



## Best Practice Approaches for State, Community and Territorial Oral Health Programs

A Best Practice Approach Report describes a public health strategy, assesses the strength of evidence on the effectiveness of the strategy, and uses practice examples to illustrate successful/innovative implementation.

Adopted: July 2017  
Amended: February 2023

### Best Practice Approach: State-Based Oral Health Surveillance System

I. Description	1
II. Guidelines & Recommendations from Authoritative Sources	12
III. Research Evidence	12
IV. Best Practice Criteria	13
V. State Practice Examples	15
VI. Acknowledgements	16
VII. Resources	17
VIII. References	17

#### I. Description

##### A. Public Health Surveillance Systems

The Institute of Medicine (IOM) -- now called the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine -- report on the future of public health outlines three core functions for public health: assessment, policy development and assurance.<sup>1</sup> To

carry out the assessment function, the IOM recommends every public health agency regularly and systematically collect, assemble, analyze, and disseminate information on community health status. Public health agencies accomplish this task through public health surveillance -- the ongoing, systematic collection, analysis and interpretation of health data.<sup>2</sup> 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.<sup>3</sup> The overarching purpose of public health surveillance is to provide actionable health information to guide public health policy and programs.<sup>4</sup>

According to the Council of State and Territorial Epidemiologists (CSTE) Surveillance Strategy Group,<sup>4</sup> the guiding principles for public health surveillance are:

1. Public health surveillance is the ongoing collection, analysis, interpretation, and dissemination of data for a stated public health purpose.
2. The primary goal of surveillance is to provide actionable health information to public health staff, government leaders, and the public to guide public health policy and programs.
3. All surveillance activities should be periodically evaluated. Because of limited resources, surveillance and assessment efforts must be intentional and prioritized to address the highest priority problems and problems most amenable to intervention.
4. Adequate and stable resources must be made available for public health surveillance and assessment, based on realistic goals for surveillance capacity within state and local health departments.
5. All levels of government need to collaborate in designing and operating surveillance systems to meet differing priorities, maximize the value of data collected, and minimize the toll on public health partners.
6. Surveillance methods should match surveillance goals, and data should be collected in the least expensive manner possible, consistent with objectives. Accordingly, surveillance data should flow in the most efficient, timely, and secure manner, given the relationships among public health agencies and their partners, and public health roles and responsibilities as defined by local, state, and federal laws.
7. High-quality data are needed if surveillance information is to be relied on, but data quality needs to be only as good as its purpose. Because no data are perfect and perfecting data can be costly, matching data quality to its use is imperative.
8. Confidentiality of surveillance data must be ensured.
9. To achieve the most public health good, surveillance data should be shared among public health partners in ways consistent with law and protection of personal confidentiality and privacy.
10. Public health data ownership must be clear, and explicit data use agreements should be established among all levels of government sharing data.

### Approaches

In performing surveillance, state oral health programs often engage in surveys and needs assessments. Although related, these activities are distinct. Surveys assess samples of defined populations (e.g., children, adults and special needs individuals) through clinical measures and/or the use of questionnaires. A survey generally provides a snapshot of a defined population at a point in time. Needs assessment is a process that seeks to identify: 1) the extent and types of existing and potential problems in a population, 2) the current system of resources and services available, and 3) the extent of unmet needs, underutilized resources or shortcomings of the service delivery system.<sup>5</sup> The practices come together when point-in-time (cross-sectional) surveys are repeated and

aggregated with other data sources into a surveillance system and when that surveillance system and/or individual surveys are used to assess needs.

### Utilization

As previously stated, surveillance systems provide information necessary for public health decision making. A comprehensive public health surveillance system routinely collects data on health outcomes, risk factors and intervention strategies for the whole population or representative samples of the population.<sup>6</sup> Such a system can be based on linkage to existing data collection resources/databases and collection of additional information to address data gaps. Surveillance systems are not just data collection systems; they also include timely communication of findings to policymakers, program administrators, program managers and other stakeholders including the public. Data from these systems are also used to evaluate public health measures to assess, prevent and control diseases and conditions.

Data from a public health surveillance system can be used to:<sup>7</sup>

- guide immediate action of public health importance;
- measure the burden of a disease (or other health-related event), including changes in related factors, populations at high risk, and new or emerging health concerns;
- monitor trends in the burden of disease (or other health-related event);
- guide the planning, implementation and evaluation of programs and State Oral Health Improvement Plans;
- develop and evaluate public policy;
- detect changes in health practices and evaluate the effects of these changes;
- prioritize the allocation of health resources;
- describe the clinical course of disease;
- provide a basis for epidemiological research.

### Dissemination

A public health surveillance system should effectively disseminate health data so that decision makers at all levels can readily understand the implications of the information. The audiences for these data can include public health practitioners, health care providers, members of affected communities, professional and voluntary organizations, policymakers, the press, and the general public.<sup>7</sup> Options for disseminating data and/or information from the system include electronic data interchange\* ; public-use data files; the Internet; press releases; newsletters; bulletins; annual and other types of reports; publication in scientific, peer-reviewed journals; and poster and oral presentations at community and professional meetings.<sup>7</sup> In August of 2021, ASTDD published a Best Practice Approach Report on [Dissemination of Data from State-Based Surveillance Systems](#). In it ASTDD encourages health jurisdictions to implement an oral health surveillance system and create a communications or dissemination plan for the system that considers six general topics - primary audience, communication message, communication channel, message marketing, cultural sensitivity, and evaluation.

### Characteristics of an Effective Surveillance System

---

\* Electronic data interchange is the transfer of data from one computer system to another by standardized message formatting, without the need for human intervention.

Public health surveillance systems vary in methods, scope, purpose, and objectives; therefore, some attributes that are important to one system might be less important to another. An oral health surveillance system should emphasize those attributes that are most important for the objectives of the system.<sup>7</sup>

Desirable attributes of public health surveillance systems are:<sup>7</sup>

- **Simplicity:** The system is as simple as possible (for structure and ease of operation) while still meeting its objectives.
- **Flexibility:** The system has the ability to adapt to changing information needs or operating conditions with little additional time, personnel or funding.
- **Data Quality:** Data used by the system are accurate, complete and valid.
- **Acceptability:** People and organizations are willing to participate in the system.
- **Representativeness:** The system accurately describes the occurrence of a health-related event over time and its distribution in the population by place and person.
- **Timeliness:** Information is available quickly.
- **Stability:** The system operates without failure and is available when needed.
- **Sensitivity:** The system identifies a very high proportion of cases (persons with a disease or other health-related event) and has the ability to detect outbreaks and monitor changes in the number of cases over time.
- **Predictive Value Positive (PVP):** The system has a high PVP, the proportion of reported cases that actually have the disease or health-related event under surveillance.

## B. National Oral Health Surveillance System

The National Oral Health Surveillance System (NOHSS), developed through a joint effort between the Association of State and Territorial Dental Directors (ASTDD) and the Centers for Disease Control and Prevention (CDC), is designed to help public health programs monitor the burden of oral disease, the use of the oral health care delivery system, and community water fluoridation status on both state and national levels.<sup>8</sup> NOHSS indicators are selected based on data sources and surveillance capacity available to most states.

The initial framework for NOHSS began in 1998 when CSTE, 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, approved two oral health indicators (oral and pharyngeal cancer incidence and mortality) for the National Public Health Surveillance System (NPHSS). In 1999, CSTE approved seven additional oral health indicators -- dental visits, teeth cleaning, edentulism, community water fluoridation status, dental caries experience, untreated tooth decay and dental sealants among children in K-3<sup>rd</sup> grade.<sup>9</sup> The website housing the NOHSS indicators was launched in 2001. Currently, CDC's [Oral Health Data](#) website contains data for a subset of the NOHSS indicators.

Since 1999, the availability of state-level oral health data has evolved and expanded resulting in additional NOHSS indicators. As of July 2017, there are 36 indicators approved by CSTE for inclusion in NOHSS. For more detailed information on the indicators including data source, refer to ASTDD's [State Surveillance Data Resource Guide](#).

1. Preventive dental visit among children aged 1-17 years
2. Preventive dental service for children aged 1-20 years enrolled in Medicaid
3. Dental visit among children aged 1-17 years

4. Any dental service for children aged 1-20 years enrolled in Medicaid
5. Dental visit among adolescents in grades 9-12
6. Dental visit among adults aged  $\geq 18$  years
7. Dental visit among adults aged  $\geq 18$  years with diagnosed diabetes
8. Population receiving oral health services at Federally Qualified Health Centers
9. Teeth cleaning among women before pregnancy
10. Teeth cleaning among women during pregnancy
11. Dental caries experience among children aged 3-5 years attending Head Start
12. Dental caries experience among children attending kindergarten
13. Dental caries experience among 3rd grade children
14. Untreated dental caries among children aged 3-5 years attending Head Start
15. Untreated dental caries among children attending kindergarten
16. Untreated dental caries among 3rd grade children
17. Untreated dental caries among adults 65+ years in long-term or skilled nursing facilities
18. Untreated dental caries among adults 65+ years attending congregate meal sites
19. Urgent dental treatment need among children aged 3-5 years attending Head Start
20. Urgent dental treatment need among children attending kindergarten
21. Urgent dental treatment need among 3rd grade children
22. Dental treatment need among adults 65+ years in long-term or skilled nursing facilities
23. Dental treatment need among adults 65+ years attending congregate meal sites
24. Dental sealants among 3rd grade children
25. Dental sealant use among children aged 6-9 years enrolled in Medicaid
26. Dental sealant use among children aged 10-14 years enrolled in Medicaid
27. No tooth loss among adults aged 18-64 years
28. Six or more teeth lost among adults aged  $\geq 65$  years
29. All teeth lost among adults aged  $\geq 65$  years
30. Incidence of invasive cancer of the oral cavity or pharynx
31. Mortality from invasive cancer of the oral cavity or pharynx
32. School-Based Health Centers that provide dental sealants
33. School-Based Health Centers that provide dental care
34. School-Based Health Centers that provide topical fluoride
35. Population served by community water fluoridation
36. State-based oral health surveillance system.

### C. Building a State Oral Health Surveillance System

A state oral health surveillance system (SOHSS) should provide information necessary for public health decision making by routinely collecting data on health outcomes, access to care, social determinants of oral health, risk factors for oral diseases 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. Following the guiding principles of a public health surveillance system, an oral health surveillance system for a state should:

- 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) to serve as benchmarks for assessing changes or 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;
- regularly submit data to NOHSS to support national data systems and assess national trends.

NOHSS can serve as a model for building a state oral health surveillance system. A state system could use a set of the NOHSS indicators and, as resources and surveillance capacity increase, the system could collect additional state- or community-level data on an ongoing basis. Time intervals for collection of specific oral health indicators are based on several factors, including cost in dollars and other programmatic resources. Data collection intervals can range from annually to every five years. According to the 2022 ASTDD State Synopses, 23 states meet the CSTE requirements for having an oral health surveillance system.

### Key Data Sources

One of the primary sources for oral health data on children are “open mouth” surveys. Because this type of survey is resource intensive, states can initially seek less expensive data sources by acquiring data relevant to oral health from existing systems where data are already being collected and analyzed. These sources could include data from the Behavioral Risk Factor Surveillance System (BRFSS), state cancer registries (oral and pharyngeal cancer deaths), state Medicaid agencies (percent of Medicaid enrolled populations with past year dental visit), and state water programs (community water fluoridation), and other data from health departments and partnering organizations. Oral health questions could be added to other ongoing community or statewide surveys, such as the [Youth Risk Behavior Surveillance System \(YRBSS\)](#) and the [Pregnancy Risk Assessment Monitoring System \(PRAMS\)](#). When there is no other way to collect needed estimates (e.g., caries prevalence), the program can pursue collection of primary data through “open mouth” surveys of probability samples of state populations. The [ASTDD Basic Screening Survey](#) is an “open mouth” tool used by states to collect comparable data on school age children, Head Start children and older adults.

In 2013, CSTE developed an operational definition for a SOHSS.<sup>9</sup> The operational definition includes a **core or foundational set of eight surveillance indicators** that CSTE encourages all states to collect.

1. 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 collected at least every five years
2. Permanent tooth loss data for adults obtained every two years
3. Annual data on oral and pharyngeal cancer incidence and mortality
4. Annual data on the percent of Medicaid- and CHIP-enrolled children who had a dental visit within the past year
5. Data on the percent of children 1-17 years who had a dental visit within the past year, obtained every four years
6. Data on the percent of adults (≥18 years) and adults with diabetes who had a dental visit within the past year, obtained every two years
7. Data on the fluoridation status of public water systems within the state, updated every two years

8. 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.

In addition to the eight core indicators, CSTE recommends that all states have a written oral health surveillance plan plus publicly available, actionable data to guide public health policy and programs. CSTE encourages 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.

A state's capacity to build and maintain a state-level oral health surveillance system can be enhanced if the state program has access to an epidemiologist or other data analyst. The results of CSTE's [2013 National Assessment of Epidemiology Capacity](#) indicate that to adequately address a state's oral health surveillance and epidemiology capacity a full-time oral health epidemiologist ( $\geq 0.7$  FTE) is needed. If resources are limited, such support can be contracted or hired by pooling resources with other programs or through partnerships with academic institutions or other entities. An epidemiologist's duties would include:

- routinely analyze state and other available oral health-related data for program decision making;
- coordinate collection and analysis of Basic Screening Survey (BSS) data according to standard BSS protocol and disseminate findings to key state audiences;
- collaborate with other epidemiologists in the health department to answer key questions of mutual interest (e.g., chronic disease epidemiologists and maternal and child health (MCH) epidemiologists).

#### Developing a State Oral Health Surveillance Plan

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 usage 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.

The surveillance plan should define a simple, effective, flexible, and sustainable surveillance system. As a resource tool, CDC's Division of Oral Health has developed a surveillance logic model. For additional guidance in developing a written oral health surveillance plan, refer to ASTDD's [State Oral Health Surveillance Plan Template](#). In general, a surveillance plan should minimally include the following information:

- Introduction and background including a summary of previous data-collection experience in the state;
- The purpose and objectives of the surveillance system;
- The oral health indicators to be included in the surveillance system;
- Data source and data collection timeline for each indicator;
- Description of data use and data dissemination;
- Creation of an optional surveillance advisory committee that includes stakeholders who can contribute surveillance data, support the surveillance system, and benefit from surveillance

- information;
- Privacy and confidentiality issues;
- An evaluation plan for the surveillance system.

#### D. Collecting Surveillance Data

The following action steps will provide guidance through the process of determining the data collection needs of the oral health surveillance system:

- Conduct an inventory of existing oral health data sources.
- Review oral health indicators used to report the oral health status and risk factors for the U.S. population (e.g., BRFSS, YRBSS, etc.). Refer to ASTDD's [State Surveillance Data Resource Guide](#).
- Select an initial set of oral health measures or indicators (use an advisory committee or a coalition to provide broad-based input). Consider selecting, at a minimum, the eight core indicators recommended by CSTE.<sup>9</sup>
- Identify data gaps where data are not available or have not been analyzed for the selected indicators.
- Prioritize indicators that need data collection and analysis.
- Establish relationships and agreements with data stewards to share secondary data and/or collaborate on collecting primary data to fill data gaps.
- Develop a data management system to organize the surveillance data. In general, a central database will be difficult and expensive to develop when data sources are provided by several partners with varied and possibly incompatible data systems. Learn from other states or programs who already have an oral health surveillance system.

Partners are critical for data collection. Collaborations reported by states include combining oral health data collection efforts with those for childhood obesity, asthma and nutrition. For example, oral health screening is conducted with height and weight measurements, and oral health questionnaires include questions on sugar-sweetened beverages and milk consumption. Other partnerships include working with local health departments, MCH and chronic disease programs, state Medicaid agencies, Head Start and other public or private preschool programs, Indian Health Service (IHS), tribal programs, community health centers, dental schools, and dental and dental hygiene associations to collect oral health data.

When developing an oral health surveillance system, certain federal policies may impact both planning and data collection processes -- namely Protection of Human Subjects and the Health Insurance Portability and Accountability Act (HIPAA). These are complex policies that can be daunting; therefore, ASTDD developed a short synopsis that gives general guidance and resources on Institutional Review Board (IRB) review and HIPAA for oral health surveys. For more information refer to [IRB Review, HIPAA and Oral Health Surveys: Guidance and Resources for State and Territorial Dental Programs](#). In terms of Protection of Human Subjects, ASTDD recommends that oral health programs review their agency's policies regarding IRB review. Prior to implementation of an oral health survey, dental programs should consider obtaining one of the following: 1) a waiver from the agency director, 2) a waiver from the IRB or 3) approval from the IRB. For HIPAA, states should determine if their agency is a covered entity, and if so, review their agency's HIPAA policies. To assure compliance with privacy laws, state and community oral health programs should consider collecting only non-identifiable data.

#### E. Disseminating Oral Health Data



Surveillance systems are not just data collection systems. They must include mechanisms to 1) communicate findings to those responsible for programmatic and policy decisions and to the public, and to 2) assure data are used to inform and evaluate public health measures to prevent and control oral diseases and conditions. In other words, ***there is no value to a surveillance system unless the information is used for actions that prevent or control disease or a health condition.***

Options for disseminating data from an oral health surveillance system include, but are not limited to, published reports, online access to surveillance information and reports, policy briefs, fact sheets, infographics, social media, presentations at community and/or professional meetings, and newsletters. In addition, in 2022 ASTDD launched the [National Oral Health Data Portal](#). ASTDD has consolidated most of the important oral health data sources in one place for people from all levels of oral health and data literacy to find the information they need. Consolidated datasets on oral health status, attitudes, cost, utilization, and access to care have been organized into files and visualizations for easy access and use.

Data communications should consider the health literacy and numeracy levels and information needs of different audiences. The target audience may include dental professionals, legislators, health professionals, health policymakers, coalition members, other state and local partners, potential funders, the media, and the general public. Refer to ASTDD's [Using Oral Health Data to Inform Decisions and Policy Development](#), for additional information. The ASTDD [Health Communications](#) webpage has other useful information for data dissemination including communication plan templates for state oral health programs.

Some states opt to create an in-depth oral health burden document that describes oral diseases, disparities, and unmet needs using the most recent data, preferably no more than five years old. A state burden document provides a broad range of measures relating to national and state health objectives.

#### F. Evaluating a Public Health Surveillance System

The purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively.<sup>7</sup> Evaluation of a public health surveillance system focuses on how well the system operates to meet its purpose and objectives. Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency and usefulness.

In 2001, CDC published [Updated Guidelines for Evaluating Public Health Surveillance Systems](#) recommending that all surveillance systems be routinely evaluated.<sup>7</sup> The evaluation of public health surveillance systems should involve an assessment of the previously discussed system attributes (simplicity, flexibility, data quality, acceptability, representativeness, timeliness, stability, sensitivity, and predictive value positive). Inherent in these attributes are public health informatics concerns that include comparable hardware and software, standard user interface, standard data format and coding, appropriate quality checks, and adherence to confidentiality and security standards.

Evaluation of a public health surveillance system should focus on attributes that are most important for the objectives of the system. The [Updated Guidelines](#) describe tasks that can be applied in the evaluation of public health surveillance systems with the understanding that not all activities listed under the tasks may be appropriate for all surveillance systems.<sup>7</sup>

- Task A: Engage the stakeholders in the evaluation.
- Task B: Describe the surveillance system to be evaluated.
- Describe the public health importance of the health-related event under surveillance.
  - Describe the purpose and operation of the surveillance system.
  - Describe the resources used to operate the surveillance system.
- Task C: Focus the evaluation design.
- Task D: Gather credible evidence regarding the performance of the surveillance system.
- Indicate the level of usefulness.
  - Describe each system attribute.
- Task E: Justify and state conclusions, and make recommendations.
- Task F: Ensure use of evaluation findings and share lessons learned.

Another resource document, [Framework and Tools for Evaluating Health Surveillance Systems](#), was developed in 2004 by Health Canada's Population and Public Health Branch Health Surveillance Coordinating Committee. The document was designed to help managers of health surveillance systems identify and document issues relating to the rationale, implementation and effectiveness of their health surveillance systems. The framework and tools were intended to provide standard approaches for enhancing the ability of surveillance to provide relevant information. The document noted that an evaluation of a health surveillance system helps to answer the following questions:

- What are the successes and deficiencies of the surveillance system?
- Is the surveillance system meeting its public health objective?
- How does surveillance both support and benefit stakeholders?
- What measures could improve performance and productivity of the surveillance system and the program(s) that it supports?

Other resources for the evaluation of surveillance systems include:

- [CDC Coffee Break: Streamlining the Evaluation of Public Health Surveillance Systems \(2012\)](#)
- [CDC's Surveillance Resource Center](#)
- [World Health Organization, Evaluating a National Surveillance System](#)
- Calba C, Goutard FL, Hoinville L, et al. [Surveillance systems evaluation: a systematic review of the existing approaches](#). BMC Public Health 2015;15:448

## G. Initiatives and Coordinated Efforts

1. *CDC, Division of Oral Health Cooperative Agreements:* As of July 2022, CDC's Division of Oral Health provides funding through cooperative agreements to 20 states until 2024 (the original 5-year cooperative agreements were extended a year due to COVID-19) to strengthen their oral health programs and improve the oral health of their residents. The CDC funding is designed to improve basic state oral health services including monitoring oral diseases and implementing and evaluating prevention programs such as community water fluoridation and school-based sealant programs. The funding supports the development of a state oral health surveillance system. Grantee states hire or contract with epidemiologists to develop, implement and sustain a state-based oral health surveillance system, establish the indicators for surveillance, collect primary and secondary data, and disseminate surveillance findings.
2. *Association of State & Territorial Dental Directors:* ASTDD, in collaboration with CDC, administers NOHSS. The ASTDD Data Committee oversees this effort and annually collects data from states to include in NOHSS. The ASTDD Data Committee has developed an [ASTDD](#)

[Oral Health Surveillance Plan Template](#) for an oral health surveillance plan. In addition, ASTDD has two oral epidemiology consultants who provide technical assistance to states.

## H. Future Considerations

According to the CSTE, 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.<sup>10</sup> 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. The COVID-19 pandemic illustrated the need for timely, high-quality data on a community level, and the current shortcomings in our public health infrastructure.

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 currently limited. Most dentists in the U.S. (80%) are small owner-operators.<sup>11</sup> 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 Federally Qualified Health Centers (FQHCs) or through dental school consortia. 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.

Facilitated by the Patient Protection and Affordable Care Act, many states have built and established an All-Payer Claims Database (APCD). By collecting claims and cost data from both private and public insurers, states have new opportunities to more fully understand health care delivery, measure quality of health care, and report on population health. In addition, some states have begun collecting workforce data through their health professions licensing boards. These data allow states to better measure the capacity, distribution and age of the current workforce and plan for the future workforce.

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 currently funded by CDC to strengthen their oral health programs receive support for epidemiologists and evaluators to help develop and maintain a SOHSS. Other states and territories, or states not receiving CDC funding for surveillance activities in the future, must rely on other funding sources. Some states have used funding from the HRSA State Oral Health Workforce grants to fund workforce assessments. Given the current fiscal climate, oral health surveillance may be a low priority for state health agencies.

Regardless of the challenges, 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. CSTE's 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.<sup>9</sup>

---

## II. Guidelines & Recommendations from Authoritative Sources

In their whitepaper, [\*State-Based Oral Health Surveillance Systems: Conceptual Framework and Operational Definition\*](#), CSTE recommends that states have an oral health surveillance system that includes, at a minimum, a written oral health surveillance plan, data for eight core indicators, and publicly available, actionable data to guide public health policy and programs.<sup>9</sup>

The Centers for Disease Control and Prevention published [\*Vision for Public Health Surveillance in the 21st Century\*](#).<sup>12</sup>

[\*Oral Health in America: Success and Challenges\*](#) updates the findings of the 2000 *Oral Health in America: A Report of the Surgeon General*, highlighting the national importance of oral health and its relationship to overall health. It also focuses on new scientific and technological knowledge as well as innovations in health care delivery that offer promising new directions for improving oral health care and creating greater equity in oral health across communities.

[\*Oral Health in America: A Report of the Surgeon General\*](#) states that having state-specific and local data that augment national data is critical in identifying high-risk populations and in addressing oral health disparities.<sup>13</sup>

[\*National Call to Action to Promote Oral Health\*](#), a report released by the Office of the Surgeon General, proposed that implementation strategies to overcome barriers in oral health disparities should include building and supporting epidemiologic and surveillance databases at national, state and local levels to identify patterns of disease and populations at risk.<sup>14</sup>

[\*Healthy People 2030 Objective OH-D01\*](#) seeks to increase the number of states that have an oral and craniofacial health surveillance system.

The Centers for Disease Control and Prevention published [\*Updated Guidelines for Evaluating Public Health Surveillance Systems\*](#).<sup>7</sup>

The 2015 CSTE position statement, [\*Revision to the National Oral Health Surveillance System \(NOHSS\) Indicators\*](#), provides detailed information on the 36 indicators approved by CSTE for inclusion in NOHSS.

---

## III. Research Evidence

Effectiveness of public health surveillance (such as early warnings on emerging health problems and program development/evaluation of intervention strategies) has been reported in other fields including infectious diseases and occupational health. There is a lack of reporting on the impact and

effectiveness of oral health surveillance in the scientific literature. Although NOHSS has been in operation for 16 years, additional time is needed before the system will be able to show its effectiveness through evaluation. Some of the evidence found in the literature for the effectiveness of surveillance systems includes:

- A longitudinal health and demographic surveillance system has been able to document the continued decline in all-cause mortality and changes in the cause of death distribution over time in four developing country populations in Africa and Asia.<sup>15</sup>
- A Canadian emergency department injury and poisoning surveillance system has found that a decentralized, web-based reporting system is providing early warnings of new hazards, issues and trends.<sup>16</sup>
- AIDS surveillance data provided an understanding of transmission risks and characterized communities affected by the epidemic. Later, these data provided the basis for allocating resources for prevention and treatment programs. New treatments have dramatically improved survival with declines in AIDS incidence and deaths.<sup>17</sup>
- In some European countries, health surveillance is part of the national health system. Such health and hazard surveillance have been aimed at improving the health, ability to work, and well-being of workers. Reported benefits of health surveillance include improvement in worker satisfaction, improvement in relationships among stakeholders, early detection of health changes, and sickness absence reduction.<sup>18, 19, 20</sup>
- Hospital-based surveillance programs of wound infection resulted in significant reduction in the infection rate of clean wounds and facilitated the adoption of evidence-based practice. Other surveillance programs for surgical-site infections resulted in reduction in infection rates of 35% to 50%.<sup>21, 22</sup>
- A 2017 article, *Public Health Surveillance Systems: Recent Advances in Their Use and Evaluation* considers their current use to increase the efficiency and effectiveness of the public health system, the role of system stakeholders, the analysis and interpretation of surveillance data, approaches to system monitoring and evaluation, and opportunities for future advances in terms of increased scientific rigor, outcomes-focused research, and health informatics. The authors found that surveillance is critical for public health, and surveillance systems are needed to conduct surveillance efficiently and effectively. The main output of surveillance systems is information that drives action; consequently, systems require data of sufficient quality and with a resolution and timeliness that match public health objectives.<sup>24</sup>

---

#### IV. Best Practice Criteria

The ASTDD Best Practices Project has selected five best practice criteria to guide state and community oral health programs in developing their best practices. For these criteria, initial review standards are provided to help evaluate the strengths of a program or practice to prevent and control tooth decay.

##### 1. Impact / Effectiveness

- A state-based oral health surveillance system contains a core set of measures that describes the status of important oral health conditions and behaviors. These measures serve as benchmarks for assessing progress in achieving good oral health.
- An oral health surveillance system communicates data and information to responsible

- parties and to the public in a timely manner.
- Data and findings from the surveillance system are used for public health actions.

## **2. Efficiency**

- Data collection is managed on a periodic but regular schedule. Basic Screening Surveys and State Surveillance Plans should be updated approximately every five years.
- Cost-effective strategies are used in collecting, analyzing and communicating surveillance data.

## **3. Demonstrated Sustainability**

- A mature surveillance system shows several years of data and analyzes trends.

## **4. Collaboration / Integration**

- Partnerships are established to leverage resources in data collection for the surveillance system.
- Data and findings from the surveillance system are used to integrate oral health into other health programs.

## **5. Objectives / Rationale**

- A state-based oral health surveillance system has a clear purpose (i.e., why the system exists) and objectives that specify how the data will be used for public health action.

### **Evidence Supporting Best Practice Approaches**

The ASTDD Best Practices Committee takes a broad view of evidence to support best practice approaches for building effective state and community oral health programs. Practices which are linked by strong causal reasoning to the desired outcome of improving oral health and total well-being of priority populations will be reported on by the Best Practices Committee. Strength of evidence from research, expert opinion and field lessons fall within a spectrum: on one end of the spectrum are promising best practice approaches, which may be supported by little research, a beginning of agreement in expert opinion, and very few field lessons evaluating effectiveness; on the other end of the spectrum are proven best practice approaches, ones that are supported by strong research, extensive expert opinion from multiple authoritative sources, and solid field lessons evaluating effectiveness.

Research may range from a majority of studies in dental public health or other disciplines reporting effectiveness to the majority of systematic review of scientific literature supporting effectiveness. Expert opinion may range from one expert group or general professional opinion supporting the practice to multiple authoritative sources (including national organizations, agencies or initiatives) supporting the practice. Field lessons may range from success in state practices reported without evaluation documenting effectiveness to cluster evaluation of several states (group evaluation) documenting effectiveness. To access information related to a systematic review vs. a narrative review: [Systematic vs. Narrative Reviews](#). (Accessed: 10/3/2022)

## V. State Practice Examples

The following practice examples illustrate various elements or dimensions of the best practice approach **State-Based Oral Health Surveillance System**. These reported success stories should be viewed in the context of the states and program's environment, infrastructure and resources. End-users are encouraged to review the practice descriptions (click on the links of the practice names) and adapt ideas for a better fit to their states and programs.

### A. Summary Listing of Practice Examples

**Table 1** provides a listing of programs and activities submitted by states. Each practice name is linked to a detailed description.

<b>Table 1. State Practice Examples Illustrating Strategies and Interventions for State-Based Oral Health Surveillance Systems</b>			
<b>#</b>	<b>Practice Name</b>	<b>State</b>	<b>Practice</b>
1.	<a href="#">Iowa Oral Health Survey- Oral Health Surveillance</a>	IA	18005
2.	<a href="#">Use of Surveillance to Direct State and Local Oral Health Programs</a>	NC	36001
3.	<a href="#">Frail Elderly Surveillance in Assisted Living Facilities</a>	NC	36007
4.	<a href="#">North Dakota's Oral Health Surveillance System</a>	ND	37001
5.	<a href="#">West Virginia Oral Health Surveillance System</a>	WV	55006

### B. Highlights of Practice Examples

Highlights of state practice examples are listed below.

#### IA- [Iowa Oral Health Survey-Oral Health Surveillance](#) (Practice #18005)

In 2016, the Iowa Department of Public Health (IDPH), Bureau of Oral and Health Delivery Systems, conducted a survey to measure the oral health status of third-grade children in Iowa. Oral health staff conducted a calibration training for Maternal and Child Health (MCH) agency I-Smile Coordinators and direct service dental hygienists from across the state who would complete the survey screenings. A computerized random sample of 5,660 third-grade children from 72 schools was selected (2,470 or 43.6 percent participated). The survey included schools with school-based sealant programs, which had been previously excluded. The survey found that 59.4 percent of the children had at least one sealant on a permanent first molar, 47.1 percent had at least one filled tooth, and 16 percent had a cavitated lesion.

#### NC- [Use of Surveillance to Direct State and Local Oral Health Programs](#) (Practice #36001)

The Oral Health Section (OHS), North Carolina Division of Public Health, determines the oral health of a community in three ways: (1) Dental assessments -measuring specific oral conditions such as the average number of decayed, missing and filled teeth and proportion of children with dental sealants, (2) Dental screenings -identifying children in need of dental care and referring them for care, and (3) Statewide epidemiological surveys -scientifically measuring the quantity and types of oral disease in a population. In 2015, 5<sup>th</sup> grade was no longer targeted for assessment. The decision



was made to target 3<sup>rd</sup> grade to be consistent with the National Oral Health Surveillance System (NOHSS) indicators. Implementation is slated to begin 2017-2018 and every 5 years thereafter.

NC- [Frail Elderly Surveillance in Assisted Living Facilities](#) (Practice #36007)

Between August 2015 and February 2016, the North Carolina Oral Health Section (OHS) conducted its first statewide oral health assessment of adults residing in licensed assisted living facilities using the Association of State and Territorial Dental Directors' (ASTDD) Basic Screening Survey (BSS) methodology. The sample was comprised of 40 randomly selected facilities with a convenience sample of 854 residents. The study successfully established a baseline oral health status for this population and determined whether oral health varied by age, gender, race and ethnicity, date of admission, Medicaid enrollment status, and size and location of facility. This study served as a critical part of the state's new Special Care in Dentistry Program to develop an oral health promotion and disease prevention initiative for North Carolina's institutionalized adults. Associations between oral health and geographic location, size and quality rating of facilities may help direct efforts as we target those with the most need.

ND- [North Dakota's Oral Health Surveillance System](#) (Practice #37001)

North Dakota Department of Health, Oral Health Program (NDOHP) began building its oral health surveillance system in 1993. With limited staff and resources for surveillance, strategies to collect data for surveillance included paying for primary data collection, bargaining/bartering with partners to collect the data, integrating oral health into existing surveillances/surveys, and enlisting the support of key stakeholders to collect the data. In 2007, the NDOHP acquired the services of epidemiology staff equal to a 0.5 full time equivalent position. The data is used for program planning and implementation, assessing program effectiveness, guiding policy planning and advocacy and improving program accountability. This resulted in the implementation of oral health components in local maternal and child health programs; targeted fluoride mouth rinse, fluoride varnish and dental sealant programs to high risk children; establishment of a dental loan repayment program to expand the dental workforce; and expanding the scope of practice to allow medical professionals to apply fluoride varnish to high-risk children.

WV- [West Virginia Oral Health Surveillance System](#) (Practice #55006)

Prior to 2010, West Virginia (WV) had very limited data on the oral health status of its population. Through a contracted partnership with the Marshall University School of Medicine and funding from the DentaQuest Foundation, the West Virginia Oral Health Program began to develop its oral health surveillance system in an effort to monitor and evaluate the effectiveness and impact of oral public health initiatives, as well as inform future project development. Since 2013, oral health surveillance is now an established component of the state oral health program (SOHP) and is conducted following the 2013-2018 Oral Health Surveillance Plan.

---

## VI. Acknowledgements

This report is the result of efforts by the ASTDD Best Practices Committee and the ASTDD Data Committee to identify and provide information on developing successful practices that address state-based oral health surveillance systems.



The ASTDD Best Practices Committee extends a special thank you to the ASTDD Data Committee and Kathy Phipps for their partnership in the preparation of this report.

This publication was supported by Cooperative Agreement NU5U8DP004919-04 and NU58DP006573-05 from CDC, Division of Oral Health.

**Suggested citation:** Association of State and Territorial Dental Directors (ASTDD) Best Practices Committee. Best practice approach: state-based oral health surveillance system [monograph on the Internet]. Reno, NV: Association of State and Territorial Dental Directors; July 2017, 16p; Amended, February 2023, 19p;. Available from: <http://www.astdd.org>.

---

## VII. Resources

1. Resources available from ASTDD
  - a. [State Oral Health Surveillance Plan Template](#)
  - b. [State Surveillance Data Resource Guide](#)
  - c. [Basic Screening Survey tools and reference documents](#)
  - d. [States with Basic Screening Survey Oral Health Data](#)
  - e. [Using Oral Health Data to Inform Decisions and Policy Development](#)
  - f. Additional health communication resources can be found on ASTDD's [Health Communications](#) webpage
  
2. Resources available from CSTE
  - a. [2013 National Assessment of Epidemiology Capacity](#)
  - b. [State-Based Oral Health Surveillance Systems: Conceptual Framework and Operational Definition](#)
  - c. [Revision to the National Oral Health Surveillance System \(NOHSS\) Indicators](#)
  
3. Other Resources
  - a. [Updated Guidelines for Evaluating Public Health Surveillance Systems](#)
  - b. [Surveillance Logic Model](#)
  - c. [Framework and Tools for Evaluating Health Surveillance Systems](#)
  - d. [CDC Coffee Break: Streamlining the Evaluation of Public Health Surveillance Systems](#)
  - e. [CDC's Surveillance Resource Center](#)
  - f. [World Health Organization, Evaluating a National Surveillance System](#)
  - g. [Surveillance systems evaluation: a systematic review of the existing approaches](#)
  - h. [Vision for Public Health Surveillance in the 21st Century](#)

---

## VIII. References

- <sup>1</sup> Institute of Medicine. The Future of Public Health. Washington, DC: National Academy Press, 1988.

- 
- <sup>2</sup> Teutsch SM, Churchill RE, Eds. Principles and Practice of Public Health Surveillance. New York: Oxford University Press, 2000.
  - <sup>3</sup> Hall HI, Correa A, Yoon PW, Braden CR. Lexicon, definitions and conceptual framework for public health surveillance. MMWR Surveill Summ 2012;61 Suppl:10-4.
  - <sup>4</sup> Smith PF, Hadler JL, Stanbury M, Rolfs RT, Hopkins RS; CSTE Surveillance Strategy Group. "Blueprint version 2.0": updating public health surveillance for the 21st century. J Public Health Manag Pract 2013;19:231-9.
  - <sup>5</sup> Association of State and Territorial Dental Directors. Assessing Oral Health Needs: ASTDD Seven-Step Model. 1995.
  - <sup>6</sup> Choi BC. Perspectives on epidemiologic surveillance in the 21st century. Chronic Dis Can 1998;19(4):145-51.
  - <sup>7</sup> German RR, Lee LM, Horan JM, Milstein RL, Pertowski CA, Waller MN; Guidelines Working Group Centers for Disease Control and Prevention. Updated guidelines for evaluating public health surveillance systems: recommendations from the Guidelines Working Group. MMWR Recomm Rep 2001;50(RR-13):1-35.
  - <sup>8</sup> Malvitz DM, Barker LK, Phipps KR. Development and status of the National Oral Health Surveillance System. Prev Chronic Dis 2009;6:A66.
  - <sup>9</sup> Phipps K, Kuthy R, Marianos D, Isman B. State-Based Oral Health Surveillance Systems: Conceptual Framework and Operational Definition. Council of State and Territorial Epidemiologist. October 2013. Available at: <http://www.astdd.org/docs/state-based-oral-health-surveillance-systems-cste-whitepaper-oct-2013.pdf>
  - <sup>10</sup> Smith PF, Hadler JL, Stanbury M, Rolfs RT, Hopkins RS; CSTE Surveillance Strategy Group. "Blueprint version 2.0": updating public health surveillance for the 21st century. J Public Health Manag Pract 2013;19:231-9.
  - <sup>11</sup> American Dental Association, Health Policy Resources Center, Distribution of Dentists in the United States by Region and State, 2009. Chicago: American Dental Association; 2011.
  - <sup>12</sup> Centers for Disease Control and Prevention. CDC's vision for public health surveillance in the 21<sup>st</sup> century. MMWR 2012;61(Suppl; July 27, 2012):1-40.
  - <sup>13</sup> U.S. Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. Rockville, MD: Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000. Available at: <http://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/>
  - <sup>14</sup> U.S. Department of Health and Human Services. National Call to Action to Promote Oral Health. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Dental and Craniofacial Research. NIH Publication No. 03-5303, Spring 2003. Available at: <http://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/NationalCalltoAction/>

- 
- <sup>15</sup> Bawah A, Houle B, Alam N, et al. The evolving demographic and health transition in four low- and middle-income countries: evidence from four sites in the INDEPTH network of longitudinal health and demographic surveillance systems. *PLoS One* 2016;11(6):e0157281.
- <sup>16</sup> Crain J, McFaull S, Thompson W, et al. Status report - The Canadian Hospitals Injury Reporting and Prevention Program: a dynamic and innovative injury surveillance system. *Health Promot Chronic Dis Prev Can* 2016;36(6):112-7.
- <sup>17</sup> Fleming PL, Wortley PM, Karon JM, et al. Tracking the HIV epidemic: current issues, future challenges. *Am J of Public Health* 2000;90(7):1037-4.
- <sup>18</sup> Franco G, Cella MT, Tuccillo E, Ferrari F, Minisci E, Fusetti L. From risk-based health surveillance to health promotion: an evidence-based experience in a health care setting. *Int J Occup Med Environ Health* 2002;15(2):117-20.
- <sup>19</sup> Fine LJ. Surveillance and occupational health. *Int J Occup Environ Health* 1999;5(1):26-9.
- <sup>20</sup> Kauppinen T, Toikkanen J. Health and hazard surveillance – needs and perspectives. *Scand J Work Environ Health* 1999;25(Suppl 4):61-7.
- <sup>21</sup> Reillay JS. The effect of surveillance on surgical wound infection rates. *J Tissue Viability* 1999;9(2):57-60.
- <sup>22</sup> Roy MC, Perl TM. Basics of surgical-site infection surveillance. *Infect Control Hosp Epidemiol* 1997;18(9):659-68.
- <sup>24</sup> Public Health Surveillance Systems: Recent Advances in Their Use and Evaluation. Accessed online 07/30/2022 at <https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-031816-044348#abstractSection>