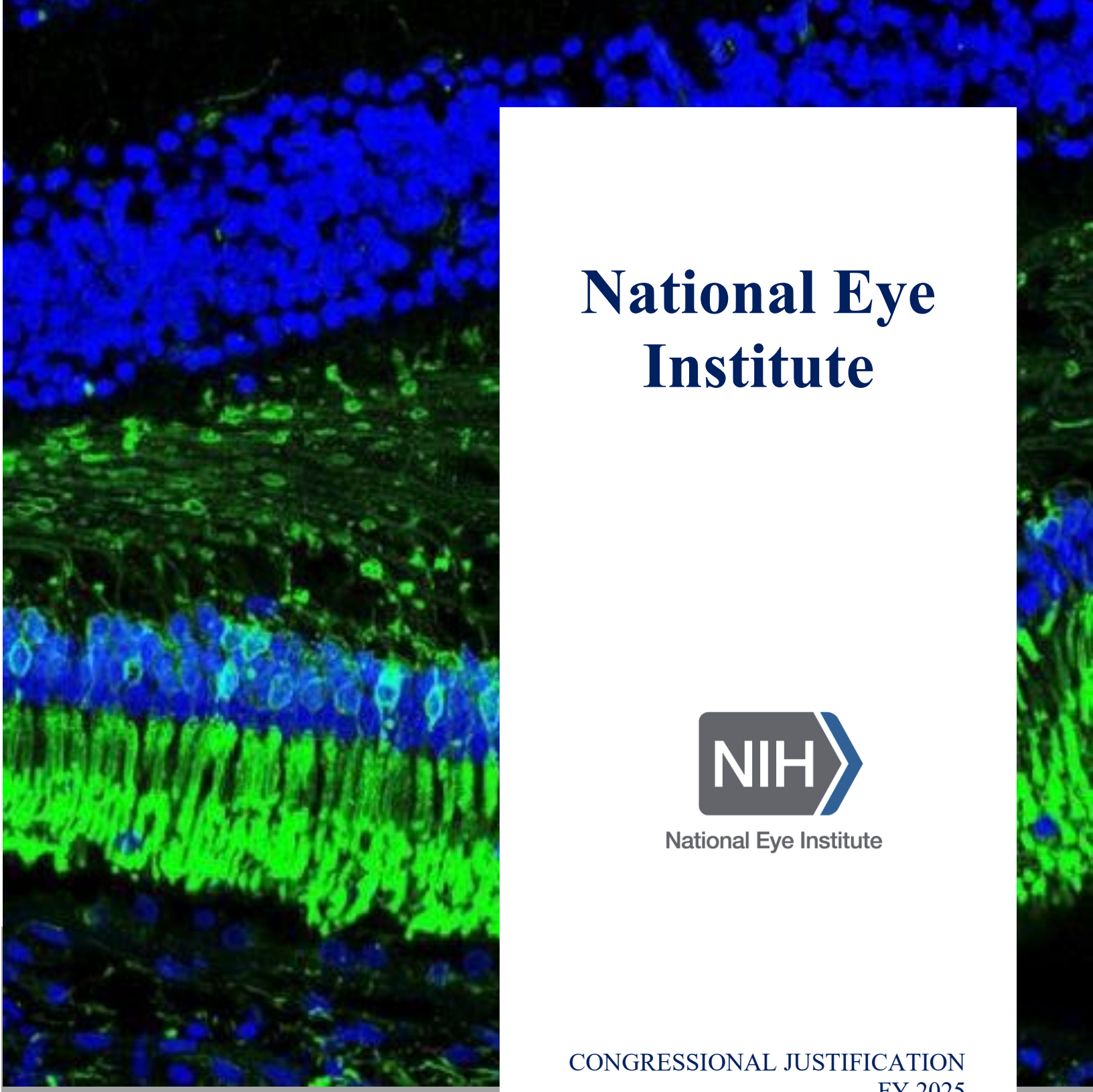

National Eye Institute

National Eye Institute

CONGRESSIONAL JUSTIFICATION
FY 2025

Department of Health and Human Services
National Institutes of Health

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DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Eye Institute (NEI)

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.

Cover Page

The fovea is essential for high acuity vision among mammals; only humans and their primate cousins possess this specialized anatomical structure.

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Director's Overview

Eye diseases that lead to vision loss and blindness, such as age-related macular degeneration (AMD), diabetic retinopathy (DR), cataracts, and glaucoma, affect millions of Americans of all ages, ethnicities, and backgrounds. These and other forms of vision disorders, like myopia, can restrict career choices and can impact people's mobility and independence. As the population ages, virtually all Americans will develop a visual problem. The National Eye Institute (NEI) supports vision research through approximately 1,800 research grants and training awards made to scientists at more than 260 medical centers, hospitals, and universities across 44 states and around the world. NEI also conducts laboratory and patient-oriented clinical research at its facilities in Maryland.

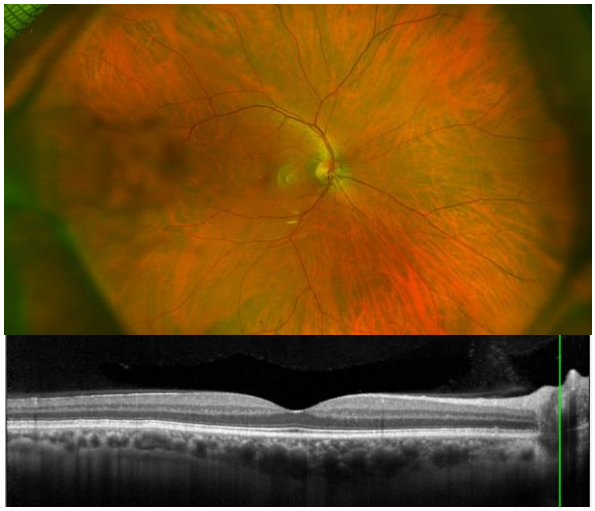
NEI Director Michael F. Chiang, M.D.

Using AI to combat blindness

Artificial Intelligence (AI) has had a breakout year, astounding us with self-driving cars, generating images from scratch, and even emulating human dialogue. Medicine has also entered an era driven by AI and data science, particularly in the eye. Autonomous AI diagnostic devices detect potentially blinding diseases in their early stages; AI powers ocular imaging and telemedicine, predicts disease progression, and informs treatment decisions. A team of vision researchers was awarded one of the four grants in the NIH Common Fund Bridge2AI Initiative, which seeks to generate flagship datasets linking clinical information to ocular imaging to propel widespread adoption of AI.

It is no coincidence that NEI has been a pioneer in developing AI technologies and applying them to research and patient care. The transparent eye is easily imaged non-invasively, enabling widespread development and use of advanced imaging tools; the pixel-level details can reveal tiny biological changes undetectable by the human eye. The 2023 Lasker-DeBakey Clinical Medical Research Award, the top science prize in the United States, was awarded to NEI-supported scientists who developed optical coherence tomography (OCT), an incredibly sensitive device that uses low-power laser light to see biological structures in microscopic detail. Independently, President Biden also recognized these scientists with the 2023 National Medal of Technology and Innovation. OCT captures cross-section images of the light-sensing retina in the back of the eye. It has revolutionized the detection and treatment of leading causes of blindness, such as age-related macular degeneration (AMD), DR, and glaucoma. Since 1991, OCT has become the most common eye imaging procedure, performed 30 million times per year, almost once every second. With hundreds of thousands of images paired to medical records, AI based approaches can make predictions of disease diagnosis and progression. In glaucoma, for example, OCT can measure structural changes in the optic nerve, the biological cable that conveys vision information to the brain. The death of optic nerve cells causes gradual vision loss, with a disproportionate burden falling on Black and Hispanic populations. Accurate and

prompt assessment of glaucoma progression is essential to determine whether escalation of therapy is necessary. Using 14,000 OCT scans from 462 glaucoma patients over time, NEI-funded researchers developed an AI model to predict individual glaucoma progression that significantly outperformed standard statistical models.



OCT (bottom) aligned with retina photo (top) shows retinal neural layers and support tissue.

Early detection of eye disease followed by appropriate treatment can prevent blindness. However, with a limited supply of eye doctors, access to eye care is a public health challenge. Autonomous systems aim to alleviate the provider shortage by identifying individuals who have image findings that warrant a referral to a specialist. NEI-funded research led to the first autonomous AI system in any field of medicine, IDx-DR, a tool approved by Food and Drug Administration (FDA) in 2018 to detect referable DR in people with diabetes. NEI small business grants supported development of EyeArt, which just became the first FDA-approved AI tool for use across multiple camera vendors, reducing the need for clinics to buy specific equipment. Another NEI-funded small business, Notal Vision, recently demonstrated success of their patient-centric home-based OCT system, which allows doctors to manage AMD in real time, through remote monitoring and telemedicine. AMD is the leading cause of irreversible vision loss in older Americans. NEI has a database of hundreds of thousands of retinal images collected in an AMD clinical trial. AI systems can leverage these rich datasets to identify diagnostic patterns: looking at a spotted pattern of lesions called pseudodrusen, one algorithm developed by NEI could predict progression from intermediate to late AMD. NEI-funded small business iHealthScreen used this dataset to develop an AI tool for identifying the subset of AMD patients with rapidly advancing disease who could benefit from aggressive treatment.

Remarkably, the first foundational AI model for generalizable disease detection from unlabeled retinal images outperforms comparison models for diagnosis and prognosis of neurological diseases like Alzheimer's disease (AD), Parkinson's, and schizophrenia, as well as systemic conditions such as heart attacks, stroke, diabetes glucose control, and kidney disease, and can even determine an individual's age, sex, and smoking status. This first-of-its-kind model uses self-supervised learning that derives signals directly from the data, instead of requiring work-intensive labeling by experts. The predictive power of AI only multiplies when other types of imaging and data like genomics are fed into the algorithm—the combined set of features was recently coined "oculomics." A new NEI-funded study correlated the distribution of specific inflammatory and neurodegenerative proteins in retinas donated from post-mortem AD patients to their cognitive scores. Since eyes are more accessible than brains, this result may lead to AD monitoring with non-invasive retinal imaging and biomarkers.

While the power of AI is transforming medicine, it is critical to be vigilant of the dangers. To avoid introducing bias, AI systems need to be trained on a diverse population sample. To work towards reducing bias in retinal research that uses AI, NEI-funded scientists conducted an evaluation to explore racial bias in retinal images used to screen premature infants for retinopathy of prematurity, a potentially blinding condition if not treated immediately. Because race is associated with variations in retinal pigmentation, the team subtracted the color features of the image, prior to training, and yet the AI prediction model was still able to determine the self-identified race, highlighting the need for more work to prevent bias in AI. To increase the diversity of datasets for AI, the NIH Artificial Intelligence/Machine Learning Consortium to Advance Health Equity and Researcher Diversity (AIM-AHEAD) Program, whose advisory committee is co-chaired by the NEI Director, is designed to boost participation and representation of researchers and communities currently underrepresented in AI development.

Data science and technology have led to next generation therapies

One year ago, there were no FDA approved therapies for geographic atrophy (GA), an advanced form of 'dry" AMD; now there are two new drugs, Syfovre and Izervay. The drugs target different proteins in the immune system's complement pathway, which protects against pathogens by triggering a cascade of proteins that enhance the body's immune response. In clinical trials, both drugs demonstrated an ability to slow the rate of GA progression, preserving sharp central vision. The impact of GA on vision depends on where the damage is in the eye—the closer to the central visual field, the greater the visual deficit, which may influence the decision to treat. Follow-up research is needed to understand which patients benefit the most from these new treatments relative to the risks. While the drugs were brought to market by the private sector, they represent years of research support from NEI. In 2005, three research teams initiated a new data-intensive technique that compares genomes of hundreds or thousands of patients and controls to identify genetic risks—AMD was the first success of this method, with the discovery of a complement gene variant that greatly increased risk.

Another promising new therapy for patients with intermediate AMD is light itself, specifically photobiomodulation (PBM). PBM uses specific wavelengths of light to boost output of mitochondria—the cell structures that generate energy. In a randomized clinical trial, AMD patients who received PBM had improved vision and slower lesion growth in their eyes relative to patients who received placebo treatment. While new therapies for GA may slow vision loss, NEI clinical trials are testing first-in-human stem cell-based tissue patches that can be transplanted in the retina where tissue has been lost. One trial is growing replacement tissues in a dish cloned from AMD patients' own cells. Their manufacturing process employs AI in quality control: AI networks were trained to identify visual indications of tissue maturation correlated with positive function to help select which potential patches have the highest likelihood of transplant success.

AI has also been used to design sustained drug delivery mechanisms to treat glaucoma. While eye drops can be effective when taken multiple times per day, frequent dosing can be a barrier for some patients to comply with their regimens. A new study used AI peptide engineering to design a non-toxic, therapeutic protein that tightly bound to melanin, the compound responsible for eye color, creating a slow-releasing drug reservoir in the eye. Animal models showed this drug was effective for 18 days following single administration**.**

Neural networks (*brain*) before there were convolution neural networks (*AI deep learning*)
Some of the fundamental secrets about how the brain develops, forms connections, organizes itself, and then reconstructs patterns and features of the outside world stem from Drs. Hubel and Wiesel's seminal Nobel Prize-winning research on the visual cortex. The relative weighting, or strength, of neuron connections in the brain are formed iteratively, through learning and experience, with feedback loops that can modify input cells based on outputs; not only do AI systems use the brain as a model—they even borrow the name artificial "neural networks." The NEI Visual Neuroplasticity Workshop in January 2024 explored vision as a paradigm for brain plasticity—the ability of the nervous system to modify its functional and structural connections in response to experience. Project Prakash is an NEI-funded scientific and humanitarian partnership in India that challenges the notion of an "all or none" critical period in which the brain learns to make sense of visual input, a window that closes around age six. Follow-up of older children (age 7-17) who have had congenital cataracts removed has shown they are able to learn a variety of visual tasks. To find structural neural correlates of this recovery, researchers used a technique called diffusion tensor imaging to show that sight surgery induced white matter (nerve fiber) plasticity in late visual pathways, which was distinct from normal maturational changes in age-matched children.

Cerebral/cortical visual impairment (CVI) results from neonatal injury to vision processing centers during the window of visual development. Children with CVI may exhibit a constellation of impairments, including cerebral palsy and cognitive delay, but may have a healthy eye exam, and therefore the condition has historically been under-recognized. The 2021 NEI Strategic Plan outlined strategies to develop methodologies to diagnose and classify CVI to ultimately understand the neural basis and structure/function relationships. NEI kicked off a NIH-wide CVI initiative with a workshop in November 2023 to develop a registry as a first step to diagnose and classify CVI. The interdisciplinary workshop included clinicians, occupational therapists, researchers, individuals with CVI, caregivers, and teachers.

Research has shown an association between the incidence of myopia (nearsightedness) and time spent reading and focusing on screens. Meanwhile, time outdoors and in sunlight appears to reduce the risk of myopia. A new study on vision neural circuits may explain why. From retina to visual cortex, neurons specialize in either the light ON pathway or OFF pathway. ON neurons respond better to bright light, large far-away objects, and to movement that stabilizes the retinal image as we move around in the world. On the other hand, OFF neurons are more engaged for close focus of central stimuli and for resolving the details of an image, as in reading. To support a theory that myopia is associated with the relative under-use of the ON pathway, researchers measured the extent to which walking outside produces stimuli that favor ON neurons, whereas reading black text on white background favors OFF neurons. This connection between neurophysiology, theory, and measurable visual perceptual impairment can potentially lead to the development of better diagnostics and therapies.

The NIH BRAIN Initiative is developing novel tools to map brain connections. Reflecting the fundamental contributions of the visual system to understanding neuroscience, one third of BRAIN projects are vision related. A team funded by NEI and BRAIN implanted brain organoids—stem-cell based tissues grown in a dish—into mouse visual cortex and demonstrated

they functionally integrated and responded to visual stimuli. A key engineering breakthrough was using transparent graphene-based electrode arrays and brain imaging that enabled recording these cells over the course of months. This study opens the door to using organoids as a neuroprosthetic for damaged brain tissue, and as a research tool to model brain development and disease.

The visual system is a paradigm for health and disease across medical disciplines

Beyond neuroscience, vision research has been on the cutting edge in fields ranging from data science to precision medicine. Meaningful data sharing is essential to facilitate and accelerate research. NEI is developing a knowledgebase—a web-based library of information for indexing NEI-supported research and datasets along with access requirements, data analysis tools, code, and contact information to encourage collaboration among data generators and data scientists. To incentivize individuals to share their data, NEI will lead a NIH-wide prize competition in 2024 to develop and validate a quantitative data sharing index ("s-index"), which will identify and reward exemplar data sharers (the score reflects how often a dataset is shared and how useful it is). NEI has been promoting universal adoption of international standards for ophthalmic imaging, especially by device manufacturers. NEI, the National Institute of Biomedical Imaging and Bioengineering, and the NIH *All of Us* Initiative convened a workshop with experts in vision, imaging technology, data science, and health disparities research to discuss opportunities to expand research with large retinal imaging cohorts. NEI is planning to incorporate eye imaging into *All of Us*, one of the largest, most diverse health databases of its kind.

While animal research is fundamental to developing new therapies, NEI has also developed complementary models that will more accurately model human outcomes. For example, NEI scientists bioprinted a 3D biodegradable scaffold, added blood vessel precursor cells, and then added retinal cells to create a model to study AMD interaction with capillary networks**.** The AMD Integrative Biology Initiative (AMD IBI) developed a research resource that combined AMD patient-derived stem cell lines with their deidentified patient medical history and genomic sequence data to study cell disease mechanisms. A cluster of genes on chromosome 10 are associated with AMD, but because they are tightly linked, it has been hard to isolate the effects of single mutations. One AMD IBI team used a gene editing tool called CRISPR to systematically test single DNA changes in stem cell-derived retinal cells from patients with AMD. They showed mutations in the *ARMS2* gene were responsible for increased oxidative stress in these cells, but as a potential therapy, administering an antioxidant drug was able to reverse the tissue death caused by this mutation. The NEI 3D retinal organoid challenge (3D-ROC) helped promote the development of human stem cell-based tissue models of disease. NEI scientists used retinal organoids to screen 6,000 FDA-approved compounds to identify a drug, reserpine, that protects photoreceptors from dying in a genetic form of childhood blindness.

The NEI Audacious Goals Initiative (AGI) is originating regenerative medicine strategies to restore vision by regenerating neurons and their connections in the visual system. One of the most challenging steps in this goal is getting new neurons to form appropriate connections for communication, or synapses. AGI grantees grew retinal organoids in a dish and then separated them into individual neurons and cultured them to grow synapses. Using a fluorescent tracer that can only spread through functional synapses, they demonstrated these lab-grown retinal neurons could spontaneously form new circuits, demonstrating their potential to replace lost tissue.

Through AGI, researchers are learning from animal models that naturally regenerate in an attempt to induce regeneration in mammals. Newts have great regenerative capacities, including their lenses; researchers have now demonstrated the key role that immune cells called macrophages play in promoting a permissive regenerative environment in newt lenses, balancing cell proliferation with cell death. Depleting macrophages increased scarring and inflammation and reduced lens regeneration. This research could also inform therapies to prevent secondary cataract formation, which sometimes occurs a few months after undergoing cataract surgery.

The NEI Anterior Segment Initiative (ASI) explores unique properties of the front of the eye, such as the ocular microbiome, the microbial community on the ocular surface that impacts health and disease as well as the eye's own immune system. NEI recently launched the ASI ocular surface innervation consortium, with eight teams collaborating to understand corneal pain, tear formation in dry eye, migraine, and other conditions. The cornea is the outermost, transparent eye layer that bends light onto the retina. Researchers created 3D corneal organoid tissues that mimic proteins and cell types of the developing cornea in the womb. These models can be used to test safety as new drugs are developed.

Partnerships to reduce health disparities

To address vision health disparities, NEI has partnered with the National Institute on Minority Health and Health Disparities (NIMHD). In April 2023, NEI and NIMHD convened a workshop on advancing health equity that brought together experts in vision with experts in disparities research. Advancing equity involves understanding health disparities, creating strategies to integrate social and structural determinants of health into research, and developing implementation methods to address preventable causes. To explore biological, environmental, and social risk factors for vision loss, NEI has a portfolio of clinical and epidemiology projects, often conducted in partnerships to leverage resources. The Study of Latinos Ojos builds off the infrastructure of the Hispanic Community Health Study to conduct comprehensive eye exams and assess chronic eye diseases (e.g., DR, AMD, glaucoma, and cataract) in these communities. Other NEI studies include looking at the impact of social determinants of health on DR; health disparities in the development, persistence, and progression of ocular inflammation (uveitis); ethnic variation in strabismus (misaligned eyes); and intrauterine exposure to tobacco smoke and vision disorders including amblyopia ("lazy eye") and hyperopia (farsightedness) in preschool children.

Access to vision care is a major source of disparity impacting conditions like unoperated cataract and uncorrected refractive errors. The Public Health and Disparities Research area of the NEI Strategic Plan emphasizes strengthening community engagement and outreach. To that end, NEI has partnered with vision advocacy organizations to launch a public awareness campaign in 2024. Also, NEI is funding a project using participatory science to design an intervention for patients with undiagnosed DR. Input from these partners has identified barriers to care including transportation, employment, childcare constraints on making appointments, or health education and trust concerns. NIMHD recently designated people with disabilities as a population with health disparities. People with vision impairments may be unable to drive to medical appointments or may have difficulty with printed health information. NEI is developing an action plan for Section 508 compliance—the section of the Rehabilitation Act that ensures public materials are accessible to individuals with disabilities. NEI's Vision Rehabilitation portfolio is

developing accessibility tools. For example, a new smartphone app, Commute Booster, designed for use in subway stations can interpret graphics or text-based signage, thus helping blind and low vision users navigate public transportation.

Health care costs also impact access to care. A clinical trial funded by NEI in partnership with the National Institute for Diabetes and Digestive and Kidney Diseases showed DR patients starting with a less expensive medicine and switching to a more expensive medicine if vision does not improve sufficiently, gives results similar to starting off with the higher-priced drug. This 'step therapy' is an effective strategy informing treatment options, which could lower costs to patients. Findings about the clinical effectiveness of different treatments in head-to-head comparisons help guide practice guidelines and reduce less effective care. Ocular inflammation, or uveitis, can lead to fluid buildup and is vision threatening. The Macular Edema Ranibizumab versus Intravitreal Anti-inflammatory Therapy (MERIT) trial compared risks and benefits of three approved treatments, and found that while all reduced swelling, corticosteroid injections were superior and were the only treatment that improved vision. Another NEI-funded trial showed that low-dose atropine was no better than placebo for slowing myopia progression in children treated for two years. Importantly, the findings contradict results from recent trials, primarily in East Asia, which showed a benefit in slowing myopia. These mixed results show more atropine research is needed to test the benefit of different doses, populations, or combination therapies. The burden of myopia is increasing, affecting 30 percent of the global population and expected to grow to 50 percent by 2050.[1] NEI has partnered with the National Academies of Sciences, Engineering, and Medicine to conduct a consensus study to understand myopia from a population public health perspective and to understand the interplay of biological and environmental factors behind the increased prevalence. Working with partners in medicine and harnessing the potential of data science and AI, NEI is poised to transform vision care far into the future.

[1] IMI Impact of Myopia. Invest Ophthalmol Vis Sci. (2021) 62(5):2.

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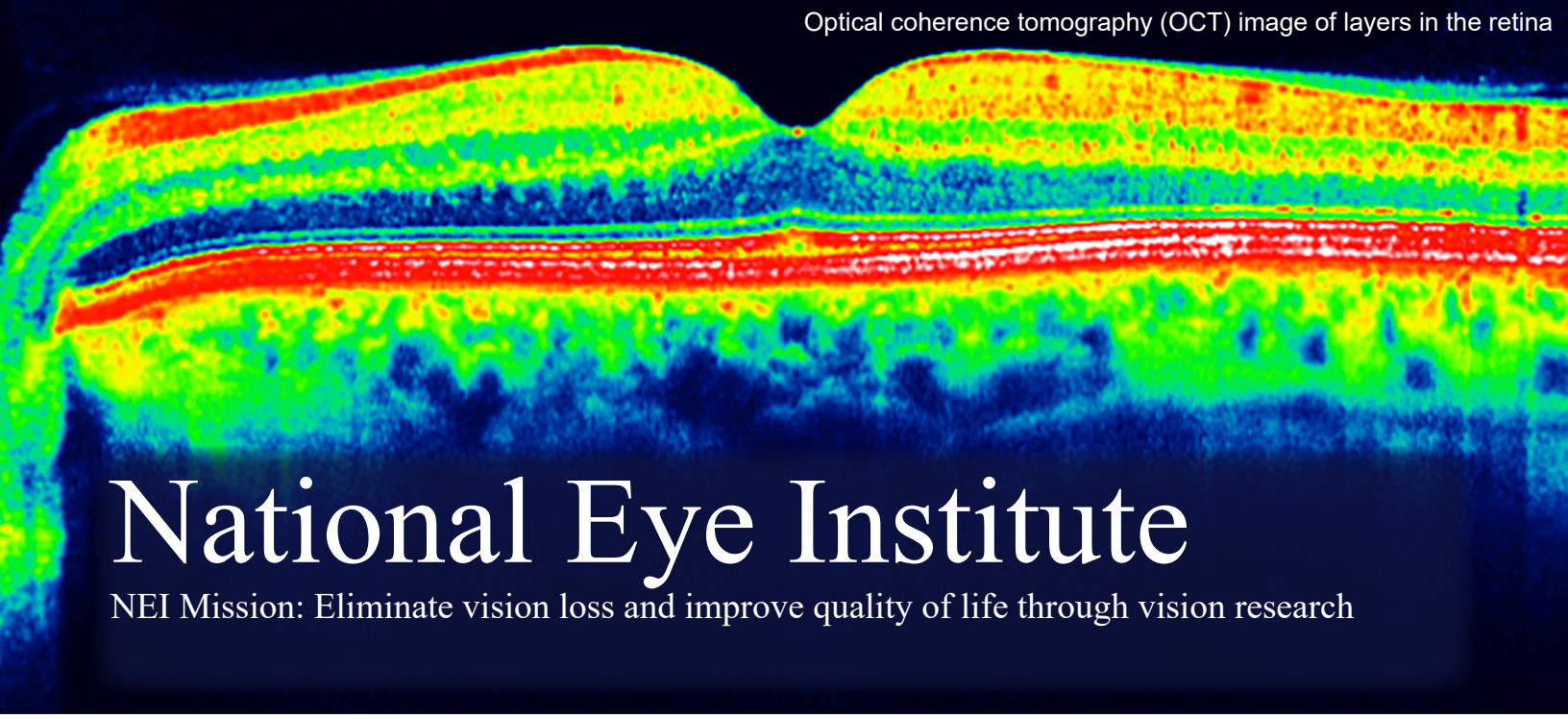

Optical coherence tomography (OCT) image of layers in the retina

National Eye Institute

NEI Mission: Eliminate vision loss and improve quality of life through vision research

$896,136,000 FY 2023
Final Budget Authority

$898,818,000 FY 2025
Budget Request

789 NEI Staff

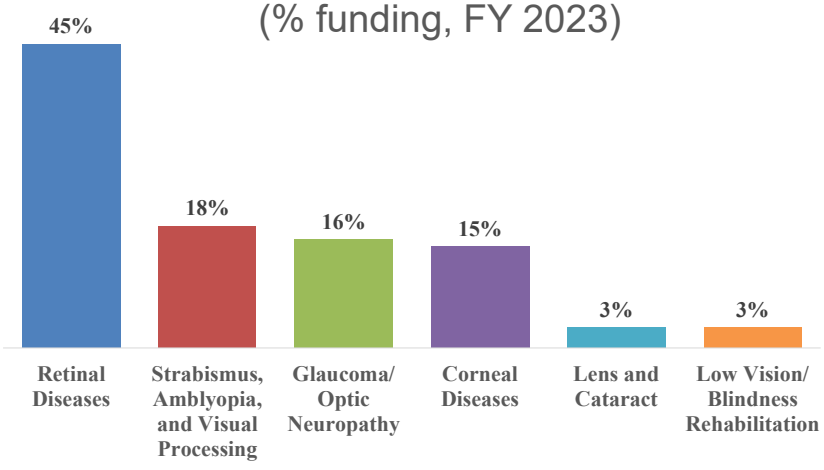
Intramural Research
20 Research Groups
5 Core Facilities
12 Diversity Research Interns

Extramural Research
1,717 Grants Awarded
20 Supplements to Promote Diversity in Research

Highlights of NEI recent progress

- NEI-funded scientists win 2023 Lasker-DeBakey Award ("America's Nobel Prize") and 2023 National Medal of Technology & Innovation for inventing Optical Coherence Tomography (OCT)
- FDA approved first drugs to treat dry age-related macular degeneration (AMD), a leading cause of vision impairment
- NEI grantees grew mini-retinas (organoids) in a dish, extracted individual neurons, and induced connections (synapse formation), demonstrating a new method of neural regeneration
- TEMPO tool combines AI with complete protein analysis from eye fluid biopsy to yield biomarkers for eye diseases states at cell level

Extramural Research Programs
(% funding, FY 2023)



NEI Director Michael F. Chiang, newly elected to the National Academy of Medicine, delivers a talk to winners of the *Eye on the Future* Teen Video Contest, a competition which encourages teens to consider a career in vision science.

NIH National Eye Institute

Welcome to the Oculome

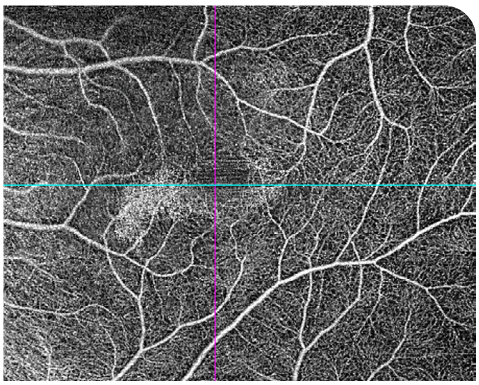
Eyes are the window to the body

Oculomics: The integration of eye information from cellular and molecular data and structural and functional imaging to assess health and disease

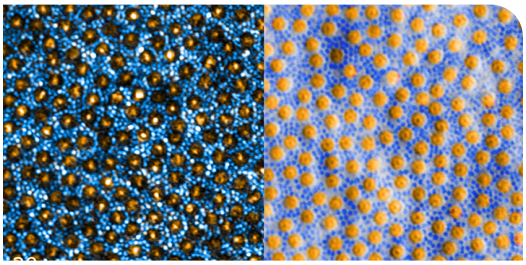
Disruptive technologies for non-invasive imaging

The retina is a directly accessible extension of the brain, enabling non-invasive examination of neurons, circuits, tissue layers, and blood capillaries

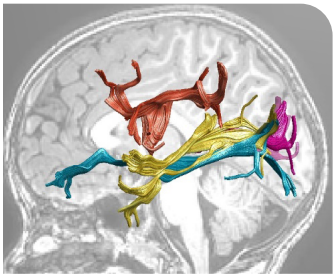
- **Optical Coherence Tomography (OCT)—**Low-power laser light to see microscopic detail of retina layers in cross-section
- **OCT-Angiography—**Non-invasive imaging of retinal capillary network
- **Adaptive Optics (AO)—**Correcting aberrations in optical path with tiny mirrors yielding exquisite resolution at cellular level
- **Diffusion Tensor Imaging (DTI)—**MRI technique using diffusion to map the nerve fiber tract organization of the brain



OCT-Angiography, courtesy of NEI.



AO image of rods (blue) and cones (orange), courtesy of Johnny Tam, NEI.



DTI of late visual nerve tracts, courtesy of NEI-funded Project Prakash.

NEI-supported AI-based tools for eye and systemic health

- **IDx-DR—**First autonomous AI tool in any field of medicine approved by FDA in 2018 to detect diabetic retinopathy (DR)
- **EyeArt*—**Autonomous DR screening tool approved for use across multiple camera vendors; has screened two million eye images
- **Notal Vision*—**Patient-centric home-based OCT system, which allows doctors to manage AMD through remote monitoring
- **iHealthScreen*—**AI tool for identifying rapidly advancing AMD patients who could benefit from aggressive treatment
- **Glaucoma progression prediction—**OCT-based AI model outperformed standard statistical models
- **REShAPE—**Single cell shape analysis tool spots disease risk
- **Neurological Disease, cardiac disease, stroke—**AI models predict risk for Alzheimer's disease, Parkinson's disease, schizophrenia and other conditions from retinal biomarkers

***NEI small business grant recipient**

NEI Future Initiatives

- **Cerebral/Cortical Visual Impairment (CVI)—**Patient registry; methodologies to diagnose and classify CVI
- **Advancing Vision Health Equity—**Integrating vision and health disparities expertise and partnering with community
- **Visual Neuroplasticity—**Exploring retinal remodeling, brain cellular mechanisms, and functional reorganization
- **NEI Knowledgebase—**Web-based library of information for indexing NEI supported research and datasets
- **S-index Prize Competition—**Develop and validate a quantitative data sharing index
- **Patient-Reported Outcomes—**Patient-centered effort to capture functional vision and quality of life in clinical trials

For more information, visit https://nei.nih.gov

Major Changes in the Budget Request

Major changes by budget mechanism and/or budget detail are briefly described below. Note that there may be overlap between budget mechanisms and activity detail and these highlights will not sum to the total change for the FY 2025 President's Budget. The FY 2025 President's Budget for the National Eye Institute (NEI) is $898.8 million, an increase of $2.7 million from the FY 2023 Final level of $896.1 million.

Research Project Grants (RPGs) (-$8.8 million; total $565.4 million):
NEI will support a total of 1,200 Research Project Grants (RPGs) in FY 2025. Noncompeting RPG awards will decrease by 49 awards relative to FY 2023, with funding decreasing by $8.5 million. Competing RPG awards will decrease by 20 awards, with funding increasing by $0.1 million.

Intramural Research (+$3.2 million; total $114.1 million):
NEI will increase funding for Intramural Research to accommodate costs of employee salary and benefits increases and increases to centrally funded services.

Research Management and Support (+$2.7 million; total $45.2 million):
NEI will increase funding for Research Management and Support to accommodate costs of employee salary and benefits increases and increases to centrally funded services.

NATIONAL INSTITUTES OF HEALTH
National Eye Institute

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	915	$402,747	870	$396,160	866	$394,273	-49	-$8,474
Administrative Supplements	*(57)*	$5,332	*(57)*	$5,400	*(50)*	$5,000	*-(7)*	-$332
Competing:								
Renewal	68	$31,835	63	$31,773	63	$31,868	-5	$33
New	242	$107,168	226	$106,959	227	$107,280	-15	$112
Supplements	0	$0	0	$0	0	$0	0	$0
Subtotal, Competing	**310**	**$139,003**	**289**	**$138,732**	**290**	**$139,148**	**-20**	**$145**
Subtotal, RPGs	1,225	$547,082	1,159	$540,292	1,156	$538,421	-69	-$8,661
SBIR/STTR	44	$27,088	44	$26,996	44	$26,977	0	-$111
Research Project Grants	1,269	$574,170	1,203	$567,287	1,200	$565,399	-69	-$8,772
Research Centers								
Specialized/Comprehensive	40	$27,354	40	$27,555	40	$27,555	0	$202
Clinical Research	0	$0	0	$0	0	$0	0	$0
Biotechnology	0	$0	0	$0	0	$0	0	$0
Comparative Medicine	0	$144	0	$144	0	$144	0	$0
Research Centers in Minority Institutions	0	$0	0	$0	0	$0	0	$0
Research Centers	**40**	**$27,497**	**40**	**$27,699**	**40**	**$27,699**	**0**	**$202**
Other Research:								
Research Careers	96	$20,744	105	$22,698	105	$22,698	9	$1,954
Cancer Education	0	$0	0	$0	0	$0	0	$0
Cooperative Clinical Research	28	$41,016	28	$41,016	28	$41,016	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	29	$21,168	33	$24,449	33	$24,449	4	$3,281
Other Research	**153**	**$82,929**	**166**	**$88,164**	**166**	**$88,164**	**13**	**$5,235**
Total Research Grants	1,462	$684,597	1,409	$683,150	1,406	$681,261	-56	-$3,335
Ruth L Kirschstein Training Awards:	FTTPs		FTTPs		FTTPs		FTTPs	
Individual Awards	126	$6,240	137	$6,803	136	$6,803	10	$563
Institutional Awards	129	$7,007	130	$7,047	129	$7,047	0	$39
Total Research Training	**255**	**$13,248**	**267**	**$13,850**	**265**	**$13,850**	**10**	**$602**
Research & Develop. Contracts	36	$44,897	31	$45,037	34	$44,403	-2	-$494
SBIR/STTR (non-add)	*(0)*	*($294)*	*(0)*	*($293)*	*(0)*	*($293)*	*(0)*	*-($1)*
Intramural Research	168	$110,974	181	$110,974	186	$114,136	18	$3,163
Res. Management & Support	104	$42,421	110	$43,539	114	$45,168	10	$2,747
SBIR Admin. (non-add)		*($0)*		*($0)*		*($0)*		*($0)*
Construction		$0		$0		$0		$0
Buildings and Facilities		$0		$0		$0		$0
Total, NEI	**272**	**$896,136**	**291**	**$896,549**	**300**	**$898,818**	**28**	**$2,682**

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

NATIONAL INSTITUTES OF HEALTH

NATIONAL EYE INSTITUTE

For carrying out section 301 and title IV of the PHS Act with respect to eye diseases and visual disorders, $898,818,000.

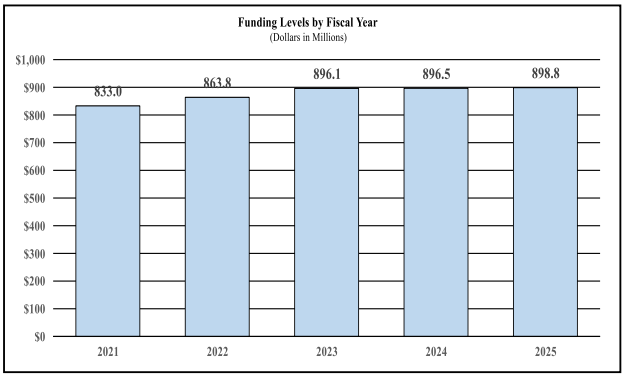
NATIONAL INSTITUTES OF HEALTH
National Eye Institute

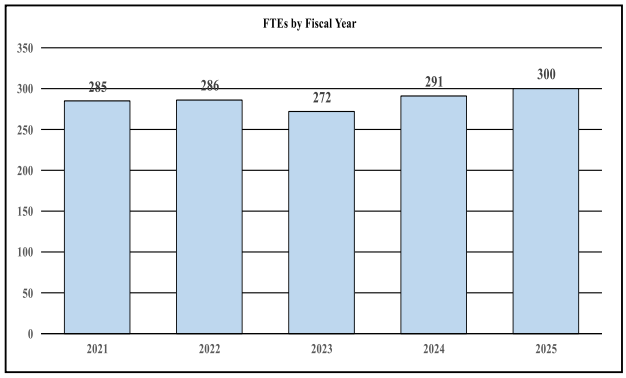
Summary of Changes
(Dollars in Thousands)

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 Research:						
A. Built-in cost changes:						
a. FY 2024 effect of FY 2023 pay & benefits increase		$38,362		$42,501		$453
b. FY 2024 effect of FY 2024 pay & benefits increase		$38,362		$42,501		$1,493
c. FY 2024 paid days adjustment		$38,362		$42,501		$148
d. Differences attributable to FY 2024 change in FTE		$38,362		$42,501		$3,255
e. FY 2025 effect of FY 2024 pay & benefits increase		$38,362		$42,501		$506
f. FY 2025 effect of FY 2025 pay & benefits increase		$38,362		$42,501		$682
g. FY 2025 paid days adjustment		$38,362		$42,501		$0
h. Differences attributable to FY 2025 change in FTE		$38,362		$42,501		$1,130
i. Payment for centrally furnished services		$16,606		$17,806		$1,200
j. Cost of laboratory supplies, materials, other expenses, and non-recurring costs		$56,006		$53,830		$3,897
Subtotal, IR built-in cost changes						$12,763
2. Research Management and Support:						
A. Built-in cost changes:						
a. FY 2024 effect of FY 2023 pay & benefits increase		$19,650		$22,034		$232
b. FY 2024 effect of FY 2024 pay & benefits increase		$19,650		$22,034		$764
c. FY 2024 paid days adjustment		$19,650		$22,034		$76
d. Differences attributable to FY 2024 change in FTE		$19,650		$22,034		$1,134
e. FY 2025 effect of FY 2024 pay & benefits increase		$19,650		$22,034		$258
f. FY 2025 effect of FY 2025 pay & benefits increase		$19,650		$22,034		$352
g. FY 2025 paid days adjustment		$19,650		$22,034		$0
h. Differences attributable to FY 2025 change in FTE		$19,650		$22,034		$754
i. Payment for centrally furnished services		$3,571		$3,729		$158
j. Cost of laboratory supplies, materials, other expenses, and non-recurring costs		$19,201		$19,405		$1,196
Subtotal, RMS built-in cost changes						$4,924

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	915	$408,079	866	$399,273	-49	-$8,806
b. Competing	310	$139,003	290	$139,148	-20	$145
c. SBIR/STTR	44	$27,088	44	$26,977	0	-$111
Subtotal, RPGs	1,269	$574,170	1,200	$565,399	-69	-$8,772
2. Research Centers	40	$27,497	40	$27,699	0	$202
3. Other Research	153	$82,929	166	$88,164	13	$5,235
4. Research Training	255	$13,248	265	$13,850	10	$602
5. Research and development contracts	36	$44,897	34	$44,403	-2	-$494
Subtotal, Extramural		$742,741		$739,514		-$3,227
6. Intramural Research	168	$110,974	186	$114,136	18	-$9,600
7. Research Management and Support	104	$42,421	114	$45,168	10	-$2,178
8. Construction		$0		$0		$0
9. Buildings and Facilities		$0		$0		$0
Subtotal, program changes						-$15,005
Total built-in and program changes	272	$896,136	300	$898,818	28	$2,682

History of Budget Authority and FTEs:





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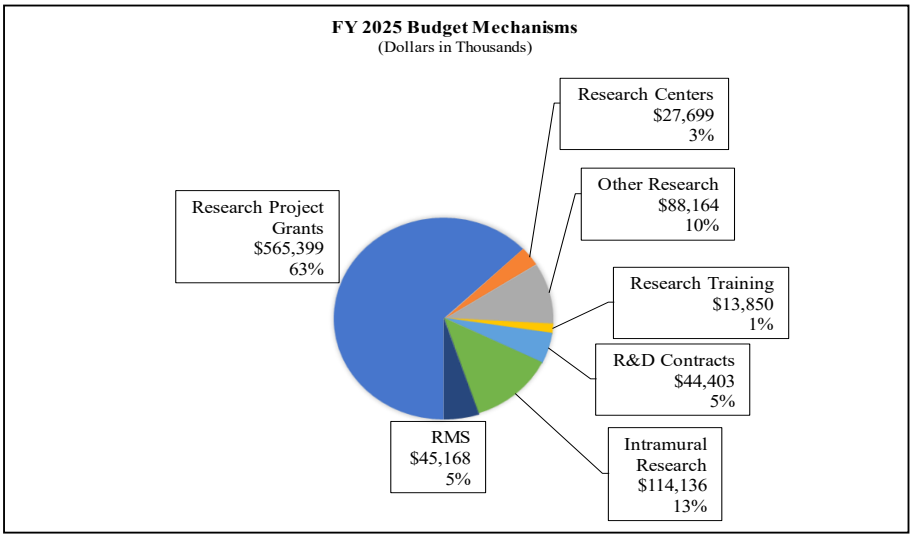
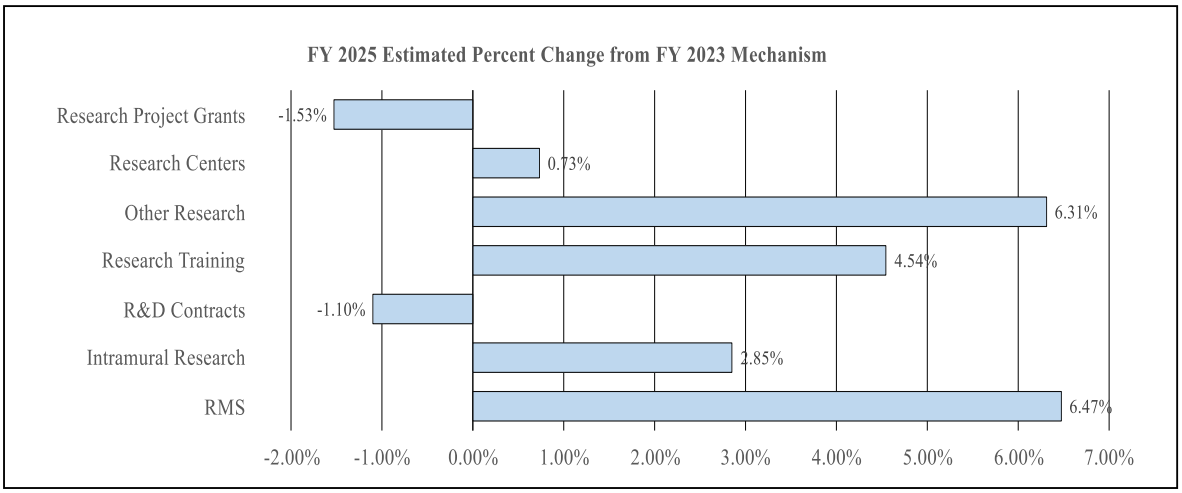


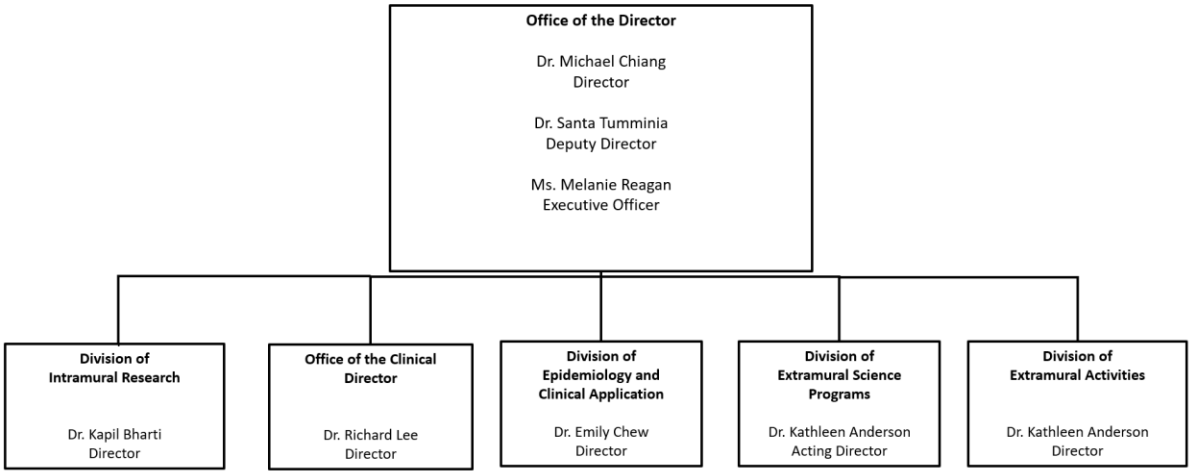
Change by Selected Mechanisms:



NATIONAL INSTITUTES OF HEALTH

National Eye Institute

Organizational Chart



NATIONAL INSTITUTES OF HEALTH
National Eye Institute

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								
Retinal Diseases Research		$350,544		$350,183		$348,992		-$1,552
Corneal Diseases, Cataract, and Glaucoma Research		$243,728		$243,515		$242,687		-$1,041
Sensorimotor Disorders, Visual Processing, and Rehabilitation Research		$148,468		$148,339		$147,834		-$634
Subtotal, Extramural		**$742,741**		**$742,037**		**$739,514**		**-$3,227**
Intramural Research	**168**	**$110,974**	**181**	**$110,974**	**186**	**$114,136**	**18**	**$3,163**
Research Management & Support	**104**	**$42,421**	**110**	**$43,539**	**114**	**$45,168**	**10**	**$2,747**
TOTAL	**272**	**$896,136**	**291**	**$896,549**	**300**	**$898,818**	**28**	**$2,682**

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

National Eye Institute (NEI)

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	$896,136,000	$896,549,000	$898,818,000	+$2,682,000
FTE	272	291	300	+28

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 the National Eye Institute (NEI) is $898.8 million, an increase of $2.7 million or 0.3 percent compared with the FY 2023 Final level. This funding level will allow NEI to execute key priorities in its 2021 strategic plan in basic, clinical, and translational vision research.

Program Descriptions

Retinal Disease Research: The retina is the light-sensitive neural tissue that lines the inside of the eye and sends visual messages through the optic nerve to the brain. Damage to the retina through diseases such as macular degeneration or diabetic retinopathy are among the leading causes of blindness in the United States. The goals of this program are to increase the understanding of disease mechanisms that cause vision loss and to develop improved methods of prevention, diagnosis, and treatment. To meet these goals, NEI supports research in cell biology, physiology, neuroscience, and immunology related to the retina. Major areas addressed within the Retina Program include key causes of blindness such as:

- **Age-related Macular Degeneration.** A leading cause of vision loss, AMD is a disease that blurs the sharp, central vision required for reading, driving, and face recognition. There are two forms of advanced AMD: geographic atrophy ("dry") AMD, a breakdown of light sensing photoreceptor neurons; and neovascular ("wet") AMD, an abnormal growth of blood vessels underneath the retina.
- **Retinopathy.** DR is a complication of diabetes mellitus in which abnormal blood vessels grow on the surface of the retina and may swell and leak fluid. Retinopathy of Prematurity (ROP) is a potentially blinding disorder that affects premature infants with very low birthweight.
- **Retinal monogenic disorders.** Single genetic mutations cause some retinal degenerative diseases, including retinitis pigmentosa, Usher syndrome, and ocular albinism.

- **Uveitis.** This group of inflammatory diseases produce swelling and destroy eye tissue, sometimes leading to severe vision loss.

Accomplishments:

- Light perception in the eye takes place in one of two kinds of photoreceptors, cone and rod cells, which are responsible for bright light and color vision and low-light vision, respectively. Retinitis pigmentosa primarily kills rod cells but ultimately the retinal degeneration also damages cone cells, leading to blindness. Researchers interested in understanding cone cell degeneration have isolated single cells and discovered that they remain responsive to light even as degeneration is progressing. With this discovery, therapies targeted at preserving cone cells may be able to save or even restore vision in patients with this disease.
- A complication of Type 1 diabetes, retinopathy progressively damages retinal blood capillaries. The source of this damage appears to lie in the belly, with a leaky small intestine that weakens the barrier between gut bacteria and the blood, promoting inflammation throughout the body. New research has revealed a potential way to fight this inflammation; in mice, supplementation with a probiotic treatment restored gut barrier function and even reversed damage in eyes affected by DR. Investigators hope this intervention will eventually prove effective in humans.

Budget Policy: The FY 2025 President's Budget request for Retinal Disease Research is $349.0 million, a decrease of $1.6 million or -0.4 percent compared with the FY 2023 Final level.

Corneal Disease, Cataract, and Glaucoma Research: Corneal disease, cataracts, and glaucoma prompt more visits to ophthalmologists each year than other vision disorders. NEI supports research to address these conditions that originate in the front of the eye.

- **Corneal disease.** Corneal injuries, infections, and diseases can be blinding, extremely painful and require immediate medical attention. The ocular surface is the front line against environmental insults, such as viruses (herpes simplex, herpes zoster, bacteria (causing trachoma), fungus (sometimes associated with contact lens wear) and ocular inflammation (uveitis). These conditions can be serious and lead to permanent vision loss. NEI's corneal research encompasses ocular injuries sustained from sports and other recreational activities, from workplace accidents, and from eye trauma associated with falls and motor vehicle accidents.
- **Cataract.** A clouding of the lens in the eye that affects vision, cataracts are the leading cause of blindness worldwide. NEI-funded researchers investigate strategies to prevent cataract formation and progression and to understand the physiological basis of how the lens in the healthy eye remains transparent for much of the lifespan.
- **Glaucoma.** Glaucoma refers to a group of blinding diseases that result from damage to the optic nerve, the bundle of fibers that transmit signals from the eyes to the brain. Because there are no early symptoms, an estimated half of people with glaucoma don't know they have it. Over time individuals with glaucoma slowly lose side (peripheral) vision. Those who are over age 60, who are Black or Hispanic, or who have a family history of glaucoma, have a much higher disease risk. Current therapies focus on

Extracellular Vesicles:
Carrying the Cargo of Future Therapeutics

Extracellular vesicles (EVs) are small round particles, like bubbles, that are released from a variety of cells loaded with different materials, or cargo. When EVs leave their parent cell they travel through different bodily fluids including cerebrospinal (brain nourishing) fluid, saliva, and tears, interacting with other cells. Similar to how bees spread pollen between two flowers, EVs spread their cargo, such as proteins and genetic molecules (RNA), to target cells as a form of cell-to-cell communication. EVs can differ by size (ranging from very small exosomes to microvesicles) as well as cell-type of origin and therefore cargo content. Also, the cargo and quantity of EVs differs in healthy versus disease states, and thus EVs could serve as biomarkers of disease, especially as many types of EVs can be collected non-invasively.

NEI scientists have demonstrated the exciting potential of EVs in future therapies. Neuroprotective abilities of EVs have been shown in animal models for several diseases including glaucoma, retinopathy of prematurity, and retinal ischemia (inadequate blood supply). Immune cell-derived EVs can cross the blood-retina barrier and have shown anti-inflammatory effects, demonstrating EVs may be a future treatment for inflammatory diseases such as macular degeneration, dry eye, and uveitis.

Due to their small size and inherent ability to communicate, EVs have attracted increased attention for their potential clinical utility. The NIH Common Fund Extracellular RNA (exRNA) Communication Initiative has cataloged EVs to identify potential biomarkers for over 30 diseases. Next steps for this initiative aim to evolve technology to isolate EVs from biofluids quicker and more precisely. Other technological advances have allowed scientists to manipulate the cargo within EVs, creating new, personalized drug delivery systems that have less toxicity compared to synthetic carriers and higher specificity to reach intended target cells. However, while EVs show exciting promise for clinical applications, there are several considerations that need to be addressed. More research is required for best practices of separating and purifying EVs and for in-depth characterization of cargo, as EVs differ vastly based on the type of parent cell and disease condition. Collecting EVs for clinical use requires rigorous processes to ensure standardization of products. To begin to address some of these concerns, NEI hosted a workshop on September 19, 2023, leveraging novel technologies and existing resources from leading EV experts, including from diverse fields outside vision research to identify opportunities for innovation and consideration of EVs in the visual system.

reducing excessive fluid pressure in the eye, which causes nerve damage in the most common form of glaucoma.

Accomplishments:

- In keratoconus, the cornea thins and bulges outward and becomes conical, causing blurry or distorted vision or scarring, possibly leading to blindness. Researchers investigating extracellular vesicles (EVs) – a small cellular messenger and a focus of recent scientific interest – found that EVs in the tears of patients with keratoconus are present in increased concentration and have different characteristics from healthy subjects, suggesting a possible role for these vesicles in the development of this disease.
- Crystallins are structural proteins, so called because their patterned alignment in the lens makes them transparent and allows them to refract light. Researchers recently identified a mutation in one type of crystallin that reduces the lens fiber cell's ability to make gap junctions used for communicating and sharing molecules with neighboring cells. This in turn results in buildup of mineral deposits (mainly calcium) in the lens, leading to cataract formation.
- Congenital glaucoma (CG) is a rare but severe early onset form of glaucoma. Children with CG have few treatment options and are most likely to become blind during their lifetimes. In recent work, researchers identified a new mutation in CG and discovered that it contributes to increased pressure in the eye, the main risk factor for glaucoma. This discovery presents new opportunities for gene-based screening and diagnosis of CG, as well as new therapeutic interventions.

Budget Policy: The FY 2025 President's Budget request for Corneal Disease, Cataract, and Glaucoma Research is $242.7 million, a decrease of $1.0 million or -0.4 percent compared with FY 2023.

Sensorimotor Disorders, Visual Processing, and Rehabilitation Research: Vision is the dominant sensory system in humans, with over one third of the brain cortex involved in visual processing. NEI funds basic and applied research on the brain as it relates to the visual system and perception, and research on rehabilitation for individuals with low vision. NEI-funded neuroscientists have made remarkable progress in understanding what goes on in the face-processing areas in the brain.

- **Sensorimotor disorders and visual processing research.** Strabismus (misalignment of the eyes) and amblyopia (commonly known as "lazy eye") are common disorders that develop during childhood and, if left untreated, are a major cause of irreversible vision loss in children. Cerebral (Cortical) Visual Impairment is a brain-based visual impairment where the eyes perform normally but neurological problems disrupt higher order visual processing. A child with CVI may have a limited field of vision and may have trouble recognizing faces or navigating a cluttered environment. Program goals center on gaining a better understanding of the neuromuscular control of gaze and the development of the visual system in babies and young children at high risk for these disorders. Neuroscientists working in vision research seek to understand how the brain processes the visual information that floods our eyes, how neural activity is related to visual perception, and how the visual system interacts with cognitive and motor systems. Additional research is directed at trying to open the so-called "critical period" and thereby allow some recovery of visual function and stereopsis in adult amblyopia subjects.
- **Refractive errors program.** Refractive errors, such as nearsightedness (myopia), farsightedness, and astigmatism, are, once diagnosed, commonly correctable with

Understanding Vision Health Through Patient Reported Outcomes

Clinical trials require quantifiable outcomes like structural endpoints to prove whether a new therapy is better than controls. Yet, for individuals experiencing vision loss, failure to read letters on the chart at the eye doctor can indicate disease progression but fails to capture lived experiences such as difficulties driving at night or experiencing eye pain or strain. It is important to capture functional vision, and how patient quality of life (QoL) is affected. These outcomes can be measured through surveys called Patient-Reported Outcomes (PROs).

The development of PROs is a multi-step process that requires collecting diverse and comprehensive patient input and ensuring that the surveys developed are reliable, valid, and understandable to patients, as well as appropriate for their intended application. In 1998, NEI developed and validated a Visual Function Questionnaire (NEI-VFQ) to measure vision-targeted health status and the impact of ocular disease on overall health, such as social and emotional well-being. The NEI-VFQ webpage is one of the most visited pages on the NEI website, and this instrument is used the world over, translated into many languages. However, it is not accepted as a primary endpoint by the FDA. Also, VFQ questions have become outdated as smartphones and accessibility technology have changed how people interact with the world.

NEI and FDA convened a workshop in September 2023 to discuss opportunities and roadblocks of developing vision-related PROs. The meeting discussed best practices and trade-offs in developing new surveys. For example, a greater number of questions provides more precision, but takes longer to administer and is less likely to be completed. Yet new tools like item banks and computer adaptive testing tailor questions based on the previous response, getting more specificity with fewer questions. Experts discussed whether a single instrument could generically apply across different causes of vision loss, or if targeted condition-specific surveys were warranted, such as existing PROs for LASIK surgery, intraocular lenses for cataract surgery, and microinvasive glaucoma surgery. Whereas written definitions of "glare" may lead to confusion, a best practice is to ask users to select from a series of representative pictures. One area of agreement is that there are many perspectives to consider when developing PROs, but it is most important to center outcomes on patients' needs.

eyeglasses or contact lenses, but these conditions often worsen and therefore remain a costly, recurring economic and personal burden to many in the United States. The steadily growing prevalence of these conditions is a public health concern. People with complications such as severe nearsightedness can also be at risk of vision loss from glaucoma or retinal detachment. The major goals of this program are to discover the biochemical pathways that govern eye growth and to uncover the risk factors associated with refractive errors with the goal of prevention of disease onset or progression.

- **Rehabilitation research.** Some causes of blindness and visual impairment are not treatable at this point. Low vision is the term used to describe chronic visual conditions whose visual impairment is not correctable by eyeglasses or contact lenses. NEI supports rehabilitation research to improve the quality of life for people with visual impairments by helping them maximize the use of remaining vision and by developing improved assistive and adaptive aids and strategies.

Accomplishments:

- AMD patients develop strategies to compensate for loss of central vision, such as shifting the eye's focus during tasks to rely on peripheral rather than central vision. However, the exact mechanisms behind the preferred retinal locus development are still unknown. Individuals may employ multiple focal points or different strategies depending on the visual task. Recent work simulating vision loss in healthy volunteers revealed participants' compensatory strategies differed, sometimes dependent on the visual task. Improved understanding of these compensatory mechanisms may lead to new methods of visual rehabilitation for patients with low vision.
- Our eyes convey a large and complex set of information to our brains, and vision researchers continue to make strides in understanding how the brain triages and processes this input. A recent study found that changes in activity level, including waking versus sleep and motion versus stillness, impact the levels of signaling molecules such as serotonin in the brain, which in turn activate specific visual processing regions. These pathways allow the brain to "turn on" the functions most useful for a specific activity, and visual neuroscientists can now show that the brain is smarter than we thought, with multiple systems to micromanage its own inputs.

Budget Policy: The FY 2025 President's Budget request for Sensorimotor Disorders, Visual Processing, and Rehabilitation Research is $147.8 million, a decrease of $0.6 million or -0.4 percent compared with the FY 2023 Final level.

Intramural Research: NEI basic and clinical studies conducted on the NIH campus are focused on the cause, prevention, and treatment of eye diseases and vision disorders; cellular and molecular mechanisms of eye development; infectious diseases of the eye; inflammatory and immunological responses; mechanisms of visual perception by the brain; and sensory control of movements.

Accomplishments:

- Scientists developed the REShAPE tool, which uses AI to provide single cell morphometric data, meaning it is able to analyze the health of a cell based on its shape and other observable characteristics captured by a photo image. They used REShAPE to

generate a complete single cell resolution map of retinal pigment epithelium (RPE) tissue. They identified five statistically distinct RPE subpopulations. Furthermore, they discovered that these subpopulations had different disease vulnerabilities in individuals with and without AMD. This tool has been shared as a research resource for other labs.

- Each human cell contains a massive amount of DNA but requires only small portions of this information at any given time. To keep things organized, DNA is packaged into a structure called chromatin. Scientists recently mapped the physical structure of chromatin in the human retina, and then integrated that topology map with data on retinal genes and regulatory elements. What emerged was a dynamic picture of interactions within chromatin over time, including gene activity hot spots and areas with varying degrees of insulation from other regions of DNA. This map is expected to reveal genes associated with retinal diseases, revealing mechanisms and potential therapeutic pathways.
- Stargardt disease is an untreatable genetic disease that causes progressive loss of central and night vision. The vision loss is associated with the toxic build-up of lipid-rich deposits in the RPE, whose main job is to support and nourish the retina's light sensing photoreceptors. The mechanisms of this disease are not well understood, but studies using a recently developed stem-cell model reveal the role of the ABAC4 gene in RPE damage. Researchers will establish a bank of patient-derived stem cells with ABAC4 gene mutations to help advance research on this disease.

Budget Policy: The FY 2025 President's Budget request for Intramural Research is $114.1 million, an increase of $3.2 million or 2.9 percent compared with the FY 2023 Final level.

Research Management and Support (RMS): RMS is the budget category that supports leadership and administrative personnel who supply direction for NEI, provide essential services, manage research programs, and monitor budgets. This encompasses functions and activities such as management of human resource support, training, travel, purchasing, facilities, budget, planning and oversight, information technology, and extramural grant awards. NEI currently oversees more than 1,800 grants and contracts, including research project grants, core center grants, research career development awards, cooperative clinical research agreements, and research and development contracts.

Accomplishments:

- In 2023, NEI conducted two international searches for top leadership positions. Dr. Kapil Bharti is the new NEI Scientific Director. He has been leading the first in-human trial using patient-derived stem cell-based tissue patches to treat severe vision loss in advanced dry AMD. NEI's new Clinical Director, Dr. Richard Lee, has a strong background in immunology, and his research focuses on how the immune system interacts with the eye, with a special interest in glaucoma and cataract.
- NEI has also developed a strategic plan for diversity, equity, inclusion, and accessibility (DEIA). NEI is in the process of recruiting a Chief Diversity Officer to lead implementation of the DEIA plan.

Budget Policy: The FY 2025 President's Budget request for Research Management and Support is $45.2 million, an increase of $2.7 million or 6.5 percent compared with FY 2023.

NATIONAL INSTITUTES OF HEALTH
National Eye Institute

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2016	$695,154,000	$698,108,000	$709,549,000	$715,903,000
Rescission				$0
2017 [1]	$707,998,000	$735,576,000	$740,826,000	$732,618,000
Rescission				$0
2018	$549,847,000	$743,881,000	$758,552,000	$772,317,000
Rescission				$0
2019	$711,015,000	$781,540,000	$796,955,000	$796,536,000
Rescission				$0
2020	$685,644,000	$835,465,000	$840,163,000	$824,090,000
Rescission				$0
2021	$749,003,000	$831,177,000	$850,135,000	$835,714,000
Rescission				$0
2022	$858,535,000	$877,129,000	$857,868,000	$863,918,000
Rescission				$0
2023	$853,355,000	$891,186,000	$890,700,000	$896,549,000
Rescission				$0
2024	$896,136,000	$896,549,000	$896,549,000	$896,549,000
Rescission				$0
2025	$898,818,000			

[1] Budget Estimate to Congress includes mandatory financing.

NATIONAL INSTITUTES OF HEALTH
National Eye Institute

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	$896,549,000	Indefinite	$898,818,000
National Eye Institute	Section 401(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				$896,549,000		$898,818,000

NATIONAL INSTITUTES OF HEALTH

National Eye Institute

Amounts Available for Obligation [1]

(Dollars in Thousands)

Source of Funding	FY 2023 Final	FY 2024 CR	FY 2025 President's Budget
Appropriation	$896,549	$896,549	$898,818
Mandatory Appropriation: (non-add)			
Type 1 Diabetes	*($0)*	*($0)*	*($0)*
Other Mandatory financing	*($0)*	*($0)*	*($0)*
Subtotal, adjusted appropriation	$896,549	$896,549	$898,818
OAR HIV/AIDS Transfers	-$413	$0	$0
Subtotal, adjusted budget authority	$896,136	$896,549	$898,818
Unobligated balance, start of year	$0	$0	$0
Unobligated balance, end of year (carryover)	$0	$0	$0
Subtotal, adjusted budget authority	**$896,136**	**$896,549**	**$898,818**
Unobligated balance lapsing	$0	$0	$0
Total obligations	$896,136	$896,549	$898,818

[1] Excludes the following amounts (in thousands) for reimbursable activities carried out by this account: FY 2023 - $18,790 FY 2024 - $25,100 FY 2025 - $25,100

NATIONAL INSTITUTES OF HEALTH
National Eye Institute

Budget Authority by Object Class [1]
(Dollars in Thousands)

		FY 2024 CR	FY 2025 President's Budget
Total compensable workyears:			
	Full-time equivalent	291	300
	Full-time equivalent of overtime and holiday hours	0	0
	Average ES salary	$196	$202
	Average GM/GS grade	12.5	12.6
	Average GM/GS salary	$130	$134
	Average salary, Commissioned Corps (42 U.S.C. 207)	$0	$0
	Average salary of ungraded positions	$167	$171
	OBJECT CLASSES	**FY 2024 CR**	**FY 2025 President's Budget**
	Personnel Compensation		
11.1	Full-Time Permanent	$24,486	$26,371
11.3	Other Than Full-Time Permanent	$13,788	$14,175
11.5	Other Personnel Compensation	$1,830	$1,880
11.7	Military Personnel	$138	$144
11.8	Special Personnel Services Payments	$5,909	$6,075
11.9	**Subtotal Personnel Compensation**	**$46,151**	**$48,645**
12.1	Civilian Personnel Benefits	$15,019	$15,882
12.2	Military Personnel Benefits	$8	$8
13.0	Benefits to Former Personnel	$0	$0
	Subtotal Pay Costs	**$61,177**	**$64,535**
21.0	Travel & Transportation of Persons	$1,176	$1,192
22.0	Transportation of Things	$163	$166
23.1	Rental Payments to GSA	$55	$57
23.2	Rental Payments to Others	$0	$0
23.3	Communications, Utilities & Misc. Charges	$59	$60
24.0	Printing & Reproduction	$63	$63
25.1	Consulting Services	$23,103	$23,741
25.2	Other Services	$39,076	$38,526
25.3	Purchase of Goods and Services from Government Accounts	$57,848	$58,704
25.4	Operation & Maintenance of Facilities	$434	$436
25.5	R&D Contracts	$1,582	$1,717
25.6	Medical Care	$987	$1,025
25.7	Operation & Maintenance of Equipment	$3,095	$3,163
25.8	Subsistence & Support of Persons	$0	$0
25.0	**Subtotal Other Contractual Services**	**$126,123**	**$127,311**
26.0	Supplies & Materials	$5,656	$5,476
31.0	Equipment	$4,762	$4,523
32.0	Land and Structures	$303	$310
33.0	Investments & Loans	$0	$0
41.0	Grants, Subsidies & Contributions	$696,999	$695,111
42.0	Insurance Claims & Indemnities	$0	$0
43.0	Interest & Dividends	$14	$15
44.0	Refunds	$0	$0
	Subtotal Non-Pay Costs	**$835,372**	**$834,283**
	Total Budget Authority by Object Class	**$896,549**	**$898,818**

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

NATIONAL INSTITUTES OF HEALTH

National Eye Institute

Salaries and Expenses

(Dollars in Thousands)

Object Classes	FY 2024 CR	FY 2025 President's Budget
Personnel Compensation		
Full-Time Permanent (11.1)	$24,486	$26,371
Other Than Full-Time Permanent (11.3)	$13,788	$14,175
Other Personnel Compensation (11.5)	$1,830	$1,880
Military Personnel (11.7)	$138	$144
Special Personnel Services Payments (11.8)	$5,909	$6,075
Subtotal, Personnel Compensation (11.9)	**$46,151**	**$48,645**
Civilian Personnel Benefits (12.1)	$15,019	$15,882
Military Personnel Benefits (12.2)	$8	$8
Benefits to Former Personnel (13.0)	$0	$0
Subtotal Pay Costs	**$61,177**	**$64,535**
Travel & Transportation of Persons (21.0)	$1,176	$1,192
Transportation of Things (22.0)	$163	$166
Rental Payments to Others (23.2)	$0	$0
Communications, Utilities & Misc. Charges (23.3)	$59	$60
Printing & Reproduction (24.0)	$63	$63
Other Contractual Services		
Consultant Services (25.1)	$23,103	$23,741
Other Services (25.2)	$39,076	$38,526
Purchase of Goods and Services from Government Accounts (25.3)	$35,434	$36,233
Operation & Maintenance of Facilities (25.4)	$434	$436
Operation & Maintenance of Equipment (25.7)	$3,095	$3,163
Subsistence & Support of Persons (25.8)	$0	$0
Subtotal Other Contractual Services	**$101,141**	**$102,099**
Supplies & Materials (26.0)	$5,656	$5,476
Subtotal Non-Pay Costs	**$108,256**	**$109,056**
Total Administrative Costs	**$169,433**	**$173,591**

NATIONAL INSTITUTES OF HEALTH
National Eye Institute

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
Division of Extramural Activities									
Direct:	20	-	20	20	-	20	20	-	20
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	20	-	20	20	-	20	20	-	20
Division of Intramural Research									
Direct:	128	-	128	147	-	147	152	-	152
Reimbursable:	2	-	2	2	-	2	2	-	2
Total:	130	-	130	149	-	149	154	-	154
Office of the Director									
Direct:	94	1	95	95	-	95	99	-	99
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	94	1	95	95	-	95	99	-	99
Division of Epidemiology and Clinical Applications									
Direct:	8	-	8	8	-	8	8	-	8
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	8	-	8	8	-	8	8	-	8
Division of Extramural Science									
Direct:	19	-	19	19	-	19	19	-	19
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	19	-	19	19	-	19	19	-	19
Total	271	1	272	291	-	291	300	-	300
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	12.5
2022	12.6
2023	12.5
2024	12.5
2025	12.6

NATIONAL INSTITUTES OF HEALTH
National Eye Institute

Detail of Positions [1]

GRADE	FY 2023 Final	FY 2024 CR	FY 2025 President's Budget
Total, ES Positions	1	1	1
Total, ES Salary	$194,510	$196,455	$201,759
General Schedule			
GM/GS-15	31	33	36
GM/GS-14	37	39	42
GM/GS-13	52	55	58
GS-12	29	32	32
GS-11	24	25	25
GS-10	1	1	1
GS-9	13	14	14
GS-8	2	2	2
GS-7	2	2	2
GS-6	1	1	1
GS-5	2	2	2
GS-4	1	1	1
GS-3	0	0	0
GS-2	1	1	1
GS-1	0	0	0
Subtotal	196	208	217
Commissioned Corps (42 U.S.C. 207)			
Assistant Surgeon General	0	0	0
Director Grade	0	0	0
Senior Grade	1	0	0
Full Grade	0	0	0
Senior Assistant Grade	0	0	0
Assistant Grade	0	0	0
Junior Assistant	0	0	0
Subtotal	1	0	0
Ungraded	80	82	82
Total permanent positions	197	208	217
Total positions, end of year	278	291	300
Total full-time equivalent (FTE) employment, end of year	272	291	300
Average ES salary	$194,510	$196,455	$201,759
Average GM/GS grade	12.5	12.5	12.6
Average GM/GS salary	$128,011	$130,274	$134,450

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