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Janet M. de Jesus, MS, RD
Office of Disease Prevention and Health Promotion
Office of the Assistant Secretary for Health
Department of Health and Human Services
1101 Wootton Parkway, Suite 420
Rockville, Maryland 20852

Re: Announcement of First Meeting of the 2025 Dietary Guidelines Advisory Committee and Request for Comments (Docket No. HHS-OASH–2022–0021)

On behalf of The Grain Chain, a grains industry coalition from farm to fork, we respectfully submit the following comments to the U.S. Departments of Agriculture and Health and Human Services (the Departments) on the protocols discussed and posted to dietaryguidelines.gov as of June 1, 2023. The Grain Chain, and its members, have a longstanding history of working to increase consumption of under consumed nutrients and foods, like grains, and have been intensely involved in developing and implementing previous editions of Dietary Guidelines for Americans (DGA) through comment submissions, attending public meetings, and participation as MyPlate partners. The Grain Chain looks forward to working with the Departments and the Dietary Guidelines Advisory Committee (DGAC) on the development of the 2025-2030 DGA.

Grains are an integral part of a recommended healthy, dietary pattern, making up one-quarter of MyPlate. In the 2020-2025 DGA, the established USDA Dietary Patterns recommend about 6 servings of grains, or ounce equivalents, per day for those two and older at a 2,000-calorie level, and up to 3 servings of grains, or ounce equivalents, per day for those 12 to 23 months of age. The recommendations also state to “make half your grains whole grains” and that refined-grain choices should be enriched. Further, whole grains were deemed essential to the daily American plate.

Although all grains are core elements of previous editions of the DGA and the 2020-2025 Dietary Guidelines for Americans, an overwhelming number of the population do not meet the recommendations related to them, particularly whole grains. According to USDA Economic Research Service research that examined consumer intake of whole grains from 1998 to 2018, Americans aged 2 years and older went from consuming 0.4 ounces per 1,000 calories to only 0.43 ounces per 1,000 calories, highlighting the need for further emphasis to increase whole grain consumption.[i]

As the DGAC begins to address the protocols, it is imperative that there are clear, accurate, scientifically based definitions and considerations of topics or terms that will be used throughout its report and the 2025-2030 DGA:

Whole Grains: A whole grain contains all three portions of the kernel – bran, germ, and endosperm. Whole grains contribute a variety of vitamins and minerals including dietary fiber, B vitamins, folate, iron, selenium, potassium, and magnesium.

Refined Grains*:* A refined grain is created during processing when the bran and germ have been removed. This is often done to provide a finer texture and improve shelf life.

Enriched grains: An enriched grain means the nutrients in the grains are replaced as part of an enrichment process and are a subcategory of refined grains that make up 95% of refined grains, contributing to a healthy, nutrient dense diet, by providing B vitamins, folic acid, and iron.

Low Carbohydrate: As outlined in the 2020-2025 DGA, daily nutritional goals for Americans ages 2 and older should include 45-65% of calories from carbohydrates, or a recommended daily allowance (RDA) of 130 grams. While a low-carbohydrate diet has gained interest among the American public, the DGAC should continue to recommend these amounts to encourage consumption of under-consumed, nutrient-dense carbohydrate foods like grains, fruits, and vegetables. The Grain Chain is aligned with the approach that a diet lower than 45% of calories from carbohydrates is considered "low carbohydrate."

Staple Carbohydrates: As the DGAC explores the topic of "staple carbohydrates" to address and operationalize health equity, it is important to encompass the nutrient profiles of various carbohydrate sources and ensure dietary recommendations include foods and food groups that will allow Americans to meet nutrient needs.

Nutrient Density & Nutrient Adequacy: Grains contain many nutrients that Americans are lacking or under consuming, including dietary fiber, potassium, iron, and folate. The consumption of grain foods has been found to lower the risk of many nutrition-related chronic diseases including some cancers, diabetes, cardiovascular disease, and stroke. The fortification of folic acid in certain grain foods has contributed to the significant reduction of neural tube defects.[ii] [iii] Breads, cereals, pasta, and other foods made with enriched flour supply about one-half of the iron consumed in the US.[iv] The DGAC must consider how the grains food group not only contributes to a nutritious dietary pattern, but how to recommend consumption of additional grain foods to improve health and nutrition.

Health Equity: The Grain Chain supports and applauds the Departments and the DGAC for a greater emphasis on health equity in developing the 2025-2030 DGA. As part of the focus on health equity, cultural and traditional foods must be considered in dietary recommendations and guidance. Grains are staple foods, providing deep-rooted connections to many cultures from around the world that should be honored and explored during the development of dietary recommendation. Grain foods are also affordable, versatile, and accessible, making them an ideal, nutritious choice for all Americans.

The Grain Chain Response to Posted Protocols

Subcommittee 1

What is the relationship between dietary patterns consumed and growth, body composition, and risk of obesity?

As the DGAC begins to examine how dietary patterns consumed impact growth, body composition, and risk of obesity, it is critical to understand how grains, and the nutrients provided through grain-based foods, play an important role in promoting health and nutritional

adequacy. A May 2019 perspective published in *Advances in Nutrition* states that no meta-analyses on the association between consumption of refined grains and body weight or adiposity have been performed. Additionally, of the three systematic reviews that have been conducted, there is no clear or consistent relationship between refined grain intake and BMI.[v] The author states that elimination of refined grains from the diet may result in inadequate intake of some key shortfall nutrients that are found in refined grains due to enrichment or fortification.

Since the DGAC is examining this question across various populations, including in children and adolescents, it is important to understand how grain consumption also impacts growth, body composition, and risk of obesity among this population. Data from the third National Health and Nutrition Examination Survey (NHANES) that examined food group intake and central obesity among children and adolescents found that in younger children, there was no relationship between central adiposity and mean intakes of grains, and among adolescents, those who met the criteria for central obesity reported consuming significantly fewer total grains (both whole and refined).[vi]

Consumption of grains allows individuals to close nutrient gaps, improve diet quality, and maintain a healthy body weight. A study examining commonly consumed grain food patterns in US adults and nutrient intakes, with a focus on 2015-2020 DGA shortfall nutrients, found that adults consuming pasta, cooked cereals, and rice, had lower body weight and waist circumference (3.5 kg and 3.0 cm, respectively) compared to those who consume no grains.[vii]

When looking at specific grains, the research is clear how various grains positively impact growth, body composition, and risk of obesity. Research published in *Nutrition Today* found a positive association between eating at least one daily serving of rice (white or brown) and reducing the likelihood of being overweight or obese. Within the 19–50-year-old subgroup, rice consumption also was associated with a reduced likelihood of being overweight or obese and a 27% reduced likelihood of having an increased waist circumference.[viii] A new technical review published in May 2023 examined the impact of pasta intake on body weight and body composition. Thirty-eight publications were included in the review and the authors concluded that based on the observational and limited clinical data, pasta is either inversely or not associated with overweight or obesity in healthy children and adults and does not contribute to weight gain within the context of a healthy diet.[ix]

What is the relationship between dietary patterns consumed and risk of cardiovascular disease?

Like the positive association with grains consumed and growth, body composition, and risk of obesity, consumption of grains has been found to lower the risk of cardiovascular disease (CVD). Research published in the *BMJ* that included 45 studies on the impact of whole grain consumption and the risk of cardiovascular disease, among other conditions, found that about three servings of whole grain intake per day (1 serving = 30 grams), but up to seven to seven and a half-servings per day, reduced the risk of CVD, coronary heart disease, and stroke. Further examination also determined that specific types of whole grains including whole grain bread, whole grain breakfast cereals, and added bran as well as total bread and total breakfast cereals were associated with reduced risks of CVD.[x]

While the correlation between whole grain consumption and a lower risk of CVD is quite clear across the evidence, recent publications highlight a similar correlation of refined grains

and the impact on cardiovascular health. The authors of a study published in 2022 in *Trends in Cardiovascular Medicine* note that while several meta-analyses have been published on the association between refined intake and CVD, and have generally shown an unrelated risk of CVD, coronary heart disease, and stroke with refined grain intake, the previous studies did not distinguish between studies that included only staple grain foods (breakfast cereals, breads, biscuits, rice, noodles, and pasta) and those that include both staple and more "indulgent" grain foods (cookies, brownies, cake, pie, etc.) in the way "refined grains" were defined. Their meta-analyses included 17 articles with six cohorts from the US. The results found that refined grain intake, regardless of whether the refined grains were defined as staple grain foods, or both staple and indulgent grain foods, was not significantly associated with CVD risk (Hazard Ratio = 1.08, 95% CI 0.99-1.18).[xi]

Enriched grains, which constitute 95% of refined grains, also play a protective role in cardiovascular health. Enriched grains contribute essential B vitamins, thiamin, niacin, and riboflavin, folic acid, as well as iron. Research has shown a possible role in thiamine deficiency and the development of cardiovascular diseases highlighting the importance of meeting recommended intakes of thiamine.[xii] Additionally, data from 2005-2016 NHANES that included over 10,000 adults found that riboflavin intake was inversely associated with CVD mortality and the association was positively modified by folate intake.[xiii] The DGAC should further emphasize the importance of all grain consumption in achieving adequate nutrient intakes from both refined, including enriched, and whole grains.

What is the relationship between dietary patterns consumed and risk of type 2 diabetes?

As rates of diabetes, particularly type 2 diabetes, and pre-diabetes, continue to soar in the US, the DGAC and the Departments have an opportunity to increase awareness of the types of food that can protect against type 2 and pre-diabetes. Approximately 1 in 10, or more than 37 million Americans, have diabetes with about 90-95% of these cases being type 2 diabetes.[xiv] Currently, $1 out of every $4 in US health care costs is spent on caring for those with diabetes.[xv] Type 2 diabetes diagnoses are increasing among children, teens, and young adults. Furthermore, type 2 diabetes among youth ages 0-19 is impacting those in racial or ethnic minority groups more than white youth with the greatest increases in type 2 diabetes prevalence being seen in youth who are Black or Hispanic. [xvi]

Dietary fiber is one of the best nutrients to help control blood sugar, reduce the risk of prediabetes, and type 2 diabetes, and is found in a variety of grain-based foods. It is also listed in the 2020-2025 DGA as a dietary component of public health concern given how under consumed it is.[xvii] The average intake of dietary fiber is only about 15 grams per day although the recommended daily intake is about 25 grams of fiber per day for women and 38 grams per day for men.[xviii] More than 90% of women and 97% of men do not meet recommended intakes for fiber.[xix] A public health roundtable that convened to address the implications of inadequate fiber intake highlighted the need for inclusion of grain-based foods with added fiber as one way to increase fiber intakes. As part of the discussion, they outlined the important benefits of adequate intake of fiber, including reducing the risk of obesity, prediabetes, and type 2 diabetes.[xx] An umbrella review of meta-analyses published in 2018 comparing diets with high dietary fiber intake to low intake, found there was a statistically significant reduction in the

relative risk of type 2 diabetes (RR = 0.81-0.85) with the greatest benefit coming from cereal fibers.[xxi]

While much of the research has focused on the benefits of whole grain consumption and management of type 2 diabetes or prediabetes, or reduced risk of type 2 diabetes or prediabetes, an article published in 2022 as part of the Mayo Clinic Proceedings, examined the intake of refined grains and the risk of type 2 diabetes.[xxii] Of note, the author states that a "healthy dietary pattern is associated with lower risk of type 2 diabetes and an unhealthy dietary pattern is associated with an increased risk of type 2 diabetes. However dietary pattern research does not provide for an assessment of the risks associated with each particular food group (*like refined grains*) within each dietary pattern." The author included ten publications, or 11 cohorts, on type 2 diabetes risk associated with the intake of refined grains which included both staple and indulgent grains. The majority of cohorts indicated no statistically significant associations with refined grain intake and type 2 diabetes risk. The author included in the discussion that "although it has been recommended that Americans replace refined grains with whole grains and reduce overall intake of refined grains, to reduce risk of type 2 diabetes, this may not be necessary." This is particularly important as continued recommendations to reduce refined grains may lead to nutrient deficiencies, given that enriched grains fit into this category, and may negatively impact cultural or traditional food preferences.

What is the relationship between consumption of dietary patterns with varying amounts of ultra-processed foods and growth, body composition, and risk of obesity?

The Grain Chain and its members express concern about the emphasis on "ultra-processed" foods currently being explored by the DGAC and the Departments. For grains, whether wheat, rice, corn, or other grains, some form of processing is necessary to make the nutrients available and digestible. First, there is no widely accepted definition of "ultra-processed foods." Additionally, much of the scientific research focused on this topic consists mainly of observational research with varying definitions of ultra-processed foods. There is a lack of randomized controlled trials (RCTs) to determine a cause-and-effect relationship on ultra-processed foods and disease risk or outcomes.

Throughout DGAC discussion in both meetings 1 and 2, the committee has not yet established a definition of ultra-processed foods and the committee does not include an expert in the food processing or food manufacturing space. Based on the discussion in the meetings thus far, it is clear that the DGAC has reservations about using the NOVA classification system when reviewing evidence on this question. The NOVA system, which primarily groups foods according to their hypothesized level of processing, is not the most appropriate or evidence-based approach to promoting nutrition and public health. In addition, NOVA does not consider the nutrient content, nutritional value, or health benefits of a food product. For example, "ultra-processed foods" as described by NOVA Category 4 are not automatically high in fat, salt, sugar, or other food additives. Further, research has shown that there is ambiguity in how the system is applied to foods and beverages:

- Sadler et al. found that there is not a consistent view on which aspects of a food determine how its level of processing is classified.[xxiii]
- Braeco and colleagues point out the inconsistencies in the NOVA classification system.[xxiv]

- In an invited commentary published in 2022, Gibney highlighted that the lack of consensus on the classification of processed foods may play a role in differences in how studies are assessed, compared, and interpreted related to and between classifications and certain measurements of health.[xxv]

The DGAC and Departments must consider the benefits of food "processing" which may in turn lead to a food being considered "processed." For example, grains must be processed to be consumed by humans. Furthermore, food processing has led to beneficial nutrients being included in foods like dietary fiber, vitamins and minerals, as well as beneficial attributes that can reduce food waste and increase shelf life. Enrichment and fortification of refined grains have made significant, long-lasting contributions to improve the health of Americans. With the addition of folic acid to the enrichment formula in grains in 1998, there has been a decrease in neural tube birth defects by one-third.[xxvi] Would this process of adding a vital nutrient then classify a food as "ultra-processed" causing potentially unintended consequences of decreased consumption of enriched grain foods, and possibly decreased intake of folic acid? This could result in negative and detrimental nutrition and public health implications, not only for folic acid, but for the other nutrients that grains provide, many of which are under consumed.

Not only could a recommendation around "ultra-processed" foods negatively impact nutrition and public health, but it could also be harmful to cultural and traditional food preferences. For example, the act of making bread or pasta, is a time-honored, authentic tradition which has been done for thousands of years. During the COVID-19 pandemic, consumers found comfort in not only consuming grain foods like pasta and breads, but in making them as well. The end result: grain foods that are a healthy, nutritious, convenient, affordable food staple and are enjoyed by all age groups.

We strongly discourage any DGAC or DGA recommendation related to this question that uses the NOVA classification system as a key aspect for dietary guidance. If the Departments are interested in pursuing this topic further, we recommend they convene a group of nutrition scientists and researchers, with expertise in food processing and manufacturing, separate from the DGAC and DGA development process, similar to how they are addressing alcohol and sustainability.

What is the relationship between consumption of dietary patterns consumed and risk of certain types of cancer (breast, colon, prostate)?

Both whole and refined grains have been found to lower the risk of cancer, as well as site-specific cancers. Meta-analyses of cohort and case control studies published in December 2020 consistently found that whole grain intake is associated with both lower risk of total and site-specific cancer, emphasizing the importance of dietary recommendations to increase the consumption of whole grains.[xxvii] Additionally, across 11 meta-analyses that examined refined grain and intake, there was no association between refined grain intake and cancer.[xxviii]

Breast Cancer

Given that breast cancer accounts for almost one-third of all new cancer cases in women each year in the US, it is critical to understand how diet and nutrition may play a role in reducing the risk of breast cancer.[xxix] A meta-analysis published in 2018 found that intermediate and high intake levels of whole grains were associated with a modest reduction of breast cancer

risk.[xxx] Research has also examined particular grain products and their role in breast cancer risk. A study published in 2016 found that consumption of whole grain cereal products was associated with a reduction in breast cancer risk in adults by up to 18% and brown rice was found to possibly reduce breast cancer risk by up to 6%.[xxxi]

Colon Cancer

According to the American Cancer Society, colorectal cancer is the third most common cancer diagnosed in women and men in the US.[xxxii] Although the incidence in colorectal cancer has been decreasing in mostly older adults from 2011 to 2019, in people younger than 50, rates have been increasing by 1-2% per year since the mid-1990s.[xxxiii] The impact of whole grain consumption on the reduced risk of colon and colorectal cancer has been well established in the literature, particularly in terms of fiber intake. An article published in *The Lancet* in 2019 further emphasized the importance of fiber that leads to protection from conditions like colorectal cancer with a 15-30% decrease in all-cause and cardiovascular related mortality, and incidence of coronary heart disease, stroke incidence and mortality, type 2 diabetes, and colorectal cancer when comparing the highest dietary fiber consumers with the lowest based on observational data.[xxxiv] Additionally, a systematic review and meta-analysis that examined food groups and risk of colorectal cancer published in 2018 in the *International Journal of Cancer,* found that a diet high in whole grains was also associated with a lower risk of colorectal cancer.[xxxv]

Prostate Cancer

Although the role of grain consumption, including dietary fiber intake, on reducing the risk of prostate cancer is not as prevalent in nutrition science and research as it is for other cancers, like breast or colorectal cancer, emerging research and evidence does shed light on the possible benefits. One study found that prostate cancer mortality was inversely associated with estimated consumption of cereals, nuts and oilseeds, and fish.[xxxvi] Another indicated that a low-fat, high fiber diet followed for 10 days resulted in serum changes that reduced the growth of prostate cancer.[xxxvii]

What is the relationship between consumption of dietary patterns consumed and risk of depression; and risk of cognitive decline, mild cognitive impairment, dementia, and Alzheimer's disease?

The Grain Chain is pleased to see the DGAC, and the Departments more closely examine food groups and dietary patterns and the impact on mood and mental health. Recently published data from the Centers for Disease Control and Prevention (CDC) states that almost 1 in 5 adults report ever being diagnosed with depression.[xxxviii] Prevalence was higher among women (24%) compared to men (13.3%) and younger adults ages 18-24 (21.5%) compared to adults 65 and older (14.2%). The COVID-19 pandemic took a severe toll on mental health throughout the world and the United States. Given the increased focus on mental health due to rising rates of depression and anxiety, and the continued negative impacts of the pandemic on mental health, the DGAC and Departments have a unique opportunity to further study how food and eating patterns impact mood and mental health.

A newly published systematic review in *Advances in Nutrition* in April 2023, looked at whole-grain intake and the impact on cognition, mood, and anxiety. Although the overall

evidence for an association between whole-grain intake and cognition was found to be inconclusive, evidence from some of the included studies suggest that higher intake of whole grains is linked to improved outcomes for mood and depression and better anxiety-related scores.[xxxix] Additionally, complex carbohydrates, like whole-grains can positively impact serotonin which helps regulate sleep and mood.[xl]

The Mediterranean diet, which includes whole grains as a core component, has been extensively studied for its various health benefits, including benefits on mental health. Meta-analysis of nine cross-sectional studies showed that greater adherence to a Mediterranean diet was associated with 28% lower odds of depression.[xli] This type of eating pattern may also have a positive impact on brain aging. One study found that when adhering to a Mediterranean diet rich in vegetables, seafood, and whole grains, participants' brain age appeared nine months younger than expected, compared to estimates of their brain's chronological age after following this type of eating pattern for 18 months.[xlii]

Furthermore, research published in March 2023 in *BMC Medicine* found that higher adherence to the Mediterranean diet was associated with lower dementia risk, independent of genetic risk.[xliii] Another study, also published in March 2023, that included the Framingham Offspring Cohort, found that higher consumption of total and several common individual whole grain foods was strongly associated with lower risk of all-cause dementia and Alzheimer's Disease dementia.[xliv]

Subcommittee 2

What is the relationship between dietary patterns consumed during pregnancy and:

- **Risk of hypertensive disorders of pregnancy**
- **Risk of gestational diabetes mellitus**
- **Gestational age at birth,**
- **and birth weight?**

Nutritious dietary patterns consumed during pregnancy are important to promote a healthy pregnancy and play a vital role in the lifetime health of the baby. Unfortunately, a study published in 2019 that examined the nutrient intakes of pregnant women in the US, based on NHANES data from 2001-2014, found that a significant number of pregnant women are not meeting recommended intakes for many essential vitamins and minerals, including vitamins D, C, A, B6, K and E, folate, choline, iron, calcium, potassium, magnesium, and zinc.[xlv] Given that dietary patterns during pregnancy are not meeting nutrient recommendations, the DGAC and the Departments must address these nutrient shortfalls during this critical window of time to improve the health and nutrition of current and future generations.

A NESR Systematic Review published in 2019 found that dietary patterns high in whole grains both before and during pregnancy are associated with reduced risk of hypertensive disorders of pregnancy, including preeclampsia and gestational hypertension, in healthy Caucasian women with access to healthcare.[xlvi] The dietary patterns characterized by higher intakes of fruits, vegetables, nuts, legumes, fish, vegetable oils, and whole grains were associated with a 30-42% decreased risk of hypertensive disorders and a 14-29% decreased risk of preeclampsia. In addition to a protective effect on hypertensive disorders, whole grain consumption has also been studied in relation to Gestational Diabetes Mellitus (GDM). A study

published in 2021 found that higher consumption of whole grains was associated with a decreased risk of receiving a GDM diagnosis.[xlvii]

Grains provide several critical nutrients that are needed during pregnancy, including folic acid and iron. As noted earlier, since 1998 when folic acid fortification was mandated in the US for enriched grain products, the prevalence of neural tube defects (NTDs) has decreased by 35%. Although this fortification has helped about 1,300 US babies to be born without NTDs, Hispanic mothers continue to be at the highest risk for having a baby with an NTD.[xlviii] Compared to 31% of non-Hispanic White women, only 13% of Hispanic women consumed folic acid.[xlix] As the DGAC examines each scientific question with a health equity lens, it is important to consider how NTDs impact specific racial and ethnic groups and how dietary guidance can address nutrient shortfalls among certain populations.

In addition to folic acid, iron is a vital nutrient during pregnancy that supports fetal development.[l] Iron deficiency anemia during pregnancy is associated with having a low-birth-weight baby and postpartum depression, and severe iron deficiency during pregnancy can increase the risk of premature birth (delivery before 37 weeks of pregnancy).[li] Consuming iron-fortified grain foods has been found to significantly reduce iron deficiency and anemia among pregnant women.[lii]

In their final report and throughout DGAC meetings, the 2020-2025 DGAC stated how imperative it is to improve the health and nutrition of adolescent girls as they were found to fall short on consuming key nutrients needed for growth and development, like folic acid and iron.[liii] Furthermore, the committee outlined how the poor health and nutrition of this specific population may impact future generations since they are of reproductive age and may become pregnant already being deficient in key vitamins and minerals. Given that these nutrients are under consumed, particularly during pregnancy, additional efforts should be made to increase the consumption of grain foods containing these key nutrients.[liv]

What is the relationship between:

- **Complementary feeding and growth, body composition, and risk of obesity?**
- **Repeated exposure to foods and food acceptance?**
- **Parental and caregiver feeding styles and practices during childhood and adolescence and 1) growth, body composition, and risk of obesity? 2) consuming a dietary pattern that is better aligned with the DGA?**

Grain consumption in the birth-24 months age range as well as among young children has been examined throughout the literature. Whole grain intake during this life stage has been found to reduce risk of overweight and diabetes and it has been associated with lower body mass index z-scores.[lv] In research published in 2019, data analysis conducted using infant data from NHANES was used to assess grain food consumption with nutrient and energy intakes, diet quality, and food group consumption in infant grain consumers versus non-consumers. For those ages 6-12 months, infant grain consumers had significantly higher intakes of dietary fiber, calcium, folate, potassium, magnesium, zinc, phosphorus, choline, thiamin, riboflavin, and vitamin B6 compared to non-grain consumers. Additionally, for those ages 13-23 months, grain consumption was associated with greater daily dietary fiber, iron, zinc, magnesium, phosphorus, folate, riboflavin, niacin, thiamin, vitamin A, vitamin B6, and vitamin B12 relative to non-

consumers. Most notably, diet quality scores were significantly higher in all infant grain consumers compared to non-consumers.[lvi]

As the DGAC further examines the questions related to complementary feeding, we want to reiterate the importance of all grains, including enriched and fortified grains, across the lifespan. Although the DGAC has stated that they will not be reviewing evidence related to complementary feeding and iron or zinc status due to the lack of research since the 2019 NESR systematic review, it is important to continue to recognize the role that iron-fortified grains, like iron-fortified rice cereal, play in reducing iron deficiency anemia which can have long term consequences. Among children, those with anemia scored lower on cognitive function tests 10 years later than those who did not have anemia in the same time period.[lvii] A study published in the early 1990s examined the iron status of infants fed iron fortified cereals compared to infants fed unfortified cereals. The results showed that infants consuming the fortified rice cereal had significantly lower rates of iron deficiency anemia compared to those consuming the unfortified cereal.[lviii] Another study examining the prevention of iron deficiency and iron deficiency anemia that was published in 2020, noted rice cereal as a food to increase iron intake and absorption.[lix]

The prevalence and importance of grains in infant and young child feeding practices is present throughout dietary recommendations as well as in federal child nutrition programs which are based on the most current DGA. In the Child and Adult Care Food Program (CACFP), grains are a required component at breakfast, lunch, and dinner meals. They can either be whole grains or must be enriched or fortified.[lx]

Related to parental feeding styles, consumer research has shown the shift in parenting styles and feeding practices. Consumer research conducted by USA Rice found that when parents were asked about eating occasions and nutrition, not only did parents report wanting their children to have a healthy relationship with food that focuses on balance, but they also want eating occasions that promote discovery, fun, and engagement through food, including wanting their child(ren) to learn about other cultures through food and flavor.[lxi] Continuing to recommend these nutrient-dense food groups through dietary guidance will ensure young children are able to access healthy, nutritious foods, like grains, in daycare or school settings.

Subcommittee 3

Data Analysis

- **What are the current patterns of food and beverage intake?**
- **What are the current intakes of food groups, nutrients, and dietary components?**

Grain foods are nutrient dense and most provide a greater percentage of several under consumed nutrients than calories (including dietary fiber, iron, and folate), as well as B vitamins, thiamin, niacin and riboflavin (in addition to folate). An NHANES 2009-2012 analysis in US adults aged 19 years and older, found that all grain foods provided 285 calories/day or 14% of all calories in the total diet. Further, the grain food category provided approximately 23% of dietary fiber, 34% of dietary folate, 30% of iron, and 14% of magnesium daily in the total diet—showcasing how grains help in meeting shortfall nutrients. Similarly, breads, rolls and tortillas, and ready-to-eat cereals supplied meaningful contributions of shortfall nutrients, including dietary fiber, folate, and iron, while concurrently providing minimal amounts of nutrients to limit.[lxii]

In addition to this particular age group, another NHANES analysis focusing on US adults aged 51 years and older, found that grain foods were key contributors of nutrients in the American diet, ranking 1st for thiamin (33% of all thiamin in diet) and niacin (23% of all niacin in diet) intake relative to 15 main food groups. The grain foods category ranked 2nd highest of 15 main food groups for daily dietary fiber (23%), iron (38%), folate (40%), and magnesium (15%).[lxiii] Similarly, analyses in children and adolescents (2-18 years-old) using NHANES 2009-2012, demonstrated that specific grain foods contribute nutrient density and have the potential to increase consumption of under-consumed nutrients in children and adolescents, within recommended dietary patterns.[lxiv]

Specific to whole grains, USDA Economic Research Service data published in April 2023 examined trends in whole-grain intakes of US residents by age and food source using national datasets from 1994-2018. The authors used the DGA-based guidance for whole grain intake. Using a 2,000-calorie diet as a reference, the recommendation is 6-ounce equivalents for grains with at least half being whole. In 1994–98, whole-grain intakes by U.S. residents 2 years old and over were 0.4-ounce equivalents per 1,000 calories; in 2017–18, intakes were 0.43-ounce equivalents per 1,000 calories, an increase of less than 0.05-ounce equivalents per 1,000 calories over two decades. Although whole grain intakes did not change significantly among adults, a significant increase did occur among children ages 2-19 years old with their diets being more whole-grain dense in 2015-2016 and 2017-2018 compared to 1994-1998 (0.5 and 0.47 versus 0.34-ounce equivalents per 1,000 calories, respectively), largely due to the role of school meals and food obtained at school.[lxv]

- **Which nutrients and/or dietary components present a substantial public health concern because of underconsumption or overconsumption?**
- **What is the current prevalence of nutrition-related chronic health conditions?**

The 2020-2025 DGA identified several nutrients and dietary components that present a substantial public health concern due to underconsumption – many of which are found in grains. Calcium, potassium, dietary fiber, and vitamin D are considered dietary components of public health concern for the *general U.S. population* because low intakes are associated with health concerns. Iron is a dietary component of public health concern for underconsumption among *older infants ages 6 through 11 months* who are fed primarily human milk and consume inadequate iron from complementary foods. During the *second year of life*, the dietary components of public health concern for underconsumption are vitamin D, calcium, dietary fiber, and potassium. *Adolescent females* have low dietary intakes of iron, folate, vitamin B6, and vitamin B12, and for women who are *pregnant or lactating*, calcium, vitamin D, potassium, dietary fiber, and iron are under consumed. When looking across the nutrients of public health concern for the various age ranges and life stages, there is one food group that supplies many of these nutrients which are under consumed it is grains – both refined (enriched/fortified) and whole.

Specific to Vitamin D deficiency, it disproportionately impacts older adults and those with darker skin tones since both groups are less able to convert Vitamin D from sunlight.[lxvi] Additionally, children experiencing food insecurity are shown to be at greater risk for Vitamin D deficiency and it is more prevalent among non-Hispanic Black children (32%) compared to non-Hispanic white children (3%).[lxvii] [lxviii] Vitamin D fortified ready-to-eat grain-based cereals

represent one way to boost vitamin D intake among populations who are deficient, or most at risk of a deficiency.[lxix] The DGAC and Departments should continue to examine the role of grains in increasing consumption of shortfall nutrients and the health and nutritional benefits they provide.

In addition to providing key nutrients, vitamins, and minerals, grains can also play a role in preventing many nutrition-related chronic health conditions. The evidence on the benefits of whole grains is clear with numerous studies and meta-analyses showing inverse relationships between whole-grain intake and risk of nutrition-related chronic diseases like cardiovascular disease, stroke, cancer, diabetes, and lower risk of dying prematurely from any cause.[lxx] [lxxi] A 2019 narrative review concluded that refined grains were not associated with increased disease risk and/or premature death and additional evidence has found that consumption of up to 50% of all grain foods as refined-grain foods, without high levels of added sugar, sodium, or fat, is not associated with any increased disease risk.[lxxii] [lxxiii]

Food Pattern Modeling

Should foods and beverages with lower nutrient density (i.e. those with added sugars, saturated fat, and sodium) contribute to item clusters, representative foods, and therefore the nutrient profiles for each food group and subgroup used in modeling the USDA dietary pattern?

Remaining Protocols:

Staple Carbohydrates (protocol 3):

Throughout the first two DGAC meetings, there has been discussion around “staple foods,” including staple carbohydrates. While the committee has stated they will examine where consumption is for these staple foods and staple carbohydrates it is important that these shifts do not exclude recommended food groups, like grains, which may cause inadequate intake of nutrients. As the DGAC, and specifically the health equity working group, work to operationalize health equity, consideration should be given to how recommended food groups like grains not only contribute vital nutrients, many of which are under consumed, but also how they are accessible, affordable, and versatile, serving as foundational foods across diverse cultures and traditions. When conducting the simulated diets, the subcommittee must closely examine any unintended nutritional consequences of replacing one more nutrient dense carbohydrate (grains) with a less nutrient dense carbohydrate (potatoes).

Low Carbohydrate (protocol 7):

The Grain Chain believes the current body of scientific evidence supports continuation of the carbohydrate levels of 45-65% of calories recommended in the recent DGAs for the U.S. population. The research to date does not support a recommendation for very low carbohydrate diets for the general population. In many cases, medical staff, dietitians, or a combination of both should supervise these diets. Outcomes from research studies are inconclusive for key health endpoints, including management of type 2 diabetes and weight loss.[lxxiv] Many of the studies used few subjects, were short in duration, or lacked appropriate control groups. Some studies suggest that a very low carbohydrate diet may help jumpstart weight loss and result in improved metabolic markers in those with type 2 diabetes or prediabetes. However, it also has

the potential to limit intakes of key food groups and nutrients and may not be a sustainable eating plan for most individuals. There is also potential for increased risk of neural tube defects in infants born to women following a low carbohydrate diet.[lxxv] [lxxvi] In addition, a 2019 study found that individuals who consumed a low carbohydrate diet were at greater risk of premature death and risks were also increased for individual causes of death, including stroke, cancer, and coronary heart disease.[lxxvii]

One of the first challenges is gaining clarity on what the actual carbohydrate level is in "low carbohydrate" diets. Wheeler et al have categorized the carbohydrate levels of diets in the following way, although this has not yet been widely adopted by all researchers studying low carbohydrate diets:[lxxviii]

- Very Low = 21-70g carb/day. (This equates to 65% of calories/day (>325g carb/d in 2000 cal diet)
- Moderately Low= 30-65% of calories/day (>325g carb/d in 2000 cal diet)
- Moderate = 40-65% of calories/day (200-325g carb/d in 2000 cal diet)
- High = >65% of calories/day (>325g carb/d in 2000 cal diet)

Restricting carbohydrate intake to 20-50g daily has a high probability of limiting healthful sources of carbohydrate, dietary fiber, and other important nutrients, including a wide variety of beneficial phytochemicals. Very low carbohydrate diets minimize available glucose, the body's primary and main source of fuel, even though the body utilizes ketone bodies as fuel when this occurs. Many people who restrict carbohydrates may increase their consumption of unhealthful saturated fats through poor choices of sources of proteins and fats. Long term adherence to low carbohydrate diets can be difficult because these eating approaches are inconsistent with the way that most Americans eat at and away from home. It is important for the DGAC to evaluate low CHO diets when conducting food pattern modeling to assess nutrient intake adequacy across the lifespan. The DGAC should also consider food and dietary patterns that individuals can sustain.

Conclusion

We appreciate this opportunity to provide comments to the 2025-2030 Dietary Guidelines Advisory Committee and the Departments. For questions or additional information, please contact Grain Chain Leader Lee Sanders, Senior Vice President for Government Relations and Public Affairs for the American Bakers Association, lsanders@americanbakers.org.

Sincerely,

Undersigned Members of The Grain Chain

American Bakers Association
American Institute of Baking
Cereals and Grains Association
Independent Bakers Association
National Association of Wheat Growers
National Pasta Association
North American Millers Association
Retail Bakers of America
USA Rice Federation
Wheat Foods Council

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