

Friday, October 4, 2024

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1101 Wootton Parkway, Suite 420  
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**RE: Comment to the 2025 Dietary Guidelines Advisory Committee Regarding the 2025-2030 Dietary Guidelines for Americans**

The Gerontological Society of America (GSA) appreciates the opportunity to offer comment on the 2025-2030 Dietary Guidelines for Americans (DGA) to the 2025 Dietary Guidelines Advisory Committee (DGAC).

GSA honors aging across the lifespan and is the nation's oldest and largest interdisciplinary organization devoted to research, education, and practice in the field of aging. The principal mission of the Society — and its 5,400+ members — is to cultivate excellence in interdisciplinary aging research and education to advance innovations in practice and policy. We encourage interdisciplinary research collaboration and communication. We routinely convene stakeholders to discuss issues of importance and make recommendations to address the specific needs of older people.

GSA members contribute to the evidence base as it relates to the importance of oral health as an essential element of healthy aging. We have a long-standing commitment to oral health, which includes multiple collaborations over several years. We have a long-standing commitment to oral health, which includes multiple collaborations. Guided by our Oral Health Workgroup, we work to increase awareness of appropriate oral care and strengthen the impact that all members of healthcare and caregiver teams have to ensure good oral care for all of us as we age.

Additionally, GSA's [Oral Health Interest Group](#) is an interdisciplinary network that provides an active opportunity for those interested in the issue of oral health to meet and exchange information and resources. In May 2023, GSA provided a platform through its Interest Group to promote the Association for State and Territorial Dental Directors' Toolkit of Older Adult Oral Health Resources for Collaboration and to share insights from the American Association for Dental, Oral, and Craniofacial Research (AAODCR) "Meeting within a Meeting" on Aging and Oral Health Research at their AAODCR Annual Meeting in March 2023.

GSA's Oral Health Initiative has published and actively disseminated several papers, including a white paper from an interprofessional convening that included more than 20 aging and oral health national organizations entitled "Interprofessional Solutions for Improving Oral Health in Older Adults: Addressing Access Barriers, Creating Oral Health Champions." GSA developed and published two *What's Hot* newsletters addressing oral health issues: "Oral Health: An Essential Element of Healthy Aging" and "Interrelationships Between Nutrition and Oral Health in Older Adults."

GSA encourages the 2025-2030 DGAC to strengthen the 2025-2030 DGAs by adding recommendations on dietary patterns and oral health practices demonstrated to prevent dental caries and periodontal disease in all of us as we age,<sup>1</sup> including older people. Because the 2020-2025 DGAs align with oral health recommendations and recognize dental caries as a preventable major public health problem, the 2025-2030 DGAC can easily expand the definitions of body composition to include teeth and the oral cavity and recognize that poor diets and nutrition are risk factors for

poor oral health and diet-related systemic diseases due to the inability to chew as a result of dental decay, periodontal disease, and pain.<sup>2</sup>

The 2025-2030 DGAs will provide guidance for health professionals, the community, and individuals. GSA urges the DGAC to include these recommendations to promote oral health prevention across the lifespan:

- Individuals at all ages, and especially older adults who are prone to root caries, should adopt and perform regular preventive oral health behaviors, avoid foods with added sugar and fermentable carbohydrates, drink fluoridated water, brush with fluoridated toothpaste, use dental floss or interdental brushes daily, and chew sugar free gum.
- All health professionals; educators; staff at nursing homes, graduated care homes, long-term care facilities, and senior centers; and caregivers of older people and people living with disabilities should know the relationship between diet and oral hygiene to overall health, as well as the specific diet and oral hygiene habits to adopt to promote and ensure healthy aging. The DGAs can become part of that authoritative knowledge base.

### **Oral Health Status and Nutritional Status Relationship**

By 2060, according to the U.S. Census, the number of adults aged 65 years or older is expected to reach 98 million, about 24 percent of the overall population.<sup>3</sup> Nearly 96 percent of people over 65 years have experienced dental caries and one in six have untreated tooth decay.<sup>4</sup> Almost 40 percent of older people have lost six or more teeth, and about 13 percent have lost all of their teeth.<sup>5</sup> Although edentulism (complete loss of teeth) is declining as adults take better care of their teeth,<sup>6,7</sup> on average, people with a greater number of missing teeth faced a 48 percent increased risk of cognitive impairment and a 28 percent increased risk of dementia.<sup>8</sup> This association between tooth loss and cognitive decline was found to be “dose-dependent,” with each additional missing tooth increasing by 1.4 percent the risk of cognitive impairment, and by 1.1 percent the risk of dementia. Notably, those missing 20 or more teeth have a 31 percent higher risk of experiencing cognitive impairment, and those who had lost all their teeth have a 54 percent heightened risk of cognitive impairment and a 40 percent greater risk of developing dementia, which places a great burden on families and healthcare systems.

Older people with the poorest oral health tend to be those who have low socio-economic status, lack dental insurance, and are members of racial and ethnic minorities.<sup>9,10</sup> Eighty-eight percent of people over the age of 60 are taking one or more medications.<sup>11</sup> The side-effects of some of these medications can manifest orally with many symptoms including dry mouth which could lead to additional risk that leads to increased caries incidence, other oral infections, and difficulty speaking and swallowing.<sup>12,13</sup>

Functional teeth units (the number of upper and lower posterior teeth that occlude with one another) and mean number of teeth present are significantly associated with nutritional status in older people.<sup>14</sup> This association operates in both directions: nutritional status affects oral health status and poor oral health status compromises nutritional intake.<sup>15</sup> For older people, a lifetime of poor diets, inadequate oral health hygiene, and gingivitis can result in tooth pain, lost teeth, and bleeding and swollen gums. These oral conditions further complicate chewing and consumption of fresh fruits and vegetables, grains, lean meat, and hard cheese -- impacting adequate nutrient and caloric intakes. Older people who report difficulty chewing and swallowing have insufficient intake of fibers, linoleic acid, potassium, calcium, magnesium, zinc, selenium, Vitamins D, E and K, folate, biotin, and molybdenum.<sup>16</sup> Older people with no teeth or those who wear dentures consumed fewer servings of fruits and vegetables, especially those rich in carotenoids and Vitamin C, than those with teeth.<sup>17</sup> Instead, they consume more carbohydrate-rich foods that are easier to chew which can exacerbate both oral health and overall health. The number of natural teeth was found to be inversely associated with BMI, waist circumference, blood pressure, and fasting blood glucose. Those with dentures often suffer from involuntary weight loss and frailty.<sup>18</sup> A comprehensive review describes the pathophysiological pathways and resulting frailty connecting sarcopenia, dysphagia, and oral health.<sup>19</sup>

Appropriate dietary changes and oral hygiene help older people maintain healthy teeth, support a healthy oral microbiome to minimize dental biofilm accumulation, and reverse the trend toward tooth loss, tooth decay, and gum

disease with potential long-term benefits in reducing the onset of systemic and brain diseases<sup>20, 21</sup>. A 2018 systematic review of 26 studies showed that well-nourished subjects had a significantly higher number of pairs of teeth or Functional Teeth Units (FTU) compared with individuals at risk of malnutrition or with malnutrition<sup>22</sup>. This review further supports the bidirectional connection between rural areas where many older people live and oral health and nutritional status. This also helps aging adults maintain strong teeth and reduce cavities by about 25 percent.<sup>23</sup> Communities of 1,000 or more see an estimated return on diet and oral health. GSA recommends increased access to fluoridated water supplies,<sup>24,25</sup> with an encouraged investment of \$20 for every \$1 spent on water fluoridation.<sup>26</sup> For older people from rural areas, their denture status and the frequency of wearing dentures during meals is associated with dietary quality or the number of foods avoided. Those with severe tooth loss had the lowest quality of dietary intake.<sup>27</sup>

## **Dietary Patterns Consumed and Risk for Cognitive Impairment and Chronic Disease**

GSA suggests including consideration of oral health status, such as tooth loss, tooth decay, and gum inflammation, in discussions of the relationship between dietary patterns and risk for cognitive decline<sup>28</sup> and other chronic diseases. Poor oral health and oral bacteria in older people may hasten the risk for Alzheimer's disease and related dementias (AD/ADRD),<sup>29</sup> Parkinson's disease,<sup>30</sup> cognitive impairment,<sup>31,32</sup> and systemic health problems, such as cardiovascular disease, arterial inflammation,<sup>33</sup> and diabetes.<sup>34</sup>

Researchers conducted a 2018 meta-analysis to understand a possible association between tooth loss and cognitive function. This meta-analysis was based on eight cohort studies involving about 2,000 people with dementia. The analysis found that tooth loss statistically increased the risk for dementia by 1.4-fold, showing a dose-response. Authors set forth several possible explanations of this association: the alteration of chewing ability<sup>35</sup>; deficiencies in memory-dependent nutrients (i.e., protein, Vitamin D, Vitamin B1, Vitamin B6, niacin, pantothenic acid, phospholipids, and other micronutrients) related to tooth loss<sup>36, 37</sup>; subsequent decreased cerebral blood circulation and neurotransmitter secretion<sup>38</sup>; and related periodontal disease that can stimulate the release of some cytokines, which are related to the activation of molecules contributing to neurodegeneration.<sup>39,40</sup> A 2017 systematic review<sup>41</sup> also found four of the studies demonstrate association of dementia with multiple loss of teeth; one human study reported that chronic periodontal disease was associated with dementia; and eight experimental studies demonstrated an association between cognitive impairment and tooth loss. A 2015 study found total tooth loss was independently associated with physical and cognitive decline in older people in England over 10 years and suggested edentulousness may be an early marker of decline.<sup>42</sup>

Tooth loss has also been significantly 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.<sup>43</sup> Researchers found poor oral hygiene, related to the chronic inflammatory process, presence of periodontal disease, and number of missing teeth may be associated with an increased risk for new-onset diabetes in a cohort of Korean adults. Those reporting brushing their teeth at least three times per day were less likely to develop Type 2 Diabetes during 10 years of follow-up compared with those who brushed once daily or less.<sup>44</sup> The number of teeth an individual maintains has also been found to be a predictor for cardiovascular disease and mortality.<sup>45</sup> Tooth loss is not a normal part of aging. Teeth are made to last a lifetime with proper care. If the DGAs include these recommendations, the DGAC will ensure the potential for lifelong teeth for all aging adults.

## **Relationship Among Frequency of Meals and/or Snacking and Body Composition, Including the Mouth**

The previous discussion sets forth the essential role and interconnectedness of the mouth to the rest of the body. This section focuses on dietary patterns that promote dental caries, microbial biofilm, and gum inflammation (gingivitis). As the DGAC deliberates conclusions about the research on the relationship between frequency of meals and/or snacking and body composition, GSA suggests considering, as part of changes in body composition, the role of frequent and sustained intakes of fermentable carbohydrates and added sugar on tooth decay and loss.

The frequent presence of fermentable carbohydrates -- sugars and starches -- in the mouth produces a greater cariogenic effect than the absolute quantity of carbohydrates consumed. Extended oral exposure to carbohydrates

enhances production of bacterial acids and microbial biofilm<sup>46,47</sup>, does not allow saliva to neutralize the acids, and eventually leads to enamel demineralization.<sup>48</sup> In periodontitis, the sugars also drive oxidative stress and may trigger a hyper-inflammatory state. Older people should brush their teeth with fluoridated toothpaste,<sup>49</sup> floss and clean between teeth,<sup>50</sup> or chew sugar free gum (SFG) to help clean teeth and stimulate saliva after meals and snacks.

Besides sugars and starches, other nutritional factors impact the development of various dental and oral pathologies. Protein deficiencies, often experienced by older people, may be associated with delayed salivary gland function.<sup>51</sup> Additionally, adequate Vitamin A intake is essential to epithelial tissue development, tooth formation, enamel retention, and caries avoidance.<sup>52</sup> Vitamin C also plays a critical role in maintaining gum integrity and averting gum disease.<sup>53</sup>

As noted previously, hyposalivation or dry mouth/xerostomia is a frequent side effect of consuming multiple medicines, dehydration, diabetes, Sjögren's Syndrome, radiation, and chemotherapy.<sup>54</sup> Frequent intakes of beverages and foods (e.g., sweetened beverages, lozenges, or mints) help stimulate saliva and provide relief, but can contribute to increased dental caries if sweetened by sugar. Research has also suggested that a saliva stimulant such as chewing SFG is an intervention that results in objective improvements in salivary flow rates and subjective relief from xerostomia.<sup>55</sup> A systematic review and meta-analysis found chewing SFG reduced the rate of new dental caries by 28 percent compared with not chewing SFG.<sup>56</sup> Two newer systematic reviews documented the benefits of chewing SFG on reducing biofilm quantity in the oral cavity<sup>57</sup> and on reducing *Streptococcus mutans* in the mouth.<sup>58</sup> The regular consumption of SFG, however, cannot replace good dental hygiene like tooth brushing and flossing, but it can have a significant, salutary impact on dental health.

## **Nutrition and Oral Health Education in the Community**

Highlighting the interactions of nutrition and oral health in the 2025-2030 DGA would strengthen the multiple community efforts to reach older people and their caregivers to advance healthy dietary patterns and impede onset of tooth loss, periodontitis, and systemic diseases nationwide. The following examples illustrate the diverse community programs pursuing these goals:

- The State of Washington engages AARP to expand community partnerships that address oral health. The two major components of the program are teleconferences that cover oral health and nutrition education, and targeted mailers to specific geographic regions.
- The Washington Dental Service Foundation launched the Mighty Mouth Social Marketing Campaign to Improve Oral Health of Older Adults. The educational campaign uses social media, local media (earned and paid), a website, partnerships, and events to improve the oral health of adults aged 25 or older. The goals of the campaign are to improve the oral health of older adults and increase awareness about the importance of planning for oral care in retirement because traditional Medicare does not include dental benefits.
- The Navajo Area Agency on Aging (NAAA) oversees more than 80 senior centers on the Navajo Nation that serve older people. Most oral health education reaches those who participate in activities and eat meals offered at the senior centers.
- Illinois, Michigan, Minnesota, Oregon, and Tennessee have implemented the *Tooth Wisdom: Get Smart About Your Mouth* program, which offers oral health education for individuals and caregivers in senior centers, community centers, churches, and libraries, focusing on people aged 65 years or older who live independently.

## **Conclusion**

Due to the increased prevalence of cognitive decline and systemic health problems associated with poor oral health and age, as well as medication-related hyposalivation in aging, the need for policies and education that advance routine oral health practices and healthy dietary intakes becomes magnified for older people. To help all of us as we age minimize tooth decay, tooth loss, and gum inflammation, health professionals and educators should assist

those receiving care and their practitioners minimize tooth decay, tooth loss, and gum inflammation through understanding the etiology of dental caries and other oral diseases; the potential risk for acute pain, chronic discomfort, and life-threatening infection due to dental decay; and the importance of specific changes in dietary patterns and oral hygiene to protect teeth and reduce chances of oral infections.

Thank you for the opportunity to provide information regarding this 2025-2030 Dietary Guidelines for Americans. If you have any questions, please contact Patricia D'Antonio, Vice President of Policy and Professional Affairs at [pdantonio@geron.org](mailto:pdantonio@geron.org) or 202-587-5880, or Jordan Miles, Director of Policy at [jmiles@geron.org](mailto:jmiles@geron.org) or 202-587-5884.

Sincerely,

A handwritten signature in black ink that reads "James C. Appleby". The signature is written in a cursive style and is contained within a thin black rectangular border.

James C. Appleby, BSPHarm, MPH, ScD (Hon)  
Chief Executive Officer

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