

The University of San Francisco

# USF Scholarship: a digital repository @ Gleeson Library | Geschke Center

---

Master's Projects and Capstones

All Theses, Dissertations, Capstones and  
Projects

---

Spring 5-15-2023

## ORAL HEALTH LITERACY: A TOOL TO REDUCE ORAL HEALTH DISPARITIES AMONG CALIFORNIANS

Rubina Bukhari

University of San Francisco, drrubi.bukhari@gmail.com

Follow this and additional works at: <https://repository.usfca.edu/capstone>



Part of the [Dental Public Health and Education Commons](#), and the [Other Public Health Commons](#)

---

### Recommended Citation

Bukhari, Rubina, "ORAL HEALTH LITERACY: A TOOL TO REDUCE ORAL HEALTH DISPARITIES AMONG CALIFORNIANS" (2023). *Master's Projects and Capstones*. 1514.

<https://repository.usfca.edu/capstone/1514>

This Project/Capstone - Global access is brought to you for free and open access by the All Theses, Dissertations, Capstones and Projects at USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. It has been accepted for inclusion in Master's Projects and Capstones by an authorized administrator of USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. For more information, please contact [repository@usfca.edu](mailto:repository@usfca.edu).

**ORAL HEALTH LITERACY: A TOOL TO REDUCE ORAL HEALTH DISPARITIES  
AMONG CALIFORNIANS**

Rubina Bukhari

School of Nursing and Health Professions, University of San Francisco

MPH-642-01 Integrated Learning Experience

Marissa Kraynak, PhD

May 15<sup>th</sup>, 2023

## **Table of Contents**

<b><i>I. Abstract</i></b> .....	<b>3</b>
<b><i>II. Introduction</i></b> .....	<b>5</b>
<b><i>III. Background and Literature Review</i></b> .....	<b>6</b>
A. Oral Health Disparities Statistics, Causes, and Financial Impacts.....	7
B. Programs and Policies Initiated by California State to Improve Oral Health.....	13
C. Gaps.....	23
<b><i>IV. Methods</i></b> .....	<b>25</b>
<b><i>V. Recommendations</i></b> .....	<b>26</b>
A. Key Recommendation Steps.....	27
1. Developing Educational Material on Oral Health Literacy and Interventions.....	27
2. Enhancing Public Outreach and Campaigns.....	28
3. Leveraging CHWs for Outreach and Connecting with a Dental Provider.....	30
B. Evaluation.....	31
C. Funding.....	32
D. The Rationale for Recommendations.....	32
<b><i>VI. Implications and Discussion</i></b> .....	<b>33</b>
<b><i>VII. Conclusion</i></b> .....	<b>36</b>
<b><i>VIII. References</i></b> .....	<b>37</b>

## Abstract

Oral health is the health of the mouth, cheeks, teeth, and their supporting structure within the oral cavity. It helps in performing day-to-day routine functions such as swallowing, tasting, chewing, talking, and making a wide array of complex facial expressions. Apart from performing everyday functions, oral health is a crucial contributor to the overall state of well-being and good quality of life. It is measured by oral conditions such as tooth decay, gum disease (Periodontal), and oral cancers. Tooth decay and cavity formations are the most prevalent oral health conditions which affect people of all age groups. However, children are more susceptible to getting them due to several risk factors such as their age, structure of teeth, and certain behavior. There are many chronic conditions associated with systemic (overall) health such as diabetes, heart disease, stroke, cancer, obesity, and arthritis. An interesting fact to know is that dental decay is also considered one of them. While focusing on health disparities, which are the differences in health outcomes between populations. Many health disparities lie in certain race/ethnic minority groups, similarly, there are many Oral Health Disparities (OHD) embedded among these groups. Statistics from U.S. and California reflect that often, these affected minority groups are Hispanic/Latino and non-Hispanic Black communities. OHD is facilitated by lack of dental care access, lack of understanding of oral health, low-income, low educational attainment and lack of paid time leave from work to go to dental visit. Tooth decay is the number one cause of children's school absenteeism. School-aged children suffering from tooth decay can have pain, malnutrition, and speech delay. Due to missing teeth, they can also have low self-esteem and reduce overall productivity. As far as dental care is concerned, the dental coverage for the low-income Medi-Cal population has been expanded and improved, yet certain inadequacies are remaining in this area. For example, Medi-Cal now covers 2 dental visits every year and all the basic dental care services for its beneficiaries. Apart from that, other government-funded programs also support and promote oral health. One of the biggest initiatives for improving oral health is happening at the state level by the California Department of Public Health-Office of Oral Health (CDPH-OOH). This office is getting funding from Prop 56 to support 61 Local Oral Health Programs (LOHPs) across California (including 58 counties and 3 cities). They have implemented certain

interventions to address the issue of OHD which include Community Water Fluoridation (CWF), Kindergarten Oral Health Assessment (KOHA), School Sealant Programs (SSPs), and Oral Health Literacy (OHL). These all are very effective and diverse approaches to serving communities in improving their oral health. OHL is one of the objectives of OOH, however, there is a lack of OHL which is specifically tailored to this hard-to-reach minority groups of California along with cultural humility and competency. Moreover, the lack of awareness about the available resources contributes to hindering the utilization of these services to their full potential. This research paper explored these gaps and made recommendations that could potentially help bridge some of these inadequacies. Disseminating educational material about oral health interventions along with outreach campaigns would enhance the public's understanding of the oral health at hand. With better knowledge about the interventions and their benefits, it is anticipated that these communities will be able to utilize available resources better. There has been a new initiative put in place by the Department of Health Care Services (DHCS) for Community Health Worker (CHW) benefits for Oral health. One of the recommendations discussed in the paper is utilizing these CHWs as a vehicle for hard-to-reach communities and facilitating the dissemination of oral health material to them. Also, CHWs can help them navigate and connect with dental providers which is again hard in the Medi-Cal population. This OHL intervention will help reduce the burden of disease and OHD at the state level, national level, and worldwide. This will lead to a healthier society where people can have a good quality of life, work, and community growth.

**Keywords:** Oral Health Disparities (OHD), Tooth decay, Tooth cavities, Early Childhood Caries (ECC), Oral diseases, Gum (Periodontal) diseases, and Oral hygiene.

## I. Introduction

Oral health consists of the health of teeth, gums, and the entire oral-facial system that enables us to smile, speak and eat. Oral health is impacted commonly by tooth decay, gum (Periodontal) disease, and less commonly, oral cancer (*Oral Health | ECLKC, n.d.*). Other systems associated with the oral-facial system are the nervous and vascular systems which nourish oral tissues and provide connections to the brain and other parts of the body (*2000 Surgeon General's Report on Oral Health in America | National Institute of Dental and Craniofacial Research, 2018*). Oral health can significantly impact an individual's health, well-being, and quality of life. Despite this, the importance of oral health is often overlooked. They allow us to talk, smile, kiss, sigh, smell, taste, touch, eat, and swallow; cry and convey feelings and emotions through facial expression. They also protect us from microbial infections and noxious environmental stimuli (*2000 Surgeon General's Report on Oral Health in America | National Institute of Dental and Craniofacial Research, 2018*). Since the Oral-facial system enables us to perform existing day-to-day life tasks, it should be of prime importance. We need to embrace that oral health is an integral part of general health. Many times, the signs and symptoms of oral disease are ignored until the condition advanced to the point where it becomes detrimental. Oral health can contribute to the number of health issues that affect our entire body. The bacteria from untreated cavities or gum disease can cause local complications and can also spread via the bloodstream and reach other systems in the body. Other complications are cellulitis (a bacterial infection), abscess formation, and facial swelling (*How Your Oral Health Affects Your Overall Health, 2022*). These abscesses can also spread to the brain via direct spread and can cause life-threatening infections. Other conditions that are commonly associated with poor dental health are cardiovascular diseases such as endocarditis (infection of heart valves by bacteria from infected gums which is common in those with preexisting heart conditions), pregnancy and birth-related complications, and lung infections such as pneumonia. This makes oral hygiene and care an indispensable component of individual and community health and well-being.

## II. Background and Literature Review

Oral health is measured by oral conditions such as tooth decay, gum disease (Periodontitis), and oral cancers. This research paper focuses on tooth decay as a measure of oral health. Tooth decay also referred to as dental caries or cavities, occurs due to the breakdown of tooth enamel. It is the most common oral condition, and it affects people of all ages throughout their life. The most vulnerable population is children. It can be very painful and detrimental to their development. In some cases, tooth decay can slowly advance over a long time (chronic), and in other cases, it could worsen in a short period needing urgent medical attention (acute) and care. Children are also not able to articulate their suffering very well, which can result in neglect of the tooth decay which can build up over several months to years and ultimately can result in tooth destruction.

Normally, we have bacteria in our mouth which is considered normal microbial flora. After having a meal, food particles are lodged inside the mouth. These bacteria produce acid that in turn destroys tooth enamel. Tooth decay is the most prevalent among all the other dental conditions which can affect people of all ages. However, children are very much susceptible to getting these cavities due to their craving of wanting to eat sugary food, their teeth anatomy, and poor oral hygiene habits. Permanent molars in all four quadrants of children's mouths start to erupt as early as 6 years of age. The main function of these molars is for the masticating (chewing) food. These molars are considered cornerstones and they are supposed to stay in children's mouths as they turn into adults. Secondly, children with untreated tooth cavities can spread the infection from their primary teeth (first set of teeth) into the developing tooth buds which are underneath the primary teeth inside the jaws. Normally it is not visible on regular clinical examination, although it can be seen on X-rays. Childhood dental caries is a public health problem that can potentially hinder the overall health and development of young children (American Academy of Pediatric Dentistry-AAPD). Children with untreated tooth decay experience unnecessary pain, difficulty chewing, and difficulty speaking. It can result in low self-esteem and absenteeism in school and that can lead to low academic performance (Oral Disease Burden and Prevention, 2017). The pain children suffer from tooth caries has negative outcomes on their emotional status, sleep patterns, and learning or performing their usual activities. A wide array of risk factors is associated with children with low socioeconomic backgrounds (Anil & Anand, 2017).

## A. Oral Health Disparities (OHD) Statistics, Causes, and Financial Impacts

### *What are Health Disparities?*

In general, health disparities are differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are faced by socially disadvantaged populations (CDC, 2019). Health disparities include mortality, life expectancy, the burden of disease, mental health, uninsured or underinsured, and lack to access to care for the most part (University of Southern California, 2021). Often the term disparities reflect differences between racial or ethnic groups. However, it can also exist across many dimensions such as gender, sexual orientation, age, disability status, socioeconomic status, and geographic location. In addition to race and ethnicity, all these other factors can play a significant role in an individual's ability to achieve optimal health (Healthy People 2020, 2016). OHD is specifically about the differences in oral health diseases and access to oral health services among underprivileged populations.

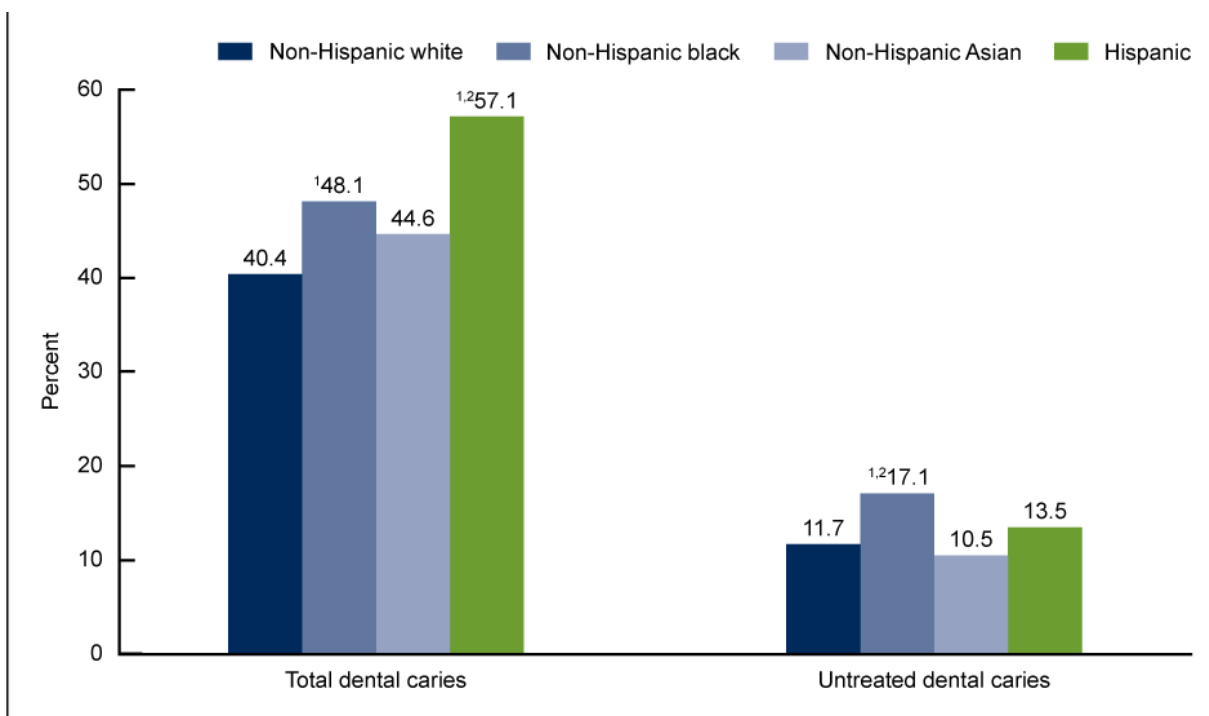
### *Statistical Trends in OHD at Global, U.S., and California Levels*

Globally, oral diseases affect 3.5 billion people and 3 out of 4 people in middle-income countries. There is an association between the income level of the country and their oral health status. Low-income people worldwide have poorer health outcomes; seventeen percent of low-income children have untreated cavities in their primary teeth from ages 2-5 years. This is 3 times compared to children from higher-income households. Within the same population, 23% of children have untreated tooth cavities in their permanent teeth by the time they reach ages 12-19 years. An estimated 2 billion people suffer from permanent teeth caries and 514 million children by primary teeth caries (*WHO Global Oral Health Status Report, 2022*).

OHD statistics across the U.S. show how that over 40% of low-income and non-Hispanic, Black adults have untreated tooth decay among working-age U.S. adults. Data on oral health outcomes for children aged 2-5 years reported that in the Mexican American population about 33% and in non-Hispanic Black children about 28% had caries in their primary teeth compared with their



non-Hispanic white counterparts which had cavities in 18% of their population. This is twice as compared to children from higher-income households (CDC, 2019).



<sup>1</sup>Significantly different from non-Hispanic white youth.

<sup>2</sup>Significantly different from non-Hispanic Asian youth.

NOTES: Total dental caries included untreated and treated caries. Access data table for Figure 2 at: [https://www.cdc.gov/nchs/data/databriefs/db307\\_table.pdf#2](https://www.cdc.gov/nchs/data/databriefs/db307_table.pdf#2).

SOURCE: NCHS, National Health and Nutrition Examination Survey, 2015–2016.

The bar graph shown above is taken from the National Health and Nutrition Examination Survey of 2015-2016. In dark gray it shows the non-Hispanic Black population and in green it shows the Hispanic population. The bars shown in the graph that are representing these populations are higher as compared to others for both total dental caries as well as for untreated dental caries. The statistics conclude that oral disease disproportionately impacts low-income, non-Hispanic Black and Hispanic communities the most in the U.S.

After looking at OHD at Global and National levels now focus is to narrow it down to the California state level. The data from California shows that Latino (as defined by California survey data) children are significantly more likely to have a history of tooth decay. The comparison between Latino and non-Latino White Children's oral health conditions is depicted in the following table:

California Children	Latino	Non-Latino White
Tooth Decay Rate	72%	47.6%
Untreated Tooth Decay Rate	32.9%	19.8%

As shown in the table, the tooth decay rate of Latino children is nearly 25% higher than non-Latino White. Similarly, the untreated tooth decay rate in Latino children is nearly 13% higher as compared to non-Latino White. Due to the higher rates of oral health, this population is more likely to have an urgent need for dental care than non-Latino white children (Oral Disease Burden and Prevention, 2017). The lack of prevention of oral health conditions among this population would cause a financial burden on the state economy. Also, in California in 2004-2005 elementary school-aged children who were eligible for free or reduced-priced lunch programs due to low income were more likely to have a history of tooth decay, untreated decay, and needed urgent dental care more than other children (Oral Disease Burden and Prevention, 2017). This points out the fact that children with low socio-economic status are more affected than others. Another important aspect is that this data is collected by Smile Survey in 2004-2005, there are not any recent statewide data available to update the progress on these measures in California. Since the data collected is quite old it is hard to make any assumptions regarding the status of oral health of California's children.

Tooth decay is a preventable disease but still, it is the most common chronic disease of children aged 6-11 years and adolescents aged 12 -19 years. In California, nearly 54% of kindergarten children and over 70% of third graders have a history of tooth decay. U.S. prevalence is 33.3% for children aged 3-5 years, and 54.4% for children aged 6-9 years (Oral Disease Burden and Prevention, 2017).

The goal of Healthy People (HP) 2020 is to improve everyone's health in the U.S. It is a comprehensive, national agenda for health promotion and illness prevention. HP 2020 has 17 goals which are about oral health improvement, these goals reflect the opinions and knowledge of various people and organizations who care about the oral health of the country. The HP 2020

Leading Health Indicator (LHI), a chosen subset of objectives that concentrate on high-priority health concerns, also includes an oral health indicator (OH-7: Oral health care system utilization in the last year by children, adolescents, and adults). Looking at the targets set by HP 2020, prevalence of the tooth decay in California children is well above the set target.

### Causes of OHD

There is deep-rooted OHD present within the U.S. (*2000 Surgeon General's Report on Oral Health in America | National Institute of Dental and Craniofacial Research, 2018*). An individual's oral and overall health is determined by a wide variety of factors that play at multiple levels (Fischer et al., 2017). These disparities may depend on income, age, sex, race or ethnicity, or medical status. Even though common dental diseases are preventable not all members of society are aware of them or able to benefit from the right oral-health-promoting measures (*2000 Surgeon General's Report on Oral Health in America | National Institute of Dental and Craniofacial Research, 2018*). There are a wide array of factors explaining the causes of OHD starting from consumption of healthy foods, personal behaviors, lack of literacy, access to oral health services, understanding and utilizing those services, access to fluoridated tap water, and availability to preventive services such as fluoride varnish. Oral diseases affect the most vulnerable citizens of the nation such as poor children, the elderly, and many members of racial and ethnic minority groups (*2000 Surgeon General's Report on Oral Health in America | National Institute of Dental and Craniofacial Research, 2018*).

Since the 1960s the Nation's oral health has been greatly improved, yet not all Americans have equal access to these improvements (CDC, 2019). Some racial or ethnic and socioeconomic groups have worse oral health attributed to social determinants of health- places where people are born, live, learn, work, and play (CDC, 2019). For instance, some communities cannot afford out-of-pay costs for dental care, do not have private or public dental insurance, or cannot get time off from work to get dental care. Many minority communities do not have access to fluoridated water and school sealant programs, healthy foods, and public transportation to get to dental appointments (CDC, 2019). Other reasons for OHD and inequities are found in the minority groups who live in medically and dentally underserved rural and urban areas (Fischer et al., 2017). There is also a correlation between lower levels of education and literacy with sugar-

heavy food consumption and poor oral hygiene (Tungare & Paranjpe, 2022). Data highlights that the rates of untreated dental caries in children 2-8 years were twice as high among Hispanic and non-Hispanic Black children as compared to non-Hispanic White children of the same age group (National Health and Nutrition Examination Survey -NHANES 2011 to 2012) (Fischer et al., 2017).

After discussing statistics and causes of OHD occurring at different levels, it is equally important to focus on the economic burden and the cost these disparities cause to the U.S. economy. This would give an idea of how much money goes into overall disparities and specifically related to oral health. It would also show the benefits of investing money in different oral health interventions for prevention.

### *Financial Impacts of OHD*

Minority groups and people of color experience higher rates of illness and death by a wide range of health conditions, which limits the overall health of the nation. Research finds that health disparities are costly. The analysis estimates that disparities amount to approximately \$93 million in excess medical care costs and \$42 billion in lost productivity each year and additional economic losses occur due to premature deaths. Since the population is becoming more diverse by 2050 it is projected to account for over half of the population (Ndugga & Artiga, 2023). Therefore, it is extremely important to address health disparities.

The costs of oral diseases are as high as \$136 billion approximately which contributes to the total yearly cost of dental care. Unplanned (emergency) dental treatment results in an annual loss of over 34 million school hours. Untreated oral illness costs the U.S. economy around \$45 billion estimated in lost productivity every year. There were 2.1 million trips to the emergency room in 2017 for dental issues. For children, Medicaid covers around 69% of these visits, and for adults, it covers roughly 40.7%. Good oral health starts with growing children, and that continues to proceed with them as they grow into adults. Then it automatically becomes adult oral health. This is how it creates the financial burden of dental care on the country's economy. In the past from years 1993- 2013, Dental care for children and adolescents cost \$26.5 billion.

Approximately 70% of this total was spent on preventive services, including general checkups, cleanings, X-rays, and orthodontic care (such as braces). Besides the financial burden oral health can cause, it also comes into play for working adults of the country who can have low self-esteem due to oral health conditions and indirectly hamper the country's overall productivity. Statistics show that almost 18% of working-age adults report that their mouth and teeth appearance influence their ability to interview for a job. This rate increases to 29% in the low-income population (*Cost-Effectiveness of Oral Diseases Interventions | Power of Prevention, 2020*). All these factors can affect the financial status of the country in different ways.

There are many benefits of using proven techniques such as different interventions to save money towards the cure of oral diseases. For instance, School Sealant Programs (SSPs) are beneficial when sealants are applied to children who are at high risk for tooth decay. SSPs provide benefits that outweigh their costs, after two years these programs start to pay for themselves. By giving sealants to the almost 7 million children from low-income families who require them, up to \$300 million in avoided dental care expenditures might be saved. It is predicted that providing fluoridated water for one year will prevent \$6.5 billion in direct and indirect treatment expenditures. Communities with fluoridated water save an average of \$32 per person-year by preventing the need for cavity fillings. An estimated \$20 for every \$1 invested in communities with 1,000 or more residents or more. If dentist offices evaluated patients for diabetes, hypertension, and excessive cholesterol and referred them for treatment, the U.S. healthcare system might save up to \$100 million a year (*Cost-Effectiveness of Oral Diseases Interventions | Power of Prevention, 2020*). Thus, money invested in the prevention of oral diseases can outweigh the cost of OHD.

## B. Programs and Policies Initiated by California State to Improve Oral Health

To understand the programs and policies for oral health improvements that are taking place across U.S. and California, it is important to look back at the last 20 years to understand the foundation of the work.

### History of Dental Care and Development of Policies/Programs in the U.S.

Looking back in the year 2000, the Surgeon General of the U.S. Richard H. Carmona, enlightened the importance of oral health for general health and wellbeing. He called upon the nation's policymakers, community leaders, private industry and agencies, health professionals, media, and the public and proclaimed it. He also announced to make changes in perceptions, overcome barriers, build the science base, and increase oral health workforce diversity, capacity, and flexibility (California Oral Health Plan, 2018). Several years later in 2011, *Advancing Oral Health in America* report was issued by the Institute of Medicine (IOM). After that, the Department of Health and Human Services (HHS) was encouraged by this report and focused on prevention. The main goals of the HHS department were OHL, enhancing the delivery of care including interprofessional, team-based approaches to the prevention and treatment of oral diseases; expanding research; and measuring progress. HHS created a strategic Oral Health Framework for the years 2014-2017 with these goals (California Oral Health Plan, 2018). Governmental entities from the state and local levels of California, including foundations, academic institutions, professional and advocacy groups, and other organizations, have cooperated, and shown a commitment to enhancing oral health in the state. This is how the changes for oral health in America started.

### Healthcare Plans in the U.S.

In the U.S. healthcare system, there are different healthcare plans such as government-based, employer-based, and individual health insurance plans. Throughout the country, there is a federally funded healthcare program which is known as Medicaid. In California, this Medicaid program is called Medi-Cal and it is managed by the Department of Health Care Services (DHCS) and the federal Centers for Medicare and Medicaid Services (CMS). Eligible Medi-Cal beneficiaries can get coverage for a variety of medical expenses such as doctor appointments, prescription drugs, dental checkups, rehabilitation, surgery, and hospital stays. This program offers medical care to low-income persons for little to no cost. Another state agency that provides health coverage is the Covered California Health Exchange. It provides subsidized Obamacare plans. This agency was established for legal residents and citizens of the country to get coverage through the marketplace to comply with the Obamacare/Affordable Care Act

(ACA). When the law was enacted in 2010, each of the 50 states had to choose whether to establish a state-administered health insurance exchange or to allow enrollment through a federally controlled exchange. California decided to establish its exchange and named it "Covered California"(Covered California). Both Covered California, which is the state's health insurance exchange, and Medi-Cal, which is the state's Medicaid program, have increased their dental insurance coverage options.

### CDPH Oral Health Plan 2018-2028

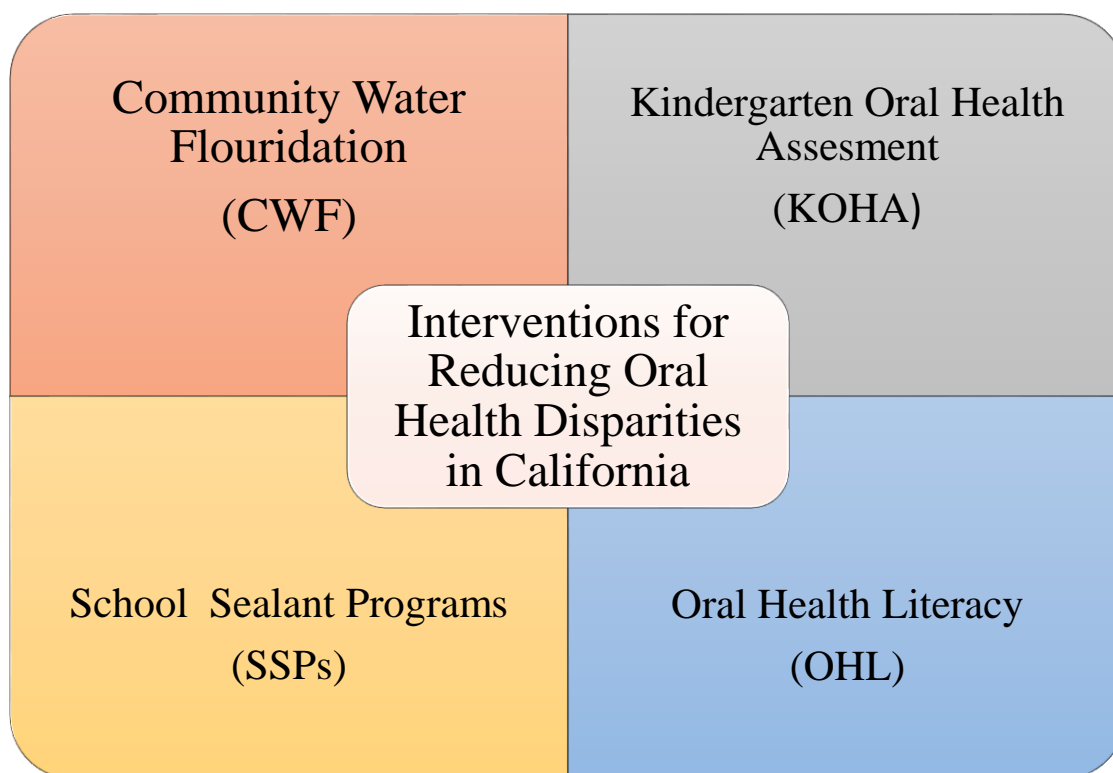
There have been several recent developments that are encouraging, including the reinstatement of the California Department of Public Health (CDPH)'s Oral Health Program (OHP), the improvement of the Medi-Cal program's dental services, and the expansion of dental insurance coverage under Covered California for kids and families (California Oral Health Plan, 2018). Healthy People 2020 is a collection of goals and objectives intended to improve everyone's health and serves as the framework for national and state-level initiatives targeted at promoting oral health and preventing disease. Preventing and controlling oral and craniofacial diseases, disorders, and injuries while enhancing access to related services are the main objectives of the oral health objectives (California Oral Health Plan, 2018).

To create the California Oral Health Plan 2018–2028, the DHCS and CDPH collaborated in 2015 to convene an advisory committee made up of state and local government organizations, advocacy and professional groups, foundations, academic institutions, and other partners. The advisory group used the assessment's findings as well as research from federal, state, and local studies to determine the main oral health problems in California while creating the plan.

Numerous hurdles prevent access to care such as a lack of implementing evidence-based models of oral disease prevention and dental treatment. There is also a lack of impactful and persistent messaging to promote oral health improvements. These issues include a lack of infrastructure that can support culturally sensitive community-based oral health programs. The Plan offers a direction for oral health advancements in California over the following ten years. The state's oral health strategy is supported by \$30 million every year, which is provided by Proposition 56 California Healthcare, Research, and Prevention Tobacco Tax Act of 2016 (California Oral

Health Plan, 2018). Many people and families will be able to obtain oral health care treatments due to the expanded coverage. The main interventions done by OOH are discussed in the a, b, c, and d sections of the paper.

### 1. Main Interventions of CDPH-Office of Oral Health (OOH)



(Figure 1.1 Interventions for reducing Oral Health Disparities in California by CDPH-OOH)

#### a. Community Water Fluoridation (CWF) Intervention

Community water fluoridation is the process of adjusting the amount of fluoride in drinking water to a level recommended for preventing tooth decay. The recommended level is 0.7 milligrams of fluoride per liter of drinking water is considered safe for drinking water to prevent tooth cavities (*Public Health Service (PHS) Recommendation | FAQs | Community Water Fluoridation |*



*Division of Oral Health | CDC, 2020*). Fluoride's activities are mostly topical for both adults and children, according to laboratory and epidemiologic research, and they can prevent dental caries primarily following tooth eruption into the mouth. These systems consist of (1) Inhibition of bacterial activity in dental plaque (2) Inhibition of demineralization and (3) Enhancement of remineralization (*Achievements in Public Health, 1900-1999: Fluoridation of Drinking Water to Prevent Dental Caries, 2019*).

According to early research, fluoride reduced dental cavities by between 50% and 70%. According to an analysis of studies on the effectiveness of water fluoridation completed in the U.S. between 1979 and 1989, caries reduction among adolescents ranged from 8% to 37%. Fluoridating water is extremely advantageous for low socioeconomic communities. In comparison to higher affluent communities, these populations have a disproportionately high rate of dental cavities and limited access to fluoride from other sources and dental treatments. Fluoridating the water supply could help close these gaps in oral health (*Achievements in Public Health, 1900-1999: Fluoridation of Drinking Water to Prevent Dental Caries, 2019*).

Costs of water fluoridation range from 31 cents per person per year on average in U.S. municipalities with more than 50,000 residents to \$2.12 per person on average in places with fewer than 10,000 residents (1988 dollars). According to one economic analysis, fluoridation and fluoride-containing products contributed significantly to the prevention of dental cavities, which reduced dental care costs in the U.S. from 1979 to 1989 by an estimated \$39 billion (1990 dollars). In 2018, 207,426,535 persons, or 73.0% of the U. S. population on community water systems, had access to fluoridated water (*Achievements in Public Health, 1900-1999: Fluoridation of Drinking Water to Prevent Dental Caries, 2019*). About 23 million Californians (59.3% of the population) have access to fluoridated water. This is a considerable improvement from 17% in the 1990s (*Is My Water Supply Fluoridated? n.d.*). Most Americans favor fluoridating municipal water supplies. Although the percentage of Americans who consume fluoridated water rose rapidly from 1945 to the 1970s, the rate of growth has slowed considerably in recent years. This slowing of fluoridation spread is caused by several variables, including: 1) Fluoridation may no longer be essential or effective, according to the public, some scientists, and politicians; 2) acceptance of water fluoridation may necessitate political procedures that

implement this public health measure challenging; 3) to sway public opinion, opponents of water fluoridation frequently make unfounded claims about the harmful effects of fluoridation; 4) many of the public water systems in the U.S. without fluoridation typically serve small populations, which raises the per capita cost of fluoridation. Overcoming these obstacles and increasing fluoridation in the U.S. in the twenty-first century will be extremely difficult (*Achievements in Public Health, 1900-1999: Fluoridation of Drinking Water to Prevent Dental Caries*, 2019).

CWF reduces dental caries across demographics, and the Community Preventative Services Task Force (CPSTF) supports it. It is a safe and economical technique for preventing tooth decay. One of the goals of CDPH-OOH is to enhance access to CWF, by the upkeep and expansion of state, local, and tribal CWF programs. With the promotion of Centers for Disease Control and Prevention (CDC) training and technical help resources, it is promoting adherence to proper water fluoridation methods. A new fluoridation tablet and feeder system is now available, making it possible to fluoridate smaller public water systems at a cost that is constant, low maintenance, and reasonable (California 2019 Third Grade Smile Survey, CDPH, June 2021).

b. Kindergarten Oral Health Assessment (KOHA) Intervention

The kindergarten oral health examination, which is compulsory in California, aids in identifying kids who have dental problems and helps them locate dental care. Also, it offers crucial information about the state of children's dental health in California. Dental professionals are being trained to support kindergarten dental assessments through a partnership between CDPH and regional oral health initiatives. They provide technical support to execute procedures, monitor development, and attempt to enhance the effectiveness and adherence to the kindergarten dental assessment (California 2019 Third Grade Smile Survey, CDPH, June 2021). Kindergarten Oral Health Requirement per California *Education Code* Section 49452.8 (Assembly Bill [AB] 1433) assists schools in identifying kids who have untreated dental disease and assists parents in setting up a dental home for their kids. A pupil is better prepared for learning and greater academic performance in school thanks to the kindergarten dental evaluation requirement (California 2019 Third Grade Smile Survey, CDPH, June 2021).

According to Senate Bill (SB) 379, the AB 1433-mandated Kindergarten Oral Health Assessment has been improved to provide better dental health outcomes data that can be used to evaluate the effectiveness of preventative and intervention programs. Following SB 379, schools conduct onsite screening and satisfy KOHA with passive permission; in this case, parents or guardians of kids must inform the school that they do not want their child to be screened. Another approach that schools can assist minimize dental illness in children is through KOHA, which also improves school readiness, lowers chronic absenteeism, and connects kids to a source of dental treatment (California 2019 Third Grade Smile Survey, CDPH, June 2021).

Gathered data based on KOHA can help state and county-level oral health programs. This will help determine the problematic areas for children's oral health, it would also show the magnitude of the problem raising or falling. That can help the county and state make an informed decision on where and how to consolidate their efforts for oral disease prevention of children (California 2019 Third Grade Smile Survey, CDPH, June 2021).

California Dental Association (CDA) is a nonprofit professional organization that represents organized dentistry in California. The mission of the CDA is to support the member dentists in their practice and service the public through education, innovation, advocacy, and related programs (*California Dental Association (CDA)*, n.d.). On its website, there is a KOHA toolkit that provides parents, educators, and dental professionals with a wealth of resources on the evaluation as well as data that has been gathered from schools.

### c. School Sealant Programs (SSPs) Intervention

Based on research showing that school-based sealant delivery programs are successful at preventing child tooth decay, the CPSTF supports them. Examples of a community-clinical linkage paradigm where screening, counseling, application of topical fluoride and sealants, referral, and follow-up all take place in a school environment include school-based and school-linked dental sealant programs. Children are given access to a dental facility where they can continue to get clinical services. The Women, Infants, and Children (WIC) Dental Days and Virtual Dental Home model are two community-based programs that CDPH is developing in collaboration with local oral health programs to broaden the reach to a variety of community

settings and dental care providers (California 2019 Third Grade Smile Survey, CDPH, June 2021).

When applied to the chewing surfaces of the rear teeth (molars), dental sealants are thin coverings that can stop cavities (tooth decay) for a very long time. Sealants defend the chewing surfaces from cavities by encasing them in a barrier that keeps food and germs out. Once used, sealants offer 80% protection against cavities for two years and 50% protection for up to four years. First molar cavities are about three times as common in children aged 6 to 11 who do not have sealants than in those who do. Sealants may be applied by a dentist, dental hygienist, or other trained dental practitioner, depending on state laws and regulations. This can be carried out in dental offices or public places like schools utilizing mobile dental equipment.

Children who are less likely to receive private dental care can benefit greatly from school sealant programs. Programs that provide sealants to kids with a high risk of tooth decay also result in financial savings. More than \$11 is saved on dental care costs for every tooth that is sealed. More than 3 million cavities might be avoided and up to \$300 million in dental care expenses could be avoided if sealants were applied in schools to the almost 7 million low-income children who do not yet have them. CDC presently provides funding to 20 states and one territory to support the organization of school sealant programs and the infrastructure of fundamental oral health initiatives (*School Sealant Programs*, 2019).

Children using portable equipment in a school setting are given pit and fissure sealants by school sealant programs. School sealant programs concentrate on giving sealants to kids aged 6 to 11 or in grades 1 through 5, while each state-coordinated program may have a different structure. A typical sealant program will spend one to three days at each school. Children will be examined for oral disease by a qualified dental expert. Also, they look to determine if the kids already have sealants and, if so, how effectively they are holding them in place. Dental sealants will be applied, often at no cost, to children who do not already have them and who have a signed permission form from their parents or legal guardians. Any young patient who requires further follow-up care will be referred to a nearby dentist. Children who are more prone to get cavities and are less likely to get private dental treatment may especially benefit from school sealant programs. Programs

often focus on schools where a higher proportion of students qualify for federally funded free or reduced-price meal programs (*School Sealant Programs, 2019*).

From 1999 to 2004 to 2011 to 2016, sealant use grew by around 75% among children with low income and stayed at about 43% among those with better incomes. This useful intervention is still underutilized, though. Fewer than half of kids between the ages of 6 and 11 have dental sealants. 2 Children from low-income homes are twice as likely to have untreated cavities and 15% less likely to receive sealants. 2 Untreated cavities may result in discomfort, infection, and issues with speaking, chewing, and learning (*School Sealant Programs, 2019*).

#### d. OHL Intervention

OHL is defined as a level to which people can collect, absorb, and understand fundamental health-related information and services that are necessary to make informed decisions about oral health. It shows that by increasing health literacy people are better caretakers of the health of their own and loved ones (California Department of Public Health, n.d.).

Poor health outcomes are influenced by low health literacy, which is especially problematic for vulnerable demographic groups. Effective oral disease prevention, diagnosis, and treatment may be hampered by patients' poor oral health literacy and dental professionals' poor communication abilities. The University of California, Berkeley's Health Research for Action Center has been hired by the Office of Oral Health to develop materials for a toolkit on oral health literacy, lead dental team training, and put strategies in place to increase the adoption of knowledge about oral health literacy. Information on certain tactics, such as using plain language communication, visual aids, and drawings, the teach-back method, and fostering a welcoming and shame-free clinical setting, will be included in the toolkit. Additionally, to support kindergarten oral health assessment, water fluoridation, school-based/linked programs, and tobacco cessation counseling, the California Oral Health Technical Assistance Center (COHTAC) at the University of California, San Francisco (UCSF) has developed resources for regional health departments and dental professionals. A campaign called Smile California has been launched by the Medi-Cal

Dental Program to get more participants to use their dental insurance (California 2019 Third Grade Smile Survey, CDPH, June 2021).

### *OHL Toolkit*

This collection of materials for oral health professionals includes an introduction to what oral health literacy is and why it's important, as well as useful tools and step-by-step instructions for enhancing dental practices' health literacy. This toolkit was created in conjunction with the California Department of Public Health Office of Oral Health and is based on research done by Health Research for Action, a research institution affiliated with the School of Public Health at UC Berkeley.

### *Tooth Decay Assessment of Third Graders*

Apart from the interventions mentioned earlier, CDPH-OOH has also done a tooth decay assessment. They evaluated tooth decay in third graders throughout the state in 2018–2019. This was the first statewide analysis of pediatric dental decay from the years 2004–2005. It was finished in collaboration with the Los Angeles County Department of Public Health and the California Department of Education. According to this analysis, tooth decay affects 61% of third graders in California. One of the main conclusions is that there are significant racial/ethnic disparities in tooth decay and untreated caries, as well as socioeconomic disadvantages. The California Oral Health Plan 2018-2028's implementation strategies are being carried out by CDPH in collaboration with regional, state, and local partners. With a budget of \$18 million, CDPH supports 59 local oral health programs to execute community-based interventions and support statewide activities to support local infrastructure.

## 2. California State Medi-Cal Programs for Dental Care

### *DHCS- Community Health Worker (CHW) Benefit*

The DHCS is a department within the California HHS agency that provides individual healthcare service delivery programs, including Medi-Cal, for low-income people (*About Us | DHCS*, 2019). CHWs benefits started in July 2022 by this department (*Medicaid Coverage of Community Health*

*Worker Services*, n.d.). The function of CHW is to promote physical and mental health by preventing disease, disability, and other health issues and their progression. Medi-Cal includes CHW services as a benefit and it will pay for CHW treatments if they are recommended in writing by a doctor or another licensed healer acting within the limits of their state-mandated scope of practice. CHWs along with the prevention of chronic conditions and infectious diseases can address oral health. These services include health navigation, health education, screening and assessment, and individual support. This can be a good lever point regarding mitigating OHD among the Medi-Cal population (*Medicaid Coverage of Community Health Worker Services*, n.d.)

A CHW is a front-line public health professional who is a respected part of the community they serve or who has an extremely deep awareness of it. Between the community and health/social services, the worker can act as a liaison, connection, or intermediary, facilitating access to services while also raising the standard and cultural sensitivity of service delivery. An additional goal of a community health worker is to increase health literacy and self-reliance through a variety of initiatives such as outreach, community education, informal counseling, social support, and advocacy (American Public Health Association, 2019).

#### *Initiatives of the Cal-AIM Incentive Payment Program, Community Support, and Improved Care Management*

To improve oral health outcomes for Medi-Cal members statewide, including both children and adults, DHCS is dedicated to increasing the accessibility of Medi-Cal dental services. For kids who qualify for Medi-Cal, DHCS set a target of at least 60% dental utilization. The following reforms will be implemented statewide by DHCS to improve care and be in line with national dental care standards. This will help the state move closer to attaining that objective and build on the lessons learned from the Dental Transformation Initiative (DTI) (*DHCS-CalAIM-Dental*, n.d.).

#### *Smile California-Medi-Cal Dental Program*

It is California's Medi-Cal Dental program and currently offers dental services as one of the program's many benefits. People who are eligible for Medi-Cal benefits are issued a Medi-Cal Benefits Identification Card (BIC) (*Smile California Medi-Cal Dental Program*, n.d.). This BIC serves as Identification for Medi-Cal members. Depending on the availability of the provider a

person can show the BIC to a dental provider and get dental services (*Smile California Medi-Cal Dental Program*, n.d.). The healthcare system in the U.S. is very complicated, and a lot of people have a hard time figuring out how to establish a dental home (Dental Insurance and provider). It is hard to find a trusted dental provider in Medi-Cal. This is one of the gaps in the health care system.

Children in households with household incomes up to 266% of poverty and pregnant women who are covered or eligible for the Medi-Cal Dental Program receive comprehensive coverage. Adults who earn up to 138% of the federal poverty threshold receive more limited benefits. The largest state-based public dental insurance program in the U.S., Medi-Cal Dental has more than 12.8 million enrollees. In California, the program is used by one-third of adults and half of all children. Members of Child Medi-Cal are those who fall within the age range of 0 to 20. Members of adult Medi-Cal must be above 21 to qualify. The Medi-Cal Dental Program offers its participants coverage for standard, preventive, and restorative dental care. Members receive these services for no cost or at a minimal cost. Delta Dental of California oversees managing the Medi-Cal Dental Program fee-for-service plan. The DHCS has reinstated adult dental benefits for qualified members with full-scope dental coverage who are 21 years of age or older as of January 1, 2018.

### C. Gaps

This research paper thoroughly explores OHD, programs, and policies put in place at the California state level. CDPH-OOH has funding available to support LOHPs and oral health is improving. This office is also working hard to implement evidence-based practices and scientifically proven techniques to help communities in need. Apart from this office, another governmental agency such as DHCS is also expanding its benefits and coverage for low-income populations. It also indicates that oral health is now considered vital and in the next couple of years, these efforts would project their outcomes on the population of interest. As discussed earlier in the paper OHL is key to improving the OHD; It is also very important to understand the distinction between the current OHL efforts taking place and what is further needed to build upon that. OOH in collaboration with UCSF-COHTAC has developed many different toolkits to help people understand the importance of oral health, they are available on their websites. Despite this material, so many missing components are there which hinder the delivery of this OHL piece



across many minority groups. Firstly, these toolkits need to be in many languages and should be very specific talking about current interventions and resources available to the public. Secondly, these OHL materials should reach our targeted audience via various credible sources. Lastly, while doing public outreach to the population of interest, it is important to establish the connection and trust among these minority groups to help take those interventions to the next level of its success.

OHD is very closely associated with the literacy rate of the population. Oral health has been historically underestimated and considered separate from overall health. Thanks to ACA, there has been a revolutionary change in the U.S. healthcare system. It made many changes and expansions in health care since then. With all the positive changes implemented by the government, now it is the public's job to utilize them to improve oral health outcomes. With all the benefits and coverage put in place, people need to be aware of services available to them at low or no cost as part of public health interventions. This knowledge would help them in practicing good oral hygiene habits, going to doctor's appointments regularly, drinking fluoridated tap water, and parents opting in for KOHA and SSPs. With those positive changes in their behavior and attitudes people will be able to protect themselves and loved ones from oral diseases. This will help bridge some of the gaps our nation is currently facing regarding the disease burden and OHD. With more knowledge and awareness people would be able to comprehend better about their oral health and overall health.

### III. Methods

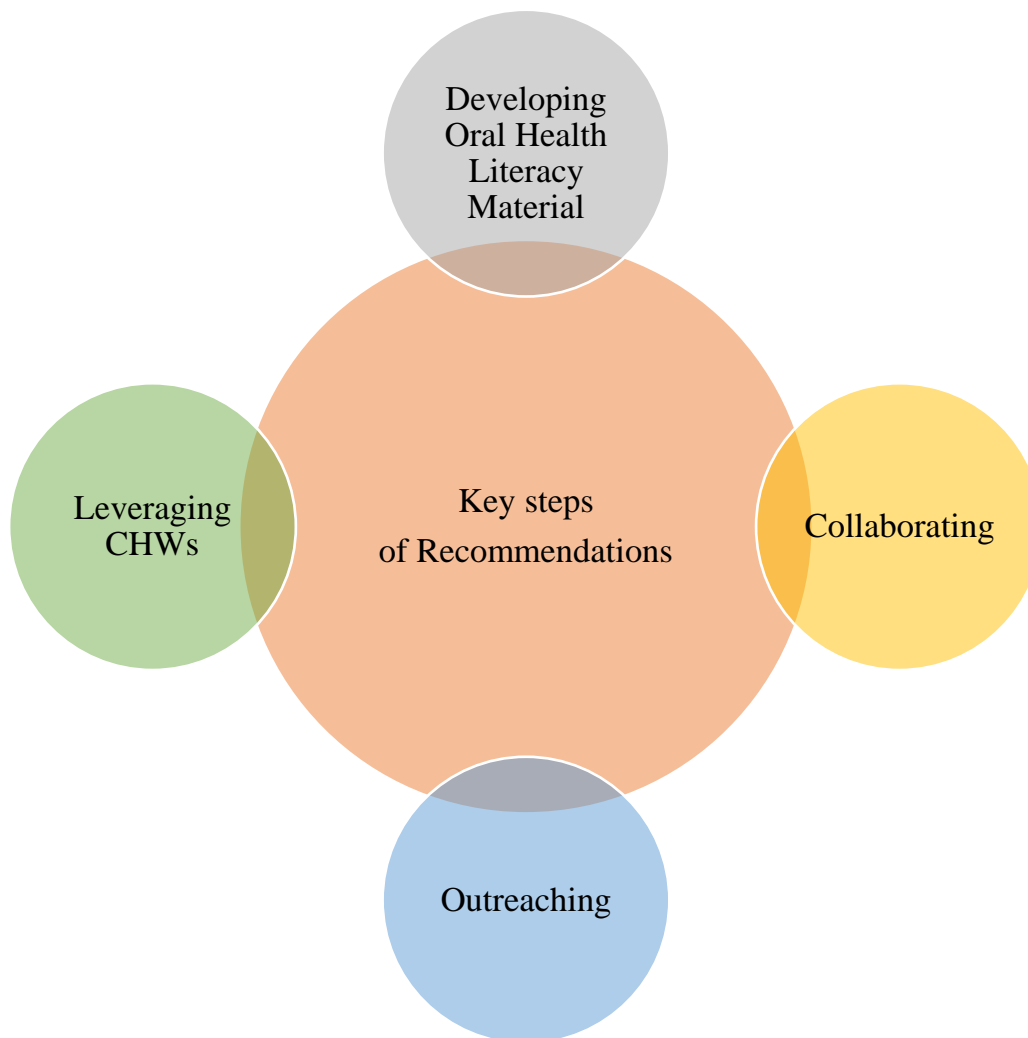
For gathering the data for this research paper, I searched on Google and PubMed. Key terms of the search were Oral Health Disparities (OHD), Tooth decay, Tooth cavities, Early Childhood Caries (ECC), Oral disease, Oral hygiene, and Gum (Periodontal) diseases. After running this search, I got articles showing OHD worldwide and across U.S. I also narrowed them down to California to compare and see the data. It was hard for me to find too many peer-reviewed articles on PubMed. I looked up different government websites to gather information about the work being done. I searched on specific public health websites such as CDC, NIH, CDPH-OOH, DHCS, HHS, HRSA, Children Now, Cal-AIM, Medi-Cal Dental Program (Smile California), Surgeon General Report-2000, and 2021. I reviewed various government documents and used them for my paper. After reviewing the literature on OHD and different programs, I was able to come up with an understanding of different specific interventions of oral health done by CDPH-OOH. Then I did my second part of research specifically on those interventions. Keywords for that search are Community Water Fluoridation (CWF), Kindergarten Oral Health Assessment (KOHA), School Sealant Program (SSP), and Oral Health Literacy (OHL) in California. So ultimately, I had three different types of searches for my paper: the first one being broad for OHD and its impacts, the second one on the department's work for oral health in California, and the third one is very specific oral health interventions in California.

#### IV. Recommendations

As discussed earlier in the paper about the different interventions happening in California to reduce OHD, my recommendation is focused on the OHL. This is an evidence-based intervention, where studies show a strong correlation between OHL and oral health in the population. According to studies, dental caries prevalence and experience were found to be higher in children whose parents had low OHL in a systematic evaluation of 11 research. Adults with lower levels of OHL have more mobile and missing teeth (Colgate Collins, 2019). Low OHL was also linked to dental phobia and nighttime bottle feeding. On the other hand, high OHL was linked to increased oral health knowledge. According to another survey, 44% of people with low OHL, and 77%, of people with high OHL had seen the dentist in the previous year. Different OHL levels are reflective of oral health awareness. Moreover, Poor parental engagement has been linked to childhood dental anxiety, which affects oral health and related quality of life (*Colgate Oral Health Network - Free Dental Continuing Education*, n.d.)

California has a very diverse population, it is evenly distributed among all races and ethnicities: The 2020 Census shows that 39% of Californians are Latino, 35% are white, 15% are Asian American or Pacific Islander, 5% are Black, 4% are multiracial, and less than 1% are Native American or Alaska Native (*California's Population*, n.d.). The State's population dynamic is changing, with an increasing number of Latino children and an aging White population. More than half of young Californians are Latinos (aged 24 and younger), whereas more than half of people 65 and older are White (*California's Population*, n.d.). California's diversity is a source of OHD since health disparities lie among minority groups the most. Thus, the recommendations would also be more meaningful for its targeted population. A very tailored OHL and outreach would be beneficial for a hard-to-reach population with an increasing understanding of oral diseases and ways to prevent them. Five other states in the U.S. have comparable diversified populations such as Hawaii, New Mexico, Texas, Nevada, and Maryland (*California's Population*, n.d.). Similarly, these five states can also benefit by adopting the OHL recommendations.

## A. Key Recommendations Steps



(Figure 1.2 Key steps of Recommendations to mitigate OHD and improve oral health)

1. Developing Educational Material on Oral Health Literacy and Interventions (Infographic, brochure, flyer, and video)

By using all the existing resources which are prepared by CDPH-OOH, creating new educational material that is very simple, comprehensive, and at the level of a 6th-grade reader. This educational material should have nice visual aids and images for ease of interpretation. This material should briefly talk about the disparities existing in today's date, then mention

different interventions happening at the state level and what these interventions mean for different populations. Depending on the intervention, the target population may vary. Such as for water fluoridation the target population is people of all age groups; for KOHA and school sealant programs then the target population is parents/legal gradians. The material should have call-to-action steps for the intended audience to follow and instructions on how to use these available interventions. This material should be in threshold languages (including Arabic, Armenian, Cambodian, Chinese, English, Hindi, Farsi, Hmong, Japanese, Korean, Laotian, Punjabi, Russian, Spanish, Tagalog, Thai, and Vietnamese). Developing this material about the various oral health interventions would help people understand what type of work is done at the state level and why it is important. Once this material is disseminated to the target population, it can improve the utilization of fluoridated water, KOHA, and School sealant programs.

Moreover, there should be material about basic oral health home care. This material should include how oral health is an integral part of overall health. Demonstrating how Some of the untreated oral health conditions can add to chronic illnesses such as diabetes and heart diseases and make them worse. This material should include home care instructions such as brushing teeth 2 times a day for 2 minutes and should see a dentist 2 times a year. Alongside brushing flossing should be done too for removing the debris stuck between the teeth. Baby teeth should be wiped and should see a dentist after the emergence of the first tooth into the mouth (Around 6 months of age). This information can help people change the attitudes, beliefs, and behavior they normally have which is destructive to good oral health.

## 2. Enhancing Public Outreach and Campaigns

### Outreach via Written Material

After developing the material mentioned above now comes the phase to disseminate this information to different stakeholders. Once the information material is put together in the form of a Pamphlet, brochure, flyer, or infographic it should be distributed to a wide range of stakeholders such as Primary care providers (Doctor's offices), Community Health Centers, Federally Qualified Health Centers, grocery stores, community-based-organizations, and faith-based-organizations to reach a wider audience across different cultures. For this outreach, city

selection can be done based on low socioeconomic status and rural areas where health disparities are often seen.

*Outreach via Collaborating across California States' Safety Net Programs such as Medi-Cal, Women, Infant, and Children (WIC), CalFresh*

CDPH-OOH should work collaboratively with various state programs such as Medi-Cal, CalFresh, and WIC programs. All these programs serve poor and disadvantaged families with a different approach. The first safety net program is Medi-Cal, which is a state healthcare program. The second safety net program is CalFresh, it is the most important safety net against hunger, and it is California's largest food program. Sometimes it is referred to as SNAP or Supplemental Nutrition Assistance Program. It offers low-income people and families monthly food payments and generates economic benefits for local areas. The third safety net program is WIC, which helps especially with disadvantaged and poor communities women who are either currently pregnant or were within the last six months; it also includes individuals with 5 years and younger children (*Women, Infants & Children Program*, n.d.). It provides a health coverage program that helps families throughout the state by providing healthy foods, Nutrition education, Breastfeeding support, and referrals to other community services.

The first recommendation is that OOH should work collaboratively with Medi-Cal, CalFresh, and WIC programs and disseminate all the information material to them. All these programs must coordinate internally and designate their work as per the scope of each program. Such as the WIC program should take the lead in implementing new recommendations since it is specifically for pregnant women or families who have younger kids. In WIC, they should focus on the video modality of OHL outreach. Normally, in this program women that come to the office to get their food supplement checks every month are supposed to participate in educational videos and materials. Just like other informative videos about kids' healthy food, and breastfeeding they have in their program, this OHL video can be incorporated into the curriculum. This will meet the criteria of our targeted audience. They can also let their friends and families know about the resources too. The second program Medi-Cal should disseminate pamphlets and flyers that emphasize oral health home care practices. This should also include recommendations to see the dentist in a year; current state interventions; and letting communities know about the dental coverage they can qualify for. The last one is the CalFresh

program, this program is related to food, therefore they should disseminate pamphlets and flyers that talk about healthy food choices to prevent cavities in children. They should mention the quantity of added sugar present in store-bought juices, ketchup, and other similar food items; it should also emphasize reading labels before buying the products; it should also mention the difference between eating natural sugar VS added sugars. Thus, all these three safety net programs would be able to help the same group of people but in very different ways. This kind of collaboration is internally with safety net programs and externally with OOH would make sure that the right message is reaching the same population. collectively, this would serve the hard-to-reach population in a meaningful manner.

### 3. Leveraging CHWs for Outreach and Connecting with a Dental Provider

CHWs are trusted health professionals who are culturally and linguistically competent to serve certain race/ethnic groups addressing their healthcare needs. It is proven that CHWs can help reduce the symptoms and severity of chronic conditions. A study of CHW home visits for Medicaid-enrolled children with asthma found that the program increased symptom-free days and reduced urgent healthcare use and produced a positive return on investment (Campbell et al. 2015).

Since community health workers' benefit is effective since July 2022 by DHCS, the recommendation is to leverage that benefit to reach people who are diverse based on their race/ethnicity. CDPH-OOH strives to improve the oral health of all Californians by supporting a total of 61 Local Oral Health Programs. On the other hand, DHCS provides health care services to low-income people. Both governmental agencies have the same missions, and they can establish partnerships. OOH has a rich source of experts who are licensed dentists, hygienists, and public health practitioners with many years of work experience. They are also partners with UCSF-COHTAC which provides them with technical assistance. Collectively they can make a strategic plan on how to implement this CHWs benefit for oral health prevention. After that, they can recruit CHWs who are culturally competent for the hard-to-reach population and train them with informational material and videos. Once their training is done, CHWs can go into the neighborhoods and do outreach through cultural humility, competence, and empathy to educate parents on how to prevent ECC in their kids and advice

on keeping teeth healthy. They can also emphasize using interventions and health care navigation. CHWs are proven to help communities with diverse backgrounds and reduce health disparities.

The second place where CHWs can be very instrumental is at the state's dental program, Smile California. Often it is hard to find trusted dental providers for the Medi-Cal population. In this situation, CHWs can help people navigate the services provided to them and connect them to a dental provider. The recommendation is that this agency should hire CHWs to better serve this population. This can result in more trust among certain race/ethnic groups where most OHD are found. Also, it can lead to more utilization of available resources to prevent oral diseases.

## B. Evaluation

### *Developing Survey Questionnaires and Taking Surveys*

Alongside the information material, very basic knowledge of oral health survey questionnaires should be developed. It should be developed in such a way that the questions included in this survey should have their answers in the developed outreach material. The target location is the doctor's office and the WIC program center. Very often these facilities have another questionnaire to fill out before the appointments start. Along with those questionnaires, this oral health survey can be administered to parents/guardians of children. The provider can briefly talk about the training and survey at the end of the visit. The educational video should be played afterward. Once the video is done, they should be given the same questionnaire once again to fill out. Before participants leave the facility, this material should be given to them. After gathering all the pre-training and post-training surveys, data can be gathered and compared with each other to see the potential effectiveness and shortfalls of the training.

### *Updating the Material and Fine-Tuning it for Quality Improvement*

The developed material should be periodically updated since coverage, technology, and techniques of administering dental care change from time to time. The material should be updated every six months. After collecting a substantial amount of data, it should be evaluated and reported for what works and what doesn't work. Ultimately, this material can be fine-tuned based on the evaluation and its future needs.



## C. Funding

### Budget Allocation Request

There is main funding coming to CDPH-OOH of 30 million dollars every year from Tobacco tax money. OOH is in partnership with UCSF-COHTAC and DHCS. These organizations can work together and develop the OHL material with the funding money, expertise, and technical assistance. This funding may not be sustainable for the proposed recommendations. Thus, the better way of getting the desirable funding would be budget ask allocation to California state. That way these efforts have their separate fund to smoothly implement the recommendations across all the safety net programs.

### Health Resources and Service Administration (HRSA) Federal Grant

Can also get additional funding by applying for the HRSA grant. This is for People who are geographically isolated, economically vulnerable, or medically ill can receive fair healthcare through HRSA services (2021 Agency Overview, 2022).

## D. The Rationale for Recommendations

After reviewing all the different approaches to reducing OHD in California, it is evident that OHL lies as the key component of all the different alternatives. OHL would bring awareness to the public that they would understand critical oral health as a part of the rally health of well-being.

Once people have a better understanding and more cultural humility to go and see a dentist and follow the recommendation our nation would be more reliant on preventive services than spending takes place to cure the disease. This will be a cost-effective way for a nation like the U.S. which is aging and very diverse.

With more outreach and education about oral health, people will be able to how to use dental services, and where to find their resources. With more information, they will be able to benefit more from other interventions such as CWF, KOHA, and SSPs.

## V. Implications and Discussion

### OHL Implications for California

As discussed, earlier the 2020 census shows that in California 39% population is Latino, 15% is Pacific Islander, 5% is Black, 4% is multiracial, and less than 1% is Native American. All these diverse race/ethnic groups comprise 75% of the total California population. On the other hand, only 35% comprise the White population (*California's Population*, n.d.). California has a significant number of minority groups, as discussed in the literature review of the paper this is where most of the disease disparities live. Despite having OHL as one of the key interventions of CDPH-OOH, it is critical to understand that still there is a need for OHL and outreach which are very specifically tailored for this hard-to-reach minority groups of California. With the implementation of these interventions, OHD can be alleviated in the upcoming years.

The U.S. has a complicated healthcare system and often it is very difficult to comprehend that information and connect to the healthcare provider. Statistics show that thirty percent of U.S. parents have difficulty understanding and utilizing health information (Yin et al., 2009). This can be reduced if the recommendations are implemented. Recommendations will utilize CHW's benefit for helping minority groups that struggle to find a dental provider and navigate through the health information. By doing that more people will be able to connect to the dental providers in Medi-Cal and would also be able to navigate through their health care benefits better.

With the dissemination of oral health intervention material people will be more compliant with the services they get at low-cost or no cost. Since lower health literacy skills often lead to poorer health status, unhealthy behaviors, and poor health outcomes (Lee et al., 2011). With the given recommendation people will be able to utilize fluoridated water and more parents/guardians would opt for KOHA and school-based sealant programs to protect their kid's teeth. This will increase the utilization of the services and reduce the disease burden eventually. With the knowledge and understanding of oral health home care and regular doctor's visit, it is anticipated that oral health outcomes would be improved. Self-efficacy and self-care can mediate the effect of health literacy on health status (Osborn et al., 2011). By prevention and education about oral diseases cost of the emergency care can be saved. Dental issues lead to more trips to the hospital, general anesthesia-requiring procedures, and hospital stays.

According to the Centers for Disease Control, Medicaid costs for operating room visits range from \$1,500 to \$5,000 per child annually (Bress, 2013).

### *OHL Implications for U.S.*

Once recommended approaches are adopted by other states in U.S. California can model the OHL intervention and its success. For example, the way California has decades of leadership to protect its environment and the health of people. California is home to some of the strongest environmental protections. It is successful in reducing greenhouse gas emissions per capita from the year 2000-2018. Similarly, California can take the lead in reducing OHD in low-income populations. For adopting the interventions, Medicaid in other states should collaborate with their state's safety net programs and use it as a platform to connect with the low-income population of Medicaid. This way so many others can benefit from California's success.

After reviewing the demographic of the total U.S. population, Hispanic/Latino Americans comprise 18.7% of the total population meaning they are the first largest racial minority group. There is a total of 40.1 million non-Hispanic black individuals living in the U.S. in 2021. They make up 12.1% of the nation's 331.9 million population. After Hispanic/Latino people, Blacks/African Americans make up the second-largest minority group in the U.S. Five other states have comparable diversified populations as California: Hawaii, New Mexico, Texas, Nevada, and Maryland (*California's Population*, n.d.). The way California can benefit from OHL, other states in the U.S. can also adopt the interventions and improve their oral health outcomes. Just like the OHD, there are other disease disparities as well. This OHL intervention can help model and reduce other healthcare disparities too in the country in upcoming years.

### *OHL Implications for Other Countries in the World*

The U.S. is a developed country still it has so many health disparities. So many Other countries in the world are still developing. OHL intervention can be adopted by other countries too and they can also benefit from it. It might not be 100% feasible for other countries to do so due to the resources available to them and different healthcare infrastructures and systems. Yet, OHL is very basic and educational it can be beneficial for them to adopt and follow. This can help reduce people's pain and make the world healthier.

### Limitations of the Recommendations

The recommended OHL intervention is mainly educational. Since it is exclusively educational it cannot treat any oral health disease itself. It can be useful in combination with other interventions. In a way, it is an indirect approach to control and mitigate oral health diseases and disparities. This type of intervention pivots on population engagement and understanding. It is reliant on the population's self-efficacy and personal beliefs. Unlike other interventions, this might not cause its impacts immediately. It can take a couple of years for us to see the results among the population. This type of intervention can be secondary or tertiary for the prevention of oral disease. The primary intervention is the treatment of oral disease. The educational material also needs periodic updates to follow the new guidelines and services provided by the state.

### Research/Program or Policy Implication

After the success of OHL, there can be more oral health prevention programs and policies implemented globally. Once people are more engaged and utilize their oral health resources, it will be easy to hone into other problems related to oral health. There have been many gaps regarding oral health found in the literature review. The first gap is about the surveillance and data collection of oral health. There is no recent data and surveillance to demonstrate and compare the progress of oral health in the last 5 years. Since the most recent CDPH-oral disease burden report is from 2017. There is a need for creating stronger data collection which can be reflective of the progress and changes made recently. The second gap is that there is a shortage of dental providers in rural areas. Currently, millions of Americans live in dental Health Care Provider Shortage Areas (HCPSAs). Due to this shortage, people living in that areas need to drive for so many hours to get dental care. Many of them don't get paid time off for dental visits. This can potentially hinder their regular check-ups and ultimately oral health outcomes. The third gap was that there is a need for building stronger infrastructure. This will address the HCPSAs issue and will support the good health of the public. Globally, surveillance and data collection will be helpful move the needle forward in the prevention process of oral health diseases. Apart from that more research work is needed to assess oral health disparities and make advancements in prevention. Programs and interventions California has such as CWF, KOHA, and SSP can also be adopted and implemented in other countries of the world.

## VI. Conclusion

Many programs have been launched in the last 20 years to better the oral health of young children in the U.S. Programs to address ECC in preschool children were started by dental professionals, researchers, policymakers, advocates, and many others because of the 2000 Surgeon General's report. These initiatives have had a significant impact on how we currently prevent and control dental caries in young children—from encouraging the first dental visits at age one to risk assessment and treatment delivery utilizing more modern methods and products, such as fluoride varnish. Also, several efforts supported the inclusion of oral health services in primary medical care. For instance, pediatric oral health specialists have collaborated with doctors to create protocols to care for infants and toddlers at well-child visits, which often take place numerous times before a kid is three. Finally, modifications to Medicaid and the Children's Health Insurance Program (CHIP) have significantly increased the number of children who now qualify for dental insurance coverage, enhancing access to dental care for those from lower-income households. Together, these initiatives have reduced preschool children's untreated tooth decay by over 50%, a historically low prevalence of ECC (“Oral Health in America: Advances and Challenges: Executive Summary”, 2021).

Since 2000, tremendous developments have occurred which have impacted the oral health of Americans. Several children's oral health disparities by race/ethnicity and household poverty have been significantly reduced because of the increased usage of dental sealants, a crucial service for caries prevention. All adult categories continue to experience a drop in tooth loss. Only 13% of persons 65 - 74 years old are edentulous now, down from 50% in the 1960s. Significant advancements have been made in the delivery of dental care, ranging from the diagnosis, planning, and management of oral discomfort to the use of cutting-edge dental materials to restore the shape and function of the dentition when filling cavities, creating crowns, and replacing missing teeth (“Oral Health in America: Advances and Challenges: Executive Summary”, 2021). Reflecting on the achievements made, we can do more work to improve oral health outcomes and reduce OHD in the upcoming years. This will support a stronger workforce and families which can contribute to the GDP of the country and make our nation healthier and wealthier for the future generations to come.

## References

Oral Health in America: Advances and Challenges: Executive Summary. (2021). In *PubMed*. National Institute of Dental and Craniofacial Research (US).

<https://www.ncbi.nlm.nih.gov/books/NBK576536/>

<https://www.ruhealth.org/sites/default/files/Oral%20Health/Smile-California-Fact-Sheet.pdf>

*2000 Surgeon General's Report on Oral Health in America* | National Institute of Dental and Craniofacial Research. (2018). Nih.gov. <https://www.nidcr.nih.gov/research/data-statistics/surgeon-general>

CDC. (2019). *Disparities in Oral Health*. Centers for Disease Control and Prevention.

[https://www.cdc.gov/oralhealth/oral\\_health\\_disparities/index.htm](https://www.cdc.gov/oralhealth/oral_health_disparities/index.htm)

CDPH(n.d).[https://www.cdph.ca.gov/Programs/CCDCPHP/DCDIC/CDCB/CDPH%20Document%20Library/Oral%20Health%20Program/Status%20of%20Oral%20Health%20in%20California\\_FINAL\\_04.20.2017\\_ADA.pdf](https://www.cdph.ca.gov/Programs/CCDCPHP/DCDIC/CDCB/CDPH%20Document%20Library/Oral%20Health%20Program/Status%20of%20Oral%20Health%20in%20California_FINAL_04.20.2017_ADA.pdf)

How your oral health affects your overall health. (2023, March 2). Cleveland Clinic. <https://health.clevelandclinic.org/oral-health-body-connection/>

*Children Now – Giving Kids Power*. (n.d.). Retrieved September 18, 2020, from <https://www.childrennow.org>

Medi-Cal Newsflash: Medi-Cal Coverage of Community Health Worker (CHW) Services is Effective July 1, 2022. (n.d.). Files.medi-cal.ca.gov. Retrieved April 25, 2023, from [https://files.medi-cal.ca.gov/pubsdoco/newsroom/newsroom\\_31781\\_01.aspx](https://files.medi-cal.ca.gov/pubsdoco/newsroom/newsroom_31781_01.aspx)

[https://oralhealthsupport.ucsf.edu/sites/g/files/tkssra861/f/wysiwyg/Appendix%207%20-%20California\\_2019\\_3rd\\_Grade\\_Smile\\_Survey.pdf](https://oralhealthsupport.ucsf.edu/sites/g/files/tkssra861/f/wysiwyg/Appendix%207%20-%20California_2019_3rd_Grade_Smile_Survey.pdf)

*Fluoridation by Public Water Systems* | California State Water Resources Control Board. (n.d.). [www.waterboards.ca.gov](http://www.waterboards.ca.gov).

[https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/Fluoridation.html](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Fluoridation.html)

Tungare, S., & Paranjpe, A. G. (2020). *Baby Bottle Syndrome*. PubMed; StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK535349/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5497869/>

Ndugga, N., & Artiga, S. (2021, May 11). *Disparities in health and health care: 5 key questions and answers*. Kaiser Family Foundation. <https://www.kff.org/racial-equity-and-health-policy/issue-brief/disparities-in-health-and-health-care-5-key-question-and-answers/>

*Achievements in Public Health, 1900-1999: Fluoridation of Drinking Water to Prevent Dental Caries*. (2019). <https://www.cdc.gov/MMWR/preview/mmwrhtml/mm4841a1.htm>

*Is my water supply fluoridated?* (n.d.). CDA. Retrieved April 25, 2023, from <https://www.cda.org/Home/Public-Health/Fluoride-and-Fluoridation/is-my-water-supply-fluoridated>

*Fluoridation by Public Water Systems | California State Water Resources Control Board*. (n.d.). [www.waterboards.ca.gov](http://www.waterboards.ca.gov).  
[https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/Fluoridation.html](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Fluoridation.html)

*Community Water Fluoridation Model – Rural Oral Health Toolkit*. (n.d.). [www.ruralhealthinfo.org](http://www.ruralhealthinfo.org). <https://www.ruralhealthinfo.org/toolkits/oral-health/2/community-water-fluoridation-model>

*Kindergarten Oral Health Assessment*. (n.d.). [www.cdph.ca.gov](http://www.cdph.ca.gov). Retrieved April 25, 2023, from <https://www.cdph.ca.gov/Programs/CCDCPHP/DCDIC/CDCB/Pages/OralHealthProgram/KOHA.aspx>

<https://oralhealthsupport.ucsf.edu/our-programs/school-programs/kindergarten-oral-health-assessment/koha-toolkit>

*School Sealant Programs*. (2019). [https://www.cdc.gov/oralhealth/dental\\_sealant\\_program/index.htm](https://www.cdc.gov/oralhealth/dental_sealant_program/index.htm)

*School Sealant Programs*. (2019, October 15). [www.cdc.gov](http://www.cdc.gov).  
[https://www.cdc.gov/oralhealth/dental\\_sealant\\_program/school-sealant-programs.htm](https://www.cdc.gov/oralhealth/dental_sealant_program/school-sealant-programs.htm)  
Literacy, R. on H., Practice, B. on P. H. and P. H., & Medicine, I. of. (2013). *Oral Health Literacy Programs*. In [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov). National Academies Press (US).  
<https://www.ncbi.nlm.nih.gov/books/NBK207117/>

*Oral Health Literacy in Practice*. (n.d.). [https://oralhealthsupport.ucsf.edu/sites/g/files/tkssra861/f/wysiwyg/CDPH\\_Toolkit\\_HL%20Guidelines.pdf](https://oralhealthsupport.ucsf.edu/sites/g/files/tkssra861/f/wysiwyg/CDPH_Toolkit_HL%20Guidelines.pdf)

Baskaradoss, J. K. (2018). Relationship between oral health literacy and oral health status. *BMC Oral Health*, 18(1). <https://doi.org/10.1186/s12903-018-0640-1>

Bress, L. E. (2013). Improving Oral Health Literacy – The New Standard in Dental Hygiene Practice. *American Dental Hygienists' Association*, 87(6), 322–329.  
<https://jdh.adha.org/content/87/6/322>

*Colgate Oral Health Network - Free Dental Continuing Education*. (n.d).  
Www.colgateoralhealthnetwork.com.<https://www.colgateoralhealthnetwork.com/article/oral-health-literacy/>

Valdez, Z. (2019). *Digital Commons @ CSUMB Digital Commons @ CSUMB Capstone Projects and Master's Theses Community Health Workers on Oral Health: Raising Awareness*.  
[https://digitalcommons.csumb.edu/cgi/viewcontent.cgi?article=1607&context=caps\\_thes\\_all](https://digitalcommons.csumb.edu/cgi/viewcontent.cgi?article=1607&context=caps_thes_all)

*Medicaid Coverage of Community Health Worker Services*. (n.d.). Retrieved July 26, 2022, from <https://www.macpac.gov/wp-content/uploads/2022/04/Medicaid-coverage-of-community-health-worker-services-1.pdf>

Oral Health in America: Advances and Challenges: Executive Summary. (2021). In *PubMed*. National Institute of Dental and Craniofacial Research (US).  
<https://www.ncbi.nlm.nih.gov/books/NBK576536/>

*Smile California | Medi-Cal Dental Program*. (n.d.). Retrieved April 25, 2023, from <https://smilecalifornia.org>

*Can my child use fluoride toothpaste? | baby gooroo*. (n.d.). Babygooroo.com. Retrieved April 25, 2023, from <https://babygooroo.com/articles/can-my-child-use-fluoride-toothpaste>

*Cost-Effectiveness of Oral Diseases Interventions | Power of Prevention*. (2020, October 28). Wwww.cdc.gov. <https://www.cdc.gov/chronicdisease/programs-impact/pop/oral-disease.htm>

*California's Population*. (n.d.). Public Policy Institute of California. Retrieved October 21, 2020, from <https://www.ppic.org/publication/californias-population/#:~:text=No%20race%20or%20ethnic%20group>

*Black/African American - The Office of Minority Health*. (n.d.). Minorityhealth.hhs.gov.



[https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=3&lvlID=61#:~:text=Overview%20\(Demo graphics\)%3A%20In%202021](https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=3&lvlID=61#:~:text=Overview%20(Demo%20graphics)%3A%20In%202021)