Keeping an eye on eye care: monitoring progress towards effective coverage

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The eye care sector is well positioned to contribute to the advancement of universal health coverage within countries. Given the large unmet need for care associated with cataract and refractive error, coupled with the fact that highly cost-effective interventions exist, we propose that effective cataract surgery coverage (eCSC) and effective refractive error coverage (eREC) serve as ideal indicators to track progress in the uptake and quality of eye care services at the global level, and to monitor progress towards universal health coverage in general. Global targets for 2030 for these two indicators were endorsed by WHO Member States at the 74th World Health Assembly in May, 2021. To develop consensus on the data requirements and methods of calculating eCSC and eREC, WHO convened a series of expert consultations to make recommendations for standardising the definitions and measurement approaches for eCSC and eREC and to identify areas in which future work is required.

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Introduction

Achieving universal health coverage (UHC)—ensuring all people can receive the high-quality health services they need, without experiencing financial hardship—is a WHO strategic priority.[1] The eye care sector is well positioned to contribute to the advancement of UHC within countries given that there is a large unmet need for eye health services (around 1 billion people have a vision impairment that could have been prevented or is yet to be addressed),[2] and given that effective interventions are available to address the needs associated with eye conditions and vision impairment. Some of these interventions are among the most feasible and cost-effective of all health-care interventions to implement.[3,4]

To understand how actions and investments in the field of eye care are delivering on the goal of improving eye health outcomes and contributing to the advancement of UHC, it is essential to identify tracer indicators that fulfil several important criteria. First, the selected indicators must serve as a reasonable proxy for the overall status of eye care services and consider different segments of the population (eg, across the life course). Second, the indicators need to be based on cost-effective interventions, with clearly outlined steps for improving their coverage. Third, variation in the indicator should primarily reflect health system factors rather than factors outside the control of the health system. Lastly, there are practical considerations, including the need for the indicators to have accompanying baseline information and to be feasibly monitored in a large number of countries across all income levels.

Uncorrected refractive error and unoperated cataract are the leading causes of vision impairment globally.[5] More than 800 million people have distance or near vision impairment that could be addressed with an appropriate pair of spectacles,[2] and an estimated 100 million people have moderate-to-severe distance vision impairment or blindness that could be corrected through access to cataract surgery.[5] These figures are expected to increase because presbyopia and cataract development are part of the ageing process, while growing evidence suggests that projected increases in myopia in the younger population will be driven largely by lifestyle-related risk factors.[2]

For these reasons, we propose that the population-based indicators of effective cataract surgery coverage (eCSC) and effective refractive error coverage (eREC) serve as ideal proxy indicators to not only track changes in the uptake and quality of eye care services[6] at the global level, but also contribute to monitoring progress towards UHC in general.[7] eREC involves ongoing access to, and uptake of, services (as needs change) through what is often a range of provider options, whereas eCSC involves a shorter-term, surgical intervention. Thus, the two indicators complement each other in how they reflect overall performance of health systems in providing access to high-quality eye care services.

Importantly, these indicators not only capture the extent of coverage, but also the concept of effective coverage, to ensure that people who need health services receive them with sufficient quality to produce the expected health outcome.[8]

Member States recognise the importance of eCSC and eREC and request global 2030 targets

In November, 2020, the resolution titled *Integrated people-centered eye care, including preventable vision impairment and blindness* was adopted by Member States at the 73rd World Health Assembly.[9] This resolution requested that WHO, in consultation with Member States, prepare recommendations on feasible global targets for 2030 focusing on eCSC and eREC. To this end, WHO undertook a consultative process[10] with Member States, and experts from the field, to develop global targets for eCSC and eREC that were endorsed by the 74th World Health Assembly in May, 2021.

The ability to collect a representative volume of data (both within and across countries) from population-based surveys, periodically and in a standardised

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***Panel 1:* Recommended calculation method for effective cataract surgery coverage**

$$\left(\frac{a+b}{c+d+e}\right)\times 100$$

- *a*=individuals with unilateral operated cataract attaining PVA ≥6/12 in the operated eye, who have BCVA <6/12 with cataract as the main cause of vision impairment or blindness in the other eye
- *b*=individuals with bilateral operated cataract attaining PVA ≥6/12 in at least one eye
- *c*=individuals with unilateral operated cataract (regardless of visual acuity in the operated eye), who have BCVA <6/12 with cataract as the main cause of vision impairment or blindness in the other eye
- *d*=individuals with bilateral operated cataract, regardless of visual acuity
- *e*=individuals with BCVA <6/12 with cataract as the main cause of vision impairment or blindness in both eyes

All visual acuities are measured for distance. PVA=presenting visual acuity; if spectacles or contact lenses are worn to the assessment, visual acuity is measured with the person wearing them. BCVA=best-corrected visual acuity; visual acuity is assessed either by pinhole or refraction.

manner, will be crucial to ensure robust reporting and monitoring of progress towards achieving the global targets for eCSC and eREC. In July, 2020, consultations were held with a WHO Expert Working Group, composed of individuals in the field of eye care in the areas of epidemiology and public health, to work with WHO to review the methods of calculating eCSC and eREC. The key proposals from these consultations were the subject of a broader web-based consultation (Oct 13 to Nov 3, 2020), which was open to Member States, other intergovernmental organisations, and non-State actors in the field of eye care. The outcomes of this series of WHO technical consultations, including the definitions, recommended calculation methods, and key considerations for both eCSC and eREC, are presented in this Health Policy paper.

Effective cataract surgery coverage

Definition and calculation method

eCSC is defined as the proportion of adults aged 50 years and older who are in need of cataract surgery, who have received this surgery, and have a resultant good-quality distance visual acuity outcome. The recommended method of calculation of eCSC is detailed in panel 1.

Considerations

To date, there has been considerable inconsistency in the visual acuity thresholds applied for both the need of surgery and what constitutes a good outcome following surgery.[11,12] In recognition that the aspiration of UHC is universal and that everyone should receive the health services they need, irrespective of their income level or any other factors, we provide recommendations to promote consistent reporting on the visual acuity thresholds applied in the calculation of eCSC.

The recommended threshold for defining a good outcome following cataract surgery is a presenting visual acuity (PVA—ie, unaided vision; or, if spectacles or contact lenses are worn to the assessment, visual acuity is measured with the person wearing them) of 6/12 or better. At an informal consultation held in Geneva in 1998, a good outcome was defined as a PVA of 6/18 or better.[13] The change in the upper visual acuity threshold from 6/18 to 6/12 recommended herein is in recognition of a growing body of evidence that mild vision impairment (ie, <6/12–6/18) has a notable impact on the everyday functioning of individuals.[14,15] Furthermore, given the advances in surgical techniques for cataract, coupled with improvements in intraocular lens design over the past two decades, it is now reasonable to expect higher-quality outcomes following cataract surgery.[16–18] The use of PVA is recommended when reporting on the visual outcome because it reflects an individual's visual acuity in everyday life following surgery, and it also allows for deficiencies in intraocular lens availability (eg, access to toric intraocular lenses) and equipment for intraocular lens power calculation (ie, keratometry and biometry), which can be common in low-resource settings.

For the global reporting framework, the estimated population in need of cataract surgery will be defined as individuals with best-corrected visual acuity (BCVA) of less than 6/12 with cataract as the main cause of vision impairment. This threshold was selected because it is consistent with the International Classification of Diseases (11th revision) definition of vision impairment, indicating that visual acuity of less than 6/12 requires an intervention which, in this case, is cataract surgery. Adopting this better visual acuity threshold, rather than, for example, a threshold of less than 6/18, broadens the range of what we define as a vision-impairing cataract that requires surgery within the population. This might result in a shift in practice to recommend cataract surgery earlier, an outcome that could lead to a reduced frequency of surgical complications, improved visual outcomes, and the earlier recovery of useful vision.[19]

The indication for cataract surgery, however, is contingent upon a range of factors including the patient's felt need for surgery. Accordingly, the visual requirements of different groups of the population might be very different and, therefore, a BCVA of less than 6/12 might not reflect the felt need for cataract surgery for all segments of the population. In addition, thresholds for cataract surgery depend on the health system context and eligibility criteria for surgery in each country—ie, countries with less comprehensive and capable health systems often use lower thresholds for defining the indication for surgery. To give a degree of

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Panel 2: Recommended calculation method for distance vision effective refractive error coverage

$$(\frac{a+b}{a+b+c+d})\times100$$

- *a*=individuals with UCVA <6/12 in the better eye who present with spectacles or contact lenses for distance vision and whose PVA is ≥6/12 in the better eye (met need)
- *b*=individuals with a history of refractive surgery whose UCVA is ≥6/12 in the better eye (met need)
- *c*=Individuals with UCVA <6/12 in the better eye who present with spectacles or contact lenses for distance vision and have PVA <6/12 in the better eye, but who improve to ≥6/12 on pinhole or refraction (undermet need)
- *d*=individuals with UCVA <6/12 in the better eye who do not have distance vision correction and who improve to ≥6/12 on pinhole or refraction (unmet need)

UCVA=uncorrected visual acuity; if spectacles or contact lenses are worn to the assessment, visual acuity is measured with the person not wearing them. PVA=presenting visual acuity; if spectacles or contact lenses are worn to the assessment, visual acuity is measured with the person wearing them.

Panel 3: Recommended calculation method for near vision effective refractive error coverage

$$(\frac{a}{a+b+c})\times100$$

- *a*=individuals with UCVA <N6 at 40 cm in the better eye who present with spectacles for near vision and whose PVA is ≥N6 in the better eye (met need)
- *b*=individuals with distance BCVA ≥6/12* in at least one eye who present with spectacles for near vision and whose PVA is <N6 in the better eye (undermet need)
- *c*=individuals with distance BCVA ≥6/12 in at least one eye who do not have correction for near vision and whose UCVA is <N6 in the better eye (unmet need)

UCVA=uncorrected visual acuity; if spectacles or contact lenses are worn to the assessment, visual acuity is measured with the person not wearing them. PVA=presenting visual acuity; if spectacles or contact lenses are worn to the assessment, visual acuity is measured with the person wearing them. BCVA=best-corrected visual acuity; visual acuity is assessed either by pinhole or refraction. *Only individuals with distance BCVA ≥6/12 will be considered in order to exclude those with reduced near vision not due to other causes.

flexibility to health systems under different stages of development, countries might elect to additionally calculate effective coverage estimates at lower thresholds of BCVA (ie, <6/18 and <6/60 with cataract as the main cause of vision impairment or blindness). This subanalysis will be possible given that existing survey methodologies in the field, and any new guidance developed by WHO, will, at a minimum, enable reporting at the key visual acuity thresholds in line with the WHO definitions of vision impairment (ie, 6/12, 6/18, 6/60, 3/60).

Effective refractive error coverage

Definition and calculation method

eREC is defined as the proportion of people in need of refractive error services who have received services (ie, spectacles, contact lenses, or refractive surgery) and have a resultant good-quality outcome. Given the well established impact of near vision impairment on quality of life and productivity,[20,21] spectacle coverage for both distance vision refractive error and near vision impairment due to presbyopia will be considered in the global monitoring of eREC. Because individuals can have both presbyopia and distance vision impairment due to refractive error, eREC for distance and near vision should be measured and reported separately in all relevant population age groups. The recommended method of calculation of distance vision eREC is outlined in panel 2 and that of near vision eREC in panel 3. Flow charts of the visual acuity measurements required to calculate distance and near vision eREC are depicted in the appendix (pp 1–2).

Considerations

The key distinguishing principle of the proposed method of calculation for eREC, when compared with approaches adopted previously,[22] is the use of uncorrected visual acuity (UCVA) to determine the met need of refractive error correction (where met need means individuals with UCVA <6/12 in the better eye who present with spectacles or contact lenses for distance vision and whose PVA is ≥6/12 in the better eye). Accurate information on the met need of refractive error correction is crucial for services planning. Previous reports rely on the assumption that all people who wear refractive correction for distance vision have vision impairment without their correction (where met need means individuals who present with spectacles or contact lenses for distance vision and whose PVA is ≥6/12 in the better eye). To compare the accuracy of the two methods of calculating distance vision eREC, direct (ie, within-survey) comparisons were conducted within four population-based samples from China (Shunyi), Nepal (Kaski), South Africa (Durban) and the USA (Los Angeles, CA). This analysis revealed that the use of PVA (only) to determine the met need leads to an overestimation of the true eREC value (see appendix pp 3–4), providing support for the adoption of the calculation method described herein.

We recommend that a history of refractive surgery is also considered when calculating distance vision eREC so as not to underestimate the met need component of the calculation method. This is in recognition that refractive surgery is highly prevalent in many countries,[23,24] particularly high-resource settings.[25] Future work is required to develop and validate questions that accurately ascertain a history of refractive surgery among survey participants.

See Online for appendix

Discussion

We have described the rationale for the selection of two proposed global tracer indicators—eCSC and eREC—to monitor the uptake and quality of eye care services at the global level, their recommended calculation methods, and other key considerations when measuring and reporting on these indicators within population-based surveys. Global targets for 2030 for these two indicators were endorsed by WHO Member States at the 74th World Health Assembly in 2021. The essential purpose of these indicators and related targets is to drive eye health coverage while delivering care of acceptable quality.

It is important to emphasise that eCSC and eREC serve as tracer indicators to monitor eye care at a global level, but a much more comprehensive range of input, process, output, outcome, and impact indicators are required, as appropriate, to monitor eye care at the national and subnational levels.[26] To this end, WHO, through consultation with international experts, is in the process of developing a comprehensive menu of indicators that Member States can select from to facilitate monitoring of strategies and actions for eye care provision at the national and subnational levels.

Adopting the recommended high thresholds to define the need for cataract surgery has the potential for unintended consequences in reaching the most vulnerable, particularly in countries with less advanced health systems. That is, in the pursuit of improving eCSC based on a higher visual acuity threshold, countries might favour providing access to those population groups that are more easily accessed and treated or to the most promising and uncomplicated cases (ie, without ocular comorbidity), with a result of the equity gap remaining or widening in traditionally disadvantaged and harder-to-reach populations (eg, people of low socioeconomic status, rural dwellers, women, or older people). Due to the importance of safeguarding against the exclusion of these populations, data will need to be collected, analysed, and reported in a stratified manner when monitoring both eCSC and eREC. To this end, it is recommended that eCSC and eREC estimates should be disaggregated by age, gender, socioeconomic status, geography, and any other relevant sociodemographic stratifiers.

There are some potential limitations of the proposed indicator calculation methods that should be considered. First, because it is not possible to ascertain pre-cataract surgery visual acuity, the eCSC calculation method assumes that all participants who have undergone surgery had a presurgical BCVA of less than 6/12. Although this is a reasonable assumption for lower-resource settings, it might result in an overestimation of coverage in higher-resource settings, where surgery is often done at higher visual acuity thresholds. Second, the use of pinhole visual acuity to establish an individual's BCVA is by no means equivalent to a refraction. Despite this, due to feasibility considerations, most existing rapid assessment survey methodologies use pinhole visual acuity as a proxy for BCVA. Third, when assigning the main cause of vision impairment in the survey context, there might be an intrinsic overestimation of cataract because this process tends to favour those conditions that are addressable and easier to identify. This bias could lead to an overestimation of the need for cataract surgery and an underestimation of the effectiveness of cataract surgery, because a poor cataract surgery outcome can be present due to coexisting disease. Before the widespread application of the proposed indicator calculation methods, additional sensitivity analysis will be done on the aforementioned variables by use of historical data and, additionally, the reliability of these indicators will be piloted and validated in prospective population-based surveys.

Given that the data source for these outcome indicators will be validated population-based surveys, we expect that the estimates generated will be reliable and accurate. However, there are some potential barriers to the robust monitoring of progress towards achieving the indicator targets, including the demand for additional resources to collect data, particularly in low-resource settings. To this end, in the context of one of WHO's core functions—monitoring and assessing health trends—WHO will support the conduct of country-level data collection on the selected eye care indicators in low-resource and intermediate-resource settings. In addition, efforts are underway to further standardise survey instruments and methods of implementation, and to promote more widespread data collection across all relevant target populations in the future. Firstly, at the request of Member States,[27] WHO, together with relevant experts, is developing a feasible and financially viable survey methodology to facilitate the collection of data on the two indicators. Secondly, work is already underway to incorporate a standardised vision module within existing WHO health surveys, including the STEPwise approach to surveillance (STEPS).[28]

If both quality and quantity of data can be ensured, eCSC and eREC can be considered as candidates for effective coverage indicators within WHO's framework for monitoring progress towards UHC, and within WHO's next General Programme of Work. Such an outcome would be of notable benefit to the people in need of eye care, potentially increasing government investments to offer eye care services within the broader context of UHC.

Contributors

SK and AC conceptualised the manuscript. SK and AM wrote the original draft. SB, RB, MJB, SC, MH, VCL, WM, SM, DM, MMR, TDR, SR, JCS, IT, TV, and NW were involved in the related WHO technical consultations and reviewed, commented on, and critically revised the manuscript for important intellectual content. All authors approved the final version of the manuscript to be published. All authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interests

We declare no competing interests.

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References

1 WHO. Strategizing national health in the 21st century: a handbook. Geneva: World Health Organization, 2016.

2 WHO. World report on vision. Geneva: World Health Organization, 2019.

3 Horton S, Gelband H, Jamison D, et al. Ranking 93 health interventions for low- and middle-income countries by cost-effectiveness. *PLoS One* 2017; **12:** e0182951.

4 Tahhan N, Papas E, Fricke TR, Frick KD, Holden BA. Utility and uncorrected refractive error. *Ophthalmology* 2013; **120:** 1736–44.

5 GBD 2019 Blindness and Vision Impairment Collaborators, on behalf of the 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* 2021; **9:** e144–60.

6 Burton MJ, Ramke J, Marques AP, et al. The *Lancet Global Health* Commission on Global Eye Health: vision beyond 2020. *Lancet Glob Health* 2021; **9:** e489–551.

7 WHO. Tracking universal health coverage: the first global monitoring report. Geneva: World Health Organization, 2015.

8 Kruk ME, Gage AD, Arsenault C, et al. High-quality health systems in the Sustainable Development Goals era: time for a revolution. *Lancet Glob Health* 2018; **6:** e1196–252.

9 Seventy-third World Health Assembly. Resolution WHA73.4 (2020) on integrated people-centred eye care, including preventable vision impairment and blindness. https://apps.who.int/gb/ebwha/pdf_files/WHA73/A73_R4-en.pdf (accessed Oct 10, 2020).

10 WHO. Web-based consultation on the development of feasible global targets for 2030 on integrated people-centred eye care. Geneva: World Health Organization, 2020. https://www.who.int/news-room/articles-detail/web-based-consultation-on-the-development-of-feasible-global-targets-for-2030-on-integrated-people-centred-eye-care (accessed Nov 18, 2020).

11 Ramke J, Gilbert CE, Lee AC, Ackland P, Limburg H, Foster A. Effective cataract surgical coverage: an indicator for measuring quality-of-care in the context of Universal Health Coverage. *PLoS One* 2017; **12:** e0172342.

12 Keel S, Xie J, Foreman J, Taylor HR, Dirani M. Population based assessment of visual acuity outcomes following cataract surgery in Australia: the National Eye Health Survey. *Br J Ophthalmol* 2018; **102:** 1419–24.

13 WHO. Informal Consultation on Analysis of Blindness Prevention Outcomes. Geneva: World Health Organization, 1998. https://apps.who.int/iris/handle/10665/67843 (accessed Oct 8, 2020).

14 O'Conor R, Smith SG, Curtis LM, Benavente JY, Vicencio DP, Wolf MS. Mild visual impairment and its impact on self-care among older adults. *J Aging Health* 2018; **30:** 327–41

15 Cumberland PM, Rahi JS. Visual function, social position, and health and life chances: the UK Biobank study. *JAMA Ophthalmol* 2016; **134:** 959–66.

16 Moran D, Gillies M, Brian G, La Nauze J. Low-cost intraocular lenses for cataract patients. *Lancet* 1997; **349:** 885–86.

17 Chen X, Xiao W, Ye S, Chen W, Liu Y. Efficacy and safety of femtosecond laser-assisted cataract surgery versus conventional phacoemulsification for cataract: a metaanalysis of randomized controlled trials. *Sci Rep* 2015; **5:** 13123.

18 de Silva SR, Evans JR, Kirthi V, Ziaei M, Leyland M. Multifocal versus monofocal intraocular lenses after cataract extraction. *Cochrane Database Syst Rev* 2016; **12:** Cd003169.

19 Lundström M, Goh P, Henry Y, et al. The changing pattern of cataract surgery indications: a 5-year study of 2 cataract surgery databases. *Ophthalmology* 2015; **122:** 31–38.

20 Goertz AD, Stewart WC, Burns WR, et al. Review of the impact of presbyopia on quality of life in the developing and developed world. *Acta Ophthalmol* 2014; **92:** 497–500.

21 Frick KD, Joy SM, Wilson DA, Naidoo KS, Holden BA. The global burden of potential productivity loss from uncorrected presbyopia. *Ophthalmology* 2015; **122:** 1706–10.

22 Foreman J, Xie J, Keel S, Taylor HR, Dirani M. Treatment coverage rates for refractive error in the National Eye Health survey. *PLoS One* 2017; **12:** e0175353.

23 Hashemiab H, Yektac A, Nojomid M, Mohazzab-orabib S, Behniae B, Khabazkhoobf M. Excimer laser refractive surgery rate in Iran: 2010–2014. *Journal of Current Ophthalmology* 2018; **30:** 311–14.

24 Kezirian G, Fatnani L, Opoku E, Lyons M, Baker J. Forecast of laser refractive surgery in China 2013–2023. Chicago, IL: Kellogg Northwestern School of Management, 2013. http://www.surgivision.net/surgivisionpublic/apps/downloads/publications/LASIK_in_China/files/assets/common/downloads/publication.pdf (accessed Nov 15, 2020).

25 Corcoran KJ. Macroeconomic landscape of refractive surgery in the United States. *Curr Opin Ophthalmol* 2015; **26:** 249–54.

26 McCormick I, Mactaggart I, Resnikoff S, et al. Eye health indicators for universal health coverage: results of a global expert prioritisation process. *Br J Ophthalmol* 2021; published online March 12. https://doi.org/10.1136/bjophthalmol-2020-318481.

27 WHO Executive Board 148. Integrated people-centred eye care, including preventable vision impairment and blindness: report by the Director General. Geneva: World Health Organization, 2020. https://apps.who.int/gb/ebwha/pdf_files/EB148/B148_15-en.pdf (accessed March 2, 2020).

28 Riley L, Guthold R, Cowan M, et al. The World Health Organization STEPwise approach to noncommunicable disease risk-factor surveillance: methods, challenges, and opportunities. *Am J Public Health* 2016; **106:** 74–78.