

Healthy Food Systems, Healthy People Implementation Strategy

Introduction

In December 2015, the Association of Public and Land-grant Universities (APLU) issued its *Healthy Food Systems, Healthy People* (HFSHP) final report. This report calls for collaboration and a multidisciplinary approach to research and education/outreach efforts across agriculture, food, nutrition and health care systems to make a positive difference on human health and chronic disease. As noted in the HFSHP report and other reports, including the recent federal Interagency Committee on Human Nutrition Research's *National Nutrition Research Roadmap*,¹ addressing these critical areas can help to alleviate skyrocketing health care costs, enhance economic productivity, and contribute to our nation's long-term national security.

The Healthy Food Systems, Healthy People Implementation Team was charged with developing an implementation strategy to achieve the goals and objectives of the report, including developing a budget for the recommended implementation actions and a funding/advocacy strategy.

Overview

The HFSHP report set out five programmatic priorities and accompanying goals and objectives for each. Achieving the report's goal of an interdisciplinary, multidisciplinary, and transdisciplinary approach to research, education and outreach across agriculture, food, nutrition and health care systems will require its own sustained education and outreach effort. The Implementation Team's

HEALTHY FOOD SYSTEMS, HEALTHY PEOPLE Programmatic Priorities

Integration across Systems: Realign the research and education approaches using a "systems' thinking *model to remove barriers*, incentivize the formation of interdisciplinary partnerships among various entities (i.e., academia, industry, federal and state government and health care), resulting in responsive systems approaches for positive health outcomes of individuals across communities, states, the nation and the world.

Drivers of Food Choice and Consumer Behaviors: Identify the main policy, systems, and environmental drivers of consumer behavior in relation to chronic diseases; and understand the drivers' inter-connectedness in terms of food consumption decisions and how that information can be used to influence better decisions.

Impact of Food on Consumer Health: Better understand the complex interrelationships of the food-human-gut microbiome ecosystem and its roles in promoting human health.

Definition and Accessibility of Quality Food: Broaden the definition of food quality in a manner that considers the true functionality of food and translation of human health promoting attributes to consumer food products and dietary supplements.

Education, Outreach and Engagement: Improve the lab-to-community pipeline so that medical, public health, education and Cooperative Extension professionals are well-prepared to use state-of-the-science food and nutrition recommendations to help their patients, clients, and the public improve their health and lessen the burden of chronic disease.

¹ Interagency Committee on Human Nutrition Research. National Nutrition Research Roadmap 2016-2021: Advancing Nutrition Research to Improve and Sustain Health. Washington, DC: Interagency Committee on Human Nutrition Research; 2016. ([https://fnic.nal.usda.gov/sites/fnic.nal.usda.gov/files/uploads/2016-03-30-%20ICHNR%20NRRR%20\(2\).pdf](https://fnic.nal.usda.gov/sites/fnic.nal.usda.gov/files/uploads/2016-03-30-%20ICHNR%20NRRR%20(2).pdf))

recommended actions are structured to contribute to achieving these goals and objectives over time. Where possible, the Team's recommended actions build on existing partnerships and programs with federal agencies and other governmental and non-governmental entities. Progress toward many of the report's goals can be achieved through actions within existing resources, if these actions are well targeted to advance HFSHP goals. However, fully achieving the goals of the report will likely require additional resources from federal and non-federal sources and the Implementation Team's proposals include several new or enhanced federal programs and additional resources to help achieve these goals.

Recommended HFSHP Implementation Actions

Facilitate Public-Private Partnerships

Partnerships with academia, government, and public, private and non-profit entities in public health, nutrition, physical activity, and the health care industry are critical to achieving the goals and objectives of the report. Many of the specific proposals discussed below include requirements for funding from private and non-profit partners, and all proposals are premised on extensive interaction and involvement of these partners in developing and implementing the programs.

The Implementation Team believes there are three important and interrelated areas where APLU efforts can raise awareness of the importance and benefits of HFSHP goals, identify relevant stakeholders, and motivate these stakeholders to develop HFSHP-focused partnerships:

- As a Convener that provides a forum to identify stakeholders and initiates stakeholder dialogues, connects potential partners, helps identify areas of mutual interest among partners, and generally works to obtain "buy-in" to HFSHP goals and concepts;
- As an Educational catalyst to help gather and disseminate scientific evidence, develop tools and other guidance, and build capacity by providing leadership and support for training, technical assistance, and by facilitating knowledge and technology transfer by sharing best practices; and
- As a Liaison between potential partners to facilitate the partnership process and help find ways to ensure all parties benefits, including sharing information to guide partnership designs and how to scale-up approaches to the community, state, regional and national levels.

The HFSHP report included a preliminary list of potential partners across industry, academia, consumer/non-profit organizations, professional organizations and other groups. The Implementation Team recommends individual briefings of key potential partners and stakeholders, working with current APLU partners (e.g., CARET members) and others to identify key stakeholders likely to be willing and able to support HFSHP efforts. These briefings should include organizations already working to develop partnerships to leverage public and private resources that are applicable to this topic area, including the Foundation for Food and Agriculture Research and the Foundation for the National Institutes of Health.

Support National Microbiome Initiative

On May 13, 2016, the White House announced a National Microbiome Initiative (NMI) involving collaborations with relevant federal agencies and private-sector stakeholders. (See Attachment B for a summary of the NMI). The NMI addressed many aspects of the HFSHP report's goal to "Better understand the complex interrelationships of the food-human-gut microbiome ecosystem and its roles in promoting human health." Specifically, the NMI would:

- Charter a Microbiome Interagency Working Group (MIWG) under the National Science and Technology Council² to develop a Federal Strategic Plan for microbiome research. The Plan will outline an approach for addressing research needs and gaps identified in the November 2015 *"Report of Fast-Track Action Committee on Mapping the Microbiome"*; and
- Provide more than \$121 million above current funding in 2016 and 2017 for microbiome research. (The NSTC report on federal microbiome activities estimated the federal government spent about \$300 million annually between 2012-2014 on microbiome research.) Of this "new" funding for microbiome research, about \$65 million appears to be in programs likely to address recommendations in the HFSHP report:
 - \$20 million in NIH to focus on multi-ecosystem comparison studies and investigations into design of new tools to explore and understand microbiomes;
 - \$16 million in NSF (BIO) for microbiome research that will be directed at interactions between microbes in the microbiomes, and also among the microbiomes of biological hosts;
 - \$14.5 million in a new NSF-NIFA Plant Biotic Interactions Program (\$8.5 million in FY 2017 from NSF and \$6 million in 2016 from NIFA) focused on current and emerging models and non-model systems and agriculture-relevant plants;
 - USDA-ARS investments of \$16.9 million in 2016 and over \$15.9 million in 2017 on computational capacities and human microbiome research;
 - \$8 million in 2017 funding in USDA-NIFA to research microbiomes of plants, livestock animals, fish, soil, air and water as they influence food production systems; and
 - \$6 million between USDA-NIFA and NSF-BIO for a joint effort on plant and animal phenomics and microbiome technologies.

The following actions would help ensure the NMI advances the goals of the HFSHP report:

- HFSHP representatives should meet with and provide comments to the NSTC Microbiome Interagency Working Group to help focus the Federal Strategic Plan for microbiome research on HFSHP research goals;

² The National Science and Technology Council is a cabinet-level council chaired by the President that includes the Vice President, the Director of the Office of Science and Technology Policy, Cabinet Secretaries and Agency Heads with significant program or policy responsibilities, and other White House officials.

- Provide support during the appropriations process for important NMI 2017 funding requests; and
- Work with specific federal agencies to affect the allocation of available FY 2016 and FY 2017 funding for microbiome research (e.g., RFPs incorporate Healthy Food Systems focus).

Encourage Federal Funding Proposals to Support HFSHP goals

This recommended action involves working with federal agencies to encourage these agencies to structure their proposal requests and other funding mechanisms to give priority to or otherwise encourage multidisciplinary, multi-institutional collaborative research, extension and outreach proposals as envisioned in the HFSHP report. This effort would be particularly important and helpful to advance HFSHP goals if additional resources are not available in the near-term and could provide a means to achieve incremental improvements in the allocation of current levels of federal funding.

New Federal Policy Proposals

Healthy Food Systems Research Program

This proposal would establish a multidisciplinary competitive research initiative to examine the complex interrelationships along the continuum of the farmer's choice of crop variety or livestock breed to the consumer choice of what to eat and lifestyle, to the effects on human health of what is consumed. The overarching goal of the Healthy Food Systems Research Program (HFSRP) is to catalyze multidisciplinary research to understand the characteristics, interactions, and challenges of agriculture, food, nutrition, and health care systems and how these systems can be better integrated to improve health outcomes. This strategic initiative would focus specifically on the convergence of agriculture, food, nutrition, and health care systems and the interactions, synergies, and impacts of these systems on overall human health and incidence of chronic disease.

Addressing these critical research topics requires a coordinated approach involving programs in several federal agencies, including the National Science Foundation, the Department of Health and Human Services, and the U.S. Department of Agriculture. Under this initiative, these agencies would be charged with developing a research agenda that identifies relevant ongoing research and research gaps and needs for the next five years. The HFSRP research agenda should be completed as soon as practical and ideally in time to inform allocations of FY 2018 federal funding and other policy decisions. The HFSRP research agenda should build off of the *National Nutrition Research Roadmap 2016-2021* and the federal strategic plan for research developed under the NMI, which address important components of the HFSHP's research goals. The HFSRP would include joint grant research request for proposals wherever possible that incentivize the formation of multidisciplinary (agriculture, food, nutrition, and health care) and multi-entity (e.g., academia, industry, government, non-profits) partnerships.

The HFSHP research agenda would be expected to set out an agenda for transformative and translational research in many key areas, including:

- Research approaches using “systems thinking” to remove barriers, incentivize formation of interdisciplinary partnerships among various entities resulting in responsive systems approaches for positive health outcomes of individuals across communities, states, and the nation; Systems implementation science identifying how to measure system variables and implement strategies to change food systems and healthcare system to impact health; and collaborative research to improve understanding of the animal-human-environment continuum of the One Health initiative;
- Fundamental research to better understand the true health functionality of food and how that functionality is altered through the full agricultural value chain, and translational research to define optimal food quality traits and their response in humans;
- Socioeconomic research to identify the main systems and environmental drivers of consumer behavior in relation to chronic disease and understand the interconnectedness of food and consumption decisions and how that information can be used to influence behavior to improve human health outcomes;
- Translational research to develop methods to improve public health through better nutrition and dietary choices, coordination and integration of health care, and an increased emphasis on prevention and wellness; and
- Actions to grow the scientific workforce capable of studying and managing these systems so medical, food and nutrition, public health and education, and health care professionals are well-prepared to use state-of-the art science, food, and nutrition recommendations to improve public health and lessen the burden of chronic disease.

Proposed Funding: Federal funding of \$80 million annually for five years; \$20 million each from NIH, NSF, USDA, and CDC).

Healthy Food Systems Integration Initiative

USDA’s Capacity programs – Hatch Act and Evans-Allen research programs and Smith-Lever and 1890s Institutions Extension programs – are critical components of a multidisciplinary and integrated program of research, Extension and education programs across agriculture, food and nutrition, and health care systems to address nutritional security and achieve positive health outcomes. Investments in Capacity programs complement investments in the competitive Healthy Food Systems Research Program grant programs by enabling a sustained, multi-year focus that allows long-term investments in human capital and infrastructure necessary to achieve health care cost savings and improved health outcomes. The close community connections of the Capacity programs are ideally suited to tailor research, education

and outreach efforts to the specific demographics, food and nutrition challenges, and health delivery infrastructure in each state and community, which can be critical to making these programs effective.

Current funding for Capacity programs support important HFSHP-related research and education and outreach efforts through Family and Consumer Sciences programs and Health and Wellness programs in county Cooperative Extension offices, efforts under the Expanded Food and Nutrition Education program and SNAP-Education. This initiative would build on the Cooperative Extension's existing strengths in health and nutrition education and its ability to link experts who can translate science into practice and with experience in effectively building partnerships and collaborations. While existing efforts support many HFSHP goals, achieving the multidisciplinary, integrated HFSHP approach requires supplementing these existing efforts with additional resources dedicated to supporting new approaches and advancing workforce development needs in health sciences, public health interventions and health systems, and knowledge and expertise with food industries. Specifically, these additional Capacity resources will focus on several key areas:

- Systems-focused research to develop a better understanding of the continuum from farm production to diet, nutrition, and health; and research to develop and evaluate innovative models for community-integrated care that make important advances in practice in this area;
- Expanded coordination and integration of Extension education and outreach activities with activities of federal, state, and local health-care agencies, private health-care providers and other non-governmental entities; and
- Innovative and expanded education and outreach programming focused on improving the food, nutrition, and health literacy of those with the greatest health care needs, including minority and high-risk populations. Increase health literacy to help improve both the health of individuals and the collective public health.

Eligibility for the additional HFS Capacity funding will be determined based on existing formula allocations. In addition, recipients of these additional funds will develop and submit to NIFA for review and approval a multi-year implementation plan for the use of these funds that sets out how the medical, public health and education components of the program will be integrated, activities to be undertaken with these funds over the period of the plan, and expected program milestones and accomplishments.

Proposed Funding: This proposal would be funded through an additional \$25 million in new federal funds provided through USDA's NIFA programs:

- \$10 million annually under Smith Lever 3 (b) and (c) and 1890s Institutions Extension funds to support Extension Service expertise in every state dedicated to HFSHP education and outreach efforts;

- \$10 million annually under Hatch Act and 1890s Institutions/Evans-Allen programs for targeted multidisciplinary HFSHP research in every state; and
- \$5 million annually under the Smith-Lever Act Section 3(d) Food and Nutrition Education Program to support nutrition education of limited resource families and youth and other nutrition education programs.

National Pilot Program for Delivery of Evidence-Based Prevention and Care

This new initiative would promote preventative health at the local level of the community by bringing together the extensive community-based resources and expertise of the nation's Extension Service and the medical expertise of the nation's colleges of medicine, nursing, and pharmacy, and private partners such as hospitals, medical providers and community-based organizations. This integrated pilot program would deliver evidenced-based education, monitoring, and interventions focused on some of the nation's highest impact diseases: diabetes, asthma, and infectious disease. The innovative alliance would combine all strata of health improvement assets into a single, unified program from the payer, hospital system, specialty physician, primary care provider, nurse, and pharmacist, to the public health professional, extension specialist, and trained community health volunteer.

The Cooperative Extension Service's efforts would focus on teaching individuals to take personal responsibility for their own health through programs to engage families, enhance education, promote behavior change, and improve quality of medical care and disease outcomes. The Extension Service's grassroots model of community development and education and existing infrastructure (present in nearly every county nationwide) provide the community presence and local credibility needed to influence the social, economic, and environmental determinants of health. Such evidence-based interventions, deployed in ways that are respectful of community individual and family norms, beliefs and current practice have been shown to keep people healthy, and delay or prevent the need for medical care. This program would fund five competitively awarded multi-year pilot efforts selected to demonstrate and evaluate innovative delivery methods across a diverse set of demographic, geographic, and health care infrastructure settings. Specific Extension Service activities expected under this pilot include:

- Expanded education and outreach programs of nutrition and health specialists, Master Wellness Volunteer Coordinators, and nutrition and health educators;
- Development of youth health delivery models using 4-H partners through "Health Rocks" and other programs to develop cooperative learning experiences between youth and adult partners and engage youth in the process of developing community strategies to help prevent high impact diseases; and

- Field-level application and rigorous evaluation of evidence-based health care delivery models in improving patient care and health outcomes.

Proposed Funding: USDA/NIFA funding of \$5 million annually for five-years would be matched at least one-to-one by funding from non-federal sources (\$2 million total annually per pilot), including funding from state and local government agencies, private health providers, and other stakeholders.

Expand CDC's High Obesity Rate Counties Program

The Center for Disease Control and Prevention's High Obesity Rate Counties program provides competitive funding to Land Grant Colleges and Universities to conduct pilot intervention strategies through existing cooperative extension and outreach services at the county (or equivalent) level that can be replicated across the country. The strategies developed and applied through these grants combine basic, clinical, and population research targeted to provide long-term improvements in physical activity and nutrition, reduce obesity and prevent and control diabetes, heart disease, and stroke in areas where adult obesity rates are high (counties with an adult obesity prevalence of over 40%). At the FY 2016 funding level (\$10 million) the High Obesity Rate Counties program reaches 41 counties nationwide (about a third of eligible counties) and over 1.6 million people (about 1.7% of the 79 million American adults and nearly 13 million children affected by obesity). An additional \$10 million annually, for a total of \$20 million annually, of targeted funding for this program could enhance existing programs to develop effective evidence-based obesity research, intervention, and prevention programs to additional communities and expand these science-based programs to additional high-risk communities across the country. Additional funding would allow the most effective model programs developed in these communities to be replicated nation-wide.

Proposed Funding: provide \$20 million annually, an increase of \$10 million annually, to CDC's High Obesity Rate Counties Program and work to direct these funds to multidisciplinary HFSHP proposals.

Expand the Pipeline of Students and Professionals for Integrated Healthy Food Systems Programs

Through this effort, the Healthy Food Systems, Healthy People initiative would have an opportunity to develop partnerships by supporting efforts of private donors, foundations, industry, and universities to allocate funds for graduate or postdoctoral fellowships, endowed positions, internships and fellowships to expand and strengthen integrated research, education, and outreach. This initiative would expand upon recommendations in the *National Nutrition Research Roadmap* addressing workforce readiness for nutritional sciences and will support several activities to prepare undergraduate and graduate students, postdoctoral positions, and professionals to collaborate across domains of science (including agricultural science, basic biological and chemical science, medical science, and other fields) and practice (including medicine, nutrition, public health, education, and Cooperative Extension) to make progress towards improving our approach to treating chronic illnesses and promoting long-term health. This would be

accomplished by supporting cross-collaboration across academic colleges of agriculture, human sciences, medicine, nursing, public health, and Cooperative Extension to develop curricula, research opportunities, and other learning experiences that enhance workforce understanding of, and scientific skills related to, food and nutrition impacts on human health.

These efforts would play a role in improving the lab-to-community pipeline so that current and future medical, public health, education, and Cooperative Extension professionals are well prepared to use state-of-the science agriculture, food, nutrition, and health care recommendations.

The Implementation Team recommends exploring opportunities to advance in the student pipeline HFSHP multidisciplinary “systems thinking” across agriculture, human sciences, food, nutrition, health care systems, including:

- Encouraging federal agencies to give increased priority in existing career development and training programs to applicants demonstrating applicable multidisciplinary “systems” thinking. Examples of such programs include USDA/NIFA’s: “Food, Agriculture, Natural Resources and Human Sciences Education and Literacy Initiative” (ELI) that provides fellowships to predoctoral, postdoctoral, undergraduate, and Secondary School teachers for research, experiential learning, fellowship, and professional development opportunities (about \$21 million annual funding); and “Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship” grants to support graduate level training programs to develop scientific and professional expertise in the food, agricultural, natural resources, and human sciences sectors (about \$3 million annual funding). (Appendix D of the *National Nutrition Research Roadmap* identifies additional federally supported career development and training programs relevant to human nutrition research.)
- Strengthening nutrition education in the curricula of medical schools and other healthcare professional programs. The National Academy of Sciences has recommended³ that all medical schools require at least 25 to 30 contact hours of nutrition education, but only 27% of medical schools currently provide the 25-hour recommended minimum and 29% of medical schools require less than 12 hours. The Implementation Team recommends monitoring federal programs and legislation for opportunities to strengthen nutrition education in medical schools and graduate health care professional programs. For example, legislation introduced in Congress (but not yet acted upon) would establish a program of competitive grants to accredited medical schools for the development or expansion of an integrated nutrition and physical activity curriculum (H.R. 1411 - Expanding Nutrition's Role in Curricula and Healthcare Act) and would require every primary care health professional employed by the federal government to have continuing education courses related to the role of nutrition in the prevention, management, and, as possible, reversal of obesity, cardiovascular disease, diabetes, or cancer (H.R.3057 – Education and Training (EAT) for Health Act of 2015).

³ *Nutrition Education in U.S. Medical Schools* (1985): <http://www.ncbi.nlm.nih.gov/books/NBK216799>

- Further developing Cooperative Extension professional development programs as a component of the recommended investment in the Healthy Food Systems Integration Initiative and support the work of *Cooperative Extension’s National Framework for Health and Wellness*, including:
 - Developing Cooperative Extension partnerships with healthcare and public health professionals to enhance understanding of the role of nutrition and lifestyle strategies in improving health and lowering the risk of chronic disease. These groups may be accessed during their pre-licensure/ pre-professional training and post licensure for continuing education opportunities; and
 - Working through 4-H Youth Development and other Extension health programs, including the CDC-USDA 4-H Public Health Youth Education Program established by the One Health Initiative, continue supporting and strengthening programs that improve community health literacy and increase youth interest in cross-system careers.

Attachment A provides a matrix that cross-walks from the goals and objectives in the HFSHP report to the Implementation Team’s recommended actions.

Summary of Recommended Federal Funding Proposals

(Dollars in millions)

Proposal		2016 Federal Baseline	Additional Annual Cost		Possible Legislation
			Federal	Non-Federal	
1	Healthy Food Systems Research Program	--	80	--	X
2	Healthy Food Systems Capacity Program Integration Initiative	640	25	25	--
3	National Pilot Program for Delivery of Evidence-Based Prevention and Care	--	5	5	X
4	Expand CDC’s High Obesity Rate Counties Program	10	10	--	--
5	Support National Microbiome Initiative (FY 2016 and proposed FY 2017 funding)	121	--	--	--

Recommended Next Steps

The Implementation Team recommends taking the following near-term actions over the next six to nine months, which coincides with the timing of the presidential transition and development of the FY 2018 Budget, to help achieve HFSHP goals.

1. Organize and lead briefings of government, private-sector and non-profit stakeholders to inform these stakeholder and potential partners of HFSHP goals, objectives, and proposals :
 - Brief federal agency staff on HFSHP goals and objectives and recommended implementation proposals, and encourage these agencies to reflect these goals/proposals in implementation of FY 2017 funding, development of “Transition” papers for the next Administration, and development of the FY 2018 Budget. The content and timing of these briefings should be considered in the context of and coordinated with efforts to advance other APLU priorities during the transition and development of the 2018 Budget. Feedback from these briefings should inform possible changes to the implementation proposals and/or implementation strategy. To the extent possible, federal agency briefings should include the offices of:
 - US Department of Agriculture (NIFA, ARS, FNS, Chief Scientist)
 - Department of Health and Human Services (CDC, NIH, FDA, ODPHP)
 - National Science Foundation
 - White House: Office of Science and Technology Policy, Office of Management and Budget.
 - Brief potential private-sector and non-profit partners on HFSHP goals and objectives and areas of mutual interest. These briefings would lay the groundwork for future participation in HFSHP workshops and potential partnerships to carrying out HFSHP proposals. As with the approach to federal agencies, HFSHP outreach to non-federal stakeholders should be undertaken in the context of other APLU activities, and feedback from these briefings should inform possible changes to the implementation proposals and/or implementation strategy. The Subcommittee should identify key stakeholders for initial briefings, which could include:
 - The Foundation for Food and Agriculture Research and the Foundation for the National Institutes of Health
 - The Robert Wood Johnson Foundation
 - The Grocery Manufacturers Association
 - large companies such as Campbell’s, ConAgra, and Kraft-Heinz.
2. Support HFSHP goals as part of the White House National Microbiome Initiative, including:
 - Seek to have input into the federal Strategic Research Plan for microbiome research currently being developed by the Microbiome Interagency Working Group under the National Science and Technology Council. This input could be accomplished by the Implementation Subcommittee briefing the MIWG (or staff of OSTP) or through written comments; and

- Support relevant programs in agency actions to carry out final FY 2017 appropriations and in development of the FY 2018 Budget.
3. Consider legislative proposals to support HFSHP goals and monitor congressional and Executive Branch actions that support or hinder achieving HFSHP goals;
 4. Organize a national workshop and/or themed regional workshops for HFSHP thought-leaders and stakeholders/partners to provide strategic support and access to experts, brainstorm barriers to broader adoption and acceptance of HFSHP goals, exchange best practices, and discuss how to work together to achieve HFSHP goals. The goal should be to hold an initial conference early in calendar year 2017. This effort could also include working to establish a HFSHP Community of Practice comprising scientists, policy makers, professional organizations and private-sector and non-profit experts to share knowledge and promote collaboration in data collection, information sharing, and coordination of research, education and outreach activities.

In the longer term, as specific appropriations and legislative proposals are developed or identified:

5. Inform Congressional Members and Committees of the goals/objectives and benefits of the HFSHP initiative and specific funding and authorizing legislation provisions that support HFSHP goals. This effort includes briefings of key Members and committee staff of relevant appropriations and authorizing committees and other key congressional stakeholders. Most of the Implementation Team's federal agency proposals, perhaps all, can be carried out within existing statutory authority. However, specific direction from Congress could be helpful to clarify any ambiguity and provide clear direction and momentum on these proposals. The implementation strategy with respect to congressional offices will need to be developed based on the specific proposals. Relevant committees include:
 - House Committees: Agriculture, Energy and Commerce, Commerce/Science/Transportation, Health/Education, and Appropriations; and
 - Senate Committees: Agriculture, Commerce/Science/Transportation, Health/Education/Labor, and Appropriations.
6. Monitor and report to the BAA/BoHS progress toward achieving HFSHP goals.

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Recommended Implementation Actions to Achieve Goals/Objectives

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HFSHP Report Goals and Objectives			Recommended Implementation Actions							
			<i>Public-Private Partnerships</i>	<i>National Microbiome Initiative</i>	<i>RFP Priorities</i>	<i>HFSHP Research</i>	<i>HFSHP Capacity</i>	<i>National Pilot Program</i>	<i>High Obesity Rate Counties</i>	<i>Student Pipeline</i>
Goal 1: Realign research and education approaches using "systems thinking"										
Objectives	A	Encourage collaboration to develop joint grant request for proposals.	X	X	X	X	X	X	X	
	B	Incentivize the formation of partnerships to establish sustainable approaches	X	X	X	X	X	X	X	
	C	Expand and /or reallocate some existing USDA/NIFA research and/or capacity funds to integrated approaches	X	X	X	X	X	X	X	
	D	Engage land-grant and non-land grant universities in a dialogue to maximize collective efforts	X	X	X	X	X	X	X	X
	E	Implement systems research for a better understanding of barriers, differences, and challenges.	X	X	X	X	X			
Goal 2: Identify and understand the interconnectedness of the main policy, systems and environmental drivers of consumer behavior in relation to chronic diseases										
Objectives	A	Understand what cultural, policy, systems, and environmental factors affect consumers' ability to make healthy choices.	X	X	X	X	X	X	X	
	B	Understand how the food environment affects consumer behavior and weight outcomes	X		X		X	X	X	
	C	Determine how US government food programs and policies affect consumer behavior and weight outcomes.	X		X	X	X	X	X	
	D	Describe the extent that US governmental and/ or agricultural policies and practices influence US food supply and changes that could have a positive outcome.	X	X	X		X	X	X	
	E	Translate science on consumer behavior into viable marketing interventions that influence consumer behavior.	X		X	X	X	X	X	
	F	Determine the impacts of interactions of nutrition/ food intake, physical activity, and educational interventions on chronic disease prevention and treatment.	X	X	X		X	X	X	

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HFSHP Report Goals and Objectives			Recommended Implementation Actions							
			<i>Public-Private Partnerships</i>	<i>National Microbiome Initiative</i>	<i>RFP Priorities</i>	<i>HFSHP Research</i>	<i>HFSHP Capacity</i>	<i>National Pilot Program</i>	<i>High Obesity Rate Counties</i>	<i>Student Pipeline</i>
Goal 3: Better understanding the complex interrelationships of the food -human-gut microbiome ecosystem and its role in promoting human health										
Objectives	A	Identify the role of the gut microbiome in modulation or inflammatory and antioxidant responses to food and the absorption and utilization of nutrient.	X	X	X	X				
	B	Understand the interaction of the human gut microbiome with the human genome and food nutritive value and its effect on nutrient absorption and utilization.	X	X	X	X				
	C	Develop new biomarkers to better predict chronic disease predispositions.	X	X	X	X				
Goal 4: Broaden the definition of food quality to consider true functionality of food and translation of human health promoting attributes to consumer food products and bioactive compounds										
Objectives	A	Develop a portfolio of reliable, robust phenotypic traits that correlates to health-protective value of agricultural compounds and finished foods that can be used to expand both breeding programs and the definition of food quality.	X	X	X	X				
	B	Better understanding of the impact of post-harvest handling and food processing on the health functionality and overall quality of foods.	X		X	X				
	C	Identify biomarkers of intake for bioactive food compounds that can be monitored in human fluids to establish diet patterns and quality and correlate these with disease risk or progression.	X	X	X	X				
	D	Determine role of underlying factors in modulating the bioavailability and efficacy of dietary bioactive compounds from food.	X	X	X	X				
	E	Establish translational and commercial paths for improved crop and animal products, and other raw materials that generate products of enhanced health quality.	X		X	X				

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HFSHP Report Goals and Objectives			Recommended Implementation Actions							
			<i>Public-Private Partnerships</i>	<i>National Microbiome Initiative</i>	<i>RFP Priorities</i>	<i>HFSHP Research</i>	<i>HFSHP Capacity</i>	<i>National Pilot Program</i>	<i>High Obesity Rate Counties</i>	<i>Student Pipeline</i>
Goal 5:	Improve the lab-to-community pipeline so that medical, public health, education, and Cooperative Extension professionals are well-prepared to use state-of-the science food and nutrition recommendations to help their patients, clients and the public improve their health and lessen the burden of chronic disease									
Objectives	A	Forge partnerships with health care and public health professionals to enhance understanding of the role of nutrition and lifestyle strategies.	X		X	X	X	X	X	X
	B	Enhance the work of Cooperative Extension's National Framework for health and Wellness to further refine the role of the Cooperative Extension.	X		X	X	X	X	X	X
	C	Build teams that link agriculture and health scientists across schools of medicine, nursing, public health, and human sciences to Cooperative Extension professionals.	X		X	X	X	X	X	X
	D	Collaborate across academic colleges of agriculture, human sciences medicine, nursing, and public health to develop curricula and other learning experiences that enhance workforce understanding of, and scientific skills related to, food and nutrition impacts on human health and chronic disease.	X		X	X	X	X		X
	E	Collaborate with veterinary medicine colleagues to improve understanding of the animal-human-environment health continuum through One Health initiative.	X		X	X	X	X		X

HFSHP Implementation Team Members

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- Hunt Shipman, Cornerstone Government Affairs
- Ian Maw, Vice President for Food, Agriculture, and Natural Resources, APLU
- Rich Linton, ex officio, Dean, College of Agriculture and Life Sciences, NC State
- Chris Ladisch, ex officio Dean, College of Health and Human Sciences, Purdue University
- Eric Young, Support, Executive Director, Southern Association of Agricultural Experiment Station Directors
- Eddie Gouge, Support, Senior Associate Director, Federal Relations -- Food and Agricultural Sciences, APLU
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