

# Oral Health 101

An Overview of Dentistry and Oral Health  
for Health Department Staff

## Module 2 The Interface of Oral Health and General Health: Preventive Interventions and Interprofessional Collaboration



Welcome to Module 2 of ASTDD's Oral Health 101 learning series.

## Learning Objectives

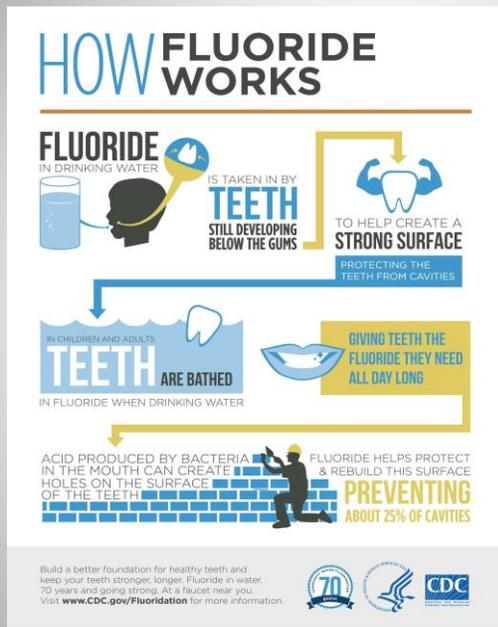
- 1. Describe the following evidence-based preventive interventions:
  - Types of fluorides
  - Dental sealants
  - Tobacco control and cessation
  - Reduction of sugar sweetened beverages
- 2. Discuss why oral health means more than “healthy teeth” and “you can’t be healthy without oral health.”
- 3. List some ways that health professionals can work together to promote messages and strategies that address common risk factors and the social determinants of health.

Our learning objectives for this module include being able to describe evidence-based prevention interventions, the relationship between oral health and overall health, and some ways health professionals can work together to address common risk factors and social determinants of health.

## Evidence-Based Prevention



The mission of public health programs is to utilize community-based disease prevention strategies to prevent and control infectious and chronic diseases. To best utilize resources, most government programs focus on evidence-based programs, meaning that research has shown that the intervention is effective in reducing disease. In oral health, there are two evidence-based strategies that are known to reduce dental caries (tooth decay) – Fluorides and dental sealants. Tobacco use cessation is also known to impact periodontal (gum) disease and oral cancer.



## Fluoride

Topical and Systemic Effects:

- Systemic - (Community Water Fluoridation, Fluoride Supplements) incorporates into enamel to make teeth more resistant to acid attack
- Topical (Fluoride Varnish, Toothpaste, Rinses, Gels) - Assists with remineralization

Fluoride is a natural element that when added to drinking water or applied to teeth can strengthen the enamel and make the tooth more resistant to tooth decay. Community water fluoridation is one of the most effective public health interventions ever instituted, so much so that CDC named community water fluoridation one of [10 great public health achievements of the 20th century](#). State oral health programs commonly advocate for community water fluoridation in local communities and develop programs for the application of topical fluorides in populations at increased risk for dental decay.

## Fluoride – Community Water Fluoridation

- Safe and highly effective
- Systemic and topical effects
- The best method for delivering fluoride to all members of the community, regardless of age, education, income level or access to routine dental care
- Cost-saving: health care costs, missed school, lost wages and productivity



Community water fluoridation is the process of adjusting the fluoride content that occurs naturally in a community's tap water to the recommended level for oral health. Based on scientific research, in 2011 the federal government set the recommended level for fluoride in drinking water at .7 ppm. At this level, there is enough fluoride in the water to prevent dental caries while minimizing the risk of dental fluorosis, which is the only unwanted health effect associated with community water fluoridation.

Dental fluorosis is a change in the appearance of the enamel of the tooth that occurs when a child ingests too much fluoride while the teeth are developing. Fluorosis commonly looks like scattered white flecks, occasional white spots, or frosty chalk-like lines. Usually these changes are barely noticeable and difficult to see except by a dental professional.

In recent years, some advocacy groups have raised concerns that adding fluoride to water can cause health problems or do damage to water systems. These claims are not supported by reputable research. State oral health programs are often contacted by citizen groups who oppose water fluoridation; these groups can be very persistent and at times combative. There are websites, social media posts and public personalities who speak against fluoride that attract attention. Public health programs reassure communities that fluoridation has been studied repeatedly by reputable scientists in government and in major universities around the world. There are no reputable, repeatable studies that connect community water fluoridation at the recommended level to any unwanted health or mental health effects except for dental fluorosis.

People who are not on community water systems may get their water from wells or use bottled water. The fluoride content of wells varies significantly, even sometimes among close neighbors. Sending a water sample from the well to the state or local health department for testing will let families know how much fluoride is in the well water and if it is enough to protect them against dental caries or if there is too much that may result in fluorosis.

Additional economic and social benefits accrue from the prevention of dental caries by use of fluoride such as reduced dental treatment visits and costs, less time missed from school or work and less tooth loss that may interfere with social interactions or job hiring.

## Topical Fluorides



Topical fluorides are applied directly to the teeth and include toothpaste, mouthrinse and professionally applied fluoride gel, foam or varnish.

Many state oral health programs promote the use of fluoride varnish. Fluoride varnish is a sticky substance that adheres to teeth, allowing fluoride to be in touch with the tooth for several hours after application. It must be professionally applied and is not available over the counter. It is quickly and easily applied without the need for bulky mouth trays or suctioning of saliva that occurs with fluoride gels and foams commonly used in the dental office. It can be painted directly on teeth and sets quickly. Varnish is a good intervention for infants and toddlers, seniors with root caries, some developmentally disabled individuals, or people with severe gag reflexes who otherwise might not tolerate the use of trays or the bulkiness of gels or foams. Fluoride varnish is the only professionally applied topical fluoride recommended for children younger than age 6.

Both dental and non-dental professionals can apply varnish. Recent efforts by the Centers for Medicare and Medicaid Services (CMS) and the American Academy of Pediatrics (AAP) encourage medical providers to apply fluoride varnish to young children's teeth during their well baby visits. These projects target very young children who may not be routinely visiting a dental office, but who are at risk for dental caries. Other programs apply the varnish to children in Head Start programs, WIC clinics, and to adults in nursing homes.

## Silver Diamine Fluoride

- Topical fluoride liquid containing silver particles and 38% (44,800 ppm) fluoride ion
- Arrests caries but stains teeth



Dentists that work with patients who have high caries rates have recently turned to silver diamine fluoride to arrest the caries process. This topical fluoride is directly applied to the decayed area and has been known to arrest the caries process in asymptomatic teeth. This procedure has real advantages as it doesn't require any anesthetic, which is highly beneficial in "difficult to treat" or fearful patients such as young children and people with certain types of disabilities. It can be applied in community-based settings, so is helpful in areas where access to dental offices is challenging. Although this is a promising practice, the procedure does stain the decay, which can be unsightly in anterior (front) teeth, so it is important that patients and parents are well informed prior to treatment.

## Dental Sealants

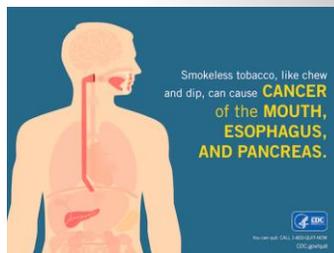


Another evidence-based preventive intervention is the application of dental sealants. Sealants are a type of liquid plastic that is flowed into pits and fissures of the chewing surfaces of teeth and hardened. The plastic serves as a barrier between the tooth and the decay-causing bacteria. Sealants are primarily used in permanent molars, as this is where up to 90% of decay occurs in school-age children. Ideally they should be placed as soon as the permanent teeth erupt in the mouth. Sealants can also be placed in primary (baby) molars. Sealants are 100% effective if they are fully retained on the tooth, and even partially retained sealants can provide protection.

Sealants are placed by trained dental professionals and require some specialized dental equipment such as curing lights and suction. In most cases they are done in dental clinical settings but can be done in other settings such as schools or mobile vans by dentists and registered dental hygienists.

State oral health programs often collaborate with local schools and the state department of education to develop school-based sealant programs for children in a school setting using portable equipment. These programs generally target vulnerable populations that may be at greater risk for developing decay and who are less likely to see a dentist on a regular basis. The Community Preventive Services Task Force [strongly recommends](#) school-based sealant delivery programs to prevent cavities among children.

## Tobacco Control and Cessation



The evidence is clear that tobacco use is harmful to health. This is true for oral health because smoking and chewing tobacco are clearly associated with periodontitis and oral cancer. This provides dental public health professionals an opportunity to work with partners in tobacco control and cessation programs. Some anti-tobacco campaigns that target oral health include CDC's Tips from Former Smokers campaign and the American Dental Hygienists' Association's (ADHA) Ask. Advise. Refer. program. Dental teams in dental offices have unique opportunities to work with their individual patients to prevent or reduce tobacco use and refer them to public health programs such as the state's tobacco Quitline to receive free counseling on how to stop using tobacco. In addition to materials developed by the public health department or other public or non-profit groups, the ADHA and the American Dental Association (ADA) both offer educational materials that can be used in dental practices and community health centers to reduce tobacco use. New types of devices such as electronic cigarettes also are a concern.

Another effective way to reduce tobacco use is through controls at the point of sales through age restrictions on purchases and sales taxes. Health professionals continue to work with advocacy groups to promote these policies and counter false or aggressive marketing by tobacco companies.

## Oral Health and General Health

- Oral health is connected to general health, and general health impacts oral health
- Health insurance doesn't cover most oral conditions, and many people lack dental insurance or have limited benefits; Emergency Room visits for dental problems are increasing
- Other health professionals are beginning to be taught how to assess, prevent and refer oral health problems to dental professionals
- Some social determinants of oral health:
  - Income
  - Access to care – lack of providers, transportation
  - Race/ethnicity, gender, cultural competency
  - Lifestyle – diet, alcohol/drug use

Although it is easy to understand how tobacco impacts oral health, it is less intuitive to understand how oral health impacts general health as a whole, but it is true that a person cannot be truly healthy if they don't have good oral health. But traditionally there have been barriers to an integrated approach to addressing general and oral health. Until recently, dental professionals have worked independently from other health professionals, and dental and medical offices have rarely communicated about their patient's care. Health professionals traditionally have not been taught much about oral diseases and were not trained to identify or treat the teeth and gums; this is slowly changing with a new emphasis on interprofessional education and practice. Dental insurance is separate from medical insurance, as is vision insurance. Medicaid covers dental care for children, but, in many cases, dental is considered an optional benefit for adults. Medicare does not include routine dental care.

These situations are unfortunate, as infection and pain due to oral diseases are common and treatment is expensive. Caries is one of the most common chronic conditions in the United States, and more than 40% of adults have felt pain in their mouth in the last year. On average, the nation spends more than \$113 billion a year on costs related to dental care. More than \$6 billion of productivity is lost each year because people miss work to get dental care. When a person with dental pain does not have a regular source of dental care, they often end up in the emergency room, where they see a physician who prescribes antibiotics and pain medication and may not provide a direct dental referral. This situation does not treat the underlying dental problem, but it can contribute to antibiotic resistance and opioid misuse. If the underlying dental issue is not treated, the pain and infection can recur, leading to significant systemic infections that could require long hospitalizations and, in some cases, could lead to death.

Public health officials use public resources to improve the health of populations. To do this, they consider more than just risk factors for disease, they also look at where people live, learn, work and play. These factors are the social determinants of health, and it is well established that they impact general health. The same is true for oral health. There are significant disparities in oral disease rates and access to dental care based on income, race/ethnicity, and geography. State public health programs consider these factors when allocating resources and targeting prevention programs.

## Oral Health and Chronic Diseases

- Diabetes
  - People with diabetes are at higher risk for periodontal disease
  - Diabetics with periodontitis have more challenges with glycemic control
  - Women with gestational diabetes with periodontal disease are at higher risk for poor maternal outcomes
- Cardiovascular disease:
  - Associations exist between periodontal disease and heart disease, but no conclusive evidence of a causal relationship
  - Shared risk factors: smoking, age, diabetes, poor nutrition
- Obesity:
  - Increases the risk for hypertension, type 2 diabetes, arthritis, cardiovascular disease, respiratory problems and some types of cancer
  - Shared risk factors: consumption of sugar sweetened beverages and other cariogenic or high caloric foods

There are some clear connections between oral diseases and chronic diseases and their risk factors, especially diabetes, cardiovascular disease and obesity. Some studies suggest a connection between healthy pregnancy and good birth outcomes with oral health, and similarly, poor oral health and less than optimal birth outcomes. Public health programs strive to prevent these conditions, so state oral health programs need to collaborate with other professionals to emphasize the oral/general health connection.

People with diabetes are at risk for periodontal disease and have more challenges with glycemic control, which in turn contributes to the progression of diabetes. Dry mouth, often a symptom of undetected diabetes, can cause soreness, ulcers, infections, and tooth decay. Smoking makes these problems worse. Good blood glucose control is key to controlling and preventing mouth problems. Prediabetes is a risk factor that qualifies for referral to the CDC-recognized lifestyle change program. Dental professionals can flag this on the patient's health history form and administer the prediabetes pen/paper risk test and refer people that score high or who have had a gestational diabetes mellitus (GDM) diagnosis. One of the HP 2020 objectives is to "Increase the proportion of adults who were tested or referred for glycemic control by a dentist or dental hygienist in the past year."

Recent research suggests that periodontal disease is also associated with an increased risk of developing heart disease and that people with chronic gum disease have increased thickness of their neck blood vessels. Although there is no conclusive evidence of a causal relationship, periodontal disease and CVD share key physiologic features, including bacterial profiles and the levels of inflammatory mediators. There is also a strong correlation between diabetes and cardiovascular (heart) disease. Dental professionals can play a role in screening for undiagnosed and uncontrolled hypertension (high blood pressure). Taking blood pressure in the dental office is a standard of care; high hypertension can adversely impact the provision of dental care, especially when giving anesthetics.

Obesity is on the rise in the United States in most all age groups. Research demonstrates that obesity increases the risk for hypertension, type 2 diabetes, arthritis, cardiovascular disease, respiratory problems and some types of cancer. Recent research study also shows that obesity increases the risk of periodontal disease; insulin resistance may regulate the relationship between obesity and periodontal disease. Evidence exists for a positive association between sugar sweetened beverages and obesity in children. Consumption of sugar far exceeds any of the recommendations in dietary guidelines for the U.S.

There is a need for effective, evidence-based consistent messaging to reduce common risk factors that lead to oral diseases and other chronic diseases. Collaboration among dental and other health professionals can include joint health messages. Another approach is screening for blood pressure and risk factors during dental visits and screening for oral health problems and risk factors during health appointments. Some health and dental services are co-located in community health centers, which can facilitate cross referrals. Issues such as incompatible medical and dental electronic health record software and different coding/billing/reimbursement systems still pose challenges for a smooth transition to an integrated system.

Another reason that this type of collaboration is important for oral health programs is when government budgets get tight, state oral health programs often need to "make the case" for why oral health is important when there are so many health promotion projects competing for public health resources. A starting point for sustainable collaborations is to emphasize that oral health professionals can be mobilized to screen and educate people about chronic and infectious diseases. Conversely, oral health programs can train medical providers and others who work directly with groups at risk for oral diseases (such as nursing aides in nursing homes or workers in daycare centers) to screen for oral problems and teach oral hygiene skills.

## Resources

- Surgeon General's Report on Oral Health. Chapter One. The Meaning of Oral Health  
<http://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/sgr/chap1.htm>
- Surgeon General's Report on Oral Health. Chapter 5. Linkages with General Health.  
<http://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/sgr/chap5.htm>
- Surgeon General's Report on Oral Health. Chapter 10. Changing Vulnerabilities Throughout Life.  
<http://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/sgr/chap10.htm#changing>
- Community Water Fluoridation  
<https://www.cdc.gov/fluoridation/index.html>

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Here are some additional resources we suggest you review.

## Resources Cont

- School-Based Dental Sealant Programs  
[https://www.cdc.gov/oralhealth/dental\\_sealant\\_program/index.htm](https://www.cdc.gov/oralhealth/dental_sealant_program/index.htm)
- Tobacco Control Interventions  
<https://www.cdc.gov/policy/hst/hi5/tobaccointerventions/index.html>
- Disparities in Oral Health  
[https://www.cdc.gov/oralhealth/oral\\_health\\_disparities/index.htm](https://www.cdc.gov/oralhealth/oral_health_disparities/index.htm)
- Healthy People 2020 <https://www.healthypeople.gov/2020/topics-objectives/topic/oral-health>

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And some other resources we suggest you check out.

## Suggested Learning Activities

- 1. Interview a few co-workers, family members, friends who are not dental professionals to determine: a. how much they know about oral health and its relation to general health, b. what they know about effective ways to prevent or control oral diseases and modify risk factors.
- 2. What were some of the knowledge gaps or myths you identified during your interviews?
- 3. What approaches or resources do you think would be appropriate to share with those you interviewed to increase their knowledge?

Additional learning activities you might want to pursue are to interview co-workers, family and friends who are not dental professionals to find out how much they know about these topics, and then think about some of the knowledge gaps or myths you identified during your interviews. Finally, try to identify approaches or resources you could share with the people you interviewed to increase their knowledge.

## Photo Credits

**Slide 3:** <https://www.cdc.gov/fluoridation/pdf/fluoride-infographic-how-it-works.pdf>

**Slide 6 Picture 1:**

<http://www.aappublications.org/news/2016/08/05/SilverDiamine080516>. *Photo courtesy Daniel Raether, D.D.S.*

**Slide 6, Picture 2:**

<http://www.drbitcuspid.com/index.aspx?sec=ser&sub=def&pag=dis&ItemID=304284>. *Image courtesy of Steven Duffin, D.D.S.*

**Slide 7, Picture 2:**

[http://www.childrensdentalnetwork.org/inschool\\_dental\\_services.html](http://www.childrensdentalnetwork.org/inschool_dental_services.html)  
603.434.2327 [smiles@childrensdentalnetwork.org](mailto:smiles@childrensdentalnetwork.org)

**Slide 8:** <https://www.cdc.gov/tobacco/campaign/tips/about/index.html>

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We would like to acknowledge the source of some of the pictures we used.

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