



Global Blindness

Around 45 million people in the world are blind. Most of these people live in developing countries where blindness can mean a life of extreme hardship and being caught in a spiral of disability and poverty.

Yet much of this blindness is avoidable and can be either prevented or treated by simple and inexpensive interventions.

The Fred Hollows Foundation works to alleviate the burden of blindness in more than 20 developing countries. Our work focuses on the treatment of cataract blindness amongst the poor, one of the most cost-effective of all health interventions.

We also tackle other causes of blindness where we work. In Africa and Asia we help to prevent and treat childhood blindness because of its devastating effects on a child's survival and future living standards.

In Australia we aim to eradicate trachoma in our Indigenous population, a condition associated with poverty and over crowding.

So far we have helped to restore sight to well over one million people. Yet there is much more work to be done.

This information sheet explores and compares the major causes of blindness globally and in Australia. It explains the conditions, who they affect and how they are treated.

Facts about Blindness

- According to the World Health Organization, of the 314 million people who are visually impaired worldwide, 45 million are blind.(A)
- More than 75% of the world's blindness is preventable or treatable.(A)
- Approximately 90% of the world's blind live in developing countries.(A)
- An estimated 1.4 million children under the age of 15 are blind worldwide(B). Around three quarters of the world's blind children live in developing countries in Asia and Africa.(A)
- VISION 2020: The Right to Sight is a global campaign to eliminate avoidable blindness. The Foundation is a partner in VISION 2020: The Right to Sight.

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The Future of Global Blindness

The World Health Organisation (WHO) estimates that without major intervention, the number of people who are blind will increase to 76 million by 2020. **(A)** This projection is based on an ageing world population along with the continuing cycle of poverty in many developing countries.

Without intervention, the costs in terms of human hardship, loss of productivity, rehabilitation, education and medical services will be virtually unupportable.

In response, WHO in partnership with the International Agency for the Prevention of Blindness launched the VISION 2020: The Right to Sight campaign to unite organisations in fighting the causes of blindness. The Foundation is a partner in VISION 2020: The Right to Sight.

For information visit: www.v2020.org

The Causes of Blindness

Blindness is defined as "visual acuity of less than 3/60 or corresponding visual field loss in the better eye with best possible correction."

However, a simple definition of blindness refers to a loss of vision resulting in a person being "unable to walk unaided".

The main causes of blindness are cataract (47.8%), glaucoma (12.3%) and age-related macular degeneration (8.7%).

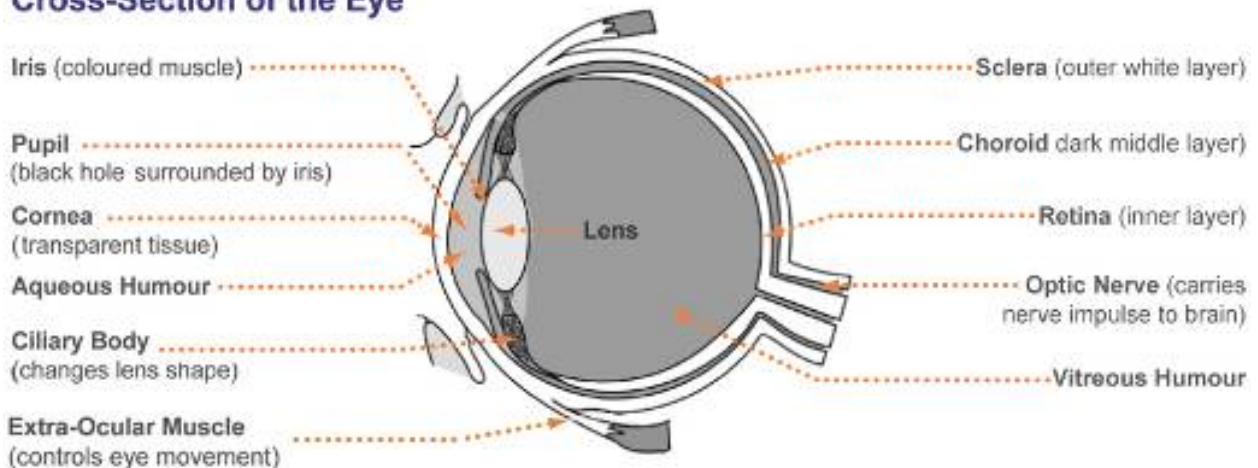
Other causes include corneal opacity (5.1%), diabetic retinopathy (4.8%), childhood blindness (3.9%), trachoma (3.6%), onchocerciasis (0.8%) and other general causes. **(B)** (See Appendix)

Blindness is most prevalent in developing countries where malnutrition, inadequate health and education services, poor water quality and a lack of sanitation leads to a high incidence of eye disease. **(C)**

In Australia, there are approximately 444,400 blind and visually impaired people aged over 55. Most blindness is caused by age-related conditions and the number of people affected is expected to double over the next 20 years as the population ages. **(D)**

In Indigenous and Torres Strait Islander communities, cataract, diabetic retinopathy, refractive error and trachoma are the leading causes of blindness and visual impairment. **(D)**

Cross-Section of the Eye



Cataract Blindness

What is it?

Cataract blindness occurs when the natural lens of the eye becomes cloudy causing a gradual loss of vision. The effect on vision is like looking at a mirror in a bathroom that has become fogged up with steam.

Who does it affect?

Cataracts often cause vision loss and blindness among people 45 years and older, as age affects the opacity of the lens. Almost everyone over the age of 60 years is affected by cataracts to some degree.

Cataracts can also affect those who have experienced an eye injury, have diabetes, take steroids or who are constantly exposed to the sun's harmful UV rays.

Children may be born with cataracts, or develop them in early life, especially if they have poor nutrition and health.

What is the magnitude of the problem?

On a global scale, cataracts are the leading cause of blindness.

Of the 45 million people **(A)** who are blind worldwide, approximately half suffer from cataract blindness. **(B)**

In Australia, cataract is the largest single direct eye health cost and the national cost of treating cataracts is predicted to reach \$668 million by the end of 2010. **(F)**

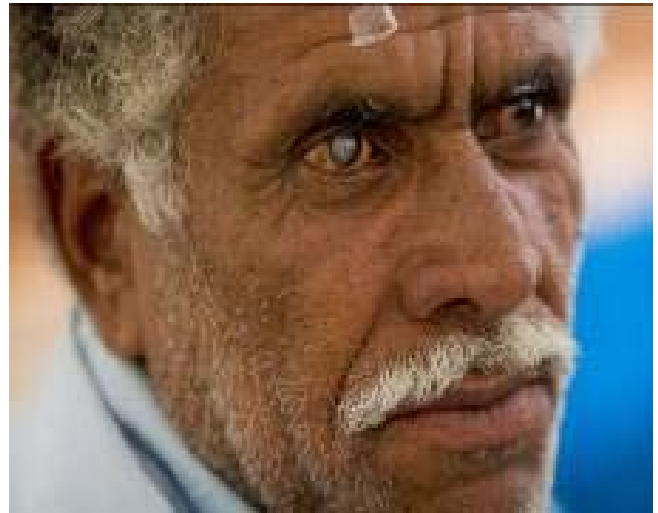


Photo | Fifty nine year old Mohammad Hassen lives in Pakistan. He only has partial vision as a result of the cataract in his right eye. Photo courtesy of www.lannonharley.com

How is it treated?

Cataract blindness is treatable. Cataracts can be removed in an operation performed under local anaesthetic.

The operation involves removing the clouded lens from the eye and leaving the thin lens capsule behind.

An intraocular lens (which is a thin piece of clinical grade plastic and often called an IOL) is then implanted into the capsule and acts as a replacement lens. The operation takes around 20 minutes in the hands of a skilled surgeon.

Despite studies showing that cataract surgery is among the most cost-effective of all health interventions, access to surgery in many developing countries is often difficult and prohibitively expensive.

Glaucoma

What is it?

Glaucoma occurs when the optic nerve at the back of the eye is damaged, often in association with an increase in pressure inside the eye.

Primary open angle glaucoma occurs when the optic nerve has become damaged without any warning symptoms and often with no (or limited) increase in eye pressure.

Damage to vision occurs very slowly and the first signs may be the loss of some parts of the visual field, usually from the edges.

Acute angle closure glaucoma, and some secondary glaucoma, occur with the sudden onset of pain and loss of vision and can lead to blindness in the affected eye if not treated promptly.

In congenital glaucoma, the drainage openings that the aqueous humour flows out of are not properly developed, resulting in damage to the infant's eye, in some cases even before birth.

Who does it affect?

Glaucoma is a leading cause of blindness. Primary open angle glaucoma is the most common form and mainly affects people over 40 years of age.

People who have diabetes, suffer from migraines or have had an eye injury, are more at risk of developing the disease. A family history of glaucoma also increases the risk. Infantile glaucoma can also occur from birth or can be developed in a child's early years.

What is the magnitude of the problem?

In developing countries, glaucoma is the second leading cause of blindness, with more than 12% of blindness cases caused by the disease. **(B)**

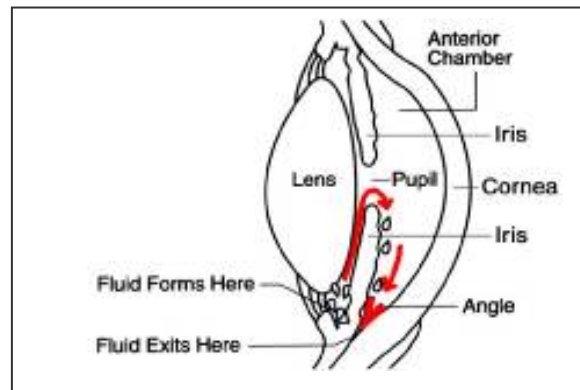


Diagram | Blockage of the drainage system in the eye can cause glaucoma. Image courtesy of National Eye Institute, US National Institutes of Health.

In Australia, glaucoma affects about 2.3% of all people aged 55 years and over. **(E)**

How is it treated?

The management of glaucoma focuses on reducing or eliminating the chances of further damage to the eye.

Existing damage and vision loss cannot be restored. Medication (eye drops); laser treatment and surgery can be used to bring the pressure in the eye under control and reduce or eliminate the risk of further damage.

Age-Related Macular Degeneration

What is it?

The macular is a small area in the retina, which is located at the back of the eye. It is responsible for detailed central vision.

Age related macular degeneration (ARMD) occurs when the macular deteriorates, affecting a person's ability to see fine detail. ARMD does not affect peripheral vision.

Who does it affect?

ARMD becomes more common as people age. Other factors which lead to an increased incidence of ARMD include smoking and a family history of ARMD.

What is the magnitude of the problem?

ARMD is now the third leading cause of blindness in the world, due largely to the fact that there are a growing number of people over the age of 70. **(B)**

In Australia, ARMD accounts for up to 28% of visual impairment and 50% of blindness in people aged over 55. ARMD affects approximated 3.1% of older Australians. **(E)**

How is it treated?

Early diagnosis of ARMD is crucial as loss of vision cannot be restored once the damage has occurred. In some cases, laser therapy can be used to seal leaking blood vessels in the macular area, which can stop further deterioration of central vision.

People affected by ARMD often benefit from low vision services and devices which help them to live independently.

Diabetic Retinopathy**What is it?**

Diabetic retinopathy affects people with diabetes whose retinal blood vessels expand, leak or break, resulting in damage to the retina and loss of vision.

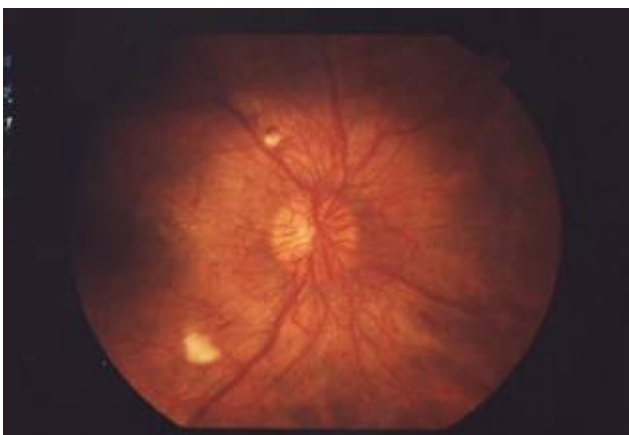


Photo | A patient with advanced (proliferative) diabetic retinopathy. Photo courtesy of National Eye Institute, National Institutes of Health.

A person with diabetic retinopathy can experience blurred or distorted vision, increased sensitivity to glare and difficulty seeing at night.

Who does it affect?

Diabetic retinopathy affects about 1 in 4 people who have diabetes. It particularly affects those who have had diabetes for more than 10 years.

Within 20 years of being diagnosed with diabetes, almost 3 out of 4 people will experience some form of vision loss as a result of diabetic retinopathy. **(A)**

Those with Type 2 diabetes are particularly at risk. Diabetic patients who have high blood sugar levels, high blood pressure, kidney disease or who smoke also have a greater chance of experiencing vision loss caused by diabetic retinopathy.

What is the magnitude of the problem?

Diabetic retinopathy accounts for nearly 5% of global blindness. **(B)**

The incidence of diabetic retinopathy is increasing in both developed and developing countries, however it is particularly on the increase in developing countries where communities are undergoing a transition from traditional lifestyles to a western diet and lifestyle.

Diabetic retinopathy affects around 2.8% of Australians aged over 55. **(E)**

How is it treated?

Laser treatment, which is used to seal leaking blood vessels, is very successful in stopping any further damage to the retina. Sometimes surgery is necessary if more extensive retinal damage has occurred.

Childhood Blindness

What is it?

Childhood blindness refers to a group of diseases and conditions that occur in childhood or early adolescence and result in severe visual impairment or blindness. (I)

Most of the world's blind children live in the poorest regions of Africa and Asia. There, childhood blindness is largely a result of poverty, malnutrition and a lack of adequate primary health care.

Childhood blindness in developing countries is mostly caused by diseases that could be entirely prevented or treated.

The causes include corneal scarring due to vitamin A deficiency and measles infection, cataract, glaucoma, optic atrophy and ophthalmia neonatorum (a severe eye infection in new-born infants) (G)

In some countries such as China, childhood blindness is most often caused by cataract, premature birth, glaucoma and foetal abnormalities (sometimes due to environmental influences or infection).

Who does it affect?

Around three-quarters of the world's blind children live in developing countries in Africa and Asia. (A)

The prevalence of childhood blindness in developed countries is relatively rare. However, the eye health situation of Indigenous children in remote locations of Australia is more like that of developing countries.

What is the magnitude of the problem?

An estimated 1.4 million children, aged 15 years or younger, are blind worldwide. (C)



Photo | Two year old Sammy smiles after having cataracts removed from both of his eyes at Birhan Eye Hospital in Eritrea. Photo courtesy of www.lannonharley.com

How is it treated?

If childhood blindness is not treated in the early stages of life, it is unlikely to be treatable later.

A child over seven years of age, who has been blind all their life, often won't respond to surgery because their brain's ability to recognise visual stimuli has never been exercised.

Most conditions that cause childhood blindness can be prevented by improving nutrition, sanitation and access to child and maternal health services. Treatment depends on the nature of the disease.

Trachoma

What is it?

Trachoma (also known as sandy blight) is an infectious eye disease caused by a micro-organism called Chlamydia Trachomatis.

The micro-organism spreads through contact with eye or nose discharge of an infected person, especially by flies, fingers, towels, handkerchiefs, etc.

After years of repeated infection, the inside of the eyelid may be scarred so severely that the eyelid turns inward and the lashes rub on the eyeball, scarring the cornea (the front of the eye).

If untreated, this can lead to the formation of irreversible corneal opacities and blindness.



Photo | Fred Hollows examining an Indigenous Australian's eye as part of the National Trachoma and Eye Health Program. Photo courtesy of Stephen Ellison/Outline.

Who does it affect?

Children under the age of five predominantly tolerate the active infection but the pain, scarring and damage to the eye is often felt in adulthood.

Due to their role as primary carers, women are also often at higher risk of being affected by the condition.

Trachoma is a marker of poverty and low living standards, particularly overcrowding, poor sanitation and nutrition.

What is the magnitude of the problem?

Trachoma affects 80 million people globally (A). This includes people who are affected by trachoma but may not be blind.

Trachoma is most common in the poorer rural areas of Africa, Asia, Central and South America, Australia and the Middle East.

In spite of a comprehensive national treatment and screening program in the 1970s, Australia is the only developed country in which trachoma is still active and is found almost exclusively within the Indigenous population.

How is it treated?

In many instances, treatment and control of trachoma has been implemented using the **S.A.F.E** strategy.

The **S.A.F.E** strategy involves **S**urgery, **A**ntibiotic treatment, **F**acial cleanliness and **E**nvironmental improvement, which includes providing access to clean water to help reduce the activity and spread of the disease.

Onchocerciasis

What is it?

Onchocerciasis (commonly referred to as river blindness) is an eye and skin disease.

Black flies, which breed in fast flowing streams, transmit the onchocera volvulus worm to humans via a bite. Once they have entered the human body, adult worms live in nodules within the host where the female worms produce a high number of first stage larvae known as 'microfilariae'.

The microfilariae migrate to the host's skin and eyes. The death of the microfilariae is toxic and causes eye damage. Untreated damage and further exposure to the onchocera volvulus worm can lead to blindness.



Photo | A man affected by onchocerciasis in his left eye. Photo courtesy of www.atlasophthalmology.com

Who does it affect?

Onchocerciasis predominately affects those living in fertile river valleys in West Africa, Central Africa, Yemen and some countries in Latin America. **(A)**

What is the magnitude of the problem?

Onchocerciasis affects around 37 million people worldwide and an estimated 300,000 people are blinded by the disease. **(A)** Onchocerciasis is not present in Australia.

How is it treated?

People with onchocerciasis can be treated with an annual dose of the drug ivermectin, which also relieves the severe skin irritation caused by the disease. The drug paralyses the microfilariae, preventing it from being formed on the eye.

Refractive Error

What is it?

The cornea and lens normally focus light to form a clear image on the retina. Refractive error occurs when the light is not being focused properly onto the retina, which leads a person to see blurred images.

Glasses or contact lenses can usually compensate for this loss of focus.

The most common forms of refractive error are myopia (short-sightedness) and hyperopia (long-sightedness).

Myopia occurs when light is focused in front of the retina instead of being focused properly on it. A person is affected by hyperopia when light is focused behind the retina.

The other major form of refractive error is presbyopia, which is loss of ability to focus on near objects and is experienced by most people over the age of 45 years.

Who does it affect?

Anyone can be affected by refractive error and most people live with some degree of the condition. Presbyopia is almost universal in the older age group.

What is the magnitude of the problem?

On a global scale, refractive error has been estimated to cause visual impairment in around 153 million people. It is the main cause of visual impairment of children aged 5-15 years. **(A)** In Australia, more than half of visual impairment cases are due to refractive error. **(E)**

How is it treated?

After an eye test, refractive error can be corrected with prescribed glasses or contact lenses. The prescription may need to be changed periodically, especially in children who are myopic and in older adults who are hyperopic.

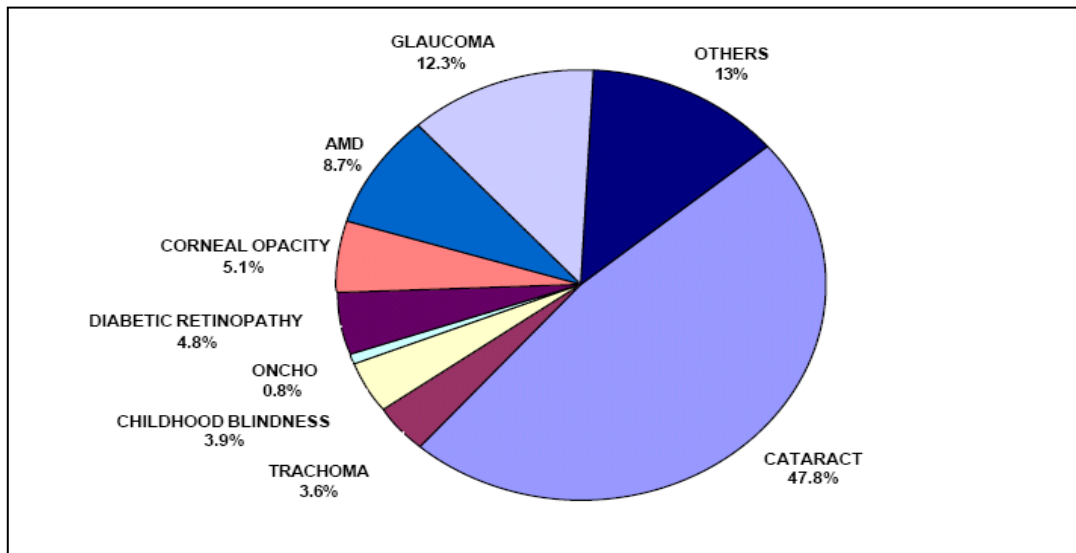
Laser surgery can also be performed on some people so that glasses no longer need to be used.

References

- A.** *VISION 2020 Global Facts and What is avoidable blindness?*, Vision 2020: The Right to Sight, website accessed 13 May 2008.
<http://www.v2020.org/default.asp>
- B.** *Magnitude and causes of visual impairment – No cause for complacency*, World Health Organization
http://www.iapb.org/WHA_59/who_factsheet.doc
- C.** *Blindness, Poverty and Development, The Impact of Vision 2020 on the UN Millennium Development Goals*, IAPB/Vision, 2020
<http://www.v2020.org/page.asp?section=000100010015>
- D.** *Aboriginal and Torres Strait Islander Eye Care Fact Sheet*, VISION 2020 Australia
http://www.vision2020australia.org.au/assets/content/1284/ATSI_fact_sheet_28Aug07.pdf
- E.** *Vision problems among older Australians*, Australian Institute of Health and Welfare, July 2005.
<http://www.aihw.gov.au/publications/index.cfm/title/10141>
- F.** *VISION 2020 Australia Annual Report 2006-200*, VISION 2020: The Right to Sight Australia.
http://www.vision2020australia.org.au/assets/content/1884/07051%20Artwork_web_a.pdf
- G.** *Childhood blindness in the context of Vision 2020 – The Right to Sight*, Clare Gilbert and Allen Foster, Bulletin of the World Health Organisation, 2001, 79 (3), 227-232
- H.** *Frequently Asked Questions*, International Trachoma Initiative, www.trachoma.org
- I.** *Childhood Blindness (web information sheet)*, VISION 2020, April 2007
<http://www.v2020.org/page.asp?section=0001000100020005>

Appendix (B)

Global Causes of Blindness as a Proportion of Total Blindness



Global Estimate of Visual Impairment and Blindness

