Asking why some children do not receive proper care after failed vision screenings

A two-year grant from the W.K. Kellogg Foundation will allow our ophthalmologists and researchers, along with collaborators around the state, to tackle disparities in children’s eye care that may result in delayed detection of eye disease or inadequate follow-up once a problem has been identified. The $2 million dollar grant will also support improved eye care for premature babies and create a fund to provide eyeglasses for children in need.

“The W.K. Kellogg Foundation is committed to creating conditions that prepare children for long-term success,” says James E. McHale, Vice President for Program Strategy for the W.K. Kellogg Foundation. “The opportunity for children to have healthy vision is fundamental to their learning and development. The Foundation’s support of the U-M Kellogg Eye Center will address the barriers to eye care access for kids most in need, ensuring that all children have access to the quality of health care they deserve.”

“The consequences of delayed treatment for certain eye conditions are significant,” says Kellogg pediatric ophthalmologist Steven M. Archer, M.D., a faculty member in Kellogg’s Carls Pediatric Ophthalmology Clinic. “Children with amblyopia—or lazy eye—are most effectively treated at an early age; untreated amblyopia may result in permanent vision loss.” In amblyopia, the connections that transmit information from the eye to the brain are poorly established. These connections are essential for vision development. Another common childhood disorder that can lead to vision loss is strabismus, in which the eyes are misaligned.

A team of Kellogg ophthalmologists and researchers led by David C. Musch, Ph.D., M.P.H., and Joshua D. Stein, M.D., M.S., will analyze data on the incidence and prevalence of strabismus and amblyopia, drawing on Medicaid and insurance claims databases. The research team expects to learn whether socioeconomic and demographic factors—such as age, race, household income, and community of residence—contribute to delayed diagnosis of these childhood conditions.

continued inside
From the Chair

Dear Friends,

It’s a pleasure to share with you news of some of the ways our clinicians and scientists are working to help our patients lead healthy and productive lives.

Thanks to a generous grant from the W.K. Kellogg Foundation, we have a unique opportunity to improve children’s eye care in this state and across the country. The grant will allow our faculty to investigate a range of questions, including how best to reach children at risk of losing vision. The answers could lead to new programs and policies to help all children receive the care they need and deserve.

Our Low Vision clinic provides assistance to patients with impaired vision, including consultation on devices that can make their lives a little easier. But we also know that our patients have a great deal to teach us. Kathryn Pflasterer is a resourceful young woman who assembled a variety of devices and strategies to help her succeed in her challenging veterinary tech program. She shares her discoveries with us.

While our patients know us best through contact with their ophthalmologists, our scientists are also at work to offer patients hope for a cure. Dr. Antonetti’s research is a wonderful example of our search for novel treatments for eye diseases. He is well on his way to bringing one such treatment to patients with diabetic retinopathy.

Many thanks to all of you for your ongoing support of our work. It is through partnerships with our patients, and wonderful organizations like the W.K. Kellogg Foundation, that we have the opportunity to improve the vision of people everywhere.

Paul P. Lee, M.D., J.D.
F. Bruce Fralick Professor and Chair
Ophthalmology and Visual Sciences
Director, W.K. Kellogg Eye Center

NEW GRANTS

Eliminating trial and error therapies in the treatment of glaucoma

Sayoko E. Moroi, M.D., Ph.D., Professor and glaucoma specialist, is the recipient of a National Institutes of Health R01 grant. Under the four-year collaborative research investigation “Aqueous humor dynamic components that determine intraocular pressure variance,” Dr. Moroi seeks to identify biomarkers associated with fluctuation in eye pressure and variation in response to glaucoma treatment that will make it possible to predict the optimal treatment for each patient. “If there are biomarkers that are linked to a ‘poor response,’ then we may be able to avoid unnecessary treatment and minimize wasted time for repeated office visits,” says Dr. Moroi. “Using these profiles to determine the best treatment could have a major impact in preventing the most severe effects of the disease.”

Preventing retinal cell death associated with diabetes

Patrice E. Fort, Ph.D., M.S., Research Assistant Professor, has been awarded a National Institutes of Health R01 grant. Under this grant, “Progressive impact of diabetes on retinal neuroprotection by alpha-crystallins,” Dr. Fort will study how the natural adaptive mechanisms for protection of the retina are impaired by diabetes—which leads to cell death and ultimately loss of vision. “Understanding how the protective abilities of alpha-crystallins [neuroprotective proteins] are affected in disease states will enable us to develop novel approaches to manipulate these pathways and provide therapeutic benefit to preserve vision in persons with diabetes,” says Dr. Fort. “This research is significant because it could lead to the development of new therapeutic strategies for diabetic retinopathy and other chronic retinal neurodegenerative disorders such as age-related macular degeneration.”
Seeking better care for children who fail vision screenings

To determine whether children receive proper follow-up care, Kellogg researchers will work with community organizations to track the results of pre-school vision screenings. “We’re interested in learning the extent to which referral after a vision problem is detected improves the child’s visual outcome,” says Dr. Archer. The research team will analyze the outcomes of the screenings—and whether the child actually received treatment—in an effort to improve follow-up care.

“The data we collect will help guide policymakers and health care providers alike,” says Paul P. Lee, M.D., J.D., F. Bruce Fralick Professor and Chair of the Department of Ophthalmology and Visual Sciences. “We will understand how to target our efforts and where resources are needed to address inequities in children’s eye care.”

Another arm of the project seeks to improve vision care for premature babies with low birth weight—babies more likely to have a potentially blinding condition known as retinopathy of prematurity. Kellogg’s newly recruited pediatric retina specialist Cagri C. Besirli, M.D., Ph.D., will help assess ways to deliver care to these infants. Together with colleagues at Duke University and William Beaumont Hospital, Dr. Besirli will also help to evaluate new technologies.

The W.K. Kellogg Foundation grant will also create a fund for families who might not otherwise be able to purchase special eyeglasses, prisms—used to treat children’s eye muscle problems—and other aids for children in need.

When the grant is completed, the Kellogg research team will hold national conferences to share what they’ve learned about pediatric retina disease and disparities in children’s eye care.

“Children with amblyopia—or lazy eye—are most effectively treated at an early age; untreated amblyopia may result in permanent vision loss.”

—Steven M. Archer, M.D.

The Kellogg Connection

In 1983, the W.K. Kellogg Foundation provided important support that allowed the U-M Department of Ophthalmology to create a comprehensive eye center, bringing researchers and clinicians together in one location to solve the puzzles of eye disease. Subspecialty care and the visual sciences were developing at a rapid pace; University and Foundation leaders understood that collaboration between the two groups would advance the pace of discovery in ophthalmology. The W.K. Kellogg Eye Center was dedicated in 1985, and was honored to be able to pursue its mission in the name of Mr. Kellogg, who was blind in the last years of his life but never lost sight of the need to help others.
Ron Coleman says his son, Beau, has always had good luck. The 10-year-old’s luck held even after a pencil thrown through the air struck his right eye. Beau had just loaned the pencil to a classmate who caught him off guard when she tossed it back to him. A mechanical pencil with thin lead, it dangled briefly before breaking off and falling from his eye.

When it appeared that pieces of pencil lead remained inside his eye, Beau’s parents picked him up from school and made their way to their local ophthalmologist in Flint. Upon examination, the ophthalmologist immediately referred him to the University of Michigan C.S. Mott Children’s Hospital, where U-M Kellogg ophthalmologist Denise A. John, M.D., was on call.

Initially, Beau was panicked, but his parents calmed him. “We explained to him that everything was going to be OK because we were taking him to the best place possible,” says Mr. Coleman. “We were aware of U-M’s great reputation. We’ve had family and friends treated there and they’ve always had wonderful things to say.”

“When he came into the emergency room, Beau was fairly calm, which is great for a 10-year-old,” says Dr. John. Although the pencil caused a three-millimeter corneal laceration, it didn’t affect any vital parts of the eye. “He did have small pieces of lead—and even an eyelash—in his eye but we were able to remove everything and repair the cornea with a single suture.”

After discharge, Michael W. Smith-Wheelock, M.D., a comprehensive ophthalmologist at Kellogg, saw Beau for his surgery follow-up. Dr. Smith-Wheelock removed the suture one month after surgery and Beau regained his 20/20 uncorrected vision. He will return to Kellogg every two years for check-ups.

“Even though Beau didn’t know what the lottery was, I told him he won it,” says Dr. Smith-Wheelock. “He was very lucky to have regained his perfect vision after an injury like this.”

Approximately one third of the estimated 2.4 million eye injuries that occur annually in the United States are in people age 17 and younger. And, many of these injuries could lead to conditions like cataracts or glaucoma.

The Coleman family is grateful for the care Beau received from the physicians and staff at Kellogg. “They stepped up to the plate to care for Beau like he was the only one in the hospital,” says Mr. Coleman. “The care you receive at Kellogg makes you feel very special.”
Kathryn Pflasterer is in the final semester of a 2 ½ year program in veterinary technology. The course work is challenging, and a little more so for Kathryn, who is visually impaired. Yet her remarkable determination and her smart phone have enabled her to navigate the program with ease.

When she enrolled in the Michigan State training program, the head of the department asked, “Are you sure you can do this? How will you draw blood from a small animal?” Kathryn replied, “I don’t know, but I’ll figure it out.” That is Kathryn’s response to every obstacle she encounters—and each time she figures it out.

Kathryn has a rare condition—coloboma of the retina, iris, and optic nerve—in which segments of tissue are missing from various eye structures. Kellogg pediatric ophthalmologist Steven M. Archer, M.D., who has seen Kathryn over the years, says that there is no treatment for colobomata, which are present at birth. With corrective lenses, the vision in Kathryn’s right eye is about 20/80. But her left eye is severely affected, and at 20/800, she sees only shapes, color, and movement.

Preparing for the first semester, Kathryn found a high-powered magnifier but soon discovered that a smart phone could meet her needs at a much lower price. The most useful app she found was iMagnify, which uses the phone’s camera as an electronic magnifier, enlarging objects up to four times. That feature was invaluable in anatomy class—as long as the phone had a protective case. Kathryn’s smart phone also allows her to photograph a professor’s chalk board notes—or other visuals—and later magnify them on her computer.

When it was time to suture a wound, Kathryn used a lighted Boa magnifier that could be looped around her neck. It was a significant moment when she could see the needle and sutures clearly—another hurdle overcome. And a dome magnifier—designed for map reading—helped her decipher medical forms printed in a tiny, light blue typeface.

When she graduates this year, Kathryn plans to work with horses as a veterinary technician. She has ridden horses since she was young and has volunteered for several riding programs.

No doubt Kathryn will continue to meet challenges and will continue to figure them out. It’s not always easy, she concedes, but “wallowing” is not an option. Says Kathryn, “If there’s a barrier, you need to step over it and keep going.”

### Apps for a Veterinary Technician

A college student with low vision uses her smart phone in classes and clinics

Kathryn Pflasterer and ophthalmic tech Sarah Fournier look at smart phone apps.

Apps for Low Vision

**LookTel Money Reader** Apple iTunes
Recognizes U.S. currency, from $1 to $100 bills

**SayText** Apple iTunes
Scans text within any image, such as a medical form or restaurant menu, and reads it aloud

**Talking Calculator** Apple iTunes
Reads aloud button names, numbers, and sums

**Read2Go** Apple iTunes
Access to over 140,000 digital books, textbooks, magazines, and newspapers from Bookshare.org

**TalkingTag LV** Apple iTunes
Records and reads information onto sticky labels that can be applied to medications, files, food items, and more

Find more apps at [www.kellogg.umich.edu/lowvision/apps.html](http://www.kellogg.umich.edu/lowvision/apps.html) or by calling our Low Vision Clinic at 734-764-5106
Kellogg study identifies a novel therapy that may prevent damage to the retina in diabetic retinopathy

Targeting two mechanisms at the root of the disease: inflammation and the weakening of the blood barrier that protects the retina

Researchers at the U-M Kellogg Eye Center have identified a compound that could interrupt the chain of events that cause damage to the retina in diabetic retinopathy, the leading cause of blindness among working-age Americans. The study’s findings were reported in the June 2012 issue of Biochemical Journal.

In diabetic retinopathy, damage to the retina results, in part, from the activity of vascular endothelial growth factor (VEGF), a protein that weakens the protective blood-retinal barrier. Recent drugs targeting VEGF have exhibited good response for nearly half of the patients with diabetic retinopathy. But researchers believe that there is also an inflammatory component that may contribute to the disease process.

These scientists identified a specific protein common to both the vascular and inflammatory pathways as an important target in regulating the disease process in which blood vessels become leaky, and provides a compound that may be developed into a therapeutic intervention for patients in which anti-VEGF treatment alone is not sufficient.

“We still have a long way to go to demonstrate effectiveness of this compound in humans, but our research results are very promising.”

—David A. Antonetti, Ph.D.

“In diabetic retinopathy and a host of other retinal diseases, increases in VEGF and inflammatory factors cause blood vessels in the eye to leak which, in turn, results in a buildup of fluid in the neural tissue of the retina. This insidious form of modified inflammation can eventually lead to blindness,” says David A. Antonetti, Ph.D., a professor in the departments of Ophthalmology and Visual Sciences as well as Molecular and Integrative Physiology, who has also been awarded a Jules and Doris Stein Professorship from Research to Prevent Blindness, Inc.

The compound that Dr. Antonetti and his colleagues discovered targets atypical protein kinase C (aPKC), required for VEGF to make blood vessels leak. Moreover, Dr. Antonetti’s laboratory has demonstrated that this compound is effective at blocking damage from tumor necrosis factor also elevated in diabetic retinopathy.

“This is a great leap forward,” says Dr. Antonetti. “We’ve identified an important target in regulating blood vessel leakage in the eye and we have a therapy that works in animal models. We still have a long way to go to demonstrate effectiveness of this compound in humans, but our research results are very promising.”

Funding sources: National Institutes of Health; Juvenile Diabetes Research Foundation; the Jules and Doris Stein Professorship from Research to Prevent Blindness, Inc.; Fight for Sight Research Foundation
The U-M Medical Innovation Center Comes to Kellogg

MIC fellows strive to bring novel ideas to market

During a year-long residency at the Kellogg Eye Center, four fellows from the U-M Medical Innovation Center (MIC) are looking for a few good ideas. They expect to find them by partnering with Kellogg faculty and staff, observing and interviewing them in an effort to flesh out ideas that have potential for commercial development.

Marius Tijunelis, M.D., M.B.A., and his teammates are now onsite to learn about Kellogg and the field of ophthalmology. “We have met with personnel from different clinics, labs, and satellite offices at Kellogg—everyone from the ultrasound technicians to two faculty members who have already brought a concept to market,” says Dr. Tijunelis.

“We’ve also shadowed physicians during patient appointments and observed multiple surgeries in the operating room. We’re not training to become ophthalmologists so we don’t need to know the intricacies of cataract surgery. But, we do need to learn as much as we can about the surgical process in the event there is a potential concept related to ophthalmic surgery.”

In an effort to learn the business end of ophthalmology, the fellows have been in touch with representatives from an ophthalmic device company and a nonprofit association dedicated to advancing Michigan’s biotechnology industry. They’ve also taken classes at an Ann Arbor workshop featuring state-of-the-art hand tools—in preparation for creating prototypes when and if the time comes.

“It is important for us to know ophthalmology and be immersed in the culture at Kellogg,” says Dr. Tijunelis. “Although one year is a tight timeline, our multidisciplinary team hopes to reach the goal of discovering a true need, developing a solution, and starting the commercialization process.”

The MIC was founded in 2008 to help clinicians and researchers overcome early developmental barriers and navigate the complexities of commercialization in moving their ideas forward. During the first four years, its fellows have launched three medical device companies and received federal grants to advance pediatric medical devices.

“When placing fellows, we look for high-technology clinical areas with faculty who are doing unique research.”

—Scott Olson, Managing Director

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—Scott Olson, Managing Director
Welcome to Kellogg’s New Faculty

**Cagri G. Besirli, M.D., Ph.D.,** Assistant Professor, Ophthalmology and Visual Sciences, has joined the retina and uveitis faculty of the Kellogg Eye Center. Dr. Besirli specializes in the medical and surgical management of diseases of the retina and vitreous. He also specializes in acquired and inherited pediatric retinal disorders, including retinopathy of prematurity, familial exudative vitreoretinopathy, Coats’ disease, retinal detachment, and ocular trauma. His research focuses on molecular mechanisms of photoreceptor cell death and survival during periods of retinal stress.

**Brenda L. Bohnsack, M.D., Ph.D.,** Assistant Professor, Ophthalmology and Visual Sciences, has joined the pediatric ophthalmology faculty of the Kellogg Eye Center. Dr. Bohnsack specializes in the diagnosis and management of childhood glaucoma and congenital eye anomalies. She also treats children with strabismus and amblyopia. Her research focuses on the genetic regulation of the neural crest in the formation of the anterior segment of the eye.

To make an appointment with a Kellogg doctor please call 734.763.8122