

Eye Health Status of children in the Commonwealth

Over 90 million children (0-14 years) and adolescents (15-19 years) have vision impairment or blindness.(1) Vision impairment in children can severely impact educational outcomes,(2–6) contribute to low self-esteem(7) and future socio-economic potential.(8) The Lancet Global Health Commission on Global Eye Health(9) reported that children with vision loss in low- and middle-income countries are up to five times less likely to be in formal education.(10) Malik et al.(11) reported that children who are blind are more likely to die in childhood than a child with good vision, especially in low-income countries.

It is **estimated that 40% of children are blind from eye conditions that could be managed or prevented if** the child had access to eye care services.(12) School-based eye health programmes offer an effective,(13–15) cost-**effective model to deliver eye** care to schoolchildren,(16,17) and are efficient in respect to time and resources.(18) Data on vision impairment in children and adults younger than 40 years are scarce.(12) Read more on [school eye health guidelines](#).

Table 1 presents a summary of the number of countries in each GBD region where child eye health (CEH) population-based, or school-based studies are available. Table 2 lists the available data for children in Commonwealth countries organised by GBD super regions and world bank income level.

Note: The purpose of this summary is to present a spotlight on the eye health status of children in the Commonwealth. This document is not intended to represent an exhaustive summary of all peer-reviewed literature in this area; rather, the list is the result of a targeted literature search exploring CEH in the Commonwealth. Due to the variety of survey methodologies and definitions used in the studies, we recommend the results for each study to be considered in isolation rather than being collated.

Table 1. summarises the distribution of available data on child eye health in the Commonwealth, ordered by GBD super region

	Number of countries with data according to total countries in each GBD super region (Commonwealth countries only)
<i>South-East Asia, East Asia & Oceania</i>	3/12
<i>Sub-Saharan Africa</i>	5/19
<i>South Asia</i>	1/3
<i>Latin America & Caribbean</i>	0/12
<i>North Africa & Middle East</i>	0/0
<i>Central Europe, Eastern Europe & Central Asia</i>	0/0
<i>High Income</i>	6/8

Table 2. Prevalence of vision impairment, common causes of vision impairment, causes that are preventable/treatable and school enrolment organised by GBD super region and world bank income level

Global burden of disease super region	Author, Year (since 2000)	World Bank Income Level	Prevalence of vision impairment* (%)	Age Range	Population-based/School-based	Common causes of VI	Preventable/treatable	School enrolment (%)#
South-East Asia, East Asia & Oceania								
Fiji	Cama et al.(19) (2010)	Upper-middle	Low Vision or Blindness (0.01%) [†]	0–15	Population-based	Retinal, cortical cataract	Cataract	84.52 (secondary, net)(20) 96.76 (primary, net)(21)
Malaysia	Goh et al.(22) (2004)	Upper-middle	Mild VI or worse (10.1%) [¶]	7–15	Population-based	Refractive error, amblyopia	Refractive error, amblyopia	72.21 (secondary, net)(23) 99.67 (primary, net)(24)
	Premsenthil et al.(25) (2013)		Mild VI or worse (5%)*	4–6	School-based (preschool)	Refractive error	Refractive error	
Kiribati								
Nauru								
Papua New Guinea								
Samoa								
Solomon Islands								
Tonga								
Tuvalu								
Vanuatu								
Sri Lanka								
Maldives								
Sub-Saharan Africa								
Mozambique	Sengo et al.(26) (2021)	Low	Mild VI or worse (10.8%) [¶]	15–20	School-based	Refractive error, amblyopia, congenital cataract	Refractive error, amblyopia, congenital cataract	19.28 (secondary, net)(27) 93.92 (primary, net)(28)
Ghana	Ovenseri-Ogbomo et al.(29) (2010)	Lower-middle	Low Vision or Blindness (1.0%) ^{^†}	5–19	School-based	Refractive error (other causes not reported)	Refractive error	57.24 (secondary, net) 86.12 (primary, net)(30)
Kenya	Muma et al.(31) (2020)	Lower-middle	Moderate VI or worse (2.4%) ^{**}	5–16	Population-based	Nystagmus, amblyopia and URE	Nystagmus, amblyopia and URE	47.42 (secondary, net)(32) 79.97 (primary, net)(33)
Nigeria	Ekpenyong et al.(34) (2020)	Lower-middle	Mild VI or worse (7.2%) [¶]	6–17	School-based	Refractive error, suspected glaucoma, amblyopia	Refractive error, suspected glaucoma, amblyopia	43.51 (secondary, gross)(35) 64.14 (primary, net)(36)

Latin America & Caribbean

Trinidad and Tobago								
Saint Vincent and the Grenadines								
St Kitts and Nevis								
Saint Lucia								
Guyana								
Jamaica								
Grenada								
Belize								
Dominica								
Barbados								
The Bahamas								
Antigua and Barbuda								

North Africa & Middle East

N/A								
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Central Europe, Eastern Europe & Central Asia

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High Income Australasia								
Australia	Fu et al.(48) (2020)	High	Not reported	6-15	School-based	Refractive error, strabismus	Refractive error, strabismus	92.23 (secondary, net)(49) 96.38 (primary, net)(50)
New Zealand	Chong et al. (51) (2014)	High	Low vision and blindness (0.9%) [†]	0-16	Population-based	Cerebral visual impairment, optic nerve atrophy, retinal dystrophy	Neonatal trauma, Non-accidental injury	96.86 (secondary, net)(52) 99.12 (primary, net)(53)
High-income Asia Pacific								
Singapore	Mohamed et al.(54) (2010)	High	Not reported	6-72 months	Population-based	Reports RE only (10.6%)	Refractive error	99.79 (secondary, net)(55) 99.67 (primary, net)(56)
Brunei								
High-income North America								
Canada	Yang et al.(57) (2018)	High	Reports on myopia	6-13	School-based	Myopia (17.5%)	Refractive error	99.81 (secondary, net)(58) 99.88 (primary, net)(59)
Southern Latin America								
N/A								
Western Europe								
United Kingdom	O'Donoghue et al.(60) (2009)	High	Reports on refractive error	6-13	School-based	Myopia 2-15%, hyperopia 12-22%, anisometropia 9.1%	Refractive error	97.13 (secondary, net)(61) 99.49 (primary, net)(62)
Cyprus								
Malta								

[^]VI defined by Presenting Visual Acuity (PVA) <6/12 in the better eye

[¶]VI defined by PVA ≤6/12 in the better eye

^{*}VI defined by PVA <6/12 in one or both eyes

[†]VI defined by Best Corrected Visual Acuity (BCVA) <6/18 in the better eye

^{^†}VI defined by PVA <6/18 in the better eye

^{*†}VI defined by PVA ≤6/18 in the better eye

[#]Bolded text indicates the school level that applied to the age range in the study

References

1. Bourne R, Steinmetz JD, Flaxman S, Briant PS, Taylor HR, Resnikoff S, et al. Trends in prevalence of blindness and distance and near vision impairment over 30 years: an analysis for the Global Burden of Disease Study. Unpublished supplementary data. Accessed via the IAPB Vision Atlas; 2021.
2. Glewwe P, West KL, Lee J. The Impact of Providing Vision Screening and Free Eyeglasses on Academic Outcomes: Evidence from a Randomized Trial in Title I Elementary Schools in Florida. *J Policy Anal Manag J Assoc Public Policy Anal Manag*. 2018;37(2):265–300.
3. Glewwe P, Park A, Zhao M. A better vision for development: Eyeglasses and academic performance in rural primary schools in China. *J Dev Econ*. 2016 Sep 1;122:170–82.
4. Hannum E, Zhang Y. Poverty and Proximate Barriers to Learning: Vision Deficiencies, Vision Correction and Educational Outcomes in Rural Northwest China. *World Dev*. 2012 Sep 1;40(9):1921–31.
5. Ma X, Zhou Z, Yi H, Pang X, Shi Y, Chen Q, et al. Effect of providing free glasses on children’s educational outcomes in China: cluster randomized controlled trial. *BMJ*. 2014 Sep 23;349:g5740.
6. Ma Y, Congdon N, Shi Y, Hogg R, Medina A, Boswell M, et al. Effect of a Local Vision Care Center on Eyeglasses Use and School Performance in Rural China: A Cluster Randomized Clinical Trial. *JAMA Ophthalmol*. 2018 Jul 1;136(7):731–7.
7. Rainey L, Elsman EBM, van Nispen RMA, van Leeuwen LM, van Rens GHMB. Comprehending the impact of low vision on the lives of children and adolescents: a qualitative approach. *Qual Life Res Int J Qual Life Asp Treat Care Rehabil*. 2016 Oct;25(10):2633–43.
8. Schneider J, Leeder SR, Gopinath B, Wang JJ, Mitchell P. Frequency, course, and impact of correctable visual impairment (uncorrected refractive error). *Surv Ophthalmol*. 2010 Dec;55(6):539–60.
9. Burton MJ, Ramke J, Marques AP, Bourne RRA, Congdon N, Jones I, et al. The Lancet Global Health Commission on Global Eye Health: vision beyond 2020. *Lancet Glob Health*. 2021 Apr;9(4):e489–551.
10. Kuper H, Dok AM, Wing K, Danquah L, Evans J, Zuurmond M, et al. The Impact of Disability on the Lives of Children; Cross-Sectional Data Including 8,900 Children with Disabilities and 898,834 Children without Disabilities across 30 Countries. *PLOS ONE*. 2014 Sep 9;9(9):e107300.
11. Malik ANJ, Mafwiri M, Gilbert C. Integrating primary eye care into global child health policies. *Arch Dis Child*. 2018 Feb;103(2):176–80.
12. Burton MJ, Ramke J, Marques AP, Bourne RRA, Congdon N, Jones I, et al. The Lancet Global Health Commission on Global Eye Health: vision beyond 2020 [Supplementary appendix 1]. *Lancet Glob Health*. 2021 Apr;9(4):e489–551.
13. Evans JR, Morjaria P, Powell C. Vision screening for correctable visual acuity deficits in school-age children and adolescents. *Cochrane Database Syst Rev*. 2018 Feb 15;2:CD005023.
14. Rono HK, Bastawrous A, Macleod D, Wanjala E, Tanna GLD, Weiss HA, et al. Smartphone-based screening for visual impairment in Kenyan school children: a cluster randomised controlled trial. *Lancet Glob Health*. 2018 Aug 1;6(8):e924–32.
15. Sheeladevi S, Seelam B, Nukella PB, Modi A, Ali R, Keay L. Prevalence of refractive errors in children in India: a systematic review. *Clin Exp Optom*. 2018 Jul 1;101(4):495–503.
16. Frick KD, Riva-Clement L, Shankar MB. Screening for refractive error and fitting with spectacles in rural and urban India: cost-effectiveness. *Ophthalmic Epidemiol*. 2009 Dec;16(6):378–87.
17. Wodon Q. LOOKING AHEAD: VISUAL IMPAIRMENT AND SCHOOL EYE HEALTH PROGRAMS. p. 40.
18. Minto H, Ho M. What is comprehensive school eye health? *Community Eye Health J*. 2017 Sep 1;30:21–5.
19. Cama AT, Sikivou BT, Keeffe JE. Childhood Visual Impairment in Fiji. *Arch Ophthalmol*. 2010 May 1;128(5):608–12.
20. School enrollment, secondary (% net) - Fiji | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=FJ&view=chart>
21. School enrollment, primary (% net) - Fiji | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=FJ>
22. Goh P-P, Abqariyah Y, Pokharel GP, Ellwein LB. Refractive Error and Visual Impairment in School-Age Children in Gombak District, Malaysia. *Ophthalmology*. 2005 Apr 1;112(4):678–85.
23. School enrollment, secondary (% net) - Malaysia | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=MY&view=chart>
24. School enrollment, primary (% net) - Malaysia | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=MY>
25. Premseenthil M, Manju R, Thanaraj A, Syed Abdul Rahman SA, Aik Kah T. The screening of visual impairment among preschool children in an urban population in Malaysia; the Kuching pediatric eye study: a cross sectional study. *BMC Ophthalmol*. 2013 Apr 19;13(1):16.
26. Sengo DB, Dos Santos IIDB, Faquihe MF, Tomo HBJF, Muaprato AM, Puchar S, et al. The Prevalence of Visual Impairment and Refractive Errors among a Youth Population in Mozambique: Evidence of the Need for Intervention. *Children*. 2021 Oct;8(10):892.
27. School enrollment, secondary (% net) - Mozambique | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=MZ&view=chart>
28. School enrollment, primary (% net) - Mozambique | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=MZ>
29. Ovenseri-Ogbomo GO, Omuemu VO. Prevalence of refractive error among school children in the Cape Coast Municipality, Ghana. *Clin Optom*. 2010 Jul 7;2:59–66.

30. School enrollment, primary (% net) - Ghana | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=GH>
31. Muma S, Obonyo S. The prevalence and causes of visual impairment among children in Kenya - the Kenya eye study. *BMC Ophthalmol*. 2020 Oct 7;20(1):399.
32. School enrollment, secondary (% net) - Kenya | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=KE&view=chart>
33. School enrollment, primary (% net) - Kenya | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=KE>
34. Ekpenyong BN, Naidoo K, Ndep A, Akpan M, Ekanem E. Prevalence and determinants of visual impairment amongst school-aged children in Southern Nigeria. *Afr Vis Eye Health*. 2020 Apr 23;79(1):6.
35. School enrollment, secondary (% gross) - Nigeria | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.ENRR?locations=NG>
36. School enrollment, primary (% net) - Nigeria | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=NG>
37. Naidoo KS, Raghunandan A, Mashige KP, Govender P, Holden BA, Pokharel GP, et al. Refractive error and visual impairment in African children in South Africa. *Invest Ophthalmol Vis Sci*. 2003 Sep;44(9):3764–70.
38. School enrollment, secondary (% net) - South Africa | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=ZA&view=chart>
39. School enrollment, primary (% net) - South Africa | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=ZA>
40. Magakwe TSS, Xulu-Kasaba ZNQ, Hansraj R. Visual impairment and refractive error amongst school-going children aged 6–18 years in Sekhukhune District (Limpopo, South Africa). *Afr Vis Eye Health*. 2020 Oct 5;79(1):8.
41. Awan AR, Jamshed J, Khan MM, Latif Z. Prevalence and causes of visual impairment and blindness among school children in Muzaffarabad, Pakistan. *Int J Sci Rep*. 2018 Mar 27;4(4):93–8.
42. School enrollment, secondary (% net) - Pakistan | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=PK&view=chart>
43. School enrollment, primary (% net) - Pakistan | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=PK>
44. Dandona R, Dandona L, Srinivas M, Sahare P, Narsaiah S, Muñoz SR, et al. Refractive Error in Children in a Rural Population in India. *Invest Ophthalmol Vis Sci*. 2002 Mar 1;43(3):615–22.
45. School enrollment, secondary (% net) - India | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=IN&view=chart>
46. School enrollment, primary (% net) - India | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=IN>
47. Murthy GVS, Gupta SK, Ellwein LB, Muñoz SR, Pokharel GP, Sanga L, et al. Refractive error in children in an urban population in New Delhi. *Invest Ophthalmol Vis Sci*. 2002 Mar;43(3):623–31.
48. Fu A, Watt K, Junghans BM, Delaveris A, Stapleton F. Prevalence of myopia among disadvantaged Australian schoolchildren: A 5-year cross-sectional study. *PLOS ONE*. 2020 Aug 27;15(8):e0238122.
49. School enrollment, secondary (% net) - Australia | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=AU&view=chart>
50. School enrollment, primary (% net) - Australia | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=AU>
51. Chong CF, McGhee CNJ, Dai S. A Cross-sectional Study of Prevalence and Etiology of Childhood Visual Impairment in Auckland, New Zealand. *Asia-Pac J Ophthalmol*. 2014 Dec;3(6):337–42.
52. School enrollment, secondary (% net) - New Zealand | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=NZ&view=chart>
53. School enrollment, primary (% net) - New Zealand | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=NZ>
54. Dirani M, Chan Y-H, Gazzard G, Hornbeak DM, Leo S-W, Selvaraj P, et al. Prevalence of refractive error in Singaporean Chinese children: the strabismus, amblyopia, and refractive error in young Singaporean Children (STARS) study. *Invest Ophthalmol Vis Sci*. 2010 Mar;51(3):1348–55.
55. School enrollment, secondary (% net) - Singapore | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=SG&view=chart>
56. School enrollment, primary (% net) - Singapore | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=SG>
57. Yang M, Luensmann D, Fonn D, Woods J, Jones D, Gordon K, et al. Myopia prevalence in Canadian school children: a pilot study. *Eye*. 2018 Jun;32(6):1042–7.
58. School enrollment, secondary (% net) - Canada | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=CA&view=chart>
59. School enrollment, primary (% net) - Canada | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=CA>
60. O'Donoghue L, Saunders KJ, McClelland JF, Logan NS, Rudnicka AR, Owen CG. Prevalence of Childhood Refractive Error in the United Kingdom. *Invest Ophthalmol Vis Sci*. 2009 Apr 28;50(13):2562.
61. School enrollment, secondary (% net) - United Kingdom | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=GB&view=chart>
62. School enrollment, primary (% net) - United Kingdom | Data [Internet]. [cited 2022 Apr 5]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR?locations=GB>