

About the National Institute of Health (NIH) Division of Nutrition Research Coordination (DNRC)

The National Institutes of Health (NIH) [Division of Nutrition Research Coordination \(DNRC\)](#) is a trans-NIH office created in 1988 to advise the NIH Director and others on nutrition and physical activity research, training, and policy initiatives. The mission of the DNRC is to coordinate nutrition-related research and training across the NIH, working in collaboration with other agencies within the United States Department of Health and Human Services (HHS), as well as other federal agencies. The DNRC traces its origins back to an NIH-wide forum—the [NIH Nutrition Coordinating Committee \(NCC\)](#), which was established in 1975 for the primary purpose of reviewing, discussing, and stimulating support for nutrition research and training within the NIH. In the 1980s, mounting interest in an expanded NIH nutrition research agenda and the need for a coordinated and unified trans-NIH response on issues and documents related to nutrition research, research translation, and nutrition research training, as well as policy development, contributed to the creation of the DNRC in 1988 within which coordinating the NCC would be an important function.

Guided by a recent assessment aimed at improving the planning and implementation of the NIH’s nutrition research coordination activities, the NIH DNRC will transition in 2015 to form the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Office of Nutrition Research (ONR), located within the NIDDK Director’s Office (For more information, see the [NIDDK press release](#)). The ONR will continue to serve as a point of contact for nutrition research coordination, and will also bring strategic focus to NIH’s nutrition research coordination activities by helping to lead an NIH-wide strategic planning effort and the development of new nutrition research initiatives.

About the *NIH Nutrition Research Report*

The *NIH Nutrition Research Report, 2013 & 2014* was prepared by DNRC staff; specifically, Rachel Fisher, Sheila Fleischhacker, Jim Krebs-Smith, Crystal McDade-Ngutter, Margaret McDowell, and Karen Regan under the leadership of the DNRC Director, Dr. Van Hubbard. Building on the DNRC’s prior 2011 and 2012 [report](#), this Report summarizes 2013 and 2014 nutrition research activities supported by the NIH during this two-year period. This Report also shares the research directions of the NIH institutes and centers supporting these activities.

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Cover Image

The “word cloud” illustrates how FY 2013 NIH nutrition projects were categorized according to the Human Nutrition Research and Information Management (HNRIM) System.

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NIH NUTRITION RESEARCH REPORT, 2013 & 2014

I. EXECUTIVE SUMMARY

Nutrition plays an integral role in human growth and development, in maintenance of good health, and in the prevention and treatment of disease. While the importance of good nutrition is well established across the lifespan, the exact nature of how diet impacts health and disease is not fully understood. Each year, the National Institutes of Health (NIH) funds a broad array of basic and applied research studies to further our understanding of nutrition as it relates to human health and disease.

This Report summarizes NIH nutrition research activities in 2013 and 2014 and builds on an earlier [publication](#) summarizing nutrition research activities in 2011 and 2012. The Report was compiled by the NIH Division of Nutrition Research Coordination (DNRC), a trans-NIH office created in 1988 to advise the NIH Director and others on nutrition and physical activity research, training, and policy initiatives. In 2015, the NIH DNRC will transition to form the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Office of Nutrition Research (ONR), located within the NIDDK Director's Office. The ONR will continue to serve as a point of contact for nutrition research coordination. The ONR will also bring a new focus to NIH's nutrition research coordination activities by helping to lead NIH-wide strategic planning and the development of nutrition research initiatives.

The NIH leads all federal agencies in funding nutrition research and training. Financial information in this Report is provided for fiscal years (FY) rather than calendar years. The total NIH investment in nutrition research was approximately \$1.5 billion in FY 2013 and \$1.6 billion in FY 2014. The following NIH institutes and centers (ICs) supported the most nutrition research: the NIDDK, the National Heart Lung and Blood Institute (NHLBI), and the National Cancer Institute (NCI). Across all NIH ICs, projects categorized as nutrition were also likely to be categorized as prevention, obesity, and clinical research.

NIH-supported nutrition research has led to a number of important discoveries. Many of these findings are announced in [NIH News Releases](#) or are published in [NIH Research Matters](#), a biweekly update of NIH research highlights from the NIH Office of Communications and Public Liaison. Highlights from 2013-2014 include:

- The [development of a mathematical model](#) that simulates how weight and body fat in children respond to changes in diet and physical activity,
- A [new explanation](#) for the link between red meat consumption and heart disease,
- Further understanding of how the [diet and gut microbes interact](#) to affect obesity, and
- The [beginning of a large-scale clinical trial](#) to investigate if a vitamin D supplement helps prevent or delay type 2 diabetes in adults who have prediabetes.

During 2013 and 2014, the NIH sponsored more than [40 nutrition-related scientific meetings, workshops, and symposiums](#). These events play a key role in the advancement of nutrition science by providing an opportunity to identify critical research gaps and disseminate research findings to the scientific community and to the general public.

Trans-NIH, government-wide, and public-private partnership collaborations were critical to the development of numerous nutrition research, strategic planning, and technology transfer initiatives during 2013–2014. These collaborations are critical to effectively utilize resources and harmonize the federal nutrition research agenda. Examples include the [NIH Nutrition Coordinating Committee \(NCC\)](#), the [National Collaborative on Childhood Obesity Research \(NCCOR\)](#), and the [Interagency Committee on Human Nutrition Research \(ICHNR\)](#).

One of the most notable collaborations during this reporting period has been the reassembling of the ICHNR. Created in 1983, the 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. 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 a draft *National Nutrition Research Roadmap* focused on identifying research gaps and opportunities with the greatest potential to yield accelerated progress in nutrition research to improve and sustain health for all children, families and communities. Following a [public comment period](#), the ICHNR plans to disseminate the final *Roadmap* in fall 2015.

The NIH is committed to fostering innovative research and training to advance the field of nutritional science with the ultimate goal of protecting and improving health. Each NIH IC plays an integral role in accomplishing this mission, and this Report puts forth their nutrition-relevant research directions. The DNRC hopes this comprehensive Report is not only informative but also serves to stimulate new ideas and discoveries.

II. INTRODUCTION

The National Institutes of Health (NIH), part of the U.S. Department of Health and Human Services (HHS), is the nation's medical research agency. The NIH is made up of 27 institutes and centers (ICs), each with a specific research agenda that often focuses on particular diseases or body system. The NIH supports biomedical research and training in nutrition as it relates to human development, health maintenance, disease prevention, and disease treatment.

Nutrition is a factor in many diseases and is an integral part of overall health, development, and wellbeing. As a result, research interests in the nutritional sciences extend far beyond those of a single institute. Biomedical nutrition research and training in 2013 and 2014 was supported by 23 NIH ICs and the NIH Office of the Director (OD).

The NIH nutrition research program includes extramural and intramural research as well as research training. The major component of the program is extramural research, carried out at hundreds of institutions across the globe. Many of the research projects funded by NIH are based on ideas developed and submitted by individual investigators, principally from graduate science departments of nutrition, medicine, public health, and dentistry. Most of the intramural research is carried out in laboratories on the NIH campus in Bethesda, Maryland, and at the Warren Grant Magnuson Clinical Center, although several ICs also have off-campus programs located throughout the country.

III. NIH NUTRITION RESEARCH AND FUNDING

Overview

NIH is the leader in federally supported nutrition research and training. In FY 2013 and FY 2014, the NIH provided \$1.5 billion and \$1.6 billion respectively in financial support for nutrition research and training. This represents the combined individual contributions of 23 NIH ICs and the NIH OD. In FY 2013-2014, NIH funded projects in all 50 states as well as in 19 foreign countries. The NIH supported 396 clinical trials, which were either active or recruiting. More than 9000 peer-reviewed publications, 624 press releases, and 45 *NIH Research Matters* articles cited NIH nutrition-related projects that were active in FY 2014.

Human Nutrition Research Reporting

The FY 2013-2014 nutrition research and training information in this document, including grants, contracts and other funding mechanisms, was obtained using the Human Nutrition Research Information Management (HNRIM) system database and the NIH [Research Portfolio Online Reporting Tools Expenditures and Results \(RePORTER\)](#) System.

About HNRIM

HNRIM was a federal government-wide database created for the purpose of fiscal accounting, management and monitoring of cross agency human nutrition research activities. Developed in accordance with the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C §3177), HNRIM operated under the auspices of the Interagency Committee on Human Nutrition Research (ICHNR) from 1985 until it was decommissioned in March 2015. HNRIM was maintained by the NIH Division of Nutrition Research Coordination, and was available for use in analyzing FY 2013 data, but not for the FY 2014 analysis.

About RePORTER

RePORTER is an electronic tool that allows users to search a repository of both intramural and extramural NIH-funded research projects from the past 25 years and access publications (since 1985) and patents resulting from NIH funding. Although not included in this Report, in addition to NIH-funded research, RePORTER provides access to research supported by the Centers for Disease Control and Prevention, the Agency for Healthcare Research and Quality, the Health Resources and Services Administration, the Substance Abuse and Mental Health Services Administration, and the U.S. Department of Veterans Affairs. The new [Federal RePORTER](#) system, launched in September 2014, was developed based on the NIH RePORTER.

As described in the [2006 NIH Reform Act](#), Congress requires NIH to report annual spending for over 200 research, condition, and disease categories, including nutrition. Historically, projects related to nutrition were identified by staff in each of the NIH ICs. However, at the request of Congress, the NIH embarked on a process to provide better consistency and transparency in the reporting of its funded research. Beginning with FY 2008, the NIH began using the [Research, Condition, and Disease Categorization](#)

(RCDC) system to define the more than 200 categories, including nutrition, which the NIH reports annually to Congress and the public. RCDC uses sophisticated text data mining in conjunction with NIH-wide definitions used to match projects to research spending categories.

The definitions (fingerprints) are a list of terms and concepts selected by NIH scientific experts to define a research category. The NIH Nutrition Fingerprint is based on the ICHNR definition of human nutrition research, *the pursuit of new knowledge to improve the understanding of nutrition as it relates to human health and disease and, as here defined, encompasses studies in five major areas: biomedical and behavioral sciences, food sciences, nutrition monitoring and surveillance, nutrition education, and impact on nutrition and intervention programs and socioeconomic factors*, and was created by HNRIM staff working in conjunction with nutrition science experts representing many NIH ICs. The Fingerprint is compared to each NIH funded research project by searching titles, abstracts and specific aims to generate a list of research projects which are nutrition-related. As there is no reasonable way to assign a percent nutrition using the Nutrition Fingerprint, the dollars for all identified nutrition-related projects are counted as 100% nutrition. Research projects may meet the criteria of multiple fingerprints, and most nutrition projects are categorized under other spending categories as well. In other words, a project may be counted as nutrition, obesity, and prevention. The project would be counted once in each category, so adding the number of projects, or dollars, in each category would far exceed the total number of projects.

Nutrition Research and Training Expenditures

Trends: FY 2010-FY2014

As a percentage of total NIH spending, nutrition research spending has been fairly stable at approximately 5%. Table 1 shows total NIH biomedical nutrition research and training support in constant, as well as current dollars. Actual obligations for nutrition research and training by NIH ICs during FY 2010-2014 are shown in Table 2. Across this 5-year interval, NIDDK, NHLBI and NCI led NIH spending in nutrition-related research. Cumulatively, nutrition spending by these three ICs accounted for more than half of all NIH nutrition related expenditures in each year of this interval.¹

Compared to FY 2013, the number of projects funded in FY 2014 increased by almost 150, and nutrition research funding increased by \$300,000. Although there was a small increase in nutrition projects and funding overall across the NIH, that was not a uniform trend across individual ICs. Although NIDDK, NHLBI and NCI are the top three ICs funding nutrition research, their nutrition funding trends are quite different. NIDDK increased nutrition funding by 4% in FY 2014, while NHLBI and NCI reduced their nutrition research funding (by 7% and 3% respectively) for the second year in a row. Additionally, there was an 18% reduction in nutrition research funding at the National Human Genome Research Institute (NHGRI), and increased nutrition research funding at the National Institute of General Medical Sciences

¹ For more information on FY 2011-2012 nutrition spending, see the NIH Nutrition Research Report 2011-2012 (http://dnrc.nih.gov/pdf/nutrition_research_report_2011_2012.pdf)

(NIGMS) (34%), the National Institute on Alcohol Abuse and Alcoholism (NIAAA) (24%), the National Institute of Allergy and Infectious Diseases (NIAID) (22%), and the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) (10%).

The most recent nutrition research and training expenditures for NIH ICs are shown in Table 3 as amounts and as percentages of their total obligation. Numbers of projects for each IC supporting nutrition research are also included. In FY 2014, NIDDK, NHLBI and NCI, collectively accounted for nearly 60 percent of the total NIH nutrition related spending, but in terms of the proportion of total IC budget dedicated to nutrition, the three leading NIH components were the NIDDK, the National Center for Complementary and Integrative Health (NCCIH)² and the National Institute of Nursing Research (NINR) with 27 percent, 21 percent and 10 percent, respectively.

Table 1. Actual Obligations, NIH Biomedical Nutrition Research and Training in Current and Constant Dollars and as a Percentage of Total NIH Obligations FY 2010-2014 (in thousands of dollars)

Fiscal Year	Nutrition Research and Training, Current Dollars ^a	Nutrition Research and Training, Constant Dollars ^b	Total NIH Obligations ^c	Current Nutrition Dollars as a Percentage of Total NIH Obligations
2010	1,643,520	1,551,793	30,492,896	5.4
2011	1,411,263	1,296,068	30,231,507	4.7
2012	1,692,018	1,520,232	30,362,977	5.6
2013	1,524,259	1,436,625	28,705,521	5.3
2014	1,554,963	1,435,792	29,930,150	5.2

a Expenditures. Source: NIH RePORT.

b Based on biomedical R&D price index, FY 2010 = 100 percent.

c Total excludes obligations for National Library of Medicine and Buildings and Facilities.

² Until December 2014, the NCCIH was named the National Center for Complementary and Alternative Medicine (NCCAM): <https://nccih.nih.gov/news/press/12172014>

**Table 2. Funding for Nutrition Research and Training by NIH Component
FY 2010-2014 (ordered by FY 2010, largest to least, in thousands of dollars)**

Institute/ Center	2010	2011	2012	2013	2014
Total	1,643,520	1,411,263	1,692,018	1,524,259	1,554,963
NIDDK	494,049	422,867	517,288	527,470	507,564
NHLBI	239,863	216,893	236,207	220,402	205,936
NCI	201,725	205,636	286,701	200,252	194,457
NICHD	120,271	95,243	115,181	88,520	97,770
NIA	88,795	80,713	92,876	85,578	87,959
NIEHS	67,161	46,902	73,018	57,072	55,250
OD ^a	65,186	46,485	50,495	49,150	82,243
NCCIH	45,243	26,819	31,757	25,248	26,531
NCRR ^b	39,313	27,789	-	-	-
NIGMS	33,338	32,423	45,899	44,427	59,388
NIMH	32,284	27,271	31,665	29,414	30,706
NIAID	29,745	28,688	31,234	33,260	40,660
NIAAA	24,274	22,104	25,647	23,727	29,461
NIMHD	23,230	23,790	25,040	16,588	18,720
NINDS	22,581	14,842	25,008	22,390	20,105
NEI	21,733	11,153	11,282	13,105	10,900
NIAMS	21,653	17,349	17,788	14,277	12,586
NIDCD	20,832	18,340	22,968	17,448	17,421
NIDA	19,017	15,480	19,285	21,881	20,933
NINR	9,784	8,719	8,717	12,206	13,585
NHGRI	9,417	11,102	9,621	9,729	7,941
NIDCR	9,371	9,835	10,516	7,370	9,273
NLM	2,886	-	-	-	35
FIC	1,065	621	1,163	1,215	1,247
NIBIB	703	199	792	2,215	2,450
NCATS ^c	-	-	1,868	1,315	1,839

a Office of the Director (OD) includes Office of Disease Prevention, Office of Dietary Supplements, Office of Behavioral and Social Sciences Research, Office of Research on Women's Health, Office of Extramural Research, Office of Research Infrastructure Programs and NIH Roadmap.

b National Center for Research Resources was disbanded in FY 2012

c National Center for Advancing Translational Sciences (NCATS) was established in FY 2012

Table 3. NIH Nutrition Research Funding as a Percentage of Total IC Obligations, and Number of Projects by NIH Component, FY 2014 (dollars in thousands)

Institute/ Center (IC)	Number of Projects	Nutrition Research and Training ^a	Total IC Obligations ^b	Nutrition as Percentage of Total IC Obligations
FIC	16	1,247	67,575	1.8
NCATS	8	1,839	633,571	0.3
NCCIH	92	26,531	124,368	21.3
NCI	540	194,457	4,932,368	3.9
NEI	23	10,900	675,551	1.6
NHGRI	6	7,941	498,076	1.6
NHLBI	483	205,936	2,988,415	6.9
NIA	264	87,959	1,171,656	7.5
NIAAA	71	29,461	446,282	6.6
NIAID	118	40,660	4,401,185	0.9
NIAMS	48	12,586	520,314	2.4
NIBIB	9	2,450	326,989	0.7
NICHD	297	97,770	1,283,314	7.6
NIDA	51	20,933	1,017,957	2.1
NIDCD	67	17,421	404,237	4.3
NIDCR	28	9,273	397,833	2.3
NIDDK	1,388	507,564	1,884,377	26.9
NIEHS	169	55,250	743,022	7.4
NIGMS	178	59,388	2,366,429	2.5
NIMH	90	30,706	1,419,632	2.2
NIMHD	67	18,720	268,439	7.0
NINDS	65	20,105	1,588,899	1.3
NINR	45	13,585	140,553	9.7
NLM	2	35	326,183	<0.1
OD ^c	220	82,243	477,293	17.2
TOTAL	4,345	1,554,963	29,930,150	5.2

^a Source: NIH RePORTER.

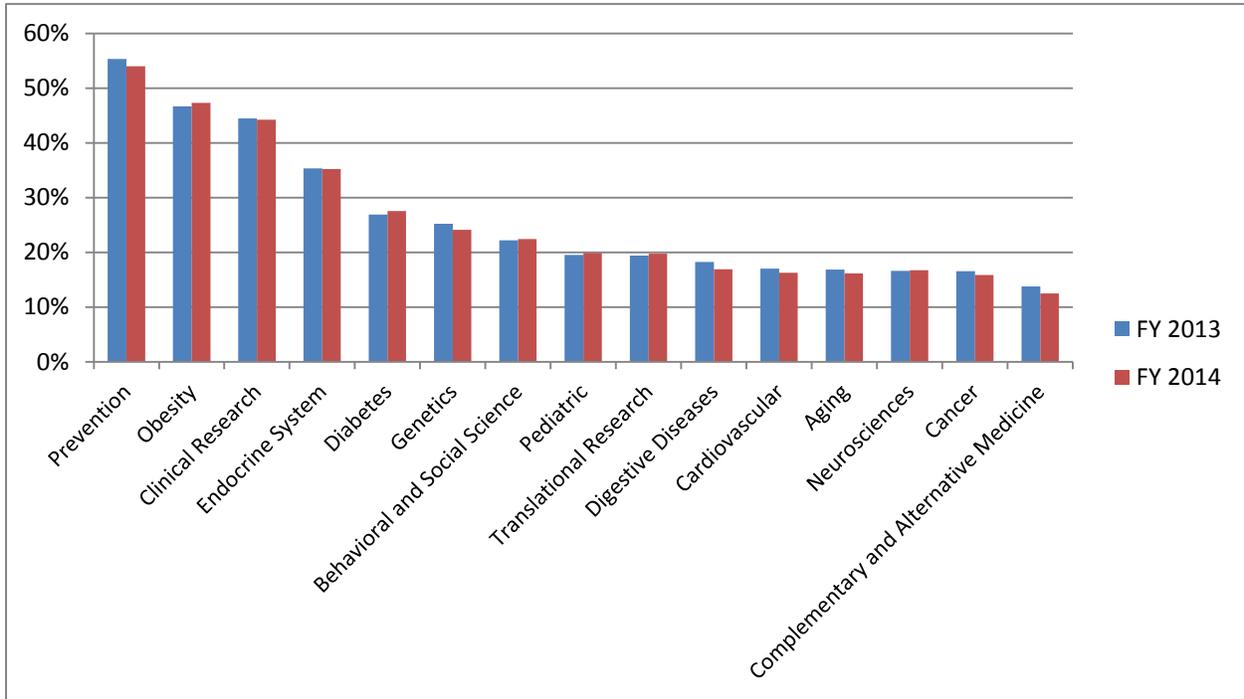
^b Source: NIH Office of Program Planning and Evaluation.

^c Office of the Director (OD) includes Office of Disease Prevention, Office of Dietary Supplements, Office of Behavioral and Social Sciences Research, Office of Research on Women's Health, Office of Extramural Research, Office of Research Infrastructure Programs, SEPA and NIH Roadmap/Common Fund.

Spending Categories

NIH research projects may meet the criteria of multiple fingerprints, and most Nutrition projects are categorized under other spending categories as well as Nutrition. Figure 1 shows the spending categories which appear most frequently in projects categorized as Nutrition. Over half of the Nutrition projects funded in FY 2013–2014 were also categorized as Prevention and nearly half were categorized as Obesity or Clinical Research.

Figure 1. NIH Nutrition Top Overlapping RCDC Spending Categories as a Percent of Total Projects

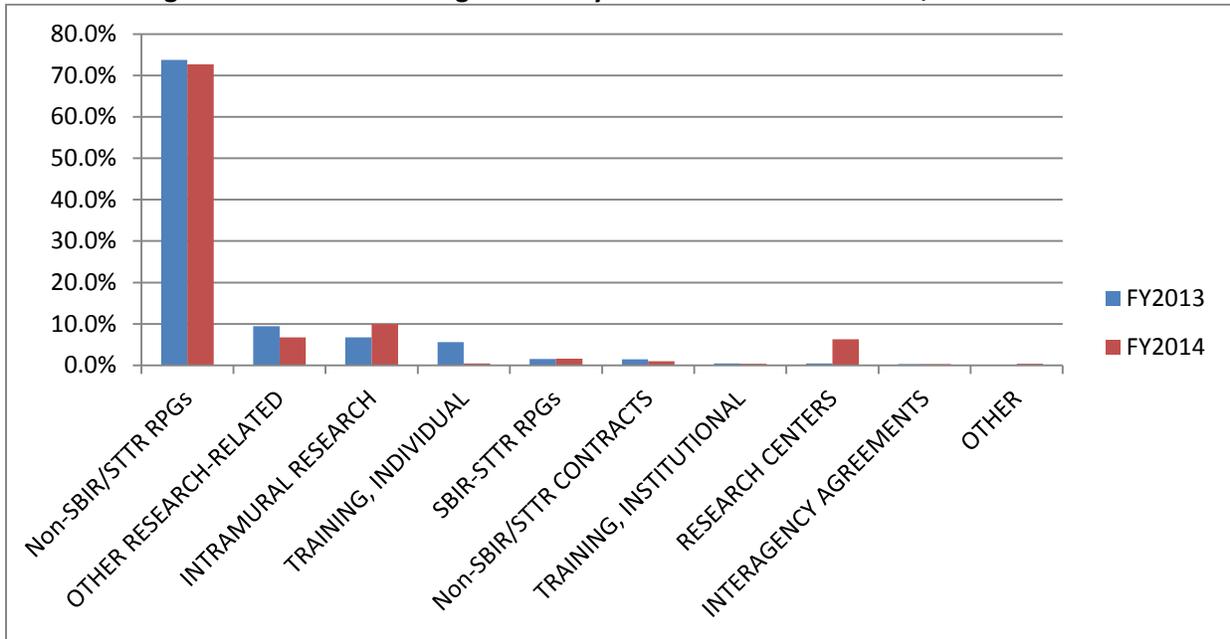


Funding Mechanism

Figure 2 shows the percent of FY 2013-2014 nutrition funding by funding mechanisms. Extramural projects comprised about 90% of the NIH nutrition research portfolio. The intramural program made up the remaining 10 percent. Within the extramural category, Research Project Grants (RPGs) comprised the largest category of support, and Other Research Related, which includes conferences and cooperative agreements, comprised the second largest category of support.

The NIH supports training in biomedical and behavioral nutrition research primarily through two extramural mechanisms: institutional awards and individual awards. The institutional awards, commonly called “training grants,” are designed to enable institutions to make training awards to individuals selected by them for predoctoral and postdoctoral research training. The predoctoral and postdoctoral individual awards are offered as either Fellowships or Career Awards to provide research training to individuals to broaden their scientific background and extend their potential for research.

Figure 2. Nutrition Funding Percent by NIH Research Mechanism, FY 2013-2014

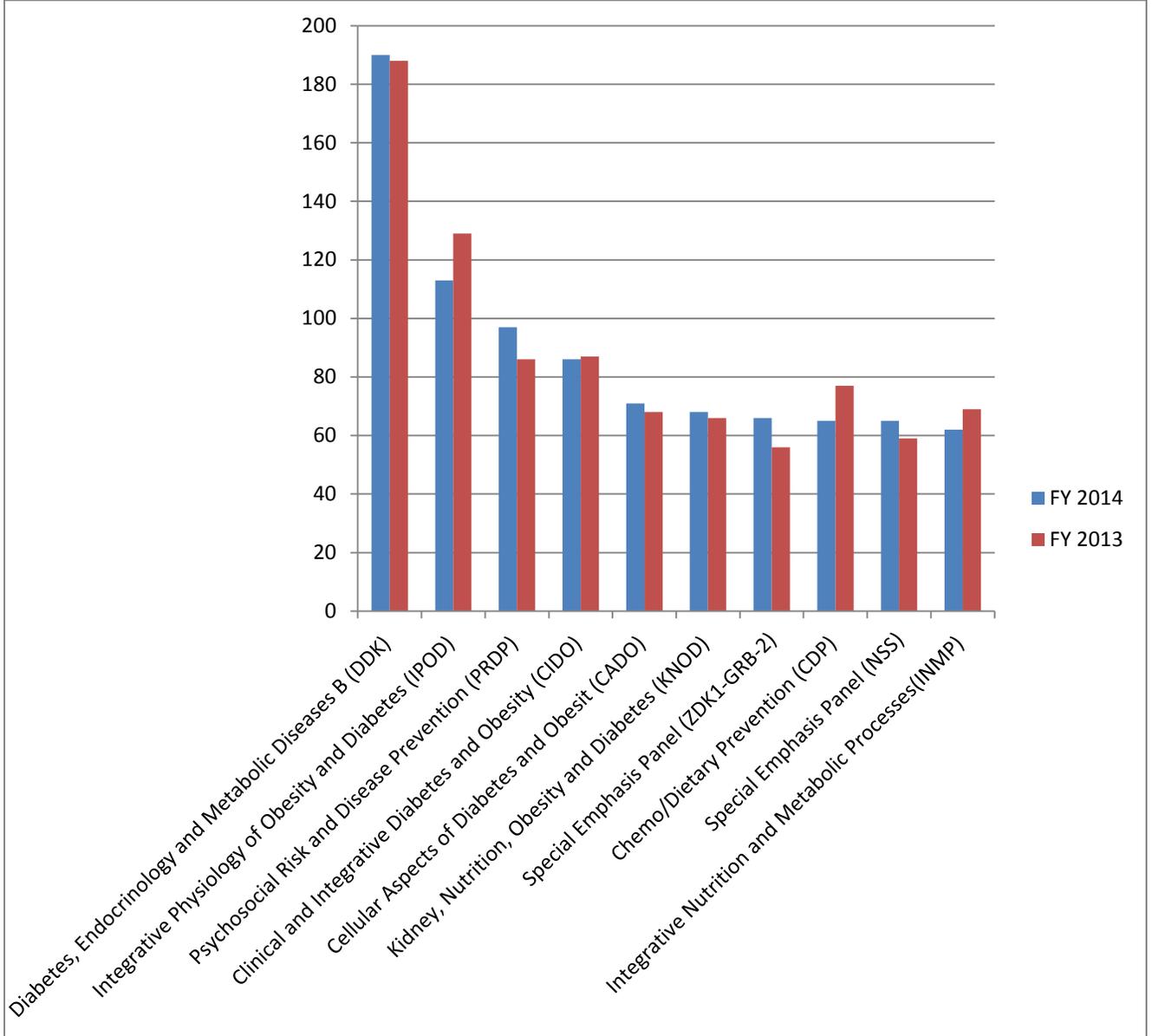


Projects funded in FY 2013-2014 were received in response to almost 600 different Funding Opportunity Announcements (FOAs), but almost half came in under just 3 Research Project Grants (Parent R01)³: PA-11-260, PA-10-067, PA-07-070.⁴ Over 800 study sections reviewed nutrition-related projects, but as with the FOAs, most projects were reviewed in just a small percent of those. Figure 3 shows the top 10 study sections reviewing nutrition-related applications.

³ All applications must be submitted in response to a [Funding Opportunity Announcement](#) (FOA). NIH and other HHS Agencies have developed omnibus Parent announcements for use by applicants who wish to submit what were formerly termed “unsolicited” applications. To learn more visit: http://grants.nih.gov/grants/guide/parent_announcements.htm

⁴ To learn more about a particular FOA, enter the number in [Grants.gov](#).

**Figure 3. Top 10 Study Sections Reviewing FY 2013-2014 Funded Nutrition Projects
(by number of projects)**



Research Solicitation

The NIH considers applications for the support of basic or clinical biomedical, behavioral, and bioengineering research. New extramural grant programs are made publicly available through FOAs, otherwise known as program announcements, requests for applications, notices of funding availability, solicitations, or other names depending on the agency and type of program.

The *NIH Guide for Grants and Contracts*, which serves in lieu of the *Federal Register*, is the official publication for NIH medical and behavioral research grant policies, guidelines, and funding opportunities. The NIH Guide is also used by [NIH Contracting Offices](#) and other HHS agencies to announce their funding opportunities. For information on how to search the NIH Guide, see the [January 13, 2005 NIH Guide Notice](#).

NIH Nutrition Research in the News

NIH-supported nutrition research led to a number of important discoveries in 2013 and 2014. Many of these discoveries were announced in an [NIH News Release](#) or published in *NIH Research Matters*, a biweekly update of NIH research highlights from the Office of Communications and Public Liaison, Office of the Director. A sample of these news items are listed by general topic below, and a more comprehensive list of NIH nutrition-related press releases and *Nutrition Research Matters* articles can be found in Table 4.

Highlights from NIH News Releases and *NIH Research Matters*

Cancer

- A protein associated with conditions of metabolic imbalance, such as diabetes and obesity, may play a role in the development of aggressive forms of breast cancer, according to new findings by researchers at the NCI and their colleagues. Metabolic imbalance is often caused by elevated carbohydrate intake, which can lead to over-activating a molecule called C-terminal binding protein. This over-activation, in turn, can increase the risk of breast cancer.
<http://www.nih.gov/news/health/feb2013/nci-05.htm>

Cardiovascular Disease

- The link between red meat consumption and heart disease, a study suggests, may stem from gut microbes breaking down carnitine, a compound found in red meat.
<http://www.nih.gov/researchmatters/april2013/04222013meat.htm>
- A study comparing low- and high-glycemic index diets found no significant difference between the two plans in reducing cardiovascular risk or reversing insulin resistance.
<http://www.nih.gov/news/health/dec2014/nhlbi-16.htm>

Diabetes

- Researchers have begun the first definitive, large-scale clinical trial to investigate if a vitamin D supplement helps prevent or delay type 2 diabetes in adults who have prediabetes, who are at high risk for developing type 2. <http://www.nih.gov/news/health/oct2013/niddk-21.htm>

Dietary Patterns

- Adults who eat a more plant-based diet may be boosting their chance of living longer, according to a large analysis of dietary patterns and death in Seventh-day Adventist men and women. <http://www.nih.gov/researchmatters/june2013/06102013vegetarian.htm>
- A high-protein diet during middle age was associated with higher mortality in a new study. In adults over 65, however, a high-protein diet was linked to lower mortality. <http://www.nih.gov/researchmatters/march2014/03172014protein.htm>

Microbiome

- Gut microbes from lean people helped prevent mice from becoming obese—but only if the animals ate a healthy diet. This research could point the way to new treatments for obesity. <http://www.nih.gov/researchmatters/september2013/09162013obesity.htm>

Overweight and Obesity

- Researchers gained new insight into how genetics may influence obesity by studying how the mouse equivalent of a fast-food diet affects different mouse strains. The findings may help explain why some people gain weight more easily than others. <http://www.nih.gov/researchmatters/january2013/01282013weight.htm>
- Overweight and obese adults who drink diet beverages consume significantly more solid-food calories—particularly from snacks—than those who drink sugary beverages. The findings highlight the challenges in using diet beverages to help control weight. <http://www.nih.gov/researchmatters/february2014/02032014diet.htm>
- Researchers created a mathematical model that simulates how weight and body fat in children respond to changes in diet and physical activity. The model may offer new insights for addressing childhood obesity. <http://www.nih.gov/researchmatters/august2013/08122013weight.htm>

DATE	TITLE
January 14, 2013	Therapy Shows Promise for Peanut Allergy
January 28, 2013	Genes, Junk Food and Weight
February 5, 2013	NIH scientists identify molecular link between metabolism and breast cancer
February 13, 2013	Lack of iron regulating protein contributes to high blood pressure of the lungs
February 25, 2013	High Salt Detected by Sour and Bitter Taste Cells
March 25, 2013	How Resveratrol May Fight Aging
April 8, 2013	Weight Loss in People with Serious Mental Illness
April 15, 2013	Gut Microbes Affect Weight after Gastric Bypass

April 15, 2013	Vitamin D may reduce risk of uterine fibroids, according to NIH study
April 22, 2013	Red Meat-Heart Disease Link Involves Gut Microbes
May 5, 2013	NIH study provides clarity on supplements for protection against blinding eye disease
June 10, 2013	Vegetarian Diets Linked to Lower Mortality
June 17, 2013	NIH launches Dietary Supplement Label Database
July 29, 2013	NIH math model predicts effects of diet, physical activity on childhood weight
July 29, 2013	Duration of Obesity May Affect Heart Disease
September 9, 2013	NIH grants expand search for role of microbes in health and disease in adults, infants
September 16, 2013	Gut Microbes and Diet Interact to Affect Obesity
October 21, 2013	Large study to examine if vitamin D prevents diabetes
November 8, 2013	NIH and the Children's Museum of Manhattan launch innovative program to help families create healthier futures
November 14, 2013	NIH statement: Family support key to diabetes prevention, management
February 3, 2014	Vitamin D Levels Predict Multiple Sclerosis Progression
February 3, 2014	Diet Beverages and Body Weight
March 17, 2014	Protein Consumption Linked to Longevity
April 1, 2014	Obesity primes the colon for cancer, according to NIH study
May 14, 2014	Single episode of binge drinking linked to gut leakage and immune system effects
May 20, 2014	NIH study links high cholesterol levels to lower fertility
July 8, 2014	NIH study finds extreme obesity may shorten life expectancy up to 14 years
September 9, 2014	Eating habits, body fat related to differences in brain chemistry
October 6, 2014	Diet Affects Autoinflammatory Disease via Gut Microbes
December 16, 2014	Low-glycemic diets may not improve cardiovascular outcomes when compared to high-glycemic diets
December 17, 2014	Chronic high blood sugar may be detrimental to the developing brain of young children

IV. NIH-SPONSORED NUTRITION CONFERENCES, SCIENTIFIC MEETINGS, & VIDEOCASTS

NIH conferences, workshops, and symposia play a key role in the advancement of nutrition science. Such forums provide an opportunity to share information, identify research gaps and to stimulate new areas of research. A selected list of nutrition-related events that were sponsored or co-sponsored by NIH institutes and centers in 2013 and 2014 are listed below in Table 5. Some of these events have been archived on the [NIH VideoCast website](#) or the sponsoring organization’s website for future viewing. See [Appendix A](#) for the list of relevant URLs.

Table 5: NIH-Sponsored Nutrition Conferences, Scientific Meetings & VideoCasts, in Chronological Order				
Title	Event Type	Date	NIH Sponsor(s)	Event Speaker(s)
Evaluating Benefits and Risks of Dietary Supplements with Rare Isotope of Calcium	Office of Dietary Supplements (ODS) Seminar Series	1/16/2013	ODS	Connie M. Weaver, PhD, Purdue University
Exploring the Microbiome of Cancer Prevention: A Closer Look at Probiotics, Prebiotics, and Synbiotics 	Frontiers in Nutrition and Cancer Prevention— Online Series	1/24/2013	NCI	Program
Mimicking Calorie Restriction with Resveratrol: Clinical Implications	Laboratory of Metabolism Seminar Series	1/28/2013	NCI	Jay Chung, PhD, MD, Senior Investigator, NHLBI, NIH
Studies of Malnutrition and Bone: Lessons Learned	Conference	2/8/2013	NICHD	Catherine M. Gordon, MD, MSc, Alpert Medical School, Brown University
Eating a Good Apoptotic Meal: Cell Clearance in Health and Disease	Twinbrook Seminar Series	2/12/2013	NIAID	Kodi S. Ravichandran, University of Virginia
Vitamin D, the Microbiome and Immune Mediated Diseases	Office of Dietary Supplements Seminar Series	2/13/2013	ODS	Margherita Cantorna, PhD, Pennsylvania State University

Neural Correlates of Food-Cue-Induced Craving in Obesity: Associations with Insulin Resistance	Seminar	2/22/2013	NIDDK	Ania Jastreboff, MD, PhD, Yale University School of Medicine
Why Don't We Believe That n-3 PUFA Can Reduce Colon Cancer Risk?	Office of Dietary Supplements Seminar Series	3/6/2013	ODS	Robert Chapkin, PhD, Texas A&M University
Micronutrients and Cancer Prevention: A Complex World Click to Watch	Stars in Nutrition and Cancer Seminar Series	3/19/2013	NCI	Susan Taylor Mayne, PhD, Yale Schools of Public Health and Medicine
Gluten Disorders: Scientific, Dietary, and Consumer Education Perspectives Click to Watch	National Nutrition Month Mini-Symposium	3/22/2013	DNRC	Agenda [doc, 18Kb]
Glycomacropeptide Provides a "Whey" Forward for Phenylketonuria	Office of Dietary Supplements Seminar Series	4/3/2013	ODS	Denise Ney, PhD, University of Wisconsin-Madison
Caloric Restriction Studies in Humans: Future Research Directions Click to Watch	Trans-NIH Geroscience Interest Group (GSIG) Spring Seminar	5/8/2013	Geroscience Interest Group (GSIG)	John Speakman, University of Aberdeen Institute of Biological and Environmental Science
Exploring the Human Gut Microbiome: Dining in With Trillions of Fascinating Friends	Wednesday Afternoon Lecture Series	6/26/2013	NIH OD	Dr. Jeffrey Gordon, Washington University at St. Louis
The Use and Biology of Energy Drinks: Current Knowledge and Critical Gaps	Workshop	8/15/2013 8/16/2013	ODS, NCI, NIAAA, NICHD, and NIDDK	Workshop Summary Agenda and Presentation PDFs
Probiotics, the Microbiome, and Host Immune Response - Insights for Novel Therapeutic Approaches Click to Watch	NCCIH (previously NCCAM) Integrative Lecture	9/9/2013	NCCIH	Patricia Hibberd, MD, PhD, Harvard Medical School
Inflammation, Microbiota, and Cancer	Symposium	9/19/2013 9/20/2013	NCI	Program Flyer

Nutrient Regulation of T Cell Activation and Effector Function	Branch Seminar	10/3/2013	NCI Experimental Immunology Branch	Naomi Taylor, Institute of Molecular Genetics, Montpellier, France
Workshop on the Prevention of Obesity in Infancy and Early Childhood	Workshop	10/30/2013 11/1/2013	NIDDK, NHLBI and OBSSR	Workshop Summary
Vitamin D Standardization Program (VDSP) Symposium	Seminar	11/13/2013	ODS	Christopher Sempos, PhD, Coordinator, Vitamin D Standardization Program, NIH Office of Dietary Supplements
Linking Nutrition and Inflammation in Bipolar Disorder: Getting off the Roller Coaster	Seminar	11/18/2013	NIA	Erika F Saunders MD, Penn State Milton S. Hershey Medical Center, Department of Psychiatry
Can Nutrition Simultaneously Affect Cancer and Aging? Click to Watch	Frontiers in Nutrition and Cancer Prevention— Online Series	12/4/2013	NCI	See program
Human Height and Weight: From Genetics to Biology	NHGRI Division of Intramural Research Genome Seminar Series	1/16/2014	NHGRI	Joel N. Hirschhorn, MD, PhD, Harvard Medical School, Children’s Hospital Boston
The Different Reward Responses to Artificial Sweeteners Versus Glucose in Mice	Endocrine Grand Rounds	2/21/2014	NIDDK	Ivan E. De Araujo, DPhil, MSc, Yale University School of Medicine
Grand Rounds: (1) The Calculus of Calories: What Mathematics Can Teach Us About Obesity (2) Artificial Sweeteners and Obesity: More than an Association? Click to Watch	Clinical Center Grand Rounds	2/26/2014	Clinical Center	Kevin Hall, PhD, Senior Investigator, Integrative Physiology Section, Laboratory of Biological Modeling, NIDDK Kristina I. Rother, MD, MHSc, Staff Clinician and Chief, Section on Pediatric Diabetes and Endocrinology, Diabetes, Endocrinology, and Obesity Branch, NIDDK

Clinically Relevant Herb-drug Interactions: Past, Present, and Future Click to Watch	Integrative Medicine Research Lecture Series	3/10/2014	NCCIH	Bill J. Gurley, PhD, Professor of Pharmaceutical Sciences, University of Arkansas for Medical Sciences
Links between Metabolism and Cancer Click to Watch	Stars in Nutrition & Cancer Lecture Series	3/18/2014	NCI	Chi Van Dang, MD, PhD, University of Pennsylvania School of Medicine
The Human Microbiome: Implications for Nutrition and Clinical Practice Click to Watch	Mini-symposium	3/28/2014	DNRC	Agenda
Cruciferous Vegetables, Epigenetics and Prostate Cancer Prevention	Office of Dietary Supplements Seminar Series	4/9/2014	ODS	Emily Ho, PhD, Oregon State University
The Role of Gut Microbial Short-chain Fatty Acids in Host Defense and the Immune System	Lecture	5/8/2014	NICHD	Hiroshi Ohno, MD, PhD, Laboratory for Intestinal Ecosystem, RCAI RIKEN IMS-RCAI, Yokohama, Japan
Evaluation of the Evidence to Support Guidelines for Nutritional Care of Preterm Infants: “The Pre-B Project”	Expert Panel	7/31/2014 8/1/2014	NICHD	More Information
Cancer Prevention through Immunomodulation. Does Diet Play a Role? Click to Watch	Frontiers in Nutrition and Cancer Prevention— Online Series	9/16/2014	NCI	Program
Omega-3 Fatty Acids in Perinatal Health	Office of Dietary Supplements Seminar Series	9/24/2014	ODS	Maria Makrides, PhD, South Australian Health and Medical Research Institute; Robert Gibson, the University of Adelaide
Childhood and Adolescent Nutrition and Growth Drive Breast Cancer Risk: Untapped Opportunities for Prevention Click to Watch	Stars in Nutrition & Cancer Lecture Series	10/6/2014	NCI	Graham Colditz, MD, DrPH, Washington University School of Medicine

The White House Summit and Research Forum on Improved Health and Fitness for Americans with Disabilities	Conference	10/6/2014 10/7/2014	NICHD	Program
Early Life Microbiome Influences on Metabolism, Immunity, and Disease Risk Click to Watch	The Kinyoun Lecture	10/7/2014	NIAID	Martin J. Blaser, MD, New York University, Langone Medical Center
Does Supplementing Children With Hypervitaminosis A at the Vitamin A RDA for 4 Months Cause Bone Metabolism Imbalance?	Office of Dietary Supplements Seminar Series	10/15/2014	ODS	Sherry Tanumhardjo, PhD, University of Wisconsin-Madison
T cell recognition of Vitamin B metabolites	Immunology Interest Group Seminar Series	10/29/2014	NIH Immunology Interest Group	Dr. James McCluskey, the University of Melbourne
Nutritional Interventions in Primary Mitochondrial Disorders: Developing an Evidence Base	Workshop	12/2/2014 12/3/2014	ODS, NCATS, ORDR, and NICHD	Event Speaker(s): Agenda More information: Executive Summary
Vitamin D: Moving Toward Evidence-based Decision Making in Primary Care Click to Watch	Conference	12/2/2014 12/3/2014	ODS, NCCIH, NIAMS, NIDDK, and NIA	Conference Website
Research Directions for Solving the Obesity Epidemic in High Risk Populations Click to Watch	The Gordon Lecture in Epidemiology	12/3/2014	NIH OD	Dr. Shiriki Kumanyika, University of Pennsylvania
Effects of Vitamin D Supplementation in Young and Old, Caucasian and African-American Women	Office of Dietary Supplements Seminar Series	12/10/2014	ODS	J. Christopher Gallagher, M.D., Creighton University

V. TRANS-NIH COMMITTEES, WORKING GROUPS, AND INTEREST GROUPS RELATED TO NUTRITION

Several groups are engaged in collaborative activities at NIH. The activities facilitate the sharing of resources and expertise, and they foster communication and opportunities for collaboration within the NIH nutrition scientific community. Key groups with representation from across NIH are listed and described below.

Behavioral and Social Sciences Research Coordinating Committee

The NIH [Behavioral and Social Sciences Research Coordinating Committee \(BSSR CC\)](#) was established to enhance information exchange, communication, integration, and coordination of behavioral and social sciences research/training activities at the NIH. The BSSR CC serves as an advisory body to the Director of the NIH Office of Behavioral and Social Sciences Research (OBSSR), which includes making recommendations regarding scientific, programmatic, and policy issues and activities and assisting OBSSR in the coordination of and collaboration among the NIH Institute/Center Directors (ICDs) in programmatic and scientific activities in the behavioral and social sciences at the NIH. In addition the BSSR CC serves as a point of coordination among the ICDs, OBSSR, NIH staff, and the external scientific community. The BSSR CC, with support from the OBSSR, regularly convenes a [series of guest lectures](#) on selected topics in the behavioral and social sciences.

Common Fund

The NIH [Common Fund](#) was enacted into law by Congress through the [2006 NIH Reform Act](#) to support cross-cutting, trans-NIH programs that require participation by at least two NIH ICs or would otherwise benefit from strategic planning and coordination. The Common Fund initiative was developed as a means of supporting priority research initiatives and fostering collaborations across the NIH ICs. The Common Fund has been used to support a series of short term, high impact, trans-NIH programs known collectively as the *NIH Roadmap for Medical Research*. The Common Fund is coordinated by the NIH Office of Strategic Coordination, one of the six offices of the Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI) within the Office of the Director. Two Common Fund initiatives of relevance to the nutrition community are the [Human Microbiome Project \(HMP\)](#) and the [Science of Behavior Change Program](#).

The first phase of the Human Microbiome Project was a \$157 million, five-year effort launched in 2008. The project is expected to increase our understanding of the function of the human microbiome in health and disease, potentially leading to new strategies and therapies to improve health. The current phase of HMP (FY2013-FY2015) is studying the roles of the microbiome and the human host during three common conditions: preterm birth, inflammatory bowel disease onset, and type 2 diabetes onset. The goal is to identify characteristic biological signals which might be associated with the onset of these conditions.

The Science of Behavior Change (SOBC) Program was developed to improve our understanding of the mechanisms of initiating and maintaining behavior change across a range of health-related behaviors.

The SOBC Program supports research that integrates basic and translational science and cuts across many disciplines including, but not limited to, cognitive and affective neuroscience, neuroeconomics, behavioral genetics, and behavioral economics. It is hoped that understanding the basic underpinnings of motivation change across a broad range of health-related behaviors can lead to more effective and efficient approaches to behavioral intervention and ultimately improve the health of our nation.

Exercise Interest Group

Formed in January 2012, the NIH [Exercise Interest Group \(EIG\)](#) is an NIH [Scientific Interest Group](#) that provides a forum for more than 50 NIH, non-NIH HHS, U.S. Department of Agriculture (USDA), and Department of Defense (DoD) researchers, clinicians, and others to explore and promote epidemiological, clinical, and basic research on the effects of exercise in prevention and treatment of disease and disability. Specific goals of the EIG include, but are not limited to, stimulating NIH collaborations to develop innovative research programs and initiatives investigating the effects of habitual exercise in clinical medicine; stimulating interest from the outside scientific community to submit research applications to NIH investigating the effects of exercise in prevention and treatment of disease and disability; maintaining a contemporary list of experts in exercise science to serve as potential NIH study section members and *ad hoc* grant reviewers; providing a forum for outside organizations with expertise in exercise science to provide input and feedback to NIH regarding important issues in this area; and providing a forum for developing educational programs and lectures in exercise science for individuals in the metropolitan Washington, D.C. area.

Health and Wellness Council

The NIH Health and Wellness Council promotes worksite health and wellness initiatives and programs at the NIH. The NIH Office of Research Services and most of the NIH institutes and centers are represented on the Council. The Council assists NIH leadership in the development of innovative worksite wellness policies and programs and the Council supports and promotes health and wellness programs, fitness classes, and education resources for employees. The Council developed content and launched a new intranet website entitled [Wellness@NIH](#) (*NIH staff only*) as a means of promoting worksite wellness and health promotion at NIH. NIH and other federal resources are featured on the site.

mHealth Inter-Institute Interest Group (mHealth IIG)

Mobile health, also known as “mHealth,” includes wireless devices and sensors (including cellular phones) that are intended to be carried on the person throughout the day (i.e., during normal daily activities) to assess or improve health functioning. This also includes mobile diagnostic devices and decision support tools, which travel with care providers and that transmit data wirelessly. The mHealth IIG was formed in 2010 to provide a forum to exchange information about mHealth methodology, research, and research applications to public health problems in diverse settings. [The NIH mHealth IIG](#) also seeks to identify future research needs and potential collaborations, and the group has sponsored mHealth research training opportunities for new investigators working in the field.

Nutrition Coordinating Committee (NCC)

The NIH [Nutrition Coordinating Committee \(NCC\)](#) was established in 1975 for the primary purpose of reviewing, discussing, and stimulating support for nutrition research and training within the NIH. The NCC is a significant activity within the NIH Division of Nutrition Research Coordination. Today, the NCC is a vibrant group whose membership includes representatives from NIH ICs and liaison representatives from several NIH offices and other federal agencies. NCC meetings occur monthly and typically include scientific seminars, nutrition research program and policy updates, information about research interest and collaborative project activities, national and international conference and workshop updates, and upcoming funding opportunities.

The NCC has a number of active subcommittees that are listed below:

[Nutrition Education Subcommittee \(NES\)](#): The NIH Nutrition Education Subcommittee (NES), reviews nutrition education materials that contain dietary guidance for the general population. A Congressional mandate for reviews of these materials was enacted in 1990 to ensure that nutrition education materials produced by federal agencies are consistent with the [Dietary Guidelines for Americans](#) and that all agencies within the U.S. departments of Health and Human Services (DHHS) and Agriculture (USDA) are consistent in regard to nutrition information and advice. A DNRC nutritionist chairs the Subcommittee. The NES reviews nutrition education materials in several formats including print and electronic media such as brochures and fact sheets, web pages, videos, and audio format messages that are intended for the general public. Information materials and resources that are intended for nutrition or medical professionals, or intended for use in treating patients (i.e., materials that might be given to a patient from a physician or a dietitian), and materials that are regulatory in nature (e.g., FDA regulations) are excluded from NES reviews. However, DNRC staff often work with the originating Institute or agency to provide informal comments on these latter types of documents. These comments are felt to be constructive and are subsequently incorporated in these documents. A list of all materials formally reviewed by the NES in 2013 and 2014 can be found in [Appendix B](#).

[Probiotic and Prebiotic Working Group \(PPWG\)](#): The PPWG was organized in 2006 by interested NCC members for the purpose of identifying gaps and challenges in prebiotic and probiotic research. The PPWG is also an NIH [Scientific Interest Group](#). The primary goals of the PPWG are to:

- Promote trans-agency collaborations in advancing the evidence base on probiotics and prebiotics
- Advance probiotic and prebiotic research and a deeper understanding of the role of gut microbes in human health.

The PPWG strives to promote constructive interactions across the NIH and the broader scientific community. The PPWG has sponsored meetings and invited experts in the field to present their research to the NCC and other scientific audiences. The PPWG also disseminates timely information including journal articles, regulatory documents, and conference proceedings to keep members and the NIH nutrition community abreast of current and future activities in probiotic and prebiotic research.

Obesity Research Task Force

The NIH [Obesity Research Task Force](#) was formed to provide the NIH research community with a means of exchanging information on a broad spectrum of NIH obesity-related research including molecular, genetic, behavioral, environmental, clinical, and epidemiologic studies. The Task Force is co-chaired by the Directors of the NIDDK, NHLBI, and NICHD. The members of the Task Force include representatives from these and many other NIH ICs. In 2011, the Task Force published an updated [Strategic Plan for NIH Obesity Research](#) to reflect recent obesity research activities and encourage innovative scientific research investigations to combat the obesity epidemic. The Plan reflects exciting opportunities and discoveries that have emerged since the first strategic plan was published in 2004.

Prevention Research Coordinating Committee (PRCC)

The [PRCC](#) is a trans-NIH committee that provides a forum for NIH Institutes and Centers, and other federal partners to exchange programmatic and scientific information on prevention research activities that are sponsored by federal agencies and other organizations. The NIH Office of Disease Prevention (ODP) coordinates the Committee's activities. The PRCC advises the ODP Director and provides recommendations regarding scientific, programmatic, and policy issues related to health promotion and disease prevention.

VI. KEY FEDERAL COLLABORATIONS

The field of nutrition is enhanced by interagency collaboration. Highlighted below are some of the key collaborative efforts that took place during 2013 and 2014.

Biomarkers of Nutrition for Development (BOND) Program

BOND was created in 2010 by the NIH *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) in collaboration with the NIH Division of Nutrition Research Coordination (DNRC) and the NIH Office of Dietary Supplements (ODS) as a means of developing a unified approach to examine the scientific basis for selecting appropriate biomarkers to assess the function and effect of diet and nutrition on health and disease in individuals and populations and to support the development and evaluation of evidence-based programs and policies to improve diet and nutrition as a means of improving health. The program has benefited from support from and other partners representing the breadth of the global food and nutrition communities such as the [Bill and Melinda Gates Foundation](#), [EUropean micronutrient RECommendations Aligned \(EURRECA\)](#), the [Micronutrient Genomics Project](#), and [PepsiCo](#).

Additional details are described in the following papers:

1. Combs GF, Trumbo PR, McKinley MC, Milner J, et al. [Biomarkers in Nutrition: New Frontiers in Research and Application](#). *Ann NY Acad Sci*. 2013;1278(1):1-10.
2. Raiten DJ, Raghavan R, Kraemer K. (2013). [Biomarkers in growth](#). *Ann Nutr Metab*, 63(4):293-7.

Dietary Guidance Development Project for Infants and Toddlers from Birth to 24 Months and Women Who Are Pregnant (B-24/PW)

The **B-24/PW** project is conducting foundational work to support the inclusion of the birth-to-24 month age group and women who are pregnant in the 2020 *Dietary Guidelines for Americans*. The [Dietary Guidelines for Americans](#), the cornerstone of the U.S. Government's nutrition policy to promote health and help prevent disease, has traditionally focused on adults and children two years of age and older. The U.S. Departments of Health and Human Services (HHS) and Agriculture (USDA) initiated the B-24/PW project in 2012 to develop a process to determine the breadth and scope of evidence available to inform development of dietary guidance for this population. Four working groups comprised of subject-matter experts—including scientists with technical expertise as well as government policy and program leaders—were constituted, each focusing on a different population: Infants 0-6 months, Infants 6-12 months, Toddlers 12-24 months, and Caregivers (mothers and others involved in infant and young child feeding). Each working group identified important topics, systematic review questions, and research and data needs that would be relevant to the future development of guidance for the birth to 24 months population. The products of the first phase of this project are available at www.NEL.gov.

In 2014, a broadly representative Federal Expert Group was established to provide oversight for the next phase of the project, which includes two parts: A) the creation and initiation of a process for reviewing the evidence, and B) gathering and synthesizing the evidence. Products from the B24/PW project will be provided to the 2020 Dietary Guidelines Advisory Committee for their use in incorporating these population groups into its advisory report. The advisory report will, in turn, be used as the scientific

basis for the 2020 *Dietary Guidelines for Americans*. For more details, see the complete [timeline](#) for the project.

Dietary Guidelines for Americans

The *Dietary Guidelines for Americans* are the foundation of federal food and nutrition programs, policies and education initiatives. The Dietary Guidelines are jointly issued and updated by USDA and HHS every five years, as required by law. The Dietary Guidelines are informed by a scientific report prepared by a federal advisory committee and comments received from federal agencies, industry, organizations, and consumers. The [Dietary Guidelines for Americans, 2010](#) reflect the [Report of the Dietary Guidelines Advisory Committee \(DGAC\) on the Dietary Guidelines for Americans, 2010](#). Numerous dietary guidance messages and education resources found on the [ChooseMyPlate.gov](#) and [Health.gov](#) websites have been developed to disseminate the Dietary Guidelines recommendations to the consumers.

During 2013-2014, the 2015 Dietary Guidelines Advisory Committee met to review the latest evidence on nutrition and health. The Committee issued their [scientific report](#) to the Secretaries of HHS and USDA in early 2015. The 2015 [Dietary Guidelines for Americans](#) will be released in late 2015.

Dietary Reference Intakes (DRI)

[Dietary Reference Intakes](#) (DRIs) consist of four nutrient-based reference values that serve as a guide for good nutrition and provide the scientific basis for the development of national nutrition policy and food guidelines in the United States and Canada. The ICHNR has established a DRI Subcommittee who is responsible for determining if there is enough research information available for re-reviews of the required are reviewed periodically as new scientific evidence emerges. This Subcommittee, along with Canadian Government's DRI Committee, developed a new, joint process to nominate and select priority nutrients for DRI review. The committees prioritized the new reviews based on evidence of significant, new, and relevant data since the last DRI review and relevance to current public health concerns. The committees also determined if methodological issues could impede a new review; issues identified previously were checked to verify that the issues had been resolved. The availability of funds is also a factor in the initiation of DRI reviews. The U.S. and Canadian Governments accepted nutrient nominations from April 29, 2013 to July 31, 2013. A total of 26 nominations were received for 16 nutrients. All of the nominations were screened for completeness to ensure all requirements were met. To avoid any bias in the screening and assessment process, submitter's names were removed from all nomination documents. The U.S. and Canadian DRI committees were asked to select their top three priority nutrients based on public health and/or policy importance. The DRI nutrient selections were announced on August 15, 2014. Four nutrient areas were selected: omega-3 fatty acids, sodium, magnesium, and vitamin E.

Following the announcement, nutrient assessment working groups were formed comprising staff from the U.S. and Canada. Each working group was tasked with evaluating whether there was new science published since the last DRI review that would be relevant to the development of a new DRI review. Government agencies jointly prioritized the nutrients and decided that a workshop on the potential use of chronic disease endpoints in setting DRI values was needed before a nutrient DRI review would be undertaken in 2015. The goal of the workshop, [Options for Consideration of Chronic Disease Endpoints](#)

for [Dietary Reference Intakes \(DRIs\)](#), was to address whether, and how, chronic disease outcomes can be incorporated into setting DRI values. The outcomes of the workshop will help inform future decisions as to whether and/or how chronic disease endpoints can be incorporated into the establishment of DRI values.

Dietary Supplement Ingredients Database (DSID)

The [Dietary Supplements Ingredients Database \(DSID\)](#) provides estimated levels of ingredients in dietary supplement products sold in the U.S. and is intended primarily for research applications. The DSID is led by the USDA/ARS [Nutrient Data Laboratory](#) in collaboration with the NIH Office of Dietary Supplements, along with the Centers for Disease Control and Prevention (CDC) National Center for Health Statistics (NCHS), Department of Commerce National Institute of Standards and Technology (NIST), and DoD. The goals of the DSID project are to develop reliable baseline estimates of nutrients and other bioactive components in dietary supplement products, compare analyzed levels of ingredients to labeled values, support efforts to improve total dietary intake assessments in research, and release and maintain a publicly available dietary supplement database. The analytically verified DSID estimates can be used to replace labeled levels for specific dietary supplement categories to improve the accuracy of ingredient intake assessment in public health studies. The current release of the DSID has application tables linking analytical estimates to dietary supplement products reported in the [National Health and Nutrition Examination Survey \(NHANES\)](#).

Dietary Supplement Label Database (DSLDB)

The [Dietary Supplement Label Database \(DSLDB\)](#) was launched in 2013 and is a joint effort between the NIH National Library of Medicine and Office of Dietary Supplements along other NIH collaborators and the USDA/ARS Nutrient Data Laboratory, CDC NCHS, NIST, and DoD. The database contains full label contents from a sample of dietary supplement products marketed in the U.S., and makes possible searches for products in the market (DSLDB On Market), off the market (DSLDB Off Market) or consumed by [National Health and Nutrition Examination Survey](#) participants in the latest survey in the DSLDB database. The DSLDB is expected to continue expanding with the goal of capturing labels for most of the 55,000 different dietary supplements sold in the U.S.

Evaluation of the Evidence to Support Guidelines for the Nutritional Care of Preterm Infants: The Pre-B Project

To address the lack of accepted standards for nutritional care of preterm infants, the NICHD—in collaboration with a consortium of professional organizations and federal agencies—organized an effort to conduct systematic reviews of existing evidence and to develop guidelines related to nutrition in preterm infants.

The [Pre-B Project](#), which is also sponsored by the [Academy of Nutrition and Dietetics \(AND\)](#), is exploring the level and quality of the evidence to support nutrition specifications to fulfill essential and/or conditionally essential macro- and micro-nutrient requirements for preterm infants that are distinct from currently established recommendations for term infants. In phase I, the project aims to develop a

structure and provide an initial report the AND. In phase II, AND systematic reviews will be conducted using the AND evidence analysis library. In phase III, the project will discuss implementation.

Federal Food Service Guidelines Workgroup

In 2011, HHS and the General Services Administration (GSA) jointly released the [Health and Sustainability Guidelines for Federal Concessions and Vending Operations](#), also known as the food service guidelines. These guidelines assist facility leadership, management, and food service operators in providing healthy dietary options in cafeterias, snack bars, and vending machines to which federal employees and visitors have access. In addition, these guidelines provide fair market choices, support healthy eating habits, and recommend environmentally responsible facility practices. The Federal Food Service Guidelines Workgroup, which includes members from CDC (coordinating body), National Prevention Council, Department of Commerce/National Oceanic and Atmospheric Administration (NOAA), DoD, Department of the Interior (DoI), Department of Education, Environmental Protection Agency, U.S. Department of Veterans Affairs, USDA, GSA, and other HHS agencies (Food and Drug Administration, Office of Disease Prevention and Health Promotion, and NIH) plans to update the food service guidelines to align the nutrition guidance with the [Dietary Guidelines for Americans, 2015](#), which has an anticipated release date of December 2015. The update will also include strategies to encourage the purchasing of healthier foods and beverages as well as guidance on efficiency of facility operations and food safety. The Workgroup continues to work together to explore ways to evaluate the [implementation](#) and impact of these guidelines at the local, state, and federal levels.

Federal Working Group on Dietary Supplements (FWGoDS)

The FWGoDS includes members from a variety of federal agencies who share information and discuss issues, initiatives, and research related to dietary supplements. It serves as means of communication between the NIH ODS and its federal partners in several ways, including co-funding research investigations within the NIH; expanding opportunities for research-investigator training; and strengthening collaborative efforts involving dietary supplement research, education, and communication across the Federal Government. The [Dietary Supplement Health and Education Act of 1994 \(DSHEA\)](#) authorized the establishment of ODS at the NIH and specified that ODS serve as an advisor to federal health agencies on issues related to dietary supplements. The FWGoDS also exists in response to a goal in the [ODS Strategic Plan](#) to expand and conduct outreach efforts that inform and educate the public about supplements.

Healthy People, 2020

Healthy People 2020 is a national health promotion and disease prevention agenda that provides a framework to achieve ten-year goals and objectives to improve the nation's health. The Healthy People initiative, which began more than thirty years ago, is grounded in the principle that setting national objectives and monitoring progress toward achieving them can motivate action.

The *Healthy People 2020* agenda resulted from a stakeholder feedback process; input from public health and prevention experts, federal, state, and local government officials, a consortium of more than 2,000

organizations, and the public contributed to the process. HHS launched a redesigned Healthy People Web site that allows users to tailor information to their needs and explore evidence-based resources for implementation. The Web site is located at: www.healthypeople.gov.

Healthy People objectives are organized within distinct topic areas, for which multiple agencies provide leadership. The National Institutes of Health co-leads the Nutrition and Weight Status, Chronic Kidney Disease, Diabetes, Cancer, and Heart Disease and Stroke topic areas. The following *Healthy People 2020* Progress Reviews were completed in 2013-2014:

[Cancer & Genomics \(February 2013\)](#)

[Chronic Kidney Disease & Diabetes \(September 29, 2014\)](#)

[Nutrition and Weight Status, & Physical Activity \(May 2014\)](#)

For more information on Healthy People Topic Areas, please view <http://www.healthypeople.gov/2020/topicsobjectives2020/default.aspx>.

Home Box Office (HBO) “The Weight of the Nation” Series

NIH collaborated with HBO and others on a [four-part documentary series](#) and public education initiative that was aired nationally in May 2012. The HBO series highlighted NIH research advances which are an important component of a comprehensive public awareness campaign to combat the nation’s obesity epidemic. The documentary series also featured case studies and interviews with obesity experts, and compelling stories about individuals and families who are struggling with obesity. A second series, [The Weight of the Nation for Kids](#) followed in 2014. In addition to highlighting the factors that contribute to obesity in America’s youth, the series profiled several innovative and practical solutions families and communities are implementing to improve child and adolescent diet and physical activity patterns.

Interagency Committee on Human Nutrition Research (ICHNR)

The Interagency Committee on Human Nutrition Research (ICHNR) aims to increase the overall effectiveness and productivity of federally supported or conducted human nutrition research. Created in 1983 and reassembled in 2013, the 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 includes representatives from the departments of Agriculture (USDA), Health and Human Services (HHS), Defense (DoD) and Commerce; the Federal Trade Commission (FTC), the National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF), the Agency for International Development (USAID), the Environmental Protection Agency (EPA), the Veterans Health Administration (VHA), and the White House Office of Science and Technology Policy (OSTP). In addition to its interagency coordination and communication roles, the ICHNR strives to increase the effectiveness and productivity of federal agencies that are engaged in nutrition research by supporting activities to inform researchers and policy staff on ongoing federally supported or conducted human nutrition research, nutrition monitoring, and nutrition program activities. In 2014, 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. 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 a draft *National Nutrition Research Roadmap* focused on identifying research gaps and opportunities with the greatest potential to yield accelerated progress in nutrition research to improve and sustain health for all children, families and communities. Following a [public comment period](#), the ICHNR plans to disseminate the final *Roadmap* in fall 2015.

Let's Move!

Let's Move! is a comprehensive initiative, launched by the First Lady Michelle Obama, dedicated to solving the challenge of childhood obesity within a generation. In an effort to mobilize action nationwide, the *Let's Move!* Initiative has instituted various sub-initiatives such as [Let's Move! Cities, Towns, and Counties](#) and [Let's Move! Active Schools](#). The *Let's Move!* sub-initiatives are supported by multiple federal agencies, including the NIH. For example, [Let's Move! Faith & Communities](#) has [partnered](#) with NIH's *We Can!* program (Ways to Enhance Children's Activity & Nutrition) to extend the program's reach to faith-based and neighborhood leaders nationwide. The NIH has also partnered with the Indian Health Service on [Let's Move! in Indian Country](#) and created a [resource page](#) that highlights NIH relevant research, resources, training opportunities and funding opportunities.

National Collaborative on Childhood Obesity Research (NCCOR)

[NCCOR](#) is a public-private partnership undertaken by the Centers for Disease Control and Prevention (CDC), the NIH (DNRC, NCI, NICHD, NIDDK, NHLBI, and OBSSR), the Robert Wood Johnson Foundation (RWJF), and the USDA. The initiative was formally launched in 2009 with a primary mission of improving the efficiency, effectiveness, and application of childhood obesity research and halting and reversing the childhood obesity epidemic through enhanced coordination and collaboration. The NCCOR partnership has focused its efforts on identifying, designing, and implementing innovative, practical, and sustainable interventions in diverse settings; increasing national, state, and local obesity surveillance activities; supporting childhood obesity research and program evaluation activities; and identifying ways to optimize research outcomes, build capacity for new research and surveillance, and create and support the mechanisms and infrastructure needed for research translation and dissemination. These efforts have proven enormously successful. NCCOR partners have formed strategic alliances with diverse groups, produced education and training resources for researchers and stakeholders, and informed the broader research community and policymakers of progress in child obesity prevention.

The [2013 NCCOR Annual Report](#) and the [2014 NCCOR Annual Report](#) are both available on the NCCOR website. Project highlights from 2013 and 2014 include the establishment of a Youth Energy Expenditure project; a series of workshops on Healthy Food Incentives; the development of a SNAP-Ed Toolkit, a Healthy Eating Index photo webpage, a Research Translation and Dissemination Tip Sheet; and the publishing of case studies from both the Catalogue of Surveillance Systems and the Food Pattern Equivalents Database.

National Food and Nutrient Analysis Program (NFNAP)

Federal food and dietary supplement product database activities have been coordinated through the [National Food and Nutrient Analysis Program \(NFNAP\)](#) initiative since 1997. NFNAP is directed by the USDA/ARS Nutrient Data Laboratory in collaboration with NCI and other supporting NIH offices and institutes (DNRC, NEI, NHLBI, NIA, NICHD, NIDCR, NIDDK, ODP, ODS, ORWH) and federal agencies (CDC and FDA).

The five Specific Aims of NFNAP are to: 1) establish a monitoring program for Key Foods and critical nutrients. Key Foods are frequently consumed foods and ingredients, which contributed, collectively, more than 75% of the intake of any specific nutrient for the U.S. population; 2) conduct comprehensive analyses of selected Key Foods; 3) develop databases for high priority foods consumed by U.S. ethnic subpopulations; 4) develop databases for new bioactive components; and 5) develop a validated database for ingredients in dietary supplements. For each Specific Aim, the process includes the identification of foods for analysis, the development of unique statistically based sampling plans, and the application of validated analytical chemistry. The primary outcome of the Program is to develop comprehensive nutrient composition databases having unprecedented analytical quality.

Several recent accomplishments in food composition analysis and database development can be traced to the NFNAP initiative. During 2013 and 2014, the USDA Nutrient Data Laboratory (NDL) developed and released two annual updates of the USDA National Nutrient Database for Standard Reference--SR26 and SR 27, respectively and related subsets used for the National Health and Nutrition Examination Survey (NHANES) *What We Eat in America* dietary interview component. Nearly 700 foods were added to the Standard Reference (SR) databases in 2013-2014; of these foods, about 165 were added or updated using NFNAP data. Additionally, a flavonoids database "USDA Database for the Flavonoid Content of Selected Foods, Release 3.1" was released on the USDA Nutrient Data Lab website (www.ars.usda.gov/nutrientdata) in 2013. The database contains flavonoid values for 508 foods. Food composition research, monitoring, and database development are dynamic areas of research and NFNAP provides an important mechanism for researchers to identify and collaborate to meet current and emerging food composition research and data needs.

The NFNAP initiative has also supported dietary supplements research and database development, including the DSID, which stemmed from the NFNAP initiative, and the DSLD. Both are described above.

National Health and Nutrition Examination Survey (NHANES)

Housed at the National Center for Health Statistics, CDC, HHS, and co-sponsored in part by other federal agencies including the NIH, the [NHANES](#) is designed to assess the health and nutritional status of adults and children in the U.S. Each year, the survey examines a national representative sample of about 5,000 persons. The NHANES is unique in that it combines interviews (demographic, socioeconomic, dietary, and health-related questions) and physical examinations (laboratory tests and medical, dental, and physiological measurements). Findings from the NHANES are used to: determine the prevalence of major diseases and risk factors for diseases; assess nutritional status and its association with health promotion and disease prevention; provide the basis for national standards for such measurements as height, weight, and blood pressure; and conduct epidemiological studies and health sciences research.

The NHANES dietary survey, referred to as [What We Eat in America](#), is carried out through collaboration with the USDA.

Nutrition and Obesity Policy Research Network (NOPREN)

NOPREN is a thematic research network of the Centers for Disease Control and Prevention (CDC) [Prevention Research Centers \(PRCs\) program](#). NOPREN aims to conduct transdisciplinary nutrition- and obesity-related policy research and evaluation along a policy change continuum. The work of NOPREN members helps foster understanding of the effectiveness of policies related to preventing childhood obesity through improved access to affordable healthy foods and beverages in a variety of settings including communities, workplaces, healthcare facilities, childcare institutions, and schools. The NIH Division of Nutrition Research Coordination, among others at NIH, advise NOPREN and contribute to joint publications, presentations and projects generated through their various working groups.

Vitamin D Standardization Program

The Office of Dietary Supplements established the [Vitamin D Standardization Program \(VDSP\)](#) in November 2010. Part of the [ODS Vitamin D Initiative](#), VDSP is an international collaborative effort to standardize the laboratory measurement of vitamin D status. A standardized laboratory measurement is one that is accurate and comparable over time, location, and laboratory procedure.

This collaboration involves the coordinated efforts of ODS; the National Institute for Standards and Technology; the Centers for Disease Control and Prevention; the Vitamin D External Quality Assessment Scheme; the College of American Pathologists; the American Association for Clinical Chemistry; the International Federation of Clinical Chemistry and Laboratory Medicine; the Laboratory for Analytical Chemistry; Faculty of Pharmaceutical Sciences; Ghent University, Ghent, Belgium; plus national surveys and collaborators around the world. Since the inception of this program, ODS has enlisted the participation of national health surveys from Australia, Canada, Germany, Ireland, Mexico, South Korea, the United Kingdom, and the United States.

VII. NIH INSTITUTE AND CENTER RESEARCH DIRECTIONS

The NIH supports extensive research on the relationship between nutrition and health. Through approaches that focus on both basic and translational research as well as training investigators, the NIH nutrition portfolio covers a vast array of programs. Details about each IC's specific research directions and priority nutrition areas are below.

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)

Fogarty International Center (FIC)

The Center for Scientific Review (CSR)

National Cancer Institute (NCI)

National Center for Complementary and Integrative Health (NCCIH)

National Eye Institute (NEI)

National Heart, Lung, and Blood Institute (NHLBI)

National Human Genome Research Institute (NHGRI)

National Institute on Aging (NIA)

National Institute on Alcohol Abuse and Alcoholism (NIAAA)

National Institute of Allergy and Infectious Diseases (NIAID)

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

National Institute on Deafness and Other Communication Disorders (NIDCD)

National Institute of Dental and Craniofacial Research (NIDCR)

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)

National Institute of Drug Abuse (NIDA)

National Institute of Environmental Health Sciences (NIEHS)

National Institute of General Medical Sciences (NIGMS)

National Institute of Mental Health (NIMH)

National Institute on Minority Health Disparities (NIMHD)

National Institute of Neurological Disorders and Stroke (NINDS)

National Institute of Nursing Research (NINR)

Office of Behavioral and Social Sciences Research (OBSSR)

Office of Dietary Supplements (ODS)

Warren Grant Magnuson Clinical Center (CC)

**Eunice Kennedy Shriver National Institute of Child Health and Human
Development (NICHD)**

<http://www.nichd.nih.gov/>

Nutrition Research Spending (FY 2014):	\$97,770,175
Nutrition as Percentage of Total IC Obligations (FY 2014):	7.7%

OVERVIEW

Consistent with the NICHD mission, the nutrition research program is focused on the continuum of human development, from conception through infancy, childhood, and adolescence. The nutrition research program emphasizes the evidence base needed to support domestic and global programs in health promotion and disease preventive through expanded understanding of the role of diet and nutrition in normal development as well as the myriad of conditions and stresses that can impact health.

Coordinated through the Pediatric Growth and Nutrition (formerly Endocrinology, Nutrition and Growth Branch: ENGB), the NICHD nutrition portfolio is multidisciplinary in nature, involving genetic, biochemical, developmental, anthropometric, behavioral, and cultural aspects of diet and nutrition. The historical focus of the NICHD nutrition extramural portfolio has been on several core areas:

- Nutrient requirements and best feeding practices for newborn infants including full term, premature, and low birth weight infants
- Lactation:
 - Mammary gland development and physiology
 - Ontogeny of breast milk
 - Human milk composition
 - Factors affecting prevalence of breastfeeding
 - Lactation performance and initiation and duration of breastfeeding
 - Social/behavioral factors influencing infant feeding choices
- Intake regulation
 - Social/cultural/behavioral aspects
 - Sensory response (i.e., development of hedonic response to food/dietary constituents)
- Growth and development
 - Physical (e.g., bone health)
 - Cognitive/behavioral
- Evaluation of the role of nutrition in ontogeny, prevention, and care of disease both acute and long-term
 - Prematurity
 - Infection, HIV, TB, malaria, diarrheal diseases
 - Non-communicable diseases (NCDs) including obesity, diabetes, bone disease, CVD risk, and cancer

Within this broad agenda, NICHD supports programs that address related issues such as:

- Impact of nutrition on reproduction
- Nutritional therapy of inborn errors of metabolism
- Assessment of nutritional status (BOND)
- Role of nutrition as both a predictor and an outcome of infectious (e.g., HIV, malaria, TB, diarrheal disease) and non-communicable diseases (e.g., diabetes, cardiovascular disease, cancer) and their treatment.

NICHD's interest in the above areas continues to expand. An area of high public health priority is best practices for feeding infants >6 months including the nutrient requirements for healthy growth and development and the modes for delivery of those nutrients to infants beyond the period of exclusive breastfeeding (> 6 months of age) via complementary feeding. Interest centers on metabolic processes in neonatal adaptation and on the role played by essential nutrients and other components of human milk. For example, NICHD has supported seminal work elucidating the effects of specific bioactive components of human milk, e.g., oligosaccharides, and lactoferrin on immune function and nutrient delivery.

NICHD continues to encourage research on cultural and behavioral determinants of nutritional individuality including studies of factors affecting the development of eating habits, taste, and olfaction; food avoidances; and behavior modification of dietary intakes.

NICHD plays a leadership role in efforts to understand the role of the fetal environment in subsequent health outcomes including development of adult diseases. In a similar vein, the portfolio is actively growing in studies of the origins of childhood obesity and other components of metabolic syndrome later in life. A particular focus of these efforts has been on those factors that contribute to documented health disparities in the US.

In the area of international nutrition research, NICHD has played a leadership role within the NIH community through the development of the trans-NIH Subcommittee on International Nutrition Research, a subcommittee of the NIH Nutrition Coordinating Committee. The current NICHD international nutrition research portfolio is coalesced around areas of traditional interest, e.g., the role and impact of specific micronutrients (e.g., vitamin A, zinc, and iron) in maternal and child health, as well as emerging programs in the role of nutrition in health promotion and disease prevention. Among the current priorities are the safety and effectiveness of common nutritional interventions in the context of prevention, care, and treatment of infectious (e.g., HIV, malaria, TB) and non-communicable diseases in resource constrained settings. Through partnerships with other funding agencies (e.g., the Bill and Melinda Gates Foundation) and the global health community (as technical consultant to the World Health Organization), NICHD has played an important role in addressing a range of issues affecting global health programs and policies.

The ability to identify, develop, and implement biomarkers to assess nutrient status has emerged as a high priority for NICHD. This interest is exemplified by a new program called "Biomarkers of Nutrition for Development: BOND" which is intended to harmonize the process for discovery, development, and use of nutrient biomarkers across a range of applications and to develop the necessary evidence through

new research to support the use and implementation of new biomarkers utilizing state-of-the-art technologies.

RESEARCH DIRECTIONS

Examples of current nutrition research supported by NICHD are studies of:

- The effects of vitamins on reproductive function and morphology, and the relationship between oral contraceptive use, cervical dysplasia, and folate levels
- Nutrient requirements during pregnancy and the mechanisms of placental transfer of essential nutrients, and the influence of these nutrients on normal and abnormal fetal development
- Events governing development of the gastrointestinal tract from fetal life to adulthood, and the role of human colostrum and milk in stimulating development of the gastrointestinal tract and protecting it from disease are of special interest
- Human milk, cow milk, soy milk, and synthetic formula to assess the requirements for optimal growth and development in normal and low birth weight infants, as well as development of the intestinal immune system and its relationship to autoimmune disease later in life
- The identification and role of non-nutritional compounds of human milk in terms of their specific effects on breast-fed infants
- The effect of micronutrient supplementation on reducing rates of infectious diseases and their attendant morbidity and mortality in infants and children living in low/middle income countries
- Behavioral, neurochemical, genetic, and hormonal factors in childhood obesity
- The influence of nutritional factors (e.g., iron) on cognitive development and behavior in both normal subjects and patients with inborn errors of metabolism
- Developing approaches to determine what the role of nutrition is in diseases such as HIV that would warrant nutritional interventions that would differ from the provision of a safe, high quality diet
- Application of a systems biology approach to evaluate the functional impact of single and multiple micronutrients in health and disease
- Safety of public health nutrition interventions in the context of infections such as HIV and malaria

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Fogarty International Center (FIC)

<http://www.fic.nih.gov/Pages/Default.aspx>

Nutrition Research Spending (FY 2014):	\$1,247,304
Nutrition as Percentage of Total IC Obligations (FY 2014):	1.9%

OVERVIEW

The Fogarty International Center (FIC) is dedicated to advancing the mission of the NIH by supporting and facilitating global health research conducted by U.S. and international investigators, building partnerships between health research institutions in the U.S. and abroad, and training future generations of scientists to address global health needs. FIC currently funds more than 400 research and training projects involving more than 100 U.S. universities and investigators in numerous foreign countries, most of which are in the developing world. FIC staff engage with scientists around the world to address critical global health research problems such as emerging infectious diseases, the impact of climate change on disease outbreaks, and the need to strengthen research capacity in low and middle income countries.

FIC has a strong interest in nutrition as it relates to overall global health. Recent nutrition-related projects funded by FIC aim to do the following:

- Determine the mechanisms and dose-effects of a novel alanyl-glutamine-based oral rehydration and nutrition therapy (Ala-Gln ORNT) for restoration of intestinal barrier function in undernourished Brazilian children
- Develop a large-scale program and policy analysis in these nutrition-related non-communicable disease areas: obesity, diabetes, hypertension, and other related cardio-metabolic problems in China
- Investigate a range of issues around the links between child malnutrition and socioeconomic status in South Africa
- Address the emerging HIV- and combined antiretroviral therapy (cART)-associated metabolic, diabetes and cardiovascular complications associated with "malnutrition" diabetes in HIV+ patients on cART
- Develop a research training program to strengthen and sustain the capability of three developing countries (Ghana, Malawi, and Bangladesh) to conduct research on maternal and child health and nutritional issues related to chronic diseases
- Develop a Nigerian-relevant Food Frequency Questionnaire, a Food Composition Database, and conduct a taste and tolerability study of brown rice substitution for white rice in adult Nigerians.
- Analyze the fatty acid levels and allele frequencies in a South Indian population in Mangalore, India and build the research infrastructure to perform the molecular and statistical techniques

needed for this analysis. Fatty acids are critical for brain and eye development and many pregnant and malnourished Indian women and children may not ingest enough food that contains the proper fatty acids for this development to occur.

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The Center for Scientific Review (CSR)

<http://www.nih.gov/about/almanac/organization/CSR.htm>

Nutrition Research Spending (FY 2014):	NA
Nutrition as Percentage of Total IC Obligations (FY 2014):	NA

OVERVIEW

The primary mission of the Center for Scientific Review's (CSR) staff is to see that NIH grant applications receive fair, independent, expert, and timely reviews that are free from inappropriate influences to ensure that NIH funds the most promising research. CSR receives all research and training grant applications submitted to the NIH and handles the review of more than 70 percent of these applications by organizing peer review groups (termed "study sections"). Additionally, CSR receives some of the applications submitted to other components of the U.S. Department of Health and Human Services (HHS). CSR holds 1,600 review meetings per year, involving about 18,000 reviewers from the scientific community.

CSR assigns all incoming NIH applications (approximately 80,000 per year) to the appropriate NIH institutes or centers for consideration for funding as well as the scientific review groups within CSR. Additionally, CSR provides the scientific merit review of most research grant and fellowship applications submitted to NIH. Further, CSR provides staff support to the Office of the Director, NIH, in the formulation of grant and award policies and procedures. CSR staff provide information on the NIH peer review system, research grant and fellowship application processes, and other procedures to the scientific community, Congress, NIH staff, and the general public.

CSR developed an Early Career Reviewer Program to train established scientists without prior experience reviewing NIH grant applications to become excellent reviewers; enrich the talent pool of NIH reviewers by recruiting scientists from less research-intensive institutions; and help emerging researchers advance their careers by exposing them to the grant review process.

Dr. Richard Nakamura was appointed director of CSR in December 2012, having served as the acting director when Dr. Antonio Scarpa retired in September 2011.

NUTRITION-RELATED GRANT APPLICATIONS

Nutrition-related grant applications are evaluated in many of the CSR Integrated Review Groups (IRGs) and their related study sections. More information about the IRGs can be found at:

<http://public.csr.nih.gov/StudySections/IntegratedReviewGroups/Pages/default.aspx>

Rosters and descriptions for these study sections, as well as scientific review administrator contact information, are available on CSR's Web site:

<http://public.csr.nih.gov/RosterAndMeetings/Pages/default.aspx>

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National Cancer Institute (NCI)

<http://www.cancer.gov/>

Nutrition Research Spending (FY 2014):	\$194,457,446
Nutrition as Percentage of Total IC Obligations (FY 2014):	4.0%

OVERVIEW

Cancer is the second leading cause of death in the United States. During 2015, the number of new cancer cases is estimated to approach 1,658,300 and about 589,430 could die as a result of cancer-associated complications. Since the NCI was established in 1937, scientists have identified various cancer-related factors such as genetics and environmental exposures. Foods and their associated constituents are thought to be environmental factors that can significantly influence cancer risk and tumor behavior. The complexity of this area is expanded by the thousands of dietary components that are consumed.

Cancer research and training are performed and/or supported by both intramural and extramural programs at NCI. NCI makes awards to investigators residing in the United States and at international sites. NCI's goal is to support research that ultimately leads to important clinical outcomes: improvements in prevention, diagnosis, and treatment that can reduce the incidence, morbidity, and mortality of all types of cancer requires a wide range of research disciplines that span the continuum from basic science to clinical research to research on implementation and cancer care delivery. Areas of research that NCI supports includes basic sciences, such as genetics, genomics, cell biology, immunology, and nanotechnology; translational and clinical sciences, such as drug development and testing, diagnostics, and the discovery and development of molecular markers, advanced imaging technologies, and new radiotherapy techniques; population sciences, such as population genetics, epidemiology, and environmental sciences; and behavioral sciences. NCI supports various interdisciplinary training programs in basic, clinical and population sciences to foster the development of future national and international scientific leaders who will use modern approaches and technologies to address critical issues in cancer.

NCI nutrition research incorporates a variety of approaches to determine the influence of diet and dietary components on the cancer process, including epidemiologic studies (i.e., cross-sectional, case-control and cohort studies), clinical intervention studies, compositional studies involving food content and components, preclinical (animal models and cell cultures) and clinical biochemical/physiologic assessments of nutrient metabolism and absorption patterns. In addition, NCI provides summaries of ongoing research related to nutrition and cancer through Web sites and other programs within the Office of Communications and Public Liaison.

RESEARCH DIRECTIONS

NCI supports extensive research on the relationship between nutrition and cancer in a wide variety of areas spanning the prevention and therapy domains including studies that focus on basic molecular and

cellular mechanisms of action of bioactive food components, dietary assessment methods, etiology, risk factor monitoring, and development of evidence-based interventions. Among the many research approaches being pursued and/or encouraged, the following are of particular note:

Dietary Assessment Methods

- Innovative methodologies, including nanotechnologies, for assessing nutritional status
- Comparative studies with biological fluids, tissues biopsies and/or exfoliated cells to evaluate nutritional status as influenced by exposures and genetics
- Innovative approaches and technologies for assessing diet, weight control, and physical activity behaviors, such as electronic handheld monitoring devices and internet surveys, in collaboration with other NIH institutes
- Identification and validation of biomarkers of dietary intake to assess the accuracy of dietary assessment methods commonly used in epidemiology, intervention, and surveillance research
- Improved diet and physical activity assessment methodology across culturally diverse populations

Define Molecular Targets for Bioactive Food Components

- Preclinical and clinical studies using genomic, epigenomic, proteomic and metabolomic approaches to identify critical bioactive food components and their sites of action in the cancer process
- Clinical studies to examine biological effects of microbially-generated metabolites from food components and their role in cancer prevention, etiology, and cancer health disparities
- Clinical and mechanistic studies on the effects of prebiotics and probiotics found in food or food components, their interaction with members of the gut, mouth, and skin microbiota, and their role in carcinogenesis and metabolism
- Essential and non-essential food components as modifiers of carcinogen metabolism, DNA repair, cell proliferation, differentiation, immunocompetence, hormonal homeostasis, and apoptosis
- New technologies for evaluating metabolic profiles, genetic susceptibilities and predispositions to cancer as influenced by diet
- Trans-disciplinary research centers to discover and characterize mechanisms by which diet, weight, and physical activity interacts with genetic and other factors in cancer development and progression
- Food preparation and processing methods, as well as variation in food and alcohol, fat, and fiber intake as modifiers of biomarkers or tumor incidence
- Interdependence of obesity, exercise, and inflammatory responses in establishing cancer risk and tumor behavior through various epidemiologic, clinical and preclinical investigations
- Physiological responses to phytochemicals occurring in fruits and vegetables, zoochemicals occurring in animal products, fungochemicals occurring in mushrooms, and bacterochemicals

arising from gastrointestinal microorganisms to determine their role in cancer incidence and tumor behavior

- Nutritional requirements of the cancer patient and neoplastic tissues with emphasis on nutrient uptake, utilization, and cellular control mechanisms in both normal and neoplastic tissues, and on host-tumor interactions and competition for nutrients

Population Surveillance, Economics and Policy

- Population-level monitoring of diet and other risk factors for the refinement of nationwide surveys such as the National Health Interview Survey, California Health Interview Survey, and National Health and Nutrition Examination Survey
- Cohort Consortium to collect enhanced self-report and objective measures on diet and bioactive food components
- Collaboration with the National Center for Health Statistics (NCHS), nationwide surveys to enhance self-report, biologic, and genetic measures for monitoring and examining the impact of behaviors related to energy balance and cancer
- Public comprehension of health recommendations on nutrition and physical activity through the NCI Health Information National Trends Survey (HINTS)
- Trans-NIH initiative to support innovative economic research on diet, physical activity, and energy balance to examine societal, market and economic forces that may influence nutrition and related practice, particularly in at risk populations
- Private-public initiatives to develop research resources to track legislation and policies related to diet, weight control, and physical activity to assist in the understanding of factors influencing decisions at the population level and within clinical practice

Development of Evidence-Based Interventions

- Trans-disciplinary research centers to develop effective innovative approaches with broad population impact at the social, environmental, and policy levels for prevention of obesity
- Clinical dietary intervention trials with specific diets, foods and bioactive food components, cancer incidence, and tumor behavior
- Genomic technologies to identify those who respond maximally to dietary intervention and those who might be placed at risk because of dietary change
- Cost-effective approaches using food components for prevention and therapeutic strategies within clinical interventions
- Clinical trials to evaluate the effectiveness of nutritional support in the rehabilitation of the cancer patient, nutrition requirements during remission, and nutrient and dietary factors needed to maximize patient survival
- Behavioral research to identify evidence-based behavioral approaches for improving diet, physical activity, and weight control practices

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National Center for Complementary and Integrative Health (NCCIH)

<https://nccih.nih.gov/>

Nutrition Research Spending (FY 2014):	\$26,531,281
Nutrition as Percentage of Total IC Obligations (FY 2014):	21.4%

OVERVIEW

The National Center for Complementary and Integrative Health (NCCIH)⁵ is the Federal Government's lead agency for scientific research on complementary and integrative health. The Center's mission is to define, through rigorous scientific investigation, the usefulness, safety and underlying mechanisms of complementary and integrative approaches and their roles in improving health and health care. There are many definitions of complementary and integrative health. NCCIH simply defines these as a group of diverse medical and health care interventions, practices, products, or disciplines that are not generally considered part of conventional medicine, such as natural products and mind and body approaches. According to the 2012 National Health Interview Survey, adults' use of fish oil, probiotics or prebiotics, and melatonin increased significantly between 2007 and 2012, while use of glucosamine/chondroitin, echinacea, and garlic decreased during that same time period. Fish oil was the most commonly used natural product among children.

CAM NATURAL PRODUCTS RESEARCH

Establishing priorities across the entire field of complementary and integrative health research is enormously challenging. Of particular interest to the field of nutrition is NCCIH's robust natural products research portfolio that includes dietary supplements, herbal and botanical products, probiotics, and food-based phytochemicals. The Center's research on natural products relies heavily on the methods and tools of pharmacology and pharmacognosy. NCCIH has established rigorous standards and policies for quality and integrity of products used in NCCIH-supported research. Read more at: <http://nccih.nih.gov/research/policies/naturalproduct.htm>.

RESEARCH DIRECTIONS

Historically, NCCIH has supported the vast majority of basic and translational research and development activities relevant to complementary approaches in natural products research through general solicitations for investigator-initiated research grants. This broad-based approach has yielded a large body of information and promising leads for future research. Support of complementary and integrative health research in the future remains essential. Going forward, a portion of NCCIH's natural product efforts will be targeted to more selected areas of basic, mechanistic, translational and clinical research needed to expedite the development of the evidence base regarding specific, high-priority NCCIH research areas.

⁵ NCCIH was formerly called the National Center for Complementary and Alternative Medicine (NCCAM) until December 17, 2014: <https://nccih.nih.gov/news/press/12172014>

NCCIH's three strategies to advance its current portfolio of complementary and integrative health research are:

- Harness state-of-the-art "omics" and other high-throughput technologies and systems biology approaches of the sciences of pharmacology and pharmacognosy
- Support translational research to build a solid biological foundation for research on complementary and integrative health topics.
- Support targeted clinical evaluation approaches and safety/efficacy studies.

In addition, NCCIH has closely aligned its probiotics/prebiotics research with the trans-NIH Microbiome Project exploring the complex microbial ecology of host-microbial relationships. NCCIH is also directing efforts to promote greater trans-agency and inter-agency collaborations to share resources and expertise with the U.S. Food and Drug Administration, the U.S. Department of Agriculture, the Department of Defense and Veteran's Administration, as well as other federal agencies and stakeholders to facilitate progress in complementary and integrative health research and regulatory policy. Finally, NCCIH continues to co-sponsor a Botanical Dietary Supplements Centers Program with the NIH Office of Dietary Supplements.

Research solicitations across the broad spectrum of NCCIH's research may be found at <https://nccih.nih.gov/grants/funding>.

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National Eye Institute (NEI)

<http://www.nei.nih.gov/>

Nutrition Research Spending (FY 2014):	\$10,900,440
Nutrition as Percentage of Total IC Obligations (FY 2014):	1.7%

OVERVIEW

NEI's mission is to reduce the prevalence of blindness, visual impairment, and eye disease in the United States and throughout the world. According to the [World Health Organization](#), three quarters of the 45 million cases of blindness worldwide are considered curable or preventable. Xerophthalmia, a blinding disease caused by vitamin A deficiency, is the leading cause of nutrition-related blindness and visual impairment among the world's children. It accounts for 70 percent of the estimated 1.5 million blind children in the world. Mild vitamin A deficiency, with consequences for child health and survival, affects another 20 to 40 million children worldwide.

Age-related cataract and macular degeneration are the major causes of visual impairment and blindness in the aging U.S. population. NEI supports research on the role of nutrition and of micronutrients, such as vitamins and trace minerals with antioxidant capabilities, in the development and worsening of these two eye disorders. NEI-supported scientists also are evaluating the effect of nutritional factors on other visual disorders, such as retinopathy of prematurity, glaucoma, retinitis pigmentosa, and diabetic retinopathy.

RESEARCH DIRECTIONS

The following projects represent some of the many nutrition-related research areas supported by NEI:

- The major epidemiological and randomized placebo-controlled clinical trial "[Age-Related Eye Disease Study](#)" (AREDS) showed that high levels of antioxidants (vitamin C, vitamin E, and beta carotene) and zinc reduced the risk of progression to advanced age-related macular degeneration (AMD) by 25 percent for those at high risk.
- A follow up study, [AREDS2](#) tested a new formulation, adding omega-3 fatty acids as well as substituting antioxidants lutein and zeaxanthin for beta-carotene, which has been implicated as a risk factor for lung cancer in smokers and former smokers. While the omega-3 fatty acids had no effect on the formulation, the combination of lutein and zeaxanthin was a successful substitution, and this new formulation provides a safe and effective treatment for people at risk of advanced AMD.
- As ancillary studies to the VITamin D and OmegaA-3 Trial (VITAL) randomized trial, investigators will examine effects and synergism of DHA and EPA supplements from fish oil and vitamin D in reducing incidence or progression of AMD and dry eye disease.

- To uncover the mechanisms by which omega-3 fatty acids protect eyes from neovascularization in a hyperoxia-induced model of retinopathy, researchers screened mice with mutations in different metabolic enzymes and identified an enzyme (5-LOX) for its role in mediating DHA protection. 5-LOX converts DHA into a compound that binds a protein known as PPAR. PPAR is a target of anti-diabetic drugs, so this advance suggests omega-3 fatty acids may be part of a solution to prevent neovascularization in diabetic retinopathy or AMD.
- Epidemiology studies are elucidating the interacting roles of environmental and genetic risk factors for complex eye diseases by examining diet and lifestyles in different populations. Using blood tests or nutritional surveys, the importance of fish oils, carotenoids, and vitamins for eye disease are being studied.
- Using samples collected in a recent clinical trial, blood and diet-based studies are examining the mechanisms by which folic acid and B vitamins are protective against AMD. These analyses are looking at the effects of supplements on biomarkers of inflammation and blood vessel function.
- Macular pigment (MP) is comprised of the dietary carotenoids lutein, zeaxanthin and meso-zeaxanthin and declines with age. NEI scientists are testing the hypothesis that MP is a modifiable risk marker for AMD, and that preserving MP might help reduce risk for developing eye diseases and vision loss.
- Basic research on the metabolism of nutritional compounds, such as carotenoids using animal models, complements epidemiological studies of the eye. Animal models also are useful for testing nutritional/pharmacological therapies to prevent proliferative diabetic retinopathy (PDR), for example. Diets rich in omega-3 fatty acids counter the effects of diabetic retinopathy; scientists are testing the ability of these fatty acids along with COX-2 inhibitors, such as aspirin, to target inflammatory and angiogenic factors in PDR.
- NEI grantees are investigating the role of oxidative stress in age- and diabetes-related eye diseases, such as AMD, cataract formation, and glaucoma. Scientists are testing if dietary interventions can modify these biochemical markers of oxidative stress in AMD patients with different backgrounds. Other teams are examining the mechanisms by which caloric restriction protects retinal cell death in glaucoma and whether these mechanisms can be reversed through dietary supplements such as resveratrol, a natural compound found in red wine.
- Vitamin A is the precursor for 11-cis-retinal, a molecule essential for vision. Investigations into vitamin A, its derivatives, and the proteins that bind and transport it to cells are a major focus of NEI-supported research. Scientists are exploring the role these substances play in the normal metabolism of ocular tissues and in the visual cycle. Alterations of ocular tissue integrity and metabolism brought about by chronic deficiency of vitamin A also are being studied. These investigations include studying the role of vitamin A in maintaining the immune competence of the eye and the ability of ocular tissues to respond to infections and trauma.
- Vitamin D, predominantly produced in the skin in response to UV sunlight, may also be produced in the cornea. It may also have a role in intraocular pressure control and AMD. NEI research is focusing on Vitamin D metabolism in the cornea and its role in corneal wound healing. Vitamin D deficiency may affect over 50 percent of the United States population.

- Cystoid macular edema (CME), swelling of the retina, is a complication occurring in 25 percent of patients with retinitis pigmentosa, but may be reduced by iodine supplements. Researchers are studying the role of dietary iodine, as well as linolenic acid, in reducing the risk of CME.
- Peters' anomaly and anterior segment dysgenesis can result from dietary vitamin A deficiency due to genetic mutations or environmental insults during human embryonic development. NEI research is investigating the signaling mechanisms of vitamin A metabolite retinoic acid and its role in programmed cell death (PCD) in the early stage of ocular lens and anterior eye development.

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National Heart, Lung, and Blood Institute (NHLBI)

<http://www.nhlbi.nih.gov/>

Nutrition Research Spending (FY 2012):	\$205,936,457
Nutrition as Percentage of Total IC Obligations (FY 2012):	6.9%

OVERVIEW

The diseases within the purview of the NHLBI impose a heavy burden on the health and economy of the American people. Cardiovascular, lung, and blood diseases accounted for 41 percent of all deaths in the United States in 2013. Cardiovascular, lower respiratory, and cerebrovascular diseases accounted for 3 of the 5 leading causes of death and 4 of the 10 leading causes of death in infants. Although deaths attributable to cardiovascular disease (CVD) declined in the last ten years, CVD still accounts for almost one third of all deaths. The estimated economic cost of these diseases was \$443 billion, 23 percent of the total economic costs of illness, injuries, and death, in 2011-2012.

An important overall goal of the NHLBI nutrition research program is to prevent and treat cardiovascular diseases, such as heart attack, stroke, arrhythmias, peripheral arterial disease, and heart failure, and their risk factors. With heart disease as the nation's number one killer, an important focus of the research is to reduce risk by examining the influence of nutrition and physical activity on well-characterized risk factors such as high blood cholesterol levels, high blood pressure, obesity, and poor levels of cardiovascular and physical fitness. Emerging cardiovascular risk factors such as elevated inflammatory response markers also may be influenced by nutrition, and it is hoped that a better understanding of these relationships will ultimately provide new approaches to prevention. Some cases of congenital heart defect also appear to have a nutritional basis and thus may be prevented by improving maternal diets or nutritional status.

Other critical goals of the NHLBI nutrition research program are to prevent and treat lung and blood diseases, such as asthma, chronic obstructive pulmonary disease, clotting disorders, and sickle cell disease. Another area of nutrition research interest is in sleep disorders, which are associated with obesity, are risk factors for cardiovascular disease, and have many intriguing connections with nutrient metabolism.

The scope of the NHLBI nutrition research program encompasses the full research spectrum including basic investigations, observational studies, clinical and community intervention studies, and demonstration and dissemination studies. NHLBI also fosters collaboration to apply research results and leverage resources to address public health needs, nationally and internationally. In addition, NHLBI supports academic and professional training in nutrition research as well as the development of innovative nutrition education programs for medical students, residents, and attending physicians. And, NHLBI manages science-based national education programs designed to help children stay at a healthy weight and to reduce cardiovascular risk factors in underserved communities.

RESEARCH DIRECTIONS

Some of the main points of emphasis in the NHLBI nutrition research program include:

Heart and Vascular Diseases

Mechanisms and Risk Factors

- Identify dietary patterns, foods, nutrients, and other dietary components that are effective in improving blood pressure, lipids, glucose, and overall cardiovascular health, and also determine the mechanisms by which these effects are achieved.
- Evaluate the relationship between physiologic- and pharmacologic-level intake of nutrients and other dietary components with the pathophysiology of atherosclerosis and other cardiovascular disease mechanisms.
- Investigate the interaction of nutrients or dietary factors with pharmacologic agents to reduce cardiovascular disease risk.
- Develop animal models to study hypertension, dyslipidemias, obesity, and other nutrition-related cardiovascular risk factors.
- Investigate the interactions between genetic factors and diet as they influence cardiovascular disease risk.
- Develop new biomarkers of nutrient metabolism for use in studies of the causation, prevention, or treatment of cardiovascular diseases.
- Investigate racial, ethnic, and gender differences in nutrition-related cardiovascular disease risk, nutrient metabolism, dietary habits, and responsiveness to dietary intervention.
- Identify behavioral and environmental determinants of nutrient intake and dietary patterns as they affect cardiovascular risk and health.
- Elucidate the role of body weight and fat distribution as related to the development of cardiovascular disease and its risk factors.
- Determine the relative roles of physical activity and diet in achieving energy balance, healthy body weight, fat loss, changes in body fat distribution, and long-term maintenance of weight loss.
- Investigate mechanisms and implications of unintended weight loss in low to moderate risk populations and on heart failure.

Intervention and Translation Research

- Investigate the effects of macro- and micro-nutrients, functional foods, and complementary and alternative therapies in the prevention and treatment of cardiovascular disease.
- Determine the optimal amount, type, and intensity of physical activity or fitness level needed for weight control and cardiovascular health.
- Identify influences of the built, home, psychosocial, and sociocultural environments on dietary behavior, and develop and test interventions targeting these influences.

- Develop and test intervention strategies that focus on the interactions among individual dietary behaviors, genetics, and the environment (e.g., home, community, and built environment) to reduce cardiovascular risks, particularly those targeting different literacy levels, socioeconomic levels, and race/ethnic groups.
- Characterize behavioral determinants of adherence to dietary and physical activity recommendations and develop effective interventions to improve adherence.
- Develop effective strategies and materials for the dissemination of nutrition and disease prevention information aimed at health professionals and the public of different ages, literacy levels, and ethnic backgrounds.
- Develop effective methods for increasing and sustaining regular moderate-intensity physical activity and for reducing sedentary behaviors.
- Develop and test interventions to prevent obesity and excessive weight gain across the lifespan, and for long-term maintenance of weight loss, particularly interventions that are practical, cost-effective, sustainable, and have high potential for broad-scale dissemination.

Assessment

- Monitor secular trends in dietary constituents related to cardiovascular disease and its risk factors.
- Continue surveillance of public knowledge and physician practices that pertain to diet, obesity, and cardiovascular disease.
- Advance the state of the art in dietary intake methodology, including dietary assessment tools, statistical techniques, and food composition analysis, methods, standard reference materials, databases, and software.
- Advance the state of the art in physical activity assessment methodology, including new instruments and techniques to assess sustained vigorous activity, moderate and light intensity activity, sedentary activity, and activity to maintain strength, balance, and flexibility.
- Develop improved technologies for assessing energy balance, intake, and expenditure under research conditions and in real-world settings.

Lung Diseases and Sleep Disorders

- Investigate the role of nutrition in the development of normal pulmonary immune defense systems, especially during lung development.
- Explore the role of nutrition in preventing respiratory muscle dysfunction in acute and chronic pulmonary disease.
- Determine the relationship between sleep apnea (sleep-disordered breathing) and obesity, as well as the effect of dietary factors on the control of breathing and airway function.
- Determine the functional and health-related consequences of sleep debt on increased disease risk for nutrition-related conditions such as obesity, cardiopulmonary diseases, and diabetes.
- Investigate the role of specific nutrients in adult and infant respiratory distress syndromes.

- Evaluate the relationship between diet and genetic factors in determining an individual's susceptibility to diseases of the lung.
- Examine undernutrition as a risk for tuberculosis and other lung infections.
- Evaluate the effect of maternal diet during pregnancy on the development of allergies and asthma in the offspring.

Blood Diseases

- Identify mechanism(s) by which nutrients and other dietary factors influence the synthesis and expression of functional activity of platelets and of proteins involved in the coagulation of blood.
- Elucidate the role of nutrients and other dietary factors in the genesis, treatment, and prevention of blood vessel obstruction.
- Investigate energy balance and nutrient requirements among children with sickle cell disease, especially children who fail to thrive, and adolescents who are in a rapid growth phase.
- Conduct studies on the benefits of appropriate dietary intervention and nutritional supplementation in hemoglobin disorders.
- Improve understanding of nutritional factors in the management and clinical variability of hemoglobin disorders.
- Characterize the relationship between nutritional deficiencies and immune dysfunction in sickle cell disease.

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National Human Genome Research Institute (NHGRI)

<http://www.genome.gov/>

Nutrition Research Spending (FY 2014):	\$7,941,034
Nutrition as Percentage of Total IC Obligations (FY 2014):	1.6%

OVERVIEW

Since the completion of the Human Genome Project in 2003, NHGRI-supported research has focused on advancing genomic science and medicine through a deeper understanding of genome structure and function, the relationships between genes, environment and human health, and attitudes and behaviors related to genomic information.

As part of its mission to advance genomic science and medicine, NHGRI funds research on the complex relationships between genomics and nutrition-relevant variables. Genomics plays an essential role in individual variation in metabolism and predisposition for genetically complex diseases including obesity, diabetes, heart disease, and cancer. NHGRI supports studies to investigate the interplay between genetic and environmental risk factors for these complex diseases in multi-ethnic cohorts. In addition, NHGRI funds research on how people understand and use genomic information to shape food and nutrition choices.

RESEARCH DIRECTIONS

NHGRI supports research on genomic and environmental interactions (GxE), including the interactions of genes and diet and nutrition.

Folate and vitamin B12 are essential nutrients for cell growth and neurological development, and deficiencies increase the risk of tumors, miscarriage, birth defects including spina bifida, and cognitive problems in older people. NHGRI intramural investigators are studying genes that affect folate and vitamin B12 metabolism and contribute to disease. Detailed knowledge of the function of the genes in the folate/vitamin B12 metabolic pathways will add to our understanding of neural tube defects and potentially help guide public health policy in the area of nutritional supplementation.

Obesity is a heritable health condition underpinned by a combination of genetic and environmental influences. Increased understanding and awareness of the heritability of obesity can help parents of children with a high risk for obesity make informed food choices and form healthy habits early on. In the Mothers' TAKE study, NHGRI researchers are investigating how mothers' food choices for their children are affected by information about family history and obesity risk. The researchers are also looking at how genetic risk information influences mothers' feelings of guilt, factors associated with food choices for boy or girl children, and how mothers' weight trajectories influenced their own health beliefs and attitudes. Results could suggest possible risks and benefits of integrating genetic risk messages into behavior change intervention approaches to promote optimal body weight in childhood.

NHGRI investigators are in the process of developing a research study about diet, weight, food preferences, and beliefs about the role of heredity in eating habits and weight. Healthy adult volunteers will answer survey questions about their behavior, experiences, preferences and beliefs related to eating, weight and nutrition. The researchers plan to evaluate the feasibility of characterizing robust clusters of eating behavior phenotypes that show variation across individuals and that are associated with weight outcomes.

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National Institute on Aging (NIA)

<http://www.nia.nih.gov>

Nutrition Research Spending (FY 2014):	\$87,959,257
Nutrition as Percentage of Total IC Obligations (FY 2014):	7.5%

OVERVIEW

Today, approximately 13.4% of Americans are 65 or over. By the year 2025, this number is expected to grow to over 20 percent as life span extends well into the eighth decade. The mission of the NIA is to foster research that finds methods to extend years of productive life through improved health, lifestyle, and psychosocial status. NIA contributes to this goal by supporting basic, animal model, clinical, and population-based studies to determine the ways in which nutrition influences the onset and progression of aging.

Nutrition and aging research poses several unique challenges. The variation of physiological and behavioral measures increases with age. Because the rate of change in functional capacity and aging processes differs among individuals, those who reach old age are the most biologically heterogeneous of all age groups. The diversity observed in aging individuals results from a lifetime of environmental experiences superimposed on individual differences in genetic predisposition. Investigators in nutrition and aging must consider additional factors such as genetic variation, race, smoking status, physical activity, social factors, and health and medication history.

A most difficult problem is to separate those changes observed in old age that are due to inevitable aging processes from those that are manifestations of pathology. In some cases, such as those related to the progressive loss of skeletal tissue, an aging process becomes pathological when bone density is reduced to a level where low-trauma fractures can occur. Researchers also must determine if the magnitude of change in age-related parameters is clinically significant and which aging processes are detrimental to the health of older individuals.

RESEARCH DIRECTIONS

The National Institute on Aging continues its efforts in nutrition research to promote and maintain healthy aging. The NIA solicits input from the scientific community to aid in identifying the most important topic areas and directions for nutrition and aging research.

Nutrition research is supported in the four Extramural Divisions—Division of Aging Biology (DAB), Division of Behavioral and Social Research (DBSR), Division of Geriatrics and Clinical Gerontology (DGCG), and Division of Neuroscience (DN) as well as in the NIA Intramural Programs—Laboratories of Epidemiology, Demography, and Biometry, Clinical Investigation, Cardiovascular Science, Molecular Biology and Immunology, and Experimental Gerontology, Genetics, Molecular Gerontology, Neurogenetics, Neuroscience, and Behavioral Neuroscience. In 1991, the NIA created a Nutrition

Office to facilitate interaction and planning activities among the NIA programs to give nutrition and aging research greater visibility.

Present research directions and areas of priority in nutrition and aging are based on NIA staff evaluation of current research, advice from scientific advisors, and the results and recommendations from nutrition and aging conferences. These include the following and the Divisions most likely to be interested in these areas of research:

- Bionutrition studies utilizing cellular and molecular techniques to identify the mechanisms of age-related changes in metabolism, homeostasis, and differential cell function (DAB)
- Nutrient requirements and their age-dependent changes in older persons and animal models (DAB and DGCG)
- Effects of age on physiological processes through which nutrients, drugs, and other non-nutrient substances are absorbed, metabolized, and excreted in humans and in analogous animal models (DAB and DGCG)
- Nutritional status of older Americans and special subpopulations of older people at special nutritional risk such as those with multiple chronic conditions (DGCG)
- Effects of calorie reduction on age-related pathologies and/or longevity (DAB and DGCG)
- Nutritional factors associated with physiologic and psychological changes such as immunocompetence, cardiovascular function, neurological function, body composition, physical function, sensory perception, control of appetite, macronutrient utilization, endocrine control, genetics, cognitive health and emotional regulation (all Divisions)
- The role of nutritional factors, including dietary supplements, in prevention and treatment of age-related degenerative diseases including diabetes, osteoporosis, neurological disorders, immune deficits, heart disease, cancer, gastrointestinal diseases, and other comorbidities (all Divisions)Effect of neurological changes, such as dementia, and declines in sensory reception and perception on nutrient intake (DN)
- Neural mechanisms underlying the control of eating, drinking, and satiety that affect Nutrient intake (DN)
- Effect of diet, food extracts, and dietary supplements on cognition, sensory systems, and motor function (DN)
- General epidemiological studies and analysis of nutritional status, body composition, and their correlates with functional measures (DGCG and DBSR)
- Psychosocial aspects of nutrition, including studies of diet as a major factor contributing to quality of life and how diet interacts with social, environmental and lifestyle variables including food insecurity, food environment/availability, exercise, smoking, and consumption of alcoholic beverages (DBSR)
- Behavioral aspects of dietary change, including behavioral economics and mechanistic studies of behavior change related to diet and other health behaviors (DBSR)

A rapidly aging population makes it critical to find ways to maximize the span of good health and thereby improve the quality of life of older people. For this reason, the NIA supports research to study nutrition-aging interactions.

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National Institute on Alcohol Abuse and Alcoholism (NIAAA)

<http://www.niaaa.nih.gov/>

Nutrition Research Spending (FY 2014):	\$29,460,628
Nutrition as Percentage of Total IC Obligations (FY 2014):	6.6%

OVERVIEW

The NIAAA supports nutrition research through programs in basic and clinical sciences and seeks to identify the complex relationships between alcohol consumption, nutritional status, and health.

RESEARCH DIRECTIONS

Examples of the nutrition research encouraged and supported by the NIAAA are:

- Studies on alcohol metabolism and its effect on autonomic signals involved in alcohol and food intake
- Studies on the interaction between chronic alcohol intake and the bioavailability of water-soluble vitamins, such as thiamin, riboflavin, vitamin B-6, folic acid, vitamin B-12, and vitamin C, in addition to studies on alcohol effects on the absorption and physiological role of lipid-soluble vitamins (A, D, E, and K)
- Studies on alcohol effects on the absorption, utilization, and excretion of minerals (iron, magnesium, zinc, selenium, and calcium) to clarify the role that alcohol-induced changes in these minerals may play in inducing pathological consequences of chronic alcohol consumption, such as liver fibrosis and hypertension
- Studies on ethanol alteration of the distribution of essential fatty acids and prostanoid production and the role of eicosanoids in alcohol-induced physiological changes
- The role of alcohol-induced malnutrition in the pathogenesis of fetal alcohol syndrome (FAS), including impaired placental transport of nutrients
- Studies on ethanol-induced free radicals with subsequent impaired cellular processes, and studies on the role of radical-scavenging nutrients and antioxidants, such as vitamin E, vitamin C, carotenoids, and thiols in preventing alcohol-induced tissue damage
- Studies of alcohol-nutrient interactions related to possible health risks or benefits of moderate ethanol intake
- Studies on the caloric value and bioenergetics of ethanol and their relationship to obesity and body composition to clarify the nutrient value of alcohol and the fate of alcohol-related nutrient energy
- Studies on the contribution of alcohol in modulation of the endocannabinoid system and appetite regulating peptides such as ghrelin and leptin
- Studies of the roles of thiamin deficiency, alcohol intake, and genetic predisposition in the etiology of cellular degeneration and Wernicke-Korsakoff syndrome

- Research examining the genetic epidemiology and relationship of eating disorders to alcohol
- Evaluation of the role of alcohol-associated increased iron accumulation in the development of alcoholic liver disease and pancreatitis
- Evaluation of the role of alcohol-associated depletion of folate, S-adenosylmethionine, and glutathione in the development of alcoholic liver disease, pancreatitis, cardiomyopathy, and lung injury
- Understanding the role of magnesium in alcohol-associated strokes
- Understanding the role of alcohol on fat metabolism (oxidation, synthesis, and transport of fatty acids) and its connection with the development of alcoholic liver disease and muscle wasting
- Studies on the possible role of fat and protein composition of the diet in management and prevention of fatty liver, alcoholic hepatitis, or liver fibrosis and cirrhosis
- Investigation of the effects of alcohol on vitamin A metabolism and associated tissue injury
- Examination of the role of choline, betaine, retinoids and phosphatidylcholine in the attenuation of alcoholic liver disease
- Understanding the contribution of prenatal and postnatal nutritional factors that may modify risk for FASD in children with prenatal alcohol exposure.
- Nutritional deficits from alcohol induced intestinal dysbiosis

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National Institute of Allergy and Infectious Diseases (NIAID)

<http://www.niaid.nih.gov/>

Nutrition Research Spending (FY 2014):	\$40,660,433
Nutrition as Percentage of Total IC Obligations (FY 2014):	1.0%

OVERVIEW

Although NIAID was established in 1948, it traces its roots back to the Laboratory of Hygiene, a bacteriological laboratory that was founded in 1887 and was the forerunner of NIH and NIAID. NIAID supports basic and clinical research in microbiology, infectious diseases, immunology, and allergy. A major component of NIAID's basic research is concerned with fundamental life processes as exemplified in microorganisms and in animal cells in vitro. Techniques and basic biologic principles, developed as a result of this fundamental research in microbiology and immunology, have been applied to other areas of biology and medicine, including nutrition.

The complex interrelationships among nutrition, microbial infections, and immunology have important health implications. In the developing world, more than 1.7 billion cases of infectious diarrheal disease occur annually in children under the age of 5 years. Malnutrition both predisposes to diarrhea and occurs as a result of diarrhea. Immunodeficiency states, such as HIV/AIDS, cause malnutrition and set the stage for co-infections and co-morbidities that accelerate the cycle of malnutrition and infection. Asthma and allergic diseases affect over 60 million Americans. Surgery and trauma lay the groundwork for infection and subsequent malnutrition. Many of these infections and conditions, or their complications, can be mitigated, at least in part, by appropriate nutrition.

NIAID studies on nutrition are an integral part of the institute's research to lessen the adverse health consequences of immunologic and infectious diseases. Of particular significance are the consequences of wasting on the underlying HIV/AIDS disease process, including its infectious and immunological complications, and the role of nutrition in the development of safe and effective vaccines against infectious diseases. Continuing concerns are the prevalence of infections among the malnourished, the effect of infections on nutritional status, host-microbiome interactions and its relationship to nutrition in health and disease, the prevalence and control of acute respiratory infections and food-borne microbial illness, and the effect of malnutrition on resistance to infection, especially to infectious diarrhea and respiratory infections in young children.

RESEARCH DIRECTIONS

NIAID's interest in nutrition aims at a better understanding of the complex inter-relationships of nutrition, immunity, and infection. The institute's research directions are correspondingly varied. They include the following:

- All aspects of nutrition and the development, consequences, and treatment of HIV/AIDS; the relationship of nutrition to the development and treatment of co-morbidities (such as

osteopenia) associated with HIV disease and treatment; the relationship of nutrition to the pathogenesis and treatment of pediatric HIV disease, such as growth and development, including the impact of infant feeding choices; and the impact of undernutrition on absorption and pharmacodynamics of antiretroviral agents

- The negative effect of malnutrition on resistance to tropical infections, especially infectious diarrheas and tuberculosis, and the role of breast milk as a defense against enteric infections
- The role of host-microbiome interactions in disease and its relationship to nutrition
- The significant morbidity and mortality of rotavirus-induced infectious diarrhea among infants in developing countries and a major effort to develop a safe, effective, and practical rotavirus vaccine for newborns
- The impact of micronutrient deficiencies on the outcome of acute respiratory infections and on viral evolution, and the role of vitamin D and other micronutrients on tuberculosis and other infectious diseases
- The role of nutritional factors in the immune response to animal parasites that cause significant human disease, e.g., schistosomiasis, giardiasis, and cryptosporidiosis
- Infections in American hospitals, including the effect of surgery on immune function, hypercatabolism, and resistance to infection
- The modulating effects of specific nutrients (e.g., vitamins, trace elements, fatty acids, fiber, and amino acids) on basic immune function
- Immune responses, tolerance, and allergic reactions to specific foods such as milk, egg, and peanut

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National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

<http://www.niams.nih.gov/>

Nutrition Research Spending (FY 2014):	\$12,585,791
Nutrition as Percentage of Total IC Obligations (FY 2014):	2.5%

OVERVIEW

NIAMS conducts and supports basic and clinical research on many of the most debilitating diseases affecting the U.S. population. These include the many forms of arthritis and numerous diseases of the musculoskeletal system and skin, as well as research on the normal structure and function of joints, muscles, bones, and skin. NIAMS is the lead institute at NIH for research on osteoporosis and related bone diseases. Basic research involves a wide variety of scientific disciplines including immunology, genetics, molecular biology, biochemistry, physiology, virology, and pharmacology. Clinical research addresses the fields of rheumatology, orthopedics, bone endocrinology, sports medicine, and dermatology.

RESEARCH DIRECTIONS

NIAMS supports programs of research and research training in the fields of arthritis, musculoskeletal diseases, bone biology and bone diseases, muscle biology, and skin diseases. Examples of ongoing nutrition research supported by NIAMS are as follows:

- Studies on the function of diets and nutrients in osteoarthritis, autoimmune diseases such as rheumatic arthritis and lupus, inflammation, and joint pain
- Research on nutritional regulation of muscle growth and repair
- Investigation of dietary risk factors for bone loss and dietary intervention to prevent bone fractures

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National Institute of Dental and Craniofacial Research (NIDCR)

<http://www.nidcr.nih.gov/>

Nutrition Research Spending (FY 2014):	\$9,273,445
Nutrition as Percentage of Total IC Obligations (FY 2014):	2.4%

OVERVIEW

The mission of the National Institute of Dental and Craniofacial Research (NIDCR) is to improve dental, oral, and craniofacial health through research, research training, and the dissemination of health information. NIDCR has a diverse portfolio of research related to taste, smell, diet, nutrition, diabetes, obesity, and oral health, including specific research on oral cancer, orofacial clefting, dental caries (cavities), and periodontal disease.

NIDCR supports research on the three underlying components of caries: oral bacteria, the biology of teeth, and the important role of diet and nutrition. Both the types of food consumed and the eating behaviors themselves are key factors in the development of caries. A better understanding of the complexity of influences on oral health, including the role of behavior, diet and nutrition, will be essential to designing effective strategies and interventions to improve oral health.

RESEARCH DIRECTIONS

Nutrition and oral health

- Influence of fluoride, exposure to sugared beverages, and other dietary factors on caries in adolescents to inform effective caries prevention programs
- Roles of dietary components and/or plant extracts in regulating the inflammatory processes of periodontitis and rheumatoid arthritis
- Genome wide analysis of non-syndromic oral clefts to identify genes controlling risk and potential interactions with common maternal exposures, including diet
- Characterization of novel innate immunity factors in human milk and their role in reducing oral HIV transmission via breastfeeding
- Use of a stable derivative of a natural bioactive substance as an oral hygiene aid to prevent and/or treat gingivitis
- Identification of nutritional biomarkers during pregnancy and genetic variants associated with risk of oral clefts
- Studies on how taste and smell are integrated to impact the sensory experience of flavor and guide behavior

Microbiology

- Understanding how the bacteria that cause caries coordinate the uptake and metabolism of sugars to maximize their growth and acid production

- Characterizing the relationship between oral bacteria and obesity
- Studies on the association of factors such as an altered gut microbiome and nutritional deficiencies with adverse outcomes in HIV-exposed infants
- Developing an anti-caries therapy using cranberry extracts to disrupt bacterial biofilms and enhance the preventative effects of fluoride

Diabetes and metabolic syndrome

- Studies to assess the impact of glycemic control on the integration and survival of dental implants, to help inform which diabetic patients are candidates for dental implants
- Research on the association between diabetes and periodontal disease
- Investigation of the correlation between metabolic syndrome and periodontal disease in adult men and postmenopausal women

Oral cancer

- Studies of the mechanisms by which dietary components (e.g. Vitamin D, Vitamin A/retinoids) may influence oral cancer development and progression
- Research on the use of enriched plant extracts as a chemoprevention formulation for precancerous oral lesions
- Development of a mouthwash formulation containing natural antioxidants to prevent oral mucositis, a common side effect of chemo-radiation treatment for head and neck cancer

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National Institute on Deafness and Other Communication Disorders (NIDCD)

<http://www.nidcd.nih.gov/>

Nutrition Research Spending (FY 2014):	\$17,420,900
Nutrition as Percentage of Total IC Obligations (FY 2014):	4.3%

OVERVIEW

NIDCD conducts and supports research and research training on normal mechanisms, as well as on diseases and disorders of hearing, balance, taste, smell, voice, speech, and language.

Chemical Senses—Taste and Smell

The chemical senses—more commonly known as taste, smell, and chemesthesis (the “feel” of a chemical; chemically provoked irritation)—enable us to use chemical signals to communicate with the environment and each other. For people, memories of taste and smell experiences are vivid and long lasting, and play an important role in our enjoyment of life.

Specialized cells in the human oral cavity can detect at least five basic taste qualities: sweet, sour, bitter, salty, and savory (umami). Taste cells may also respond to components of fat, to calcium, and perhaps to other chemical substances found in foods and beverages. Together with the nose and oral cavity, the tongue also plays a role in chemesthesis, a multimodal chemical sensitivity whose burning sensations signal the presence of chemical irritants such as capsaicin in hot peppers and toxic chemicals in the air.

Taste and Smell—Impact on Nutrition

The chemical senses are important for regulating food preferences and intake. They evolved to help humans and other animals survive in environments in which required nutrients were scarce and many plants contained poisonous, bitter compounds. Consequently, we seek out sweet, fatty foods and tend to reject the bitterness that characterizes many nutritious vegetables. Although this behavior made sense as humans were evolving, an almost limitless availability of high-calorie foods today can cause the normal function of taste and smell to lead to overconsumption. Over two-thirds of American adults are overweight, and one-third are obese.⁶ Individuals who are overweight or obese are at risk for numerous serious conditions, including:

- type 2 diabetes,
- coronary heart disease and stroke,
- metabolic syndrome,
- certain types of cancer,
- sleep apnea,

⁶ NIDDK. [Overweight and Obesity Statistics, 2010.](#)

- osteoarthritis,
- gallbladder disease,
- fatty liver disease, and
- pregnancy complications.⁷

People who have smell and taste disorders often have problems appreciating foods, and claim that food is less enjoyable. They may change their eating habits. Some may eat too little and lose weight, while others may eat too much and gain weight. In either case, there may be a long-term impact on overall health. Loss of the sense of taste or smell may also cause a person to add too much sugar or salt to make food taste better. This can be a problem for people with certain medical conditions such as diabetes or high blood pressure. Cancer treatments such as radiation and chemotherapy may also result in taste and smell loss. In severe cases, loss of the ability to taste and/or smell can lead to depression.

Humans seek out their preferred flavors in foods. Flavor involves interactions between the sensors that detect taste, smell, and chemesthesis in our foods and the parts of the brain that interpret, remember, or think about them. Flavor plays an important role in determining whether someone accepts a particular food and how much of it they choose to eat.⁸ Scientists studying the chemical senses are interested in learning more about the molecular and developmental bases for how flavors influence food intake and overall health.

Overconsumption of salt has become an area of particular concern due to the high levels of salt found in the processed foods that comprise the typical modern diet. Historical evidence suggests that for a long time human beings have consumed more salt than is physiologically necessary.⁹ Scientists are interested in learning whether there is another undetermined reason for this high salt intake. Too much salt raises blood pressure, and high blood pressure is related to numerous health conditions including heart disease, kidney failure, and stroke.¹⁰

Scientists are interested in learning more about how the body detects and responds to salt, fats, and other food characteristics that humans seek out. Data gained from these studies can help us determine new strategies to control overconsumption and improve health without reducing our enjoyment of food. Ongoing research is studying the structure and function of discrete taste, smell, and chemesthetic receptors, as well as their targets within the brain.

⁷ NIDDK. [Do you know the health risks of being overweight?](#) 2007.

⁸ Beauchamp GK, Mennella JA. Flavor perception in human infants: Development and functional significance. *Digestion*. 2011; PMID: 21389721; PMCID: PMC3202923.

⁹ IOM. [Strategies to reduce sodium intake in the United States](#). Washington, DC: The National Academies Press; 2010.

¹⁰ NHLBI. [What is high blood pressure?](#) 2011.

RESEARCH DIRECTIONS

NIDCD's Priority Areas in Taste and Smell Research

With the help of experts in the field of Chemical Senses, NIDCD has identified the following areas of research opportunity and areas where gaps in knowledge are hampering our understanding. For more detail, please refer to [NIDCD's Strategic Plan for Research 2012-2016](#).

Priority Area 1

Understanding Normal Function

- **Fundamental Biology of Chemosensory Function:** Continue to develop and apply new tools and approaches to delineate the organization of molecules, cells, and neural circuits underlying the function of the gustatory and olfactory systems
- **Peripheral and Central Bases of Flavor:** Understand the complex interactions between peripheral and central aspects of flavor perception, including retronasal or orthonasal olfaction, oral chemesthesis (chemical irritation), taste, oral somesthesia (temperature, texture), memory, and motivational state (e.g., hunger)
- **Sentinel/Sensory Functions:** Describe how chemical senses help us avoid dangers such as spoiled or contaminated foods, how they detect potentially toxic chemicals in the environment and in our bodies, and how these protective functions can be damaged and regenerated
- **Genetic Aspects of Chemosensory Sensitivity:**
 - **Genomics:** Identify genes involved in the development and normal function of the taste and smell systems
 - **Variation:** Describe the normal variation in taste and smell sensitivity; identify the genes involved in order to understand what is outside the range of normal function; describe how such variation may relate to susceptibility for human communication disorders
 - **Experience:** Identify genes involved with storing memories of taste and smell; determine how experience influences future diet
 - **Epigenetics:** Describe how external factors (e.g., diet, stress) activate and deactivate genes
- **Central Control of Taste and Smell:** Characterize inputs from the central nervous system that adjust the sensitivity of taste and smell receptors or otherwise modulate sensory input, and determine how such activity may change depending on motivational or cognitive factors
- **Develop Tools to Measure Taste and Smell Function:** Provide practicing physicians with standardized tools to test taste and smell during physical exams or routine office visits
- **Develop Novel Approaches to Alter Taste Function:** Alter the levels of salt, sugar, and fat intake using innovative methods such as using artificial substitutes or changing learned flavor preferences

- Training: Emphasize training in certain classical areas of investigation (e.g., psychophysics, in vivo extracellular recordings, and quantitative electron microscopy) to ensure that taste and smell research can continue to be multidisciplinary

Priority Area 2

Understanding Diseases and Disorders

- Genetic Disorders: Clarify and classify taste and smell disorders caused mainly by significant genetic alterations (e.g., ciliopathies and channelopathies)
- Sinusitis/Rhinitis: Identify the molecular and cellular bases for loss of olfaction following nasal cavity or sinus infection, the most common cause of temporary and permanent olfactory loss
- Understand How the Activity of the Chemical Senses Can Lead to Excessive Consumption: Determine whether excessive calorie intake is affected by normal variation or altered function of taste and smell activity
- Epidemiology: Describe the incidence and prevalence of taste and smell loss and dysfunction; for example, as the population ages, determine how many more people report taste and smell problems that affect quality of life

Priority Area 3

Improving Diagnosis, Treatment, and Prevention

- Improved Diagnostic Tools and Pharmacological Treatments: Develop and validate tests to evaluate taste and smell function that are practical and affordable for use in the office setting; develop targeted drugs to treat taste and smell dysfunction, especially drugs which slow apoptosis (cell death) and promote regeneration
- Regenerative Medicine/Tissue Engineering: Increase understanding of the properties that enable stem cells in the peripheral taste and smell pathways to proliferate and differentiate, providing insights not only for the treatment of taste and smell loss but also for the treatment of other neurological diseases
- Enhancing the Clinical Enterprise: Promote clinical training in the chemical senses, and create targeted funding opportunities, to encourage more clinical research and interdisciplinary teams of clinicians and basic scientists

Priority Area 4

Improving Outcomes for Human Communication

- Translational Research: Translational Research is in its infancy in the chemical senses, due in part to the modest amount of clinical research that has been conducted; currently, no evidence-based preventive measures, interventions, or treatments are applied to taste and smell dysfunction; comparative effectiveness research is premature because of the lack of intervention and treatment strategies and decisions; this is a critical gap area in the chemical senses, especially since taste and smell loss become increasingly common in a population

OUTLOOK

Nutrition is often a significant factor in studies of taste and smell, and NIDCD will continue to support chemosensory/nutrition research through the Taste and Smell Program. Because this research is often of trans-NIH relevance, NIDCD will continue to collaborate with other components of the NIH.

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National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)

<http://www2.niddk.nih.gov/>

Nutrition Research Spending (FY 2014):	\$545,799,910
Nutrition as Percentage of Total IC Obligations (FY 2014):	29.0%

OVERVIEW

Since its creation in 1950, NIDDK's research responsibilities have included nutrition-related programs to prevent and treat disorders such as liver and biliary diseases; pancreatic diseases; gastrointestinal, digestion, and absorption disorders; diabetes; obesity; a variety of endocrine disorders; kidney and urological diseases; metabolic diseases, including cystic fibrosis; and eating disorders. NIDDK plays an important role in the study of nutritional factors relating to the etiology, prevention, and treatment of diabetes and digestive and kidney diseases. This research is supported by three divisions: the Division of Diabetes, Endocrinology, and Metabolic Diseases; the Division of Digestive Diseases and Nutrition; and the Division of Kidney, Urologic, and Hematologic Diseases.

Nutrition research training in the areas of nutrient metabolism, obesity, and energy regulation has been encouraged. NIDDK training and career development (F, T, and K funding mechanisms) are described in more detail at the following website: <http://www2.niddk.nih.gov/Funding/TrainingCareerDev/>.

The NIDDK Clinical Obesity Research Panel (CORP) is the successor to the National Task Force on Prevention and Treatment of Obesity, which was in existence from June 1991 until June 2003. The NIDDK CORP, composed of leading obesity researchers and clinicians, is charged with providing advice to the NIDDK Advisory Council on important clinical research needs related to obesity prevention and treatment, including their relative priority and costs, and identifies concepts for future clinical studies of obesity. The CORP serves in an advisory capacity to the [Weight-control Information Network](#) and may suggest topics for NIDDK-sponsored workshops and develop papers on topics related to clinical aspects of obesity. The CORP is placed organizationally under the auspices of the NIDDK Advisory Council, and a member of the NIDDK Advisory Council serves on the CORP as a liaison member.

The Weight-control Information Network (WIN) is an information service of the [National Institute of Diabetes and Digestive and Kidney Diseases \(NIDDK\)](#). WIN was established in 1994 to provide the general public, health professionals, the media, and Congress with up-to-date, science-based information on obesity, weight control, physical activity, and related nutritional issues.

WIN produces, collects, and disseminates materials on obesity, weight control, and nutrition. Win provides:

- [Publications](#), including fact sheets and brochures
- NIDDK's Clinical Weight Loss and Control Lecture Series videos
- Information on [Nutrition Obesity Research Centers \(NORCs\)](#)

- [WIN Notes](#), an electronic newsletter for health professionals features the latest information from NIDDK and other organizations on obesity, weight control, and related nutritional topics; WIN Notes also reports on activities of the NIDDK-sponsored Clinical Obesity Research Panel (CORP)
- [Sisters Together: Move More, Eat Better](#), WIN's national initiative to encourage Black women to maintain a healthy weight
- Additional WIN resources: <http://win.niddk.nih.gov/resources/index.htm>

RESEARCH DIRECTIONS

NIDDK fosters and supports other nutrition research and training in a number of areas of basic and clinical nutrition including:

- Research on dietary requirements (and safe levels) of many nutrients needed for health maintenance, proper growth and development, and a state of well-being at all ages and under various conditions, such as stress, drug use, nutrient imbalances, and changing activity levels
- Fundamental studies exploring nutritional factors that are active in absorption, transport, and metabolism, the biological control of such processes, and the identification of unrecognized roles of nutrients or their metabolites
- Research on dietary fiber to determine its chemical characteristics in order to determine its effects on intestinal microflora and food transit time; its interaction with nutrients, bile acids, and other substances in the gut; its effects on digestive enzymes and absorption; and the development of improved routine methods for analyzing its components
- Assessment of the requirement levels and metabolic roles of trace elements, with the help of reliable, newly developed analytical methods
- Research on relationships between genetic predisposition, induced metabolic changes, thermogenesis, environmental and physiological factors, and behavioral and lifestyle factors that result in obesity
- Research on the social, cultural, psychological, economic, environmental, and other determinants that influence eating patterns and dietary intake
- Clinical trials investigating approaches to prevent or treat obesity
- Research to evaluate environmental and policy interventions to promote healthy eating
- Studies to evaluate the role of various interventions such as liquid meal replacements, or the role of non-caloric beverages, in weight loss and maintenance
- Studies of the mechanism and efficacy of pharmacologic agents on energy balance and weight control
- Determination of the most effective individual, group, and community intervention strategies for weight management

- Investigation into the contribution of genetic and metabolic factors to obesity causation, including the molecular and genetic basis of energy metabolism and the nature of genetic factors associated with human obesity research to improve nutritional support to hospitalized patients, to improve nutritional status assessment methodology, and to acquire more information about the effects of disease states on the nutritional needs of patients
- Investigation of dietary modifications that may retard the rate of progression of end-stage renal disease, reduce the need for dialysis, or both
- Investigation of the mechanisms by which nutrients might affect renal function
- Studies of the causes of wasting malnutrition and other nutritional disorders that occur in renal failure
- Research on the interplay of dietary factors (such as calcium, vitamin D, phosphate, protein, and oxalate) in the etiology of renal stones
- Studies on hormones that regulate bone metabolism, nutrition and nutrient metabolism, and the maintenance of calcium balance, especially as related to osteoporosis and related bone disorders
- Studies of nutrients (and nutrient absorption) that influence bone metabolism
- Studies to elucidate the endocrine and metabolic basis of wasting in HIV infection and other chronic diseases
- Studies to elucidate the molecular basis for the metabolic and body composition changes seen in HIV infection and/or treatment
- Exploration of mechanisms for the development of gastrointestinal malabsorption in patients with HIV infection and investigations of other metabolic perturbations of nutrient metabolism, such as lipogenesis, to develop rational means of nutritional support of these patients
- Regulation of muscle mass and nitrogen balance in HIV infection.
- Studies on the role of calorie intake and physical activity, and subsequent weight control, in the prevention of type 2 diabetes
- Investigation of the metabolic mechanisms of intestinal and hepatic processing of dietary carbohydrate, and the effects of other nutrients and of fiber on carbohydrate metabolism
- Studies on the role of nutrients in gene regulation and expression
- Investigation of the effects of nutrient antioxidants in normal and abnormal cellular function and metabolism.
- Clinical research into nutrition-related areas such as cholesterol and pigment gallstones; inborn errors in bile acid metabolism; chronic hepatitis that evolves from autoimmune, viral, or alcoholic disease; and various liver diseases, such as Wilson's disease and portal hypertension
- Investigations into the control of appetite and satiety in animals and humans
- Funding of multiple Nutrition/Obesity Research Centers (NORCs), each conducting an intensive program of nutrition research

- Large multi-site clinical trials investigating health impact of weight loss in persons with type 2 diabetes
- Studies on the impact of bariatric surgery on health and on the mechanisms by which bariatric surgery may impact food intake, body weight, and obesity-related co-morbid conditions

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For more information on the NIDDK obesity research program and staff contact information please see: <http://www2.niddk.nih.gov/Research/ScientificAreas/Obesity/>.

National Institute on Drug Abuse (NIDA)

<http://www.drugabuse.gov/>

Nutrition Research Spending (FY 2014):	\$20,933,427
Nutrition as Percentage of Total IC Obligations (FY 2014):	2.1%

OVERVIEW

NIDA's mission is to lead the Nation in bringing the power of science to bear on drug abuse and addiction. NIDA supports research programs in basic, clinical, and translational sciences in the areas of neuroscience, genetics, medication and behavioral therapies, epidemiology, prevention, and health services, including implementation science and comparative effectiveness research.

RESEARCH DIRECTIONS

NIDA encourages and supports a variety of nutrition-related research in human and animal subjects. Examples of NIDA-funded studies and areas of interest include:

- Identifying whether developmental exposure, including prenatal exposure, to specific nutrients modifies subsequent sensitivity or vulnerability for drug abuse or other natural rewards
- Determining the role of nutritional conditions affecting homeostatic regulation, food restriction, and the effect of specific nutrients, on drug taking and relapse to drug taking
- Understanding the influence of environmental exposures, including drugs of abuse and dietary components, on brain energy utilization in key systems for drug abuse and addiction
- Studies of nutritional and metabolic disorders in HIV-positive and HIV-negative drug users
- Studies of the addiction-like effects of highly palatable foods, and conversely, the role of appetite-regulating peptides such as orexin/hypocretin, leptin, and ghrelin in drug addiction
- Examining bi-directional interactions between the effects of drugs of abuse on the gut microbiome and microbial effects in the gut-brain axis on motivational and cognitive processes influencing drug abuse and addiction
- Assessing the biological basis for co-morbidity of eating disorders and drug addiction, including the role of stress hormones and specific neurotransmitter systems
- Behavioral and neurobiological studies of reward processing and compulsive seeking of food and drug rewards to characterize processes of dysregulation
- Identifying biobehavioral mechanisms underlying appetite changes associated with smoking cessation, including the role of genetic factors and gender differences

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National Institute of Environmental Health Sciences (NIEHS)

<http://www.niehs.nih.gov/>

Nutrition Research Spending (FY 2014):	\$55,249,904
Nutrition as Percentage of Total IC Obligations (FY 2014):	7.5%

OVERVIEW

The National Institute of Environmental Health Sciences (NIEHS) is located in Research Triangle Park, North Carolina. The mission of NIEHS is to discover how the environment affects people in order to promote healthier lives. As an institute, NIEHS is uniquely positioned to investigate the interplay between environmental exposures, human biology, genetics, and common diseases that limit longevity and quality of life.

Research conducted over the past several decades indicates clearly that disease risk is multifactorial, influenced by diverse elements that include exposure to environmental agents, diet/nutrition, and genetic susceptibility. From a pathophysiological standpoint, many environmental exposures affect common biological pathways that are linked to disease, such as oxidative stress and inflammation; these same pathways are likely to be influenced by diet and nutritional status. Thus, variability in disease risk in response to environmental exposures within populations may be at least partially attributable to unmeasured variation in nutritional status and/or other components of the diet. The NIEHS nutrition research portfolio includes projects aimed at: 1) more clearly identifying those dietary components that influence the trajectory or onset of environmentally-linked disease, and 2) increasing our understanding of the mechanisms underlying the interplay between diet/nutrition and exposure to environmental agents and disease risk. A better understanding of mechanisms underlying these complex interactions will enable the development of effective primary prevention and intervention strategies to mitigate environmentally-induced diseases.

RESEARCH DIRECTIONS

Applied Research

- Expand existing studies to look at the interplay between diet and health outcomes, including secondary data analysis in on-going studies
- Encourage studies to test or develop novel tools or methods of exposure assessment for future studies that will look at diet and environment
- Refine and validate dietary assessments for exposure characterized subpopulations
- Add new environmental measures or assays to existing dietary studies
- Develop new analytical methods or models to incorporate multiple layers of data (diet and environment)

Basic Research

- Identify pathways during critical life stages where the effects of dietary parameters will have the most pronounced effects on health outcomes

- Use well established animal models of environmentally-induced disease to study the interaction of diet with environmental toxicants
- Identify key molecular targets in relevant biologic pathways that could be useful in prevention/intervention studies

Examples of Nutrition Research Supported by NIEHS

- The impact of dietary fat on arsenic-induced hepatotoxicity
- Silica-accelerated autoimmunity and the role of dietary lipids
- The epigenetic effects of dietary polyphenols and zeronal
- Diet, physical activity, and the relationship between air pollution and CVD
- Health disparities that can lead to both poor nutrition and increased environmental exposures in vulnerable populations
- The combined effects of high fat diet and air pollutants on inflammation and insulin resistance
- Increased neurotoxicity of manganese in individuals with iron deficiency
- Combined exposures to poor nutrition and chlorinated organics that lead to obesity, CVD, and cancer
- Nutrients that modify the toxicity of methylmercury in a fish-eating population
- Ameliorating environmental risk factors for autism with folate supplements
- The protective effects of fatty acids against phthalate-induced inflammation
- The protective effects of selenium against neurological damage
- The impact of serum vitamin D levels on susceptibility to inhaled pollutants in urban children with asthma
- The impact of prenatal diet on how air pollutants affect neurodevelopment
- The endocrine disrupting effects of genistein in soy formula
- The efficacy of chemoprevention interventions with broccoli sprouts in populations exposed to high levels of food (aflatoxins) and air-borne toxicants (alkylanilines and polycyclic aromatic hydrocarbons)
- Prevention of UV-induced carcinogenesis by cyanidin-3-glucoside

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National Institute of General Medical Sciences (NIGMS)

<http://www.nigms.nih.gov/>

Nutrition Research Spending (FY 2014):	\$59,387,873
Nutrition as Percentage of Total IC Obligations (FY 2014):	2.5%

OVERVIEW

The principal mission of NIGMS is to support fundamental research that undergirds all biomedical investigations. The major focus of the institute is on research concerned with expanding knowledge of fundamental biological structure and function at the cellular and molecular levels. Extramural studies supported by the institute include investigations in the biophysical sciences and the physiological sciences, in particular the response of the whole body to trauma; the structure and function of the cell; the basic mechanisms of heredity; and the molecular aspects of the interactions between therapeutic drugs and agents and their target cells, tissues, or organs.

The majority of the nutrition-related research supported by NIGMS is in its trauma and burn injury program area, which focuses on the mechanisms involved in the body's systemic responses to trauma. Thus, research on the role of nutrition in decreasing morbidity rates and morbidity for patients who suffer serious trauma or burn injury is of significant interest to the institute. NIGMS-supported scientists are exploring nutritional requirements following severe trauma and sepsis, new concepts in parenteral therapy, branched chain amino acid feeding during injury, and cellular function during septic and hemorrhagic shock. In addition, studies are being supported that are investigating the cellular changes and mechanisms responsible for the protein wasting associated with nutritional deprivation.

RESEARCH DIRECTIONS

The following areas of basic research on diseases and traumatic injury are being investigated:

- The role of diet in organ and cellular responses to cytokines
- Changes in metabolic patterns and nutritional requirements following severe injury
- Hormonal imbalance following injury and its effects on metabolism
- Mechanisms involved in producing a protein catabolic state after injury
- Adaptive regulation of nutrient transport by the gut; transport appears to be governed by nutrient-receptor proteins on specific cell surfaces
- Mechanism of suppression of lipoprotein lipase activity by tumor necrosis factor (TNF)
- Determining components of the host defense system (neutrophils, immunomodulators, etc.) that are important in preventing bacterial translocation
- Identifying receptors that recognize serum proteins carrying galactosyl sugar residues, including hormones that regulate the rate and extent of nutrient uptake and processing in the liver
- The importance of enteral versus parenteral feeding

- The inclusion of glutamine and human growth hormone in nutritional regimes
- Interactions between and regulation of arginine, citrulline, ornithine, and urea metabolism following trauma or sepsis

Research supported by NIGMS serves to establish the foundation of new knowledge needed to make advances in the understanding of biological processes and many diseases. Those investigations that are nutrition-related will help to provide the concepts and relevant information necessary to develop new treatments, particularly in the area of traumatic injury, and hence, serve to decrease morbidity and mortality.

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National Institute of Mental Health (NIMH)

<http://www.nimh.nih.gov/index.shtml>

Nutrition Research Spending (FY 2014):	\$30,706,118
Nutrition as Percentage of Total IC Obligations (FY 2014):	2.2%

OVERVIEW

The mission of NIMH is to transform the understanding and treatment of mental illnesses through basic and clinical research, paving the way for prevention, recovery, and cure.

RESEARCH DIRECTIONS

The Eating Disorders Research Program

This program supports research on the etiology, core features, longitudinal course, and assessment of eating disorders. It also supports studies focusing on the elucidation of risk factors for the onset or recurrence of psychopathology. Intervention development studies grounded in findings from psychopathology are supported as the next step in the translation of basic research to effective treatments.

Areas of Emphasis

- Identifying phenotypes and endophenotypes as new targets for assessment and therapeutics that are emerging from integrative genetics, pathophysiology, and psychopathology research
- Conducting translational research on cognition, emotion and affect dysregulation to find new strategies for treating eating disorders
- Identifying ways in which genetic and environmental factors interact to raise or lower risk for eating disorders
- Developing new preventive and treatment interventions targeted to specific cognitive, emotional, or interpersonal components of the psychopathology of eating disorders
- Using modern psychometric and statistical theories to advance fundamental conceptualizations of nosology and consequent approaches toward more focused assessment and treatment of the many dimensions and subtypes that constitute eating disorders

Mechanisms of Biobehavioral and Mood Dysregulation Program

This program supports research on the mechanisms underlying mood dysregulation in childhood-onset mental disorders. Of particular interest is research that identifies genetic factors and/or aspects of neural structure or function associated with dysregulated mood, anxiety, emotional processing, and biobehavioral processes such as sleep and appetite. Examples of areas of interest include positive and negative affect, suicidality, anxiety, fear, mood cycling, sleep/circadian rhythm disturbance, appetite dyscontrol, and motivation.

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National Institute on Minority Health and Health Disparities (NIMHD)

<http://www.nimhd.nih.gov/>

Nutrition Research Spending (FY 2014):	\$18,720,196
Nutrition as Percentage of Total IC Obligations (FY 2014):	7.0%

OVERVIEW

Over the last two decades the overall health of the Nation has improved significantly. Yet, racial/ethnic minorities and other medically underserved populations continue to experience an alarmingly disproportionate burden of illness, disability, and premature death. These populations typically have a shorter life expectancy and higher rates of cardiovascular disease, cancer, infant mortality, obesity, asthma, diabetes, stroke, and mental illness.

Established by the Minority Health and Health Disparities Research and Education Act of 2000, Public Law 106-525, the National Center on Minority Health and Health Disparities (NCMHD) was re-designated in FY 2010 as the NIMHD, and all the responsibilities of NCMHD authorized under Public Law 106-525 were transferred to the institute in accordance with the Patient Protection and Affordable Care Act (Public Law 111-148). In accordance with this Act, NIMHD is charged to plan, review, coordinate, and evaluate minority health and health disparities research activities conducted by NIH institutes and centers (ICs). NIMHD seeks to understand health disparities and implement strategies to eradicate them across the nation. As health disparities transcend many diverse areas of biomedical science and public health, NIMHD works independently and in partnership with all of the NIH institutes and centers and with other federal agencies and grassroots organizations in minority and other medically underserved communities to:

- Conduct and support basic, clinical, social sciences, and behavioral health disparities research and research training
- Understand and eradicate health disparities
- Strengthen the infrastructure of qualified research institutions that conduct health disparities research and training
- Establish Centers of Excellence (COE) in health disparities research, research training, and outreach
- Provide Endowment Grants at Centers of Excellence established by NIMHD or under HRSA Section 736
- Repay the educational loans of culturally competent researchers who agree to do health disparities research and clinical research
- Increase the numbers of minorities and other medically underserved populations in health disparities research

- Promote outreach and the dissemination of health information to minorities and other medically underserved populations

RESEARCH DIRECTIONS

NIMHD supports nutrition research that informs the treatment and prevention of diseases disproportionately impacting on medically underserved populations. The following research goals are currently being pursued:

- Reduce risk factors for chronic disease and rebuilding local food economies through community-based participatory research with church youth in rural North Carolina
- Understand the relationship between socio-cultural factors, dietary intake, and individual psychosocial factors to increase the success of obesity interventions among black women residing in Alabama
- Explore the use a refined smectite clay as a potential aflatoxin enterosorbent for populations at risk for dietary exposure to aflatoxin
- Determine the impact of obesity and diabetes during pregnancy on racial disparities in maternal and infant outcomes at the population level for blacks, Hispanics, and non-Hispanic whites in South Carolina
- Provide the knowledge and research tools needed to conduct and develop translational and transdisciplinary research and interventions to eliminate health disparities through the annual Health Disparities Course.
- Investigate the role of Vitamin D in hypertensive heart disease in African American adults.
- Investigate the relationship between vitamin D and subclinical target-organ cardiac damage in a cohort of African-American, vitamin D deficient hypertensive patients without prior history of heart disease. To study the role of Vitamin D deficiency that may be an important contributor to racial differences in hypertensive heart disease.
- Develop family-based obesity preventive interventions for youth that target physical activity and poor diet, for Hispanic youth that have disproportionate and multiple obesity-related health burdens.
- Develop healthy eating mobile applications ("apps") that target the Hispanic population, incorporating Spanish language, culturally-tailored food shopping suggestions, educational and motivational text messages, and peer support via social media.
- Examine the contribution of vitamin D to disparities in the control and severity of asthma in African American youths.

OUTLOOK

NIMHD collaborates annually with the NIH Director and NIH institute and center directors to update the [NIH Health Disparities Strategic Plan and Budget](#). This strategic plan serves as a guiding mechanism for

the conduct and support of all NIH minority and health disparities research. NIMHD strives to ensure continued progress toward effective methods of treating and preventing diseases disproportionately impacting minorities and medically underserved populations.

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National Institute of Neurological Disorders and Stroke (NINDS)

<http://www.ninds.nih.gov/>

Nutrition Research Spending (FY 2014):	\$20,105,151
Nutrition as Percentage of Total IC Obligations (FY 2014):	1.3%

OVERVIEW

Created in 1950, NINDS conducts, fosters, coordinates, and guides research on the causes, prevention, diagnosis, and treatment of neurological disorders and stroke, and supports basic research in related scientific areas. The mission of NINDS is to reduce the burden of neurological disease—a burden borne by every age group, by every segment of society, and by people all over the world.

RESEARCH DIRECTIONS

Rapid and recent progress in brain research has yielded new understanding of the interaction between nutrition and the nervous system. NINDS nutrition research supports studies examining the role of specific nutrients in a number of neurological disorders and in neuronal injury. Additionally, the influence of brain-specific regulatory factors on obesity and other eating disorders is being investigated.

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National Institute of Nursing Research (NINR)

<http://www.ninr.nih.gov/>

Nutrition Research Spending (FY 2014):	\$13,585,027
Nutrition as Percentage of Total IC Obligations (FY 2014):	9.7%

OVERVIEW

The mission of NINR is to promote and improve the health of individuals, families, communities, and populations. NINR supports clinical and basic research, and research training, to build the scientific foundation for clinical practice, prevent disease and disability, manage and eliminate symptoms caused by illness, and enhance end-of-life and palliative care. The research focus encompasses health promotion and disease prevention, quality of life, health disparities, and end-of-life/palliative care. NINR seeks to extend nursing science by integrating the biological and behavioral sciences, employing new technologies to research questions, improving research methods, and developing the scientists of the future. The research mission of NINR is available at:

www.ninr.nih.gov/AboutNINR/NINRMissionandStrategicPlan/

RESEARCH DIRECTIONS

NINR views nutrition as an essential component of health promotion, disease prevention, and self and symptom management; and, as such, supports a broad range of research in the science of nutrition. The nutrition research portfolio at NINR crosses the spectrums of disease, populations, and the lifespan. Recent examples of research areas include studies elucidating the effects of nutrition in gestation, including conditions such as pre-eclampsia; examining breastfeeding outcomes and feeding difficulties in pre-term infants and their growth and long-term health outcomes; designing and testing tailored, nutritional interventions for low income and diverse populations; exploring nutritional connections and molecular mechanisms in abdominal and gastrointestinal pain for children and adults; implementing nutrition interventions in diabetes and kidney disease management; and, developing and testing a variety of interventions for prevention and treatment of obesity and cardiovascular disease. NINR has co-sponsored several nutrition-related funding announcements and recently sponsored an announcement (PA-10-236: Health Promotion Among Racial and Ethnic Minority Males) to promote research into the development and testing of innovative interventions to reduce risk factors associated with the leading causes of morbidity and mortality (e.g., smoking, poor nutrition, and alcohol use) among racial and ethnic minority men in rural, urban, and nontraditional settings.

These studies highlight NINR's long-term commitment to health promotion, patient empowerment in the management of illness and recovery, and the reduction of disease and disability. Findings from these studies will add to the growing body of literature related to nutrition.

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Office of the Director
<http://www.nih.gov/icd/od/>

Nutrition Research Spending (FY 2014):	\$44,006,778
Nutrition as Percentage of Total IC Obligations (FY 2014):	9.3%

Office of the Director (OD) includes Office of Disease Prevention, Office of Dietary Supplements, Office of Behavioral and Social Sciences Research, Office of Research on Women's Health, Office of Extramural Research, Office of Research Infrastructure Programs, SEPA, and the NIH Roadmap/Common Fund.

Office of Behavioral and Social Sciences Research (OBSSR)
<http://www.obssr.od.nih.gov/>

OVERVIEW

Congress established the OBSSR in the Office of the Director, NIH, in recognition of the key role that behavioral and social factors often play in illness and health. OBSSR's mission is to stimulate behavioral and social sciences research throughout NIH and to integrate these areas of research more fully into others of the NIH health research enterprise, thereby improving our understanding, treatment, and prevention of disease.

OBSSR officially opened on July 1, 1995. The major responsibilities of the office are:

- To provide leadership and direction in the development, refinement, and implementation of a trans-NIH plan to increase the scope of and support for behavioral and social sciences research.
- To inform and advise the NIH director and other key officials of trends and developments having significant bearing on the missions of the NIH, DHHS, and other federal agencies.
- To serve as the principal NIH focus for research on the importance of behavioral, social, and lifestyle factors in the causation, treatment, and prevention of disease; and to advise and consult these topics with NIH scientists and others within and outside the federal government.
- To develop a standard definition of "behavioral and social sciences research," assess the current levels of NIH support for this research, and develop an overall strategy for the uniform expansion and integration of these disciplines across NIH institutes and centers.
- To develop initiatives designed to stimulate research in the behavioral and social sciences arena, integrate a bio-behavioral perspective across the research areas of the NIH, and encourage the study of behavioral and social sciences across NIH's institutes and centers.
- To initiate and promote studies to evaluate the contributions of behavioral, social, and lifestyle determinants in the development, course, treatment, and prevention of illness and related public health problems.
- To provide leadership in ensuring that findings from behavioral and social sciences research are disseminated to the public.
- To sponsor seminars, symposia, workshops, and conferences at the NIH and at national and international scientific meetings on state-of-the-art behavioral and social sciences research.

RESEARCH DIRECTIONS

OBSSR's vision is to bring together the biomedical, behavioral, and social science communities to work more collaboratively to solve the pressing health challenges facing our nation. OBSSR's plan includes facilitating: (a) the next generation of basic behavioral and social sciences research; (b) trans-disciplinary "team science" that integrates biomedical, behavioral, and social-ecological perspectives; (c) research that looks at how individual, group, and societal factors interact; and (d) the translation, implementation, dissemination, and maintenance of best practices and proven strategies that reduce the burden of chronic disease and eliminate inequities in health and health care.

Consumption of a nutritious diet is of primary importance for health. Moreover, dietary intake is a behavior that is strongly influenced by social factors such as family, peer group, community, socioeconomic status, culture, and education. Recent OBSSR activities related to research on dietary intake, particularly as related to obesity, include the following: 1) Participation in the National Collaborative on Childhood Obesity Research (NCCOR) and co-lead NCCOR's [Envision network](#) on modeling to inform policy to reduce childhood obesity; 2) Co-sponsorship of ORBIT (Obesity Related Behavioral Intervention Trials), a program led by the National Heart, Lung, and Blood Institute, aimed at developing new approaches to improve obesity-related behaviors based on basic behavioral and social science findings; 3) In collaboration with numerous NIH Institutes and Centers, issuance of PA-11-063, *Translating Basic Behavioral and Social Science Discoveries into Interventions to Improve Health-Related Behaviors (R01)*; and 4) OBSSR provides co-funding for, and sits on the Steering Committee of, the [Johns Hopkins Global Center on Childhood Obesity—Where Systems Science Meets Public Health](#), (PI: Youfa Wang; grant # U54-HD-070725-01).

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Office of Dietary Supplements (ODS)

<http://ods.od.nih.gov/>

OVERVIEW

The mission of the ODS at the National Institutes of Health (NIH) is to strengthen knowledge and understanding of dietary supplements by evaluating scientific information, stimulating and supporting research, disseminating research results, and educating the public to foster an enhanced quality of life and health for the U.S. population.

Dietary supplements are widely used in the United States by people who want to maintain or improve their health or reduce their risk of illness. Americans spend over \$34 billion per year on more than 75,000 products containing vitamins and minerals, herbs and botanicals, and other ingredients such as glucosamine, fish oils, and probiotics.

The Dietary Supplement Health and Education Act (DSHEA) of 1994 defined dietary supplements as products intended to supplement the diet. DSHEA also established ODS at NIH in the U.S. Department of Health and Human Services (HHS), which began operations in November 1995. Its director is Paul M. Coates, PhD.

Scientists are studying dietary supplements to determine their value in maintaining good health. ODS supports this research to assess the benefits and risks of dietary supplements and communicates the results of this research to scientists, health professionals, and consumers.

RESEARCH DIRECTIONS

Examples of ODS Activities:

Research Support

The majority of the ODS budget supports research on dietary supplements in collaboration with many NIH institutes and centers. For the 5 year period, FY2010 to FY2014 ODS provided more than \$67 million in co-funding more than 450 grants. Since its inception, ODS has funded hundreds of conferences, workshops, symposia, and meetings on dietary supplements that help inform and direct research efforts for ODS and NIH.

<http://ods.od.nih.gov/Research/funding.sec.aspx>

Botanical Research Centers

Since 1999, ODS has funded multidisciplinary centers to study the health effects of botanicals (products made from plants) at academic research institutions across the United States. These centers identify and characterize botanical ingredients, assess their biological activity and bioavailability (amount that the body can use); evaluate their effects in cells, animals, and people; help select botanicals to test in clinical trials; and provide a rich environment for training and career development.

http://ods.od.nih.gov/Research/Dietary_Supplement_Research_Centers.aspx

Analytical Methods and Reference Materials

More than 75,000 dietary supplements are estimated to be available in the U.S. marketplace, but in many cases, reliable analytical methods are not available to assess the quality of their ingredients. This ODS initiative enhances collaborative efforts to develop and validate analytical methods and develop reference materials for commonly used dietary supplements.

<http://ods.od.nih.gov/Research/AMRMPProgramWebsite.aspx>

Evidence-Based Reviews

ODS sponsors systematic reviews of the efficacy and safety of dietary supplements and the identification of research needs. Reviewed topics have included ephedra, omega-3 fatty acids, vitamin D, soy, berries and B vitamins, and multivitamin/mineral supplements.

http://ods.od.nih.gov/Research/Evidence-Based_Review_Program.aspx

Training and Career Development

ODS provides support for postdoctoral students and scientists at universities across the United States, as well as in government agencies. This program's goal is to expand the number of well-qualified researchers who investigate dietary supplements, with an emphasis on training young investigators, minorities, and women.

<http://ods.od.nih.gov/Research/Training.aspx>

Population Studies

This program evaluates dietary supplement use, including the assessment of biological measures of supplement exposure and associated health effects in representative populations. This effort will build the capacity of ODS to analyze population data, such as those from the National Health and Nutrition Examination Survey (NHANES). Initial work has focused on vitamin D through collaborative research projects with several universities and government agencies.

Vitamin D Initiative

ODS leads efforts to advance knowledge of vitamin D's importance to health, and to accurately measure vitamin D levels in foods and vitamin D status in the U.S. population. ODS has funded the development of standard reference materials to assess this nutrient, and has sponsored evidence-based reviews to inform updated recommended dietary allowances and safe levels of intake for vitamin D. ODS also sponsors conferences and workshops on vitamin D and leads a federal working group to identify and meet research needs.

Dietary Supplement Ingredient and Label Databases

The Dietary Supplement Ingredient Database (DSID) provides estimated levels of ingredients in dietary supplement products sold in the United States. The DSID is intended primarily for research applications.

<http://dietarysupplementdatabase.usda.nih.gov/>

The Dietary Supplement Label Database (DSLDD) contains information taken from the labels of approximately 42,000 dietary supplement products available in the U.S. Marketplace. Each month 1,000 labels are added to the DSLDD.

<http://www.dsld.nlm.nih.gov/dsld/>

Communications

ODS develops and disseminates information about the latest science on dietary supplements. This information is provided through the ODS Web site, fact sheets, e-newsletters, and staff presentations at professional and consumer-focused meetings. More information:

<http://ods.od.nih.gov/HealthInformation/makingdecisions.sec.aspx>

Information Resources on Dietary Supplements

ODS makes accurate and up-to-date scientific information about dietary supplements available to researchers, health care providers, and the public, through the following resources:

Dietary Supplement Fact Sheets: These overviews of dietary supplement ingredients (including vitamin D, black cohosh, and omega-3 fatty acids) are written for varied audiences, including researchers, health care providers, and consumers.

PubMed Dietary Supplement Subset: The subset is designed to limit search results to citations from a broad spectrum of dietary supplement literature including vitamin, mineral, phytochemical, ergogenic, botanical, and herbal supplements in human nutrition and animal models.

Computer Access to Research on Dietary Supplements (CARDS): This searchable database provides information on federally funded research projects pertaining to dietary supplements.

Dietary Supplement Ingredient Database (DSID): This database provides the amount of nutrients in some dietary supplements based on chemical analysis.

Dietary Supplement Label Database (DSLDD): This database contains information taken from the labels of the dietary supplement products available in the U.S. marketplace.

ODS Newsletters

ODS distributes three free [electronic publications](#) through the ODS listserv:

- *ODS Update* includes news about ODS programs, staff publications and presentations, dietary supplement fact sheets, databases, meetings, and exhibits. It is emailed to the ODS listserv four to six times a year.
- *The Scoop*, a consumer-focused e-newsletter, is sent out quarterly. Each issue has a slightly different theme such as multivitamins or dietary supplements and aging.
- ODS informs the listserv about timely announcements through the *Special Supplement*.

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Warren Grant Magnuson Clinical Center (CC)

<http://clinicalcenter.nih.gov/>

OVERVIEW

The Clinical Center at the National Institutes of Health (NIH) in Bethesda, Maryland, is part of the NIH's intramural science research program and is the nation's largest hospital devoted entirely to clinical research. It is a national resource that makes it possible to rapidly translate scientific observations and laboratory discoveries into new approaches for diagnosing, treating, and preventing disease.

Approximately 1,500 studies are in progress at the NIH Clinical Center. Most are Phase I or Phase II clinical trials.

More than 350,000 patients, from all 50 states and throughout the world, have participated in clinical research at the Clinical Center since it opened in 1953.

The Clinical Center promotes translational research—that is, the transference of scientific laboratory research into applications that benefit patient health and medical care. The "bench-to-bedside" approach adopted in 1953 locates patient care units in close proximity to cutting-edge laboratories conducting related research. This facilitates interaction and collaboration among clinicians and researchers. Most important, patients and families in the Clinical Center benefit from the cutting-edge technologies and research, and the compassionate care that are the signature of the NIH.

The Mark O. Hatfield Clinical Research Center was opened in 2005. The facility houses inpatient units, day hospitals, and research labs and connects to the original Warren Grant Magnuson Clinical Center. Together, the Magnuson and Hatfield buildings form the NIH Clinical Center. They serve the dual role of providing humane and healing patient care and the environment clinical researchers need to advance clinical science. It was named in honor of Senator Mark O. Hatfield of Oregon, who supported medical research throughout his congressional career.

The 870,000-square-foot Hatfield building has 240 inpatient beds and 82 day-hospital stations. This arrangement can be easily adapted to allow more inpatient beds and fewer day-hospital stations, or vice versa, because the new facility's design is highly flexible.

Nutrition Research Services

Clinical Research Dietitians are available to consult with Clinical Center (CC) investigators regarding the planning, design, and implementation of nutrition-related components of proposed research protocols. Dietitians recommend optimal methodologies to assure valid and reliable data and assist with data collection, analysis, interpretation, and manuscript preparation. Dietitians advise on the benefit and appropriateness of adding nutrition services to existing research protocols.

Nutrition Research Services include:

- **Research Meals**

Purpose: to control food intake as either a constant or a variable to meet protocol needs.

- **Dietary Intake and Eating Behavior Assessments**

Purpose: to quantify energy and nutrient intake for a defined period of time; to characterize eating behaviors.

- **Body Composition Analysis**

Purpose: to assess a patient's lean and fat mass.

- **Nutrition Counseling**

Purpose: to provide nutrition education and counseling to research subjects as part of protocol requirements.

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APPENDICES

Appendix A: Website Links for Nutrition Conference and Symposia Materials and VideoCasts

Event Title	Link
Caloric Restriction Studies in Humans: Future Research Directions	VideoCast: http://videocast.nih.gov/Summary.asp?File=17937&bhcp=1
Can Nutrition Simultaneously Affect Cancer and Aging?	Program: http://prevention.cancer.gov/news-and-events/meetings-and-events/online-cme-series-can
Cancer Prevention through Immunomodulation: Does Diet Play a Role?	Program: http://prevention.cancer.gov/news-and-events/meetings-and-events/online-series-presents-cancer Webinar: http://prevention.cancer.gov/news-and-events/videos-and-webinars/cancer-prevention-through
Childhood and Adolescent Nutrition and Growth Drive Breast Cancer Risk: Untapped Opportunities for Prevention	VideoCast: http://videocast.nih.gov/summary.asp?Live=14864&bhcp=1
Clinically Relevant Herb-Drug Interactions: Past, Present, and Future	VideoCast: http://videocast.nih.gov/summary.asp?Live=13727&bhcp=1
Early Life Microbiome Influences on Metabolism, Immunity, and Disease Risk	VideoCast: http://videocast.nih.gov/summary.asp?Live=14598&bhcp=1
Exploring the Microbiome of Cancer Prevention: A Closer Look at Probiotics, Prebiotics, and Synbiotics	Program: http://prevention.cancer.gov/news-and-events/meetings-and-events/online-cme-series-will-present Webinar link: http://prevention.cancer.gov/news-and-events/videos-and-webinars/exploring-microbiome
Gluten Disorders: Scientific, Dietary, and Consumer Education Perspectives	Agenda: http://www.dnrc.nih.gov/docs/glutendisorder2013.docx VideoCast: http://videocast.nih.gov/Summary.asp?File=17931&bhcp=1
Grand Rounds: (1) The Calculus of Calories: What Mathematics Can Teach Us About Obesity (2) Artificial Sweeteners and Obesity: More than an Association?	VideoCast: http://videocast.nih.gov/summary.asp?Live=13690&bhcp=1
Inflammation, Microbiota, and Cancer	Program Flyer: https://ncifrederick.cancer.gov/events/microbiota/default.asp

Links between Metabolism and Cancer	http://videocast.nih.gov/summary.asp?Live=13801&bhcp=1
Micronutrients and Cancer Prevention: A Complex World	VideoCast: http://videocast.nih.gov/summary.asp?Live=12492&bhcp=1
Nutritional Interventions in Primary Mitochondrial Disorders: Developing an Evidence Base	Agenda: http://ods.od.nih.gov/attachments/Mito_Agenda_20141202.pdf Executive Summary: : http://ods.od.nih.gov/News/Mito2014_ExecutiveSummary.aspx
Probiotics, the Microbiome, and Host Immune Response - Insights for Novel Therapeutic Approaches	VideoCast: http://videocast.nih.gov/Summary.asp?File=18070&bhcp=1
Research Directions for Solving the Obesity Epidemic in High Risk Populations	VideoCast: http://videocast.nih.gov/summary.asp?Live=15323&bhcp=1
The Human Microbiome: Implications for Nutrition and Clinical Practice	Agenda: http://www.dnrc.nih.gov/human-microbiome-agenda.asp VideoCast: http://videocast.nih.gov/summary.asp?Live=14238&bhcp=1
The Use and Biology of Energy Drinks: Current Knowledge and Critical Gaps	Workshop Summary: http://ods.od.nih.gov/News/EnergyDrinksWorkshopSummary2013.aspx Agenda and Presentations: http://ods.od.nih.gov/News/EnergyDrinksWorkshop2013.aspx#agenda
The White House Summit and Research Forum on Improved Health and Fitness for Americans with Disabilities	Program: http://www.nichd.nih.gov/about/meetings/2014/Pages/100714.aspx
Vitamin D: Moving Toward Evidence-based Decision Making in Primary Care	Conference Website: http://ods.od.nih.gov/Research/VitaminDConference2014.aspx VideoCast Day 1: http://videocast.nih.gov/summary.asp?Live=15254 VideoCast Day 2: http://videocast.nih.gov/summary.asp?Live=15258
Workshop on the Prevention of Obesity in Infancy and Early Childhood	Workshop Summary: http://archpedi.jamanetwork.com/article.aspx?articleID=2206334&utm_source=Silverchair%20Information%20Systems&utm_medium=email&utm_campaign=JAMAPediatrics%3AOnlineFirst03%2F16%2F2015

Appendix B: Dietary Guidance Reviews

NIH NUTRITION EDUCATION SUBCOMMITTEE ACTIVITIES IN 2013-2014

A Congressional mandate was enacted in 1990 stipulating that all HHS and USDA nutrition education materials for the general public undergo joint U.S. Department of Health and Human Services (DHHS) and U.S. Department of Agriculture (USDA) dietary guidance review to ensure scientific and technical accuracy and consistency with the *Dietary Guidelines for Americans* (DGAs). Dietary guidance reviews ensure that agencies within DHHS and USDA speak with one voice with regard to nutrition information and advice for the general public. The NIH Nutrition Education Subcommittee (NES), a subcommittee of the NIH Nutrition Coordinating Committee (NCC), is the focal point for dietary guidance reviews of NIH nutrition education publications and related materials for the public. The 2012 NES roster is composed of 12 members from 8 NIH institutes, centers, and offices who have expertise in the nutritional sciences. The NES performs the initial dietary guidance reviews of nutrition education materials produced within the NIH and may be asked to review nutrition education materials produced by non-NIH, DHHS, and USDA agencies. The NES completed dietary guidance reviews of the following NIH materials in 2013-2014.

Additional education materials can be found on the DNRC Web site:

<http://www.dnrc.nih.gov/education.asp>

NIH Materials Reviewed by the NIH Nutrition Education Subcommittee 2013-2014	
NIH Institute, Center, or Office	Name of Material and Distribution Information
DNRC	NIH Health and Wellness Intranet Website Nutrition Content (internal website for NIH staff)
NCCIH	Time to Talk Tips-Omega-3 Link: https://nccih.nih.gov/health/tips/omega3
NCCIH	Diabetes and Dietary Supplements Fact Sheet Link: https://nccih.nih.gov/health/diabetes/supplements
NCCIH	Vitamins and Minerals Webpage Link: https://nccih.nih.gov/health/vitamins
NCCIH	Weight Loss Tips Link: https://nccih.nih.gov/health/tips/weightloss
NCI	Vitamin D and Cancer Fact Sheet Link: http://www.cancer.gov/cancertopics/factsheet/prevention/vitamin-D
NHLBI	Healthy Eating, Healthy Living (bilingual English, Vietnamese language) Tip Sheet Link: Healthy Eating, Healthy Living
NIDDK	Improving Your Health: Tips for African Americans Link: NIDDK Improving Your Health
ODS	Folate Fact Sheet for Consumers Link: http://ods.od.nih.gov/factsheets/Folate-Consumer
ODS	Selenium Fact Sheet for Consumers Link: http://ods.od.nih.gov/factsheets/Selenium-Consumer
ODS	Magnesium Fact Sheet for Consumers Link: http://ods.od.nih.gov/factsheets/Magnesium-Consumer
ODS	Iron Fact Sheet for Consumers Link: http://ods.od.nih.gov/factsheets/Iron-Consumer

NIH Nutrition Education Subcommittee Roster 2013-2014

Roz Breslow, PhD, MPH, RD, LD, NIH National Institute on Alcohol Abuse and Alcoholism
Amber Courville, PhD, RD, CSSD, NIH Clinical Center
Mary Evans, PhD, NIH National Institute of Diabetes and Digestive and Kidney Disease
Rachel Fisher, MS, MPH, RD, NIH Division of Nutrition Research Coordination
Carol Haggans, MS, RD, NIH Office of Dietary Supplements
Van Hubbard, MD, PhD, Director, NIH Division of Nutrition Research Coordination
Crystal McDade-Ngutter, PhD, NIH Division of Nutrition Research Coordination
Margaret McDowell, MPH, PhD, RD, Chair, NIH Division of Nutrition Research Coordination
Kathryn McMurry, MS, NIH National Heart, Lung, and Blood Institute
Daniel Raiten, PhD, *Eunice Kennedy Shriver* National Institute of Child Health and Development
Elaine Trujillo, MS, RDN, NIH National Cancer Institute

Appendix C: List of Embedded URLs

HYPLERLINK NAME	URL
17 U.S.C. §105	http://www.copyright.gov/title17/92chap1.html#105
2006 NIH Reform Act	http://olpa.od.nih.gov/legislation/109/publiclaws/reformact06.asp
Academy of Nutrition and Dietetics (AND)	http://www.eatright.org/
Age-Related Eye Disease Study (AREDS)	http://www.nei.nih.gov/amd/summary.asp
Age-Related Eye Disease Study 2 (AREDS2)	http://www.areds2.org/
American Recovery and Reinvestment Act (ARRA)	http://www.hhs.gov/recovery/overview/
Behavioral and Social Sciences Coordinating Committee (BSSR-CC)	http://obssr.od.nih.gov/about_obssr/bssr_cc/
Behavioral and Social Sciences (BSSR) Lecture Series	http://obssr.od.nih.gov/news_and_events/lectures_and_seminars/BSSR_lecture_series/seminars.aspx
Bill and Melinda Gates Foundation	http://www.gatesfoundation.org/
Biomarkers in growth	http://www.ncbi.nlm.nih.gov/pubmed/24457286
Biomarkers in Nutrition: New Frontiers in Research and Application	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3627310/
Biomarkers of Nutrition for Development (BOND) Program	http://www.nichd.nih.gov/global_nutrition/programs/bond/
Cancer & Genomics (February 2013): Healthy People 2020 Progress Review	http://www.cdc.gov/nchs/healthy_people/hp2020/hp2020_cancer_genomics.htm
Center for Scientific Review (CSR)	http://www.nih.gov/about/almanac/organization/CSR.htm
Chronic Kidney Disease & Diabetes (September 29, 2014): Healthy People Progress Review	http://www.cdc.gov/nchs/healthy_people/hp2020/hp2020_D_CKD_progress_review.htm
Common Fund	http://commonfund.nih.gov/
Computer Access to Research on Dietary Supplements (CARDS)	http://ods.od.nih.gov/Research/CARDS_Database.aspx
Dietary Guidance Development Project for Birth to 24 Months and Pregnant Women (B-24/PW)	http://www.nel.gov/birth-to-24-overview
Dietary Guidance Development Project for Birth to 24 Months and Pregnant Women (B-24/PW), timeline	http://www.cnpp.usda.gov/birthto24months

Dietary Guidelines for Americans, 2010	http://www.cnpp.usda.gov/dgas2010-policydocument.htm
Dietary Guidelines for Americans, 2015	http://health.gov/dietaryguidelines/2015.asp
Dietary Reference Intakes (DRI)	http://fnic.nal.usda.gov/dietary-guidance/dietary-reference-intakes
Dietary Supplement Health and Education Act of 1994 (DSHEA)	http://www.health.gov/dietsupp/ch1.htm
Dietary Supplement Fact Sheets	http://ods.od.nih.gov/factsheets/list-all
Dietary Supplement Label Database (DSLID)	http://www.dslid.nlm.nih.gov/dslid/
Dietary Supplements Ingredients Database (DSID)	http://dietarysupplementdatabase.usda.nih.gov/index.html
Division of Nutrition Research Coordination	http://www.dnrc.nih.gov/
Do you know the health risks of being overweight?	http://win.niddk.nih.gov/publications/health_risks.htm
Envision network	http://www.nccor.org/envision
EUropean micronutrient RECommendations Aligned (EURRECA)	http://www.eurreca.org/everyone
Evaluation of the Evidence to Support Guidelines for Nutritional Care of Preterm Infants: “The Pre-B Project”	http://www.nichd.nih.gov/about/meetings/2014/Pages/080114.aspx
Exercise Interest Group	http://sigs.nih.gov/exercise/Pages/default.aspx
Federal RePORTER	http://federalreporter.nih.gov/
Fogarty International Center (FIC)	http://www.fic.nih.gov/Pages/Default.aspx
<i>Health and Sustainability Guidelines for Federal Concessions and Vending Operations</i>	http://www.cdc.gov/chronicdisease/pdf/guidelines_for_federal_concessions_and_vending_operations.pdf
Healthy People, 2020	http://www.healthypeople.gov/2020/default.aspx
Holland, Robert (USDA, NIFA Associate Director of Operations)	http://nifa.usda.gov/staff-bio/robert-holland
Home Box Office (HBO) “The Weight of the Nation”	http://theweightofthenation.hbo.com/
Home Box Office (HBO) “The Weight of the Nation for Kids”	http://theweightofthenation.hbo.com/films/kids-films/the-great-cafeteria-takeover
Implementation of the HHS/GSA Health and Sustainability Guidelines	http://www.gao.gov/products/GAO-15-262R
January 13, 2005 NIH Guide Notice	http://grants.nih.gov/grants/guide/notice-files/NOT-OD-05-025.html

Johns Hopkins Global Center on Childhood Obesity	http://www.jhgcco.org/
<i>Let's Move!</i>	http://www.letsmove.gov/
<i>Let's Move! Active Schools</i>	http://www.letsmove.gov/active-schools
<i>Let's Move! Cities, Towns, and Counties and</i>	http://www.letsmove.gov/become-lets-move-city-or-town
<i>Let's Move! Faith & Communities</i>	http://www.letsmove.gov/community-leaders
<i>Let's Move! In Indian Country</i> , Resource Page from the NIH	http://lmic.ihs.gov/federalpartners/fedpartnersnih/
mHealth Inter-Institute Interest Group (mHealth IIG)	http://ppp.od.nih.gov/pppinfo/mhealth.asp
Micronutrient Genomics Project	http://www.micronutrientgenomics.org/index.php/Main_Page
Murray, David: (NIH Associate Director for Prevention and Director of the NIH ODP)	http://www.nih.gov/news/health/jul2012/od-02a.htm
National Cancer Institute (NCI)	http://www.cancer.gov
National Center for Complementary and Integrative Health (NCCIH)	https://nccih.nih.gov/
National Collaborative on Child Obesity Research (NCCOR)	http://nccor.org/
National Collaborative on Child Obesity Research (NCCOR): 2013 Annual Report	http://nccor.org/annualreport2013/
National Collaborative on Child Obesity Research (NCCOR): 2014 Annual Report	http://nccor.org/downloads/NCCOR-AR2014_final.pdf
National Eye Institute (NEI)	http://www.nei.nih.gov/
National Food and Nutrient Analysis Program (NFNAP)	http://www.ars.usda.gov/Aboutus/docs.htm?docid=9446
National Health and Nutrition Examination Survey (NHANES)	http://www.cdc.gov/nchs/nhanes.htm
National Heart, Lung, and Blood Institute (NHLBI)	http://www.nhlbi.nih.gov/
National Human Genome Research Institute (NHGRI)	http://www.genome.gov/
National Institute on Aging (NIA)	http://www.nia.nih.gov/
National Institute on Alcohol Abuse and Alcoholism (NIAAA)	http://www.niaaa.nih.gov/
National Institute of Allergy and Infectious Diseases (NIAID)	http://www.niaid.nih.gov

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)	http://www.niams.nih.gov/
National Institute of Child Health and Human Development (NICHD)	http://www.nichd.nih.gov/
National Institute on Deafness and Other Communication Disorders (NIDCD)	http://www.nidcd.nih.gov/
National Institute on Deafness and Other Communication Disorders (NIDCD) Strategic Plan for Research, 2012-2016	http://www.nidcd.nih.gov/about/plans/2012-2016/Pages/2012-2016-Strategic-Plan.aspx
National Institute of Dental and Craniofacial Research (NIDCR)	http://www.nidcr.nih.gov/
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)	http://www2.niddk.nih.gov/
National Institute of Drug Abuse (NIDA)	http://www.drugabuse.gov/
National Institute of Environmental Health Sciences (NIEHS)	http://www.niehs.nih.gov/
National Institute of General Medical Sciences (NIGMS)	http://www.nigms.nih.gov/
National Institute of Mental Health (NIMH)	http://www.nimh.nih.gov/index.shtml
National Institute on Minority Health Disparities (NIMHD)	http://www.nimhd.nih.gov/
National Institute of Neurological Disorders and Stroke (NINDS)	http://www.ninds.nih.gov/
National Institute of Nursing Research (NINR)	http://www.ninr.nih.gov/
National Nutrition Research Roadmap (NNRR)	https://prevention.nih.gov/NNRR
National Nutrition Research Roadmap, Public Comment Period (Federal Register Notice)	http://www.gpo.gov/fdsys/pkg/FR-2015-05-26/pdf/2015-12628.pdf
National Prevention Council	http://www.surgeongeneral.gov/priorities/prevention/about/index.html
National Science Foundation	http://www.nsf.gov/
NIH Contracting Offices	http://oamp.od.nih.gov/
NIH Guide for Grants and Contracts	http://grants.nih.gov/grants/guide/index.html
NIH News Releases	http://www.nih.gov/news/index.html#releases
NIH Nutrition Research Report, 2011 & 2012	http://www.dnrc.nih.gov/pdf/nutrition_research_report_2011_2012.pdf

NIH Nutrition Quarterly	http://www.dnrc.nih.gov/newsletter/
NIH Research Matters	http://www.nih.gov/researchmatters/
NIH VideoCasting and Podcasting	http://videocast.nih.gov/
Nutrition and Obesity Policy Research and Evaluation Network (NOPREN)	http://www.nopren.org/
Nutrition and Weight Status, & Physical Activity (May 2014): Healthy People Progress Review	http://www.cdc.gov/nchs/healthy_people/hp2020/hp2020_NWS_HP_progress_review.htm
Nutrition Coordinating Committee (NCC)	http://www.dnrc.nih.gov/committee.asp
Nutrition Education Subcommittee (NES)	http://www.dnrc.nih.gov/committee-subcommittee.asp
Nutrition Obesity Research Centers (NORCs)	http://www.win.niddk.nih.gov/research/cnr.htm
Obesity Research Task Force	http://obesityresearch.nih.gov/about/
Office of Behavioral and Social Sciences Research (OBSSR)	http://www.obssr.od.nih.gov/
Office of Dietary Supplements (ODS)	http://ods.od.nih.gov/
Office of Dietary Supplements (ODS), Newsletters	http://ods.od.nih.gov/News/ODS_Update.aspx
Office of Dietary Supplements (ODS), Strategic Plan	https://ods.od.nih.gov/About/Strategic_Plan_2010-2014.aspx
Office of Dietary Supplements (ODS) Vitamin D Initiative	https://ods.od.nih.gov/Research/VitaminD.aspx
Office of Disease Prevention (ODP)	http://prevention.nih.gov/
Options for Consideration of Chronic Disease Endpoints for Dietary Reference Intakes (DRIs)	http://ods.od.nih.gov/News/DRI_Workshop_March_10-11_2015.aspx
Overweight and Obesity Statistics	http://win.niddk.nih.gov/statistics/index.htm#overweight
PA-11-260	http://grants.nih.gov/grants/guide/pa-files/PA-11-260.html
PA-10-067	http://grants.nih.gov/grants/guide/pa-files/pa-10-067.html
PA-07-070	http://grants.nih.gov/grants/guide/pa-files/PA-07-070.html
Parent Announcements (For Unsolicited or Investigator-Initiated Applications)	http://grants.nih.gov/grants/guide/parent_announcements.htm

PepsiCo	http://www.pepsico.com/
Prevention Research Centers (PRCs) program	http://www.cdc.gov/prc/
Prevention Research Coordinating Committee (PRCC)	http://prevention.nih.gov/prcc.aspx
Probiotic and Prebiotic Working Group (PPWG)	http://sigs.nih.gov/PPWG/Pages/default.aspx
PubMed Dietary Supplement Subset	http://ods.od.nih.gov/Research/PubMed_Dietary_Supplement_Subset.aspx
Research Portfolio Online Report Tools, Expenditures and Results (RePORTER)	http://projectreporter.nih.gov/reporter.cfm
Report of the Dietary Guidelines Advisory Committee (DGAC) on the Dietary Guidelines for Americans, 2010	http://www.cnpp.usda.gov/dgas2010-dgacreport.htm
Research, Condition, and Disease Categorization (RCDC)	http://report.nih.gov/rcdc/index.aspx
Science of Behavior Change Program	http://commonfund.nih.gov/behaviorchange/
Scientific Interest Group	http://www.nih.gov/sigs/sigs.html
Scientific Report of the 2015 Dietary Guidelines Advisory Committee	http://www.health.gov/dietaryguidelines/2015-scientific-report/PDFs/Scientific-Report-of-the-2015-Dietary-Guidelines-Advisory-Committee.pdf
<i>Sisters Together: Move More, Eat Better</i>	http://www.win.niddk.nih.gov/sisters/index.htm
Strategic Plan for NIH Obesity Research	http://www.obesityresearch.nih.gov/about/strategic-plan.aspx
Strategies to reduce sodium intake in the United States (IOM Report)	http://www.iom.edu/Reports/2010/Strategies-to-Reduce-Sodium-Intake-in-the-United-States.aspx
Surgeon General's 2011 Call to Action to Support Breastfeeding	http://www.surgeongeneral.gov/library/calls/breastfeeding/call-toactiontosupportbreastfeeding.pdf
U.S. Department of Agriculture Nutrient Data Laboratory	http://www.ars.usda.gov/main/site_main.htm?modecode=80-40-05-25
U.S. Department of Health and Human Services	http://www.hhs.gov/
Vitamin D Standardization Program (VDSP)	http://ods.od.nih.gov/Research/vdsp.aspx
Warren Grant Magnuson Clinical Center (CC)	http://clinicalcenter.nih.gov/
Wellness@NIH	http://wellnessatnih.nih.gov/Pages/default.aspx (NIH staff only)
What is high blood pressure?	http://www.nhlbi.nih.gov/health/health-topics/topics/hbp/
What We Eat in America	http://www.ars.usda.gov/News/docs.htm?docid=13793

WIN Notes (electronic newsletter)	http://www.win.niddk.nih.gov/notes/index.htm
WIN Publications	http://www.win.niddk.nih.gov/publications/index.htm
World Health Organization--Visual Impairment and Blindness, Fact Sheet	http://www.who.int/mediacentre/factsheets/fs282/en/index.htm

Appendix D: Acronyms

<u>Acronym</u>	<u>Name</u>
ARS	USDA Agricultural Research Service
BOND	Biomarkers of Nutrition for Development Program
BSSR CC	Behavioral and Social Sciences Research Coordinating Committee
CARDS	Computer Access to Research on Dietary Supplements
CC	NIH Clinical Center
CDC	Centers for Disease Control and Prevention
CNPP	USDA Center for Nutrition Policy Promotion
CSR	Center for Scientific Review
DGAC	Dietary Guidelines Advisory Committee
DHHS	U.S. Department of Health and Human Services
DNRC	NIH Division of Nutrition Research Coordination
DoD	Department of Defense
DPCPSI	NIH Division of Program Coordination, Planning, and Strategic Initiatives
DRI	Dietary Reference Intakes
DSHEA	Dietary Supplement Health and Education Act
DSID	Dietary Supplements Ingredients Database
DSLID	Dietary Supplement Label Database
EIG	NIH Exercise Interest Group
FDA	U.S. Food and Drug Administration
FIC	John E. Fogarty International Center for Advanced Study in Health Sciences
FOA	Funding Opportunity Announcement
FWGoDS	Federal Working Group on Dietary Supplements
FY	Fiscal Year
GSA	General Services Administration
HINTS	Health Information National Trends Survey
HMP	Human Microbiome Project
HNRIM	Human Nutrition Research Information Management System
IC	Institute and Center
ICHNR	Interagency Committee on Human Nutrition Research
IOM	NAS Institute of Medicine
mHealthIIG	NIH mHealth Inter-Institute Interest Group
NAS	National Academy of Science
NCATS	National Center for Advancing Translational Sciences
NCC	NIH Nutrition Coordinating Committee
NCCAM	National Center for Complementary and Alternative Medicine
NCCIH	National Center for Complementary and Integrative Health
NCCOR	National Collaborative on Childhood Obesity Research
NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NEI	National Eye Institute
NES	NIH Nutrition Education Subcommittee
NFNAP	National Food and Nutrient Analysis Program
NHANES	National Health and Nutrition Examination Survey
NHLBI	National Heart, Lung, and Blood Institute
NHGRI	National Human Genome Research Institute
NIA	National Institute on Aging
NIAAA	National Institute on Alcohol Abuse and Alcoholism
NIAID	National Institute of Allergy and Infectious Diseases
NIAMS	National Institute of Arthritis and Musculoskeletal and Skin Diseases

NIBIB	National Institute of Biomedical Imaging and Bioengineering
NICHD	<i>Eunice Kennedy Shriver</i> National Institute of Child Health and Human Development
NIDCD	National Institute on Deafness and Other Communication Disorders
NIDCR	National Institute of Dental and Craniofacial Research
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
NIDA	National Institute on Drug Abuse
NIEHS	National Institute of Environmental Health Sciences
NIFA	National Institute of Food and Agriculture
NIGMS	National Institute of General Medical Sciences
NIH	National Institutes of Health
NIMH	National Institute of Mental Health
NIMHD	National Institute on Minority Health and Health Disparities
NINDS	National Institute of Neurological Disorders and Stroke
NINR	National Institute of Nursing Research
NIST	National Institute of Standards and Technology, Department of Commerce
NLM	National Library of Medicine
NNRR	National Nutrition Research Roadmap
OBSSR	Office of Behavioral and Social Sciences Research
OD	NIH Office of the Director
ODP	NIH Office of Disease Prevention
ODPHP	Office of Disease Prevention and Health Promotion
ODS	NIH Office of Dietary Supplements
ONR	Office of Nutrition Research
ORDR	NIH Office of Rare Diseases Research
ORWH	NIH Office of Research on Women's Health
PA	Program Announcement
PPWG	Probiotic and Prebiotic Working Group (PPWG)
PRCC	NIH Prevention Research Coordinating Committee
RCDC	Research, Condition, and Disease Categorization
RePORT	Research Portfolio Online Reporting Tools
RePORTER	Research Portfolio Online Reporting Tools Expenditures and Results
RFA	Request for Application
RFP	Request for Proposal
RPG	Research Project Grant
SOBC	Science of Behavior Change
USDA	U.S. Department of Agriculture
VDSP	Vitamin D Standardization Program