



Krembil's Dr. Michael Brent is one of the leading forces behind the national network Diabetes Action Canada. Diabetes is the leading cause of blindness among working-age Canadians.

## Breaking down the barriers to eye care

Krembil researchers tackling diabetes are constantly innovating to make retinal screening easier

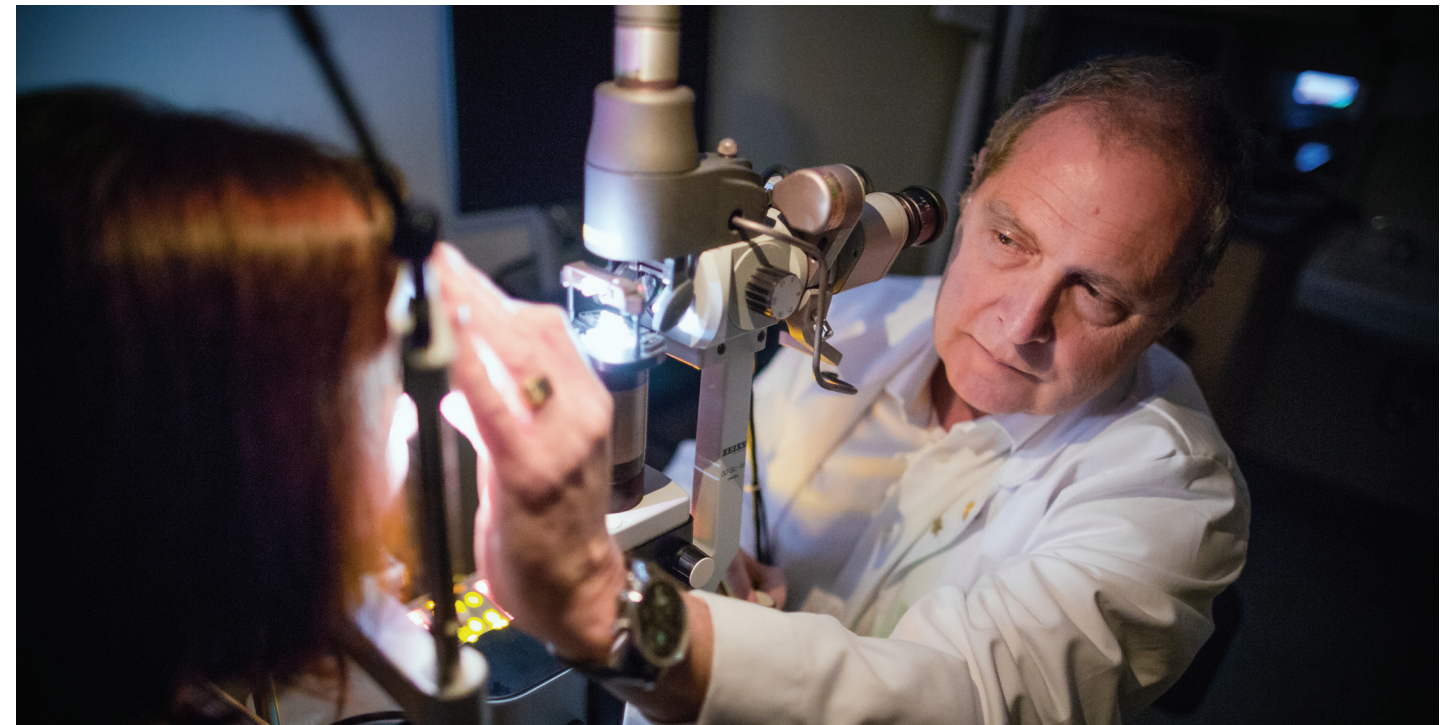
Mary Gooderham

**D**ibetes is the leading cause of blindness among working-age Canadians. Yet, many people living with the disease fail to get regular examinations that can detect changes in their eyes, signalling diabetes-related complications.

A national network has been set up to encourage earlier diagnoses of eye problems and ensure better health outcomes for more than three million Canadians with the disease.

Dr. Michael Brent, a clinician investigator at the Krembil Research Institute and ophthalmologist at the Donald K. Johnson Eye Institute, says that diabetes particularly affects the eyes. A disease called diabetic retinopathy, which can lead to hemorrhaging of the blood vessels in the retina, is present in up to two-thirds of patients who have had diabetes for 10 years or more, he notes. Yet, studies show that one-third of Canadians living with diabetes have not had an eye examination in the last two years or more.

"There are a number of barriers to care," says Dr. Brent, a retinal specialist who is the ophthalmology lead for Diabetes Action Canada, a national network on diabetes and its related complications that was set up under the Strategy for Patient-Oriented Research (SPOR) program, established by the Canadian



Institutes of Health Research. "Low screening rates can be found everywhere, from marginalized communities in inner cities to the most remote Aboriginal reserves."

The network is currently focused on studying why people don't get regular eye examinations, he says, while its goals include creating a national diabetic retinopathy screening program and developing new technologies that allow for better monitoring of eye diseases among diabetic patients.

"We know that having regular eye examinations is a critically important aspect of preventing blindness in people with diabetes," says Dr. Gary Lewis, endocrinologist and diabetes specialist at University Health Network, director of the Banting & Best Diabetes Centre at the University of Toronto and co-leader of Diabetes Action Canada. "Much of the vision loss associated with diabetes is preventable."

He says the key is to make retinal screening as easy to do as possible. One option is to establish a tele-ophthalmology program, using mobile imaging units in places such as community centres that can take images of the retinas of people with diabetes and upload them for experts elsewhere to analyze. A number of provinces have piloted such programs, Dr. Lewis says. "It's a massive undertaking to do this

kind of thing, and we're making huge headway."

Dr. Chris Hudson, a senior scientist at Krembil, says there are novel tests to look for changes in the blood vessels of retinas in patients with diabetes and other diseases such as macular degeneration, hypertension and atherosclerosis. His lab at Krembil has developed techniques to measure changes and differences in blood vessels that are as small as 0.1 of a millimetre thick. For example, the vessels can become stiffer and lose the ability to regulate the flow of blood.

Detecting these kinds of changes – or simply by looking at subtle differences between blood vessels – could help doctors diagnose diabetic retinopathy sooner, says Dr. Hudson. Meanwhile, interventions are possible to repair and restore the condition of the microscopic blood vessels themselves, including new drugs and laser surgery. "All of these treatments work better if you can flag the problem as early as possible," he cautions.

"People often don't get tested in the first place because screening can be expensive and involve long wait times," says Dr. Brent, who is also the Milton Harris Chair in Adult Macular Degeneration. "And this can particularly be an issue for new immigrants and indigenous people." The network's retina screening group, which he co-leads, involves physicians, scientists and patients working together

toward solutions.

"Learning from each other is very important," he says. "We can change policy, scale up and take things to a national level, which someone working on their own can't do."

Dr. Lewis, who is also the Drucker Family Chair in Diabetes Research and the Sun Life Financial Chair in Diabetes, says the issue of retinal screening is getting an ever-higher profile, with the involvement of federal and provincial governments, as well as private companies. "And we have people living with diabetes advising us at every level of what we're doing."

He says that Diabetes Action Canada, which is one year into its five-year mandate, "has tremendous profile already," with vision as one of its flagship programs. "We have a real focus on innovation and healthcare delivery," Dr. Lewis says.

By developing a national diabetes database and taking a deep reach into marginalized communities, he expects that diabetic retinopathy can be diagnosed earlier, with fewer people experiencing vision loss.

"We're talking about blindness – that's a tremendous disability, and it's preventable in many cases. Let's screen more people and refer them for treatment," says Dr. Lewis. "We're talking about a very big, impactful thing we're doing here." ■