National Institutes of Health

Fact Sheet — *Diabetic Retinopathy*

Thirty Years Ago

- Diabetes mellitus affected about 5 million Americans. Diabetic retinopathy was a frequent, blinding complication of the high blood sugar levels that characterize diabetes.
- Blindness from diabetic retinopathy was responsible for about 20 percent of new cases of blindness between the ages of 45 and 74.
- Half of the nearly one million patients who developed severe diabetic retinopathy went blind within 5 years of diagnosis.
- Researchers did not yet recognize the need for intensive glucose control to delay or prevent the complications of diabetes. Also, the importance of blood pressure control in preventing complications was not established.
- Diabetic retinopathy lacked safe and effective treatments, condemning patients to progressive loss of their vision and independence.
- The only available treatment, destruction of the pituitary gland, an aggressive and controversial surgical procedure that caused many complications, had fallen out of favor.
- Laser treatment to prevent the abnormal blood vessel growth that defines the condition was becoming more widely used but it was unknown whether this treatment was truly effective in preventing vision loss.

Today

- Thanks to a series of landmark clinical trials sponsored by the National Institutes of Health, people with diabetes can now control their disease better and reduce their risk for developing the many complications that result from poorly controlled diabetes.
- In one NIH trial, timely treatment with laser therapy and appropriate follow-up care was established as an effective regimen to prevent vision loss.
- The Diabetes Control and Complications Trial showed that intensive blood glucose control dramatically delays or prevents diabetic retinopathy and other complications in people with type 1 diabetes. The benefits in reduced eye complications extend for years after the early diabetes control.
- Another NIH-supported trial showed that lowering blood glucose and blood pressure levels in people with type 2 diabetes reduces the risk of diabetic retinopathy and other diabetes complications.
- Clinical trials also established the value of vitrectomy for patients who experience bleeding in the vitreous, the clear, jelly like substance inside the eye. Vitrectomy allows surgeons to remove blood that often occludes vision.
- With laser treatment and vitrectomy for diabetic retinopathy, blindness was reduced by 90 percent in patients with severe diabetic retinopathy, and societal savings are estimated at $1.6 billion per year.
- In stark contrast, the Nation's investment in research to establish safe and effective standards of care was only $70 million.
- Research produced a major improvement in the visual health of the country and significantly lowered the associated disability and health care costs.

Tomorrow

The NIH is poised to make major discoveries in the diagnosis and treatment of diabetic retinopathy.

- NIH researchers discovered that the development of the abnormal blood vessels which invade the retina to cause blindness is spurred by a protein called vascular endothelial growth factor (VEGF). Further evidence suggests that the gene that encodes the

VEGF protein can be therapeutically regulated to prevent blood vessel growth.

- Numerous NIH-sponsored clinical trials have begun testing pharmacologic agents to control the expression of VEGF.
- NIH researchers have also developed a high resolution imaging technology called optical coherence tomography (OCT) that allows clinicians to definitively diagnose diabetic retinopathy in its earliest stage.
- Early detection with OCT and regular follow-up to monitor the progression of the patient's disease are essential to delivering personalized treatment to patients.
- Much of the research responsible for the dramatic reduction in blindness associated with diabetic retinopathy relied on large-scale, multi-center clinical trials. Moving forward, the NIH recently established the Diabetic Retinopathy Clinical Research Network, (DRCR.net). This collaborative group of clinicians from around the country is able to quickly recruit the thousands of patients needed to test new treatments in clinical trials, thus allowing promising research to move quickly from the laboratory to the clinic.
- Federally-sponsored health education programs will continue to inform patients and the public about ways to improve the treatment and outcomes for people with diabetes, to promote early diagnosis, and to prevent or delay the onset of diabetes, and thus reduce the burden of diabetic retinopathy and other complications.