

A multidisciplinary network to preserve eye health and minimise the risk of blindness for healthy ageing in rural Australia

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With local GPs and NSW Health, he is currently setting up a primary care eye and vision clinic to be part of the new Manilla Health One/Multi-Purpose Service (MPS) within the Hunter New England Area Health Service. Phil is a private pilot with an interest in gliding, and a member of the Champion Gunnedah Shire Brass band.

A major threat to the health and quality of life of Australia's aging population is the risk of vision loss and blindness through age-related eye disease. Not only is vision loss a cause of personal tragedy, it can also reduce a person's financial and social independence, and increase their need for specialised care and support⁰. Health authorities in Australia need to take measures to promote and enable the avoidance of preventable blindness, not only to minimise the incidence of personal tragedy, but also to reduce their need to supply expensive publicly funded care, rehabilitation and support⁰.

The most common age-related eye condition, affecting most people over the age of 45-55, is presbyopia, a simple condition normally corrected by reading glasses. There are also four chronic organic diseases affecting aging eyes that together pose the most significant risks of visual impairment and blindness. These are cataract, age-related macular degeneration (ARMD), diabetic retinopathy (DR) and glaucoma. It has been shown that the risk of avoidable blindness is reduced for persons over 50 years if they receive regular (about every 2 years) eye examinations, including tonometry, ophthalmoscopy and suitable analysis of medical history for relevant risk factors. There are major potential cost-savings associated with minimising vision loss by enabling regular high-quality eye and vision examinations for the ageing population⁰. To enable these savings in rural Australia will require the appropriate strategies to support continuity of care provided by the rural eye health workforce.

Epidemiology

The Australian Institute of Health and Welfare (AIHW) reported the prevalence of visual impairment and blindness in older Australians (aged 55+) by combining the results of three large population studies, a number of sample surveys that collected self-reported information, and data collected for administrative purposes⁰. Visual impairment was defined as visual acuity less than 6/12 (as required legally in Australia for driving a motor vehicle) and it occurs in 9.4% of the population aged 55 or more.; blindness is commonly defined as having a visual acuity one tenth of normal (6/60), and it is found in 1.2% of those aged 55 or above. These data are reproduced in Table 1. They include only very limited data from the rural population.

Table 1 Prevalence of conditions causing visual impairment and blindness in samples of the Australian population aged 55yrs and over

	Visual impairment 9.4% pop. 55+		Blindness 1.2% pop. 55+	
	Number	Rate	Number	Rate
Cataract	73 000	16%	6 600	12%
ARMD	51 500	12%	28 300	50%
Glaucoma	14 100	3%	9 200	16%
Diabetic Retinopathy	7 400	2%		
Uncorrected Refractive Error	262 400	59%		
Other	36 000	8%	12 000	22%
TOTAL	444 400		56 100	

Source: from AIHW 2005

There has been no large study of the epidemiology of vision loss in the rural population of Australia. Such a study is required urgently to assist planning for rural eye health practitioner education and resourcing. A recent survey of eye health in Australian indigenous populations⁰ reported the principal causes of blindness as cataract, refractive error and optic atrophy. Cataract and refractive error are capable of treatment by surgery and spectacles respectively. The gap between the levels of health in the Aboriginal community compared with mainstream Australia is illustrated by the finding that the risk of blindness in indigenous adults was more than 6 times greater than in the mainstream population.

To further understand the significance of this epidemiology, and potential future directions, below are presented a brief explanation of each condition, its risk factors, and opportunities for early detection and treatment.

Cataract

Cataract occurs when the clear material in the lens of the eye becomes cloudy and opaque. The normal human lens loses its transparency gradually with age, causing a minor but often clinically insignificant reduction in vision. In some older persons, the loss of transparency progresses rapidly, and the condition needs to be treated with surgery.

The main problem with cataract is to find adequate sources of publicly funded surgery for those who cannot afford private care. There have been some very long waiting lists in rural and regional areas for publicly provided cataract surgery.

The main risk factor for cataract is age. There is some evidence that inadequate diet can hasten the process, and that antioxidant supplements may delay progress.

In rural Australia, cataract is usually identified by an optometrist, general practitioner (GP), or primary care nurse. Referral to an ophthalmologist for assessment for surgery usually provides a high likelihood of restoration of vision through cataract extraction and pseudophakic lens implant.

Age Related Macular Degeneration (ARMD)

The *macula lutea* is the part of the retina which we use the most to see what we are doing, and to recognise objects and faces. Unfortunately it is also the part that is affected by this disease. ARMD is the most common cause of blindness in the mainstream Australian population (Table 1). There are two forms, neovascular ARMD ("wet") and geographic ARMD ("dry"). Approximately 90% of ARMD in Australia is "dry".

The rate of progress of "wet" ARMD can be slowed or halted with regular intravitreal injections of an antibody to a vascular growth factor at appropriate intervals. There is no specific treatment for "dry" ARMD.

The main risk factors for ARMD are age and family history; however another very significant risk factor is a history of smoking⁰, which increases risk fourfold. A significant reduction of risk may be achieved by dietary modification⁰ (high levels of Vitamins C and E, beta-carotene and zinc).

There is a simple chart test (the Amsler grid) which can be used regularly by those at risk to detect the early stages of this disease subjectively. Suspected cases of early “wet” ARMD require immediate referral for further examination and possible treatment by a course of intraocular injections. Any suspect with risk factors for ARMD should use an Amsler grid regularly to detect onset or progress of the condition.

Glaucoma

The most common form is primary open-angle glaucoma, a slow progressive neuropathy which affects the optic nerve at the point where it meets the posterior globe of the eye (the optic nerve head). It can be associated with high fluid pressure in the eye, but this is only one of a number of significant risk factors for progress of the disease. An affected eye gradually loses the ability to detect objects in peripheral vision, and this is related to a pattern of nerve/glial tissue loss at the optic nerve head.

Glaucoma is treated by lowering the pressure in the eye, either by topical medication or surgery. There is good evidence that early treatment delays the progress of the disease. It has been reported that one half of the open-angle glaucoma present in the Australian population goes undetected, though this may be an oversimplification.

The risks of vision loss from glaucoma are minimised with adequate surveillance (especially in older patients), early diagnosis, early treatment and appropriate monitoring of eye pressure and visual fields in suspects and those under treatment. NHMRC guidelines⁰ recommend regular examination for everyone aged over 50. For those with one or more risk factors, regular examination should begin at age 40. Examination for glaucoma includes multiple measurements of eye pressure, careful examination of the optic disc and baseline visual fields if risk is very high.

Diabetic retinopathy

Diabetic eye disease is a potentially blinding condition; however blindness can be averted by early detection, identification and management of the condition. The single risk factor for diabetic retinopathy is the presence of diabetes mellitus. The risk increases with time after diagnosis and with poor control of blood glucose levels⁰. The visual welfare of Aboriginal and Torres Strait Islander people is said to be threatened more by diabetes than by any other condition⁰.

As for glaucoma, the risks associated with diabetic eye disease are minimised by adequate surveillance, early detection and, in the case of proliferative disease, early referral for assessment and possible laser surgery. It is essential that diabetic patients receive regular attention through a comprehensive program that includes regular detailed ophthalmoscopic examination of both eyes, through dilated pupils, for signs of retinopathy. Ideally, multiple images should be taken of the entire retina and stored for comparison at later examinations. NHMRC recommends biennial examination in those with no previous known retinopathy, and more frequent examinations in those with high risk or known retinopathy⁰.

Refractive error

Refractive error is the need to wear appropriate glasses to see clearly at distance. In rural Australia, these services are almost entirely provided by rural optometrists, and there is usually one practice located in towns for population 6000 or more. Most rural optometrists provide outreach services, running a clinic once a week or once a month in nearby smaller towns. There are also optometry outreach services provided through the Visiting Optometrist Scheme (VOS), which supports regular circuits by optometrists in the more remote areas of Australia.

There are still areas of Australia where access to optical care is absent or restricted, and those who need glasses but cannot get them suffer functional vision loss as a result. Of particular importance are children whose schooling will be affected if they are myopic, cannot see their teacher and/or schoolwork, and have no opportunities to gain corrective glasses.

Predictions of the future effect of aging

There is no doubt that the combination of age-related eye disease, and a disproportionately growing elderly population, will pose major challenges for both rural and metropolitan communities over the next 10-30 years. It is possible to predict the degree of the problem by combining the results of these epidemiological studies with projections from the Australian Bureau of Statistics about population aging⁰. The number of older persons with significant vision loss is expected to increase from approximately 560500 in 2010 to approximately 799100 in 2024. Over the same period the number of older blind persons will increase from 62000 to 87600. The important question is whether our communities will have available the required numbers of skilled health personnel, in the right locations, to provide the surveillance and management required to minimise avoidable blindness, and to provide quality rehabilitation and low vision care for those affected.

The rural eye health workforce

In urban Australia, there are numerous sources of eye and vision health care, including numerous competing optometrists and optical dispensers, private ophthalmologists, and eye-specific hospitals where coordinated care is provided by registrars, staff specialists, orthoptists and ophthalmic nurses. In rural Australia, eye and vision primary care is provided locally by optometrists and GPs. This is supplemented by occasional visiting outreach services from either city or local optometrists and ophthalmologists.

The local combination of GPs and optometrist, both resident and working in the one town, provides a most useful and powerful system for local surveillance and treatment of all but the most complex conditions. In many locations, GPs refer suspect patients to the local optometrist for assessment of, for example eye pressure or visual fields. At the same time, the optometrist will refer to the GP if systemic disease is found or suspected. As they are both "local", the optometrist and the GP will communicate extensively and personally to work out together what a given patient may require. Either may refer if necessary, but care is required to ensure clarity of management. Where referral to an ophthalmologist is required, each will inform the other of such referral where patients are jointly served. After ophthalmologist consultation, a report will usually be sent to the referring practitioner and copied to the other, as the local regional ophthalmologists are aware of the close collaboration between the various practitioners in each town.

Indeed, the key to adequate provision of eyecare in rural areas is the continuing presence and expansion of the eye-specific clinical network that has developed independently between these three groups. Currently there is no provision for specific support for this network, nor is it officially recognised as a worthwhile and valuable initiative to be nurtured and strengthened. It is provided solely by the individual practitioners, and depends on the extent to which they invest the time, money and experience in maintaining this network.

At the previous NRHC, optometrist Ms Robyn Main presented her analysis of a survey of 50 rural (RRMA 4-7) optometrists throughout Australia⁰. They had a mean age of 47 years, and 33% had decided that they would probably retire within 5 years. Ninety-three per cent had spouses whose background was also rural. There is a very poor history of graduates from the existing coastal tertiary optometry schools deciding to practice outside of metropolitan areas.

When one considers the combination of an increasing demand for surveillance for, and treatment of, chronic eye disease and refractive error, together with reducing numbers of rural practitioners, it is not hard to predict a looming crisis in the ophthalmic rural workforce in the near future.

Two new Schools of Optometry have recently been founded, one in Adelaide (Flinders University) and one in Geelong (Deakin University). Both claim to be guided by a special interest in providing practitioners to satisfy rural demand, but neither has provided details of the nature of any specific clinical rural placements and how they will be funded. Similarly the established Schools now include short term voluntary "rural clinical placements" as a part of their clinical training. It is too early to review evidence of effectiveness of these strategies but work from other fields suggests that multiple strategies are required to grow rural health workforces⁰.

New England eye health workforce

The New England area of NSW is about the size of Tasmania and it extends south from the Eastern Queensland border, between Tenterfield and Moree, down to the major regional centre of Tamworth. It is used here as an

example of a relatively densely populated rural area well removed from metropolitan facilities. Data on numbers of practitioners were collected from the Optometrists Association Australia and the Barwon and Northern Slopes Divisions of General Practice.

In New England, the population of approximately 130000 is spread over 17 towns and regional centres, the largest being Tamworth with a population of about 35000. Approximately 130 GPs, 18 optometrists and 4 ophthalmologists service their vision and eye health needs. Centres with population larger than about 1000 usually have at least one resident GP. Towns of population larger than about 6000 have one or more resident optometrist. The ophthalmologists are based in the larger centres of Tamworth (3) and Armidale (1).

Based on the epidemiology presented previously, one may offer a prediction of the incidence and prevalence of refractive error and potentially blinding chronic eye disease. Glaucoma, ARMD and Diabetic Retinopathy would be found in 864, 4510 and 1165 persons respectively, aged 55 or older. Cataract surgery will be required in about 716 persons each year. Many patients will require more than one consultation per year. This care will be provided through primary and shared care given locally by GPs and optometrists, and secondary care from the 4 local ophthalmologists together with visiting outreach services. Some patients will need to travel to metropolitan areas for tertiary care.

Given the fact that these patients are often elderly and may be residents of aged care facilities the need for local care is even more imperative. If it is not available locally then there may be no access to any service at all.

Clearly there is a great need for the continued presence, and future growth, of the numbers of local GPs, local optometrists and regional ophthalmologists in this and other large rural areas. It is the network between the locally available primary eye and vision care providers (local GP and local optometrist), and the nearby regional ophthalmologist, which provides the most convenient and cost-effective source of surveillance, diagnosis and management of refractive error and potentially blinding chronic eye disease. Policies need to be developed to address the rural-specific education needs, and provide the necessary network infrastructure required to ensure the continued presence and growth of this valuable rural clinical eye and vision network.

Rural ophthalmic clinical education

There are at least two possible strategies at the undergraduate level that can be employed to address these problems. In fact the best answer will likely involve multiple strategies aimed at rural predictors, rural-based health education and clinical training (the “rural pipeline”) and improved conditions and status for those who work in rural areas with the necessary extended scope of practice.

There is very good evidence to show that health students are more likely to practice in rural areas if they come from a rural area, and spend most of their study time working in that rural area, particularly in the rural clinical environment⁰. Rural Clinical Schools and University Departments of Rural Health provide a partial solution, but they do not, as yet, provide a genuine “rural pipeline” to minimise the dislocation of rural health students during their undergraduate studies. There are currently no dedicated facilities in Australia for rural optometry clinical education.

Rural Clinical Education must be extended to include allied health and paramedical disciplines such as optometry. This will enable rural students to develop within their unique local multidisciplinary network. Rural students also need to be provided with an alternative source of entry into health disciplines with very high UAI entry requirements.

Progress in the establishment of “Medicare Locals” provides an opportunity for the value of the multidisciplinary rural eye and vision care network to be recognised and supported. Systems could be developed to support the multidisciplinary surveillance for, and treatment of, chronic disease in the elderly, facilitating collaboration between practitioners, and utilising mutually developed evidence-based procedures. Similarly, support and recognition could be provided to those GPs and optometrists who need to work with an extended scope of practice within this network. Where appropriate, support could also be provided for IT facilities to enhance surveillance and treatment with image-sharing and e-Health collaboration. It should be noted that most services (such as correction of refractive error) require the presence of a health practitioner and cannot be replaced by e-Health initiatives.

Summary and conclusions

Australia's rapidly aging population will experience an increased prevalence of chronic age-related eye disease, accompanied by an increased risk of blindness and vision loss. To minimise the potential related morbidity and social cost, systems need to be put in place urgently to support the current rural ophthalmic workforce, in particular the network of local optometrists, local GPs and regional ophthalmologists, and to promote effective rural succession planning. Without remedial action, there will be an increased prevalence of avoidable vision loss and blindness, and this will bring with it personal loss and increased costs to Governments for rehabilitation and specialised care.

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