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Global Public Health Crisis What's in Sight?





Preamble

Global Burden of Disease and WHO Global Target



Global Burden of Disease Study – Systematic Review

Levels of visual acuity estimated in this study

International Classification ICD-10

Visual Impairment = BL + MSVI = < than 20/70





Global burden: Blindness (PVA <20/400)



Bourne R, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, Jost JB, Keeffe J, Leasher J, Naidoo K, et al. Causes of visual loss worldwide: 1990-2010; a systematic analysis. Lancet Glob Health 2013;1:e339-49



Global burden: Blindness (PVA <20/400) 1990 - 2010²



Bourne R, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, Jost JB, Keeffe J, Leasher J, Naidoo K, et al. Causes of visual loss worldwide: 1990-2010; a systematic analysis. Lancet Glob Health 2013;1:e339-49



Causes of Vision Impairment 1990 – 2010 PVA < 20/70



Bourne R, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, Jost JB, Keeffe J, Leasher J, Naidoo K, et al. Causes of visual loss worldwide: 1990-2010; a systematic analysis. Lancet Glob Health 2013;1:e339-49





Universal eye health: a global action plan 2014–2019

surgery. Further details are provided in Appendix 4.

 Prevalence and causes of visual impairment. It is important to understand the magnitude and causes of visual impairment and trends over time. This

and causes of visual impairment, coverage

for cataract surgery can be calculated; it is an

important measure that provides information

on the degree to which cataract surgical

10. For the first of these indicators there is a global target. It will provide an overall measure of the impact of the action plan. As a global target, the reduction in prevalence of avoidable visual impairment by 25% by 2019 from the

noncommunicable diseases 2013-2020,

and global efforts to eliminate trachoma

suggest the target, albeit ambitious, is

achievable. In addition, wider health gains

oming from the expected incr

As a global target, the **reduction in prevalence of avoidable visual impairment by 25% by 2019** from the baseline of 2010 has been selected for this action plan.

The global prevalence of avoidable visual impairment in 2010 was 3.18%. A 25% reduction means that the prevalence by 2019 would be 2.37%





Changes in prevalence of Avoidable Visual Impairment, 1990 - 2010



2. Bourne R, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, Jost JB, Keeffe J, Leasher J, Naidoo K, et al. Causes of visual loss worldwide: 1990-2010; a systematic analysis. Lancet Glob Health 2013;1:e339-49



Projected reduction in prevalence of Avoidable Visual Impairment, 2010 - 2020





Projected reduction in prevalence of Avoidable Visual Impairment, 2010 - 2020







2. Bourne R, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, Jost JB, Keeffe J, Leasher J, Naidoo K, et al. Causes of visual loss worldwide: 1990-2010; a systematic analysis. Lancet Glob Health 2013;1:e339-49



Global burden of Visual Impairment due to URE



UNCORRECTED REFRACTIVE ERRORS (108 million people in the world)

6.8 million Blind 101.2 million MSVI



Near distance VI: 1,095 million with presenting functional presbyopia

Classification Issue: Near Distance VI not included in ICD 10



The Problem: 1.2 billion people are vision impaired simply because they don't have a pair of glasses.





Global and Regional Prevalence of Visual Impairment due to URE



Number Vision Impaired (in millions) due to URE in 2010



Naidoo et al. on behalf of the Vision Loss Expert Group of the Global Burden of Disease Study. Prevalence and causes of vision loss in Sub-Saharan Africa: 1990-2010. British Journal of Ophthalmology. 2014 98(5): 612-618



Prevalence of URE – PVA<20/70 all ages, agestandardised, 2010



Naidoo et al. on behalf of the Vision Loss Expert Group of the Global Burden of Disease Study. Prevalence and causes of vision loss in Sub-Saharan Africa: 1990-2010. British Journal of Ophthalmology. 2014 98(5): 612-618



Refractive errors in children aged 5-15: 56% to 88% Under-corrected



Zhao J, Pan X, Sui R, Munoz SR, Sperduto RD, Ellwein LB. Refractive error study in children: results from Shunyi District, China. American Journal of Ophthalmology. 2000;129(4):427-35. Pokharel GP, Negrel AD, Munoz SR, Ellwein LB. Refractive Error Study in Children: results from Mechi Zone, Nepal. Am J Ophthalmol. 2000;129(4):436-44 Maul E, Barroso S, Munoz SR, Sperduto RD, Ellwein LB. Refractive Error Study in Children: results from La Florida, Chile. Am J Ophthalmol. 2000;129(4):445-54



Reduction in prevalence of URE PVA<20/70, all ages,1990 – 2010



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- Current trend will not lead to a 25% reduction
- Need to double the reduction rate
 - Requires massive scale up
 - Needs to concentrate on underserved populations

• Role of "Myopia Epidemics" - a major challenge

Myopia Epidemic





Canalitat

both found to cause 12.2% of vision impairment in Japan



Purpose: Myopia is a common cause of vision loss, with uncorrected myopia the leading cause of distance in the resonance assess - because of elements and elements in the orientarios of moreta and Hob muotia be-

Purpose: Myopia is a common cause of vision loss, with unconscient myopia the leading cause of delators when implement globally. Individual studies show variations in the prevalence of myopia and high myopia be-tween regions and ethnic groups, and there continues to be uncertainty regarding increasing prevalence of myopia. Design: Systematic review and meta-analysis. Methods: We performed a systematic review and meta-analysis of the prevalence of myopia and systematic design to 2005 to 2005 using data published since 1995. The primary data myopia and estimated terms to the systematic terms of the providence in each country, as and industrial prime uthere in the systematic terms to mode to 100, in urban or and coulations in each country, as and industrial data systematic terms of the systematic terms of the systematic terms of the prevalence in each country, as and industrial prime uthere in the systematic terms of terms of the systematic terms of terms

myopia and estimated temporal trends from 2000 to 2050 using data published since 1995. The primary data were gathered into f-year age groups from 0 to 2100, in urban or nair populations in each country, transformation to definitions of myopia of 2000 (booker C) or issue of this myopia of -5,00 D or issue, projected to the ver-2010, then meta-analyzed within Ook data from the most similar region. Any urban or nair age one prima lodel data in a GBD region look data from the most similar region. The prevalence data were combined each urbanization data and ecoulation data from Unlaw Nations Population Department UNPOL to estimate the urbanization data and ecoulation data from Unlaw Nations Population Department UNPOL to estimate the stored outs in a UBD region took data from the most similar region. The prevalence data were Combined with urbanization data and population data from United Nations Population Department (UNPD) to estimate the prevalence of microa and high microals in such neuronal bas world. These estimates are constructed as a set of the sector of t urbanization data and population data from United Nations Population Department (UNPD) to estimate the pervalence of myopia and population data in each country of the world. These estimates were construct were myopia channels estimates cover true deduces from evenescence evolution of evolution estimates are expensed on the weath myopia.

prevalence of myopia and high myopia in each country of the world. These estimates were combined with myopia brance estimates over time densed from regression analysis of published evidence to project to each decade and the state of the provided data term table provided evidence of a second state of the Non 2000 through 2050. Results: We included data from 145 studies covering 2.1 million participants. We estimated 1406 million people with mycopia (22.9% of the world population; 65% confidence retenal EC, 932-1932 million 15.2% and the studies of the studies of the world population; 65% confidence retenal EC, 932-1932 million (15.4%).

people with myodia (22,9% of this world population; 36% confidence interval (CL, 932–1932 mill 31.5%) and 163 million people with high myopia 2.5% of the world population; 95% CL 86–337 m (S1%) in 2000. We predict the 2200 three with the 61/3 million people with myopia (83.8% of the world 3200–6076 million (95% CL, 55.7%) and 938 million people with high myopia (9.8% of ullion; 47% million million (95% CL, 55.7%) and 938 million people with high myopia (9.8% of Decidarions: Myopia and high myopia estimates from 2000 to 2000 support significant prevalences slobally, with implications for planning services, including managing and prevale Conclusions: Myopia and high myopia estimates from 2000 to 2050 suggest significant income previencies globally, with inglications for planning services, including managing and preventing sycola material double complications and vision loss arrong almost 1 billion people with high myo-bia. Ophiaminology 2016;123:1026-102; 2016 by the American Academy of Ophiaminology. This is an open access article under the CC BY-INC-ND Science (http://onadeecommons.org/licence/by-ro-noi/4.03.

Supplemental material is evaluate at www.asojournal.org high prevalence of stryopic, stryopic rancelar degeneration ingh prevaring on injugat, wysper cancers organized and have been found to be the most frequent cause of new orbite blindness.¹ Myopic macular degeneration has

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In 2010, it was estimated that uncorrected refractive error was the most contrasts user outcorrestes intractory enter affecting 108 million persons, and the second most company affecting 108 million persons, and the second most common neuron of blandness (shold). The economic basis of pur-succentral density effective error, largely and by morphic was estimated to be US5202 billion per amoun-tives in a substantive economic segments for distanting there is a substantive economic segments for distanting monetal stypping and other that we error. However, surgets before, further visual, discharge

Organizantely 100 000 people?" There termine 2 major paps in the literature. Heat, indi-vidual andion suggest wide variation in the prevalence of morphs between diffuent regions and others: promp." For example, the new-slower of mounts is more than 2 score example, the new-slower of mounts is more than 2 score. Reserver, myopia brings further vision diskeeps becase high morph increases the risk of pathologic ordia tectante trajti triyo pai increaseri tie risk of particulogie coviar disanges such as catanit, glaccona, riteral detectante and orgogie macular degeneration, all of which can cause introverbile vision kusi. In some communities with a

myopia tetrate antenne regions and enters props, not example, the prevalence of myopia is more than 2 series example, no prevance or stylpts higher smood, East Asians than similarly aged white press," Second, the prevalence of stylpts in different press," Second, the prevalence of stylpts is different to the second present account the prevaience or myopea in determine outstiles seems to be incensible, and most desimilically among younger people in East Asia. The combination

Looking at **Myopia**

specifically

Meta-analysis





Overview of research process

Focus on Eye Health National Summit:





Vorld Health





Standardising the definitions of myopia and high myopia

THE IMPACT OF MYOPIA AND HIGH MYOPIA

Report of the Joint Norld Health Organization-Brien Holden Vision Institute Norld Health Organization Myopia

University of New South Wales, Sydney, Australia 16–18 March 2015 Myopia defined as ≤ --0.50D High myopia as $\leq -5.00D$.

 Studies in meta-analysis used various classifications of myopia, but definition based on most commonly used

World Health Organization. The impact of myopia and high myopia: report of the Joint World Health Organization-Brien Holden Vision Institute Global Scientific Meeting on Myopia. Geneva; 2017.





Holden et al. Global prevalence of myopia and high myopia and temporal trends from 2000 to 2050. Ophthalmology 2016;123:1036-1042



Prevalence of Myopia, 21 Regions, 2000 to 2050



Holden et al. Global prevalence of myopia and high myopia and temporal trends from 2000 to 2050. Ophthalmology 2016;123:1036-1042



Projected number of high myopes in 2050



Holden et al. Global prevalence of myopia and high myopia and temporal trends from 2000 to 2050. Ophthalmology 2016;123:1036-1042



What are the implications?

2050



Approx 50% of countries will have myopia ≥ 50%

& high myopia 10%



Impact of myopia on individuals and Eye Care Services

High Myopia is a significant risk factors for Cataract (3.3x) and Glaucoma (14.4x)

Blindness and vision impairment due to Myopic macular degeneration(MMD) and other retinal complications will increase substantially



Iwase A, Araie M, Tomidokoro A, Yamamoto T, Shimizu H, Kitazawa Y. Prevalence and causes of low vision and blindness in a Japanese adult population: the Tajimi Study. Ophthalmology 2006; 113: 1354–1362. Marcus MW, de Vries MM, Junoy Montolio FG, Jansonius NM. Myopia as a risk factor for openangle glaucoma: a systematic review and metaanalysis. Ophthalmology 2011; 118: 1989–1994 e2. Pan CW, Cheng CY, Saw SM, Wang JJ, Wong TY. Myopia and age-related cataract: a systematic review and meta-analysis. Am J Ophthalmol 2013; 156: 1021–1033 e1.



Myopic Macular Degeneration

- Already 1st cause of Vision Loss in some places in Asia
- Preliminary estimates
 - 10+ million visually impaired in 2015
 - 70+ million in 2050 if nothing changes



Implications

 Need for refractive services- spectacles, contact lenses and specialist services for managing myopia related complications will increase

ECFD







A Global Response is needed

 A Global Issue – no country is to be spared, even the most developed



A clear success (Trachoma, Onchocerciasis, Cataract...) However, "elimination" is not possible, especially for chronic conditions



Global Response : WHO and partners



Fig. 1. Three dimensions to consider when moving towards universal coverage



Health Financing WHO Report, 2010



Global Response: what's next?

- WHO World Report on Vision
 - Planned for Oct 2018
 - Multisectoral approaches
 - Links to SDGs
 - Behavioral changes



Might lead to a Global Campaign







Bringing Americans to Eye Care

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