

The Oral Health Alliance, a 2030 Healthy People Champion, that represents nutrition, oral health education, and public health professional organizations, oral health providers, groups representing community, children, pregnant women, and older adults, industry, and consumer groups, submits this document to justify adding a new scientific question under the *Strategies for Individuals and Families Related to Diet Quality and Weight Management – What is the relationship between dietary patterns during aging and: Risk of overweight and obesity and underweight and Dental caries, loss of teeth, and oral health?*

Under *Strategies for Individuals and Families Related to Diet Quality and Weight Management*

1. Suggesting new question – *Strategies for individuals and families Related to Diet Quality and Weight Management*
 - a. *What is the relationship between dietary patterns during aging and:*
 - *Risk of overweight and obesity and underweight*
 - *Dental caries, loss of teeth, and oral health?*

Relevance

Oral health and nutrition have an interdependent relationship – oral infectious diseases, including dental caries, impact the ability to eat healthy and nutritious foods that meet the DGAs and nutrition status across the lifespan. Nutrition and diet can affect the development and integrity of the oral cavity and progression of oral diseases.¹ Pain and infection from dental caries and lost teeth reduce intakes of appropriate amounts of fruits, vegetables, dairy, and lean protein recommended in the Dietary Guidelines for Americans.^{2,3} Studies have found that individuals with partial or full dentures had lower consumption of 20 key nutrients including vitamin A, vitamin C, vitamin B6, folic acid, Vitamin D, calcium, iron, and protein.^{4,5} This correlated with diets low in milk and milk products, dark green vegetables, yellow vegetables, fiber, and protein.^{6,7} Those with dentures often suffer from involuntary weight loss and frailty.⁸ Tooth loss has been closely associated with increased rates of metabolic syndrome and increased waist circumference even when adjusting for age, race/ethnicity, sex, income, physical activity, smoking, and energy intake.⁹ Research about tooth loss has concluded an association with cognitive decline, Alzheimer Disease, and related dementias in older adults, which can further impact nutrition and overall health outcomes.¹⁰ Eighty-eight percent of persons over the age of 60 are taking one or more medications¹¹ that often causes dry mouth, which increases the risk for dental caries, infection, and difficulty speaking and swallowing.¹² Stimulating saliva increases the rate of clearance of sugars from the mouth, raises the concentration of bicarbonate buffers in saliva to raise plaque pH, and increases calcium and phosphate levels responsible for remineralization.¹³ Reducing quantity and frequency of added sugars and fermentable foods helps eliminate the substrate for oral bacteria. Twenty-minute episodes of gum chewing after meals daily can have the most positive effect on the immediate conditions on plaque pH, can increase saliva,¹⁴ and help remove food from the oral cavity.^{15,16}

Importance

Dental caries (tooth decay) is a silent epidemic; it is not only the most prevalent and largely preventable oral disease worldwide, but also, it is the most prevalent disease that affects both children and adults in the United States. Dental caries is fully preventable through simple and basic routine dietary and oral health practices. NCHS Data in this table shows that the dental caries rates are high for all age groups, and they begin with the primary teeth and continue through the permanent dentition. Throughout the lifespan, the prevalence of dental caries is close to the prevalence of obesity among 2–5-year-olds and significantly higher than the prevalence of overweight and obesity for all other age groups.

<p>Prevalence of Dental Caries in the U.S. Population United States, National Health and Nutrition Examination Survey, 1999–2004 to 2011–2014¹⁷</p>	<p>Prevalence of Obesity 2017–2018¹⁸</p>	<p>Prevalence of Obesity and Severe Obesity Among Adults 2017–2018¹⁹</p>
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Age	Percent with dental caries experience (primary teeth)		Percent with untreated dental caries (primary teeth)		Percent with dental caries experience* (permanent teeth)		Percent with untreated dental caries (permanent teeth)		Percent	Percent
	1999-2004	2011-2016	1999-2004	2011-2016	1999-2004	2011-2016	1999-2004	2011-2016		
2-5	27.9	23.3	20.5	10.4					13.4	
6-11	51.5	52.1	27.8	16.4	21.2	17.4	7.7	5.2	20.3	
12-19					59.4	56.8	19.6	16.6	21.2	
20-64					91.6	89.9	25.3	26.1		40.0 (20-39 y.o). 44.8 (40-59 y.o.)
65+					93.0	96.2	18.1	15.9		42.8 (60 plus y.o)
*Includes missing or filled permanent teeth.										

Oral health is fundamental to the quality of life and overall well-being.²⁰ Many individuals assume that losing teeth is a part of aging, when in fact, it does not need to be a part of aging at all. For those over 65 years, the prevalence of dental caries exceeds that of hypertension, arthritis, and diabetes. According to the *Oral Health of America: Advances and Challenges*,²¹ “older adults have a higher risk for poor oral health than any other age group because many of them lack dental insurance, have underlying health conditions, lack convenient access to care (especially those living in underserved urban and rural areas), and have limited financial resources.²² Routine oral health care also helps prevent periodontal disease, which impacts over 17% of seniors²³ and can lead to tooth loss and subsequent poor dietary intake. *Oral Health in America* referenced “the 2016 Global Burden of Disease Study that found among the 328 health-related conditions assessed, 4 among the top 30 prevalent diseases are related to oral health: untreated dental caries in adult teeth (#1), severe periodontitis (#11), untreated dental caries in baby teeth (#17), and severe or complete tooth loss (#29)²⁴ Avoiding the oral infections resulting from poor oral health might also decrease the risk of heart disease²⁵, diabetes, dementia, rheumatoid arthritis, hospital-acquired pneumonia, and even premature birth.^{26,27} Dental caries, if untreated, can lead to death.²⁸

Potential Impact through Federal Programs

With the significant impact of poor oral health on the nutritional status of older adults, strong dietary guidelines used in federal nutrition programs for older Americans should also be tailored for limitations of chewing and swallowing, presence of dental prosthesis (dentures), and for the loss of smell and taste in older adults. Home delivered and center-oriented meal programs for older adults often offer educational programs through the state Offices on Aging and could include education on oral health preventive practices. Guidelines for federally supported nursing homes, Veteran hospitals²⁹ and clinics should instruct the nurses and other caregivers on the importance of healthy snacks and meals, as well as instruction on routine oral hygiene, especially among those with physical and cognitive limitations

Avoiding Duplication

Although the HP 2030 Oral Condition Objectives and the *Oral Health in American Report* highlighted the importance of diet and preventive oral health practices, no specific recommendations for these behaviors were highlighted in the calls for action. The 2025-30 DGAs must make specific recommendations to improve dietary intakes, food security, and nutrition security for all ages, ethnic groups, and levels of economic status. Using a lens of racial equity and cultural practices, the DGAs should include specific advice about reducing the

problems of dry mouth and removing microbial infections from the mouth with routine use of brushing with fluoridated toothpaste, cleaning between the teeth, and chewing sugarfree gum after eating or drinking.

Research Availability

Extensive research exists to justify the inclusion of a scientific question exploring the relationship of dietary patterns during aging on the risk of overweight/obesity and underweight as well as dental caries and tooth loss/edentulism. The 2020-25 DGAs added numerous recommendations for older adults and these two conditions should be added to the evidence reviews. The Alliance has contracted for a Scoping Review to help provide evidence on which oral health prevention strategies have a positive effect on dental caries incidence and adoption of the preventive practices.

¹ Touger-Decker R, Mobley C; Academy of Nutrition and Dietetics. 2013. Position of the Academy of Nutrition and Dietetics: Oral health and nutrition. *Journal of the Academy of Nutrition and Dietetics* 113(5):693–701.

² Centers for Disease Control and Prevention. “Fruit and vegetable consumption among high school students—United States, 2010.” *MMWR Morb Mortal Wkly Rep.* 2011;60(46):1583–1536.

³ Brennan DS, Singh KA. “Dietary, self-reported oral health and socio-demographic predictors of general health status among older adults.” *J Nutr Health Aging.* 2012;16(5):437–441.

⁴ Papas, A.S., Palmer C.A., Rounds, M.C., McGandy R.B., Hartz S.C., Russell R.M., Dallal, G.E.: The effects of denture status on nutrition. *Special Care in Dentistry.* 18:17-25,1998

⁵ Papas AS, Joshi A, Guinta JL, Palmer CA. Relationships Among Education, Dentate Status and Diet in Adults. *Special Care in Dentistry.* 18: 26-32,1998

⁶ Nowjack-Raymer R, Sheiham A. Association of Edentulism and Diet and Nutrition in US Adults. *Journal of Dental Research.* 2003. Feb;82(2):123-6.

⁷ Savoca M et al. Impact of Denture Usage Patterns on Dietary Quality and Food Avoidance amount Older Adults. *J Nutr Gerontol Geriatr.* 2011; 30(1): 86–102.

⁸ Kamdem B. et al. Relationship between oral health and Fried’s frailty criteria in community-dwelling older persons. *BMC Geriatric.* 2017; 17: 174.

⁹ Zhu and Hollis. Associations between the number of natural teeth and metabolic syndrome in adults. *J Clin. Perio.* 2015.

¹⁰ Zhang. S. Poor Oral Health and Cognitive Decline: Studies in Humans and Rats. *PLoS One* 2020;15 (7) e0234659

¹¹ Gu Q. et al. Prescription Drug Use Continues to Increase: U.S. Prescription Drug Data for 2007-2008. Centers for Disease Control and Prevention. National Center for Health Statistics. 2010.

¹² Chan A K Y et al. Common Medical and Dental Problems of Older Adults: A Narrative Review. *Geriatrics (Basel).* 2021 Sep; 6(3): 76, Published online 2021 Aug 6.

¹³ Beiswanger BB et. al, “The Effect of Chewing Sugar-free Gum After Meals on Clinical Caries Incidence,” *J Am Dent Assoc*, 129(11): 1623-1626, 1624 (Nov. 1998).

¹⁴ Claxton L, Taylor M., and Kay E, Oral health promotion: the economic benefits to the NHS of increased use of sugarfree gum in the UK. *Bri Den J.* Feb 12 2016, Vol 220 (3);, pgs. 121-127.

¹⁵ Szöke et. al, “Effect of After-Meal Sucrose-Free Gum-Chewing on Clinical Caries,” *J Dent Res*, 80(8): 1727, 1728 (Aug. 2001).

¹⁶ Machiulskiene V, Nyvad B, Baelum V. Caries preventive effect of sugar-substituted chewing gum. *Community Dent Oral Epidemiol* 2001;29(4):278-288.

¹⁷ [NCHS Oral Health Surveillance Report List of Tables. https://www.cdc.gov/oralhealth/publications/OHSR-2019-list-of-tables.html](https://www.cdc.gov/oralhealth/publications/OHSR-2019-list-of-tables.html)

¹⁸ [Fryar CD, Carroll MD, Afful J. Prevalence of Overweight, Obesity, and Severe Obesity Among Children and Adolescents Aged 2–19 Years: United States, 1963–1965 Through 2017–2018. NCHS Division of Health and Nutrition Examination Surveys. Health-e Stat. Available here https://www.cdc.gov/nchs/data/hestat/obesity-child-17-18/obesity-child.htm#table2](https://www.cdc.gov/nchs/data/hestat/obesity-child-17-18/obesity-child.htm#table2)

¹⁹ [Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of Obesity and Severe Obesity Among Adults: United States, 2017–2018, NCHS Data Brief 360, February 2020. Available https://www.cdc.gov/nchs/data/databriefs/db360-h.pdf](https://www.cdc.gov/nchs/data/databriefs/db360-h.pdf)

²⁰ Locker D. Concepts of oral health, disease and quality of life. In: Slade GD, editor. *Measuring oral health and quality of life.* Chapel Hill: University of North Carolina, Dental Ecology; 1997, pp. 11-23

²¹ NIDCR, *Oral Health in America: Advances and Challenges.* December 2021. <https://www.nidcr.nih.gov/sites/default/files/2021-12/Oral-Health-in-America-Advances-and-Challenges.pdf#page=59>

²² QuickStats: Prevalence of Edentulism in Adults Aged ≥65 Years, by Age Group and Race/Hispanic Origin — National Health and Nutrition Examination Survey, 2011–2014. *MMWR Morb Mortal Wkly Rep* 2017;66:94. DOI: <http://dx.doi.org/10.15585/mmwr.mm6603a12>.

²³ National Institute of Dental and Craniofacial Research. Periodontal Disease in Seniors. Available at <https://www.nidcr.nih.gov/research/data-statistics/periodontal-disease/seniors>.

²⁴ GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016, *Lancet.* 2017 Oct 28;390(10106):e38.

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- ²⁵ Holmlund A. et al. Number of Teeth as a Predictor of Cardiovascular Mortality in a Cohort of 7,674 Subjects Followed for 12 Years. *J Perio* 2010 81:870-876.
- ²⁶ Han Y.W. . Oral Health and Adverse Pregnancy Outcomes – What’s Next? *J Dent Res*. 2011 Mar; 90(3): 289–293.
- ²⁷ Boggess KA and Edelstein BL Oral Health in Women during Preconception and Pregnancy: Implications for Birth Outcomes and Infant Oral Health. *Maternal Child Health J*. 2006 Sep; 10(Suppl 1): 169–174.
- ²⁸ Jackson, J. 2007. Nursing home fined \$100,000 for death. *Petaluma Argus-Courier*, July 11, 2007.
- ²⁹ Munro, S., Baker, D. Reducing missed oral care opportunities to prevent non-ventilator associated hospital acquired pneumonia at the Department of Veterans Affairs. *Applied Nursing Research*. *Appl Nurs Res*. 2018 Dec. 44: 48-53