A Vision for All to See

A report on global eye health and vision care from Brien Holden Vision Institute
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A Vision for All to See:
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A Vision for All to See

Taking care of your eyes is just as important as taking care of the rest of your body. Good vision helps us to work, study and enjoy life. We only have one pair of eyes. Protecting our sight is vital to our families, communities and society in general.

Alarming statistics show that vision impairment is on the rise. Myopia (near-sightedness) and presbyopia (aging sight) are two eye conditions that are rapidly having an immense impact on the visual welfare and social well-being in the United States and around the world.

The global need for vision correction

It has been estimated that up to 60% of the world’s population require some form of vision correction for myopia, hyperopia, astigmatism, presbyopia (all ‘refractive errors’) or other clinical needs. Yet, over 625 million do not have the eye examinations and glasses they need to see for distance or near vision, 162 million have avoidable vision loss due to untreated disease and, unnecessary blindness and impaired vision is not being comprehensively prevented.

Furthermore, evidence is mounting that a major vision impairment and blinding condition – yet to be prioritized by the World Health Organization (WHO), the major NGOs and research agencies – known as myopic macular degeneration (MMD), will become the major cause of blindness in Asia and a growing threat
for many other countries where the prevalence of myopia is on the rise.

The numbers alone suggest an impending crisis. We believe there were around 1.45 billion myopes worldwide in 2010 and that this will increase to around 2.5 billion by 2020, with a significant number living in urban areas of Asia.

The other concern is for presbyopia, which affects over 1 billion people and is expected to increase to 1.5 billion by 2050. What it means is that we’re duty-bound to act now, to find a breakthrough treatment to slow the progress of myopia before millions of people lose their sight.

In addition to the impact on public health there is enormous economic potential in addressing uncorrected refractive error and other treatable conditions. For uncorrected distance vision impairment alone the estimated loss in global productivity is US$202 billion annually, however, a one-time investment of between US$20 - US$28 billion would save that amount – a ten-fold return on investment.

In the area of myopia there is an enormous market for an effective treatment that prevents high levels of myopia and the associated increased risk of blindness. For presbyopia, although a range of treatments are available, none are able to restore youthful vision to those whose ability to focus has dramatically reduced with age. Meeting these needs requires vast numbers of professional, support staff, technical, manufacturing, logistics and ancillary personnel. A conservative assessment of the retail value of the vision care and eye health industry (including contact lenses, contact lens care, glasses, surgical and pharmaceutical treatments and other technologies) suggests it is worth over US$80 billion in sales annually.

Substantial international responses to these crises are underway but what is now critical to their success is investment and support. This report not only highlights the health and social imperatives implicated in responding but the significant economic benefits to be gained by governments and private investors through action.

Governments, universities, institutes and industry have opportunities and obligations to build an excellent, effective vision care industry that through social entrepreneurship can and should meet everyone’s needs. This report also reveals how technology is able to make this challenge easier.

The aim of this report is to:

1. Raise awareness of the impending crisis of myopia and presbyopia and the potential human and economic impact worldwide if left untreated.
2. Create a call to action that prioritizes the issue and creates a sense of urgency for the development and implementation of solutions.
Myopia and presbyopia

Myopia and presbyopia are often referred to as refractive errors and are caused by the inability of the cornea and/or the lens of the eye to bend (refract) accurately; someone with a refractive error will experience blurred vision at some distance. Other refractive errors include hypermetropia (hyperopia) and astigmatism.

A refractive error is a condition rather than a disease and, as such, can be corrected easily with glasses. However, a progressive condition such as myopia cannot be treated with lenses and can significantly increase the risk of potentially blinding conditions.

Myopia and presbyopia are the two most rapidly increasing refractive errors. There are an estimated 625 million people worldwide with uncorrected refractive error (107.8 million with uncorrected distance refractive error and 517 million with uncorrected presbyopia (near refractive error)).

Myopia, also known as ‘near-sightedness’, causes people to have difficulty seeing distant objects clearly. Light is brought to a focus in front of the retina. The most common cause is an elongation of the eyeball, known as axial myopia.

The chances of a child becoming myopic are increased if one or more of the child’s parents are myopic.

It is a fact of aging, impossible to refute, that between the ages of 40 and 50 years we all develop a condition known as ‘presbyopia’, which limits the eye’s ability to focus at close range. When we read or look at something close, the flexible lens of the eye changes shape to provide the close focus required. However, as we age, the lens becomes less flexible and its ability to change shape is reduced. This inevitable loss of flexibility causes near vision to be blurred. As a result, almost everyone over the age of 45 needs vision correction for reading and other close work.
Among all the important public health priorities, vision impairment is a pressing global problem. According to Frick and Kymes,6 “The absolute economic burden of visual impairment ranks with cancer, dementia and arthritis.” Chiang et al.7 point out that, “Vision impairment ranks 6th in the world’s major causes of loss of wellbeing, just below HIV/AIDS.” The burden of avoidable vision impairment falls more heavily on developing countries with people in the developing world being ten times more likely to become blind than those in the developed world.8 Resnikoff and Pararajasegaram9 warned in 2001 that without intervention the global burden of avoidable blindness would double by the year 2020.

**Myopia**

Myopia is not only the most common cause of vision impairment – it presents a rapidly increasing threat of blindness, especially in urban areas of Asia, but also in the United States.

In the United States, the prevalence of myopia has increased markedly in the last 30 years – from 25 % in the early 1970s among those aged 12 to 54 years to 42 % now.10 In 2010, there were an estimated 34 million myopes, which has been forecast to increase to 44 million by 2050.11 In areas such as East Asia, rates of myopia are astounding. In Taiwan myopia jumped from 36.7 % to 61 % between 1983 and 2000 for 12-year-olds.12 Studies have shown that 93 % of 18 year old girls in Taiwan are myopic.13 In Singapore around 70 % of college graduates have the condition13 and in China, a country of over 1.3 billion people, studies have shown rates as high as 78 % amongst 15 year-old children in urban areas.14 We believe up to 600 million Chinese could be myopic. In Australia, the prevalence of myopia in children whose parents both have myopia is 43.6 %.15

Accompanying this change in prevalence is a rising risk of vision threatening conditions, such as myopic macular degeneration, retinal detachment and glaucoma, which are associated with high levels of myopia.

A recent study found that myopic macular degeneration is now the leading cause of blindness in Jing-An District, Shanghai, China (19.4 % of all blindness) with rates of blindness increasing from 113.7 per 100,000 in 2003 to 165.9 per 100,000 in 2009.16

Other research is revealing high levels of myopia in young age groups in some areas of Asia, which is a worrying trend. For example, in Taiwan 20 % of 18-year-old girls had high myopia (over –6.00 D),17 and a study in Singapore found 18 % of 7-year-olds had high myopia.18

**Presbyopia**

Presbyopia is the most widespread ocular problem in the world – it eventually affects every person after the age of approximately 45, regardless of their location, health status or economic circumstance. In 2005, just over 1 billion people were presbyopic and by 2050 due to aging of the population, this is predicted to increase to 1.5 billion people by 2050.3 In the United States approximately 46 % of the population was over 40 years of age in 2010 and hence, within the presbyopic age bracket, with almost 143 million people being affected.19

The sad fact about presbyopia, a condition that needs to be corrected for adequate near vision was that in 2005, over 50 % of the world’s presbyopes (517 million people – mostly living in developing communities) had either no glasses or had inadequate glasses, causing significant near vision impairment.3 This situation is still not acknowledged by the World Health Organization (WHO) and major agencies, as a global health priority.

Approximately 94 % of those with uncorrected vision impairment caused by presbyopia live in developing countries and an estimated 410 million are unable to perform near tasks as required.5
The prevalence (existing cases) and incidence (new cases) of both myopia and presbyopia are increasing dramatically and disturbingly worldwide. While glasses will solve the problem of poor vision, the prevalence and incidence of myopia require more than merely correcting the error with glasses. High myopia is associated with other very serious eye conditions.

There is a need to slow down the development of myopia to prevent potentially blinding conditions such as myopic macular degeneration, retinal detachment and glaucoma, resulting from the elongated eye. A meta analysis in 2006 of several previous studies concluded that, "The impact of myopia, an apparently benign ocular disease, may be larger than it seems. A greater understanding of the potentially blinding risks of myopia by ophthalmologists and optometrists may facilitate the screening and management of myopia-related ocular complications."20

The problem is that while lenses can correct the immediate problem – blurred vision at distance – they don’t treat the underlying cause (elongation of the eye), which as it progresses with age, increases the risk of blindness. As the myopic eye continues to grow beyond ‘normal limits’ the stretching of the eye creates the risk of potential retinal damage and detachment and the risk of glaucoma and cataract is significantly increased.

Evidence is mounting that a major blinding condition known as myopic macular degeneration (MMD) will become the major cause of blindness in Asia, and a growing threat in many other countries where the prevalence of myopia is on the rise.

Data from Asia provides an indication of trends in prevalence and levels of high myopia in that region and therefore some understanding of the magnitude of this emerging threat. In the U.S. there is clear evidence that myopia is on the rise, but worryingly, little knowledge about the potential impact on levels of blindness there.

Simply supplying glasses will not address the problem of these myopia related blinding conditions. The key to the future is slowing the progression of myopia.

A reduction in progression of 33 % would produce a 73% reduction in myopia above 5.00 D.21

Access to care

Our eyes should give us a lifetime of service. But sometimes, we get an eye condition that causes our vision to be impaired. These problems can happen at any time, but are more likely to happen as we get older. An eye examination can not only help detect eye disease, but is also part of an overall health checkup.

Unfortunately, not everyone in the world has access to vision care services. In developed countries, there is approximately one eye care practitioner for every 10,000 people. In some regions around the world, the ratio may be one practitioner per 500,000 people and the situation is much worse in many rural areas.

In the United States the majority of people have access to an eye care practitioner and appropriate correction. However, there is a gap. According to Vitale et al.,22 in the United States “approximately 14 million individuals aged 12 years or older have visual impairment (defined as distance visual acuity of 20/50 or worse), and of these, more than 11 million individuals could have their vision improved to 20/40 or better with refractive correction.”

In 2007 it was estimated that 61 million adults in the United States were at high risk for serious vision loss, due to existing vision or eye problems, diabetes or because they were in an at risk age group (≥65 years).23 However, of that number only an estimated 50 % had received a dilated eye examination in the past 12 months, despite recommendations of regular eye care for people in these groups.23

It has been argued that with the aging of its population the number of people in the United States with eye diseases and associated vision loss could increase by 50% or more by 2020.24 Coupled with an obesity epidemic and increasing prevalence of diabetes, this raises significant concerns that vision loss will be an even greater problem in the future. 24
Vision impairment significantly affects a person’s quality of life. Furthermore, it is the loss of visual acuity (clearness of vision) that determines the quality of life rather than the particular condition which has caused the poor vision. Hence, blindness resulting from uncorrected refractive error will have the same effect on quality of life as blindness caused by cataracts or diabetic retinopathy. The ease of correction does not influence the effects on quality of life.

Although the potential improvement in the quality of life for someone with permanent low vision may be marginal, the improvement for someone with uncorrected refractive error and the same initial acuity and quality of life would be significant merely with the provision of glasses. Even modest levels of spectacle correction have an impact on well-being.

It is not only poor distance vision that has a detrimental effect on a person’s life. A recent study has shown that uncorrected presbyopia has an equivalent effect on quality of life as blindness caused by cataracts or diabetic retinopathy. The ease of correction does not influence the effects on quality of life.

Although the potential improvement in the quality of life for someone with permanent low vision may be marginal, the improvement for someone with uncorrected refractive error and the same initial acuity and quality of life would be significant merely with the provision of glasses. Even modest levels of spectacle correction have an impact on well-being.

Vision impairment imposes a significant burden on individuals and families. There is a vicious cycle of poverty and disability, which needs to be broken. Poverty prevents access to services for many with myopia or presbyopia and the lack of correction condemns them to unemployment and further poverty. According to Vitale et al., in the United States, “>110 million Americans could or do achieve normal vision with refractive correction.

The annual direct cost of correcting distance vision impairment is at least $3.8 billion. Of this amount, $780 million represents the annual cost of providing distance vision correction for persons >age 65.”

For many who have vision impairment, but are still in employment, the fear of unemployment and poverty drives them to ignore or hide their impairment, therefore leading to inefficient or even dangerous work practices.

• A study of drivers of public institutions in Nigeria found a strong correlation between motor vehicle accidents and poor vision. The study discovered that 43.8% of drivers with vision impairment were driving without glasses. Many are forced to adopt the dangerous option of driving with vision impairment because of a lack of access to affordable glasses. For many, the alternative would be unemployment. Correction of myopia and presbyopia is a humanitarian imperative. But there is also a heavy economic cost to the community, particularly resulting from reduced productivity.

A conservative estimate of the lost productivity resulting from uncorrected distance refractive error (myopia, hyperopia and astigmatism) has been set US$202 billion annually. This does not include the burden of presbyopia. For the AMRA zone, which includes the United States, Canada and Cuba, the figure is around $44 billion.

The impact of untreated myopia and presbyopia

The estimates of the many millions needing more timely assessment or refractive correction, suggests an urgent need to improve access to, or utilization of, eye care services in the United States. Additionally, there is an inequity in accessing services that several studies have reported.

• Uganda (pop. 35 million) has 16 optometrists and one dispensing optician
• Australia (pop. 22 million) has 3500 optometrists
• United States (pop. 317 million) has 34,200 optometrists

In North America and Australia approximately 16% of presbyopes are uncorrected while the rate of uncorrected presbyopia is as high as 94% in parts of Africa and up to 74% in parts of Asia.
Glasses can provide people with refractive error with good vision. However, they do not cure the underlying cause of their poor vision. A new approach is necessary to address the causes of myopia or restore natural accommodation for presbyopes. Producing natural, unaided vision must be the goal.

Research and subsequent action are essential to address the enormous prevalence and rapidly increasing incidence of myopia and the inevitable growth of presbyopia. The consequences of inaction are a significant increase in preventable blindness and vision impairment and a substantial economic burden to society in lost productivity and increased health costs in addition to a growing humanitarian crisis.

The public health response

The World Health Organization (WHO) has only recently recognized refractive error as a public health issue. While distance refractive error has now been recognized as a global public health problem, presbyopia is still awaiting official recognition despite it being shown to have the same detrimental effect on quality of life as distance refractive error.36

Non-government organizations like the public health division of the Brien Holden Vision Institute have been implementing programs to build sustainable eye care systems globally to overcome the tragic deficit in services which has led to hundreds of millions being unnecessarily vision impaired and blind. The Institute has also been raising awareness internationally of the issue of uncorrected refractive error, including hosting the inaugural World Congress on Refractive Error (WCRE1) in 2007 and more recently WCRE2 in 2011.

In 1999, the WHO and International Agency for the Prevention of Blindness (IAPB), launched the Vision 2020: Right to Sight initiative to eliminate avoidable blindness and vision impairment worldwide. The Brien Holden Vision Institute has been instrumental in this initiative and in developing globally co-ordinated programs, in consultation with local governments and communities.

We seek further support and funding from donors and governments around the world to meet this massive challenge.

Cost of the solution versus loss in productivity

It has been estimated that the cost of solving the global problem of unnecessary and correctable vision impairment resulting from a lack of access to an eye test and glasses would be between US$20 billion and US$28 billion.5 This is approximately 10 % of the total burden of uncorrected distance vision impairment alone.

The return on investment from the outlay required to solve the problem of uncorrected refractive error has been estimated at 59 %.5 The total for the United States would be as low as US$2.2 billion.5

US$20-28 billion would cover the cost of...

- 47,000 functional clinical eye care providers – to assess vision and eye health and prescribe corrective lenses needed to restore good vision.
- 18,000 optical dispensers – to provide appropriate glasses.
- Establishing the service delivery facilities needed.
- Operating costs for facilities for 5 years, after which it is assumed that revenue generated by the service would cover costs.5
The number of people with presbyopia (aging sight):
- 1 billion in 2010
- 1.5 billion by 2050
- 143 million in United States

The number of people with myopia (near-sightedness):
- 1.45 billion in 2010
- 2.5 billion by 2020
- Up to 600 million in China
- 34 million in United States (42% of those aged 12-54 years)

The number of people with uncorrected refractive error:
- 107.8 million with uncorrected distance vision impairment
- 517 million with uncorrected near vision impairment
- 25 million in North America

- 625 million globally

Loss in productivity:
- US$ 202 billion annually due to uncorrected distance vision impairment

Cost of the solution:
- US$ 28 billion (one-off investment)
New technology and future innovation: finding a solution

In the area of myopia, research is currently being carried out with the aim of treating the condition by reducing the rate of development of myopia, preventing progression to the higher levels of the condition which significantly increase the risk of blindness.

For presbyopia (and cataract) researchers are working on the development of an accommodating intra-ocular lens (IOL) that will simulate a young pre-presbyopic lens. Researchers at the Brien Holden Vision Institute are looking at ways of reducing the incidence of refractive error in addition to employing the normal corrective measure, glasses. This is being achieved through a variety of projects:

**Myopia Control program**

The Brien Holden Vision Institute, in collaboration with the University of Houston, has established that the rate of increase in myopia can be slowed by an optical intervention based on bringing the peripheral focus in front of the retina. The translation of this technology into contact lenses and spectacle treatments is being urgently pursued.

Correcting myopia currently involves measuring the refractive error only at the very center of the retina, an area known as the fovea. The contribution of the periphery, which constitutes 95% of the whole retina, is simply ignored. The Brien Holden Vision Institute and its collaborating partners in the Vision CRC found that the retinal periphery plays a significant role in development and progression of all refractive errors and especially of myopia.

These data gave rise to the hypothesis, and key intellectual property, that myopia progression can be reduced through controlling the position of both central and peripheral retinal image points. Thus, correcting lenses can be designed that control myopic progression by changing the retinal image position at the periphery without affecting the image at the fovea.

Through the Myopia Control program several spectacle lenses were designed and developed in collaboration with the industry partner, Carl Zeiss Vision, and assessed in trials conducted at the Zhongshan Ophthalmic Center, Guangzhou, China.

Based on the results of a one-year trial which showed a reduction in myopia progression of 30% in children 6 to 12 years old, with at least one myopic parent, the first myopia control spectacle lens, the MyoVision™ lens, was marketed by Carl Zeiss Vision in 2010. Results from this one-year trial and subsequent studies have generated invaluable information which is applied in designing and testing the next generation myopia control spectacle lenses.

The program is also evaluating novel contact lens optical designs and clinical trials with prototypes have indicated that the rate of progression of myopia can be slowed by approximately 40% compared to single vision glasses. Studies with various designs of novel lenses are currently ongoing.

**Accommodating Gel project**

In 2002, in the United States alone, 123 million people (44% of the population) were presbyopic and, globally there were over 1 billion people with the condition in 2005. There is currently no successful therapeutic, surgical treatment or cure for this condition.

Cataracts are presently the leading cause of blindness and the second largest cause of vision impairment in the world. In 2010, there were an estimated 24 million Americans aged 40 and over with cataracts, which is predicted to increase to around 50 million by 2050.

The Accommodating Gel project is developing a clear gel-lens system that will replace the old presbyopic or cataractous lens. The lens is removed during a simple procedure and replaced by the polymer gel. Existing technology doesn’t restore the eye’s natural ability to focus. The Accommodating Gel technology is potentially an alternative for lens replacement in cataract surgery procedures, during which the opaque lens is removed and replaced by a synthetic intra-ocular lens (IOL).

Existing ‘mechanical’ accommodating IOLs have shown limited accommodative power – around 1.00 D to 1.50 D. In contrast, internal tests on an earlier gel prototype have shown accommodative amplitude comparable to the focusing ability of someone in their early twenties.
Intelligent Retinal Camera project

A new technology for use in real-time detection and assessment of common blinding eye disease and general health disorders will soon be available to the world with stimulus funding provided for development by the Australian Government’s Cooperative Research Centre Program. The imaging technology of the breakthrough retinal camera is being developed by the Brien Holden Vision Institute and collaborators in the Vision Cooperative Research Centre (Vision CRC) based in Sydney, with participants in Australia, United States, China, India and Africa.

The intelligent retinal camera is being designed to accurately and rapidly detect and eventually diagnose sight-threatening conditions such as diabetic retinopathy and glaucoma. The camera is being designed to be affordable and easy to use in the most extreme environments so that it can be used by technical support staff and in the most remote and under-served locations.

About Brien Holden Vision Institute

The Brien Holden Vision Institute is a science, technology, research and development, education and public health social enterprise, focused on developing new solutions for vision care, eye health and eliminating vision impairment and avoidable blindness, thereby reducing poverty and suffering.

We believe that sight is a fundamental right for everyone, everywhere and we work with the best in the world to deliver innovative solutions to common eye conditions, such as myopia, presbyopia, hyperopia and the automatic detection of diseases of the eye and general health.

We are a social enterprise. We research and develop breakthrough technologies and products that improve vision, and then, we invest the revenue from this work in our sustainable eye care programs around the world.

As a leading champion for developing new and better vision care technology and products, Brien Holden and his partners have contributed to a development agenda targeting uncorrected refractive error – the leading and yet most easily avoidable cause of vision loss.
At seven years old, Thuy is a keen student but she experienced great difficulty seeing her lessons at school in her first year. Thuy explained, “My eyes were red and often streaming from me rubbing them when I tried to see the board. To see the written words clearly I had to stand very close up so my nose nearly touches. This makes me ashamed.”

With encouragement from Thuy’s school teacher, a local taxi driver helped her and her great-grandmother travel to where she could have her eyes examined. Thuy was referred by the Dat Do refractive error services unit, supported by the Brien Holden Vision Institute, for a full eye examination as they were concerned about her severe level of myopia.

Thuy’s great-grandmother expressed her gratitude with tears in her eyes, “Thank you everyone for helping Thuy. With her new glasses my great-grand daughter’s life with be much improved,” she said.

While at the Dat Do Health Centre, Thuy’s great-grandmother had her eyes examined as she has suffered with poor sight for many years. She was diagnosed with cataracts and offered surgery to restore her sight.
Huala is a nine year old school girl with a story that is sadly quite common. As told by her concerned father, Kato, whenever his daughter came home from school, she would complain that she couldn’t see the words written on the chalkboard. More alarmingly, he said one day she described nearly being knocked down by a motorist on the road. “At that point, I realized she was going blind and needed urgent help,” he said.

“Her performance in class was not good. I took her to Mulago Masaka Regional Hospital eye department for her eyes to be tested. According to the eye doctor, Huala needed a very high prescription. She was given a pair of glasses to help her see clearly. Her performance at school has greatly improved. I no longer worry about her being run over on the way home,” Kato smiled.

Through access to eye care Huala’s life has been transformed thanks to correctly prescribed glasses. Huala can now see everything she needs to live normally and her improved sight has given her a future she would not have had.
More than 5000 school children, aged from six to fifteen, braved freezing wind and snow to have their eyes tested for the very first time in Lechang County, a rural county in Guangdong Province, China. The screenings were provided by local school nurses, ophthalmic nurses and ophthalmologists trained in vision screening and optometric skills by the Institute. This project is now serving as the basis for the expansion of our child eye health efforts in China.

Dr. Xiang Chen, from local implementing partner Zhongshan Ophthalmic Center, Sun Yat-Sen University praised the new initiative.

“People with great commitment have devoted their time and energy to this project. The satisfied smiles from the children who had received our primary eye care service are unforgettable.”
Mary, 54, a Bundjolong woman from Taree was declared legally blind last year. Just over 27 years ago she was diagnosed with diabetes and over the years, due to associated complications, she developed diabetic retinopathy – a condition that causes damage to the retinal tissue and can lead to blindness if left untreated.

Recent developments in advanced technology are producing the world’s first intelligent retinal camera that will accurately and rapidly detect, and eventually diagnose, sight-threatening conditions such as diabetic retinopathy and glaucoma. In Australia, it will help to close the gap in eye health in Aboriginal communities and ensure people like Mary receive diagnosis and treatment much earlier in their lives, making it more likely vision loss is averted.

Mary lived most of her childhood and teenage years at Parramatta Girls Home as a state ward. When she grew into a young adult she moved into a hostel and began training as a nurse. When diagnosed as a diabetic, she was married with two small children, working in Redfern as a district officer, and also studying childcare at TAFE.

During that period she found it hard to juggle motherhood, studying and working and still attend the many doctors’ appointments, so she missed more than a few. Even though both Mary and her husband were working, they simply couldn’t afford to pay for the amount of medication the doctors suggested.

“As a parent you have to make choices. I chose to feed and clothe my children over paying for medication,” Mary said.

She continued, “I tried to access the Aboriginal Medical Service at Mount Druitt, but I lived outside their area so the free transport and assistance for my medical check-ups were not available to me. I really wanted to utilize the services and make sure my kidneys and eyes were alright, but I was not able to.”

Until she went blind, Mary had been caring for her two grandsons, 9 and 14 years old, but due to her complete loss of vision, Mary had to make other arrangements for them.

“That was a very difficult time for me as I had been caring for the boys since they were babies. At the same time I had to surrender my driving license and give up my car. So I went from being an independent woman and active grandmother to being completely dependent on people to do everyday things for me – like taking showers or medication, packing kids’ lunches for school – all that stuff you take for granted, I could no longer do,” Mary said.

Luckily for Mary some help came her way and Guide Dogs NSW/ACT were able to offer her mobility aids and provide training for her and her family.

“They gave me my friend – the cane,” Mary says smiling, holding up her long cane in the colours of the Aboriginal flag. “With this cane I learnt to be independent again. I can even go shopping and travel to places on my own – just me and my cane. I wouldn’t have been able to do that without Guide Dog NSW/ACT’s help. I am very grateful to them,” she said.

CEO of Vision CRC and Brien Holden Vision Institute, Professor Brien Holden said, “Aboriginal communities will be among the first to experience and benefit from this technology thanks to the funding from the Australian Government recently announced and the partnership with Aboriginal researchers and community health experts.”

“Having spent the last 20 years researching and bringing to communities around the world solutions for correcting refractive error, we are delighted that the Australian Government is backing our plan to piggyback onto the systems developed to deliver vision correction, the capacity to simply and effectively detect and manage blinding eye disease through retinal image analysis,” Holden said.
Nigeria, Africa’s most populous country and home to more than 170 million, suffers from high levels of avoidable blindness and vision impairment. In Zamfara State there are five eye clinics to service a population of three million people. These eye care facilities are overstretched due to the large number of patients arriving each day and there is a great need for the development of optical workshops equipped with skilled eye care staff to ‘edge and fit’ glasses to order. This service currently is a very limited resource which means that people often have to wait long periods to receive the glasses they need.

Dr Anne Ebri, West Africa Sub-Regional Manager for the Brien Holden Vision Institute, speaks openly about the impact of current eye care programs.

“The Institute tries to make a positive impact on the quality of life of individuals and communities through project implementation,” Dr Ebri says. “Through these programs I have seen lives transformed and people return to a previously abandoned career, ambitions and hobbies. The Standard Chartered Bank, Seeing is Believing program is addressing the visual needs of the underserved in urban areas of Abuja Federal Capital Territory and Zamfara State.”

“Our programs put in place several strategies to ensure sustainability,” Dr Ebri says. “This includes up-skilling available personnel, training more local people to fill the gaps that exist, establishment of a supervision framework, and the provision of infrastructure and equipment to ensure that quality eye care services are available, affordable and accessible.”

The project is incorporating cost recovery measures to improve economic sustainability, especially through the sale of optical products at affordable rates. Working together with Ministries of Health and Education, local governments and professional bodies, the Seeing is Believing program is a great example of how collaborations will help deliver eye care to local communities and create infrastructure to build a sustainable vision care system.

“A 27 year old could have continued to study in Braille and not be able to pursue his dream of becoming a mechanical engineer. Following the simple intervention of an eye examination and a pair of glasses to correct his vision problem, he has recently completed secondary education in print and has equal opportunity to a normal-sighted person to pursue his dream.”

“Such examples abound across the sub-region – including an eight year old girl who was identified in a School for the Blind during one of our low vision service development activities. One eye was blind but with the other eye, through appropriate treatment and glasses, the child is now able to see the faces of her family, and her environment for the first time.”

“Her first fascination was with vehicles; she wanted to know what each type was used for. She has now gained the independence to move by herself, no longer led by others. She has started to learn the alphabet so she can study at school and learn to read and write – she now has a far better opportunity for the future.”
References

Glossary

A

Accommodation: The ability of the lens in the eye to increase in power to view near objects.

Accommodating gel: An artificial material injected into the lens capsule in place of the eye’s lens with the capability of flexing like the normal young crystalline lens.

Age related macular degeneration: Deterioration of the central retina because of aging which can result in loss of precise central vision.

Ametropia: Distance refractive error. Light is brought to a focus off the retina when the eye is at rest.

Astigmatism: A form of ametropia. Light is brought to two line foci when the eye is at rest.

Axial hypermetropia: Hypermetropia caused by a shorter than normal eyeball.

Axial myopia: Myopia caused by the elongation of the eyeball.

B

Best-corrected vision: Visual acuity wearing optimal spectacle prescription.

Blindness: Visual acuity of less than 20/400 (3/60).

C

Cataract: A clouding of the lens inside the eye which leads to a decrease in vision (leading to blindness if left untreated).

Contact lenses: Ophthalmic lenses worn on the surface of the eye.

Crystalline lens: The lens inside the eye, responsible for accommodation.

Custom-made glasses: Glasses manufactured to a prescription (bespoke glasses).

D

DALYs: Disability adjusted life years – a measure of how people rate their health status.

Diabetic retinopathy: Damage to the retina caused by complications of diabetes, which may eventually lead to blindness.

Diopter (dioptre) (D): The unit of measurement of lens power, equal to the reciprocal of the focal length of the lens in meters.

Distance refractive error: Inability to form a focus on the retina for distance vision. It includes myopia, hypermetropia and astigmatism.

Distance vision: Viewing objects at a distance of 20 feet (6m) or more.

Distance vision impairment: Inability to see objects beyond 20 feet (6m) clearly. It is often the result of Ametropia.

F

Fovea: The central area of the macula on the retina, responsible for the sharpest vision.

Functional presbyopia: The inability to see clearly at near. Presenting near vision <N8 and improving to ≥N8 with near addition lenses.

G

Glasses: A colloquial term for glasses (lenses today are usually made of plastic rather than glass). Also see Spectacles.

Glaucoma: A group of ocular disorders characterized by increased intraocular pressure (which can potentially lead to blindness).

H

Hypermetropia (hyperopia): A form of ametropia. Light is brought to a focus behind the retina when the eye is at rest.

I

Incidence: The measure of new cases arising in a population over a given period of time.

Intelligent retinal camera: A camera which takes a picture of the retina and uses algorithms to analyze the picture and diagnose any pathology.

Intermediate vision: Viewing objects at a distance of between 16 inches and 20 feet (40cm and 6m).

International dollar(I$): An international dollar has the same purchasing power over gross national income as a U.S. dollar has in the United States. It is based on the concept of purchasing power parity.

Intra-ocular lens: An artificial lens surgically implanted in the eye as a replacement for the eye’s crystalline lens.
L

Long-sightedness: See hypermetropia.

M

Macula: The central area of the retina, responsible for precise vision.

Myopia: A form of ametropia. Light is brought to a focus in front of the retina when the eye is at rest.

Myopia control: A method of reducing the development of myopia with optical or pharmaceutical techniques.

Myopic macular degeneration: Deterioration of the central retina as a result of high myopia which can result in loss of precise central vision.

Myopic retinal degeneration: Deterioration of the retina as a result of high myopia which can result in loss of precise central vision.

N

Near refractive error: Inability to form a focus on the retina for near vision. It is also known as presbyopia.

Near-sightedness: See myopia.

Near vision: Viewing objects at a distance of approximately 16 inches (40cm).

Near vision impairment: Inability to see objects at a close distance clearly. It is often the result of presbyopia.

O

Objective presbyopia: Loss of accommodation. Binocular near vision < N8 and improving to ≥ N8 with near addition lenses.

Ophthalmic: Related to the eye.

Ophthalmologist: A medically qualified specialist who treats eye disease and operates on the eye.

Optician: A person qualified to take facial measurements, advise on the choice of lenses and frames, and fit glasses.

Optometrist: A primary healthcare practitioner of the eye and visual system who provides comprehensive eye and vision care, which includes refraction and dispensing, detection/diagnosis and management of disease in the eye, and the rehabilitation of conditions of the visual system.

P

Presbyopia: A loss of accommodation such that the person can no longer read comfortably at their normal reading position. Binocular near vision < N8 and improving to ≥ N8 with near addition lenses.

Presenting Vision: Visual acuity with habitual correction.

Prevalence: The proportion of a population found to have a condition.

Q

Quality of life: The general well-being of individuals – usually measured in QALYs or DALYs.

QALYs: Quality adjusted life years – a measure of how people rate their health status.

R

Ready-made glasses: Glasses mass produced with balanced spherical powers.

Refractive error: Ametropia and presbyopia. Inability to form a focus on the retina for either distance or near vision.

Retina: The light receiving film of the eye.

S

Short-sightedness: See myopia.

Spectacles: Ophthalmic lenses held in a spectacle mount or frame.

U

Unaided vision: Visual acuity without correction.

V

Vision impairment: A loss of visual acuity or field of view from any cause.

Visual acuity: The ability of the eye to distinguish form and detail. Usually measured on a Snellen or LogMAR chart.
Myths about your eyes – Busted
A quick and quirky guide to vision impairment and some of the myths about your eyes that prevail around the world

Information leaflet
Snapshot of Brien Holden Vision Institute

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