

# Paving a Path Towards Oral Health Equity: Planning Out an Oral Health Surveillance System for the U.S. Virgin Islands

Benjamin Lee, MPH Candidate

Tufts University Applied Learning Experience

U.S. Virgin Islands Department of Health, Primary Care Office | Spring 2022

Course Director: Beth Rosenberg, MPH, ScD

Site Preceptor: Berlina Wallace-Berube, MACP, MEd

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## **Abstract**

Although many residents of the United States Virgin Islands experience significant unmet oral health needs, the Virgin Islands Department of Health (VIDOH) does not currently have an oral and craniofacial health surveillance system (OHSS) to accurately monitor the oral health needs of its communities. In line with Healthy People 2030 objectives outlined by the U.S. Department of Health and Human Services, this project aims to accelerate the development of an OHSS on the territory to facilitate the development of effective, targeted public health interventions and policies for Virgin Islanders with the greatest oral health needs. Literature reviews of peer-reviewed literature and reports by state and federal agencies were used to guide this project, culminating in the development of a proposed OHSS which describes required and recommended oral health data indicators alongside their associated data source(s) for different priority populations. This proposed OHSS is more comprehensive than other OHSSs implemented by other states and provides insights into both oral health outcomes and access to oral health services within the territory. By understanding which indicators to collect data on, VIDOH can work to establish the requisite data infrastructure and engage in primary data collection to realize their vision of establishing an OHSS on the territory. Before an OHSS can be implemented, however, VIDOH must first develop a centralized data repository and establish a Basic Screening Survey (BSS) and engage community partners like FQHCs and private dental providers to supplement existing data sources.

## **I. Introduction**

### **Assessment of the Issue and the Target Population's Needs**

Affecting more than 25% of adults and over 17% of children in the United States with persistent disparities among low socioeconomic status (SES) communities, oral diseases remain a pressing public health issue across the United States (CDC, 2020-b; Guarnizo-Herreño and Wehby, 2014). Common oral diseases include dental decay (caries) and gum disease (periodontitis), and, if left untreated, can cause significant pain, masticatory difficulties, self-esteem issues, and can also increase the risk of other chronic diseases like cardiovascular disease, diabetes, and stroke (Office of Disease Prevention and Health Promotion, 2020). However, oral diseases are largely preventable with regular dental check-ups to ensure oral diseases are addressed in their incipient stages.

Despite the preventable nature of oral diseases, marginalized communities like low SES communities face the greatest burden of oral diseases due to a lack of accessible dental care. According to the Centers for Disease Control and Prevention (CDC), dental caries among children whose family's household income is less than 100% of the federal poverty level (FPL) are nearly twice as prevalent compared to children whose family's household income exceeds 300% of the FPL (CDC, 2018). Additionally, the National Institutes of Health (NIH) reports that the prevalence of untreated caries among adults who have less than a high school education is nearly four times that among adults who have more than a high school education (NIH, 2018). These data demonstrate stark disparities in the oral health statuses of low SES communities, largely stemming from their inability to afford dental services or private dental insurance.

As such, many low SES communities rely on Medicare for accessible dental services, but a limited number of dental providers who accept Medicare and limited funding for state and

territorial Medicare programs makes regular dental visits an unfeasible reality for many. This is particularly true in the United States Virgin Islands (USVI), where the median family income is \$24,269 below the median U.S. family income and where a third of the population rely on Medicaid (VIDOH, 2020). Following the 2012 suspension of dental services provided by the USVI Department of Health (VIDOH) and an indefinite suspension of dental services at the Charles Harwood community health complex because of Hurricanes Irma and Maria, the Federally Qualified Health Centers (FQHCs) in St. Croix and St. Thomas remain the only two Medicaid-accepting entities providing dental services across the entire territory (HRSA, 2020). Consequently, the two FQHCs in the USVI experience massive backlogs, with more than 4,000 residents waiting for dental care in St. Croix alone (HRSA, 2020).

Although great backlogs within the USVI's FQHCs indicate a high degree of unmet oral health needs among low SES communities in the USVI, little data exist to quantify the number of Virgin Islanders experiencing unmet oral health needs as there are currently no programs that monitor the overall oral health of the USVI population. Particularly considering that the COVID pandemic led to an indefinite hiatus of dental services across the United States, FQHCs within the USVI have likely experienced increased waitlist times — further magnifying the territory's oral health disparities (HRSA, 2020). It is thus imperative an oral health surveillance system (OHSS) be set up as soon as possible to assess the current state of oral health within the USVI.

### **Previous Relevant and Evidence-Based Efforts**

During the 20<sup>th</sup> century, the federal government was chiefly responsible for the collection of oral health data. In 2001, the National Oral Health Surveillance System (NOHSS) was launched through a partnership between the CDC and the Association of State and Territorial

Dental Directors (ASTDD) to address a lack of public health surveillance surrounding oral health (Phipps et al., 2013). The NOHSS provided a framework to states and territories within the United States to collect standardized measures of oral health according to nine indicators, and these original set of indicators primarily drew data from existing national surveys including the Behavioral Risk Factor Surveillance System (BRFSS), the Basic Screening Survey (BSS), the CDC's National Program of Cancer Registries, and the CDC's Water Fluoridation Reporting System (Phipps et al., 2013).

After the release of the Healthy People 2020 objectives, a workgroup consisting of the CDC, ASTDD, and the Council of State and Territorial Epidemiologists (CSTE) updated NOHSS indicators in a 2013 report to further bolster the capacity of federal and state agencies to assess progress towards the oral health objectives of Healthy People 2020. The updated NOHSS guidelines increased the number of state-level indicators and added developmental indicators like the number of states with a comprehensive oral health surveillance system (Phipps et al., 2013). In addition to providing standardized indicators to track oral health, NOHSS additionally provides guidance for states to develop their own OHSSs.

Following the update of NOHSS, states like Ohio released outlines which describe how their state health departments will implement an OHSS, how surveillance data will be analyzed, and how these data will be used to inform public health programming from 2021–2025. In accordance with NOHSS guidelines to include a wider array of data sources, Ohio's oral health surveillance plan now includes state-based data sources, like the Ohio State Dental Board, Ohio's Youth Risk Behavior Survey, the Ohio Pregnancy Assessment Survey, Ohio's Head Start Program Information Report, and the Ohio Medicaid Assessment Survey, in addition to nationally available sources like BRFSS and BSS (Ohio Department of Health, 2020).

To guide the development of an OHSS for the USVI, the ASTDD’s 2013 report and OHSSs from other states were used as models. Using the 2013 ASTDD report to the USVI’s proposed OHSS ensures full compliance with federal reporting requirements (such as data reporting for inclusion into NOHSS) and provides insight into necessary components of the OHSS as defined by the federal government. Other states’ OHSS were additionally used as a framework to understand the resources required to operate and maintain a well-functioning OHSS, how states have planned their data collection, and how states have realized their OHSS. By doing so, this report hopes to develop a comprehensive OHSS which adequately meets the needs of VIDOH and those of Virgin Islanders.

### **The Purpose of Public Health Surveillance**

In a 1988 report on the future of public health, the Institute of Medicine (IOM) outlined three core functions of public health: assessment, policy development, and assurance (IOM, 1988). This report recommended “every public health agency regularly and systematically collect, assemble, analyze, and make available” communities’ health information to conduct the assessment function (IOM, 1988). To achieve this goal, public health agencies engage in surveillance – the “regular and systematic collection, analysis, and interpretation of health data” (Teutsch and Churchill, 2000). Surveillance equips public health agencies with the necessary knowledge needed to make informed decisions about the timely development, implementation, and evaluation of current and future public health programming (Hall et al., 2012). Additionally, public health surveillance facilitates robust data dissemination to thereby foster stakeholder engagement, collaboration, and trust (Phipps et al., 2013).



## **II. Background**

### **The Public Health Relevance of Oral Health**

In 2000, the Surgeon General released a seminal report on the status of oral health in America, recognizing that poor oral health is a “silent epidemic” and that “oral health means more than just healthy teeth” (U.S. Dept. of Health and Human Services, 2000). In recognizing the numerous impacts of poor oral health on an individual’s physical, mental, and social wellbeing, the Surgeon General drew considerable attention to oral health as a public health issue of urgent concern (U.S. Dept. of Health and Human Services, 2000). As such, public health agencies at all levels of government have mobilized toward adopting oral health as a key indicator of population health. For example, the Healthy People objectives for the past three decades include objectives related to oral health and related infrastructure, highlighting oral health as a public health problem of national importance (CDC, 2015; CDC, 2020-b; ODPHP, n.d.).

Despite this building attention, oral diseases continue to impact millions with persistent disparities now more than two decades since the Surgeon General’s original report, underscoring the need for public health agencies to continue developing their capacities to tackle this issue (NIH, 2021). Today, one in four adults and nearly one in five children in the United States are affected by oral diseases including dental caries (dental decay), periodontal (gum) disease, and edentulism (tooth loss), among many others, with dental caries ranked as the “single most common chronic childhood disease” (Phipps et al., 2013). These diseases can cause significant pain, affect how individuals speak, eat, and drink, create self-esteem issues, and increase the risk

of other chronic diseases like cardiovascular disease, diabetes, and stroke (Office of Disease Prevention and Health Promotion, 2020). Additionally, wide disparities in the oral health status of communities persist, with low SES communities affected the greatest (NIH, 2021).

Because oral health is profoundly influenced by social determinants, much like other public health issues, oral disease will continue to disproportionately impact those with lower SES and lower education — most often those in marginalized communities which have faced the brunt of historical injustices (NIH, 2021). These social determinants include access to healthcare, education, the neighborhood and built environment, SES, social contexts, and race and ethnicity. However, by addressing oral health, public health agencies like that of the United States Virgin Islands (USVI) can work to alleviate the economic, emotional, and physical burdens of community members affected by oral diseases to thereby pave a path toward realizing health equity for all Virgin Islanders.

## **Purpose**

In accordance with the Healthy People 2030 objective OH-D01, to “increase the number of states... that have an oral and craniofacial health surveillance system”, this proposed OHSS aims to act as a “consistent source of updated, reliable, and valid” data for the informed design, implementation, and evaluation of oral public health programs and policies for Virgin Islanders (CDC, 2020; Phipps et al., 2013). By building the territory’s capacity to monitor health data for specific priority populations and the general population, an OHSS helps support the Primary Care Office’s aims of “measuring access to healthcare providers and assessing underservice” and using these data to “[work] towards solutions” for communities with the greatest unmet health needs and disparities (VIDOH Primary Care Office, n.d.).

## **Historical Perspective**

Established in 2014, the Epidemiology Division of VIDOH (EPID) operates the only public health surveillance effort on the territory, monitoring, analyzing, and reporting data on “nationally notifiable diseases” in collaboration with the CDC (VIDOH-EPID, 2019). In doing so, EPID additionally works to develop the territory’s “epidemiology and laboratory capacities” and “strengthen public health infrastructure and information systems” within the territory (VIDOH-EPID, 2019). However, even though EPID operates a robust surveillance system, EPID focuses on providing infectious disease epidemiology capacities and does not yet monitor non-communicable conditions like oral diseases (VIDOH-EPID, 2019). Still, VIDOH can capitalize on the knowledge and expertise within EPID to facilitate the development of a comprehensive public health surveillance system tailored to monitoring oral health.

### **III. Outline of the Proposed OHSS**

#### **Missions and Goals**

- Enable the development of preventive oral public health initiatives like community water fluoridation and school-based sealant programs
- Facilitate access to oral health services for all Virgin Islanders
- Use data collection, analysis, and dissemination to monitor the oral health of Virgin Islanders
- Support healthcare providers to develop robust oral health infrastructure

- Ensure that oral health is considered as a critical component of overall wellbeing and health

## **Objectives**

- Estimate the prevalence and severity of oral diseases and their risk factors in the Virgin Islands
- Measure the utilization of oral health services in the Virgin Islands
- Monitor oral public health interventions to understand their utilization and efficacy
- Identify priority populations who face the greatest unmet oral health needs and understand the barriers that facilitate underservice
- Provide updated, reliable, and valid health data for use by the territory and the federal government
- Use collected data to inform the design, implementation, and evaluation of oral public health initiatives
- Provide information to support resource allocation and guide future oral public health programs and policy decisions
- Evaluate strengths and weaknesses in the health surveillance capabilities of the USVI to strengthen the OHSS and other public health surveillance efforts

## **Framework for a Territorial Oral Health Surveillance System (OHSS)**

The framework of the proposed OHSS for the USVI is largely guided by recommendations from a 2013 report by the Council of State and Territorial Epidemiologists (CSTE) which outlines the structure and contents of a well-functioning OHSS. According to the

CSTE, all states or territories implementing an OHSS should regularly collect data on “health outcomes, access to care, risk factors and intervention strategies for the whole population, representative samples of the population, or priority subpopulations” (Phipps et al., 2013). CSTE additionally suggests that OHSSs collect information about the “oral health workforce, oral health infrastructure, and policies that impact oral health outcomes” and further recommends supplemental data collection by public health agencies to “fill data gaps” as needed (Phipps et al., 2013).

Mechanisms for the dissemination of collected data are also critical to developing a robust OHSS which adequately meets the needs of its communities. By making collected data easily accessible, public health agencies can not only facilitate the informed design of public health programming and policy, but public health agencies can also develop stakeholders’ and the public’s trust in the OHSS to fulfill the third function of public health as described by the IOM – assurance (Phipps et al., 2013).

As such, the VIDOH’s OHSS should (1) “have an oral health surveillance plan”, (2) define the purpose and objectives of the surveillance system, (3) use a “core set” of indicators as “benchmarks” to track oral health progress, (4) “analyze trends”, (5) disseminate data to stakeholders and the public in a timely and accessible manner, and (6) “strive to” ensure collected data is used for the betterment of the territory’s oral health (Phipps et al., 2013).

### **Operationalized Definition of OHSS Components**

In the same 2013 report, the CSTE developed an operationalized definition of an OHSS to outline the “foundational set of surveillance elements” required (Phipps et al., 2013).

According to the CSTE, a state/territory has an oral health surveillance only if the system has all of the following ten components (Phipps et al., 2013).

- A written oral health surveillance plan updated within the past five years
- Oral health data for a representative sample of third-grade children who meet NOHSS inclusionary criteria. These data must have been collected within the past 5 years.
- Data on the loss of permanent teeth among adults obtained within the past 2 years.
- Annual data on the incidence and mortality of oral and pharyngeal cancer
- Annual data on the percentage of Medicaid- and CHIP-enrolled children who have had a dental visit within the past year
- Data on the percentage of children aged 1 – 17 years who have had a dental visit within the past year. These data should be collected every 4 years.
- Data on the percentage of adults ( $\geq 18$  years) and the percentage of adults with diabetes who have had a dental visit within the past year, obtained within the past 2 years.
- Data on the fluoridation status of public water systems within the territory, collected every 2 years.
- Annual data on oral health programs run by the territory and the environment in which they operate, including workforce and infrastructure indicators. These data must be submitted to the Annual Synopses of State and Territorial Dental Public Health Programs.
- The timely release of publicly available, actionable data that guides public health policy and programming. Data may be presented through an oral disease burden document, publicly available reports, or via a website which has been developed or updated within the past 5 years.

## **Oral Health Indicators**

This proposed OHSS is designed around a framework of indicators that fulfill the core requirements as outlined by the CSTE's operationalized definition of an OHSS, indicators approved by CSTE for inclusion in the CDC's National Oral Health Surveillance System (NOHSS), and indicators that align with the U.S. Department of Health and Human Services' Healthy People 2030 objectives. While some indicators do not have an associated Healthy People 2030 objective, these indicators were still included because they are CSTE-approved for NOHSS inclusion or because these supplemental indicators provide deeper insight into the burdens and risk factors of oral diseases to facilitate a more holistic understanding of the community's oral health.

**Appendices B and C** provide a list of included indicators in addition to whether the indicator is CSTE-approved for NOHSS inclusion or whether the indicator is associated with a Healthy People objective. Core indicators that fulfill the CSTE's operationalized definition of an OHSS have cells with blue backgrounds while indicators that are CSTE-approved for NOHSS inclusion have cells with green backgrounds. Supplemental indicators which provide a broader understanding of the oral health of Virgin Islanders and are not CSTE-approved have cells with white backgrounds.

## **Supplemental Data Indicators**

Because the operationalized definition of an OHSS was written in 2013, the data indicators required and recommended by ASTDD are alone insufficient. For example, compared to Healthy People 2020, Healthy People 2030 no longer tracks the prevalence of cleft lip births (CDC,

2020c; ODPHP, n.d.). Additionally, Healthy People 2020 did not track the prevalence of periodontal disease, but Healthy People 2030 now reflects the federal government's focus on this domain (ODPHP, n.d.). As such, data indicators were modified to align with the oral health objectives of Healthy People 2030 while still ensuring compliance with ASTDD's requirements.

In consult with Ms. Wallace-Berube, supplemental data indicators include measuring the prevalence of moderate and severe periodontitis among adults 45 years and older and measuring the lifetime experience of caries among all age groups. A complete list of included data indicators stratified by domain and target population is found in **Appendix A**.

## **Data Sources**

While many proposed indicators for this OHSS utilize existing territorial and federal data sources, some indicators do not have a data source and as such require additional primary data collection. The 14 indicators which require supplemental data collection include those measuring: (1) the lifetime caries experience, the prevalence of active, untreated caries, and the prevalence of dental sealants among school-aged children, (2) the prevalence of active, untreated caries among adults and older adults, (3) the prevalence of moderate and severe periodontitis among older adults, (4) the utilization of preventive and restorative dental services among all age groups and among pregnant women.

Existing data sources for the proposed indicators are found in **Appendix B**, with detailed descriptions of each source found in **Appendix C**.

## **IV. Discussion**

### **Comparison Against Other OHSSs**



In comparison with OHSS plans developed by other states like Rhode Island, Ohio, and Texas, the proposed OHSS for the USVI is more comprehensive. The proposed OHSS for VIDOH not only contains the same data indicators as included by other states but also contains additional indicators which provide key insights into the access of dental services and the oral health status of priority populations. By including indicators like the prevalence of moderate and severe periodontitis, the use of dental visits by FQHC patients, the use of preventive dental services among pregnant women, and the availability of community-level interventions like topical fluoride programs or School-Based Health Centers which provide dental sealants and services, this proposed OHSS provides a more informed understanding of communities' oral health status and their access to dental services.

### **Limitations**

While many proposed indicators for this OHSS utilize existing territorial and federal data sources, the territory does not have available data sources for some indicators. The 14 indicators which require supplemental data collection include those measuring: (1) the lifetime caries experience, the prevalence of active, untreated caries, and the prevalence of dental sealants among school-aged children, (2) the prevalence of active, untreated caries among adults and older adults, (3) the prevalence of moderate and severe periodontitis among older adults, (4) the utilization of preventive and restorative dental services among all age groups and among pregnant women. Although other states who collect data on such indicators typically utilize state-based surveys like the annual BSS, the Virgin Islands does not currently administer a BSS. As such, the territory must first develop a BSS or engage in supplementary primary data collection before implementing this proposed OHSS.

Additionally, the territory lacks the data infrastructure required to coordinate systematized data collection. Without the necessary data infrastructure, the territory will likely experience significant challenges and delays in data processing, analysis, and dissemination. This deficiency in turn impacts the ability of public health leaders to make timely and informed decisions about the design, implementation, and analysis of all public health programs and policies. Timely data collection, analysis, and dissemination are critical components of all well-functioning public health surveillance systems, and a lack of data infrastructure is a fundamental barrier to realizing this OHSS.

Although VIDOH is working to develop a BSS and a data repository, such efforts are unlikely to find success without the requisite funding. VIDOH receives nearly 40% of its annual budget from the federal government, and as such is heavily reliant on the federal government to achieve its numerous goals (VIDOH, 2020). Especially considering that Hurricanes Irma and Maria significantly damaged much of the island's infrastructure and considering the impact of the COVID-19 pandemic, the Department of Health in all likelihood is focusing its priorities on these issues. Therefore, VIDOH likely lacks the financial ability to afford such resource-intensive initiatives, adding further complications to the roll-out of an OHSS on the territory.

### **Anticipated Impact on the USVI**

While VIDOH currently lacks many capacities required to successfully implement and operate an OHSS, this proposed OHSS sets a roadmap toward establishing these capacities. By knowing which data indicators, the territory should collect and by also knowing which data sources and Healthy People 2030 objectives are associated with each indicator, this project better equips VIDOH to realize the proposed OHSS. Such knowledge can provide justification and

inform discussions with federal agencies like the CDC, with non-profit organizations, with private individuals, or even with other decision-makers within VIDOH to generate political will and secure funding toward goals like fluoridation of municipal water systems, developing a BSS, or developing data repository.

When implemented, this proposed OHSS will also significantly bolster the ability of the VIDOH to accomplish various public health goals — oral health-related and otherwise. Through the regular and systematic monitoring and analysis of oral health-related data, VIDOH can better: (1) Estimate the prevalence and severity of oral diseases and their risk factors in the Virgin Islands; (2) Measure the utilization of oral health services on the territory; (3) Monitor oral public health interventions to understand their utilization and efficacy; (4) Identify priority populations who face the greatest unmet oral healthcare needs and understand the barriers that facilitate underservice; (5) Inform funding and resource allocation towards these priority populations; (6) Provide updated, reliable, and valid health data for use by the territory and the federal government; (7) Support the development of oral health infrastructure like FQHCs or community clinics; (8) Support the recruitment of dental providers; and (9) Evaluate strengths and weaknesses in the health surveillance capabilities of the USVI to iteratively improve other public health surveillance efforts on the territory. In summary, this project serves to strengthen numerous domains of VIDOH, ultimately serving to advance oral health equity and overall health equity within the territory.

## **V. Recommendations**

During the next six months, the Primary Care Office should continue working with leaders in the Epidemiology Division of VIDOH to develop the data infrastructure required to

engage in the comprehensive epidemiological surveillance of oral diseases. The Epidemiology Division currently works to monitor data on communicable and vaccine-preventable diseases, and members of the Epidemiology Division therefore hold significant expertise in establishing information systems like a data repository (VIDOH-EPID, 2019). Organizing collected data into a centralized repository is vital to streamlining data processing, analyses, and dissemination, and this capacity is therefore fundamental to the regular, systematic, and timely monitoring of and action on oral health data (Phipps et al., 2013).

Additionally, ASTDD and the Epidemiology Division of VIDOH can provide their expertise to facilitate the development of data sources for primary data collection on oral health indicators which do not currently have an established data source. Such indicators, identified in **Appendix B**, are crucial to understanding both the community's access to dental services and the prevalence and distribution of common oral diseases and conditions within the territory. Developing tools like a BSS will create the ability to monitor crucial oral health data and also expand the territory's capacity to monitor other diseases of public health importance. ASTDD offers a BSS toolkit which provides information to help states and territories plan and conduct a BSS, including training videos, sample screening forms, reference guides, and reference documents.

Lastly, the Primary Care Office, in concert with the Epidemiology Division, should work to develop data-sharing agreements with dental providers in the community like FQHCs and dentists in private practice. The collection of oral health data among both priority populations and members of the general populace is important to understanding the true magnitude of oral health disparities, and these data-sharing agreements will help the Primary Care Office develop a

more holistic perspective of the use of dental services and the distributions of oral diseases within the territory.

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**Appendix A:** Indicators included in the proposed OHSS for the USVI according to indicator type and age group.

Indicator Type	Preschool-Aged Children	School-Aged Children	Adults	Older Adults	
Oral Health Outcomes	Prevalence of cleft lip with/without cleft palate	Third Grade Prevalence of dental sealants* Caries experience*	<u>18-64 years old</u> No tooth loss	<u>65+ years old</u> Moderate periodontitis* Severe periodontitis*	
	<u>Headstart</u> Caries experience* Active and untreated caries*		<u>45-64 years old</u> Moderate periodontitis* Severe periodontitis*	<u>65+ years old</u> Complete tooth loss*	
			<u>45-64 years old</u> Complete tooth loss*	<u>65+ years old</u> Complete tooth loss*	
	<u>3-17 years old</u> Caries experience* Active and untreated caries* Prevalence of dental sealants*		<u>18+ years old</u> Complete tooth loss* Active and untreated caries*		
<u>All ages</u> Incidence and mortality of oral and pharyngeal cancers*					
Access to Care		<u>Medicaid- and CHIP-enrolled children 6-9 years old</u> Dental sealants*	<u>Pregnant women</u> Use of preventive dental services in the past year*		
		<u>Medicaid- and CHIP-enrolled children 10-14 years old</u> Dental sealants*			
	<u>Medicaid- and CHIP-enrolled children</u> Dental visits in the past year*		<u>18+ years old</u> Dental visits in the past year*		
	<u>1-17 years old</u> Dental visits in the past year*		<u>18+ years old with diabetes</u> Dental visits in the past year*		
	<u>Medicaid- and CHIP-enrolled children</u> Use of preventive dental services in the past year* Use of restorative dental services in the past year*		<u>18+ years old</u> Use of preventive dental services in the past year* Use of restorative dental services in the past year*		
	<u>1-17 years old</u> Use of preventive dental services in the past year* Use of restorative dental services in the past year*				
<u>All ages</u> Dental visits for FQHC patients in the past year*					
Risk Factors		<u>9th-12th Grade</u> Tobacco use	<u>18+ years old</u> Tobacco use		
	<u>≤ 18 years old</u> Free or reduced-cost lunch status				
	<u>All ages</u> Demographic factors				
Intervention Strategies		<u>School-Based Health Centers</u> Dental sealant programs Dental services			
	Community water fluoridation*				
	Topical fluoride programs				
Workforce, Infrastructure, and Policy	Number of licensed dental professionals Number of dentists who service Medicaid Dental Health Professional Shortage Areas Medicaid policies and payments Director leading USVI dental public health efforts*				

\* These indicators have an associated Healthy People 2030 objective

**Appendix B: Data source(s) and associated Healthy People objective(s) for indicators included in the proposed OHSS for the USVI.**

Domain	Target Population	Indicator	Data Source	Associated Healthy People Objective(s)
Oral Health Outcomes	Pre-school Age	Prevalence of cleft lip with/without cleft palate	USVI VRS	OH-15 (HP2020 only)
	Headstart	Active and untreated caries	USVI DHS: Office of Preschool Services	OH-02, AHS-05
		Any lifetime caries experience	USVI DHS: Office of Preschool Services	OH-01
	Third Grade	Prevalence of dental sealants	TBD	OH-10
		Any lifetime caries experience	TBD	OH-01
	3-17 years old	Active and untreated caries	TBD	OH-01
		Prevalence of dental sealants	TBD	OH-10
		Any lifetime caries experience	TBD	OH-01
	≥ 18 years old	Active and untreated caries	TBD	OH-03
		Complete tooth loss	BRFSS	N/A
	18-64 years old	No tooth loss	BRFSS	N/A
	45-64 years old	Complete tooth loss	BRFSS	OH-05
		Moderate periodontitis	TBD	OH-06
		Severe periodontitis	TBD	OH-06
	≥ 65 years old	Moderate periodontitis	TBD	OH-06
Severe periodontitis		TBD	OH-06	
All ages	Complete tooth loss	BRFSS	OH-05	
Access to care	Medicaid- and CHIP-enrolled children	At least one dental visit in the past year	CMS-416, CARTs	OH-09, AHS-05
		Use of preventive dental services in the past year	CMS-416, CARTs	OH-09, AHS-05
		Use of restorative dental services in the past year	CMS-416, CARTs	OH-08, AHS-05
	Medicaid- and CHIP-enrolled children 6-9 years old	Prevalence of dental sealants	CMS-416	OH-10, OH-09
	Medicaid- and CHIP-enrolled children 10-14 years old	Prevalence of dental sealants	CMS-416	OH-10, OH-09
	1-17 years old	At least one dental visit in the past year	NSCH	OH-08
		Use of preventive dental services in the past year	NSCH	OH-08
		Use of restorative dental services in the past year	TBD	OH-08
	Adults ≥ 18 years old	At least one dental visit in the past year	BRFSS	OH-08
		Use of preventive dental services in the past year	TBD	OH-08
		Use of restorative dental services in the past year	TBD	OH-04
	Adults ≥ 18 years old with diabetes	At least one dental visit in the past year	BRFSS	OH-08
	Pregnant women	Use of preventive dental services in the past year	PRAMS	OH-08
	All ages	At least one dental visit for FQHC patients in the past year	UDS / FQHCs	AHS-05
	Risk Factors	≤ 18 years old	Free or reduced-cost lunch status	U.S. Dept of Education
9th - 12th grade		Tobacco use	YRBSS	N/A
≥ 18 years old		Tobacco use	BRFSS	N/A
All ages		Demographic factors	Census	N/A
Intervention Strategies	School-aged children	Dental sealant programs at SBHCs	NC-SBHC	OH-01, OH-02, OH-10
		Dental services offered at SBHCs	NC-SBHC	OH-01, OH-02, OH-09
	All ages	Community water fluoridation	WFRS	OH-11
		Topical fluoride programs	AS-STDPHP	OH-01, OH-02, OH-09
Workforce, Infrastructure, and Policy	Dental professionals	Number of licensed dental professionals	AS-STDPHP	N/A
		Number of dentists who service Medicaid	AS-STDPHP	N/A
		Director leading USVI dental public health efforts	AS-STDPHP	OH-17 (HP2020 only)
	Underserved communities	Dental Health Professional Shortage Areas	HRSA	N/A
		Medicaid policies and payments	USVI DHS	N/A

N.B.: Although state-based BSSs are the typical source of data for indicators marked “TBD”, the USVI does not yet administer a BSS for the territory. As such, potential data sources include partners like VIDA, FQHCs, or dentists in private practice. The USVI DOH is currently undergoing efforts to establish data collection tools and infrastructure for such indicators.

**Appendix C:** Description of each data source alongside associated OHSS data indicator(s)

- **ASTDD Synopses of State and Territorial Dental Public Health Programs (Synopses); indicators include the number of licensed dental professionals, the number of dentists servicing Medicaid, and whether the territory has a dental director.**

Each year, the ASTDD sends the Synopses, a structured, email-based questionnaire, to departments of public health in all 50 states, the District of Columbia, and all US-associated jurisdictions – including the USVI. The Synopses assesses: (1) the dental workforce and oral health infrastructure of states, (2) past-year dental public health initiatives and their associated successes and challenges, and (3) the workforce and infrastructure for oral public health efforts within states’ departments of public health.

- **CDC Behavioral Risk Factor Surveillance System (BRFSS); indicators include tooth loss (none and complete) among adults  $\geq$  18 years old and dental visits among adults, adults with diabetes, and older adults.**

The BRFSS is a random, telephone-administered survey sponsored by the CDC which collects information about health-related risk behaviors, chronic health conditions, and the use of preventive services of adults 18 years and older in all 50 states, the District of Columbia, and three U.S. territories – including the USVI. While the survey is conducted every year, questions related to oral health are only included every two years. As the USVI does not currently administer a state-based BSS, the BRFSS is the sole source of many data regarding the oral health status of Virgin Islanders.

- **CDC National Vital Statistics System (NVSS); indicator includes the mortality of oral and pharyngeal cancers among all age groups.**

The NVSS collects data on births and deaths in the United States with the intention of making vital data easily accessible to the public. While vital data collected in the NVSS is “provided through contracts between [the National Center for Health Statistics] and ... [the] vital registration systems [of participating states and territories]”, each state and territory are responsible for maintaining their own registry of vital events (National Vital Statistics System, 2016). NVSS data is available through CDC WONDER.

- **CDC Water Fluoridation Reporting System (WFRS); indicator includes the fluoridation status of community water systems in the USVI.**

In association with ASTDD, the CDC tracks the percentage of United States residents who “receive optimally fluoridated drinking water” through their community water systems using WFRS. WFRS also provides data on average fluoride concentrations, on results of daily testing, and on “laboratory split sample results” to help states and territories with fluoridated water systems monitor and manage levels of fluoride in drinking water (CDC, 2022). These data are summarized every two years in the Water Fluoridation Statistics report.

- **CHIP Annual Reporting Template System (CARTS); indicators include the use of dental services among CHIP-enrolled children.**

Each year, by January 1<sup>st</sup>, states and territories are required to submit a CARTS report to CMS which evaluates the scope, performance, financing, and development of each state/territory’s CHIP program. As a part of CARTS, states are also required to report on the number of CHIP enrollees who receive dental benefits stratified by age group. As a result, CARTS provides a useful opportunity to assess, monitor, and understand the access to dental services among underserved children.

- **Centers for Medicare & Medicaid Services (CMS) form CMS-416: Annual Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) Participation Report; indicators include utilization of dental services and the prevalence of dental sealants among Medicaid- and CHIP-enrolled children.**

For Medicaid-enrolled children under 21 years of age, the EPSDT benefit of Medicaid “provides comprehensive and preventive health care services” and ensures that eligible participants receive the necessary “preventive, dental, mental health, developmental, and specialty services” (CMS, 2022). Dental services required by the EPSDT benefit include “dental care needed for relief of pain, infection, restoration of teeth, prevention and maintenance of dental health, and emergency dental services” (CMS, 2022). To assess the quality of services rendered by EPSDT, CMS collects information on state/territorial Medicaid and CHIP programs.

- **Census; indicator includes demographic factors for all age groups**

Conducted by the United States Census Bureau each decade, the national census measures population data like age, sex, SES, education, employment, and geography, among many other demographic factors (U.S. Census Bureau, 2017). While these data are most often used at the federal level, census data can provide useful insight into the social determinants of health which powerfully impact whether individuals and communities achieve oral health.

- **FQHCs in the USVI; indicator includes past-year dental visits for FQHC patients.**

FQHCs act as an important safety net for underserved communities in the USVI providing many comprehensive and preventive services. At the same time, the two FQHCs in

St. Croix and St. Thomas remain the only two Medicaid-accepting entities providing dental services across the entire territory.

- **HRSA HPSA Find database; indicator includes the number of dental HPSAs in the USVI.**

HRSA tracks the location and distribution of HPSAs across the United States – geographic areas, populations, or facilities which have a shortage of primary care, mental health, and dental providers – through their HPSA Find database (HRSA, n.d.-b).

- **HRSA Uniform Data System (UDS); indicator includes dental visits by FQHC patients among all age groups.**

HRSA Health Center Program awardees are required to report information on patient characteristics, the provided services, clinical processes, health outcomes, the use of services, staffing, costs, and revenues through the UDS each year (HRSA, n.d.-a).

- **National Census of School-Based Health Centers (NC-SBHC); indicators include school-based health centers who offer dental sealants, dental care, and topical fluoride.**

NC-SBHC collects annual data on School-Based Health Centers (SBHCs) to understand their ability to meet the needs of underserved children and adolescents, collect data on the operations of SBHCs, track the programs and services offered by each SBHC, and aggregates all SBHCs in the nation into a database (ODPHP, 2022).

- **National Program of Cancer Registries (NPCR); indicator includes mortality rates of oral and pharyngeal cancers among all age groups.**

NPCR collects data to monitor the prevalence and mortality of cancers, evaluate public health programming, and identify priority communities who require additional support for cancer prevention and control efforts.

- **National Survey of Children’s Health (NSCH); indicators include the use of dental services among children 1-17 years old.**

NSCH collects information relevant to the physical and mental wellbeing of children 0-17 years old. Collected information includes access to care, demographic factors, neighborhood characteristics, and their use of health services (U.S. Census Bureau, n.d.). Surveys are conducted each year and are reported to the Census Bureau’s NSCH website (U.S. Census Bureau, n.d.).

- **Surveillance, Epidemiology, and End Results (SEER) Program; indicators include the incidence and mortality of oral and pharyngeal cancers among all age groups.**

Like NPCR, the SEER program, operated by the National Cancer Institute, provides information on cancer statistics in the United States including stage of diagnosis, patient survival data, and mortality data (NIH, n.d.). Collected information is available for access via CDC WONDER (NIH, n.d.).

- **U.S. Department of Education, National Center for Educational Statistics (NCES); indicator includes the number of children ≤ 18 years old participating in free and reduced-cost lunch programs.**

The U.S. Department of Education is home to NCES, which collects and analyzes data relevant to education in the United States, including tracking the number of children participating in subsidized lunch programs (NCES, n.d.). These data are published and freely available via the NCES website (NCES, n.d.).

- **USVI Department of Human Services (DHS): Office of Preschool Services; indicators include the lifetime caries experience and the prevalence of active, untreated caries among children participating in Head Start.**

The Office of Preschool Services, housed within the Virgin Islands Department of Human Services, operates the territory's HeadStart program (U.S. Virgin Islands Department of Human Services, 2016). In accordance with federal reporting guidelines, the Office of Preschool Services collects information on the demographics and program statistics of the Virgin Islands HeadStart program (U.S. Virgin Islands Department of Human Services, 2016). While the Office of Preschool Services does not currently track oral health outcomes of HeadStart participants, they are a potential stakeholder to widen primary data collection opportunities.

- **USVI Office of Professional Licensure and Health Planning; indicators include the number of licensed dental professionals and the number of dentists who service Medicaid.**

The Office of Professional Licensure and Health Planning is the territory's licensure authority which issues licenses that allow healthcare providers to operate on the territory (VIDOH, n.d.). As such, they also have data to track the number of licensed dental professionals and the number of dentists who service Medicaid. Data is not publicly available but may be available to VIDOH.

- **USVI Office of Vital Records & Statistics (VRS); indicator includes the prevalence of live births who have cleft lip with and without cleft palate.**

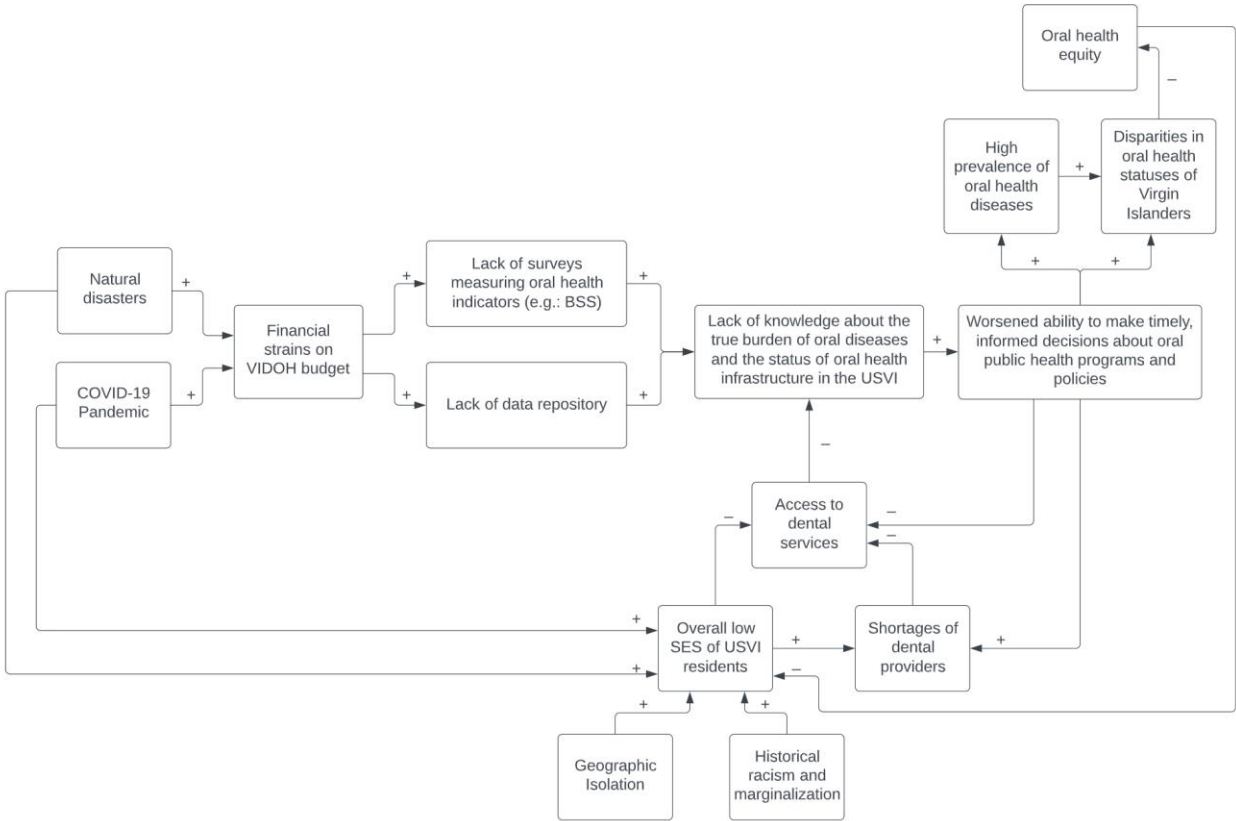
VRS collects and preserves vital statistics data, including birth and death records (VIDOH, n.d.). As a component of birth records, birth defects, including whether a child has cleft lip, are tracked (VIDOH, n.d.). Data are available by contacting VRS directly (VIDOH, n.d.).



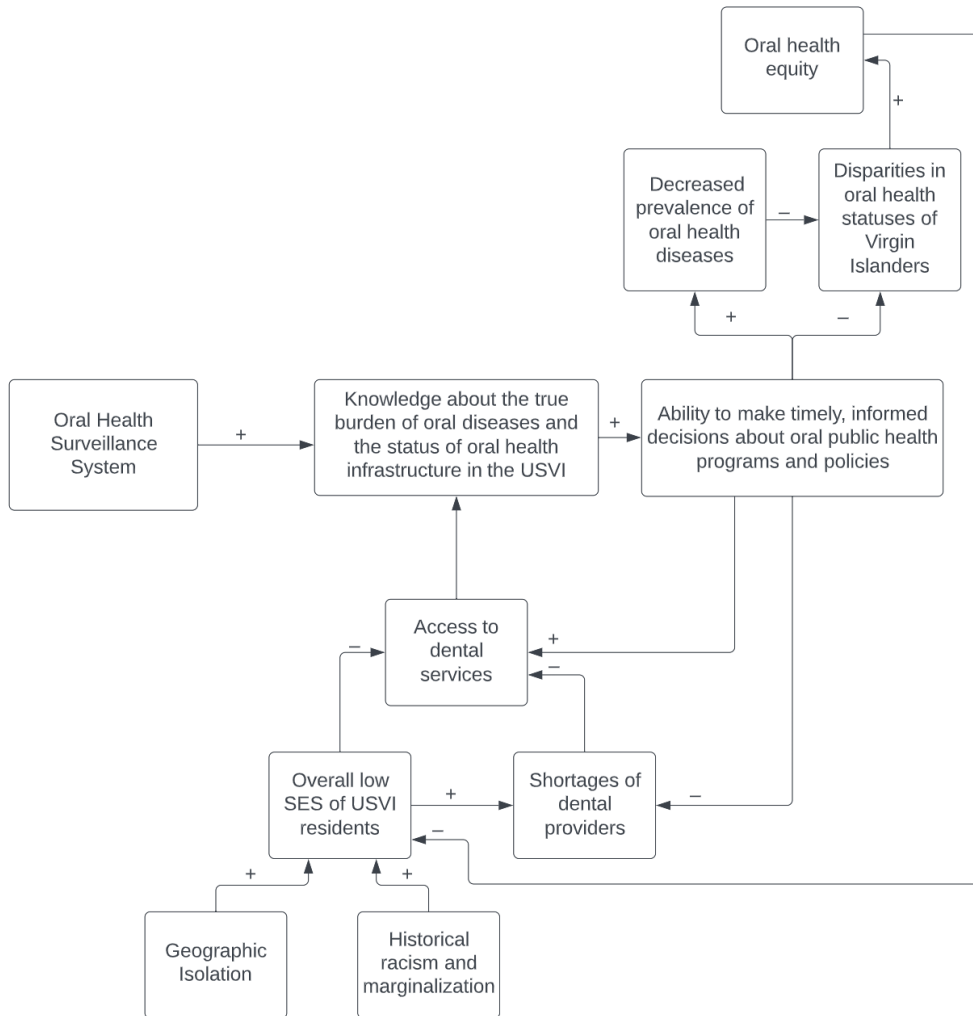
- **Youth Risk Behavior Surveillance System (YRBSS); indicator includes tobacco use among children 9<sup>th</sup> – 12<sup>th</sup> grade.**

Conducted each year, YRBSS collects data on six categories of health-related behaviors which contribute significantly to death and disability among youth and adults. Such data includes sexual behaviors, alcohol and drug use, tobacco use, dietary patterns, and physical activity (CDC, 2020a). YRBSS combines national school-based surveys and locally conducted surveys, and data is available via the YRBSS website (CDC, 2020a).

**Appendix D: Systems Map – Current State of Oral Health and Related Infrastructure in the USVI**



**Appendix E: Systems Map – Anticipated Impact of an OHSS on Oral Health Access and Outcomes in the USVI**



By working to increase VIDOH’s understanding of the true burden of oral diseases and the status of oral health-related infrastructure on the territory, an OHSS will help VIDOH make timely and informed decisions about oral public health programs and policies. In doing so, VIDOH can work to increase the number of dental providers and increase access to dental services overall to thereby lessen the burden of oral diseases, decrease oral health disparities

within the U.S. Virgin Islands, and work towards achieving oral health equity for all Virgin Islanders.