

# Vision Research at NIH

## What is the National Eye Institute?

The National Eye Institute (NEI), part of the National Institutes of Health (NIH), was created by Congress in 1968 to manage national efforts in vision research. Our mission is to eliminate vision loss and improve quality of life through vision research.

We do this by providing leadership to help:

1

**Drive innovative research** to understand the eye and visual system, prevent and treat vision diseases, and expand opportunities for people who are blind or could benefit from vision rehabilitation.

2

**Foster collaboration** in vision research and clinical care to develop new ideas and share knowledge.

3

**Recruit, inspire, and train** talented individuals to expand and strengthen the vision workforce.

4

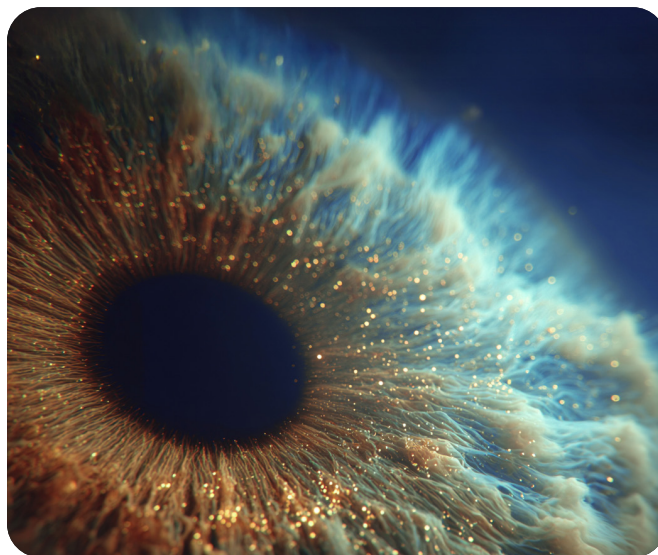
**Educate** health care providers, scientists, policymakers, and the public about advances in vision research and the impact on health and quality of life.

## Why the Eye?

**Vision is fundamental** to how people navigate the world, connect with others, and live independently. Going blind ranks among peoples' deepest fears.

**The eye is a window on overall health.** It is an accessible part of the central nervous system directly observable without surgery. Advances in ocular imaging and artificial intelligence (AI) are transforming the eye into a diagnostic powerhouse to someday enable detection of problems such as cardiovascular disease, Alzheimer's and Parkinson's diseases early, when treatments are most effective.

**The eye is a site for innovation.** From AI-driven autonomous systems for disease screening to gene and stem cell therapies and imaging technologies — vision scientists pioneer methodologies that are used across biomedical research to improve overall health.



## The Burden of Vision Loss

**Vision loss carries a major economic burden.** Costs associated with vision loss in the United States total an estimated

**\$134.2**  
BILLION ANNUALLY

Leading cost drivers include:

**\$98.7** BILLION

in direct expenses from nursing home care and medical expenses for diagnosed ocular disorders and refraction correction, and

**\$35.5** BILLION

in indirect expenses from lost productivity and informal care.

## We Fund Research

NEI supports basic, translational and clinical vision research through approximately:

**2,660**

GRANTS (primary & secondary) AND TRAINING AWARDS

AT OVER

**384**

INSTITUTIONS

ACROSS

**47**

STATES IN THE USA

Vision research studies are also conducted by the Intramural Research Program in Bethesda, MD.

# Our Impact

Virtually all available detection technologies and therapies for conditions causing vision loss result from our national investment in early-stage research supported by NEI.

*Examples of our impact include:*

## **Age-Related Macular Degeneration (AMD)**

AMD causes deterioration of the central part of the retina (the macula), leading to blurred or lost central vision in older adults. NEI-funded research has dramatically improved AMD outcomes for the estimated 19.8 million people affected in U.S. The Age-Related Eye Disease Study (AREDS) showed that antioxidants and zinc supplements slow disease progression. NEI-supported research led to the use of anti-vascular endothelial growth factor (anti-VEGF) therapies for neovascular (wet) AMD. Building on discoveries about the immune system's complement pathway, two drugs (Syfovre and Izervay) were approved by the U.S. Food and Drug Administration (FDA) in 2023 for treating non-neovascular (dry) AMD. NEI is conducting a clinical trial of an autologous stem cell therapy for advanced dry AMD.

## **Diabetic Retinopathy**

In the U.S., about 9.6 million people have diabetic retinopathy, which causes vision loss by affecting blood vessels in the retinas of people who have diabetes. Clinical trials show that laser surgery on the eye, intensive blood sugar control, and lipid-lowering therapies can slow vision loss from the disease. Methods to detect the

disease early using retinal images have led to readily available detection using the first autonomous AI-driven device ever to be cleared by the FDA. Researchers continue to seek better ways to treat diabetic macular edema, a complication of diabetic retinopathy that impairs sharp central vision.

## **Cataracts**

Replacement of a lens made cloudy by a cataract, the most commonly performed surgery in the U.S., successfully restores vision for about 4 million people each year. NEI-funded research has helped dramatically shorten the procedure recovery time and optimize outcomes. Ongoing research is seeking to prevent secondary cataracts, a complication that can occur months or years after cataract surgery. NEI-supported research is also paving the way for a potential non-surgical treatment for cataracts.

## **Glaucoma**

In the U.S., glaucoma affects 4 million people, making it a leading cause of blindness. All types of the disease primarily cause vision loss by damaging the optic nerve. NEI-supported research has led to several therapies for slowing vision loss. Advances include medications that lower intraocular pressure and early-detection

strategies that help people start therapy sooner as early disease can progress without symptoms. Researchers are studying ways to regenerate the cells that make up the optic nerve.

## **Myopia**

In the U.S., myopia (nearsighted) prevalence among those aged 12 to 54 rose from 25% in the early 1970s to over 40% by 2004, raising the risk of vision loss from retinal detachment, glaucoma, and macular degeneration—all complications of severe myopia. An NEI-funded clinical trial found that multifocal contact lenses slow the rate of myopia progression among children who wear them into their late teenage years.

## **Leber Congenital Amaurosis (LCA)**

LCA is a family of inherited retinal degenerative diseases that begin in childhood and were previously untreatable. A gene responsible for LCA was isolated by scientists at NEI. Decades of NEI research support led to a gene therapy that partially restored vision to people with a type of LCA, leading to the first FDA-approved gene therapy for an inherited disease. This work also laid the foundation for the BRILLIANCE trial, which found improvements from a CRISPR-based (gene editing) treatment for a different form of retinal degeneration.



## Training the Next Generation of Vision Researchers

NEI supports emerging scientists and clinicians through pre- and postdoctoral fellowships, career development awards, institutional training grants, and the Mentored Research Pathway in Residency (R38) program. The Council of Vision Editors Fellowship Program helps early-career vision scientists learn about peer review.

The Eye on the Future Teen Video Contest inspires high school students to pursue careers in science and medicine.