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TO: Kristin Koegel
USDA Food and Nutrition Service, Center for Nutrition Policy and Promotion

FROM: Maureen Ternus, MS, RDN
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Subject: Comments for Docket Number FNS-2019-0001

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The International Tree Nut Council Nutrition Research & Education Foundation (INC NREF), a non-profit organization located in Davis, California, represents nine tree nut industries (almond, Brazil, cashew, hazelnut, macadamia, pecan, pine nut, pistachio and walnut) and supports nutrition research and education. INC NREF appreciates the opportunity to provide written comments and data pertinent to the Dietary Guidelines for Americans.

The following questions will be addressed in our comments:

- What is the relationship between dietary patterns consumed and growth, size, body composition, and risk of overweight and obesity?
- What is the relationship between dietary patterns consumed and risk of cardiovascular disease?
- What is the relationship between dietary patterns consumed and neurocognitive health?
- What is the relationship between the frequency of eating and growth, size, body composition, and risk of overweight and obesity?

Dietary Patterns

Currently, all three recommended dietary patterns in the 2015-2020 Dietary Guidelines for Americans include nuts, which provide a number of nutrients of concern, including vitamin E, calcium, magnesium, iron and fiber.¹ The Healthy U.S. Style and Healthy Mediterranean Style patterns both recommend a maximum of 2.5 ounces of nuts per week. The Healthy Vegetarian Style Eating pattern recommends a maximum of 3.5 ounces of nuts per week. Compare this to the 10.5 ounces per week recommended in the FDA qualified health claim for nuts and heart disease².

According to USDA/ERS data (2015), consumers eat about 1.3 ounces of tree nuts per week. Increasing the recommended amount of nuts in healthy food patterns may help consumers lower their risk of chronic disease and potentially improve overall health.

Overweight/Obesity

In the last five years, more than eight epidemiological and clinical mixed-nut studies have shown the

beneficial impact of nuts on weight and satiety. Specifically, this research has shown that nut consumption is not associated with higher body weight.

Recently, researchers at Harvard³ looked at 27,521 men in the Health Professionals Follow-up Study and 117,364 women from the Nurses' Health Study I and II and found changes in nut consumption can influence long-term weight change in both men and women. The researchers concluded that increasing daily consumption of nuts is associated with less long-term weight gain, a lower risk of moderate weight gain, and a lower risk of obesity in adults. Incorporating nuts as part of a healthy dietary pattern by replacing 0.5 servings/day of less healthful foods with nuts, may be a simple strategy for the primary prevention of obesity.

Cardiometabolic Health

Over 46 research articles have shown that consumption of mixed nuts may be associated with reducing the risk of heart disease, diabetes and metabolic syndrome:

In a systematic review and meta-analysis of 61 controlled intervention trials⁴ with a total of 2,582 individuals, researchers investigated the effects of tree nuts on blood lipids, lipoproteins, blood pressure and inflammation in adults 18 years and older without prevalent cardiovascular disease (CVD). The amount of nuts varied from 5 to 100 grams per day (median 56 grams/day or approximately two ounces). Compared with the control groups, consumption of tree nuts (per serving/day) significantly lowered total cholesterol (-4.7mg/dL; 95% CI-5.3,-4.0), LDL cholesterol, ApoB (-3.7mg/dL; 95% CI -5.2,-2.3) and triglycerides (-2.2mg/dL; 95% CI-3.8,-0.5). The major determinant of cholesterol lowering appears to be nut dose rather than nut type.

In a study by Becerra-Tomás, et al,⁵ researchers conducted a meta-analysis of 19 prospective cohort studies. The results showed an inverse association between total nut consumption (comparing highest vs lowest categories) and CVD incidence (RR, 0.85; 95% CI, 0.800-0.91; I2, 0%), CVD mortality (RR, 0.77; 95% CI, 0.72–0.82; I2, 3%), coronary heart disease (CHD) incidence (RR, 0.82; 95% CI, 0.69–0.96; I2, 74%), CHD mortality (RR, 0.76; 95% CI, 0.67–0.86; I2, 46%), stroke mortality (RR, 0.83; 95% CI, 0.75–0.93; I2, 0%), and atrial fibrillation (RR, 0.85; 95% CI, 0.73–0.99; I2, 0%). According to the researchers, this analysis suggests a beneficial role of total nut consumption in reducing the incidence of, and mortality from, different CVD outcomes such as CHD, stroke and atrial fibrillation.

In another systematic review and meta-analysis of 40 randomized, controlled trials⁶, with 2,832 individuals, consumption of nuts significantly decreased insulin resistance/HOMA-IR (WMD: -0.23; 95% CI: -0.40, -0.06; I2 =51.7%) and fasting insulin (WMD:-0.40 μ IU/mL; 95% CI: -0.73, -0.07 μ IU/mL; I2 = 49.4%). The findings suggest that nut consumption may play a role in improving insulin sensitivity and thereby, possibly delaying the development and progression of type 2 diabetes.

Neurocognitive Health

With an aging population there is an increase in the frequency of age-related diseases, including Alzheimer's disease, the most common type of dementia. Alzheimer's is the sixth leading cause of death in the United States and the fifth leading cause of death among adults aged 65 years and older.⁷

Research suggests an association between dietary habits and cognitive performance. Oxidative stress is believed to play a major role in cognitive decline and neurodegenerative disorders. By counteracting oxidative stress, it's possible that antioxidant-rich foods, such as nuts, might provide protection from neurodegenerative diseases.⁸

More than 18 papers have been published in the last five years looking at nuts and cognitive health. *Valls-Pedret, et al.⁹ conducted a clinical study in a subcohort of the PREDIMED trial and found that*

in an older population, a Mediterranean diet supplemented with olive oil or nuts may counteract age-related cognitive decline.

More recently, the MIND Diet (*Mediterranean-DASH Diet Intervention for Neurodegenerative Delay*)¹⁰, which was developed specifically to promote brain health and contains nuts, was studied in relation to Parkinsonism. A total of 706 adults, ages 59-97, without parkinsonism at baseline, were followed for an average of 4.6 years. At the end of the study, those with a higher adherence to the MIND diet were more significantly associated with lower rates of developing parkinsonism and with a slower progression of signs of the disease.

Frequency of Eating

Research shows snacks provide about 25% of daily calories. *According to a study by Dunford, et al.*, a large proportion come from desserts, sugar-sweetened beverages, sweets and salty snacks. These are foods that are recommended in limited amounts in U.S. dietary guidelines.¹¹ *In a more recent study looking at overall diet from 1999 to 2016*¹², there was a significant decrease in the percentage of calories from low-quality carbohydrates and significant increases in calories from high-quality carbohydrates, polyunsaturated fat and plant protein. However, despite these changes, low-quality carbohydrates and saturated fat intake still remain higher than recommended.

When it comes to the role of nuts in the diet, approximately 60% of the nuts consumed are as snacks.¹³ *Rehm, et al.*,¹⁴ looked at data from the 2009-2012 NHANES and found that replacing between-meal snacks with tree nuts, on a per calorie basis, led to more nutrient-rich diets that were lower in empty calories and sodium and had more favorable fatty acid profiles. The researchers concluded that even a partial replacement, not counting already nutrient-rich snacks, had a significant positive effect on the quality of the diet.

In summary, consumption of nuts per person in the US is well below both USDA Dietary Guidelines and FDA recommendations. Interestingly, evidence to date continues to support the recommendation that nuts can and should play an important role in the American diet to help improve overall health and reduce the risk for various chronic diseases.

Sincerely,



Maureen Ternus, M.S., R.D.N.

Executive Director

International Tree Nut Council Nutrition Research & Education Foundation

cc: Dennis Balint

Chair, International Tree Nut Council Nutrition Research & Education Foundation

¹ U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015 – 2020 Dietary Guidelines for Americans*. 8th Edition. December 2015. Available at <https://health.gov/dietaryguidelines/2015/guidelines/>.

² Food and Drug Administration (FDA), Qualified Health Claims: Letter of Enforcement Discretion – Nuts and Coronary Heart Disease, Docket No 02P-0505, Food & Drug Administration, Washington, DC, 2003.

³ Liu, X., Y. Li, M. Guasch-Ferre, W.C. Willett, J.-P. Drouin-Chartier, S.N. Bhupathiraju, D.K. Tobias, 2019. **Changes in nut consumption influence long-term weight change in US men and women.** *bmjnph* Epub ahead of print: September 25. doi:10.1136/bmjnph-2019-000034.

⁴ Del Gobbo, L.C., M.C. Falk, R. Feldman, K. Lewis, D. Mozaffarian, 2015. **Effects of tree nuts on blood lipids, apolipoproteins, and blood pressure: systematic review, meta-analysis, and dose-response of 61 controlled intervention trials.** *AJCN*. First published ahead of print November 11, 2015 as doi: 10.3945/ajcn.115.110965.

⁵ Becerra-Tomás, N., I. Paz-Graniel, C.W.C. Kendall, H. Kahleova, D. Rahelić, J. L. Sievenpiper, Jordi Salas-Salvadó, 2019. **Nut consumption and incidence of cardiovascular diseases and cardiovascular disease mortality: a meta-analysis of prospective cohort studies.** *Nutrition Reviews*. Vol. 0(0):1–19. doi: 10.1093/nutrit/nuz042

⁶ Tindall, A.M., E.A. Johnston, P.M. Kris-Etherton, K.S. Petersen, 2019. **The effect of nuts on markers of glycemic control: a systematic review and meta-analysis of randomized controlled trials.** *Am J Clin Nutr*. 109:297–314.

⁷ Matthews, K.A., W. Xub, A.H. Gaglioti, J.B. Holt, J.B. Croft, D. Mack, L.C. McGuire, 2019. **Racial and ethnic estimates of Alzheimer's disease and related dementias in the United States (2015–2060) in adults aged ≥65 years.** *Alzheimer's & Dementia*. 15(1): 17–24.

⁸ Valls-Pedret C, Sala-Vila A, Serra-Mir M, Corella D, de la Torre R, Martínez-González MÁ, Martínez-Lapiscina EH, Fitó M, Pérez-Heras A, Salas-Salvadó J, Estruch R, Ros E, 2015. **Mediterranean diet and age-related cognitive decline: a randomized clinical trial.** *JAMA Intern Med*. 175(7):1094-103.

⁹ Valls-Pedret C, Sala-Vila A, Serra-Mir M, Corella D, de la Torre R, Martínez-González MÁ, Martínez-Lapiscina EH, Fitó M, Pérez-Heras A, Salas-Salvadó J, Estruch R, Ros E, 2015. **Mediterranean diet and age-related cognitive decline: a randomized clinical trial.** *JAMA Intern Med*. 175(7):1094-103.

¹⁰ Agarwal, P., Y. Wang, A.S. Buchman, T.M. Holland, D.A. Bennett, M.C. Morris, 2018. **Mind diet associated with reduced incidence and delayed progression of parkinsonism in old age.** *J Nutr Health Aging* 22(10): 1211–1215.

¹¹ Dunford, E.K., B.M. Popkin, 2017. **Disparities in snacking trends in US adults over a 35-year period from 1977 to 2012.** *Nutrients* 9(8), 809; <https://doi.org/10.3390/nu9080809>.

¹² Shan, Z., C.D. Rehm, G. Rogers, M. Ruan, D.D. Wang, F.B. Hu, D. Mozaffarian, F.F. Zhang, S.N. Bhupathiraju, 2019. **Trends in dietary carbohydrate, protein, and fat intake and diet quality among US adults, 1999-2016.** *JAMA*. 322(12):1178-1187.

¹³ King, J.C., J. Blumberg, L. Ingwersen, M. Jenab, K.L. Tucker, 2008. **Tree nuts and peanuts as components of a healthy diet.** *J. Nutr*. 138: 1736S-1740S.

¹⁴ Rehm, C., A. Drewnowski, 2017. **Replacing American snacks with tree nuts increases consumption of key nutrients among U.S. children and adults: results of an NHANES modeling study.** *Nutrition Journal*. 16:17. DOI 10.1186/s12937-017-0238-5