

Developmental Process and Early Phases of Implementation for the US Interagency Committee on Human Nutrition Research National Nutrition Research Roadmap 2016–2021

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Abstract

The Interagency Committee on Human Nutrition Research (ICHNR) is 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. The ICHNR is co-chaired by the USDA Under Secretary for Research, Education, and Economics and Chief Scientist and the US Department of Health and Human Services Assistant Secretary for Health and is made up of >10 departments and agencies. Once the ICHNR was reassembled after a 10-y hiatus, the ICHNR recognized a need for a written roadmap to identify critical human nutrition research gaps and opportunities. This commentary provides an overview of the process the ICHNR undertook to develop a first-of-its-kind National Nutrition Research Roadmap, which was publicly released on 4 March 2016. The primary audience for the Roadmap is federal science agency leaders, along with relevant program and policy staff who rely on federally supported human nutrition research, in addition to the broader scientific community. The Roadmap is framed around the following 3 questions: 1) How can we better understand and define eating patterns to improve and sustain health? 2) What can be done to help people choose healthy eating patterns? 3) How can we develop and engage innovative methods and systems to accelerate discoveries in human nutrition? Within these 3 questions, 11 topical areas were identified on the basis of the following criteria: population impact, feasibility given current technological capacities, and emerging scientific opportunities. This commentary highlights initial federal and some professional research society efforts to address the Roadmap's research and resource priorities. We conclude by noting examples of early collaborations and partnerships to move human nutrition research forward in the 21st century. *J Nutr* 2017;147:1833–8.

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Improved nutrition is one of the most cost-effective approaches to address many of the societal, environmental, and economic challenges facing nations across the globe today (1). Nutrition research is the foundation for achieving these improvements. To more effectively and efficiently advance the role of nutrition research in improving and sustaining health, more attention is needed to identify the most

important questions to address, within the context of existing research resources and capacity. This commentary provides an overview of the process the US government undertook to develop a first-of-its-kind National Nutrition Research Roadmap and highlights initial federal and some professional research society efforts to address the Roadmap's research and resource priorities (2). We conclude by noting examples of early collaborations and partnerships to move human nutrition research forward in the 21st century.

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Address correspondence to SEF (e-mail: sheila.fleischhacker@osec.usda.gov). Abbreviations used: DoD, Department of Defense; HHS, US Department of Health and Human Services; ICHNR, US Interagency Committee on Human Nutrition Research; JSHNR, Joint Subcommittee on Human Nutrition Research; OSTP, White House Office of Science and Technology Policy.

About the Interagency Committee on Human Nutrition Research

The US Congress first called for improved coordination of human nutrition research within and among federal departments and agencies in the Food and Agriculture Act of 1977 (3). Specifically, Congress designated the Secretary of the USDA responsible for establishing with the Secretary of Health and Human Services (HHS) procedures for coordination in areas of mutual interest in human nutrition research. Under the aegis of the White House Office of Science and Technology Policy's (OSTP's) Federal Coordinating Committee for Science, Engineering, and Technology, the Joint Subcommittee on Human Nutrition Research (JSHNR) was chartered in September 1978 (2). Consisting of representatives from the HHS, the USDA, and 7 other federal departments and agencies, the JSHNR established the groundwork for developing an improved federal coordinated nutrition research planning system through its 1980 report, among other activities (4). Under the auspices of the OSTP, the JSHNR felt it had accomplished most of its objectives, including the establishment of nutrition coordinators or coordination groups to deal with cross-cutting nutrition issues, and was terminated in June 1983. The decision was made that issues related to human nutrition research could be adequately addressed through the establishment of a collaborative mechanism by the federal agencies that principally support human nutrition research. To realize this goal, in July 1983, the HHS and the USDA created the Interagency Committee on Human Nutrition Research (ICHNR) whose primary purpose was to increase the overall effectiveness and productivity of federal research efforts in nutrition by improving the planning, coordination, and communication among federal agencies engaged in research on nutrition.

The ICHNR charter establishes the HHS Assistant Secretary for Health and the USDA Assistant Secretary for Science and Education or their designees as the committee co-chairs (2). The charter also requires representatives from the USDA, the HHS, the Department of Defense (DoD), the Department of Commerce (specifically, the National Oceanic and Atmospheric Administration, although the National Institute of Standards and Technology now participates too), the Federal Trade Commission, the National Aeronautics and Space Administration, the National Science Foundation, the US Agency for International Development, the Veterans Health Administration, and the OSTP. The charter allows for the participation of other departments and agencies, as appropriate; for example, the Environmental Protection Agency currently participates, although it is not an original charter member. Table 1 lists current ICHNR members.

In light of the OSTP's encouragement to enhance coordination, the ICHNR was reassembled in 2013. At this time, the ICHNR renewed its commitment to improve coordination and to increase the effectiveness and productivity of federal agencies engaged in nutrition research to help ensure that the nation benefits from focused, strategic human nutrition research and that the results provide clear information and guidance for Americans resolved to create a healthier future. Once reassembled, during initial meetings in 2013, the ICHNR co-chair, Catherine Woteki, then USDA Under Secretary for Research, Education, and Economics and Chief Scientist, recognized a need for a written roadmap to identify critical human nutrition research gaps and opportunities that could be addressed over the next 5–10 y. The Committee agreed and determined that the primary audience for the Roadmap would be federal science agency leaders, along with relevant program and policy staff who rely on federally supported human nutrition research. The ICHNR

also aimed to inspire the broader scientific community—at all developmental stages across the globe. The role of current or future federal funding for human nutrition research was not within the charge.

About the National Nutrition Research Roadmap

More than 90 federal experts from the participating ICHNR departments and agencies worked collaboratively to develop the National Nutrition Research Roadmap, which was then reviewed and approved by the ICHNR and publicly released on 4 March 2016 (5). The initial development process started with a selective review of existing documents that identified research gaps and priorities, including human nutrition research reviews as well as federal and non-US strategic plans and reports. For example, the ASN sought input from 75 thought leaders and convened a working group in 2012 to identify the following 6 high-priority areas, published in 2013 (1): 1) variability in individual responses to diet and foods; 2) healthy growth, development, and reproduction; 3) health maintenance; 4) medical management; 5) nutrition-related behaviors; and 6) food supply and environment. Another example was a 2014 report by the Joint Research Center, the European Commission's in-house science service, which put forth research priorities for foods and diets based on the input of ~40 experts and stakeholders who participated in 3 workshops in 2012 and 2013 focused on the European consumer, with the year 2050 as a long-term time horizon (6). On the basis of this information and expert insights, the Roadmap Writing Group generated the 3 framing questions that covered the broad spectrum of nutrition research likely to accelerate progress in improving and sustaining health for all children, adults, families, and communities (see Table 2).

Within these 3 questions, 11 topical areas were identified on the basis of the following criteria: population impact, feasibility given current technological capacities, and emerging scientific opportunities. In finalizing these topical areas, consideration was given to research gaps 1) across the lifecycle, particularly for at-risk groups such as pregnant women, children, and older adults; 2) in nutrition-related noncommunicable chronic diseases contributing the most to the morbidity, mortality, and health disparities in the United States; and 3) in understanding the role of nutrition for optimal performance and military readiness. Although the topical selections focused primarily on reducing nutrition-related noncommunicable chronic diseases in the United States, the research and resource initiatives could guide other national governments, nongovernmental organizations, or collaborative global efforts. Each topical area provides a rationale that explains the importance of the area to improving and sustaining health, then identifies research gaps and opportunities, and concludes with suggested short-term (could be initiated in ~1–3 y) and long-term (could be initiated in ~3–5 y) research and resource initiatives. The Roadmap also put forth recommendations for developing a diverse, interdisciplinary workforce able to advance nutritional sciences research. In the Roadmap, each of the participating ICHNR departments or agencies also briefly describes their contributions to human nutrition research, particularly in the Roadmap's 11 topical areas. Revisions were made to the Roadmap on the basis of public input, including public comments from the ASN, among various other scientific societies, trade groups, nongovernmental organizations, academics, health professionals, citizens, and industry groups (7).

TABLE 1 Members of the ICHNR, which is co-chaired by the USDA Under Secretary for Research, Education, and Economics and Chief Scientist and the HHS Assistant Secretary for Health¹

Department	Agency
Agriculture (USDA)	Food, Nutrition, and Consumer Services (FNCS) Mission Area <ul style="list-style-type: none"> Center for Nutrition Policy and Promotion (CNPP) Food and Nutrition Service (FNS) Office of the Secretary (OSEC) <ul style="list-style-type: none"> Office of the Chief Scientist (OCS) Research, Education, and Economics (REE) Mission Area <ul style="list-style-type: none"> Agricultural Research Service (ARS) Economic Research Service (ERS) National Institute of Food and Agriculture (NIFA)
Commerce (DOC)	National Institute of Standards and Technology (NIST) National Oceanic and Atmospheric Administration (NOAA)
Defense (DoD)	
Environmental Protection Agency (EPA)	Office of Pesticide Programs (OPP)
Federal Trade Commission (FTC)	
Health and Human Services (HHS)	CDC FDA Health Resources and Services Administration (HRSA) NIH Office of the Assistant Secretary for Health (OASH) <ul style="list-style-type: none"> Office of Disease Prevention and Health Promotion (ODPHP)
National Aeronautics and Space Administration (NASA)	
National Science Foundation (NSF)	
US Agency for International Development (USAID)	Bureau of Food Security (BFS) Bureau of Global Health (BGH) Bureau for Democracy, Conflict, and Humanitarian Assistance (DCHA)
Veterans Affairs (VA)	Veterans Health Administration (VHA)
White House (WH)	Office of Science and Technology Policy (OSTP)

¹ ICHNR, US Interagency Committee on Human Nutrition Research.

Addressing the Roadmap’s Research and Resource Priorities

Signs of implementation at the strategic planning stages already exist among ICHNR members. For example, during initial planning

stages of the first NIH-wide strategic plan for nutrition research expected to be released in October 2018, the Roadmap has been one piece of information used to build an initial framework (8). As part of the NIH-wide strategic planning effort, an open crowd-sourcing process was used to engage the

TABLE 2 The key research priorities for 2016–2021 put forth by the ICHNR in the National Nutrition Research Roadmap¹

Question 1: How can we better understand and define eating patterns to improve and sustain health?
Topic 1: How do we enhance our understanding of the role of nutrition in health promotion and disease prevention and treatment?
Topic 2: How do we enhance our understanding of individual differences in nutritional status and variability in response to diet?
Topic 3: 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?
Topic 1: How can we more effectively characterize the interactions among the demographic, behavioral, lifestyle, social, cultural, economic, occupational, and environmental factors that influence eating choices?
Topic 2: How do we develop, enhance, and evaluate interventions at multiple levels to improve and sustain healthy eating patterns?
Topic 3: How can simulation modeling that applies systems science in nutrition research be used to advance exploration of the impact of multiple interventions?
Topic 4: 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?
Topic 1: How can we enhance innovations in measuring dietary exposure, including use of biomarkers?
Topic 2: How can basic biobehavioral science be applied to better understand eating behaviors?
Topic 3: How can we use behavioral economics theories and other social science innovations to improve eating patterns?
Topic 4: How can we advance nutritional sciences through the use of research innovations involving Big Data?

¹ Data are from reference 2. ICHNR, US Interagency Committee on Human Nutrition Research.

TABLE 3 The ASN 4-part webinar series focusing on the questions and topics in the ICHNR National Nutrition Research Roadmap¹

Webinar 1

Title: The National Nutrition Research Roadmap: Basic Science and Epidemiology of Nutrition

Moderator: Marian L Neuhouser, PhD, RD, Cancer Prevention Program, Fred Hutchinson Cancer Research Center, and the 2016–2017 President, ASN

Session titles and speakers:

Nutrition's Role in Disease Prevention and Treatment: Paul M Coates, PhD, Director, Office of Dietary Supplements, NIH and the Co-Executive Secretary to the ICHNR

Individual Variances in Nutritional Status and Response to Diet: Patrick J Stover, PhD, Professor and Director, Division of Nutritional Sciences, Cornell University

Learning objective: Attendees will be able to describe research gaps and opportunities, including the open funding opportunity announcements, training activities, and research resources related to the basic science and epidemiology of nutrition, as found in the National Nutrition Research Roadmap.

Recording: <https://attendee.gotowebinar.com/recording/4641361116147893763>

Slides: <http://asn-cdn-remembers.s3.amazonaws.com/6b8701dc0c69980c81f19fb2d3d0670a.pdf>

Date recorded: 2 November 2016

Webinar 2

Title: The National Nutrition Research Roadmap: Measuring and Monitoring Individual Dietary Intake and the Food Environment

Moderator: Rachel Ballard, MD, MPH, Director, Prevention Research Coordination, Office of Disease Prevention and the NIH

Session titles and speakers:

Individual Dietary Intake: Susan Krebs-Smith, PhD, MPH, Branch Chief, Risk Factor Assessment Branch, Division of Cancer Control and Population Sciences, National Cancer Institute, NIH

The Food Environment and Short Screening Tools for State-Based Monitoring: Deborah Galuska, PhD, Associate Director of Science, Division of Nutrition, Physical Activity, and Obesity, CDC

Biomarkers of Dietary Status: Christine Pfeiffer, PhD, Chief, Nutritional Biomarkers Branch, Division of Laboratory Sciences, National Center for Environmental Health, CDC

Learning objective: Attendees will understand research gaps and opportunities and research resources related to measuring and monitoring dietary intake and the food environment, as found in the National Nutrition Research Roadmap.

Recording: <https://attendee.gotowebinar.com/register/8605188497041999361>

Slides: <http://asn-cdn-remembers.s3.amazonaws.com/99cf735a526587f9b68036ee15bacf58.pdf>

Date recorded: 18 January 2017

Webinar 3

Title: The National Nutrition Research Roadmap: Behavioral Science of Eating Habits

Moderator: Marian L Neuhouser, PhD, RD, Cancer Prevention Program, Fred Hutchinson Cancer Research Center, and the 2016–2017 ASN President

Session titles and speakers:

Applying Behavioral Science to Better Understand Eating Behaviors: Alice S Ammerman, Dr.PH, RD, Director, Center for Health Promotion and Disease Prevention, Professor of Nutrition, Gillings School of Global Public Health and School of Medicine, University of North Carolina at Chapel Hill

Environmental Context and Influence on Eating Behavior: Sonia Arteaga, PhD, Program Director, Clinical Applications and Prevention Branch, Division of Cardiovascular Sciences, National Heart, Lung, and Blood Institute, NIH

Learning objective: Attendees will understand research gaps and opportunities, including the open funding opportunity announcements, training opportunities, and research resources related to the behavioral science of eating habits, as found in the National Nutrition Research Roadmap.

Recording: <https://attendee.gotowebinar.com/register/5942518779512839681>

Slides: <http://asn-cdn-remembers.s3.amazonaws.com/7a7fcb5d9fdb28691bc66c181c40f85.pdf>

Date recorded: 1 February 2017

Webinar 4

Title: The National Nutrition Research Roadmap: Applications of Systems Science, Design, and Systems Change to Effect Population Level Change in Eating Behaviors

Moderator: Marian L Neuhouser, PhD, RD, Cancer Prevention Program, Fred Hutchinson Cancer Research Center, and the 2016–2017 ASN President

Session titles and speakers:

Use of Modeling to Explore Intervention Impact: Bruce Lee, MD, Associate Professor, Department of International Health, Bloomberg School of Public Health, Johns Hopkins University

Existing Big Data Resources Relevant to Nutrition Science and How to Use Them: Michele Forman, PhD, Department Head, Nutrition Science, Purdue University

Big Data Case Study: USDA Food Assistance Programs: Mark Denbaly, PhD, Deputy Director for Food Economics Data, USDA/Economic Research Service

Learning objective: Attendees will understand research gaps and opportunities, including the open funding opportunity announcements, training opportunities, and research resources related to the application of systems science, design, and systems change to effect population-level change in eating behaviors, as found in the National Nutrition Research Roadmap.

Recording: <https://attendee.gotowebinar.com/recording/5091634222109736203>

Slides: http://nutrition.org/wp-content/uploads/2017/06/NNRR-webinar-4_Final.pdf

Date recorded: 31 May 2017

¹ Data are from reference 2. ICHNR, US Interagency Committee on Human Nutrition Research.

public, including scientists in nutrition and many related fields, in proposing areas of research priorities in addition to a thought leader panel of external experts in nutrition research (9). Similarly, the USDA Research, Education, and Economics mission area is considering the Roadmap while working on potential updates to their current Action Plan (10). Other ICHNR members, such as the DoD and the Veterans Health Administration, are using the

Roadmap to actively guide their current and future research efforts and to help identify potential federal collaborators. Early signs of new trans-agency activities are also underway, particularly on Big Data. The *Dietary Guidelines for Americans* (11) and the DRIs (12), which are existing trans-agency activities, are tackling a variety of Roadmap-relevant priorities. For example, the HHS Office of Disease Prevention and Health Promotion and the USDA

Center for Nutrition Policy and Promotion currently have 2 initiatives exploring scientific topics with regard to nutrition and health for women who are pregnant and children from birth to 24 mo. The Pregnancy and Birth to 24 Month Project is a collaboration with programmatic and scientific experts to begin examining topics of public health importance on diet and health for infants, toddlers, and pregnant women (13). The Pregnancy and Birth to 24 Month Data Consortium is a second activity that coalesced out of a need for additional data from nationally representative samples of women who are pregnant or lactating and children from birth until 24 mo and has involved experts from >24 federal agencies across the HHS, USDA, DoD, the Environmental Protection Agency, and the US Agency for International Development who have articulated crucial gaps in nutrition and health data and are actively identifying and collaborating on opportunities to fill these gaps. As another example, the US and Canadian DRI committees are currently sponsoring the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee of external experts to assess options presented in the *American Journal of Clinical Nutrition* article entitled “Options for basing Dietary Reference Intakes (DRIs) on chronic disease endpoints: report from a joint US-/Canadian-sponsored working group” (14), among other possible courses of action. This ad hoc committee will also determine guiding principles for the inclusion of chronic disease endpoints for food substances that will be used by future National Academies committees in establishing DRIs (15).

Engaging the nutritional sciences community is vital to accelerating progress on the research priorities identified by the Roadmap. For instance, the extramural scientific community whose research is funded by a number of the participating ICHNR departments and agencies has important roles and responsibilities in developing promising investigator-initiated research proposals and in serving on rigorous peer-review systems that have been established to ensure that the federal government only funds proposals that maintain standards of scientific excellence. The majority of biomedical research in the United States, including that focused on nutrition science, is funded on the basis of peer review of investigator-initiated research applications. Because non-federal research peers in the research community influence the direction of the majority of federally funded biomedical research, ensuring a broad reach to the external research community was a critical early step in accelerating progress. To engage and inspire the broader scientific community, the ICHNR widely distributed the Roadmap to >600 individuals, organizations, and government entities. The Roadmap has been presented at a number of national and international conferences and among diverse, relevant research networks such as the CDC-supported Nutrition and Obesity Policy Research and Evaluation Network (16).

Subsequent to a Roadmap presentation at Experimental Biology 2016 (17), the 2016–2017 President of the ASN, Marian L Neuhauser, worked with Rachel Ballard, a member of the Roadmap Writing Group, to jointly develop a Roadmap webinar series that featured federal staff and extramural researchers (see Table 3) (18). The purpose of this webinar series was to provide perspectives from the research community on future opportunities in nutrition research. The ICHNR continues to look for other innovative ways to educate and engage the nutritional sciences community on the research priorities identified by the Roadmap. As explained in the Roadmap, the ICHNR recognizes that public-private partnerships among government, academia, and private entities 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; and reduce the cost of a project to an individual collaborator (19). The USDA Branded Food Products Database (20) is a recent example that was developed to enhance public health and the sharing of open data by complementing the USDA National Nutrient Database for Standard Reference with the nutrition composition of branded foods and private-label data provided by the food industry.

Conclusions

Through a collaborative effort integrating invaluable public input, the National Nutrition Research Roadmap identified key research and resource priorities for 2016–2021. The ICHNR will continue to monitor progress on the Roadmap’s ability to foster efforts toward addressing knowledge gaps in human nutrition research, accelerating innovations, and strengthening the capacity of the interdisciplinary workforce required to bring these innovations to fruition. The ICHNR will also focus on identifying emerging knowledge gaps, opportunities, and research resources, such as the now readily available NHANES Biospecimen Program (21) and the USDA FoodAPS National Household Food Acquisition and Purchase Survey (22) data set, 2 examples of federal nutrition data systems available for researchers. Further engagement with the extramural scientific community and maximizing existing or new public-private partnerships will be important to moving human nutrition research forward in the 21st century and ensuring the positive role of nutrition in improving and sustaining health.

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