

# *Connecting healthy ageing and vision*

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**The Fred Hollows**  
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International  
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Ageing

a contribution to the

**Decade  
of healthy  
ageing**

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# Key messages

This report brings together the vision and ageing sectors to align efforts and join forces to improve the health and quality of life of older people. With the world's population ageing at a rapid rate, collaborative action is imperative. An estimated 73% of people living with avoidable vision impairment are older people; that is 800 million people globally. This number will increase as the population ages, reaching 1.28 billion people by 2050. Age-related eye conditions, including cataracts and glaucoma, are already leading causes of vision impairment and blindness. Existing health and social disparities contribute to the burden of vision impairment for older people, especially for older women and disadvantaged groups. Vision is an integral component of an individual's capacity and deficits in vision have wide-ranging impacts on individuals, economies, and society at large. Therefore, eye health is instrumental to advancing healthy ageing.

## *The impact of vision loss on healthy ageing*

### Vision loss is linked to worse physical and mental health



#### **MORTALITY**

Older people with severe vision impairment or blindness face an increased mortality risk.



#### **CO-MORBID CONDITIONS**

Vision loss is associated with the presence of co-morbid chronic conditions such as cardiovascular disease and hearing impairment.



#### **LIMITED SELF-CARE**

Older people with vision loss find it more challenging to engage in self-care (e.g., physical activity, attending medical appointments).



#### **COGNITIVE DECLINE**

Vision loss is associated with accelerated cognitive decline and dementia in older people.



#### **DEPRESSION**

Older people with visual impairments face an increased risk of depression.



#### **SOCIAL ISOLATION AND LONELINESS**

Vision loss is associated with reduced social activity and loneliness in older people.



#### **FALLS**

Older people with vision impairments are more likely to fall than those without vision loss.

## Key actions to advance eye health in older age

Vision loss and its negative consequences can largely be avoided in older age through dedicated efforts to maximize the functional ability of the older person within their environment.

Vision can be preserved and protected in older age through addressing risk factors and screening for eye conditions that can avoid irreversible vision loss and ensure timely treatment.

Treatment and management of eye conditions can restore or slow progression towards vision impairment. Integrated care can enable timely detection and management of declines in capacity in older people (including visual capacity) through comprehensive assessments and personalized care plans. This model of care requires reorienting services towards primary care, training the health workforce and creating multidisciplinary teams, limiting out-of-pocket expenditures to access care, building strong referral pathways to specialized care, and ensuring that essential equipment is available.

Rehabilitation services and assistive technologies (e.g., eye glasses, braille devices) as well as environmental interventions (e.g., accessible infrastructure, clear signage in public spaces) can ensure that people with vision loss can maintain a high level of function.

The UN Decade of Healthy Ageing (2021-2030) offers an opportunity to bridge gaps between the vision and ageing agendas to improve the eye health and quality of life of older people. It can help deliver Integrated Care for Older People (ICOPE) to achieve better health outcomes; create age-friendly environments that address the needs and preferences of older people with vision loss; address ageism and intersecting forms of disadvantage that prevent older people from accessing the eye care and support they need; and prioritize eye health in long-term care to ensure equal access for all.

## Vision loss can affect functional ability



### STAYING MOBILE

Increasing levels of vision impairment in older people can make it difficult to walk, navigate, drive and access public transportation.



### MEETING BASIC NEEDS

Vision loss can exacerbate poverty through unaffordable health care and a lack of employment opportunities, making it difficult for older people to meet basic needs.



### CONTRIBUTING TO SOCIETY

Vision loss can impact a person's ability to engage in employment or volunteering and caring for family members and the wider community.



### LEARNING, GROWING & MAKING DECISIONS

Older people with vision loss can face barriers to accessing information and educational opportunities.



### DEVELOPING AND MAINTAINING RELATIONSHIPS

Social interactions can be more challenging for older people with vision loss, making it difficult to develop and maintain relationships.

## Vision loss impacts economies and society at large



### ECONOMIC LOSS

Vision loss contributes to productivity losses when older people with vision impairments are not able to work.



### CAREGIVER BURDEN

Caregivers of people with vision loss, usually women and girls, may experience anxiety and depression and lose opportunities to go to school or earn a living.



## *Context*

Population ageing is a rapid global phenomenon that has significant impacts on all aspects of society and economies around the world. Older people already outnumber children under 5 years, and the share of the global population over 60 years of age is expected to nearly double from 12% in 2015 to 22% in 2050. By 2050, the number of people aged 60 years and older will have reached 2.1 billion (WHO, 2020). This increase is occurring at an unprecedented rate, particularly in low- and middle- income countries where 80% of older people are expected to live by the year 2050.

With increasing age, many physiological changes occur which can impact an individual's sensory functions. Age-related losses in sensory functions, including hearing and vision, account for most of the burden of disability in older age (GBD Ageing Collaborators, 2022). These losses are often directly associated with changes in physical and mental health and increase the likelihood of falls. Older people are more susceptible to eye conditions, and subsequently vision loss or impairment, particularly if not detected and addressed in a timely manner. Additionally, noncommunicable diseases (NCDs) are an increasing cause of death and morbidity in older age (GBD Ageing Collaborators, 2022) and may result in vision loss over time (e.g., diabetes, hypertension). Despite the relationship between vision and healthy ageing and the increasing prevalence of vision loss in older age, there is a paucity of dialogue on the connection between vision and healthy ageing.

Every person should have the opportunity to live both a long and a healthy life. Making this a reality requires prioritizing healthy ageing from research to policy and practice, and across sectors and disciplines, including the health system. This is the intention of the United Nations (UN) Decade of Healthy Ageing (the Decade) (2021-2030): a global collaboration, aligned with the last ten years of the

Sustainable Development Goals (SDGs), to improve the lives of older people, their families, and the communities in which they live (WHO, 2020).

Achieving the objectives of the Decade and SDG 3 ("Ensure healthy lives and promote well-being for all at all ages") requires recognition that eye health is a key element of overall functioning in older age and across the life course. Coordinated purposeful action is required to attend to the growing number of current and future older people impacted by vision impairment. A common agenda must be developed on ageing and eye health with the collective goal to improve vision in older age as a means to support healthy ageing, and with entry points for various disciplines and sectors.

This policy brief aims to provide an overview of the status of vision health in older people, demonstrate how vision fits within the healthy ageing public health framework, and drive forward action to advance vision health for all. This brief brings together the goals of the Decade, integrated people-centred eye care (IPEC), integrated care for older people (ICOPE), and age-friendly environments, presenting key strategies to improve vision in older age. In this report, persons above the age of 50 are considered older persons. Although this is an arbitrary age cut-off, it has been used to bring together evidence from different sources.



## *Vision and older people*

The World Health Organization estimates that at least 2.2 billion people are living with vision impairment around the world, of whom 1.1 billion have a condition that could have been prevented or treated (WHO, 2019c). Of the people living with avoidable vision impairment, an estimated 73% are aged 50 years and over (Bourne et al., 2021). This means that more than 800 million older people globally are living with avoidable blindness or vision impairment today, and an increase in these numbers is expected as the population ages (Bourne et al., 2021). The prevalence of vision loss is highest in older people compared to other age groups and it rises sharply from the age of 50 years (see Figure 1).

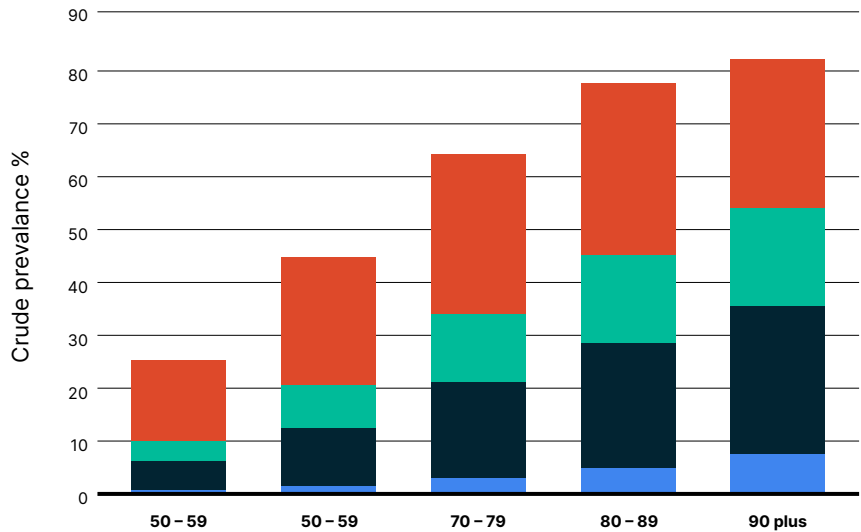


FIGURE 1:

**Crude prevalence of vision loss by age**

- Near
- Mild
- Mod-severe
- Blindness

Source: Bourne et al., 2021, accessed via the IAPB Vision Atlas (<https://www.iapb.org/learn/vision-atlas/>)



Age-related eye conditions (e.g., cataracts, glaucoma, age-related macular degeneration, and diabetic retinopathy) are already leading global causes of vision impairment and blindness (Burton et al., 2021; Steinmetz et al., 2021). Table 1 presents an overview of these key conditions.

TABLE 1:

**Leading causes of vision loss in older people**

Eye Condition	Definition	Signs / Symptoms
<b>Cataract</b>	Cloudiness in the lens of the eye, leading to increasingly blurred vision.	Blurred vision, glare, blindness (advanced cases), abnormal or absence of pupillary reflex, visible opacification of the lens.
<b>Refractive error</b>	Due to an abnormal shape or length of the eyeball, the light does not focus on the retina resulting in blurred vision. Common types of refractive error include: <ul style="list-style-type: none"> <li>• Myopia: difficulty seeing distant objects (near-sightedness)</li> <li>• Presbyopia: difficulty seeing objects at near distance with increasing age</li> </ul>	Blurred vision, difficulty reading (presbyopia), difficulty seeing distant objects (myopia).
<b>Glaucoma</b>	Progressive damage to the optic nerve.	Initially vision loss occurs in the periphery and can progress to blurred vision and severe vision impairment and blindness.
<b>Age-related macular degeneration</b>	Damage to the central part of the retina responsible for detailed vision leads to dark patches, shadows, or distortion of central vision.	Blurred vision, image distortion, central areas of depressed vision, difficulty reading.
<b>Diabetic retinopathy</b>	Damage to blood vessels in the retina which become leaky or blocked. Vision loss most commonly occurs due to swelling in the central part of the retina which can lead to vision impairment.	Blurred vision, floaters, visual field loss.

Source: adapted from WHO, 2019c

In older age, cataract and refractive error are the leading causes of blindness and moderate to severe vision impairment, respectively (see Table 2). Recent estimates suggest that worldwide, there are over 15 million people aged 50 years and older who are blind, and more than 78 million people

who have moderate to severe vision impairment due to cataract alone. In turn, uncorrected refractive error is responsible for blindness in about 2 million people and moderate to severe vision impairment in more than 86 million older people (Steinmetz et al., 2021).

**TABLE 2:**

**Proportion of cases of blindness and moderate to severe vision impairment attributable to each cause for people who are aged 50 or over**

	Blindness	Moderate to severe vision impairment
Cataract	45%	Undercorrected refractive error 42%
Other vision loss	29%	Cataract 38%
Glaucoma	11%	Other vision loss 14%
Uncorrected refractive error	7%	Age-related macular degeneration 3%
Age-related macular degeneration	5%	Glaucoma 2%
Diabetic retinopathy	3%	Diabetic retinopathy 1%

Source: Steinmetz et al., 2021, accessed via the IAPB Vision Atlas (<https://www.iapb.org/learn/vision-atlas/>)

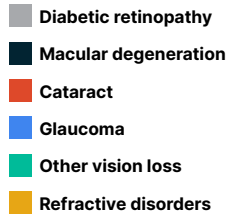
Other common causes of vision impairment in older age include glaucoma, age-related macular degeneration (AMD), and diabetic retinopathy. The relative contribution of each of these causes to the overall prevalence of blindness and vision impairment varies depending on the age group (see Figure 2). For example, whilst uncorrected refractive error is the main cause of moderate to severe vision impairment in younger age groups, cataract becomes the principal cause for those aged 70 years and over. Glaucoma and age-related macular degeneration are responsible for an increasing proportion of blindness in older age groups.



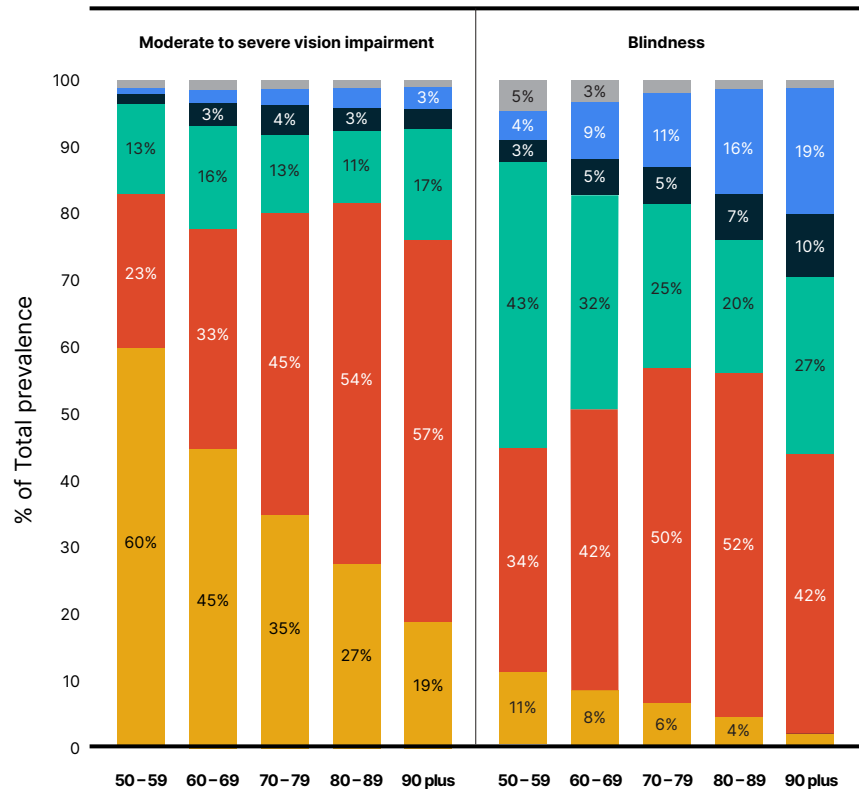
Photo: RDNE Stock Project

FIGURE 2:

### Relative contribution of each cause to crude prevalence of blindness and moderate and severe vision impairment in 2020 by age group



Source: Steinmetz et al., 2021, accessed via the IAPB Vision Atlas (<https://www.iapb.org/learn/vision-atlas/>)



Existing health and social inequities contribute to the increased burden of vision impairment in older people. For example, a WHO analysis of 175 population-based eye health surveys undertaken in 62 countries between 2001 and 2021 revealed that only 17% of people aged 50 and over in need of cataract surgery could access an operation, with coverage being more than four times lower in low-income countries compared to high-income countries (WHO, 2022d). It is not a coincidence that 90% of people affected by vision loss across age groups today live in low- and middle-income countries (IAPB, 2023). Adequate and affordable eye care is generally lacking in these settings, where eye health literacy also tends to be lowest and where rehabilitation and access to assistive technologies is most limited (Marasinghe et al., 2015; Vela et al., 2012). Even in high-income countries, eye care coverage is not comprehensive, and inequities also exist, largely based on socioeconomic factors. For example, a free eye examination policy in Scotland was noted to have enhanced accessibility of eye care services overall; however improvements were less apparent in population groups with lower income or

lower education, highlighting the complexity of factors that contribute to eye health inequities (Dickey et al., 2012).

Within the older population, older women are disproportionately affected, accounting for 56% of cases of vision loss (IAPB, 2023). Much of this gender imbalance is determined by socioeconomic factors, such as reduced access to care (Ehrlich et al., 2019; IAPB, 2023; WHO, 2022d). This is also reflected in the above mentioned WHO analysis involving 62 countries that found that coverage of good quality cataract surgery was 3.8% lower in older women, despite suffering higher rates of cataract (WHO, 2022d).

Considering the global burden of vision impairment in older age and the growing number of older people worldwide, this population group can no longer be ignored. The eye sector and the ageing sector must come together to ensure that eye health is centred within efforts to support healthy ageing, and that older populations are duly considered in existing programmes to improve eye health.



Photo: Kampus Production

## *Vision within the healthy ageing framework*

Healthy ageing is defined as the process of developing and maintaining the functional ability that enables well-being in older age (WHO, 2015). Functional ability consists of the intrinsic capacity of the individual, relevant environmental characteristics, and the interaction between them.

Intrinsic capacity comprises all the mental and physical capacities that a person can draw on and it includes six different domains: locomotor capacity, vitality, psychological capacity, cognitive capacity, hearing capacity and visual capacity (Cesari et al., 2018; WHO, 2019b). This means that vision is an integral part of an individual's intrinsic capacity and therefore instrumental to advancing healthy ageing. At any point in time, the level of intrinsic capacity of an individual is influenced by various factors such as the presence of diseases, and age-related changes. In relation to our visual capacity, certain NCDs can result in vision loss and age is associated with functional changes in the eye that can result in different eye conditions.

The additional functioning that a person can have beyond their intrinsic capacity reflects the net benefits accrued from the environment that they live in. Environments are the second defining element of healthy ageing. They include the home, community, and broader society, and all the factors within them such as the built environment, people and their relationships, societal attitudes and values, and existing policies and services.

Environments influence both intrinsic capacity and functional ability (WHO, 2015). For people with no losses in visual capacity, environments can help to maintain this level of capacity by giving access to educational resources to promote eye health literacy or by reducing environmental hazards. For people with vision impairment, environments can play a fundamental role, enhancing their safety, independence, social participation, and overall quality of life. For example, the availability and affordability of spectacles can mean that older people with presbyopia can continue to read, write, or use the computer. Similarly, living in a neighborhood where there is good street lighting may allow an older person with slight vision impairment to venture out in the evening.

Environments can also present barriers that contribute to reductions in both capacity and functional ability. For example, policies that restrict older people's access to eye care or public spaces that fail to follow universal design principles.



Photo: Michael Amendolija  
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Photo: Mart Production

## *The impact of vision loss on healthy ageing*

Vision loss not only has a direct impact on individuals' visual capacity but also has indirect negative consequences on individuals' physical and mental health, and functional ability. It further impacts economies and society at large.

## ***Impact on physical health***

In older adults, vision loss contributes to diminished physical well-being, and is associated with co-morbid chronic conditions, such as diabetes, cardiovascular disease, joint problems, and hearing impairment (Burton et al., 2021; Court et al., 2014; Crews et al., 2017; WHO, 2019c). Older people experiencing vision impairment have an increased risk of falling (National Academies of Sciences, 2017; WHO, 2021b), which can, in turn, increase the likelihood of premature admission to a long-term care facility and dying (WHO, 2019c, 2021b).

The self-administration of medications, attendance to health appointments, preparation of meals, and engagement in physical activity can become more challenging for people with vision loss, making routine activities of daily living and self-care difficult to sustain. Overall, these limitations can impact health and well-being (WHO, 2019c).

Older people with severe vision impairment or blindness also face increased risk of mortality in comparison to older adults with mild to no vision impairment, according to a recent systematic review and meta-analysis (Ehrlich et al., 2021).

## ***Impact on mental health***

The WHO World Report on Vision highlights the importance of good vision later in life and its pivotal role in sustained mental health among older populations (WHO, 2019). In contrast to those with no vision loss, older persons with vision impairment report lower mental health (Nyman et al., 2010).

Older adults experiencing vision loss are often subject to reduced social activity and loneliness (Brunes et al., 2019; Hodge & Eccles, 2013), and are at increased risk of depression (Parravano et al., 2021; Virgili et al., 2022; Zheng et al., 2017), particularly if they

experience dual sensory impairment (i.e., hearing and vision loss). In fact, one study conducted in India found that older adults with both vision and hearing loss were five times more likely to experience depression (Marmamula, Kumbham, et al., 2021).

The evidence to support a strong association between vision impairment and anxiety is still limited but population-based cross-sectional studies reveal a slight correlation between individuals with vision impairment and having two or more symptoms of anxiety (Evans et al., 2007; Kempen et al., 2012).

Vision impairment is further associated with increased risks of both cognitive decline and dementia as shown in recent systematic reviews and meta-analyses (Cao et al., 2023; Shang et al., 2021; Vu et al., 2021). One of these analyses found that individuals with vision impairment had a 47% greater risk of developing dementia and a 35% greater risk of developing cognitive impairment compared with those without vision impairment (Shang et al., 2021). 4.7% of the global burden of dementia in 2016 was associated with moderate to severe vision impairment, which underscores the need to address vision impairment in older adults as a potential modifiable risk factor for dementia (Shang et al., 2021). Preliminary data from a longitudinal study in England showed that cataract surgery decreased cognitive decline in older populations (Maharani et al., 2018).

## ***Impact on functional ability***

An older person experiencing loss of vision or vision impairment may not only experience a decline in their physical and mental health (intrinsic capacity) but also in their functioning depending upon their environment. In fact, the extent of disability and care dependence resulting from vision impairment and blindness will be largely shaped by the environment, including the availability of adequate rehabilitation



Photo: Streetwindy

services and assistive technologies. Higher degrees of disability and care dependence occur when an individual with vision impairment cannot access eye care products and services, and when the physical environment is not designed to be accessible. Available research shows that older persons with vision loss, compared to the general older population or older patients with different chronic conditions, report poorer levels of functioning with respect to activities of daily living (Kempen et al., 2012). Vision loss also constitutes a leading cause of disability worldwide, particularly among older populations (GBD Ageing Collaborators, 2022; James et al., 2018).

Functional ability includes five different domains according to WHO, referring to a person's ability to meet basic needs by having an adequate standard of living; contribute to society; be mobile; learn, grow and make decisions; and maintain relationships (WHO, 2015). All can be affected by vision loss. Blindness can exacerbate poverty through basic screening and treatment costs and by limiting employment opportunities (WHO, 2019c). These barriers are especially impenetrable where pensions are unavailable or insufficient to cover basic needs and where older people depend exclusively on their work to sustain themselves and their families. The inability to work due to vision impairment can also push older adults and their dependents into poverty, limit their sense of identity and their ability to continue contributing to society (Aboderin & Beard, 2015).

Increasing levels of vision impairment in older adults are linked to reduced mobility and, subsequently, loss of functional ability. This is particularly the case in environments that are not adequately prepared to enhance mobility among people with sensory loss. Cohort studies show, for example, that vision impairment can result in reduced walking speeds, limited ability in climbing stairs and walking for long periods of time (Miyata et al.,



2021; Swenor et al., 2015). Independence for those with vision impairments is also impacted when public transport is not accessible. Such situations can force older people to either stay at home or require the help of another person to assist them in their mobility. A reliance on another family member may mean the loss of the caregiver's income as they will have to forego employment opportunities to be able to fulfil this caregiving role (Gallagher et al., 2011; Keeffe et al., 2009).

Vision loss can also result in reduced social interaction and participation, making it more difficult for people with vision impairments to maintain relationships (Heine et al., 2019). This is partly because of communication difficulties that arise from not being able to register visual cues, such as visual detail, illumination, and the facial expressions of others. The inability to feel connected to others caused by a lack of social networks can increase isolation and loneliness, which can further affect the health of the older person. Additionally, vision loss can make it challenging to participate in activities that require good vision, such as reading or using technology which can reduce our ability to continue to learn, grow and make decisions in environments that are not adapted.

### ***Impact on society***

Vision impairment imposes a significant global financial burden due to productivity loss (Eckert et al., 2015; Köberlein et al., 2013; Marques et al., 2021). The inability to work (loss of income) or work at reduced productivity levels is referred to as the loss of economic productivity. Available assessments suggest that the global annual productivity loss was about US\$411 billion (equivalent to 0.3% of the world's GDP in 2018), with productivity losses being highest in east Asia (US\$ 90 billion) and south Asia (US\$ 70 billion) across current working age groups (15-64 years) (Burton et al., 2021; Marques et al., 2021).

One study specifically estimated the annual loss of productivity from blindness and moderate to severe vision impairment in adults aged 50 to 65 years across nine countries. This study found that the cost of blindness ranged from US\$0.1 billion in Honduras to US\$2.5 billion in the United States, while the cost of vision impairment ranged from US\$0.1 billion in Honduras to US\$16.5 billion in the United States (Eckert et al., 2015). Other studies looking at specific conditions like uncorrected or under-corrected presbyopia in low- and middle- income countries have estimated a total loss of US\$ 315 billion (or an average loss of US\$1453.72 per person aged 40 to 64) (Ma et al., 2022). These figures are likely to be an underestimate given that most studies have limited their assessment of productivity loss to populations under 65 years of age, when a significant percentage of older people remain economic contributors beyond that age.

Vision loss also has an impact on the caregivers of people with vision impairments. Research shows that the burden of caregiving can lead to anxiety and depression, especially when caregivers struggle to balance their needs with those of the family member, or when financial resources are limited (WHO, 2019c). Informal (family) caregiving, which mainly falls on women, also amounts to significant indirect productivity loss. For example, in Canada, it was estimated that the provision of informal care for people with vision impairment resulted in \$290 million of lost productivity (Canadian Council of the Blind, 2021).



## *Protecting and restoring vision in later life*

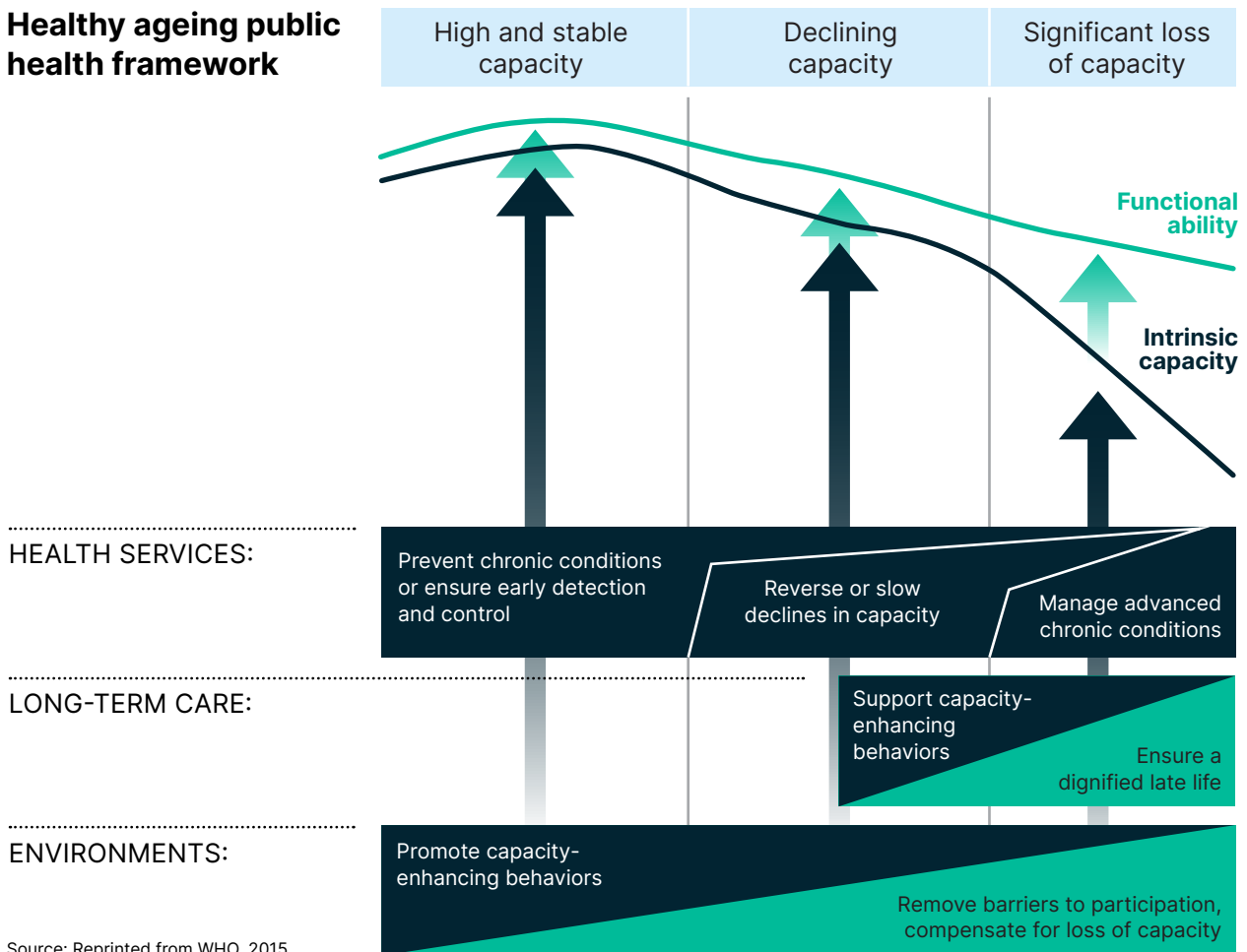
The impact of vision impairment on individuals and society is to a large extent a consequence of unequal access to and limited coverage of eye health and environmental interventions. These consequences can largely be avoided through dedicated efforts. In fact, it has been estimated that up to 90% of vision loss across age groups is preventable or treatable (IAPB, 2023). For example, the two leading causes of blindness and moderate to severe visual impairment – cataract and refractive error – can be addressed with inexpensive surgery and glasses, respectively.

In the second half of life, the trajectories of functional ability and intrinsic capacity vary for every older person. The public health framework for healthy ageing illustrated in Figure 3 outlines strategies to support older populations in maximizing functional ability and intrinsic capacity. The framework identifies three common periods: a period of relatively high and stable capacity, a period of declining capacity, and a period of significant loss of capacity. These periods are not defined by chronological age, are not necessarily continuous nor do they cover the course of every older person's life. However, they provide a helpful framework to discuss opportunities

to develop, maintain and protect functioning (WHO, 2015). The trajectories are also dynamic, meaning that, for example, older people may move from high and stable capacity to decreasing capacity and then back to high and stable capacity. The needs of people in these different phases are distinct and require tailored approaches. At every phase, the goal is to foster functional ability within the environment in which the person lives. Applying the healthy ageing public health framework, this section discusses the interventions required to support and maximize both intrinsic visual capacity and functional ability.

FIGURE 3:

**Healthy ageing public health framework**



Source: Reprinted from WHO, 2015

## ***Preventing chronic conditions and ensuring early detection and control***

To maintain visual capacity in the second half of life, health prevention and promotion must be a priority. Firstly, it is important to prioritize preventative measures that address known risk factors for eye conditions, such as smoking or NCDs. The use of behavioral interventions can help reduce smoking, thereby decreasing the risk of developing age-related macular degeneration and cataract (WHO, 2019c). The early detection and management of NCDs that can result in vision loss such as hypertension and diabetes is equally important. For example, research shows that around 75% of people who have had diabetes for 20 years or more will experience some form of diabetic retinopathy, due to persistent high blood sugar levels damaging the retinal blood vessels (WHO, 2006). Similarly, attention should be given to medications used to manage some NCDs which can increase the risk of developing eye conditions (e.g., the long-term use of steroids) (James, 2007).

Beyond the prevention of risk factors, it is important to support the early detection of eye conditions through regular screening programmes (including mobile clinic programmes) as these can help avoid irreversible loss of visual capacity and enable timely treatment. A large proportion of individuals with common eye conditions such as diabetic retinopathy and cataract remain undiagnosed and untreated because these conditions are often asymptomatic in their early stages (WHO, 2019c). Universal screening programmes underpinned by national or regional guidelines for people of all ages, including older people and at-risk adults, are key to maintaining vision in later life. Despite the potential cost savings of early detection and treatment and the economic benefits

and improvements to individual health and well-being, preventative eye care services such as optometry exams, often require out-of-pocket payments, even in high-income countries with national public health services (The Economist, 2022). To truly address and protect eye health, preventative eye care services must be viewed as a part of universal health coverage, included within national health plans and integrated into primary care services.

Additionally, to support prevention and early detection of eye conditions, education is a priority. Health literacy and knowledge of the availability of services is currently limited in many settings, and there is a general tendency for individuals to consider poor vision an inevitable and normal part of the ageing process (WHO, 2019c). Investments in eye health literacy programmes are therefore required to raise awareness of eye conditions and the need for regular screening as well as to prevent self-medication or the use of local remedies which can worsen eye conditions.

## ***Reversing or slowing declines in capacity***

To reverse or slow declines in capacity, effective interventions start with a comprehensive assessment of the older person, including their visual capacity, as well as an assessment of the conditions, behaviors and risks that may influence this capacity, and the person's environments. This comprehensive assessment provides the information needed to inform the development of a personalized care plan. The focus here must be expanded from health prevention and promotion interventions to taking actions that can help stop or reverse losses in intrinsic capacity.

The treatment of eye conditions can cure or slow progression towards vision impairment. For example, the treatment of cataract is

a simple and highly cost-effective surgical intervention, involving the removal of the opaque lens and the implantation of an artificial intraocular lens. The management of refractive error requires the use of spectacles or contact lenses. For eye conditions like diabetic retinopathy and glaucoma, laser therapy and other treatments can be employed to reduce the risk of vision impairment or blindness.

In turn, the neovascular form of age-related macular degeneration can be effectively treated with anti-vascular endothelial growth factor (anti-VEGF) intraocular injections (WHO, 2019c). Addressing these conditions early can be pivotal to restoring a high level of visual capacity in older people.

Despite the existence of effective interventions to reverse or slow declines in visual capacity, challenges with service delivery, capacity, availability, and access make it difficult for older people to receive timely diagnosis and management of eye conditions, including access to treatment or to assistive technologies. For example, many eye conditions can be effectively diagnosed and managed at the primary care level and yet primary health care providers are often not trained to manage these conditions. Out-of-pocket spending is also a barrier to accessing eye health care services, particularly for low-income and other disadvantaged groups (WHO, 2019c). Complex or overburdened health systems and long wait times can also make it difficult for older people to access eye care specialists when required. The lack of eye care professionals in some countries and their concentration in urban areas and in secondary and tertiary hospitals as opposed to primary level clinics further entrenches existing inequities in access to effective interventions.

These challenges emphasize the importance of integrated care that is holistic, and person-centred. Providing integrated care for older people that recognizes vision as a key part

of overall health will require reorienting the model of care towards primary and community care so that older populations can be reached where they live and transportation costs can be eliminated (Mohd Rosnu et al., 2022). Essential equipment and trained human resources will also be needed, as well as service structures that foster care by multidisciplinary teams. At the same time, out-of-pocket expenditures will need to be reduced or eliminated especially for those who are poor. The management of more complicated cases will require that specialized services are accessible at secondary and tertiary levels (e.g., to adequately manage diabetic retinopathy) and that referral pathways and coordination mechanisms across providers and levels of care are in place to avoid fragmentation, delayed diagnosis or treatment, or a discontinuation of care.

## ***Managing advanced chronic conditions***

The management of advanced chronic eye conditions is key for people with, or at high risk of, a significant loss of visual capacity. These include, among others, diabetic retinopathy, age-related macular degeneration, glaucoma, and complications of high myopia. The effective management of these conditions often requires a range of interventions as well as long-term care. The latter consists of those activities undertaken by others to ensure that people with significant and ongoing losses of capacity can maintain a level of functional ability that is consistent with their basic rights and human dignity. These services typically involve care and assistance with everyday tasks (e.g., bathing, dressing, eating), and the management of advanced conditions through community nursing, rehabilitation, and palliative care; and can be provided by both unpaid caregivers (typically family but also volunteers) and paid care staff.

## STORY

Mrs. Ly Giang May is 77 years old. She has spent most of her life in a small house in Yen Minh district, in Viet Nam. Three of her children passed away at a very young age, and the last remaining daughter moved out a few years later, leaving her with her oldest grandson.

The family raises livestock and grows vegetables for their self-subsistence. Despite all the efforts, her family barely has enough food, and things get worse in the winter.

Tragedy struck when her eyes got blurry. Mrs. May assumed it was only an effect of ageing.

Time passed and she completely lost her eyesight a couple of years later. The most terrible thing for her was being unable to see her great-grandchildren who had just been born. All she could ever do was imagine their faces.

Mrs. May had the chance to regain her vision thanks to a project ran by The Fred Hollows Foundation that included a free eye care campaign. Before initiating the campaign, doctors in the district instructed community eye health volunteers to search for and inform local people who were experiencing eye problems in the area. After hearing the news, Mrs. May's grandson took his grandmother on his motorbike and travelled over 40km through the mountains to the General Hospital in the District.

Mrs. May was diagnosed with cataracts and needed to have eye surgery immediately. The surgery was successful and, Mrs. May could not hold back her tears for being able to see again after such a long time. When she made it back to her village and was having dinner with her family, somebody asked "What is true happiness to you?" Silence suddenly fell over the table.

*"This moment!  
The moment I can see  
my beloved family"*

she answered with a radiant smile and then gently looked at her great-grandchildren.

Mrs. Ly  
Giang May from  
Viet Nam



For individuals with vision impairment or blindness that cannot be treated, vision rehabilitation and assistive technologies can play a fundamental role helping to optimize functioning and prevent or reduce care dependence (WHO, 2015). Different interventions can be helpful and will need to be tailored to meet individual needs and preferences – from the provision of optical magnifiers to the availability of screen readers, psychological therapies and home skills training or orientation and mobility training with white canes to ensure safety (van Nispen et al., 2020; WHO, 2019c). A WHO package of evidence-based eye care interventions, including rehabilitation, is available to support these needs (WHO, 2022c).

Increasing the availability of rehabilitation services and assistive technologies as well as awareness about their availability and efficacy in improving functioning is essential to prevent situations of dependency that could be avoided and ensuring that people with significant impairments can continue to live a dignified life (WHO, 2019c). These interventions and services can be applied across settings, from the home to long-term care facilities. It will be equally important to support caregivers of older people who have severe vision impairment by providing training, information and respite care that can help to reduce stress and enable them to better manage their responsibilities.

### ***Promoting and supporting capacity-enhancing behaviours and removing barriers***

At every level of visual capacity, environments can play a key role by helping to maintain the highest level of functional ability. They can promote capacity-enhancing behaviors, compensate for losses of visual capacity, remove barriers to participation, and ensure a dignified late life.

At a societal level, policies and systems can foster eye health, regulating person-centred primary eye care and ensuring support for those with any level of vision impairment, including through the provision of spectacles and other assistive products. At the community level, accessible infrastructure that supports navigation (e.g., facilities with universal design principles, including tactile cues, contrasting colors and well-marked pathways), and clear signage that supports orientation (well-lit signage with clear fonts and Braille in public areas) can mean continued autonomy and mobility for people with vision loss. Similarly, having accessible digital platforms can enable access to information, and vision rehabilitation (e.g., learning how to use a white cane to identify landmarks and obstacles) can provide life-changing benefits. Simple environmental modifications in the home such as improved lighting can also improve navigation and reduce the risk of falls for people with vision impairments.

Technology is another vital tool to support improved functioning and is becoming increasingly important for older people across the spectrum of capacity. For example, the use of artificial intelligence (AI) can support screening and diagnosis of corneal and retinal diseases, reducing wait times for care and alleviating health system burden (Han, 2022). Other technological advances – including the development of smart phones, voice recognition, digital audio books, and electronic canes – have significantly enhanced the functional ability of people with vision impairment, including, for example, their ability to learn, maintain relationships and be mobile, and will continue to be needed in the future (Irvine et al., 2014; Pallejà et al., 2010).



Photo: Hamza Razzaq  
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## *Eye health in the UN Decade of Healthy Ageing*

The UN Decade of Healthy Ageing (2021-2030) focuses on four interrelated action areas, all of which are relevant to vision. With the aim of bridging gaps between vision and ageing agendas, it is important to situate vision health within the context of the Decade. This section explains the links between eye health and each of the action areas of the Decade and offers examples of what can be done to optimize the eye health of older people within and beyond the Decade.



## Combatting ageism

Ageism refers to how we think (stereotypes), feel (prejudice), and act (discrimination) towards others or ourselves on the basis of age (WHO, 2021a). Ageism affects people of all ages but has a particularly negative impact on the health and well-being of older people (WHO, 2021a). Institutional ageism within the health care system may prevent populations from receiving adequate eye care and priority due to their age. Attitudes of healthcare professionals and policymakers can also influence the provision and accessibility of eye care, while self-directed ageism contributes to low eye care utilization among older populations who assume that vision loss is an unavoidable consequence of ageing (Vela et al., 2012; WHO, 2019c, 2021a). Older people may also be denied access to eye care by family members, a form of ageism that can be particularly harmful for those who are most care dependent (Marmamula et al., 2023).

Individuals with vision impairment are at increased risk of discrimination (Jackson et al., 2019), which may be related to the dual experience of ageism and ableism. The intersection between these two '-isms' can amplify barriers (e.g., in employment, healthcare, housing, etc.), making it more difficult for older people with vision loss to thrive in society. Ultimately these compounded forms of disadvantage can lead to exclusion and more severe and negative consequences on a person's life (WHO, 2021a).

Fostering vision in older age requires addressing ageism and intersecting forms of disadvantage in society and in institutions - such as ableism and sexism. The UN Decade of Healthy Ageing provides an opportunity to develop and enact policies and laws that eliminate ageism across institutions, including health and long-term care systems, and that help respect, protect, and promote the rights and dignity of older persons with vision loss (WHO, 2021a).

Educational activities for healthcare professionals and society at large will also be required to dispel misconceptions regarding the inevitability of vision loss in older age, and to improve eye care utilization (WHO, 2021a). AI technologies used in the field of eye health

will also need to ensure that they don't replicate or introduce new forms of ageism against older populations (WHO, 2022a).

## Age-friendly environments

Age-friendly communities are physical, social, and economic environments, both urban and rural, that enable older people in their full diversity to age safely in a place that is right for them; be included and participate; develop personally and professionally; and contribute to their communities while retaining autonomy, dignity, health and well-being. Age-friendly environments help foster healthy ageing by enabling older people to maximize both their capacity and their ability. This requires actions by many sectors (e.g., transport, housing, labor) and actors across multiple levels of government (WHO, 2015).

The Decade offers an opportunity to develop age-friendly environments that can effectively protect vision in older age and enable older people with vision loss to continue to do what they have reason to value. The process of establishing age-friendly rural and urban communities involves a cycle that begins with dedication from political leaders. This commitment is followed by an assessment of needs and possibilities in the community; the development of a strategic plan to address identified needs; the implementation of the plan; and its evaluation. The cycle would then reinitiate with a new assessment of needs (WHO, 2023).

In responding to the environmental needs of older people with vision loss it will be key to work with older persons with vision impairments to first identify and then use the most effective interventions for each of the detected issues. While there is emerging evidence on effective interventions (Berger et al., 2013; Smallfield & Kaldenberg, 2020), more research is required to understand the effect of different strategies. For example, a systematic review found that most environmental and behavioral interventions for older people with visual impairment had no effect in reducing limitations in physical activity and preventing falls, and reported low certainty of evidence due to methodological limitations in the included studies (E et al., 2020).

## STORY

Over the past three years Joshna Begum, the mother of two sons and two daughters, has struggled to see clearly. Joshna used to read books for her daughter and help her with her studies and Holy Quran recitation. In her spare time, she enjoyed knitting Nakshi Katha (Bengali designed bedsheets). But over the past few years, her vision impairment had made it difficult for her to do regular and enjoyable activities, including daily household chores, knitting, move around, and even go to the washroom.

One day, she learned about the eye care services of Ispahani Islamia Eye Institute and Hospital in Barishal supported by The Fred Hollows Foundation and shared the details with her husband.

He was very keen to take Joshna to the hospital to find out what was wrong with her eyes. Joshna and her husband had to use three modes of travel to reach the hospital, including cars and boats, which made transportation costs hard to manage.

When they reached the hospital, Joshna received an eye check and was diagnosed with severe uncorrected refractive error and was prescribed glasses. Joshna was very happy when she learned that her eyesight could be restored by simply wearing glasses. However, she was also worried about the cost of the glasses and the social stigma associated with wearing glasses.

In many parts of the world the social stigma of wearing glasses

disproportionately impacts women and reduces their likelihood of obtaining glasses to correct refractive errors. Fortunately, after receiving counselling from specialists, Joshna's fear of facing social stigma was gone.

Joshna was overjoyed to receive free glasses:

*"I received a nice glasses, which I am using to see. And now I can do my household chores smoothly, I can read, and I can move from one place to another without anyone's support."*

Joshna Begum  
from  
Bangladesh



## Integrated care

The action area of integrated care aims to foster equitable access to good quality, person-centred health care that is reoriented towards primary care. Integrated Care for Older People (ICOPE) is an approach for implementing the complex spectrum of interventions that are needed to deliver the best possible health outcomes for older populations (WHO, 2015). It refers to services that are responsive to older people's needs and preferences, and are integrated across levels and sites of care, and across health and long-term care systems. With its focus on optimizing intrinsic capacity and functional ability, ICOPE can improve system efficiency and facilitate early detection and management of declines in intrinsic capacity in older people, helping to prevent care dependency (WHO, 2015).

The availability, accessibility, acceptability, and quality of eye healthcare services and their integration with other health services for older people, as part of an integrated care approach, are essential to preventing and addressing vision loss in older age and addressing existing health disparities (WHO, 2019c). The Integrated Care for Older People (ICOPE) approach proposed by the World Health Organization can help to protect and restore vision in older age, and ultimately promote healthy ageing (WHO, 2019b). This approach is not only aligned with the Integrated People-Centred Eye Care agenda (WHO, 2019c), which is the priority of the global health eye sector, but also provides a specific focus on older populations - placing them at the centre of care. Aligning these two agendas supports a continuum of care that spans health and social services and includes services beyond eye care, thereby enabling greater integration of healthcare services and coordination of providers. The ICOPE approach is also in step with the definition of eye health proposed by the Lancet Commission on Global Eye Health, which takes a holistic view describing eye health as "maximised vision, ocular health and functional ability, thereby contributing to overall health and well-being, social inclusion and quality of life" (Burton et al., 2021).

## KEY TOOLS & RESOURCES

### ICOPE Implementation Framework:

This framework provides guidance on assessing and measuring the capacity of services and systems to deliver integrated care at the community level (WHO, 2019a).

### ICOPE guidance for person-centred assessment and pathways in primary care:

This tool supports community health and care workers with early detection and management of declines of capacity, including vision (WHO, 2019b).

### Package of evidence-based eye care interventions:

This resource provides a set of evidenced-based eye care interventions across the continuum of care and the material resources required for implementation. It aims to help policy-makers and technical decision-makers in low- and middle-income countries to integrate eye care into the packages and policies of their health services (WHO, 2022c).

### Eye Care in Health Systems - Guide for Action:

This manual for health planners outlines strategies and approaches that provide practical, step-by-step support to countries in the planning and implementation of integrated people-centred eye care (WHO, 2022b).

### WHO Priority Assistive Product List:

This list aims to provide countries with a model from which to develop a national list of assistive products, including products for people with vision loss (WHO, 2016).

### A guide for national programmes for age-friendly cities and communities:

This guide includes practical steps for creating or strengthening a national age-friendly programme, as well as detailed examples of existing programmes (WHO, 2023).

SRI LANKA

**CASE STUDY:**

**With the support of international non-governmental organizations and the Ministry of Health, Sri Lanka started strengthening its vision rehabilitation services underpinned by the first national eye care plan in 2007. This required strengthening the existing tertiary level rehabilitation services and establishing ten secondary level clinics in district hospitals, with referral links to the tertiary clinics. Eye care practitioners in district hospitals were trained to provide comprehensive low-vision assessments, prescribe, and dispense assistive products, and offer training in their use. Those with complex needs were referred to tertiary low-vision clinics for further assistance.**

**The establishment of these clinics significantly improved the accessibility of vision rehabilitative services across the country. Within just two years of implementation, nearly 8000 people with vision impairment across age groups received rehabilitation services. This represented a five-fold increase compared to the number of people accessing such services in the previous three years. Although this figure is a small proportion of the total number of people with vision impairment in Sri Lanka, it demonstrates a notable improvement in access to low-vision rehabilitation services following the implementation of the national eye care plan.**

Source: Yasmin, 2012

## ***Long-term care***

People may reach a time in their lives when they need assistance from others to carry out activities of daily living. When people experience a significant decline in capacity – including severe vision impairment or blindness – access to good-quality long-term care, including rehabilitation, is essential to maintain their quality of life and functional ability and to live with dignity. Long-term care requires aligned, coordinated health and social care systems to provide a continuum of care.

Studies in high-income countries have found an increased prevalence of vision impairment among older people living in long-term care facilities compared to older people living in communities (Owsley et al., 2007; Thederan et al., 2016). Information about the eye health of older people in long-term care facilities in low- and middle- income countries is still limited, which may reflect that these types

of facilities are not as common in these countries or that there is a lack of information about older people's eye health within the few facilities that do exist. Still, the limited data that is available suggests that older people in these contexts experience a high prevalence of eye conditions. For example, a study conducted in Nepal found that 44% of older people living in seven institutions were affected by vision impairment or blindness, mainly due to cataract, age-related macular degeneration, glaucoma, and under-corrected refractive error. Importantly, vision screening was unavailable in these facilities and there was inadequate provision of glasses or referral for cataract surgery (Dev et al., 2012). Similarly, a study conducted in South Africa found a prevalence of vision impairment and blindness of 63% among older persons living in low-income nursing homes (Mashige & Ramklass, 2020), and another one conducted in India found a prevalence of visual impairment of 30.1% (Marmamula, Barrenakala, et al., 2021).



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Research on the prevalence of vision impairment among care-dependent older people receiving home-based care is also scarce but the studies that are available also suggest that it is more common than among the general older population (Pesonen et al., 2023). Taken together, this evidence signals that vision screening is key for older people with significant declines of capacity, including those living in long-term care facilities and those receiving home-based care. The provision of appropriate services should become routine practice in these two settings and promoted during the Decade. The use of care plans can enable coordination and integration of health and long-term care services, preventing unnecessary hospital admissions and supporting people to remain at home.

#### CASE STUDY:

**A new residential ocular care model was tested in Australia, whereby nursing home residents with vision impairment underwent an on-site eye examination by trained optometrists and were referred for appropriate follow-up care based on the findings and their eye history. This randomized-controlled trial found significant improvements in the near visual acuity, and emotional well-being of participants assigned to the intervention arm of the study (i.e., those receiving the residential ocular care model) compared to those receiving usual care.**

Source: Man et al., 2020

# Conclusion

Healthy ageing and vision are intricately linked, and addressing the eye health of older populations is crucial for promoting overall health and well-being and creating more prosperous societies. 73% of avoidable vision impairment occurs in people who are 50 years and over, with older women being most affected. With population ageing affecting every country and increasing at an unprecedented pace, vision loss is estimated to result in avoidable harm and suffering in a growing number of older people if action is not taken.

Fostering healthy ageing requires recognizing vision as a key part of overall health, delivering Integrated Care for Older People (ICOPE), and creating age-friendly environments that can address the specific needs and preferences of older adults with vision impairment, while also ensuring person-centredness as part of a comprehensive approach to eye care delivery. Specific actions can be taken as part of the UN Decade of Healthy Ageing (2021-2030) to protect and restore vision in older age and compensate for possible losses in visual capacity, mitigating the potential effects of vision related disability. A holistic approach to healthy ageing and vision loss will not only benefit older populations today but also lead to more inclusive, compassionate, and age-friendly societies for generations to come.

# References

- Aboderin, I. A. G., & Beard, J. R.** (2015). Older people's health in sub-Saharan Africa. *The Lancet*, *385*(9968), e9-e11. [https://doi.org/10.1016/S0140-6736\(14\)61602-0](https://doi.org/10.1016/S0140-6736(14)61602-0)
- Berger, S., McAteer, J., Schreier, K., & Kaldenberg, J.** (2013). Occupational therapy interventions to improve leisure and social participation for older adults with low vision: A systematic review. *The American Journal of Occupational Therapy*, *67*(3), 303-311. <https://doi.org/10.5014/ajot.2013.005447>
- Bourne, R., Steinmetz, J. D., Flaxman, S., Briant, P. S., Taylor, H. R., Resnikoff, S., Casson, R. J., Abdoli, A., Abu-Gharbieh, E., & Afshin, A.** (2021). Trends in prevalence of blindness and distance and near vision impairment over 30 years: an analysis for the Global Burden of Disease Study. *The Lancet Global Health*, *9*(2), e130-e143. [https://doi.org/https://doi.org/10.1016/S2214-109X\(20\)30425-3](https://doi.org/https://doi.org/10.1016/S2214-109X(20)30425-3)
- Brunes, A., B. Hansen, M., & Heir, T.** (2019). Loneliness among adults with visual impairment: prevalence, associated factors, and relationship to life satisfaction. *Health and quality of life outcomes*, *17*, 1-7. <https://doi.org/https://doi.org/10.1186/s12955-019-1096-y>
- Burton, M. J., Ramke, J., Marques, A. P., Bourne, R. R. A., Congdon, N., Jones, I., Ah Tong, B. A. M., Arunga, S., Bachani, D., Bascaran, C., Bastawrous, A., Blanchet, K., Braithwaite, T., Buchan, J. C., Cairns, J., Cama, A., Chagunda, M., Chuluunkhuu, C., Cooper, A., . . . Faal, H. B.** (2021). The Lancet Global Health Commission on Global Eye Health: vision beyond 2020. *The Lancet Global Health*, *9*(4), e489-e551. [https://doi.org/10.1016/S2214-109X\(20\)30488-5](https://doi.org/10.1016/S2214-109X(20)30488-5)
- Canadian Council of the Blind.** (2021). *The cost of vision loss and blindness in Canada*. <https://www.fightingblindness.ca/wp-content/uploads/2021/12/Deloitte-Cost-of-vision-loss-and-blindness-in-Canada-report-May-2021.pdf>
- Cao, G.-Y., Chen, Z.-S., Yao, S.-S., Wang, K., Huang, Z.T., Su, H.-X., Luo, Y., De Fries, C. M., Hu, Y.-H., & Xu, B.** (2023). The association between vision impairment and cognitive outcomes in older adults: a systematic review and meta-analysis. *Aging & mental health*, *27*(2), 350-356. <https://doi.org/10.1080/13607863.2022.2077303>
- Cesari, M., Araujo de Carvalho, I., Amuthavalli Thiyagar jan, J., Cooper, C., Martin, F. C., Reginster, J.-Y., Vellas, B., & Beard, J. R.** (2018). Evidence for the Domains Supporting the Construct of Intrinsic Capacity. *The Journals of Gerontology: Series A*, *73*(12), 1653-1660. <https://doi.org/10.1093/gerona/gly011>
- Court, H., McLean, G., Guthrie, B., Mercer, S.W., Smith, D.J.** (2014). Visual impairment is associated with physical and mental comorbidities in older adults: a cross-sectional study. *BMC medicine*, *12*(1), 1-8. <https://doi.org/10.1186/s12916-014-0181-7>
- Crews, J. E., Chou, C.-F., Sekar, S., & Saaddine, J. B.** (2017). The prevalence of chronic conditions and poor health among people with and without vision impairment, aged  $\geq 65$  years, 2010-2014. *American Journal of Ophthalmology*, *182*, 18-30. <https://doi.org/10.1016/j.ajo.2017.06.038>
- Dev, M. K., Shrestha, G. S., Paudel, N., Joshi, N. D., Thapa, M., & Shah, D. N.** (2012). Visual status and ocular morbidity in older adults living in residential care. *Graefes' Archive for Clinical and Experimental Ophthalmology*, *250*, 1387-1393. <https://doi.org/10.1007/s00417-012-2056-y>
- Dickey, H., Ikenwilo, D., Norwood, P., Watson, V., & Zangelidis, A.** (2012). Utilisation of eye-care services: the effect of Scotland's free eye examination policy. *Health Policy*, *108* (2-3), 286-293. <https://doi.org/10.1016/j.healthpol.2012.09.006>
- E, J. Y., Li, T., McNally, L., Thomson, K., Shahani, U., Gray, L., Howe, T. E., & Skelton, D. A.** (2020). Environmental and behavioural interventions for reducing physical activity limitation and preventing falls in older people with visual impairment. *Cochrane Database of Systematic Reviews*(9). <https://doi.org/10.1002/14651858.CD009233.pub3>
- Eckert, K. A., Carter, M. J., Lansingh, V. C., Wilson, D. A., Furtado, J. M., Frick, K. D., & Resnikoff, S.** (2015). A simple method for estimating the economic cost of productivity loss due to blindness and moderate to severe visual impairment. *Ophthalmic epidemiology*, *22*(5), 349-355. <https://doi.org/10.3109/09286586.2015.1066394>
- Ehrlich, J. R., Ramke, J., Macleod, D., Burn, H., Lee, C. N., Zhang, J. H., Waldock, W., Swenor, B. K., Gordon, I., & Congdon, N.** (2021). Association between vision impairment and mortality: a systematic review and meta-analysis. *The Lancet Global Health*, *9*(4), e418-e430. [https://doi.org/10.1016/S2214-109X\(20\)30549-0](https://doi.org/10.1016/S2214-109X(20)30549-0)
- Ehrlich, J. R., Stagg, B. C., Andrews, C., Kumagai, A., & Musch, D. C.** (2019). Vision impairment and receipt of eye care among older adults in low-and middle-income countries. *JAMA ophthalmology*, *137*(2), 146-158. <https://doi.org/10.1001/jamaophthalmol.2018.5449>
- Evans, J. R., Fletcher, A. E., & Wormald, R. P. L.** (2007). Depression and anxiety in visually impaired older people. *Ophthalmology*, *114*(2), 283-288. <https://doi.org/10.1016/J.OPHTHA.2006.10.006>
- Gallagher, B. A. M., Hart, P. M., O'Brien, C., Stevenson, M. R., & Jackson, A. J.** (2011). Mobility and access to transport issues as experienced by people with vision impairment living in urban and rural Ireland. *Disabil Rehabil*, *33*(12), 979-988. <https://doi.org/10.3109/09638288.2010.516786>
- GBD Ageing Collaborators.** (2022). Global, regional, and national burden of diseases and injuries for adults 70 years and older: systematic analysis for the Global Burden of Disease 2019 Study. *bmj*, *376*, e068208. <https://doi.org/10.1136/bmj-2021-068208>
- Han, J.-H.** (2022). Artificial Intelligence in Eye Disease: Recent Developments, Applications, and Surveys. *Diagnostics*, *12*(8), 1927. <https://doi.org/10.3390/diagnostics12081927>

- Heine, C.,** Browning, C. J., & Gong, C. H. (2019). Sensory loss in China: prevalence, use of aids, and impacts on social participation. *Frontiers in public health*, 7, 5. <https://doi.org/10.3389/fpubh.2019.00005>
- Hodge, S.,** & Eccles, F. (2013). *Loneliness, social isolation and sight loss: A literature review conducted for Thomas Pocklington Trust*. Lancaster University.
- IAPB.** (2023). *International Agency for the Prevention of Blindness's Vision Atlas*. Retrieved 16/06/2023 from <https://www.iapb.org/learn/vision-atlas/>
- Irvine, D.,** Zemke, A., Pusateri, G., Gerlach, L., Chun, R., & Jay, W. M. (2014). Tablet and smartphone accessibility features in the low vision rehabilitation. *Neuro-ophthalmology*, 38(2), 53-59. <https://doi.org/10.3109/01658107.2013.874448>
- Jackson, S. E.,** Hackett, R. A., Pardhan, S., Smith, L., & Steptoe, A. (2019). Association of perceived discrimination with emotional well-being in older adults with visual impairment. *JAMA ophthalmology*, 137(7), 825-832. <https://doi.org/10.1001/jamaophthalmol.2019.1230>
- James, E. R.** (2007). The etiology of steroid cataract. *Journal of Ocular Pharmacology and Therapeutics*, 23(5), 403-420. <https://doi.org/10.1089/jop.2006.0067>
- James, S. L.,** Abate, D., Abate, K. H., Abay, S. M., Abbafati, C., Abbasi, N., Abbastabar, H., Abd-Allah, F., Abdela, J., Abdelalim, A., Abdollahpour, I., Abdulkader, R. S., Abebe, Z., Abera, S. F., Abil, O. Z., Abraha, H. N., Abu-Raddad, L. J., Abu-Rmeileh, N. M. E., Accrombessi, M. M. K., . . . Murray, C. J. L. (2018). Global, regional, and national incidence, prevalence, and years lived with disability for 354 Diseases and Injuries for 195 countries and territories, 1990-2017: A systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*, 392(10159), 1789-1858. [https://doi.org/10.1016/S0140-6736\(18\)32279-7](https://doi.org/10.1016/S0140-6736(18)32279-7)
- Keeffe, J. E.,** Chou, S.-L., & Lamoureux, E. L. (2009). The Cost of Care for People With Impaired Vision in Australia. *Archives of Ophthalmology*, 127(10), 1377-1381. <https://doi.org/10.1001/archophthalmol.2009.242>
- Kempen, G. I.,** Balleman, J., Ranchor, A. V., van Rens, G. H., & Zijlstra, G. R. (2012). The impact of low vision on activities of daily living, symptoms of depression, feelings of anxiety and social support in community-living older adults seeking vision rehabilitation services. *Quality of life research*, 21, 1405-1411. <https://doi.org/10.1007/s11136-011-0061-y>
- Köberlein, J.,** Beifus, K., Schaffert, C., & Finger, R. P. (2013). The economic burden of visual impairment and blindness: a systematic review. *BMJ open*, 3(11), e003471. <https://doi.org/10.1136/bmjopen-2013-003471>
- Ma, Q.,** Chen, M., Li, D., Zhou, R., Du, Y., Yin, S., Chen, B., Wang, H., Jiang, J., & Guan, Z. (2022). Potential productivity loss from uncorrected and under-corrected presbyopia in low-and middle-income countries: A life table modeling study. *Frontiers in public health*, 10, 983423. <https://doi.org/10.3389/fpubh.2022.983423>
- Maharani, A.,** Dawes, P., Nazroo, J., Tampubolon, G., & Pendleton, N. (2018). Cataract surgery and age-related cognitive decline: A 13-year follow-up of the English Longitudinal Study of Ageing. *PLOS ONE*, 13(10), e0204833. <https://doi.org/10.1371/journal.pone.0204833>
- Man, R. E. K.,** Gan, A. T. L., Constantinou, M., Fenwick, E. K., Holloway, E., Finkelstein, E. A., Coote, M., Jackson, J., Rees, G., & Lamoureux, E. L. (2020). Effectiveness of an innovative and comprehensive eye care model for individuals in residential care facilities: results of the residential ocular care (ROC) multicentred randomised controlled trial. *British Journal of Ophthalmology*, 104(11), 1585-1590. <https://doi.org/10.1136/bjophthalmol-2019-315620>
- Marasinghe, K. M.,** Lapitan, J. M., & Ross, A. (2015). Assistive technologies for ageing populations in six low-income and middle-income countries: a systematic review. *BMJ Innov*, 1(4), 182-195. <https://doi.org/10.1136/bmjinnov-2015-000065>
- Marmamula, S.,** Barrenakala, N. R., Challa, R., Kumbham, T. R., Modepalli, S. B., Yellapragada, R., Bhakki, M., Khanna, R. C., & Friedman, D. S. (2021). Prevalence and risk factors for visual impairment among elderly residents in 'homes for the aged'in India: the Hyderabad Ocular Morbidity in Elderly Study (HOMES). *British Journal of Ophthalmology*, 105(1), 32-36. <https://doi.org/10.1136/bjophthalmol-2019-315678>
- Marmamula, S.,** Kumbham, T. R., Modepalli, S. B., Barrenakala, N. R., Yellapragada, R., & Shidhaye, R. (2021). Depression, combined visual and hearing impairment (dual sensory impairment): a hidden multi-morbidity among the elderly in Residential Care in India. *Scientific Reports*, 11(1). <https://doi.org/10.1038/S41598-021-95576-5>
- Marmamula, S.,** Kumbham, T. R., Modepalli, S. B., Chakrabarti, S., & Keeffe, J. E. (2023). Barriers to uptake of referral eye care services among the elderly in residential care: the Hyderabad Ocular Morbidity in Elderly Study (HOMES). *British Journal of Ophthalmology*, 107(8), 1184-1189. <https://doi.org/10.1136/bjophthalmol-2021-320534>
- Marques, A. P.,** Ramke, J., Cairns, J., Butt, T., Zhang, J. H., Muirhead, D., Jones, I., Tong, B. A. A., Swenor, B. K., & Faal, H. (2021). Global economic productivity losses from vision impairment and blindness. *EClinicalMedicine*, 35. <https://doi.org/10.1016/j.eclinm.2021.100852>



- Mashige, K. P., & Ramklass, S. S. (2020).** Prevalence and causes of visual impairment among older persons living in low-income old age homes in Durban, South Africa. *African Journal of Primary Health Care and Family Medicine*, 12(1), 1-7. <https://doi.org/doi:10.4102/phcfm.v12i1.2159>
- Miyata, K., Yoshikawa, T., Harano, A., Ueda, T., & Ogata, N. (2021).** Effects of visual impairment on mobility functions in elderly: Results of Fujiwara-kyo Eye Study. *PLOS ONE*, 16(1), e0244997-e0244997. <https://doi.org/10.1371/JOURNAL.PONE.0244997>
- Mohd Rosnu, N. S., Singh, D. K. A., Mat Ludin, A. F., Ishak, W. S., Abd Rahman, M. H., & Shahar, S. (2022).** Enablers and Barriers of Accessing Health Care Services among Older Adults in South-East Asia: A Scoping Review. *International journal of environmental research and public health*, 19(12), 7351. <https://www.mdpi.com/1660-4601/19/12/7351>
- National Academies of Science, Engineering, and Medicine. (2017).** *Making eye health a population health imperative: Vision for tomorrow* (A. Welp, R. B. Woodbury, M. A. McCoy, & e. al., Eds.). National Academies Press (US). <https://www.ncbi.nlm.nih.gov/books/NBK402367/>
- Nyman, S., Gosney, M. A., & Victor, C. R. (2010).** The Psychosocial Impact of Vision Loss on Older People. *British Journal of Ophthalmology*, 94(11), 1427-1431. <https://doi.org/https://doi.org/10.1136/bjo.2009.164814>
- Owsley, C., McGwin, G., Scilley, K., Meek, G. C., Dyer, A., & Seker, D. (2007).** The visual status of older persons residing in nursing homes. *Archives of Ophthalmology*, 125(7), 925-930. <https://doi.org/10.1001/archophth.125.7.925>
- Pallejà, T., Tresanchez, M., Teixidó, M., & Palacin, J. (2010).** Bioinspired electronic white cane implementation based on a LIDAR, a tri-axial accelerometer and a tactile belt. *Sensors*, 10(12), 11322-11339. <https://doi.org/10.3390/s101211322>
- Parravano, M., Petri, D., Maurutto, E., Lucenteforte, E., Menchini, F., Lanzetta, P., Varano, M., van Nispen, R. M., & Virgili, G. (2021).** Association between visual impairment and depression in patients attending eye clinics: a meta-analysis. *JAMA ophthalmology*, 139(7), 753-761. <https://doi.org/10.1001/jamaophthalmol.2021.1557>
- Pesonen, T., Saarela, K. M., Falck, A., Edgren, J., Kyngäs, H., & Siira, H. (2023).** Visual impairment and the need for vision care services amongst older Finnish people receiving home care. *Nursing Open*, 10(4), 2519-2529. <https://doi.org/10.1002/nop2.1510>
- Shang, X., Zhu, Z., Wang, W., Ha, J., & He, M. (2021).** The Association between Vision Impairment and Incidence of Dementia and Cognitive Impairment A Systematic Review and Meta-analysis. *Ophthalmology*, 128, 1135-1149. <https://doi.org/10.1016/j.ophtha.2020.12.029>
- Smallfield, S., & Kaldenberg, J. (2020).** Occupational therapy interventions to improve reading performance of older adults with low vision: A systematic review. *The American Journal of Occupational Therapy*, 74(1), 7401185030p7401185031-7401185030p7401185018. <https://doi.org/10.5014/ajot.2020.038380>
- Steinmetz, J. D., Bourne, R. R. A., Briant, P. S., Flaxman, S. R., Taylor, H. R. B., Jonas, J. B., Abdoli, A. A., Ahrha, W. A., Abualhasan, A., Abu-Gharbieh, E. G., Adal, T. G., Afshin, A., Ahmadi, H., Alemayehu, W., Alemzadeh, S. A. S., Alfaar, A. S., Alipour, V., Androudi, S., Arabloo, J., . . . Vos, T. (2021).** Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study. *The Lancet Global Health*, 9(2), e144-e160. [https://doi.org/10.1016/S2214-109X\(20\)30489-7](https://doi.org/10.1016/S2214-109X(20)30489-7)
- Swenor, B. K., Simonsick, E. M., Ferrucci, L., Newman, A. B., Rubin, S., & Wilson, V. (2015).** Visual Impairment and Incident Mobility Limitations: The Health ABC Study. *Journal of the American Geriatrics Society*, 63(1), 46-46. <https://doi.org/10.1111/JGS.13183>
- The Economist. (2022).** *Vision for change: Meeting the growing demand for eye care.* <https://impact.economist.com/projects/vision-for-change/>
- Theederan, L., Steinmetz, S., Kampmann, S., Koob Matthes, A.-M., Grehn, F., & Klink, T. (2016).** The prevalence of visual impairment in retirement home residents. *Deutsches Ärzteblatt International*, 113(18), 323. <https://doi.org/10.3238/arztebl.2016.0323>
- van Nispen, R. M., Virgili, G., Hoeben, M., Langelaan, M., Klevering, J., Keunen, J. E., & van Rens, G. H. (2020).** Low vision rehabilitation for better quality of life in visually impaired adults. *Cochrane Database of Systematic Reviews*(1). <https://doi.org/10.1002/14651858.CD006543.pub2>
- Vela, C., Samson, E., Zunzunegui, M. V., Haddad, S., Aubin, M.-J., & Freeman, E. E. (2012).** Eye care utilization by older adults in low, middle, and high income countries. *BMC Ophthalmology*, 12(1), 5. <https://doi.org/10.1186/1471-2415-12-5>
- Virgili, G., Parravano, M., Petri, D., Maurutto, E., Menchini, F., Lanzetta, P., Varano, M., Mariotti, S. P., Cherubini, A., & Lucenteforte, E. (2022).** The association between vision impairment and depression: a systematic review of population-based studies. *Journal of Clinical Medicine*, 11(9), 2412. <https://doi.org/10.3390/jcm11092412>
- Vu, T. A., Fenwick, E. K., Gan, A. T., Man, R. E., Tan, B. K., Gupta, P., Ho, K. C., Reyes-Ortiz, C. A., Trompet, S., & Gussekloo, J. (2021).** The bidirectional relationship between vision and cognition: a systematic review and meta-analysis. *Ophthalmology*, 128(7), 981-992. <https://doi.org/10.1016/j.ophtha.2020.12.010>

- WHO.** (2006). *Prevention of blindness from diabetes mellitus: report of a WHO consultation in Geneva, Switzerland, 9-11 November 2005*. World Health Organization.
- WHO.** (2015). *World report on ageing and health*. World Health Organization.
- WHO.** (2016). *Priority Assistive Products List (WHO/EMP PHI/2016.01)*. World Health Organization.
- WHO.** (2019a). *Integrated care for older people (ICOPE) implementation framework: guidance for systems and services*. World Health Organization.
- WHO.** (2019b). *Integrated care for older people (ICOPE): guidance for person-centred assessment and pathways in primary care (WHO/FWC/ALC/19.1)*.
- WHO.** (2019c). *World report on vision*. World Health Organization.
- WHO.** (2020). *Decade of healthy ageing: 2021–2030*. World Health Organization. Retrieved 30 March 2023 from <https://www.who.int/initiatives/decade-of-healthy-ageing>
- WHO.** (2021a). *Global report on ageism*. World Health Organization.
- WHO.** (2021b). *Step safely: strategies for preventing and managing falls across the life-course*. World Health Organization.
- WHO.** (2022a). *Ageism in artificial intelligence for health: WHO policy brief*. World Health Organization.
- WHO.** (2022b). *Eye care in health systems: guide for action*. World Health Organization.
- WHO.** (2022c). *Package of eye care interventions*. World Health Organization.
- WHO.** (2022d). *Report of the 2030 targets on effective coverage of eye care*. World Health Organization.
- WHO.** (2023). *National programmes for age-friendly cities and communities: a guide*. World Health Organization.
- Yasmin, S.** (2012). An integrated low vision service: Sri Lanka. *Community Eye Health*, 25(77), 16.
- Zheng, Y., Wu, X., Lin, X., & Lin, H.** (2017). The prevalence of depression and depressive symptoms among eye disease patients: a systematic review and meta-analysis. *Scientific Reports*, 7(1), 46453. <https://doi.org/10.1038/srep46453>

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