Perspective on The Vision Loss Expert Group's 19 years of work as the global international ophthalmology epidemiology reference group, producing the 5 yearly estimates of blindness, vision impairment and risk factors that underpins WHO, GBD and Vision Atlas outputs.

Rupert Bourne

Professor of Ophthalmology, Vision & Eye Research Institute, Anglia Ruskin University, Cambridge, UK
Coordinator of Vision Loss Expert Group, GBD
Principal Collaborator, Global Burden of Disease Study & Data theme lead European Coalition for Vision



Disclosures:

Commercial:

AbbVie
Santen
Thea

Non-Commercial:

Bill & Melinda Gates Foundation; WHO;
Fight for Sight, Fred Hollow Foundation;
Sightsavers International, Fondation Thea

What… Vision Loss Expert Group… the global ophthalmic epidemiology reference group that provides 5yrly updates of European & global vision loss data

Where… to access vision impairment data, the Lancet Global Health papers, info@globalvisiondata.net and Vision Atlas

Why …the impact of vision impairment on lives [EUROSTAT analysis]

"actionable data"

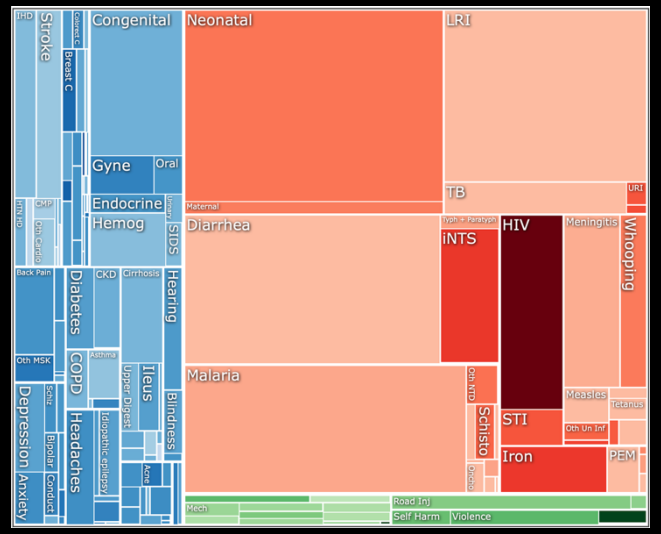




VLEG
VISION LOSS EXPERT GROUP

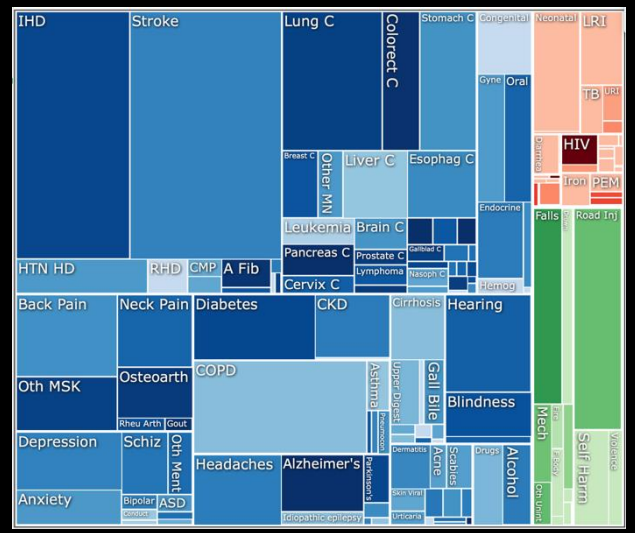
The Epidemiological Transition

Nigeria



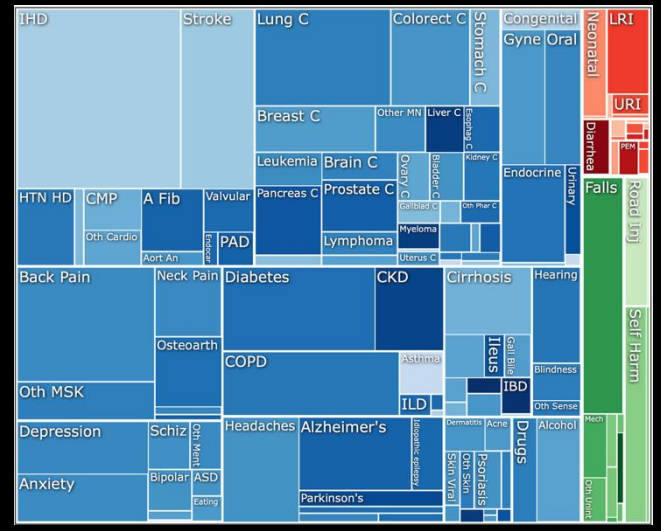
- **~70% disease burden** due to infectious, child and maternal health conditions ("Group 1")
- **~30% disease burden** due to NCDs and injuries

China



- **~5% disease burden** due to infectious, child and maternal health conditions ("Group 1")
- **~95% disease burden** due to NCDs and injuries

Germany



gbdcompare

The Vision Loss Expert Group:
the global Ophthalmic Epidemiology Reference Group



The Fred Hollows Foundation
Fondation Théa
BHVI
Sightsavers
Lions Clubs International FOUNDATION
UNIVERSITÄT HEIDELBERG

Hugh Taylor
Seth R Flaxman
Jost Jonas
Ningli Wang
Pradeep Ramulu
Harry Quigley
Sheila West
Janet Leasher
Bob Casson
Kovin Naidoo
Konrad Pesudovs
Julie-Anne Little
John Kempen
Ching-Yu Cheng
Alain Bron
Nathan Congdon
David Friedman
João Furtado
Ronnie George
Rim Kahloun
Moncef Khairallah
Van Lansingh
Hans Limburg
Vinay Nangia
Nina Tahhan
Tien Wong

19 years of international collaboration

>100 members
Ophthalmologists
Optometrists
7 regional groups

IHME GBD

IAPB

World Health Organization

World report on vision



Special thanks to current VLEG Fellows
Maria Vittoria Cicinelli
Arthur Fernandes
Alessandro Arrigo
Meiken Low

globalvisiondata.net

The Vision Loss Expert Group: What we do

the global Ophthalmic Epidemiology Reference Group:

GOAL: To develop and deploy new and improved evidence on the prevalence of blindness and vision impairment and its causes, on intervention coverage, to inform and influence global priorities and programs.

Pre-2010

World Health Organization

WHO released infrequent updates on blindness & VI prevalence from some published papers & gray lit
No sex disaggregation, limited age/cause disaggregation,
Model and sources used did not permit temporal analysis (change)
No central, continuously updated database

2010-

VLEG

Systematic regular review of published and gray literature,
Central electronic database: **Global Vision Database**
Multiple studies offering microdata
Sophisticated statistical modeling of prevalence estimates
Temporal change modeled & predictions
Independent of GBD but also supporting & validating GBD outputs
Risk factor analysis
Regular publications and visualisations IAPB

2010
2015
2020
2025



World Health Organization

IHME GBD

Vision Loss Expert Group

Systematic Review of all published and many unpublished eye surveys from 1980- present
search strategy commissioned from independent organisation

Sources are checked for population representativeness, clarity of methodology
(esp. visual acuity testing) & rated by VLEG Regional Consensus Panels

Microdata received from Chief Investigators; gray literature

IHME GBD

Advice; data, validation

Global Vision Database

Analysis by Vision Loss Expert Group
Validated by WHO
Prevalence Estimates [2020] published*
Online visualisation tool

Prevalence x
Disability Weight

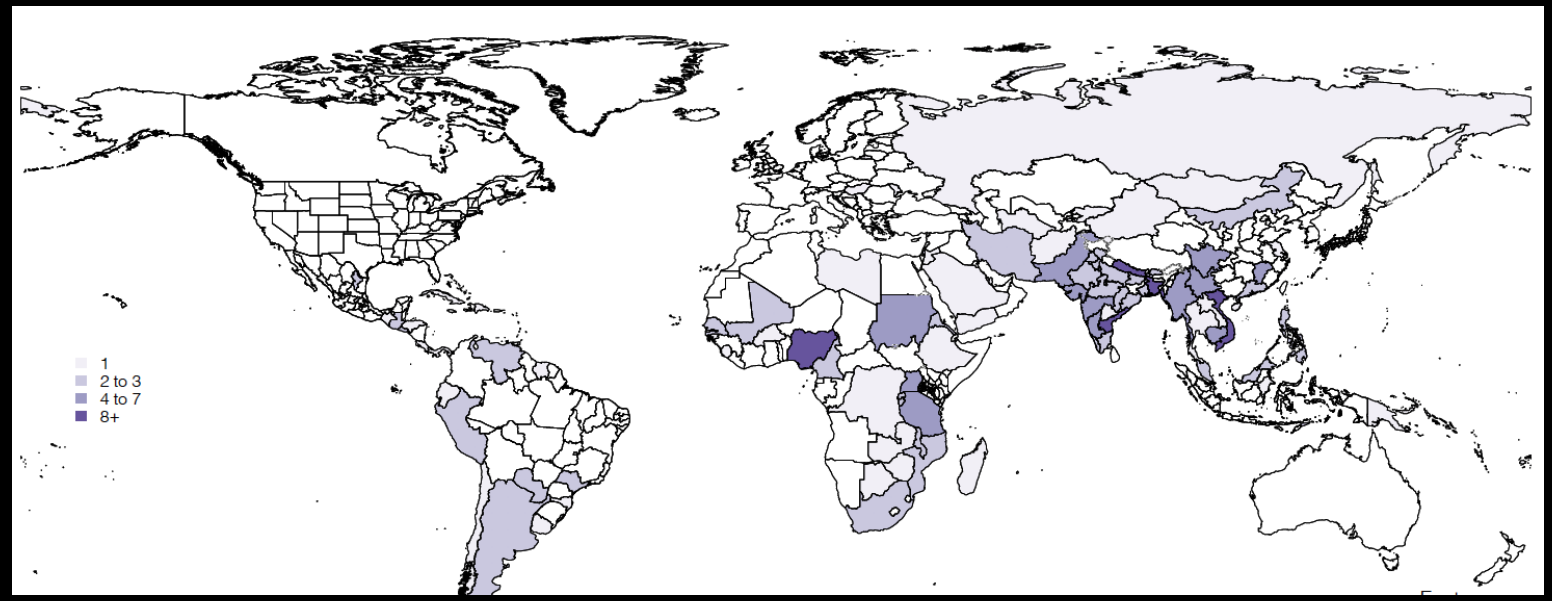
Disability Adjusted Life Years (DALYs)



VLEG
VISION LOSS EXPERT GROUP

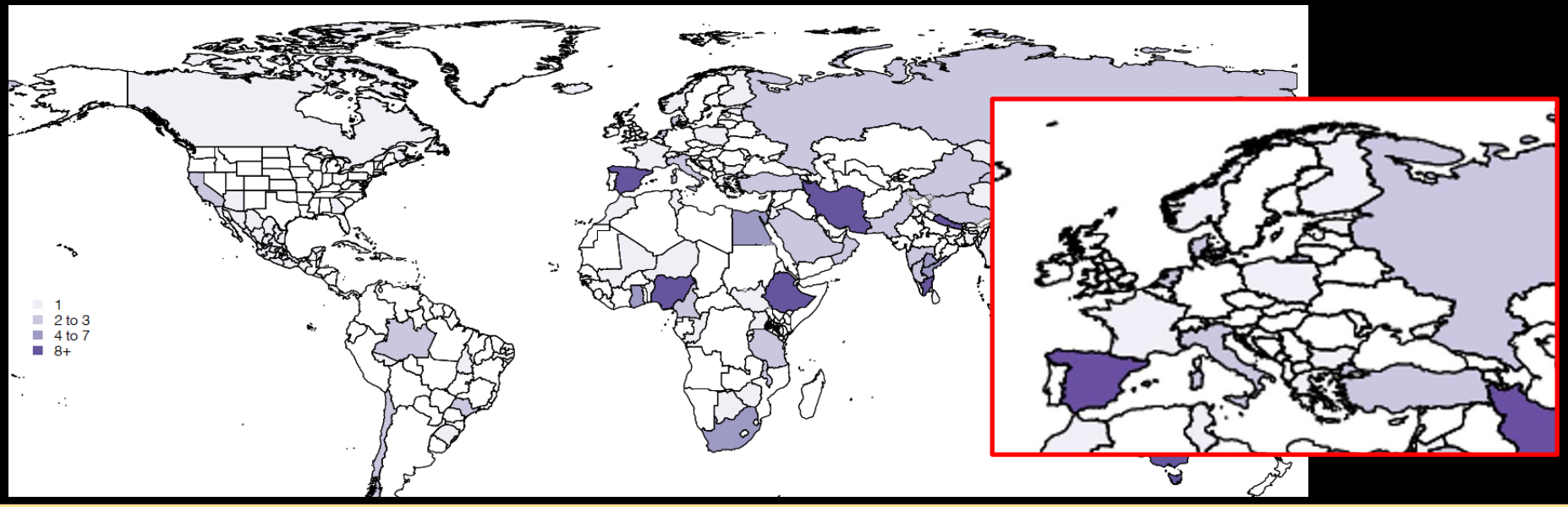
Global Vision Database:
data availability

RAAB sources



>600
studies

Non-RAAB sources



https://doi.org/10.1016/ S2214-109X(20)30425-3

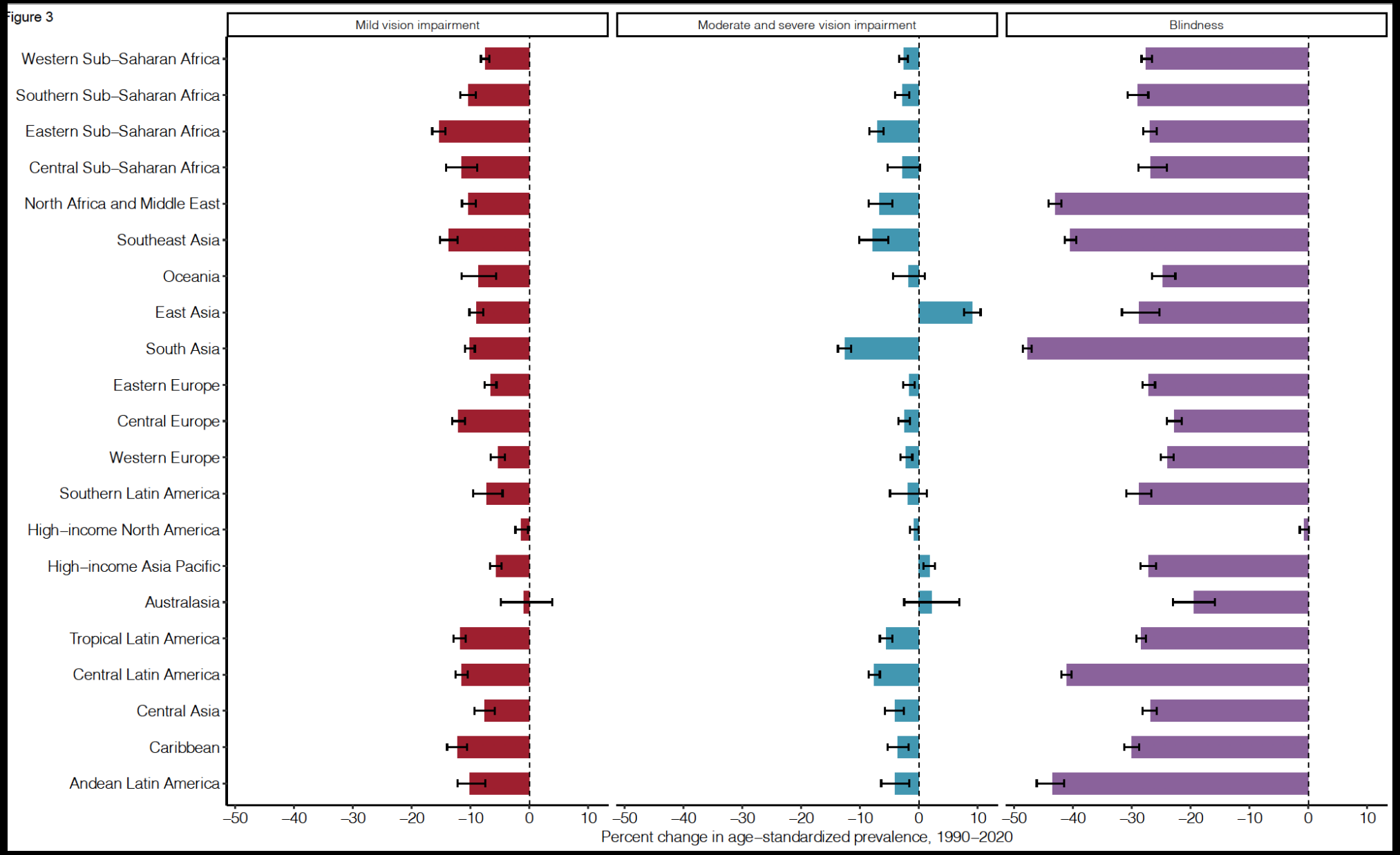
Numbers of people blind or MSVI (<6/18 in better eye but 3/60 or better)

	Blind				Moderate VI			
Region	1990	2000	2010	2020	1990	2000	2010	2020
Western Europe	1237221 (984992-1525496)	1230702 (984903-1511835)	1356057 (1086422-1665597)	1,533752 (1218371-1898343)	9936879 (8509500-11420417)	10730125 (9170175-12320090)	12178100 (10428830-14043272)	1,3430322 (11497033-15518095)
Central Europe	283220 (229670-341974)	285048 (231144-344126)	299467 (240288-364388)	327352 (264513-398083)	2801254 (2378905-3263721)	3008932 (2543707-3521567)	3272143 (2764243-3845094)	3642424 (3061692-4282576)
Eastern Europe	817263 (681238-959917)	853662 (712915-1004712)	772146 (642166-906215)	789618 (663130-923121)	8652844 (7427449-10019994)	9065756 (7758535-10509282)	9374455 (8048875-10879217)	1,0076967 (8649024-11703244)
World	28727188 (24330372-33469590)	33418797 (28343018-38899428)	37028948 (31339506-43116119)	43279994 (36422802-50650530)	136339883 (118314861-155941648)	167287682 (145440158-191126407)	205726218 (178917096-234511710)	260282672 (224738540-299522456)

Crude prevalence of blindness



distance vision impairment: change in age-standardized prevalence 1990-2020



Bourne, Steinmetz, et al. Lancet Global Health 2020

2020

Vision Loss Expert Group published prevalence data for 2010 and 2015 independently from GBD and intermittently supplied data and advised GBD

For 2020, Vision Loss Expert Group collaborated closely with GBD by supplying VLEG's Global Vision Database. Therefore vision loss model for GBD 2019 differs from prior GBD outputs.



Trends in prevalence of blindness and distance and near vision impairment over 30 years: an analysis for the Global Burden of Disease Study

GBD 2019 Blindness and Vision Impairment Collaborators* on behalf of the Vision Loss Expert Group of the Global Burden of Disease Study†

Summary

Background To contribute to the WHO initiative, VISION 2020: The Right to Sight, an assessment of global vision

Lancet Glob Health 2020

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

GBD 2019 Blindness and Vision Impairment Collaborators* on behalf of the Vision Loss Expert Group of the Global Burden of Disease Study†

Summary

Background Many causes of vision impairment can be prevented or treated. With an ageing global population, the demands for eye health services are increasing. We estimated the prevalence and relative contribution of avoidable causes of blindness and vision impairment globally from 1990 to 2020. We aimed to compare the results with the World Health Assembly Global Action Plan (WHA GAP) target of a 25% global reduction from 2010 to 2019 in avoidable vision impairment, defined as cataract and undercorrected refractive error.

Lancet Glob Health 2020

Published Online December 1, 2020 https://doi.org/10.1016/S2214-109X(20)30489-7

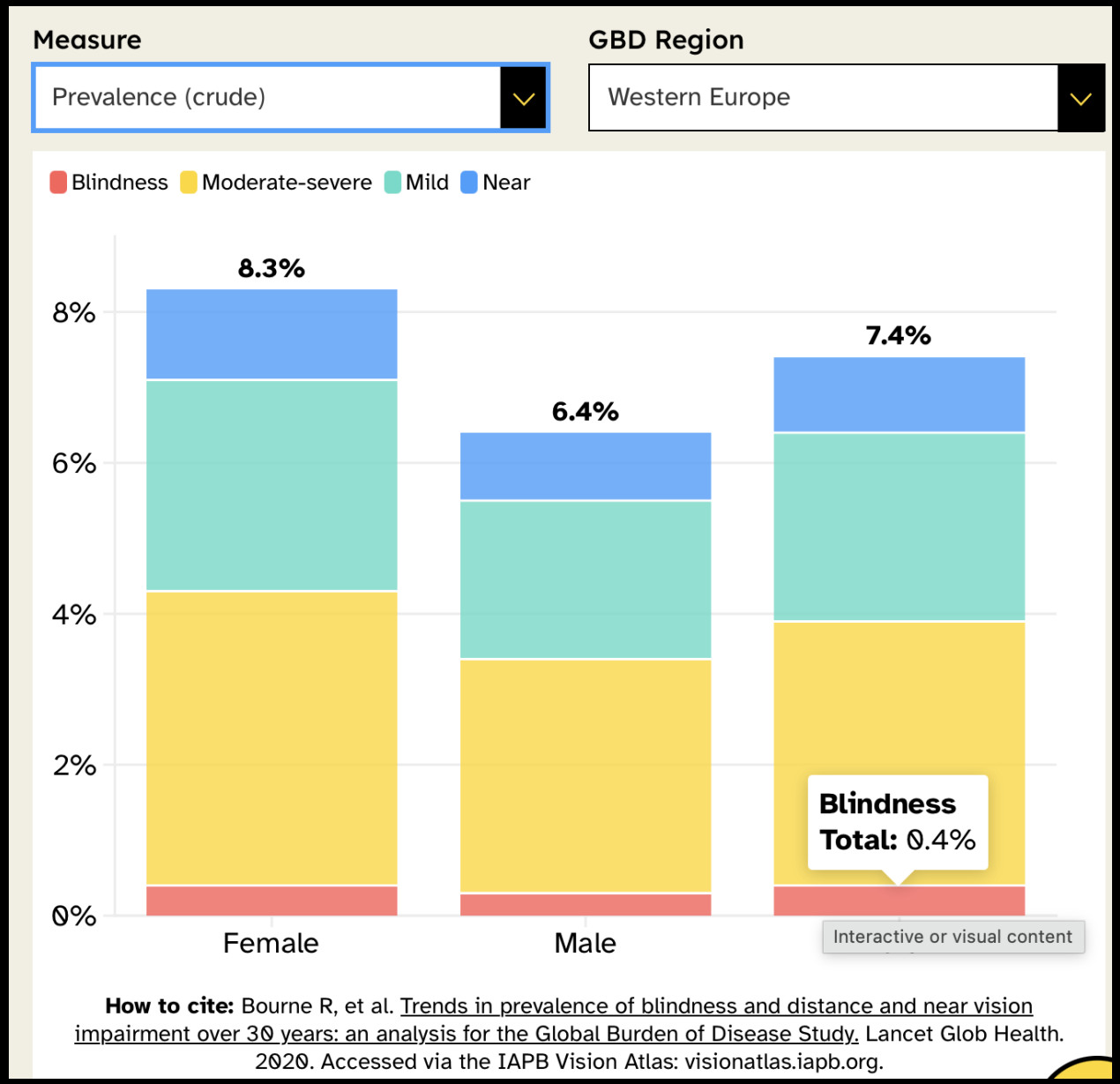
*Listed at the end of the Article

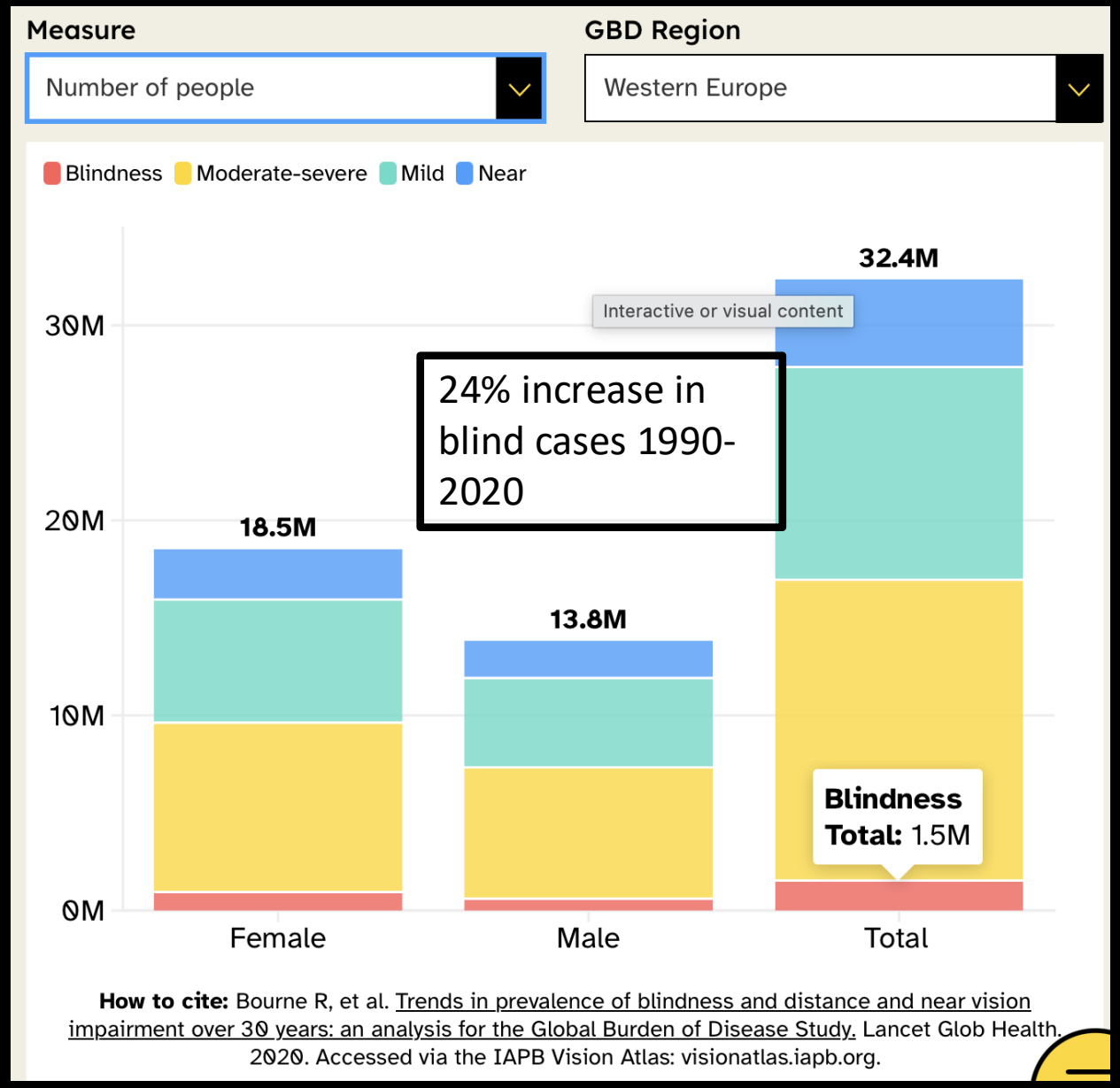
https://authors.elsevier.com/sd/article/S2214-109X(20)30489-7

Lead authors: R Bourne & J Steinmetz
Last authors: Jost Jonas & Theo Vos

https://authors.elsevier.com/sd/article/S2214-109X(20)30425-3

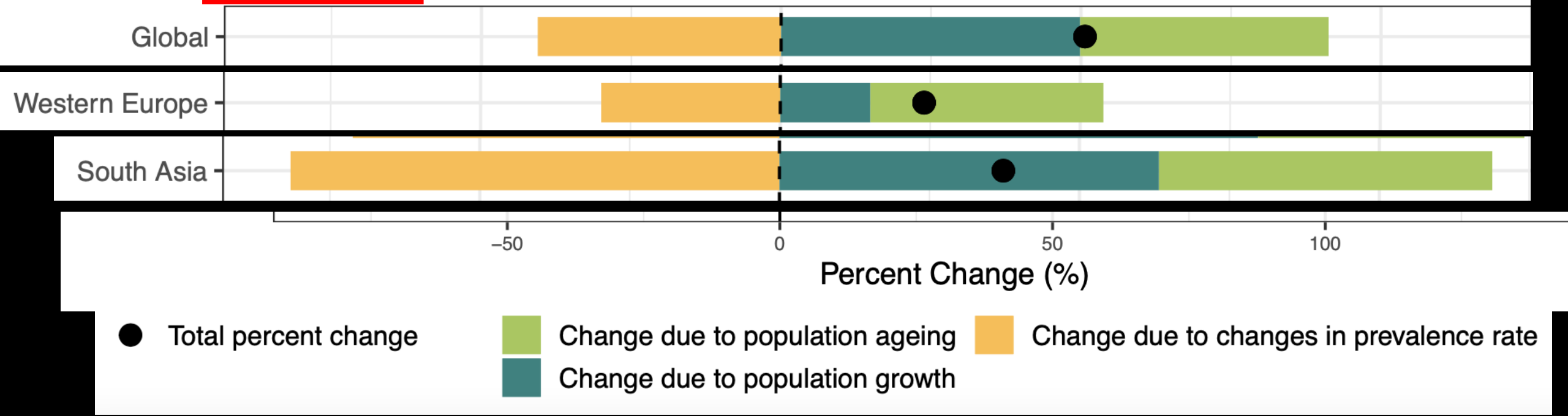
Lead authors: J Steinmetz & R Bourne
Last authors: Serge Resnikoff & Theo Vos



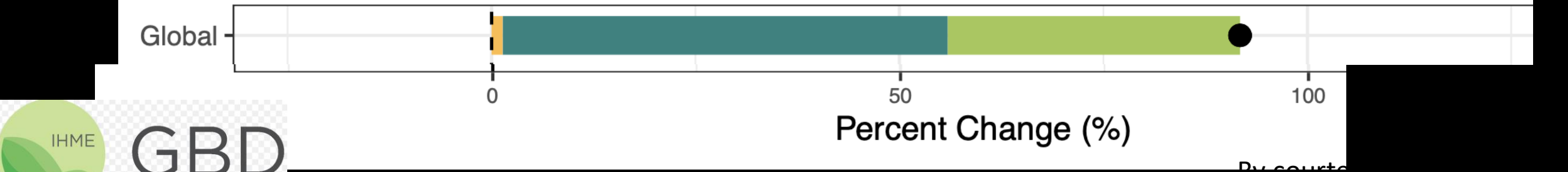


Bourne, Steinmetz, et al. Lancet Global Health 2020 & visionatlas.iapb.org

Decomposition of the change in the number of prevalent blindness cases from 1990 to 2020



Decomposition of the change in the number of prevalent moderate and severe vision impairment cases from 1990 to 2020



IHME GBD

Sight loss by region and cause

Share Download

This map displays the geographic distribution of sight loss by cause across different regions (all ages). Explore different causes, severity levels, and measures of sight loss using the dropdown menus.

Cause

Uncorrected refractive error

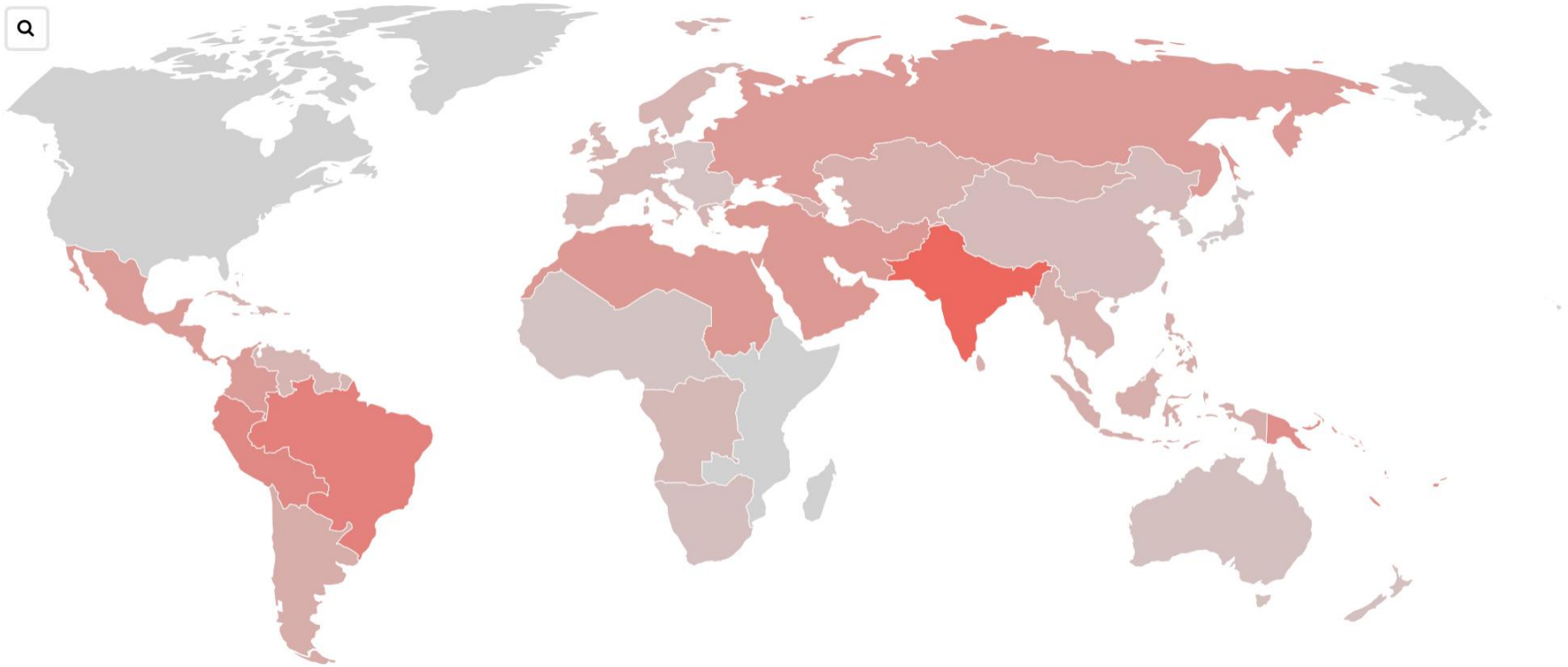
Severity

Moderate-severe

Measure

Prevalence (age-standardised)

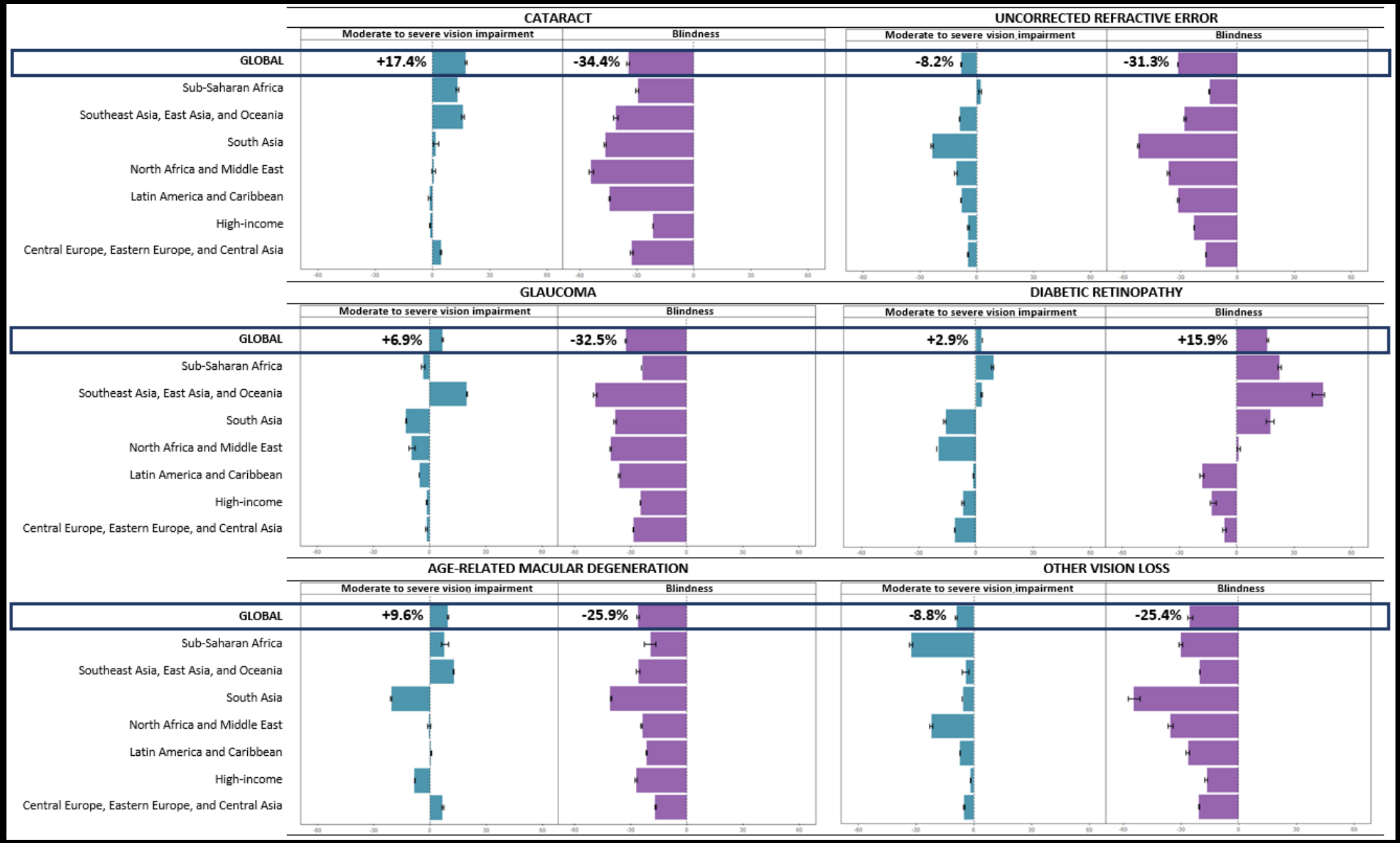
1.03% 3.38%





How to cite: Steinmetz, Jaimie D et al. 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. 2021;9(2):e144–60. Accessed via the IAPB Vision Atlas: visionatlas.iapb.org.

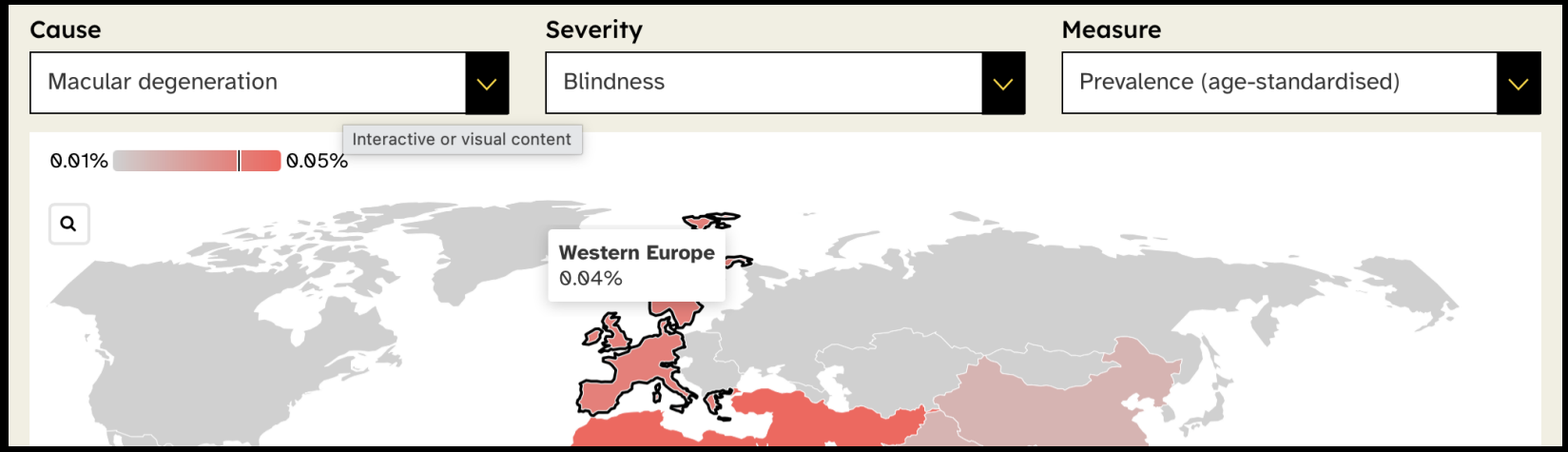
Change in prevalence of blindness & MSVI by cause



1990-2020

Steinmetz, Bourne, et al. Lancet Global Health
Feb 2021

Case Example, using Vision Atlas



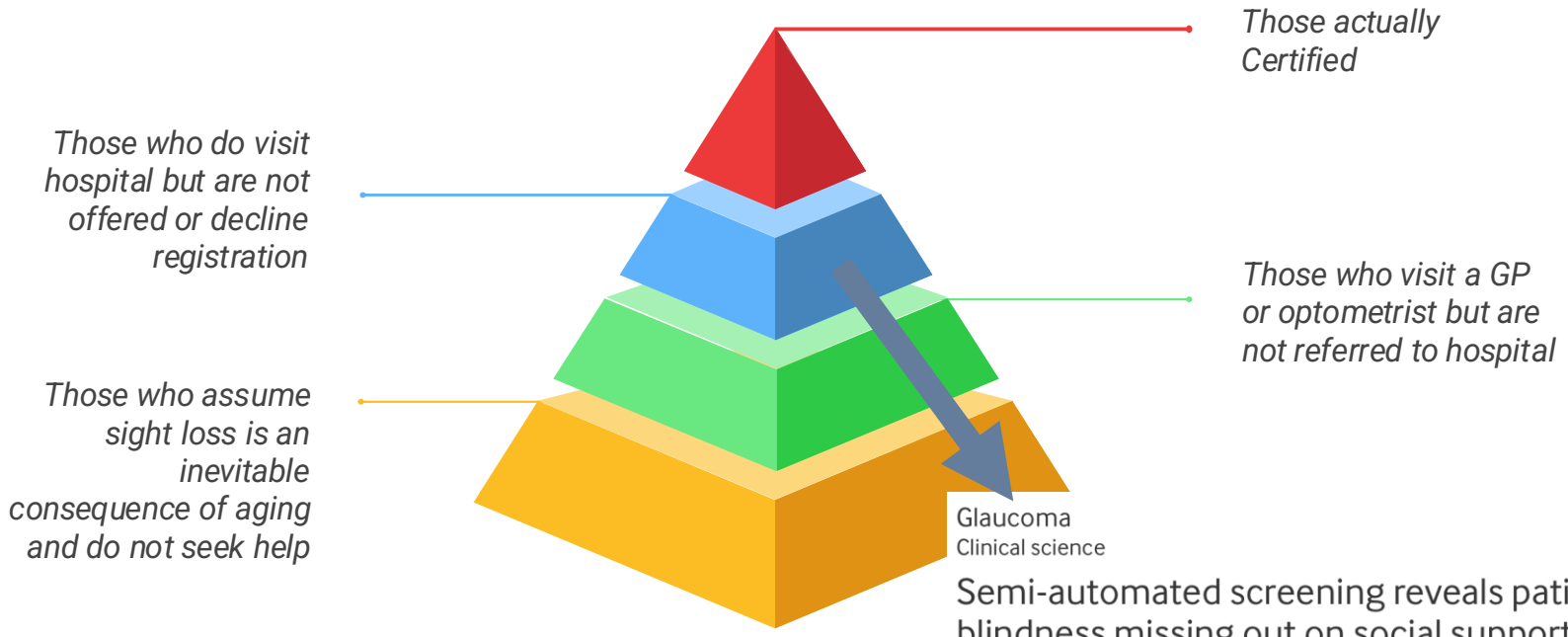
Cannot obtain blindness by cause per country
this is population-based data not those ‘certified’ blind
Interpret ‘with caution’- data sparsity, esp C/E Europe





Certification of Vision Impairment (CVI)

CVI rates do not equate to blindness rates



Glaucoma
Clinical science

Semi-automated screening reveals patients with glaucoma-induced blindness missing out on social support: a cross-sectional study of certificate of visual impairment allocation

Arun James Thirunavukarasu [1, 2, 3], Nikhil Jain [2, 4], Helmut C Y Yu [2, 5], George Nishimura [2, 3], Ansh Tandon [2, 3], Hamid Butt [2, 3], Rohan Sanghera [1, 3], Rupert R A Bourne [2, 6] Cambridge Students Glaucoma Initiative
Correspondence to Dr Arun James Thirunavukarasu; arun.thirunavukarasu@medsci.ox.ac.uk

Slide diagram courtesy of Catey Bunce

https://doi.org/10.1136/bjo-2024-326745

EUROVISION

Self-reported vision status and associated risk factors in Europe

"The Sensory Status of European adults"

Professor Rupert Bourne

Anglia Ruskin University, Cambridge

Professor Nicolas Leveziel

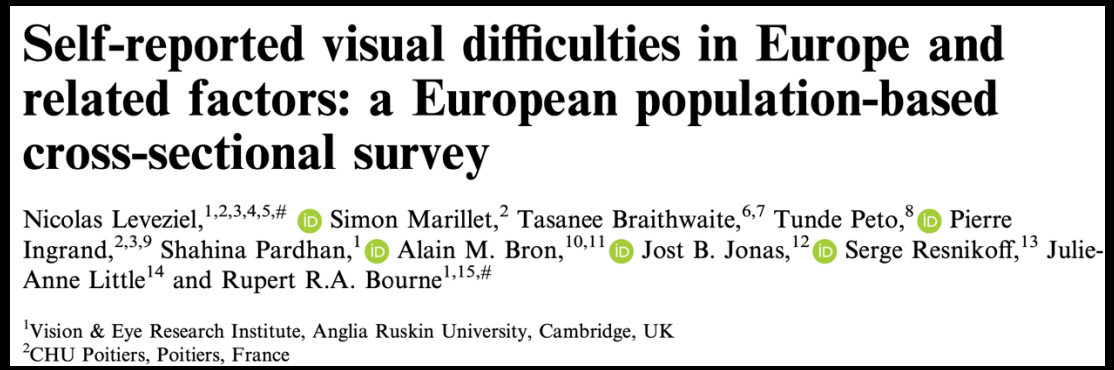
University of Poitiers

Dr Julie-Anne Little (Ulster), Prof Tunde Peto (Belfast), Prof Pierre Ingrand & Dr Simon Marillet (Poitiers), Prof Shahina Pardhan, Prof Jost Jonas, Prof Serge Resnikoff, Dr Tasanee Braithwaite, Prof Alain Bron





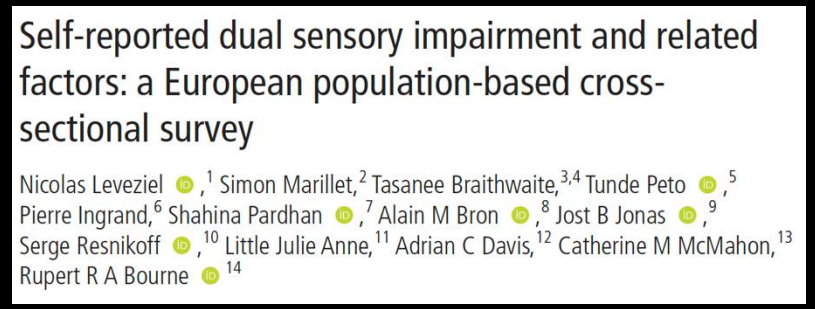




Self-reported visual difficulties in Europe and related factors: a European population-based cross-sectional survey

Nicolas Leveziel,[1,2,3,4,5,#] Simon Marillet,[2] Tasanee Braithwaite,[6,7] Tunde Peto,[8] Pierre Ingrand,[2,3,9] Shahina Pardhan,[1] Alain M. Bron,[10,11] Jost B. Jonas,[12] Serge Resnikoff,[13] Julie-Anne Little[14] and Rupert R.A. Bourne[1,15,#]

[1]Vision & Eye Research Institute, Anglia Ruskin University, Cambridge, UK
[2]CHU Poitiers, Poitiers, France



Self-reported dual sensory impairment and related factors: a European population-based cross-sectional survey

Nicolas Leveziel ,[1] Simon Marillet,[2] Tasanee Braithwaite,[3,4] Tunde Peto ,[5] Pierre Ingrand,[6] Shahina Pardhan ,[7] Alain M Bron ,[8] Jost B Jonas ,[9] Serge Resnikoff ,[10] Little Julie Anne,[11] Adrian C Davis,[12] Catherine M McMahon,[13] Rupert R A Bourne [14]

European Health Interview Survey EHIS II

Population aged 15 and over, living in private households

(excluded persons in collective households & institutions)

Sampling frames: depended on country

28 EU countries + Iceland + Norway

316,000 participants

147 variables

Public health modules

- European Health Status Module
- European Health Determinants Module
- European Health Care Module

Demographic and socio-economic variables

European Health Status Module

- ✓ Health status
- ✓ Specific diseases & chronic conditions
- Accidents and injuries
- ✓ Absence from work (health problems)
- ✓ Physical & sensory limitations
- ✓ Difficulties with personal care activities
- ✓ Difficulties with household activities
- ✓ Having pain
- ✓ Specific aspects of mental health

European Health Care Module

- ✓ Use of inpatient and day care services
- ✓ Use of ambulatory and home care
- ✓ Medicine use
- ✓ Use of preventive services
- ✓ Unmet needs for health care (delay in getting health care..)

Difficulty/ inability to see despite correction

Age	Gender	N	Prevalence (%) [95% CI]	OR (95% CI)
All	M	142,662	1.70 [1.61 - 1.78]	1.43 [1.34 - 1.54]
	F	168,724	2.41 [2.31 - 2.51]	
50+	M	72,285	2.9 [2.74 - 3.05]	1.52 [1.41 - 1.63]
	F	85,599	4.32 [4.13 - 4.51]	
60+	M	46,953	3.62 [3.40 - 3.84]	1.60 [1.47 - 1.74]
	F	60,228	5.65 [5.38 - 5.92]	
70+	M	23,136	5.07 [4.70 - 5.45]	1.67 [1.52 - 1.85]
	F	32,218	8.18 [7.74 - 8.62]	
85+	M	2,677	11.85 [10.25 - 13.45]	1.55 [1.28 - 1.87]
	F	4,967	17.22 [15.68 - 18.76]	

Sex imbalance

Leveziel et al. Acta Scand Ophth. 8 October 2020

Associated factors: Multivariate regression analysis*

EHIS 2 (N = 302,093)	OR [95% CI]
Physical health	
Self-rated health (poor vs good)	1.87 [1.69 - 2.07]
Limiting long-standing illness (yes vs no)	2.66 [2.42 - 2.92]
Chronic illness (yes vs no)	1.46 [1.35 - 1.57]
Mental health	
Depression (yes vs no)	2.16 [2.01 - 2.32]
Lifestyle	
Daily smoking (yes vs no)	1.11 [1.01 - 1.23]
Physical activity (no vs yes)	1.31 [1.21 - 1.42]
Near-daily alcohol consumption (yes vs no)	0.93 [0.80 - 1.08]
Economics	
Wealth (higher versus low)	0.80 [0.73 - 0.86]
Education (high vs intermediate)	0.95 [0.84 - 1.08]
Education (low vs intermediate)	1.29 [1.19 - 1.40]
Social life	
Social isolation (yes vs no)	1.45 [1.26 - 1.67]

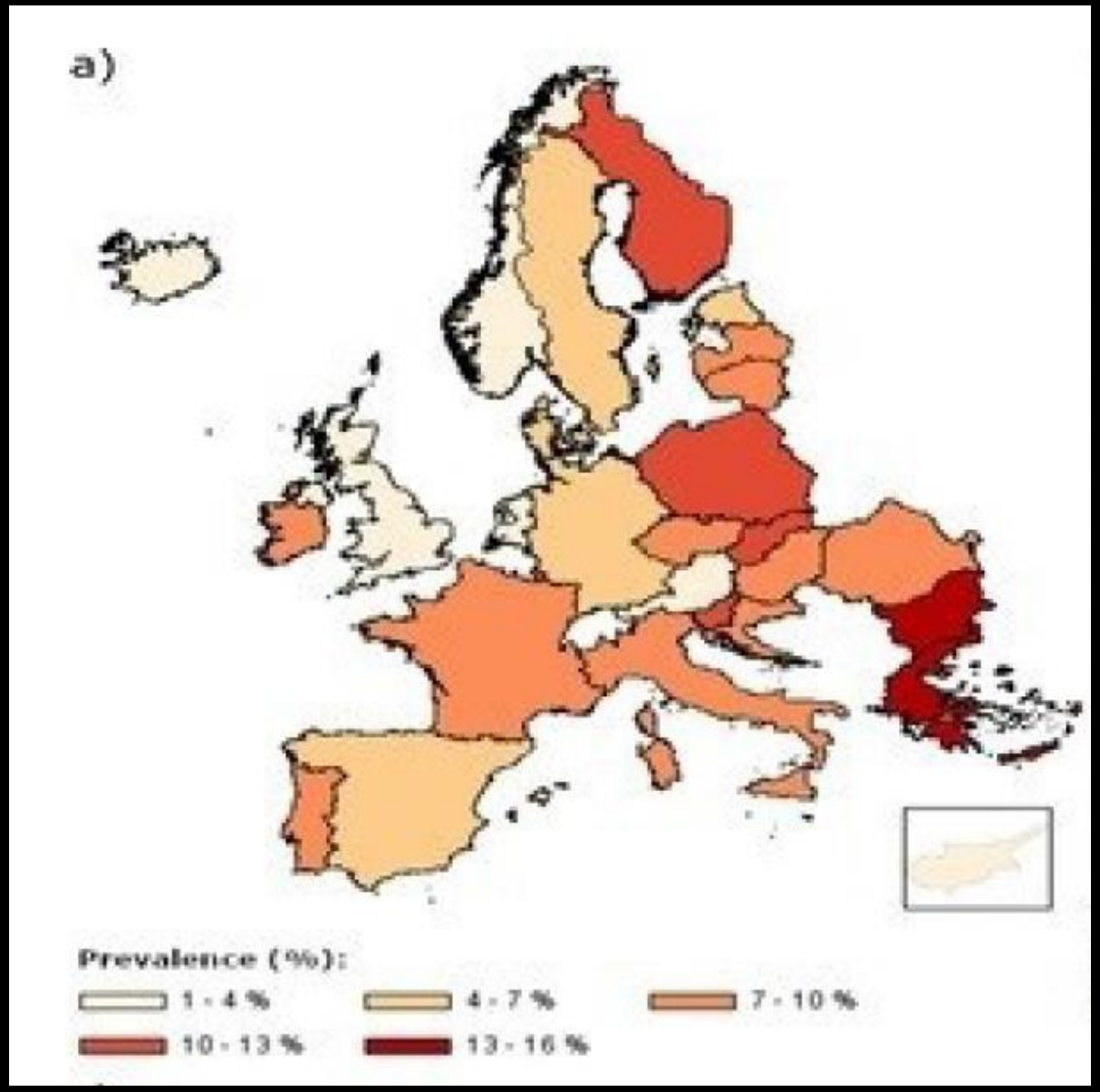
Sensory** Problem	Total	% women	Not wearing correction UNMET NEED
Hearing	23,234	53%	12.4%
Vision problem	41,821	60%	6.3%
Both	12,202	58%	1.5%

	OR [95%CI]
Self-rated health (good vs poor)	2.31 [2.13 - 2.51]
Social isolation (yes vs no)	2.01 [1.79 - 2.26]

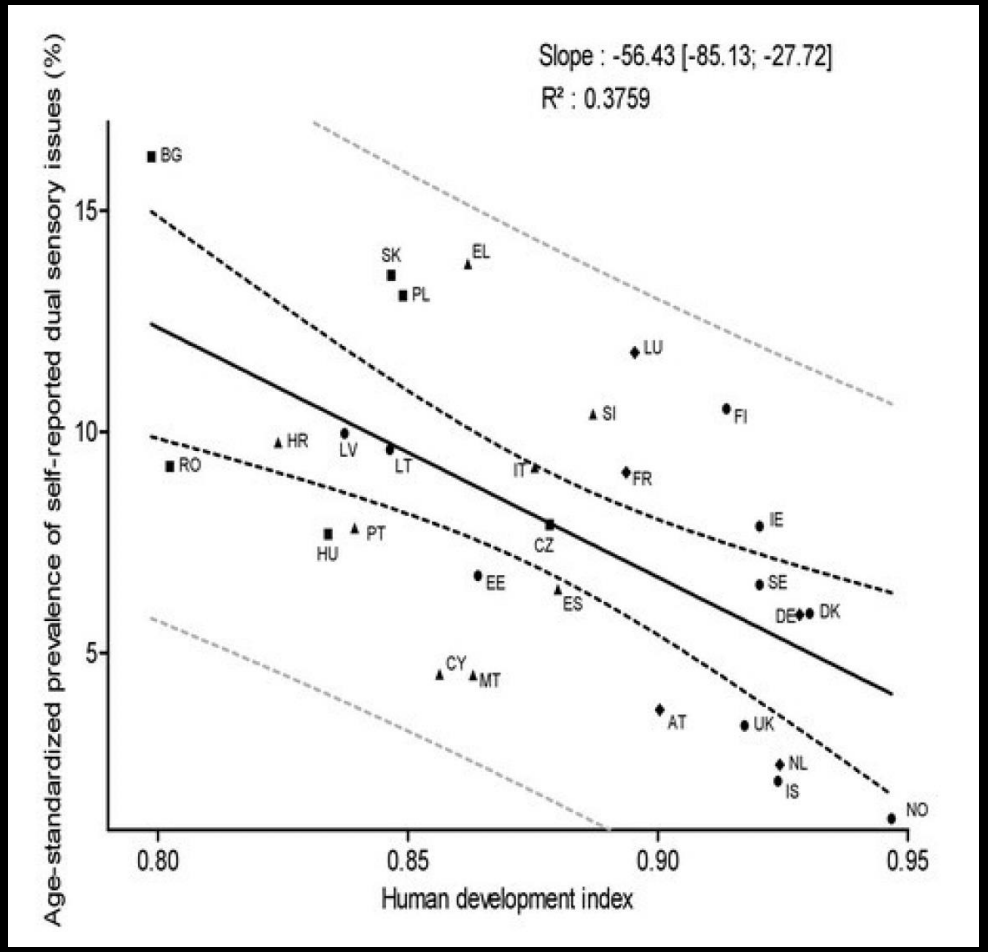
*Leveziel et al. Acta Scand Ophth 8 October 2020

** Leveziel et al. under review

The prevalence of **Dual Sensory Impairment** varies greatly across Europe



Many more adults (50+) report vision and hearing impairment in Central & Eastern Europe



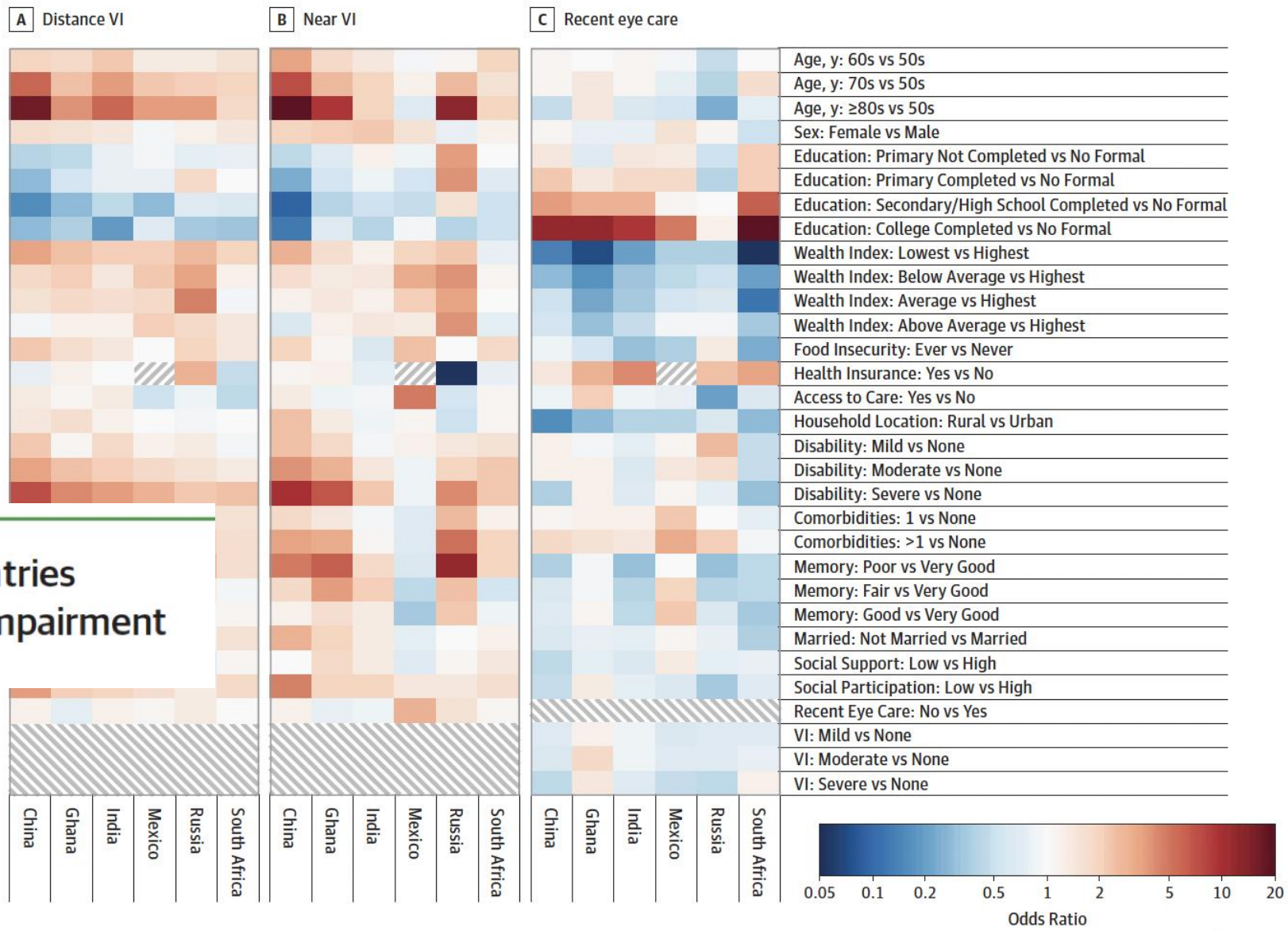
Risk Factors for Vision Impairment & Blindness

Invited Commentary

Looking Within Rather Than Between Countries to Understand the Risk Factors for Vision Impairment

Rupert R. A. Bourne, FRCOphth, MD; Jost B. Jonas, MD; Serge Resnikoff, MD, PhD

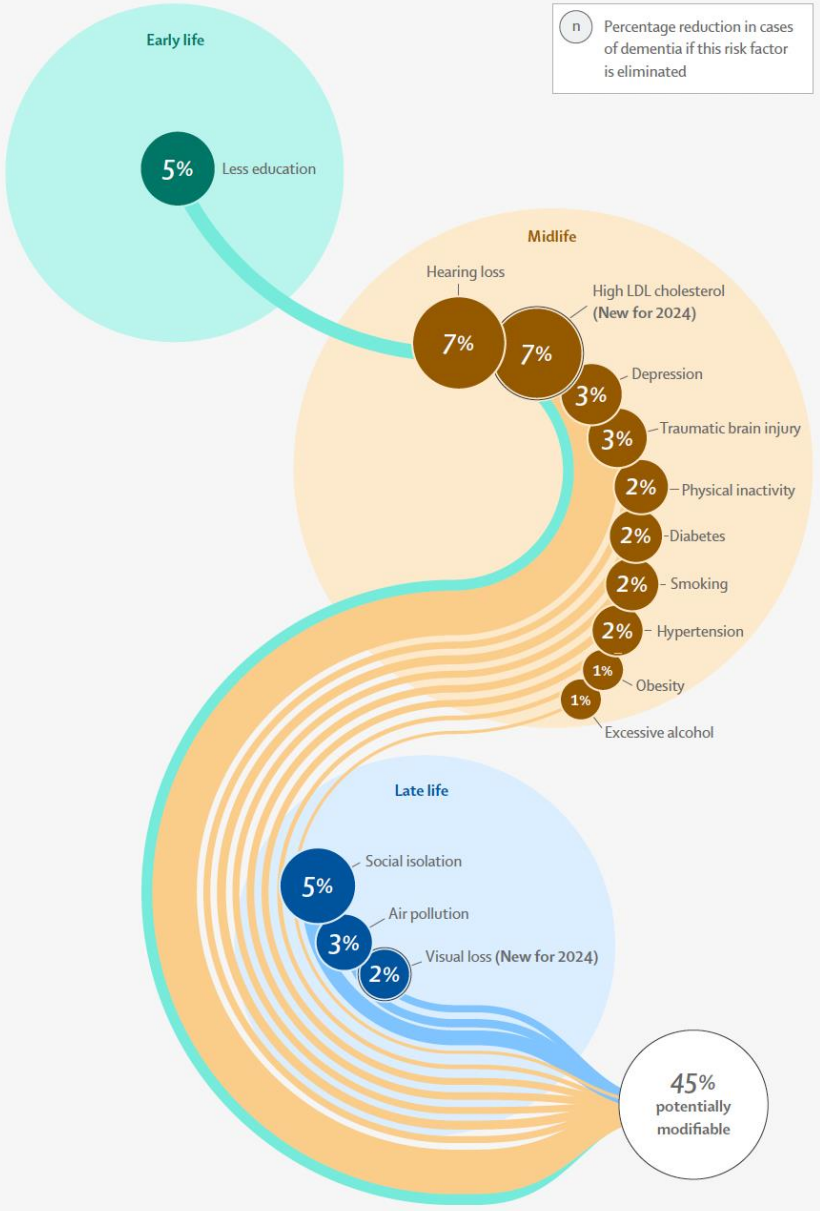
Figure. Heat Maps of Unadjusted Associations of Demographic, Socioeconomic, and Health-Related Variables With Distance Vision Impairment (VI), Near VI, and Receipt of a Recent Eye Examination



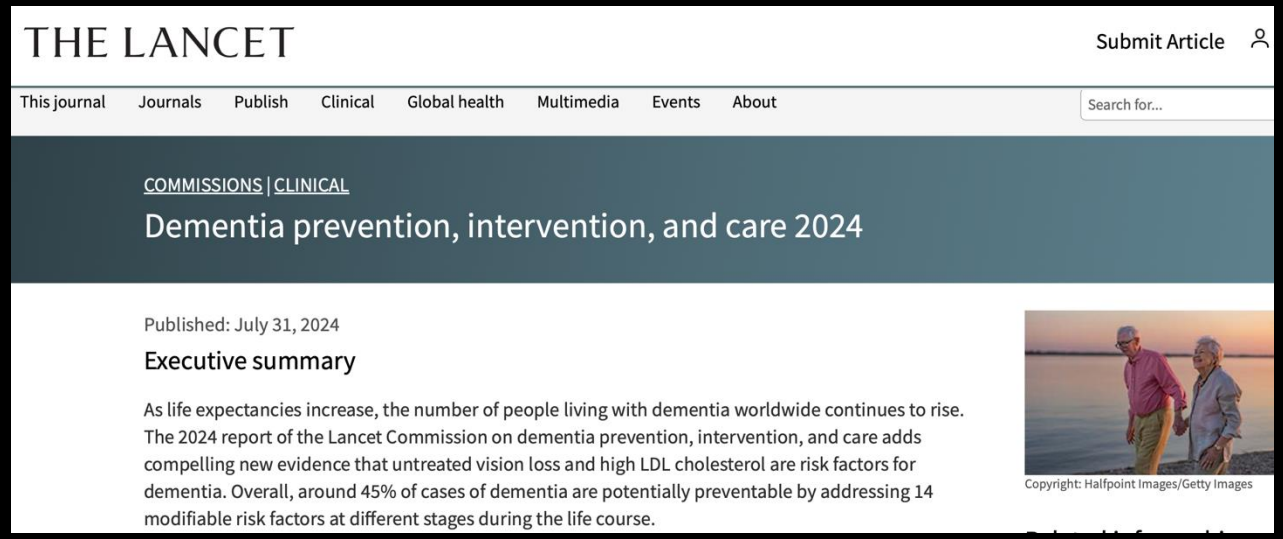
Ehrlich et al. JAMA Ophthalmol. 2019;137(2):146-158.

Risk factors for dementia — 2024 update

The 2024 update to the standing Lancet Commission on dementia prevention, intervention, and care adds two new risk factors (high LDL cholesterol and vision loss) and indicates that nearly half of all dementia cases worldwide could be prevented or delayed by addressing 14 modifiable risk factors.



Read the full commission update at thelancet.com/commissions/dementia-prevention-intervention-care



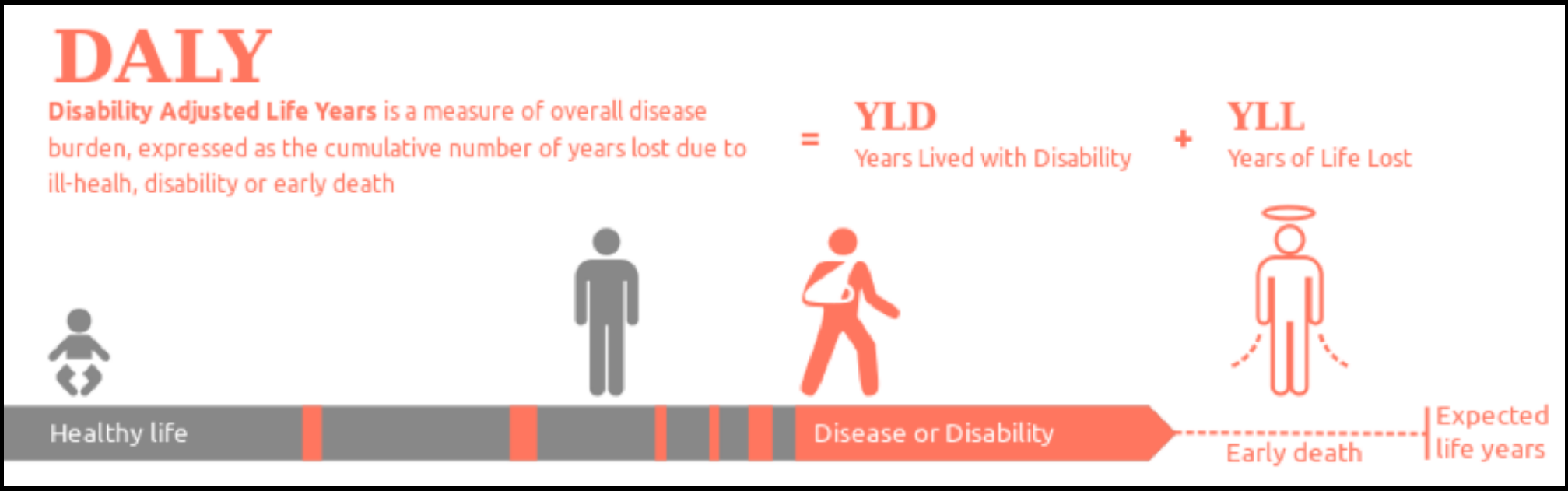
https://www.thelancet.com/infographics-do/dementia-risk

Advice; data, validation

Global Burden of Disease Study

IHME GBD

Disability Adjusted Life Years (DALYs)



Prevalence x Disability Weight

Disability Adjusted Life Years (DALYs)

DALY

GBD2019

Summary

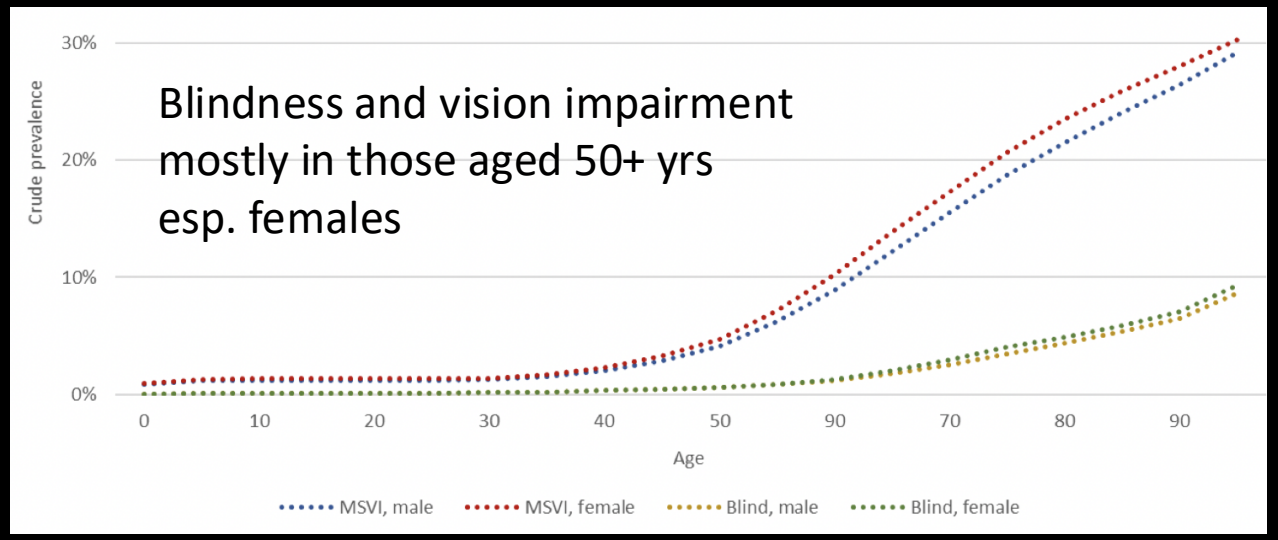


Blindness & Vision Loss	50-74 yrs	75+ yrs
% of total DALYs	1.4%	1.7%
RANK	19	15



Age-related hearing loss	50-74 yrs	75+ yrs
% of total DALYs	2.2%	2.5%
RANK	9	10

Sensory loss	50-74 yrs	75+ yrs
% of total DALYs	3.6%	4.2%
RANK	6	5



50-74 yrs	RANK	75+ yrs
Ischaemic heart disease	1	Ischaemic heart disease
Stroke	2	Stroke
Diabetes	3	COPD
COPD	4	Alzheimers
Lung Cancer	5	**SENSORY LOSS**
SENSORY LOSS	6	Diabetes
Low Back Pain	7	Lower resp infect.

GBD

Global burden of 369 diseases and injuries in 204 countries…GBD 2019 Diseases & Injuries Collaborators. Lancet 2020;396: 1204-22

WHA Resolution 73.4

World Health Organization

SEVENTY-THIRD WORLD HEALTH ASSEMBLY **WHA73.4**

Agenda item 11.7 **3 August 2020**

Integrated people-centred eye care, including preventable vision impairment and blindness

REQUESTS the Director-General:

(4) to prepare, in consultation with Member States, recommendations on feasible global targets for 2030 on integrated people-centred eye care, focusing on effective coverage of refractive error and effective coverage of cataract surgery, for consideration by the Seventy-fourth World Health Assembly in 2021, through the 148th session of the Executive Board;

World Health Organization

74th WHA
Global eye care targets endorsed

World Health Organization

SEVENTY-FOURTH WORLD HEALTH ASSEMBLY
Provisional agenda item 13.9

A74/9 Add.3
19 April 2021

Integrated people-centred eye care, including preventable vision impairment and blindness

Global targets for 2030

- **40% Increase Effective Coverage of Refractive Error by 2030**
- **30% Increase Effective Coverage of Cataract Surgery by 2030**

World Health Organization

2021 UN GA
Resolution 75/310

United Nations A/RES/75/310

General Assembly

Distr.: General
26 July 2021

8. *Invites* the Inter-Agency and Expert Group on Sustainable Development Goal Indicators to review and consider in the context of the global indicator framework for the Sustainable Development Goals, at the fifty-sixth session of the Statistical Commission, to be held in 2025, the feasible global indicators on eye health included in World Health Assembly resolution 73.4, as a mechanism for monitoring and reporting on progress towards Vision for Everyone and its contributions to the 2030 Agenda for Sustainable Development;[3]

Resolution adopted by the General Assembly on 23 July 2021

[*without reference to a Main Committee (A/75/L.108 and A/75/L.108/Add.1)*]

75/310. Vision for Everyone: accelerating action to achieve the Sustainable Development Goals

The General Assembly,

Report of the 2030 targets on effective coverage of eye care



World Health Organization

THE LANCET
Global Health

https://pubmed.ncbi.nlm.nih.gov/36240807/

ARTICLES | VOLUME 10, ISSUE 12, E1754-E1763, DECEMBER 2022

Effective refractive error coverage in adults aged 50 years and older: estimates from population-based surveys in 61 countries

Rupert Richard Alexander Bourne, BSc FRCOphth MD * • Maria Vittoria Cicinelli, MD * • Tabassom Sedighi, PhD • Ian H Tapply, FRCOphth • Ian McCormick, MSc • Jost B Jonas, MD • et al. Show all authors • Show footnotes

Open Access • Published: October 11, 2022 • DOI: https://doi.org/10.1016/S2214-109X(22)00433-8 • Check for updates



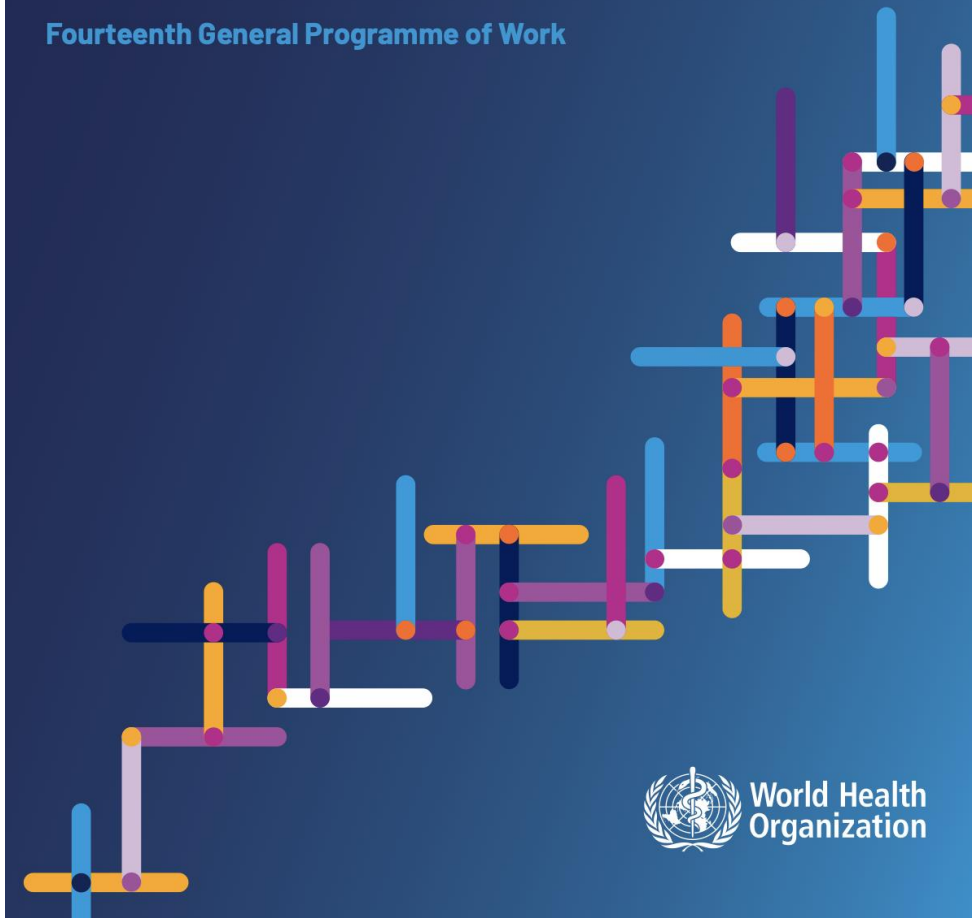


VLEG
VISION LOSS EXPERT GROUP

A Global Health Strategy for 2025–2028

advancing equity and resilience in a turbulent world

Fourteenth General Programme of Work



World Health Organization

UK NEHS

UK NATIONAL EYE-HEALTH AND HEARING STUDY

SCAN ME

Thomas Pocklington Trust

RNIB

FIGHT FOR SIGHT

RNID

GUIDE DOGS

Glaucoma UK

deafblind uk

Macular Society
Beating Macular Disease

UK's first hearing and sight loss survey launched



The sensory health survey has been launched across Cambridgeshire and Peterborough

Shariqua Ahmed

BBC News, Peterborough

(A) Care Home Study and **(B) Community Study**



Sampling

- Sequential households from a list of 1-250 in each cluster



Inclusion & Exclusion

- Inclusion: 50 years and older
- Exclusion: None









Enumeration

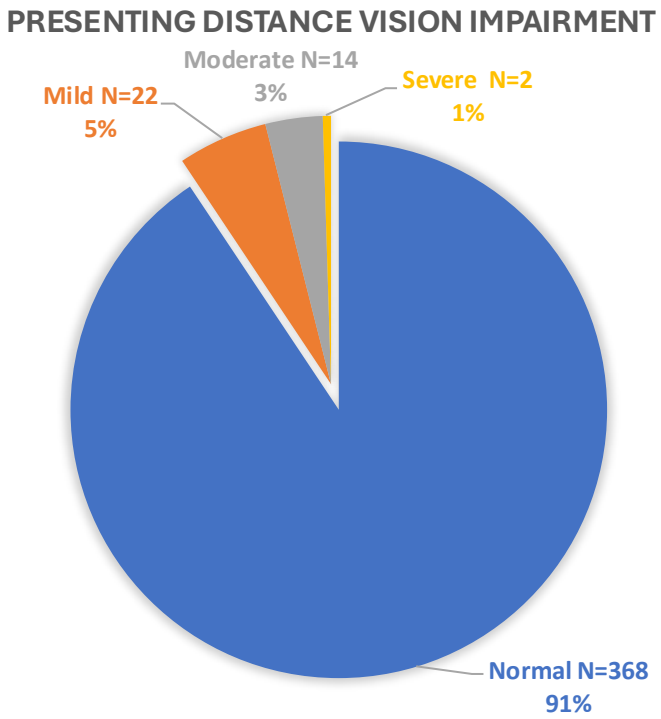
- 1,113 households personally approached by enumeration team
- 705 eligible people invited
- Medical students
- Project manager: Clare Fraser

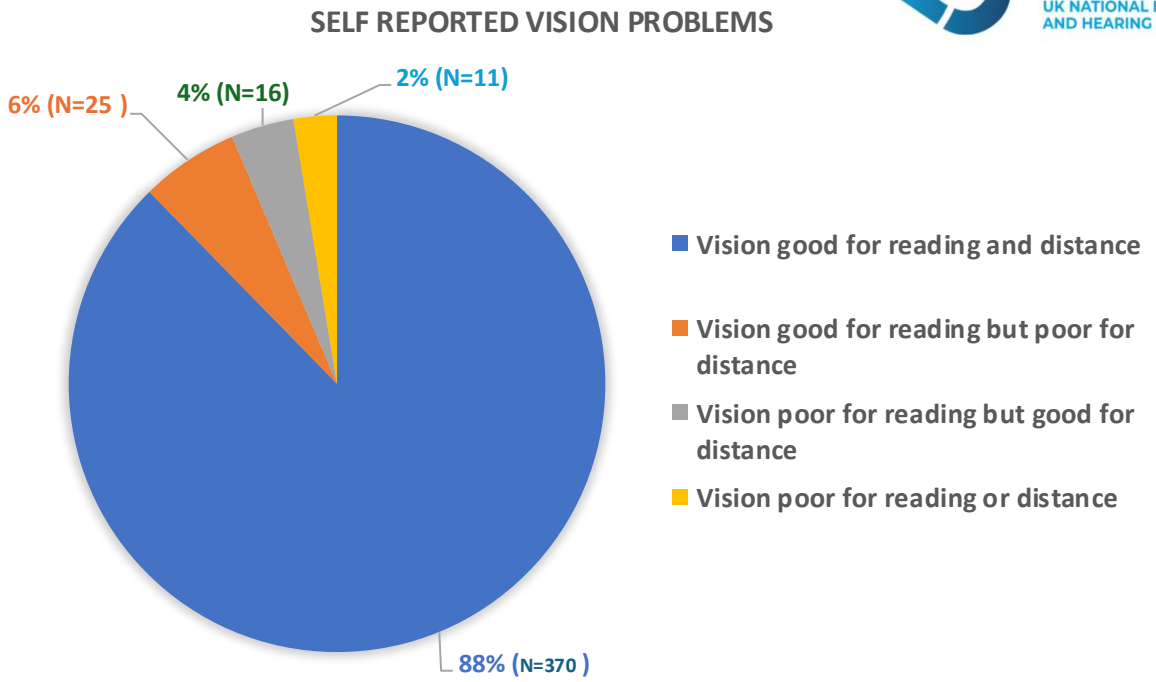
Examination

- Carolina Leal (audiologist); John Kidd (optometrist); Yoshi Nagaya (nurse); Ghanwa Arshad; Mona Arshad; Medical students

Raise awareness by: Local - BBC Radio Cambridgeshire; National - Radio 4 In Touch

Measured vs Self-Reported Vision Impairment: UKNEHS Pilot Findings





- **1 in 11 (9%)** adults aged 50+ were vision impaired (worse than 6/12)

Mild or worse = below UK driving standard

- **4× higher** in 70s, **6× higher** in 80s
- No sex difference

- **1 in 8** reported vision problems (distance, near, or both)
- **Difficulty ↑** with age and deprivation
- Awareness good, care uptake low

Potential for Improvement in Visual Acuity | Prevention of undiagnosed eye dx

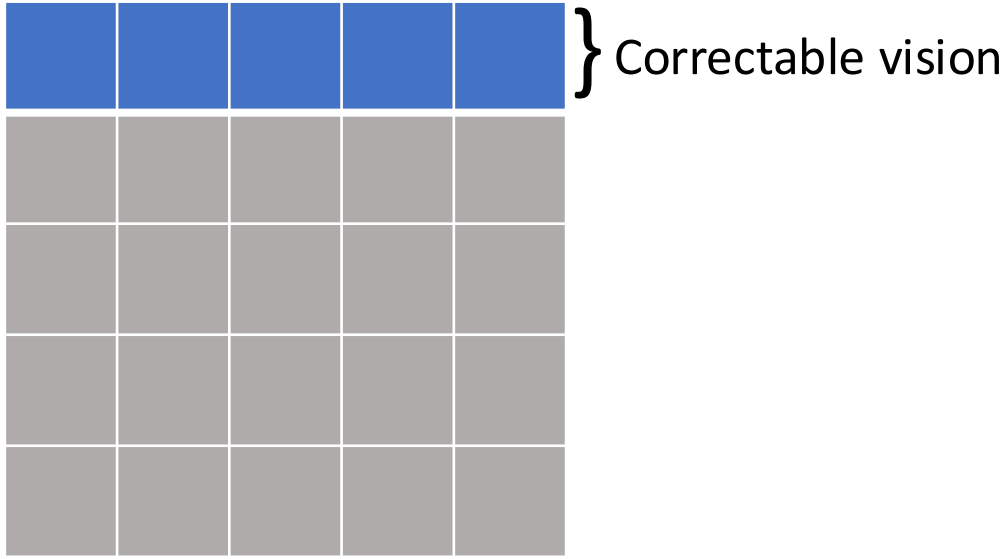


Fig. 1: 19% of participants showed potentially correctable vision with glasses/change in glasses

Glaucoma

9 people with high eye pressures (23+); 3 were urgently referred
9 people with optic discs suspicious for glaucoma; 6 of whom were aware (67%)

Age-related Macular Degeneration

Of those with intermediate AMD (n=19); only 30% had been made aware of this. One late AMD case (of 2) was undiagnosed

Diabetic retinopathy

Detected in 4 people, 2 of whom were already under DR screening/hospital eye service for this

Summary



Epidemiological Transition & rising importance of chronic disability

Although age-standardised prevalence of blindness is falling, population ageing means that absolute numbers affected are relatively static/ increasing

Important changes in causal contribution to blindness and vision impairment

Urgent need for better data on prevalence and utilization

Inclusion of effective Refractive Error Coverage in WHO's GPW is a step-change

Eyecare should not exist in isolation

Advocacy opportunities for eyehealth in context of universal health coverage, prevention, social isolation, falls, [dementia]

Thank you

The Fred Hollows Foundation

Fondation Théa

BHVI

Sightsavers

Lions Clubs International FOUNDATION

UNIVERSITÄT HEIDELBERG

World Health Organization

And thanks to investigators who contributed datasets to the WHO/VLEG model



Further information on VLEG activities and publications can be found at www.globalvisiondata.net

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