

# Focus on Low Vision



Centre for Eye Research Australia



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# Focus on Low Vision



## Foreword

Low vision is a much misunderstood condition. Despite all the advances in diagnosis and treatment, many misconceptions abound. Health professionals, people with low vision, families, carers, society, and policy makers often have limited expectations of the quality of life that persons with low vision can achieve.

The purpose of this booklet is to challenge these misconceptions. It draws together what we currently know about low vision and key research findings from what is a recent but growing area of inquiry. Much of this information is drawn from our research here at the Centre for Eye Research Australia (CERA). When other sources are cited, they have been duly referenced.

We trust that this booklet will extend your knowledge of low vision and that together we can work towards better understanding this growing phenomenon of our aging society.

Patricia O'Connor  
Jill Keefe

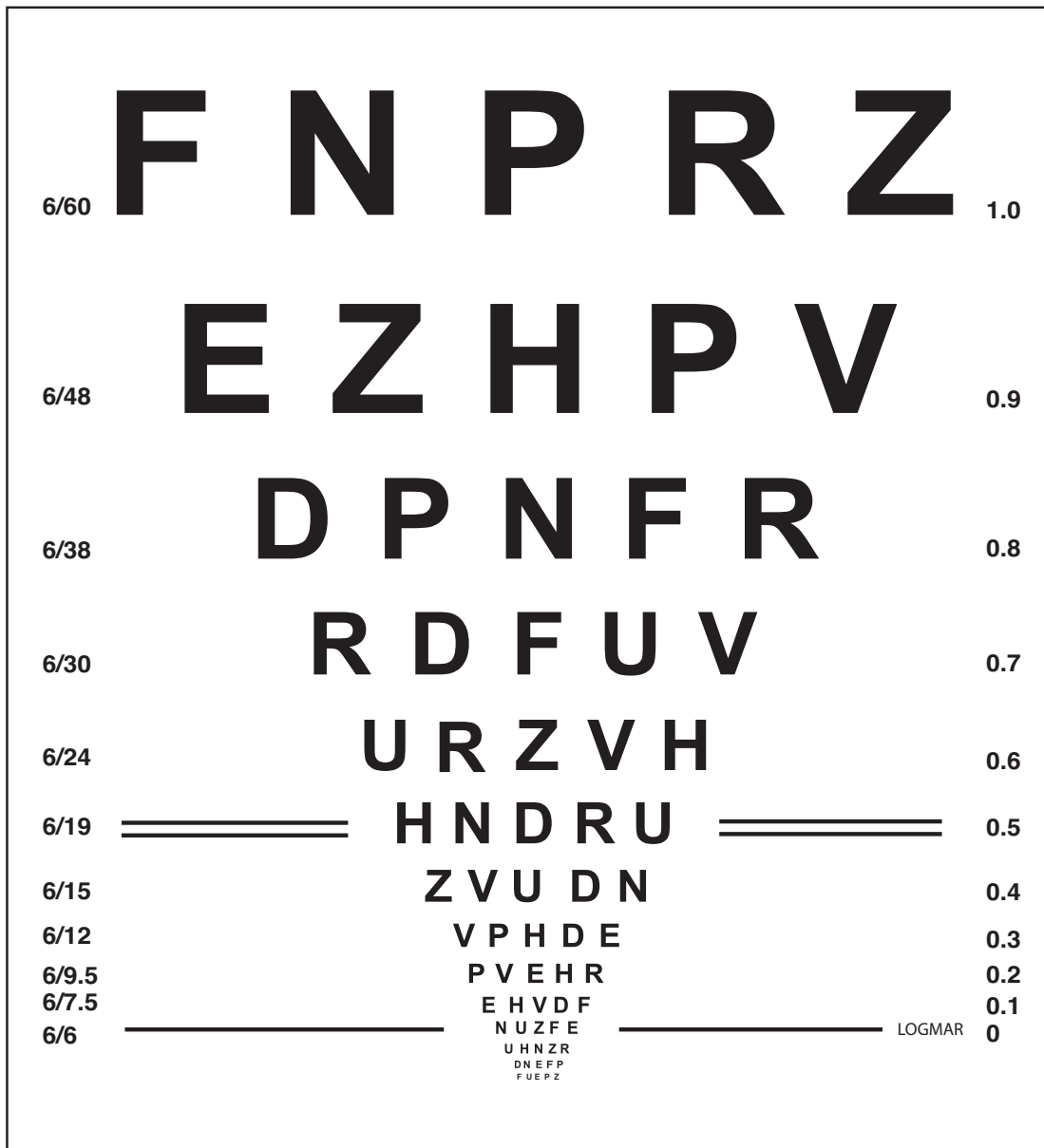
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## What is Low Vision?

Low vision is both a clinical condition and a lived experience. It impacts the day to day quality of life of those with low vision and the familial, workplace and community networks of which they are part.

Low vision is a consequence of the eye's inability to function normally. An important measure of visual function is distance visual acuity and is based on an assessment of the ability to discern letters on an eye chart at specified distances. Normal vision is usually defined as visual acuity of 6/6 or 20/20. This means that a person with normal vision can see at six metres (20 feet in imperial) with both eyes a letter on an eye chart that is designed to be seen at 6 metres or 20 feet.

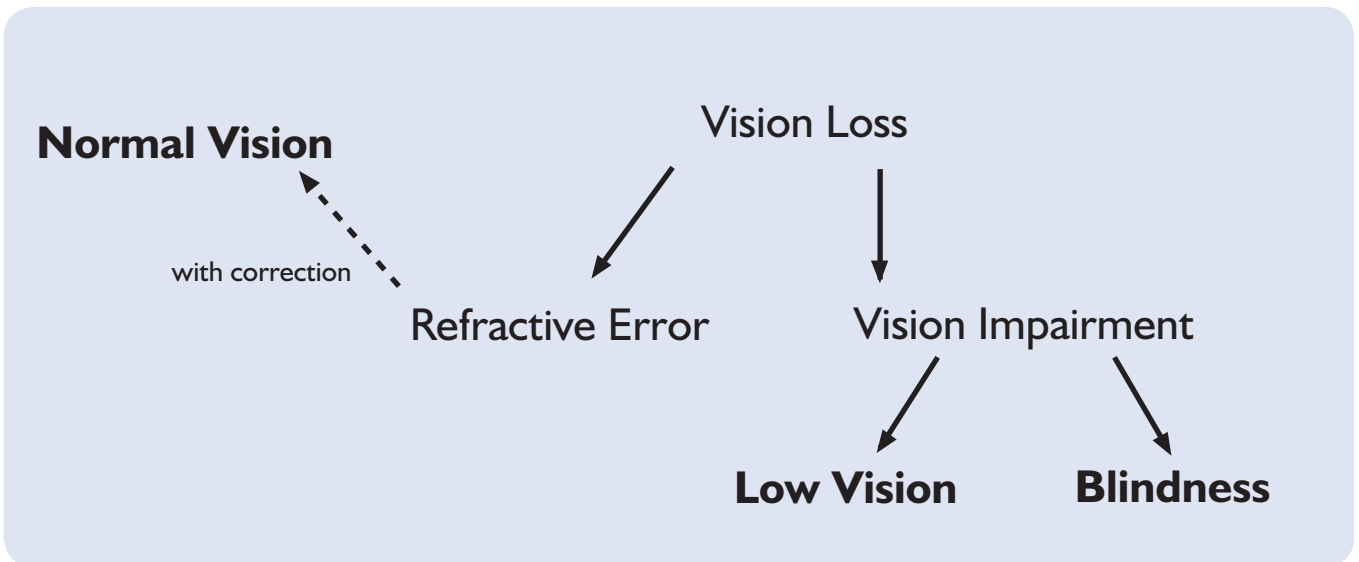
As vision deteriorates, fewer lines on the eye chart can be seen clearly and the second number in the visual acuity measure increases, eg 6/36 (20/120).



Many people with poor vision have refractive error that can be corrected or improved with glasses, contact lenses or surgery.

Low vision is a form of vision impairment that involves irreversible vision loss. Low vision is significantly reduced vision but not blindness.

## Classification of Low Vision



## Defining Low Vision

**Low Vision is defined by the World Health Organization (WHO) in two ways:**

- (i) From an **epidemiological perspective**, low vision is defined by measures of visual acuity and/or visual field as follows:

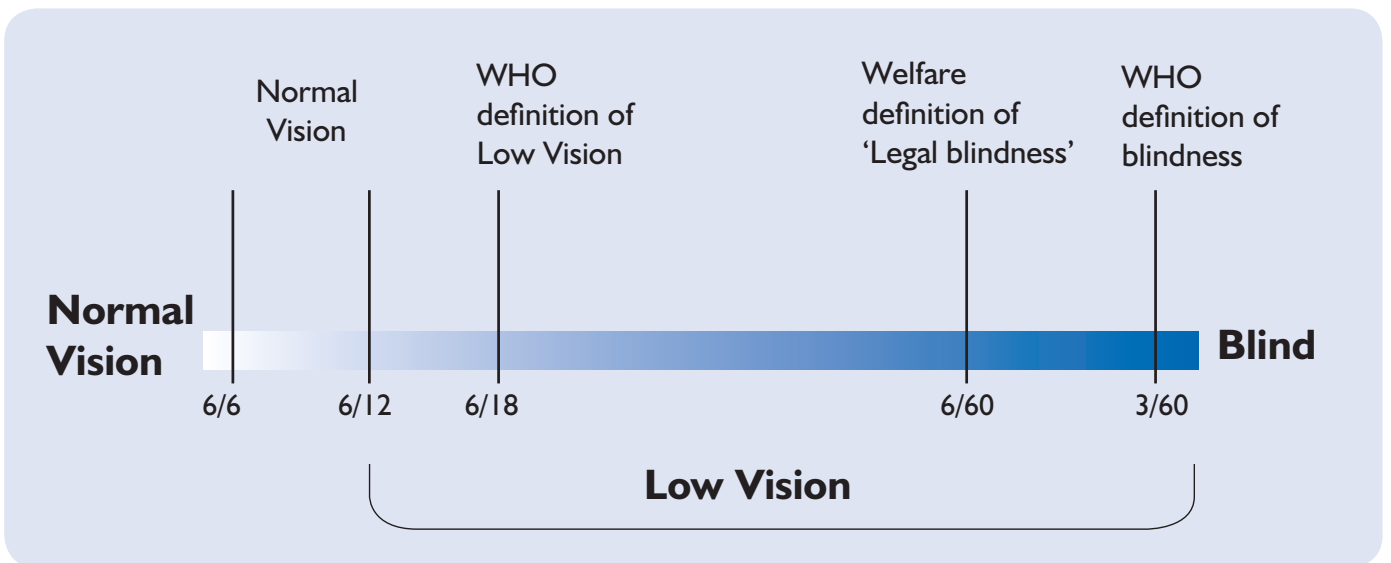
*visual acuity less than 6/18 (20/60) and equal to or better than 3/60 in the better eye with best correction or visual fields less than 20 degrees in diameter.<sup>1</sup>*

- (ii) From a **service provision perspective**, low vision is defined in functional terms:

*a person who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task.<sup>2</sup>*

*In addition to these WHO standards, several other definitions are in common use.*

Vision impairment is often defined as less than 6/12. In Australia, this is less than driving vision. This is also the level at which morbidity and mortality increases.



## The Causes of Low Vision

**The main causes of low vision are age-related:**

- Age-related macular degeneration (AMD)
- Glaucoma

Diabetic eye disease (diabetic retinopathy) is becoming an important cause of low vision.

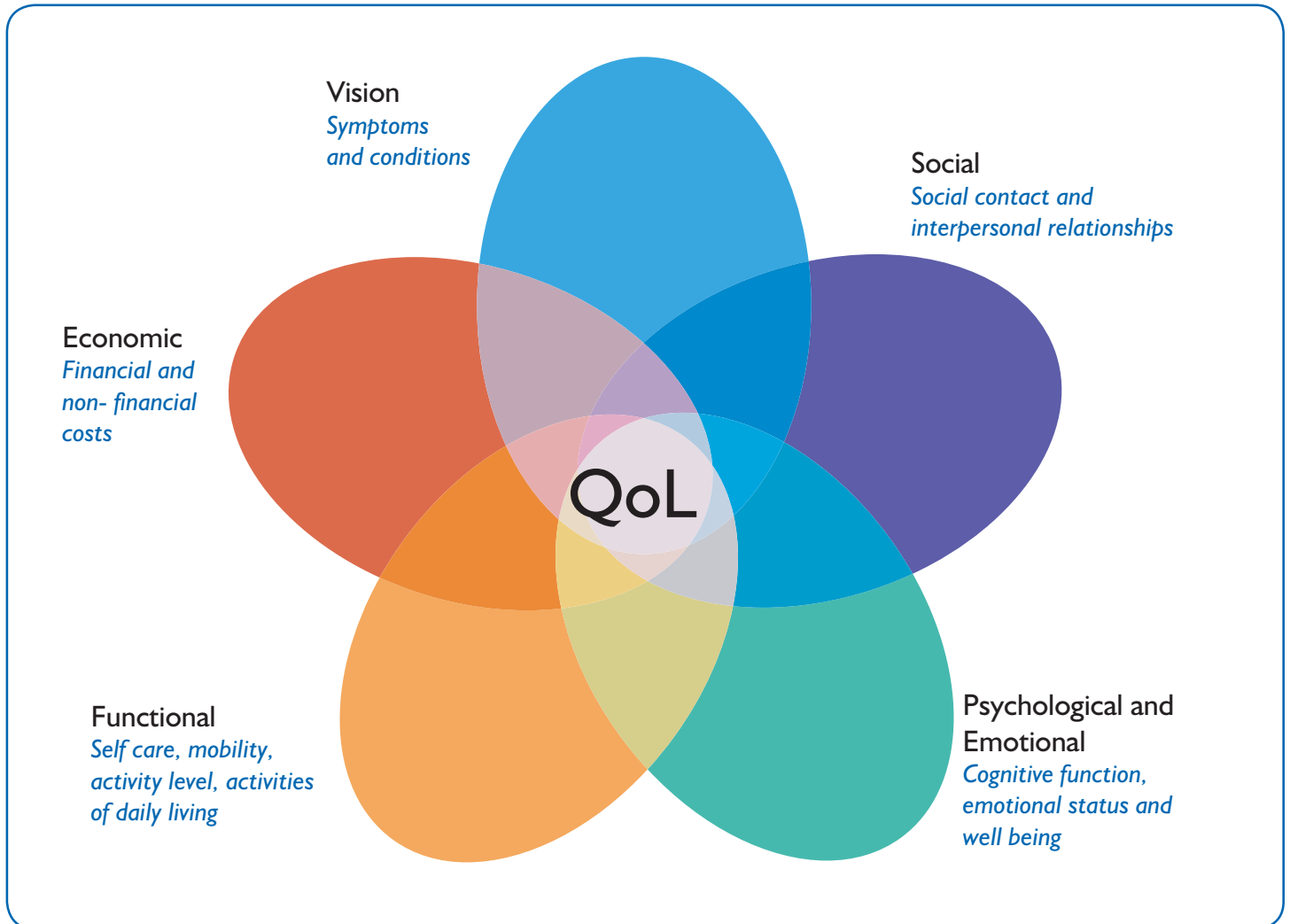
Low vision also occurs in younger people. Among children in the world's middle to high income countries, low vision is largely caused by unavoidable causes such as hereditary or congenital conditions, and retinopathy of prematurity. In the poorest countries, the key causes of low vision are vitamin A deficiency, harmful traditional practices, measles, and cataract as well as unavoidable causes.

**An estimated 124 million  
people in the world have  
low vision<sup>3</sup>**

## The Consequences of Low Vision

**Low vision has consequences for quality of life (QoL) that differ for each person.**

Combinations of visual, functional, psychological, social and economic factors collectively shape individual experience.



The key dimensions of Quality of Life (QoL)<sup>6</sup>

# Two-thirds of the world's vision impaired are women <sup>4</sup>

## The Vision Implications of Low Vision

Different eye conditions affect vision in different ways. Much depends on the loss of visual acuity, visual field and contrast sensitivity generated by these conditions.

CERA's Visual Impairment Project (VIP) found that visual acuity less than 6/12 had major consequences for the individual. The likelihood of falls increased as did the probability of nursing home admission. The Impact of Vision Impairment questionnaire (IVI) confirmed this. Studies using IVI found that visual acuity less than 6/12 was a strong predictor of emotional and functional difficulties.

### Corneal / Lens Problems



### Retinal Problems



### Normal Vision



### Central Field Loss



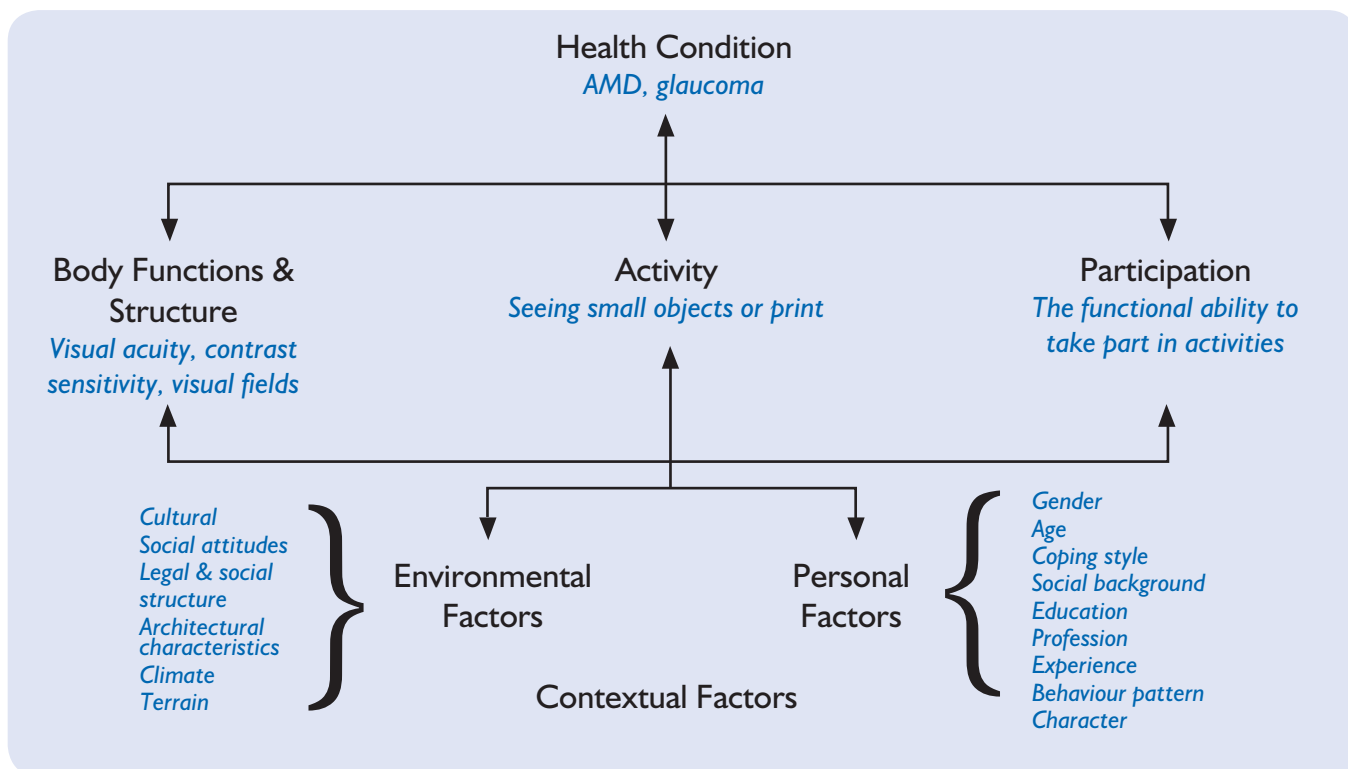
### Peripheral Field Loss



# The Functional Impacts of Low Vision

**How well a person with low vision can see is not fully determined by their degree of vision loss.** Various factors independent of the eye's physiology influence **quality of sight**.

The WHO uses the term “biopsychosocial” to describe the amalgam of physical, psychological and social factors that combine to shape how low vision impacts day-to-day functioning. Their International Classification of Functioning<sup>7</sup> model demonstrates the interaction of these factors.



## Putting **Low Vision** in Context: Some Key Day-to-Day Functional Difficulties

**A person with limited distance vision may have difficulties:**

- learning by imitation
- understanding nonverbal communication
- integrating senses (e.g. visual/auditory, visual/tactual, visual/olfactory, visual/gustatory)
- with independent mobility (e.g. avoiding obstacles and detecting moving vehicles, bicycles or animals)
- recognising people, objects or actions; reading street signs

**A person with poor near vision may have difficulties:**

- with personal care and hygiene
- preparing food and eating
- making and taking care of clothes
- weaving, carving
- reading

**A person with restricted visual fields may have difficulties:**

- with general functioning in poor light
- finding objects
- with independent mobility

## Low Vision and Mobility

**Low vision can impact mobility and independence.** Although people with low vision get sound, smell, and tactual information about their physical environment, the visual cues they receive are often incomplete or blurred. Their ability to effectively use these cues depends on vision, personal and environmental factors.

### Aspects of vision that affect mobility include:

- darkness, dim light
- changing light conditions
- unfamiliar areas
- crowded situations
- visually complex environments (e.g. supermarkets)

“The fact of not being able to see properly is very tiring because you have to concentrate whether you’re in the house and doubly so when you are outside the house.”

“Walking is a concern; one of my biggest problems is uneven footpaths.”

“I don’t tend to travel on public transport because it worries me. I have enough problems without worrying.”

“It’s made me very slow and very careful and quite nervous.”

### Low Vision can also indirectly impact mobility through:

- increased risk of falls and hip fractures
- being overly careful because of a fear of falling
- other medical conditions that either follow or predate vision loss

Through rehabilitation, social support, and environmental modification, many mobility issues can be addressed.

“It’s not only difficult to cope with impaired vision, but other disabilities come.”

“I had a big fall recently and broke a vertebrae in my back.”

# Vision loss is more common in older people

# The Psychological and Emotional Implications of **Low Vision**: Depression

## **FACT#1:**

Depression is not an inevitable consequence of vision loss.<sup>8</sup>

## **FACT#2:**

The majority of adults with low vision never experience significant depression as a result of their vision loss.<sup>8</sup>

**YET....**

## **FACT#3:**

Rates of depression are higher among those who have low vision<sup>9</sup>

## **FACT#4:**

25%-45% of people with low vision experience depression<sup>9</sup>

## **FACT#5:**

Less than 20% of the elderly who are not vision impaired experience depression<sup>9</sup>

## **Susceptibility to depression varies according to:**

- Age
- Gender
- Eye condition
- Pre-existing health conditions
- Functional ability
- Personal resources, social support, relationships
- Culture

The risk of depression increases when low vision occurs simultaneously with other medical conditions.<sup>8</sup>

**180,000 Australians have  
vision impairment that cannot  
be corrected by refraction**

## The Most Common Triggers of Depressive Feelings are:

**Believing that even simple daily functions can no longer be carried out.** In some cases, people reject low vision devices and mobility training because of depression.<sup>8</sup>

“I think it’s the frustration in the first place. It’s total frustration and depression.”

“I was very angry that I couldn’t see and do the things that I wanted to do.”

**Feeling a loss of autonomy, independence and self-worth.**<sup>11</sup>

“[When you] go to an unfamiliar place... you really have to have a carer with you who will tell you where to go. That is something that makes you feel a bit childish.”

“I’m not a baby. I’m not an imbecile. I’m a fully grown adult. I just can’t see.”

**Being embarrassed trying to read in public.** It is often difficult for people with low vision to read menus, product labels and other print material.

“I’ve got someone to go shopping with me because I find it difficult to pick the goods that I want to buy.”

**Being no longer able to drive.** Driving provides the means to undertake daily activities. Having to use unfamiliar public transport systems can be very stressful for people with low vision.

“We’ve tried to get them to announce the stops on the trams and that’s going to take another 50 years.”

“I miss the freedom of having a car.”

## The Social Implications of Low Vision

Low vision can have significant social consequences. Mobility and/or emotional problems can cause individuals to become socially isolated.

Depression and other medical conditions may worsen as a result.

One way to minimise this social disengagement and loneliness is through social support networks.

“I withdrew from mixing with strangers.”

“It would be easy if you had been confined to your house for any length of time to stay confined. You know you’ve got to make yourself go out again.”

However, **social support can also be a source of negative experiences.**  
Negative interaction with family members can increase depressive symptoms.

Their over-protectiveness can hinder the rehabilitation process. This may also threaten their low vision family member's ability to remain independent and increase their relatives' feelings of helplessness.<sup>8</sup>

**"When I first lost my vision...[my husband] wouldn't let me go anywhere on my own."**

**"The worst problem I have is people being over-protective."**

**Culture also influences an individual's capacity to participate in society.** It defines what is considered reasonable and how well people with vision impairment are supported. Expectations regarding quality of life and what low vision entails can also be culturally and socially driven.

**"It embarrasses other people sometimes and they don't know how to handle your condition."**

## The Economic Implications of **Low Vision**

Vision impairment can have a significant economic impact on the individual, their family, community and the nation of which they are part.\*

- **Globally, vision impairment is estimated to cost more than US\$28 billion per year<sup>5</sup>**
- **In 2004, the total cost of vision impairment was estimated to be \$9.85 billion in Australia alone.**
- **In Australia, the personal cost of low vision is approximately \$2,500 annually.**

\* More details on the costs of low vision in the Australia context can be found through the following links:  
[http://www.cera.org.au/publications/clear\\_insight.html](http://www.cera.org.au/publications/clear_insight.html)   [http://www.cera.org.au/publications/invest\\_sight.html](http://www.cera.org.au/publications/invest_sight.html)

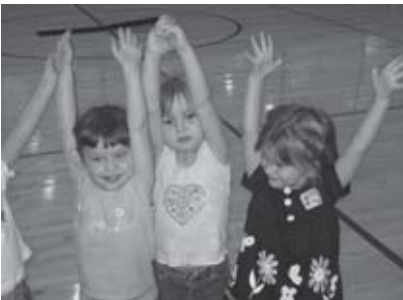


## Low Vision in Children

Children face a lifetime of vision difficulties which can affect their education, employment and social opportunities.

- Many children benefit from the use of special services and devices to optimise the use of the vision they have.
- **Parents** and children voice similar quality of life concerns. Both highlight the importance of social interaction, fitting in and maintaining independence. In addition, parents also emphasise the importance of family and community support, particularly in terms of providing good role models for their children, and the need for equity of access in education.
- The economic impacts of low vision in children are felt by **families and societies**, particularly in the world's poorest communities where most of childhood vision loss occurs.
- For the **individual child**, vision loss can have major quality of life implications. Children themselves have expressed three main areas of concern in this regard:

### 1. Social Interaction



“I can see so I get to see how the sighted people react around blind people and they don't usually do visual signs. Usually it's in their voice... That's generally a fact. I get to realise how vision impaired people are treated compared to sighted people.”

“My social life isn't really ultra affected except the things like taunts, like “blindy” and....”

“Communication's the biggest thing for me. It's frustrating!”

### 2. Fitting In

“I try and be like everyone else, try and stick in the crowd and kind of, yes, be like them.”

“I didn't really want any attention drawn to me at all.”

“I just want to be like everyone else.”



### 3. Maintaining Independence



“ It's also important to know how to ask for help, because you might feel too shy to ask for help, but you shouldn't worry about it, because you are there to learn, and the teacher is there to teach you, or if you need help you should really ask them.”

“People are always telling me I can't do what I want to do and I think if I just agreed with them then I'd get nowhere.”

# Low Vision Services

Comprehensive low vision services include **clinical, rehabilitation services and the use of adaptive technologies.**

## Components of low vision services

Rehabilitation services	Adaptive technologies
<ul style="list-style-type: none"><li>• Low vision clinics</li><li>• Assistance with activities of daily living</li><li>• Counselling</li><li>• Orientation and mobility training</li><li>• Peer support groups</li><li>• Community and social services</li><li>• Advocacy (helplines, support groups)</li><li>• Education</li><li>• Employment and training</li></ul>	<ul style="list-style-type: none"><li>• Environmental modifications eg: lighting, tactile markers, contrast</li><li>• Optical devices/aids eg: magnifiers, telescopes</li><li>• Non-optical devices eg: glare control devices, bold lines pen and paper, writing guides, needle threaders, high contrast watches, talking calculators, enlarged print, and computers with audio output or enlarged display</li></ul>



Hand Magnifier



Stand Magnifier



Telescope

## Use of Low Vision Services

Despite the large proportion of people who could benefit from low vision services, globally as few as **5-10% of people with low vision actually use such services.** In Australia, this figure is estimated to be 20% of people with low vision.

The mismatch between need and uptake reflects a combination of three sets of issues:

- Services-related issues
- People-related issues
- Health professional issues.

These issues converge to create **barriers to accessing low vision services.**

## Service-Related Issues in **Low Vision** Service Uptake

The **key service-related barriers to service uptake** include:

### **Pathways to referral**

In Australia, few ophthalmologists prescribe low vision devices. Their onward referral of patients to low vision services is often delayed until the eye condition is advanced, resulting in coping strategies not being taught in the early stages of vision loss.

### **The distribution and co-ordination of services**

Often different stages in care are fragmented and services operate independently because few interdisciplinary services exist. This can make it difficult for individuals to decipher what services are available and identify which services would best suit their needs.

### **Low-vision care should not be offered in isolation**

They need to be part of comprehensive eye care services and act as a bridge between medical, rehabilitative, and educational programmes.

### **Access to and availability of services**

For those with mobility problems, distance from services and having to use public transport or taxis can be a barrier.

**Advertising, fund-raising and publicity** by agencies have tended to emphasise their blind clientele rather than generate awareness of the services they provide for those with mild or moderate vision impairment.

### **Client awareness of services**

Potential clients may be unaware of or have never attended services available in their community.

**Vision impairment ranks  
6th in the world's major  
causes of loss of wellbeing,  
just below HIV/AIDS**

# Client-related Issues in **Low Vision** Service Uptake

The following are the key barriers that explain why people with low vision do not avail of low vision services: <sup>11</sup>

## **Understanding, awareness and attitude**

- Assuming or being led to believe that nothing can be done to improve their sight
- Accepting poorer vision as an inevitable consequence of ageing
- Having cognitive impairment
- Not self-referring
- Not considering vision impairment to be greatly interfering with quality of life
- Having poor knowledge of the term 'low vision' and the potential benefits of low vision services

## **Access**

- Mobility issues – being unable to travel independently to services
- Affordability issues

## **Personal factors**

- Culture, language and ethnicity
- Gender. Men have a greater tendency to withdraw and are less willing to learn new things
- Complications of co-morbidity e.g. deafness
- Family either impeding or supporting the use of services<sup>12</sup>

# The Role of Health Professionals in **Low Vision** Service Uptake

Communication between eye care practitioners and their patients plays a critical role in patients' experiences of low vision services.

Practitioners **focus on the medical aspects** of their patient's vision problems.<sup>10</sup> This emphasis may mean that rehabilitation options are not always discussed with patients. A specialist's assertion that "nothing can be done" (from a medical perspective) is often falsely interpreted by the patient to mean that no services can help them. Without a referral from their medical practitioners, many patients do not consider using low vision services.

Ophthalmologists typically **refer only a small percentage of their vision impaired patients for vision rehabilitation services**. In one study, only 35% referred any of their 'legally blind' patients and even fewer referred their low vision patients. By making referral a routine part of their treatment regimes, ophthalmologists and other health care providers can play an important role in encouraging more patients to use rehabilitation services.

## Low Vision Service Outcomes

When it comes to assessing the outcomes of a low vision service intervention, much depends on:

- How success is defined and by whom
- Whether success is measured from the perspective of the system or the individual
- The validity of the test or questionnaire used to measure changes following intervention.

### Success within a Clinical Framework:

**From a clinical perspective,** outcomes are largely measured in terms of improvements in visual acuity and competency/compliance in the use of low vision devices. Focusing solely on functional vision and visual acuity measures may however, fail to recognise quality of life issues that may be of greater importance to their low vision clients.

**For a person with low vision,** measures such as self-assessed quality of life and the achievement of greater independence may be more important than clinically defined measures.

### From a system's perspective, success is generally measured by:

- **Compliance with referrals**  
How many patients who are referred actually attend low vision services?
- **Coverage**  
What proportion of the low vision population use available services?
- **Changes achieved through interventions**  
This involves measuring changes in quality of life assessments before and after rehabilitation using instruments such as CERA's Impact of Vision Impairment questionnaire (IVI) for adults and the children's version.

**90% of the world's vision impaired live in developing countries<sup>3</sup>**

## Outcomes from **Low Vision** services can be optimised by:

- **Tailoring the service to best meet needs**

In many cases, only simple aids and low magnification are required rather than more elaborate services.

- **Being age-appropriate**

Services need to address the needs of a broad range of clients, not just older age-groups. Those with earlier onset vision problems such as diabetic retinopathy also need to be catered for.

- **Providing adequate training in using low vision devices**

This promotes greater patient satisfaction and more sustained use of these devices.

- **Including self-management programmes in low vision care**

By providing training, information and peer support, these programmes encourage clients to become involved in the management of their own condition. They have been found to improve self-confidence, increase the number of vision devices used, and reduce stress.<sup>13</sup>

## Providing Comprehensive **Low Vision** Care

The WHO, in association with the International Agency for the Prevention of Blindness, has developed **VISION 2020**. While this project is primarily concerned with the elimination of avoidable blindness by the year 2020, low vision is also one of its priority areas.

The provision of appropriate low vision services has policy implications at a global, national and local level. These services are planned and provided at national level. The following factors need to be considered in national planning initiatives:

- service delivery
- human resource development
- technology
- advocacy
- monitoring and evaluation



## Finding Solutions to **Low Vision** Service Delivery

To ensure that comprehensive low vision services are provided, it is essential to undertake a needs analysis. This analysis has three components:

- **Epidemiological**  
Establishing the scale and nature of the low vision population to be served. This will determine priority areas for action. In Australia, up to 85% of people with low vision and visual acuity of <6/12 could benefit from low vision services.
- **Model(s) of care**  
Reviewing effective models of comprehensive low vision care within primary, secondary and tertiary levels of eye care. From this review, identify the most effective model(s) to use.
- **Monitoring and evaluation**  
Understanding the barriers to accessing low vision care.  
Ensuring the service remains optimum and responsive to changing needs.

### This needs analysis provides the foundations for:

- Establishing comprehensive low vision services based on gaps and priorities identified in the needs analysis.
- Addressing human resource requirements. This involves determining current and future needs in relation to personnel (numbers, professions, specialities), training, curriculum content and development.
- Reviewing infrastructure and resources. This entails assessing the current range, supply and distribution of equipment and low vision devices. Ensuring these devices are affordable will optimise access and usage.
- Advocacy. This includes promoting the inclusion of low vision care as part of eye care, education and rehabilitation services and conducting campaigns to increase awareness about low vision and low vision services in the community and among health professionals .

**Vision impairment increases  
three-fold with every decade  
of life after the age of 40<sup>5</sup>**

## Models of Low Vision Care

Low vision services are delivered through three main models of care: primary, secondary and tertiary. The key features of each model are shown below.

Level	Type of eye care delivered	Type of low vision service provided	% of need met at each level <sup>14</sup>
Primary or community	Community health centres, community based/outreach services, schools	<ul style="list-style-type: none"> <li>• vision screening</li> <li>• assessment of functional vision</li> <li>• referral to low vision services</li> <li>• simple advice on environmental modification and non-optical interventions</li> <li>• simple low vision devices (low power magnifiers)</li> </ul>	30%
Secondary	Ophthalmologists, Optometrists, Orthoptists, (ophthalmic technicians), ophthalmic nurses, counsellors	<ul style="list-style-type: none"> <li>• diagnosis and treatment</li> <li>• assessment of low vision</li> <li>• refraction</li> <li>• prescription of optical and non-optical devices</li> <li>• training in visual skills and use of devices</li> </ul>	50%
Tertiary	Specialised multidisciplinary low vision care team: Ophthalmologists, Optometrists, Orthoptists (ophthalmic technicians), rehabilitation specialists, orientation and mobility instructors	<ul style="list-style-type: none"> <li>• diagnosis and treatment</li> <li>• assessment of low vision</li> <li>• refraction</li> <li>• prescription of high power and complex optical, non-optical and electronic devices</li> <li>• training in visual skills and use of devices</li> <li>• referral and consultation with other professionals</li> </ul>	20%

## Patients' Perspectives: The Essential Elements of Low Vision Care

In discussions with people with low vision, six key elements have emerged as critical to any model of low vision care:

- Services need to assist with personal adjustment and provide help in coping with vision loss
- Professionals need to be educated in sensitivity
- Information needs to be provided on devices and equipment that facilitate independent living
- Services need to facilitate the acquisition of skills in areas such as mobility, and maximise the use of remaining vision
- Access needs to be made available to subsidies such as taxi vouchers so that clients can avail of existing services
- The community needs to be educated on the needs of those with low vision

## Improving Current Models of Low Vision Service Delivery

One of the enduring dilemmas within current models of low vision service delivery is the mismatch that exists between the numbers needing low vision services and the numbers who utilise the services that are available. The American Academy of Ophthalmology has devised the SmartSight<sup>15</sup> program. This model of service delivery is designed to improve patient referrals and provide health care professionals with a more proactive role in vision rehabilitation. In so doing, it advocates incorporating many of the elements that patients themselves have identified as important to their care.

This model recognises the critical role ophthalmologists and optometrists play in their patients' access to low vision care. The roles proposed for ophthalmologists and optometrists are outlined as follows:

### Low vision rehabilitation: the role of eye care practitioners and low vision teams \*

Practitioner	Role
<b>Ophthalmologists and Optometrists</b>	<p>Recognise the major impact even a little vision loss has on function the link between vision loss and depression</p> <p>Respond provide information about low vision and the services that are available</p> <p>Refer to low vision services and/or other practitioners as appropriate</p>
<b>Ophthalmologists and Optometrists</b>	<p>Record visual acuity, visual fields and contrast sensitivity</p> <p>Refract and prescribe magnification</p> <p>Advise and/or demonstrate lighting, filters, and magnification for close work</p> <p>Communicate with other practitioners involved in the patient's care to ensure optimum eye care and low vision service delivery</p>
<b>Ophthalmologists and Optometrists</b>	<p>Evaluate low vision by means of a comprehensive assessment that includes:</p> <ul style="list-style-type: none"> <li>• functional history</li> <li>• visual acuity and contrast sensitivity</li> <li>• magnification</li> <li>• mapping of central or peripheral field loss</li> <li>• counselling and advice</li> </ul>
<b>Vision Rehabilitation Practitioners</b> including: orthoptists, occupational therapists, orientation and mobility specialists, counsellors, etc.	<p>Rehabilitation activities such as:</p> <ul style="list-style-type: none"> <li>• activities of daily life (reading, self-care etc)</li> <li>• environmental adaptation</li> <li>• participation in community-based activities (e.g. shopping, social, recreational)</li> <li>• adjustment to vision loss</li> </ul>

\*Adapted from the American Academy of Ophthalmology SmartSight™ program. Copyright ©2005.

## Gaps in Knowledge

Although the body of research on low vision is growing, some major gaps still exist in our understanding. Among the greatest of these relates to the **optimum models of service delivery**. Other key areas of further research include:

### **More developing world studies needed.**

Research has largely focussed on populations in the world's wealthier countries. Comparatively little is known of the developing world context where the greatest proportion of the world's low vision populations live.

### **Cultural differences need investigation.**

Relatively few studies have been conducted on the role culture plays in the experience of low vision. Cross cultural measurement tools (questionnaires) need to be developed so that tools developed in one country/context can be translated and adapted for use in other countries/contexts. This will make comparisons between different language and cultural groups more meaningful and reliable.

### **Longitudinal studies needed.**

Most studies have captured information at one or two points in the person's life. Studies that track changes in experiences over more extended periods would further our understanding of the long-term impacts of low vision on quality of life.

### **Processes, outcomes and impact of low vision services.**

Current models of low vision service delivery need to be evaluated. A fuller understanding of the coverage and impact of eye care and low vision delivery systems will ensure future planning is better informed and gaps in the system are identified and addressed.

By expanding our knowledge in these areas, our capacity to address the phenomenon of low vision improves.

## Concluding Remarks

The key message of this publication is that low vision is usable vision. This is something that people with low vision, their families, their carers, health professionals, society, and policy makers all need to recognise. Our challenge is to get this message across so that a growing proportion of our population can enjoy the best quality of life possible

*.....because tomorrow that person with low vision could be you.*

## Glossary of terms used

Term	Meaning
Cognitive impairment	Diminished mental capacity. Memory, information processing, and executive functions are the most commonly affected functions.
Comorbidity	Conditions that exist simultaneously with and usually independent of another medical condition.
Compliance	The process of complying with referral or treatment.
Contrast sensitivity	Contrast sensitivity is the ability to see differences in contrast between objects or parts of objects.
Epidemiology	The branch of medical science dealing with the study of the causes and distribution of disease.
Gustatory	Relating to taste.
Morbidity	Illness, disease, injury
Mortality	Death
Normal vision (6/6)	This means that a person with normal vision can see a letter on an eye chart that is designed to be seen at 6 metres (20 feet).
Olfactory	Relating to smell.
Ophthalmologist	An ophthalmologist is a physician, a medical doctor (MD) who specialises in eye and vision care. They are specially trained to provide the full spectrum of eye care, including eye surgery. Many specialise in a certain area of eye care (for example, glaucoma, refractive surgery or retinal surgery).
Optometrist	Optometrists measure refractive errors and prescribe glasses to correct the out of focus error. They are also involved in the detection and diagnosis of eye disease.
Orientation and mobility (O&M)	Orientation and mobility instructors teach people with impaired vision to move around the environment safely and with confidence.
Orthoptist	A health-care professional who prevents, investigates, manages and researches disorders of the eye and vision systems through education, exercise, and visual training.
Refractive error	Refractive error is a term that is used to describe the inability of images to be focussed properly on the retina. The most common refractive errors are astigmatism, long sightedness, and short sightedness.
Retinopathy of prematurity	A disorder of the retina in premature infants.
Vision impairment	It is the inclusive term for low vision and blindness. It is the reduced vision caused by eye disease, accident or eye condition. About 90% of people who are vision impaired have some vision, that is, they have low vision.
Visual acuity	A measure of the eye's ability to see detail.
Visual field	The whole area that is seen when looking straight ahead when the eyes, head and body are still. The peripheral visual field is the outer edges of the field.

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## For further information on the CERA studies used in this booklet, please refer to:

- Access Economics (2006) *Centrally Focussed. The impact of Age-Related Macular Degeneration.* CERA.
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**The rapid growth of the world's elderly population may result in the number with low vision doubling by 2020<sup>3</sup>**



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