BY ELECTRONIC MAIL:
MedicarePhysicianFeeSchedule@cms.hhs.gov

February 8, 2023

The Honorable Chiquita Brooks-LaSure
Centers for Medicare and Medicaid Services
Attention: CMS–1770–F
7500 Security Boulevard
P.O. Box 8016
Baltimore, MD 21244-8016

Re: Nominations of Dental Services for Medicare Coverage

Dear Administrator Brooks-LaSure:

The Santa Fe Group (https://santafegroup.org/) is pleased to provide the Centers for Medicare and Medicaid Services (CMS) nominations of dental services for Medicare coverage, pursuant to the final rule on Medicare and Medicaid Programs: CY2024 Payment Policies under the Physician Fee Schedule and Other Changes to Part B Payment Policies, Medicare Shared Savings Program Requirements, etc. (CMS-1770-F).

The Santa Fe Group is a 501(c)(3), action-oriented think tank with a passion to improve lives through oral health. Since its inception 25 years ago, the Santa Fe Group has served as a neutral convener, communicator, connector, and catalyst to move the needle on critical issues such as oral cancer, dental education, children's oral health, improved primary care access, the importance of linking medical and dental health systems, and most recently, expanding oral healthcare for our nation's seniors.

We thank CMS for its willingness to consider new conditions in definition of medically necessary dental coverage. Prior to this, the Santa Fe Group (SFG) has worked in various capacities with the CMS, other federal agencies, and like-minded groups to support the inclusion of medically necessary dental treatment in Medicare parts A and B for over seven years.

As we expressed when the final Physician Fee Schedule for 2023 was issued last year, the Biden Administration's adoption of Medicare coverage policy for certain types of medically necessary oral and dental care holds the promise of having a direct and meaningful impact in the lives of many beneficiaries. Equally meaningful is the final rule's establishment of a novel process "to identify for consideration and review submissions of additional dental services that are inextricably linked and substantially related and integral to the clinical success of other covered medical services."

Because the opportunity to nominate conditions for coverage consideration is so meaningful, we took very seriously the charge articulated in the final rule: "we encourage stakeholders who believe they have identified dental services that are inextricably linked to, and substantially related and integral to the clinical success of, other covered medical services to nominate these scenarios, supported by documentation, through the public process." We have also been mindful of the rule's invitation "to submit additional information regarding some of the clinical scenarios presented, but not included in a finalized policy, in this final rule, including immunosuppressant therapies, joint replacement surgeries, and **management of chronic conditions such as diabetes**."

Towards that end, we are pleased to present herein the Santa Fe Group's nominations for medically necessary coverage of diabetes and blood and solid tumor cancers. As detailed below, we strongly believe coverage of the dental services that are inextricably linked and substantially related to medical treatment of these conditions will make possible unprecedented progress in the management of such chronic conditions as certain cancers and diabetes.

Based on the extensive clinical and academic experience of our members, we respectfully submit that the dental services nominated below are inextricably linked to, and substantially related and integral to the clinical success of, other covered medical services. Moreover, we have long seen that the lack of medically necessary oral and dental coverage for beneficiaries with these conditions has precluded, delayed, and jeopardized the delivery of covered medical

treatments, heightening the risk of costly medical complications and increased[1] the financial burden on Medicare, beneficiaries, and taxpayers. On those bases, we submit that coverage in the circumstances below will improve population health and health equity in America, as many of the chronic medical conditions included are unequally distributed among medically and dentally underserved individuals.

Inequities remain in access to oral health care and health outcomes related to race, ethnicity, residence, socioeconomic level, gender identity, and sexual orientation[1]. Such inequities diminish health and quality of life. Poor oral health has consequences for health, consequences that are often more significant for Black, Hispanic, and AI/AN individuals. For example, people with periodontal disease (PD) — also called gum disease — are 28% more likely to suffer a first-time heart attack than persons without this condition[2]. While white adults over the age of 18 are more likely to have heart disease, Black adults are more likely to die of heart disease[3]. Black, and Hispanic Americans and AI are also more likely to have severe PD[4,5]. Treating PD in people with diabetes is "particularly important" because success in managing PD is linked with success in managing blood sugar levels. Because diabetes rates are higher in AI/AN, Black, and Hispanic communities than in white communities, untreated PD is likely to result in greater harm for these communities[6].

The cost of oral health care remains a significant barrier to equitable access to care and improved oral health. According to the Social Security Administration, among elderly beneficiaries:

- 37% of men and 42% of women receive half or more of their income from Social Security, and
- 12% of men and 15% of women rely on Social Security for 90% or more of their income[7].

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[1] National Institutes of Health. Oral Health in America: Advances and Challenges. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, National Institute of Dental and Craniofacial Research, 2021. Use of trade names is for identification only and does not constitute endorsement by the US Department of Health and Human Services. Pp.3B3-5.
[2] Periodontitis Increases the Risk of a First Myocardial Infarction | Circulation (ahajournals.org)
[3] Racial and Ethnic Disparities in Heart Disease (cdc.gov)
[4] National Institutes of Health. Oral Health in America: Advances and Challenges. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, National Institute of Dental and Craniofacial Research, 2021. Use of trade names is for identification only and does not constitute endorsement by the US Department of Health and Human Services. Pp.3B3-5.
[5] Nelson RG, Schlossman M, Budding LM, et al. Periodontal Disease and NIDDM in Pima Indians. Diabetes Care 13:836-40, 1990.
[6] L Casanova, F J Hughes, P M Preshaw, Diabetes and periodontal disease: a two-way relationship, Br Dent J. 2014 Oct;217(8):433-7. doi: 10.1038/sj.bdj.2014.907.
[7] Fast Facts & Figures About Social Security, 2021 (ssa.gov)

Medicare Parts A and B do not usually cover routine dental services; and Medicare Advantage dental benefits vary greatly by plan. Nearly 24 million Medicare beneficiaries lack critical oral health coverage, and 76.5 million adult Americans lack dental coverage overall. Many older adults did not receive regular dental services when they were younger; as a result older adults experience more dental disease and need more extensive treatment to maintain their oral health. Among all Medicare and Medicare Advantage recipients, at least 75% of total dental costs were paid out of pocket, adding strain to household budgets for people on fixed incomes[8], with median incomes among Medicare recipients at $26,668 in 2020[9].

All Americans should receive regular dental care to prevent oral health problems from developing and affecting general health. When cost, lack of transportation, or other barriers lead people to postpone care, oral infections worsen and become more difficult and costly to treat. Because of delays in care, cancers of the mouth and throat might not be diagnosed until these conditions become more difficult to treat. Untreated and active dental disease inequitably affects the general health outcomes of several chronic diseases leading to increased morbidity and costs.

In considering what changes to make in the delivery of medically necessary dental care in Medicare, CMS can benefit from the many studies and prospective actions of the private health care insurance sector. Insurance studies and industry practices strongly suggest that provision of dental care, especially the elimination of oral infections, can significantly lower total healthcare costs. The cost savings are realized almost entirely by fewer and shorter hospitalizations for chronic, non-communicable diseases like diabetes, respiratory infections and heart disease.[10,11,12,13]

CMS seeks criteria to use in determination of medical necessity. SFG favors the use of the triple aims criteria for guidance, i.e., coverage of dental problems and procedures that are inextricably linked to the clinical success of an otherwise covered medical service, and therefore,

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[8] The Glaring Scope of Racial Disparities in Oral Health | CareQuest Institute for Oral Health
[9] Administration for Community Living, 2021 Profile of Older Americans. DHHS
[10] United Healthcare. Medical Dental Integration Study 2013. http://www.uhc.com/content/dam/uhcdotcom/en/Private%20Label%20Administrators/100- 12683%20Bridge2Health_Study_Dental_Final.pdf. Accessed June 1, 2016.
[11] Cigna. Improved Health and Lower Medical Costs: Why Good Dental Care is Important. 2010. https://www.cigna.com/assets/docs/life-wall-library/Whygooddentalcareisimportant_whitepaper.pdf. Accessed June 1, 2016.
[12] Nasseh K, Vujicic M, Glick M. The relationship between periodontal interventions and healthcare costs and utilization: Evidence from an integrated dental, medical, and pharmacy commercial claims database. Health Econ. 2017;26:519–527. http://onlinelibrary.wiley.com/doi/10.1002/hec.3316/epdf. Accessed June 1, 2016.
[13] Avalere Health LLC. Evaluation of Cost Savings Associated with Periodontal Disease Treatment Benefit. Memo to Pacific Dental Services Foundation. January 4, 2016. Accessed August 30, 2017. http://pdsfoundation.org/downloads/Avalere_Health_Estimated_Impact_of_Medicare_Periodontal_Coverage.pdf.

are substantially related and integral to that primary medical service. Further, covered dental services should improve one or more of the triple aims: patient experience, cost, and clinical outcomes.

Santa Fe Group recognizes that CMS is interested in feedback on whether there are circumstances - such as diabetes - where the ongoing disease management of the patient receiving a medically necessary treatment may have an improved outcome or see a clinical benefit from the performance of dental and cancer services. Thus, the Santa Fe Group focuses this submission on medical conditions where **Dental Services are Integral to Covered Medical Services and Result in Improved Patient Outcomes**, i.e., diabetes and cancer. Appendices address administrative matters as requested.

As you consider the nominations below, please know how grateful we and our 240+ partners in the Consortium for Medically Necessary Oral Health Coverage are for the important steps the Administration has already taken to extend Medicare coverage to medically necessary oral and dental care. We are hopeful its leadership in this vital arena will continue in the forthcoming Physician Fee Schedule for 2024. By appropriately broadening coverage of medically necessary treatment, the Administration has and will continue to make much-needed progress in the clinical success of and equitable access to covered medical services.

Dental Services Integral to Covered Medical Services That Result in Improved Patient Outcomes

The CDC reports that persons with certain chronic non-communicable diseases (NCDs) are more likely to have severe oral disease, especially periodontal disease[14]. Although there is an extensive list of NCDs to which oral diseases are linked, the SFG focuses herein on two with the most evidence, and with the greatest opportunity for improvements in population health and health equity, and associated cost avoidance. These linkages are based on data from clinical trials, laboratory studies of biological mechanisms, case control studies, retrospective studies from large insurance data sets, best practice protocols advocated by both clinical care centers and private insurance companies, and treatment paradigms recommended over many years by professional clinical societies and associations.

[14] Parker ML, Thornton-Evans G, Wei L,Griffin SO. Prevalence of and Changes in Tooth Loss Among Adults Aged ≥50 Years with Selected Chronic Conditions — United States, 1999–2004 and 2011–2016. MMWR 2020;69:21.

Conservative Periodontal Care for Persons with Diabetes

Epidemiologic surveys, clinical trials, animal models and cell function studies have identified oral infection and inflammation as risk factors for chronic diseases. Published data are strongest for the relationship of periodontal disease and diabetes mellitus (DM). There is a bidirectional relationship between DM and periodontal disease. Data from the NHANES clearly demonstrate that persons with mild, moderate or severe periodontitis are more likely to have DM than persons without periodontitis, and that persons with DM are at significantly increased risk for both periodontitis and tooth loss [14,15]. Further support for the close association between DM and periodontal disease is provided by a meta-analysis of the association of periodontitis and microangiopathies in persons with DM[16,17]

A critical question is whether treatment of oral infection, and the resulting reduction of inflammation, can improve health outcomes. Thus, clinical studies must examine how surrogate markers of chronic diseases are affected by preventive dental care/periodontal treatment. An example is the effect on glycated hemoglobin (HbA1c) in blood as an indicator of metabolic control in DM. HbA1C provides a measure of the concentration of glucose in blood over a 2-to-3-month period, reflective of the combination of hemoglobin and glucose, a reaction that is determined solely on the concentration of glucose in the blood. As red blood cells have a half-life of 2-3 months, HbA1c reflects the level of metabolic control over this period. Elevated levels of HbA1c in blood are associated with increased risk of developing clinical complications of DM, including retinopathy[18] and nephropathy[19].

A recent Cochrane review examined "Treatment of periodontitis for glycemic control in people with diabetes mellitus"[20]. This systemic review included 35 studies including 3,245 patients. The focus was on persons with type 2 diabetes, and follow-up ranged from 3 to 12 months. This review considered the risk of bias present in each study. The major conclusion was

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[15] Eke PI, et al. Periodontitis in US Adults: National Health and Nutrition Examination Survey 2009-2014. *J Am Dent Assoc*. 2018;149(7):576-88 e6 https://www.ncbi.nlm.nih.gov/pubmed/29957185.

[16] *Microangiopathies are among the earliest clinical complications of DM. Data from 13 studies with 10,500 participants showed a strong association between retinopathy and periodontitis (OR=4.33; 95% CI: 2.19, 8.55); an association between nephropathy and periodontitis was also observed (OR=1.75; 95% CI: 1.07, 2.85*).

[17] Zhang B, et al. The value of glycosylated hemoglobin in the diagnosis of diabetic retinopathy: a systematic review and Meta-analysis. *BMC Endocr Disord*. 2021;21(1):82 https://www.ncbi.nlm.nih.gov/pubmed/33902557.

[18] Zhang B, et al. The value of glycosylated hemoglobin in the diagnosis of diabetic retinopathy: a systematic review and Meta-analysis. *BMC Endocr Disord*. 2021;21(1):82 https://www.ncbi.nlm.nih.gov/pubmed/33902557.

[19] Lin CH, et al. Hemoglobin glycation index predicts renal function deterioration in patients with type 2 diabetes and a low risk of chronic kidney disease. *Diabetes Res Clin Pract*. 2022;186:109834 https://www.ncbi.nlm.nih.gov/pubmed/35314255.

[20] Simpson TC, et al. Treatment of periodontitis for glycaemic control in people with diabetes mellitus. *Cochrane Database Syst Rev*. 2022;4:CD004714 https://www.ncbi.nlm.nih.gov/pubmed/35420698.

that at 3 months after treatment the reduction in HbA1c was 0.43%, 0.30% at 6 months, and 0.50% at 12 months. Critically, the results necessitated *"a change in our [Cochrane's] conclusions about the primary outcome of glycaemic control in our level of certainty in this conclusion. We now have evidence that periodontal treatment using subgingival instrumentation improves glycaemic control in people with both periodontitis and diabetes by a clinically significant amount when compared to no treatment or usual care"*. Notably this changed from the previous Cochrane review, which concluded that there was not sufficient evidence to state that periodontal therapy had this beneficial effect. Further, the review stated that additional studies are "not likely to change the outcome". The ability of preventive dental care to affect HbA1c is critical. Because high HbA1c levels are associated with the micro- and macrovascular complications of diabetes, reduction in this marker represents a valid clinical goal[21]. After 30 years of follow-up in the DCCT trial, "Intensive therapy (to improve HbA1c) reduced the incidence of any cardiovascular disease by 30% (95% CI 7, 48; P = 0.016), and the incidence of major cardiovascular events (nonfatal myocardial infarction, stroke, or cardiovascular death) by 32% (95% CI -3, 56; P = 0.07). The lower HbA1c levels during the DCCT/EDIC account for all of the observed treatment effect on cardiovascular disease risk." [21]. Therefore, dental prophylaxis and conservative non-surgical periodontal therapy is associated with a statistically and clinically significant improvement in metabolic control in persons with DM, and this therapy represents a logical and cost-effective approach to prevent or reduce the impact of the devasting complications associated with the disease.

Analysis of 'Big Data'

Given that preventive dental care/periodontal treatment reduces surrogate markers of DM, a next step was to evaluate the effect of this treatment on development of clinical complications of these chronic diseases. This led to the analyses of large databases that contain medical and dental treatment and outcomes data to determine if there is an association between provision of preventive dental care/conservative periodontal treatment and health outcomes (both use of care and cost) in persons with DM.

[21] Diabetes Control and Complications Trial (DCCT)/Epidemiology of Diabetes Interventions and Complications (EDIC) Study Research Group. Intensive Diabetes Treatment and Cardiovascular Outcomes in Type 1 Diabetes: The DCCT/EDIC Study 30-Year Follow-up. Diabetes Care. 2016 May;39(5):686-93. doi: 10.2337/dc15-1990. Epub 2016 Feb 9. PMID: 26861924; PMCID: PMC4839174.

The first of the studies combined data from United Concordia (dental insurance claims) and Highmark, Inc. (medical insurance claims) to examine 338,891 patient records where both dental and medical claims data were available[22]. Inclusion criteria were a diagnosis of periodontal disease and a medical diagnosis of: type 2 DM, coronary artery disease (CAD), cerebral vascular disease (CVD), rheumatoid arthritis (RA), and pregnancy. Outcomes evaluated were: 1. total medical costs, and 2. number of hospitalizations. The comparison was between persons who were and were not treated for periodontal disease. Their analyses revealed significant reductions in both costs and hospitalizations for persons receiving periodontal treatment versus no treatment for persons with DM, CAD, CVD, and pregnancy, but not RA. The authors concluded that these findings agreed with the earlier evidence; treatment of "active periodontal disease" has a systemic effect that goes beyond improving the status of the periodontium. They also advocated for inclusion of such treatment in the management of chronic diseases. The publication of the Jeffcoat et al. study[22] heightened interest in the use of large data sets to determine if there was an association between preventive dental care/conservative periodontal treatment and improved health outcomes. More recent studies are described below.

A report from the American Dental Association's Health Policy Institute (HPI) used the Truven Market Scan® Research Databases, which contained medical, dental and pharmacy claims data to study the relationship of periodontal treatment to health care costs and utilization for persons with recently diagnosed type 2 DM[23]. HPI compared individuals with DM who received periodontal treatment within a two-year period after their DM diagnosis, and those that did not receive such care. Total health care costs (including medications), the sum of total inpatient and outpatient medical costs, and total costs related to diabetes care in the 3rd and 4th years after the diagnosis of DM were evaluated. There were 15,002 individuals in the database, with an age range of 18 to 64 years. For participants who had a periodontal intervention, total net health care cost savings were $1,328 over 2 years, i.e., years 3 and 4. Total type 2 DM-related costs savings were $408. However, the savings were only seen for those individuals who did not begin drug treatment for DM. Investigators acknowledged that certain information such as levels

[22] Jeffcoat MK, et al. Impact of periodontal therapy on general health: evidence from insurance data for five systemic conditions. *Am J Prev Med*. 2014;47(2):166-74 https://www.ncbi.nlm.nih.gov/pubmed/24953519.
[23] Nasseh K, et al. The relationship between periodontal interventions and healthcare costs and utilization. Evidence from an integrated dental, medical, and pharmacy commercial claims database. *Health Econ*. 2017;26(4):519-27 https://www.ncbi.nlm.nih.gov/pubmed/26799518.

of HbA1c were not available in their database. They did, however, consider other potential confounders that were available in the database, including age, gender, and general medical status.

Investigators in the Netherlands examined an insurance database of claims for enrollees with diabetes who did and did not have periodontal treatment[24]. All individuals were continuously enrolled between 2012 and 2018. The comparison was made between enrollees with DM (with one or more claims in 2012) who had or did not have periodontal treatment (total cohort was 41,598 enrollees, 8,188 who received periodontal treatment, and 33,409 who did not). Over the course of the next 6 years, the mean quarterly DM-related health care costs were €38.45, which considered diagnostic assessments, any treatment, required medications, and hospital-related costs. Enrollees who had periodontal treatment averaged a reduction of €12.03 per quarter in diabetes-related health care costs. While the costs per quarter were small, the percentage reduction in costs associated with provision of conservative periodontal therapy was 31%. The authors concluded that all health care providers should be aware of the periodontal status of persons with DM, and the need for treatment if periodontitis is present. They suggested that an association between periodontal treatment and reduced health care costs for persons with DM argues for better coordination of care between physicians and dentists when treating such patients.

In 2021, Lamster et al.[25] reported on the relationship of preventive dental care (including conservative periodontal care) to health outcomes in the New York State (NYS) Medicaid program. This database offered some unique advantages:

1. Medicaid programs provide health insurance for a publicly insured population with a heavy chronic disease and oral disease burden.
2. In addition to medical benefits, the NYS Medicaid program provided a relatively robust range of adult dental benefits. Therefore, the database contains data about medical diagnoses and treatment, as well as dental treatment.

All eligible enrollees between the ages of 40 and 62 years of age at the initiation of the trial, who were continuously enrolled for 3 years, were included. Older adults (65 years of age

[24] Smits KPJ, et al. Effect of periodontal treatment on diabetes-related healthcare costs: A retrospective study. *BMJ Open Diabetes Res Care*. 2020;8(1) https://www.ncbi.nlm.nih.gov/pubmed/33099508.
[25] Lamster IB, et al. Dental services and health outcomes in the New York State Medicaid Program. *J Dent Res*. 2021:220345211007448 https://www.ncbi.nlm.nih.gov/pubmed/33880960.

and older) were not included because medical care for these individuals is provided through the Medicare program, and Medicare data were not in the NYS Medicaid database. Dental services received in the first two years of the study were evaluated in reference to health outcomes (costs and utilization of services) in the third year. The analyses focused on the relationship of preventive dental care (PDC) to visits to a hospital emergency department (ED) and hospital inpatient admissions (IP), and costs of the emergency department visits, inpatient admissions, pharmacy costs and total adjusted health care costs. Also considered was the need for an extraction or endodontic therapy, as surrogate indicators of advanced dental infection. Importantly, propensity scores were calculated to adjust for potentially confounding variables. Propensity score analysis is specifically designed to assess the effect of treatments or interventions on outcomes using observational data.

Rates of admission to the ED were lower for members with at least one PDC visit without an extraction or endodontic treatment as compared to those who did not receive dental care. IP rates were lower for members who received a PDC without an extraction/endodontic therapy (14%), as well as a PDC and an extraction/endodontic therapy (11%), compared to enrollees who did not receive dental care. The cost of ED differed little among the groups. However, for IP costs, receiving a PDC visit was associated with lower costs as compared to enrollees who did not receive dental care (ranging from -$379 for PDC without an extraction/endodontic therapy to -$304 for PDC plus an extraction/endodontic therapy). No reduction was seen if enrollees received an extraction/endodontic therapy but not PDC. For total health care costs, enrollees requiring an extraction or endodontic treatment had higher total health care costs as compared to enrollees who did not receive dental care.

Of particular importance, an incremental beneficial effect of additional PDC visits on outcomes was observed. The Medicaid program allows 2 PDC visits per year, which would be up to 4 visits in the two-year observational period. Each additional PDC visit was associated with a 3% decrease in the relative risk for an ED visit, and a 9% reduction in the risk for an IP admission. Further, health care costs were reduced with each additional PDC visit. This was most pronounced for total adjusted health care costs.

A subsequent analysis of the NYS Medicaid program database evaluated enrollees with DM, comparing members with diabetes who did and did not receive preventive dental care.

Receiving PDC was associated with lower rates of healthcare utilization and costs[26]. Enrollees with DM who received PDC, but did not require an extraction or endodontic treatment, had a lower rate of ED use. By contrast, enrollees who had an extraction or endodontic treatment had a higher rate of ED use. Having PDC was also associated with a reduction in IP admissions. The most notable association was a reduction in IP costs with receiving a PDC visit. This was not seen for enrollees who received an extraction or endodontic treatment. Cost reductions ranged up to -$823.02 for enrollees with a PDC but without an extraction or endodontic treatment. In addition, lower total adjusted health care costs were seen for enrollees with a PDC, ranging from -$538.84 to -$983.88. Again, requiring an extraction or endodontic treatment was not associated with a reduction in costs. Again, the incremental effects of an additional PDC visits on utilization and costs were seen. For each additional PDC visit, ED costs were reduced 4% and IP admissions by 11%. This incremental effect was also seen for health care costs, as each additional PDC visit was associated with an average reduction in IP costs (-$407.58), and total adjusted health care costs (-$665.74).

The two NYS Medicaid analyses[23,24] were particularly noteworthy for the following reasons:

1. This was the first report of the association of preventive dental care and general health outcomes in a publicly insured population with heavy oral and systemic disease burdens.
2. Improved outcomes were most pronounced for hospitalizations. Hospital costs account for 70% of the healthcare costs for persons with a chronic disease [(13)].
3. These studies demonstrated an incremental, positive effect of additional preventive care visits on health outcomes (both utilization and costs).
4. The need for an extraction or endodontic treatment, surrogates of advanced dental infection, reduced the association of preventive care and lower utilization and costs.
5. Lower utilization and costs associated with preventive dental care were more pronounced for the enrollees with chronic disease (here DM), as compared to the entire cohort.

[26] Lamster IB, et al. Preventive dental care is associated with improved health care outcomes and reduced costs for Medicaid members with diabetes. *Front Dent Med* 2022; 3:952182.

6. In an effort to reduce the influence of confounding variables, these two studies adjusted the analyses for 15 variables in the database, including the severity of systemic disease and receiving a well-person medical visit. However, other potential confounding variables such as weight/body mass index and smoking were not available in the database.

Another study that examined the association of preventive dental care and health outcomes analyzed data from a commercial healthcare plan in Arkansas[27]. Here the outcome measure was the total amount paid by the plan (referred to as "all-cause costs"). Enrollees who adhered to a plan of preventive dental care (defined as at least one preventive dental care visit in each of the 4 years of the observation period) had reduced costs. This ranged from -$515 to -$574 for enrollees with DM and -$866 to -$1718 for enrollees with DM and CAD. The authors suggested that health plans should both include preventive dental care services in their plan and provide incentives for enrollees to utilize these benefits "to improve health and lower costs for enrollees with diabetes and coronary artery disease."

An important analysis of the estimated annual savings in the United States that could be realized with provision of periodontal treatment for persons with DM in the Medicare program[28] provides a sense of the economic benefits that could be realized with provision of conservative periodontal care to persons with DM. Enrollment and cost expenditure data were obtained from the Medicare Current Beneficiary Survey, which is conducted by the Centers for Medicare & Medicaid Services. The estimated per-person savings associated with periodontal treatment for individuals with DM was based on an analysis conducted by Cigna. The calculation included consideration of Medicare enrollees who were and were not in Medicare Advantage plans, as well as different levels of utilization. **The analysis indicated an estimated annual savings of between $3.6 and $14.5 billion for enrollees with DM.** Even greater savings were seen for persons with cardiovascular disease, a major complication of DM.

[27] Borah BJ, et al. Association Between Preventive Dental Care and Healthcare Cost for Enrollees With Diabetes or Coronary Artery Disease: 5-Year Experience. *Compend Contin Educ Dent*. 2022;43(3):130-9 https://www.ncbi.nlm.nih.gov/pubmed/35272460.
[28] Heaton LJ, et al. Another billion reasons for a Medicare dental benefit. Boston, MA: CareQuest Institute, September 2022. DOI: 10.35565/CQI.2022.2006.

Statements from Professional Organizations Support the Importance of the Linkage of Diabetes and Periodontal Disease

The American Diabetes Association annually updates its Standards of Care in Diabetes[29]. Recommendation 4.2 under person-centered collaborative care emphasizes the importance of multidisciplinary care, including dental care, as part of comprehensive care for person with diabetes.

Similarly, the American Dental Association has emphasized the important linkage between periodontal disease and DM. For example, in the *JADA* section called "For the Patient", the article starts out with the American Diabetes Association recommendation: *"If you have diabetes, it is recommended that you see your dentist regularly*"[30]. Further, ADA's research resources publication on "Diabetes" includes an entire section on Periodontal Disease and Diabetes that acknowledges:

1. The bidirectional relationship between diabetes and periodontal disease, and that periodontitis is associated with (a) higher HbA1c levels in persons without diabetes and persons with type 2 diabetes, (b) worsened complications from diabetes in people with type 2 diabetes, and (c) a higher prevalence of complications in persons with type 1 diabetes.
2. Periodontitis is associated with higher prevalence of prediabetes, and that severe periodontitis is statistically significantly associated with an increased risk of developing diabetes."
3. Periodontitis is associated with (a) higher HbA1c levels in persons without diabetes and persons with type 2 diabetes, (b) worsened complications from diabetes in people with type 2 diabetes, and (c) a higher prevalence of complications in persons with type 1 diabetes.
4. Patients with diabetes benefit from periodontal therapy in conjunction with good oral health maintenance at home[31].

[29] ElSayed NA, Aleppo G, Aroda VR, et.al on behalf of the American Diabetes Association, Diabetes Care 2023; 46(Suppl. 1): S5-59.| Summary of Revisions: Standards of Care in Diabetes—2023 | *Diabetes Care* | American Diabetes Association (diabetesjournals.org).
[30] For the Patient: Can diabetes affect my oral health? *JADA* 2018; 149 (4):328.)
[31] American Dental Association. Diabetes. https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/diabetes. Accessed 1/3/23).

Finally, it is important to note that one of the studies cited earlier that demonstrate the beneficial effect of conservative periodontal care on health outcomes for persons with DM was reported by the American Dental Association's Health Policy Institute[32].

Recommendation

For persons with DM, there is compelling evidence indicating that preventive dental care/conservative periodontal treatment is associated with 1) a reduction in HbA1c, 2) a reduction in utilization of health care services, and 3) a reduction in health care expenditures (with the greatest reduction in the cost associated with hospitalizations). Consequently, the evidence suggests that such dental treatment is inextricably linked, substantially related, and integral to the success of covered medical service for persons with DM (Table 1A). Therefore, the Santa Fe Group recommends including coverage for preventive dental care in persons with poorly controlled diabetes. Table 1B provides the ICD 10 codes for the periodontal diseases. We respectively request that CMS provide coverage for dental procedures as listed in Table 2.

To further develop this request, the number of persons in the Medicare program who would be eligible for dental benefits can be estimated using some basic assumptions:

- The number of people 65 years of age and older in the Medicare program: **nearly 56 million**
- Percent of the population 65 years of age and older with diabetes: **29%**
- The percent of adults with an HbA1c of 8% and higher: **25%**
- Percentage of adults with severe/advance periodontitis: **10%**

Therefore, the number of Medicare beneficiaries aged 65 years and older who have a diagnosis of DM and severe/advanced periodontitis, and who would be eligible for a dental benefit if these criteria were used would be:

56,000,000 x 29% = 16,240,000 x 25% = 4,060,000 x 10% = 406,000

[32] Nasseh K, et al. The relationship between periodontal interventions and healthcare costs and utilization. Evidence from an integrated dental, medical, and pharmacy commercial claims database. *Health Econ*. 2017;26(4):519-27 https://www.ncbi.nlm.nih.gov/pubmed/26799518.

Finally, it is important to consider that the prevalence of diabetes is much higher among Medicare enrollees of color. Forty-seven percent (47%) of Black and 46% of Hispanic Medicare beneficiaries have diabetes, compared to 29% of White enrollees[33]. As a result, providing Medicare coverage for medically necessary dental care to beneficiaries with DM and dental disease would help to address racial and ethnic inequities in the Medicare program.

Dental Services Integral to Covered Medical Services for Immunosuppression and Cancer Treatment That Result in Improved Patient Outcomes.

Dental coverage to prevent oral and systemic complications prior to, during, and following adjuvant and transplant therapy for cancer

Cancers, including leukemias, lymphomas, and solid tumors (and tumors/lesions of the oral cavity and oropharynx), are the second leading cause of death in the United States after heart disease[34]. In 2022, there was an estimated 1.9 million new cases of cancer and 606,520 died[35]. The term "cancer" is an umbrella term that includes over 100 neoplastic diseases that includes solid tumors, multiple myeloma, leukemias and lymphomas[36]. In the U.S., cancer is diagnosed more frequently in men than women. Advancing age is the number one risk factor for cancer; more than two thirds of all new cancers are diagnosed among adults aged 60 years and older, i.e., the Medicare population. As the number of adults living to old age increases, so will the number of new cancer cases[37]. For example, multiple myeloma accounts for 15% of all hematologic malignancies in the United States. Thirty-five percent of patients are diagnosed at 75 or older[38].

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[34] Siegel, R.L., Miller, K.D., Fuchs, H.E., & Jemal, A. (2021). Cancer statistics, 2021. *CA: A Cancer Journal for Clinicians, 71*(1), 7-33. https://doi.org/10.3322/caac.21654.

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National expenditures for cancer care in the U.S. are approximately $200 billion per year[39]. Costs will increase as the population ages, more people are diagnosed with cancer, and as new and more expensive treatments become the standard of care[40,41].

There is a close association of cancer and oral disease. And, there are ethical issues with the conduct of clinical trials evaluating the benefit of dental clearance and cancer treatment. As such, some evidence regarding the effectiveness of dental clearance protocols and the extent of clearance needed to prevent or minimize oral complications associated with anti-neoplastic therapy is associative rather than causal[42]. However, seminal studies have long established the link between cancer, cancer treatment, immunosuppression, and increased risk for oral health related complications during chemotherapy and radiation adjuvant therapies[43,44,45,46]. There are many manifestations of anti-neoplastic treatment and its side effects in the oral cavity, especially for older adults.

While cancer affects all populations nationwide, social, geographic, and economic inequities are present. Cancer health equity is negatively affected by low income, low health literacy, inaccessible transportation to screening and treatment sites, and/or lack of insurance. People who do not have reliable access to health care are also more likely to be diagnosed with late-stage cancer that might have been treated more effectively if diagnosed at an earlier stage.

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Notably Blacks/African Americans have higher cancer death rates than all other racial ethnic groups[47].

Medicare provides coverage for treatment of medical and surgical services but does not provide a dental benefit for older adults, not even in medically necessary cases like cancer. Coordinated, collaborative care, including dental care, is crucial before, during, and after cancer care to maximize clinical outcomes, decrease cost, and improve quality of life and the patient experience (Triple Aim). **Moreover, oral/dental care is inextricably linked, substantially related, and integral to the clinical success of Medicare covered medical and surgical treatments for blood and solid tumor cancers. Oral conditions like periodontitis, tooth decay, infections, and abscesses that are not assessed, treated, and resolved can delay, interrupt, or cancel cancer treatment thereby compromising optimal clinical outcomes and contributing to increased risk for morbidity and mortality. Choi and colleagues[48] and Elting and Chang[49] assert that timely and appropriate treatment of cancer related oral complications is critical as oral complications may necessitate a delay or interruption of cancer treatment thereby worsening cancer outcomes (Table 3).**

Cancer Treatment Modalities and Immunosuppression Related Oral-Systemic Side Effects

Major medical cancer treatment modalities cause immunosuppression and include, but are not limited to, chemotherapy, radiation, immunotherapy, and stem cell and bone marrow transplants. Adjuvant therapy agents interrupt cell metabolism, inhibit cell division, and cause cell death to rapidly proliferating cancer cells and healthy, normal cells in bone marrow, mucosal cells in the digestive tract (including the oral cavity) and hair follicle cells. The results are bone marrow suppression, and immunosuppression with systemic and oral side effects[50,51,52].

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Anti-neoplastic chemotherapy and hematopoietic stem cell transplantation have a similar mechanism, that is, inhibition of cell proliferation and growth. The majority of agents used to treat solid tumors do not differentiate between cancer and healthy tissues. Thus, rapidly dividing non-cancerous tissues such as hair follicles, skin, and bone marrow are also affected. The suppression of bone marrow resulting in immunosuppression predisposes patients to increased risk of opportunistic viral and fungal infections. Exacerbation of pre-existing oral or dental infections occur and may be complicated by superinfection and necrosis[53,54].

Chemotherapy. High dose myeloablative chemotherapy regimens for patients with hematological malignancies are associated with a significant decline in hemoglobin, platelet, and neutrophil levels. Neutropenia occurs about seven days after the drug administration, with the immunosuppression nadir occurring between 10-14 days and recovery in 3-4 weeks. The recovery to functional blood levels is prolonged for some patients, including older adults and those on concurrent or subsequent radiation therapy[55,56]. For allogenic hematopoietic stem cell transplant patients, a certain degree of immunosuppression is deliberately maintained for 6-12 months for prophylaxis against graft-vs-host disease[57,58]. Hi dose bisphosphonates used to treat breast cancer, bone metastases and antiangiogenic therapies used to treat multiple myeloma may

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be associated with an adverse oral side effect, medication-related osteonecrosis of the jaw (MRONJ)[59,60,61].

Radiation Therapy. Radiation therapy, especially for head and neck cancer, results in oral damage that includes, but is not limited to, permanent dysfunction of vasculature, connective tissue, salivary glands, muscle, and bone[62]. Loss of bone vitality occurs secondary to injury to osteocytes, osteoblasts, and osteoclasts or from hypoxia due to decreased vascular supply[63]. Radiation induced damage differs from chemotherapy related immunosuppression in that irradiated tissue damage tends to be permanent and puts patients at continued risk for oral complications including, but not limited to xerostomia, mucositis, trismus, dysphagia/dysgeusia, severe tooth decay, and MRONJ[64]. Most patients with head and neck cancer and oropharyngeal cancer are treated with radiation and chemotherapy. They are exposed to radiation-induced oral damage and chemotherapy-related immunosuppression increasing their risk for oral and systemic complications that increase cost, compromise clinical outcomes, and negatively affect quality of life[65,66].

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Immunosuppression and Related Side Effects. A significant concern, especially for older adults, is that immunosuppression increases the potential for oral and systemic related side effects. For example, risk for sepsis and mucositis. increase the risk for morbidity and mortality.

Sepsis is life-threatening organ dysfunction due to a dysregulated host response to infection[67].Oral pathogens are commonly isolated in chemotherapy-induced neutropenic fever and sepsis. Cancer patients are estimated to account for 16.4% of sepsis cases per 1000 people and are 10-times more likely to develop sepsis than non-cancer patients[68,69]. Two thirds of sepsis cases occur in people over 60. The mortality rate for cancer patients who develop sepsis is 20-40%. Sepsis can disrupt cancer therapy, and delay and reduce survival[70].

Mucosal injury is one of the most consistent side effects of anti-cancer therapy. Mucositis is a painful side effect of chemotherapy and/or radiation in which the lining of the digestive system, including the mouth, becomes inflamed, often seen as sores and ulcers in the mouth[71,72]. Oral mucositis occurs in ~40% of patients having chemotherapy; up to 90% of patients with head and neck cancer develop mucositis in the mouth and digestive system[73]. Oral mucositis is the most severe side effect for patients during stem cell transplantation ranging from 42% to 98% for those having total body irradiation and myeloablative therapy. Oral mucositis negatively impacts tumor control, treatment outcomes, including patient survival because its presence often necessitates treatment modifications like unplanned breaks or delays in treatment. Oral mucositis is associated with increased mortality[74].

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A specific complication of complication of allogenic stem-cell with an oral manifestation is chronic graft-versus-host disease (cGvHD) that may present with mucosal lesions, salivary gland dysfunction or trismus because of cutaneous sclerosis, xerostomia, and dysphagia in which the engrafted stem cells mount an immune response to the recipient's own cells[75]. Medication-related osteonecrosis of the jaw (MRONJ) is another significant oral complication in cancer patients being treated with antiresorptive (IV bisphosphonates) and antiangiogenic medications. Clinical manifestations include pain, fistulas, and exposed and extensive destruction of jawbone. Treatment for MRONJ ranges from palliative to intensive hyperbaric oxygen and surgical removal of necrotic jawbone.

A study conducted by Owosho and colleagues[76] at Memorial Sloan Kettering Cancer Center (MSKCC) among >2000 patients treated for cancer, reported a twelve-fold decrease in the incidence of MRONJ for patients who had pre-treatment dental exams and removal of all dental decay in comparison to those who had no dental pretreatment. These findings are supported by data from other studies[77,78,79,80]. The MSKCC evidence provided support for MSKCC's implementation of a pre-treatment dental care protocol with follow up dental care every three months for 24 months.

Other serious oral complications include oral bleeding, candidiasis, salivary changes, xerostomia, dysgeusia and medically related osteonecrosis of the jaw (MRONJ). Oral health problems related to poor oral hygiene, tooth decay, and periodontal disease present at the time of

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diagnosis, or during treatment or recovery escalate the risk for treatment side effects and complications like mucositis and sepsis that increase resource utilization and cost[81,82].

The Cost of Immunosuppression Related Side Effects. Cancer patients who develop sepsis and/or septic shock, represent a disproportionately high burden in terms of hospital utilization, intensity of resource use, and excess cost (~$30,000 per patient), and are estimated to double cancer care costs[83]. Elting and Chang[84], report that the incremental cost of immunosuppression-related oral mucositis among patients receiving radiation therapy is approximately $5,000-30,000 and $3700 per cycle among patients receiving chemotherapy. The incremental cost of immunosuppression-related mucositis-related hospitalization among stem cell transplants may exceed $70,000 per patient. Ongoing management of xerostomia is reported to cost $40-200 per month[85]. Estimates for conservative management of MRONJ are reported to range from $35,000 to a high of $70,000 per patient[86]. The primary drivers of cost are hospitalizations, rehospitalizations, parenteral and enteral feedings, febrile neutropenia, and chronic use of interventions like sialagogues.

Statements from Professional Organizations Supporting the Linkage between Immunosuppression and Cancer

- National Cancer Institute (NCI) - https://www.cancer.gov/about-cancer/treatment/side-effects/mouth-throat/oral-complications-hp-pdq
- National Institute for Dental and Craniofacial Research (NIDCR) - https://www.nidcr.nih.gov/health-info/cancer-treatments

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- American Cancer Society (ACS) - https://www.cancer.org/cancer/oral-cavity-and-oropharyngeal-cancer.html
- American Dental Association (ADA) – https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/cancer-therapies-and-dental-considerations
- Oncology Nursing Society (ONS) Integrating Oral Health Throughout Cancer Care - https://www.ons.org/cjon/19/5/integrating-oral-health-throughout-cancer-care
- National Comprehensive Cancer Network (NCCN) - https://jnccn.org/view/journals/jnccn/20/3.5/article-pEPR22-109.xml
- American Society of Clinical Oncology (ASCO) - https://www.cancer.net/coping-with-cancer/physical-emotional-and-social-effects-cancer/managing-physical-side-effects/dental-and-oral-health
- Centers for Disease Control (CDC) - https://www.cdc.gov/cancer/preventinfections/index.htm https://www.cdc.gov/parasites/crypto/gen_info/infect_ic.html
- The Leukemia & Lymphoma Society, Dental and Oral Complications of Cancer Treatment: https://www.lls.org/sites/default/files/2021-05/FS29 Dental and Oral Fact Sheet FINAL 9.2016.pdf

Recommendations

SFG recommends that preventive dental care, oral hygiene care, and dental treatments to eliminate oral infection (see paragraph below for a list of appropriate codes) are medically necessary in cancer therapy[87,88,89,90]. There are increased risks for compromising clinical outcomes and increasing the cost burden of cancer care when treatment plans do not include dental screening, preventive dental care, and dental

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procedures that precede chemotherapy, radiation, stem cell and/or bone marrow transplants, and implementation of bisphosphonate therapy for blood and solid tumor cancers, multiple myeloma, and metastatic cancers associated with ONJ. Dental care should be included before and when critically necessary during treatment, and continued as ongoing oral health care until immunosuppression is resolved[91,92,93]. Since ~66% of cancer occurs in older adults, these additional costs and poor clinical outcomes will have a significant negative effect on CMS costs.

SFG further recommends that CMS provide a medically necessary dental benefit for preventive, diagnostic, periodontal, caries removal, extractions, and management of oral side effects of cancer treatment in both inpatient or community settings and cover reconstruction essential to restoring capacity to eat, drink, and swallow to maintain nutrition and overall health. The evidence supports that this dental benefit should begin prior to beginning cancer therapy, continue as appropriate during treatment, and continue post-treatment until immunosuppression ends, infections are resolved, and restorative interventions when indicated are completed.

The appropriate CDT codes for consideration are D0120, D0140, D0150, D0210, D0230, D0270, D0272 D0273, D0274, D0277, D0330, D1110, D1206, D1208, D4341, D4342, D4346, D4355 and D4910.

Conclusion

The Santa Fe Group thanks the CMS for their willingness to again consider issues related to medically necessary dental care. We appreciate the opportunity to provide comments about these proposed rules and have provided evidence to demonstrate how patients with diabetes and cancer would benefit from recommended changes. Improving oral health will improve health, health equity and quality of life for some of this nation's most underserved seniors. Thank you for your consideration!

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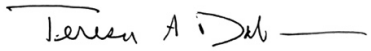
[91] Riley, P., Glenny, A., Worthington, H.V., Littlewood, A., Fernandez-Mauleffinch, L., Clarkson, J.E., McCabe, M.G. (2017) Interventions for preventing oral mucositis in patients with cancer receiving treatment: Cytokines and growth factors. *Cochrane Database of Systematic Reviews* 2017Nov 28: 11(11):CD011990, doi: 10.1002/14651858CD01990.pub2.

[92] Ishimaru, M., Matsui, H., Ono, S., Hagiwara, Y., Morita, K., & Yasunaga, H. (2018). Preoperative oral care and effect on postoperative complications after major cancer surgery. *British Journal of Surgery, 105*(12), 1688-1696. doi: 10.1002/bjs.10915.

[93] Saito, H., Watanabe, Y., Sato, K., Kkawa, H., Yoshida, Y., Katakura, A., Takayama, S and Sato, Michio (2014). Effects of professional oral healthcare on reducing risk of chemotherapy-induced oral mucositis. *Support Care Cancer*, 22(11): 2935-2940. Doi: 10.1007/s00520-014-2282-4.

Sincerely,



Terri Dolan,
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For additional information, please do not hesitate to contact the following collaborators on this letter:

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Table 1A: ICD-10 CM codes related to diabetes

E1010 Type 1 diabetes mellitus with ketoacidosis without coma
E1011 Type 1 diabetes mellitus with ketoacidosis with coma
E1021 Type 1 diabetes mellitus with diabetic nephropathy
E1022 Type 1 diabetes mellitus with diabetic chronic kidney disease
E1029 Type 1 diabetes mellitus with other diabetic kidney complication
E10311 Type 1 diabetes mellitus with unspecified diabetic retinopathy with macular edema
E10319 Type 1 diabetes mellitus with unspecified diabetic retinopathy without macular edema
E10321 Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
E10329 Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
E10331 Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
E10339 Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
E10341 Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
E10349 Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
E10351 Type 1 diabetes mellitus with proliferative diabetic retinopathy with macular edema
E10359 Type 1 diabetes mellitus with proliferative diabetic retinopathy without macular edema
E1036 Type 1 diabetes mellitus with diabetic cataract
E1039 Type 1 diabetes mellitus with other diabetic ophthalmic complication
E1040 Type 1 diabetes mellitus with diabetic neuropathy, unspecified
E1041 Type 1 diabetes mellitus with diabetic mononeuropathy
E1042 Type 1 diabetes mellitus with diabetic polyneuropathy
E1043 Type 1 diabetes mellitus with diabetic autonomic (poly)neuropathy
E1044 Type 1 diabetes mellitus with diabetic amyotrophy
E1049 Type 1 diabetes mellitus with other diabetic neurological complication
E1051 Type 1 diabetes mellitus with diabetic peripheral angiopathy without gangrene
E1052 Type 1 diabetes mellitus with diabetic peripheral angiopathy with gangrene
E1059 Type 1 diabetes mellitus with other circulatory complications
E10610 Type 1 diabetes mellitus with diabetic neuropathic arthropathy
E10618 Type 1 diabetes mellitus with other diabetic arthropathy
E10620 Type 1 diabetes mellitus with diabetic dermatitis
E10621 Type 1 diabetes mellitus with foot ulcer
E10622 Type 1 diabetes mellitus with other skin ulcer
E10628 Type 1 diabetes mellitus with other skin complications
E10630 Type 1 diabetes mellitus with periodontal disease
E10638 Type 1 diabetes mellitus with other oral complications
E10641 Type 1 diabetes mellitus with hypoglycemia with coma
E10649 Type 1 diabetes mellitus with hypoglycemia without coma
E1065 Type 1 diabetes mellitus with hyperglycemia
E1069 Type 1 diabetes mellitus with other specified complication
E108 Type 1 diabetes mellitus with unspecified complications
E109 Type 1 diabetes mellitus without complications
E1100 Type 2 diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
E1101 Type 2 diabetes mellitus with hyperosmolarity with coma
E1121 Type 2 diabetes mellitus with diabetic nephropathy
E1122 Type 2 diabetes mellitus with diabetic chronic kidney disease
E1129 Type 2 diabetes mellitus with other diabetic kidney complication
E11311 Type 2 diabetes mellitus with unspecified diabetic retinopathy with macular edema
E11319 Type 2 diabetes mellitus with unspecified diabetic retinopathy without macular edema
E11321 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
E11329 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
E11331 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
E11339 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
E11341 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
E11349 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
E11351 Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema
E11359 Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema
E1136 Type 2 diabetes mellitus with diabetic cataract
E1139 Type 2 diabetes mellitus with other diabetic ophthalmic complication
E1140 Type 2 diabetes mellitus with diabetic neuropathy, unspecified
E1141 Type 2 diabetes mellitus with diabetic mononeuropathy
E1142 Type 2 diabetes mellitus with diabetic polyneuropathy

E1143 Type 2 diabetes mellitus with diabetic autonomic (poly)neuropathy
E1144 Type 2 diabetes mellitus with diabetic amyotrophy
E1149 Type 2 diabetes mellitus with other diabetic neurological complication
E1151 Type 2 diabetes mellitus with diabetic peripheral angiopathy without gangrene
E1152 Type 2 diabetes mellitus with diabetic peripheral angiopathy with gangrene
E1159 Type 2 diabetes mellitus with other circulatory complications
E11610 Type 2 diabetes mellitus with diabetic neuropathic arthropathy
E11618 Type 2 diabetes mellitus with other diabetic arthropathy
E11620 Type 2 diabetes mellitus with diabetic dermatitis
E11621 Type 2 diabetes mellitus with foot ulcer
E11622 Type 2 diabetes mellitus with other skin ulcer
E11628 Type 2 diabetes mellitus with other skin complications
E11630 Type 2 diabetes mellitus with periodontal disease
E11638 Type 2 diabetes mellitus with other oral complications
E11641 Type 2 diabetes mellitus with hypoglycemia with coma
E11649 Type 2 diabetes mellitus with hypoglycemia without coma
E1165 Type 2 diabetes mellitus with hyperglycemia
E1169 Type 2 diabetes mellitus with other specified complication
E118 Type 2 diabetes mellitus with unspecified complications
E119 Type 2 diabetes mellitus without complications
E1300 Other specified diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
E1301 Other specified diabetes mellitus with hyperosmolarity with coma
E1310 Other specified diabetes mellitus with ketoacidosis without coma
E1311 Other specified diabetes mellitus with ketoacidosis with coma
E1321 Other specified diabetes mellitus with diabetic nephropathy
E1322 Other specified diabetes mellitus with diabetic chronic kidney disease
E1329 Other specified diabetes mellitus with other diabetic kidney complication
E13311 Other specified diabetes mellitus with unspecified diabetic retinopathy with macular edema
E13319 Other specified diabetes mellitus with unspecified diabetic retinopathy without macular edema
E13321 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
E13329 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
E13331 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
E13339 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
E13341 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
E13349 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
E13351 Other specified diabetes mellitus with proliferative diabetic retinopathy with macular edema
E13359 Other specified diabetes mellitus with proliferative diabetic retinopathy without macular edema
E1336 Other specified diabetes mellitus with diabetic cataract
E1339 Other specified diabetes mellitus with other diabetic ophthalmic complication
E1340 Other specified diabetes mellitus with diabetic neuropathy, unspecified
E1341 Other specified diabetes mellitus with diabetic mononeuropathy
E1342 Other specified diabetes mellitus with diabetic polyneuropathy
E1343 Other specified diabetes mellitus with diabetic autonomic (poly)neuropathy
E1344 Other specified diabetes mellitus with diabetic amyotrophy
E1349 Other specified diabetes mellitus with other diabetic neurological complication
E1351 Other specified diabetes mellitus with diabetic peripheral angiopathy without gangrene
E1352 Other specified diabetes mellitus with diabetic peripheral angiopathy with gangrene
E1359 Other specified diabetes mellitus with other circulatory complications
E13610 Other specified diabetes mellitus with diabetic neuropathic arthropathy
E13618 Other specified diabetes mellitus with other diabetic arthropathy
E13620 Other specified diabetes mellitus with diabetic dermatitis
E13621 Other specified diabetes mellitus with foot ulcer
E13622 Other specified diabetes mellitus with other skin ulcer
E13628 Other specified diabetes mellitus with other skin complications
E13630 Other specified diabetes mellitus with periodontal disease
E13638 Other specified diabetes mellitus with other oral complications
E13641 Other specified diabetes mellitus with hypoglycemia with coma
E13649 Other specified diabetes mellitus with hypoglycemia without coma
E1365 Other specified diabetes mellitus with hyperglycemia
E1369 Other specified diabetes mellitus with other specified complication
E138 Other specified diabetes mellitus with unspecified complications

E139 Other specified diabetes mellitus without complications
E15 Nondiabetic hypoglycemic coma
E160 Drug-induced hypoglycemia without coma
E161 Other hypoglycemia
E162 Hypoglycemia, unspecified

Table 1B: ICD-10 CM codes related to periodontal diseases

K0500 Acute gingivitis, plaque induced
K0501 Acute gingivitis, non-plaque induced
K0510 Chronic gingivitis, plaque induced
K0511 Chronic gingivitis, non-plaque induced
K0520 Aggressive periodontitis, unspecified
K0521 Aggressive periodontitis, localized
K0522 Aggressive periodontitis, generalized
K0530 Chronic periodontitis, unspecified
K0531 Chronic periodontitis, localized
K0532 Chronic periodontitis, generalized
K054 Periodontosis
K055 Other periodontal diseases
K056 Periodontal disease, unspecified
K060 Gingival recession
K061 Gingival enlargement
K08121 Complete loss of teeth due to periodontal diseases, class I
K08122 Complete loss of teeth due to periodontal diseases, class II
K08123 Complete loss of teeth due to periodontal diseases, class III
K08124 Complete loss of teeth due to periodontal diseases, class IV
K08129 Complete loss of teeth due to periodontal diseases, unspecified class
K08421 Partial loss of teeth due to periodontal diseases, class I
K08422 Partial loss of teeth due to periodontal diseases, class II
K08423 Partial loss of teeth due to periodontal diseases, class III
K08424 Partial loss of teeth due to periodontal diseases, class IV
K08429 Partial loss of teeth due to periodontal diseases, unspecified class

Table 2: Dental CPT (treatment) codes related to periodontal diseases

Evaluation / Assessment		
Code	**Category**	**Short Description**
D0120	Assessment	Periodic Oral Evaluation
D0140	Assessment	Limit Oral Eval Problem Focus
D0145	Assessment	Oral Evaluation, Pt < 3yrs
D0150	Assessment	Comprehensive Oral Evaluation
D0191	Assessment	Assessment of a Patient
D0210	Imaging	Intraoral Comprehensive Series
D0220	Imaging	Intraoral Periapical First
D0230	Imaging	Intraoral Periapical Ea Add
D0240	Imaging	Intraoral Occlusal Film
D0270	Imaging	Dental Bitewing Single Image
D0272	Imaging	Dental Bitewings Two Images
D0273	Imaging	Bitewings - Three Images
D0274	Imaging	Bitewings Four Images
D0330	Imaging	Panoramic Image

Prevention		
Code	**Category**	**Short Description**
D1110	Cleaning	Dental Prophylaxis Adult
D1206	Prevention	Topical Fluoride Varnish
D1208	Prevention	Topical App Fluoride Ex Varnish
D4355	Cleaning	Full Mouth Debridement
D4910	Cleaning	Periodontal Maintenance

Disease Intervention		
Code	**Category**	**Short Description**
D4341	Treatment	Scaling and Root Planing (4+ teeth / quadrant)
D4342	Treatment	Scaling and Root Planing (1-3 teeth / quadrant)
D4346	Treatment	Scaling in Presence of Moderate or Severe Gingival Inflammation

Table 3: ICD-10 Terminology Codes for Oral Conditions Related to Immunosuppression and Cancer Treatment

Complication Type	ICD-10[a]
AD	R13.-
BM	K14.6-
DC	K02.-, K03.-
DM	R68.2
GP	K05.-, K06.-
HL	R19.6-
IC	M27.2
OD	K08.-
PP	K04.-
SG	K11.-
SM	K12.1-, K12.2-, K12.3-
TC	B37.0-
TD	R43.2-, R43.8-, R43.9-
TS	R25.2-

Abbreviations: AD, aphagia and dysphagia; BM, glossodynia or burning mouth syndrome; DC, dental caries and other diseases of hard tissues of teeth; DM, dry mouth; GP, gingival and periodontal diseases, gingival recession etc; HL, halitosis; IC, inflammatory conditions of jaws/osteoradionecrosis; OD, other disorders of teeth and supporting structures; PP, diseases of pulp and periapical tissues, including infection; SG, diseases of the salivary glands, including xerostomia or hyposalivation among others; SM, stomatitis and mucositis (ulcerative); TC, thrush or candidiasis; TD, disturbances of sense of taste; TS, trismus.

[a]Here, "-", following the ICD codes, indicates the wildcard character (numeric).

Source: Choi, S. E., Choudhary, A., Sonis, S., & Villa, A. (2021). Benefits of the involvement of dentists in managing oral complications among patients with oral cavity and oropharyngeal cancer: An analysis of claims data. JCO Oncology Practice, 17(11), e1668–e1677. https://doi.org/10.1200/OP.20.00892.