publicly available, actionable data to guide public health policy and programs disseminated in a timely manner. This may take the form of an oral disease burden document, publicly available reports, or a web-based interface providing information on the oral health of the state's population developed or updated within the previous five years. Source for monitoring OH-16: Synopses.

Challenges, Recommendations and Future Considerations

According to the CSTE Surveillance Strategy Group, public health surveillance is an ever-changing process being rapidly transformed by three influences: the emergence of public health information and preparedness as national security issues, availability of new information technologies, and the advent of health care reform.[4] National security concerns have had a substantial impact on surveillance, with non-public health agencies and the public demanding timely access to high quality data. Yet, security demands have also diverted public attention to lethal but rare events (e.g., anthrax and ricin attacks) and away from more prevalent, but less immediately threatening concerns, such as obesity, hypertension and oral health surveillance.

New information technologies such as electronic health records (EHRs) have potential to improve public health surveillance systems, but their impact on oral health surveillance is probably limited. Most dentists in the U.S. (80%) are small owner-operators.[35] While these small practices are moving toward electronic dental records, they are not integrating dental data with medical data because the two are captured and stored in separate delivery systems and databases. The ability to capture oral health data from EHRs will likely be limited, although EHR data may be available from publicly funded dental clinics, such as FQHCs or through dental school consortia. The one potential change on the horizon that may improve oral health surveillance is the use of diagnostic codes in dentistry. Pressure from insurance providers will likely make diagnostic coding standard practice, allowing the use of dental claims data to monitor disease trends, access to care, and the cost-effectiveness of various services and interventions.

While national security, new information technologies and health care reform are important issues, the primary challenges for state oral health surveillance are limited infrastructure, insufficient resources, public health workforce shortages, and frequent staff turnover. As with other public health surveillance systems, state oral health surveillance is largely dependent on federal funding. The states funded by CDC to strengthen their oral health programs receive support for epidemiologists and evaluators to help develop and maintain a SOHSS. Unsupported states and territories must rely on other funding sources. Given the current fiscal climate, oral health surveillance may be a low priority for state health agencies.

There are serious public health workforce shortages in the disciplines that perform surveillance functions.[36] In addition, state health agencies may have rigid classification systems that hamper the creation of new positions or a position requiring the knowledge and skills needed for effective oral health surveillance. To assure ongoing, high-quality oral health surveillance at the state level, we propose a number of actions:

- CDC continues to support oral health surveillance technical assistance for state health agencies, through ASTDD or another entity with expertise in all aspects of oral health surveillance systems.
- ASTDD and/or CSTE develop guidance for state health agencies on data interpretation, dissemination and presentation of NOHSS indicators.
- Appropriate federal funders expand support of state public health surveillance systems, including oral health surveillance systems.
- ASTDD, CSTE and/or CDC provide continuing education for health agency staff on the development, implementation, maintenance, and evaluation of public health surveillance systems.
- ASTDD, CSTE and CDC monitor emerging data sources and develop or revise NOHSS indicators as additional data sources become available.
- ASTDD promote and provide training on the oral health surveillance competencies in the ASTDD Competencies for State Oral Health Programs.[37]
- The American Association of Public Health Dentistry should develop competencies for oral health surveillance and assure that all dental public health training programs include the competencies in their curricula.

Over the past 15 years, substantial progress has been made in state oral health surveillance. In the 1990s no state had the ability to monitor a broad array of oral health indicators and disseminate information in a timely fashion. Today an increasing, but still far from universal, number of states collect information on a host of oral health indicators. Expansion of the definition of an oral health surveillance system to include an oral health surveillance plan, evaluation plan and data dissemination will make state-based surveillance systems more powerful and allow them to truly ***use*** data to protect and promote the oral health of the population.

Appendix 1: Healthy People 2020 Oral Health Objectives

OH-1: Reduce the proportion of children and adolescents with dental caries experience in their primary or permanent teeth.

OH-2: Reduce the proportion of children and adolescents with untreated dental decay.

OH-3: Reduce the proportion of adults with untreated dental decay.

OH-4: Reduce the proportion of adults who have ever had a permanent tooth extracted because of dental caries or periodontal disease.

OH-5: Reduce the proportion of adults aged 45-74 years with moderate or severe periodontitis.

OH-6: Increase the proportion of oral and pharyngeal cancers that are detected at the earliest stage.

OH-7: Increase the proportion of children, adolescents and adults who used the oral health care system in the past year.

OH-8: Increase the proportion of low income children and adolescents who received any preventive dental service during the last year.

OH-9: Increase the proportion of school-based health centers with an oral health component.

OH-10: Increase the proportion of local health departments and Federally Qualified Health Centers that have an oral health program.

OH-11: Increase the proportion of patients who receive oral health services at Federally Qualified Health Centers each year

OH-12: Increase the proportion of children and adolescents who have received dental sealants on their molar teeth.

OH-13: Increase the proportion of the U.S. population served by community water systems with optimally fluoridated water.

OH-14: (Developmental) Increase the proportion of adults who receive preventive interventions in dental offices.

OH-15: (Developmental) Increase the number of States and the District of Columbia that have a system for recording and referring infants and children with cleft lips and cleft palates to craniofacial anomaly rehabilitative teams.

OH-16: Increase the number of states and the District of Columbia that have an oral and craniofacial health surveillance system.

OH-17: Increase health agencies that have a dental public health program directed by a dental professional with public health training.

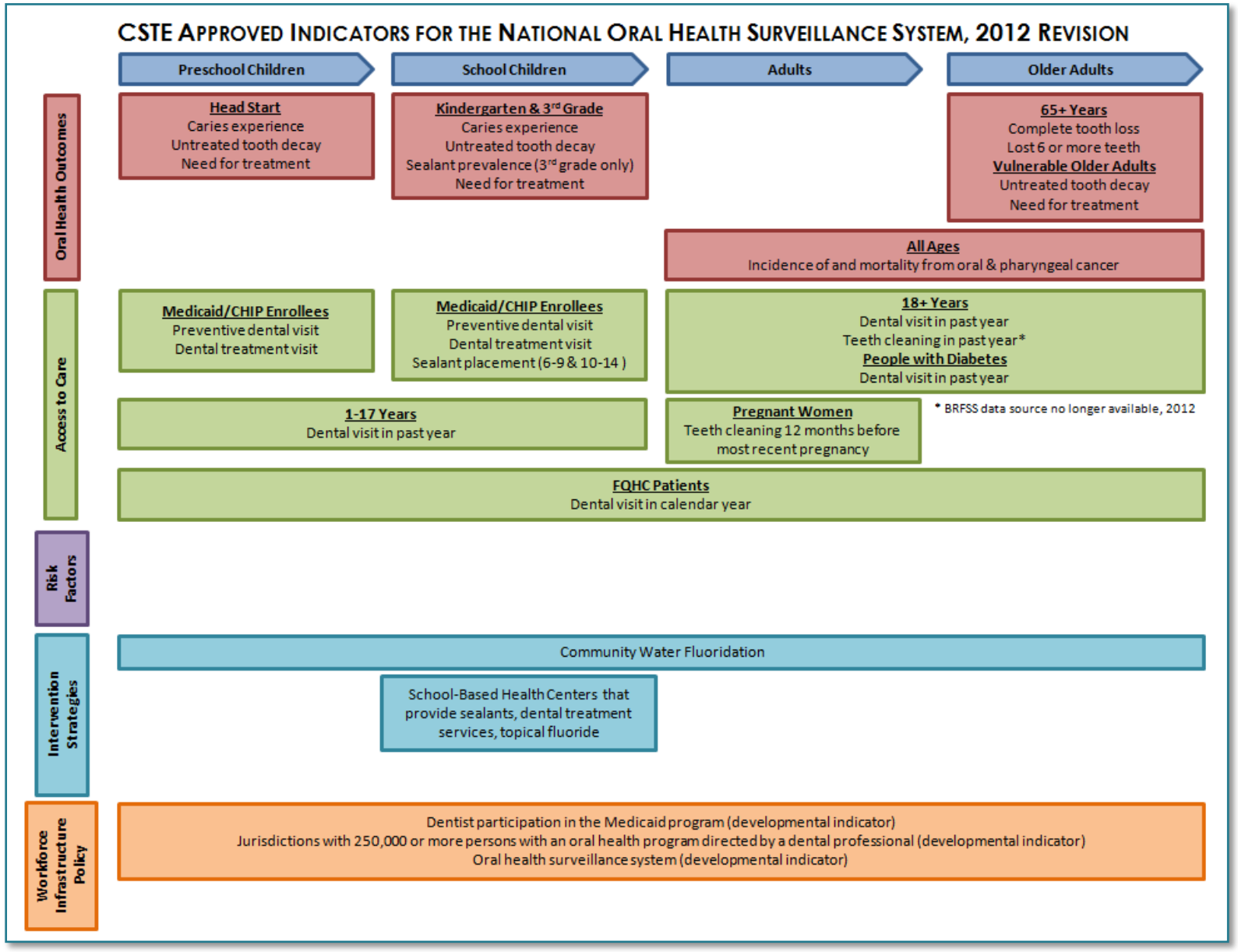
C-6: Reduce the oropharyngeal cancer death rate.

D-8: Increase the proportion of persons with diagnosed diabetes who have at least an annual dental examination.

AHS-1.2: (Developmental) Increase the proportion of persons with dental insurance.

AHS-6.3: Reduce the proportion of persons who are unable to obtain or delay in obtaining necessary dental care.

APPENDIX 2: NOHSS INDICATORS APPROVED BY CSTE, 2012



APPENDIX 3: HEALTHY PEOPLE 2020 OBJECTIVES COMPARED TO NOHSS INDICATORS

HP2020 Objective		National Data Source	CSTE Approved Indicator for NOHSS	State Data Source
OH-1:	**Dental caries experience**		**Dental caries experience**	
	3–5 years	NHANES	Head Start	State BSS
	6–9 years	NHANES	Kindergarten & 3rd grade	State BSS
	13–15 years	NHANES		
OH-2:	**Untreated dental decay**		**Untreated dental decay**	
	3–5 years	NHANES	Head Start	State BSS
	6–9 years	NHANES	Kindergarten & 3rd grade	State BSS
	13–15 years	NHANES		
OH-3:	**Untreated dental decay**		**Untreated dental decay**	
	35–44 years	NHANES		
	65–74 years	NHANES	Vulnerable Older Adults	State BSS
	75+ years	NHANES	Vulnerable Older Adults	State BSS
OH-4:	**Permanent tooth extraction**		**Permanent tooth loss**	
	45–64 years (1+ tooth)	NHANES		
	65–74 years (all teeth)	NHANES	65+ years (all teeth)	BRFSS
			65+ years (6 or more teeth)	BRFSS
OH-5:	**Moderate or severe periodontitis**			
	45–74 years	NHANES		
OH-6:	**Early detection of oral cancer**			
	All ages	NPCR/SEER		
OH-7:	**Dental visit in past year**		**Dental visit in past year**	
	2+ years	MEPS		
			1–17 years	NSCH
			18+ years	BRFSS
			FQHC patients	UDS
			Adults with diabetes	BRFSS
OH-8:	**Preventive dental service past year**		**Preventive dental visit past year**	
	2–18 years ≤ 200% FPL	MEPS	Medicaid enrolled children	CMS-416
			CHIP enrolled children	CARTS
OH-9:	**School-based health centers with**		**School-based health centers with**	
	Dental sealants	SBHCC	Dental sealants	SBHCC
	Dental care	SBHCC	Dental care	SBHCC
	Topical fluorides	SBHCC	Topical fluorides	SBHCC
OH-10:	**Oral health programs in:**			
	FQHCs	UDS		
	Local health departments	Synopses		
OH-11:	**FQHC patients with dental visit**	UDS	**FQHC patients with dental visit[1]**	**UDS**
OH-12:	**Dental sealants on molar teeth**		**Dental sealants on molar teeth**	
	3–5 years	NHANES		
	6–9 years	NHANES	3rd grade	State BSS
			6–9 years Medicaid	CMS-416
	13–15 years	NHANES	10–14 years Medicaid	CMS-416

HP2020 Objective		National Data Source	CSTE Approved Indicator for NOHSS	State Data Source
OH-13:	**Community water fluoridation**	WFRS	**Community water fluoridation**	**WFRS**
OH-14:	**Preventive interventions in dental office – adults (D)**			
	Tobacco cessation	NHANES		
	Oral cancer screening	NHANES		
	Glycemic control	NHANES		
OH-15:	**Craniofacial anomalies (D)**			
	Recording system	Synopses		
	Referral system	Synopses		
OH-16:	**State oral health surveillance system**	Synopses		
OH-17:	**Health agencies with dental public health program**			
	Local agencies ≥ 250,000	Synopses		
	IHS/Tribal ≥ 30,000	IHS		
C-6:	**Oropharyngeal cancer**		**Oral & pharyngeal cancer**	
	Death rate	NVSS	Mortality	NVSS
			Incidence	SEER/NPCR
D-8:	**Diabetics with annual dental exam**	NHIS	**Diabetics with dental exam** [1]	**BRFSS**
AHS-1.2:	**Persons with dental insurance (D)**	NHIS		
AHS-6.3:	**Ability to obtain dental care**	MEPS		
			Teeth cleaning	
			18+ years[2]	
			Women before pregnancy	PRAMS
			Need dental treatment	
			Head Start	State BSS
			Kindergarten	State BSS
			3rd grade	State BSS
			Vulnerable older adults	State BSS
			Dental treatment visit	
			Medicaid enrolled children	CMS-416
			CHIP enrolled children	CARTS

[1] Also listed under dental visit in past year

[2] BRFSS data source no longer available as of 2012

(D) Developmental objective

APPENDIX 4: DATA SOURCE LINKS

Source	Link
BRFSS	BRFSS home page: www.cdc.gov/brfss/ State specific oral health data on NOHSS: www.cdc.gov/nohss/
BSS	BSS manual: www.astdd.org/basic-screening-survey-tool/ State specific BSS data on NOHSS: www.cdc.gov/nohss
Census	Census home page: www.census.gov Poverty data: www.census.gov/hhes/www/poverty/data/
CMS-416	National & state data: www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Benefits/Early-Periodic-Screening-Diagnosis-and-Treatment.html
HPSA	HRSA-HPSA home page: www.hrsa.gov/shortage/ HPSA by state and county: http://hpsafind.hrsa.gov/
Kaiser	Kaiser home page: http://kff.org/ Dental HPSAs: http://kff.org/other/state-indicator/dental-hpsas/
MEPS	MEPS home page: http://meps.ahrq.gov/mepsweb/
NBDPN	NBDPN home page: www.nbdpn.org/index.php State profiles: www.nbdpn.org/state_profiles.php?navtitle=idxpubs?navtitle=idxpubs
NCES	NCES home page: n ces.ed.gov/ Custom table query system: nces.ed.gov/ccd/bat/
NHANES	NHANES home page: www.cdc.gov/nchs/nhanes.htm Key statistics: www.cdc.gov/nchs/nhanes/bibliography/key_statistics.aspx
NOHSS	www.cdc.gov/nohss
NPCR	NPCR home page: http://www.cdc.gov/cancer/npcr/
NSCH	NSCH home page: www.cdc.gov/nchs/slaits/nsch.htm National and state data are available through the data resource center: www.childhealthdata.org/
NS-CSHCN	NS-CSHCN home page: www.cdc.gov/nchs/slaits/cshcn.htm National and state data are available through the data resource center: www.childhealthdata.org/learn/NS-CSHCN
NVSS	NVSS home page: www.cdc.gov/nchs/nvss.htm
PIR	PIR home page: eclkc.ohs.acf.hhs.gov/hslc/mr/pir PIR data reports: hses.ohs.acf.hhs.gov/pir (requires user to register)
PRAMS	PRAMS home page: www.cdc.gov/prams/ PRAMS Online data query system (CPONDER): apps.nccd.cdc.gov/cPONDER/
SBHA	SBHA home page: www.sbh4all.org National Census data: www.sbh4all.org/site/c.ckLQKbOVLkK6E/b.7742441/k.E71F/SBHC_Data.htm
Synopses	Synopses home page: http://apps.nccd.cdc.gov/synopses/
UDS	UDS home page: bphc.hrsa.gov/healthcenterdatastatistics/ Query for state data: bphc.hrsa.gov/healthcenterdatastatistics/statedata/index.html
WFRS	WFRS fact sheet: www.cdc.gov/fluoridation/fact_sheets/engineering/wfrs_factsheet.htm My Water's Fluoride: apps.nccd.cdc.gov/MWF/Index.asp

Source	Link
	2010 fluoridation statistics: www.cdc.gov/fluoridation/statistics/2010stats.htm
YRBS	YRBS home page: www.cdc.gov/HealthyYouth/yrbs/index.htm Custom table query system: apps.nccd.cdc.gov/youthonline/App/Default.aspx

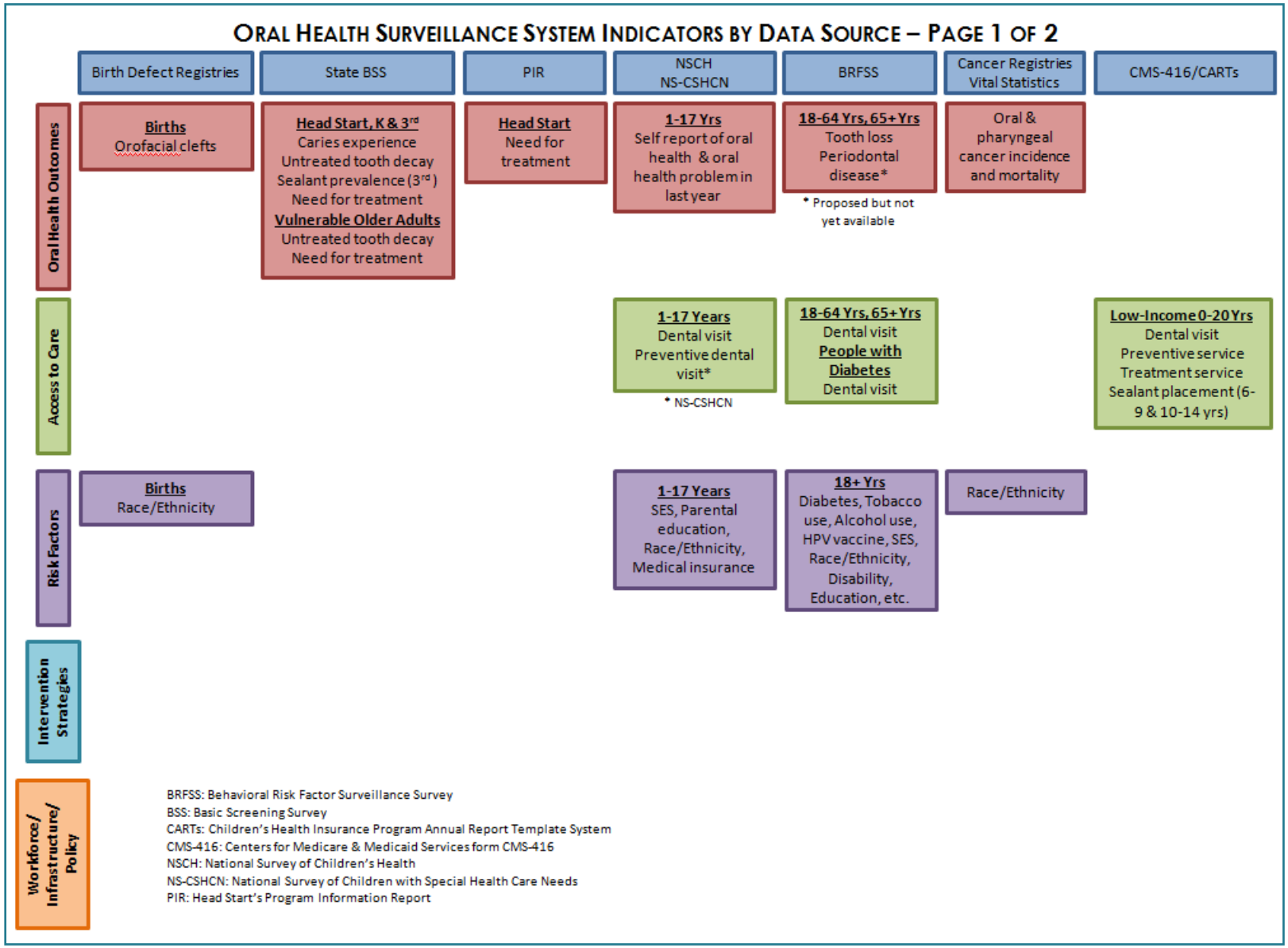
Current as of May 1, 2013

Appendix 5: Oral Health Questions in Surveys with State-Specific Data

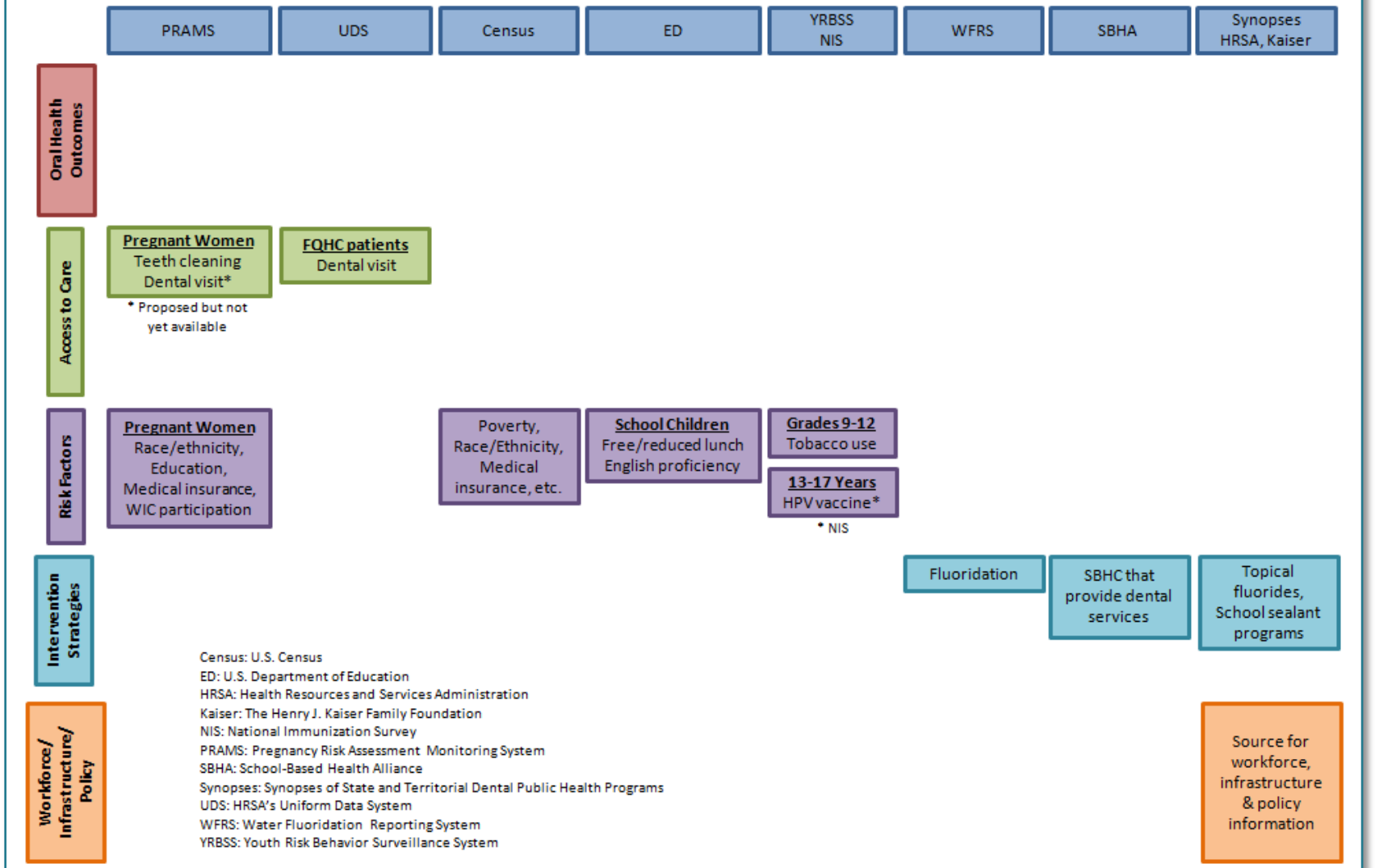
Survey	Question
BRFSS	How long has it been since you last visited a dentist or a dental clinic for any reason? Include visits to dental specialists, such as orthodontists.
	How many of your permanent teeth have been removed because of tooth decay or gum disease? Include teeth lost to infection, but do not include teeth lost for other reasons, such as injury or orthodontics.
SBHA National Census	Indicate which of the following services are provided to individuals by the health center: oral health education, dental screenings, dental examination by a dentist, dental examination by a dental hygienist, dental sealants, fluoride mouthrinse, fluoride varnish, fluoride supplements, dental cleaning, general dental care, specialty dental care
	In which of the following ways are primary medical care professionals involved in oral health care? Risk assessment, diagnosis, treatment, preventive services, guidance/referral, education.
	What barriers exist for the health center providing oral health services? Space or equipment, reimbursement, cost, provider availability, funding, no barriers exist.
NSCH	How would you describe the condition of your child's teeth: excellent, very good, good, fair, or poor?
	During the past 12 months did your child see a dentist for any kind of dental care, including check-ups, dental cleanings, x-rays, or filling cavities?
	During the past 12 months how many times did your child see a dentist for *preventive* dental care, such as check-ups and dental cleanings?
	During the past 12 months did your child have a toothache, decayed teeth, or unfilled cavities?
NS-CSHCN	During the past 12 months, how many times did your child see a dentist for preventive dental care, such as check-ups and dental cleanings?
	During the past 12 months was there any time when your child needed the following services: preventive dental care, other dental care. Did they receive all services, reasons for not receiving care.
PRAMS	At any time during the 12 months before you got pregnant with your new baby did you do any of the following things? I had my teeth cleaned by a dentist or dental hygienist.

Current as of May 1, 2013

APPENDIX 6: SOHSS INDICATORS BY DATA SOURCE



ORAL HEALTH SURVEILLANCE SYSTEM INDICATORS BY DATA SOURCE – PAGE 2 OF 2



APPENDIX 7: STATE ORAL HEALTH INDICATOR AND HP2020 OBJECTIVE CROSSWALK

State Indicator	State Data Source	State Estimate Available	National Estimate Available	CSTE Approved NOHSS Indicator	CDI	Related HP2020 Oral Health Objective	National Data Source	State Estimate Available	National Estimate Available
Oral Health Outcomes – Children (NOTE: Dental sealant prevalence is included in oral health outcomes while sealant placement is listed under access to care)									
Cleft lip & palate	Birth defect registries	Most	Yes	No	No				
Caries experience						OH-1: Caries experience			
Head Start	State BSS	Some	No	Yes	No	3–5 years	NHANES	No	Yes
Kindergarten	State BSS	Some	No	Yes	No	6–9 years	NHANES	No	Yes
3rd Grade	State BSS	Most	No	Yes	No	6–9 years	NHANES	No	Yes
						13–15 years	NHANES	No	Yes
Untreated tooth decay						OH-2: Untreated tooth decay			
Head Start	State BSS	Some	No	Yes	No	3–5 years	NHANES	No	Yes
Kindergarten	State BSS	Some	No	Yes	No	6–9 years	NHANES	No	Yes
3rd Grade	State BSS	Most	No	Yes	No	6–9 years	NHANES	No	Yes
						13–15 years	NHANES	No	Yes
Need for dental treatment									
Head Start	State BSS	Some	No	Yes	No				
Head Start	PIR	All	Yes	No	No				
Kindergarten	State BSS	Some	No	Yes	No				
3rd Grade	State BSS	Most	No	Yes	No				
Dental sealants (prevalence)						OH-12: Dental sealants (prevalence)			
3rd Grade	State BSS	Most	No	Yes	No	3–5 years	NHANES	No	Yes
						6–9 years	NHANES	No	Yes
						13–15 years	NHANES	No	Yes
Perceived oral health status	NSCH	All	Yes	No	No				
Oral health problem	NSCH	All	Yes	No	No				
Need for dental treatment	NS-CSHCN	All	Yes	No	No				
Oral Health Outcomes – Adults & Older Adults									
Tooth loss						OH-4: Tooth loss			
18–64 years (no tooth loss)	BRFSS	All	Yes	No	Yes				
45–64 years (1+ tooth)	BRFSS	All	Yes	No	No	45–64 years (1+ tooth)	NHANES	Yes	Yes
65+ years (all teeth)	BRFSS	All	Yes	Yes	Yes	65–74 years (all teeth)	NHANES	(BRFSS)	Yes
65+ years (6 + teeth)	BRFSS	All	Yes	Yes	Yes			Yes	

State Indicator	State Data Source	State Estimate Available	National Estimate Available	CSTE Approved NOHSS Indicator	CDI	Related HP2020 Oral Health Objective	National Data Source	State Estimate Available	National Estimate Available
								(BRFSS)	
Untreated tooth decay						OH-3: Untreated tooth decay			
						35-44 years	NHANES	No	Yes
						65-74 years	NHANES	No	Yes
Vulnerable older adults	BSS	Some	No	Yes	No	75+ years	NHANES	No	Yes
Oral & pharyngeal cancer						Oral/pharyngeal cancer			
Incidence	SEER/NCRP	All	Yes	Yes	Yes				
						Early detection (OH-6)	NPCR/SEER	No	Yes
Mortality	NVSS	All	Yes	Yes	Yes	Mortality (C-6)	NVSS	Yes	Yes
Self-reported periodontal disease	BRFSS (proposed)	None	No	No	No	OH-5: Periodontitis 45-74 years	NHANES	No	Yes
Access to Care - Children (NOTE: Dental sealant placement is included in access to care while prevalence is listed under oral health outcomes)									
Dental visit in past year									
Medicaid	CMS-416	All	Yes	Yes	No				
CHIP	CARTS	All	Yes	Yes	No				
1-17 year olds	NSCH	All	Yes	Yes	Yes				
Preventive dental service						OH-8: Preventive dental service			
Medicaid	CMS-416	All	Yes	Yes	No	2-18 years < 200% FPL	MEPS	No	Yes
CHIP	CARTS	All	Yes	Yes	No				
1-17 year olds	NSCH	All	Yes	No	Yes				
Treatment service									
Medicaid	CMS-416	All	Yes	Yes	No				
CHIP	CARTS	All	Yes	Yes	No				
Dental sealants (placement)									
Medicaid (6-9 years)	CMS-416	All	Yes	Yes	No				
Medicaid (10-14 years)	CMS-416	All	Yes	Yes	No				
Access to Care - Adults									
Dental visit in past year						D-8: Diabetics with dental exam	NHIS	No	Yes
18+ years	BRFSS	All	Yes	Yes	Yes				
Adults with diabetes	BRFSS	All	Yes	Yes	Yes				
Teeth cleaning									
18+ years	--	No longer	No	Yes	No				
Pregnant women	PRAMS	Most	No	Yes	Yes				
Access to Care - All Ages									
Dental visit in past year						OH-7: Dental visit in past year			

State Indicator	State Data Source	State Estimate Available	National Estimate Available	CSTE Approved NOHSS Indicator	CDI	Related HP2020 Oral Health Objective	National Data Source	State Estimate Available	National Estimate Available
						2+ years	MEPS	No	Yes
FQHC patients	UDS	All	Yes	Yes	Yes	OH-11: FQHC patients	UDS	Yes	Yes
Risk Factors									
Demographic factors	Census	All	Yes	No	No				
Free/reduced lunch status	ED	All	Yes	No	No				
Tobacco use									
Grades 9-12	YRBS	Most	Yes	No	Yes				
18+ years	BRFSS	All	Yes	No	Yes				
Diabetes, alcohol	BRFSS	All	Yes	No	Yes				
HPV, disability, etc	BRFSS	All	Yes	No	No				
Intervention Strategies									
Water fluoridation	WFRS	Yes	Yes	Yes	Yes	OH-13: Water fluoridation	WFRS	Yes	Yes
School-based health centers						OH-9: School-based health centers			
Dental sealants	SBHCC	Yes	Yes	Yes	No	Dental sealants	SBHCC	Yes	Yes
Dental care	SBHCC	Yes	Yes	Yes	No	Dental care	SBHCC	Yes	Yes
Topical fluoride	SBHCC	Yes	Yes	Yes	No	Topical fluoride	SBHCC	Yes	Yes
Topical fluoride programs	Synopses	Most	No	No	No				
Workforce, Infrastructure, Policy									
Number of dental professionals	Synopses	Most	No	No	No				
Dentists that service Medicaid	Synopses	Most	No	No	No				
Dental HPSAs	HRSA/Kaiser	All	Yes	No	No				
Medicaid dental for adults	Synopses	Most	No	No	No				
Medicaid policies & payment	State Medicaid	Most	No	No	No				
Agencies with dental public health directed by DPH professional						OH-17: Agencies with dental public health directed by DPH professional			
State/local agencies	Synopses	Most	Yes	No	No	State/local agencies	Synopses	Yes	Yes
						IHS/tribal	IHS	No	Yes
						OH-16: State oral health surveillance system	Synopses	Yes	Yes
						OH-15: Craniofacial anomalies			
						Recording system	Synopses	Yes	Yes
						Referral system	Synopses	Yes	Yes

State Indicator	State Data Source	State Estimate Available	National Estimate Available	CSTE Approved NOHSS Indicator	CDI	Related HP2020 Oral Health Objective	National Data Source	State Estimate Available	National Estimate Available
						OH-14: Preventive interventions			
						Tobacco cessation	NHANES	No	Yes
						Oral cancer screening	NHANES	No	Yes
						Glycemic control	NHANES	No	Yes
						OH-10: Oral health programs in			
						FQHCs	UDS	Yes	Yes
						Local Health departments	Synopses	Yes	Yes

CDI = Chronic Disease Indicator

Appendix 8: Acronyms Used in Document

Acronym	Meaning
ASTDD	Association of State and Territorial Dental Directors
BRFSS	Behavioral Risk Factor Surveillance System
BSS	Basic Screening Survey
CARTs	CHIP Annual Report Template System
CDC	Centers for Disease Control and Prevention
CDI	Chronic Disease Indicator
CHIP	Children's Health Insurance Program
CMS	Centers for Medicare and Medicaid Services
CSTE	Council of State and Territorial Epidemiologists
DOH	CDC's Division of Oral Health
ED	U.S. Department of Education
FPL	Federal Poverty Level
FQHC	Federally Qualified Health Center
HP2020	Healthy People 2020
HPSA	Health Professional Shortage Area
HPV	Human papillomavirus
HRSA	Health Resources and Services Administration
IHS	Indian Health Service
IOM	Institute of Medicine
Kaiser	Henry J. Kaiser Family Foundation
MCHB	Maternal and Child Health Bureau
MEPS	Medical Expenditure Panel Survey
NBDPN	National Birth Defects Prevention Network
NCES	National Center for Education Statistics
NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NCIRD	National Center for Immunizations and Respiratory Diseases
NHANES	National Health and Nutrition Examination Survey
NIS	National Immunization Survey
NOHSS	National Oral Health Surveillance System
NPCR	National Program of Cancer Registries
NPHSS	National Public Health Surveillance System
NSCH	National Survey of Children's Health
NS-CSHCN	National Survey of Children with Special Health Care Needs
NVSS	National Vital Statistics System

Acronym	Meaning
PIR	Performance Information Report
PRAMS	Pregnancy Risk Assessment Monitoring System
SBHA	School-Based Health Alliance
SBHC	School-based health center
SBHCC	School-based health center census (National Census)
SEER	Surveillance, Epidemiology and End Results
SOHSS	State Oral Health Surveillance System
Synopses	Annual Synopses of State and Territorial Dental Public Health Programs
UDS	Uniform Data Set
WFRS	Water Fluoridation Reporting System
YRBSS	Youth Risk Behavior Surveillance System

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