



The 2nd Oxford Conference on Vision for Children in the Developing World

University of Oxford, April 2011



The 2nd Oxford Conference on Vision for Children in the Developing World was held in April 2011 at the University of Oxford.

This Conference built on the 1st Oxford Conference on Vision for Children in the Developing World held in 2007, a forum that brought together leading international child vision experts, development specialists and government representatives from low-income countries. The key question under discussion during the 1st Oxford Conference was:

‘How can vision correction be delivered to children in developing countries in an affordable, cost-effective, systematised and sustainable way?’

The experts concluded that the implementation of currently available spectacle technologies as well as the provision of supporting personnel needed to be scaled up to address uncorrected vision in children and that innovative new solutions, such as ‘self-refraction’ with adjustable spectacles, had the potential to dramatically increase the coverage of programmes in resource-poor settings. The 1st Oxford Conference concluded that while previous studies had shown that adults can effectively use self-refracting spectacles, further research was required to assess the efficacy and safety of the use of such spectacles among children. This question was taken forward by a core group of conference participants who established a global research team to oversee a ‘Child Self-Refraction Study’ (CSRS) which ran from 2008 to 2010 through support provided by the Partnership for Child Development (PCD).

The 2nd Oxford Conference enabled expert discussion on the implications of the CSRS by development specialists, academics, child vision experts, non-governmental organisations and representatives of the private sector. The results of the CSRS were presented at the Conference which facilitated discussion on their implications. The Conference then went on to explore the potential for the wider application of self-refraction using adjustable spectacles and the training of adequately trained personnel to support the delivery of effective eye care services to children in the developing world and agreed next steps for further development.

Adjustable Lens Technology

Adjustable spectacles come in a variety of designs which allow the power of each lens to be varied independently to meet the requirements of the user. The *Focusspec* (see below), manufactured by Focus on Vision (Eindhoven, The Netherlands) is one design that has been implemented in the field. These spectacles use sliding plastic lenses to adjust lens power and refraction.



The Focusspec, © Focus on Vision

The adjustable spectacles that were selected for the CSRS were fluid-filled lenses called Adspecs (see below) which were manufactured by Adaptive Eyecare (Oxford, UK). With Adspecs, the power of each lens is fixed once the correct prescription is reached and the user is left with a uniquely modified pair of spectacles for their personal use.



Adspecs, © Centre for Vision in the Developing World

Current Situation

It has been suggested that up to 3 billion people may require some form of vision correction to see clearly. In developing countries, it is estimated that there are around 2 billion people who could benefit from vision correction and yet the majority of these do not have access to affordable eye examination or a pair of glasses. Within this group school-age children are a highly vulnerable subset where poor vision can lead to reduced participation in education leading to increased absenteeism, increased dropout rates, reduced ability to learn and poorer career prospects.

Global education initiatives such as ‘*Education for All*’ (EFA), ‘*Focusing Resources on Effective School Health*’ (FRESH) and the education-related ‘*Millennium Development Goals*’ (MDGs) have produced record numbers of school enrolments in recent years around the world. Correcting the vision of children who currently lack access to eye care or spectacles could make an important contribution to the impact of these initiatives.

Existing services do not meet even the most basic eye care needs in most developing countries.

Challenges Identified

The experts gathered at the Conference agreed that existing services do not meet even the most basic eye care needs in most developing countries.



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Key challenges facing the provision of effective vision correction services for children in developing countries were identified during the Conference:

Awareness: People are often not aware that their sight is poor and that this can be improved through vision correction.

Acceptability: The willingness of people, especially children, to obtain and wear spectacles in order to improve their sight needs to be understood and their motivation to wear them encouraged.

Availability: There are considerable restrictions in the availability of appropriately trained eye care personnel through both inadequate numbers and poor distribution in the areas in need.

Affordability: Good quality products at affordable cost are not reaching the poor in a sustainable way.

The overwhelming majority of children with poor vision in the studies could obtain excellent vision and good accuracy with self-refraction.

CSRS Summary

Study settings and methods:

Three studies of self-refraction with adjustable spectacles among teenagers occurred in Boston (USA) and in urban and rural China in 2009 and 2010. All children had vision measured in three ways: (1) after self-refraction, (2) after automated refraction and (3) after refraction by an ophthalmologist (the “gold standard”).

Vision results:

Using self-refraction, excellent vision (at least 6/7.5) was achieved among 92.4%, 96.9% and 95.6% of children in urban and rural China and Boston respectively, compared to 99% with refraction by an eye care professional in all three centres. Using their current spectacles, only about one third of children were found to achieve such excellent results.



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Refractive accuracy:

In the two Chinese centres (urban and rural), the average value for self-refraction was closer to the “gold standard” than automated refraction using much more expensive machines. In both Chinese centres, inaccurate refractions occurred in less than 10% of children using self-refraction. In urban China, inaccurate refractions were more common with self-refraction than with automated refraction, but in rural China, self-refraction was more accurate than automated refraction.



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Significance:

The overwhelming majority of children with poor vision in these settings could obtain excellent vision and good accuracy with self-refraction. Self-refraction might allow programmes to reduce dependency on scarce, highly-trained personnel and expensive machines that limit ability to reach children in need at scale.



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Limitations and Future Work:

The cosmetic acceptability to children of adjustable spectacles needs further research. It is also not currently known how far the production cost of adjustable glasses can be reduced by large-scale production and technological innovations.

The results of the CSRS have now been published by *Ophthalmology* (June 2011) and has also been accepted for publication by the *British Medical Journal* (June 2011).

Way Forward

Success in addressing poor vision will depend on both scaling up the training of appropriately-skilled, adequately-supported personnel capable of delivering effective eye care services and affordable technology including spectacles. The Conference unanimously agreed that adjustable spectacles can potentially provide a way to address some of the challenges to the provision of vision care in developing countries. This includes applications such as vision screening, promoting awareness and services as well as potentially providing the necessary prescription of spectacles.

A set of key operational issues requiring further investigation were identified through working groups during the Conference:

- **Cost-effectiveness of deploying different strategies, including adjustable spectacles, to correct poor vision.**
- **Identification of strategies that will make adjustable spectacles acceptable to children for constant use when necessary.**
- **Day-to-day performance of adjustable spectacles when in constant use.**
- **Approaches to improve the accuracy of children's self-refraction using adjustable spectacles.**
- **Impact of poor vision on children's school enrolment and attendance.**

PCD and the Research Working Group of the International Agency for the Prevention of Blindness (IAPB) were charged by those present at the meeting to work together to enable the identified research to be taken forward. The Conference called on all stakeholders, including the private sector, academia and the public sector to work in partnership so that improved vision correction can be accessed by the millions of children worldwide that need it.

For a more in-depth review of the CSRS including comparisons between the results of three measurement approaches and further discussion please see the Technical Summary and published papers in the 'School Health' section of www.schoolsandhealth.org.

Images on front page courtesy of Centre for Vision in Developing World, CSRS and Focus on Vision.

Further Information

For further information on child vision in low-income countries please visit www.schoolsandhealth.org and see the 'School Health' section, or alternatively email pcd@imperial.ac.uk.