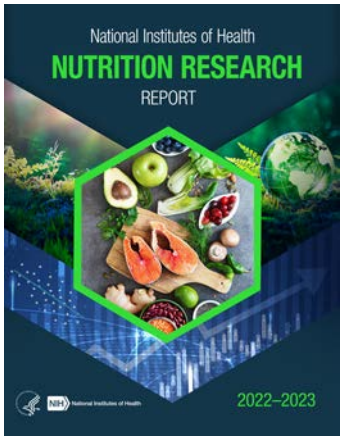
NIH Nutrition Research Report 2022–2023

Executive Summary

The mission of the National Institutes of Health (NIH), the nation's biomedical research agency, is to seek fundamental knowledge about the nature and behavior of living systems and apply that knowledge to enhance health, lengthen life, and reduce illness and disability. To this end, NIH researchers are conducting studies to better understand optimal nutrition and how it relates to human health and the risk for disease. Nutrition is inextricably linked to all aspects of health and disease. As such, research related to nutrition is supported by 24 NIH institutes and centers (ICs) and the NIH Office of the Director (OD) and focuses on understanding how nutrients and food components impact health and well-being throughout the lifespan. It also includes research studies to better understand the effects of behavior—including eating habits and food choices—and environmental exposures on nutritional status. ICs, for example, are investigating: (1) approaches for determining the influence of diet, dietary patterns, and dietary components on the cancer process; (2) nutrition-related health disparities in common chronic diseases (e.g., obesity, type 2 diabetes) and social risk factors, such as food insecurity and nutrition insecurity; (3) how nutrition influences the trajectories of health and aging; (4) nutrition's role in growth and development; and (5) artificial intelligence for precision nutrition.

The Office of Nutrition Research (ONR), which is a part of the Division of Program Coordination, Planning, and Strategic Initiatives within OD, is the primary driver of NIH nutrition research activities. ONR's mission is to advance nutrition science to promote health across the lifespan and to support the development of evidence-based, equitable, context-specific, culturally appropriate, resilient, and sustainable solutions to reduce the burdens of diet-related diseases and health disparities. ONR works to achieve its mission through its role as a service provider, technical resource, and coordinator of the nutrition research agenda across NIH Institutes, Centers, and Offices (ICOs).



NIH continues to strengthen its role in nutrition research and has been implementing the *2020–2030 Strategic Plan for NIH Nutrition Research* (SPNNR), its first agencywide nutrition research plan. The SPNNR, with a unifying vision of precision nutrition research, includes four strategic goals: (1) spur discovery and innovation through foundational research; (2) investigate the role of dietary patterns and behaviors for optimal health; (3) define the role of nutrition across the lifespan; and (4) reduce the burden of disease in clinical settings. Additionally, the SPNNR addresses five crosscutting areas relevant to all four strategic goals, including minority health and health disparities; health of women; rigor and reproducibility; data science, systems science, and artificial intelligence; and training the nutrition scientific workforce. In addition to implementing the SPNNR, ONR is establishing thematic working groups—comprised of scientific staff from across NIH, as well as nutrition experts from the U.S. government—to address high-priority areas in nutrition science.

The *NIH Nutrition Research Report* summarizes nutrition research activities supported and conducted by NIH ICOs in fiscal years 2022 and 2023 (FY22 and FY23). ONR compiled and produced this report, and the detailed document can be accessed on the ONR website.

Annual Nutrition Research and Training Expenditures

As a percentage of total NIH spending, nutrition research funding has been stable at approximately 5 percent since FY15. The table below shows total NIH nutrition research and training support in current and constant dollars from FY19 through FY23. While the total amount of NIH funding for nutrition research and training has increased from FY19 to FY23 (in current dollars not adjusted for inflation), the percentage of NIH expenditures for nutrition research and training has decreased from 4.90 percent to 4.07 percent, respectively.

Actual Obligations for NIH Nutrition Research and Training in Current and Constant Dollars and as a Percentage of Total NIH Obligations, FY19–FY23 (in thousands of dollars)

Fiscal Year	Nutrition Research & Training Current Dollars[a]	Nutrition Research & Training Constant Dollars[b]	Actual Total NIH Obligations[c]	Constant Nutrition Dollars as a Percentage of Actual Total NIH Obligations
2019	$1,931,268	$1,931,268	$39,420,151	4.90
2020	$2,047,194	$2,012,392	$41,524,839	4.85
2021	$2,065,040	$1,980,373	$42,738,079	4.63
2022	$2,102,819	$1,928,285	$45,327,368	4.25
2023	$2,230,647	$1,967,431	$48,371,641	4.07

Highlights in Nutrition Research: FY22 to FY23

NIH-supported nutrition research has led to several important discoveries. Many of these findings are announced in NIH news releases or published in *NIH Research Matters,* a biweekly update of NIH research highlights from the NIH Office of Communications and Public Liaison. Selected accomplishments, gaps and opportunities, tools and resources, and future directions for nutrition research from FY22 to FY23 include the following:

SELECTED ACCOMPLISHMENTS

- Began enrollment in the *Nutrition for Precision Health, powered by the All of Us Research Program* at 14 clinical sites in the United States, with a goal of accruing at least 8,000 participants from diverse backgrounds.
- Established the Advanced Training in Artificial Intelligence for Precision Nutrition (AIPrN) Science Research Institutional Research Training Program (T32) (RFA-OD-22-027) and awarded four AIPrN T32 grants.
- Sponsored more than 60 nutrition research–related events, which play a key role in the advancement of nutrition science.
- Launched a randomized clinical trial investigating the effects of time-restricted eating on weight loss in adults with type 2 diabetes compared with calorie restriction as a means of effective weight reduction and glycemic control.
- Published results of a study suggesting that dietary fat restriction, but not carbohydrate restriction, modulates activity in brain-reward regions and affects food choice in ways that may hamper diet adherence.
- Published a study suggesting that *ad libitum* meal energy intake is positively influenced by energy density, eating rate, and hyper-palatability across multiple dietary patterns.
- Published the report of the Food Insecurity, Neighborhood Food Environment, and Health Disparities: State of the Science, Research Gaps and Opportunities governmentwide workshop and released a notice of special interest (NOT-OD-22-135) on Stimulating Research to Understand and Address Hunger, Food and Nutrition Insecurity, in alignment with the National Strategy on Hunger, Nutrition, and Health.

[a] Source: NIH RePORT, using the Nutrition RCDC category.
[b] Based on the Biomedical Research and Development Price Index, Fiscal Year 2019 equals 100 percent.
[c] Source: NIH Budget Office Actual Total Obligations by Institute and Center FY00–FY23:The amounts for FY22 and FY23 include ARPA-H.

SELECTED GAPS AND OPPORTUNITIES

- As many as 80 percent of people with cancer experience malnutrition, but cancer-associated malnutrition may be preventable.
- The disproportionate existence of food deserts in underserved communities, including Tribal reservations and adjacent lands, has resulted in people who live in these areas experiencing food and nutrition insecurity.
- Research is needed to investigate the role of housing insecurity, its influence, and the mechanisms underlying health disparities across the lifespan, particularly across diverse populations during critical periods, such as the prenatal period, early childhood, adolescence, and older adulthood.

TOOLS AND RESOURCES

- *Nutrition for Precision Health, powered by the All of Us Research Program*
- Automated Self-Administered Dietary Assessment (or ASA24®) Dietary Assessment Tool
- Nutrition Science Data and Biospecimen Resources Portal
- Dietary Supplement Fact Sheets

FUTURE DIRECTIONS

- Expand the concept of nutrition from a one-dimensional construct (food-focused) to an ecological system (nutritional ecology) affected by both internal (biology, genetics, microbiome, health context, developmental stage) and external (household, community, physical, environmental) factors.
- Enhance rigor and reproducibility in scientific studies by adopting the principle that nutritional status is a biological variable—like age and sex.
- Improve the precision of nutritional assessment.
- Develop new tools and resources that broadly inform nutrition science.
- Build a diversified workforce in nutrition science and dietetics that will be able to use growing data resources to tackle complex biomedical challenges in nutrition science and implement solutions.
- Encourage research and programs that focus on nutrition and that incorporate traditional and cultural approaches for improving nutrition and overall health.
- Support nutrition research and training in multiple areas of basic, epidemiological, and clinical nutrition, as well as promote nutrition health disparities research.