Better Education in Sight

An estimate of global learning and economic productivity losses from uncorrected refractive error in schools

IAPB Vision Atlas

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Millions of children worldwide struggle to learn due to poor vision that could be corrected with a pair of glasses, making this both a healthcare and economic crisis. Uncorrected refractive errors, if left uncorrected, hinder learning and limit future opportunities. Although it seems clear that poor vision leads to learning loss, this is the first comprehensive analysis of the learning loss and long-term economic impacts of poor vision in schoolchildren.

The annual learning loss:

6.3 million school years

Children with poor vision problems face significant educational setbacks.

Schoolchildren with poor vision **learn approximately half as much in school** as those with good or corrected vision.

Globally, these vision problems result in the equivalent **loss of 6.3 million years of schooling every year**,

highlighting countless missed opportunities for learning and development, with lasting consequences for the affected children.

The economic impact:

$173 billion lost every year

The impact of uncorrected vision problems goes beyond the classroom. It affects future academic success and limits career opportunities. If not addressed, these vision issues will cost the global economy $173 billion every year (PPP, international dollars). This demonstrates the significant loss of potential and underscores the urgent need for investment in vision correction programs for school-aged children.

If a five-year-old is **provided with glasses in primary school** and continues to wear them until they are 18,

they will earn, on average, 78% more over their lifetime than if they never had their vision corrected.

The disparity:

High-income vs. low- and middle-income countries

Uncorrected vision problems affect children in low- and middle-income countries (LMICs) the most.

Although high-income countries face **50% of the global economic loss**,

LMICs experience **83% of the total lost school years**.

This shows the inequality in access to eye care, where children in LMICs face more barriers to getting treatment and suffer bigger long-term educational and economic setbacks.

The solution:

A clear vision for the future

Solving the problem of uncorrected vision in schoolchildren needs focused actions, such as comprehensive eye health programs and good-quality glasses. These solutions are both effective and cost-efficient.

Implementing vision screening and providing glasses in schools **can yield returns as high as $65 for every $1 invested** in some contexts.

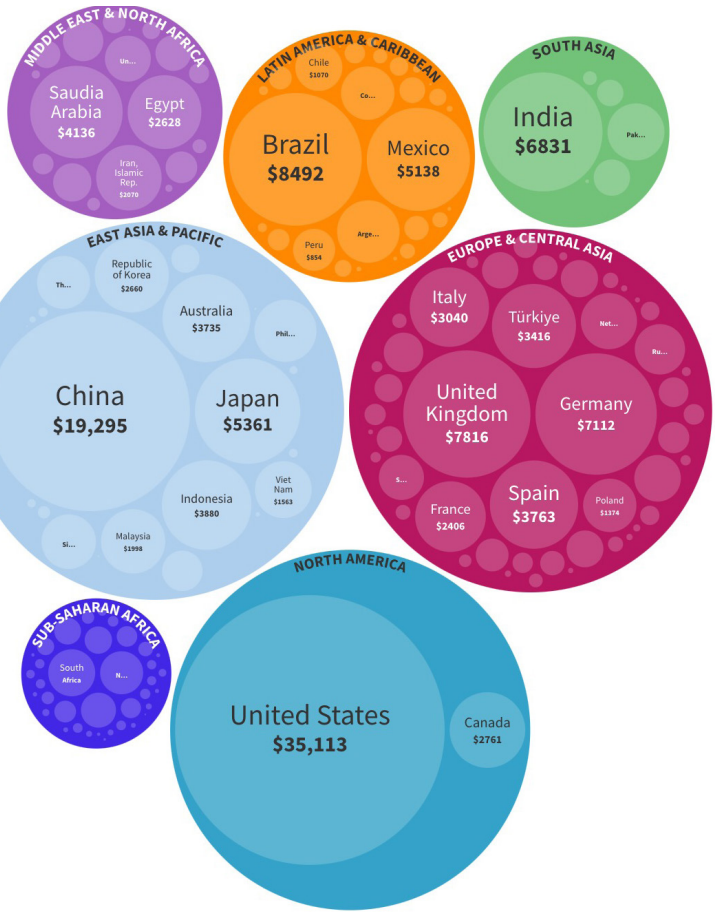
These interventions are comparable to the most successful global development initiatives, offering an unparalleled opportunity to improve educational outcomes and future economic productivity.

Schooling loss from one year of uncorrected refractive error. One year of sub-optimal learning due to uncorrected refractive error costs 6.3 million years of schooling loss each year.

95% CI: 2.7 to 9.7 million years.

The Vision Atlas is a free knowledge resource for eye health thanks to the support from CBM, He Eye Specialist Hospital, Johnson & Johnson, Mission for Vision, Roche, Seva Foundation, Sightsavers, and The Fred Hollows Foundation.

Economic loss from one year of uncorrected refractive error. One year of sub-optimal learning due to uncorrected refractive error costs $173 billion in future economic productivity loss every year.



PPP (purchasing power parity) in 2022 international dollars.
95% confidence interval: $83 billion to $246 billion (PPP) in present value terms.

Key takeaways:

The need for action

- **Profound learning impact:** Children with uncorrected vision problems learn approximately half as much as their peers – every year, this accumulates to 6.3 million years of schooling being lost globally.
- **Staggering economic losses:** Uncorrected refractive errors in schoolchildren result in an annual global economic loss of $173 billion, with low- and middle-income countries (LMICs) bearing 83% of the educational burden.
- **High cost-effectiveness of interventions:** Vision screening and the provision of glasses in schools offer exceptional returns, up to $65 for every $1 invested, making them one of the most effective educational interventions.
- **Substantial increase in lifetime earnings:** Correcting vision in children can increase their lifetime earnings by up to 78%, breaking the cycle of poverty and contributing to greater economic productivity.
- **Global inequity highlighted:** The burden of uncorrected vision is disproportionately felt in LMICs, where children are less likely to receive the necessary corrective treatment, exacerbating global inequalities.
- **Call to action:** By prioritizing eye health in schoolchildren, especially in low- and middle-income countries, we can ensure that millions of children have a better chance to achieve their full potential.

How did we do this?

We started with a previously published meta-analysis, that looked at whether providing glasses to children with uncorrected refractive errors improves learning outcomes. We only included studies with rigorous designs to ensure high-quality evidence.

How did we estimate the years of schooling lost?

We calculated the average improvement in test scores for children after they were given glasses to correct their vision problems. We then calculated the equivalent years of schooling lost due to uncorrected refractive errors by combining the individual learning loss with data on typical learning gains for children with good vision, the prevalence of refractive errors, school enrolment rates, and age distributions across 168 countries. This represents the global learning loss in terms of the number of school years missed each year.

How did we estimate the future income loss?

We estimated the future income losses due to reduced educational attainment from uncorrected refractive errors. This was calculated from country-specific data on GDP per capita, labour force participation, projected economic growth rates, and the percentage decrease in expected income, based on how much learning is lost due to uncorrected refractive error. For example, if a vision problem causes a child to lose half a year of schooling, and each year of schooling normally increases future income by 10%, the income loss would be 5%. The longer the child stays in school with uncorrected vision, the greater the total loss in income.

What assumptions did we make?

In global models like this, it's impossible to have precise data for every point, so some assumptions are necessary. We made some assumptions about the age people enter and leave the labor force, discount rates for future income and the transferability of estimates from the individual studies to other contexts. Modelled data were used for future GDP per capita and prevalence rates of refractive error by age. Full details of the methodology, findings, assumptions and limitations can be found here.

For full details see:

Parami Dhakhwa, Bryce Everett, Brad Wong. Better education in sight. An estimate of global learning and economic productivity losses from uncorrected refractive error in schools. (2024) DOI:https://doi.org/10.17605/OSF.IO/ZTGPQ

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