



School Health Integrated Programming

Guidelines for School-based Eye Health Programs

Information for policy-makers and planners on conducting vision screening as a component of school-based eye health, as part of an integrated school health program



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Purpose of the Guidelines

Child eye health is a significant public health issue, particularly in low income countries, and requires well-integrated, innovative strategies to address the growing need. The consequences of inaction range far beyond vision, affecting education, social participation and future economic productivity. The UN Convention on the Rights of the Child is the most ratified human rights convention in history, providing a mandate for communities, civil society and governments to come together to address child eye health¹. Promoting and improving the eye health of children will contribute to Goal 4 of the Sustainable Development Goals, to “ensure inclusive and equitable quality education for all and promote lifelong learning.”

The purpose of these guidelines is to provide direction to those planning and implementing vision screening programs, as a part of eye health initiatives within the education sector. These guidelines are intended for policy makers, educational and health care authorities, health planners, eye care delivery organizations and professionals, in partnership with teachers, parents and children. In situations where resources for eye health are limited, decisions need to be made to ensure that programs not only address public health problems but are also implemented in a way that is effective, efficient and, wherever possible, sustainable. Systems for monitoring, and plans for evaluation should be developed at the outset. These guidelines take an integrated approach to school eye health, in which the Ministries of Education and Health work together to ensure effective and efficient delivery of these initiatives.

These guidelines have been developed jointly by Sightsavers, the Partnership for Child Development (Imperial College London), Brien Holden Vision Institute, the International Centre for Eye Health (London School of Hygiene and Tropical Medicine), the World Bank and the Global Partnership for Education, drawing on the increasing body of evidence of the eye health needs of children and adults of working age, as well as examples of best practice. Where they exist, in-country formal and legal guidelines or protocols for school health or eye health should be considered and integrated. Finally, child eye health programs need to have appropriate child safeguarding mechanisms to ensure the safety of children who come in contact with the programs.

The goal of these guidelines is provide technical guidance on how to develop a more comprehensive and integrated approach to school eye health. It is intended that this will result in improving the effectiveness, efficiency, and quality of school eye health programs to facilitate scalability and sustainability to improve health and education outcomes in children.



Child eye health is a significant public health issue, particularly in low income countries, and requires well-integrated, innovative strategies to address the growing need.

1. UNICEF. 2014. Convention on the Rights of the Child: A World of Difference: 25 CRC achievements. Available at: https://www.unicef.org/crc/index_73549.html

Key Abbreviations

D	Diopters
DR	Diabetic retinopathy
GPE	Global Partnership for Education
NGO	Non-government organization
RE	Refractive error
ST-DR	Sight-threatening diabetic retinopathy
URE	Uncorrected refractive error
VA	Visual acuity
VADD	Vitamin A deficiency disorders
WHO	World Health Organization

Background & Introduction

Scope of eye health disorders in children

Uncorrected refractive error is the most common cause of poor vision in children. These treatable conditions can impact a child's life through difficulties with activities of daily living, mobility, reading and fine work. This can impact on education, personal development and economic productivity. It is estimated that at least one third of the world's 72 million children who are not in school have a disability which includes those with a vision impairment². One of the main drivers of school eye health programs is the detection and treatment of uncorrected refractive errors.

Refractive errors (RE) result in an unfocussed image falling on the retina which causes blurred and/or distorted vision. These conditions can be corrected by spectacles or contact lenses in the majority of cases. There are several different types of refractive error, which cause different symptoms, and occur in all populations to varying degrees.

Many of the other causes of poor vision in children, such as vitamin A deficiency disorders, preterm birth, measles infection, congenital rubella syndrome are also causes of child mortality. In developing countries, a large proportion of children die within a few years of becoming blind, from systemic complications of the condition causing blindness, or because of poor support from families³. Many of these conditions are avoidable through cost effective interventions and much can be done through primary health care and school health programs through health education which promotes healthy behaviours and including early detection and referral of children with eye problems in school eye health initiatives.

Trachoma is ocular infection caused by *Chlamydia trachomatis*. It is the most common cause of blindness due to an infectious disease, and predominantly affects the poorest communities. Signs of active infection are primarily found in children less than 10 years old, while the scarring stages affect adults. The SAFE strategy, as recognized in global initiatives for trachoma control, is used: Surgery to correct upper eyelid deformities, usually in adults; Antibiotics delivered to communities with active infection, including children; Facial hygiene, to reduce the risk of transmission of infection, and Environmental improvement, focusing on water supplies and sanitation, to reduce transmission.

Vitamin A deficiency disorders (VADD) principally affect preschool age children and pregnant and lactating women who live in poor communities. A diet low in vitamin A rich foods, and malabsorption and diarrhea due to poor water supplies and sanitation are the underlying causes. Children who are deficient may or may not have eye signs which are classified as night blindness, conjunctival and corneal drying (xerosis), corneal ulcers and corneal scarring. In children VADD is associated with increased mortality, and there are global initiatives for the control, including vitamin A supplementation of pre-school age children and addressing the underlying causes.

2. UNESCO. 2006. Education for All Global Monitoring Report 2007: *Strong Foundations*. Available at: www.unesco.org/education/GMR/2007/Full_report.pdf

3. Gilbert, C & Rahi, J., 2011. Visual impairment and blindness in children. In G. Johnson et al., eds. *Epidemiology of visual impairment in children*. London: Arnold Publications, pp. 260-286.

A child's ability to learn can also be impacted by irritated, sore, light sensitive eyes. In addition, these children may be at risk for harmful traditional practices that can damage the eyes. The detection and treatment of common eye conditions, such as conjunctivitis and lid infections, should also be included within a school eye health program.

Eye conditions in teachers

Poor vision is more common as people age; therefore, teachers are likely to benefit from vision screening as well as the children. Common conditions in adults include refractive error, diabetes, and glaucoma.

In addition to the types of refractive error found in children, 80% of adults aged 40 years and above have presbyopia. Presbyopia affects a person's ability to focus at close, thus causes difficulty seeing near objects, hence this condition affects reading among other daily tasks. For school teachers this can impact the preparation, delivery and marking of school work.

Diabetes, which is a condition of faulty metabolism of glucose, is increasing in most populations as a result of socio-economic development and changing life styles. Complications of diabetes, which includes blindness from diabetic retinopathy, kidney failure, foot ulcers and an increase risk of strokes and heart disease, can be reduced by good control of blood glucose and blood pressure. Up to 10% of people with diabetes develop vision threatening complications affecting the eyes, resulting from damage to retinal blood vessels which become blocked or leaky⁴. These complications if not prevented or detected and treated, can lead to blindness.

Glaucoma is a chronic eye condition affecting 3.5% of adults aged 40 years and above, in which the progressive damage to the optic nerves occurs⁵. This condition causes no symptoms in the early stages, can progress to total, irreversible visual loss if not detected early and treated and treated.

The implications of these underlying conditions among adults necessitate school health initiatives include the eye health of teachers. These approaches to treatment and management of these conditions should take into account the resources available, including at a minimum, the provision of ready glasses to correct for presbyopia and referrals for other health conditions.



4. Negi A, Vernon SA. 2003. An overview of the eye in diabetes. *Journal of the Royal Society of Medicine*. 96(6):266–272.

5. Tham, Yih-Chung et al. 2014. Global Prevalence of Glaucoma and Projections of Glaucoma Burden through 2040. *Ophthalmology*. 121(11): 2081 – 2090.

Summary of refractive error in children and in adults

This table notes the main types of refractive error in children and adults, the impact on vision and types of correction:

Technical term	Lay term	Groups affected	Impact on vision	Type of correction
Myopia	Short/near sightedness	Children and adults	Clear near vision; blurred distance vision	Minus (-) spectacle or contact lenses
Hypermetropia / hyperopia	Long sightedness	Children and adults	Clear distance vision, blurred or difficulty with near vision	Plus (+) spectacle or contact lenses
Astigmatism	-	Children and adults	Distorted vision at all distances	Cylinder (+ or -) spectacle or contact lenses
Anisometropia	-	Children and adults	Different visual impact in right and left eyes	Different spectacle or contact lenses needed for each eye
Presbyopia	-	Adults aged 40 years and above	Difficulty seeing near objects clearly	Plus (+) spectacle lenses

Strategies for school eye health

School-based eye health programs can be used as an effective platform to promote prevention, early detection and treatment of common disorders. Prevention can reduce cases of conjunctivitis and eye injuries, for example. Early detection and treatment can address conditions like cataract and uncorrected refractive error. In addition, school eye health programs can help identify children requiring referral for services, like low vision care, rehabilitation and special education.

Comprehensive school eye health

An ideal school eye health program should engage Ministries of Health and Education, be integrated into the broader school health program and must be backed up by eye and child health services to manage referrals. The following components, which encompass strategies for control of visual loss in children, are recommended, using the World Health Organization's Health Promoting Schools framework⁶:

Formal health curriculum

- + Eye health promotion; i.e. health education and literacy, empowerment, increasing awareness regarding eye health and its implications.
- + Promoting a healthy school environment i.e. growing vitamin A rich foods in school gardens; water collection for face washing; clean latrines and waste management for fly control.
- + Promote uptake of programs for locally endemic diseases especially those targeted for elimination and of public health significance, including trachoma and vitamin A deficiency.

Ethos and school environment

- + Healthy practices emphasizing personal hygiene, including soap and sinks provided for face and hand washing for trachoma control.

Engagement with families and/or communities

- + Use the Child-to-Child approach to take eye health messages home, and to use children as "case detectors" of individuals in their families or community who need eye services.
- + Screen siblings of children with refractive errors and other familial conditions.
- + How to help and interact with other children and adults who are irreversibly low vision or blind.

6. WHO. 1998. WHO Information Series on School Health Document Four: *Healthy Nutrition – An Essential Element of a Health-Promoting School*. 6. Available at: http://www.who.int/school_youth_health/media/en/428.pdf?ua=1

Specific eye care activities:

- + Identification of children with visual impairment.
- + Correction of refractive error, provision of spectacles that are acceptable, durable, comfortable and affordable.
- + Primary management of common and acute cases, including lid infections, conjunctivitis, trauma.
- + Identification, referral and treatment of potentially visual impairing conditions, like cataract.
- + Screening of teachers to detect and provide spectacles for presbyopia and referral for other ocular conditions if necessary.

See Appendix 1 for a schematic representation of some of the components of a school eye health program.



Steps in Planning School Health

In order to effectively plan, implement, and evaluate a school eye health program, a step-by-step approach can be followed. In this section, an approach is described, with tools and resources available as appendices.

Step-by-step approach in developing a school eye health program

Step 1	Establish the need
Step 2	Situation analysis of policy, program and resources for refraction and eye care
Step 3	Initial sensitization
Step 4	Situation analysis of school education system
Step 5	Determine the goal of the program
Step 6	Gap analysis
Step 7	Develop a plan with short, medium and long term objectives and indicators
Step 8	Develop a monitoring framework and plans for review and evaluation
Step 9	Identify and secure resources
Step 10	Develop a manual of Standard Operating Procedures
Step 11	Pilot the program in a defined setting or area
Step 12	Establish formal partnerships
Step 13	Management and governance
Step 14	Program implementation
Step 15	Monitoring systems and evaluation

Step 1: Establish the need

A. For services for refractive errors in children

The need can be established using the following approaches.

- + Review existing literature to estimate the prevalence and type of refractive error. This can be confirmed by testing the vision of 200 children in each of the following age groups 5–8 years, 9–10 years (primary school) and 11–15 years and 16–18 years (secondary/middle school). It is recommended that uncorrected refractive error is defined as an inability to see 6/9 in BOTH eyes for this exercise (see section Implementing School Eye Health: Detection & Management for screening criteria). The children who fail the vision test can be refracted to confirm and determine the level of refractive error. The percentage of the children with refractive error can be used for planning purposes.
- + Obtain information from other local school eye health programs
- + Undertake a formal population based survey to determine refractive error prevalence. However, these are expensive and time consuming, and may not reflect the findings in school going children.

B. For other eye conditions in children and adults (teachers)

Locally endemic eye conditions in children:

- + Consult Ministry of Health and available resources to ascertain prevalence of locally endemic conditions that can affect eye health (i.e. Trachoma Atlas - <http://www.trachomaatlas.org/> for trachoma prevalence).

Conditions likely to affect visual acuity of teachers:

- + Ascertain proportion of teachers aged 40 years and above. This group is likely to be presbyopic and require spectacles for near vision;
- + Consult the International Diabetes Federation Atlas for country specific estimates for prevalence of Diabetes in country (<http://www.diabetesatlas.org/resources/2015-atlas.html>).

Step 2: Situation analysis of policy, programs and resources

A. Policies on child eye health

- + Is child eye health included in national prevention of blindness plans?
- + Are refractive errors in children included in other government policies, and if so, is there a budget?
- + Are there insurance schemes or formal private-public partnerships which include eye conditions of children?
- + Are there policies regarding engaging teachers in health programs?

B. Programs for school health

- + Is there an existing school health program? If so, is eye health included? Is there a budget? Do all schools have a school nurse?
- + Are other organizations already active in school eye health in the planned area?
- + Are there other school health initiatives that eye health could be integrated into, i.e. deworming programs?
- + Does school health education include eye health?

C. Resources for refractive errors and other eye conditions

The next step is to conduct a situation analysis to ascertain the following (see Appendix 2 for assessment templates):

For eye care

- + At tertiary, secondary and primary level for medical and surgical care, prescribing and dispensing spectacles, low vision care, and for the detection, diagnosis and management of diabetic retinopathy.
- + The standard list of the equipment required at each level of service delivery is in Appendix 3.

For children with low vision or who are blind

- + Education institutions for visually impaired children, social welfare services, organizations of and for the blind.

Step 3: Initial sensitization

Active engagement of State / District Ministries of Education and Health are critical. An early sensitization meeting between Ministries of Education and Health, as well as other key stakeholders, is recommended.

Step 4: Situation analysis of school education system

Request the Ministry of Education generate lists of schools to identify schools with and without eye health programs for the proposed program area, in order to avoid duplication.

In addition, it is important to identify term times, examination dates, and holidays to best plan for dates of interventions.

Step 5: Determine the goal of the program and delineate the causal pathways to achieve the goal

Having established the needs and available resources, decide on the goal of the program. The goal can be defined as the positive change that would come about as a result of successful implementation of the program. Consider constructing a Theory of Change which describes the outcomes which would feed into the goal, and the inputs and outputs required to achieve each outcome⁷.

From the Theory of Change it is possible to identify potential barriers, and assumptions. For example, potential barriers may be that Head Teachers do not permit their teachers to screen, or parents refuse to have their children's eyes tested. Assumptions might include that an adequate supply of suitable spectacle frames will be maintained; screeners will be willing to spend time screening and will maintain high standards; the local pediatric ophthalmologist will stay in post.

For each outcome, objectives and activities need to be delineated. Objectives must be SMART (Specific, Measurable, Attainable, Relevant and Time-bound).

Step 6: Gap analysis

For each component of the program, identify gaps that need to be addressed to ensure implementation. This could include training existing cadres to measure vision or to refract, prescribe and dispense spectacles for children. Individuals may need training in low vision care for children and access to supplies of appropriate devices; local clinical staff may require training in detecting sight-threatening diabetic retinopathy; school nurses may require orientation and health education materials for eye health in children.

Step 7: Develop a plan with short, medium and long term objectives and indicators

For each outcome it is useful to define short, medium and long term SMART objectives, with activities and indicators. Examples of short term objectives could be training core cadres in refractive services and providing the equipment required; providing equipment for eye care in the referral hospital; awareness raising workshops for eye care professionals, and including an eye health component into existing training programs. Medium term objectives may include establishing refractive services and networking of service providers. Long term objectives could entail ensuring that eye health is included in school health curricula, that optometry training specifically includes children, for example.

The ultimate aim is that services for refractive errors in children are fully integrated into a national comprehensive eye care program. This will require robust evidence of the costs and benefits of school eye health, and advocacy.

Key elements to consider in planning:

Provision of spectacles: An efficient mechanism must be in place to procure spectacle frames and lenses of appropriate quality. Spectacle frames should be acceptable to boys and girls of different age groups and be of the correct size. An inventory of frames and lenses must be in place, with a large enough stock available at all times to meet the demand.

7. Morra-Imas L. G., Ray C. Rist. 2009. *The road to results: designing and conducting effective development evaluations*. The World Bank. 154-165. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/2699/526780PUBoRoad101OfficialUseOnly1.pdf?sequence=1>

Referral mechanisms and tracking update of referral: Children whose vision does not improve with refraction should be referred to specific eye departments / departments with the capacity to manage them. It is important to track whether these children attend following referral and systems should be in place for this. This may entail referral slips and a register at the hospital, or electronic systems could be used.

Step 8: Develop a monitoring framework and plans for review and evaluation

A monitoring framework is required, which lists each indicator and how it is defined; the source of information; who is responsible for gathering / proving the data and the frequency of reporting. A list of potential output, outcome and impact indicators are shown in Appendix 4a and a flow diagram is shown in Appendix 4b.

At the outset plans should be made for a midterm review, and an end of project evaluation. A budget line should be superficially allowed for these activities.

Step 9: Identify and secure resources

To promote sustainability, comprehensive school eye health programs should not require extensive additional external resources. However, in the short term additional resources are usually required for training, to produce materials, and ensure supplies of spectacle frames and lenses.

At this stage, the different components of the school eye health intervention needs to be costed and a budget created (see section on Funding and Budgeting). Once the budget has been determined, funding should be requested from the government, non-governmental organizations, community based and service organizations and commercial enterprises willing to support the program.

Step 10: Develop a manual of Standard Operating Procedures

Standard Operating Procedures (SOPs) are highly desirable to ensure that activities are implemented in a uniform, consistent, and a high quality manner. SOPs provide a step by step guide on who

should do what and how. For school eye health, SOPs should cover many of the aspects covered in this guideline, from engagement with Ministries of Health and Education, sensitization of Head Teachers through to how to train screeners and refractionists; how to prescribe spectacles for children; who, how and where to refer and track referrals (including teachers with diabetes). The SOP should also include data to be collected for monitoring.

The SOPs provide a benchmark against which the competencies and activities of those involved in the program can be monitored.

Step 11: Pilot the program in a defined setting or area

Pilot testing the different elements of the program is useful, as it can identify barriers, assumptions or other problems which limit implementation. The pilot could be done in a district with a secondary level eye unit with optical services and an educational institution willing to participate. Access to a tertiary eye department for referrals and community based eye health program in the area are added advantages.

The SOP may need to be modified after the pilot.

Step 12: Establish formal partnerships

Before implementation starts, it is advisable to obtain MOUs with the Ministries of Education and Health, and to hold a District level workshop with relevant stakeholders for advocacy and sensitization.

Step 13: Management and governance

All programs regardless of their size and complexity will need to be well managed. Managers with clearly defined roles and responsibilities should provide oversight of implementation, and manage the financial, human and other resources. Managers will be responsible for reporting on progress and for financial accountability to donors, Ministries and other stake holders. Managers are also usually responsible for initiating midterm reviews and end of program evaluations.

The overall processes and procedures of the program will have to be governed in manner that ensures the provision of quality eye health services to children in a way which promotes equity.

Step 14: Program implementation

The Ministry of Education should be requested to identify and train two contact teachers who will assist and coordinate screening for each school. For large programs, it is advisable to have a District level liaison teacher who co-ordinates with the contact teachers.

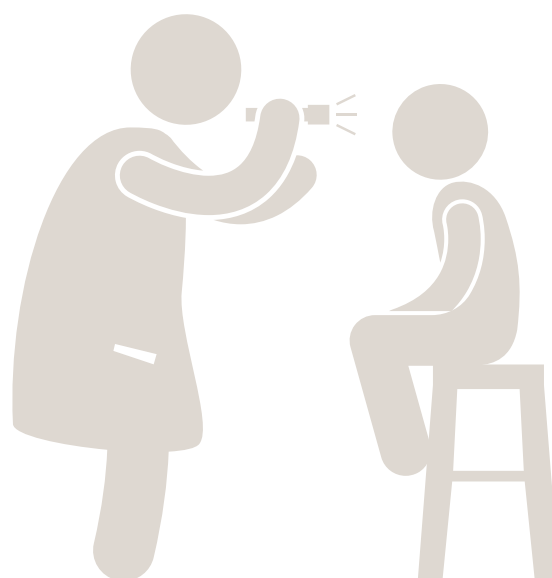
Suggestions for the roles and responsibilities of individuals who might be involved in a school eye health program are described in Appendix 5.

Step 15: Monitoring systems and evaluation

Progress of the program should be monitored on a regular basis to ensure that it is meeting targets. Monitoring should be conducted by the program implementers. Reporting of indicators (see Appendix 4a) for monitoring should be built into the SOPs. The program should be reviewed periodically to ensure screening accuracy, referrals, retention of spectacles, spectacle wear, maintenance of records, and referral attendance rates amongst other things.

An evaluation needs to be planned, and ideally undertaken by individuals external to the program who have relevant expertise. The purpose of an evaluation is to assess the extent to which the goal and objectives have been met, and if not, why not. An evaluation can also assess the impact of the program, in terms of quality of life and visual functioning of children and teachers given spectacles; satisfaction with the processes; whether school attendance or academic performance have improved; whether teachers with diabetes have undergone a retinal examination and whether they were treated; whether teachers are willing to continue in their role as screeners, health educators and in detecting and referring children. In addition, compliance should be evaluated to determine whether students given spectacles continue to wear them and if not, reasons for noncompliance.

Evaluation reports should be shared with all relevant parties, and if new lessons have been learnt, the findings can be written up for publication as a means of spreading best practices and other learning. The evaluation needs to be planned and budgeted for at the inception of the school eye health program.



Technology Guidelines

Equipment and spectacles

Technology should be used to support the expansion and improved quality of refractive care, but only in the context of comprehensive eye care. Essential and appropriate technology that assists refractive care includes:

Locally-affordable instruments

- + Retinoscopes (instrument used to measure refractive error), trial frames for adults and children and trial lenses are recommended from among the options that are available, based upon current information and experience with validity, reliability, cost and feasibility
- + Alternatives such as low-cost auto-refractors may become available if their validity (particularly control of accommodation in children) is proven and should be considered where their use is appropriate

Locally-affordable and available topical medications

- + Short-acting topical cycloplegic agents (used to control focusing in children where appropriate, to assist in determining a more accurate measurement of refractive error) such as cyclopentolate hydrochloride (0.5 or 1.0%) are recommended

Affordable spectacles

- + Purchasing, manufacture, distribution services, warehousing and inventory management for affordable spectacles should be accurate and efficient
- + Custom-made spectacles and conventional or clip in and out ready-made spectacles are recommended from among the options that are available, based upon current information and experience with validity, reliability, cost and feasibility
- + Quality standards (as equivalent to ISO standards as practical) should be maintained for both custom-made and ready-made spectacles.
- + Recycled spectacles should not be used

Eligibility for ready-made spectacles

Children and teachers need to fulfill ALL the following criteria to be eligible for conventional ready-made spectacles

According to the prescription:

- + The spherical equivalent improves the visual acuity equal to, or not more than one line less than full correction in the better eye
- + The difference between the spherical equivalent in each eye is not more than 1D
- + There is astigmatism of less than 1 D in one or both eyes
- + The spherical equivalent required in each eye is less than or equal to +4D or -4D

According to the frame sizes available:

- + The inter-pupillary distance matches that of the frames available
- + The spectacle frames are acceptable to the child or teacher
- + The spectacle frames are a comfortable fit for the child or teacher

Tips for dispensing spectacles for children are shown in Appendix 6.

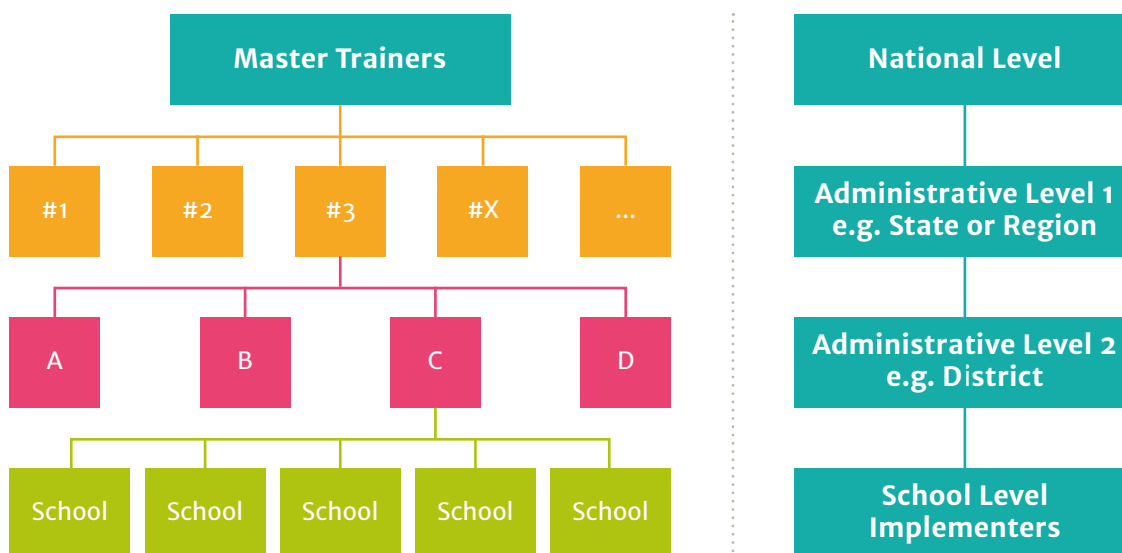
Training of Teachers & Implementation Staff

Training for teachers to deliver school health services is essential. This is crucial for both the practicalities of the services as well as ensuring that teachers have the knowledge to provide strong health education to children.

In terms of eye health, training teachers in how to screen children and record their findings, as well as having a basic understanding of major eye health conditions affecting children in their region is important.

Developing Materials for Training

- + In many instances resources already exist for trainers and teachers at various levels, perhaps developed by partner organizations or government bodies. These resources should be reviewed, developed, piloted and finally validated for use at national or regional levels.
- + Training materials could include a *Guide for District Level Managers*; a *Teaching Training Kit*, and a *Handout for Teachers*.



- + It is important to contextualize these resources with respect to cultural issues related to sanitation, names of conditions in local languages, etc.

Planning your training schedule

In order to train a large number of teachers quickly and efficiently, in-service training or cascading training sessions from the national to regional, then local to school level can be effective. The figure below illustrates how training can be effectively cascaded, starting with training of master trainers at national level. These master trainers then distribute the training to state or regional level trainers, and eventually the materials and information is delivered down at school level. At each level, the total number of people trained increases.

Cascaded training design also provides an opportunity for training materials, monitoring forms and medication to be distributed from holding at a national level through the levels to teachers at individual schools.

Cascaded training sessions can be coordinated across multiple school health training sessions to save travel and teaching time for all personnel involved. Through this integration the program can be designed more efficiently and at a lower cost to the government.

Master training should be carried out in a team comprising Ministries of Education, Ministries of Health and any other key technical bodies. The number of master trainers to be trained should be

determined by the number of next level trainings to be conducted with 3 or 4 master trainers attending each 'next level' training sessions.

In approximately 2 days, master trainers can be briefed thoroughly on a roll out plan and extensively trained, equipping them to begin conducting next level of training sessions.

Next Level of Training: In approximately 3-day master trainers train the next level of personnel then supervise as this level then trains the next.

The necessity of these cascade levels are determined by size of the targeted population and country size as well as number of schools and teachers and administrative setup.

Teacher Training: Takes approximately half a day to one day for each component (e.g. deworming, eye health) and one teacher training session should cater for approximately 30 teachers, and a maximum of 40 teachers.

The training should aim to encompass two teachers from each school involved, ideally inclusive of the head teacher or school director and will be led by two previously trained individuals from one level above; Master trainers, administrative level 2 or 3 (depending on cascade size). The school should consider that one of the two teachers should be a science teacher.

Documentation & indicators on completion of training cascade

The following documents and activities acts as indicators of a successfully completed training cascade:

- + Development and publication of a suite of training materials for various levels of the training cascade.
- + Development and publication of a suite of context specific manuals and guidelines relevant to school eye health.
- + A training schedule that can distribute training to all levels.
- + A fully enacted cascaded training from master level training to teacher training.
- + Distribution of other required materials to local levels via training cascade. These materials can include: vision screening kits, deworming tablets and tablet poles (where relevant), monitoring forms, teacher companion manuals.

Community Sensitization

A key step for a school health and nutrition program is communication with parents, community leaders, religious leaders and local health agents about the objectives of the program in schools and what they should expect.

Community sensitization ensures that teachers, parents and children are aware of the occurrence, reasons, benefits and safety of school-based activities such as vision screening.

The campaign should be made appropriate for the area in which it is occurring in terms of language and media. Potential community sensitization methods include press conferences, use of radio, television and posters as well as communicating via any existing community groups, religious leaders or community infrastructure.

Good community sensitization is vital to the success and sustainability of a program. It will ensure good turn out on screening and treatment days, and that parents, children and students are aware that non-enrolled children are welcome to come along to be screened on specific days. There may also be other members of the community that the MoH may want to target, such as out of school children. Community sensitization can also ensure that there is understanding of the goals of the program.

Documentation & indicators on completion of community sensitization

Development and publication of context specific materials for mass communication of various aspects of the program, including its benefits, what vision screening entails and who it is targeting, any risks associated and dates for planned school health (screening/treatment) days.

Guidelines for school directors to communicate with communities and students about the school health activities.

Implementing School Eye Health: Detection & Management

This section provides recommendations on:

1. Detection and management of refractive errors in children
 - a. Frequency of child vision screening in different age groups
 - b. Screening: visual acuity cut-off for screening and screening charts
 - c. Who should screen
 - d. Refraction
 - e. Prescribing guidelines for children
 - f. Referral mechanisms
 - g. Referral to low vision services and for special education and rehabilitation
2. Detection and management of other common eye diseases in children
3. Teachers' eye health
4. Control of locally endemic eye diseases in children
5. Child safeguarding

1. Detection and management of refractive errors in children

a. Frequency of child vision screening in different age groups

As myopia usually starts during late primary school age, and in some children progresses over time, schools should be visited every 2 years.

Recommendations for years 1-3 of implementation:

	Age group	
	Primary (5-10 years)	Secondary (11-18 years)
Year 1 of implementation	Screen <u>all</u> children for <ul style="list-style-type: none"> + reduced visual acuity + red eyes + white pupils + normal pupil reactions, equal size + strabismus (eye turn) + external eye abnormalities 	Screen all children for <ul style="list-style-type: none"> + reduced visual acuity + red eyes + white pupils + normal pupil responses and equal in size + external eye abnormalities
Year 2 of implementation	Screen <u>new intake</u> only for <ul style="list-style-type: none"> + reduced visual acuity + red eyes + white pupils + strabismus (eye turn) + external eye abnormalities AND re-examination all children given spectacles the previous year	Screen new intake Re-examine all students given spectacles the previous year and those where teachers have concerns
Year 3 of implementation	As for year 2	As for year 1

b. Screening: visual acuity cut-off for screening and screening charts

Visual acuity charts

Vision screening should use only one row of optotypes at the 6/9 (0.2 logMar) level at the appropriate test distance (minimum of 3 meters). High contrast black on white should be used, with a dark surround (see below) which improves reliability when only using one row of optotypes.



Failure of screening is defined as a child cannot see **3 of the 5 letters** (therefore to pass the screening, the child must correctly identify 3 of the 5 letters).

Note: not all children who fail screening will require spectacles. Some may have minor REs and others may have other ocular pathology.

Important: if other charts are used, the manufacturer's instructions should be followed which define failure at the 6/9 level.

Mobile phone applications

Only mobile phone applications that have been validated in children at the 6/9 level should be used.

Screening for hyperopia

There is no internationally agreed consensus on whether to or how to screen children for hyperopia.



c. Who should screen

Screening can be undertaken by health care professionals or non-healthcare personnel who have been trained and who have demonstrated high levels of competency in all the steps involved (i.e., explanation; asking if child already wears spectacles; ensuring adequate lighting and test distance; adequate instructions; tests each eye separately; correctly records the findings as pass or fail for both eyes).

Trained teachers or school nurses are recommended as screeners, as this is cost effective and builds ownership. There is significant evidence that shows that teachers are able to accurately measure and correctly identify children with vision impairment^{8,9,10,11,12,13}.

d. Refraction

Who should carry out the refraction and further examination?

Children should be refracted by a recognized cadre within the health system (public/private), with the necessary competencies in refracting children. A refraction is used to determine the magnitude of refractive error, hence needed to identify the power of the spectacles for correction.

How should the refraction be conducted?

Objective refraction, which does not rely on the response of the child to determine RE, can be done by retinoscopy or using an autorefractor validated for use in children. This must be followed by subjective refraction, which incorporates responses from the child to assist in refining the final prescription for spectacles.

8. Paudel, P. et al., 2016. Validity of Teacher-Based Vision Screening and Factors Associated with the Accuracy of Vision Screening in Vietnamese Children. *Ophthalmic epidemiology*, 23(1), pp.63–68.
9. De Fendi, L. et al., 2008. Assessment of visual acuity evaluation performed by teachers of the “Eye in eye” program in Marilia-SP, Brazil. *Arquivos brasileiros de oftalmologia*, 71(4), pp.509–513.
10. Khandekar, R., Parast, N. & Arabi, A., 2009. Evaluation of “vision screening” program for three to six-year-old children in the Republic of Iran. *Indian journal of ophthalmology* 2, 57(6), pp.437–442.
11. Ostadi, Moghaddam, H. et al., 2012. Validity of vision screening tests by teachers among school children in Mashhad, Iran. *Ophthalmic epidemiology*, 19(3), pp.166–171.
12. Sharma, A. et al., 2008. Strategies to improve the accuracy of vision measurement by teachers in rural Chinese secondary schoolchildren: Xichang Pediatric Refractive Error Study (X-PRES) report no. 6. *Archives of ophthalmology* 2, 126(10), pp.1434–1440.
13. Wedner, S. et al., 2000. Prevalence of eye diseases in primary school children in a rural area of Tanzania. *The British journal of ophthalmology*, 84(11), pp.1291–1297.

Where should the refraction and further examination take place?

Referral to optical centers who are not actively engaged in the program is not recommended as the quality of the refraction and the spectacles dispensed cannot be monitored, and can result in over-prescribing and poor quality spectacles being dispensed.

There are two alternatives 1) refraction takes place in the school or 2) children who fail screening are referred to the eye care provider engaged in the program.

The advantage of school-based refraction is that a high proportion of children who fail screening can be refracted. The disadvantages of this approach are the additional cost to the program which limits sustainability, and lack of ownership of eye problems by the community. Another disadvantage is that dilated retinoscopy is more problematic as parental consent is required.

The advantages of refraction in the eye care facility are the reduced costs to programs and hence greater sustainability, and ownership can be built. The disadvantages are that it is recognized that a high proportion of children referred for refraction do not attend, and costs of travel have to be borne by parents which may result in inequity.

Indications for cycloplegic refraction

Children should be referred for cycloplegic refraction if children are uncooperative or difficult because of media opacities or irregular cornea; if there is a variable or inconsistent end point to refraction, in the presence of strabismus or suspected amblyopia.

In children over the age of 5 years, 2 drops of cyclopentolate 1% should be administered per eye with 5-10 minutes separation between instillations.

e. Guidelines for prescribing for children

The following indications for correction provide a way to objectively prioritize refractive care in situations of limited resources, but should not override individual needs where resources permit. These indications apply for students who have failed the screening (vision worse than 6/9).

As most studies show that spectacle wear is associated with poorer uncorrected visual acuity and higher levels of refractive error, the guidelines are primarily based on improvement in distance visual acuity (VA) with correction, taking account of other related ophthalmic factors. All prescribing should be based on appropriate refractive technique (e.g. retinoscopy) undertaken by competent practitioners.

Correction for myopia is indicated if

- + minus powered lenses improve vision by 2 or more log MAR VA lines (or 2 or more Snellen VA lines) in one or both eyes.

Correction for hypermetropia is indicated if

- + plus powered lenses improve vision by 2 or more log MAR VA lines (or 2 or more Snellen VA lines) in one or both eyes and/or noticeably improve comfort;
- + there is amblyopia (and the child's age, usually 8 years or below, suggests the amblyopia is potentially treatable), or esotropia or large esophoria (and the child has some potential for normal binocular vision).

Correction of astigmatism is indicated if

- + cylindrical lenses improve vision by 2 or more log MAR VA lines (or 2 or more Snellen VA lines) in one or both eyes and/or noticeably improve comfort,
- + there is a suggestion of amblyopia (and the child's age suggests the amblyopia is potentially treatable).

Correction for anisometropia is indicated if

- + significant anisometropia PLUS one or more of the following: correctly balanced lenses improve vision of the worse eye by 2 or more logMAR VA lines (or 2 or more Snellen VA lines), and/or noticeably improve comfort,
- + there is a suggestion of amblyopia (and the child's age suggests the amblyopia is potentially treatable).

f. Indications for referral by the refractionist

- + Any child whose presenting visual acuity is less than 6/60 in either eye, even if due to a refractive error
- + All children whose visual acuity does not improve by two or more lines in either eye
- + The child requires cycloplegic refraction
- + If a child has one or more of the signs of an unhealthy eyes
 - The cornea is not transparent
 - The pupil is not round and black
 - One eye turns inwards or outwards (strabismus)
 - The eye(s) are red with discharge (conjunctivitis or allergy)
 - There is a foamy white spot or a dry wrinkled patch on the bulbar conjunctiva (Bitot's spot)

No child with low vision or who is blind should be referred directly to special education or rehabilitation services as they should all be assessed first by an ophthalmologist.

g. Referral Mechanisms

All children referred should be given an information sheet to take home to their parents.

Referral slips given to the child for their parents can be used together with a register at the hospital to track whether the child attended or not. Electronic mobile phone based systems can also be used to track attendance, where available and appropriate.

h. Referral to education and rehabilitation

All children whose visual acuity does not improve to normal in both eyes with refraction must be referred to the local eye care provider.

After a clinical diagnosis has been made and treatment given, if indicated, children with low vision should be assessed in a low vision clinic. Those who are blind should be referred for assessment to the authorities providing rehabilitation services and special education.

2. Detection and management of other common eye diseases in children

Common eye conditions of childhood include eye infections (conjunctivitis), lid infections (styes) and allergies (allergic conjunctivitis; vernal catarrh and trachoma). These may keep children away from school or interfere with learning.

Other more serious eyes conditions which needs to be detected and referred to an eye care provider for management include squints (in-turning or out-turning eyes), and cataracts.

Some children have eye conditions which lead to visual loss and where no treatment is possible, including corneal scarring and diseases of the retina or optic nerve.

Recommended strategies

1. Train school nurses in the detection, management, and appropriate referral of eye conditions in children, ideally by ensuring this is included in their curriculum;
2. Train teachers in simple eye examination using a torch to detect and refer children they suspect of having an eye condition, where appropriate
3. Optometrists / refractionists to detect and refer conditions as needed during refraction

3. Teachers' eye health

As the eye health of teachers is so important for quality education, teachers should be included in school initiatives. In order not to interfere with activities focusing on children, it is recommended that teachers are screened either before or after the children are screened.

Recommended activities – for vision

- + All ages: Habitual distance visual acuity testing (with distance correction, if usually worn) at the 6/9 level. If they fail in one or both eyes, refraction should be undertaken in the school, or they can be referred for refraction at a participating eye care facility.
- + Aged 40 years and above: Near visual acuity measurement to assess whether they can N5 at 40 cm with current near correction or unaided. If not, a near add should be prescribed. Ready-made spectacles can be used for those without

significant astigmatism or anisometropia (range +1.00 – +3.50 D).

Prescribing guidelines for teachers

The following indications for correction provide a way to objectively prioritize refractive care in situations of limited resources, but should not override individual needs where resources permit. The guidelines are primarily based on improvement in distance and or near visual acuity with correction, taking account of other related ophthalmic factors.

Correction for myopia is indicated if significant myopia is detected PLUS one or more of the following apply:

- + difficulty with distance vision is reported
- + minus powered lenses improve vision by 2 or more log MAR VA lines (or 2 or more Snellen VA lines) in one or both eyes.

Correction for hypermetropia is indicated if significant hypermetropia is detected PLUS one or more of the following apply

- + difficulty with (far or near) vision or discomfort with concentrated visual effort is reported
- + plus powered lenses improve vision by 2 or more log MAR VA lines (or 2 or more Snellen VA lines) in one or both eyes and/or noticeably improve comfort;

Correction of astigmatism is indicated if significant astigmatism is detected PLUS or one more of the following apply:

- + difficulty with distance or near vision are reported
- + cylindrical lenses improve vision by 2 or more log MAR VA lines (or 2 or more Snellen VA lines) in one or both eyes and/or noticeably improve comfort,

Correction for anisometropia is indicated if significant anisometropia is detected PLUS one or more of the following:

- + difficulty with distance or near vision are reported
- + correctly-balanced lenses improve vision of the worse eye by 2 or more logMAR VA lines (or 2 or more Snellen VA lines), and/or noticeably improve comfort,

Correction of presbyopia is indicated if plus lenses of 1D or more

- + improve near visual acuity at an appropriate working distance, or
- + ease symptoms during near tasks

Recommended activities – other eye conditions

- + Aged 40 years and above: Ask if the teacher is diabetic. If so, refer to the eye care provider for retinal examination. Provide information about diabetic retinopathy
- + Aged 40 years and above: If resources allow, perform undilated optic disc examination with referral of those with a cup:disc ratio of 0.8 or above in one or both eyes
- + Advocate with the Ministry of Education that all teachers aged 40 years and above have annual blood glucose and blood pressure measurement.

4. Control of other locally endemic eye conditions in children

Where Vitamin A deficiency disorders and/or trachoma are locally endemic, the following strategies are recommended:

- + Provision of clean water for hand washing with provision of soap and towels. In areas with poor water supplies a “leaky tin” or gourd with a hole in the bottom can be used
- + Health education about personal hygiene and the risks of open defecation
- + Hand and face hygiene checks at the start of the day
- + Provision of sanitation that is sensitive to the specific needs of adolescent girls

Specific recommendations where vitamin A deficiency disorders is endemic include:

- + Nutrition education to include vitamin A rich sources of food and how to prepare and cook them
- + School garden to grow vitamin A rich food
- + Child-to-child approach with messages that children can take home about breast feeding, vitamin A rich diet for young children, measles immunization, vitamin A supplementation of younger siblings, and to ask whether young children in the family have night blindness

Specific recommendations where trachoma is endemic include:


- + Child-to-child approach with messages that children can take home about face washing and avoiding open defecation

Useful resource: The Healthy Eyes Activity Book (available at http://www.sightandlife.org/fileadmin/data/Books/heab_new_e.pdf)

5. Child safeguarding

Steps must be taken to ensure the safety of all children participating in these programs. Child abuse is a deliberate act of ill-treatment that can harm or is likely to harm a child's safety, well-being, dignity and development. Abuse can be physical, emotional, sexual or neglect. Abuse and exploitation of children is unacceptable and concerns and reports of child abuse must be taken seriously. All concerns must be reported to a project manager, relevant child protection organisation, and in keeping with local law and processes. Such reports must be kept confidential and only released on a "need to know" basis.

Children should not be screened or examined in isolation, and recommend that the 'two adult' rule is adhered.



Identifying challenges in program implementation allows for **adaptation and program strengthening**.

Monitoring & Evaluation

School health programs should be monitored and evaluated to ensure they are functioning properly and having the desired effect. Identifying challenges in program implementation allows for adaptation and program strengthening.

Monitoring Processes

- + **Process monitoring** should be continuous.
- + This monitoring should also apply to the teacher training as a method of assuring the quality.
- + Monitoring forms should be provided to schools and teachers at the training sessions and training should explicitly detail how these should be completed and by when.
- + There should also be in place a system for collating and using the data which is generated and captured on the forms given
- + There should also be in place a feedback system.

Vision Screening Indicators

- + The following should be tracked as a minimum for vision screening programs:
 - a. Number screened for refractive error
 - b. Number children who fail screening
 - c. Number of people given spectacles
 - d. Distribution of dispensed spectacles by lenses powers
 - e. Number of children referred to eye hospital
 - f. Number of children needing bespoke glasses

Other important criteria to consider are whether the child is enrolled or unenrolled in school and whether they had previously worn spectacles or are a new wearer.

Monitoring Impact

- + **Impact monitoring** includes assessing the impact of health interventions. This can include information such as changes in school participation attributable to addressing uncorrected refractive error.

- + Impact assessments should occur every 2–3 years in pre-identified sentinel schools and using rapid appraisal techniques. This is another reason why initial situation assessment and mapping is essential.
- + Baseline and follow up measures should be decided upon and measured before interventions begin (baseline) and 2–3 years later (follow up).

Documentation & Indicators on Completion of Monitoring and Evaluation

- + Accurate and completed forms transferred back up the monitoring chain to central level.
- + Follow up prevalence surveys conducted in identified sentinel schools according to the planned timeline.

Funding and Budgeting

The budget for a school eye health program should plan for, and include the cost of the following activities:

- 1. Training and supply of training materials.** These costs will include the printing and translation of training materials, training halls, and travel and per diems for the trainers and trainees.
- 2. Community sensitization.** The costs include the cost of radio messages, posters and other activities involved with building awareness amongst the school and community on the importance of eye health. The messages need to be targeted at parents, teachers, and children.
- 3. Procurement of equipment.** The costs include costs for both the screening at the schools and the diagnostic equipment to detect refractive error. The detailed list of recommended equipment is found in Appendix 3.
- 4. Assessment of children who failed screening.** These costs include the cost for the refraction team to visit the schools where children have been identified as failing the screening. These include transportation and per diem costs.
- 5. Provision of spectacles.** Children and teachers who have been identified with URE should receive spectacles. A budget should be included for ready-made and/or clip-in spectacles from

children and teachers, as well as those with more complex prescriptions, requiring custom made spectacles.

- 6. Referral to eye clinic.** Children identified by the refraction team with complex refractive error and/or other eye conditions will be referred to an eye clinic participating in the school eye health program. Therefore, costs will include transportation and associated costs for the child and parent/guardians.
- 7. Treatment at eye clinic.** These are costs associated with further treatment, including medication or surgery at the eye clinic, for those children requiring these services.
- 8. Monitoring and evaluation.** These costs include preparation, collection, and analysis of monitoring data, and costs associated with further evaluation of the school eye health program, including travel and dissemination.

You will require the following pieces of information to ensure your budget and related plan are accurate:

1. Number of children to be screened
2. Number of children likely to require ready-made spectacles (based on prevalence data)
3. Number of children likely to require custom made spectacles (based on prevalence data)
4. Number of teachers likely to require spectacles (based on prevalence data)
5. Number of schools and their locations
6. Number of teachers to be trained and likely training plan
7. Likely community sensitization campaign
8. Existing infrastructure of eye health services within the area (based on situational analysis)

Within the planning and budgeting process, the agency or organization providing the funds or supplies for each of the activities should be specified. In addition, opportunities to integrate with other school health initiatives should be explored for likely cost savings with activities such as training and community sensitization.

Appendix 1. Overview of the components of an integrated comprehensive school eye health program

		Eye health needs				What can be done in schools and at home					Measure of success	Assesment and first aid kit	
		Eye health needs in children		Teachers		Curriculum	Within primary schools	Within secondary schools	At home	Who can help			
		0-5 yrs	6-10 yrs	11-15 yrs									
1. Allergies, red eye etc.	Pre-school age children	++	++	++	++	Causes, treatment & what not to do	Hand & face washing	Hand & face washing	Causes, treatment & what not to do	Local health facility to diagnose, treat &/or refer		Tetracycline eye ointment	
2. Injuries		-	++	++	-	Prevention & treatment	Safe environment	Safe environment	Safe environment	Local health facility to diagnose, treat &/or refer		Torch; sterile eye pads & tape	
3. Refractive error		-	+	++	+	Symptoms; benefits of spectacle wearing	Vision testing with checking & referral	Vision testing by teachers with mechanisms to provide spectacle	Information for parents about benefits of spectacle use	Local eye unit with services for refractive errors; PTA; community leaders		Visual acuity screening chart: 6/12 level; 3m rope. N8 reading test	
4. Trachoma (rural areas)		++ ++	++	-	+	Prevention & treatment	Water supply & sanitation; face washing; leaky tin		Water supply & sanitation; face washing; leaky tin	Refer for confirmation; treat with tetracycline eye ointment	Clean hands & faces; use of latrines		Tetracycline in kit
5. Vitamin A deficiency (rural areas)		++ ++	+	-	-	Prevention & treatment	Nutrition; home gardening; hand washing & sanitation;		Nutrition; home gardening; hand washing & sanitation;		Clean hands & faces; use of latrines		-
Poor near vision				++									
Poor distance vision				++									
Other eye diseases e.g. glaucoma				+									

Appendix 2. Detailed of situation analysis and data collection tools

Current school eye health activities

Do you have an existing school eye health-screening program? Yes / No

If yes:

Types of schools included e.g., government / private / informal / mix	
Funding source	
Who coordinates/ manages the program	
Age range of children being screened	
Number of children screened annually	
Who currently performs the screening	
Number of screeners	
Number of children refracted	
Number of children dispensed spectacles	
Number referred for other causes (non-refractive error)	
Who provides the spectacles	
Proportion of children requiring spectacles receive them	
Proportion of children receiving spectacles who wear them	
Number of years the program has been running	
Frequency at which schools are revisited	

Situation Analysis for new / expanded school eye health programs

Overview

Planning for school health requires several stages which are summarized below

1. Determine coverage of planned program area
2. Assess whether there are policies for school health in the government health and education systems;
3. Identify activities / programs for eye care in school children which are already being provided and who is managing them;
4. Identify the unmet need for school eye health in the geographical area to be covered i.e. for refractive errors and other eye conditions
5. Assess the resources and services available for eye care in children;
6. Estimate the number of children to be screened and the number needing spectacles, referral and other interventions
7. Estimate the number of teachers to be screened and who require eye care services

Program area

Preliminary background information

Country/ Region		
Total Population		
	%	Number
Population aged 0-5 years		
Population aged 5-10 years		
Population aged 11-18 years		

Planned program area

Geographical area to be covered:

State / province	_____	Estimate of children aged 5-10 years	_____
District(s)	_____	Estimate of children aged 11-18 years	_____
Total population in geographical area	_____		

Government policies in planned program area

	Yes	No	Comments
Education policies for eye health			
Eyes and vision included in school curriculum			
Health care provided in schools by nurse/ trained teacher			
Eye Health policies			
Government policy for correction of RE in children			
If yes, is there financial support and what are the criteria?			
Financing mechanisms (e.g., insurance schemes) includes other eye conditions in children			
Other health policies			
Are other health conditions included in school health			
If yes, are there active school screening programs?			



Coverage of planned program

Type(s) of schools to be included

	Yes	No
Government		
Private		
Informal (e.g., faith-based)		
Other		

Obtain list of schools and estimate of number of children to be included

Provider	Type of school (age group)	In geographical area		To be included in the program	
		Number of schools	Average enrolment	Number of schools	Target to be screened
Government	Primary only (5-10)				
	Middle only (10-13)				
	Secondary only (11-18)				
	All ages (5-18)				
Private	Primary only				
	Middle only				
	Secondary only				
	All ages				
Informal	Primary only				
	Middle only				
	Secondary only				
	All ages				
Other					
Total to be screened					
	Aged 5-10 years				(a)
	Aged 11-18 years				(a)

(a) See next page

Programs for eye care in school children already being provided

Are other organizations already providing school eye health in the planned program area?

Yes / No / not known

If yes, existing programs supported by other organizations

- + List organizations supporting school eye health in the proposed program area
- + Identify which schools they work in and which schools they plan to work in

Assess need for school eye health – refractive errors

Uncorrected refractive errors		Estimate
Children aged 5-10 years:		
Number of children to be screened ^a		
Estimated prevalence of uRE	%	
Estimate of number requiring refraction*		
Estimate of number requiring spectacles		
Children aged 11-18 years:		
Number of children to be screened ^a		
Estimated prevalence of uncorrected uRE	%	
Estimate of number requiring refraction*	*	*
Estimate of number requiring spectacles		

(a) Use data from the table above

*Assume 40-50% of children who fail vision screening will not require spectacles or referral for other eye condition, so this number will be almost double the number requiring spectacles

Assess need for school eye health – other eye conditions

Is trachoma known to be endemic in the proposed program area?

Yes / No

Is vitamin A deficiency known to be endemic in the proposed program area?

Yes / No

Other eye conditions	Estimate
Children aged 5-10 years:	
Number of children to be screened	
Estimated prevalence with other eye conditions (approx 10-15%)*	
Number to be referred	
Children aged 11-18 years:	
Number of children to be screened	
Estimated prevalence with other eye conditions (approx 5-10%)**	
Number to be referred	

*referral for cycloplegic refraction and other eye conditions

**referral for other eye conditions



Resources available for eye care in children – service providers to be included

Lead referral / management eye care centre

Name and location _____

Identify other service providers who will be included in the program, bearing in mind the need, population density, distances etc.

Other eye centres being included and the services they will provide

Name of facility	Government / NGO / private	Town / city	Services: screeners; refraction; dispensing; primary eye care; surgery; low vision care; other
1.			
2.			
etc.			

Resources available for eye care in children – Human Resources

Human resources available

a. In main referral centre

	Total
Number of ophthalmologists	
Number of mid-level ophthalmic personnel who can refract children	
Number of mid-level ophthalmic personnel with adequate competencies to assess children with eye conditions	
Number of low vision experts with adequate competencies to assess children	
Number of dispensing opticians with adequate competencies to assess children	

Human resources available

b. In other eye centres

Eye care Provider _____	Total
Number of ophthalmologists	
Number of mid-level ophthalmic personnel who can refract children	
Number of mid-level ophthalmic personnel with adequate competencies to assess children with eye conditions	
Number of low vision experts with adequate competencies to assess children	
Number of dispensing opticians with adequate competencies to assess children	

Human resources – total available to be included in the program

Ophthalmologists _____ Dispensing opticians _____

Mid-level ophthalmic personnel _____ Low vision workers _____

Optometrists/refractionists _____ Other, specify: _____

Management and other key personnel

List the names of people responsible for the following roles:

Role	Number required	Named person (if known)	Contact details (if known)
Program manager	1		
Program administrator	1		
Technical lead	1		
Teacher liaison	1		
Contact teachers	1 per school		
Trainer of vision screeners	Add		

*Key activities roles of these personnel are available in Appendix 1

Equipment available to manage RE

a. In main referral centre

Equipment	Yes	No	Comment (including condition and number of pieces of each)
For refraction			
Visual acuity charts			
Lea symbols			
Occluder			
Autorefractor			
Retinoscope			
Paediatric trial frame			
Trial lens set			
Cross cylinders (-0.25 / 0.5D)			
Flipper lenses (-0.25 / 0.5D)			
Duochrome test			
Cyclopegic drops			
Ophthalmoscope			
Fixation target			

Equipment	Yes	No	Comment (including condition and number of pieces of each)
For dispensing			
PD ruler / pupillometer			
Focimeter			
Frame heater			
Spectacle frames for children			
Other			
Low Vision Devices			

Equipment available to manage RE

b. In other eye centres. *The table above can be used*

Provision of services for children

List the names of individuals who are responsible for providing services for children in the proposed program area

Services for children	Individual(s) (name(s))	Eye care provider(s) (name(s))
Refraction		
Dispensing		
Low vision care		
Surgery		

Cost of providing services for children

Average cost	Government clinics/hosp	NGO clinics/hosp	Private services
Eye drops			
Refraction			
Spectacles			
Cataract surgery			
Squint surgery			

Estimating the work load for screening, refraction and dispensing in Years 1, 2 and 3

In year 1 it is recommended that all children aged 5–18 years are screened in ALL settings.

	Number to be screened (from table above)	Number to be refracted	Number to be dispensed spectacles	Number to be examined by eye care provider
Aged 5 –10 years				
Aged 11–18 years				
Total				

Important question:

Are there adequate resources available for each component?

If not, the target number of children to be screened needs to be reduced.

In year 2

- + Primary school children: it is recommended that all children entering primary school are screened, and that all children given spectacles the previous year re-examined and re-issued spectacles, if required.
- + Secondary school children: all children given spectacles the previous year re-examined and re-issued spectacles, if required.

In year 3

- + Primary school children: it is recommended that all children entering primary school are screened, and that all children given spectacles are re-examined
- + Secondary school children: screen all children, including those given spectacles

Assessing barriers and assumption

What are the key barriers (i.e. anticipated problems) which might have a negative impact on program implementation?

Example: girls do not like wearing spectacles

How might these be addressed?

What assumptions (i.e. un-anticipated problems) have been made hinder implementation?

Example: trained staff, such as optometrists, will remain in post

How might the program continue if these are realized?

Appendix 3. Standard item list for refractive error screening

Teacher's screening

- + Vision screener for three meters (6/9 optotype)
- + Three meter rope
- + Record forms

Optometrist (for refraction)

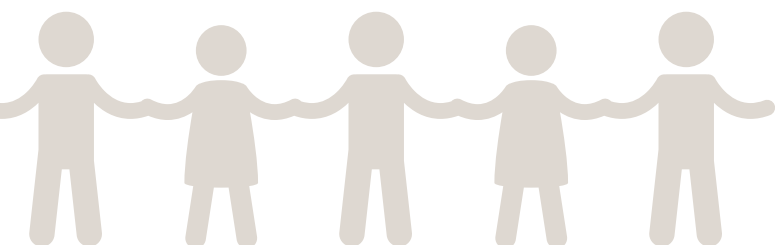
- + Visual acuity charts – distance
- + Visual acuity charts – near
- + Occluder
- + Autorefractor (Nice to have)
- + Retinoscope
- + Paediatric trial frame
- + Trial lens set
- + Cross cylinders (± 0.25 , $\pm 0.5D$)
- + Flipper lenses (± 0.25 , $\pm 0.5D$) (Not needed, nice to have)
- + Cyclopegic drops (at clinic)
- + Ophthalmoscope
- + Fixation target

For Dispensing

- + PD ruler / pupillometer
- + Focimeter
- + Frame heater
- + Spectacle frames for children

Other

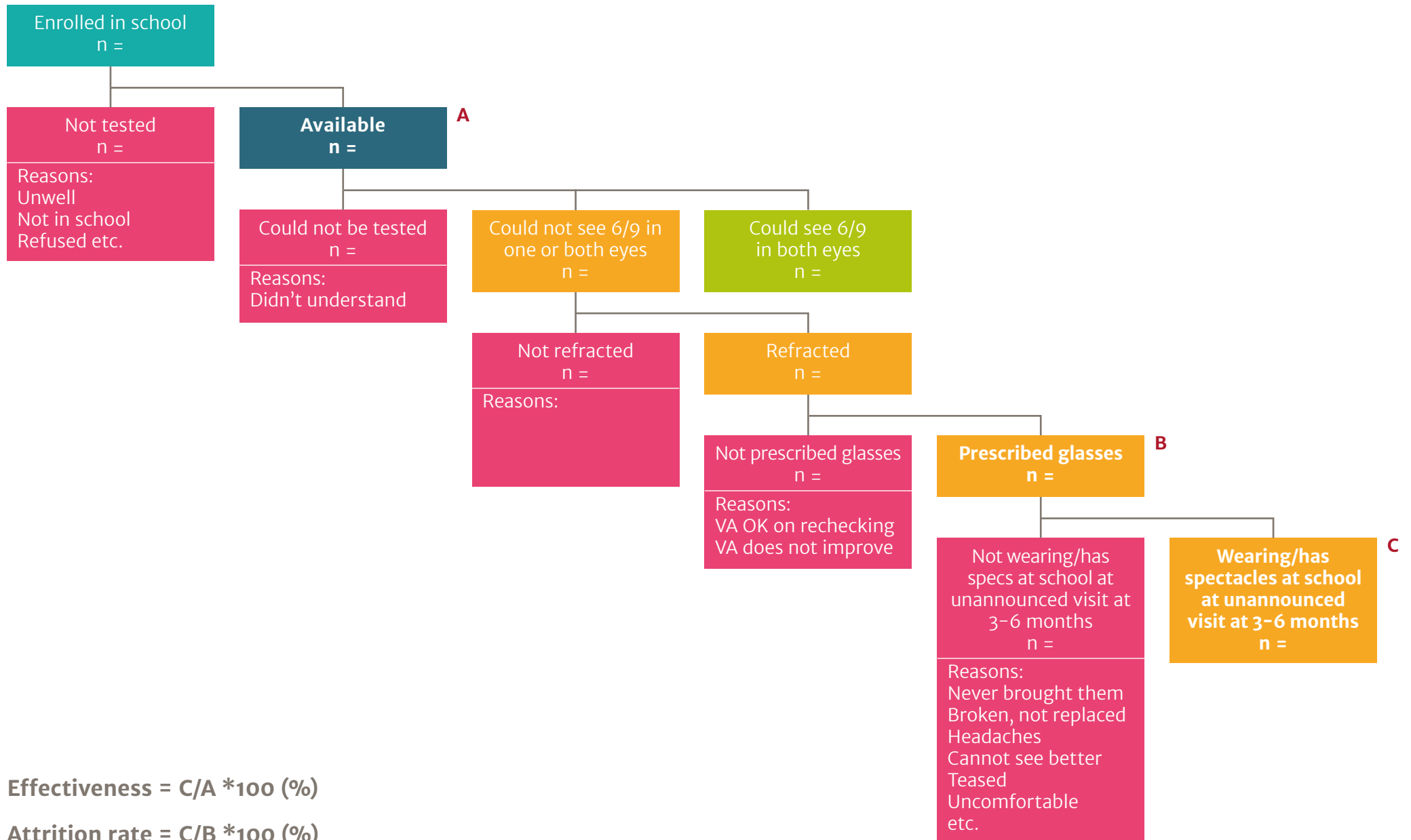
- + Low Vision Devices



Appendix 4a. Monitoring - recommended indicators

Output indicators (number)
Screeners trained
Refractionists orientated
Children screened 5–10yrs
Children screened 11–18yrs
Children refracted 5–10yrs
Children refracted 11–18yrs
Spectacles dispensed 5–10yrs
Spectacles dispensed 11–18yrs
Children referred 5–10yrs
Children referred 11–18yrs
Teachers screened
Teachers dispensed spectacles (near and/or distance)
Teachers referred
Children exposed to health education
Parents of children dispensed spectacles exposed to health education
Parents of children referred exposed to health education
Outcome indicators (%)
Proportion of children enrolled in schools who are screened
Proportion of children 5–10yrs requiring spectacles who receive them
Proportion of children 11–18yrs requiring spectacles who receive them
Proportion of children 5–10yrs receiving spectacles who wear them
Proportion of children 11–18yrs receiving spectacles who wear them
Proportion of children 5–10yrs referred who access eye care services
Proportion of children 11–18yrs referred who access eye care services
Proportion of teachers requiring spectacles who receive them
Proportion of teachers referred who access eye care services
Impact
Number of children undergoing sight restoring surgery
Change in quality of life / visual functioning in children wearing spectacles
?? school attendance
?? school performance

Appendix 4b. Flow diagram for monitoring school eye health programs



Appendix 5: Roles and responsibilities of personnel involved in School Eye Health Programs

Note: The following apply to the model where optometrists/refractionists visit schools to refract, and spectacles are delivered to each child in each school

Program manager (PM)

Attributes

- + Medically trained or trained in public health; program management experience. Preferably ophthalmologist or optometrist with management skills

Responsibilities

- + Overall management of the program
- + Planning all aspects of implementation
- + Managing finances and other program staff
- + Coordination and collaboration with partners, sensitization of other stakeholders
- + Seeking permissions
- + Troubleshooting
- + Procurement
- + Leadership and motivation
- + Managing data
- + Communication
- + Monitoring: ensure regular reporting; compilation; use indicators to identify problems
- + Evaluation: initiation and planning
- + Reporting to donors, Ministries and other stake holders
- + Technical Program Manager will report to PM

Technical Program Manager

Attributes

- + Skills in planning and management; communication and organization

Responsibilities

- + Communication: liaison teachers, for consent with parents

- + Coordination: timetable for screening in collaboration with the school contact teacher/ head teacher through the liaison teacher
- + Ensures an appropriate contact teacher is identified by the head teacher
- + Contact point for contact teacher
- + Relationship building with person respected by head teachers after intro by liaison teacher
- + Organize a venue for screening: a decent size room, clean
- + Communicate what screening will entail with head teachers etc. If child needs treatment what will happen
- + Arrange dates for sensitization in school assembly
- + Train and manage screeners
- + Follow up children referred
- + Answering technical questions from Contact Teachers i.e. phone calls

Coordinator (could be a District level teacher)

Attributes

- + Knowledge (authority/relationship) of all schools and teachers in the county
- + Good relationship with senior education authorities

Responsibilities

- + Works with program manager to seek permission and planning
- + Coordinate screeners teachers with for screening
- + Visit every school
- + Sensitize head teachers
- + Appoint contact teachers
- + Allocate schools for screening
- + Day-to-day management of screeners
- + Logistics
- + Maintain record of number of children screened and referred

Head teacher

- + Identifies contact teacher
- + Date for assembly sensitization
- + Fix a date for screening

Contact teacher (one for each school)

Attributes:

- + Knows and understand the family situation of the child i.e. financial, other issues
- + Knows if there are any other children have eye problems

Responsibilities

- + At school level, prepares the venue
- + Liaises with class teachers to ensure flow of children for screening
- + List ready of children to be screened, gender, age, contact number for parent, which parent
- + On the day helps screener
- + Record of those screened and those referred
- + Follow up those who have/have not gone for treatment –how?? Contact parent?

Class teacher

- + List of children that require screening
- + Contact teacher and Peek user assistance
- + Names, phone numbers
- + Facilitate the contact teacher with screening
- + Crowd control on the screening day

Screener

- + Liaise with contact teacher
- + Check screening venue
 - Measure room distance (2m)
 - Refresh child on how E (seat)
- + Screen children and record findings as per SOP
- + Ensure children who fail screening are referred for refraction
- + Prepare list of children who fail screening for contact teacher and refractionist

- + Collects spectacles, delivers them to school and works with contact teacher to ensure the correct children are given the correct spectacles

Senior optometrist in partner eye hospital / department

- + Maintains close communication with Technical Program Manager
- + Allocates optometrists / refractionists to schools
- + Ensures correct spectacles are made up for all children requiring them

Optometrist / refractionist

- + Refract according to SOP
- + Prescribe according to SOP
- + Record prescription
- + Ask child to select preferred frames
- + If vision does not improve with refraction record a preliminary diagnosis and refer according to SOP
- + Give child needing spectacles or referral an information sheet for their parents
- + Give contact teacher lists of children a) who fail screening and require spectacles b) referred
- + Give list of children who require spectacles to the relevant dispensing optician

Parents

- + Take child to eye care provider, if referred
- + Pay for treatment – mechanism required to support the child with financial barriers

Community opinion leaders

- + Encourage children to be screened and to wear their spectacles
- + Encourage parents to take child for treatment e.g. not spectacles

Child welfare officer

- + Work with community leaders to encourage parents and children to comply with recommendations, if required.

Children

Recommended duration of training of screeners and eye care professionals

Cadre	Training
Screeners (Health workers, teachers and nurses)	+ Eye and vision screening for school aged children (5-18 years) + 5 hours
Eye care personnel - Refraction (Optometrists, Ophthalmologists, Ophthalmic Clinical Officers (OCO), Ophthalmic Nurses (ON) and other cadres qualified to provide refraction services)	+ Refraction and prescribing for children + 14 hours
Optical dispensers (Dispensing opticians, optometrists, OCO, ON and other cadres qualified to provide dispensing services)	+ Dispensing for children + 3 hours
All cadres	+ Child protection and gender equity + Documentation; monitoring + 4 hours

Appendix 6. Tips for dispensing spectacles for children

Spectacle frames

Young children do not have a bridge to their nose. Spectacle frames for children must be selected carefully. The characteristics of good children's frames are:

- + A larger frontal angle (Figure 1) i.e., the angle formed by a line parallel to the rim of the frame where it rests on the nose and the perpendicular line dividing the nose in two (viewed from directly in front). Metal frames with pad arms allow the frontal angle to be adjusted.

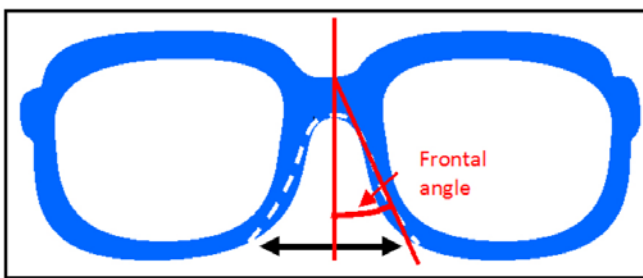


Figure 1 Frontal angle

- + A larger splay, see Figure 2 (The angle formed by a line parallel to the rim of the frame where it rests on the nose and the perpendicular line dividing the nose in two (viewed from above). Metal frames with pad arms allow some flexibility in adjusting the splay.

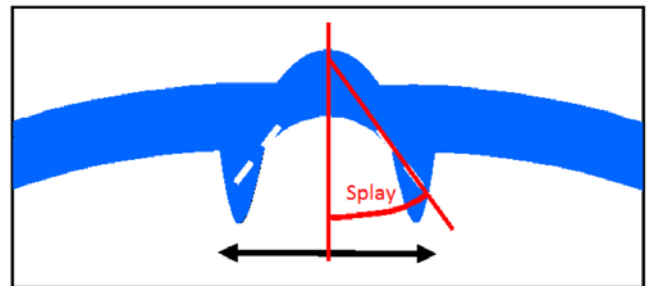


Figure 2 Splay

- + A flatter pantoscopic angle (Figure 3 i.e., the angle at the vertical plane between the optical axis of a lens and the visual axis of the eye in the primary position (horizontal)—with the lenses tilted forward.

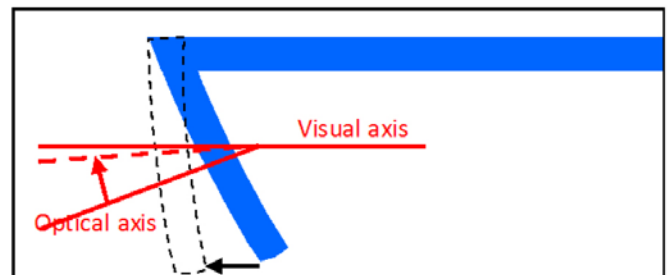


Figure 3 Pantoscopic angle

- + A lower crest, see Figure 4 (crest height is the distance from the horizontal centreline to the crest of the frame).

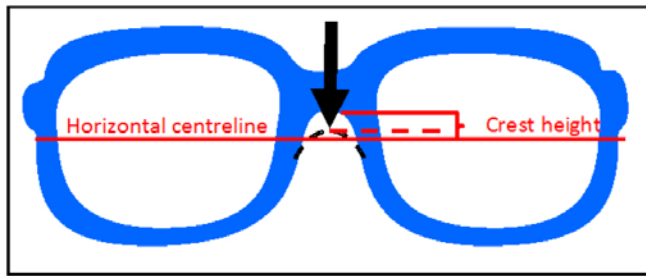


Figure 4 Crest height

- + Ability to shorten sides (sometimes referred to as temples). The plastic covering the end of the side can be removed, the wire cut to shorten the side, and the plastic refitted. The angle down (see Figure 5) should not extend beyond the ear lobe.



Figure 5. Angle down

- + Spring hinges mean that the frame is less likely to go out of adjustment if the child takes the spectacles of with one hand. Also, the frame will absorb some of the impact if hit by an object such as a ball.

In addition to the above characteristics:

- + Make sure that the frames have no sharp edges which may cause injury if the frame is struck.
- + Match the frame width to the child's face. Avoid choosing a frame that they can "grow into".

A frame that is too wide will be easily knocked off, and will result in thicker lenses than necessary. Children are also likely to reject oversized frames.

Lens material

The ideal lens material should be:

1. Impact resistant – do not use glass lenses. Scratches on lenses reduce impact resistance. Lenses should be replaced regularly or if badly scratched.

2. Light and comfortable (all plastic lens materials meet this criterion).
3. Able to cut out ultraviolet (while polycarbonate is the most effective material in cutting ultraviolet all plastic lenses perform adequately).
4. Relatively thin. If possible higher refractive index plastic materials should be used for higher powers.
5. Relatively durable. When coated all plastic materials perform adequately.

The best option for children is polycarbonate. Where this is not available CR-39 (also known as ADC* or allyl diethyleneglycol carbonate) is an acceptable alternative. Some ready-made spectacles may have acrylic plastic lenses; this is also acceptable.

* This is the preferred term in standards documents because it is not proprietary.

Ready-made spectacles

Ready-made spectacles in low to moderate plus powers have been used for many years as a simple means of correcting presbyopia. They are now available in powers from -6.00 D to $+6.00$ D, making them useful for correcting distance refractive errors in children. They are usually available in both metal and plastic frames with plastic lenses.

Ready-made spectacles are suitable for children where:

- + anisometropia (the difference between the two eyes) is less than 0.50 D
- + astigmatism is less than or equal to 0.75 D
- + prescribed prism is less than or equal to 0.5 D

Ready-made spectacles should preferably be limited to powers less than or equal to ± 3.50 D with the exception of outreach programs¹⁴. If powers outside this range are used then full quality assurance checks should be carried out where possible.

Ready-made spectacles of less than or equal to ± 3.50 D should be checked visually for faults and flaws, notably surface waves¹⁵.

14. Delivery of custom-made spectacles back to outreach sites can be difficult, therefore a wider range of ready-made spectacles may be needed for such programs.

15. Powers of less than or equal to ± 3.50 D are relatively unlikely to fail on criteria requiring measurement by a focimeter. Therefore, focimeter checking for powers within the range -3.50 D to $+3.50$ D is not required; a brief visual inspection will suffice.

Ready-made spectacles should be an appropriate physical fit and be adjusted to suit the wearer by a trained person.

If children are to be prescribed ready-made spectacles they should be of an appropriate size and particular consideration should be made of the PD.

Ready-made spectacles should be cosmetically acceptable

Ready-made spectacles should be supplied under the guidance of a qualified practitioner, and only when custom-made spectacles are not available or affordable.

Recycled spectacles

Recycled spectacles are used spectacles donated by members of the public. The International Agency for the Prevention of Blindness (IABP) recommended that groups involved in eye care should not accept donations of recycled spectacles nor use them in their programs as “no amount of efficiency and effectiveness in the delivery chain can justify the output and outcome of this recycling scheme.”

Adjustable spectacles

Several types of self-adjusting spectacles are available. However, self-correction involves trial and error and bypasses clinical refraction. Self-refraction can lead to overcorrection of myopia, under correction of hyperopes as a result of accommodation¹⁶ and cannot correct astigmatism. Self-adjustment should not be used in school eye health programs.

Custom-made spectacles

Custom-made spectacles require access to an edging and fitting workshops and access to uncut spectacle lenses and spectacle frames. They are the ideal solution to refractive error, particularly in cases of significant astigmatism or anisometropia. However they are more costly since they are more labour intensive and require a production facility.

Spectacle frames

Cosmesis and comfort are essential for compliance. Children must be comfortable about wearing the spectacles which is assisted by allowing children to choose the frames they prefer from a range of metal and different colored plastic frames. Gender has also been identified as a perceived barrier in use of spectacles. The sensitivities of young girls needs to be considered, or boys concerned with their appearance.

Prescription of spectacles should be accompanied with health promotion especially with peers, teachers and parents.



16. Holden, B. & Resnikoff, S. 2002. The role of optometry in Vision 2020. *Journal of Community Eye Health* 15, 33-36.

Sightsavers

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