PENNSYLVANIA ORAL HEALTH SURVEILLANCE PLAN 2019-2024

Pennsylvania Department of Health, Bureau of Health Promotion Risk Reduction

April 2019

pennsylvania
DEPARTMENT OF HEALTH

Table of Contents

Introduction

Public Health Surveillance
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. 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 (IOM, 2003). Public health agencies accomplish this task through public health surveillance, the ongoing, systematic collection, analysis and interpretation of health data (Teutsch & Churchill, 2000). 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 (Hall, Correa, Yoon, & Braden, 2012). The overarching purpose of public health surveillance is to provide actionable health information to guide public health policy and programs (Smith, Hadler, Stanbury, Rolfs, Hopkins, & CSTE Surveillance Strategy Group, 2013).

Historical Perspective
The Pennsylvania (Pa.) Oral Health Program (OHP) is administered by the Pa. Department of Health (DOH), Bureau of Health Promotion Risk Reduction (BHPRR), Division of Health Risk Reduction. The OHP was formed in 2014 with the receipt of grant funds from the Health Resources and Services Administration (HRSA) to address workforce capacity, oral health education and infrastructure. Prior to the OHP, oral health needs were addressed primarily through two funding sources. Preventive Health and Health Services Block Grant (PHHSBG) funds were utilized to fund three county/municipal health departments to implement school-based sealant programs and state appropriations for the Donated Dental Services (DDS) Program were utilized to provide oral health services to indigent residents who are either over age 65, have physical or mental disabilities, or who are otherwise medically compromised. Beginning in 2018, PHHSBG, DDS, HRSA grant funds, and Centers for Disease Control and Prevention (CDC) grant funds now work collaboratively to address oral health needs in Pa.

From 1998 through 2000, a Pa. Oral Health Needs Assessment was conducted by the University of Pittsburgh. No other assessment or state-level information has since been published nor any efforts completed to connect population oral health needs and national objectives, such as Healthy People 2020, to initiate population prevention strategies and policies. Additionally, the 2000 Oral Health Needs Assessment was utilized to develop the first Oral Health Strategic Plan (Plan) for Pa. in 2002. An updated statewide Oral Health Strategic Plan was not developed until 2017. The current Plan expires in 2020, with an updated Plan set to be released for the next five years.

Most recent data shows that 45 percent of states do not have a partial or full oral health surveillance system (OHSS) (Association of State and Territorial Dental Directors, 2014). Development of an OHSS is an essential element in building the infrastructure for the improvement of oral health in Pa. The development of the PaOHSS is funded through CDC grant funds and must be completed by the close of the project period in 2023.

Pennsylvania Oral Health Needs
Oral health continues to be a challenging issue for many underserved populations in Pa. Summarized below are highlights of the gaps and disparities in oral health and access to care.
- More than 2 million individuals live in dental health professional shortage areas, which is approximately 16 percent of the population (HRSA, 2018).

- There are 8,146 dentists statewide, which is a decrease of 612 dentists from 2015 (Department of State, 2017).
- There are only 2,246 dentists that accept Medicaid (Department of Human Services, 2018).
- Medicaid enrollment was at 2,854,435 persons in December 2018. Of those persons, 1,210,910 are classified as children, up to age 21. There were an additional 180,260 children enrolled in the Children's Health Insurance Program (CHIP) (Department of Human Services, 2019).
- In 2011, a report from the Pew Center on the States compared children's oral health care across all states and graded Pa. a "D" when evaluating eight benchmarks for policies that can improve children's dental health for relatively low cost. According to the report, school dental sealant programs, community water fluoridation, and Medicaid enrollment and reimbursement were among the failed benchmarks (Pew, 2011).
- Within the past year, 66 percent of adults ages 18 and older have visited a dentist (CDC, 2016) .
- Only 58 percent of Pennsylvanians served by public water systems receive fluoridated water (Department of Environmental Protection, 2018).
- In 2016, there were 48,000 visits made to the emergency room by individuals enrolled in Medicaid that were coded with a dental diagnosis. This cost over $5.9 million under Medicaid's Fee For Service and Managed Care Organizations (Department of Human Services, 2018).

Purpose, Goals and Objectives

Purpose
The purpose of the PaOHSS is to provide a consistent source of reliable and valid information for use in the monitoring of oral health status and trends of the state and for developing, implementing and evaluating programs to improve the oral health of Pennsylvanians.

Goals
- Create an ongoing, efficient system that provides relevant and reliable data for Pa.
- Collect, analyze and disseminate data to stakeholders.
- Use data on oral disease and associated risk factors to plan, implement and evaluate the oral health program.

Objectives
- Estimate the extent and severity of oral disease and risk factors in Pa.
- Measure utilization of oral health services in Pa.
- Monitor utilization and effectiveness of community-based and school-based oral health prevention programs.
- Identify populations at high risk of oral disease and the unmet needs of these populations.
- Provide current, scientific and reliable data for the state.
- Use oral health data to plan, implement and evaluate the impact of Pa.'s oral health programs and policies.
- Provide information for decision making and public health resource allocations.
- Evaluate Pa.'s strengths and gaps in surveillance measurements and in surveillance of priority populations and identify opportunities to improve the OHSS.

Framework for a State Oral Health Surveillance System

Healthy People 2020 (HP2020) Objective OH-16, "increase the number of states and the District of Columbia that have an oral and craniofacial health surveillance system," deserves special mention (Office of Disease Prevention and Health Promotion, 2014). In 2013, the Council of State and Territorial Epidemiologists (CSTE) developed an operation definition of HP2020 OH-16. According to the CSTE, a state oral health surveillance system should provide information necessary for publich health decision-making by routinely collecting data on oral 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 state oral health surveillance system should consider collecting information on the oral health workforce, infrastructure, financing and policies impacting oral health outcomes.

At a minimum, a state-based oral health surveillance system should include the following 10 core or foundational set of surveillance elements identified by the CSTE:
- "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, including prevalence of caries experience, untreated tooth decay and dental sealants meeting criteria for inclusion in National Oral Health Surveillance System (data to 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 within the past year;
- Data on the percent of children 1-17 years who had a dental visit within the past year, obtained every four years;
- 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;
- 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; and
- Publically 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 report, 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 (Phipps, Kuthy, Marianos, & Isman, 2013, p. 2)."

Oral Health Indicators

A state-based surveillance system contains core oral health indicators that are routinely monitored to measure the status and trends of oral health disease in that population. These measures serve as benchmarks for assessing progress in achieving optimal oral health.

The PaOHSS has been modeled after the National Oral Health Surveillance System (NOHSS), which is a collaborative effort between CDC's Division of Oral Health and ASTDD. The NOHSS includes eight indicators monitored nationally and has been shaped by Healthy People 2020 (HP2020) (CDC, 2017).

The surveillance indicators were established after consideration of data sources available within the state, as well as indicators at the national level to support the NOHSS and to monitor progress towards achieving the HP2020 Oral Health Objectives. These indicators serve as a foundation for development of the PaOHSS oral health indicators.

Definition of indicators from the NOHSS and the core set of indicators required by CDC (CDC, 2017):

Dental visit: Adults aged 18+ who have visited a dentist or dental clinic in the past year

Teeth cleaning: Adults aged 18+ who have had their teeth cleaned in the past year (among adults with natural teeth who have ever visited a dentist or dental clinic)

Complete tooth loss: Adults aged 65+ who have lost all of their natural teeth due to tooth decay or gum disease

Lost six or more teeth: Adults aged 65+ who have lost six or more teeth due to tooth decay or gum disease

Caries experience: Percentage of third grade students with caries experience, including treated and untreated tooth decay

Untreated tooth decay: Percentage of third grade students with untreated tooth decay

Dental sealants: Percentage of third grade students with dental sealants on at least one permanent molar tooth

Water fluoridation: Percentage of the population served by public water systems who receive fluoridated water

Cancer of the Oral Cavity and Pharynx: Incidence and mortality rate; oral and pharyngeal cancer comprising a diverse group of malignant tumors that affect the oral cavity and pharynx (mouth and throat)

Table 1 includes all oral health indicators identified by PaOHSS with target population, timeframe for collection, data source and related HP2020 national oral health objective. Shaded indicators are in the core set of surveillance indicators required for tracking and monitoring by the CDC.

Table 1: PaOHSS Indicators

Indicator Group	Target Population	Indicator (related HP2020 Objective)	Data Collection Timeline	Data Source	Data Source Availability
Oral Health Outcomes	Newborns	Cleft lip with & without cleft palate (OH 15)	Annual	Birth Certificates; Birth Defects Registry	4th Quarter of the Calendar Year (i.e. 2018 released 4th Quarter of 2019)
		Cleft palate (OH 15)			
	Public elementary school children in grade 3	Dental caries experience (OH 1.2)	Every 5 years, beginning in 2020	Basic Screening Survey	1st Quarter of the Calendar Year (i.e. 2020 released 1st Quarter of 2021)
		Untreated dental caries (OH 2.2)			
		Urgent dental treatment needed			
		Dental sealants (OH 12.2)			
	Adults 18-64 years	Any tooth loss (OH 4.1)	Every 2 years, beginning in 2018	Behavioral Risk Factor Surveillance System (BRFSS)	3rd Quarter of the Calendar Year (i.e. 2018 released 3rd Quarter of 2019)
		No tooth loss			
		1-5 permanent teeth lost			
		6 or more teeth lost			
		All permanent teeth lost (OH 4.2)			
	Adults 65 years and older	No tooth loss	Every 2 years, beginning in 2018	BRFSS	3rd Quarter of the Calendar Year (i.e. 2018 released 3rd Quarter of 2019)
		1-5 permanent teeth lost			
		6 or more teeth lost			
		All permanent teeth lost (OH 4.2)			
	All state population	Oral cavity & pharyngeal cancers; incidence and mortality	Annual	Cancer Registry	1st Quarter of the Calendar Year (i.e. 2016 released 1st Quarter of 2019)
		Oral cavity & pharyngeal cancers detected at early stages (OH 6)			
	Children 1-17 years	Oral Health Problems	Annual	National Survey of Children's Health	Annually in October (based on that 2017 data was released in October 2018)
		Condition of teeth			
		Tooth decay/cavities			

Indicator Group	Target Population	Indicator (related HP2020 Objective)	Data Collection Timeline	Data Source	Data Source Availability
Access to Care	Children 0-20 years enrolled in Medicaid (90 Continuous Days)	Dental visit (OH 7) - any dental services, preventive services, or dental sealants	Annual	CMS-416 Annual EPSDT Report	Annually in June (when DHS submits to CMS, not publicly available)
	Children 1-17 years	Preventive dental visit (OH 7 and 8)	Annual	National Survey of Children's Health	Annually in October (based on that 2017 data was released in October 2018)
	Adolescents in grades 9-12	Never saw a dentist	Every 2 years, beginning in 2019	Youth Risk Behavior Surveillance System (YRBSS)	3rd Quarter of Even Calendar Years (i.e. 2019 released 3rd Quarter of 2020)
	Adults 18 years and older	Dental visit (OH 7)	Every 2 years, beginning in 2018	BRFSS	3rd Quarter of the Calendar Year (i.e. 2018 released 3rd Quarter of 2019)
	Adults 18 years and older with diabetes	Dental visit (OH 7)	Every 2 years, beginning in 2018	BRFSS	3rd Quarter of the Calendar Year (i.e. 2018 released 3rd Quarter of 2019)
	Pregnant Women	Preventive dental visit before pregnancy	Annual	Pregnancy Risk Assessment Monitoring System (PRAMS)	Annually in February (i.e. 2017 data was released in February 2019)
		Preventive dental visit during pregnancy			
		Dental insurance coverage during pregnancy			
	Children & Adults enrolled in Medicaid	Received oral health services	Annual	Medicaid Claims	Annually in July
		Dental providers who participate in Medicaid	Every 2 years	Health Care Workforce Report (Pulse Report)	Report Released 3rd Year After Data Collected (i.e. 2019 Report will be Released in 2022)

Indicator Group	Target Population	Indicator (related HP2020 Objective)	Data Collection Timeline	Data Source	Data Source Availability
Interventions	School Children	Children served by CDC qualified school-based sealant programs	Annual	DOH School Sealant Programs	Annually in August
		Molars with sealant placed by school-based sealant programs	Annual		
	All state population	Population served by community water systems	Annual	Pennsylvania Drinking Water Information System (PADWIS)	Annually in June
		Population served by community water systems that are fluoridated	Annual		

Indicator Group	Target Population	Indicator (related HP2020 Objective)	Data Collection Timeline	Data Source	Data Source Availability
Workforce & Infrastructure	All state population	State oral health plan	Annual	PA Oral Health Program Data & ASTDD Synopses Report	Annually in the Summer (i.e. FY 2017-2018 was released in July 2019)
		State oral health coalition	Annual		
		State oral health surveillance system	Annual		
		Number of dental professionals	Every 2 years, beginning in 2019	Health Care Workforce Report (Pulse Report)	May of each Odd Year (Raw Data) Report Released 3rd Year After Data Collected (i.e. 2019 Report will be Released in 2022)
		Number of dental professionals that work in PA (of those that returned the survey)			
		Number of dental professionals that live in PA (of those that returned the survey)			
		Number of full time equivalent (FTE) licensed practicing dentists (of those that returned the survey)			
		Number of FTE licensed dental hygienists (of those that returned the survey)			
		Percentage of practicing dentists who work part time			
		Percentage of practicing dentists who plan to retire in one to five years (among those that provide direct patient care)			
		Percentage of practicing dentists who accept any and all Medicaid patients (among those that provide direct patient care)			
		Dental Health Professional Shortage Areas	Annual	HRSA Data Warehouse	Annually in June

Indicator Group	Target Population	Indicator (related HP2020 Objective)	Data Collection Timeline	Data Source	Data Source Availability
Risk Factors	Children 0-17 years	Poverty	Annual	American Community Survey (ACS)	Annually Beginning in September (i.e. 2018 data will be released beginning in September 2019)
	Children 0-18 years	Medical insurance			
	Adolescents in grades 9-12	Smokeless tobacco use	Every 2 years, beginning in 2019	YRBSS	3rd Quarter of Even Calendar Years (i.e. 2019 released 3rd Quarter of 2020)
	Adults 18 years and older	Diabetes prevalence	Annual	BRFSS	3rd Quarter of the Calendar Year (i.e. 2018 released 3rd Quarter of 2019)
		Tobacco use			
		Alcohol use			
		Poverty	Annual	ACS	Annually Beginning in September (i.e. 2018 data will be released beginning in September 2019)
		Education			
		Employment			
		Race/Ethnicity			
		Disability			
		Medical insurance			

Data Sources

American Community Survey (ACS): An annual survey conducted by the U.S. Census Bureau to over 3.5 million households. It is the premier source for detailed population and housing information (United States Census Bureau, n.d.).

ASTDD State Synopses: An annual report that describes state's oral health program activities and successes that contribute to progress towards the national targets for HP2020 (ASTDD, 2019).

Basic Screening Survey (BSS): A standardized set of surveys designed to collect information on the observed oral health of participants; self-reported or observed information on age, gender, race and ethnicity; and self-reported information on access to care for preschool, school-age and adult populations. School-age children are examined for presence of sealants on permanent molars. In addition, caries experience (treated and untreated) is recorded for preschool and school-age children. These observations and screenings are conducted by dentists, dental hygienists or other appropriate health care workers in accordance with state law (ASTDD, 2017).

Behavioral Risk Factor Surveillance System (BRFSS): A state-based, ongoing data collection program designed to measure behavioral risk factors in the adult, non-institutionalized population 18 years of age or older. States select a random sample of adults for a telephone interview (CDC, 2014).

Birth Defects Registry: A registry that collects data from birthing facilities within Pa. to study the rates and trends of birth defects. In regard to oral health, the birth defects registry collects the number of babies born with cleft lip and cleft palate to calculate a rate of babies born with cleft lip/cleft palate per 10,000 live births (Department of Health, 2019).

Cancer Registry: A registry that collects information on all cancers diagnosed and/or treated in the state of Pa. The cancer data is analyzed to determine and monitor trends in cancer incidence and stage at diagnosis among Pa. residents (Department of Health, 2019).

Early and Periodic Screening, Diagnostic, and Treatment (EPSDT): This Medicaid benefit provides comprehensive and preventive health care services for children under age 21. EPSDT is to ensure that children and adolescents receive appropriate preventive, dental, mental health, developmental and specialty services. Dental services include relief of pain and infections, restoration of teeth, and maintenance of dental health. All data is reported annually in the CMS-416 report (Department of Human Services, n.d.).

Head Start Program Information Report (PIR): Provides comprehensive data on the services, staff, children and families served by Head Start and Early Head Start programs nationwide (U.S. Department of Health & Human Services, n.d.).

HRSA Data Warehouse: A database maintained by the Health Resources and Services Administration (HRSA) to include designated health professional shortage areas. Some geographic areas, populations and facilities have too few dental health providers and services and are therefore eligible to receive certain federal resources (HRSA, n.d.).

Medicaid: A state-administered program intended to provide health care and health-related services to low-income or disabled individuals (Medicaid.gov, n.d.).

National Survey of Children's Health: A national survey that provides data on multiple, intersecting aspects of children's health and well-being – including physical and mental health, access to and quality of health care, and the child's family, neighborhood, school and social context (Data Resource Center for Child & Adolescent Health, n.d.).

Pa. Drinking Water Information System (PADWIS): A Pa. Department of Environmental Protection maintained database. PADWIS provides information on all public water systems and can be searched by system type, size or source. The database can also be used to find system-specific information such as inventory information, monitoring requirements, and sample and violation histories (Department of Environmental Protection, n.d.).

Pa. Healthcare Workforce Reports (Pulse Report): A report completed by both the Pa. Department of Health and Pa. Department of State. A survey is given to dentists and dental hygienists during the license renewal process. Resulting data describes demographic, educational, employment and other characteristics (Department of Health, n.d.).

Pregnancy Risk Assessment Monitoring System (PRAMS): A CDC-sponsored initiative to reduce infant mortality and low birth weight. PRAMS is a collection of state-specific, population-based data on maternal attitudes and experiences prior to, during and immediately following pregnancy. The PRAMS sample of women who have had a live birth is drawn from the state's birth certificate file (CDC, 2019).

Uniform Data System (UDS): The UDS operated by HRSA contains information that is used to review the operation and performance of health centers (HRSA, n.d.).

Vital Records: A registry that provides registration and certification of the vital events that occur in Pa. These events include births, marriages, and deaths (Department of Health, n.d.).

Youth Risk Behavior Surveillance System (YRBSS): A school-based survey conducted biennially to assess and monitor priority health risk behaviors that contribute markedly to the leading causes of death, disability, and social problems among youth and adults in the United States. YRBSS includes national, state, territorial and local school-based surveys of high school students (CDC, 2018).

Resources

Resources needed to operate and sustain the PaOHSS include funding and personnel. Other resources such as travel, training, supplies, computers and related services, including mail, telephone, computer support, internet connections, and hardware and software maintenance are needed as well.

Partnerships, both internal and external, are integral to sustaining the PaOHSS. The Oral Health Program collaborates with 1) the Department of Health's Bureau of Health Planning to obtain data related to the Dental and Dental Hygiene Workforce Surveys; 2) the Department of Human Services to obtain Medicaid claims data from the EPSDT annual report; and 3) the Pa. Coalition for Oral Health to implement and collect data from the BSS.

Data Dissemination and Use

Surveillance results will be disseminated to interested programs and policy-makers at the local, state and national level through presentations and reports. Presentations, reports and briefs will be used to increase awareness about oral diseases and associated risk factors; monitor trends and disparities; develop new interventions; and expand existing programs. All documents will contain current oral health data and trends as available. The surveillance results will also aid in writing and releasing Pa.'s oral health disease burden document, as well as provide information at the national level to the National Oral Health Surveillance System and the ASTDD State Synopses.

Reports will be distributed electronically to internal and external stakeholders and shared with other state oral health programs, CDC and ASTDD. Reports will be available electronically on the Pa. DOH website.

Venues for presentation of surveillance results include, but are not limited to, the Pa. Oral Health Coalition and various oral health and chronic disease conferences.

As the PaOHSS evolves, it will be enhanced by refining the indicators and improving the system's ability to communicate surveillance results.

Privacy and Confidentiality

The PaOHSS follows Health Insurance Portability and Accountability Act (HIPAA) standards for patient privacy and protected health information. The system limits identifiers collected to only essential data elements, and the data are stored on a secure, private electronic server at the Pa. DOH. Unique identifiers can only be seen by Pa. DOH staff who have been trained on HIPAA, data security and confidentiality. Unique identifiers will never be released to external partners and the public. Surveillance results will be reported as aggregated data.

Evaluation

The purpose of evaluating the PaOHSS is to ensure that the oral health indicators are being monitored effectively and efficiently and to increase the utility and productivity of the system. Periodic evaluation will be performed to determine the system's usefulness in monitoring oral health trends over time, determining the effectiveness of interventions, and planning future programmatic and policy initiatives. The Pa. DOH will evaluate the PaOHSS based on CDC's framework for program evaluation, including how well the following six steps outlined in "Updated Guidelines for Evaluating Surveillance Systems" were implemented (German, Lee, Horan, Milstein, Pertowski, & Waller, 2001):

- Engage Pa.'s stakeholders;
- Describe the PaOHSS;
- Focus the evaluation design;
- Gather credible evidence regarding the performance of the PaOHSS;
- Justify and state conclusions, make recommendation; and
- Ensure use of evaluation findings and share lessons learned.

The evaluation of the PaOHSS will focus on providing recommendations for improving the quality, efficiency, and usefulness of the system. PaOHSS will also be evaluated to determine the system's sustainability, the timeliness of analysis of surveillance data, dissemination and use of the reports by stakeholders, and the surveillance system's impact on policy and legislative actions.

Acknowledgements

References

Association of State and Territorial Dental Directors. (2014). Synopses of state dental public health programs, data for fiscal year 2012-2013.

Association of State and Territorial Dental Directors. (2019). Synopses of state oral health programs – selected indicators. Retrieved from https://chronicdata.cdc.gov/Oral-Health/ASTDD-Synopses-of-State-Oral-Health-Programs-Selec/vwmz-4ja3

Association of State and Territorial Dental Directors. (2017). The basic screening survey: a tool for oral health surveillance not research. Retrieved from https://www.astdd.org/docs/bss-surveillance-not-research-july-2017.pdf

Centers for Disease Control and Prevention. (2014). Behavioral risk factor surveillance system. Retrieved from https://www.cdc.gov/brfss/about/index.htm

Centers for Disease Control and Prevention. (2016). *Behavioral risk factor surveillance system* [Data set]. Retrieved from https://www.cdc.gov/brfss/annual_data/annual_2016.html

Centers for Disease Control and Prevention. (2017). National oral health surveillance system. Retrieved from https://www.cdc.gov/oralhealthdata/overview/nohss.html

Centers for Disease Control and Prevention. (2019). What is PRAMS?. Retrieved from https://www.cdc.gov/prams/index.htm

Centers for Disease Control and Prevention. (2018). Youth risk behavior surveillance system (YRBSS). Retrieved from https://www.cdc.gov/healthyyouth/data/yrbs/index.htm

Data Resource Center for Child & Adolescent Health. (n.d.). The national survey of children's health. Retrieved from https://www.childhealthdata.org/learn-about-the-nsch/NSCH

German, R.R., Lee, L.M., Horan, J.M., Milstein, R.L., Pertowski, C.A., & Waller, M.N. (2001). Updated guidelines for evaluating public health surveillance systems: Recommendations from the guidelines working group. *Morbidity and Mortality Weekly Report,* 50(RR-13), 1-35.

Hall, H.I., Correa, A., Yoon, P.W., Braden, C.R., & Centers for Disease Control and Prevention. (2012). Lexicon, definitions and conceptual framework for public health surveillance. *Morbidity and Mortality Weekly Report, 61(3)*, 10-14.

Health Resources and Services Administration. (2018). Designated health professional shortage areas statistics. Retrieved from https://ersrs.hrsa.gov/ReportServer?/HGDW_Reports/BCD_HPSA/BCD_HPSA_SCR50_Qtr_Smry_HTML&rc:Toolbar=false

Health Resources and Services Administration. (n.d.). Explore data and maps on HRSA's health care programs. Retrieved from https://data.hrsa.gov/

Health Resources and Services Administration. (n.d.). Uniform data system resources. Retrieved from https://bphc.hrsa.gov/datareporting/reporting/index.html

Institute of Medicine. (2003). The future of the public's health in the 21st century. Washington, D.C.: The National Academies Press.

Medicaid.gov. (n.d.). Medicaid. Retrieved from https://www.medicaid.gov/medicaid/index.html

Office of Disease Prevention and Health Promotion. (2014). Healthy people 2020. Retrieved from https://www.healthypeople.gov/

Pennsylvania Department of Environmental Protection. (n.d.). Drinking water reporting system. Retrieved from http://www.drinkingwater.state.pa.us/dwrs/HTM/Welcome.html

Pennsylvania Department of Environmental Protection. (2018). *Drinking water reporting system* [Data set]. Retrieved from http://www.drinkingwater.state.pa.us/dwrs/HTM/SelectionCriteria.html

Pennsylvania Department of Health. (n.d.). Birth, death, and other vital statistics. Retrieved from https://www.health.pa.gov/topics/HealthStatistics/VitalStatistics/Pages/vital-statistics.aspx

Pennsylvania Department of Health. (2019). *Enterprise data dissemination informatics exchange* [Data set]. Retrieved from https://www.health.pa.gov/topics/HealthStatistics/EDDIE/Pages/EDDIE.aspx

Pennsylvania Department of Health. (n.d.). Health care workforce reports. Retrieved from https://www.health.pa.gov/topics/Health-Planning/Pages/Reports.aspx

Pennsylvania Department of Health. (2019). Pennsylvania cancer registry. Retrieved from https://www.health.pa.gov/topics/Reporting-Registries/Cancer-Registry/Pages/Cancer%20Registry.aspx

Pennsylvania Department of Human Services. (2018). *Emergency room dental visit analysis* [Data set].

Pennsylvania Department of Human Services. (n.d.). 309.5 MA services for children. Retrieved from http://services.dpw.state.pa.us/oimpolicymanuals/ma/309_Health_Care_Services_Benefits_for_Children/309_5_MA_Services_for_Children.htm

Pennsylvania Department of Human Services. (2018). *Medical assistance enrolled dentists* [Data set].

Pennsylvania Department of Human Services. (2019). Monthly data report. http://www.dhs.pa.gov/cs/groups/webcontent/documents/document/c_213880.pdf

Pennsylvania Department of State. (2017). Pennsylvania Licensing System. Retrieved from https://www.pals.pa.gov/#/page/default

Phipps, K., Kuthy, R., Marianos, D., & Isman, B. (2013). State-based oral health surveillance systems: Conceptual framework and operational definition. Retrieved from

https://c.ymcdn.com/sites/www.cste.org/resource/resmgr/Chronic/StateBasedOralHealth
Surveill.pdf

Smith, P.F., Hadler, J.L., Stanbury, M., Rolfs, R.T., Hopkins, R.S., & CSTE Surveillance
Strategy Group. (2013). Blueprint version 2.0: Updating public health surveillance for the
21st century. *Journal of Public Health Management and Practice, 19*, 231-239.

Teutsch, S.M. & Churchill, R.E. (Eds.). (2000). Principles and practice of public health
surveillance. New York: Oxford University Press.

The Pew Center on the States. (2011). The state of children's dental health: Making coverage
matter. https://www.pewtrusts.org/-
/media/legacy/uploadedfiles/wwwpewtrustsorg/reports/state_policy/childrensdental50stat
ereport2011pdf.pdf

United States Census Bureau. (n.d.). American community survey. Retrieved from
https://www.census.gov/programs-surveys/acs/

United States Department of Health & Human Services. (n.d.). Program information report.
Retrieved from https://eclkc.ohs.acf.hhs.gov/data-ongoing-monitoring/article/program-
information-report-pir

Appendix 1: Logic Model for Pa.'s OHSS

Inputs	Outputs	Outcomes	
Using these RESOURCES	**We will engage in these ACTIVITIES**	**Which yield these short-term and mid-term OUTCOMES**	**With these ultimate long-term OUTCOMES**
Staff • State dental director • Oral health program managers • Epidemiologist • Information technology support • Data entry/support staff **Data Sources** • National data sources • State data sources • Local-level data sources • New data collection to fill data gaps **Equipment** • Hardware (desktop computers, printers, IT server) • Software (SAS, MS Office Suite, internet access) **Other** • Key stakeholders and partners • Funding • Community support	**Implementation of PaOHSS** • Identify data indicators • Link existing data sources • Network with other agencies for collaboration • Sustain and modify PaOHSS as needed **Data Management** • Identify data gaps • Acquire data from sources • Ensure data security/confidentiality • Analyze data and interpret findings • Maintain/update data regularly **Evaluation** • Engage stakeholders and partners • Describe PaOHSS • Evaluate the PaOHSS • Evaluate performance and progress of the PaOHSS • Justify conclusions and make recommendations as needed **Reporting** • Routine dissemination of reports at local, state and national levels • Incorporate findings into burden document and update every 5 years	Increased monitoring of oral health trends in Pa. Increased use of data by stakeholders Increased evidence-based program planning and evaluation based on surveillance data Targeted program activities for populations most in need, as identified by surveillance data	Increased use of data by leadership and policymakers for developing and implementing oral health policies Increased programs for high-risk populations or areas Documentation of changes in oral health indicators Improved oral health of Pennsylvania citizens