



Eye health in Australia

A background paper
to the National
Framework for Action
to Promote Eye
Health and Prevent
Avoidable Blindness
and Vision Loss

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Eye Health in Australia – A background paper to the National Framework for Action to Promote Eye Health and Prevent Avoidable Blindness and Vision Loss

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Introduction

‘Eye Health in Australia’ has been prepared as a background paper to the ‘National Framework for Action to Promote Eye Health and Prevent Avoidable Blindness and Vision Loss’. It sets out background information regarding the epidemiology of eye disease and injury in Australia, in addition to describing the current service provision and policy context, thereby providing a basis for the development of the National Framework. As a background paper, ‘Eye Health in Australia’ is by necessity intended to be broader in scope than the Framework, which has as its primary focus the promotion of eye health and the prevention of avoidable blindness.

The intended audience for the Background Paper is health planners and policy makers and others concerned with promoting eye health and preventing avoidable blindness in Australia. However it may also be of interest to overseas countries and therefore the Australian eye health care system is described in some detail.

The World Health Organization (WHO) estimated that an estimated 180 million people worldwide are visually impaired, and of these, between 40 and 45 million persons are blind (WHO 2004). It also estimated that about 80% of blindness around the world is avoidable, either resulting from conditions that could have been prevented or controlled if the available knowledge and interventions had been applied earlier (e.g. trichiasis), or successfully treated by restoring sight (e.g. cataract) (WHO 2004).

This report examines the major avoidable causes of blindness and vision loss in Australia and provides information about the eye health care workforce and the delivery of eye health programs and services in Australia. The report is divided into five sections. Section One describes the Australian and international policy context and considers definitional issues.

Section Two outlines the epidemiology and impact of eye disease and injury in Australia. It provides information on the prevalence, distribution and known risk and causal factors for the major causes of avoidable blindness and vision loss in Australia, and a brief consideration of currently available interventions for the management of these conditions. It also provides information on the social and economic consequences of blindness and vision loss in Australia.

Section Three provides an overview of the Australian eye health care workforce and major eye health programs and services.

Section Four provides information on Australia's current eye health research capacity and relevant data collections.

Finally, since eye health cannot be considered in isolation from other public health strategies, information on related strategies and initiatives is provided in Section Five.

The paper does not attempt to be an exhaustive or authoritative document but rather to present additional information to support aspects of the 'National Eye Health Framework'. The two documents are intended to be read in conjunction with each other.

Section one: Setting the scene

This section provides information about the international and Australian context to the development of the National Eye Health Framework. Also provided is a brief consideration of the definitions of blindness, visual impairment, low vision and visual acuity, which are currently in use in Australia.

The international context

The development of the National Eye Health Framework for Australia takes place against the backdrop of a legacy of initiatives in the international arena to reduce the incidence of avoidable blindness worldwide. Since its inception over 50 years ago, and beginning with trachoma control, the World Health Organization has promoted initiatives to meet the challenge of avoidable blindness.

The International Agency for the Prevention of Blindness (IAPB)

The International Agency for the Prevention of Blindness (IAPB) was established in 1975 as a coordinating, umbrella organisation to lead an international effort in mobilising resources for blindness prevention activities. Its first major achievement was to promote the establishment of a WHO Programme for the Prevention of Blindness, with which it has maintained strong links.

WHO Programme for the Prevention of Blindness

In 1978 the WHO Programme for the Prevention of Blindness was established, aimed mainly at the prevention and control of onchocerciasis, xerophthalmia, cataract and trachoma. Consistent with the Alma Ata declaration of 1978, eye health care was seen as an integral part of primary health care and the concept of “primary eye health care” was developed.

The primary eye health care approach involves:

- social and community development to promote eye health through changes in behaviour and environments;

- building community capacity to recognise and provide appropriate care for individuals at risk of eye disease; and
- the delivery of basic preventative and curative eye care by primary health care workers.

Vision 2020 – The Right to Sight

The Vision 2020 – The Right to Sight initiative, launched in early 1999, is a collaborative effort between WHO and a number of partners (including non-government organisations, professional bodies and institutions). The aim of Vision 2020 is the elimination of avoidable blindness worldwide by the year 2020.

Vision 2020 promotes the basic strategy of providing comprehensive eye care as an integral part of the primary health care system, whilst targeting three major priorities: specific disease control, human resource development and infrastructure and technology development. Although Vision 2020 is being developed as a global initiative, the implementation of the initiative needs to be actioned at the individual country level.

World Health Assembly Resolution WHA 56.26

In May 2003 the World Health Assembly passed resolution WHA56.26 on the elimination of avoidable blindness. The resolution calls on WHO member states to:

- (a) in partnership with WHO and in collaboration with NGOs and the private sector, set up a national Vision 2020 plan (the Plan) by 2005;
- (b) establish a national coordinating committee or blindness prevention committee to help develop and implement the Plan;
- (c) start implementation of the Plan by 2007 at the latest;
- (d) include in the Plan effective information systems with standardised indicators and periodic monitoring and evaluating, aiming to show reduced magnitude of avoidable blindness by 2010;
- (e) support mobilisation of resources for eliminating avoidable blindness.

Australia sponsored the WHA resolution and Australian non-government organisations (under the Vision 2020 Australia umbrella) were instrumental in gaining international support for it. The development of a National Eye Health Framework is Australia's response to WHA Resolution WHA 56.26.

The Australian context

The impact of population ageing

As in other developed countries, the most prevalent causes of blindness and vision loss in Australia are the age-related degenerative eye diseases, such as macular degeneration, glaucoma and cataract.

Australia's population is ageing both numerically and structurally. Numerical ageing is the increase in the number of older people in the population and is primarily caused by increasing life expectancy. Structural ageing is the increase in the proportion of older people in the population and is primarily the result of decreasing fertility.

From 2002 to 2032, the total Australian population is predicted to increase by 27% to approximately 25 million, whilst the **number** of people aged over 55 is predicted to double from 4.4 million to 8.9 million.

The **proportion** of the Australian population aged 55 years and over is projected to increase from over one in five in 2002 to one in three in 2032. Corresponding to this increase is the considerable decrease in the proportion of the Australian population aged 14 years and under from more than one in five in 2002 to almost one in seven in 2032.

It is estimated that currently about 9.4% of Australians aged 55 or older are visually impaired and about 1.2% are blind (AIHW 2005). With the ageing of Australia's population, the number of older people with vision problems is projected to increase over future decades, if prevalence rates remain constant, increasing the demand for eye health care services.

Population ageing will also impact on the eye health workforce, since in some eye health professions the largest numbers of practitioners are in the older age cohorts and will be proceeding through to retirement in the next 20 years.

Therefore the issue of potential gaps in supply of suitably trained practitioners will need to be considered in planning and developing the eye health workforce, not only to allow for a lack of eye health professionals, but also to meet the likely increase in demand.

The impact of the increase in diabetes

Diabetes is a significant disease that affects almost a million Australians and the numbers are increasing. In 2002 the Diabetes, Obesity and Lifestyle study (known

as AusDiab) estimated that diabetes affects 7.4% of the Australian population aged 25 years and over (Dunstan et al. 2002). Only half of the people who participated in this study were medically diagnosed. This means that for every person in Australia diagnosed with diabetes there may be another person with undiagnosed diabetes. Type 2 diabetes is most common amongst people aged 40 years or over, although recent experience suggests that diagnoses of Type 2 diabetes are increasingly being made in adolescents and children.

People with diabetes are at an increased risk of developing eye disease, particularly diabetic retinopathy, cataract and glaucoma. The AusDiab study found that 15.4% of people with diabetes (known and newly diagnosed) had retinopathy.

Changing health care systems

As in other developed countries, a number of shifts are occurring in Australia in the delivery of health care services. These include:

- an increasing emphasis on health care provision in the primary care sector;
- a reduced length of stay in acute health care facilities;
- an increasing emphasis on managed care for chronic conditions;
- an increasing focus on prevention and health promotion; and
- the adoption of new health technologies and information systems.

New technologies

Advances in eye health technologies are proceeding at an unprecedented rate, placing new demands on the eye health sector in Australia. The management of many eye diseases and injuries is expected to change substantially through the introduction of new nanotechnologies, genetic screening and gene therapies, robotics and electronic technologies.

The new technologies are also making greater demands on visual function in the workplace and socially than previously, with people requiring greater visual acuity to maintain functional capacity and employment in today's complex information society.

Consumer empowerment

Empowered consumers are demanding more knowledge about the effectiveness and safety of proposed treatments and about the track record of their health care

practitioners in the diagnosis and performance of procedures. There is increasing involvement of consumers in the planning and design of health care services that impact on them and in assessing the quality of care provided. Consumer empowerment has been one of the factors leading to the increasing development and adoption of protocols, care pathways and guidelines by health care practitioners.

The need for a coordinated approach

Development of a National Eye Health Framework for Australia occurs at a time when a number of health and other system-wide national plans and strategies are already in existence or are in preparation in Australia. These include public health strategies to address the common risk factors for chronic disease, as well as workforce initiatives and strategies aimed at system-wide change in the delivery of health services.

Many of these national strategies and initiatives are of particular relevance to eye health and the implementation of measures under these initiatives will impact on the prevention and treatment of eye conditions, just as strategies outlined in the National Eye Health Framework for Australia will potentially impact on other health initiatives. Further details of related strategies and initiatives are provided in Section Five.

Of particular relevance in this regard is the current development of a National Chronic Disease Strategy which aims to provide a consistent and system-level approach to the prevention and management of chronic disease. This approach will enable similar issues across chronic diseases to be addressed more effectively. These issues include integration and coordination of care, and addressing common risk factors such as hypertension, nutrition and exposure to sunlight and tobacco smoke.

Also, since the major sight-threatening conditions in Australia are the age-related eye diseases, strategies to promote eye health need to be linked to initiatives and approaches targeted at population ageing.

Vision terminology in use in Australia

Various definitions of the term ‘blindness’ are in use in Australia, and there are over 50 definitions of blindness in use world-wide. In general, the term “visual impairment” includes blindness, whilst the term “low vision” refers to visual impairment excluding blindness.

Definitions commonly refer to the terms visual acuity and visual field. Visual acuity 6/60 describes the ability to see objects only at 6 metres that the normal eye can see at 60 metres. Normal visual acuity is 6/6; the equivalent in imperial measurement (feet) is 20/20. A normal visual field is about 160-170 degrees horizontally.

The World Health Organization defines blindness as visual acuity of less than 3/60 (or equivalent) in the better eye with best correction, or visual field in each eye restricted to less than 10 degrees radius from fixation.

Centrelink uses the term 'legal blindness' to define vision loss when determining eligibility for special benefits and services from government. Legal blindness is defined as visual acuity after correction by suitable lenses of less than 6/60 in both eyes, or constriction to within 10 degrees radius from fixation in the better eye irrespective of corrected visual acuity, or a combination of visual defects resulting in the same degree of visual impairment as that described above (Department of Family and Community Services 2002).

Australian population surveys have used different definitions of blindness and different approaches to assessing vision loss in data collections. Some surveys assess vision loss using ophthalmic examination, while others rely on self-report methods, as in the examples below.

- The 2001 National Health Survey (NHS) defined blindness as a long-term sight problem that has lasted or is expected to last for 6 months or more. 'Blindness' included either total blindness in both or one eye, or partial blindness in both or one eye that could not be corrected by spectacles. The category 'other vision disturbances' included conditions and symptoms of vision problems that could not be categorised as 'blindness', such as difficulty reading or vision that was blurred, double, cloudy or hazy.
- The National Survey of Disability, Ageing and Carers (NSDAC) 1998 defined blindness as total loss of sight, and visual impairment as partial loss of sight not corrected by spectacles.

- The Melbourne Visual Impairment Project (MVIP) used an ophthalmic examination and defined visual impairment as visual acuity of less than 6/12 and/or homonymous hemianopia or worse. It also presented data on acuity of less than 6/18, less than 6/60 and less than 3/60. (See Section Four for more information about the MVIP).
- The Blue Mountain Eye Study (BMES) defined visual impairment as visual acuity of 6/12 or worse in the better eye. (See Section Four for more information about the BMES).
- A recent analysis of combined data from MVIP and BMES defined visual impairment as visual acuity of <6/12 and blindness as <6/60 (Access Economics 2004).

For the purposes of the development of a National Eye Health Framework for Australia **avoidable** blindness and low vision are considered to be visual impairment due to conditions that are either potentially preventable through the modification of known risk factors, or for which effective treatments exist to restore sight.

Section two: The epidemiology and impact of blindness and vision loss in Australia

Worldwide, the leading causes of blindness and low vision are cataracts, onchocerciasis ('river blindness'), trachoma, leprosy, and vitamin A deficiency.

In Australia ageing is the major contributing factor to visual impairment and blindness. The most prevalent causes of blindness and vision loss in Australia are age-related macular degeneration, cataract, glaucoma, diabetic retinopathy, uncorrected or under-corrected refractive error, eye trauma and trachoma in some remote areas.

Other causes of blindness and vision loss in Australia include retinal diseases such as retinitis pigmentosa, amblyopia, eye cancers, stroke, complications of premature birth and various infective agents such as herpes zoster and cytomegaly virus in people with HIV/AIDS. However at a population level the prevalence of these conditions is small compared with vision problems associated with ageing towards the end of life.

This section provides a brief overview of the major causes of blindness and low vision in Australia, including a brief description of the signs and symptoms, and an indication of the prevalence, risk factors and interventions for each condition. Prevalence data have in most cases been taken from the AIHW Bulletin 'Vision Problems Among Older Australians' which was released in July 2005. Readers interested in accessing further information about the methodologies involved in determining these prevalence figures are referred to that publication.

Age-related macular degeneration

Age-related macular degeneration (AMD) is a progressive condition affecting the central part of the retina (macula) which is the area at the back of the eye that provides fine vision for daily tasks such as reading, recognising faces and driving. The early stage of the disease is sometimes referred to as age-related maculopathy (ARM). In this stage vision is unaffected and people may be unaware that they have the condition.

If the disease progresses to AMD, irreversible loss of central vision occurs, usually in both eyes. People with advanced AMD often maintain sufficient peripheral vision to be able to move around independently, but they are legally blind and their capacity to undertake normal daily activities is limited.

AMD is classified as either dry (geographic atrophy) or wet (neovascular AMD). Dry AMD is the most common, caused by fatty deposits (drusen) formed in the macula. Large drusen are associated with an almost 6% risk of developing AMD over 5 years in the involved eye (Friedman et al. 2004a). Wet AMD is less common, resulting from abnormal blood vessels forming and leaking into the macula. Vision loss tends to be gradual for those with the dry form, but is often sudden for those with the wet form and vision loss may be severe.

Prevalence of AMD

It is estimated that 3.1% (147,000) of the population aged 55 years or more have AMD (AIHW 2005). Rates are similar between men and women and increase markedly for men and women older than 80 years. A further 491,900 Australians aged 55 or more (10.4%) have early ARM defined by large drusen in at least one eye. Thus 638,900 Australians aged 55 or more have either the late (147,000) or early (491,900) stage of ARM (720,900 aged 40 or more) (AIHW 2005).

Risk factors for AMD

AMD is strongly related to advancing age and family history, and the most important known preventable risk factor is tobacco consumption. The Blue Mountains Eye Study showed that current smokers had a four-fold increased risk of ARM compared to past or non-smokers (Smith, Mitchell, Leeder 1996).

Findings from a number of human studies suggest that people with low levels of carotenoids and the antioxidant vitamins C and E in their blood and who also smoke are at increased risk of developing macular degeneration (NHMRC 2003).

Experimental studies indicate that two carotenoids in particular – lutein and zeaxanthin – appear to be accumulated by the macula, and in a human study, when the dietary intake of carotenoids was analysed, the sum of the intake of lutein and zeaxanthin had the strongest protective effect against macular degeneration. Taken together, these findings suggest that in many cases macular degeneration may be prevented by eliminating smoking and ensuring an adequate intake of fruit and vegetables (NHMRC 2003).

Of particular interest are several recent reports on the presence of lutein and zeaxanthin in precise but different orientations in the membranes of the macula, which suggest that these two carotenoids may serve a special role in reducing the risk of AMD (NHMRC 2003).

There is some evidence that in people with particular indications of AMD, taking a supplement of antioxidants and certain minerals may reduce the risk of progression to advanced AMD (AREDS Research Group 2001).

Interventions for AMD

There are currently no treatments available to reverse the effects of dry MD. There are two currently available treatments for some forms of wet MD - laser photocoagulation and photodynamic therapy with verteporfin. These treatments are not a cure for wet MD, but can help reduce the risk of advancing vision loss in selected cases. A third treatment, injections of vascular endothelial growth factor blocker, has been approved in the USA.

Cataract

A cataract is a clouding of the eye's naturally clear lens. When the lens becomes opaque, the amount of light that passes through it is reduced and scattered, and the image cannot be correctly focused on the retina at the back of the eye, leading to blurred vision. The eyes may be more sensitive to glare and light, and colours may seem faded or yellowed. Double vision may also occur.

There are three types of age-related cataract: nuclear cataract (in the centre of the lens), cortical cataract (in the outer shell or periphery of the lens) and posterior subcapsular cataract (at the back of the lens in the central axis). The three types of cataract often occur together.

Prevalence of cataract

It is estimated that, in 2004, almost 1.5 million Australians aged 55 or more had cataracts, which represents 31% of that population (AIHW 2005). Age-specific rates for cataract increase with age for men and women and are well over 70% for men and women aged 80 or more. Prevalence rates are higher among women than men (AIHW 2005).

It is estimated that in 2004 there were 429,600 Australians aged 55 or more who had had cataract surgery, which represents 9.1% of that population (AIHW 2005). Cataract surgery is the main type of eye surgery needed by Indigenous Australians.

Risk factors for cataract

Cataracts are largely related to the ageing process. There is some evidence that long-term exposure to sunlight, tobacco, and heavy alcohol consumption may be associated with cataract formation. Systemic diseases such as diabetes and vascular disease may increase the risk of cataract development, as may eye injury or the use of some medications, including corticosteroids.

Several studies in humans have reported that the risk of developing ocular cataracts is significantly higher in people with low dietary intakes of fruit and vegetables, vitamins C and E and betacarotene (NHMRC 2003).

Experimental studies with model systems have added further support to the notion that above average intakes of antioxidant nutrients may delay the onset of senile cataract. More recently a modest protective effect against the development of cataracts has been observed for higher intakes of the carotenoids lutein and zeaxanthin (NHMRC 2003).

Interventions for cataract

When symptoms begin to appear, visual aids such as glasses, strong bifocals or magnifying glasses may be used to improve vision for a while. When the condition becomes serious enough to affect daily life, a surgical procedure becomes necessary to restore vision. The operation is a simple and effective procedure that can restore vision. The cloudy lens is removed and replaced with a clear, permanent intra-ocular lens. Cataract surgery is generally performed under local anaesthetic as day surgery.

Glaucoma

Glaucoma is a disease involving damage to the optic nerve and subsequent vision loss or blindness. The condition is often associated with increased intraocular pressure; however it can also occur with normal or even below-normal eye pressure.

Most cases of glaucoma are open-angle glaucoma (OAG), also called chronic glaucoma. OAG usually begins with the loss of peripheral vision, which is often unnoticeable. As permanent nerve damage occurs, symptoms become obvious. Tunnel vision might develop, and only objects that are straight ahead can be seen.

Primary closed-angle glaucoma is less common and usually occurs in an acute form, which presents with the sudden onset of symptoms such as decreased vision, extreme eye pain, headache, nausea and vomiting, and glare and light sensitivity.

Prevalence of glaucoma

The prevalence rate for glaucoma in 2004 was estimated to be 2.3% (109,300) for the Australian population aged 55 years or more (AIHW 2005). There is no statistically significant difference in prevalence rates between men and women.

Risk factors for glaucoma

Advancing age is associated with the development of glaucoma, although it can occur at any stage of life. Other risk factors include high intra-ocular pressure, heredity, extreme short-sightedness, conditions such as diabetes and hypertension, eye injury and the use of steroids.

Although high intra-ocular pressure is often associated with glaucoma, it is now considered a risk factor rather than a diagnostic criterion for the condition.

Interventions for glaucoma

Automated visual field testing (perimetry) is used to assess the progress of glaucoma.

There are a range of treatments that have been shown to be effective in slowing down or halting the progress of glaucoma, including the use of medications such as prostaglandins, or surgical techniques, including laser surgery. The medicinal use of cannabinoids needs to be ascertained for the treatment of intra-ocular pressure in cases of glaucoma where individuals may be refractory to traditional methods of managing the disease.

The Blue Mountains Eye Study found that only half of the cases with signs of glaucoma in the population surveyed had previously been diagnosed (Mitchell, Smith, Attebo and Healey 1996). Vision loss caused by glaucoma cannot be restored.

Diabetic retinopathy

Diabetic retinopathy (DR) is a common diabetes complication that affects the small blood vessels of the retina. It remains one of the leading causes of vision loss despite the availability of effective treatment.

In the early stages, known as non-proliferative DR, the blood vessels of the retina swell and leak fluid. This stage is not usually associated with visual impairment and there are no symptoms. As the disease progresses (known as proliferative DR) abnormal blood

vessels grow on the surface of the retina and, without treatment, these can bleed causing cloudy vision or blindness. Abnormal fibrous tissue may also develop, leading to retinal detachment and severe vision loss. Blurred central vision may occur when the macula swells from leaking fluid (called macular oedema) or due to macular ischaemia from poor perfusion consequent upon perifoveal capillary loss.

Prevalence of diabetic retinopathy

It is estimated that about 133,900 Australians aged 55 or more had diabetic retinopathy in 2004, which represents 2.8% of that population (AIHW 2005). The prevalence of DR was greater in the older age groups. Published results from the Diabetes, Obesity and Lifestyle Study reported that the prevalence of DR was similar in men and women (Tapp et al. 2003). Also, any form of DR occurred in 22% of those with known type 2 diabetes and 6% in those who had not previously been diagnosed.

The prevalence of proliferative retinopathy was 2.1% in those with known type 2 diabetes and there were no cases identified among those who had not been previously diagnosed (Tapp et al. 2003). DR is the primary vision-threatening condition for Aboriginal and Torres Strait Islander people (OATSIH 2001).

Risk factors for diabetic retinopathy

Everyone with diabetes is at risk of developing DR. People with diabetes who are most at risk include those who have had diabetes for many years; those whose diabetes is poorly controlled; those with kidney damage; and those with high blood pressure or high blood cholesterol (NHMRC 1997).

Poor control of blood sugar is the most critical risk factor for the development and progression of DR (NHMRC 1997).

Interventions for DR

The efficacy of timely laser photocoagulation in preventing vision loss from DR is well established. Early detection of sight-threatening retinopathy by regular eye exams is the key to reducing avoidable blindness and low vision from DR (NHMRC 1997). All people with diabetes need to have an eye examination on diagnosis and at least every two years if no retinopathy is present and more frequently if retinopathy is found. Annual eye examinations are recommended for Aboriginal and Torres Strait Islander people with diabetes (NHMRC 1997).

Refractive error

Refractive errors are optical defects that result in light not being properly focused on the eye's retina. The most common are hypermetropia (long-sightedness), myopia (short-sightedness), astigmatism (uneven focus) and presbyopia (an age-related problem with near focus). It is estimated that nearly 300,000 Australians may have visual impairment because of under-corrected refractive error.

With the exception of presbyopia, refractive errors usually develop during childhood, when the eyes are growing. The exact causes of refractive errors are still being studied, but it is known that both hereditary and environmental influences can affect their development.

Although long-sightedness and short-sightedness are not specifically age-related, they remain common conditions in later life. Long-sightedness, short-sightedness and presbyopia were included among the five most common long-term medical conditions reported by people aged 55 years or more in the 2001 National Health Survey (AIHW 2005).

As refractive error is the most common cause of visual impairment in Australia, access (both cost and physical) to affordable corrective devices such as spectacles is an important issue. Spectacles (glasses) and contact lenses are commonly provided through optical dispensers at market prices. Some private health insurance schemes provide a subsidy for the cost of the appliances. State and Territory governments have schemes to provide spectacles at low cost for people on low incomes.

Laser surgery

Several surgical techniques have been developed to treat refractive error in suitable candidates. The two most common types of laser refractive surgery in Australia are PRK (PhotoRefractive Keratomy) and LASIK (Laser-Assisted In-Situ Keratomileusis). Many factors can affect the outcomes of surgery, including surgical skill, clinical equipment (blades, lasers, controlling computers) and clinical conditions (the presence of dust, use of aerosols, humidity etc).

The cost of laser refractive surgery in Australia is usually borne by the patient, since laser surgery is not usually covered by private health insurance.

Presbyopia

Presbyopia is a condition in which the natural lens of the eye loses its flexibility so that focusing on close objects becomes difficult. It develops over a number of years and usually becomes noticeable during middle age, beginning in the 40s.

The signs of presbyopia include tendency to hold reading materials at arm's length, blurred vision at normal reading distance, and fatigue, eyestrain or headache when performing close work.

Prevalence of presbyopia in Australia

Based on the latest National Health Survey, the prevalence of presbyopia in 2004 among older Australians (aged 55 or more) is estimated to be 1,317,000, which represents 27.9% of that population (AIHW 2005). There is a clear increase in the prevalence rate with age, from 15.3% of those aged 45-49 to 40.1% of those aged 80 and over, with men and women having similar patterns (AIHW 2005). It should be noted that these figures are based on self-report and are likely to be significant underestimates and are perhaps best considered as estimates of symptomatic presbyopia (AIHW 2005).

Risk factors for presbyopia

Presbyopia is believed to be part of the natural process of ageing. However several factors are thought to increase the likelihood of developing presbyopia, including long-sightedness, an occupation which has near vision demand, ocular disease or trauma which causes damage to lens or its surrounding muscles, conditions such as diabetes and multiple sclerosis, and use of drugs such as alcohol, anti-depressants and antihistamines. Greater exposure to ultraviolet radiation and higher temperature climate may also increase the risk of the condition.

Interventions for presbyopia

The most common treatment for presbyopia is eyewear such as reading glasses, bifocal glasses or progressive addition lenses (multifocal glasses). Contact lenses may also be used.

Myopia (short-sightedness)

Myopic people do not see distant objects clearly. This can make it hard, for example, for affected people to read road signs, play ball games and recognise people in the distance.

This is because a myopic eye is longer than normal or has a cornea that is too steep (thick), so that light is focussed in front of the retina and the image is blurred.

People with high myopia have a higher risk of detached retina or AMD. They therefore need regular eye examinations to watch for changes in the retina. People with myopia can also develop cataract or glaucoma at an earlier age than people with normal vision.

Prevalence of myopia in Australia

Myopia is very common in Australia; with about 15-20% of the adult population being short sighted (ABS 2003).

Risk factors for myopia

The causes of myopia are unknown. Excessive amounts of reading, poor metabolism, poor diet; poor light, poor posture and genetic factors have been suggested.

Interventions for myopia

The most common treatment for myopia is corrective eyewear. Laser surgery is becoming increasingly popular.

Hypermetropia (long-sightedness)

Prevalence of hypermetropia in Australia

The 2001 National Health Survey found that less than 8% of people in all age groups under 45 reported being long-sighted. However, 41% of those aged 45-49 reported being hypermetropic and a greater percentage again in age groups up to the sixties. Hypermetropia was reported in 43% of people aged 85 and over (ABS 2003).

Interventions for hypermetropia

The most common treatment for hypermetropia is corrective eyewear. Laser surgery may also be used.

Astigmatism

Astigmatism is a focusing error that causes asymmetric blur, so that some directions in an image are more out of focus than others. This causes images to appear distorted, or sometimes even double. It is possible to have astigmatism in combination with myopia or hypermetropia.

Astigmatism is usually caused by the shape of the front surface of the eye (the cornea) but it can also be caused by slight tilting of the lens inside the eye. It may be an inherited characteristic or a normal variation accompanying growth.

Astigmatism can be corrected by spectacles or contact lenses (hard and soft).

Trachoma

Trachoma is a chronic conjunctivitis caused by repeated episodes of infection with the bacteria *Chlamydia trachomatis* that can lead to conjunctival scarring.

Trichiasis is a sight-threatening complication of trachoma where the lid margin and eyelashes turn inwards. The rubbing of the eyelashes on the cornea leads to corneal damage and blindness in later life. Secondary infections may also contribute to vision loss. However, active trachoma does not inevitably lead to cicatricial disease and blindness.

Prevalence of trachoma in Australia

In Australia, trachoma and trichiasis affect mainly Aboriginal and Torres Strait Islander peoples in some remote areas. The exact prevalence of trachoma and trichiasis is not known.

Risk factors for trachoma

Trachoma is strongly associated with sub-optimal housing and living environments. Routes of transmission include: conveyance by fingers, indirect spread on fomites, coughing and sneezing and by eye-seeking flies.

Interventions for trachoma

Trachoma control in endemic regions requires a holistic, coordinated and sustained public health response with the involvement of public health units, primary health care services and housing and essential services in affected geographical regions to reduce the risk.

The WHO recommends the adoption of the SAFE strategy (Surgery, Antibiotics, Facial Cleanliness and Environmental improvement) for trachoma control. There are a range of surgical procedures currently in use to correct trichiasis. Antibiotic treatment may

reduce the transmission of infection. Face washing is likely to be effective in controlling trachoma, when promoted as part of a holistic program of personal hygiene.

Environmental factors associated with trachoma include household flies breeding unchecked in public latrines, uncollected household refuse and on neglected domestic animals; overcrowded housing; contaminated water supplied to households; community education around the importance of personal and community hygiene not re-inforced or maintained.

There is no national approach to trachoma control. In some states and in the Northern Territory where trachoma is still prevalent a variety of trachoma control activities are implemented.

The Department of Health and Ageing is currently working with the Communicable Diseases Network Australia (CDNA) to develop guidelines for a nationally consistent approach to the surveillance and public health management of trachoma within Australia. The CDNA is the peak national body for the public health management of communicable diseases. The CDNA reports to the Australian Health Ministers' Advisory Council through the National Public Health Partnership. The CDNA intends to consult with key national stakeholders before finalising the guidelines.

Eye trauma

It is estimated that 500,000 blinding ocular injuries occur worldwide each year and that ocular trauma is a leading cause of monocular vision loss (Thylefors 1992).

The age distribution of ocular trauma is bimodal, with the greatest risk occurring among the young and people over 70 years of age. Most ocular trauma occurs in young people (Fong 1995) and could be prevented by proper use of safety eyewear. Alcohol is often a major contributing factor.

Prevalence of eye trauma

A 1995 prospective survey of eye injuries treated in Victorian hospitals (Imberger, Altmann and Watson 1998) found that:

- the workplace accounted for 44% of all injuries and 19% of severe trauma, including ruptured globes and internal bleeding;
- sports injuries accounted for 5% of all injuries, but 19% of severe injuries;

- the incidence estimate for penetrating eye injuries was 3.6 per 100,000 population; and
- the incidence of eye injuries requiring hospitalisation was 15.2 per 100,000.

Causes of eye trauma

Agents of eye damage may be broadly classified into the following four categories:

- impact or blunt force;
- foreign bodies;
- chemicals injurious to the eye; and
- radiation.

In a study of eye injuries presenting to emergency departments of hospitals, the National Injury Surveillance Unit (NISU) of the Australian Institute of Health and Welfare found a pattern of injury similar to that in the United States. Of the 1000 eye injuries estimated to occur in US workplaces each day, 70% are caused by flying particles smaller than a pin head and one fifth are caused by exposure to chemicals. Many of these injuries occurred when workers were not wearing appropriate eye protection, but more than 50% of workers injured while wearing eye protection felt that another type of eye protection could have better prevented or reduced the injury suffered (Research Centre for Injury Studies 1997).

Risk factors for ocular trauma

There are many occupations where eyes are at risk. Workers at risk include those who work with:

- mechanical equipment;
- chemicals; and
- sources of radiation, mainly ultraviolet radiation from welding and infra-red radiation from furnaces.

Construction, automotive repair and manufacturing occupations have the highest rate of workplace eye injuries in the United States. Military personnel are also at risk in conflict settings, with injuries much more likely to be bilateral than in peacetime. The rate of penetrating eye injuries appears to be on the increase due to changing weaponry.

Sports are a common cause of severe ocular injuries in the developed world. Injuries range from abrasions of the cornea and bruises of the eyelids to internal eye injuries, such

as retinal detachments and internal bleeding. Many of these injuries lead to vision loss and permanent blindness. Sports presenting particular risks include basketball, baseball, football, soccer, hockey, tennis, golf, water sports and gun sports. Assault may also lead to ocular trauma, and often with a particularly poor outcome.

Prevention of eye trauma

Nearly all cases of eye damage that occur in Australia each year are preventable. Damage to the eye can be avoided by suitable design and engineering controls, following well-established safe working and playing procedures and, where necessary, wearing suitable eye protection.

Australia has an Australian Standard for eye protectors for racquet sports (AS/NZS 4066:1992, amended 1994). This Standard specifies requirements for eye protectors designed for use by players of racquet sports; requirements for eye protectors for indoor and outdoor cricket are not included. AS4066 deals with materials, construction, attachment, optical properties, testing, labelling and marking, and optical, field of view, area of coverage and impact resistance requirements.

The Standards for eye protection in industrial applications are given in AS/NZS 1336 (1997) and AS/NZS 1337 (1992), and eye protectors for motor cyclists and racing car drivers are specified in AS 1609 (1981, amended 1982). Safety of laser products is given in AS/NZS 2211 (1997-2004) and AS 2397 (1993) sets standards for safe use of lasers in the building and construction industry.

AS1337 aims to assist in the provision of safe, efficient and comfortable vision in the industrial situation, including consideration of the need for protection against sunglare and optical radiation in the natural environment. The Standard specifies minimum requirements for eye protectors and associated lenses designed to protect eyes against common industrial hazards such as flying particles and fragments, dusts, splashing materials and molten metals, harmful gases, vapours and aerosols. Requirements for optical qualities and low, medium and high impact resistance are given and appendices describing appropriate test methods are included.

AS1336 sets recommended practices for protecting eyes against the same range of hazards as well as high-intensity radiation generated during welding operations and furnace work. It also gives guidance on selecting eye protectors appropriate to the use of particular lasers.

Retinitis pigmentosa

Retinitis Pigmentosa is a progressive degeneration of the retina due to the inability or reduced ability of the body to provide the retina, in both eyes, with the necessary protein to sustain the health of the retina. The condition affects night vision and peripheral vision. Signs and symptoms usually appear first in childhood, but severe visual problems do not usually develop until early adulthood. Retinitis Pigmentosa is the leading cause of youth blindness in Australia.

Risk factors

So far the only discovered risk factor for retinitis pigmentosa is family history. Over 150 specific genes have been identified in affected families. Family planning with genetic counselling can assist to determine the risk of the disease occurring.

Interventions

There is currently no effective treatment for retinitis pigmentosa. However use of sunglasses to protect the retina from ultra violet light may have a vision preserving effect. Promising research advances include – transplantation of stem cells or retinal elements and effect on progression of injected growth factors, and, in the future, specific gene therapy.

Amblyopia

Amblyopia, sometimes known as lazy eye, is a condition of reduced or dim vision in an eye which appears to be normal. It can be caused by any condition that leads one eye to be favoured and the image from the other eye to be suppressed by the brain. Common causes include squint (strabismus), different refractive errors in each eye and childhood cataract. The condition is thought to affect between 2% and 4% of the Australian population.

Interventions

If amblyopia is detected early in childhood, near complete recovery of normal vision is usually possible. The most common treatment involves patching the good eye to force the child to use the amblyopic eye. In some instances, eyeglasses are prescribed to correct refractive errors. Sometimes muscle surgery may be necessary. Orthoptics therapy can re-train the eyes to work together.

The social and economic impact of blindness and vision loss in Australia

Diseases of the visual system, and possible subsequent vision loss, represent substantial social and economic concerns to the Australian public. Based on the results of the 2001 National Health Survey, 9.7 million Australians had at least one sight problem (ABS 2002).

Vision loss is among the major causes of disability. According to the 1998 Survey of Disability, Ageing and Carers 'loss of sight' was the reason or part of the reason for disability given by 2% of the total population (349,800 people). It was the principal cause of disability in 113,200 people and about 39,600 people had a severe or profound 'core activity restriction' due to loss of sight.

Recent independent economic analysis undertaken by Access Economics for the Centre for Eye Research Australia estimated the total cost of vision disorders in Australia to be \$9.85 billion for 2004, including both direct and indirect costs (Access Economics 2004).

Direct health costs of visual impairment include health system costs, including pharmaceuticals, imaging and pathology, optometry and medical services, inpatient and outpatient procedures and aged care costs.

Indirect costs of visual impairment include financial costs, such as earnings and taxation forfeited and premature mortality rates, as well as the costs of carers, aids and building modifications. Non-financial indirect costs are difficult to measure and include the pain, suffering and loss of life quality that may result from visual impairment.

Section three: The delivery of eye health programs and services

This section briefly outlines the roles of the various professional groups engaged in the delivery of eye health care in Australia and their areas of responsibility and training requirements. Also provided is information about a range of current and recent eye health care programs. The intention is to provide contextual information that aids understanding of the challenges outlined in the ‘National Eye Health Framework’ rather than to provide a comprehensive guide to eye health care services.

Provision of eye health care in Australia

By international comparison Australia has excellent eye health services, with highly qualified eye care specialists providing the full range of interventions. Responsibility for eye health programs and services in Australia is currently spread across governments, the private sector, health care professions and non-government organisations.

Private health insurance is an important component in the funding of eye health care in Australia. Costs incurred by patients receiving private doctors’ services and some optometrical services, whether in or out of hospital, are generally reimbursed either fully or in part by means of Medicare benefits. Private insurance may also assist with meeting the costs of private sector services such as corrective eyewear.

All states and territories have subsidised spectacle schemes for people who meet eligibility requirements. These schemes vary across the states and territories.

Where eye disease cannot be prevented or treated, the quality of life for people with low vision can be greatly improved with appropriate rehabilitation and support. In Australia, many services and devices are available to help people maintain their independence. The types of supports provided by low vision services include adaptive technology, assistance with employment, in-home support, guide dogs, mobility training and alternative print and library services.

Numerous non-government organisations, often staffed by dedicated volunteers, provide community based services to promote eye health, provide information about specific eye conditions and available treatments, fund research activities and support people with low vision.

Medicare Benefits Schedule

The Australian Government expends approximately \$410 million per year for the full range of ophthalmology consultation, diagnostic and procedural items through the Medicare Benefits Schedule (MBS), as well as a range of items performed by participating optometrists under the Optometry Schedule of the MBS.

The Medicare Benefits Schedule lists a wide range of consultations, procedures and tests, and the Schedule fee applicable for each of these items. Proposed listings of new medical procedures and new technologies on the Schedule are assessed by the Medical Services Advisory Committee on the basis of evidence of safety, effectiveness and cost-effectiveness.

Optometry was the first profession other than medicine to have its consultative services covered by Medicare benefits, and remains the only non-medical profession to have unrestricted access to Medicare benefits payable for their professional services.

Nearly all Australian optometrists have agreed to participate as providers of optometric care under Medicare. Participation in this scheme also requires adherence to standards of practice and limitations on consultation fees that may be charged. Medicare pays benefits to patients for examinations given by optometrists. This does not include fees for spectacles or contact lenses.

The MBS currently provides for a comprehensive optometric consultation every two years for patients generally, and consultations as clinically required for people with significant changes in vision, new signs and symptoms or progressive disorders. This interval between examinations is consistent with national and international good practice. There are no restrictions on consultations with general practitioners or specialist ophthalmologists. These are available under Medicare as clinically required.

Pharmaceutical Benefits Scheme

The Australian Government subsidises a very wide range of necessary prescription medicines for the Australian community through the Pharmaceutical Benefits Scheme (PBS). A range of ophthalmological drugs are subsidised under the PBS for the treatment of many eye conditions. New medicines are being added to the PBS all the time.

All patients are required to pay a co-payment towards the cost of a PBS prescription. In 2005, the co-payment is \$28.60 for general patients and \$4.60 for concession card

holders. The Government subsidises the difference between the cost of a PBS listed medicine and the patient's co-payment.

In 2003-04 the Government cost of ophthalmological drugs listed on the PBS was \$89.3 million. There were over 6.2 million prescriptions for these drugs.

The eye health workforce

Issues relating to the Eye Health Care Workforce need to be considered in the context of national health workforce initiatives currently in progress to improve and streamline health care delivery. Health workforce is a high priority for Australian Health Ministers and in recent years there has been an ongoing investment in the coordination of national health workforce action.

The National Health Workforce Strategic Framework is designed to guide national health workforce policy and planning and Australia's investment in its health workforce through the decade. The framework recognises that a collaborative, multidisciplinary approach is needed to effectively tackle health workforce issues.

Guiding principles are critical to the success of the framework. The principles are the core of the framework and provide a simple set of rules, guidelines and aims which allow all stakeholders to apply them to their own circumstances with a minimum of prescription.

1. Australia should focus on achieving, at a minimum, national self sufficiency in health workforce supply, whilst acknowledging it is part of a global market.
2. Distribution of the health workforce should optimise equitable access to health care for all Australians, and recognise the specific requirements of people and communities with greatest need.
3. All health care environments regardless of role, function, size or location should be places in which people want to work and develop; where the workforce is valued and supported and operates in an environment of mutual collaboration.
4. Cohesive action is required among the health, education, vocational training and regulatory sectors to promote an Australian health workforce that is knowledgeable, skilled, competent, engaged in life long learning and distributed to optimise equitable health outcomes.

5. To make optimal use of workforce skills and ensure best health outcomes, it is recognised that a complementary realignment of existing workforce roles or the creation of new roles may be necessary. Any workplace redesign will address health needs, the provision of sustainable quality care and the required competencies to meet service needs.
6. Health workforce policy and planning should be population and consumer focused, linked to broader health care and health systems planning and informed by the best available evidence.
7. Australian health workforce policy development and planning will be most effective when undertaken collaboratively involving all stakeholders. It is recognised that this will require:
 - cohesion among stakeholders including governments, consumers, carers, public and private service providers, professional organisations, and the education, training, regulatory, industrial and research sectors;
 - stakeholders' commitment to the vision, principles and strategies outlined in this framework;
 - a nationally consistent approach;
 - best use of resources to respond to the strategies proposed in this framework; and
 - a monitoring, evaluation and reporting process.

In order to ensure the best eye health outcomes, to improve and streamline health care delivery and optimal use of the health workforce, there needs to be a focus on preventive eye health care which involves cooperative effort between those in the specialist eye health care workforce and the generalist health workforce.

The specialist eye health care workforce

Specialist professions engaged in the delivery of eye care include ophthalmologists, optometrists, orthoptists, ophthalmic nurses and optical dispensers. The services they provide include prevention, education, research, treatment, rehabilitation and palliation. There is some overlap across the roles of the various eye health care practitioners.

Traditionally there has been a close working relationship between ophthalmologists, orthoptists and ophthalmic nurses in the public and private sectors, but optometrists have tended to work independently in primary care with less direct interaction with

other eye care professions. Ophthalmologists often employ orthoptists and ophthalmic nurses in their private practices and day surgeries. Ophthalmologists, optometrists and orthoptists can all prescribe glasses and a range of nonsurgical forms of eye care, while ophthalmologists, general practitioners and suitably qualified optometrists can prescribe medications.

Ophthalmologists

Ophthalmologists are medical practitioners who have undertaken postgraduate medical training to specialise in eye health and vision. The ‘ABS Australian Standard Classification of Occupations’ (ASCO) 2nd edition describes the work of ophthalmologists as ‘to provide diagnostic, treatment and preventative medical services related to diseases, injuries and deficiencies of the human eye and associated structures’.

They are trained and registered to provide total care of the eyes, from performing comprehensive eye examinations to prescribing corrective lenses, diagnosing diseases and disorders of the eye, and carrying out the medical and surgical procedures necessary for their treatment. Their work includes prevention of blindness, promotion of eye health, and the rehabilitation of people with visual disability. Almost all ophthalmologists are in the private sector, either as a self-employed small business or within larger practices or health care companies.

Ophthalmologists practice both medicine and surgery. They provide primary care as well as highly specialised treatment. Ophthalmologists are the only providers of surgical correction of eye disease, and for most ophthalmologists, cataract removal is the most commonly performed surgical procedure.

Scientific and technological advances have opened a wide range of clinical and research opportunities in a number of ophthalmology sub-specialties. These include cornea and external disease, glaucoma, neuro-ophthalmology, ophthalmic pathology, ocular inflammation, oculo-plastics, orbital surgery, refractive surgery, paediatric ophthalmology, vitreoretinal disease, ocular oncology and developing world ophthalmology.

Training

Medical practitioners seeking to gain the specialist qualification to practise as ophthalmologists complete the postgraduate vocational training program offered by

the Royal Australian and New Zealand College of Ophthalmologists (RANZCO). The College introduced new eligibility and training requirements for ophthalmologists during 2000-04. Under the new arrangements, doctors wishing to apply for an accredited ophthalmology training post need to possess medical qualifications registrable in Australia or New Zealand, and have completed at least two years of postgraduate pre-vocational medical and surgical training (including the intern year) in hospitals approved by the College.

Once accepted, ophthalmology trainees undertake five years of training. (Prior to 2004 the training took place over four years). The training program is conducted across Australia and New Zealand, with the cooperation of selected hospitals, universities and Fellows of the College. The clinical elements of the College program are conducted in selected hospitals and university ophthalmology departments accredited by the College as specialist ophthalmology training posts.

Continuing Professional Development (CPD) Framework

The Department of Health and Ageing is currently piloting a Continuing Professional Development (CPD) Framework in specialist medical colleges. The aim is for specialist medical colleges and Fellows to use a CPD Framework to improve the range and availability of CPD activities, and to move the narrow focus of continuing education toward a concept of 'medical professionalism'. The Framework also has the potential to improve the standard and consistency of CPD activities within and across the medical colleges. The development and the application of the CPD Framework contributes to the maintenance of a suitably trained, skilled and equipped workforce to meet the demands required in the management of eye health.

Ophthalmic nurses

Ophthalmic nurses care for patients with disorders and diseases relating to the eye. They test vision and perform other eye tests under medical direction. Ophthalmic nurses work in specialist eye hospitals, day surgery centres, general hospitals where beds are allocated to ophthalmic patients, and medical practices. Ophthalmic nurses play a key role in the delivery of ophthalmic surgical services in public and private facilities.

Ophthalmic nurses complete general nurse training then additional training to specialise in the nursing care of patients who have eye problems, whether they are in hospital, clinics or the community. Postgraduate ophthalmic nursing courses are available

through The College of Nursing (incorporating the NSW College of Nursing), Sydney Hospital and some universities.

Optometrists

Optometrists assess the eye and the visual system, sensory and ocular motor disorders and dysfunctions of the eye and the visual system; diagnose refractive disorders; and prescribe and dispense corrective and preventative devices. The 'ABS Australian Standard Classification of Occupations' (ASCO) 2nd edition describes the work of optometrists as 'to perform eye examination and vision tests to determine the presence of visual, ocular and other abnormalities, and to prescribe lenses, other optical aids or therapy'.

In Australia optometrists are educated to degree level at one of the three institutes conducting optometric courses: the University of Melbourne (five years), the University of New South Wales and the Queensland University of Technology (four years each). Optometrists may proceed to higher degrees (MSc, Moptom, PhD) at each of the schools of optometry.

The states and territories are responsible for control of optometric practice and registrations. Each State of Australia has an Optometrists' Registration Act that controls the practice of optometry and is administered by a Registration Board. Currently the registration authorities in all states and territories accept graduates of Australian optometry courses and the University of Auckland for registration. All other optometrists are required to pass an examination before being registered.

When an optometrist finds a visual complaint that requires medical or surgical treatment the patient is referred to a general practitioner or an ophthalmologist. Whilst optometrists in Australia may use ophthalmic drugs to facilitate diagnostic procedures, in most states they are not permitted to use other drugs. In recent years, though, the legislation controlling optometry in some states has been changed to allow optometrists to prescribe a limited range of eye medications for uncomplicated eye conditions. Optometrists practising in these states undergo further training to allow them to extend their scope of practice in this way.

Australian optometrists may specialise in providing care to particular groups of patients such as children or people with low vision; research; assessment and care of patients with perceptual problems; counselling on subjects such as occupational vision; educational problems that are visually related; or consulting in industry.

Over time Australian optometrists have come to see their major role of being that of a primary health care provider. This contrasts with earlier times when they promoted themselves primarily as sellers and suppliers of spectacles, although most optometrists still supply the patient with the items which are prescribed to assist vision (most commonly spectacles and contact lenses).

Most Australian optometrists are self-employed or partners in private practice, although most new graduates work initially as employees of optometrists in private practice, with large optical chains, in public clinics and occasionally with ophthalmologists. Unlike some other countries, optometrists in Australia do not commonly work in hospitals and similar institutions. Most Australian optometrists make occasional domiciliary visits for bedridden patients.

The Australian Government recognised the profession's health care role in 1975 by including optometry in the Medicare program. In 1996-97 Australian optometrists provided nearly 3.2 million initial consultations, which meant that approximately 16 per cent of the Australian population utilised optometric services. It is estimated that optometrists provide over 75 per cent of all vision care services in Australia.

Orthoptists

Orthoptics is an allied health profession that specialises in the diagnosis and management of disorders of eye movements and associated vision problems; performance of investigative procedures appropriate to disorders of the eye and visual system; and rehabilitation of patients with vision loss. The ABS Australian Standard Classification of Occupations (ASCO) 2nd edition describes the work of orthoptists as 'to diagnose and manage eye movement disorders and associated sensory deficiencies'. Orthoptic treatment of certain conditions can relieve visual symptoms and enhance visual performance.

In performing these functions orthoptists are an integral part of the eye health team providing investigative testing of diseases such as glaucoma, assessment and management of eye movement disorders (for example, following a head injury) and rehabilitation of persons with sight loss due to eye diseases such as age-related macular degeneration.

Initial orthoptic education in Australia is currently through a Bachelor degree course undertaken at the University of Sydney (4 years) or at the La Trobe University in

Melbourne (3.5 years). Graduates are eligible for registration as orthoptists and membership of the orthoptic professional body, the Orthoptic Association of Australia Inc. This membership carries with it automatic recognition by private health funds throughout Australia. The Australian Orthoptic Board provides a register of accredited professional continuing education activities for orthoptists.

Under state/territory legislation orthoptists are not able to refract and prescribe spectacles and visual aids in every Australian state. Following changes to Victorian legislation in 1996, orthoptists in Victoria are now allowed to prescribe glasses at the request or referral from an ophthalmologist or optometrist (where the request or referral has been made within six months before that measurement or prescription).

Orthoptists work in many areas including neonatal care, paediatrics, rehabilitation, geriatrics, neurological impairment, community services and ophthalmic technology. They are mainly employed by ophthalmologists, low vision clinics or public health services such as public hospitals or community health services. A small proportion of orthoptists are in private practice.

Optical dispensers

Optical dispensers (also called opticians or spectacle makers) make spectacles as prescribed by optometrists or ophthalmologists. Optical dispensers complete a technical course which enables them to make up spectacles to an optometrist's or ophthalmologist's prescription. They are not permitted to examine eyes or to write the prescriptions.

The generalist workforce

Anyone in the generalist health care workforce may be called upon to provide eye health care or to refer patients for eye examination. Generalist health professionals such as general practitioners, nurses, ambulance workers, pharmacists, Aboriginal and Torres Strait Islander health workers and the Royal Flying Doctor Service often provide basic services and advice relating to eye health. Others such as occupational therapists and physiotherapists may detect problems that could be vision-related, and recommend eye checks.

Nurses in many different settings may be called upon to provide eye care. These include occupational health nurses, community nurses and hospital nurses who work in emergency departments. Nurses who provide care to unconscious patients have a particular responsibility to ensure that appropriate eye care is routinely undertaken to prevent corneal scarring and other vision problems.

Pharmacists are involved in eye care through their role dispensing prescription and over-the-counter therapeutic goods and as primary care providers.

It is estimated that 1.8% of reasons for visits to GPs relate specifically to eye conditions, with removal of foreign bodies in the eye one of the most common services provided by GPs.

GPs also play an important role in indirect eye care, through their care of patients whose conditions or medication can affect eye health, such as diabetes.

Referral pathways

No referral is needed for consultations with GPs, optometrists or ophthalmologists. However, Medicare benefits are only payable for an initial consultation with an ophthalmologist if there is a referral from a GP, optometrist or current specialist. In general, referrals from GPs and optometrists are valid for 6-12 months, and for 3 months from other specialists.

Optometrists can formally refer patients to ophthalmologists or other optometrists, with people needing surgery or treatment of eye disease being referred to ophthalmologists. General practitioners and other specialists can make referrals to ophthalmologists and optometrists: 7.3% of referrals from general practitioners are to ophthalmologists and 0.9% are to optometrists. Eye health professionals may also refer people to non-government support groups.

Workforce supply

Membership records supplied by the Royal Australian and New Zealand College of Ophthalmologists indicate that as of 30 June 2005 there were 710 ophthalmologists in Australia, as follows:

	NSW	VIC	QLD	WA	SA	TAS	ACT	NT	Total
Males	235	145	106	54	50	10	9	4	613
Females	45	31	7	5	5	2	2	-	97
Total	280	176	113	59	55	12	11	4	710

Based on 2001 census data, the Australian Institute of Health and Welfare (AIHW 2003) estimated the numbers of eye health professionals, their age and their distribution around Australian states and territories in 2001 as follows:

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Ophthalmologists									
Males	113	86	64	34	34	3	3	—	337
Females	43	30	12	—	6	—	—	—	91
Total	156	116	76	34	40	3	3	—	428
Per 100,000	2	3	2	2	3	2	3	3	2
Optometrists									
Males	576	367	325	152	105	33	20	11	1,589
Females	410	300	198	91	58	22	20	7	1,106
Total	986	667	523	243	163	55	40	18	2,695
Per 100,000	15	14	15	13	11	13	14	10	14
Orthoptists									
Males	25	21	9	3	—	—	—	—	58
Females	177	146	24	12	9	3	12	—	383
Total	202	167	33	15	9	3	12	—	441
Per 100,000	3	4	1	1	—	1	3	—	2

Note: Does not include those whose age or sex was not stated.

Source: ABS, Census of Population and Housing, 2001

The age distribution of these professions was as follows:

	15-24	25-34	35-44	45-54	55-64	65+	Total
Ophthalmologists							
Males	—	36	107	82	62	50	337
Females	6	25	28	23	6	3	91
Total	6	61	135	105	68	53	428
Optometrists							
Males	99	432	568	313	115	62	1,589
Females	160	489	292	145	11	9	1,106
Total	259	921	860	458	126	71	2,695
Orthoptists							
Males	9	37	9	—	—	3	58
Females	66	158	90	49	16	4	383
Total	75	195	99	49	16	7	441

Note: Does not include those whose age or sex was not stated.

Source: ABS, Census of Population and Housing, 2001

The hours that they work are as follows:

	1-15	16-24	25-34	35-40	41-48	49+	Not stated(a)	Total
Ophthalmologists								
Males	24	23	17	61	39	166	7	337
Females	9	8	12	20	12	25	5	91
Total	33	31	29	81	51	191	12	428
Optometrists								
Males	59	53	99	468	448	411	51	1,589
Females	138	112	176	382	166	83	49	1,106
Total	197	165	275	850	614	494	100	2,695
Orthoptists								
Males	4	3	6	21	7	13	4	58
Females	50	70	71	115	41	11	25	383
Total	54	73	77	136	48	24	29	441

(a) Includes those who were on leave and worked zero hours.

Source: ABS, Census of Population and Housing, 2001

The change in numbers of these professionals between 1996 and 2001 was as follows:

	1996	2001	Difference	Per cent difference
Ophthalmologists	440	436	-4	-0.9
Optometrists	2,253	2,694	441	19.6
Orthoptists	348	434	86	24.7

Source: ABS, Census of Population and Housing, 2001

In 1996, the Australian Medical Workforce Advisory Committee (AMWAC) released a report entitled 'The Ophthalmology Workforce in Australia: Supply, Requirements and Projections', whereby the need for training positions in ophthalmology in Australia was measured against the increasing population. The projected need for 2006 was stated as 91 positions (p54). In 2003, AMWAC's Annual Report reported 102 ophthalmologist trainees in training positions throughout Australia (p77). Based upon this information, the number of ophthalmologist training positions appears to have matched the 'expected future growth in activity due to population growth and population ageing'.

Specialist Re-Entry Program (SREP)

Medical specialists who have left the medical workforce and are interested in resuming clinical practice may be eligible for the Specialist Re-Entry Program (SREP). The Specialist Re-Entry Program is an initiative which aims to increase the specialist workforce by supporting specialists who want to resume clinical practice after having taken a break. The program can assist in providing eligible specialists with a clinical placement as part of an individually tailored refresher program, and in providing financial support to specialist practices that host a participant in the program.

Negotiations are underway with the Royal Australian and New Zealand College of Ophthalmologists (RANZCO) to ensure that the refresher needs of eligible specialists can be met under SREP.

Workforce distribution

One of the major obstacles to maximising the eye health of rural and remote communities is the difficulty experienced in attracting and retaining a competent and highly skilled workforce in these areas. There are a number of Australian Government funded programs of relevance to eye health care delivery that aim to streamline the distribution of the medical workforce in Australia and address workforce shortages in rural and remote areas. These include:

Medical Specialist Outreach Assistance Program (MSOAP)

The MSOAP was introduced in the 2000-01 Federal Budget as part of a package of measures under the 'Regional Health Strategy: More Doctors Better Services' initiative.

The MSOAP aims to improve the access of rural and remote communities to medical specialist services through:

- increasing visiting specialist services in areas of identified need;
- supporting medical specialists to provide outreach medical services in rural areas;
- facilitating visiting specialist and local health professional relationships and communication about ongoing patient care; and
- increasing and maintaining the skills of regional, rural and remote health professionals in accordance with local need.

Visiting Optometrists Scheme (VOS)

The VOS enables participating optometrists to be reimbursed for travel and accommodation expenses incurred when providing professional optometry services at locations that are remote from the optometrist's base practice. The Scheme is administered by the Australian Government Department of Health and Ageing and is currently under review.

Nationally Consistent Approach to Medical Registration (NCAMR)

In 2004 Health Ministers agreed to a model for a Nationally Consistent Approach to Medical Registration. The model will introduce multi-jurisdictional/national registration making it easier for doctors to work across state boundaries and allow public access to medical registration information. The NCAMR will assist in addressing distribution and quality issues of the medical workforce.

Rural and Remote Health Professionals Scholarship Scheme

The Australian Government Rural and Remote Health Professionals Scholarship Scheme offers scholarship assistance to rural and remote health professionals (non-doctor, non-nurse) to undertake continuing professional development opportunities, such as postgraduate study, short courses, clinical placements and conference attendance. These scholarships can be used to encourage health professionals such as optometrists, to enter and remain in the rural workforce.

Advanced Specialist Training Posts in Rural Areas (ASTPRA)

The ASTPRA Program provides funding to states and territories for specialist training posts in rural and regional areas. States and the Northern Territory Government propose posts for funding based on state workforce planning priorities and the training targets recommended by the Australian Medical Workforce Advisory Committee. As a result the program aims to support recruitment and retention of rural medical specialists. There is currently one ophthalmologist funded under this program, and there are proposals for involvement to continue in 2005.

Support Scheme for Rural Specialists (SSRS)

The scheme provides funding for Continuing Professional Development (CPD) of specialists, including ophthalmologists, practising in rural areas. Extensive use is being

made of modern technology to reach the participating specialists, including the Internet, PC based learning packages, video conferencing and teleconferencing to overcome the obstacles in rural practice. It is anticipated that involvement in the SSRS will increase with the emphasis on future CPD projects being generic in nature, and therefore applicable to multiple speciality groups, and that the Scheme will encourage retention of rural specialists.

Eye health programs and initiatives

The National Aboriginal and Torres Strait Islander Eye Health Program

The recently-reviewed National Aboriginal and Torres Strait Islander Eye Health Program began in 1998 and aims to address the range of eye health conditions experienced by Aboriginal and Torres Strait Islander peoples, such as cataract, diabetic retinopathy, refractive error and region-specific trachoma.

The Program is funded by the Australian Government to provide a regional model of eye health service delivery involving Regional Eye Health Coordinator positions. The model focuses on increasing eye health services within the context of comprehensive primary health care, by providing the necessary infrastructure and resources such as ophthalmic and optometric equipment in identified Aboriginal Community Controlled Health Services. The Program facilitates specialist access primarily but not exclusively to rural and remote areas.

The Review of the program was conducted for the Office of Aboriginal and Torres Strait Islander Health between September 2002 and July 2003 by a team of Indigenous and non-Indigenous reviewers assembled by the Centre for Remote Health, Alice Springs.

The Review highlighted the need to further imbed the Program into primary health care services, with a future emphasis on integration with services required to manage chronic disease and particularly the early detection and prevention of diabetes and its complications.

The Vision Impairment Prevention Program (VIPP)

In May 1999 the National Diabetes Strategy provided a total of \$1.8 million one-off grants to state and territory governments for the Vision Impairment Prevention Program (VIPP). The objective of the VIPP was to reduce the incidence of, and provide better

management for, diabetic retinopathy by improving access to eye checks, education and appropriate referral and treatment programs.

The funding model provided states and territories a degree of autonomy in implementing and evaluating VIPP projects, some of which have become sustainable without the need for continuing Australian Government funding. A national review of the program indicated that in some states stronger relationships between GPs and optometrists developed as a result of the VIPP.

Victoria

Vision Initiative

In 2002 Victoria introduced a Vision Initiative in partnership with Vision 2020 Australia as a three year pilot program for 2002–05 with the aim of preventing avoidable blindness and reducing the impact of severe vision loss for all Victorians. Additional one year funding has been further provided for the 2005/06 financial year to continue the work of the Vision Initiative and to provide a comprehensive evaluation of campaign interventions.

Victoria's Vision Initiative is a coordinated, multi-disciplinary effort involving approximately 13 partner agencies delivering eye care services, eye research and education services. These include the Victorian Health Promotion Foundation, ophthalmologists, general practitioners, optometrists, and the Centre for Eye Research Australia.

Vision 2020 Australia's Victorian Vision Initiative focuses on five conditions that are responsible for 80% of the burden of eye disease in Victoria:

- Age-related macular degeneration
- Cataract
- Diabetic eye disease
- Glaucoma
- Under- and un-corrected refractive error

The main message for both the public and for eye health professionals is for regular eye examinations to detect and provide early treatment for these conditions. The key message is encapsulated as a part of a communications campaign with the slogan 'Save

Your Sight'. Under the Victorian Initiative, examinations are recommended every five years for those aged 50 years and over, or more frequently for those in high risk groups (e.g. people with diabetes).

Victorian Eyecare Service (VES)

The Victorian Eyecare Service (VES) provides eye tests and glasses at a nominal cost for Victorians who hold a pensioner concession card or have a health care card for at least six months and their dependants under the age of 18 years. The VES is funded through the Department of Human Services and is run by the Victorian College of Optometry.

Rural patients can have their eyes tested and glasses prescribed through a network of optometrists and ophthalmologists participating in the service.

In 2002-03 VES provided 67,000 people with subsidised glasses at a cost of \$3.4 million. An estimated budget of \$3.5 million was allocated for 2003-04. Subsidised glasses are also available from some Victorian public hospitals. The RVEEH provides subsidised glasses to eligible patients through a contracted service provider, currently the Victorian Eye Care Network. The Royal Children's Hospital provides vouchers for discount glasses.

South Australia

In general in South Australia, eye health is incorporated within an integrated health screening approach. Networks operate in a number of settings in metropolitan and rural areas. Within the chronic disease management setting, retinopathy is recognised as a significant co-morbidity and the Department of Health is working with general practitioners to raise awareness about this issue. Local diabetes networks include components of vision impairment prevention and promotion of eye health. For example the Peelies Bus (Peelies is the Aboriginal word for 'eyes') in the Riverland area of SA travels throughout the region testing for diabetes in the Aboriginal community. Part of the testing regime involves checking for glaucoma and cataracts, as well as diabetic retinopathy. This was originally an eye health service funded through the Vision Impairment Prevention Program, but was expanded at the request of the Aboriginal community and is funded by the state as well as through other Australian Government programs.

South Australia Spectacle Scheme (SASS)

The aim of the SASS is to assist eligible cardholders to obtain basic spectacles or, with some prescribed eye conditions, contact lenses, at reduced personal cost. To be eligible the client must be a resident of SA and hold a Pensioner Concession Card or have held a Health Care Card continuously for at least 12 months.

Eligible clients are entitled to a pair of reading glasses and a pair of distance glasses or a pair of bifocals every two years. If the client's vision has altered considerably within that timeframe the two year limitation is not evoked. The range of optical appliances is restricted to basic items and the high end of the market, such as graduated lenses or photosensitive lenses, are not included on the schedule of items to be dispensed under the scheme at reduced cost.

The scheme invites optometrists to participate and sign a Deed of Agreement to dispense the scheduled items at an agreed reduced price. The client receives a 25% rebate of this reduced price at point of sale and the optometrist is able to claim that portion back from the Department of Health by submitting a claim. A client can obtain a pair of bifocals at a personal cost of \$65.85 and a pair of single vision glasses at \$41.10. If the client chooses unlisted items they must pay the normal retail price, less the SASS contribution on scheduled prices.

In the 2003/04 financial year SASS assisted 59,743 clients with reduced cost spectacles and 400 clients received contact lenses with a \$20 co-payment through SASS. The budget for SASS is \$1.2 million annually.

Trachoma control

In the out-of-Council areas of SA the various indigenous health services are aware of the issue of trachoma, monitor the situation and implement programs as the need arises. For example, the Nganampa Health Council, with funding from the Christian Blind Mission International have undertaken building mounds and revegetation programs in some centres in the Anangu Pitjantjatjara Lands to reduce the risk from environmental agents, particularly dust. This project was initiated and oversighted by the Centre for Eye Research Australia.

The SA Department of Health Environmental Health Service (Regional Services) is involved as part of the general role in other activities aimed at reducing the risk of trachoma from environmental agents in these areas.

The SA Department of Health is funding four indigenous environmental health workers (IEHWs) in these areas, whose role will include prevention of diseases such as trachoma through the control of environmental agents and improving community and personal hygiene as required.

Environmental health

The SA Department of Health Environmental Health Service has requested that the Metropolitan (land use) Planning Strategy include the need for sun protection outdoors in public and private institutions and areas where the public are likely to congregate, such as shopping centres.

Similarly, it is considered that the Department's input into urban and regional (or land use) planning could include other measures for eye health, including adapting the built environment to the needs of visually impaired people, particularly given the increased incidence of visual impairment with an ageing population.

Tasmania

Visual Impairment Prevention Program

The improved health service relationship between General Practitioners, Optometrists and Ophthalmologists, which was fostered by the Tasmanian section of the Visual Impairment Prevention Program, is continuing following the program implementation in 2000.

The Visual Impairment Prevention Program increased the awareness of Low Vision Clinics (LVC) of which there are four in Tasmania – three are under the auspices of the Guide Dog Association of Tasmania in Hobart, Launceston and Ulverstone and the fourth LVC is conducted by optometrists at the Royal Hobart Hospital.

Type 2 Diabetes Referral Guide and Personal Diabetes Record

The Tasmanian Divisions of General Practice (TDGP), in collaboration with the Tasmanian Department of Health & Human Services (DHHS) and funded by the National Health Development fund, produced the 'Type 2 Diabetes Referral Guide' to facilitate improvement in appropriate utilisation and coordination of services across the multidisciplinary health team for people with Type 2 diabetes. The 'Guide' includes recommendations on timely referral to eye health practitioners for the prevention and management of eye diseases associated with diabetes.

The TDGP and DHHS produced 'A Personal Diabetes Record' to help people with diabetes keep track of important information about diabetes management and assist them in communicating with their GP and other health professionals. This 'Record' is designed to be used as a reminder for regular and screening appointments in addition to information and is hoped to facilitate collaborative and effective diabetes self management, including that for eye health care.

Tasmanian Spectacles Assistance Scheme (SAS)

The Spectacles and Intraocular Assistance Scheme conducted by the Department of Health & Human Services is well utilised by eligible people in Tasmania. This scheme is advertised to the community through Service Tasmania, the DHHS intranet and all optometrists.

The state departments of Education, and Health and Human Services (DHSS), jointly fund the SAS. Tasmanians who receive a Commonwealth pension or benefit (excluding DVA gold card holders and people with private health insurance) or low income earners who can demonstrate genuine financial hardship may receive a financial subsidy under SAS supplied through a state-wide network of participating optometrists and ophthalmologists towards the cost of: spectacle lenses and negotiated low cost frames; non cosmetic contact lenses; low vision aids; and intra-ocular implants and optical prostheses.

DHHS approved applicants (pre-school and post year 12 clients) receive a 75% subsidy for lenses and low cost frames. Education approved clients (school aged attending colleges or schools or those receiving home education with a registered home educator) receive 100% subsidy for lenses and low cost frames. All applicants are subject to defined eligibility criteria.

Western Australia

General eye health services

The WA Government funds regular visits to all areas of WA with a single ophthalmologist and optometrist responsible for each separate area on a long term basis.

Public cataract program

WA has negotiated an agreement with a large number of private ophthalmologists to perform cataract surgery on a contract basis in non-teaching public hospitals throughout the rural areas and in all metropolitan public non-teaching hospitals.

Cataract waitlist reduction program

WA has a joint initiative with the Federal Government to each partially fund cataract surgery where the waiting list is more than six months for those on the public centralised waiting list.

Diabetic retinopathy

State based rural programs seek to screen all diabetics at risk throughout the state. Non-mydriatic cameras are widely distributed and operated by Aboriginal health workers under a joint program with the Lions Eye Institute. Specific training and quality control programs run by the Lions Eye Institute (LEI) are in place in the Kimberley. A collaborative venture between the LEI and BHP Billiton is under way in the Pilbara under a specific project grant from BHP.

Telemedicine

The advent of telemedicine has revitalised Lions Glaucoma Screening programs throughout Western Australia on a free, voluntary basis. These programs are targeted at communities at risk, excluding younger people or Aboriginal and Torres Strait Islander people.

Telemedicine has also enhanced the communication between regional health workers and especially optometrists with ophthalmologists. Pilot programs in the North West have clearly demonstrated economic benefits from the use of telemedicine in providing ophthalmic surveillance in these areas particularly for the prevention of blindness from diabetic retinopathy and glaucoma.

Patient Assisted Travel Scheme (PATS)

The PATS scheme in WA has run for decades and provides virtually unrestricted free travel and accommodation for patients, and their relatives if necessary, attending hospitals or private specialists in Perth.

New South Wales

NSW Spectacles Program

The NSW Spectacles Program provides spectacles and vision aids free of charge to low income and other disadvantaged people in NSW. Since 1992 the Program has been

managed by the NSW Department of Community Services (DoCS) and administered by VisionCare NSW, a non-profit organisation.

The Program has an annual budget of \$3.97 million and approves over 80,000 applications each year. Applicants are entitled to one pair of spectacles every two years. The Program has an eligibility criteria and means test. To be eligible for the Program applicants must meet an income and assets test.

The Program also has a hardship provision with the majority of people receiving spectacles under this provision being of Aboriginal or Torres Strait Islander background.

VisionCare works in partnership with the International Centre for Eye Care Education at the University of NSW to increase access to the Program by Aboriginal communities. Incentives also exist to increase the involvement of rural optometrists in the program.

NSW Diabetes Prevention Program

NSW Health is in the process of developing a NSW Diabetes Prevention Program and a scoping project resulting in a report and recommendations to the Department has been completed. NSW Health is also working in partnership with the IHR to establish up to three seeding grants in the areas of Prevention in Primary Care, Prevention in Indigenous Communities, and Prevention/Management of Gestational Diabetes.

NSW has also chaired the National Public Health Partnership Diabetes Prevention Working Group, which secured Partnership agreement that an economic modeling project on Prevention of Type 2 Diabetes will be undertaken.

Queensland

Spectacle Supply Scheme (SSS)

The SSS assists eligible Queensland residents by providing a comprehensive range of free basic prescription spectacles. Queensland Health administers the scheme through public hospitals and community health services. Eligibility is determined by permanent residency and possession of current pension, healthcare, low income health care or Queensland Seniors Cards. The holder must have held the card for 6 months.

Section four: Eye health research and data

This section provides an overview of the eye health research sector in Australia, its funding sources and research priorities, together with an outline of key health data collections of relevance to eye health.

Australian eye health research infrastructure

Eye health research is supported and undertaken by many institutions and organisations in Australia. The Australian Government, through the National Health and Medical Research Council (NHMRC) and the Cooperative Research Centres Programme, is a major source of funding for eye health research.

Other support for eye health research comes from the private and non-government sectors with a number of foundations specifically set up to raise funds for eye health research. These funds are used to support research that would otherwise not be funded through the NHMRC, or to top up research funded by mechanisms such as the NHMRC.

National Health and Medical Research Council (NHMRC)

The NHMRC was established in 1936 and its broad strategic intent is better health for all Australians. It is governed by legislation and reports to the Minister for Health and Ageing. The NHMRC plays a pivotal role in providing independent advice on all aspects of health and health care delivery in Australia. This is achieved by managing the complementary functions of funding for health and medical research, providing ethical guidance on health and medical research issues, and providing health advice that is both current and relevant to the Australian community.

NHMRC's research programs encompass the full spectrum of health and medical science, and funding is granted on the basis of scientific quality as judged by rigorous peer review.

Research support is provided through a variety of schemes, including support for individual research projects, broad programs of research, training awards and fellowships. Through its Strategic Research Initiatives Working Committee, it also has capacity to develop and support strategic and priority driven research, and to respond to research issues deemed urgent.

While eye health research is not currently identified as an NHMRC research priority, nevertheless the NHMRC awarded 87 new and continuing grants totalling \$9.6 million for vision-related research in 2004. Half of the grants (44) were for basic eye research, with an emphasis on neurology. A further third (30) were for clinical and medical science (including diagnosis and treatment) and the remaining 13 were for public health, with 7 grants for epidemiology and 1 for preventative health.

The NHMRC has identified priority areas as outlined in the NHMRC's Road Map. At the 144th (October 2002) meeting of the Council, the Council agreed to a number of recommendations, including to adopt Aboriginal and Torres Strait Islander Health research as a strategic priority, as well as to accept responsibility for implementing the Road Map and commit to allocating at least 5% of the total annual research funding to achieve this commitment over the course of the current triennium. The NHMRC has established the Aboriginal and Torres Strait Islander Forum to guide Council activities in this area. In addition to the Forum the NHMRC has established an Aboriginal and Torres Strait Islander Health Research Working Committee to assist in the implementation and monitoring of the health research priorities as identified in the Road Map.

The Collaborative Research Centre Programme (CRC)

The Australian Government established the CRC Programme in 1990 to improve the effectiveness of Australia's research and development effort. It links researchers with industry to focus Research & Development efforts on progress towards utilisation and commercialization. The close interaction between researchers and the users of research is a key feature of the programme. Another feature is industry contribution to CRC education programs to produce industry-ready graduates. CRCs combine funding from the CRC Program with in-kind or cash contributions from all participants.

Vision Cooperative Research Centre (Vision CRC)

The Vision CRC was established in 2003. It is a synergistic collaboration of national and international researchers from 38 organisations involved in eye care and vision research, education and delivery. Vision CRC is a multi-node centre, with its hub at dedicated premises at the University of New South Wales in Kensington, Sydney. Vision CRC participants comprise **Core**, **Supporting** and **Industry** members.

Core members	<p>Australia</p> <ul style="list-style-type: none"> • University of Melbourne, Centre for Eye Research Australia (CERA) • University of New South Wales, International Centre for Eye care Education (ICEE) • University of Sydney, Institute for Eye Research <p>India</p> <ul style="list-style-type: none"> • LV Prasad Eye Institute
Supporting members	<p>Australia</p> <ul style="list-style-type: none"> • Aboriginal Health and Medical Research Council • Professor Robert Augusteyn • CSIRO Molecular Science • International Association of Contact Lens Educators (IACLE) • Optometric Vision Research Foundation • Open Training and Education Network • Queensland University of Technology, Centre for Eye Research, School of Optometry • Government of Victoria, Department of Human Services • University of Sydney <ul style="list-style-type: none"> - Centre for Vision Research - Save Sight Institute • Vision 2020 Australia • Vision 2020 (Global) • VisionCare NSW <p>Canada</p> <ul style="list-style-type: none"> • University of Waterloo, Centre for Contact Lens Research <p>China</p> <ul style="list-style-type: none"> • Zhongshan Ophthalmic Centre, Sun Yat-Sen University <p>Finland</p> <ul style="list-style-type: none"> • Professor Antii Vannas <p>UK</p> <ul style="list-style-type: none"> • Anglia Polytechnic University, Department of Optometry and Ophthalmic Dispensing <p>USA</p> <ul style="list-style-type: none"> • Bascom Palmer Eye Institute • Johns Hopkins University, Department of Ophthalmology • Pennsylvania College of Optometry • University of California, Los Angeles, Jules Stein Eye Institute • University of Houston, College of Optometry
Industry members	<p>Australia</p> <ul style="list-style-type: none"> • Australian Ophthalmic Consortium (Precision Optics, City Optical, Opticare and Express Eyecare) • Contact Lens Industry Council • Ellex Medical • I-Optics • ProVision • Vision Instruments <p>USA and International</p> <ul style="list-style-type: none"> • CIBA Vision • Essilor

The Vision CRC aims to tackle world-scale research and development projects to deliver vision excellence for all people in order to establish Australia as a world leader in research, education and delivery of vision correction; to improve international eye care; and to maximise commercial opportunities for the Centre, Australia and the eye care industry.

Its major programs are in the areas of myopia, presbyopia, vision care delivery, business growth, science and core capabilities, and professional and academic education for postgraduate students, eye care professionals and industry in Australia and internationally. Myopia and presbyopia have been identified as key areas of opportunity in eye care; and Vision Care Delivery and Business Growth, will provide the essential support needed to ensure market development.

The Vision CRC is receiving Australian Government CRC Grant funding for seven years (2003-04 to 2009-10).

Funding	Average Funding per annum (\$million)	Total Funding over Grant period (\$million)
CRC Programme Funding	4.6	32.0
Total Resources for CRC	51.2	358.1

Source: Australian Government. Department of Education, Science and Training. CRC Directory 2004. <https://www.crc.gov.au/HTMLDocuments/Documents/PDF/CRCcompendium.pdf>

In addition to the primary eye health work of the Vision CRC, the Cooperative Research Centre for Aboriginal Health (CRCAH) is undertaking complementary research which is considering improvements to Indigenous chronic and infectious disease treatment and management. This research is looking at earlier diagnosis, critical intervention points and more effective treatment strategies. The CRCAH health systems and processes research program focuses on achieving substantial changes in aspects of primary health care delivery.

Aboriginal Health and Medical Research Council of NSW

The Aboriginal Health and Medical Research Council of NSW is the peak body representing the Aboriginal community controlled health sector in NSW. The Council works in partnership with NSW Health and has collaborated with the Institute for Health Research (a coalition of universities and research centres in NSW) to form the Coalition for Research to Improve Aboriginal Health (CRIAHA).

The aims of CRIAH are to:

- foster Aboriginal health research;
- provide a forum for brokering partnerships between researchers and Aboriginal communities;
- promote high quality research which has the potential to improve Aboriginal health; and
- seek to build capacity among Aboriginal health researchers.

CRIAH has conducted an audit of individuals and groups undertaking Aboriginal health research in NSW.

Centre for Eye Research Australia (CERA)

The Centre for Eye Research Australia (CERA) is a joint undertaking between:

- University of Melbourne
- Royal Victorian Eye and Ear Hospital
- Royal Australian College of Ophthalmologists
- Ansell Ophthalmology Foundation
- Christian Blind Mission International
- Lions Clubs of Victoria
- Vision Australia

CERA was established in 1996 as a centre for excellence for eye research and was registered as a public company limited by guarantee in November 1996 and was granted Approved Research Institute status in March 1997. CERA has developed around the research activities of the University of Melbourne Department of Ophthalmology and is located at the Royal Victorian Eye and Ear Hospital, East Melbourne. The Department is also a World Health Organization Collaborating Centre for the Prevention of Blindness, the only such centre in Australia.

CERA's focus is on the elimination of vision loss and blindness and it works on the prevention, treatment and rehabilitation of eye disease, vision loss and blindness through six units: Corneal Research Unit, Eye Health Promotion Unit, Glaucoma Research Unit, Macular Research Unit, Ocular Genetics Unit & McComas Family Laboratory, Retinal Vascular Unit.

Funding for CERA comes from government, foundations and other agencies by means of competitive grant applications and other requests and from support it receives from the **Eye Research Australia Foundation** (an independent foundation established to raise funds to support the research of CERA).

The Centre for Vision Research

The Centre for Vision Research was established in 2001 to bring together the vision and allied sensory research being conducted by the University of Sydney Department of Ophthalmology at Westmead Hospital to collaborate with many other university departments and hospitals and their research centres, both in Australia and in other countries.

The Centre is a multidisciplinary, collaborative body of scientists from a number of Australian universities, and is currently one of five research centres of the Westmead Millennium Institute (WMI) and is also affiliated with the Save Sight Institute (SSI).

The Centre's focus is on reducing vision and other sensory impairments in Australia through researching the causes, risk factors and impacts of relevant diseases and developing strategies to reduce their frequency and impact.

The Centre receives funding from government and foundations and support from sponsors. The Centre has received several grants from National Health and Medical Research Council (NHMRC), Ophthalmic Research Institute of Australia (ORIA) and other bodies. Both the WMI and SSI are research institutes of the University of Sydney, are registered for charitable donations (through their respective Foundations) and are recipients of research infrastructure funding from NSW Health.

Glaucoma Australia

Glaucoma Australia is a non-profit registered charity that aims to minimise visual disability from glaucoma. One of the ways that it does this is by funding glaucoma research.

Institute for Eye Research

The Institute for Eye Research was established in 1985 to support, conduct and coordinate scientific research and education in matters relating to vision, including detection, diagnosis, causes, prevention, cure and correction of abnormalities of the

eye and vision system. It is a company limited by guarantee and affiliated with the University of NSW in Sydney.

The Institute aims to:

- support, conduct and coordinate scientific research in matters in any way relating to vision, including detection, diagnosis, causes, prevention, cure and correction of abnormalities of the eye and vision system; and
- integrate their work with eye research and educational programs undertaken by other organisations.

The Institute funds particular projects and organisations in Australia and overseas. Particular research interests are optical design, metrology and bioengineering of ophthalmic products; and biological and clinical sciences related to the eye.

International Diabetes Institute

The International Diabetes Institute was established in 1976 to study health effects of lifestyle change in developing countries. It is an independent, volunteer-based charity.

The Institute aims to develop the capacity to cure and prevent diabetes and its complications through integrated research, education and care and to find a cure for diabetes and contribute to its worldwide prevention.

The Institute research interests are in epidemiology, nutrition, activity programs and the clinical application of pharmaceutical products, and it maintains the largest diabetes clinic in Australia.

Lions Eye Institute

The Lions Eye Institute in Perth, Western Australia, is the largest eye research institute in the southern hemisphere. The Institute was established in 1983. The Institute maintains a close relationship with the University of Western Australia, with which it formed the Centre for Ophthalmology and Visual Science (COVS) in 1994. COVS has independent University status within the Faculty of Medicine and Dentistry. Other affiliations include Sir Charles Gairdner Hospital, Royal Perth Hospital and Fremantle Hospital.

The Institute grew out of the Lions Save Sight Foundation's establishment of a Chair in Ophthalmology at the University of Western Australia to foster and co-ordinate research

into blinding eye diseases and conditions. It aims to:

- conduct research into the causes, diagnosis, prevention and treatment of diseases and conditions giving rise to blindness and other ocular disorders;
- advance the standards of medical eye care through education and training of the medical and allied professions; and
- stimulate public interest in the social and economic impact of eye disease.

Core activities of the Institute now include research and technical development to prevent or cure blindness, ophthalmic services and teaching, and community service aimed at early detection and prevention of blinding eye disease. Institute research teams investigate cataract, diabetes, glaucoma, retinal degenerations, artificial cornea and laser and gene therapies.

Ophthalmic Research Institute of Australia

The Ophthalmic Research Institute of Australia (ORIA) was founded in 1953 by a group of ophthalmologists concerned with the need to advance eye research in Australia. ORIA is now the research arm of the Royal Australian and New Zealand College of Ophthalmologists.

ORIA is dedicated to promoting research into the nature and cause of eye disease and to prevent blindness.

Optometric Vision Research Foundation

The Optometric Vision Research Foundation (OVRF) is a team of optometrists and researchers who share a common interest in vision care research and a genuine desire to improve and preserve the vision of the Australian community, and people in other lands.

Retina Australia

Retina Australia funds high quality scientific/medical research relevant to causes, treatments, prevention and cure of retinitis pigmentosa and other inherited and age-related retinal dystrophies.

Since it became active in fund raising for research (1998) Retina Australia has provided a total of \$1.3 million to fund, or assist with funding, research by a total of 25 researchers at 12 institutions (predominantly universities).

The Royal Australian and New Zealand College of Ophthalmologists Eye Foundation

The Royal Australian and New Zealand College of Ophthalmologists Eye Foundation was set up to fund eye research in Australia, improve community awareness and support ophthalmology aid projects. It is affiliated with the Royal Australian and New Zealand College of Ophthalmologists. One of the Eye Foundation's key roles is raising money for research into age-related macular degeneration, diabetic eye disease and glaucoma.

The RANZCO Eye Foundation has set a target to raise \$10 million from Federal and State Governments, corporate donors and private benefactors to support research into prevention and treatment of vision disorders.

The Queensland University of Technology (QUT) Centre for Health Research (Optometry)

The Queensland University of Technology (QUT) Centre for Health Research (Optometry) was established in 1986 to provide a focus for optometric research and development activities at QUT. The Centre conducts research in optometry and vision science, including how eye growth is regulated and why myopia develops in some individuals, using human and animal based studies.

Save Sight Institute

The Save Sight Institute for Community Ophthalmology was established in 1985. The Institute aims to create new knowledge to enable sight for life for the whole community. Its research focus aims to:

- influence better eye care through research, teaching and service;
- empower the community to become advocates for eye health;
- generate eye health initiatives that are appropriate, affordable, acceptable and accessible to all members of the community, including remote and rural Australia;
- increase research activities to solve unanswered problems in diagnosis and sight restoration;
- discover new eye health initiatives through the interface of community, clinical and laboratory-based research; and
- share in overseas programs for prevention of needless blindness.

Research at the Institute concentrates on visual science (particularly relating to developmental neurobiology of the retina and optic nerves, age-related macular degeneration, and development of the lens and cataract and clinical visual science (particularly paediatric ophthalmology, external eye disease and immunology of the cornea, medical retina, glaucoma and cataract).

Australian eye health data sources

Australia has some of the best population-based data about eye disease and refractive error in the world. Nevertheless, that data is far from comprehensive, particularly in published form. There are no specific national mechanisms to monitor major eye conditions and eye trauma.

A number of population surveys in Australia collect data about eye health. The extent to which they routinely collect information on the Indigenous status of the patient is not known, although the National Health Survey and National Survey of Disability, Ageing and Carers have specific techniques to ensure that information can be provided about Aboriginal and Torres Strait Islander peoples.

Some of the most relevant surveys to eye health include:

The Melbourne Visual Impairment Project (MVIP) 1992–96

The MVIP, conducted by the Centre for Eye Research Australia (CERA), is a population-based study of the prevalence and causes of vision problems. The sample population consisted of 5,147 randomly selected individuals aged 40 and over, from Melbourne and rural Victoria, including residents of households and nursing homes (Weih et al. 2000).

The Blue Mountains Eye Study (BMES) 1992–1994

The BMES is a population-based study of the prevalence and causes of vision problems. The sample population included 3,654 non-institutionalised residents aged 49 or older living in two adjoining urban postcode areas in the Blue Mountains area, west of Sydney, in New South Wales (Mitchell et al. 1995).

The Australian Diabetes, Obesity and Lifestyle Study (AusDiab) 1999–2000

The AusDiab is a population based national study conducted by the International Diabetes Institute in 1999-2000. It provides information on the prevalence of diabetes and obesity, and on lifestyle and its related conditions in Australia. It included 11,247 participants aged 25 and over in 42 randomly selected areas from six states and the Northern Territory. The identification of diabetes was based on an oral glucose tolerance test (Tapp et al. 2003).

The AusDiab study was a large population-based cross-sectional survey of national diabetes prevalence and associated risk factors in non-institutionalised adults aged 25 years or older. An ophthalmological examination was included in order to estimate the prevalence of diabetic retinopathy. Retinopathy was assessed among those having diabetes, impaired fasting glucose, and impaired glucose tolerance, and in a random sample of those with normal glucose tolerance.

About 50% of eligible households participated in the household interview and 55% of eligible adults in these households took part in the clinical examination. An initial analysis of non-response bias concluded that the effect on survey estimates would be negligible (Dunstan et al. 2002).

National Health Survey (NHS) 2001 and 1995

The NHSs, conducted by the Australian Bureau of Statistics, were designed to obtain national information on the health status of Australians, use of health services and facilities, health-related aspects of people's lifestyle, and demographic and socio-economic characteristics. Each survey included a sample of private dwellings such as houses, flats and townhouses across Australia. Non-private dwellings such as nursing homes, hostels and hospitals were not included in the surveys.

The 2001 survey collected information from approximately 26,900 respondents across all age groups between February to November 2001, of which about 9,000 were aged 45 and over. The 1995 survey collected information from 57,600 respondents between January 1995 and January 1996, of which about 16,600 were aged 45 and over.

The NHS asks respondents about their eyesight. Issues covered include colour blindness, refractive error (conditions and whether corrective lenses are used) and other problems with sight and whether they can be corrected with lenses or are linked to diabetes or high blood sugar levels. Other conditions for which data was collected in 2001 include blindness (total/partial, one or both eyes), glaucoma, cataract, trachoma and lazy eye/strabismus. The 2004 survey also collected data on macular degeneration.

National Surveys of Disability, Ageing and Carers (NSDAC) 1998 and 2003

The 1998 survey was conducted by the ABS from March to May 1998. It provided information from people around Australia with disability about their health status, and their need for and receipt of assistance. Data was also collected from carers of people with disability about the type of care they provide and impact that the caring role has on them.

The survey included people across all age groups in both private dwellings such as houses and flats, non-private dwellings such as hotels, motels, and cared accommodations such as hospitals, nursing homes and hostels. The sample population comprised approximately 37,000 respondents from about 15,700 private dwellings and non-private dwellings, and approximately 5,800 respondents from about 800 cared accommodations.

The 2003 survey was conducted by the ABS throughout Australia from June to November 2003. This survey was largely a repeat of the 1998 survey, with some additions to content in the areas of cognitive and emotional support and computer and internet use.

In this survey respondents are assessed as having a disability if they report that they have a limitation, restriction or impairment which has lasted, or is likely to last, for at least six months and restricts everyday activities. This includes loss of sight (not corrected by glasses or contact lenses).

Data sources for Indigenous people

There are few data sources that relate to vision problems among Indigenous people. Self-reported data on the prevalence of blindness and visual impairment, and the prevalence of cataract, are available from the NHS 2001. Apart from this, the only data available are from studies conducted in particular regions or communities that included an eye examination.

Recent estimates of the prevalence of diabetic retinopathy among Indigenous people are available from two studies in the Katherine region and a non-random study in the Pilbara region (Jaross et al. 2003, Diamond et al. 1998). Data on the prevalence of trachoma is available from studies in some areas of Western Australia, South Australia and the Northern Territory (Ewald et al. 2003, Mak & Plant 2001).

Section five: Related strategies and initiatives

Many public health and health services strategies and initiatives have relevance for eye health. The National Eye Health Framework for Australia lists national strategies and initiatives that impact on eye health under each key action area. Further information about national strategies that are particularly relevant for eye health is provided below:

National Chronic Disease Strategy

The National Chronic Disease Strategy aims to provide an overarching framework of national direction for improving chronic disease prevention and care across Australia. It is a nationally agreed agenda to encourage coordinated action in response to the growing impact of chronic disease on the health of Australians and the health care system.

The Strategy has been developed jointly by all jurisdictions through the National Health Priority Action Council. Forming part of Health Ministers' health reform agenda, it is planned that the Strategy will be considered by Health Ministers later this year. It will be considered at the same time as the complementary disease specific National Service Improvement Frameworks (NSIFs) which have been developed for major chronic diseases, including diabetes.

The NSIFs are intended to be high-level generic policy guides. They are designed to inform senior health policy makers, health planners, peak consumer organisations, health professionals and health service managers of effective evidenced based care for the condition. The Frameworks outline opportunities for improving prevention and care in relation to these diseases, while not prescribing the detail of individual services in the Australian health system.

National Tobacco Strategy

Australia has had a National Tobacco Strategy since 1999. The revised National Tobacco Strategy 2004-2009 was endorsed by the Ministerial Council on Drug Strategy (MCDS) at its meeting on 12 November 2004. The Strategy reflects evidence about the health effects of tobacco and the views of experts about the best ways to reduce those effects in society.

The Strategy also reflects common agreement between the Australian Government and the States and Territories as to the broad policy directions that are needed to reduce tobacco related disease. This includes a balance of educational effort together with essential regulations such as advertising bans and health warnings on tobacco products. One of the current health warning labels features macular degeneration as a health effect of tobacco smoke.

National Strategy for an Ageing Australia

The ‘National Strategy for an Ageing Australia’ document was released in 2001 and was Australia’s first national coordinated approach to population ageing with a particular emphasis on promoting positive images of older people and encouraging healthy and productive ageing.

It is part of the Australian Government’s whole-of-government approach to population ageing which includes other initiatives such as: the release of the Treasurer’s ‘Intergenerational Report’ (IGR) in 2002 and his discussion papers on ‘Australia’s Demographic Challenges’ and ‘A More Flexible and Adaptable Retirement Income System’ in early 2004; the Minister for Employment and Workplace Relations’ 2004-05 Budget initiative, the Mature Age Employment and Workplace Strategy; and the creation in late 2004 of the portfolio of Workforce Participation.

Aboriginal and Torres Strait Islander Eye Health Program

The National Aboriginal and Torres Strait Islander Eye Health Program commenced in 1998 using a regional model of eye health service delivery. The program facilitates specialist access to remote areas and provides ophthalmic equipment in identified Aboriginal Community Controlled Health Services across the country.

By increasing access to specialist eye health services within the context of comprehensive primary health care, the Program aims to address the range of eye health conditions experienced by Aboriginal and Torres Strait Islander people, such as cataract, diabetic retinopathy, trachoma and refractive error.

Major components of the Program include the following:

- i. establishment of 34 Eye Health Coordinator positions (some are part-time) nationally within Aboriginal primary health care settings.

- ii. provision of ophthalmic and optometric equipment in identified Aboriginal Community controlled health services across the country, to reduce barriers in service delivery for specialists visiting regional areas;
- iii. provision of eye health training for regional Eye Health Coordinators and Aboriginal Health Workers;
- iv. development of Specialist Eye Health Guidelines - evidence-based clinical practice guidelines for the provision of specialist eye care in rural and remote communities, which were released in September 2001; and
- v. In 1998 azithromycin was listed on the Pharmaceutical Benefits Schedule for the treatment of trachoma.

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Appendix two: Glossary

Accommodation	The ability of the eye to change the shape of its lens and focus at different distances
Age-related macular degeneration	Degenerative disease of the central retina with no obvious cause, occurring in older people
Astigmatism	Instead of the front surface of the eye being round it is more oblong. This prevents the light being focused in the right way and leads to blurring. Astigmatism can be secondary to the shape of the cornea or the lens, and is usually correctable with spectacles or contact lenses
Binocular vision	Each eye looking at the same object sees a slightly different image. Binocular vision is the ability to fuse these two images into one and gives us the ability to perceive depth and judge distances. See also stereopsis
Blindness	There are over 50 definitions of blindness world-wide. The World Health Organization definition of blindness is less than 3/60 in the better seeing eye. This means that the better seeing eye cannot read the top letter on the Snellen visual acuity chart at three metres. Australian population surveys define blindness as visual acuity of less than 6/60 in the affected eye
Cataract	Opacity of the lens inside the eye
Cataract extraction /Cataract surgery	Removal of the lens usually after opening the lens capsule (extra-capsular cataract extraction) or less frequently with the lens capsule (intra-capsular cataract extraction)
Choroid	The choroid is the posterior portion of the uveal tract and lies between the retina and the sclera. It is darkly pigmented. When the overlying sclera is thinned it is the colour of the underlying choroid which gives rise to the term 'blue sclera'
Colour blindness	Diminished ability to perceive differences in colour - never a complete absence of colour vision

Cornea	Clear window in the front of the eyeball which together with the lens focuses light on the retina
Corneal graft (keratoplasty)	Operation to restore vision by replacing a diseased portion of the person's cornea with healthy cornea from a donor. The operation may involve the full thickness of the cornea (penetrating keratoplasty) or only a superficial layer (lamellar keratoplasty)
Cotton wool spots	Fluffy white retinal areas seen on fundoscopy that signify infarction of the superficial retinal layers. Characteristically associated with micro-vascular disease such as diabetic retinopathy, AIDS retinopathy
Cup-disc ratio	This is a term used to communicate the extent of disc cupping. In the healthy disc, the ratio of the vertical diameters of the cup to the optic disc rim should be 0.4 or less, i.e. the height of the inner rim (the cup) should be 30% of the height of the outer rim (the disc). The size of the disc (and subsequently the cup) is dependent on several factors, including the person's refractive error and the presence of glaucoma
Cytomegalovirus (CMV)	A virus of the herpes family that, in the ophthalmic context, causes infection and inflammation of the retina in patients with AIDS (CMV Retinitis)
Dendritic ulcer	Corneal ulcer caused by the herpes simplex virus (a secondary infection of the corneal epithelium). This is evidence of previous (primary) exposure to herpes which usually occurs in childhood/adolescence
Drusen	These are accumulation of waste products of metabolism under the retina, which are associated with age-related macular degeneration. They are white/yellow and may be discrete or confluent dots
Entropion	Turning inward of the eyelid against the eyeball
Field of vision	The entire area that can be seen without shifting of gaze

Floater	These are black or opaque objects that float across the line of vision. People describe them as spiders, flies, hairs or nets. They change position with eye movements, and are seen most clearly against a white or bright background
Fluid level	When blood enters the front of the eye, it may be visible in the front part of the eye as a level of dark red fluid beneath the clear aqueous fluid (hyphaema) or whitish material with pus (hypopyon)
Fluorescent dye/ Fluorescent	A dye which will absorb light of one colour such as blue and emit another colour such as green
Fluorescein Angiography	This is a tool for examination of the back of the eye. It involves photographs being taken at the same time as a dye is injected intravenously. The test is usually performed on an out-patient basis, and takes 10 minutes once both eyes are dilated
Fundoscopy	Examination of the back of the eye with an ophthalmoscope that allows the examiner to see the vitreous, retina and optic nerve head
Fundus	The back of the eye, that is, the retina, vessels and the optic disc, seen with an ophthalmoscope
Glare	The sensation of being dazzled by direct light
Glaucoma	A disease characterised by defects in the visual field, damage to the nerve at the back of the eye, and usually raised pressure inside the eye
Herpes virus	A family of viruses that include Herpes simplex, Herpes zoster, and Cytomegalovirus
Hypermetropia / Hyperopia / 'Farsightedness'	Ability to see distance better than near when not wearing corrective spectacles or contact lenses. These people use + or convex lenses
Hypertension, ocular	High pressure inside the eye
Intra-ocular	Inside the eye

Iris	The coloured muscular membrane which lies behind the cornea and in front of the lens which by opening or closing determines the size of the pupil and hence the amount of light entering the eye
Lacrimal gland	The source of some of the eyes' tears, this gland sits in the upper outer part of the socket just inside its outer rim
Lens	A medium which will bend light. The eye has its own crystalline lens that helps focus light. Spectacle lenses help bend the light in such a way that once it reaches the eye it can then be focused. Contact lenses do the same except that they are in contact with the eyeball
Miosis	Constriction of the pupil
Miotic	A drug causing pupillary constriction
Mydriasis	Dilatation of the pupil
Mydriatic	A drug causing pupillary dilatation
Myopia / Near sightedness	The ability to see near objects better than distant ones when not wearing corrective spectacles or contact lenses
New vessels	This term is used to signify the abnormal growth of vessels in the eye in response to a need for more oxygen. On the cornea - pannus, on the iris - rubeosis, on the disc - new vessels disc 'NVD', on the retina - new vessels elsewhere 'NVE'
Night blindness	The inability of the eye to adapt to reduced illumination, therefore leading to a complaint of not being able to see in the dark. Characteristically associated with the disease retinitis pigmentosa and with vitamin A deficiency and seen in glaucoma patients taking pilocarpine drops
Ophthalmia neonatorum	Conjunctivitis in the newborn
Ophthalmoscope	An instrument specially designed to allow visualisation of the back of the eye and lens
Optic atrophy	Loss of cells and tissue from the optic nerve from whatever cause, which results in poor vision

Optic disc	Portion of the optic nerve seen with an ophthalmoscope which is also called the optic nerve head
Optic nerve	The nerve that carries visual information from the eye to the brain
Optic neuritis	Inflammation of the optic nerve
Optic neuropathy	Any disease process that might damage the optic nerve
Orbit	The bony socket in which the eye resides. It is shaped like a pyramid which is lying on its side with the tip pointing backwards and inwards towards the centre of the brain. The orbit is described as having a roof, floor, apex, inner (medial) and outer (lateral) wall
Perimeter	An instrument for measuring the field of vision
Peripheral vision	Ability to perceive objects when outside the direct line of vision
Photocoagulation	Using laser light to treat certain disorders at the back of the eye
Photophobia	Abnormal sensitivity to light
Posterior capsule	The back of the bag in which the lens normally sits in the eye. This can become opaque some time after cataract surgery leading the patient to complain of mistiness of vision
Posterior chamber	A space filled with clear fluid (called aqueous humor) behind the iris and in front of the lens
Presbyopia / Old sight	Increasing distance at which text can be read usually occurs after the age of about 40. This is an entirely normal process and signals the need for reading glasses. As a general rule presbyopia occurs at an earlier age in far-sighted people and at a much later age (if ever) in short-sighted people
Pupil	The round hole in the centre of the iris that corresponds to the lens aperture in a camera. The pupil varies in size according to whether the environment is bright (small pupil) or dark (large pupil)

Pupillary light reflex	The pupil contracts or gets smaller in response to a bright light being shone into it and automatically causes the pupil of the other eye to contract
Refraction	The deviation of light in passing obliquely from one medium to another of different density. In ophthalmic practice, refraction describes the process by which the prescription of spectacle lenses for an eye is measured
Refractive error	When the eye fails to focus light correctly and needs a lens (for example spectacles or contact lens) to correct it
Retina	The light sensitive part of the back of the eye that corresponds to the film in a camera
Retinal detachment	The falling away of the retina from its correct position at the back of the eye, which leads to a defect in the field of vision and ultimately loss of vision
Retinopathy	Disease of the retina, for example, diabetic retinopathy is disease of the retina secondary to diabetes
Slit lamp	A slit beam of light and a horizontally mounted microscope which allows detailed examination of the eye
Squint / Strabismus	A condition in which the two eyes do not point in the same direction when the patient is looking at a distant object
Tension	Pressure
Tonometer	An instrument for measuring the pressure inside the eye
Trichiasis	Rubbing of inturned eyelashes against the eyeball
Visual acuity	Measurement of the finest details that an eye can distinguish often estimated using LogMar or Snellen charts
Visual Impairment	Partial loss of vision not corrected by spectacles.
Vitrectomy	Surgical removal of the vitreous
Vitreous	Soft gelatinous material that fills the back of the eye and sits behind the lens. See also Syneresis

Appendix three: Acronyms

AHMC	Australian Health Ministers' Conference
AIHW	Australian Institute of Health and Welfare
AMD	Age-related macular degeneration
AMWAC	Australian Medical Workforce Advisory Committee
ARM	Age Related Maculopathy
BMES	Blue Mountains Eye Study
CERA	Centre for Eye Research Australia
DALY	Disability Adjusted Life Year
DR	Diabetic Retinopathy
IAPB	International Agency for the Prevention of Blindness
IOP	Intra-ocular pressure
MBS	Medicare Benefits Schedule
MSOAP	Medical Specialist Outreach Assistance Program
MVIP	Melbourne Visual Impairment Project
NHMRC	National Health and Medical Research Council
NHS	National Health Survey
OAA	Optometrists Association Australia
OAG	Open-angle glaucoma
RANZCO	Royal Australian and New Zealand College of Ophthalmologists
SREP	Specialist Re-Entry Program
VES	Victorian Eyecare Service
VOS	Visiting Optometrists Scheme
WHA	World Health Assembly
WHO	World Health Organization

Appendix four: The consultation process

The National Eye Health Framework for Australia and the accompanying Background Paper “Eye Health in Australia” have been developed by the Australian Government Department of Health and Ageing and the Victorian Department of Human Services, in consultation with all other states and territories. The input of the non-government sector has been sought at several stages during the development of the Framework.

Vision 2020 Australia has been instrumental in facilitating discussion and collaboration across the eye health care sector and presenting collective feedback to governments on behalf of the sector. As such it has played a valuable role in providing advice to governments on the development of the Framework. However, throughout the consultation process, each organisation has also had the opportunity to present its particular views through the preparation of written submissions, in unilateral meetings with government officials and through representation at the stakeholder workshops.

In March 2004 the Department of Health and Ageing sponsored a national workshop in Canberra involving representatives of key eye health stakeholder groups. The purpose of the workshop was for the non-government eye care sector to have the opportunity to provide advice to governments on the content of a National Vision Plan.

The Forum was convened by Vision 2020 Australia and resulted in a submission to the Department of Health and Ageing from Vision 2020 on behalf of the non-government eye care sector. The submission outlined the main issues facing the eye care sector from the perspective of non-government stakeholders and set out a number of proposed strategies to address these issues. This submission subsequently informed the development of consultation draft papers by governments.

Development of consultation papers

Two consultation documents were prepared by the lead agencies in conjunction with other states and territories: the consultation paper ‘Towards a National Eye Health Plan for Australia 2005 to 2010’ and the accompanying Background Paper ‘Eye Health in Australia’. These documents were made available in a range of alternative formats, including Braille, audio cassette and large print formats. The documents were also made available on the Department of Health and Ageing website and www.seniors.gov.au, as well as some state and territory health department websites.

Call for written submissions July/August 2005

Over 100 organisations and individuals with an interest in eye health issues were contacted and sent copies of the consultation documents and invited to prepare a written submission. Submissions were made by the following organisations and individuals:

- Associate Professor Roger Truscott, Australian Cataract Research Foundation
- Retina Australia (NSW) Inc
- Mr Bill Robertson, Optometrist, Alice Springs
- Professor Hugh Taylor, Centre for Eye Research Australia
- Retina Australia (SA) Inc
- Guide Dogs Victoria
- Retina Australia (Vic) Inc
- Orthoptic Association of Australia Inc
- Professor Peter McCluskey, Chair and Professor of Ophthalmology, NSW Statewide Ophthalmology Service (SOS) and Liverpool Hospital/UNSW
- Professor Siaw-Teng Liaw, Head, University Department of Rural Health, University of Melbourne
- Royal Society for the Blind of South Australia
- Dr Allan Rosenberg, President, Royal Australian and New Zealand College of Ophthalmologists
- Dr Robert Mackay, Director of Ophthalmology, Royal Darwin Hospital and Dr Tim Henderson, Director of Ophthalmology, Alice Springs Hospital
- Alexander Gilliland, Chairman, QLD Vision Initiative
- Optometrists Association Australia QLD/NT
- Dr Mark McGree, Chairman, Health Policies Committee, Royal Australian and New Zealand College of Ophthalmologists
- Brotherhood of St Laurence
- Dr Mark Loane, Rowan Churchill, Nancy Long & Dr Venkat Reddy, Cape York Eye Health Program, Wu Chopperen Health Service
- Fred Hollows Foundation
- Optometrists Association Australia
- Vision 2020 Australia
- Associate Professor James Semmens, Dr Nigel Morlet, Dr William Morgan, Dr Jonathan Ng, School of Population Health, University of Western Australia

- Royal College of Nursing Australia
- Professors Douglas Coster and Konrad Pesudovs, NH&MRC Centre for Clinical Eye Research, Flinders University
- Professor Tanya Packer, Centre for Research into Disability and Society, School of Occupational Therapy, Curtin University of Technology and Dr Margaret Crowley, Association for the Blind of Western Australia
- Ms Robyn Wright, President, Retina Australia
- Australian Diabetes Professional Organisations (on behalf of Australia Diabetes Society)
- Office of the National Health and Medical Research Council
- Glaucoma Australia
- Macular Degeneration Foundation

Stakeholder workshops July/August 2005

A series of stakeholder workshops was held in each capital city in Australia during July/August 2005, using the consultation papers for the basis of discussion. The workshops were hosted by the states and territories and facilitated by Ms Dianne Beatty and Ms Marilyn Alt. The following organisations and individuals participated in the stakeholder workshops:

ACT workshop - Monday 1 August 2005, Reception Room, ACT Legislative Assembly

Alison Geijssen	ACT Division of General Practice
Vicki Mahood	ACT Health (Diabetes Service VIPP)
Cindy Dykes	ACT Health Child, Youth & Women's Health Program
Helen Jackson	ACT Health Child, Youth & Women's Health Program
Lynn Gould	Pharmaceutical Society of Australia
Jennifer Gersbeck	Vision 2000 Australia
Jen Thompson	Vision 2000 Australia
John Beever	Optometrists Association Australia
Joanne Thomas	Optometrists Board of the ACT
Mark Feltham	Optometrists Board of the ACT
David Ashmore	Canberra Blind Society
Paul Hemsley	Canberra Blind Society

Bob James	Blind Citizens Australia– ACT Branch
Robert Altamore	National President, Blind Citizens Australia
Judith Colquhoun	ACT Health
Kay Blemings	ACT Health
Fiona Lynch	AG Department of Health and Ageing
Sue Gordon	AG Department of Health and Ageing

Observer:

Dr Jo Burnand	NSW Health
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Victorian workshop - Tuesday 2 August 2005, William Angliss Conference Centre, Melbourne

Prof Neville McBrien	Victorian College of Optometry
Prof Hugh Taylor	Centre for Eye Research Australia, c/- Royal Victorian Eye and Ear Hospital
Jennifer Gersbeck	Vision 2020 Australia
Nadia Mattiazzo	Blind Citizens Australia
Graeme Craig	Vision Australia Foundation
Renata De Lazzari	Orthoptic Association of Australia
Joe Chakman	Optometrists Association of Australia
Anthony Hall	Royal Melbourne Hospital
Ben Harris	Optometrists Association Australia (VIC)
David Gerrard	Royal Victorian Eye & Ear Hospital
Shirley Evers-Buckland	Guide Dogs Victoria
Emer Diviney	Brotherhood of St Laurence
Jenny Hickleton	Diabetes Australia Victoria
Associate Prof. Jill Keeffe	Centre for Eye Research Australia
Dr Richard J Stawell	RANZCO
Wayne Kinrade	Healthcare Management Advisors
Graham White	Guide Dogs Victoria
Ray Barber	Office of Aboriginal and Torres Strait Islander Health, Department of Health & Ageing
Andreas Mueller	Eye Research Australia

Maria Saggio	Department of Human Services
Dr. Robert Hall	Department of Human Services
Tony Blackwell	Department of Human Services
Lynn Holt	Department of Human Services

Did not attend workshop but provided submission:

Gayle Skinner	President, Victorian Association of Parents for Children with Vision Impairment
Professor Paul Zimmet	Director, International Diabetes Institute

Tasmanian workshop - Wednesday 3 August 2005, Elizabeth Pier Function Centre, Hobart

Sally Edwards	Family Child Youth Health Services DHHS
Keith Mackriell	Optometrists Association Australia
Robert Scanlon	Pharmaceutical Society of Australia
Dr Michael Treplin	Vice President, RANZCO
Jennifer Gersbeck	Vision 2020
Andrew Hogan	President, Optometrists Association Australia
Lee McGovern	Senior Allied Health Adviser

Queensland workshop - Friday 4 August 2005, Royal Brisbane and Women's Hospital

Cassandra Koutouridis	Project Officer, Queensland Vision Initiative
Luke Schepan	Policy & Communications Officer, Australian Medical Association of Queensland
Lyn Hinspeter	Board Member, Council of Remote Area Nurses of Australia
Liz Herbert	Diabetes Australia (Qld)
Greg Johnson	Optometrist Association Australia (Qld & NT)
Julia Mainstone	Research Optometrist, QUT School of Optometry
Stella Haralampou	Manager, Queensland Blind Society
Claire Lees	Chairperson, Queensland Chapter, Royal College of Nursing
Dr Peter O'Connor	Royal Australasian and New Zealand College of Optometrists

Jennifer Gersbeck	Chief Executive Officer, Vision 2020 Australia
Kathleen Lilley	Centre Manager, Queensland Centre for Public Health
Margaret Campbell	Dept of Health & Ageing
Kym Hearn	Office of Aboriginal and Torres Strait Islander Health, Dept of Health & Ageing
Danielle Regelling	Office of Aboriginal and Torres Strait Islander Health, Dept of Health & Ageing
Eddie Hollingsworth	Policy Officer – Partnerships, Queensland Aboriginal and Islander Health Council
Marie Skinner	Principal Policy Officer, Strategic Policy Branch, Queensland Health
Heather Edwards	Northern Zone, Qld Health
Jane Paterson	Health Services Branch, Qld Office, Department of Health and Ageing
Dr Robin Mortimer	Director of Endocrinology, Royal Brisbane and Women’s Hospital
Tanya Handloe	Royal Blind Foundation
Kate Copeland	Statewide Health Services Planning, Qld Health
Christina Farley	Statewide Health Services Planning, Qld Health

NSW workshop - Monday 8 August 2005, Sydney Eye Hospital

Professor Frank Billson	Save Sight Institute
Professor Paul Mitchell	Centre for Vision Research, Westmead Hospital
Shane Brown	RANZCO Eye Foundation
Professor Brian Layland	Optometric Vision Research Foundation
Melinda Bell	NSW Aboriginal and Medical Research Council
Julie Heraghty	Macular Degeneration Foundation
Dr Stephen Cains	Fred Hollows Foundation
Keith Masnick	Centre for Public Health, University of New South Wales
Professor Kerry Goulston	Greater Metropolitan Clinical Taskforce
Jan Steen	Greater Metropolitan Clinical Taskforce
Annie Hutton	Greater Metropolitan Clinical Taskforce
Professor Minas Coroneo	Prince of Wales Hospital

Janet Stretton	Sydney Eye Hospital
Dr Justin Playfair	Sydney Eye Hospital Medical Staff Council
Alex Hunyor	Sydney Eye Hospital
Damien Miners	Sydney Eye Hospital
Ellen Moore	Sydney Eye Hospital
Pauline Rumma	Sydney Eye Hospital
Yuen-Yu Wong	Sydney Eye Hospital
Jennifer Gersbeck	Vision 2020 Australia
Helen Backshell	Radio for Print Handicapped
Tim Connell	Quantum Technology Pty Ltd
Michael Simpson	Policy and Advocacy, Vision Australia
Julia Kelly	South Eastern Sydney Area Health Service
Neryla Jolly	Faculty of Health Sciences, University of Sydney
Andrew McKinnon	Optometrists Association of Australia
Narelle Hine	Optometrists Association
Jan Jones	Centre for Vision Research, Westmead Hospital
John Piccles	Office for Aboriginal and Torres Strait Islander Health
David Pye	School of Optometry, University of New South Wales
Fiona Stapleton	University of New South Wales
Dr Lewis Williams	Institute for Eye Research
Ken Wyatt	Centre for Aboriginal Health, NSW Health
Steevie Chan	Statewide Services Development, NSW Health
Professor Peter Sainsbury	Population Health, NSW Department of Health
Julie Baz	Population Health, NSW Department of Health

NT workshop - Tuesday 9 August 2005, Health House, Darwin

Magda Buchholz	Guide Dogs Association
Mei Ling Aw	Optometrist, NT Health
Christine Dinning	Educational Resource Centre for the Vision Impaired, NT Department of Employment, Education and Training
Helen Summers	Optometrist

Dr Jo Wright	District Medical Officer, NT Health
Simon Booth	Aged Care, OATSIH
Keith Edwards	Chair, NT Trachoma Working Group
Shaun Tatipata	Danila Dilba
Tess Pollock	Optometrist, NT Health
Dr Robert McKay	Ophthalmologist, NT Health
Jennifer Gersbeck	Vision 2020 Australia

In addition on the same day, a teleconference was conducted with Dr Tim Henderson, Ophthalmologist at the Alice Springs Hospital.

Western Australia workshop - Wednesday 10 August 2005, East Perth offices of the Western Australian Department of Health

Elizabeth Zambotti	Lions Eye Institute
Dr Margaret Crowley	Association for the Blind WA / Guide Dogs WA
Margaret Haydon	Association for the Blind WA / Guide Dogs WA
Richard Thompson	Optometry WA
Paul Levi	Optometry WA
Mary Shaw	Orthoptics WA
Liz Kerrigan-Benson	Diabetes Association of WA
George Vassiley	WA Aboriginal Community Controlled Health Organisations
Daniel McAullay	Office of Aboriginal Health, Department of Health
Jennifer Gersbeck	Vision 2020
Brad Bairstow	SOLA Optical
Dr James Semmens	School of Population Health, University of Western Australia
Dr Jonathon Ng	School of Population Health, University of Western Australia
Dr Nigel Morlet	School of Population Health, University of Western Australia
Dr Brian Lloyd	Chief Health Officer, WA Department of Health
Dr Peter Barratt	Health Reform and Clinical Policy Directorate, WA Department of Health

Did not attend workshop but provided submission:

Professor Ian Constable Lions Eye Institute

South Australia workshop - Thursday 11 August 2005, Royal Society for the Blind, Adelaide

Desley Culpin	Coordinator, Eye Health Specialist Support Program, Aboriginal Council of SA
Mr Andrew Daly	Executive Director, Royal Society for the Blind
Prof Gary Andrews	Director, Centre for Ageing Studies
Mark Battista	Guide Dogs SA
Fran Lovell	A/g Assistant State Manager, Health Branch, Department of Health and Ageing
Kae Martin	Executive Director, Central Northern Adelaide Health Service
Tony Starkey	Blind Citizens of Australia
Konrad Pesudovs	NH&MRC Centre for Clinical Eye Research, Department of Ophthalmology, Flinders University & Flinders Medical Centre
Dr Henry Newland	Head of Unit, Ophthalmology, Royal Adelaide Hospital
Ms Phillipa Cooper	President, Retina Australia
Myra Wilson	Health Promotion SA
Lesley Currie	Guide Dogs SA & NT
Carolyn Modra	A/g Manager, Health Issues Team, Office of Aboriginal and Torres Strait Islander Health
David Coppock	Consumer and Board Representative, Royal Society for the Blind
Dennis Moir	Royal Society for the Blind
Trevor Frost	Macular Degeneration Foundation
Tony Gray	Sales and Marketing Director Asia Pacific, Carl Zeiss Vision (SOLA)
Jennifer Gersbeck	CEO, Vision 2020 Australia
Libby Boschen	Executive Officer, Optometrist Association of Australia
Ian Bluntish	Optometrist Association of Australia
Dr Richenda Webb	A/g Director, Clinical Systems, Dept of Health, SA
Did not attend workshop but provided submission:	
Dr Jim Runciman	Ophthalmologist, Private Practice