Institution: Anglia Ruskin University

Unit of Assessment: 03 – Allied Health Professions, Dentistry, Nursing and Pharmacy

Title of case study: New Policies and Strategies Addressing the Global Burden of Eye Diseases

Period when the underpinning research was undertaken: 2007–2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Rupert Bourne	Professor of Ophthalmology	01.10.2007–present

Period when the claimed impact occurred: 2014–December 2020

Is this case study continued from a case study submitted in 2014? No

1. Summary of the impact (indicative maximum 100 words)

Professor Rupert Bourne of Anglia Ruskin University (ARU) leads the research for the Vision Loss Expert Group (VLEG) as part of the Global Burden of Disease study. The research underpins the 'Vision Atlas' hosted by the International Agency for Prevention of Blindness. It has become the authoritative source of global data on vision impairment and blindness. Accessed by 243,000 unique visitors and with 314,000 page views, the Atlas has raised awareness of the prevalence of eye diseases globally. The WHO, UN and the governments of Australia, Sierra Leone, Nigeria, the UK, and international charities have made eye-health policies and/or investment decisions based on the research findings. The Australian National Eye Health Survey used the data to plan their national eye survey. In all, the research has positively impacted millions of individuals at risk of preventable eye diseases.

2. Underpinning research (indicative maximum 500 words)

The World Health Organization (WHO) has estimated that globally at least 2.2 billion people have vision impairment or blindness, of whom at least 1 billion have vision impairment that could have been prevented or has yet to be addressed. Sight loss is associated with a drop in quality of life and the WHO has identified it as a major issue to be tackled. Historically, a lack of comprehensive data made it impossible to make comparisons between countries, impeding effective planning and resource allocation, and resulting in unnecessary suffering. The data prepared by the Vision Loss Expert Group (VLEG) are considered as the most comprehensive on global blindness and vision impairment by the International Agency for the Prevention of Blindness and the WHO, having been published in over 28 papers including 18 papers in *The Lancet* since 2013.

The Vision Loss Expert Group, led by Professor Rupert Bourne, is a global network of over 102 ophthalmic epidemiologists including ophthalmologists, optometrists and the WHO. The group, which was set up in 2007, delivers on strategic objectives Professor Bourne initiates and co-develops. This advises and supports the Global Burden of Disease Study with the goal of providing global technical leadership in the development and improvement of epidemiological estimates for blindness and vision impairment. In the UK, VLEG's members, aside from Prof. Bourne are: Drs Tasanee Braithwaite (University College London), Seth Flaxman (Imperial College London), Aditi Das (St James's University Hospital, Leeds), Alexander Silvester (Royal Liverpool University Hospital) and Professors Usha Chakravathy (Queen's University, Belfast), Tunde Peto (Queen's University Belfast) and Richard Wormald (University College London). The VLEG research provided, for the first time, a temporal analysis of change in the burden of blindness and vision impairment by cause [R1–6]. The study also captured important risk factors such as gender inequality in vision impairment.

Initially, the VLEG prepared global estimates for 2010 and 2015 [R1, 3, 4] by performing a meta-analysis of 288 studies, covering 4 million participants from 98 countries. The systematic review was extended to 2019 with multiple sources of microdata added into the open-source Global Vision Database. The new research included a wider range of causes, severities and conditions such as impairments to near and distance vision, and milder grades of vision impairment that affect quality of life and employment potential. Region-specific data showed temporal trends of decreased prevalence of age-standardised blindness [R4, 5, 6]. Analysis of the data produced comparable metrics for eye diseases that incorporated disability weights to provide years lived with disability (YLDs) and disability-adjusted life years (DALYs) [R2].

The key research finding was that the age-standardised prevalence of vision loss had fallen over the 25 years covered by the study. However, due to the global rise in ageing populations, the actual number of people living with blindness and vision impairment had increased, with future projections for the next 30 years indicating a dramatic rise in the number of people affected by vision loss. New data for near vision impairment (presbyopia) showed that a billion people are affected worldwide [R3]. The majority of vision loss was found to be in females. The researchers identified the causal distribution: vision loss is principally due to cataract [R2] but there is also significant impact from other eye conditions such as glaucoma, age-related macular degeneration and diabetic retinopathy. Over 80% of the burden of vision impairment was found to be avoidable or treatable. The research highlighted the magnitude, temporal trends and future projections for vision loss in different parts of the world, including Europe [R4], Asia [R5] and Africa [R6].

3. References to the research (indicative maximum of six references)

The body of research represented below meet the two-star threshold for underpinning research since they have been published in peer reviewed journals, received 2,294 citations, attracted peer reviewed funding from the EU, Brian Holden Institute, THEA Foundation, Fred Hollows, Sightsavers (totalling together £556,079) and an award from The International Agency for the Prevention for Blindness:

1. Flaxman SR, **Bourne RRA**, Resnikoff S, et al. Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis. *Lancet Global Health*. 2017;5(12):e1221-e1234. doi:10.1016/S2214-109X(17)30393-5. Submitted in REF2.
2. GBD 2016 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet*. 2017;390(10100):1260-1344. doi:10.1016/S0140-6736(17)32130-X
3. **Bourne RRA**, Flaxman SR, Braithwaite T, et al. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis. *Lancet Global Health*. 2017;5(9):e888-e897. doi:10.1016/S2214-109X(17)30293-0. Submitted in REF2.
4. **Bourne RRA**, Jonas JB, Bron AM, Cicinelli MV, Das A, Flaxman SR, Friedman DS, Keeffe JE, Kempen JH, Leasher J, Limburg H, Naidoo K, Pesudovs K, Peto T, Saadine J, Silvester AJ, Tahhan N, Taylor HR, Varma R, Wong TY, Resnikoff S. Prevalence and causes of vision loss in high-income countries and in Eastern and Central Europe in 2015: magnitude, temporal trends and projections. *British Journal of Ophthalmology*. 2018 May;102(5):575-585. doi: 10.1136/bjophthalmol-2017-311258. Submitted in REF2.
5. Cheng CY, Wang N, Wong TY, Congdon N, He M, Wang YX, Braithwaite T, Casson RJ, Cicinelli MV, Das A, Flaxman SR, Jonas JB, Keeffe JE, Kempen JH, Leasher J, Limburg H, Naidoo K, Pesudovs K, Resnikoff S, Silvester AJ, Tahhan N, Taylor HR, **Bourne RRA**; Vision Loss Expert Group of the Global Burden of Disease Study. Prevalence and causes of vision loss in East Asia in 2015: magnitude, temporal

trends and projections. *British Journal of Ophthalmology*. 2020 May;104(5):616-622. doi: 10.1136/bjophthalmol-2018-313308 (doi.org)

6. Kahloun R, Khairallah M, Resnikoff S, Cicinelli MV, Flaxman SR, Das A, Jonas JB, Keeffe JE, Kempen JH, Leasher J, Limburg H, Naidoo K, Pesudovs K, Silvester AJ, Tahhan N, Taylor HR, Wong TY, **Bourne RRA**; Vision Loss Expert Group of the Global Burden of Disease Study. Prevalence and causes of vision loss in North Africa and Middle East in 2015: magnitude, temporal trends and projections. *British Journal of Ophthalmology*. 2019 Jul;103(7):863-870. doi: 10.1136/bjophthalmol-2018-312068

4. Details of the impact (indicative maximum 750 words)

The impact of the research findings has been global in reach and has shaped the strategies and practices of international organisations, as well as practices at country level and of large charities. The WHO, UN and the governments of Australia, Sierra Leone, Nigeria and the UK have made eye-health policies and/or investment decisions based on the research findings. Charities in the UK, US and Australia, working in over 25 countries, have used the data to underpin their lobbying activities and to inform their strategies and investment decisions.

Professor Bourne disseminated key findings from his research through meetings, keynote invited speeches and research collaborations with various government and non-government agencies, charities and other international policymakers. This approach was taken specifically to inform policy and decision making such as the development of pathways for improved eyecare informed by the research findings.

The impacts can be summarised under three headings:

Influencing eye-health policy at the global level

A. VLEG data was used to create the 'Vision Atlas' in 2016, an open-access, online tool developed by Professor Bourne with the **International Agency for the Prevention of Blindness (IAPB)**, which is the principal global lobby group for eye health. The Vision Atlas reports 243,000 unique visitors and 314,000 page views since 2016 (30/12/2020). IAPB has representatives of governments and NGOs on its boards, and the consolidated information on global eye diseases held in the Atlas has underpinned its efforts to influence policymakers. The CEO of IAPB stated: "*The VLEG data have been critical to IAPB and our members to define advocacy strategies and plans, and to achieve advocacy successes at the global level. These have included gaining a commitment to 'eye health for all' in the Commonwealth Heads of Government Meeting communique, getting governments engaged in shaping the work of the UN Friends in Vision, and gaining attention to eye health within the Global Strategy for Human Resources for Health"* [E1].

B. Aside from the Vision Atlas, the IAPB have used VLEG data [R2] to develop advice and strategies on managing and eradicating reversible causes of global vision impairment such as myopia and cataract. This includes IAPB's and WHO's strategy to quantify the need for cataract operations worldwide and per country (2017), mapping this need onto actual operations carried out in identified countries where there is an unmet need [E2].

C. In collaboration with the **World Health Organization**, the IAPB used the VLEG data to gauge how effectively the WHO's Global Action Plan (2014–19) for Universal Eye Health has met its target. The WHO stated: *"The results of the VLEG provided much of the evidence base for … 'Global magnitude: eye conditions and vision impairment' of the first WHO World report on vision that was launched globally ... in 2019."* It continued: *"The data were also extensively cited in the 'Report by the Director-General' [of the WHO] and the proposed resolution on 'integrated people centred eye care' that was subsequently approved by the WHO Executive Board in February 2020".* [E3]

D. The **Fred Hollows Foundation** (a non-profit aid organisation for the prevention of blindness and other vision problems, operating across 25 countries) is a stakeholder in setting global eye-health policy at the UN. Their Director of Global Partnerships stated that they had "*utilised VLEG data in advocating for the inclusion of eye health… within the global policy at the United Nations, such as [the] UN Third High Level Meeting on Non-Communicable Diseases (2017) and during negotiations for the UN First High Level Meeting on Universal Health Coverage".* They added: *"This is a testament to the utmost importance of credible and consistent evidence in shaping political agendas and sound policy responses.*" [E4]

E. The **Pan American Health Organization** in collaboration with WHO used the VLEG data at their meeting of the 72nd session of the Regional Committee of WHO for the Americas (September 2020) to generate the plan for 'Action for the prevention of blindness and visual impairment' that offers concrete actions to address priorities for the prevention of blindness and improved eye care for different countries of America [E5].

Shaping strategies and practice at country level

F. VLEG data have been used to plan large population-based studies. The **Australian** government recognised the need to update its population-based data and then committed to funding a second countrywide survey. The Chief Investigator said "*the VLEG data… meant that we had the estimates of vision loss we needed to help plan a sample size for the Australian National Eye Health Survey (NEHS*)… *The study has had very significant impact in Australia, with the follow-up survey to commence in 2020,* and this has *gained the support of the Australian Government*" [E6]. The implementation of this has been delayed due to COVID-19.

G. VLEG research identified a need to have up-to-date comprehensive data of eye health in the **UK**, leading to the development of the protocol for the UK National Eye and Hearing Survey (UKNEHS; Prof Bourne is Chief Investigator). The Survey will examine 25,000 participants drawn from across the UK. The programme has been finalised and was costed and importance noted by the Four Nations Committee for Public Health committee at its January 2020 meeting [E7]. The protocol has received support of multiple public sector stakeholders in the UK, evidenced by events held at the House of Lords (February 2019) chaired by Lord Low and Professor Sir Michael Rawlins, at the Conservative Party Conference (October 2019) and the Houses of Parliament (October 2019).

Shaping the strategies and practice of charities and NGOs

H. **Vision Aid Overseas (VAO)**, a UK charity operating in Africa, has used VLEG data to advocate the need for universal eye care. At an event at the House of Commons (2018) designed to mobilise political will towards improved access to affordable eye care in developing countries, Bourne was an invited keynote speaker. The CEO of Vision Aid Overseas stated: *"Since [..] the House of Commons, VAO has been developing its [..] School Based Eye Health and Primary Eye Care*" and "*When producing programme proposals and presentations to donors and partners (including for UNICEF in Sierra Leone and Ethiopia and in our successful applications to USAID), IAPB, VLEG and the Atlas have been the go-to organisations for such data and analysis*" [E8].

I. VLEG data and the Vision Atlas have been used by other major charities to further their agenda for improving eye health globally. For instance, the CEO of **Sightsavers**, referring to the VLEG research stated: "*For the first time, the eye health community has a clear and objective evidence"* and confirmed that the data had informed government policies in : (i) "*in **Sierra Leone**, the Vision Atlas was the prime source of data in the development of the National Health policy in 2018"* (ii) "*In **Nigeria**, the Vision Atlas was used to convince the Minister of Health… and the first National Eye health policy was*

approved by government in 2019". Further, VLEG data has informed Sightsavers' own organisational policies for improvements, especially with regards to gender inequality in eye care. The CEO stated: *"Sightsavers has ensured that all our data is now gender disaggregated...to make sure more women are reached with eye health services than men"* [E9].

J. The **SEVA Foundation** (an international NGO working in more than 20 countries), referred to VLEG's data [R3], when they stated in their strategy document (2018) that there were *"clear and specific actions needed to redress this unmet need for cataract operations"*. As a result, it has planned *"to add another million sight-saving surgeries in developing countries per year"*, through its Global Sight Initiative (GSI) [E10].

5. Sources to corroborate the impact (indicative maximum of 10 references)

E1. Evidence 1: Letter from CEO of International Agency for the Prevention of Blindness.
E2. Evidence 2: Links to IAPB web pages for e.g. Vision Atlas and findings, Cataract Surgery indicators, WHO strategies.
E3. Evidence 3: Testimony from WHO, provided by Unit Head, Vision, Hearing, Rehabilitation, Disability, Department of Noncommunicable Diseases.
E4. Evidence 4: Letter from Fred Hollows Foundation provided by Director of Global Partnerships and Advocacy.
E5. Evidence 5: Report: Plan of action for the prevention of blindness and visual impairment: Final Report. 72 Session of the regional committee of WHO for the Americas. Virtual Session, 28–29 September 2020. Pan American Health Organization and the WHO (also downloadable at https://www.paho.org/en/documents/cd58-inf-2-e-prevention-blindness)
E6. Evidence 6: Letter from PLANO (Save Sight Empower Lives) outlining how the research was used to plan Australian Eye Health National Survey.
E7. Evidence 7: Four Nations Committee for Public Health with UKNEHS as agenda item 5 (17 February 2020).
E8. Evidence 8: Letter provided by CEO of Vision Aid Overseas.
E9. Evidence 9: Letter from CEO Sightsavers International.
E10. Evidence 10: *The Ophthalmologist* report (April 2018) on SEVA Foundation's plans for sight-saving surgery in developing countries. https://theophthalmologist.com/subspecialties/a-question-of-capacity.