Introduction

Vision impairment can create difficulty in coping with the environment in which people live and may limit opportunities in education, employment and social engagement. It can also be a reason for dependence on services and on other people. Eye health can be affected by genetic factors, premature birth, ageing, diseases, smoking, injuries, UV exposure and nutrition. Many eye health problems can be prevented (globally about 80% of blindness is avoidable) and treatments are among the most successful and cost-effective of all health interventions [1]. In Australia, the percentage of the population over the age of 50 years is increasing and it is estimated that the number of people with visual impairment will double by the year 2030 due to the increasing risk with age [2]. The Visual Impairment Project, an epidemiological survey of people aged 40 years and older in Melbourne, found that the five major causes of vision impairment were: refractive error; age-related macular degeneration; cataract; diabetic retinopathy and glaucoma [3].

Types of eye conditions

Refractive error

Refractive error includes longsighted vision (hyperopia or hypermetropia), shortsighted vision (myopia or near-sightedness), astigmatism and presbyopia (vision defects due to advancing age). Myopia occurs when the eyeball is too long and light rays focus in front of the retina (the innermost layer of the eye, which contains the receptors for vision - the rods and cones) making distant images look blurred. Hyperopia occurs when the eyeball is too short and light rays focus behind the retina making near images look blurred.

More detailed information about eye health in Indigenous people can be found at:

http://www.healthinfonet.ecu.edu.au/eye_review
Presbyopia is usually noticed over the age of 40 years when the lens loses its flexibility and is less able to change shape, leading to a loss of ability to see close objects. Astigmatism is often associated with longsighted and shortsighted vision and is a focusing error causing asymmetric blur.

Poor vision due to refractive error can be detected by routine eye examinations. People who notice a change in their vision should have their eyes examined without delay. Those over 50 years and with normal vision and no other risk factors still should have an eye examination at least once every five years. Spectacles or contact lenses can be used for correction of refractive error. Refractive surgery techniques have recently become available.

**Diabetic retinopathy**

Diabetic retinopathy (DR) is a complication of diabetes and involves damage to small blood vessels in the retina. Since DR can affect vision and may cause blindness, early diagnosis and treatment are essential. Blindness from DR can be prevented by regular screening to detect early stages and, if needed, retinal laser treatment. The main risk factors for DR are the duration of diabetes and inadequate glycaemic control; others include hypertension, elevated serum lipid levels and pregnancy [4]. The key to preventing DR is good control of blood sugar, hypertension and cholesterol, plus regular eye examinations once every two years.

In the early stages of DR (termed non-proliferative retinopathy), lesions are visible with an ophthalmoscope. They include microaneurysms, haemorrhages, hard exudates, cotton wool spots, intraretinal microvascular abnormalities and venous beading. In the non-proliferative stage vision is rarely threatened [4]. If the disease progresses to the proliferative stage, vision is at risk, new blood vessels may grow on the retina and into the vitreous and are prone to rupturing. Scar tissue can eventually pull the retina away from the back of the eye (retinal detachment) - if this occurs surgical procedures may prevent permanent vision loss. At any stage of retinopathy, leaking from macular capillaries can result in macular oedema that, when present close to the central macula, is termed clinically significant macular oedema. Severe blurring may occur with macular oedema (the macula is the most sensitive portion of the retina). Macular oedema and peripheral retinopathy can be treated with laser surgery.

**Cataract**

A cataract is an opacity of the crystalline lens of the eye, which can prevent light from reaching the retina at the back of the eye. There are three main cataract conditions, each with its own pathology and occurring in different areas of the lens: cortical cataract, nuclear cataract and posterior subcapsular cataract [5]. Cataract develops progressively: at an early stage cataract may only slightly reduce vision, but, over time, a mature cataract can cause blindness. The risk of cataract increases as people grow older. Apart from age, risk factors include: cigarette smoking, exposure to ultraviolet-B and ionising radiation; the presence of diabetes; ocular trauma and the use of drugs (such as steroids).

Cataract is detected by an eye examination and corrected by replacing the lens with an artificial lens. This has a significant impact on restoring vision and can usually be performed as day surgery. The quality of vision after cataract/intraocular lens surgery is usually excellent, although bifocal glasses are usually needed.

**Trachoma**

Trachoma is a form of conjunctivitis caused by the obligate intracellular bacterium, Chlamydia trachomatis. Globally, trachoma is a common serious eye infection with about 150 million people needing treatment and an estimated 6 million people blinded as a result of the disease [6]. The initial form, follicular trachoma, occurs primarily in childhood and early adolescence, with a peak prevalence in children aged 2 to 3 years [7]. Long-standing and moderately severe follicular trachoma can lead to cicatricial trachoma, involving scarring and other damage to the eyelids and eyes [4]. Severe scarring of the eyelids and in-turning of the eyelashes (trichiasis) can lead to opacification of the cornea and blindness.

Stages of trachoma are [4] [8]:

- **Trachomatous inflammation follicular (TF)** - current active infection, requiring antibiotic treatment;
- **Trachomatous inflammation intense (TI)** - severe current infection with an increased risk of scarring, requiring antibiotic treatment;
- **Trachomatous scarring (TS)** - the presence of scarring in the tarsal conjunctiva, indicates the patient has or has had trachoma and will require regular review to identify and deal with possible progression to trichiasis;
- **Trachomatous trichiasis (TT)** - where at least one eyelash rubs on the eyeball, and the patient is at risk of developing corneal opacity and visual loss; and
- **Corneal opacity (CO)** - a disabling lesion that can result from trachomatous trichiasis. A patient should be referred to an ophthalmologist for assessment and possible surgical correction.

The disease spreads easily, and management involves screening, attention to personal hygiene, environmental improvement and azithromycin treatment [7]. Azithromycin is a long-acting antibiotic which has been found to be an effective therapy for trachoma. As it can be used as a single dose, it overcomes the disadvantages of previous treatments that involved prolonged
courses of tetracycline ointment, had poor compliance rates and were relatively ineffective. The World Health Organization (WHO) has developed a strategy involving a combination of interventions known by the acronym SAFE, which stands for Surgery for trichiasis (in-turned eyelashes), Antibiotics, Facial cleanliness and Environmental improvement [8].

**Macular degeneration**

Macular degeneration is damage to the macula, a small part of the retina which produces the finest detailed vision. Age-related macular degeneration (AMD) is a disease that affects the central vision as people grow older and is a common cause of vision loss among people aged 60 years or older. In the general population, two out of three people will develop age-related macular degeneration and one person in four will lose sight because of AMD [9]. A risk factor for AMD is smoking tobacco, with studies demonstrating that people who smoke are two to five times more likely to develop AMD than those who don’t smoke [10].

**Pterygium**

A pterygium is a triangular thickening of the bulbar conjunctiva extending from the inner canthus to the border of the cornea, with the apex towards the pupil [11]. It is likely that pterygia form as a result of prolonged exposure to ultraviolet rays from the sun, hence they are more common among individuals in the warm, dry regions of Australia and in people who spend most of their time outdoors. Other agents that may contribute to the development of pterygia include allergens, chemicals and irritants (for example, wind, dirt, dust, air pollution), and heredity may also be a factor. A pterygium does not usually produce symptoms, but in some cases the eye may become red and inflamed. The growth may need to be removed by a doctor if it is grows to the pupil edge or affects vision.

**Gonococcal conjunctivitis**

Gonococcal conjunctivitis is a highly infectious, painful and sight-threatening condition caused by Neisseria gonorrhoeae (the agent responsible for the sexually transmitted infection, gonorrhoea). It can be transmitted between individuals through non-sexual contact. Symptoms include intense inflammation of the conjunctiva and copious purulent discharge with or without periorbital oedema [12]. N. gonorrhoeae can be isolated by culture and detected by polymerise chain reaction (PCR) or gram negative diplococci can be seen by microscopy. N. gonorrhoeae only survives in warm moist conditions and will die rapidly in a dry cold atmosphere. Antibiotics are used for treatment.

**Glaucoma**

Glaucoma is a group of conditions usually associated with elevated intraocular pressure due to inadequate drainage of the clear liquid that normally flows in and out of the eye. Pressure can damage nerve cells leading to loss of vision. Usually symptoms are not noticeable. An optometrist can use an instrument called a tonometer to measure eye pressure. Diagnosis also involves the examination of the eye’s nerve fibres and drainage network. The most common form of glaucoma is open-angle glaucoma, and the risk of the condition increases with age. A family history of glaucoma increases the risk at least four times [9]. Unfortunately half of those with glaucoma are undiagnosed and therefore not receiving treatment. Without treatment they will lose vision and once this vision is lost it cannot be restored. People with glaucoma need to tell their first degree relatives (brothers, sisters, sons and daughters) about their family risk of glaucoma. People who have a family history of glaucoma need to have their eyes examined and will need regular checks.

**References**

4. Office for Aboriginal and Torres Strait Islander Health (2001) Specialist eye health guidelines for use in Aboriginal and Torres Strait Islander populations. Canberra: Commonwealth Department of Health and Aged Care
11. Thomson N, Paterson B (1998) Eye health of Aboriginal and Torres Strait Islander people. Aboriginal and Torres Strait Islander Health Reviews; 1:
The Australian Indigenous HealthInfoNet is an innovative Internet resource that contributes to ‘closing the gap’ in health between Indigenous and other Australians by informing practice and policy in Indigenous health.

Two concepts underpin the HealthInfoNet’s work. The first is evidence-informed decision-making, whereby practitioners and policy-makers have access to the best available research and other information. This concept is linked with that of translational research (TR), which involves making research and other information available in a form that has immediate, practical utility. Implementation of these two concepts involves synthesis, exchange and ethical application of knowledge through ongoing interaction with key stakeholders.

The HealthInfoNet’s work in TR at a population-health level, in which it is at the forefront internationally, addresses the knowledge needs of a wide range of potential users, including policy-makers, health service providers, program managers, clinicians, Indigenous health workers, and other health professionals. The HealthInfoNet also provides easy-to-read and summarised material for students and the general community.

The HealthInfoNet encourages and supports information-sharing among practitioners, policy-makers and others working to improve Indigenous health – its free on line yarning places enable people across the country to share information, knowledge and experience. The HealthInfoNet is funded mainly by the Australian Department of Health and Ageing. Its award-winning web resource (www.healthinfonet.ecu.edu.au) is free and available to everyone.

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