

DOI: <https://doi.org/10.25276/2410-1257-2021-3-9-15>

## A way of the dark

# Vision 2020: The Right to Sight – what’s next in the global challenge to reduce vision impairment and blindness?

Rupert Bourne

Consultant Ophthalmic Surgeon and Lead for the Vision Expert Group, Cambridge, UK

**W**hy collect health data unless you can use it effectively and make it available to everyone who could benefit? The Vision Loss Expert Group (VLEG) answered that key question by publishing the estimated numbers of people suffering from blindness and vision impairment worldwide in *The Lancet Global Health* in February 2021 (1). Our ongoing work, supported by several charities, is in collaboration with the Global Burden of Disease (GBD) Study and funded by The Bill and Melinda Gates Foundation. At the 20th Anniversary of the GBD in 2017, attended by members of VLEG, Bill Gates explained how his aim was to make disability data “actionable.” This article, featuring leading experts – including the World Health Organization (WHO) and International Agency for Prevention of Blindness (IAPB) – explains the vision disability data that has underlined the 20-year VISION 2020 WHO Initiative, the progress made, and the actions needed to meet the challenges ahead.

### Vision 2020: The right to sight and who report on vision

VISION 2020: The Right to Sight, the joint global initiative for the elimination of avoidable blindness of the WHO and the IAPB, has been important in increasing awareness of avoidable blindness and has resulted in the establishment of regional and national entities that facilitate a broad range of activities. The adoption of a resolution entitled “Towards Universal Eye Health: A Global Action Plan 2014–2019” by the 66th World Health Assembly opened up a new opportunity for member states to progress with their efforts to prevent visual impairment and strengthen rehabilitation of the blind in their communities. As the period of the WHO’s Global Action

Plan 2014–2019 (2) came to an end, it became clear that the 25 percent reduction in avoidable blindness has not yet been met – largely because of aging populations. In 2019, the WHO published the World Report on Vision (3). The report provides evidence on the magnitude of eye conditions and vision impairment globally (provided by VLEG), draws attention to effective strategies to address eye care, and offers recommendations for action to improve eye care services worldwide. The key proposal of the report is for all countries to provide integrated people-centered eye care services that ensure people receive a continuum of eye care based on their individual needs throughout their lives.

### VLEG and the Global Vision Data Base

For the past 13 years, VLEG has curated a Global Vision Database that contains prevalence data on vision impairment and blindness by cause from published (and some unpublished) population-based surveys of eye disease since 1980. More than 100 members of VLEG worldwide contribute the regional

expertise to select only high-quality studies with samples representative of the population and with clearly defined visual acuity testing protocols. VLEG has analyzed this data to provide prevalence estimates (with 95 percent uncertainty intervals (UI)) for 2010, 2015, and now 2020. Definitions are as follows:

Prior to this project there was no accessible data resource for blindness and vision impairment figures by country worldwide. Occasional WHO estimates were not sex-specific and only reported for two age groups, with no facility for estimating temporal change in the burden of vision loss.

### Millions affected by blindness and vision impairment in 2020

In 2020, an estimated 43.3 million (95 percent UI 37.5–48.4) people were blind. We estimated 295 million (267–325) people to have moderate and severe vision impairment; 258 million (233–285) to have mild vision impairment; and 510 million (371–667) to have visual impairment from uncorrected presbyopia. Fifty-five percent of people in each of these groups were female. Since 1990,

Table

Level of visual impairment	Presenting visual acuity*
Mild vision impairment	≥6/18 and <6/12
Moderate and severe vision impairment	<6/18 to 3/60
Blindness	<3/60 or less than 10° visual field around central fixation
Vision impairment from uncorrected presbyopia	Presenting near vision <N6 or <N8 at 40 cm where best-corrected distance visual acuity is ≥6/12

\*Presenting visual acuity means the visual acuity measured in the better eye using the corrective lenses brought to the appointment

blindness has increased by 50 percent and the number of individuals with moderate and severe vision impairment has risen by 92 percent. Importantly, however, if one adjusts for the change in the age structure of the world's population over that time (by age-standardization), the age-standardized prevalence of blindness has decreased in adults aged 50+ by 29 percent – a very positive message for advocacy. The same cannot be said for the prevalence of mild and moderate vision impairment, which barely changed.

### The causes of blindness and vision impairment are changing

As countries move up the spectrum of development, more people live into adulthood, the average age of the population increases, and the disease burden shifts to noncommunicable diseases and disabilities. The vast majority of ocular disease burden is noncommunicable, so eye diseases occupy an increasing share of the overall disease burden. In 2020, cataracts remained the most common cause of blindness in those aged 50+ (83 million people), followed by glaucoma (3.6 million), under corrected refractive error (2.3 million), AMD (1.8 million), and diabetic retinopathy (0.86 million). In terms of moderate and severe vision impairment, under corrected refractive error affected 86.1 million people followed by cataracts (78.8 million).

A unique aspect of VLEG's work has been the ability to look at the changing contribution to vision loss over the last three decades. Although the number of affected people increased for blindness due to all modeled causes, age-standardized prevalence for all modeled causes of vision except diabetic retinopathy has decreased over the past three decades. This suggests that eye care services did successfully reduce age-standardized prevalence, but they did not meet the increasing needs of an aging and growing population.

### Conclusions and future expectations

The work of this international collaboration has demonstrated the considerable inter-regional differences that exist and highlighted areas that require particular attention,

such as blindness caused by diabetic retinopathy.

Regional-level data might be misleading – masking the diversity of existing situations within countries and even within communities. We need greater sociodemographic granularity in data collection to identify the populations most at risk and to capture actual progress in the provision of equitable eye care services.

Our group has highlighted a need for more data on the causes of vision impairment; we found data sources to be sparse, particularly in children and young adults, high-income locations, and in sub-Saharan Africa. Moreover, up-to-date, population-representative data from high-income settings has lagged behind. Better age and geographical data coverage would allow for more detailed analyses of individual country differences and a breakdown of which diseases most impact vision in children.

The recently published work by VLEG and GBD for 2020 is a major update of global and regional data on the causes of prevalence of blindness and vision impairment and adds to our understanding of temporal change over 30 years. Over the past decade, the prevalence of avoidable visual impairment has decreased in older adults, but it has not reached the target reduction delineated in the WHA GAP. The principal reason from a global perspective is the failure of eye care services to keep pace with the aging and growing populations; however, the reduction in age-standardized prevalence of blindness caused by cataract, glaucoma, age-related macular degeneration, and under corrected refractive error was a reassuring step in the right direction.

For more information on reports and data, go to [globlvisiondata.org](http://globlvisiondata.org).

### Testing eyesight in Russia; Ural Eye Surve

In the following sections, leading epidemiologists give an overview of the status of vision loss in the seven super-regions of the world...

#### Central Europe, Eastern Europe, and Central Asia

*Mukbarram M. Bikbov, Director of the Ufa Eye Research Institute in Ufa,*

*Russia, and Tunde Peto, Professor of Clinical Ophthalmology, Queen's University Belfast, Northern Ireland, UK*

The number of individuals with mild vision impairment (VI), moderate to severe (MSVI) and blindness is highest in Eastern Europe (5.34, 11.08, and 0.79 million, respectively), followed by countries of Central Europe (1.98 million, 3.95 million, and 0.33 million, respectively) and Central Asia (2.20 million, 2.95 million, and 0.30 million, respectively). Similarly, the number of individuals with near VI is highest in Eastern Europe (26.03 million), followed by Central Europe (12.18 million), and Central Asia (5.04 million).

Uncorrected refractive error (9.6 million) was the most frequent cause of reversible VI, followed by other causes of vision loss (4.5 million), and cataract (3 million). Age-related macular degeneration (AMD) (228,000), glaucoma (213,000), and diabetic retinopathy (144,000) were most commonly responsible for irreversible vision impairment. The most common causes for blindness were glaucoma (178,000), followed by cataract (291,000) AMD (63,000), uncorrected refractive error (29,000), and diabetic retinopathy (14,000). In Central Europe, Eastern Europe, and Central Asia there are more people blind due to cataract (52,000, 173,000, and 66,000, respectively) than glaucoma (38,000, 105,000, and 35,000, respectively). In Eastern Europe, uncorrected refractive error (16,000) was responsible for more people being blind than in Central Europe and Central Asia (4,000 and 10,000 respectively).

Between 1990-2010, the age-standardized prevalence of mild VI, MSVI, and blindness decreased the most in Central Europe (by 12.0 percent, 2.6 percent and 22.8 percent, respectively), and Central Asia (by 7.6 percent, 4.1 percent, and 26.8 percent, respectively). Stratified by the various causes of vision impairment, the decrease in the age-related prevalence of MSVI and blindness was most marked for glaucoma (1.4 percent, 28.5 percent, respectively) and uncorrected refractive error (4.5 percent, 20.7 percent, respectively). Forecasting to the year 2050, the numbers of blind and people with MSVI are expected to increase, particularly in Eastern

Europe; however, the age-standardized prevalence of blindness is estimated to decrease; while MSVI rates are expected to remain relatively stable.

Myopic maculopathy was the second most frequent cause for irreversible MSVI and the second most common cause for blindness in the Ural Eye and Medical Study, one of the few sources of data for Eastern Europe. It shows the importance of myopia as a potentially blinding disease for Eastern Europe and Central Asia, and it demonstrates how important it is that meta-analyses explicitly separate myopic maculopathy from AMD within the group of macular diseases as a cause for vision impairment.

### High-Income Countries

*Jost Jonas, Chairman of the Department of Ophthalmology of the Medical Faculty Mannheim of Heidelberg University, Germany, and Alain Bron, Professor of Ophthalmology at the University Hospital of Dijon, France*

The high-income super-region includes the countries of the high-income Asia Pacific region, high-income North America region, Western Europe, Australasia, and Southern Latin America. Within the high-income super-region, the number of individuals with mild VI, MSVI and blindness is highest in Eastern Europe (10.91, 15.42, and 1.53 million, respectively), followed by the high-income Asia Pacific countries (9.84, 5.34, and 0.54 million) and high-income North America (5.14, 7.44, and 0.71 million), and it is lowest in Southern Latin America (1.29, 2.12, and 0.16 million) and Australasia (0.43, 0.75, and 0.07 million). In contrast, the number of individuals with near vision impairment is highest in high-income North America (4.93 million), followed by Western Europe (4.49 million), and high-income Asia Pacific (1.98 million). In the whole high-income super-region and in each of the subregions, by far the leading cause for MSVI was under corrected refractive error (17 million), followed by cataract (8 million). The most common causes for irreversible MSVI were age-related macular degeneration (AMD) (739,000), glaucoma (597,000) and diabetic retinopathy (420,000). The most common causes for blindness were glaucoma (786,000), followed by

AMD (596,000), cataract (506,000), diabetic retinopathy (161,000), and under corrected refractive error (80,000). In high-income North America, Australasia and Southern Latin America, the number of cataract-related blind individuals (160,000, 18,000, and 49,000, respectively) was higher than the number of glaucoma-related blind persons (154,000, 15,000, and 25,000). In Western Europe, the number of individuals blind due to AMD (446,000) was higher than the number of individuals blind due to glaucoma (439,000). In the period from 1990-2010, the age-standardized prevalence of mild vision impairment, MSVI, and blindness reduced the most in Southern Latin America (7.2 percent, 2.0 percent, and 28.7 percent), and the least in high-income North America (1.4 percent, 0.9 percent, and 0.7 percent). Stratified by the various causes of vision impairment, the decrease in the age-related prevalence of MSVI and blindness was most marked for AMD (8.3 percent and 26.9 percent), followed by glaucoma (1.5 percent, 24.7 percent), and under corrected refractive error (4.4 percent, 22.9 percent). The marked decrease in AMD as a blinding cause may be due to the clinical introduction of intraocular anti-VEGF (vascular endothelial growth factor) therapy for the exudative form of AMD. In the forecast of the situation in the year 2050, the numbers of blind individuals and individuals with MSVI are estimated to further increase, in particular in high-income North America, Western Europe and high-income Asia Pacific, while the age-standardized prevalence of blindness is estimated to decrease (except for Southern Latin America). Age-standardized rates for MSVI are estimated to remain constant.

### Latin America and the Caribbean

*João Furtado, Assistant Professor of Ophthalmology at University of São Paulo, Brazil, Van Charles Lansingh, Medical Officer, Latin America, HelpMeSee, Querétaro, Mexico, and Tasanee Braithwaite, Consultant Ophthalmologist, The Medical Eye Unit at Guy's and St Thomas' NHS Foundation Trust, London, UK*

In 2020, there were 77.55 million people with vision loss in Latin

America and the Caribbean, including 3.66 million with blindness, 24.48 million with MSVI, 21.47 million with mild VI, and 27.94 million with near VI. VISION 2020 has made great strides in the region, with national VISION 2020 or prevention of blindness committees established in nearly every country at some point. Intersectoral collaboration between ministries of health, national societies of ophthalmology, and nongovernmental organizations has resulted in increased epidemiological coverage, increased cataract surgical rates, and capacity building throughout the region.

Cataract surgical services are a regional strength. Regional epidemiological data generally supports gender equity in eye health, particularly with cataract surgical coverage, although some countries demonstrate disparities. However, men have had greater reductions in prevalence rates than women, but this is likely due to regional demographic trends. The highest prevalence of blindness in most of Latin America and the Caribbean has shifted from cataract to other vision loss, indicating a regional need to strengthen comprehensive eye care. The changing trends in vision loss have likely been driven by the aging population and strengthened economies in some areas, but the most important driver may be the increased epidemiological coverage. However, a paucity of epidemiological data available for younger age groups remains.

Challenges to VISION 2020 in the region include the continuity of national committees, which tend to get disbanded and occasionally reactivated with changes in government, and the need for ongoing external facilitation to ensure that all public and private stakeholders are engaged in the implementation of national, regional, and global eye health plans. Though ophthalmologists vis-à-vis their national societies have had a strong VISION 2020 role, the role of optometrists and allied health professionals is grey, given the lack of universal definitions for these cadres, with many positions lacking formal training and certification and professional societies for advocacy.

The greatest emerging threat to vision loss in Latin America and the

Caribbean is the rapidly growing epidemic of diabetes. In 2019, the International Diabetes Federation estimated that there were 79.2 million people living with diabetes in the Western Hemisphere, which affected 13.3 percent of people in North America (including Mexico) and the Caribbean and was expected to increase to 15 percent within 20 years. The rise of diabetic eye disease and diabetes-related complications that may affect cataract surgical outcomes could have dire consequences over the coming decades.

### North Africa and Middle East

*Moncef Kbaïrallah, Head of Ophthalmology at University of Monastir, Tunisia, and Rim Kabloun, Associate Professor at University of Monastir, Tunisia*

In 2020, there were 53.79 million people with vision loss in North Africa and the Middle East (NAME). This includes 3.09 million with blindness, 21.8 million with MSVI, 14.4 million with mild VI, and 14.5 million with near VI. Cataract was the most common cause of blindness (0.756 million [95 percent UI 0.593- 0.841]), followed by glaucoma (0.463 million [0.354-0.578]), age-related macular degeneration (0.194 million [0.136-0.264]), under corrected refractive error (0.842 million [0.638-0.103]), and diabetic retinopathy (0.61 million [0.401-0.918]).

Cataract was also the leading cause of MSVI (5.02 million [4.23-5.92]), followed by under corrected refractive error (4.68 million [3.96-5.55]), age-related macular degeneration (0.493 million [0.39-0.613]), diabetic retinopathy (0.399 million [0.288-0.54]), and glaucoma (0.325 million [0.251-0.419]). Between 1990 and 2020, the age-standardized prevalence decreased by 41.5 percent (-2.7 to -40.3) for blindness, by 6.1 percent (-7.3 to -4.5) for MSVI, by 10.1 percent (-10.9 to -9.2) for mild VI, and by 14.0 percent (-16.8 to -11.5) for near VI. The age-standardized prevalence due to all causes of blindness has decreased between 1990 and 2020, with the exception of diabetic retinopathy, which has increased by 0.9 percent (-6.2 to 9.3). The age-standardized prevalence of MSVI has decreased in the period from 1990 to 2010 for

all causes except cataract, which increased by 0.6 percent (-2.1 to 3.6).

Cataract remains the first cause of blindness and MSVI, with increasing prevalence in the last three decades. Strengthened efforts in terms of promotion, availability, and accessibility are still needed to support high-volume, high-quality cataract surgery in the NAME countries, with intraregional cooperation required to help regions cope with the increased prevalence of visual impairment caused by cataract.

Under corrected refractive error remains a major cause of MSVI. Several school eye health programs were established in several countries from the NAME region in association with non-governmental organizations to focus on detection and management of refractive error. These have certainly helped reduce the burden of visual impairment from uncorrected refractive error; however, further efforts are needed for early detection. It is suggested that countries perform vision tests at the beginning of every year to correct refractive errors in schoolchildren.

Diabetic retinopathy, age-related macular degeneration, and glaucoma are a public health problem in several countries in the NAME region. This may be the result of the aging population, combined with an increasing prevalence of diabetes mellitus. Development of educational programs and appropriate screening and management strategies – including promotion of telemedicine-based digital retinal imaging – can help reduce the risk of visual impairment from diabetic retinopathy, age-related macular degeneration, and glaucoma neuropathy.

### South-East Asia, East Asia, and Oceania

*Ningli Wang, Director of the Beijing Tongren Eye Center, China, and Robert Casson, Head of Ophthalmology and Visual Sciences at the University of Adelaide, Australia*

The global burden of disease (GBD) super-regions, East Asia, Southeast Asia and Oceania, are home to approximately 2.5 billion people. Together, these regions contain some of the most populous and least populous regions on the planet.

The population of East Asia is aging faster than any other region in history. In 2020, there were 9.09 million people with blindness, 53.9 million with MSVI, 60.15 million with mild vision impairment, and 163.58 million with near vision impairment. It is estimated that East Asia's elderly population – aged 65 years or older – will grow by 22 percent every five years for the next two decades. The increasing burden of cataract blindness presents a confronting challenge for this region, confounded by the increasing prevalence of age-related glaucoma and diabetes in urbanizing populations.

Southeast Asia comprises a mix of developing and high-income regions. In 2020, there were 5.95 million people with blindness, 28.77 million with MSVI, 30.51 million with mild vision impairment, and 29.49 million with near vision impairment. There remains a paucity of ophthalmic epidemiological data from developing regions, but preventable blindness including cataract and uncorrected refractive error remain significant problems in the adult population. Refractive error is exceptionally uncommon in children in developing regions, such as Lao PDR, but is expected to increase as education levels rise.

Although there is no universally accepted definition of Oceania – it is not a WHO-recognized region – Oceania broadly reflects the Pacific Island nations in the WHO Western Pacific region. In 2020, there were 40,000 people with blindness, 390,000 with MSVI, 380,000 with mild vision impairment, and 400,000 with near vision impairment. It contains some of the world's smallest, most isolated, and least populous nations, with the world's highest prevalence of diabetes. In addition to the blinding complications of uncontrolled diabetes, cataract and uncorrected refractive error remain the most common causes of visual impairment in this region, whilst sustainable models of ophthalmic care are a significant challenge in these isolated island nations.

The leading causes of blindness and vision impairment in this super region were uncorrected refractive error and cataract. For diabetic retinopathy, there has been a 286.7 percentage

change in cases of blindness caused by the condition between 1990 and 2020. It is crucial to put in place a national plan that prioritizes early screening, detection, and treatment of these ocular conditions, so as to better deal with their challenges. A good example would be the White Paper on Eye Health in China, launched in 2020, which shed light on current challenges, and also indicated work priorities for the next national eye health plan, including the incorporation of eye disease screening into the current chronic disease management system.

### South Asia

*Vinay Nangia, Director of the Suraj Eye Institute in Nagpur, Maharashtra, India, and Ronnie George, ophthalmologist in Chennai, India*

South Asia comprises the countries of Afghanistan, Bangladesh, Bhutan, India, Nepal, and Pakistan, and has a total population of 1.94 billion. In 2020, there were 60.08, 96.22, and 1.94 million people with MVI, MSVI, and with blindness, respectively. The total number of people with near-vision impairment from uncorrected presbyopia was 166.82 million. The age-standardized prevalence of blindness for females and males over the age of 50 was highest for cataract (5.0 percent and 3.9 percent, respectively), followed by refractive disorders (0.7 percent and 0.6 percent, respectively), and glaucoma (0.4 percent and 0.6 percent, respectively)

Refractive disorders were the most age-standardized prevalent cause of MSVI in females and males over the age of 50 (20.8 percent and 20.4 percent, respectively), followed by cataract (20.4 percent and 17.4 percent, respectively), macular degeneration (0.9 percent and 0.8 percent, respectively), and glaucoma (0.6 percent and 0.8 percent, respectively). Causes of MSVI and blindness in 54 and 1.5 million people, respectively, were cataract (29 and 6 million, respectively), AMD (1.2 and 0.298 million, respectively), glaucoma (0.955 and 0.579 million, respectively), and diabetic retinopathy (0.445 and 0.197 million, respectively). Between 1990 and 2020, there was a significant decrease in age-standardized prevalence of blindness (-47.7 percent) and MSVI (-12.6 percent) in adults over the age of 50. While age-standardized cataract-related causal blindness (-46.5 percent)

decreased during this period, MSVI (+1.72 percent) showed a slight increase, as did age-standardized blindness related to diabetic retinopathy, with a rise of +17.7 percent. Blindness and MSVI related to glaucoma (-38.1 percent and -12.6 percent, respectively), age-related macular degeneration (-41.0 percent and -20.5 percent, respectively), and uncorrected refractive error (-52.3 percent and -23.3 percent, respectively) also decreased in prevalence. Promisingly, though the forecasted trends for those blind and/or with MSVI by 2050 shows an increase, age-standardized prevalence shows a significant decrease.

Cataract was the most significant cause of blindness in the region, followed by uncorrected refractive error, glaucoma, and age-related macular degeneration. Overall, the age-standardized prevalence of MSVI and blindness for all causes has shown a significant decrease since 1990, with the exception of diabetic retinopathy, which has increased. This is an important change; one that may be related to the rapidly shifting economy of South Asia as the region gradually improves its sociodemographic index (SDI), with associated lifestyle and life expectancy changes. If levels of visual impairment and blindness are to be reduced substantially, several challenges in public health services and resource allocation must be overcome. Fortunately, due to improvement in economic standing and life expectancy, as well as the predicted decline in population post-2050, over time, South Asia may see a significant change in the causes and trends of regional blindness.

### Sub-Saharan Africa

*John H. Kempen, Professor of Ophthalmology at Harvard University in Cambridge, Massachusetts, USA and Kovin Naidoo, Associate Professor at the University of KwaZulu-Natal, Durban, South Africa*

The sub-Saharan Africa (SSA) super-region (~1.1 billion population) generally includes the area south of the Sahara, including Eastern (~452 million), Central or Middle (~183 million), Western (~408 million), and Southern Africa (~68 million). Within this area, visual impairment is exceptionally high, especially considering the young age-structure of

the region. By age 75, approximately 10 percent are estimated to be blind, with an additional 25 percent estimated to have MSVI. The absolute respective number of individuals with MVI, MSVI, and blindness is highest in Western Africa (15.99, 9.86, and 2.35 million), followed by Eastern Africa (11.33, 7.01, and 1.97 million), Central Africa (3.84, 2.01, and 0.29 million) and Southern Africa (2.53, 1.56, and 0.48 million).

The number with near visual impairment from uncorrected presbyopia is 19.99 million, 17.26 million, 4.71 million, and 9.57 million respectively, with the higher number in Southern Africa relative to distance visual impairment reflecting the older population (as age is the primary factor determining presbyopia). In general, leading single cause of blindness in all these subregions was cataract, distantly followed by glaucoma, uncorrected refractive error, diabetic retinopathy, and age-related macular degeneration. The leading cause of MSVI by several-fold was uncorrected refractive error, followed by cataract, with the other specified causes far behind. However, "other" causes of visual impairment – usually not specified in the source studies – were in aggregate a more common cause of blindness than cataract and were the second or third most common cause of MSVI. Overall, the change in cause-specific blindness has improved from 2000 after standardizing for age structure and population size – a shift which has been favorable for cataract (-29.4 percent), uncorrected refractive error (-14.5 percent), glaucoma (-23.7 percent), age-related macular degeneration (-19.4 percent) and "other" causes (-30.0 percent). The exception to this being diabetic retinopathy (+22.4 percent), as the population with diabetes mellitus rises, which is similar to that reported in other developing regions. SSA is projected to have the highest age-standardized prevalence of blindness of any region of the world by 2050, which will translate to a huge increase in the burden of blinding eye disease as the population in this region rapidly ages. As most disease requires individual-level clinical care to avoid blindness, the need for expanding clinical training and institutional development is especially great in this region, especially when given the huge expected increase in the

absolute number of visually impaired cases by 2050.

### Data and Advocacy

*Ian Tappay, an ophthalmologist from the University Hospital in Bristol, UK, working with VLEG, explains how to access the data while Peter Holland, CEO, and Jessica Crofts-Lawrence, head of policy and advocacy at the International Agency For Prevention of Blindness, London, UK, explain how it is used for advocacy*

The Global Vision Database is an extensive and up-to-date source of Ophthalmic Epidemiological data. A key ethos of the VLEG is the dissemination of data to inform and drive policy that can improve the lives of those affected by, or at risk of, vision loss. To this end, the five-yearly reports, the most recent published in Lancet Global Health in December 2020, provide actionable data at the country and the global level. These papers enable us to review progress and forecast trends for the future. The progress in reducing avoidable visual impairment in the over-50s during the past decade is laudable, although it is disappointing that the targeted 25 percent reduction set by the World Health Assembly global action plan (WHA GAP) was not met. The global demographic changes forecast for the next 30 years, with the numbers of over-65s rising from 1 billion to 2 billion, highlight the importance of keeping pace with population eye care needs.

The information contained in the database has been made accessible through the Vision Atlas (4) in collaboration with the IAPB. This extensive resource enables the user to visualize the burden of visual loss at country, regional, and supra-regional level. Changes in these figures from 1990 onwards can also be accessed. Country-level demographic data and availability of trained eye-care professionals is also available. The Atlas is therefore a powerful tool to access and use the extensive data.

The Vision Atlas and underpinning data have been critical in advancing the global policy agenda for eye health. The VLEG data provided the foundation for the WHO's first World report on Vision, endorsed by all countries. The data have also enabled organizations, such as the IAPB, to make the case for the importance of eye health to all, and to

demand greater action of governments. The visual presentation of the data in the Vision Atlas has enabled advocates to make the case for eye health to governments around the world. A year-long advocacy campaign drawing on the VLEG data and the Vision Atlas led to the World Health Assembly adopting in August 2020 a resolution on integrated people-centered eye care, making eye care an integral part of the journey toward Universal Health Coverage

### Members of the Department of Noncommunicable Diseases, specializing in sensory loss, offer the WHO's perspective

*By Stuart Keel, Technical Officer: Vision and Eye Care Programme, Department of Noncommunicable Diseases, and Alarcos Cieza, Unit Head, Blindness and Deafness Prevention, Disability and Rehabilitation, WHO, Geneva, Switzerland*

The recently published estimates on the magnitude and causes of vision impairment offer important insights into the effectiveness of public health strategies and new treatments in the field over the past decades, as well as highlighting a number of remaining challenges in eye care. In the global context, the take home messages are clear:

Unoperated cataract and uncorrected refractive error remain major items on the agenda of public health;

New strategies are needed to cater to the comprehensive and long-term health system requirements associated with the rapid emergence of noncommunicable chronic eye conditions, such as diabetic retinopathy, glaucoma, age-related macular degeneration, and complications of myopia.

The World Health Assembly (WHA) resolution titled 'Integrated people-centered eye care, including preventable vision impairment and blindness' adopted by Member States in 2020 aims to stimulate action to address many of these key challenges and sets forth concrete actions to make eye care an integral part of Universal Health Coverage (UHC).

As the eye care sector transitions from "VISION 2020: The Right to Sight" to these new strategies in the coming

years, several opportunities also exist to strengthen the type of data that is collected in epidemiological surveys. Firstly, as recommended in the WHO World report on vision (2019), it is important that the field moves away from reporting solely on the "presenting" vision impairment (vision with spectacles or contact lenses if worn to the assessment) to also report on "uncorrected" vision impairment (without spectacles or contact lenses) given individuals with refractive errors have an ongoing need for eye care services and therefore information on both the unmet and the met needs are important to plan services. Secondly, to effectively target the eye care needs of people at critical periods throughout the life course, data on the magnitude and causes of vision impairment in younger populations requires strengthening. Addressing these data gaps will mean that the evidence generated from epidemiological surveys can be more effectively used to drive policy decisions around eye care service planning.

### Gender And Vision Impairment

*By ME Hartnett, Distinguished Professor, Calvin S. and JeNeal N. Hatch Presidential Endowed Chair in Ophthalmology and Visual Sciences, Vitreoretinal Medical and Surgical Service, University of Utah, USA*

The Vision Loss Expert Group, made up from more than 100 experts worldwide, has identified successes and avenues for continued improvement to eliminate avoidable blindness. The group reported in two recent publications, prevalence estimates analyzed from systematic review and meta-analysis of population-based surveys of eye disease from 1980 through 2018, and forecasts of estimates of vision loss through 2050. Their work highlights important observations. One is that after adjusting for age, progress has been made in reducing blindness in adults 50 years of age or older. However, there has not been much change in the prevalence of mild and moderate vision impairment. The group also identified that there is a growing need for vision services to meet the aging and growing population, as the crude prevalence of blindness and vision impairment

increased. What is also important is that these studies used disaggregated data allowing the analysis of outcomes by sex. With the ability to analyze data specifically by sex, the VLEG found that women bore the greater burden of vision impairment and blindness. Age-standardized prevalence of blindness and vision impairment were greater for female patients due to cataract, under corrected refractive error, age-related macular degeneration, and diabetic retinopathy, greater only for male patients due to glaucoma. Although age-standardized prevalence of blindness decreased overall from 1990 to present, the decrease in burden of vision loss was lower for women than for men. In addition, for those with moderate and severe vision impairment, the minimal change in prevalence (an increase of about 2.5 percent for those over age 50 years) was largely due to a greater increase among females (4.27 percent) than males (0.35 percent). When considering mild and moderate and severe vision loss, global age-standardized prevalence increased for women. Cataract and refractive error are avoidable causes of vision impairment, as defined by the World Health Assembly, because there are ways to effectively treat these with surgery or glasses. Outreach screening has helped with equity of access for cataract surgery among underserved groups, including women and the elderly, but there is still more to be done. Additional studies are needed to understand the reasons for these sex disparities, particularly in more complex and less easily treatable conditions like diabetic retinopathy, glaucoma, and AMD. Diabetic retinopathy was found to be the only cause of vision loss and blindness studied with a global increase in age-standardized prevalence between 1990 and 2020. This is particularly concerning as the number of people with diabetes and diabetic retinopathy is projected to increase in the coming years.

More research is also needed to fully understanding why there are sex discrepancies in all categories of vision loss in both high- and low- to middle-income countries in order to improve outcomes. It is important to note that the causes for discrepancies may vary depending on collective wealth. For example, in low- and middle- income countries, difficulties can exist in diagnosing and delivering care to patients; however, in high-income countries, management of chronic age-related conditions may be more common. Nonetheless, additional research is necessary to probe for the causes of discrepancies across levels of vision loss and across economies. The work of VLEG helps to develop research protocols and generate funding.

**Experts with decades of experience in vision loss prevention episodes share their view on challenges and opportunities for the future**

*By Hugh Taylor, Melbourne Laureate Professor at the University of Melbourne, and Serge Resnikoff, Professor at University of New South Wales Sydney in Kensington, Australia*

We face some real challenges for the future. In 1999, when Vision 2020: The Right to Sight was launched by WHO and the IAPB, it was estimated that the number of blind people in 1990 was approximately 38 million and that, without targeted programs, the number would more than double by 2020 to 90 million. However, if preventable blindness was properly addressed that number could be reduced dramatically to 25 million. Although Vision 2020 achieved a great deal, the number of blind people in 2020 is 43 million. Both population growth and the increased aging of the population have led to this large number, although the prevalence of blindness in those aged 50 years and above has been reduced by 29 percent from 25.8 percent in 1990 to 18.5 percent in 2020. We see similar issues

with MSVI, although the numbers here are much larger with 295 million affected.

We do know what to do to reduce most preventable vision loss; for example, a pair of spectacles can correct refractive vision loss immediately, and vision is restored overnight by cataract surgery. When we look at the projections for 2050, we can see a significant increase, with estimates of 61 million blind people and some 474 million with MSVI. Clearly, there is a large challenge and much to be done. The recently released World Report on Vision from the WHO builds on the plans of VISION 2020 and emphasizes the need for the integration of eye care into universal health care. Care must be affordable, accessible, and appropriate. There is a strong need for government planning and oversight. It focuses on integrated person-centered eye care with the need for coordination between primary, secondary, and tertiary eye care services so the patient's journey or the pathway of care is seamless.

## REFERENCE

1. GBD 2019 Blindness and Vision Impairment Collaborators; Vision Loss Expert Group of the Global Burden of Disease Study, "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," *Lancet Glob Health*, 9, e144 (2021). PMID: 33275949.
2. WHO, "Universal Eye Health Global Action Plan 2019-2024." Available at: <http://bit.ly/2Zqlydc>.
3. WHO, "World Report on Vision." Available at: <http://bit.ly/2NiWF6H>.
4. IAPB Vision Atlas, "1.1 billion people live with vision loss," (2020). Available at: <http://bit.ly/3u1JrH8>.

Статья опубликована в журнале  
The Ophthalmologist. 02/25/2021

<https://theophthalmologist.com/subspecialties/a-way-out-of-the-dark>