CENTER FOR Science IN THE Public Interest

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Admiral Rachel L. Levine, MD
Assistant Secretary for Health
U.S. Public Health Service
U.S. Department of Health and Human Services

Janet de Jesus, MS, RD
Nutrition Advisor
Division of Prevention Science
Office of Disease Prevention and Health Promotion
U.S. Department of Health and Human Services

Re: **Request for Comments on Scientific Questions to Be Examined to Support the Development of the Dietary Guidelines for Americans 2025-2030**; Docket No. HHS-OASH-2022-0005-0001

Dear Assistant Secretary Levine and Ms. de Jesus,

The Center for Science in the Public Interest (CSPI) respectfully submits these comments to the U.S. Departments of Agriculture and Health and Human Services (the Departments) in response to the proposed scientific questions to be examined to develop the 2025-2030 *Dietary Guidelines for Americans* (DGA).

CSPI is a non-profit consumer education and advocacy organization that since 1971 has been working to improve the public's health through better nutrition and food safety. CSPI helped to lead efforts to win passage of the Nutrition Labeling and Education Act, the Healthy, Hunger-Free Kids Act (to improve school food), the Food Safety Modernization Act, menu labeling, and the Food Allergen Labeling and Consumer Protection Act. CSPI publishes *Nutrition Action* (NA) and is supported by the subscribers to NA, individual donors, and foundation grants. CSPI is an independent organization that does not accept any government or corporate donations.

I. Summary

Overall, CSPI supports the questions and topics that have been identified by the Departments to support the development of the DGA. Further, we urge the Departments to:

- Add a question to examine the relationship between saturated vs. unsaturated fats and the risk of cardiovascular disease.
- Prioritize completing the separate processes for reviewing the evidence on sustainability and alcohol to ensure that recommendations on these topics are included in the 2025-2030 DGA.
- Operationalize a health-equity lens by adding equity-related questions to each topic area.
- Counter weight stigma in the process of developing the next DGA by addressing the root causes of excess body weight and using preferred terminology to discuss higher weight individuals.
- Incorporate questions regarding:
    - The relationships between red and processed meats and a range of health outcomes
    - Policy, systems, and environmental strategies to support healthy eating

- Substances to avoid or minimize for all age groups, especially during critical windows of susceptibility

Below we expand on these and other issues.

II. The Departments' Proposed Questions

a. Saturated Fats

This comment is in relation to the following question: What is the relationship between food sources of saturated fat consumed and risk of cardiovascular disease?

CSPI urges the Departments to also include a question to examine the relationship between saturated vs. unsaturated fats and the risk of cardiovascular disease.

Rationale:

This question should be similar to the one answered by the 2020 DGAC—that is, "What is the relationship between types of dietary fat consumed and risk of cardiovascular disease?" It is critical that the 2025 DGAC compare types of fat because major health authorities—including the American Heart Association, the American College of Cardiology, the National Heart, Lung, and Blood Institute, the World Health Organization, Health Canada, the European Society of Cardiology and European Atherosclerosis Society, and the UK Scientific Advisory Committee on Nutrition—recommend diets that *replace* some saturated fats with monounsaturated and especially polyunsaturated fats.[1,2,3,4,5,6,7,8,9]

It is not possible to evaluate the effect of saturated fats on the risk of CVD without considering which nutrients would replace it, as explained by a 2017 Presidential Advisory from the American Heart

[1] Sacks FM, et al. Dietary Fats and Cardiovascular Disease: A Presidential Advisory from the American Heart Association. *Circulation*. 2017;136(3):e1-e23.
[2] Eckel RH, et al. 2013 AHA/ACC Guideline on Lifestyle Management to Reduce Cardiovascular Risk: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol.* 2014;63(25 Pt B):2960-84.
[3] Lichtenstein AH, Appel LJ, Vadiveloo M, Hu FB, Kris-Etherton PM, Rebholz CM, Sacks FM, Thorndike AN, Van Horn L, Wylie-Rosett J. 2021 Dietary Guidance to Improve Cardiovascular Health: A Scientific Statement From the American Heart Association. Circulation. 2021 Dec 7;144(23):e472-e487.
[4] National Heart, Lung, and Blood Institute. *Choose Heart-Healthy Foods.* March 24, 2022. nhlbi.nih.gov/health/heart-healthy-living/healthy-foods. Accessed May 13, 2022.
[5] National Heart, Lung, and Blood Institute. *DASH Eating Plan*. December 19, 2021. nhlbi.nih.gov/education/dash-eating-plan. Accessed May 13, 2022.
[6] World Health Organization. *Healthy diet*. April 29, 2020. who.int/news-room/fact-sheets/detail/healthy-diet. Accessed May 13, 2022.
[7] Health Canada. *Canada's Dietary Guidelines for Health Professionals and Policy Makers*. 2019. https://food-guide.canada.ca/sites/default/files/artifact-pdf/CDG-EN-2018.pdf. Accessed May 13, 2022.
[8] Mach F, Baigent C, Catapano AL, Koskinas KC, Casula M, Badimon L, Chapman MJ, De Backer GG, Delgado V, Ference BA, Graham IM, Halliday A, Landmesser U, Mihaylova B, Pedersen TR, Riccardi G, Richter DJ, Sabatine MS, Taskinen MR, Tokgozoglu L, Wiklund O; 2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk. ESC Scientific Document Group. Eur Heart J. 2020 Jan 1;41(1):111-188. doi: 10.1093/eurheartj/ehz455.
[9] Scientific Advisory Committee on Nutrition. *Saturated fats and health*. 2019. www.gov.uk/government/publications/saturated-fats-and-health-sacn-report. Accessed May 13, 2022.

Association.[10] Studies that ignore the replacement nutrient are effectively comparing saturated fats to refined carbohydrates (largely refined flour and added sugars), which comprise a major component of the average American diet.[11] As the AHA Advisory explains, meta-analyses of prospective observational studies that did not take the replacement nutrient into account have mistakenly concluded that saturated fat intake had no significant effect on CVD risk.[12,13] In contrast, meta-analyses that evaluated the effect of replacing saturated fat with polyunsaturated fat reported a reduced risk of CVD, while replacing saturated fat with refined carbohydrates yielded no lower risk of CVD.[14,15]

If the Departments intend to have the DGAC evaluate the evidence that some saturated fat-rich food groups (such as red meat, dairy, or tropical oils) or some foods (such as milk, cheese, yogurt, or butter) have a greater or lesser impact on LDL cholesterol, cardiovascular disease risk, or other outcomes, those impacts should also be compared to the same impacts from food groups or foods that are rich in unsaturated fats. For example, one recent study compared LDL cholesterol levels not only on a diet rich in butter versus cheese, but on a diet rich in mono- or polyunsaturated fats.[16]

b. Ultra-processed Foods

This comment is in support of the following question: What is the relationship between consumption of dietary patterns with varying amounts of ultra-processed foods and growth, size, body composition, risk of overweight and obesity, and weight loss and maintenance?

CSPI agrees that the DGAC should examine the evidence on ultra-processed foods and excess weight.

Rationale:

We agree that the DGAC should review the evidence on ultra-processed foods and the risk of weight gain, overweight, and obesity. In a tightly controlled clinical trial, subjects consumed roughly 500 more calories per day when given access to large quantities of ultra-processed foods than when they had access to large quantities of unprocessed foods. Moreover, the participants gained roughly 2 lb. on the

[10] Sacks FM, Lichtenstein AH, Wu JHY, et al; American Heart Association. Dietary Fats and Cardiovascular Disease: A Presidential Advisory from the American Heart Association. *Circulation*. 2017 Jul 18;136(3):e1-e23.
[11] Shan Z, Rehm CD, Rogers G, Ruan M, Wang DD, Hu FB, Mozaffarian D, Zhang FF, Bhupathiraju SN. Trends in Dietary Carbohydrate, Protein, and Fat Intake and Diet Quality Among US Adults, 1999-2016. JAMA. 2019 Sep 24;322(12):1178-1187.
[12] Siri-Tarino PW, Sun Q, Hu FB, Krauss RM. Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease. *Am J Clin Nutr*. 2010;91:535–546.
[13] Chowdhury R, Warnakula S, Kunutsor S, Crowe F, Ward HA, Johnson L, Franco OH, Butterworth AS, Forouhi NG, Thompson SG, Khaw KT, Mozaffarian D, Danesh J, Di Angelantonio E. Association of dietary, circulating, and supplement fatty acids with coronary risk: a systematic review and meta-analysis [published correction appears in *Arch Intern Med*. 2014;160:658]. *Ann Intern Med*. 2014;160:398–406.
[14] Jakobsen MU, O'Reilly EJ, Heitmann BL, Pereira MA, Bälter K, Fraser GE, Goldbourt U, Hallmans G, Knekt P, Liu S, Pietinen P, Spiegelman D, Stevens J, Virtamo J, Willett WC, Ascherio A. Major types of dietary fat and risk of coronary heart disease: a pooled analysis of 11 cohort studies. *Am J Clin Nutr*. 2009;89:1425–1432.
[15] Li Y, Hruby A, Bernstein AM, Ley SH, Wang DD, Chiuve SE, Sampson L, Rexrode KM, Rimm EB, Willett WC, Hu FB. Saturated fats compared with unsaturated fats and sources of carbohydrates in relation to risk of coronary heart disease: a prospective cohort study. *J Am Coll Cardiol*.2015;66:1538–1548.
[16] Brassard D, Tessier-Grenier M, Allaire J, Rajendiran E, She Y, Ramprasath V, Gigleux I, Talbot D, Levy E, Tremblay A, Jones PJ, Couture P, Lamarche B. Comparison of the impact of SFAs from cheese and butter on cardiometabolic risk factors: a randomized controlled trial. *Am J Clin Nutr*. 2017 Apr;105(4):800-809.

ultra-processed diet and lost about 2 lb. on the unprocessed diet.[17] Furthermore, prospective observational studies have reported a greater risk of weight gain, overweight, and obesity in people who report consuming a diet that is high in ultra-processed foods.[18,19,20,21] The growing body of evidence on ultra-processed foods indicates that the DGAC should address their relationship with weight gain. Furthermore, the DGAC should consider whether the current definition of ultra-processed foods is sufficiently precise and consistently applied across studies.[22]

III. Proposed Separate Processes

This comment is in relation to the Departments' proposed use of "separate processes" to examine the evidence on sustainability and alcohol.

CSPI urges the Departments to prioritize completing the proposed separate processes for reviewing the evidence on sustainability and alcohol to ensure that recommendations on these topics are included in the 2025-2030 DGA.

Rationale:

a. Sustainability

We support the Departments' intention to examine the relationship between diet and environmental sustainability to inform work across the Departments, including the 2025-2030 DGA. However, we are concerned that addressing sustainability outside of the 2025 DGAC would compromise its long overdue incorporation into the next edition of the DGA.

To date, the DGAs have not incorporated a substantial body of current scientific literature on sustainable diets that can help prevent chronic disease while ensuring a healthy food supply and nutritionally adequate diet. The 2015 DGAC, charged with reviewing the best available evidence on the

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[17] Hall KD, Ayuketah A, Brychta R, Cai H, Cassimatis T, Chen KY, Chung ST, Costa E, Courville A, Darcey V, Fletcher LA, Forde CG, Gharib AM, Guo J, Howard R, Joseph PV, McGehee S, Ouwerkerk R, Raisinger K, Rozga I, Stagliano M, Walter M, Walter PJ, Yang S, Zhou M. Ultra-Processed Diets Cause Excess Calorie Intake and Weight Gain: An Inpatient Randomized Controlled Trial of Ad Libitum Food Intake. *Cell Metab*. 2019 Jul 2;30(1):67-77.e3.

[18] Beslay M, Srour B, Méjean C, Allès B, Fiolet T, Debras C, Chazelas E, Deschasaux M, Wendeu-Foyet MG, Hercberg S, Galan P, Monteiro CA, Deschamps V, Calixto Andrade G, Kesse-Guyot E, Julia C, Touvier M. Ultra-processed food intake in association with BMI change and risk of overweight and obesity: A prospective analysis of the French NutriNet-Santé cohort. .*PLoS Med*. 2020 Aug 27;17(8):e1003256.

[19] Cordova R, Kliemann N, Huybrechts I, Rauber F, Vamos EP, Levy RB, Wagner KH, Viallon V, Casagrande C, Nicolas G, Dahm CC, Zhang J, Halkjær J, Tjønneland A, Boutron-Ruault MC, Mancini FR, Laouali N, Katzke V, Srour B, Jannasch F, Schulze MB, Masala G, Grioni S, Panico S, van der Schouw YT, Derksen JWG, Rylander C, Skeie G, Jakszyn P, Rodriguez-Barranco M, Huerta JM, Barricarte A, Brunkwall L, Ramne S, Bodén S, Perez-Cornago A, Heath AK, Vineis P, Weiderpass E, Monteiro CA, Gunter MJ, Millett C, Freisling H. Consumption of ultra-processed foods associated with weight gain and obesity in adults: A multi-national cohort study. .*Clin Nutr*. 2021 Sep;40(9):5079-5088.

[20] Rauber F, Chang K, Vamos EP, da Costa Louzada ML, Monteiro CA, Millett C, Levy RB. Ultra-processed food consumption and risk of obesity: a prospective cohort study of UK Biobank. .*Eur J Nutr*. 2021 Jun;60(4):2169-2180.

[21] Chang K, Khandpur N, Neri D, Touvier M, Huybrechts I, Millett C, Vamos EP. Association Between Childhood Consumption of Ultraprocessed Food and Adiposity Trajectories in the Avon Longitudinal Study of Parents and Children Birth Cohort. .*JAMA Pediatr*. 2021 Sep 1;175(9):e211573.

[22] Tobias DK, Hall KD. Eliminate or reformulate ultra-processed foods? Biological mechanisms matter. .*Cell Metab*. 2021 Dec 7;33(12):2314-2315.

relationships among population-level dietary patterns, sustainability, and food security, concluded that "in general, a dietary pattern that is higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in animal-based foods is more health promoting and is associated with lesser environmental impact ([greenhouse gas] emissions and energy, land, and water use) than is the current average U.S. diet." It also concluded that a "diet that is more environmentally sustainable than the average U.S. diet can be achieved without excluding any food groups."[23]

Now there is even more evidence on the environmental impact of different dietary patterns. In 2020, researchers from the Union of Concerned Scientists and Tufts University conducted a systematic review of the evidence on U.S. dietary patterns and sustainability outcomes published from 2015 to 2019, replicating the 2015 DGAC methodology.[24] The authors identified 22 relevant studies published since the 2015 DGAC report, including 8 studies comparing the sustainability of DGA-compliant dietary patterns with current U.S. diets. The researchers concluded that "consistent with previous research, studies meeting inclusion criteria generally support the conclusion that, among healthy dietary patterns, those higher in plant-based foods and lower in animal-based foods would be beneficial for environmental sustainability." Further, findings from this review "challenge prior findings that diets adhering to national dietary guidelines are more sustainable than current average diets and indicate that the Healthy US-style dietary pattern recommended by the DGA may lead to similar or increased greenhouse gas emissions, energy use, and water use compared with the current U.S. diet," affirming the urgency of addressing sustainable eating patterns in the 2025-2030 DGA.

Despite the 2015 DGAC's conclusions, guidance on sustainable dietary patterns was excluded from the 2015-2020 DGA, and the 2020 DGAC was not charged with updating this review of evidence. The omission of this topic from the 2020-2025 DGA represents yet another tragically missed opportunity to adopt authoritative recommendations to reduce the environmental footprint of U.S. diets.

Considering that the Biden Administration has identified slowing and mitigating the effects of climate change to be a top priority[25] (the food system, including manufacturing, agricultural inputs, food processing, and transportation has been estimated to account for up to 37% of global greenhouse gas emissions),[26] we hope the Departments agree that sustainable diets cannot wait. Therefore, we urge the Departments to prioritize completing the separate process for evaluating diet and sustainability on a timeline that ensures that the 2025-2030 DGA includes guidance on sustainable dietary patterns. Additionally, in order to forestall inevitable criticism, it is imperative that this separate process be at least as scientifically rigorous and transparent as the DGAC review process—that is, giving the public the opportunity to provide input on the questions to be addressed, the experts appointed to review the evidence, the methods to be used to review the evidence, and the translation of expert panel conclusions into dietary guidance. These measures are critical to ensure the resulting recommendations are sound and trustworthy.

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[23] DGAC (Dietary Guidelines Advisory Committee). *Scientific Report of the 2015 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Health and Human Services and the Secretary of Agriculture*. 2015. Washington, DC: US Department of Agriculture. Pg. 289. https://health.gov/dietaryguidelines/2015-scientific-report. Accessed May 13, 2022.

[24] Reinhardt SL, Boehm R, Blackstone NT, et al. Systematic Review of Dietary Patterns and Sustainability in the United States. *Adv Nutr*. 2020;11(4):1016-1031.

[25] The White House. *Executive Order on Tackling the Climate Crisis at Home and Abroad*. January 27, 2021. https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/. Accessed May 13, 2022.

[26] Intergovernmental Panel on Climate Change. *Climate Change and Land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*. 2019. https://www.ipcc.ch/site/assets/uploads/2019/11/SRCCL-Full-Report-Compiled-191128.pdf. Accessed May 13, 2022.

b. Alcohol

Similarly, we urge the Departments to prioritize completing the separate process used to examine the relationship between alcohol and health outcomes to ensure that the best available evidence is used to inform recommendations on consuming alcoholic beverages in the 2025-2030 DGA. Alcohol is a known human carcinogen that is associated with a higher risk of cancers of the breast, colon, rectum, esophagus, liver, mouth, pharynx, larynx, and stomach.[27] Alcohol use is the third leading modifiable risk factor for cancer-related death, with researchers estimating that each year in the United States, 23,510 cancer deaths are attributable to alcohol consumption.[28] Given the rise in alcohol consumption in recent years, the substantial percentage of adults who report binge drinking,[29] and the clear association between alcohol consumption and risk of cancer, we further recommend that the separate process used to examine the evidence on alcohol be as transparent and scientifically rigorous as the DGAC review process.

IV. Overarching Recommendations

a. Health Equity

This comment is in relation to the Departments' intent to review the scientific questions using a health equity lens.

CSPI urges the Departments to operationalize a health equity lens by adding equity-related questions to each topic area.

Rationale:

Although the DGA can play a vital role in promoting the public's health, more transformative changes are needed to mitigate the injustices that serve as barriers to health equity. These changes include dismantling systems that bolster and widen health disparities, such as structural racism and poverty, to forge a path towards meaningful social change. Without addressing these upstream factors that mediate health disparities, more downstream effects, such as ensuring equitable access to healthy dietary patterns, will be challenging to bring to fruition. At the same time, there are opportunities to shift the process and the content of the DGA to center equity.

CSPI supports the Departments' proposal to intentionally center equity throughout the scientific review process, but how a health equity lens will be applied to the DGAC's review of the topics and questions should be specified. To meaningfully evaluate inequities in dietary factors and health outcomes, and to understand their root causes, the Departments should incorporate relevant language into the final scientific questions.

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[27] American Institute for Cancer Research, World Cancer Research Fund. Alcoholic Drinks and the Risk of Cancer. Diet, Nutrition, Physical Activity and Cancer: A Global Perspective, 2018. https://www.wcrf.org/dietandcancer/exposures/alcoholic-drinks; IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Alcohol Consumption and Ethyl Carbamate. Vol 96. Lyon, France: International Agency for Research on Cancer; 2010.

[28] Islami F, et al. Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States. *CA: A Cancer Journal for Clinicians.* 2018; 68(1): 31-54.

[29] Substance Abuse and Mental Health Services Administration. *Key substance use and mental health indicators in the United States: Results from the 2020 National Survey on Drug Use and Health* (HHS Publication No. PEP21-07-01-003, NSDUH Series H-56). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. 2021. https://www.samhsa.gov/data/. Accessed May 13, 2022.

Suggested question wording:

This could be accomplished by developing general equity-related questions to be examined as part of the planned systematic reviews within each topic area. For example, when examining "the relationship between dietary patterns consumed and: growth, size, body composition, risk of overweight and obesity, and weight loss and maintenance," the DGAC could further examine:

- **"How does this relationship vary across different demographics (race, ethnicity, disability, income, sexual orientation, gender identity, etc.)?"**
- **"What are the environmental, systemic, and structural factors that contribute to or impact this relationship across different demographics?"**

This language should be adapted and added to each question as appropriate.

To further promote inclusivity, guidance on meeting dietary guidelines across diverse cultural food preferences and traditions should also be better integrated into the next edition of the DGA. To that end, within the proposed questions to guide the DGAC's Food Pattern Modeling activities, CSPI agrees with the intent to examine whether changes should be made to USDA Dietary Patterns or whether additional Dietary Patterns should be developed based on population norms, preferences, and needs.

Below, under Section V: "Policy, systems, and environmental (PSE) strategies," as an additional way to operationalize health equity in the DGAC's work, we recommend an additional topic area to examine the evidence on policy, systems, and environmental strategies to support healthy eating.

b. Countering Weight Stigma

This comment is in relation to the Departments' emphasis on body weight-related outcomes in the proposed scientific questions.

CSPI urges the Departments to counter weight stigma in the process of developing the next DGA by addressing the root causes of excess body weight and using preferred terminology to discuss higher weight individuals.

Rationale:

There is a significant emphasis in the proposed scientific questions on body weight-related outcomes. While elevated body weight is a major diet-related risk factor for chronic disease and warrants serious consideration in the DGA, we urge the Departments and the DGAC to approach these subjects with due sensitivity to individuals at higher weights and make every effort to avoid contributing to weight stigma throughout this process.

Weight stigma, or social devaluation based on body size or body weight, is a form of injustice that has been linked to extensive psychological harm. Approximately 40 percent of a representative sample of U.S. adults report that they have been subjected to weight-based teasing, unfair treatment, and/or discrimination.[30] Weight-based prejudice is also one of the most prevalent reasons that youth are bullied in the United States.[31] A 2020 systematic review reported that for both youth and adults,

[30] Himmelstein MS, Puhl RM, Quinn DM. Intersectionality: An understudied framework for addressing weight stigma. *Am J Prev Med.* 2017; 53: 421-31.
[31] Bucchianeri MM, et al. Youth experiences with multiple types of prejudice-based harassment. *J Adolesc.* 2016;51:68–75.

experiencing weight stigma is linked to an increased risk of psychological distress, including depression and anxiety.[32] Furthermore, contrary to the common and enduring perception that shame is motivating, evidence indicates that weight stigma interferes with healthy eating, physical activity, and weight management.[33]

Weight stigma stems in part from societal views that body weight is wholly an issue of personal responsibility. However, there is a hierarchy of factors that contribute to excess body weight, with policies, systems, and environments being more powerful drivers than individual behavior.[34] For example, the school food environment determines the choices available to children who depend on school for lunch each day. Further, there are also complex physiological barriers to achieving sustainable, significant weight loss, like the reductions in energy expenditure resulting from weight loss.[35]

In the past, the DGAs have primarily provided guidance for individual consumption. This implicitly reinforces the personal responsibility framing of weight gain and weight loss that is misleading and stigmatizes people at higher weights. To minimize any contribution to weight stigma, we urge the Departments to be sensitive to and acknowledge the complex factors that contribute to excess body weight and the drawbacks to solely emphasizing individual-focused strategies to promote healthy weight. One way to address this is by implementing our recommendations for applying a health equity lens to questions that address body weight (see above) and for additional questions on policy, systems, and environmental strategies to improve diet quality and weight status (see below).

In addition, research has elucidated preferences for weight-related terminology. Using this research, CSPI has developed guidelines for discussing body weight in our external communications that we encourage the Departments to implement where relevant. In brief, these are:

- The following words are <u>least</u> preferred and should be avoided when describing people: *obese, morbidly obese, morbid obesity, heavy, chubby.*
- Instead, try to use more neutral, preferred language in the context of overweight and obesity while remaining scientifically accurate and precise: *weight gain, excess body weight, healthy/unhealthy weight, healthy/unhealthy BMI, elevated weight, elevated BMI, higher weight*. It may be appropriate to use the terms 'overweight' and 'obesity' if used by the source material.
- Always try to contextualize any mention of weight in terms of the increased risk for chronic disease, which is our ultimate concern.
- Always use person-first language to describe people: 'people with obesity', 'people at higher weights', 'people with elevated BMI', 'X% of Americans are people with obesity."[36] Do NOT say "overweight people", "obese people," or "X% of people are overweight or obese."
- Consider the implications of words that you are using in the same sentence as "obesity" or "weight" that could be perceived as stigmatizing. For example, words like "burden" should be avoided when referring to people with obesity, as should words like "motivation" or "effort" when discussing weight or weight loss.

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[32] Alimoradi Z, et al. Weight-related stigma and psychological distress: A systematic review and meta-analysis. *Clin Nutr*. 2020; 39: 2001-2013.
[33] Puhl RM, Himmelstein MS, Pearl RL. Weight stigma as a psychosocial contributor to obesity. *American Psychologist*. 2020; 75*:* 274-289.
[34] Swinburn BA, et al. The Global Obesity Pandemic: Shaped by Global Drivers and Local Environments. *Lancet*. 2011;378:804-14.
[35] Ochner CN, Barrios DM, Lee CD, Pi-Sunyer FX. Biological mechanisms that promote weight regain following weight loss in obese humans. *Physiol Behav*. 2013;120:106–113.
[36] Pearl RL, et al. Preference for People-First Language Among Patients Seeking Bariatric Surgery. *JAMA Surgery*. 2018;153(12):1160-1162.

V. CSPI's Recommended Additions to the Proposed Questions

a. Red and Processed Meats

This comment proposes a new scientific question. The Departments should add a question on the relationship between red and processed meats and a range of health outcomes to clarify existing guidance in the 2020 DGA.

Suggested question wording:

To ensure the 2025-2030 DGA provides clear, evidence-based guidance on red and processed meats, we recommend that the Departments incorporate the following question under "Specific Dietary Pattern Components":

What is the relationship between red and/or processed meat consumption and:

- **growth, size, body composition, risk of overweight and obesity, and weight loss and maintenance?**
- **risk of cardiovascular disease?**
- **risk of type 2 diabetes?**
- **risk of certain types of cancer (breast, colorectal, lung, prostate)?**
- **risk of all-cause mortality?**
- **bone health?**
- **risk of cognitive decline, mild cognitive impairment, dementia, and Alzheimer's disease?**

Rationale:

The 2015 and 2020 DGACs examined the health impacts of dietary patterns higher in red and processed meats. The 2015 DGAC's review of the evidence found strong or moderate evidence for associations between dietary patterns high in red and processed meat intake and increased risk of cardiovascular disease, colorectal cancer, measures of body weight or obesity, and type 2 diabetes.[37] Further, the International Agency for Research on Cancer also concluded in 2015 that processed meats are "carcinogenic to humans" and red meats are "probably carcinogenic to humans."[38]

Despite these associations, the 2015-2020 DGA did not include a recommendation to lower consumption of red and processed meat, except for teen and adult males. In 2018, the American Institute for Cancer Research also identified strong evidence that consuming red meat and processed meat increases the risk of colorectal cancer.[39] The 2020 DGAC's conclusions contributed additional support for limiting red and processed meat as part of a healthy dietary pattern in relation to all-cause mortality, bone health, and pregnancy outcomes.

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[37] DGAC (Dietary Guidelines Advisory Committee). *Scientific Report of the 2015 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Health and Human Services and the Secretary of Agriculture*. Washington, DC: US Department of Agriculture. Pg. 188, 192, 197, 204. https://health.gov/dietaryguidelines/2015-scientific-report. Accessed May 13, 2022.

[38] World Health Organization: International Agency for Research on Cancer. *IARC Monographs Evaluate Consumption of Red and Processed Meat*. October 26, 2015. http://www.iarc.fr/en/media-centre/pr/2015/pdfs/pr240_E.pdf. Accessed May 13, 2022.

[39] American Institute for Cancer Research, World Cancer Research Fund. Meat, Fish, and Dairy Products and the Risk of Cancer. *Diet, Nutrition, Physical Activity and Cancer: A Global Perspective*. 2018. https://www.wcrf.org/dietandcancer/exposures/meat-fish-dairy. Accessed May 13, 2022.

Despite these findings, the 2020-2025 DGA's advice on consuming red and processed meats is inconsistent and leaves room for confusion. The 2020-2025 DGA encourages eating a variety of protein foods, including lean meats, poultry, eggs, seafood, beans, peas, lentils, nuts, seeds, and soy products.[40] "Lean meat" presumably includes lean red meat, which is primarily beef and pork. However, elsewhere in the report, the DGA states that dietary patterns characterized by lower consumption of red and processed meats are associated with health benefits, including reduced risk of cardiovascular disease, type 2 diabetes, and certain types of cancer.[41]Adding these questions would enable the 2025-2030 DGA to offer clear guidance on the health impacts of consuming red and processed meats.

b. Policy, systems, and environmental (PSE) strategies

This comment proposes new scientific questions. The Departments should add questions related to policy, systems, and environmental strategies to support healthy eating.

Rationale:

It is no secret that the average U.S. diet departs significantly from that recommended by the DGA.[42] Many people in the United States face profound structural and socioeconomic barriers that place a healthy diet out of reach. Those barriers—along with a lack of culturally tailored recommendations—may help explain why the average individual does not eat in accordance with the DGA. The 2015-2020 DGA included a key recommendation to "Support healthy eating patterns for all," followed by specific policy, systems, and environmental change strategies to make it easier for people to eat the recommended eating pattern. None of this content was retained in the 2020-2025 DGA. Given the Biden administration's unprecedented commitment to nutrition security and health equity, it is an opportune time to reincorporate PSE strategies into the DGA, building on the content from 2015 with much greater attention to health equity.

The Departments indicated that existing Federal guidance from the Community Preventive Services Task Force on Healthy Food Environments precludes the need for the 2025 DGAC to address the topic. However, there are many promising PSE strategies that the CPSTF has not examined recently or at all.

Therefore, we recommend incorporating questions examining the impact of PSE strategies on diet quality. Below are suggested questions that are modeled from questions reviewed and answered by the 2015 DGAC.

Food Access and Assistance:

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[40] U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2020-2025 Dietary Guidelines for Americans*. 9th Edition, Page ix. December 2020. https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf. Accessed May 13, 2022.

[41] U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2020-2025 Dietary Guidelines for Americans*. 9th Edition, Page 23. December 2020. https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf. Accessed May 13, 2022.

[42] U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2020–2025 Dietary Guidelines for Americans*. 9th Edition, Page 4 December 2020. https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf. Accessed May 13, 2022.

- What is the relationship between neighborhood and community access to food retail settings and individuals' dietary intake and quality?
- What is the relationship between neighborhood and community access to food retail settings and income?
- What is the impact of expanding SNAP delivery options on food retail settings on individuals' dietary intake and quality?
- What is the impact of SNAP nutrition incentives that increase funds for fruits and vegetables on food retail stocking?
- What is the impact of policies that either increase SNAP eligibility or increase benefit allotments on food retail settings and individuals' dietary intake and quality?

Place-Based Strategies:

- What is the impact of school-based approaches on dietary intake, quality, behaviors, and/preferences of school-aged children?
- What is the impact of worksite-based approaches on the dietary intake, quality, behaviors and/or preference of employees?
- What is the impact of restaurant-based approaches on the dietary intake, quality, behaviors and/or preference of consumers?
- What is the impact of retail-based approaches on the dietary intake, quality, behaviors and/or preference of consumers?
- What is the impact of in-store and online food retail marketing on individuals' dietary intake and quality? Does the impact vary by socioeconomic status?
- What is the impact of worksite-based approaches (*e.g.*, parental leave) on breastfeeding practices?

Labeling

- What is the impact of labeling strategies (*e.g.*, nutrient warnings, front-of-pack nutrient disclosures) on dietary intake, quality, or behaviors?

Economic

- What is the impact of economic incentives/disincentives (*e.g.*, excise taxes on sugary drinks) on dietary intake, quality, and behaviors?

Marketing

- What is the impact of food marketing on dietary intake, quality, and behaviors and/or preferences of consumers at different life stages?

c. Additives and Chemical Substances

This comment proposes new scientific questions. CSPI urges the Departments to add questions regarding substances to avoid or minimize for all age groups, especially during critical windows of susceptibility.

People of all ages are exposed to potentially harmful substances through food. However, some populations receive greater dietary exposures than others, especially children, in part because they have higher food and fluid intake per pound of body weight than do adults. Children can also be exposed *in utero* via placental transfer or after birth via breast milk. Furthermore, it is widely recognized by health authorities, including the U.S. National Institute of Environmental Health Sciences (NIEHS) and the U.S. Centers for Disease Control and Prevention (CDC), that exposures early in life, during "windows of susceptibility" when certain tissues and organ systems are developing, are of paramount importance to health throughout the lifetime (according to NIEHS, obesity, type 2 diabetes, insulin resistance, asthma,

cardiovascular diseases, behavioral disorders, neurodegenerative diseases, reproductive disorders, and some cancers may arise through such exposures).[43,44,45,46] Similarly, the susceptibility to carcinogens from exposures during pregnancy and early in life is a well-recognized public health concern.

Thus, in addition to ensuring good nutrition early in life, every effort should be made to avoid or minimize potentially harmful dietary exposures. While the current Dietary Guidelines address alcohol[47] and provide general advice on caffeine,[48] many other dietary exposures of concern, including arsenic, cadmium, lead, and mercury, have not been addressed. The decision to provide advice at different life stages starting in the 2020-2025 DGA provides an opportunity to address this topic. For each life stage, and in particular during pregnancy and early in life, the Departments should add the topic "Avoiding or minimizing dietary exposures of potential concern," and charge the DGAC with conducting systematic reviews to address the relationships between dietary exposures to specific chemicals and adverse health outcomes. To identify food-based strategies to reduce exposure to substances of concern, the Dietary Patterns topic area should include a series of questions on the relationships between dietary patterns and exposure to substances of concern. We provide question wording and justification for addressing several dietary exposure categories of particular concern below. If the Departments or the DGAC decline to address specific exposures of potential concern, they should publicly indicate which exposures they are not addressing, so that consumers are aware that the list of addressed exposures is not exhaustive.

i. Toxic heavy metal contaminants, including lead, arsenic, mercury, and cadmium

Suggested question wording:

"What is the relationship between dietary exposure to arsenic, cadmium, lead, and mercury and adverse health outcomes?"

"What is the relationship between dietary patterns and exposures to arsenic, cadmium, lead, and mercury?"

Rationale:

Exposure to toxic heavy metals, including lead, arsenic, cadmium, and mercury, especially early in life, can result in adverse health outcomes. Lead, arsenic, and mercury are especially toxic to the

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[43] National Institute of Environmental Health Sciences, National Institutes of Health. *Developmental Origins of Health and Disease*. https://www.niehs.nih.gov/research/supported/health/developmental/index.cfm. Accessed May 10, 2022.
[44] U.S. Centers for Disease Control and Prevention. *Children's Environmental Health*. https://www.cdc.gov/nceh/tracking/topics/ChildrensEnvironmentalHealth.htm. Accessed May 10, 2022.
[45] U.S. Centers for Disease Control and Prevention. *Health Effects of Lead Exposure*. https://www.cdc.gov/nceh/lead/prevention/health-effects.htm. Accessed May 10, 2022.
[46] Centers for Disease Control and Prevention. *Alcohol use in pregnancy*. 2016. https://www.cdc.gov/ncbddd/fasd/alcohol-use.html. Accessed May 10, 2022.
[47] U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2020-2025 Dietary Guidelines for Americans*. 9th Edition, Page 117. December 2020. https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf. Accessed May 13, 2022.
[48] U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2020-2025 Dietary Guidelines for Americans*. 9th Edition, Page 118. December 2020. https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf. Accessed May 13, 2022.

developing brain, as recognized by the U.S. Food and Drug Administration (FDA) and the U.S. Environmental Protection Agency (EPA), contributing to learning and behavioral problems in children.[49,50,51] Arsenic and inorganic arsenic compounds and cadmium and cadmium compounds are "known to be a human carcinogen" according to the National Toxicology Program's Report on Carcinogens, while lead and lead compounds are also considered "reasonably anticipated to be human carcinogens."[52] These are only some of the adverse health effects associated with toxic heavy metal exposure. Baby foods sold in the U.S. sometimes contain dangerously high levels of arsenic, cadmium, lead, and mercury, as shown by manufacturers' internal data and reports published by Congress in September and February 2021.[53,54] This prompted the FDA to launch its Closer to Zero Action Plan, a series of steps intended to reduce heavy metal contamination in foods intended for infants and young children.[55] While American consumers wait for the FDA to complete the first round of this iterative process over the next several years, the DGA could provide guidance to avoid toxic heavy metals in baby foods.

Heavy metals are not solely found in baby foods. Seafood, for example, is a known source of methylmercury exposure, and the DGA 2020-2025 encourages consumption of seafood varieties lower in methylmercury, especially for children and people who are pregnant or lactating, based on joint advice issued by the FDA and EPA.[56] As noted by the FDA in their Closer to Zero Action Plan, the metals present in baby food result in part from environmental contamination of raw agricultural ingredients (i.e., the metals were taken up by crops during cultivation),[57] meaning other foods produced from these crops could also contain heavy metals. For example, according to the most recent four years of data from FDA's Total Diet Study (2014-2017), lead levels in canned sweet potatoes (mean = 0.013 mg/kg; std deviation = 0.00376 mg/kg; n = 14) were not statistically significantly different ($p = 0.6701$; two sample t-test, $\alpha = 0.05$) from lead levels in sweet potato baby foods (mean = 0.014 mg/kg; std deviation = 0.00413 mg/kg; n = 14).[58] Similar to the advice provided in the DGA 2020-2025 for seafood, the DGA

[49] U.S. FDA. *Arsenic in Food and Dietary Supplements*. https://www.fda.gov/food/metals-and-your-food/arsenic-food-and-dietary-supplements. Accessed April 29, 2022.
[50] U.S. FDA. *Lead in Food, Foodwares, and Dietary Supplements*. https://www.fda.gov/food/metals-and-your-food/lead-food-foodwares-and-dietary-supplements. Accessed April 29, 2022.
[51] U.S. Environmental Protection Agency. *Health Effects of Exposures to Mercury.* https://www.epa.gov/mercury/health-effects-exposures-mercury. Accessed April 29, 2022.
[52] NTP (National Toxicology Program). 2021. Report on Carcinogens, Fifteenth Edition.; Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. https://ntp.niehs.nih.gov/go/roc15.
[53] Subcommittee on Economic and Consumer Policy, Committee on Oversight and Reform, U.S. House of Representatives. Baby Foods are Tainted with Dangerous levels of Arsenic, Lead, Cadmium, and Mercury. 2021. https://oversight.house.gov/sites/democrats.oversight.house.gov/files/2021-02-04%20ECP%20Baby%20Food%20Staff%20Report.pdf.
[54] Subcommittee on Economic and Consumer Policy, Committee on Oversight and Reform, U.S. House of Representatives. New Disclosures Show Dangerous Levels of Toxic Heavy Metals in Even More Baby Foods. 2021. https://oversight.house.gov/sites/democrats.oversight.house.gov/files/ECP%20Second%20Baby%20Food%20Report%209.29.21%20FINAL.pdf.
[55] US Food and Drug Administration. Closer to Zero: Action Plan for Baby Foods. https://www.fda.gov/food/metals-and-your-food/closer-zero-action-plan-baby-foods. Accessed May 2, 2022.
[56] U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2020-2025 Dietary Guidelines for Americans*. 9th Edition, Page ix. December 2020. https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf. Accessed May 13, 2022.
[57] U.S. Food and Drug Administration. Closer to Zero: Action Plan for Baby Foods. https://www.fda.gov/food/metals-and-your-food/closer-zero-action-plan-baby-foods. Accessed May 2, 2022.
[58] U.S Food and Drug Administration. Elements 2017 MB 1-3, Analytical Results of the Total Diet Study. www.fda.gov/food/total-diet-study/analytical-results-total-diet-study.

could issue broader guidance for minimizing dietary exposure to all toxic heavy metals from other foods, especially for people who are pregnant or lactating.

ii. Additives that cause or are reasonably anticipated to cause cancers

Suggested question wording:

"What is the relationship between dietary exposure to Red 3, aspartame, and BHA and cancer?"

"What is the relationship between dietary patterns and exposure to Red 3, aspartame, and BHA?"

Rationale:

Several food chemicals in use today, including Red 3, aspartame, and butylated hydroxyanisole (BHA) have been linked to cancer. In 1990, the FDA determined that the synthetic color additive, Red 3, caused cancer based on evidence from animal feeding studies and accordingly terminated provisional uses of Red 3 in cosmetics.[59]

Compelling evidence from three animal studies suggests the artificial sweetener, aspartame, may cause cancer in multiple species (rats and mice), both sexes, and at multiple sites, including extremely rare cancer types.[60,61,62] After questions were raised about the diagnosis of lymphomas/leukemias in an earlier study, a 2020 study used more advanced diagnostic techniques and confirmed the prior conclusion.[63,64] Importantly, when exposures began prenatally (i.e., female rats were fed aspartame while pregnant) and continued throughout the lifespan, lymphomas/leukemias occurred faster and at a higher rate compared to exposures beginning postnatally,[65] raising concerns about the consumption of aspartame by people who are pregnant.

Butylated hydroxyanisole (BHA) is currently used as a food preservative and is classified as "reasonably anticipated to be a human carcinogen" by the U.S. National Toxicology Program (NTP).[66] The DGA could issue guidance to consumers to reduce their exposure to these and other potentially carcinogenic food additives.

iii. Synthetic color additives (food dyes)

Suggested question wording:

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[59] 21 CFR 81.10 (u).
[60] Soffritti M, et al. First Experimental Demonstration of the Multipotential Carcinogenic Effects of Aspartame Administered in the Feed to Sprague-Dawley Rats. *Environ Health Perspect*. 2006; 114(3):379-385.
[61] Soffritti M, et al. Lifespan Exposure to Low Doses of Aspartame Beginning During Prenatal Life Increases Cancer Effects in Rats. *Environ Health Perspect*. 2007; 115:1293-1297.
[62] Soffritti M, et al. Aspartame Administered in Feed, Beginning Prenatally Through Life Span, Induces Cancers of the Liver and Lung in Male Swiss Mice. *Am J Ind Med*. 2010; 53(12):1197-1206.
[63] Tibaldi E, et al. Identification of Aspartame-Induced Haematopoietic and Lymphoid Tumours in Rats After Lifetime Treatment. *Acta Histochem*. 2020; 122(5):15148.
[64] Landrigan PJ, Straif K. Aspartame and Cancer – New Evidence for Causation. *Environ Health*. 2021; 20(1):42.
[65] Soffritti M, et al. Lifespan Exposure to Low Doses of Aspartame Beginning During Prenatal Life Increases Cancer Effects in Rats. *Environ Health Perspect*. 2007; 115:1293-1297.
[66] NTP (National Toxicology Program). 2021. *Report on Carcinogens, Fifteenth Edition*.; Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. https://ntp.niehs.nih.gov/go/roc15.

"What is the relationship between dietary exposure to synthetic color additives and adverse neurobehavioral outcomes in children?"

"What is the relationship between dietary patterns and exposure to synthetic color additives?"

Rationale:

Synthetic color additives—Blue 1, Blue 2, Green 3, Red 3, Red 40, Yellow 5, and Yellow 6—have no nutritional nor public health benefit. The FDA reported in 2011 that synthetic dyes are associated with adverse behaviors in some susceptible children with Attention Deficit/Hyperactivity Disorder or other problem behaviors, but at the time, the FDA concluded that the evidence was not sufficient to establish a causal relationship between exposure to synthetic food dyes and hyperactivity in the general population.[67] In 2021, a systematic review of the evidence, including 27 human clinical trials as well as animal and in vitro studies, was completed by the California Office of Environmental Health Hazard Assessment (OEHHA), confirming the link between synthetic dyes and adverse neurobehavioral outcomes.[68] In its final peer-reviewed report, OEHHA stated, "the scientific literature provides evidence in humans and animals, as well as mechanistic information, that synthetic food dyes can cause or exacerbate neurobehavioral problems in some children." This review is more comprehensive than any review to date. Throughout the European Union, a warning notice—"may have an adverse effect on activity and attention in children"—is required on foods that contain Red 40, Yellow 5, or Yellow 6, as well as three other food dyes not used in the U.S.[69] Yet Americans may not be aware that synthetic food dyes can trigger adverse behavioral reactions in certain individuals. The DGAC should be charged with addressing exposures of concern so that the DGA can provide guidance to U.S. consumers on avoiding exposure to synthetic dyes, especially those who shop for and serve food to children.

iv. Other substances indirectly added to food from packaging, processing, or cooking

Suggested question wording:

"What is the relationship between dietary exposure to synthetic phthalates and PFAS and adverse health outcomes?"

"What is the relationship between dietary patterns and exposure to phthalates and PFAS?"
Rationale:

Acrylamide, polycyclic aromatic hydrocarbons (PAHs), heterocyclic amines (HCAs), phthalates, and per- and polyfluorinated alkyl substances (PFAS) are examples of potentially harmful chemicals that end up in foods as a result of food packaging, processing, or cooking. Acrylamide, PAHs, and HCAs are

[67] U.S. Food and Drug Administration. *Background Document for the Food Advisory Committee: Certified Color Additives in Food and Possible Association with Attention Deficit Hyperactivity Disorder in Children*. 2011. https://wayback.archive-it.org/org-1137/20170406211659/https://www.fda.gov/downloads/AdvisoryCommittees/CommitteesMeetingMaterials/FoodAdvisoryCommittee/UCM248549.pdf.

[68] California Environmental Protection Agency: Office of Environmental Health Hazard Assessment. *Health Effects Assessment: Potential Neurobehavioral Effects of Synthetic Food Dyes in Children*. April 2021. https://oehha.ca.gov/media/downloads/risk-assessment/report/healthefftsassess041621.pdf.

[69] European Union. Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives. http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:354:0016:0033:en:PDF.

substances that are produced during cooking of certain foods that have been linked to cancer.[70,71] The FDA has issued guidance to industry to reduce acrylamide in foods,[72] and the National Cancer Institute provides suggestions to consumers seeking to minimize formation of PAHs and HCAs in food they prepare themselves.[73] These recommendations could serve as a foundation for DGA guidance on selecting and preparing food to minimize dietary exposures to these substances. The DGAC could conduct systematic reviews to address the questions: "What is the relationship between dietary exposure to PAHs and HCAs and cancer?" and "What is the relationship between dietary patterns and exposure to PAHs and HCAs?"

Phthalates and PFAS can migrate into food from food packaging, and PFAS are also environmental contaminants and thus are also found in foods through contamination of seafood and agricultural commodities.[74,75] The DGA could offer guidance to consumers on selecting foods to minimize exposures to PFAS and phthalates.

Thank you for the opportunity to provide comments on the proposed scientific questions to support the development of the 2025-2030 *Dietary Guidelines for Americans*.

For more information please contact:

Catherine Cochran, MA
Policy Fellow
Center for Science in the Public Interest
Cochran@cspinet.org

[70] US Food and Drug Administration. *Acrylamide*. https://www.fda.gov/food/chemical-contaminants-food/acrylamide. Accessed May 2, 2022.
[71] National Cancer Institute, U.S. National Institutes of Health. *Chemicals in Meat Cooked at High Temperatures and Cancer Risk*. https://www.cancer.gov/about-cancer/causes-prevention/risk/diet/cooked-meats-fact-sheet. Accessed May 2, 2022.
[72] US Food and Drug Administration. *Guidance for Industry: Acrylamide in Foods*. 2016. https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-acrylamide-foods. Accessed May 2, 2022.
[73] National Cancer Institute, U.S. National Institutes of Health. *Chemicals in Meat Cooked at High Temperatures and Cancer Risk*. https://www.cancer.gov/about-cancer/causes-prevention/risk/diet/cooked-meats-fact-sheet. Accessed May 2, 2022.
[74] National Institute of Environmental Health Sciences, National Institutes of Health. *Endocrine Disruptors*. https://www.niehs.nih.gov/health/topics/agents/endocrine/index.cfm. Accessed: 2 May 2022.
[75] U.S. Environmental Protection Agency. *Our Current Understanding of the Human Health and Environmental Risks of PFAS*. https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas. Accessed May 2, 2022.

CC:

Sara Bleich, PhD
Director of Nutrition Security and Health Equity
Food and Nutrition Service
Food, Nutrition, and Consumer Services
U.S. Department of Agriculture

Stephanie Fu
Senior Policy Advisor
Center for Nutrition Policy and Promotion
Food and Nutrition Service
U.S. Department of Agriculture

Jackie Haven, MS, RD
Deputy Administrator
Center for Nutrition Policy and Promotion
Food and Nutrition Service
Food, Nutrition, and Consumer Services
U.S. Department of Agriculture

Jessica Larson, MS, RD
Public Affairs Specialist
Center for Nutrition Policy and Promotion
Food and Nutrition Service
Food, Nutrition, and Consumer Services
U.S. Department of Agriculture

Eve Essery Stoody, PhD
Lead Nutritionist
Center for Nutrition Policy and Promotion
Food and Nutrition Service
Food, Nutrition, and Consumer Services
U.S. Department of Agriculture