Draft Strategic Plan
2022–2026

Office of Dietary Supplements
National Institutes of Health
U.S. Department of Health and Human Services

2022

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Strategic Plan: 2022–2026

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I. Overview and Introduction

A. Introduction to the Office of Dietary Supplements

The origin of the Office of Dietary Supplements (ODS) is rooted in legislation—the Dietary Supplement Health and Education Act (DSHEA) of 1994—and subsequent congressional language that form the basis of its mission, vision, and programs. The passage of DSHEA followed two related and important legislative changes. In 1976 Congress prohibited the Food and Drug Administration (FDA) from limiting the potency of vitamins and minerals in dietary supplements or regulating them as drugs. In 1990, nutrition labels on packaged foods were mandated by the Nutrition Labeling and Education Act (NLEA) and certain health claims that could be made for food and food products were permitted. Related questions about the labeling and regulation of dietary supplements led Congress to pass the DSHEA in 1994 in which dietary supplements were classified as a special category of food (see Appendix A), and the Secretary of the Department of Health and Human Services (HHS) was directed to establish an Office of Dietary Supplements within the National Institutes of Health (NIH). Through its programs, funding opportunities, and activities, and consistent with the overall mission of the Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI), ODS supports dietary supplement research and research training at NIH Institutes, Centers, and Offices (ICOs) and enhances the array of resources available to dietary supplement researchers and other ODS stakeholders.

B. Mission, Vision, and Goals

The **mission** of ODS is to support, coordinate and disseminate scientific research and provide intellectual leadership for the purpose of strengthening the knowledge, scientific evidence, and understanding of dietary supplements to foster an enhanced quality of life and health for the U.S. population.

The **vision** of ODS is that researchers, health professionals, government officials, other policymakers, and consumers will have ready access to scientific information of the highest quality on the health effects of dietary supplements.

ODS's five **goals** are

1. Expand the scientific knowledge base on dietary supplements and their ingredients by stimulating and supporting a full range of biomedical research and by developing and contributing to relevant initiatives, workshops, meetings, and conferences.
2. Enhance the dietary supplement research workforce through training and career development.
3. Foster development and dissemination of research resources and tools to enhance the quality of dietary supplement research.
4. Translate dietary supplement research findings into useful information and disseminate it to researchers, health professionals, government officials, policymakers, and consumers.
5. Coordinate and support the development of collaborative initiatives to address gaps in dietary supplement research.

As a result of the strategic planning process ODS has reaffirmed its mission and vision statement and expanded its goals for research on dietary supplements and their ingredients and health outcomes, maintaining a focus on the office's core purpose and responsibilities as mandated by DSHEA. In addition to the four goals on which ODS focused in prior strategic planning periods, the office has added a fifth goal that delineates the need for actively coordinating and supporting collaborative dietary supplement research efforts across NIH. This enhanced focus on collaboration recognizes the increasing interest across NIH and other federal agencies in understanding the knowledge gaps that exist with respect to dietary supplements at a time when dietary supplement usage across the United States continues to grow.

II. Scientific Strategy

A. Strategies by Goal

As the lead federal entity for addressing the scientific exploration of dietary supplements, ODS continues to advance the research agenda and knowledge base for the health effects of these products. The key to ODS's success is the balance it achieves between its roles as a communicator of knowledge; facilitator of research; developer of resources; funder of research training; and coordinator and collaborator with NIH ICOs, academic researchers, federal and state agencies, and non-governmental organizations (NGOs).

The details of ODS's scientific strategy for 2022–2026 are presented by individual goals and strategies below.

GOAL 1: Expand the scientific knowledge base on dietary supplements and their ingredients by stimulating and supporting a full range of biomedical research and by developing and contributing to relevant initiatives, workshops, meetings, and conferences.

Today, more than 80,000 dietary supplement products that contain vitamins and minerals, herbs and botanicals, and other ingredients (such as glucosamine, fish oils, and probiotics) are available. Dietary supplements are consumed by about one-half of adults and one-third of children and adolescents in the United States. Yet questions remain about the cellular mechanisms, metabolism, efficacy, and safety of many dietary supplement formulations. ODS will continue working in collaboration with NIH ICOs and other research institutions to answer such questions. ODS will continue to prioritize research and program activities based on public health importance, will use systematic reviews as a primary assessment tool to assess evidence for efficacy and safety, and will use research coordination and funding to address critical gaps in knowledge. ODS also will use systematic reviews to assess and translate research results for public health policy decision-making.

Strategy 1-1: Increase understanding of the health impacts and biological effects of dietary supplements.

ODS will identify dietary-supplement–related public health areas and support innovative research to evaluate the health effects of dietary supplements—primarily for promoting health

and reducing the risk of disease—and the underlying biological mechanisms by which they do so. ODS will fund only research that focuses on legal dietary ingredients (kava, etc.) and will co-fund safety-related applications. In addition to co-funding new research with partner NIH ICs, ODS will continue to increase the exposure to and awareness of research on dietary supplements by funding expanded research aims for existing NIH grants through administrative supplements, thus stimulating more investigations of dietary supplements' health effects.

In a joint effort with the National Center for Complementary and Integrative Health (NCCIH), ODS will continue to promote collaborative, transdisciplinary research on the safety, effectiveness, and mechanisms of action of those inherently complex natural products, such as botanicals, with evidence of a high potential to affect human health. ODS also will support the development of methods and resources that will enhance the progress and sustainability of this research. The NIH Consortium for Advancing Research on Botanical and Other Natural Products (CARBON) Program will continue to support preclinical and translational research to inform future clinical trials, along with early-phase clinical trials, and to support work to accelerate state-of-the-art method development.

ODS will continue to guide and coordinate data collection activities across the federal government for the purpose of tracking exposure to dietary supplements among specific populations. ODS will support research to identify and measure biomarkers of nutrient exposure and status in relation to chronic disease in populations and individuals.

Recent research—such as that supported by the NIH Human Microbiome Project—has revealed many insights into the influence of human-associated microbes on health and nutrition and has raised many more research questions. ODS will seek to understand the role of the microbiome in mediating the effects of bioactive components in food and dietary supplements. ODS will remain committed to supporting novel research, workshops, symposia, and trans-federal agency efforts aimed at elucidating the functional relevance of the microbiota to nutritional status, energy balance, and risk of disease.

ODS will coordinate and foster collaboration between NIH ICOs with strategic priorities or funds dedicated to resilience research programs. ODS will facilitate the collection and harmonization of data on commonalities related to resilience outcomes, phenotype patterns, and measurements of resilience.

Strategy 1-2: Conduct research on patterns of dietary supplement use in the U.S. population.

ODS staff will assess the prevalence, frequency, duration, levels, and types of dietary supplements used in the United States. For example, ODS will continue to use National Health and Nutrition Examination Survey (NHANES) data to investigate dietary supplement usage patterns in population subgroups (such as seniors, pregnant women, infants, children, adolescents, racial/ethnic minority groups, and food-insecure individuals) and consumer use of dietary supplements in combination with widely used over-the-counter and prescription medications. ODS also plans to evaluate the cognitive, behavioral, and motivational factors underlying dietary supplement use.

ODS will address and work to identify, evaluate, and overcome methodological issues related to assessment of supplement usage in epidemiologic and other study designs. It also will evaluate current and novel laboratory methods to measure supplement usage and nutritional status for individual ingredients in supplements (see Strategy 4-3 discussion).

Strategy 1-3: Identify knowledge gaps and research needs.

ODS will support and co-sponsor systematic reviews of dietary supplements and their ingredients. Topics will include the efficacy and safety of supplement use in health maintenance and their potential role in reducing disease risk. ODS also will sponsor systematic reviews to assess the strength and quality of the science on the health effects of dietary supplements and their ingredients and the differences that exist as they relate to health status, age, ethnic group, nutrition status, pregnancy, etc.

ODS will continue to conduct internal and NIH-wide portfolio analyses with NIH ICOs and other federal partners, leading to priority setting for funding decisions and identification of emerging research opportunities. This work will contribute to ODS's coordination role in the Dietary Supplement Research Coordinating Committee (see Goal 5).

ODS will lead and sponsor workshops and conferences with NIH ICOs to discuss and evaluate the current state of the science. Attendees will include dietary supplement researchers, clinicians, government officials, industry representatives, and other stakeholders.

GOAL 2: Enhance the dietary supplement research workforce through training and career development.

Despite the widespread use and availability of dietary supplements, the scientific underpinnings of the potential health effects of the vast majority of ingredients and combinations remain relatively underrepresented in the published peer-reviewed literature. Therefore, funding is needed to develop and support a cadre of researchers who productively study dietary supplements and to recognize their work as an important area of investigation. Through its activities to train, educate, and stimulate research, ODS will work to close the gap in disparities in funding success for researchers from diverse backgrounds.

Strategy 2-1: Support scientific training programs and continuing education activities.

The funding support that ODS provides to extramural researchers also will give them access to ODS staff expertise in dietary supplement research, research procedures, and NIH/ODS grant-funding activities. ODS will continue to support training grants and career development grants with partner Institutes and Centers (ICs) to train junior scientists in methodologies that will enhance dietary supplement research skills and methodologies. All components of the CARBON Program, for example, will train young investigators (students, postdoctoral fellows, and early career faculty members) and encourage recruitment of junior researchers through the support of innovative pilot projects.

ODS will maintain its support for the ODS Intramural Research Scholars Program, a 1-year competitive scholarship opportunity for NIH intramural junior scientists who have at least 1 year

of postdoctoral research experience. This program will enable them to develop expertise in the scientific exploration of dietary supplements for health promotion and disease prevention.

ODS will continue to provide healthcare professionals and researchers with a thorough overview about issues, concepts, unknowns, and controversies about dietary supplements and supplement ingredients through its annual Mary Frances Picciano Dietary Supplement Research Practicum. ODS will continue to broaden the practicum's reach by making a video archive of the presentations available on the ODS website.

ODS will continue to sponsor the ODS Seminar Series featuring monthly presentations by experts who conduct research on dietary supplements, nutrition, and related issues.

ODS will help sponsor workshops conducted by scientific organizations (such as the Federation of American Societies for Experimental Biology [FASEB], the American Society for Nutrition [ASN], and others) that include a focus on dietary supplements or a topic relevant to ODS.

Strategy 2-2: Provide continuing education activities and career development for professionals through opportunities to work with ODS.

ODS will continue to offer postdoctoral and career training in its offices. ODS plans to maintain its sponsorship of fellows through the John A. Milner Fellowship with the U.S. Department of Agriculture (USDA) and the American Association for the Advancement of Science's (AAAS's) Science & Technology Policy Fellowship. ODS will explore other mechanisms to support postdoctoral research training in collaboration with other NIH ICOs and federal agencies.

ODS will continue to offer opportunities for academic faculty members to work at ODS during their sabbaticals. Mid- and senior-level faculty members will work with ODS for up to 1 year to develop experience in investigating dietary supplements and to work with ODS scientists on new initiatives.

Strategy 2-3: Provide funding to stimulate research training in federal laboratories.

ODS will continue to train young intramural investigators in the stimulating environments of research laboratories across the federal government.

ODS will maintain its support for interagency agreements (IAAs) to sponsor junior and senior investigators at collaborating federal agencies. Examples include the support of a postdoctoral fellow in metrology (the science of measurement) at the National Institute of Standards and Technology (NIST) and support for the validation of methods for authentication of botanical supplements and ingredients at the USDA Agriculture Research Service (ARS).

GOAL 3: Foster development and dissemination of research resources and tools to enhance the quality of dietary supplement research.

There is an ongoing need to develop new research methodologies, resources, and tools to support the study of dietary supplements. ODS will continue to coordinate the creation and dissemination of analytical tools for the characterization of dietary supplement ingredients through its

Analytical Methods and Reference Materials (AMRM) Program.

ODS will continue to work to improve survey instruments for observational studies and resources and methodologies for preclinical and clinical trials and will continue to work with NCCIH and the National Center for Advancing Translational Sciences (NCATS). This effort will continue to expand beyond dietary supplements to include the measurement of biomarkers of nutrient status and nutrient and non-nutrient exposure in blood and other biological specimens.

Strategy 3-1: Enhance the development of appropriate study methods for research on dietary supplements and their ingredients.

ODS will stimulate the development, evaluation, and use of appropriate and rigorous research paradigms for investigating the efficacy and safety of dietary supplements and their ingredients. For example, ODS will continue to support and plan workshops on the latest knowledge and emerging approaches in the study of dietary supplements (similar to the workshop on the unique challenges of translating natural products research to clinically useful trial outcomes organized and co-sponsored by ODS and the workshop on assessing the safety of botanical dietary supplements co-sponsored by ODS).

ODS will support the development of cutting-edge approaches to elucidate the mechanisms of action of chemically complex natural product dietary supplements. The Natural Product Technology, Methodology, and Productivity Optimization (NP-TEMPO) Center component of the CARBON Program develops methods to accelerate research on complex natural products such as botanicals for human health and establishes collaborations to refine applications of these methods. Another component of the CARBON Program, the Natural Product Magnetic Resonance Database (NP-MRD), has established a resource that will serve as a repository specifically for natural product nuclear magnetic resonance (NMR) spectra, which provides a growing suite of powerful tools for assigning, refining, and comparing molecular structure asignments and metadata. This repository and its associated tools provide an important new resource to support the rigor and progress of natural products research.

ODS also will encourage the development and use of appropriately validated biomarkers of nutrient status in studies of the health effects of dietary supplement ingredients. In addition, through its Population Studies Program, ODS will help to develop tools to evaluate dietary supplement usage more precisely in national health surveys and other large cohorts in collaboration with Centers for Disease Control and Prevention (CDC) National Center for Health Statistics (NCHS) and the USDA's ARS Human Nutrition Research Center (HNRC).

The ability to compare, reproduce, and replicate published research results is essential for building scientific knowledge. ODS will ensure that its funded grants adhere to rigorous standards for dietary supplement identification to ensure product integrity using a paradigm first established by the NCCIH. ODS also will continue to promote the highest quality research in dietary supplements by requiring investigators to thoroughly characterize and report the composition of the products they use in mechanistic and clinical investigations.

ODS will support the use of validated artificial intelligence and machine learning techniques to understand individual variability in response to dietary supplements, especially in cases where

there is insufficient evidence (e.g., glucosamine and arthritis).

ODS will continue to collaborate with NIST to administer laboratory Quality Assurance Programs (QAPs) to enable laboratories to improve the accuracy of their analytical measurements of foods, dietary supplements, and biological samples.

ODS will coordinate with NIH ICOs to facilitate the development of research tools to enhance the advancement of resilience research.

Strategy 3-2: Foster the highest quality laboratory analyses for dietary supplement constituents by developing and promoting validated analytical methods and certified reference materials.

NIST is the U.S. national metrology institute and producer of reference materials that industry and academia can use to ensure precision and accuracy in measurements. Through its collaborative interagency activities, ODS will continue to advance the development and expanded availability of reference materials for dietary ingredients and natural products as well as their metabolites in biological samples.

Furthermore, ODS will foster the development, optimization, validation, dissemination, and use of reliable and accurate analytical techniques for identifying and quantifying specific dietary supplement ingredients, natural product constituents, and potential contaminants. ODS will support these efforts through funding for research grants, interagency agreements, and contracts with NGOs.

Strategy 3-3: Develop and provide publicly accessible databases for use in clinical, epidemiological, and other population research on dietary supplements.

ODS will continue to compile dietary supplement product label information in a publicly accessible database. As it has done since launching the Dietary Supplement Label Database (DSLD) in 2013, ODS will continue to add all information printed on dietary supplement product labels to the DSLD and enhance user usability. It will continue to lead efforts to synergize dietary supplement, food, and drug ingredient databases across the federal government to facilitate research and complete the deployment of database enhancements in line with consumer requests. ODS also will continue to call on external experts and request public comments to further enhance the DSLD by increasing its utility for researchers and consumers.

ODS will continue to prioritize its efforts to work with the USDA/ARS/Beltsville Human Nutrition Research Center (BHNRC) to analyze ingredients for the Dietary Supplement Ingredient Database (DSID) based on their public health relevance. ODS also will support USDA analyses of ingredients in both foods and dietary supplements to estimate total intakes, especially of key nutrients, and explorations of potential problems in dissolution and disintegration of certain botanical dietary supplements.

ODS will continue to maintain and enhance the Computer Access to Research on Dietary (CARDS) database of federally funded research projects, updating it on a yearly basis. ODS also will develop a more user-friendly interface and create a more precise and informative research

categorization system for CARDS.

GOAL 4: Translate dietary supplement research findings into useful information and disseminate it to researchers, health professionals, government officials, policymakers, and consumers.

ODS provides an array of information on dietary supplements and their ingredients that the public views as reliable and up to date. Dietary supplement users will continue to benefit from free access to this objective information. Along with the general public, the website-user community includes the media, social media, health professionals, researchers, policymakers, and those in the dietary supplement industry. ODS will continue to collaborate with others in translating research findings into actionable information for public policy and guideline development.

Strategy 4-1: Develop and maintain informational resources on dietary supplements for diverse audiences.

ODS will publish new dietary supplement fact sheets (the most frequently viewed materials on the ODS website) and revise existing fact sheets as necessary to keep them current. It also will prepare fact sheets on other ingredients in dietary supplement products and on dietary supplements for specific purposes such as sleep and relaxation and for different age groups. ODS will continue to create several forms of each fact sheet: a detailed, referenced version directed to health professionals and easy-to-read versions in both English and Spanish directed to consumers.

ODS will periodically review and update the ODS website to ensure that it meets the needs and interests of users. ODS will further increase access to ODS informational resources through various outreach efforts, such as expanding and promoting its service that provides personal responses from ODS nutrition staff to questions about dietary supplements from ODS website users.

ODS will continue to explore ways to increase the office's reach through federal programs that serve rural and underserved communities, patient advocacy organizations, and communication services such as govDelivery and Meltwater. The use of the email subscription and marketing service govDelivery by Granicus has helped ODS gain access to a large network of federal, state, and local government clients and subscribers, increasing ODS's subscriber numbers significantly over the past year.

Strategy 4-2: Provide leadership on dietary supplement research and educational activities within the federal government.

By congressional mandate, ODS advises the HHS and its agencies on matters related to dietary supplements and will continue to do so. For example, ODS scientists and the staff of FDA's Office of Dietary Supplement Programs will continue to meet on a regular basis, collaborating as is needed and appropriate.

To further collaborative efforts on dietary supplement research, education, and communications

beyond the HHS, ODS will continue to lead the Federal Working Group on Dietary Supplements (FWGoDS) that includes representatives of most NIH ICOs and other federal agencies. Through these efforts, ODS will continue to build strategic partnerships and engage leaders and stakeholders in exchanging information and ideas on nutrition and dietary supplement research, education, and policy.

Strategy 4-3: Collaborate with stakeholders to inform public health policy and clinical practice related to nutrients and other ingredients in dietary supplements.

Data on food and nutrient intake have been collected for decades. Collecting data on dietary supplement use is more recent and has grown in importance with increased use of dietary supplements by the U.S. population. Dietary supplements can contribute substantially to intakes of several essential nutrients. Food and supplement intake data must be assessed together for total dietary intakes for individuals and groups and for developing recommendations at the federal and local levels.

In addition to supporting the development of a NHANES Dietary Supplement Database to be used with data from the NHANES to address population dietary supplement intakes, ODS has developed two databases that are used to estimate the intake of ingredients in dietary supplements—the DSLD and the DSID. They were developed in collaboration with federal experts from NIH, USDA, U.S. Department of Commerce (USDOC), FDA, and U.S. Department of Defense (DoD).

These databases, in addition to ODS's support for the collection and analysis of dietary supplement use in NHANES, now permit population-based estimates of total dietary intake (as discussed in Strategy 1-2). ODS staff, in collaboration with other federal agencies, have produced prevalence estimates, reviewed existing data, and developed new data collection and analysis methods and resources. This work allows for assessments of dietary supplement formulations (e.g., through quantification of ingredients and studies of disintegration) with particular focus on nutrients and supplements of current public health concern (iron, iodine, folic acid and folate, prenatal and infant and child multivitamins, and herbal supplements). It also facilitates the accurate collection of prevalence data from high-risk target populations (infants, toddlers, pregnant and lactating women, and older adults). The work on the databases and on methods for data collection and analysis has been accomplished by staff from various ODS program areas and through collaborations with FDA, National Library of Medicine (NLM), National Cancer Institute (NCI), the Uniformed Services University of the Health Sciences (USUHS), CDC, USDA, USDOC, and DoD.

The ODS Iodine Initiative provides a specific example of the NHANES work described above. ODS is working with multiple federal agencies to follow up on a series of workshops held to identify research needs in this area. Major projects in this initiative seek to improve assessment of iodine status in the U.S. population; encourage the submission of investigator-initiated grant applications to study various aspects of iodine nutrition, particularly in humans; and measure the iodine content of foods and dietary supplements and release the information in publicly accessible databases.

GOAL 5: Coordinate and support the development of collaborative initiatives to address gaps in dietary supplement research.

Since its inception, ODS has supported and facilitated the development of dietary supplement research. Because dietary supplements are marketed and used to address concerns across the health spectrum, research is vital to understanding the usage of these supplements and their impact on health and physiological systems. In this period with a new strategic plan, ODS will create a new initiative to systematically identify ongoing dietary supplement research and foster and facilitate collaborations among NIH ICOs. This coordination role will allow ODS to more easily identify dietary supplement research gaps and provide the leadership needed for them to be addressed. Among these issues is collaboration with FDA and sister agencies in the U.S. Public Health Service and the USDA to enhance interoperability of federal databases, such as through standardization of ingredient entries in dietary supplements, drugs, and foods.

Strategy 5-1: Identify dietary supplement research programs within NIH and the federal agencies.

As the field of dietary supplement research continues to expand, ODS will identify and catalog NIH-funded and other federally funded research relevant to dietary supplements for the purpose of fostering and coordinating dietary supplement research collaborations across NIH and between NIH and other federal agencies. Initially, ODS will rely on its existing programs and initiatives to categorize dietary supplement research and will expand this assessment with a thorough NIH dietary supplement portfolio analysis using robust NIH research program databases and evaluation tools.

Strategy 5-2: Increase collaborations on dietary supplement research within NIH and the federal government.

Through its existing program workshops and meetings, ODS seminars, and ODS-led working groups, (e.g., the Trans-NIH Resilience Working Group and the FWGoDS) as well as through staff participation in working groups across the NIH (e.g., the Coordinating Committee for Research on Women's Health), ODS leverages opportunities to encourage dietary supplement research collaborations across NIH and with other federal agencies. ODS will establish a new NIH Dietary Supplement Research Coordinating Committee (DSRCC). This committee will formalize ODS's coordinating role with the objective of increasing collaboration among NIH ICOs whose programs include work on dietary supplements and the intersection of dietary supplements and nutrition research. Members will include representatives from NIH ICOs who have been appointed by their directors.

The purpose of the NIH DSRCC will be to identify emerging and cross-cutting research areas and to develop platforms for encouraging collaborative initiatives across NIH and within the federal government. Research coordination may initially be achieved by the DSRCC through the identification of co-funding and administrative supplement grant opportunities to further encourage the integration of dietary supplement research into existing research programs.

B. ODS Program Activities and Strategic Innovation

More than half of the ODS research budget goes to support grants with NIH ICO partners. Of particular note is the CARBON Program, managed in collaboration with NCCIH and other ICs, which studies the safety and mechanisms of action of botanicals in improving resilience to infection, psychological and social stress, and aging. Exhibit 1 presents the array of research topics funded by ODS for FY2017–FY2021 and Table 1 presents the distribution of funds by NIH ICs.

EXHIBIT 1: ODS-SUPPORTED GRANTS BY DIETARY SUPPLEMENT
FY2017–FY2021
($50.8M)

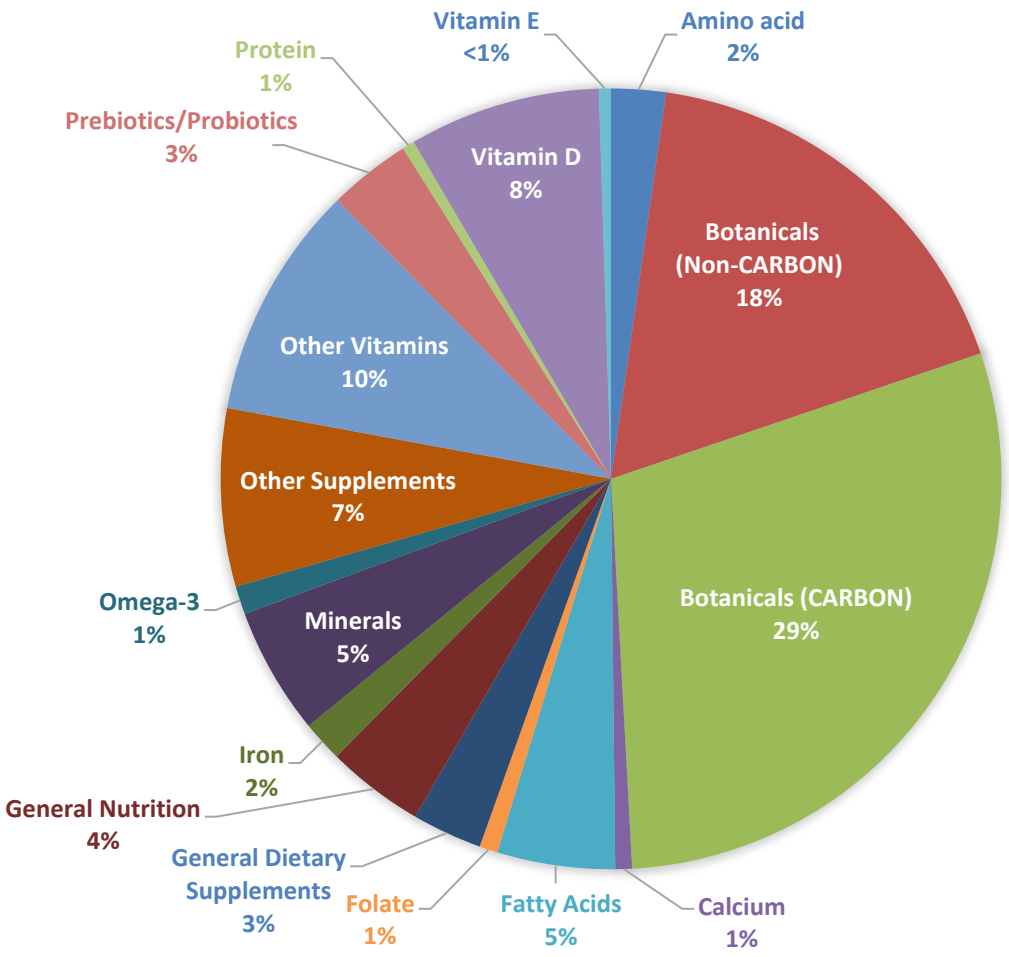


TABLE 1: ODS Co-Funded Investments with NIH ICs (FY2017 through FY2021)	
National Center for Complementary and Integrative Health (CARBON)	$14,911,149
National Center for Complementary and Integrative Health (Other)	$7,947,904
National Heart, Lung, and Blood Institute	$5,078,687
National Institute of Diabetes and Digestive and Kidney Diseases	$6,989,422
National Cancer Institute	$4,147,222
National Institute on Alcohol Abuse and Alcoholism	$963,554
National Institute on Aging	$2,011,239
Fogarty International Center	$565,918
National Institute of Environmental Health Sciences	$813,327
National Institute of Child Health and Human Development	$2,335,537
National Institute of Neurological Disorders and Stroke	$575,000
National Institute of Allergy and Infectious Diseases	$1,346,924
National Institute of Biomedical Imaging and Bioengineering	$149,377
National Eye Institute	$813,327
National Institute of Arthritis and Musculoskeletal and Skin Diseases	$478,052
National Institute of Mental Health	$100,000
National Institute of Nursing Research	$769,535
National Institutes of Health Office of the Director	$551,193

The remainder of this section describes ODS's programs and activities.

Grants and Funding Program

The ODS Grants and Funding Program supports research on dietary supplements in collaboration with many NIH ICOs, with the goal of supporting innovative research to evaluate the health effects of dietary supplements—primarily for promoting health and reducing the risk of disease—and the underlying biological mechanisms by which they do so. Three main funding approaches are used to build the program's research investment portfolio.

- ODS co-funding of research and training grants. Co-funding supports new (or renewal) projects that include dietary-supplement–related specific aims or training in dietary supplement research.
- Administrative supplements for grants proposing an expanded component related to dietary supplements. These are awards of up to $100,000 direct costs for 1 year. They support research within the scope of the parent grant in which the primary emphasis is on dietary supplements and/or supplement ingredients in health maintenance and disease prevention.

- Limited collaboration with the NIH Office of Intramural Research. This includes support of special programs, such as the Bench-to-Bedside Program, unique dietary supplement-related intramural research projects, and ODS Research Scholars Program. The latter program targets early career scientists in intramural laboratories who propose research projects on dietary supplements and have identified mentors. Funding is limited to 1 year and $100,000. All funded scholars present their results at the annual ODS Scholars Symposium.

CARBON Program

The CARBON Program uses different types of awards with synergistic but separate individual goals.

- The Botanical Dietary Supplement Research Center (BDSRC) components of the consortium aim to fill gaps in the foundational data needed for the design of highly rigorous and informative clinical trials of the effects on resilience of the most promising botanical dietary supplements.
- The Natural Product Technology, Methodology, and Productivity Optimization (NP-TEMPO) Center is developing approaches expected to accelerate mechanistic research on these complex natural products, leveraging collaborations with other research groups to beta test various applications of the NP-TEMPO approaches. The Natural Product Magnetic Resonance Database (NP-MRD) is developing a unique resource, a repository dedicated to serving as a repository for (only) natural product nuclear magnetic resonance (NMR) spectra, while providing a growing suite of powerful tools for assigning, refining, and comparing molecular structure assignments and metadata. This repository with its associated tools provides an important new resource to support the rigor and progress of natural products research.
- The Pilot Projects Increasing the Impact of CARBON is a competitive initiative to increase the impact of research in the BDSRC by leveraging their well-characterized products and advanced methods to enable less experienced botanical dietary supplements researchers to strengthen their own research portfolios and toolkits while also providing new information that contributes to the BDSRC specific aims.

The purpose of the CARBON Program, a partnership between ODS, NCCIH, and the National Institute on Aging (NIA), is to coordinate and promote collaborative, transdisciplinary research on the safety, effectiveness, and mechanisms of action of botanical dietary supplements that have a high potential to benefit human resilience and health. An explicit goal of the program is to foster development of transdisciplinary research teams focused on the investigation of the health effects of chemically complex botanicals.

Launched in 1999 as the NIH Botanical Research Centers Program, each grant award cycle has had an overarching theme developed by coordinating with partner NIH ICOs to create one or more funding opportunity announcement(s) (FOA[s]) with the goal of addressing broad research questions of high interest to all the partner organizations.

The focus of the current Botanical Dietary Supplement Research Centers (BDSRCs) is investigation of the mechanisms through which botanicals may modulate human resilience. Each BDSRC is required to provide an environment, personnel, and resources that promote collaboration between experts in the identification and characterization of botanicals and their chemistry; experts in *in vitro* and *in vivo* model systems used to study mechanisms of resilience to stress, aging, or infection; and experts in the design and conduct of clinical trials. These collaborations strengthen the rigor of the research and enhance both the innovation and the eventual utility of the research for clinical trial design.

Analytical Methods and Reference Materials (AMRM) Program

The ODS AMRM Program works to enhance the foundation for biomedical research on the health effects of nutrients, botanical constituents, and their metabolites by advancing their analytical characterization in dietary supplements and clinical/biological samples. In addition to providing resources for assuring that scientifically valid analytical methods and authentic and well-characterized reference materials are available to stakeholders, the AMRM Program evaluates the resource needs of the dietary supplement community, maintains a repository of tools and information, and provides guidance to investigators on questions of natural product integrity to support the NIH-wide rigor and reproducibility initiative.

To accomplish its goals the Analytical Methods and Reference Materials (AMRM) Program coordinates multiple complementary activities with NIH ICOs, government agencies, and private sector organizations.

- Analytical method innovation and validation are supported through an Interagency Agreement (IAA) with the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) and Administrative Supplements to National Institutes of Health (NIH)-funded grants through partner NIH Institutes, Centers, and Offices (ICOs).
- Improved accuracy, precision, and reliability of analytical measurements are promoted through the development of methods, standards, and reference materials under an IAA with the National Institute of Standards and Technology (NIST) and contracts with other national metrology institutes and commercial organizations.
- The joint coordination and conduct of laboratory quality assurance programs with NIST collects information on stakeholder priorities and provides research scientists, clinical labs, industry analysts, and regulators with a means to evaluate their measurement systems and capabilities, identify and resolve problem areas, and improve performance and harmonization across analytical communities.

AMRM staff also participate in numerous external educational, standard setting, and consensus building activities in the dietary supplement and natural product research and analytical communities to promote analytical rigor and reproducibility and, thus, support the translation of dietary supplement research to protect and improve public health. These multifaceted AMRM activities have fostered creation and dissemination of a substantial body of resources for dietary supplement research, with new validated methods, certified reference materials, analytical laboratory guidance documents, and novel research publications produced annually.

Population Studies Program

The Population Studies Program evaluates the use of dietary supplements by the U.S. population and specific population subgroups and the contributions that dietary supplements make to nutritional status. Research is focused on describing the use of dietary supplements, including specific supplements taken, amount consumed, and duration of use. This program uses data from nationally representative surveys and other large population-based studies to conduct research and characterize emerging issues such as changing patterns in use of these products. Staff also lead efforts to address methodological issues in assessing dietary and dietary supplement intakes and, importantly, total nutrient intakes from foods and supplements in epidemiological and other large studies.

The Population Studies Program accomplishes its goals through the following program activities:

- Dietary supplement use is characterized and evaluated and estimates are developed for total nutrient intakes from all sources (foods, beverages, and dietary supplements).
- Nutritional status of specific nutrients in the U.S. population is assessed and has included vitamin D, iodine, folate, vitamin B-12, and iron.
- Methodological issues in assessing dietary supplement use are identified through the review of existing assessment tools and data. This has included a review of food frequency questionnaires used to assess dietary supplement use and an analysis of dietary supplement use by lactating women in the Human Milk Composition Study.
- To improve dietary assessment tools, the Population Studies Program identifies, develops, and implements new methods. For example, these have included developing new methods to collect data from the National Health and Nutrition Examination Survey (NHANES) on the use and composition of infant formula from NHANES; determining best methods to assess iodine intake from foods and salt; consulting on dietary assessments in studies of pregnancy and offspring; developing and improving dietary supplement questionnaires including the support of validation studies of questionnaires; and providing input on dietary assessment in the National Institutes of Health (NIH) All of Us Research Program and for the *Dietary Guidelines for Americans* planning guide.
- To develop validated biomarkers of nutrient exposure and status the Population Studies Program works with a laboratory at the Centers for Disease Control and Prevention (CDC) National Center for Environmental Health (NCEH) to develop new biomarkers of omega-3 fatty acids in blood and forms of folate in red blood cells; with the CDC NCEH to develop new tests for markers of inflammation and iron status; and with the CDC Division of Nutrition, Physical Activity, and Obesity to identify biomarkers of iodine status.

Dietary Supplement Databases

ODS funds and leads the development of three databases. The Dietary Supplement Label Database (DSLD) and the Dietary Supplement Ingredient Database (DSID) contain information on the composition of dietary supplements offered for sale in the United States. Using these databases together with food composition databases makes it possible to estimate the total daily intakes of nutrients and other bioactive substances from both foods and dietary supplements.

Computer Access to Research on Dietary Supplements (CARDS) contains information on research projects pertaining to dietary supplements funded by the USDA, DoD, or NIH since 1999.

Office of Dietary Supplements (ODS) continues to develop and expand the utility of dietary supplement databases.

- The Dietary Supplement Label Database (DSLD) is a repository for all the information on the product label (composition, claims, manufacturer contact information, etc.) of dietary supplements. The database has data from more than 130,000 labels, and data from another 1,000 labels are added each month. DSLD data are used to compare nutrient needs/dietary intake gaps with multivitamin/mineral and prenatal supplements.
- The Dietary Supplement Ingredient Database (DSID) contains analytically derived information on the amount of labeled ingredients of many dietary supplements offered for sale in the United States. It currently includes adult, child, and prenatal multivitamin/multimineral supplements and omega-3 fatty acid products.
- Since 2010 the Federal Dietary Supplement Database Working Group* has developed criteria for choosing botanicals and other dietary ingredients of public health interest to add to the DSID that do not have established recommended intakes but that should be analytically evaluated.
- The Computer Access to Research on Dietary Supplements (CARDS) Database ensures that all data are easily accessible and includes dietary-supplement– related projects funded through FY2019, with FY2020 projects in review.

*The working group consists of representatives from ODS, National Library of Medicine (NLM), National Cancer Institute (NCI), U.S. Department of Agriculture (USDA), Centers for Disease Control and Prevention (CDC), Food and Drug Administration (FDA), Department of Defense (DoD), and National Institute of Standards and Technology (NIST).

Mary Frances Picciano Dietary Supplement Research Practicum

ODS offers the Mary Frances Picciano Dietary Supplement Research Practicum, a 2.5-day annual educational opportunity to provide fundamental knowledge of dietary supplements to faculty members, students, and practitioners with a serious interest in this subject. This intensive practicum provides a thorough overview and grounding about issues, concepts, unknowns, and controversies about dietary supplements and supplement ingredients. It also emphasizes the importance of scientific investigations to evaluate the efficacy, safety, and value of these products for health promotion and disease prevention and how to carry out this type of research.

Practicum Faculty and Participants

- The faculty consists of experts from the National Institutes of Health (NIH), academic institutions, federal regulatory agencies such as the U.S. Food and Drug Administration (FDA), and practicing stakeholders. Participants also hear from various stakeholders—the dietary supplement industry, consumer advocacy groups, and media—who study, advocate, regulate, or educate about dietary supplements.
- The practicum is open to selected faculty members, graduate students, and research practitioners in health-related disciplines such as nutrition, food science, pharmacy, pharmacology and pharmacognosy, exercise science and kinesiology, medicine, dentistry, nursing, and complementary and alternative medicine. Primary candidates are full-time academic faculty members, research practitioners, doctoral students, postdoctoral fellows, and fellows.

Resilience and Health Studies Program

Resilience and Health Program Activities

- An interagency agreement (IAA) with the Uniformed Services University of the Health Sciences (USUHS) Department of Defense (DoD) Center for Health and Military Performance (CHAMP), "Dietary Ingredients to Minimize Environmental Heat Injury," investigated the ability to mitigate mitochondrial damage with select dietary ingredients following exposure of mice to acute heat stress.
- An IAA with CHAMP titled "Dietary Supplement Ingredients Promoted for Immune Health" was initiated in response to increased (pandemic-related) inquiries of the benefits and risks associated with the use of new products or new uses/immune health claims for previously marketed products.
- The Trans-NIH Resilience Working Group was established to enhance collaboration and coordination of the resilience research agenda across all of the National Institutes of Health (NIH). Institutes, centers, and offices (ICOs) representing the core working group include the National Cancer Institute (NCI), National Center for Complementary and Integrative Health (NCCIH), National Institue on Aging (NIA), National Heart Lung and Blood Institute (NHLBI), National Institute of Nursing Research (NINR), National Institute on Minority Health and Health Disparities (NIHMD), and Office of Dietary Supplements (ODS). A website with an agreed-upon definition and conceptual model of resilience and a resilience research decision tool is available on the ODS website.
- An analysis of ODS resilience grants (2018–2020) was completed to facilitate criteria development for resilience study designs and to identify common measures of resilience.

The Resilience and Health Studies Program focuses on elucidating mediators of resilience or protective factors to help gain a better understanding of how responses to biological, environmental, and psychosocial stressors may impact nutrient status and overall health status in individuals. The program helps to address key questions such as the following: when that are relevant to the mission of ODS should a change in nutrient status or altered biochemical markers represent a beneficial adaptation to a stressor versus a detrimental imbalance to the system (or a combination of both); and when do individual nutrient variations require intervention with dietary supplements? The program encourages researchers to identify opportunities to study resilient special populations (active-duty military, centenarians, survivors within high-risk populations) that are typically under-represented in scientific investigations. The program also promotes a better understanding of the impact that protective factors have on disease risk factors. ODS coordinates the Trans-NIH Resilience Working Group to enhance resilience research collaborations across NIH.

Iodine Initiative

Iodine is an essential nutrient and a component of the thyroid hormone. The iodine status (i.e., adequacy, deficiency, or excess) of populations and individuals varies with geography, iodine content of the food supply, and use of iodized salt and dietary supplements.

Although iodine deficiency is currently rare in the United States and Canada, it can have serious effects. ODS originally developed its Iodine Initiative in 2011 in response to concerns that some pregnant women in the United States might have inadequate iodine intakes at a time of high physiologic demand. Six NIH- sponsored workshops have provided expert opinion on public health issues and research needs. In addition, the *Scientific Report of the 2020 Dietary*

Guidelines Advisory Committee identified a number of iodine-related concerns. ODS seeks to address these identified research and resource needs by supporting research and methodology development to provide a scientific base for understanding how best to improve iodine status in individuals with low to moderate risk of deficiency.

Iodine Program Highlights

- **Iodine Content of Foods and Dietary Supplements:** Develop a database of the iodine content of foods and dietary supplement content database with the U.S. Department of Agriculture (USDA) and the Food and Drug Administration (FDA).
- **Characterization of U.S. Population-Level Iodine Intake**: Analyzed the National Health and Nutrition Examination Survey (NHANES) data to determine the proportion of pregnant women advised by physicians to take supplements containing iodine (80%). Partially supported NHANES to gather information on household usage of iodized salt and other types of salt, total individual dietary intake of iodine from foods and supplements, exposure to iodine uptake inhibitors, and thyroid status as indicated by clinical laboratory measurements. Estimates of the dietary iodine intake of individuals participating in NHANES will be derived using the newly released USDA, FDA and Office of Dietary Supplements-National Institutes of Health (ODS-NIH) Database of the Iodine Content of Common Foods.
- **Analytical Methods, Reference Materials, and Standards for Assessing Iodine Status:** ODS supports the development of certified reference materials that researchers can use to support measurements of iodine in foods and dietary supplements as well as thyroxine and triiodothyronine in serum.

Federal Working Group on Dietary Supplements

The federal working group consists of representatives from federal agencies that share information and discuss issues, initiatives, and research related to dietary supplements and serves as a means of communication between ODS and its federal partners in several ways

- to support research investigations within the NIH.
- to expand opportunities for research investigator training.
- to strengthen collaborative efforts involving dietary supplement research, education, and communication across the government.

Federal Working Group on Dietary Supplements Members

- Most National Institutes of Health (NIH) institutes, centers, and offices (ICOs)
- Agency for Healthcare Research and Quality (AHRQ)
- Administration for Community Living
- Centers for Disease Control and Prevention (CDC)
- Consumer Product Safety Commission
- Department of Defense (DoD)
- Department of Justice
- Department of Veterans Affairs
- U.S. Food and Drug Administration (FDA)
- Federal Trade Commission (FTC)
- Health Resources and Services Administration
- National Aeronautics and Space Administration
- National Institute of Standards and Technology (NIST)
- U.S. Department of Health and Human Services (HHS) Office of Disease Prevention and Health Promotion
- U.S. Agency for International Development (USAID)
- U.S. Department of Agriculture (USDA)

The federal working group was established in part on the basis of a congressional law that specifies that ODS serve as an advisor to federal health agencies on issues related to dietary

supplements. It also exists in response to a goal in the ODS Strategic Plan to expand and conduct outreach efforts that inform and educate about supplements. The federal working group has met twice a year since 2005, generally in April and October. It also maintains periodic contact via email and other means as appropriate.

ODS Communications Program

ODS has communicated the science of dietary supplements to diverse audiences through its information products—primarily a library of consumer and professional fact sheets on ingredients in supplements. Most of these products are available on the ODS website, accessed by more than 1.5 million people per month.

Meeting ODS's strategic plan goals requires not only the development of useful and up-to-date content but also a large investment in the maintenance and enhancement of the technical infrastructure required to disseminate that content.

To ensure that information about ODS events and activities and the availability of content reaches the broadest audience possible, communications staff develop detailed outreach plans. These plans include engaging the help of ODS senior staff as appropriate, resulting in highly customized and effective strategies.

The Office of Dietary Supplements (ODS) Communications Program provides helpful, up-to-date information on dietary supplements through various channels, including social media platforms.

- ODS communications staff respond directly to media inquiries and questions from the public about dietary supplements.
- Fact sheets on dietary supplement ingredients (the most frequently viewed materials on the ODS website) include more than two dozen fact sheets on nutrients such as vitamin D and magnesium with detailed versions including references directed to healthcare professionals as well as easy-to-read versions for consumers in English and Spanish.
- Additional fact sheets are available on dietary supplements such as multivitamin/mineral products and on supplements marketed for specific purposes (such as weight loss and athletic performance).
- The ODS website provides detailed descriptions of ODS program areas and activities, including the Analytical Methods and Reference Materials Program and the vitamin D, iodine, and iron initiatives.
- The ODS website includes information that is particularly relevant to the scientific research community: research-funding opportunities; a listing of funded grants; and dietary supplement research, label, and ingredient databases.
- Through the ODS website, users can sign up to receive e-newsletters, such as *ODS Update* (directed to professional audiences) and *The Scoop* (for consumers) as well as email blasts on special topics.
- ODS posts information daily about dietary supplements and/or nutrition on Twitter and Facebook.
- Communications staff continually monitor and assess new communications technologies and services to ensure that ODS is using the most efficient, cost-effective, and feasible tools available. GovDelivery and Meltwater are two recent examples.
- ODS communications staff support all aspects of meeting planning for the office.

C. New Initiatives 2022–2026

ODS's activities are built upon the successful development of programs since the office's inception and continue to reflect the mandate set by the DSHEA. However, new knowledge, technologies, and public health concerns move scientific knowledge in new directions and necessitate the development of new programs. Examples of new initiatives that ODS may implement to expand its direction in the next 5 years include the following:

1. The establishment of the NIH DSRCC to increase information exchange, communication, collaboration, and coordination of dietary supplement and total dietary intake research/training activities at the NIH. The committee will provide input to the ODS director on scientific gaps in dietary supplement research, along with emerging and cross-cutting dietary supplement research areas; platforms for encouraging collaborative initiatives across NIH and within the federal government; dietary supplement programmatic and policy issues and activities that impact ODS or to which ODS can contribute; and coordinating within the NIH and the external dietary supplement research community on areas of importance across NIH.

2. Increase efforts to address diversity and health equity through investigation, communication, and workforce development activities. ODS aims to facilitate, coordinate, and support research that creates a better understanding of nutrient-based health disparities, so this initiative will have a research arm. ODS also intends to help develop a research community in the form of a diverse new generation of dietary supplements researchers, so it will develop training and outreach programs to enhance representation in the workforce.

3. Explorations of additional mechanisms to support the training of a more diverse cohort of postdoctoral researchers through collaboration with other NIH ICOs and federal agencies.

4. Expand coordination of the development and dissemination of analytical methods including, and extending beyond, the measurement of individual nutrient ingredients in dietary supplement products. Expansions will include the development and characterization of mixtures of constituents and/or suites of materials used to discriminate between plant species, descriptions of the chemical constituents associated with biological activities of interest, and efforts at standardization of ingredients and products. The latter may aid in identifying more or less active preparations of a product.

5. In consultation with relevant ICOs, ODS will assemble, brief, and convene an expert panel to consider critical gaps and needs in research on chemically complex botanical and other natural products and the ways in which the current CARBON Program contributed to advancing the field over the 2017–2021 period. Input from the expert panel will be utilized in developing concepts for future CARBON initiatives.

6. Establish a joint co-funding mechanism for resilience research with NCCIH.

7. Coordinate the writing of a special-issue journal publication on resilience titled, "Advancing the Science of Resilience," as a collaboration with NIH ICOs and other partnering agencies

to highlight examples of resilience projects that are aligned with the concept of resilience developed by the Trans-NIH Resilience Working Group. The special issue also will serve as a resource for investigators to identify important criteria that are key to designing experiments that will help to advance the science of resilience.

8. Collaborate with FDA, USDA, and other federal partners to standardize reporting in federal databases of ingredients in dietary supplements to increase interoperability between them.

9. ODS will use new media approaches, such as a webinar, to promote its funding opportunities in an effort to increase its visibility among ICs. These will remain available on the ODS website and the ODS communications team will develop and implement a dissemination plan to ensure that the webinar is widely advertised.

D. Key Accomplishments from the Strategic Planning Period 2017–2021

The following is an overview of key ODS program accomplishments in the period 2017–2021 by ODS goal and specific objectives for each ODS program. Note that this includes only the four goals that were part of the 2017–2021 strategic plan. This summary supplements activities and scientific strategies described in sections above. Please refer to staff publications and presentations posted on the ODS website for additional information.

GOAL 1: Expand the scientific knowledge base on dietary supplements and their ingredients by stimulating and supporting a full range of biomedical research and by developing and contributing to relevant initiatives, workshops, meetings, and conferences.

Objectives	Key Accomplishments
Grant Funding Program • To support innovative research that evaluates the health effects of dietary supplements • To increase the exposure to and awareness of research on dietary supplements among researchers in related fields	• Co-funded or provided administrative supplements to 307 grants valued at $35.9 million across 13 NIH ICs (not including CARBON grants)
CARBON Program • To develop methods and data required to understand and test the biological effects of inherently complex natural products, especially botanicals, both food and nonfood, on resilience in humans or other animal models	• Co-funded 5 CARBON grants valued at $14.9 million • 206 publications resulted from CARBON program support • 5 new CARBON centers were funded in 2020 and a new pilot project was awarded in 2021
Population Studies • To characterize patterns of dietary supplement use in the U.S. population • To determine the contribution of dietary supplements to the nutritional status of the population and subgroups • To identify nutrients requiring additional research	• Iodine: USDA-FDA database, National Institute of Child Health and Human Development (NICHD) Notice of Special Interest (NOSI), Federal Interagency Working Group • Collaborated with NHANES on folate, vitamin D, iron, and iodine (populations: infants to older adults; data collection methods: analyses) • Collaborated with USDA; National Center for Health Statistics (NCHS); HHS; National Academies of Sciences, Engineering, and Medicine (NASEM); CDC; Centers for Medicare & Medicaid Services (CMS); FDA; NCI; Administration on Aging (AoA); and others on dietary supplement use across the lifespan • Vitamin D Standardization Program resulted in 90+ publications, certification program at CDC, accuracy-based Vitamin D External Quality Assessment Scheme (DEQAS), and standard reference materials (SRMs) available at NIST
Resilience and Health Studies Program • To foster collaboration around resilience research between ICOs • To collect data on common elements in resilience research related to outcomes, phenotype patterns, and measurements of resilience	• Trans-NIH Resilience Working Group: conceptual development retreat, conceptual model, research tools, website • Planning of joint program with NCCIH • Collaborations with the Center for Health and Military Performance (CHAMP) and others

GOAL 2: Enhance the dietary supplement research workforce through training and career development.

Objectives	Key Accomplishments
Grant Funding Program • To enhance the dietary supplement research workforce through training and career development opportunities	• 26 ODS Scholar projects (NIH early career scientists) • 2 Milner fellows • 20 extramural training, fellowship, and career development grants (D43, F, K, R25, and T grants)
CARBON Program • To provide training opportunities to postgraduate and graduate students **AMRM Program** • To promote advances in analytical laboratory proficiency and capability by supporting outreach and education in chemical and biological characterization of dietary supplements and their bioactive ingredients	• CARBON and AMRM contributed to the training of 83 postgraduates and 50 graduate students
Dietary Supplement Research Practicum • To offer a brief course in fundamental knowledge of dietary supplements to academics, doctoral students, and postdoctoral fellows; healthcare practitioners; and other professionals with advanced biomedical degrees	• 772 practicum attendees 2017–2019, and 2021 (academic faculty, doctoral students, postdoctoral fellows, healthcare practitioners, and other biomedical professionals). The 2020 practicum was cancelled because of Covid.

GOAL 3: Foster development and dissemination of research resources and tools to enhance the quality of dietary supplement research.

Objectives	Key Accomplishments
CARBON Program • To develop methods that will be directly applicable to the biological effects of animal- and plant-derived foods and fermented foods	• CARBON supported the development of 20 new methods • The CARBON Center's Natural Products-Magnetic Resonance Database (np-mrd.org) currently contains 41,000 compounds, continues to accept deposits, can be used to analyze deposited spectra or structures, and can be searched using a variety of parameters.
AMRM Program • To catalyze analytical method development and validation for quantitative and qualitative characterization of dietary supplements and their ingredients • To advance development of reference materials for dietary ingredients and natural products	• A contract to AOAC International for method standardization resulted in 30+ method performance requirement documents and 15+ Official Methods of Analysis • AMRM collaborators (i.e., NIST, National Research Council Canada, private sector) produced 35+ reference materials specific to dietary supplement ingredients/metabolites • AMRM supports NIST to administer laboratory quality assurance programs to help laboratories improve accuracy of analytical measurements (cumulative 35 exercises conducted to date)

Objectives	Key Accomplishments
Population Studies • To improve data collection and analysis tools for total nutrient consumption (food and dietary supplements)	• Collaborated with USDA to develop database of iodine content of food, beverages, and dietary supplements • Collaborated with NHANES on data collection methods for infant formula and iron and iodine status in pregnant/lactating women and infants
AMRM, CARBON, and Population Studies • To enhance rigor and reproducibility of dietary supplement research	• Developed a complete renovation of the AMRM and CARBON Program websites, providing ODS stakeholders with summaries and ready access to seminal publications, validated analytical methods, certified reference materials, and database resources resulting from these programs • Published an updated product integrity page titled *The Importance of Natural Product Characterization and Integrity for Dietary Supplement Research* on the ODS website
Dietary Supplement Label Database (DSLD) Program • To maintain and expand a database with labels of products sold in the United States • To perform program and policy research and inform stakeholders of findings • To provide training to researchers via presentations, posters, and articles in peer-reviewed journals	• DSLD includes more than 130,000 labels • Analyzed DSLD data to compare nutrient needs/dietary intake gaps with multivitamin/mineral and prenatal supplements • Published 15 papers in the peer-reviewed literature and presented at national meetings to assist researchers in using the database • Developed and deployed a mobile version of DSLD
Dietary Supplement Ingredient Database (DSID) Program • To maintain dietary supplement ingredient database complementary to the DSLD • To conduct analyses of dietary supplement ingredient concentrations and composition • Support use of the DSID database for public health research	• Analyzed DSID data to develop precise estimate of nutrient intake through dietary supplements • Developed updated estimates of ingredient content of representative samples of the most commonly used dietary supplements
CARDS Program • To maintain a database of all federally funded dietary supplement research • To ensure that data collected for the database is easily accessible by stakeholders • To increase the use of the CARDS database	• CARDS includes NIH dietary-supplement–related projects 2002–2020 • Strategies being developed to identify non-NIH federally funded dietary-supplement–related research
Resilience and Health Studies Program • To coordinate a Trans-NIH Resilience Working group for the purpose of fostering collaboration around resilience research between ICOs • To coordinate the collection and harmonization of data on common elements in resilience research related to outcomes, phenotype patterns, and measurements of resilience • To facilitate the development of research tools to enhance the advancement of resilience research	• Developed the Trans-NIH Resilience Webpage • Developed the Trans-NIH Resilience conceptual infographic • Developed the Trans-NIH Resilience Decision Tool

GOAL 4: Translate dietary supplement research findings into useful information and disseminate it to researchers, health professionals, government officials, policymakers, and consumers.

Objectives	Key Accomplishments
Communications Program • To provide and promote the use of the most current, accurate, and useful information about dietary supplements to ODS audiences • To support ODS scientific staff and programs • To monitor the tech environment for most recent advances and evaluate their usefulness for ODS	• ODS website averages more than 1.5 million visits and 2.5 million page views per month • ODS responded to 539 public inquiries in 2020 • Social media: 10,000 Facebook followers; 16,000 Twitter followers • Products: *ODS Update* has more than 11,000 subscribers; *The Scoop* has more than 21,000 subscribers; videos have 94,700 views • Fact sheets (health professionals and consumers) continuously reviewed, updated, and new ones developed • New webpages added for CARBON and the Trans-NIH Resilience Working Group • Presentations and publications 2017–2020: 146 presentations at national/international conferences and 155 publications • ODS increased the number of its subscribers more than four-fold in a 6-month period following its use of GovDelivery by Granicus
ODS Seminar Series • To increase exposure to dietary supplement research and to encourage collaborations by hosting monthly presentations by experts who conduct research on dietary supplements, nutrition, and related issues.	• Hosted 36 seminar speakers (2017–2020)

III. Scientific Stewardship

A. Addressing Health Disparities and Enhancing Health Equity

The ODS plan has been developed to align with and support the overall NIH focus on health disparities and health equity. ODS will support research to reduce health disparities and increase health equities and will fund researchers committed to both. The ODS initiatives focus on the research supported at ODS, coordination of dietary supplement research across NIH, training and career development activities, and communication of research findings to professional and consumer audiences.

To adequately address health disparities in dietary supplements it is vital to understand the differences that exist between subgroups of the population that might impact benefits or risks associated with use of dietary supplements. Factors to be considered are community- and population-level dietary patterns, access to food and dietary supplements, and attitudes surrounding use of nutritional and non-nutritional dietary supplements (e.g., botanicals, probiotics). Variables to be addressed include gender, racial, ethnic, and health status differences that impact the utilization of and access to nutrients and phytochemicals in supplements and conventional food and how these might influence health in diverse populations and across the lifespan. To address health disparities in dietary supplement research, ODS will support relevant research and disseminate knowledge (through fact sheets, communications, and workshops/forums) that promotes equity in data collection/reporting to ensure that these data are available to policymakers who might influence more equitable policies relevant to dietary supplement benefits and risks.

ODS staff participate in working groups with the NIH Tribal Health Research Office (THRO), Office of Research on Women's Health (ORWH), and the National Institute on Minority Health and Health Disparities (NIMHD). These relationships are used to augment ODS efforts to actively inform ICOs of the office's interest in dietary supplement grant co-funding and administrative supplements relevant to their interests and to collaborate on relevant projects when possible. For example, ODS staff participated in a project with ORWH preparing a journal article titled "Physiological Need for Calcium, Iron, and Folic Acid for Women of Various Subpopulations During Pregnancy and Beyond.*"* The ODS also co-sponsored an expert panel meeting with NIMHD, the NIA, and the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) on the vitamin D paradox in Black Americans. The paradox is that despite markedly low (or deficient) measures of vitamin D status in Black Americans, the incidence of falls, fractures, or osteopenia among this population is significantly lower compared to White Americans with similar vitamin D status. Identification of knowledge gaps permits ODS to prioritize research support in areas that advance the science of dietary supplements.

Staff at ODS work with other NIH ICOs and HHS agencies to develop and implement survey instrument questions to capture dietary supplement and dietary information to identify knowledge gaps. These efforts permitted development of research efforts such as nutrient-specific programs (e.g., vitamin D or iodine) both to fill the knowledge gaps and to address the health disparities associated with the gaps. The ODS population studies program has worked collaboratively across the federal government and the broader research community to

characterize supplement use in groups such as infants and toddlers, females of reproductive age, pregnant women, and older adults, evaluating dietary supplement use in relation to demographics, lifestyle, health status, and disease risk. With the intent to better address health disparities and advance health equity, future work will include investigations of additional subpopulation groups (e.g., by race/ethnicity, rural/urban, ability/disability, underserved populations, military/civilian groups, family status, immigrant status, or health status).

Although ODS is not authorized to publish funding requests on its own, ODS will develop new outreach strategies within and outside of NIH for the purpose of supporting grants and research opportunities and other collaborations through established ODS interagency agreements, grant co-funding, and administrative supplement programs. These strategies are intended to provide access to a broader group of ODS and NIH stakeholders (the diversity, equity, inclusion and accessibility [DEIA] groups outlined in the Chief Officer for Scientific Workforce Diversity [COSWD] Strategic Plan). For example, ODS will explore how to better connect with Historically Black Colleges and Universities (HBCUs) to ensure that they are aware of funding and collaboration opportunities.

Goal 2 of the ODS Strategic Plan states that ODS will "enhance the dietary supplement research workforce through training and career development." In all of these efforts, whether it be training, career development, or funding junior and mid-level scientists, ODS will work to close the gap in disparities in funding success for researchers investigating health disparities. To enhance these efforts, ODS will work with COSWD in developing appropriate recruitment protocols to help identify highly qualified, diverse candidates for open positions. ODS will also explore potential collaborations with NIH ICOs to develop a research scholars program for minority-serving institutes (HBCUs, Tribal Colleges and Universities [TCUs], and Minority Serving Institutions [MSIs]) to provide students with opportunities to learn about dietary supplement research at various stages of their career pathways.

As part of its congressionally mandated communications efforts, ODS has worked to prepare a number of materials in both English and Spanish. For example, there is a Spanish version of the popular ODS Dietary Supplement Fact Sheets for consumers. Future communication efforts targeting the general population may consider utilizing an array of communication strategies to ensure that diverse populations have easy and equitable access to relevant and valuable ODS information. For enhancing knowledge among professional audiences on health diversity and equity as related to dietary supplements, ODS will sponsor additional webinars similar to one they recently hosted on dietary supplement use among Hispanics/Latinos living in the United States.

Through the new ODS DSRCC, ODS will serve as a facilitator and catalyst of research on dietary supplements that creates a better understanding of health differences among population groups and what can be done to reduce health disparities. To foster this charge to the committee, membership will be structured to assure that NIH DEIA goals are met.

B. Priority Setting

Priority setting is a dynamic process within ODS and considers public health needs, knowledge gaps, and changing trends in the dietary supplement marketplace (comprising more than 80,000 products and thousands of ingredients) and consumer use of these products. Key questions are used to determine what new initiatives are needed and how the work should be approached. These questions include

- What is the nature and intensity of the public health issue?
- Is the prevalence of the population exposure to a nutrient or other supplement ingredient known? Is it too low or too high? What is the evidence?
- How are biomarkers of nutritional exposure, status, and bioavailability of dietary supplement ingredients and metabolites measured? Are there concerns about the reliability of the measurements? Are new methods available or on the horizon that might provide more useful information?
- What is the evidence for the health effects of dietary supplements? What levels of dietary supplement intake, relevant to dietary consumption, produce an observed biological effect or health outcome?
- How should ODS and the research community identify and fill gaps in knowledge?
- How should ODS and its partners translate the results of research for policymakers, clinicians, and the public?
- How can ODS reach out to the greater NIH community to acquire and communicate information as well as knowledge gaps and to coordinate and support trans-NIH efforts to fill those gaps?

Because ODS was not granted the authority and administrative infrastructure to make its own grant awards and directly issue requests for applications (RFAs) it must depend on coordination and collaboration with NIH ICOs that have their own research and funding priorities. ODS staff rely on extensive interactions with ICOs to assist in setting research priorities and monitor dietary supplement research expenditures by other ICOs through NIH portfolio databases to identify promising areas of collaboration. In addition, ODS staff work with ICO program staff to develop initiatives, develop and contribute to relevant workshops, and publish key findings from workshops and other meetings. Lastly, through close communication and interactions across NIH and with the ODS-sponsored FWGoDS, ODS staff capture insights into emerging public health issues related to dietary supplements and use the insights gained in communication and coordination of research support across NIH.

Working closely with the DPCPSI Office of Portfolio Analysis and taking advantage of other resources, ODS will measure the success of its activities to address its five goals based on the impact of publications in the peer-reviewed literature arising from supported grants, research tools developed, information pieces written, initiatives and workshops developed by staff, and manuscripts published by ODS and other NIH staff. ODS will assess the impact of these results over time as they inform policy and influence health practices related to dietary supplements. ODS programs and initiatives also undergo periodic external evaluations and lifecycle assessments. Programs are sunsetted when workshops, the peer-reviewed literature, or portfolio analyses indicate that needs have been met or priorities have shifted.

C. Rigor and Reproducibility

Dietary supplements commonly contain mixtures of vitamins, minerals, and/or other natural products such as botanical constituents. Even supplements marketed as having a single active ingredient such as an extract of the leaf of a plant may be complex preparations containing numerous unique phytochemicals in a milieu of thousands of other chemical compounds. Relatively simple single chemical entity products may occur in the marketplace as different chemical isomers (e.g., resveratrol, vitamin E) or as a unique formulation marketed for its purportedly enhanced bioavailability (e.g., curcumin). In addition to this complexity, there are tens of thousands of supplement products available in the U.S. market that are combinations of one or two to dozens of active dietary ingredients. Dietary supplements used in biomedical investigations must therefore be rigorously identified and characterized to know exactly what is being studied. The end product of this characterization process is assurance of product integrity and enhanced ability to understand and potentially learn from any variability in outcomes associated with changes in product composition or matrix. Critical parameters of product integrity must include the source, identity, composition, purity, and stability of the dietary supplement that is being investigated, as described, for example, on ODS's newly updated page of related resources for dietary supplement research. ODS works with all its collaborators and funding recipients to assure that the product integrity of dietary supplements under investigation has been carefully considered and appropriately documented to ensure experimental rigor and enhance research reproducibility.

The ODS AMRM Program plays a large role in enhancing experimental rigor and research reproducibility with its goal to enhance the analytical foundation for biomedical research on the health effects of nutrients, botanical constituents, and their metabolites in dietary supplements and biological samples. In addition to disseminating information and resources (publications, certified reference materials, laboratory quality assurance exercises) to assure that AMRMs are available to stakeholders, the AMRM Program assesses community resource needs and provides guidance to ODS grant awardees and IC partners for demonstrating the integrity of natural product interventions used in research, which supports the NIH-wide rigor and reproducibility initiative. To accomplish these goals the AMRM Program coordinates multiple complementary activities with NIH ICs, government agencies, and private sector organizations.

- Analytical method innovation and validation are supported through an IAA with the USDA ARS and administrative supplements to NIH-funded grants through partner NIH ICs.
- Improved accuracy, precision, and reliability of analytical measurements are promoted through the development of methods, standards, and reference materials under an IAA with NIST and contracts with other national metrology institutes and industry organizations.
- The joint coordination and conduct of laboratory quality assurance programs with NIST collects information on stakeholder priorities and provides research scientists, clinical labs, industry analysts, and regulators with a means to evaluate their measurement systems and capabilities, identify and resolve problem areas, and improve performance and harmonization across analytical communities.

In addition to these ODS-organized efforts, AMRM staff participate in numerous educational, standard-setting, and consensus-building activities in the dietary supplement and natural product

research and analytical communities to promote analytical rigor and reproducibility and, thus, support the translation of dietary supplement research to protect and improve public health. These multifaceted AMRM activities have fostered creation and dissemination of a substantial body of resources for dietary supplement research, with new validated methods, certified reference materials, analytical laboratory guidance documents, and novel research publications produced yearly.

D. Partnerships and Collaborations

ODS has developed stable, productive relationships with select ICOs, external groups, and federal agencies whose research interests are clearly aligned with ODS (see Appendix B for a complete list of ODS liaisons and interactions). Although the type of collaborations vary, they help ODS increase its impact/influence on dietary supplement biomedical research.

- ODS has built solid relationships with ICOs such as NCCIH through the CARBON Program and NIDDK through several joint funding opportunities based on a mutual interest in nutrition research.
- ODS also regularly participates in co-funding and administrative supplement activities with 13 ICOs and has funded ODS Scholars from 8 ICOs.
- ODS's relationship with CDC's NHANES Program has provided valuable and clinically relevant information for the research community as a resource leading to numerous highly cited publications on important differences in folic acid, iodine, and vitamin D status in the U.S. population and subgroups.
- ODS's support for the USDA's DSID, Food Composition Lab, and special databases such as the flavonoid database and interagency agreements with NIST have yielded many useful outputs including reference materials, standards, and assays for the research community.
- ODS has developed a collaboration with the National Institute of Environmental Health Sciences (NIEHS) and the National Toxicology Program (NTP) on their safety-focused Botanical Dietary Supplements Program. ODS and NIEHS NTP continue to routinely communicate, and NIEHS is a sign-on partner for ODS's current FOAs.
- ODS also participates in a number of other trans-agency working groups, including the Federal Dietary Reference Intakes Steering Committee and the Joint Agency Nutrition Working Group and convenes and leads the FWGoDS and the Trans-NIH Resilience Working Group.
- ODS has co-authored papers, hosted numerous ICO staff for ODS seminars, and supported workshops with a wide range of ICOs including the Vitamin D Paradox workshop (NIMHD, NIA, NIDDK), the Enhancing Natural Product Clinical Trials workshop (NCI, NIA, National Institute on Alcohol Abuse and Alcoholism [NIAAA], NIEHS, and ORWH), and the Trans-NIH Resilience Workshop (National Institute of Nursing Research [NINR], NCCIH, NCI, National Heart, Lung, and Blood Institute [NHLBI], NIMHD, NIA).

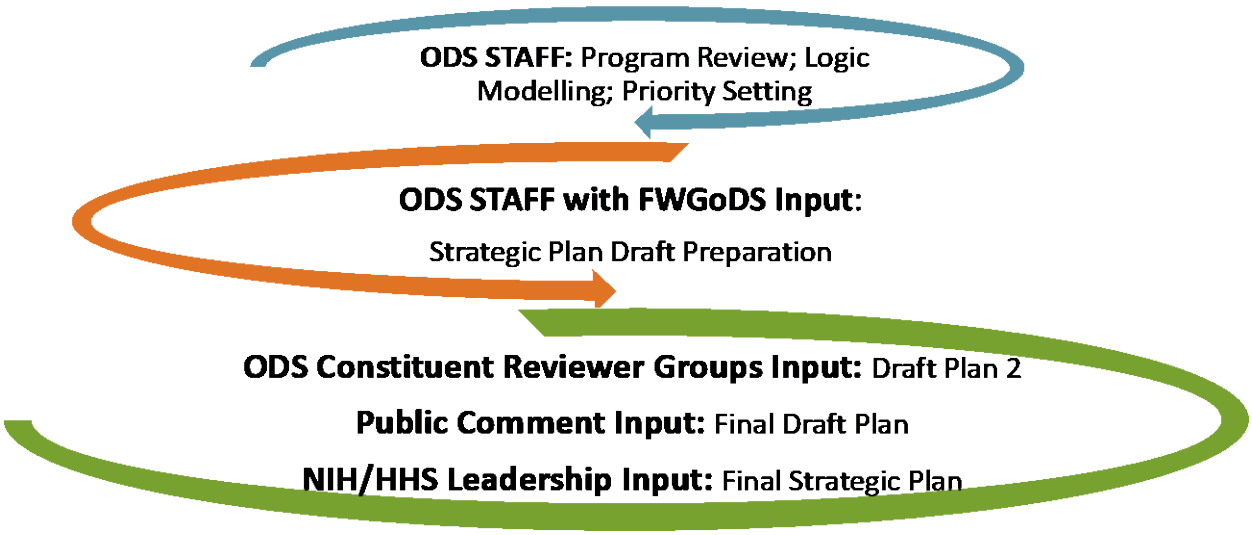
IV. Strategic Planning Process

Since its inception, ODS has used a deliberate planning process to develop 5-year strategic plans. The strategic plan serves multiple purposes for ODS. The planning process provides ODS management and program directors with an opportunity to evaluate their progress over the prior 5-year period and to determine how best to optimize their work going forward. This evaluation process focuses on questions such as

- What is ODS trying to achieve?
- What activities has the office pursued and accomplished?
- What activities should ODS implement or continue to pursue to achieve intended impacts?
- How is success determined?

The following (as depicted below) describes the strategic planning process used to build the ODS 2022–2026 strategic plan with key steps including

- ODS individual program review of accomplishments and program goals
- ODS office review of accomplishments and program goals
- Stakeholder review



ODS individual program review of accomplishments and program goals
Since 2017 ODS has used an annual reporting process to ensure that it continues to meet its objectives while responding to emerging public health issues throughout the 5-year strategic planning period. These reports are available on the ODS website and provide a basis for receiving feedback from key stakeholders. These stakeholders include NIH IC leadership; representatives of the scientific community, industry, other federal agencies; and the public. Gathering the data for these reports provided staff with the opportunity to review their activities and accomplishments on a quarterly and annual basis.

In preparation for the development of the strategic plan, ODS program staff engaged in a logic-modeling process to further review program accomplishments and determine future program directions. Each program director and program staff developed a logic model that included the following:

- Key stakeholders (who has an interest in the work being done?)
- Underlying program assumptions (why is the program necessary?)
- External influencing factors (what factors influence the success of the program?)
- Program objectives and activities (what is the program trying to accomplish and how?)
- Program inputs (what is needed for the program to exist?)
- Program outputs and assessment measures (what are the tangible results and how are they measured?)
- Program short- and long-term outcomes and assessment measures (what is the program trying to add to the field of dietary supplement research and how will it be measured?)

ODS office review of accomplishments and program goals
Upon completion of all program logic models, the individual program data were compiled and an ODS-wide logic model was developed. The ODS logic-modeling process included the presentation of compiled information and staff deliberations on each of the data categories (above). Together, staff considered overall ODS goals and objectives, activities, inputs needed, and outputs and assessment measures to be used. These discussions and the final ODS logic model served as the basis for the initial development of ODS's goals and objectives for the 2022–2026 ODS strategic plan.

Stakeholder review
ODS is committed to engaging the NIH ICO leadership, representatives of the scientific community, industry, other federal agencies, and the public in the strategic planning process. For the 2022–2026 strategic planning process, ODS incorporated various stakeholder review strategies to complete the plan. These included presenting the key goals and program objectives to the FWGoDS, establishing partner review groups (external, NIH, and federal partners), and gathering feedback from other interested stakeholders by issuing a request for public comment.

The first presentation of the agreed-upon ODS mission, goals, program accomplishments, and future direction was made to the FWGoDS in April 2021. Members of the working group were invited to comment on public health issues related to dietary supplements, existing knowledge gaps, or other areas that ODS can help address or do differently to meet the needs of stakeholders. Following this meeting, ODS constructed a final set of goals and completed a first draft version of the report.

In August 2021, ODS established four expert review panels: the Academic Expert Panel, Industry and Association Expert Panel, NIH Partner Expert Panel, and Federal Partner Expert Panel. Academic and Industry and Association Expert Panels included academic researchers, health professionals, leadership from related professional associations, and members of the dietary supplement industry, while the NIH and Federal Partner Expert Panels included partner NIH ICO program directors and partner federal agency program directors outside of NIH (CDC, FDA, Health Resources & Services Administration [HRSA], NIST, U.S. Agency for

International Development [USAID], U.S. Army Research Institute of Environmental Medicine [USARIEM], USDA, and USUHS). Members of all groups had the opportunity to review a PowerPoint overview of ODS's strategic plan and a draft of the written plan. They were asked to respond to the following three questions:

- Are there emerging public health issues that ODS can help address?
- Are there existing knowledge gaps that ODS can help address?
- Is there anything that ODS can do differently to meet the needs of its stakeholders?

All reviewer feedback was received by early December 2021 and was used to stimulate discussion among ODS staff regarding potential changes to the draft strategic plan. A revised version of the plan was presented to the NIH Office of the Director Council of Councils in late January and feedback provided was incorporated into a final draft.

An additional feedback strategy was a widely publicized request for public comment that linked to an online version of the draft strategic plan and the recorded overview presentation posted on a dedicated ODS webpage. Stakeholders were alerted to the availability of these materials and asked to provide comments to ODS through a Federal Register notice. ODS publicized the notice through its listserv, a notice on its website, and direct email with colleagues and other program contacts. Stakeholders were asked to comment on new directions that ODS might pursue and on ways in which ODS can continue to meet stakeholders' needs.

All the feedback gathered through these different stakeholder feedback activities was used to revise the ODS 2022–2026 strategic plan. Upon completion of a final draft, the plan was shared with partner NIH ICO directors and the DPCPSI leadership. Their comments were incorporated into a final version of the strategic plan.

Appendix A: ODS Mandates in the Dietary Supplement Health and Education Act (DSHEA) of 1994 and Subsequent Congressional Language

ODS purpose

- Explore more fully the potential role of dietary supplements as a significant part of the efforts of the United States to improve healthcare.
- Promote scientific study of the benefits of dietary supplements in maintaining health and preventing chronic disease and other health-related conditions.

ODS responsibilities

- Conduct and coordinate scientific research within NIH relating to dietary supplements and the extent to which the use of dietary supplements can limit or reduce the risk of diseases.
- Collect and compile the results of scientific research relating to dietary supplements, including scientific data from foreign sources.
- Serve as the principal advisor to the Secretary and to the Assistant Secretary for Health and provide advice to the Director of NIH, the Director of the Centers for Disease Control and Prevention, and the Commissioner of the Food and Drug Administration on issues relating to dietary supplements. These issues include dietary intake regulations, the safety of dietary supplements, the claims characterizing the relationship between the use of dietary supplements and the prevention of disease or other health conditions and the maintenance of health, and scientific issues arising in connection with the labeling and composition of dietary supplements.
- Compile a database of scientific research on dietary supplements and individual nutrients.
- Coordinate funding relating to dietary supplements for the NIH.

Congressional mandates to ODS subsequent to DSHEA

- Develop a botanical research center initiative (1999).
- Conduct evidence-based reviews of the efficacy and safety of dietary supplements (2001).
- Accelerate the validation of analytical methods and reference materials for dietary supplements (2001).
- Support the development of a dietary supplement label database (2004).

Definition of a dietary supplement (from DSHEA)

- A product (other than tobacco) that is intended to supplement the diet and that bears or contains one or more of the following dietary ingredients: a vitamin; a mineral; an herb or other botanical; an amino acid; a dietary substance for use by humans to supplement the diet by increasing the total daily intake; or a concentrate, metabolite, constituent, extract, or combination of these ingredients.
- Intended for ingestion in pill, capsule, tablet, or liquid form.
- Not represented for use as a conventional food or as the sole item of a meal or diet.
- Labeled as a dietary supplement.

Appendix B: Glossary

AAAS	American Association for the Advancement of Science
AHRQ	Agency for Healthcare Research and Quality
AMRM	Analytical Methods and Reference Materials Program
AoA	Administration on Aging
ARS	Agriculture Research Service
ASN	American Society of Nutrition
BDSRC	Botanical Dietary Supplement Research Center
BHNRC	Beltsville Human Nutrition Research Center
BRC	Botanical Research Center
CARBON	Consortium for Advancing Research on Botanical and Other Natural Products
CARDS	Computer Access to Research on Dietary Supplements
CDC	Centers for Disease Control and Prevention
CHAMP	Center for Health and Military Performance
CMS	Centers for Medicare & Medicaid Services
COSWD	Chief Officer for Scientific Workforce Diversity
CRM	Certified Reference Material
DEIA	diversity, equity, inclusion, and accessibility
DEQAS	Vitamin D External Quality Assessment Scheme
DoD	Department of Defense
DPCPSI	Division of Program Coordination Planning and Strategic Initiatives
DRIs	Dietary Reference Intakes
DSHEA	Dietary Supplement Health and Education Act
DSID	Dietary Supplement Ingredient Database
DSLD	Dietary Supplement Label Database
DSRCC	Dietary Supplement Research Coordinating Committee
FASEB	Federation of American Societies for Experimental Biology
FDA	U.S. Food and Drug Administration
FOA	funding opportunity announcement
FTC	Federal Trade Commission
FWGoDS	Federal Working Group on Dietary Supplements
HAMQAP	Health Assessment Measurements Quality Assurance Program
HBCUs	Historically Black Colleges and Universities
HHS	U.S. Department of Health and Human Services
HNRC	Human Nutrition Research Center
HRSA	Health Resources & Services Administration
IAA	Interagency Agreement
ICOs	Institutes, Centers, and Offices (of NIH)
ICs	Institutes and Centers (of NIH)
MSI	Minority-Serving Institutions
NASEM	National Academies of Sciences, Engineering, and Medicine
NCATS	National Center for Advancing Translational Sciences
NCCIH	National Center for Complementary and Integrative Health
NCEH	National Center for Environmental Health

NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NGO	Non-Governmental Organization
NHANES	National Health and Nutrition Examination Survey
NHLBI	National Heart, Lung, and Blood Institute
NIA	National Institute on Aging
NIAAA	National Institute on Alcohol Abuse and Alcoholism
NICHD	National Institute of Child Health and Human Development
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
NIEHS	National Institute of Environmental Health Sciences
NIH	National Institutes of Health
NIMHD	National Institute on Minority Health and Health Disparities
NINR	National Institute of Nursing Research
NIST	National Institute of Standards and Technology
NLEA	Nutrition Labeling and Education Act
NLM	National Library of Medicine
NMR	nuclear magnetic resonance
NOSI	Notice of Special Interest
NP-MRD	Natural Product Magnetic Resonance Database
NP-TEMPO	Natural Product Technology, Methodology, and Productivity
Optimization NTP	National Toxicology Program
ODS	Office of Dietary Supplements
ORWH	Office of Research on Women's Health
QAP	Quality Assurance Program
RCDC	Research, Condition, and Disease Categorization
RFA	Request for Application
SIG	Scientific Interest Group
SRM	standard reference material
TCUs	Tribal Colleges and Universities
THRO	Tribal Health Research Office
USAID	U.S. Agency for International Development
USARIEM	U.S. Army Research Institute of Environmental Medicine
USDA	U.S. Department of Agriculture
USDOC	U.S. Department of Commerce
USUHS	Uniformed Services University of the Health Sciences