National Institute of General Medical Sciences

Basic Discoveries for Better Health

National Institute of General Medical Sciences 5-Year Strategic Plan 2021-2025

May 2021

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Message from the NIGMS Director

Jon R. Lorsch, Ph.D.
Director, NIGMS

I am pleased to present the 2021-2025 National Institute of General Medical Sciences (NIGMS) strategic plan. This forward-looking document reflects the Institute's priorities and activities in pursuit of its mission and builds upon the successes of the Institute's prior strategic plan. It lays out the goals, objectives, and implementation strategies that the Institute—in partnership with the scientific community at extramural research institutions, professional societies, and other federal agencies—will engage in over the next 5 years. It also provides snapshots of specific priorities and associated targets to ensure that the Institute demonstrates transparency in the pursuit of its goals and objectives.

NIGMS-funded scientists investigate how living systems work at a range of levels, from molecules and cells to tissues, whole organisms, and populations. Investments in these diverse and fundamental areas of biomedical research serve as the foundation for subsequent disease- and organ-specific discoveries and advances. Our ability to effectively treat, diagnose, manage, and ultimately cure diseases requires an understanding of their underlying mechanisms and biology. For example, the outcomes of NIGMS' investments in fundamental biomedical research have resulted in 90 Nobel prizes—47 in chemistry and 43 in physiology or medicine.

NIGMS was established in 1962 with a $124.6 million budget (Pub. L. 87-838, 76 Stat. 1072). In Fiscal Year (FY) 2020, the Institute's budget was $2.9 billion. Most of this appropriation goes into local economies through grants that support individual investigators and trainees at universities, medical schools, hospitals, and other research institutions throughout the country. NIGMS takes its role as a steward of taxpayer dollars very seriously and thus works to invest its resources in a manner that maximizes scientific impact and productivity, safety, efficiency, transparency, and accountability.

As indicated in this strategic plan, the Institute places great emphasis on supporting a wide range of investigator-initiated research grants that unleash the creativity and energy of investigators across the country to solve important biomedical problems. A key tenet of the Institute's vision is that by supporting a broad and diverse portfolio of scientific topics, approaches, investigators, and institutions, we maximize the opportunities for breakthroughs and build the strongest foundation possible on which future advances in medical practice will be built. An important part of achieving this goal is to support the next generation of scientists, who will conduct the breakthrough work of the future. Due in part to the successful introduction of the R35 Maximizing Investigators' Research Award (MIRA) grant mechanism in FY 2016, the number of new research project grants awarded by NIGMS to early stage investigators (ESIs) increased from 128 in FY 2015 to 264 in FY 2020.

NIGMS research training programs are built upon recognition of the interdisciplinary nature of biomedical research and thus emphasize experiences that cut across multiple fields of inquiry.

Certain NIGMS training programs address areas in which there are critical needs such as effective mentorship. Other programs aim to strengthen the research process by engaging individuals from different scientific disciplines and skills earlier along the biomedical career pathway.

In addition, the Institute provides funding to research centers that support critical research resources used by the scientific community or that build research capacities in states that have historically received lower levels of NIH funding. In all its investments, and in line with agency-wide efforts, NIGMS continues to stress the critical importance of rigor, reproducibility, and transparency in all biomedical pursuits.

As NIGMS continues its work over the next 5 years, it does so with an ongoing commitment to public service, the careful stewardship of taxpayer funds, and a focus on achieving important outcomes such as those documented in this strategic plan. Recognizing that the achievement of such outcomes cannot occur in isolation, NIGMS maintains its commitment to pursue its mission in an atmosphere of open dialogue, collaboration, and shared responsibility with the scientific community and general public.

Jon R. Lorsch, Ph.D.
Director
National Institute of General Medical Sciences
National Institutes of Health
U.S. Department of Health and Human Services

NIGMS Profile

NIGMS Profile	
Year Established	1962
FY 2020 Budget	$2.9 billion
FY 2020 Supported Investigators	>5,500

FY 2020 Newly Funded Early Stage Investigators	264
FY 2020 Funded Research Grants	> 4,500
FY 2020 National Research Service Award-Supported Trainees	>4,000
Number of Grantees Who Have Won Nobel Prizes Since 1962	90

Divisions

- Biophysics, Biomedical Technology, and Computational Biosciences
- Data Integration, Modeling, and Analytics
- Extramural Activities
- Genetics and Molecular, Cellular, and Developmental Biology
- Management
- Pharmacology, Physiology, and Biological Chemistry
- Research Capacity Building
- Training and Workforce Development

Introduction

Established in 1962, the National Institute of General Medical Sciences (NIGMS) is a component of the National Institutes of Health (NIH) in the U.S. Department of Health and Human Services (HHS). NIGMS supports fundamental biomedical research—defining the mechanisms of how biological systems work, which serves as the foundation for advancements in nearly every area of medicine and public health. Thus, NIGMS-supported research remains a critical driver of both scientific discovery and the U.S. economy. Keeping the biomedical research enterprise healthy and flowing requires supporting a broad and diverse scientific research and training portfolio. NIGMS prides itself as an efficient, productive, and accountable steward of taxpayer funds, particularly in sustaining investigator-initiated, fundamental biomedical research; training the next generation of scientists; developing institutional research capacities; and supporting robust research resources to meet the needs of the 21st century biomedical research enterprise.

NIGMS uses four major means to advance its mission:

- Awarding grants that support scientific research at colleges, universities, medical schools, research institutes, and small businesses in areas directly relevant to the NIGMS mission. This effort includes promoting the ability of a broad range of individual investigators to pursue new research directions, novel scientific insights, and innovative ideas to optimize the likelihood of making important scientific discoveries and advances.
- Supporting training and education awards that promote the development of a skilled and talented biomedical research workforce.
- Administering programs that support the development of, and widespread access to, high-quality research resources and technologies that are essential for research advances.
- Building biomedical research capacity in under-resourced institutions, regions, and states.

Through these activities, NIGMS plays a major role in advancing fundamental biomedical research and maintaining a healthy research enterprise in every state in the nation as well as in U.S. territories.

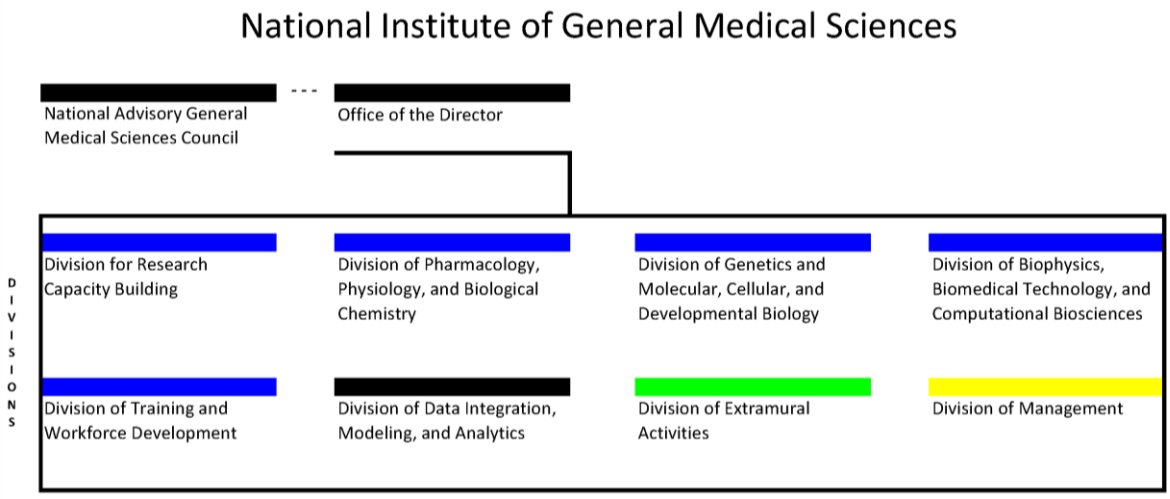
The NIGMS 2021-2025 strategic plan is a management tool that will be used by the Institute to guide the efficient and effective use of taxpayer funds to extend the reach of fundamental scientific knowledge to meet the challenges of a rapidly evolving biomedical research landscape.

Mission Statement

NIGMS supports basic research that increases our understanding of biological processes and lays the foundation for advances in disease diagnosis, treatment, and prevention. NIGMS also supports research in specific clinical areas that affect multiple organ systems: anesthesiology and peri-operative pain; clinical pharmacology common to multiple drugs and treatments; and injury, critical illness, sepsis, and wound healing. NIGMS-funded scientists investigate how living systems work at a range of levels—from molecules and cells to tissues and organs—in research organisms, humans, and populations. Additionally, to ensure the vitality and continued productivity of the research enterprise, NIGMS provides leadership in supporting the training of the next generation of scientists and developing research capacity throughout the country.

Organizational Structure

NIGMS is organized into divisions that support research and research training in a range of scientific fields. In the organizational chart below, management and administration components of the Institute are depicted in black and yellow, scientific divisions in blue, and grants administration in green. The disciplines and areas in which the scientific divisions fund research are also indicated.



Full descriptions of NIGMS' divisions can be found on the NIGMS organization and staff webpage.

Cross-Cutting Themes

Several aspects of NIGMS' mission are not unique to any one goal or objective contained in this strategic plan. Thus, NIGMS has identified key *cross-cutting themes* that span multiple aspects of the Institute's mission and operations.

Evaluating and Iteratively Optimizing NIGMS Programs and Portfolios Through Data

Regularly performing analyses that support the effective administration of programs ensures the efficient stewardship of taxpayer resources. Application of this principle is a central tenet of NIGMS operations, as the Institute continues to support multiple types of programmatic analyses (e.g., portfolio, descriptive, predictive) and evaluations (e.g., outcomes, process, needs-based) that inform program and business process improvements and enhancements. Analyses include activities such as data modeling that uses descriptive data as a baseline for better, more accurate predictive analytical models of program function as well as financial forecasting. Commensurate with the principles of the Foundations for Evidence-Based Policymaking Act, the results of evaluations of NIGMS programs and the ensuing actions taken in response to their findings have been publicly posted. These efforts provide robust, timely, contextually appropriate data and other information that promote organizational efficiency, transparency, and stewardship of public resources.

Over the next 5 years, NIGMS will continue to enhance its ability to collect and analyze data related to its programs, initiatives, and business processes. The measurement of program performance is a continuing challenge, given the many goals of differing grant programs (e.g., funding scientific activities, provisioning research infrastructure, training students), multiple stakeholders for every program, and a mix of quantitative and qualitative data collected over time. NIGMS will enhance efforts to strengthen its collection and analysis of data regarding program performance as well as expand the breadth of its data sources, analytic expertise, and in-house evaluative capacity. In this regard, in FY 2020, NIGMS reorganized its structure to elevate the former Office of Program Planning, Analysis, and Evaluation to a full division: the Division of Data Integration, Modeling, and Analytics.

Transparency and Communication

Robust strategies in transparency and communication are crucial to the success of NIGMS' mission and scientific discovery. NIGMS employs a variety of communication strategies to facilitate a reciprocal dialogue with its stakeholders and the general public, including live broadcasts of the National Advisory General Medical Sciences Council open sessions, training webinars, requests for information (RFIs), social media, online blogs, presentations at conferences, and meetings with professional societies. Moreover, the findings of NIGMS' reports and program evaluations, and the Institute's actions taken in response to them, are routinely posted on the NIGMS evaluation website. Through these varied methods, NIGMS

continues to proactively engage its stakeholders with transparency, accountability, and to broaden the public's understanding of NIGMS-funded scientific activities.

Scientific Priorities, Goals, and Objectives

Targets are exemplars and not inclusive of all NIGMS activities

(Unless otherwise indicated, targets will be completed by 2025)

Goal 1: Sustain Strong Support for Investigator-Initiated Research

Because scientific discoveries and technological breakthroughs usually come from unexpected directions and are built on foundations of knowledge produced by many researchers over decades, supporting a broad scientific portfolio of fundamental, investigator-initiated research is critical for future advances in biomedicine and is central to NIGMS' mission. The Institute will continue to prioritize this aspect of its research portfolio over the next 5 years.

Objective 1-1: Invest in and sustain a portfolio of highly meritorious fundamental biomedical research.

To maximize scientific opportunity and discovery, NIGMS will continue to prioritize its support of investigator-initiated research through a variety of grant mechanisms, including collaborative team science, for studies of complex biomedical problems. NIGMS also recognizes that early stage investigators (ESIs) are a critical component of scientific creativity, and support for ESIs continues to remain an Institute priority. These efforts will shape and continually evolve a robust and productive biomedical research portfolio.

Implementation Strategies:

1. Prioritize funding for meritorious early career and other at-risk investigators (i.e., those who otherwise would not have significant research support).

   Target:

   a. Meet or exceed NIH Next Generation Researchers Initiative targets yearly.

2. Continually assess and optimize the efficacy, distribution (e.g., scientific, geographic, institutional), and impact of NIGMS investments by conducting regular portfolio analyses and periodic evaluations of each Institute program.

   Targets:

   a. Ensure that at least 30% of NIGMS programs have been evaluated in the past 5 years.
   b. Post all outcomes assessments and program evaluations on the NIGMS website, along with descriptions of any changes made to the programs based

on the findings.

3. Actively assess funding distribution to optimize the scientific productivity and impact of the NIGMS portfolio.

   Target:
   a. Annually assess and publish NIGMS' scientific funding trends through the NIGMS *Feedback Loop* blog.

4. Encourage robust research collaborations among multidisciplinary teams of investigators through initiatives and activities that promote team science.

   Targets:
   a. Fund at least two new team science (RM1) grants or other awards aimed at fostering team science per year.
   b. Develop or participate in at least one new partnership with another federal agency or external organization to encourage collaborations between biomedical researchers and scientists, engineers, and/or other professionals in fields outside of biomedical research.

5. Assess the Institute's clinical research programs and use the results to ensure these programs are optimally focused to promote rapid progress toward improved clinical outcomes.

   Targets:
   a. Complete assessment of non-sepsis clinical areas.
   b. Support at least one partnership with another NIH institute or center related to one or more of NIGMS' clinical research areas.
   c. Launch and/or participate in at least three initiatives related to women's health and/or health disparities.

Objective 1-2: Promote the ability of individual investigators to pursue new research directions, novel scientific insights, and innovative ideas.

Biomedical research is a dynamic enterprise that creates opportunities to explore new ideas and paradigms while questioning established ones. NIGMS will continue to utilize and expand the MIRA grant mechanism, initially launched as a pilot in 2015, to provide investigators with the flexibility to pursue new research directions as they arise while simultaneously enhancing the stability of overall support and reducing administrative burden. MIRA also helps distribute funding broadly among the nation's highly talented and promising investigators, including ESIs.

Implementation Strategies:

1. Continue to assess, expand, and enhance NIGMS' MIRA program to ensure that it is

meeting its intended objectives of promoting creative and ambitious research.

Targets:

a. Have at least 60% of the R01-equivalent pool be MIRAs.
b. Complete initial outcomes assessment for MIRA programs and continue to gather information to conduct additional periodic assessments.

2. Strengthen the Institute's ability to conduct in-depth analyses of the outcomes of its investigator-initiated portfolio (e.g., R01, R35) and use this information to inform current and future programmatic decisions.

   Targets:

   a. Conduct analyses of funding trends associated with NIGMS' R01/R35 research portfolio at least annually and publish the results in the NIGMS *Feedback Loop*.
   b. Develop at least two new methods for assessing the outcomes and impact of investigator-initiated research.

Goal 2: Invest in the Development of a Skilled 21st Century Biomedical Research Workforce

NIGMS strongly believes that the scientific enterprise is best served by a research workforce that incorporates various scientific perspectives, skills, and disciplines. NIGMS supports nearly half of all NIH-sponsored predoctoral students in structured institutional training programs across the country. NIGMS' investments provide for a geographically broad training and workforce infrastructure that collectively foster scientific innovation, enhance global competitiveness, contribute to robust learning environments, improve the quality of research, enhance public trust, and increase the likelihood that the health needs of all populations are addressed in biomedical research.

Objective 2-1: Support highly effective, evidence-informed research training at all stages of the biomedical research training and career development pathway.

Training encompasses both formal research training from undergraduate education onward, as well as educational activities that encourage students at the preK-12 level to pursue science as a career. NIGMS will continue its educational investments to ensure that the nation's biomedical research needs are met, and will also support development of a robust workforce by providing opportunities for students from all communities to consider careers in basic, translational, or clinical research.

Implementation Strategies:

1. Promote the development and use of evidence-informed training and curricular activities that keep pace with the rapidly evolving biomedical research enterprise.

Targets:

a. Fund the development and dissemination of at least two freely available online training modules in key areas per year.
b. Present at least 5 new, evidence-informed training and/or curricular activities at every biennial NIGMS Training and Workforce Development (TWD) program director's meeting.

2. Support effective, evidence-informed programs that develop mentoring skills of investigators and trainees.

Targets:

a. Ensure that all TWD funding opportunity announcements (FOAs) emphasize mentoring skill development and assessment.
b. Support development and dissemination of at least three freely available online training modules about mentor skill development and assessment.

3. Emphasize quantitative and computational skills development in all TWD programs.

Targets:

a. Ensure that all TWD FOAs emphasize quantitative and computational skills development by 2022.
b. Pilot at least three synergistic partnerships between TWD and Division for Research Capacity Building (DRCB) grantees and organizations with special expertise and infrastructure (e.g., private sector, professional societies) to accelerate student and faculty quantitative and computational skills development.

Objective 2-2: Promote and enable the enhanced utilization of data in the development, assessment, and pursuit of research training outcomes.

NIGMS will continue to support improvements in collecting and using outcomes data by both the Institute and the scientific community. This data driven approach will be used to continuously identify and improve training outcomes. It also will increase the Institute's responsiveness to the changing needs of the biomedical research workforce, avoids duplication of effort, and enhances efficiencies in mentorship.

Implementation Strategies:

1. Further refine retrospective and prospective methods to collect outcomes data from NIGMS research training and education activities.

Target:

a. Develop at least two significant new approaches for training outcomes analysis.

2. Provide resources to aid the training community in developing evaluation and assessment capabilities.

   Targets:
   a. Launch at least one grants and/or administrative supplements initiative to enable training programs to develop the knowledge, skills, and infrastructure needed to conduct effective evaluations.
   b. Present at least two effective evaluation and assessment strategies at each biennial TWD program director's meeting.

3. Utilize a mix of quantitative and qualitative data to guide the development and optimization of research training and education programs.

   Targets:
   a. Ensure that all TWD programs older than 10 years have been evaluated at least once in the past decade.
   b. Post all outcomes assessments and program evaluations on the NIGMS website, along with descriptions of any changes made to the programs based on the findings.

4. Develop tools to rapidly assess and visualize key metrics of support, such as funding levels over time, geographic distribution, institution type, career stage, and associated outcomes.

   Target:
   a. Build and deploy TWD trainee statistics and outcomes data dashboard.

Goal 3: Enhance Research Capacity and Enable Access to Critical Research Resources

NIGMS seeks to advance the nation's capabilities for biomedical research by enabling the broadest possible community of scientists to create, expand, and apply knowledge that leads to a deeper understanding of biological systems and, ultimately, the improvement of human health. This effort includes providing access to research resources and ensuring that investigators from a broad range of geographic regions and institutions are working at their full potential. NIGMS will leverage multiple strategies to build research infrastructure and capacity at academic institutions located in states that have historically received lower aggregate levels of NIH funding and at resource-limited institutions . To achieve this aim, the Institute will aid in the development and dissemination of new technologies and will work to ensure access to them as research resources. Efforts will also include continued support of research on the causes of and interventions to reduce health disparities in medically

vulnerable communities, such as many rural communities.

Objective 3-1: Support access to essential research resources and the development of new technologies that enable novel scientific advances.

Cutting-edge technologies are critical enablers of biomedical research and discovery. NIGMS will employ a multistage approach to support the full continuum of research-enabling technology development, from proof of concept to maturation and commercialization and/or utilization as a regional/national resource. The Institute continues to place a high level of importance on the development, enhancement, and dissemination of a broad range of cost-effective, cutting-edge, and productive research technologies *across* their lifespans.

Implementation Strategies:

1. Ensure strong support for the invention of transformative technologies to enable biomedical research.

   Targets:
   a. Complete initial outcomes assessment of NIGMS technology development R21 and R01 programs.
   b. Increase the number of patents linked to NIGMS grants since 2015 by 10%.
   c. Increase the number of start-up companies linked to NIGMS-funded technology development since 2015 by 10%.

2. Expand the national availability and accessibility of research resources for investigators from all types of academic institutions and organizations.

   Targets:
   a. Leverage the National and Regional Research Resource program to support access to at least five key technologies not currently accessible to most NIGMS-funded researchers.
   b. Increase the majority of the NIGMS National and Regional Research Resources grants userbase over the 5-year period of their awards by at least 25%.

3. Expand data collection mechanisms for national and regional resources (e.g., end-user utilization rates, frequencies).

   Target:
   a. Support at least five administrative supplements to resources toward testing of new methods of data collection and dissemination of best practices.

4. Optimize the Institute's support of small business research and development by defining strategic priorities for commercial development, enabling access to

entrepreneurial training and mentoring, and enhancing connections with other parts of the NIGMS technology research and development portfolio.

Targets:

a. Complete evaluation of NIGMS' small business and commercialization-support portfolio and programs.
b. Award at least 10 new SBIR/STTR grants to former/current principal investigators of NIGMS technology development R21s or R01s, or Biomedical Technology Development and Dissemination Centers.
c. Increase the number of patents linked to NIGMS grants since 2015 by 10%.
d. Increase the number of start-up companies linked to NIGMS-funded technology development since 2015 by 10%.

Objective 3-2: Catalyze the development of institutional research capacities, particularly in traditionally underserved states, regions, communities, and institutions.

NIGMS is committed to programs focused on building research capacities at academic institutions located in states that have historically received lower aggregate levels of NIH funding. These programs support basic, translational, and clinical research; research training; faculty development; and research infrastructure improvements to address specific health needs of resource-limited, rural, and/or medically underserved communities. In addition, NIGMS will continue its aid and support to American Indian/Alaska Native tribes and tribally based organizations, as well as to resource-limited institutions, in building robust research and technological capacities that address challenging biomedical questions and health needs.

Implementation Strategies:

1. Support programs and initiatives that enhance entrepreneurial culture and infrastructure in Institutional Development Award (IDeA)-eligible states.

   Targets:

   a. Achieve successful recompetition of the IDeA State Technology Transfer Accelerator Hubs program.
   b. Develop and launch IDeA State Technology Transfer Accelerator Hubs outcomes dashboard.
   c. Increase SBIR/STTR grant applications from IDeA states since 2015 by at least 10%.
   d. Increase patents linked to NIH grants from IDeA states since 2015 by at least 10%.

2. Promote renewed support for basic research at IDeA state institutions.

   Target:

   a. Increase the number of Centers of Biomedical Research Excellence awards

with a basic science focus by 20%.

3. Enhance clinical research capacity in IDeA states and in federally recognized nations of American Indians and Alaska Natives to help address the specific health challenges and disparities faced by the communities in those states and tribal nations.

   Target:
   a. Establish and/or participate in one or more initiatives to promote the ability of IDeA-state and tribally based researchers, institutions, and organizations to participate in and conduct clinical trials.

4. Support effective, evidence-informed training and career-building programs that develop mentoring skills of investigators and trainees.

   Target:
   a. Ensure that all DRCB FOAs involving a training component emphasize mentoring skill development and assessment by 2023.

5. Strengthen training in quantitative and computational research and skills in all NIGMS capacity building programs including IDeA, Support for Research Excellence (SuRE), Native American Research Centers for Health (NARCH), and SEPA.

   Targets:
   a. Ensure that all DRCB FOAs involving a training component emphasize quantitative and computational skills development by 2023.
   b. Pilot at least three synergistic partnerships between TWD and DRCB grantees and organizations with special expertise and infrastructure (e.g., private sector, professional societies) to accelerate student and faculty quantitative and computational skills development.

6. Enable iterative evaluations and assessments that allow for the continual development and enhancement of NIGMS' capacity building programs and initiatives.

   Targets:
   a. Ensure that all DRCB programs older than 10 years have been evaluated at least once in the past decade.
   b. Post all outcomes assessments and program evaluations on the NIGMS website, along with descriptions of any changes made to the programs based on the findings.

Serving as an Efficient and Effective Steward of Public Resources

Goal 4: Advance the Public's Understanding of NIGMS-Supported Research, Training, and Capacity Building Programs and the Critical Role of Basic Biomedical Research

Robust, data-informed communication is a bedrock of scientific education, exploration, and discovery. NIGMS employs a variety of communication strategies to inform and engage its stakeholders and the general public. These strategies include RFIs and social media posts to obtain stakeholder perspectives and feedback, press and governmental communications, educational materials, and online resources for biomedical trainees and investigators. By implementing these strategies, NIGMS continues to effectively advance the public's understanding of the vital role played by the Institute's scientific investments in improving public health and health outcomes.

Objective 4-1: Leverage a broad range of outreach approaches and resources to disseminate accurate, timely, and clear information about NIGMS goals, activities, results, and returns on investment to the public.

NIGMS will continue to use a variety of communication approaches, channels, and partnerships to develop and distribute information about scientific findings, the role of basic research in scientific discovery, and the excitement of careers in science. These activities will ensure that NIGMS' mission and resources will be disseminated to all public sectors.

Implementation Strategies:

1. Disseminate information about NIGMS-funded programs and outcomes to investigators and trainees at all career levels.

   Target:

   a. Increase the number of individuals signed up for *Feedback Loop* by at least 20%.

2. Leverage web and social media analytics as well as stakeholder feedback (e.g., RFIs) to broaden NIGMS' communications strategies.

   Target:

   a. Increase user engagements with NIGMS outreach efforts by at least 10%.

3. Develop strategic partnerships with organizations that can provide access to communities not currently reached through NIGMS' outreach efforts (e.g., retirees).

   Targets:

a. Forge at least one new communications partnership.
b. Pitch at least five NIGMS-supported STEM and training resources per year to external publications (e.g., society websites, trade journals, news outlets).

Objective 4-2: Enhance transparency and accountability by continuing to engage in an open dialogue with NIGMS stakeholders about the importance and impact of NIGMS priorities, programs, processes, and policies.

NIGMS broadly disseminates information about its programs and policies and also invites and responds to feedback from its constituents. NIGMS will continue a conversation with the scientific community and other stakeholders through various avenues. These strategies will ensure that NIGMS optimizes its investments on behalf of the scientific community and general public.

Implementation Strategy:

1. Encourage and analyze feedback from the scientific community (e.g., RFIs), including investigators and trainees at all levels, grantee organizations, scientific and professional societies, and other stakeholders to ensure an open dialogue about NIGMS priorities, programs, processes, and policies.

   Targets:

   a. Issue and analyze at least five RFIs related to NIGMS' priorities, plans, and programs.
   b. Launch a campaign in partnership with key professional societies to promote NIGMS programs.
   c. Launch a virtual meeting with trainees to hear their ideas and concerns.

Goal 5: Maintain or Enhance Investments in the NIGMS Workforce and Operations to Better Enable Delivery of the Institute's Mission

NIGMS relies on the efforts of its talented and dedicated staff to accomplish its core activities of reviewing, awarding, and managing its grants and contracts. The Institute is therefore committed to supporting ongoing staff training and encouraging participation in professional development activities to help maintain the organizational agility needed for optimal work performance. In addition, NIGMS will continue iterative reviews of its internal business practices and processes to ensure optimal and efficient operations.

Objective 5-1: Foster a proficient, effective and high quality NIGMS workforce.

A knowledgeable and skilled workforce that is aligned with NIGMS' mission is a key element in the overall success of the Institute. NIGMS will support the ongoing professional development and training of staff to maintain organizational agility and adaptability, both of which are necessary to achieve optimal performance.

Implementation Strategies:

1. Ensure continued career development and training opportunities for NIGMS staff, including use of individual development plans (IDPs).

   Targets:
   a. Increase the voluntary use of IDPs among nonsupervisory staff by at least 50%.
   b. Increase participation in career development and training activities by at least 25%.

2. Support leadership, management, and supervisory training for NIGMS supervisors.

   Targets:
   a. Launch a yearly management and leadership lecture series organized by the NIGMS Grants, Analytics, and Program (GAP) committee by the end of 2021 and host one lecture per year thereafter.
   b. Ensure that supervisors who have been at the Institute for 3 or more years have participated in the NIH Senior Leadership Program (or equivalent).

Objective 5-2: Maximize the efficiency of NIGMS operations by continuously assessing, identifying, and applying business practices that promote effective and efficient management and stewardship of taxpayer investments.

The ability of NIGMS to deliver on its mission requires optimizing the integration of business processes and practices with emerging technology solutions (e.g., machine learning/natural language processing) to streamline and automate (when possible) the work of its staff. NIGMS will continuously seek opportunities to streamline labor-intensive workflows and integrate its business processes and tools with NIH-wide enterprise systems.

Implementation Strategy:

1. Continue to optimize internal operating procedures and processes to maximize the efficiency of NIGMS business operations.

   Targets:
   a. Have the GAP committee identify at least one operational inefficiency or other issue per year and propose to senior staff a solution to improve it.
   b. Decrease the use of paper-based business processes by at least 50%.

Objective 5-3: Enhance the collection, analysis, and utilization of data to iteratively assess, evaluate, and optimize NIGMS operations.

NIGMS will employ various data collection, assessment, visualization, and improvement tools to support the continual improvement and optimization of its internal operational

activities.

Implementation Strategy:

1. Promote transparency about the use of data in decision-making for Institute functions.

   Targets:

   a. Build and deploy an administrative data dashboard to track key metrics to help staff optimize efficiency of operations.
   b. Build and deploy a budget data dashboard to streamline routine budget office monitoring of expenditures and to provide division directors and NIGMS leadership access to the data.

Objective 5-4: Continue to enhance and evolve NIGMS information systems, technologies, and related infrastructures to ensure maximal security and utility.

NIGMS is committed to developing comprehensive protection and security for the privacy and integrity of its information and information systems. The Institute's Information Resources Management Branch (IRMB) will continuously update and maintain maximally secure data systems, enable staff access to needed technological and data resources, and improve the physical infrastructure of information technology within the Institute.

Implementation Strategies:

1. Leverage the latest information technologies to help advance NIGMS' business operations.

   Targets:

   a. Complete implementation of cloud technology to maximize business support applications.
   b. Develop at least one new method utilizing artificial intelligence, machine learning, and/or natural language processing to enhance the efficiency of business processes.
   c. Assess mobile device operability of NIGMS websites and internal information technology tools at least biennially.
   d. Assess NIGMS systems and business practices for their suitability to be integrated with or replaced by NIH enterprise systems at least annually.

2. Optimize information technology services for the curation, analysis, visualization, and expansion of data used for strategic decisions.

   Target:

   a. Build and deploy TWD trainee statistics and outcomes data dashboard.

3. Enhance the cybersecurity and privacy of NIGMS information systems.

   Target:
   a. Complete assessment of the NIGMS information technology infrastructure at least annually.

4. Provide optimal support for NIGMS users and community outreach platforms.

   Target:
   a. Evaluate NIGMS external and internal websites at least once to ensure they meet user expectations and needs.

Objective 5-5: Develop and optimize cooperative and synergistic partnerships with other NIH institutes and centers, other federal agencies, and other organizations.

NIGMS exists within an ecosystem of scientific relationships, serving as an important player in the network of stakeholders striving toward scientific discovery and advancement. These relationships encompass a variety of activities such as creating FOAs, publishing notices of special interest, participating in working groups on scientific and administrative topics, serving on coordinating committees, and contributing analyses to trans-NIH initiatives. Developing, leveraging, and enhancing partnerships within NIH and throughout the federal government serves to strengthen NIGMS' capabilities and broaden the impact of its actions.

Implementation Strategy:

1. Continue to build and leverage productive partnerships to increase the efficiency, effectiveness, and reach of NIGMS in areas related to the Institute's mission.

   Targets:
   a. Conduct at least one collaboration with the Office of Extramural Research/electronic Research Administration to optimize NIH enterprise systems for better support of NIGMS and NIH business processes.
   b. Develop at least one collaboration to enhance the Institute's ability to track outcomes data for one or more of its programs.

Priority Setting

NIGMS priorities contained in this strategic plan were informed by a combination of factors including, but not limited to, core components of the Institute's mission (e.g., supporting individual investigator-initiated research), input from the National Advisory General Medical Sciences Council, feedback received from the extramural scientific community via a published Request for Information (e.g., RFI NOT-GM-20-034), and input from NIGMS staff via a series of internal focus groups. These sources of input and feedback were utilized to create a balanced set of priorities representative of NIGMS' mission areas.

Closing

The NIGMS 2021-2025 strategic plan sets the Institute's direction over the next 5 years and will serve as a management tool to help the Institute achieve its goals and meet its obligations to the American public. The creation of this forward-looking document is consistent with the Institute's philosophy of demonstrating the highest levels of operational integrity, transparency, and accountability. The plan builds on the successes of NIGMS' prior strategic plan, the outcomes of which are publicly available. A similar outcomes document will be produced once the goals and objectives contained in this plan have been pursued and evaluated.

Description of Strategic Plan Development Process

Development and Dissemination of 2021-2025 Strategic Plan Framework

- Senior NIGMS leadership developed and reviewed the 2021-2025 strategic plan framework in the spring of 2020.
- NIGMS Director Dr. Jon Lorsch presented the 2021-2025 strategic plan framework for discussion at the May 2020 NIGMS Advisory Council meeting.
- In June 2020, NIGMS issued an RFI to gather input from the public and further inform the development of the 2021-2025 strategic plan framework. NIGMS staff analyzed RFI comments and presented the information to senior leadership.
- At the September 2020 NIGMS Advisory Council meeting, Dr. Lorsch presented a timeline for completing the strategic plan and its dissemination.

Development and Dissemination of the Final 2021-2025 Strategic Plan

- In early 2021, NIGMS held internal working groups with NIGMS staff to solicit feedback on the strategic plan framework and further develop implementation strategies and targets for each goal and objective.
- At the February 2021 NIGMS Advisory Council meeting, DIMA Division Director, Dr. Richard Aragon presented the revised strategic plan framework, which included strategic goals, objectives, implementation strategies, and targets.

- NIGMS convened a second round of internal focus groups to give feedback on Council comments and suggest modifications to implementation strategies and targets.
- NIGMS senior leadership considered all comments and finalized the strategic plan.
- NIGMS revised the plan in 2025 to ensure its compliance with all relevant administration executive orders.