

Ophthalmology

THE MAJOR ADVANCE IN OPHTHALMOLOGY in the past five years has been the findings from two recent epidemiological studies that have indicated the priorities for clinical and public health practice and basic science research in ophthalmology in Australia.^{1,2}

These studies have shown that the prevalence of vision impairment increases threefold with each decade after the age of 40, with almost one in three people over the age of 80 having impaired vision.

Prevention. There are five major causes of vision loss: under-corrected refractive error, age-related macular degeneration (AMD), cataract, glaucoma, and diabetic retinopathy.^{1,2} Of the 400 000 Australians with impaired vision, half have refractive error that is correctable. Almost all of the 9% with cataract will have excellent outcomes from surgery, and a further 8% have preventable vision loss due to glaucoma or diabetic retinopathy.

With the ageing of the population, the number of cataract operations (currently about 125 000 a year) will need to double over the next 20 years. By the age of 90, most people will develop cataract and half will have already had cataract surgery. Another key finding of the two Australian studies was that cigarette smoking and ultraviolet-B exposure bring on cataract earlier, but lifetime exposure seems critical.

These studies have also reported the impact of vision loss on quality of life. Even relatively minor vision impairment (< 6/12 vision) increases social isolation and doubles the dependency on community services, increases morbidity (with a twofold increase in falls and a threefold increase in depression), and doubles mortality rate. It is critical for healthy ageing that people with impaired vision be referred to vision-related rehabilitation services to reduce the impact of vision loss. Currently, less than one person in three with vision loss has used these services.

Within the past few years, simple visual acuity tests have been developed to detect most treatable or correctable vision loss, particularly from refractive error, cataract and AMD. Vision screening targeted at older people (65 years and over) through primary healthcare is both simple and effective.

Diagnosis. Although almost one in 10 people will develop glaucoma by the age of 80,³ only half of those with the disease are currently diagnosed. The measurement of intraocular pressure has been shown to be ineffective in detecting glaucoma. Current trials are investigating new screening technologies (frequency-doubling technology and confocal scanning laser tomography) and protocols for community use to detect early signs of damage to the retinal nerve fibre layer. The target group for screening is people with a family history of glaucoma and those over 50 years.

Diabetes, associated with a 25-fold greater risk of vision loss, is a rapidly increasing problem. Although tight control of diabetes, blood pressure and blood lipid levels will reduce the development of diabetic retinopathy, the critical issue is its early detection (by screening at least every two years) and

timely laser treatment.⁴ New, non-mydriatic fundus cameras used by non-

specialised staff are an effective alternative to dilated ophthalmoscopy. They offer a great advantage in some situations, especially in rural and Indigenous communities.

Intervention. Cataract surgery is now extraordinarily successful. The next major development will be an accommodating intraocular lens that will remove the need for reading-glasses after surgery — this is probably 5–10 years away.

Ultimately, two in three people will develop AMD and one in four will lose vision. However, a third of AMD incidence is attributable to cigarette smoking.⁵ Only a few people with AMD benefit from current laser therapy. However, newly developed photodynamic therapy (PDT) can reduce or delay vision loss in selected cases. PDT involves the use of a diode laser with an intravenous light-sensitive dye (verteporfin). The laser photocoagulation of choroidal neovascularisation can reduce the risk of progression of vision loss from AMD. Treatment often has to be repeated three or four times a year and long-term benefits are still unclear.

A large randomised controlled trial we completed this year showed that vitamin E supplementation did not protect against either AMD or cataract. The recently completed Age-related Eye Disease Study found that dietary supplements containing high-dose combinations of antioxidants and minerals (vitamins C, E, beta-carotene and zinc) reduced the risk of advanced AMD and vision loss (see <<http://www.nei.nih.gov/amd>>).

The development of glaucoma, cataract and AMD has been found to have a genetic basis. Genes related to presence and severity of glaucoma have been identified, but candidate genes for AMD are still to be found. It seems unlikely that gene therapy will prevent eye disease in the short term.

As the famous baseball player Yogi Berra said, “predictions are always hard, especially when they are about the future”. Even though the bionic ear is highly successful, a successful bionic eye is unlikely to be seen in the next 10 years or more.

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