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Background: The USDA Agriculture Research Service (ARS) requested stakeholder input on five human nutrition research priorities for the next five years.

1. Monitoring Food Composition and Nutrient Intake of the Nation (including food databases and What We Eat In America Survey)
2. Research to Improve the Scientific Basis for Dietary Guidelines
3. Research on the Prevention of Diet-Related Chronic Diseases
4. Research on Life Stage Nutrition and Metabolism
5. Research to Bridge the Gap between Food Production and Human Health

Further details on each priority area can be found at <https://np107.arsnet.usda.gov/>.

The Institute of Food Technologists (IFT) provided the following comments via website:

<https://np107.arsnet.usda.gov/>

The Institute of Food Technologists (IFT) appreciates the opportunity to provide input to the USDA ARS research priorities.

1. Monitoring Food Composition and Nutrient Intake of the Nation

IFT agrees that there is a need to expand and update the current data on composition of foods, such as what is found in Food Data Central, and would recommend using the most up-to-date methodologies for determining nutrient content and food composition. As an example, there are new, approved AOAC methodologies for determining dietary fiber content of foods and these should be employed to update food composition databases. USDA should also consider how to align laboratory methods with new regulatory definitions applied to nutrients, such as dietary fibers added to foods (which require a physiological benefit in addition to analytical detection) and added sugars (which require manufacturer documentation as there is no analytical method) to create a database that can more accurately reflect the nutrient content of foods.

IFT also agrees that the What We Eat in America survey is critical for understanding food consumption in the US. We also recommend that future surveys increase sampling of diverse groups, such as different ethnicities, low-income populations, SNAP and WIC

participants, pregnant or lactating women, vegetarians, vegans, etc. It is critical to understand intake patterns in these populations to inform dietary guidance unique to these populations. We would also suggest USDA ARS consider additional research into real-time dietary assessment tools, such as wearable sensors, that might be able to be piloted as a potential survey tool in WWEIA. This could yield more reliable intake data than tools based on memory alone. It could also potentially yield multiple days of intake which would more accurately reflect typical intake than a 24 h recall.

IFT also suggests that USDA ARS consider opportunities to work with the ERS and leverage data from private organizations, such as IRI/NPD to merge food composition data with data on purchasing habits and consumption frequency across geographies and diverse groups of individuals.

2. Research to Improve the Scientific Basis for Dietary Guidelines

IFT agrees that there should be a strong scientific basis for national dietary standards and guidelines and understanding how food and food components impact health is critical to establishing these standards. However, the science of food is often overlooked when establishing dietary guidelines and primarily focuses on the science of nutrition and public health. IFT suggests the science of food is of equal importance to the science of nutrition and public health in establishing dietary guidelines. For example, in addition to inter-individual variation in nutrient requirements, the impact of food form, food matrix and bioavailability on nutrient delivery also be researched and considered.

USDA ARS might also consider the additional lens of contaminant risk and potential impact to nutrient intake and requirements, particularly for vulnerable groups such as infants and breast-feeding women. To this end, USDA ARS could collaborate more closely with other agencies working in this area, such as the FDA's Closer to Zero initiative, to determine specific research needs related to food contaminant risk in these vulnerable populations.

3. Research on the Prevention of Diet-Related Chronic Diseases

IFT applauds ARS for prioritizing this research area due to the epidemic of diet-related diseases in the United States as well as other countries around the world. We would emphasize the importance of research into behavioral factors as well as behavior change strategies that can help consumers adopt the dietary guidelines. In addition to behavioral research, we also suggest research into communication, education and implementation strategies that can help lead to behavioral changes to improve diets and physical activity.

IFT would also suggest additional support for research on the human microbiome and its relationship to chronic disease. Research on the impact of certain nutrients and food

components on the human microbiome can help lead the way to better understanding the complexities of the causes of these diseases.

4. Research on Life Stage Nutrition and Metabolism

IFT agrees research across the life stage is critical for understanding age related determinants of metabolism and health. As stated in an earlier section on the science basis for dietary guidelines, we suggest a research emphasis on potential food safety and contaminant issues in vulnerable populations with habitual intake of specific foods, such as infants consuming infant foods and elderly consuming nutritional beverages. This research may provide another critical lens important in determining dietary guidelines.

5. Research to Bridge the Gap between Food Production and Human Health

IFT agrees that a greater understanding of food production is critical to informing dietary guidance and we applaud USDA ARS for taking a systems and multi-disciplinary approach to this complex topic. We suggest also considering how food production technologies may contribute to the affordability, accessibility and availability of foods as well as improving the sensory characteristics of critical food groups, all of which play a critical role in consumers ability to meet the dietary guidelines. We also support continued research into improving the feasibility, affordability and scaling of existing technologies that can preserve the quality and nutrient content of foods (e.g., isochoric freezing).

IFT agrees it is important to examine the impact of food processing on nutritional quality of foods and impact on health. Specifically, there is a need for more clinical trials to determine any cause-effect relationships and potential mechanisms by which food processing may be impacting health. There is currently an overreliance on observational data which is limited by many confounders and the inability to establish cause and effect. Considering that most foods in the market receive some level of processing, it is critical to understand any causal relationships to nutritional value and health before reliable national guidelines can be made.

To achieve a multi-disciplinary approach, IFT encourages USDA ARS to consider public-private partnerships to help drive this research area forward.