Caries Process, Prevention, and Management: Risk Assessment

Course Author(s): Marcelle M. Nascimento, DDS, MS, PhD
CE Credits: 1 hour
Intended Audience: Dentists, Dental Hygienists, Dental Assistants, Dental Students, Dental Hygiene Students, Dental Assisting Students, Dental Therapists
Date Course Online: 08/21/2025
Last Revision Date: NA
Course Expiration Date: 08/20/2028
Cost: Free
Method: Self-instructional
AGD Subject Code(s): 10

Online Course: *www.dentalcare.com/en-us/ce-courses/ce719*

Disclaimers:
- P&G is providing these resource materials to dental professionals. We do not own this content nor are we responsible for any material herein.
- Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

Acknowledgement
- We would like to thank Robert V. Faller providing foundational content for the original version of this course and for his contributions to previous versions of a similar course.

Conflict of Interest Disclosure Statement
- Dr. Nascimento reports no conflicts of interest associated with this course. She has no relevant financial relationships to disclose.

Short Description – Forensic Dentistry
This course is part 10 of a 10-part series entitled *Caries Process, Prevention and Management*. This course provides dental team members with information on identifying caries-causing factors and assessing a patient's risk for developing dental caries.

Course Contents
- Overview
- Learning Objectives
- Glossary
- Introduction
- Risk Assessment: Identifying Biological, Behavioral, and Environmental Risk Factors
  o Step 1: Review the Patient's Medical History
  o Step 2: Review the Patient's Dental History
  o Step 3: Conduct a Clinical Assessment of the Oral Cavity
- Risk Assessment: Identifying Social, Cultural, and Economic Factors
- Risk Assessment: Protocol
  o Step 1: Complete a Risk Assessment Survey
  o Step 2: Develop Personalized Non-Operative Strategies for Caries Management
  o Step 3: Incorporate Additional Strategies for Patients with Special Considerations
- CAMBRA System
- Conclusion
- References / Additional Resources

Overview
This course is part 10 of a 10-part series entitled *Caries Process, Prevention and Management*. This course provides dental team members with information on identifying caries-causing factors and assessing a patient's risk for developing dental caries.

Learning Objectives
Upon the completion of this course, the dental professional should be able to:
- Define the terms risk, risk factor, and risk assessment in the context of caries prevention and management.
- Identify biological, environmental, sociocultural, and economic factors that increase caries risk.
- Analyze patient's medical and dental history to identify clues relevant to caries risk.
- Apply a structured caries risk assessment protocol in clinical practice.
- Conduct a caries risk assessment survey.

- Choose individualized intervention strategies based on a risk-assessment survey.
- Recognize and address the special considerations of high-risk populations, such as older adults or individuals with xerostomia (dry mouth).
- Describe the Caries Management by Risk Assessment (CAMBRA) system.

Glossary
risk - The probability or likelihood that a specific event will occur. In the context of oral health, teeth erupt caries-free, but from the moment of eruption onward, they are at risk of developing dental caries. This risk is influenced by the presence or absence of risk factors - those that promote or protect against disease development.

risk assessment – A qualitative or quantitative evaluation of the likelihood that a patient will develop dental caries based on a combination of clinical findings, biological and behavioral risk factors, and protective factors. Risk assessment is a foundational component of personalized caries management strategies such as CAMBRA (Caries Management by Risk Assessment) and is widely recognized in clinical practice and by dental insurers.

risk factor – Any biological, behavioral, environmental, or social condition that increases or decreases the probability of developing disease. Behavioral/ frequency of sugar intake, oral hygiene practices, fluoride exposure. Biological factors include saliva quality and flow and past caries experience. Social factors include access to care and socio-economic status.

risk survey – A structured assessment tool or questionnaire used to gather specific information about an individual's caries-related risk and protective factors. It helps the dental professional systematically determine a patient's caries risk level and guide personalized prevention and treatment planning.

Introduction

Dental caries is now widely recognized as a noncommunicable, diet-mediated chronic disease, rather than a classical infectious disease. This reflects an updated understanding of its multifactorial etiology, which involves the interplay between host susceptibility, the oral microbiome, dietary behaviors (particularly sugar consumption), fluoride exposure, and broader social determinants of health.[1,2] Unlike diseases caused by a single pathogen, caries results from a dysbiosis of the dental biofilm driven by environmental and behavioral factors, particularly frequent sugar intake and inadequate oral hygiene.

Despite improvements in fluoride access and public health initiatives, dental caries remains one of the most prevalent noncommunicable diseases globally and in the United States, disproportionately affecting low-income and underserved populations.[3]

Risk assessment is an essential part of caries management and should be performed for every patient. It is not only a method to evaluate the likelihood of future caries development or progression of existing lesions, but more importantly, it helps identify why an individual is at risk. Understanding the specific biological, behavioral, or environmental contributors allows clinicians to design personalized, preventive treatment plans tailored to each patient's unique needs. This individualized approach to caries management is the foundation of minimally invasive dentistry. By using caries risk assessment tools, dental professionals can implement targeted interventions, such as dietary counseling, behavior change support, optimized oral hygiene, professional fluoride therapies, and sealants.[4-6]

Moreover, when patients are made aware of their caries risk and contributing factors, they are more likely to adopt health-promoting behaviors and engage more actively in their oral health care. Educating patients about their risk empowers them to make informed decisions, supports shared decision-making, and leads to improved long-term oral health outcomes.

Clinical Significance Snapshots

What is the point of undertaking risk assessment for a patient? Isn't everyone who has natural teeth at risk of dental caries?

Yes, everyone with natural teeth is at some risk of developing dental caries. However, caries is a preventable and manageable disease, and patients do not all have the same level of risk. Caries risk assessment (CRA) is a structured, evidence-based process used to identify patients at low, moderate, or high risk for developing caries, based on a combination of risk factors, protective factors, and clinical findings.

In the past, caries was typically treated only after visible tooth damage had occurred, often leading to a cycle of repeated restorative treatments. CRA allows dental professionals to move from a surgical-restorative model to a personalized, preventive approach. By identifying high-risk individuals, targeted interventions - such as dietary counseling, behavior change support, improved oral hygiene practices, fluoride therapies, and sealant application - can be implemented to reduce risk and prevent the progression of dental caries.

Patients at low risk still require ongoing monitoring and preventive care to ensure their risk remains low. High-risk patients, on the other hand, should be recalled more frequently, monitored more closely, and provided with a more intensive preventive care plan designed to modify risk factors and support protective behaviors.

Which are the strongest indicators of risk?

- Presence of active caries lesions (cavitated or non-cavitated lesions).
- History of caries in the past 12-24 months.
- Frequent consumption of fermentable carbohydrates.
- Poor oral hygiene practices, including infrequent or ineffective toothbrushing
- Use of appliances or restorations that retain plaque (e.g., orthodontic devices, partial dentures)

- Low salivary flow or impaired salivary function (e.g., due to medications, medical conditions, or radiation therapy)
- Inadequate fluoride exposure (e.g., not using fluoride toothpaste daily or living in a non-fluoridated area)
- Socioeconomic or behavioral factors that limit access to dental care, fluoride exposure, oral health education, or the ability to maintain daily oral hygiene routines

Risk Assessment: Identifying Biological, Behavioral, and Environmental Risk Factors

Step 1: Review the Patient's Medical History

A comprehensive medical history helps identify systemic diseases, medications, and treatments that may reduce salivary flow- an essential protective factor in oral health. Saliva plays a critical role in buffering acids, promoting remineralization, and supporting antimicrobial defenses. When salivary function is compromised (xerostomia), these protective mechanisms are weakened, significantly increasing the risk of dental caries, especially among high-risk populations such as older adults and those with chronic health conditions.[1,7]

Several systemic diseases and conditions can lead to xerostomia (dry mouth), which increases the risk of dental caries by reducing the protective functions of saliva. These include autoimmune diseases such as Sjögren's syndrome, which primarily affects middle-aged women and involves immune-mediated destruction of salivary and lacrimal glands, and lupus erythematosus and rheumatoid arthritis. Metabolic and endocrine disorders such as diabetes mellitus, thyroid dysfunction, and pancreatic or liver diseases also contribute. Neurological conditions like Parkinson's disease and Alzheimer's disease, respiratory conditions such as asthma (especially with inhaler use), and genetic disorders like cystic fibrosis are also associated with reduced salivary flow. Hormonal changes during pregnancy, perimenopause, and menopause, along with anorexia nervosa and other psychiatric illnesses, further impact salivary function. Additionally, lifestyle factors including tobacco use, alcohol consumption, and drug abuse, especially with opioids and methadone, have been shown to significantly impair salivary gland activity.[7-9]

More than 500 medications are associated with salivary gland hypofunction, and it is estimated that over 90% of the most frequently prescribed medications in the U.S. can cause dry mouth as a side effect. Medications in the following classes are most commonly implicated: antidepressants, antipsychotics, hypnotics, antihistamines, anticholinergics, antihypertensives, diuretics, appetite suppressants, muscle relaxants, and expectorants. Many of these drugs affect the autonomic nervous system, which regulates salivary secretion, leading to decreased salivary output and elevated caries risk.[7,8,10]

Cancer therapies are a well-established cause of xerostomia. Chemotherapy may reduce salivary flow due to cytotoxic effects on salivary glands, while radiotherapy to the head and neck region can irreversibly damage salivary acinar cells, leading to long-term salivary dysfunction. The extent of xerostomia depends on the radiation dose and the area treated. These therapies significantly elevate the risk of dental caries, mucosal infections, and oral discomfort.[7,11,12]

Older adults are more susceptible to dry mouth (xerostomia) due to age-related physiological changes in salivary gland function and their increased use of medications, many of which have xerogenic effects. Polypharmacy, defined as the regular use of five or more medications, is common in older populations and significantly contributes to salivary gland hypofunction. Studies have shown that age itself may not reduce salivary output significantly, but the cumulative impact of multiple medications and comorbidities leads to a higher prevalence of dry mouth in this group.[7,13,14] Patients often report dry mouth due to discomfort, such as difficulty swallowing, speaking, or altered taste. Clinically, signs of xerostomia may include a dry or sticky oral mucosa, frothy or absent saliva, and a tendency for the dental mirror to stick to the buccal mucosa or tongue. These clinical observations, combined with patient-reported symptoms and medication history, help identify those at risk of caries due to salivary dysfunction.[10,15]

Step 2: Review the Patient's Dental History

While the presence of active carious lesions at the time of examination is clear evidence of caries, a comprehensive dental history is critical for understanding a patient's long-term risk. Past caries experience, including the number of restorations, extractions due to caries, or episodes of rapid lesion progression, is the single strongest predictor of future caries development.[16,17] Sudden changes in caries activity such as going from years of low risk to multiple new restorations can signal underlying changes, like the introduction of xerogenic medications or shifts in salivary flow, diet, or behavior.[1,7] Understanding these patterns helps clinicians identify modifiable risk factors and tailor preventive strategies more effectively.

In addition to past restorative history, it's essential to assess current oral hygiene behaviors and dietary habits. Ask how often the patient brushes and flosses, what type of toothbrush and toothpaste they use, and whether they use fluoride-containing products. Inquire about how they rinse after brushing since excessive rinsing can diminish the effects of fluoride. Also, assess whether their water supply is fluoridated, especially in communities without public water fluoridation.[18]

A dietary history should explore frequency and type of sugar exposure. Frequent snacking on fermentable carbohydrates, sipping sugary beverages, or nighttime bottle feeding (in children) are major contributors to caries risk. Recognizing these patterns allows dental professionals to offer targeted nutritional counseling and behavior-change strategies.[19,20]

Step 3: Conduct a Clinical Assessment of the Oral Cavity

In addition to identifying current and past carious lesions, a thorough clinical assessment should consider anatomical and restorative factors that may contribute to increased caries risk. Tooth morphology and alignment can affect plaque retention and make effective cleaning more difficult—particularly in areas that are crowded, rotated, pitted, or rough. These surfaces create retentive niches for plaque biofilm and are often missed during routine oral hygiene, allowing for prolonged acid exposure and increased risk of demineralization. Moreover, restorations with faulty margins, such as overhangs, open contacts, or marginal gaps, can harbor cariogenic bacteria, facilitating biofilm retention and promoting secondary caries. These sites are particularly concerning in patients with inadequate oral hygiene or reduced salivary flow.[1,21] A clinical exam should systematically document such conditions to inform personalized preventive and restorative care planning.

Risk Assessment: Identifying Social, Cultural, and Economic Factors

Social, cultural, and economic influences play a critical role in shaping oral health behaviors and caries risk. Certain dental habits can be passed down through families or communities via enculturation and social norms. For example, in some cultures, it is customary to allow infants to fall asleep with bottles containing sugared liquids, an established risk factor for early childhood caries. In other communities, edentulism may be perceived as an inevitable part of aging, and chronic oral pain may be normalized rather than treated.

Economic barriers also significantly impact oral health. Individuals living in poverty or underserved communities may face limited access to preventive dental care, fluoridated water, oral hygiene products, and health education. These structural inequalities contribute to disparities in caries prevalence and treatment outcomes. Identifying and acknowledging these contextual factors is essential for delivering patient-centered care. Dental professionals should be trained to approach such discussions with cultural sensitivity, and when possible, work collaboratively with patients to modify risk-enhancing behaviors and improve access to care.[23,25]

Risk Assessment: Protocol
Step 1: Complete a Risk Assessment Survey

Using a structured survey, such as the one outlined in Table 1, allows dental professionals to identify caries risk factors in a clear and systematic manner.

5

Table 1. Caries Risk Assessment Survey.

Category	Question	At Risk	Not at Risk
Caries History	Does the patient have current or past cavitated lesions or restorations due to caries?	Yes	No
New Caries History	Have new lesions appeared in the last 12 months?	Yes	No
Salivary Function	Does the patient report dry mouth or take medications associated with reduced salivary flow?	Yes	No
Sugar Intake	Does the patient consume sugary snacks or beverages more than 3 times per day?	Yes	No
Oral Hygiene Practices	Does the patient have inconsistent oral hygiene habits, such as skipping bedtime brushing, or not using fluoride toothpaste?	Yes	No
Fluoride Exposure	Does the patient have limited or no access to fluoride (toothpaste, rinses, water)?	Yes	No
Tooth Morphology/Alignment	Are there deep pits/fissures, crowding, or difficult-to-clean areas?	Yes	No
Socioeconomic Barriers	Does the patient face financial or educational barriers to accessing dental care?	Yes	No
Special Health Conditions	Does the patient have systemic or behavioral conditions that increase caries risk?	Yes	No
Parental/Caregiver History	For pediatric patients: Do parents/caregivers have a history of high caries?	Yes	No

Step 2: Develop Personalized Non-Operative Strategies for Caries Management

One of the foundational steps in non-operative caries management is reinforcing effective oral hygiene practices. Dental professionals should emphasize brushing with fluoride toothpaste twice daily and performing interdental cleaning, such as flossing or using interdental brushes. These practices are critical for disrupting plaque biofilm and reducing cariogenic bacterial activity, especially in high-risk individuals.[4,25]

More importantly, involving the patient in understanding their disease can improve adherence. Visually showing the patient their lesions - either through radiographs or intraoral inspection with a mirror - can enhance motivation and accountability. Studies have shown that when patients can see the disease, they are more likely to engage in preventive behavior and follow oral hygiene recommendations.[5]

Instructing the patient to focus first on cleaning the affected areas before brushing the rest of the

mouth can help ensure more thorough plaque removal at the site of disease activity. Tailored suggestions may include modifying the angle of brushing, switching to a toothbrush with a smaller or tapered head, or replacing dental floss with an interdental cleaner with a handle for improved access, particularly in posterior regions where carious lesions may be more difficult to reach.[1,4]

Use of Fluoride: All patients should be advised to brush with fluoride-containing over-the-counter toothpaste at least twice per day. Fluoride toothpastes available in the United States are regulated by the U.S. Food and Drug Administration (FDA) and must contain clinically proven fluoride concentrations. Most over-the-counter formulations provide between 850 and 1150 parts per million (ppm) as sodium fluoride or sodium monofluorophosphate. This method is cost-effective, simple to implement, and widely accessible. Systematic reviews have demonstrated that regular use of fluoridated toothpaste results in a 24% average reduction in caries incidence in permanent teeth.[26,27]

Fluoridated toothpaste can also be used topically and therapeutically. For patients with early-stage active lesions, a small amount of toothpaste can be applied directly to the cleaned lesion with a toothbrush or fingertip before bedtime. This enhances fluoride availability at a time when salivary flow is lowest, improving remineralization potential. In patients with caries activity who struggle with thorough brushing, a 0.05% sodium fluoride (NaF) mouthrinse once daily, or a 0.02% NaF mouthrinse twice daily, can be recommended. Clinical studies show fluoride mouthrinses reduce DMFS (Decayed, Missing, and Filled Surfaces) by approximately 27% compared to placebo or no rinse.[28]

For individuals with high caries activity, higher-concentration fluoride products may be required. These include prescription-strength fluoride dentifrices containing 5000 ppm fluoride, gels, or tablets for daily use. Professional fluoride varnish application by a dental provider following plaque removal has also been shown to reduce caries in permanent teeth by an average of 43%.[26,29]

In patients with porcelain or composite restorations, acidulated phosphate fluoride (APF) should be avoided due to its potential to etch and degrade restorative surfaces. In these cases, neutral sodium fluoride formulations are preferred for both in-office and at-home use.

Diet Modification: Diet modification should be considered an essential component of caries prevention, even in patients who do not currently present with active lesions. The dental professional should review the patient's caries risk factors and explain how dietary changes, particularly increased frequency or quantity of sugar intake can elevate risk. Life events such as pregnancy, job loss, divorce, retirement, or bereavement often lead to shifts in eating habits, including more frequent snacking or reliance on processed foods. These transitions may go unnoticed but can contribute to a shift from low to moderate or high caries risk. Simple, open-ended questions during recall visits can help identify these changes early and support timely preventive guidance.[30,31] Asking about lifestyle or health changes allows the dental provider to reinforce the importance of limiting fermentable carbohydrates and maintaining consistent oral hygiene and fluoride use, even during periods of stress or disruption.

For patients presenting with active carious lesions, dietary analysis is a critical step in identifying potential contributors to disease progression. A 24-hour dietary recall or a 3-day food log (including at least one weekend day) is typically used to capture what the patient has consumed, including foods, drinks, and medications. This information reveals patterns such as frequent snacking and prolonged exposure to fermentable carbohydrates. Based on this data, dental professionals can collaborate with the patient to develop practical, realistic strategies—such as limiting sugary foods to meal times, choosing water over sugar-sweetened drinks, and encouraging sugar-free alternatives.[19,30]

Recent evidence supports the effectiveness of behavioral counseling methods: for instance, home-delivered bottled water combined with caregiver dietary guidance significantly decreased children's sugary drink intake.[32]

Additionally, specific dietary screening questions, such as those addressing meal patterns and drink habits have been strongly associated with caries and useful in improving risk assessments.[33] However, it's important to recognize that dietary data is self-reported and susceptible to recall bias; therefore, it should be interpreted alongside clinical findings and risk indicators to create a comprehensive caries management plan.[30,31]

Recalling the Patient: Recalls appointments should be tailored to each patient's individual risk level. For individuals without active caries and with good oral hygiene, one to two visits per year are generally sufficient. However, high-risk patients, such as those who struggle with plaque control or have reduced salivary flow due to medication, medical conditions, or lifestyle habits, require more frequent care.

Initially, high-risk individuals should return every 2 to 3 weeks until plaque control is achieved. Once stabilized, ongoing recalls of 2 to 3 months are recommended for those with xerostomia or persistent plaque issues. Patients without dry mouth and with controlled caries may shift to recalls every 6 to 12 months. During recall visits, the provider should assess plaque control, monitor lesion activity or progression, update radiographs as necessary, and reinforce oral hygiene and dietary advice. Application of sealants or re-assessment of non-operative strategies may also be appropriate.[34]

A randomized international trial found that risk-based protocols lead to better resource allocation and more targeted care, recommending intervals from 3 to 24 months based on risk indicators and age.[35] The CAMBRA model also advises bitewing radiographs every 6-18 months for high-risk, and every 18-24 months for moderate-risk adults, reinforcing the need for personalized recalls.[36]

Step 3: Incorporate Additional Strategies for Patients with Special Considerations
Dry mouth (xerostomia): Patients with reduced salivary flow require extra care beyond standard hygiene, fluoride use, and dietary counseling. Encourage them to sip water regularly throughout the day and limit substances that further dry the mouth, such as caffeinated beverages and alcohol. Saliva substitutes available as sprays, lozenges, gels, or rinses can provide lubrication and, in some cases, added fluoride protection. These measures help maintain oral moisture and buffer acid attacks in the absence of sufficient natural saliva.[7,37]

Patients with self-care limitations:
Individuals who rely on others or are unable to perform oral hygiene themselves, such as older adults with illnesses or cognitive impairments, often require tailored preventive care. Their diets may lean toward soft, easily chewable foods, which can be high in carbohydrates; medications may be syrup-based and contain sugar; and they may not receive adequate nutrients that support oral health. A study found only 5% of elderly residents in assisted-living homes asked caregivers for oral cleaning assistance.[38] Providers should educate caregivers to help with daily oral care and prompt assistance when needed.

Other considerations include recommending toothpastes for sensitivity when dentin is exposed, and ensuring effective removal of hardened calculus (tartar) through professional cleaning or specialized tools. These individualized adaptations align with CAMBRA principles of minimizing disease progression and preserving oral health.[36]

CAMBRA System
The CAMBRA (Caries Management by Risk Assessment) system is an evidence-based framework designed to prevent, arrest, or reverse dental caries by addressing the full disease process.[2,4] CAMBRA uses a "caries balance" approach, evaluating both disease-promoting factors (the "bad") and protective factors (the "good") in order to define a patient's risk level and guide individualized care.

The CAMBRA system provides a more in-depth assessment tool as a key element of the overall approach and takes account of:
• **Caries disease indicators:** Includes Socio-economic status, developmental conditions, and the presence of lesions, restorations or extractions due to decay within the previous 3 years.

- **Caries risk factors:** Includes visible plaque, frequent sugar intake, low salivary flow or medications affecting saliva, complex tooth morphology, exposed root surfaces, and use of orthodontic appliances or removable prostheses.[4]
- **Caries protective factors:** Includes use of fluoride (systemic and topical) and adequate salivary function .
- **Clinical examination findings:** Includes observation of white spot lesions, demineralization areas, restorations, and plaque accumulation

After evaluating these categories, CAMBRA assigns a risk level of *low, moderate, high*, or extreme and provides tailored recommendations. There are age-specific versions for children aged 0-5 years and for individuals aged 6 years and older.

CAMBRA's comprehensive, evidence-based design encourages both clinicians and patients (or their caregivers) to focus on disease etiology rather than solely on repair. It guides personalized preventive strategies, fosters shared decision-making, and enhances communication within the dental team.[4,25] The approach is supported by clinical outcomes data demonstrating reduced caries incidence and improved patient engagement.[5,30]

Conclusion

To reduce the prevalence of dental caries and improve population oral health, it is essential for dental professionals to routinely assess each patient's risk for developing new lesions or experiencing caries progression. Effective caries risk assessment relies on a combination of factors, including the patient's medical and dental history, dietary habits, oral hygiene behaviors, and relevant social, cultural, and economic influences. A systematic approach, such as using a structured risk assessment survey, allows clinicians to identify risk factors efficiently and develop personalized, non-operative strategies. These may include enhanced oral hygiene practices, fluoride use, dietary counseling, and targeted interventions for patients with special considerations, such as xerostomia or limited self-care capacity. This patient-centered, preventive approach not only promotes better oral health outcomes but also empowers patients to take an active role in managing their own oral health.

Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: *www.dentalcare.com/en-us/ce-courses/ce719/start-test*

1. Which of the following is the definition of risk factor?
   A. The probability that an event will occur.
   B. The qualitative estimation of adverse effects that may result from exposure to specific hazards.
   C. An environmental, biological, behavioral or social factor that the likelihood of a disease or adverse health outcome.
   D. None of the above.

2. When taking the patient's medical history, why is it important to look for clues that could lead to dry mouth?
   A. Dry mouth is a factor linked to increased risk of caries because there is insufficient saliva present in the oral cavity o buffer acids and remineralize teeth during acid attacks.
   B. Dry mouth causes oral cancer.
   C. Dry mouth is always a sign of serious illness.
   D. All of the above.

3. Which of the following is a condition that can lead to dry mouth?
   A. Diabetes
   B. Sjögren's Syndrome
   C. Hormonal changes in menopause
   D. All of the above.

4. Which of the following types medications are NOT commonly linked to dry mouth?
   A. Analgesic
   B. Antidepressant
   C. Antihistamine
   D. Antihypertensive

5. Why are patients undergoing radiotherapy at risk for dry mouth?
   A. Radiotherapy reduces moisture levels in the body.
   B. Radiotherapy causes an autoimmune reaction that dries the body's tissues.
   C. Radiotherapy causes damage to the salivary acinar cells, thereby hindering saliva production.
   D. None of the above.

6. How can a dental professional tell if a patient has dry mouth?
   A. Ask the patient if they are experiencing discomfort because the mouth feels dry.
   B. Check to see if saliva appears frothy.
   C. Observe whether the mouth mirror sticks to mucosal surfaces.
   D. All of the above.

7. From a patient's dental history, which of the following indicates high caries risk?
   A. A history of multiple restorations.
   B. History of a trauma that chipped a tooth.
   C. Teeth with white enamel stains.
   D. A history of using whitening toothpaste.

8. What is common information to gather when collecting a patient's dental history?
    A. What toothpaste the patient uses
    B. How often the teeth are cleaned.
    C. Dietary habits that may contribute to caries.
    D. All of the above.

9. During the clinical exam, which of the following is a site that is more likely to have caries?
    A. A front tooth that has a white enamel discoloration.
    B. Front teeth with a diastema (gap).
    C. Restorations with faulty margins.
    D. A tooth that is smooth.

10. Which of the following might help a patient improve cleaning around carious lesions?
    A. Suggesting a different angle for brushing the diseased area.
    B. Showing the patient where the lesion is using a radiograph and/or help of a mirror.
    C. Saying they should listen to you because you are a professional.
    D. A and B

11. What is the typical amount of fluoride recommended for toothpaste?
    A. 500 ppm to 1000 ppm
    B. 850 ppm to 1150 ppm
    C. 2000 ppm to 2500 ppm
    D. 2500 ppm to 3000 ppm

12. In a patient with active lesions, how can a dental professional identify potential dietary contributors to caries?
    A. Ask the patient to recall all they have consumed over the past 24-hour.
    B. Rely solely on the appearance of the lesions.
    C. Ask the patient to complete a 3-day food and drink diary.
    D. A and C

13. Which of the following is true regarding recalling the patient after a dentist visit?
    A. Patients without active caries should return once or twice a year.
    B. High-risk patients with poor plaque control may need to return every 2-3 weeks initially.
    C. Patients without dry mouth whose caries activity appears under control may only need to be seen every 6 to 12 months.
    D. All of the above.

14. Which of the following is NOT a tip that can help patients with dry mouth?
    A. Sip water frequently.
    B. Use saliva substitutes.
    C. Drink caffeinated beverages.
    D. None of the above.

15. What percentage of elderly occupants in residential homes ask their caregivers for help with oral hygiene?
    A. 50
    B. 5
    C. 80
    D. 100

References / Additional Resources

1. Pitts NB, Zero DT, Marsh PD, et al. Dental caries. Nat Rev Dis Primers. 2017;3:17030. Published 2017 May 25. doi:10.1038/nrdp.2017.30
2. Featherstone JDB, Crystal YO, Alston P, et al. Evidence-Based Caries Management for All Ages-Practical Guidelines. Front Oral Health. 2021;2:657518. Published 2021 Apr 27. doi:10.3389/froh.2021.657518.
3. Peres MA, Macpherson LMD, Weyant RJ, et al. Oral diseases: a global public health challenge. Lancet. 2019;394(10194):249–260.
4. Young DA, Featherstone JD, Roth JR, et al. Caries management by risk assessment: implementation guidelines. J Calif Dent Assoc. 2007;35(11):799-805.
5. Slayton RL, Urquhart O, Araujo MWB, et al. Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: A report from the American Dental Association. J Am Dent Assoc. 2018;149(10):837-849.e19. doi:10.1016/j.adaj.2018.07.002
6. Ng TC, Luo BW, Lam WY, Baysan A, Chu CH, Yu OY. Updates on Caries Risk Assessment-A Literature Review. Dent J (Basel). 2024 Sep 29;12(10):312. doi: 10.3390/dj12100312. PMID: 39452440; PMCID: PMC11506515.
7. Villa A, Connell CL, Abati S. (2015). Diagnosis and management of xerostomia and hyposalivation. Ther Clin Risk Manag, 11:45–51.
8. Tanasiewicz M, Hildebrandt T, Obersztyn I. (2016). Xerostomia of Various Etiologies: A Review of the Literature. Adv Clin Exp Med, 25(1):199–206.
9. Ship JA, Pillemer SR, Baum BJ. (2007). Xerostomia and the geriatric patient. J Am Geriatr Soc, 50(3):535–543.
10. Navazesh M, Kumar SKS. (2008). Measuring salivary flow: challenges and opportunities. J Am Dent Assoc, 139:35S–40S.
11. Jensen SB et al. (2010). A systematic review of salivary gland hypofunction and xerostomia induced by cancer therapies: management strategies and economic impact. Support Care Cancer, 18(8):1061–1079.
12. Zunt SL. Xerostomia/Salivary Gland Hypofunction: Diagnosis and Management. Compend Contin Educ Dent. 2018;39(6):365-371.
13. Turner MD, Ship JA. Dry mouth and its effects on the oral health of elderly people [published correction appears in J Am Dent Assoc. 2008 Mar;139(3):252-3]. J Am Dent Assoc. 2007;138 Suppl:15S-20S. doi:10.14219/jada.archive.2007.0358
14. Sreebny LM, Schwartz SS. A reference guide to drugs and dry mouth—2nd edition. Gerodontology. 1997;14(1):33–47.
15. Khamdi S, Matangkasombut O, Lam-Ubol A. Non-pharmacologic interventions for management of radiation-induced dry mouth: A systematic review. Oral Dis. 2024;30(5):2876-2893. doi:10.1111/odi.14804.
16. Mejàre I, Axelsson S, Dahlen G, et al. Caries risk assessment: A systematic review. Acta Odontol Scand. 2014;72(2):81–91.
17. Powell LV. Caries risk assessment: Relevance to the practitioner. J Am Dent Assoc. 1998;129(3):349–353.
18. Centers for Disease Control and Prevention (CDC). Community Water Fluoridation. 2022. Accessed June 1st, 2025
19. Touger-Decker R, van Loveren C. Sugars and dental caries. Am J Clin Nutr. 2003;78(4):881S–892S. doi:10.1093/ajcn/78.4.881S
20. Moynihan P, Kelly S. Effect on caries of restricting sugars intake: Systematic review to inform WHO guidelines. J Dent Res. 2014;93(1):8–18. doi:10.1177/0022034513508954
21. Fontana M, Gonzalez-Cabezas C, Tenuta LMA. Evidence-based approaches and considerations for nonrestorative treatments within modern caries management: Integrating science into practice. J Am Dent Assoc. 2024;155(12):1000-1011. doi:10.1016/j.adaj.2024.09.007
22. Fisher-Owens SA, Gansky SA, Platt LJ, et al. Influences on children's oral health: a conceptual model. Pediatrics. 2007;120(3):e510-e520. doi:10.1542/peds.2006-3084.

23. Edelstein BL. (2010). The dental caries pandemic and disparities problem. BMC Oral Health, 6(Suppl 1):S2.
24. Dye BA, Thornton-Evans G, Li X, Iafolla TJ. Dental caries and sealant prevalence in children and adolescents in the United States, 2011-2012. NCHS Data Brief. 2015;(191):1-8.
25. Featherstone JD, Domejean-Orliaguet S, Jenson L, Wolff M, Young DA. Caries risk assessment in practice for age 6 through adult. J Calif Dent Assoc. 2007;35(10):703-713.
26. Wright JT, Tampi MP, Graham L, et al. Sealants for preventing and arresting pit-and-fissure occlusal caries in primary and permanent molars: A systematic review of randomized controlled trials-a report of the American Dental Association and the American Academy of Pediatric Dentistry [published correction appears in J Am Dent Assoc. 2017 Apr;148(4):210. doi: 10.1016/j.adaj.2017.02.003.]. J Am Dent Assoc. 2016;147(8):631-645.e18. doi:10.1016/j.adaj.2016.06.003.
27. Marinho VC, Higgins JP, Logan S, Sheiham A. (2003). Fluoride toothpastes for preventing dental caries in children and adolescents. Cochrane Database Syst Rev, (1):CD002278.
28. Marinho VC, Chong LY, Worthington HV, Walsh T. (2016). Fluoride mouthrinses for preventing dental caries in children and adolescents. Cochrane Database Syst Rev, 7:CD002284.
29. Marinho VC, Worthington HV, Walsh T, Clarkson JE. (2013). Fluoride varnishes for preventing dental caries in children and adolescents. Cochrane Database Syst Rev, 7:CD002279.
30. Fontana M, Zero DT. (2006). Assessing patients' caries risk. J Am Dent Assoc, 137(9):1231–1239.
31. Featherstone JD, Doméjean S. Minimal intervention dentistry: part 1. From 'compulsive' restorative dentistry to rational therapeutic strategies. Br Dent J. 2012;213(9):441-445. doi:10.1038/sj.bdj.2012.1007
32. Cunha-Cruz J, Ko LK, Mancl L, et al. Feasibility and acceptability of home delivery of water for dental caries control in Latinx children-"Sediento por una Sonrisa," Thirsty for a Smile: Single-arm feasibility study. Front Public Health. 2022;10:916260. Published 2022 Sep 20. doi:10.3389/fpubh.2022.916260
33. Delaney C, Warren J, Rysavy OA, Marshall T. Dietary questions in caries risk assessment and their relationship to caries. J Public Health Dent. 2025;85(2):197-202. doi:10.1111/jphd.12647.
34. Scott H, Cope AL, Wood F, et al. A qualitative exploration of decisions about dental recall intervals - Part 1: attitudes of NHS general dental practitioners to NICE guideline CG19 on the interval between oral health reviews. Br Dent J. 2022;232(5):327-331. doi:10.1038/s41415-022-3998-z.
35. Taqi M, Razak IA, Ab-Murat N, Zaidi SJA. Establishing risk-based recall interval for caries management among 11-12-year-old Pakistani children. BMC Oral Health. 2022;22(1):349. Published 2022 Aug 13. doi:10.1186/s12903-022-02383-z
36. Morgan TD, Horst JA. (2021). Evidence-based caries management for all ages. Frontiers in Oral Health, 2:657518.
37. Swathi D, Sailo JL, Ausare SS, et al. Management Strategies for Xerostomia in Patients with Sjögren's Syndrome: A Comprehensive Review. J Pharm Bioallied Sci. 2025;17(Suppl 1):S74-S76. doi:10.4103/jpbs.jpbs_1451_24.
38. Aurlene N, Ravichandran S, Bish M, Tadakamadla SK. Oral Health Promotion Interventions in Residential Aged Care Facilities - A Systematic Review of Behaviour Change Techniques Used in Interventions. Community Dent Oral Epidemiol. Published online May 5, 2025. doi:10.1111/cdoe.13042.

Additional Resources

- No Additional Resources Available

About the Author

Marcelle M. Nascimento, DDS, MS, PhD

Dr. Marcelle Nascimento is a Professor of Restorative Dentistry, serving as the Director of Cariology and Assistant Dean for Clinical Research at the University at Buffalo (UB) School of Dental Medicine since May 2024. Holding DDS, MS, and PhD degrees in Cariology from the University of Campinas, Brazil, Dr. Nascimento has been actively engaged in the teaching of Cariology and Operative Dentistry in the U.S. since 2007. Prior to joining UB, she served as Professor with tenure and Director of the Dental Clinical Research Unit at the University of Florida (UF) College of Dentistry (2007-2024). Committed to providing exceptional education to predoctoral and graduate students, Dr. Nascimento possesses a wealth of experience in developing pre-clinical and clinical courses and fostering an engaging learning environment in dental education.

Dr. Nascimento has been funded by NIH/NIDCR and industry to conduct clinical and translational science research in Cariology and Oral Microbiology. She is a member of the Executive Board of Directors of the American Academy of Cariology (AAC) and is serving as the AAC president for the 2024-2025 term. She has served as the president of the Cariology Research group of the International Association for Dental Research (IADR), and as chair and councilor of the American Dental Education Association (ADEA) Cariology section. In addition, Dr. Nascimento has served as Chair of Seal Subcommittee and member of the American Dental Association (ADA) Council on Scientific Affairs. With an established record of research funding, and highly cited, peer-reviewed publications in renowned dental journals, Dr. Nascimento has attained national and international eminence owing to her scholarly and scientific contributions to the fields of Cariology, Oral Microbiology and Operative Dentistry.

Email: mmnascim@buffalo.edu