

Applicability of Systems Science Approaches to the Dietary Guidelines for Americans: Report Summary

Background

In September 2022, the U.S. Department of Agriculture (USDA), Food and Nutrition Service's (FNS) Center for Nutrition Policy and Promotion (CNPP) contracted with Westat Insight (WI) to develop a comprehensive report with potential options to integrate systems science approaches into the Dietary Guidelines process. The development of this report is supported by 2017 recommendations from an expert committee convened by the National Academies of Sciences, Engineering, and Medicine (NASEM), which encouraged the commission of research and evaluation of strategies to integrate systems approaches into the Dietary Guidelines process. Systems science (sometimes called "complex systems science" or "complexity science") refers to a set of methods that are designed to handle the challenges standard analysis tools may confront because of the complexity of a system or problem. In March 2023, a 2-day inperson workshop with systems science, nutrition, and public health experts took place at USDA. The input received at the workshop and during subsequent review of the report draft were the main data sources for the report. The report was authored by the workshop cochairs and project staff from WI. The six action strategies discussed in the report are those of the workshop experts as interpreted by the report authors and should not be construed to represent any official USDA or U.S. Government determination or policy. A summary of the report and findings follow.

Project Overview and Summary

- In 2017, a NASEM committee encouraged the commission of research and evaluation of strategies to integrate systems approaches into the Dietary Guidelines process.
- In 2022, CNPP obtained funding support to conduct a study to explore potential options to incorporate systems science into the Dietary Guidelines process.
- In early 2023, a 2-day inperson workshop was held in Washington, DC at USDA Headquarters with a diverse panel of 16 experts in systems science, nutrition, and health. Experts engaged in extensive discussion on systems science and its applicability to the Dietary Guidelines development process, including implementation.
- In late 2023, "Applicability of Systems Science Approaches to the Dietary Guidelines for Americans" was developed based on workshop discussions. The report provides six action strategies for integrating systems science into the process as well as acknowledgment of systems science work currently underway.

Methods

Project Objectives: (1) explore potential options to incorporate systems science into the process to develop the Dietary Guidelines; (2) determine the applicability and feasibility of the proposed options to improve Dietary Guidelines process; and (3) identify the steps and resources needed for any feasible, applicable, and beneficial options.

Expert Identification: CNPP and WI identified a systems science expert, Dr. Ross Hammond, to cochair the workshop. Sixteen (of 26) invited experts diverse in their expertise, race, and geography participated in the workshop. Some experts also had experience and knowledge about the Dietary Guidelines development process.

Workshop Focus: Experts learned more about Dietary Guidelines and how the 2017 NASEM recommendations served as the impetus for the report. Experts then generated

ideas on how systems science approaches could inform Dietary Guidelines development and implementation. During idea generation, a variety of ideas were suggested, then prioritized. During idea buildout, prioritized ideas were expanded by adding information on the partners needed to incorporate an idea, the resources and time needed, along with the benefits and challenges.

Report Development: Authors included L. Gutuskey, R. Neenan, H. Wagner (Westat Insight), and Dr. Ross Hammond. Authors identified common themes and ideas that received broad support, then grouped ideas into six potential action strategies (AS) based on the ideas' intersection with the Dietary Guidelines process. The report draft was reviewed by workshop participants and comments were incorporated into the final report.

Action Strategies

AS1: Add scientific questions informed by ongoing systems science research.

Example: Use agent-based modeling and systems dynamics modeling to identify which system structures have the most potential to influence dietary patterns.

AS2: Use systems science methods to complement or augment existing methods used in scientific evidence review.

Example: Simulation modeling of diets to improve representation of diverse dietary practices (being utilized by the 2025 Dietary Guidelines Advisory Committee). Systems modeling can complement the current scientific review by capturing additional aspects of dynamics and heterogeneity not as easily captured in traditional study designs.

AS3: Include systems science experts in Dietary Guidelines development.

Example: Many action strategies would require system science expertise to navigate best practices, limitations, and considerations. Ideas included experts as future members of a Dietary Guidelines Advisory Committee, hired staff engaged throughout the process, or consultants engaged as needed.

AS4: Inform implementation efforts, which might also inform future iterations of Dietary Guidelines development.

Examples: Modeling to customize programs, interventions, or communications for specific subpopulations; modeling implementation resistance; combating misinformation and disinformation; developing personalized interactive decision tools; identifying implementation gaps; and modeling barriers that prevent adoption of recommendations that would otherwise promote health and prevent disease.

AS5: Consider the Dietary Guidelines process as a system that can be modeled for better understanding.

Example: The Dietary Guidelines process itself is a system that could benefit from being described, explored, and potentially improved by using qualitative systems science methods like group model building.

AS6: Generate systems science research that could inform future iterations of Dietary Guidelines development.

Example: The use of systems methods to explore nutrition science is a growing but nascent field. With the support of a broader Federal and non-Federal effort, systems science models could be used to facilitate connections between the Dietary Guidelines and the broader food system, including feasibility and downstream consequences.

Report Conclusions

- The action strategies discussed the range in the parties responsible and partnerships needed, the relative timelines and resources needed, and potential benefits and challenges to the Dietary Guidelines process, but most importantly, benefits for the public.
- Some strategies could more readily be incorporated into upcoming cycles of the Dietary Guidelines development process, while other strategies cannot be implemented until researchers produce a preponderance of systems science evidence.
- Experts agreed all six strategies could add value to the Dietary Guidelines process and impact, with particular enthusiasm regarding the role systems science could have in Dietary Guidelines implementation.

Systems Science Workshop Experts

Ross Hammond, Ph.D., Report Coauthor & Workshop Co-chair, Washington University & The Brookings Institution; **Jamy Ard**, M.D., Wake Forest School of Medicine; **Shari Barkin**, M.D., M.S.H.S., Virginia Commonwealth University; **Christina Economos**, Ph.D., Tufts University; **Naomi Fukagawa**, M.D., Ph.D., U.S. Department of Agriculture; **Matthew Gillman**, M.D., S.M., National Institutes of Health; **Kevin Hall**, Ph.D., National Institutes of Health; **Kamal Henderson**, M.D., M.Sc., Ph.D., University of Colorado, Anschutz; **Matt Kasman**, Ph.D., Brookings Institution; **Shiriki Kumanyika**, Ph.D., M.P.H., Drexel University; **Brent Langellier**, Ph.D., M.A., Drexel University; **Douglas Luke**, Ph.D., Washington University in St. Louis; **Cynthia Ogden**, Ph.D., Centers for Disease Control and Prevention; **Emily Oken**, M.D., M.P.H., Harvard Medical School; **Nico Pronk**, Ph.D., M.A., FACS, FAWHP, HealthPartners Institute; **Jill Reedy**, Ph.D., M.P.H., RDN, National Institutes of Health

For More Information:

Gutuskey, L., Neenan, R., Hammond, R. A., & Wagner, H. (2023). Applicability of systems science approaches to the Dietary Guidelines for Americans. Prepared by Westat Insight, Contract No. 12319822F0063. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Center for Nutrition Policy and Promotion, Project Officer: Meghan Adler.