



an initiative of Dow Corning Corporation
and the Centre for Vision in the Developing World



Frequently Asked Questions

What is the goal of the collaboration between Dow Corning and the Centre for Vision in the Developing World?

Dow Corning, a global leader in silicon-based technology, and the Centre for Vision in the Developing World (CVDW) are collaborating to create an innovative new way to help correct the vision of children in the developing world. Dow Corning has committed US \$3 million of funding and materials expertise to the CVDW as part of this collaboration to launch an initiative called Child ViSion™.

What is the Child ViSion™ initiative?

The Child ViSion™ initiative will design, manufacture and distribute a child-specific version of self-adjustable eyeglasses to children in the developing world. The aim is to increase the effectiveness of classroom-based education by improving children's ability to see the blackboard from which they are being taught.

How significant is poor vision in children in the developing world?

The Centre for Vision in the Developing World estimates that more than 100 million children (age 12-18) in the developing world need vision correction, but that 60 million of them lack access to appropriate eyeglasses or to eye care professionals.

This means that they can have great difficulty learning at school, which has an untold impact on their education, their social participation, their overall quality of life, and ultimately their economic potential as individuals, and that of their communities.

Much of this can be corrected with a simple pair of corrective eyeglasses.

Why do young people who need eyeglasses not have them?

The reasons why young people do not have access to the eyeglasses that they need to correct their vision are complex. The CVDW believes that there are five underlying reasons for this – awareness, access, affordability, attractiveness, and accuracy.

Awareness - Many living in poor villages are unaware either that they suffer from poor vision, or that poor vision can be corrected

Access - Eyeglasses are primarily available in urban optical shops; they are only rarely available in rural areas

Affordability - The total cost of obtaining corrective eyeglasses is too high – including time lost to work in travelling to multiple screening and fitting appointments

Attractiveness - May be due to a number of factors. Aesthetics and ‘standing out’ is very important, particularly among adolescents. Cultural attitudes toward glasses, a belief that eyeglasses can be harmful, and comfort are other important contributors

Accuracy - A significant proportion of people wearing eyeglasses in developing countries have inadequate correction that leaves them with poor visual acuity. This may be due either to poor testing by an optician, or a complete lack of professional testing

What is the impact of poor vision?

The impact of poor vision on the educational, quality of life and economic potential of young people is substantial, but has not been well investigated. A recent working paper by Glewwe, Park and Zhao (<http://purl.umn.edu/120032>) based on school children in rural China estimates that wearing eyeglasses for a year increased average test scores by an amount equivalent to 0.33-0.5 extra years of schooling. This implies that poor vision presents a major problem to learning for these children, which can be readily corrected.

There have been various studies of the economic impact of poor vision (in adults, not in children). A study by AMD Alliance International reported a total global cost of blindness and poor vision of nearly \$3trn in 2010 (including all indirect costs), while a study by VisionSpring

and the William Davidson Institute in India estimates that providing reading glasses can improve worker productivity by 35 percent, and deliver \$381 in increased earnings over two years.

The CVDW plans to do additional research into the impact of poor vision and vision correction specifically on young adults.

How will the Child ViSion™ initiative help improve vision correction for children in the developing world? What are the goals of the initiative?

Child ViSion™ has developed a prototype of a child-specific version of self-adjustable eyeglasses designed specifically for use by young adults aged from 12-18 years. These eyeglasses are smaller, lighter and more attractive than previous designs, and have been designed to withstand hard use in challenging environments and minimize the cost of production. The short-term goal of the initiative is to manufacture and distribute 50,000 pairs to children in the developing world in 2013; the long-term goal is to provide vision correction to all young people who would benefit from it.

How do self-adjustable eyeglasses work? How can a wearer adjust them without help from an eye care professional?

The original self-adjustable eyeglasses, known as Adspecs, contain special lenses – two clear membranes filled with silicone fluid – that can be adjusted when more or less fluid is pumped between them. They are held between two protective plastic covers. The volume of fluid can be changed by using a removable syringe and dial that attach to the eyeglasses' frame. Depending on that volume of fluid, the curvature of the lenses changes, adjusting the strength. The new eyeglasses operate on a similar principle, with a single clear membrane in each lens allowing them to be lighter and smaller.

Fluid-filled lenses can correct a wide range of vision problems, including myopia (nearsightedness), hyperopia (farsightedness) and presbyopia (age-related difficulty in focusing up close).

Research shows that children as young as 12 can effectively adjust self-adjustable eyeglasses on their own, with assistance from teachers who have been instructed in supervising self-correction.

What are the benefits of self-adjustable eyeglasses?

Self-adjustable eyeglasses can address several of the difficulties in providing vision correction to young people, helping to increase the level of access to vision correction. Most importantly, the ability for young people to adjust self-adjustable eyeglasses on their own, with assistance from adults who have been instructed in supervising self-correction, means that accurate eyeglasses can be distributed without the requirement for expensive equipment and lengthy training of optometric or ophthalmic professionals.

What conditions do these glasses correct?

The glasses developed by the Child ViSion™ initiative correct for myopia (nearsightedness).

Can these glasses help children with astigmatism?

To some extent - it depends on the severity of the astigmatism and whether there is other refractive error. The recent work of the child self-refraction study showed that the majority of children with low-to-moderate astigmatism in conjunction with myopia (nearsightedness) could still achieve a good standard of vision. Over 90 percent of children with refractive error can be corrected by self-adjustable eyeglasses.

How do you know self-adjustable eyeglasses work?

Several published studies have demonstrated that the process of self-refraction with the Adspecs can produce very good visual outcomes in both adults and teenagers. See in particular:

Zhang, M., Zhang, R., He, M., Liang, W., Li, X., She, L., . . . Congdon, N., “Self correction of refractive error among young people in rural china: Results of cross sectional investigation”, BMJ (Clinical Research Ed.), 343 (2011)

He M, Congdon N, Mackenzie G, Zeng Y, Silver JD, Ellwein L, “The Child Self-Refracton Study: Results from urban Chinese children in Guangzhou”, Ophthalmology 118 (6) , pp. 1162-1169 (2011)

M. G. Douali and J. D. Silver, “Self-optimised vision correction with adaptive spectacle lenses in developing countries”, Ophthalmic and Physiological Optics, Vol 24 (2004)

To date, 40,000 pairs of the original Adspecs have been produced and distributed worldwide by a number of different distribution organizations.

Can a young person adjust the glasses effectively?

Yes, recently published research results have shown young people can adjust them effectively.

The Centre for Vision in the Developing World was involved in a World Bank-funded research study involving 1768 Chinese and American students, aged 12 to 17 years. Researchers assessed students’ ability to self-correct their vision with the assistance of their teachers, who were instructed previously how to adjust the eyeglasses. The results were then compared to students who were given a professional eye exam.

The most recent results from this work indicated that more than 96% of students were able to use the self-adjustable eyeglasses to correct nearsightedness, compared with 99% of those who received professional eye exams. [See: Zhang, M., Zhang, R., He, M., Liang, W., Li, X., She, L., . . . Congdon, N., “Self correction of refractive error among young people in rural china: Results of cross sectional investigation”, BMJ (Clinical Research Ed.), 343 (2011)].

Research into the use of self-refraction eyeglasses will continue.

What are the ages of young people who can wear self-adjusted glasses?

Published research has found that young people aged 12 to 17 years can use the existing self-adjustable eyeglasses effectively with the assistance of teachers who are instructed in their use.

How will the eyeglasses be distributed?

We plan to distribute the eyeglasses through schools in developing countries, with teachers assisting their students to adjust them correctly. We will work with trained eyecare professionals to ensure that the process for fitting eyeglasses and training teachers is fully validated.

Where will they be distributed?

The focus of the first stages of distribution will be in Asia, where the prevalence of refractive error is highest. Long-term, we hope to establish distribution programs throughout the developing world.

How will the geographies for the program be selected?

The locations will be selected by the project team based on a combination of need and feasibility. All of the countries will be in the developing world, where the need is the greatest.

How much do the eyeglasses cost?

The CVDW expects that the glasses will cost approximately US\$15 once we have production up and running. This will reduce as we reach scale – our goal is to get the cost per pair down towards US\$5 or lower.

When will the first eyeglasses be distributed?

The CVDW is currently developing its production capability, and aim to distribute the first eyeglasses toward the end of 2012.

Can individuals purchase a pair of Child ViSion™ glasses?

At present, adjustable glasses are not available for sale to individuals.

What are the next steps?

The immediate next steps are to develop our production capability to produce the new design of eyeglasses, and to manufacture and distribute 50,000 pairs of the eyeglasses to children in the developing world through schools. The CVDW is actively seeking partnerships with NGOs and education providers who are interested in distributing the eyeglasses.

Beyond this, the CVDW will continue to improve the design of the eyeglasses, drive down the production cost, and explore the potential of other distribution approaches as it pursues its goal of correcting the vision of everyone who needs it.

What technologies or expertise does Dow Corning have in this field?

Dow Corning has more than 50 years of experience innovating and supplying products and solutions for healthcare applications.

Dow Corning's optical silicone fluid has been used effectively in self-adjustable eyeglasses for more than a decade.

How did Prof. Josh Silver and the Centre for Vision in the Developing World connect with Dow Corning?

As he was developing the original self-adjustable, fluid-filled eyeglasses, Prof. Silver found that Dow Corning's silicone fluid worked most effectively at correcting vision due to its excellent optical performance and high refractive index. This allows for thinner variable-power lenses that can correct a higher power range to help a greater number of those in need of vision correction. Following these discoveries, Prof. Silver and the Centre for Vision in the Developing World and Dow Corning decided to collaborate in order to pursue these efforts in a broader way.

Why did Dow Corning choose this cause?

This is an area where there is a strong match between society's needs and Dow Corning's products and expertise. It's an example of how Dow Corning's silicone materials can improve the quality of life for people around the world.

This also supports Dow Corning's long-time commitment to education. Without good sight or access to eye care professionals, it is difficult for young people to learn to read or benefit from educational opportunities.