The Interagency Committee on Human Nutrition Research
National Nutrition Research Roadmap 2016-2021:
Advancing Nutrition Research to Improve and Sustain Health
Executive Summary

Improved nutrition could be one of the most cost-effective approaches to address many of the societal, environmental, and economic challenges facing nations across the globe today. These challenges include the morbidity, mortality, and economic burden associated with chronic diseases and disorders. That is, nutrition plays an integral role in human growth and development, in the maintenance of good health and functionality, in genetic disorders such as inborn errors of metabolism, and in the prevention and treatment of infectious, acute, and chronic diseases. To effectively and efficiently advance the role of nutrition in improving and sustaining health, efforts must be made to coordinate nutrition research supported by the federal government, as well as federal workforce development and training efforts that support nutrition research.

Created in 1983, the Interagency Committee on Human Nutrition Research (ICHNR) was charged with improving the planning, coordination, and communication among federal agencies engaged in nutrition research and with facilitating the development and updating of plans for federal research programs to meet current and future domestic and international needs for nutrition. Early in 2013, the ICHNR recognized the need for a written strategic plan to identify critical human nutrition research gaps and opportunities that could be addressed over the next five to ten years. The Committee anticipates that an interagency plan for federal human nutrition research could foster a coordinated approach that would address knowledge gaps, accelerate innovations, and strengthen the capacity of the interdisciplinary workforce that is required to bring these innovations to fruition.

To develop a national plan, the ICHNR created a National Nutrition Research Roadmap (NNRR) Subcommittee with representatives from each of the participating ICHNR departments and agencies. Beginning in the summer of 2014, the NNRR Subcommittee and its subsidiary Writing Group, with the assistance of more than 90 federal experts, developed the *National Nutrition Research Roadmap*, which was reviewed and approved by the ICHNR. The *Roadmap* was developed to engage federal science agency leaders, along with relevant program and policy staff who rely on federally supported human nutrition research, in addition to the broader research community. Initial discussions addressed common knowledge gaps, opportunities, and research themes extracted from a variety of publications and websites, including human nutrition research reviews, as well as federal and non-United States strategic plans and reports. These discussions generated the following three framing questions that covered the broad spectrum of research likely to yield accelerated progress in nutrition research to improve and sustain health for all children, adults, families and communities.

Within these three questions, the following eleven topical areas were identified based on the following criteria: population impact, feasibility, and emerging scientific opportunities, given advances in research knowledge and capacity. In finalizing these

topical areas, consideration was given to research gaps across the lifecycle, particularly for at-risk groups such as pregnant women, children, and older adults, in nutrition-related chronic diseases contributing most to the morbidity, mortality, and health disparities in the United States, and in understanding the role of nutrition for optimal performance and military readiness. The *Roadmap* primarily focuses on population impact within the United States but also considered global reach. While the topical selections focused primarily on reducing nutrition-related chronic diseases in the United States, the research and resource initiatives could guide other national governments, non-government organizations, or collaborative global efforts to advance human nutrition research to improve and sustain health across the globe.

Key Research Priorities for 2016-2021

Question 1: How can we better understand and define eating patterns to improve and sustain health?
Question 1 Topic 1 (Q1T1): How do we enhance our understanding of the role of nutrition in health promotion and disease prevention and treatment?
Question 1 Topic 2 (Q1T2): How do we enhance our understanding of individual differences in nutritional status and variability in response to diet?
Question 1 Topic 3 (Q1T3): How do we enhance population-level food- and nutrition-related health monitoring systems and their integration with other data systems to increase our ability to evaluate change in nutritional and health status, as well as in the food supply, composition, and consumption?
Question 2: What can be done to help people choose healthy eating patterns?
Question 2 Topic 1 (Q2T2): How can we more effectively characterize the interactions among the demographic, behavioral, lifestyle, social, cultural, economic, occupational, and environmental factors that influence eating choices?
Question 2 Topic 2 (Q2T2): How do we develop, enhance and evaluate interventions at multiple levels to improve and sustain healthy eating patterns?
Question 2 Topic 3 (Q2T3): How can simulation modeling that applies systems science in nutrition research be used to advance exploration of the impact of multiple interventions?
Question 2 Topic 4 (Q2T4): How can interdisciplinary research identify effective approaches to enhance the environmental sustainability of healthy eating patterns?
Question 3: How can we develop and engage innovative methods and systems to accelerate discoveries in human nutrition?
Question 3 Topic 1 (Q3T1): How can we enhance innovations in measuring dietary exposure, including use of biomarkers?
Question 3 Topic 2 (Q3T2): How can basic biobehavioral science be applied to better understand eating behaviors?
Question 3 Topic 3 (Q3T3): How can we use behavioral economics theories and other social science innovations to improve eating patterns?
Question 3 Topic 4 (Q3T4): How can we advance nutritional sciences through the use of research innovations involving Big Data?

Each topical area first provides a rationale that explains the importance of the topical area to improving and sustaining health; then identifies research gaps and opportunities; and concludes with suggested short- (could be initiated in approximately 1–3 years) and long-term (could be initiated in approximately 3–5 years) research and resource initiatives. The NNRR Subcommittee also put forth recommendations for developing a diverse, interdisciplinary workforce able to advance nutritional sciences research. The role of current or future federal funding for human nutrition research was not within the charge of the NNRR Subcommittee.

Each of the participating ICHNR departments or agencies briefly describes their contributions to human nutrition research and, as the table below illustrates, gathered insights from senior leadership on relevant contributions to the identified topical areas.

Agency	Commerce	DoD	EPA	FTC	HHS	NASA	USAID	USDA	VHA
Question 1: How do we better understand and define eating patterns to improve and sustain health?									
Q1T1 Health Promotion and Disease Prevention and Treatment	X	X		X	X	X	X	X	X
Q1T2 Individual Differences Including "Omics"		X			X	X		X	X
Q1T3 Population-Level Monitoring	X	X	X		X		X	X	X
Question 2: What can be done to help people choose healthy eating patterns?									
Q2T1 Influences on Eating Patterns	X	X		X	X	X	X	X	X
Q2T2 Interventions		X		X	X	X	X	X	X
Q2T3 Systems Science					X				X
Q2T4 Environmental Sustainability	X	X					X	X	X
Question 3: How can we develop and engage innovative methods and systems to accelerate discoveries in human nutrition?									
Q3T1 Assessing Dietary Exposures	X	X	X	X	X	X	X	X	X
Q3T2 Biobehavioral Science		X			X	X	X	X	X
Q3T3 Behavioral Economics		X		X	X			X	X
Q3T4 Big Data	X	X		X	X		X	X	X

Critical ingredients to addressing the research needs put forth in this *Roadmap* will be interagency collaborations and public-private partnerships among government, academia, and private entities. These types of collaborations and partnerships could potentially:

- Expand the scope, interdisciplinary nature, and potential of a project;
- Enhance the likelihood of broader and more rapid implementation of the results;
- Allow for needed expertise to advance project goals;
- Reduce the cost of a project to an individual collaborator; and
- Increase the likelihood of adequate funding for meritorious projects.

Implementing the National Nutrition Research Roadmap

The ICHNR will distribute this *Roadmap* to encourage all relevant federal departments and agencies to coordinate human nutrition research programs to identify solutions to critical, nutrition-related, chronic disease prevention and health promotion issues. The aim is to have participating departments and agencies develop specific goals, objectives, strategies, and budget priorities based on the *Roadmap* and to identify their unique and collaborative roles, responsibilities, and the required resources and time frames to accomplish those research goals. Given the strong trans-agency interests in a number of these areas of research, we hope to foster coordinated research efforts to address research gaps and opportunities identified in this *Roadmap* and monitor their progress. The ICHNR recognizes the important laws, regulations, and policies for establishing research priorities governing participating federal departments and agencies. For several participating departments and agencies, this includes significant roles and responsibilities of the extramural scientific community to initiate promising investigator-initiated research proposals and to serve on rigorous peer-review systems that have been established to ensure the federal government only funds proposals that maintain standards of scientific excellence. Moreover, the ICHNR avoided further prioritization within each of the topical areas to acknowledge the funding criteria and capacity of government, non-government, and private sector funding agencies in the United States and across the globe varies. Our hope is the dissemination of these critical research gaps and opportunities across the eleven selected topical areas will inspire the broader scientific community—at all developmental stages across the globe—to accelerate advances in human nutrition research to help improve and sustain the health of all children, adults, families and communities.