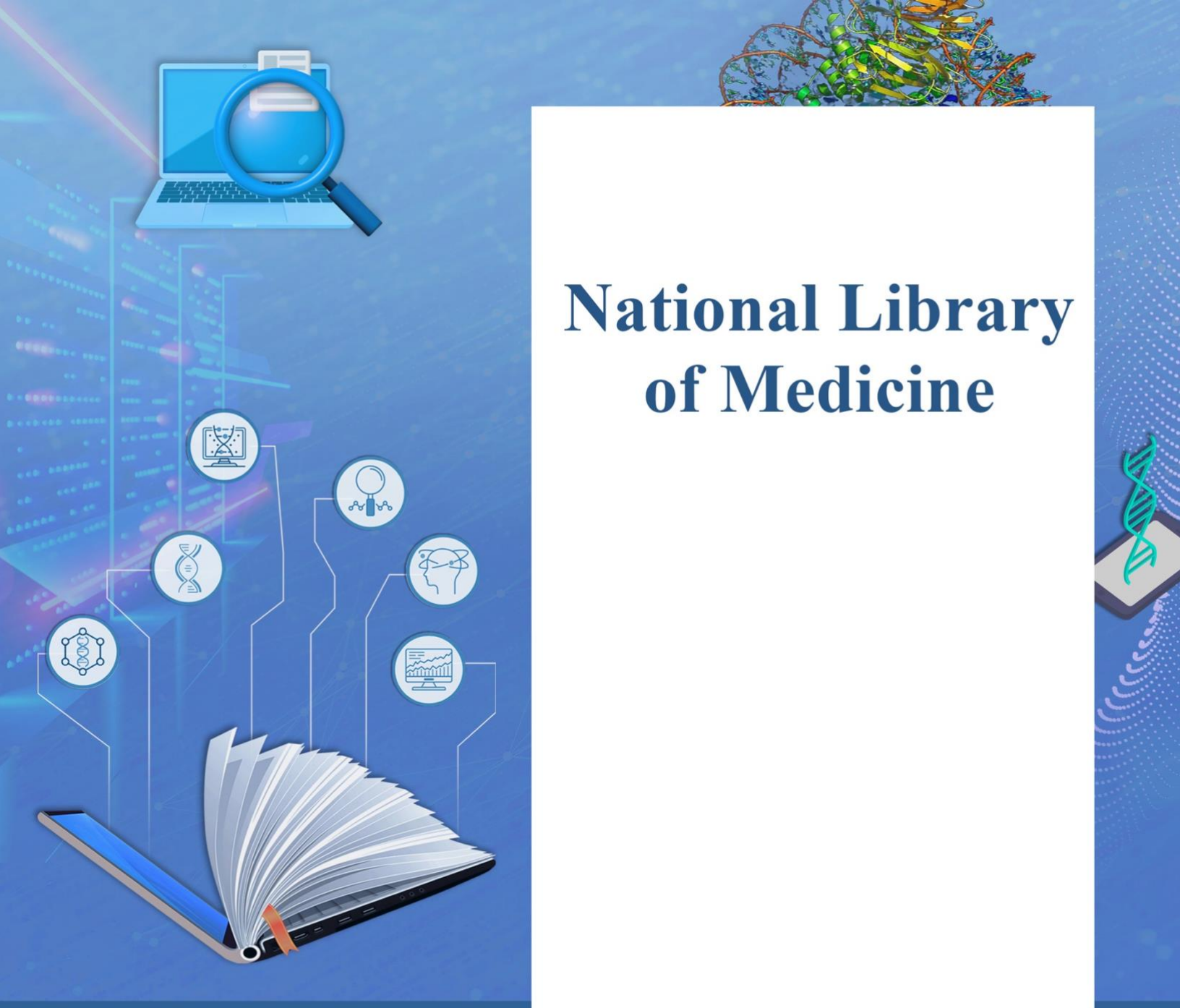

National Library of Medicine

CONGRESSIONAL JUSTIFICATION
FY 2025

Department of Health and Human Services
National Institutes of Health

NIH NLM

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DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Library of Medicine (NLM)

FY 2025 Budget Table of Contents

General Notes

1. FY 2024 funding levels cited in this document are based on the Continuing Resolution in effect at the time of budget preparation (Public Law 118-35) and do not include HIV/AIDS transfers.
2. Detail in this document may not sum to the subtotals and totals due to rounding.

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Director's Overview


Stephen Sherry, Ph.D.

Mission

The National Library of Medicine (NLM) is a global leader in biomedical informatics and computational health data science research and the world's largest biomedical library. As a 21st-century library, NLM has a multifaceted role as an information hub, learning center, and innovation incubator and plays a central role in advancing science through the effective use of data and analytics for discovery and health care. NLM leverages modern technologies, including trustworthy artificial intelligence (AI), and a strong data infrastructure to support our mission to acquire, collect, preserve, and disseminate biomedical data and information that reflects the diversity of health, illness, and society, setting the stage to accelerate progress on new initiatives on machine learning (ML) and data. We make the world's biomedical data and information available, accessible, and understandable to all: scientists, clinicians, students, educators, librarians, and the public. NLM holds an unwavering commitment to pursue excellence through our research and biomedical information services, both of which are vital to accelerate science and innovation, inform clinical care and public health, and guide personal health decisions.

Our innovative research programs develop and apply novel computational approaches to accelerate biomedical discovery and advance health care across disease areas. Our biomedical information services empower data-driven scientific discovery, health care, and public health by preserving and disseminating biomedical knowledge and information for those who need it today and in the future. Through our health information resources and our outreach and engagement efforts, we deliver trusted health information to users and communities across the United States.

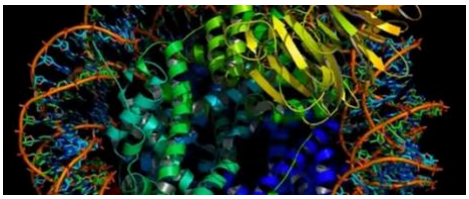
Advancing Data-Driven Research, Training, and Innovation for Discovery and Health

To achieve our mission, we engage and work with a variety of interest groups, including scientists, universities, scholarly publishers, drug and device manufacturers, biotechnology and bioinformatics firms, clinicians, librarians, patients, and the public, to advance and extend the value of our biomedical information services. We also engage with and provide technical expertise to other NIH Institutes and Centers, agencies across the federal government, and external interest groups to achieve NIH's mission, support national priorities, and fuel innovation and problem solving.

Through our programs and services, we harness the power of data and technology to drive medical breakthroughs and enhance public health. We conduct and fund leading-edge research that improves the use of biomedical data and information for science and health care. Our biomedical data repositories and literature services ensure the availability of data and information needed to advance scientific discovery and health. We deliver trusted information about health conditions, drugs and supplements, medical tests, and genetics in ways that are consumer-oriented and easy to understand. We ensure that our resources are available, accessible, and understandable and reach a wide range of users both nationally and

internationally. Through our Network of the National Library of Medicine (NNLM®), a network of more than 8,800 libraries, we reach users and the public in communities across the United States to ensure that vital health information is accessible to all.

Advancing Cutting-Edge Research for Scientific Discovery and Health



NLM continues to invest in cutting-edge biomedical informatics and computational health data science research through our intramural and extramural research programs—for example, over the past year, we added a new intramural investigator and expanded our support for early career and at-risk investigators. NLM-supported research and researchers collect, integrate, and leverage data and analytics to advance our understanding of the evolution of life, the functions of living cells, and patient care trajectories. NLM's intramural investigators apply advanced machine learning methods to improve clinical prediction in internal medicine and clinical care settings, leverage data resources to study the evolution of bacteria, and apply machine learning and AI techniques to medical images to improve disease screening and diagnosis for a variety of conditions such as sickle cell disease, tuberculosis, and cervical cancer. NLM's extramural programs advance biomedical informatics, data science, computational biology, and computational health research to support health care, discovery, and public health. NLM-funded researchers employ computational approaches and natural language processing to derive insights from health data sources such as electronic health record systems. NLM-funded researchers also leverage AI and machine learning techniques to develop resources and tools that allow clinicians and pharmacists to better serve their patients. They also create methods to improve the quality and effectiveness of health information and informatics tools in support of patient-centered care, precision medicine, and public health. Continued investments in our research programs position NLM at the forefront of the future of biomedical research and health.

Developing the Future Workforce of Data-Driven Scientists and Librarians

NLM continues to build on its strong history and foundation of training biomedical informaticists, computational health data scientists, and biomedical librarians to develop a skilled and innovative workforce to drive the future of biomedical research and discovery. To meet our mission, we offer a rich set of intramural and extramurally funded training opportunities at various academic and professional career stages. Our university-based training program provides doctoral and postdoctoral training in biomedical informatics and data science at 18 universities across the United States. Our biomedical informatics and data science summer training program welcomed its inaugural cohort of research students from 12 U.S. institutions. Our intramural data science and informatics training program also hosted its second cohort of nine trainees and provided them with research training opportunities in computer science and biomedical informatics. We continue to offer annual short- and long-term intramural training opportunities at high school, undergraduate, postbaccalaureate, graduate, professional school, and postdoctoral levels. In addition, we provide training for the next generation of biomedical librarians and library leaders through on-site fellowships and an NNLM-led data science internship program for up-and-coming library

professionals from backgrounds typically underrepresented in library sciences. Through these opportunities, NLM supports workforce development nationwide.

Improving and Sustaining Biomedical Information Services

NLM continues to enhance its information services by leveraging emerging technologies and innovative approaches to communicate about science and health. We foster innovative programs, strengthen internal operations, and apply strategies to manage the exponential growth of information and data generated by biomedical research. We continue to enhance our internal data infrastructure to ensure data availability and continuity of services. We are migrating our biomedical information services to commercial cloud platforms to improve the reliability, security, and access of biomedical data for discovery and public health. NLM continues to enhance and modernize the physical and computing infrastructure needed to advance NIH priorities and safeguard the integrity and availability of biomedical data that support research. These actions are essential to ensure that valuable insights can be derived, shared, and used to advance scientific knowledge and improve health.

Ensuring a Diverse and Representative Workforce and Reaching Diverse Users

NLM continues to work to ensure diversity, equity, inclusion, and accessibility of and for our workforce, programs, and resources. We are implementing plans to address racial and ethnic disparities in our workplace and to increase the overall diversity of our workforce. We are also increasing the diversity of the next generation of biomedical informaticists and data scientists through our intramural and extramural training programs. We are taking steps to ensure that our biomedical information services equitably reach all our users and meet their individual needs. We are making our resources universally accessible and our collections representative of our diverse interest groups. Additionally, by applying crucial metadata to the biomedical data and information that we collect, curate, and disseminate, we support the scientific community's ability to conduct research to address health disparities and inequities. Through outreach and engagement activities conducted by the NNLM, we reach underserved communities and support minority-serving institutions. Finally, we continue to support the Environmental Health Information Partnership (EnHIP), which focuses on enhancing the capacity of minority-serving academic institutions to acquire, disseminate, and use environmental health information through community-based projects focused on awareness and use of NLM resources.

Leading Data-Driven Research Priorities to Advance Science and Health

NLM is advancing NIH priorities around data management, data infrastructure, and data sharing for research. We continue to guide the development of NIH-wide solutions to manage and provide access to an increasing volume of data. We accelerate NIH's ability to advance data science and information technology priorities, including those for the newly released *Digital NIH* plan. NLM engages across NIH and the federal government to ensure public access to biomedical data and information is open and transparent, including by advancing NIH-wide use of data and information technology investments. NLM strives to instill integrity and public trust in science by using our biomedical information services to improve transparency in the performance and outcomes of NIH-funded

research. NLM's work advances a data-driven research ecosystem and enables discovery to address pressing research and health challenges.

Future Initiatives

NLM will continue to lead the development of advanced biomedical data and information systems to support research, clinical care, and public health, as well as novel analytical approaches to uncover new patterns and biomedical phenomena from biomedical and health data. We will strive to facilitate research by providing trustworthy health information to those who need it and by advancing NIH- and government-wide priorities.

Priorities for FY 2025 include efforts to:

- **Advance biomedical informatics and computational health data science.** We will expand our investment in intramural and extramural research to develop methods and approaches that better leverage a variety of data types for research. New research directions will include using AI and natural language processing to glean knowledge from scientific literature, improving disease detection and diagnosis through analyses of medical images, developing computational and statistical methods to enhance discovery from health data, and identifying novel approaches to help individuals understand and improve their health. We will continue to train the next generation of biomedical informatics and data science researchers through our university-based research and summer training programs.

- **Support quality and sustainability of NLM biomedical information services.** We will leverage our expertise to create high-quality, reliable, and secure databases and make biomedical data and information accessible through innovative information services that engender trust. We will continue to strengthen our computational platforms and information services through robust engagement across different communities.

- **Modernize NLM's infrastructure and organization.** We will continue to build a 21st-century digital library that offers literature, data, analytical models, and new approaches to scholarly communication that are accessible, sustainable, and available 24 hours a day, 7 days a week. We will continue to advance efforts to modernize systems for genomics and for clinical trial registration and results reporting. We will also continue to improve our operational and organizational efficiency so that it is well suited to the future of work.

- **Contribute to NIH- and government-wide priorities.** We will continue to provide critical data management and guidance to support NIH and government-wide efforts to enable breakthroughs in medicine that advance public health, enhance research data management, implement robust infrastructure, provide public access to research results, and advance the bioeconomy. We will also contribute to NIH efforts to increase diversity, equity, inclusion, and accessibility across our programs and operations. We will pursue new opportunities to share and apply our scientific knowledge and program expertise in data science, data management, infrastructure, and security to support these and other priorities.

National Library of Medicine

Improving health through data-driven discovery

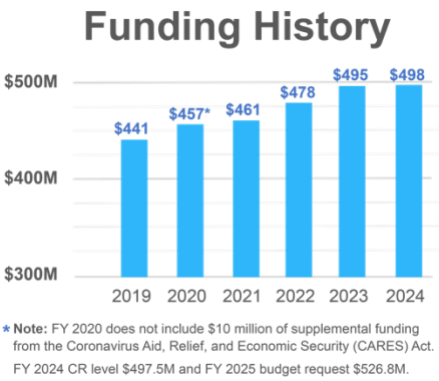
The National Library of Medicine (NLM) is a global leader in biomedical informatics and computational health data science and the world's largest biomedical library. As 1 of the 27 Institutes and Centers at NIH, NLM's research and information services support scientific discovery, health care, and public health.

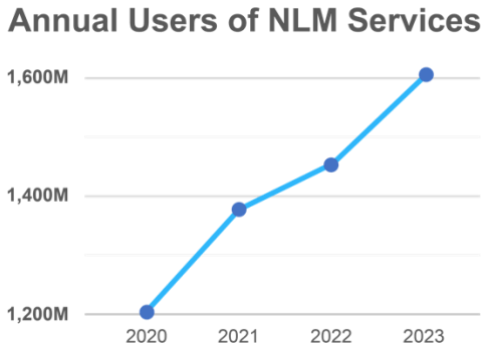
A PLATFORM FOR BIOMEDICAL DISCOVERY

The 2017-2027 NLM strategic plan includes three goals:

1. Accelerate discovery and advance health through data-driven research;
2. Reach more people in more ways through enhanced dissemination and engagement; and
3. Build a workforce for data-driven research and health.

Implementation of the strategic plan enables NLM to support and respond to NIH-wide priorities and support discovery and public health globally.





Stephen Sherry, Ph.D.

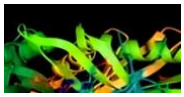
Dr. Sherry became Acting Director of NLM in October 2023. He brings to the position a history of innovation and leadership. Dr. Sherry leads NLM efforts to develop advanced computational solutions for health science information and health care needs and to facilitate open science and scholarship through a growing array of data, literature, and other information offerings and services made available by NLM.

NLM CONDUCTS AND FUNDS RESEARCH

NLM's vibrant intramural research program conducts innovative research and training in computational biology and computational health sciences. NLM's extramural grants support original research projects and advanced training in biomedical informatics and data science.

Intramural Researchers at NLM

Explore novel applications of artificial intelligence that advance interpretation of medical images to detect health issues.



Apply network analysis approaches to protein-protein interactions to predict interactions between individual molecules in human diseases.

Study and assess features that can predict and mitigate bias in clinical data sets and design algorithms to reduce bias in research data sets.

Extramural Researchers Across the Nation

Incorporate machine learning and artificial intelligence into tools and resources that benefit health care providers, scientists, and the public.

Develop approaches to curate biomedical knowledge and data to make data findable and usable for scientific discovery.

Develop informatics tools and approaches to support care delivery and patient self-management.

NIH National Library of Medicine

21st-CENTURY LIBRARY

Every day, millions of scientists, health professionals, and members of the public use NLM's online information resources to translate research results into new treatments, access NLM's collections, develop new products, inform clinical decision-making, and improve public health.

ClinicalTrials.gov The world's largest clinical trial registry and results database, with nearly 470,000 clinical studies and more than 60,000 results summaries.

MedlinePlus NLM's trusted and authoritative source of consumer health information, accessed by nearly 440 million users annually.

PubMed The most heavily used biomedical literature citation database in the world, containing more than 36 million citations.

PMC PubMed Central® Digital archive of more than 9 million freely accessible, full-text biomedical and life sciences journal articles and nearly 14,000 preprint articles featuring NIH-funded research.

Sequence Read Archive The world's largest publicly available repository for high-throughput sequencing data, comprising nearly 70 petabytes of data which are also freely available through commercial cloud services.

Terminology Standards NLM is the central coordinating body within HHS for clinical terminology standards for health data interoperability.

BIOMEDICAL INFORMATICS TRAINING

NLM funds research training programs in biomedical informatics and data science at 18 universities across the country that enroll approximately 200 predoctoral and postdoctoral trainees.

NLM funds 12 institutions under its research experience training program that attracts approximately 120 underrepresented undergraduate, postbaccalaureate, and master's students to bioinformatics and data science doctoral programs and to promote scientific workforce diversity.

NLM provides research training experiences for short-term, summer, and fellowship trainees at the high school, pre- and postbaccalaureate, and pre- and postdoctoral levels to work with its intramural investigators in computational biology or computational health research.

OUTREACH AND ENGAGEMENT

NLM leverages its Network of the National Library of Medicine (NNLM®) of more than 8,800 academic health science libraries, hospital and public libraries, and community organizations to improve access to health information for all. NNLM offers training to support effective use of NLM information resources by librarians, health professionals, researchers, and the public. NNLM currently operates through seven regions across the United States.

FUTURE INITIATIVES

NLM will continue to lead the development of advanced biomedical data and information systems to support research, clinical care, and public health, as well as novel analytical approaches to uncover new patterns and biomedical phenomena from biomedical and health data. NLM will:

Advance biomedical informatics and computational health data science. NLM will expand its research investment in methods to analyze different data types, improve disease detection and diagnosis, enhance discovery from health data, and continue to train the next generation of biomedical informatics and data science researchers.

Support quality and sustainability of biomedical information services. NLM will leverage its expertise in creating high-quality, reliable, and secure databases to make biomedical data and information accessible through innovative information services that engender trust.

Modernize NLM infrastructure and organization. NLM will continue to build a 21st-century digital library that offers literature, data, analytical models, and new approaches to scholarly communication that are accessible, sustainable, and available 24 hours a day, 7 days a week.

Contribute to NIH and government-wide priorities. NLM will continue to provide critical data management and guidance to support NIH- and government-wide efforts and share its scientific knowledge and program expertise in data science, data management, infrastructure, and security to support these efforts.

Major Changes in the Budget Request

Major changes in the FY 2025 President's Budget request for the National Library of Medicine (NLM) are briefly described below, by budget mechanism and activity detail. Note that there may be overlap between budget mechanism and activity detail; thus, these highlights will not sum to the total for NLM's FY 2025 President's Budget request, which is $526.8 million, an increase of $31.5 million from the FY 2023 Final level. Within the FY 2025 request level and informed by the NLM Strategic Plan 2017-2027 and other NIH strategic objectives, NLM will pursue its highest priorities through strategic investments and careful stewardship of appropriated funds, such as prioritizing a new clinical data initiative.

Extramural Programs (-$1.0 million; total $70.6 million):
NLM will maintain level funding for its in-demand research, training, and engagement programs in biomedical informatics and data science. NLM will continue to support 18 university-based graduate and post-doctoral biomedical informatics and data science training programs, and 12 summer research experience programs designed to attract talented undergraduate and post-baccalaureate students to bioinformatics and data science careers. NLM expects to award an estimated 29 new research project grants and will prioritize advances in biomedical informatics and data science, as well as support for early-stage investigators. NLM will maintain support for its Network of the National Library of Medicine.

Intramural Programs (+$31.3 million; total $430.6 million):
Additional funding will be used by NLM in support of a new $30.0 million clinical data initiative to develop the tools, computational resources, and datasets necessary to extend NIH clinical research capabilities, including supporting AI research and development. NLM will seek efficiencies across the full scope of its ongoing intramural programs. NLM will continue to consolidate research and training efforts to develop and apply computational approaches to a broad range of information problems in biology, biomedicine, and human health. NLM will prioritize support for mission critical information systems that are most heavily used by scientists, clinicians, students, educators, librarians, and the public, and identify opportunities to consolidate other related systems onto common, robust platforms. NLM will support work to update clinical vocabularies and data interoperability standards that are most important to NIH's data science efforts and the nation's health care delivery systems. Additionally, NLM will conduct outreach and engagement to promote NLM and NIH resources.

NATIONAL INSTITUTES OF HEALTH

National Library of Medicine

Budget Mechanism *
(Dollars in Thousands)

Mechanism	FY 2023 Final		FY 2024 CR		FY 2025 President's Budget		FY 2025 +/- FY 2023	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount
Research Projects:								
Noncompeting	97	$33,001	88	$30,965	75	$30,821	-22	-$2,180
Administrative Supplements	*(3)*	$170	*(4)*	$165	*(3)*	$120	*(0)*	-$50
Competing:								
Renewal	2	$969	2	$1,035	2	$1,035	0	$66
New	23	$9,198	28	$10,886	27	$10,604	4	$1,406
Supplements	0	$0	0	$0	0	$0	0	$0
Subtotal, Competing	**25**	**$10,167**	**30**	**$11,921**	**29**	**$11,639**	**4**	**$1,473**
Subtotal, RPGs	122	$43,338	118	$43,051	104	$42,580	-18	-$758
SBIR/STTR	5	$2,287	5	$2,468	4	$1,828	-1	-$459
Research Project Grants	127	$45,625	123	$45,519	108	$44,409	-19	-$1,217
Research Centers								
Specialized/Comprehensive	0	$89	0	$109	0	$104	0	$15
Clinical Research	0	$0	0	$0	0	$0	0	$0
Biotechnology	0	$0	0	$0	0	$0	0	$0
Comparative Medicine	0	$0	0	$0	0	$0	0	$0
Research Centers in Minority Institutions	0	$0	0	$0	0	$0	0	$0
Research Centers	**0**	**$89**	**0**	**$109**	**0**	**$104**	**0**	**$15**
Other Research:								
Research Careers	4	$358	4	$358	4	$360	0	$2
Cancer Education	0	$0	0	$0	0	$0	0	$0
Cooperative Clinical Research	0	$0	0	$0	0	$0	0	$0
Biomedical Research Support	0	$0	0	$0	0	$0	0	$0
Minority Biomedical Research Support	0	$0	0	$0	0	$0	0	$0
Other	64	$24,832	64	$23,890	61	$25,106	-3	$275
Other Research	**68**	**$25,189**	**68**	**$24,248**	**65**	**$25,466**	**-3**	**$277**
Total Research Grants	195	$70,904	191	$69,876	173	$69,979	-22	-$925
Ruth L Kirschstein Training Awards:	FTTPs		FTTPs		FTTPs		FTTPs	
Individual Awards	7	$334	8	$380	6	$277	-1	-$57
Institutional Awards	0	$0	0	$0	0	$0	0	$0
Total Research Training	**7**	**$334**	**8**	**$380**	**6**	**$277**	**-1**	**-$57**
Research & Develop. Contracts	0	$348	0	$330	0	$330	0	-$18
SBIR/STTR (non-add)	*(0)*	*($18)*	*(0)*	*($18)*	*(0)*	*($18)*	*(0)*	*($0)*
Intramural Programs	551	$399,265	638	$401,862	638	$430,608	87	$31,343
Res. Management & Support	91	$24,463	103	$25,099	103	$25,601	12	$1,138
SBIR Admin. (non-add)		*($0)*		*($0)*		*($0)*		*($0)*
Construction		$0		$0		$0		$0
Buildings and Facilities		$0		$0		$0		$0
Total, NLM	**642**	**$495,314**	**741**	**$497,548**	**741**	**$526,796**	**99**	**$31,482**

* All items in italics and brackets are non-add entries.

NATIONAL INSTITUTES OF HEALTH

NATIONAL LIBRARY OF MEDICINE

For carrying out section 301 and title IV of the PHS Act with respect to health information communications, $526,796,000: Provided, That of the amounts available for improvement of information systems, $4,000,000 shall be available until September 30, 2026: Provided further, That in fiscal year 2025, the National Library of Medicine may enter into personal services contracts for the provision of services in facilities owned, operated, or constructed under the jurisdiction of the National Institutes of Health (referred to in this title as "NIH").

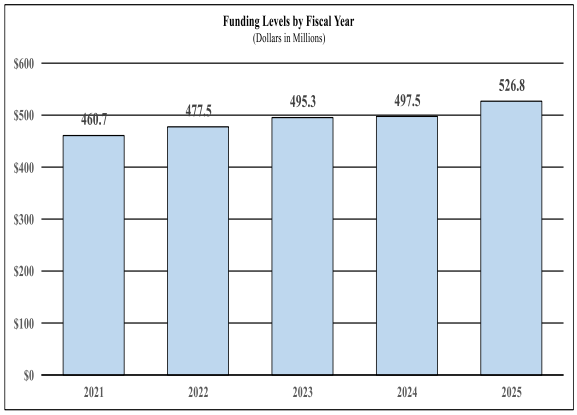
NATIONAL INSTITUTES OF HEALTH
National Library of Medicine

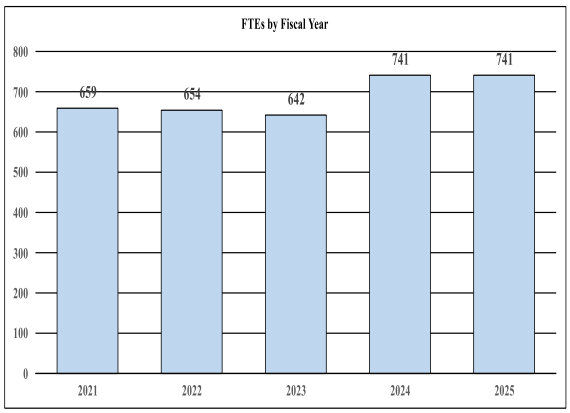
Summary of Changes
(Dollars in Thousands)

CHANGES	FY 2023 Final FTEs	FY 2023 Final Budget Authority	FY 2025 President's Budget FTEs	FY 2025 President's Budget Budget Authority	Built-In Change from FY 2023 Final FTEs	Built-In Change from FY 2023 Final Budget Authority
1. Intramural Programs:						
A. Built-in cost changes:						
a. FY 2024 effect of FY 2023 pay & benefits increase		$107,688		$122,230		$1,273
b. FY 2024 effect of FY 2024 pay & benefits increase		$107,688		$122,230		$4,190
c. FY 2024 paid days adjustment		$107,688		$122,230		$415
d. Differences attributable to FY 2024 change in FTE		$107,688		$122,230		$17,744
e. FY 2025 effect of FY 2024 pay & benefits increase		$107,688		$122,230		$1,417
f. FY 2025 effect of FY 2025 pay & benefits increase		$107,688		$122,230		$1,927
g. FY 2025 paid days adjustment		$107,688		$122,230		$0
h. Differences attributable to FY 2025 change in FTE		$107,688		$122,230		$0
i. Payment for centrally furnished services		$393		$421		$28
j. Cost of laboratory supplies, materials, other expenses, and non-recurring costs		$287,851		$307,957		$14,132
Subtotal, IR built-in cost changes						$41,125
2. Research Management and Support:						
A. Built-in cost changes:						
a. FY 2024 effect of FY 2023 pay & benefits increase		$14,015		$15,219		$166
b. FY 2024 effect of FY 2024 pay & benefits increase		$14,015		$15,219		$545
c. FY 2024 paid days adjustment		$14,015		$15,219		$54
d. Differences attributable to FY 2024 change in FTE		$14,015		$15,219		$2,102
e. FY 2025 effect of FY 2024 pay & benefits increase		$14,015		$15,219		$185
f. FY 2025 effect of FY 2025 pay & benefits increase		$14,015		$15,219		$252
g. FY 2025 paid days adjustment		$14,015		$15,219		$0
h. Differences attributable to FY 2025 change in FTE		$14,015		$15,219		$0
i. Payment for centrally furnished services		$0		$0		$0
j. Cost of laboratory supplies, materials, other expenses, and non-recurring costs		$10,448		$10,382		$509
Subtotal, RMS built-in cost changes						$3,813

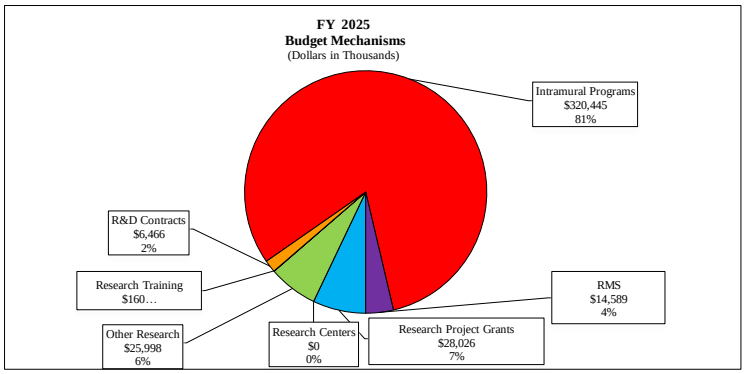
CHANGES	FY 2023 Final No.	FY 2023 Final Amount	FY 2025 President's Budget No.	FY 2025 President's Budget Amount	Program Change from FY 2023 Final No.	Program Change from FY 2023 Final Amount
B. Program:	-	-	-	-	-	-
1. Research Project Grants:	-	-	-	-	-	-
a. Noncompeting	97	$33,172	75	$30,941	-22	-$2,231
b. Competing	25	$10,167	29	$11,639	4	$1,473
c. SBIR/STTR	5	$2,287	4	$1,828	-1	-$459
Subtotal, RPGs	127	$45,625	108	$44,409	-19	-$1,217
2. Research Centers	0	$89	0	$104	0	$15
3. Other Research	68	$25,189	65	$25,466	-3	$277
4. Research Training	7	$334	6	$277	-1	-$57
5. Research and development contracts	0	$348	0	$330	0	-$18
Subtotal, Extramural		$71,586		$70,586		-$1,000
6. Intramural Programs	551	$399,265	638	$430,608	87	-$9,782
7. Research Management and Support	91	$24,463	103	$25,601	12	-$2,675
8. Construction		$0		$0		$0
9. Buildings and Facilities		$0		$0		$0
Subtotal, program changes						-$13,456
Total built-in and program changes	642	$495,314	741	$526,796	99	$31,482

History of Budget Authority and FTEs:

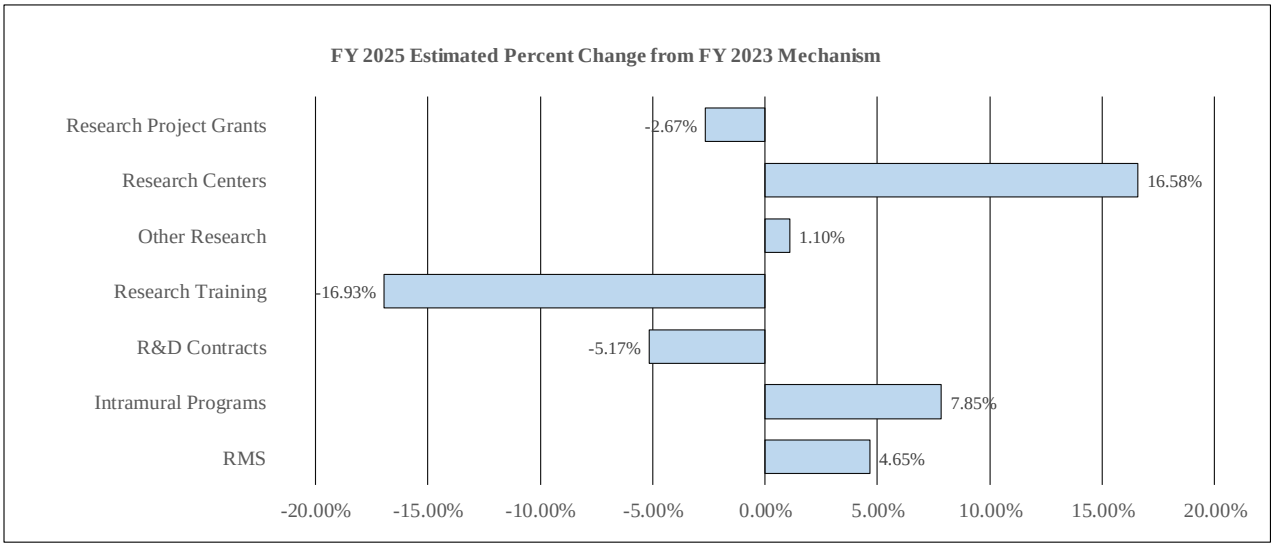




Distribution by Mechanism:



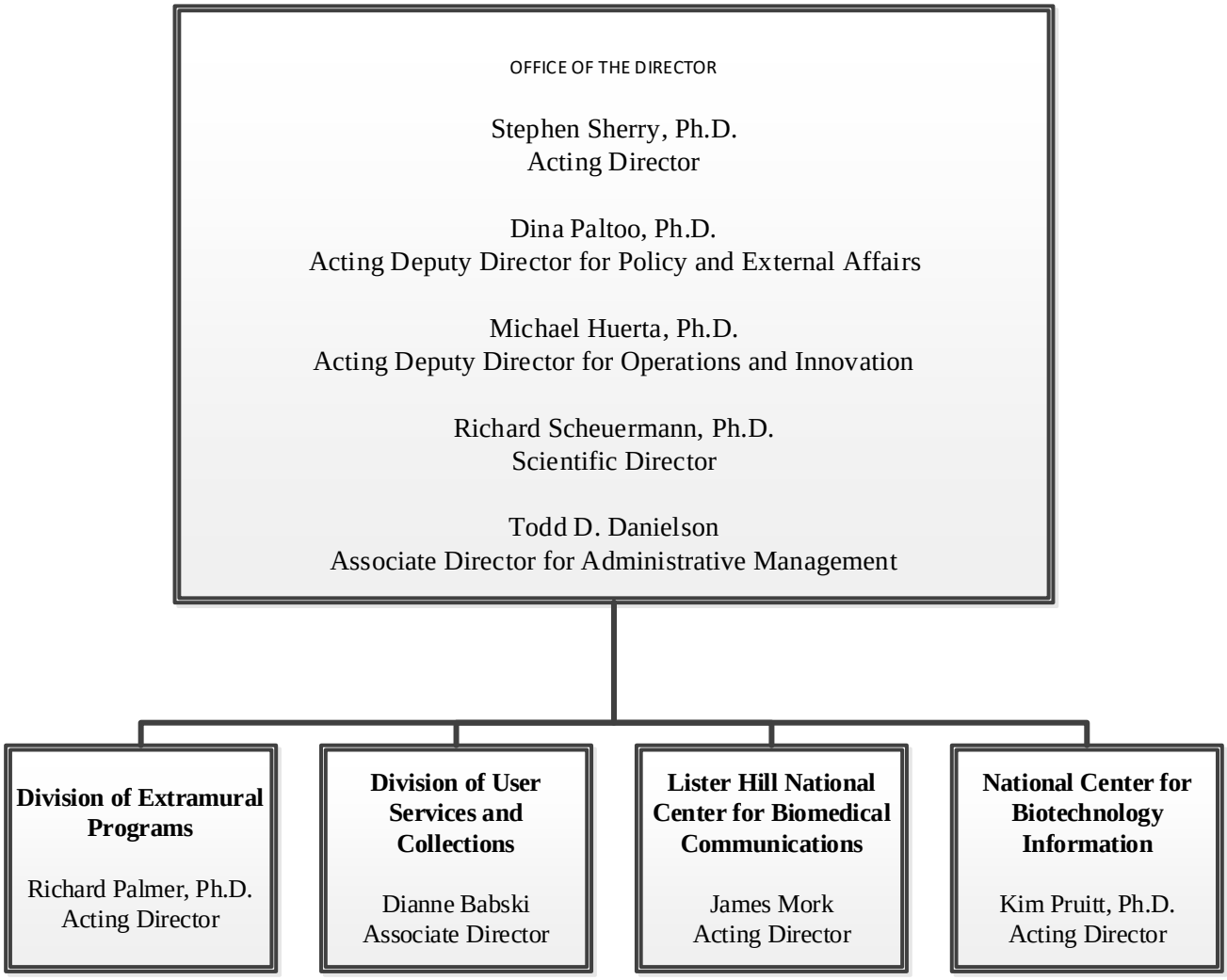
Change by Selected Mechanisms:



NATIONAL INSTITUTES OF HEALTH

National Library of Medicine

ORGANIZATIONAL CHART



NATIONAL INSTITUTES OF HEALTH
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Budget Authority by Activity *

(Dollars in Thousands)

	FY 2023 Final		FY 2024 CR		FY 2025 President's Budget		FY 2025 +/- FY 2023 Final	
Extramural Research	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**
Detail								
Health Information for Health Professionals and the Public (NN/LM)		$11,735		$11,658		$11,567		-$168
Informatics Resources for Biomedicine and Health		$14,225		$13,409		$14,611		$386
Biomedical Informatics Research		$45,625		$45,519		$44,409		-$1,217
Subtotal, Extramural		**$71,586**		**$70,586**		**$70,586**		**-$1,000**
Intramural Programs	**551**	**$399,265**	**638**	**$401,862**	**638**	**$430,608**	**87**	**$31,343**
Research Management & Support	**91**	**$24,463**	**103**	**$25,099**	**103**	**$25,601**	**12**	**$1,138**
TOTAL	**642**	**$495,314**	**741**	**$497,548**	**741**	**$526,796**	**99**	**$31,482**

* Includes FTEs whose payroll obligations are supported by the NIH Common Fund.

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Authorizing Legislation: Section 301 and Title IV of the Public Health Service Act, as amended.

Budget Authority (BA):

	FY 2023 Final	FY 2024 CR	FY 2025 President's Budget	FY 2025 +/- FY 2023
BA	495,314,000	497,548,000	526,796,000	31,482,000
FTE	642	741	741	99

Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

Overall Budget Policy: The FY 2025 President's Budget request for NLM is $526.8 million, an increase of $31.5 million from the FY 2023 Final level. The increase will fund a novel $30.0 million clinical data initiative to develop the tools, computational resources, and datasets necessary to extend NIH clinical research capabilities, including supporting AI research and development. In addition, NLM will seek efficiencies across its ongoing intramural programs, including intramural research in computational health and computational biology and information services that provide access to published biomedical literature, molecular biology and clinical research data, and consumer health information. NLM will continue to review its information services to consolidate similar services onto a small number of well-maintained, modern information technology (IT) platforms. NLM will award an estimated 29 new research project grants through its extramural programs and maintain constant funding for graduate and post-doctoral training programs and summer research experience programs in the fast-growing fields of biomedical informatics and data science. NLM will support outreach programs to promote access and training in the effective use of NLM resources across multiple stakeholders, including community engagement in the NIH *All of Us* Research Program. NLM will also provide mission critical support for NIH- and government-wide priorities regarding public access to research results, data management, and data science.

Program Descriptions

Intramural Programs

NLM's intramural programs encompass three major activities: 1) Intramural Research and Training; 2) Biomedical Information Services; and 3) Outreach and Engagement.

Intramural Research and Training

NLM supports 17 intramural researchers,[1] or investigators, who drive medical breakthroughs and enhance public health through the development and application of new computational approaches to a broad range of information problems in biology, biomedicine, and human health. They leverage mathematical, statistical, computer science, and bioinformatics techniques to help people understand health information and how to use it. NLM investigators build a deeper, generalizable understanding of current biological problems to inform future solutions, derive insights from large clinical and biological datasets such as those from electronic health records (EHRs), and enhance information access to scientific literature. They play a unique and vital role in a wide range of collaborations across NIH to devise new, customized analytical methods that give scientists and clinicians a better understanding of basic biology, the natural history of disease, and clinical manifestations of illness.

Facilitating Large-Scale Clinical Data Research to Improve Health

Large clinical datasets that provide real-world clinical data on millions of patients are an essential resource for biomedical research and may reduce the need for some traditional interventional trials. However, accessing large clinical datasets can be challenging due to associated cost and license restrictions, among other reasons.

To address these challenges, in FY 2023, NLM launched a new Center for Clinical Observational Investigations, a groundbreaking center that will allow researchers to test their hypotheses on data found in large-scale clinical datasets.

NLM will first curate a list of nationally and internationally available clinical datasets. Using informatics, data science, and statistical analysis, NLM will then create and make available dataset profiles that describe the scale of participants, demographics, diseases, and other characteristics important to research. The center will employ a consistent approach to organize the data, foster standardization across datasets, reduce ambiguity, improve the reliability of research, and facilitate use of the data.

Through this new center, NLM will leverage records from multiple disparate clinical datasets; employ data science, artificial intelligence, and machine-learning methods to analyze data; and generate findings based on clinical data from electronic health record systems and insurance claims. This will advance scientific discovery and health by supporting researchers in efficiently testing hypotheses that arise from basic or pre-clinical research using real clinical data.

NLM researchers develop computational approaches that characterize biological phenomena and predict functional consequences. In FY 2023, NLM investigators advanced the understanding of how viruses evolve by leveraging computational approaches to discover new viruses that attack bacteria, which provided insight into their diversity, possible hosts, and evolution. Using computational modeling, NLM researchers uncovered mutations in the human genome that likely influenced the evolution of human cognition, which is leading to a better understanding of human health and discovery of novel treatments for complex brain disorders. Researchers at NLM are also developing and improving data-driven computational approaches to predict protein structures that evade current state-of-the-art approaches. Research on some of these difficult-to-predict proteins that are associated with diseases such as cancer, autoimmune disorders, and bacterial and viral infections could lead to the development of new therapeutics for several conditions.

NLM researchers also employ computational methods to derive insights from clinical records and clinical care literature and develop artificial intelligence (AI) tools that analyze medical images for reliable predictions in health care, develop predictive tools, and advance biomedical

[1] nlm.nih.gov/research/index.html

information retrieval. In FY 2023, they leveraged AI techniques to examine issues related to prediction reliability, interpretability, fairness and bias, and overall trust in the use of AI in medical imaging. They applied new AI techniques to improve the accuracy and reproducibility of screening and the diagnosis of certain kinds of cancer and cardiac disease. NLM investigators also applied advanced machine learning methods to analyze EHR data and improve their quality and employed AI methods to develop and improve clinical prediction of patient risk in internal medicine and critical care settings. NLM researchers leveraged advanced AI, natural language processing, and data mining techniques to streamline biomedical information retrieval from a variety of sources to best answer user questions and simplify medical language so the public can access reliable and understandable information.

NLM's intramural research program offers a variety of training opportunities[2] to prospective researchers at different career stages across a range of computational health and computational biology topics, including natural language processing and machine learning to improve predicted clinical outcomes based on clinical notes, intelligent systems for predicting mortality rates, and evolutionary genomics and protein structure to improve our understanding of biology. In FY 2023, NLM hosted 27 postdoctoral researchers, 10 postbaccalaureate trainees, 4 predoctoral researchers, 9 summer interns, 16 research fellows, 4 clinical fellows, and 3 visiting scientists. Additionally, in FY 2023, NLM hosted nine trainees under its data science and informatics scholars' program, where they worked on projects that applied machine learning to diagnose age-related macular degeneration and predict post-admission events for patients based on analysis of clinical notes and EHR data, studied the evolution and comparative genomics of bacterial proteins, and evaluated the ability of protein prediction models to examine how certain proteins undergo structural changes.

Biomedical Information Services

Through its web-based biomedical information services, NLM collects, manages, preserves, and disseminates trillions of bytes of data and information derived from biomedical literature, molecular biology data, clinical trial reports, consumer health information, and health data standards. These services make available biomedical data and information to more than 8 million people and computer information systems every day to support scientific discovery, health care, and public health. In FY 2023, these services have undergone significant modernization efforts, which have increased and improved access to biomedical literature and data. NLM also continued to advance its work in health data standards and promote NLM and NIH resources through outreach and engagement.

Biomedical Literature Information Services

NLM makes trusted biomedical literature information available to those who need it when they need it. It achieves this by expanding and improving its literature information services to accommodate emerging changes in scholarly communication. NLM continues to improve its biomedical literature services while providing users with timely and relevant information and preserving the integrity of the scientific record.

[2] nlm.nih.gov/research/training.html

One of NLM's literature services is its flagship PubMed®[3] database of citations to biomedical literature, where users can access information both across many devices and platforms and through major search engines. In FY 2023, NLM improved PubMed's search functionality and navigation by streamlining lengthy author lists and adding the ability to search for multiple terms in any order. In FY 2023, NLM expanded the number of citations available for search and added nearly 1.6 million citations to PubMed, bringing the collection to more than 36 million citations.

NLM leads the world in promoting free public access to published results of biomedical research through PubMed Central® (PMC),[4] NLM's full-text archive of biomedical literature. Nine other federal agencies use PMC as the most efficient and effective means of disseminating full-text journal articles reporting on research they fund. In FY 2023, NLM expanded PMC eligibility requirements to include Spanish-language journals. This expansion will inform future efforts to support applications from journals in most major languages. In FY 2023, NLM added nearly 1 million full-text articles to PMC, expanding the public's access to more than 9 million articles, 5.5 million of which are downloadable in machine-readable formats.

NLM continues to lead the NIH Preprint Pilot,[5] which initially provided direct access to NIH-funded COVID-19 scientific articles prior to peer review and accelerated the broad discovery of NIH-funded SARS-CoV-2 and COVID-19 research. The pilot has since been extended to include all preprints reporting on NIH-funded research that are published on eligible preprint servers. The NIH Preprint Pilot currently provides access to the full text of nearly 14,000 preprints of NIH-funded research.

[3] pubmed.ncbi.nlm.nih.gov/
[4] ncbi.nlm.nih.gov/pmc/
[5] ncbi.nlm.nih.gov/pmc/about/nihpreprints/

Molecular Biology Data

Rapid and reliable access to molecular biology data, including genomic data, is essential to support research and translate discovery into knowledge. NLM maintains an array of more than 40 freely accessible integrated molecular biology databases and bioinformatics tools to enable biomedical research, support public health, and power new discoveries. NLM continues to expand these databases and improve molecular data submission tools and submission processing by improving access to complete collections of timely and accurate data and ensuring its databases and tools function effectively.

In FY 2023, NLM launched a new tool to facilitate the submission of messenger RNA (mRNA) sequence data to GenBank®,[6] NLM's database of publicly available assembled sequences. This allowed for a clearer and more efficient submission process. NLM added nearly 1 billion genetic sequences to GenBank, including close to 2 million SARS-CoV-2 sequence records. NLM also added more than 5 million records to its Sequence Read Archive (SRA),[7] the world's largest publicly available repository of raw, unassembled genetic sequencing data, which now provides more than 25 million SRA data records. In FY 2023, NLM began to streamline access to SRA COVID-19 datasets by consolidating them into a single cloud platform. NLM initiated use of a simplified data file format that reduces the average file size of large datasets for more efficient analysis and storage. NLM continued its support of the NIH Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) Tracking Resistance and Coronavirus Evolution (TRACE) initiative by enhancing processes and infrastructure to standardize, gather, and share SARS-CoV-2 variant sequencing data within GenBank and SRA. As part of its engagement in ACTIV TRACE, NLM implemented consistent processing for SARS-CoV-2 SRA files,

Modernizing Genomic Resources to Advance Scientific Discoveries

Biomedical research relies on access to high-quality data to understand human biology and health. Increased access to genetic sequence data from non-human organisms such as plants, animals, and fungi has fueled the modern era of genomic biology. Consistent with its mission, NLM collects, curates, and disseminates genetic sequence data that offer enormous promise for discoveries that have the potential to improve human health.

NLM has been leading the NIH Comparative Genomics Resource (CGR) to modernize genetic data resources and their underlying infrastructure. NLM has spearheaded the development of new infrastructure, user interfaces, and tools to facilitate better data submissions and provide an improved experience for researchers. Consistent with NLM's modernization approach, this initiative includes extensive engagement with the research and broader scientific community.

In FY 2023, NLM introduced an updated a toolkit of interconnected databases and interoperable data and tools to improve CGR's effectiveness for users. The toolkit helps users improve data quality before submission, compare genetic sequences, visualize data, and explore and download sequence data.

NLM provided a new public tool to support quality control testing of genetic sequence data submissions and integrated this tool into its internal sequence submission processes. This has led to reduced processing time and has improved existing submissions.

NLM also added new features to a visualization tool that allows researchers to compare two genetic sequence data records, search for a gene and navigate directly to its location, and quickly determine the relative orientation of aligned sequence segments.

In addition, NLM released new webpages providing a single point of access to genetic sequence data from across NLM and NIH repositories, making it easier to find and download data across repositories.

Through its ongoing commitment to modernization initiatives such as CGR, NLM aims to improve the user experience for accessing, analyzing, and visualizing sequence data and related information.

[6] ncbi.nlm.nih.gov/genbank/

[7] ncbi.nlm.nih.gov/sra

furnished variant information in easy-to-use formats, and provided access to variant analysis files in cloud computing platforms. Further, in the interest of transparency and reliability, NLM launched a new webpage where the public can learn about how sequence data are submitted, processed, and made publicly available in both GenBank and SRA.

In FY 2023, NLM improved the research and clinical utility of its sequence data repositories by adding nearly 63 million records to RefSeq,[8] a database of annotated reference sequences against which variations can be analyzed. NLM also added more than 750,000 human genome sequence variants to ClinVar,[9] a public archive of reports on relationships among human genome variations and human phenotypes, and improved how data submitted to ClinVar are organized and standardized to make them more accurate and useful.

In FY 2023, NLM continued developing the NIH Comparative Genomics Resource (CGR)[10] to modernize biomolecular data resources and their underlying infrastructure. The NIH CGR now provides an updated toolkit with new and modern resources for collaborative comparative genomics analysis and additional features that facilitate relevant research.

Clinical Trial Data

NLM's ClinicalTrials.gov[11] is the world's largest publicly accessible database of privately and publicly funded clinical studies. In FY 2023, NLM received registration information for more than 38,000 new clinical research studies and added nearly 5,000 new results summaries. Making this information visible and accessible improves transparency, ensures accountability, and fosters public trust in science consistent with legislative requirements. In FY 2023, NLM launched a modernized ClinicalTrials.gov website informed by extensive user feedback and testing. The website includes an updated interface with improved functionality for searching, viewing, and downloading information about clinical trials, and an updated platform to accommodate growth and enhance efficiency. In FY 2023, NLM improved the ClinicalTrials.gov study registration and results submission system by launching a new, easy-to-navigate design to facilitate study registration. NLM also added a new draft API to help developers and researchers access study records data from ClinicalTrials.gov more easily. NLM continues to solicit user feedback on how to improve both ClinicalTrials.gov and the registration and results submission system.

Consumer Health Information

NLM's MedlinePlus® website[12] is specifically designed to meet consumers' health information needs. Available in English and Spanish, MedlinePlus offers trusted, authoritative information for patients and families on a broad variety of health conditions, medical tests, and drugs and supplements, as well as links to other credible sources of information. In FY 2023, NLM enhanced and updated the MedlinePlus and MedlinePlus en Español websites to communicate their purpose more clearly, remove outdated features, and improve navigation. In FY 2023,

[8] ncbi.nlm.nih.gov/refseq/
[9] ncbi.nlm.nih.gov/clinvar/
[10] ncbi.nlm.nih.gov/datasets/cgr/
[11] clinicaltrials.gov/
[12] medlineplus.gov

nearly 440 million users viewed nearly 850 million MedlinePlus pages for health information. A companion service, MedlinePlus Connect,[13] provides patients and clinicians with direct, tailored access to MedlinePlus resources automatically through EHR systems, patient portals, and other health IT systems at the point of care. In FY 2023, NLM migrated MedlinePlus Connect to a cloud computing platform for faster and more reliable access to critical health information and responded to nearly 190 million electronic requests from health IT systems.

Standards and Terminologies for Health Data Interoperability

NLM plays a critical role in promoting the interoperability of health data through the development, maintenance, and dissemination of health data standards. NLM works across NIH and the federal government to advance the interoperable exchange of health data for care and quality reporting in support of federal health IT interoperability requirements and of research.

NLM continued to support the improvement of three standards that assure the precise and current representation of terms and codes needed for clinical care and research. In FY 2023, NLM supported expansion of the International Edition of SNOMED CT® (Systematized Nomenclature of Medicine Clinical Terms, the standard nomenclature of medicine) with nearly 10,000 concepts and the addition of over 550 concepts to enable users to capture information specific to the U.S. health care system. NLM also added nearly 2,600 new terms to LOINC® (Logical Observation Identifiers Names and Codes) to support the provision of high-quality interoperable laboratory information and added nearly 250 new terms to RxNorm (which provides normalized names for generic and branded drugs). Such terminology additions are critical to health care—for example, including new drug terms in RxNorm facilitates the prescription and monitoring of therapeutics and vaccinations in EHR systems that support payment as well as care management.

In addition, NLM added more than 1,700 federally recognized American Indian or Alaska Native tribal names and ethnolinguistic terms to its Medical Subject Headings (MeSH®)[14] indexing terms and hosted listening sessions to engage users and interest groups in the process of updating MeSH terms. NLM also enhanced the Common Data Element (CDE) Repository[15]—a freely available source of standard, structured, machine-readable definitions of data elements, variables, and measures used in NIH-funded clinical research—to encourage adoption of CDEs in NIH-funded research. Using CDEs improves consistency of data collection across research studies to enable comparison of results and data aggregation. In FY 2023, additional CDEs on evaluating COVID-19 and therapeutic strategies were added to the repository.

Outreach and Engagement

NLM's outreach and engagement activities foster innovation, raise awareness, and promote the use of NIH and NLM information, data resources, and physical collections. In FY 2023, NLM hosted a virtual workshop series to inform students and educators about relevant resources available from NLM and NIH. With support from the NIH *All of Us* Research Program (*All of Us*), NLM continued to support awareness and use of the *All of Us* Researcher Workbench at

[13] medlineplus.gov/medlineplus-connect/
[14] nlm.nih.gov/mesh/meshhome.html
[15] cde.nlm.nih.gov/home

institutions with a historic and current commitment to educating underrepresented students by providing training on user conduct, access to *All of Us* data, and data engagement techniques via the *All of Us* data training and engagement for academic libraries program.

NLM also expanded its public outreach efforts by hosting more than 35 online exhibitions, including 2 new and 3 redesigned exhibitions, that reached nearly 700,000 visitors and linked to more than 1,000 pages of digitized NLM collection materials. In FY 2023, NLM continued its collaboration under the Environmental Health Information Partnership (EnHIP)[16] to advance health equity and build capacity on college campuses and in communities with projects that included using NLM resources to educate public housing residents about COVID-19, promote access to health information, conduct community outreach in public libraries, and increase health literacy competencies of students enrolled in minority-serving institutions and their families.

Budget Policy: The FY 2025 President's Budget estimate for NLM's Intramural Programs is $430.6 million, an increase of $31.3 million from the FY 2023 Final level of $399.3 million. These additional funds will allow NLM to establish a novel $30.0 million clinical data initiative to develop the tools, computational resources, and datasets necessary to extend NIH clinical research capabilities, including supporting AI research and development. This work will focus on obtaining and analyzing diverse clinical data needed to develop tools and computational models that can support clinical care and improve health outcomes. In addition, NLM will seek efficiencies across its ongoing intramural programs, including research and training in computational health and biology, which aim to support the needs of NLM, NIH, and the broader biomedical research community related to the use of AI and natural language processing to glean knowledge from scientific literature; using computational approaches to improve disease detection and diagnosis through analysis of biomedical images; and developing methods to enhance discovery from health data. NLM will prioritize support for its most heavily used biomedical information services including SRA, ClinicalTrials.gov, and PubMed, and will continue to consolidate related services onto a small number of well-maintained, modern IT platforms. NLM will also seek efficiencies in its support for clinical terminology standards that foster integration, interoperability, and analysis of genomic, clinical research, and electronic health data. NLM will sustain outreach programs that promote access and training in the effective use of biomedical and health information through engagement with broad sets of stakeholders.

Extramural Programs

NLM's extramural programs[17] provide financial support for three major activities:
1) Biomedical Informatics Research and Training; 2) Informatics Resources for Biomedicine and Health; and 3) Health Information for Health Professionals and the Public.

Biomedical Informatics Research and Training

NLM's research grants advance cutting-edge science through fundamental and applied biomedical informatics and data science research and develop novel computational approaches for biomedical research. In FY 2023, NLM funded 208 awards across the country, including 33

[16] nlm.nih.gov/oet/partnerships/enhip.html
[17] nlm.nih.gov/ep/index.html

co-funded with other NIH Institutes, Centers, and Offices. NLM-funded researchers develop methods to improve the quality and effectiveness of health information and informatics tools, including those that support patient-centered care, precision medicine, and public health. NLM-supported projects develop and test health IT solutions that increase the usefulness of information for patient self-management, incorporate AI into tools that benefit providers and researchers, and develop new informatics tools to enhance patient safety.

In FY 2023, NLM-funded researchers:

- Developed a resource that researchers are using to better understand how tumors change in response to therapy and to make predictions for improving cancer treatment.
- Developed an open-source natural language processing tool to standardize EHR data mining for clinical and translational research.
- Developed a mobile health application to improve children's early language environment, promote bilingualism, and help parents monitor developmental milestones.
- Developed a health data registry, generated by patients or their caregivers, as a research resource to advance equitable precision health.
- Developed an accessible personal health tool for individuals with multiple sclerosis that monitors and reports falls to prevent and reduce their incidence and severity.
- Examined strengths and weaknesses of deep learning algorithms used in medical imaging interpretation.

Providing Information Resources to Reduce Health Disparities

NLM's portfolio of extramurally funded biomedical informatics and data science research projects improve access, dissemination, and use of health information. Access to usable, understandable health information is key to health decision-making, patient self-management, and caregiver support and can have an impact on health care quality and disparities in health and health care.

As part of its goal to reach more people through enhanced dissemination, NLM funds resource grants that develop informatics solutions to provide useful and useable health information to populations that experience health disparities, including their caregivers and the health care providers who manage their care. Funded resource grants are developing innovative approaches to reduce health disparities and support underserved communities that bear a disproportionate burden of disease.

Recently funded projects include guides developed for people in rural areas living with and managing autism spectrum disorder, programs to improve reproductive health literacy for refugees, resources to increase access to and dissemination of information on heart disease, and an accessible app-based informed consent toolkit for prospective research participants who are deaf and hard-of-hearing.

Projects funded in FY 2023 by NLM are developing resources to support kindergarteners' reading readiness, individuals with sensory disabilities, and deaf and hard-of-hearing populations with diabetes.

Through these programs, NLM is ensuring that health information remains relevant to end users and is built upon new and innovative technologies that lead to knowledge that informs health decisions.

NLM continues to issue new and update ongoing funding opportunities to solicit innovative ideas that address scientific gaps or propose solutions to critical health problems. In FY 2023, NLM issued a new notice of funding opportunity seeking innovative approaches to advance informatics tools, systems, and platforms that can help individuals understand and improve their health through actionable insights. NLM also renewed its biomedical informatics and data science funding opportunity with a focus on using new and scalable data

discovery and management approaches to advance biomedical discovery and data-powered health. NLM is also soliciting research projects to develop novel computational and statistical methods that reduce or mitigate gaps and errors in health datasets.

NLM continues to be a leading funder of Ph.D.-level training in biomedical informatics and data science. NLM's flagship university-based research training program[18] supports universities across the country to enroll predoctoral and postdoctoral fellows and trainees and provide them a core curriculum focused on biomedical data science concepts and methods to develop skills needed to lead independent future research. In FY 2023, funded universities shared knowledge across projects and programs, and nearly half of the programs participated in two outreach days with NLM's new biomedical informatics and data science summer training program[19] to provide information on the field of biomedical informatics, offer predoctoral training opportunities, and share information on how to successfully apply to doctoral programs. This new training program provides research experiences to undergraduate, postbaccalaureate, and master's students and develops a cadre of diverse scientists capable of leading biomedical informatics and data science research. In FY 2023, each of the 12 funded institutions implemented mentoring programs, developed research projects, and offered a variety of training opportunities to their first cohort of trainees.

Informatics Resources for Biomedicine and Health

The NLM Information Resource Grants to Reduce Health Disparities supports projects that bring useful and understandable health information to at-risk populations and their health care providers. These grants are designed to improve the development and deployment of biomedical knowledge management tools, resources, and services that address identified yet unmet needs. In FY 2023, NLM awarded three grants that fund the development of a free mobile application for parents to address disparities in home reading routines and kindergarten reading readiness by providing clear, evidence-based literacy-related guidance and resources; patient education materials for individuals with sensory disabilities; and a website to improve access to diabetes information for deaf and hard-of-hearing populations. The NLM Grants for Scholarly Works in Biomedicine and Health, renewed in FY 2023, supports the development of monographs and books by health professionals, public health officials, biomedical researchers, and health science historians. In FY 2023, NLM awarded four grants for scholarly works on a global history of measles; a comprehensive view of food allergy therapeutics and their risks and benefits; diversity and inclusion practices in precision medicine research; and the biomedical use of a compound produced by American horseshoe crabs to detect the presence of potentially deadly toxins.

Health Information for Health Professionals and the Public

NLM's extramural program oversees cooperative agreements that fund the Network of the National Library of Medicine (NNLM®),[20] which trains U.S. health professionals on how to access biomedical information, enhance access to trusted health information, and build capacity for data management and science at health sciences libraries. In FY 2023, the newly launched *NNLM Discovery Podcast* series featured stories and companion videos that explore

[18] nlm.nih.gov/ep/GrantTrainInstitute.html
[19] nlm.nih.gov/ep/R25_program.html
[20] nnlm.gov

how NNLM engages with local communities to provide access to trusted information and improve public health. The NNLM also provided nearly 300 continuing education classes and tutorials to nearly 30,000 health sciences library and information specialists, public librarians, community health specialists, and public health professionals. NNLM also funds regional competitive projects to advance health equity through information dissemination. In FY 2023, NNLM-funded projects included hosting community engagement events to solicit feedback on future community outreach projects, improving health-related collections at academic libraries to support students and increase representation, and tailoring and translating into Navajo an existing community science project on pollinators in the environment and the food supply. NNLM also leads engagement activities through programs, partnerships, activities, and trainings offered in support of the NIH *All of Us* Research Program. In FY 2023, this collaboration resulted in more than 90 engagement activities reaching an audience of more than 3,000 participants.

Budget Policy: The FY 2025 President's Budget request includes $70.6 million for NLM's Extramural Programs, is a decrease of $1.0 million from the FY 2023 Final level. Within this funding level, NLM will seek to keep pace with growing demand for research and training in biomedical informatics and data science, including among early-stage investigators and those from underrepresented communities. NLM will continue to accept investigator-initiated applications through NIH parent-grant announcements, as well as targeted funding announcements. NLM will aim to support noncompeting grants at the previously committed level. NLM will award an estimated 29 competing research project grants and aim to support early stage and new investigators at success rates comparable to those of established investigators submitting new applications. NLM will maintain funding for 18 university-based graduate and post-doctoral biomedical informatics and data science training programs, which reach approximately 200 trainees a year who are in high demand across the biomedical enterprise. NLM will continue to support 12 summer research experience programs aimed at attracting talented undergraduate and post-baccalaureate students to bioinformatics and data science careers. NLM will support its unique resource grant programs aimed at ensuring relevant and reliable information for consumers and health professionals. Through a cooperative agreement with the Network of the National Library of Medicine, NLM will continue to support efforts to advance community engagement in the *All of Us* Research Program and retain support for training on and access to biomedical and health information resources, as well as to improve data management and sharing practices among biomedical researchers.

Research Management and Support

NLM's research management and support (RMS) activities provide administrative, budgetary, communications, and logistical support for NLM programs to ensure strategic planning and evaluation, regulatory compliance, policy development, and partnerships with other federal agencies, Congress, the private sector, and the public. NLM is continuing to improve its organizational effectiveness through realignments and innovation. In FY 2023, NLM welcomed a newly appointed scientific director to lead its intramural research program. NLM continued to ensure responsible stewardship of federal funds by implementing its objectives, outlining progress towards the NLM Strategic Plan,[21] streamlining biomedical information services to make it easier for users to access information, ensuring the integrity of biomedical data to

[21] nlm.nih.gov/pubs/plan/lrp17/NLM_StrategicReport2017_2027.html

support research, and aligning products and services to their related policies and procedures. NLM also actively engaged in NIH and government-wide policy efforts related to open science, public access, clinical trial transparency, and data management.

Budget Policy: The FY 2025 President's Budget request includes $25.6 million for NLM's RMS activities, an increase of $1.1 million from the FY 2023 Final level. RMS will support NLM-wide planning and evaluation, including implementation of NLM's strategic plan. Increased funding will enable critical enhancements of NLM's physical and information systems security infrastructure, policy development and administration functions, as well as improved coordination of NLM's growing engagement in trans-NIH efforts.

Conclusion: As the leader in biomedical informatics and computational health data science research, NLM's role in making data-driven biomedical resources and science available whenever and wherever it is needed cannot be overstated. NLM harnesses its intramural and extramural research programs, biomedical information services, and engagement activities to advance breakthroughs in science, medicine, and public health. NLM's work and resources accelerate research, foster collaboration, improve health care, and benefit science and society by addressing health challenges more effectively.

NATIONAL INSTITUTES OF HEALTH
National Library of Medicine

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2016	$394,090,000	$341,119,000	$402,251,000	$394,664,000
Rescission				$0
2017 [1]	$395,684,000	$407,086,000	$412,097,000	$407,510,000
Rescission				$0
2018	$373,258,000	$413,848,000	$420,898,000	$428,553,000
Rescission				$0
2019	$395,493,000	$433,671,000	$442,230,000	$441,997,000
Rescission				$0
2020	$380,463,000	$463,599,000	$465,837,000	$456,911,000
Rescission				$0
Supplemental				$10,000,000
2021	$415,665,000	$460,841,000	$471,789,000	$463,787,000
Rescission				$0
2022	$474,864,000	$486,769,000	$476,074,000	$479,439,000
Rescission				$0
2023	$471,998,000	$494,572,000	$494,302,000	$497,548,000
Rescission				$0
2024	$495,314,000	$497,548,000	$497,548,000	$497,548,000
Rescission				$0
2025	$526,796,000			

[1] Budget Estimate to Congress includes mandatory financing.

NATIONAL INSTITUTES OF HEALTH
National Library of Medicine

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2024 Amount Authorized	FY 2024 CR	2025 Amount Authorized	FY 2025 President's Budget
Research and Investigation	Section 301	42§241	Indefinite	$497,548,000	Indefinite	$526,796,000
National Library of Medicine	Section 401(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				$497,548,000		$526,796,000

NATIONAL INSTITUTES OF HEALTH

National Library of Medicine

Amounts Available for Obligation [1]

(Dollars in Thousands)

Source of Funding	FY 2023 Final	FY 2024 CR	FY 2025 President's Budget
Appropriation	$497,548	$497,548	$526,796
Mandatory Appropriation: (non-add)			
Type 1 Diabetes	*($0)*	*($0)*	*($0)*
Other Mandatory financing	*($0)*	*($0)*	*($0)*
Subtotal, adjusted appropriation	$497,548	$497,548	$526,796
OAR HIV/AIDS Transfers	-$2,234	$0	$0
Subtotal, adjusted budget authority	$495,314	$497,548	$526,796
Unobligated balance, start of year	$3,000	$3,000	$0
Unobligated balance, end of year (carryover)	-$3,000	$0	$0
Subtotal, adjusted budget authority	**$495,314**	**$500,548**	**$526,796**
Unobligated balance lapsing	-$332	$0	$0
Total obligations	$494,982	$500,548	$526,796

[1] Excludes the following amounts (in thousands) for reimbursable activities carried out by this account: FY 2023 - $21,653 FY 2024 - $21,653 FY 2025 - $21,653

NATIONAL INSTITUTES OF HEALTH
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Budget Authority by Activity *
(Dollars in Thousands)

		FY 2024 CR	FY 2025 President's Budget
Total compensable workyears:			
	Full-time equivalent	741	741
	Full-time equivalent of overtime and holiday hours	0	0
	Average ES salary	$223	$229
	Average GM/GS grade	12.0	12.0
	Average GM/GS salary	$131	$134
	Average salary, Commissioned Corps (42 U.S.C. 207)	$99	$102
	Average salary of ungraded positions	$184	$189
	OBJECT CLASSES	**FY 2024 CR**	**FY 2025 President's Budget**
	Personnel Compensation		
11.1	Full-Time Permanent	$45,256	$50,763
11.3	Other Than Full-Time Permanent	$44,079	$45,313
11.5	Other Personnel Compensation	$2,749	$2,826
11.7	Military Personnel	$289	$303
11.8	Special Personnel Services Payments	$3,081	$3,167
11.9	**Subtotal Personnel Compensation**	**$95,455**	**$102,373**
12.1	Civilian Personnel Benefits	$32,899	$35,061
12.2	Military Personnel Benefits	$16	$16
13.0	Benefits to Former Personnel	$0	$0
	Subtotal Pay Costs	**$128,369**	**$137,450**
21.0	Travel & Transportation of Persons	$880	$900
22.0	Transportation of Things	$151	$155
23.1	Rental Payments to GSA	$44	$45
23.2	Rental Payments to Others	$178	$182
23.3	Communications, Utilities & Misc. Charges	$176	$180
24.0	Printing & Reproduction	$131	$133
25.1	Consulting Services	$72,147	$81,413
25.2	Other Services	$59,095	$66,234
25.3	Purchase of Goods and Services from Government Accounts	$104,726	$107,429
25.4	Operation & Maintenance of Facilities	$883	$883
25.5	R&D Contracts	$330	$346
25.6	Medical Care	$9	$9
25.7	Operation & Maintenance of Equipment	$14,940	$15,269
25.8	Subsistence & Support of Persons	$0	$0
25.0	**Subtotal Other Contractual Services**	**$252,131**	**$271,583**
26.0	Supplies & Materials	$3,310	$3,383
31.0	Equipment	$20,007	$20,447
32.0	Land and Structures	$7,654	$7,823
33.0	Investments & Loans	$0	$0
41.0	Grants, Subsidies & Contributions	$84,467	$84,467
42.0	Insurance Claims & Indemnities	$0	$0
43.0	Interest & Dividends	$50	$50
44.0	Refunds	$0	$0
	Subtotal Non-Pay Costs	**$369,179**	**$389,346**
	Total Budget Authority by Object Class	**$497,548**	**$526,796**

* Includes FTEs whose payroll obligations are supported by the NIH Common Fund.

NATIONAL INSTITUTES OF HEALTH

National Library of Medicine

Salaries and Expenses

(Dollars in Thousands)

Object Classes	FY 2024 CR	FY 2025 President's Budget
Personnel Compensation	-	-
Full-Time Permanent (11.1)	$45,256	$50,763
Other Than Full-Time Permanent (11.3)	$44,079	$45,313
Other Personnel Compensation (11.5)	$2,749	$2,826
Military Personnel (11.7)	$289	$303
Special Personnel Services Payments (11.8)	$3,081	$3,167
Subtotal, Personnel Compensation (11.9)	**$95,455**	**$102,373**
Civilian Personnel Benefits (12.1)	$32,899	$35,061
Military Personnel Benefits (12.2)	$16	$16
Benefits to Former Personnel (13.0)	$0	$0
Subtotal Pay Costs	**$128,369**	**$137,450**
Travel & Transportation of Persons (21.0)	$880	$900
Transportation of Things (22.0)	$151	$155
Rental Payments to Others (23.2)	$178	$182
Communications, Utilities & Misc. Charges (23.3)	$176	$180
Printing & Reproduction (24.0)	$131	$133
Other Contractual Services	-	-
Consultant Services (25.1)	$72,147	$81,413
Other Services (25.2)	$59,095	$66,234
Purchase of Goods and Services from Government Accounts (25.3)	$92,344	$95,046
Operation & Maintenance of Facilities (25.4)	$883	$883
Operation & Maintenance of Equipment (25.7)	$14,940	$15,269
Subsistence & Support of Persons (25.8)	$0	$0
Subtotal Other Contractual Services	**$239,409**	**$258,845**
Supplies & Materials (26.0)	$3,310	$3,383
Subtotal Non-Pay Costs	**$244,236**	**$263,778**
Total Administrative Costs	**$372,605**	**$401,227**

NATIONAL INSTITUTES OF HEALTH
National Library of Medicine

Detail of Full-Time Equivalent Employment (FTE)

Office	FY 2023 Final			FY 2024 CR			FY 2025 President's Budget		
	Civilian	Military	Total	Civilian	Military	Total	Civilian	Military	Total
Office of the Director/Administration									
Direct:	63	-	63	74	-	74	74	-	74
Reimbursable:	11	-	11	11	-	11	11	-	11
Total:	74	-	74	85	-	85	85	-	85
National Center for Biotechnology Information									
Direct:	268	1	269	317	1	318	317	1	318
Reimbursable:	23	-	23	23	-	23	23	-	23
Total:	291	1	292	340	1	341	340	1	341
Lister Hill National Center for Biomedical Communications									
Direct:	30	-	30	44	-	44	44	-	44
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	30	-	30	44	-	44	44	-	44
Division of Library Operations									
Direct:	228	-	228	248	-	248	248	-	248
Total:	228	-	228	248	-	248	248	-	248
Division of Extramural Programs									
Direct:	17	1	18	22	1	23	23		23
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	17	1	18	22	1	23	23		23
Division of Library Operations									
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	-	-	-	-	-	-	-	-	-
Total	640	2	642	739	2	741	740	1	741
Includes FTEs whose payroll obligations are supported by the NIH Common Fund.									
FTEs supported by funds from Cooperative Research and Development Agreements.	0	0	0	0	0	0	0	0	0

FISCAL YEAR	Average GS Grade
2021	11.9
2022	12.0
2023	12.0
2024	12.0
2025	12.0

National Library of Medicine

Detail of Positions [1]

GRADE	FY 2023 Final	FY 2024 CR	FY 2025 President's Budget
Total, ES Positions	4	5	5
Total, ES Salary	$844,415	$1,112,510	$1,143,660
General Schedule			
GM/GS-15	18	18	18
GM/GS-14	56	60	60
GM/GS-13	134	150	150
GS-12	101	119	119
GS-11	19	19	19
GS-10	0	0	0
GS-9	9	9	9
GS-8	23	23	23
GS-7	6	6	7
GS-6	2	3	2
GS-5	2	2	3
GS-4	2	3	2
GS-3	0	0	0
GS-2	1	1	1
GS-1	2	2	2
Subtotal	375	415	415
Commissioned Corps (42 U.S.C. 207)			
Assistant Surgeon General	0	0	0
Director Grade	0	0	0
Senior Grade	1	1	1
Full Grade	0	0	0
Senior Assistant Grade	1	1	0
Assistant Grade	0	0	0
Junior Assistant	0	0	0
Subtotal	2	2	1
Ungraded	272	323	324
Total permanent positions	372	468	468
Total positions, end of year	653	745	745
Total full-time equivalent (FTE) employment, end of year	642	741	741
Average ES salary	$211,104	$222,502	$228,732
Average GM/GS grade	12.0	12.0	12.0
Average GM/GS salary	$124,133	$130,836	$134,499

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.