IAPB School Eye Health Guidelines

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IAPB School Eye Health Work Group

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IAPB School Eye Health Guidelines for Programmes in Low- and Middle-Income Settings 2024

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Important notice:

Any organisation working with or for children should reflect on the risk associated with their activities. Programme makers should consider possible child protection risks that could be identified in projects and how to mitigate them through safeguarding policies.

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1. School Eye Health Guidelines

The purpose of these guidelines is to provide direction to those planning and implementing eye health initiatives for schools, including policy makers, health care and educational authorities, health planners, organizations that provide eye care and other professionals involved in addressing the health needs of children. In situations where resources for eye health are limited, decisions need to be made to ensure that programmes 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 also be developed at the outset.

These guidelines represent minimum clinical guidelines for school eye health, with a focus on low- and middle-income countries. Where they exist, in-country formal and legal guidelines or protocols for school health or eye health should be considered and integrated.
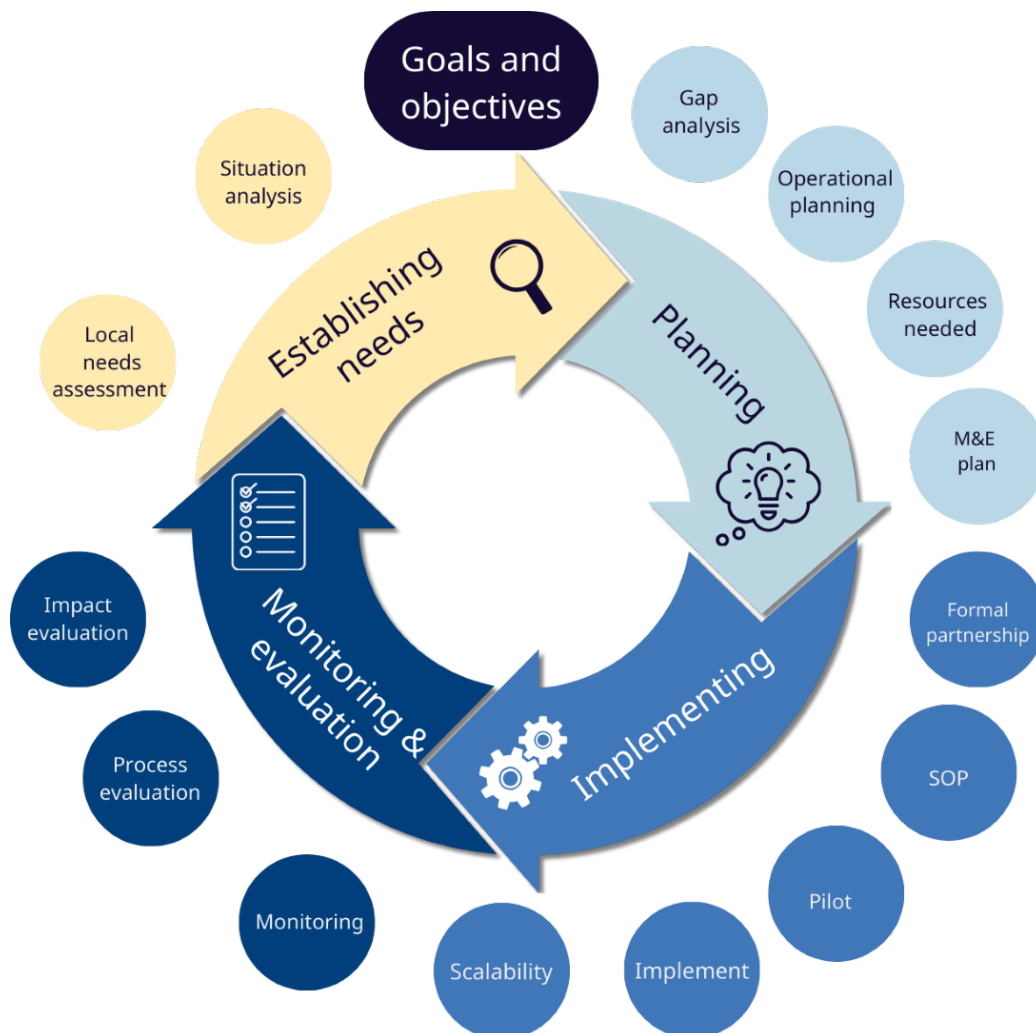
# 2. Planning & implementation


2.1. Local needs assessment

Prevalence of URE and other eye conditions may vary depending on the regions. In order to plan effectively school eye health programmes, local assessment of the needs is required to ensure relevance of the interventions. The extent of uncorrected refractive errors and NVIC needs to be assessed not only for children but also for teachers.
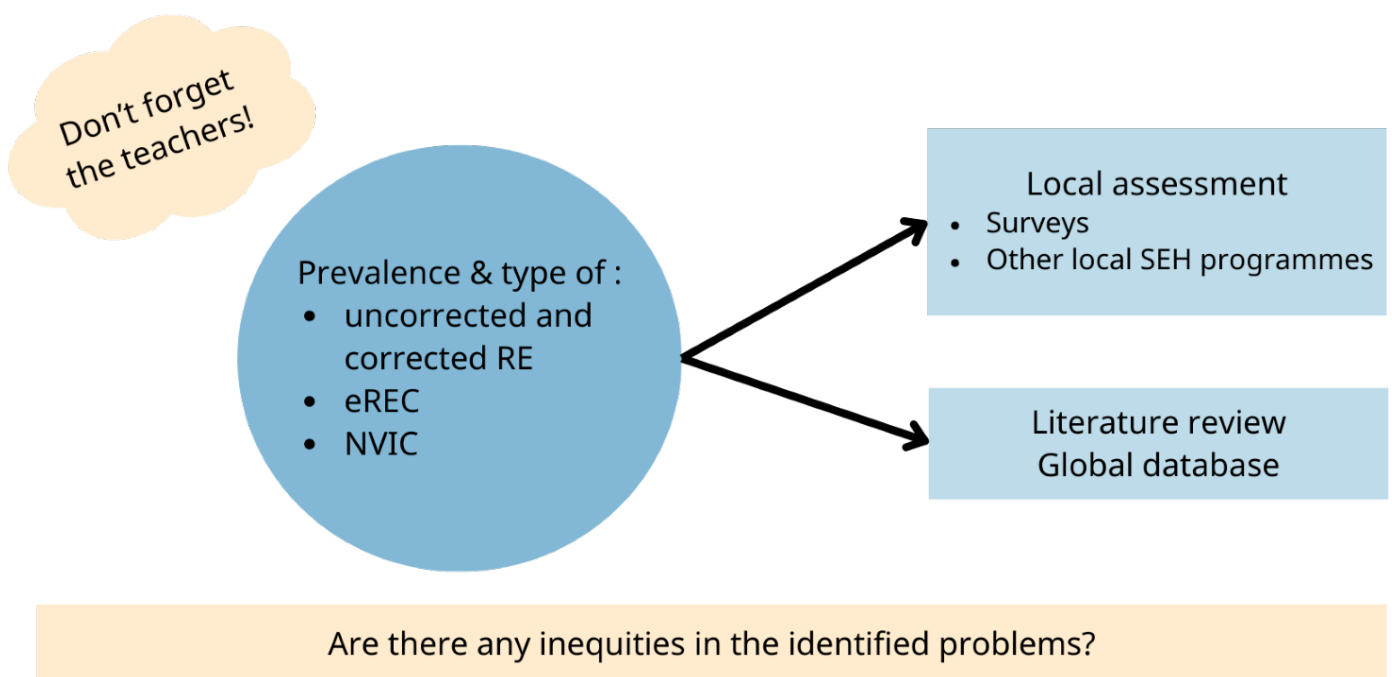
2.1.1. Situation analysis

Understanding the national and local context in which the programme will be embedded is an essential step in planning. In fact, collaboration with ministries, schools, and local eye care providers is crucial for sustainability, so a good understanding of the current situation is required.
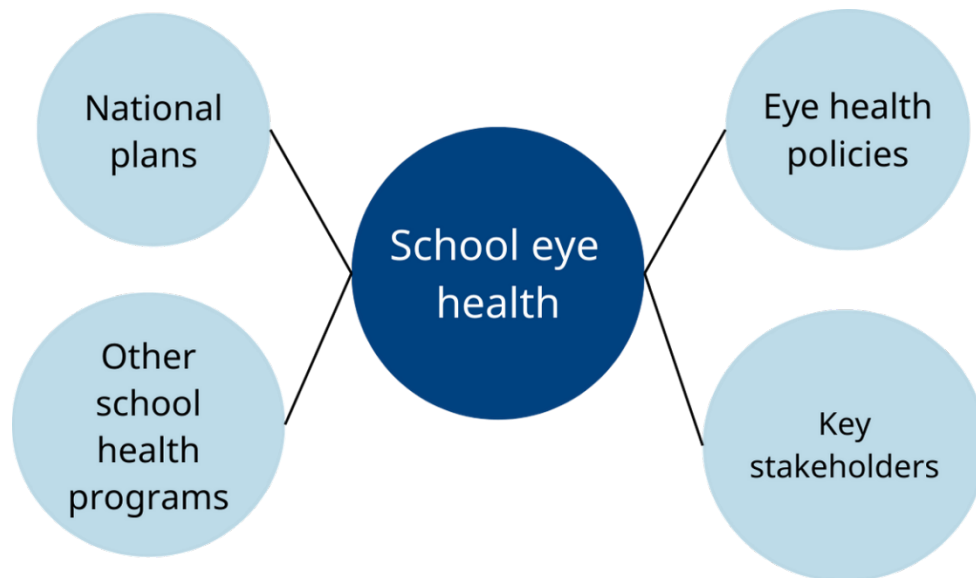
An early sensitisation meeting with representatives from ministries of health and education, and other key stakeholders is recommended. They can contribute to the endorsement of the programme, identification of other school health programmes that can be integrated and help in the selection of schools to target. Key informant interviews can be useful to complete the situation analysis and a review of any prevalence data or other eye health program data, monitoring or published available.

A complete situation analysis should include overviews of:

- National legislation, policies, regulation and sector strategies for eye care
- National health and education plans and approaches
- Eye care services delivery environment
- Available human resources (including training, screening and monitoring)
- Supply chain (glasses, equipment)
- Potential barriers

*based on Peek Minto Module

See Appendix 1 + link: WHO's stakeholder mapping tool

2.1.2. Cultural considerations

With regards to eye health, culture can impact people's perceptions of diseases and what they are willing to communicate with health workers; health-seeking behaviour; understanding of the treatment process, options and decision making; interactions with program staff and health services; attitudes to outsiders, helpers and authorities; gender norms and differential treatment of boys and girls; and community attitudes (and potentially stigma) towards vision impairment, disability and wearing glasses.

Therefore, diversity, equity and inclusion considerations should be part of the initial meetings between program managers, partners and relevant stakeholders to adapt the program to the specific context.

2.2.   Goals and objectives

Formulating the goals is a key step in the development of a programme. A goal is the positive change that would come about as a result of successful implementation of the programme. It represents the ultimate outcome that we want to achieve. Multiple goals can be formulated to cover different parts of the programmes. Once the goals have been established, the inputs and activities required to reach these goals need to be determined. A theory of change or logic model can help in visualising the steps leading to the desired outcomes.
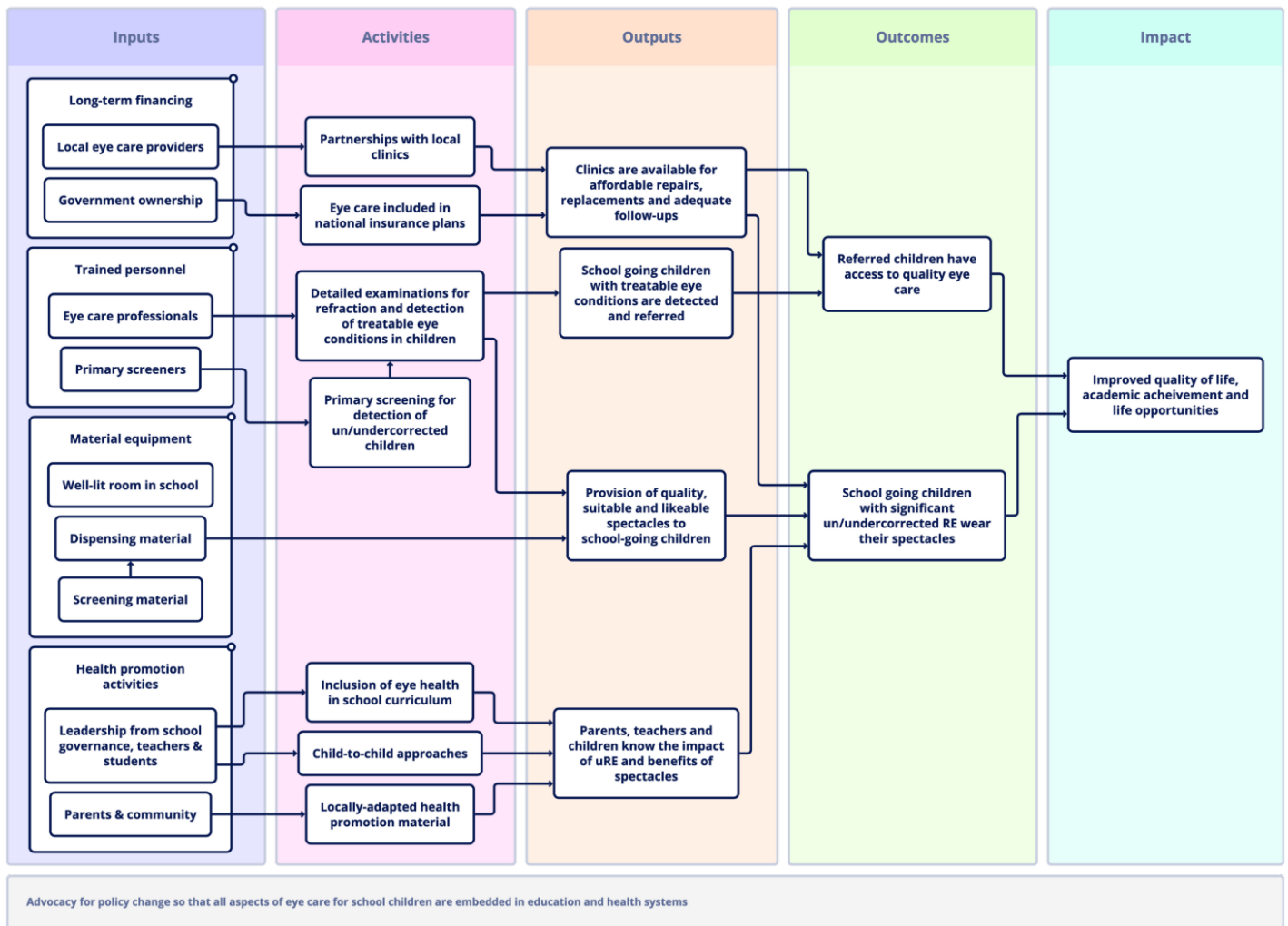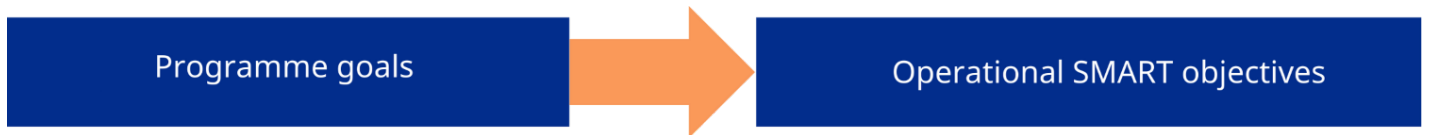
For each outcome, a SMART objective must be formulated: specific, measurable, attainable, relevant and time-based.

e.g. To screen XX children aged 7-15 years in one year; To dispense XX spectacles to children, % of which will be ready-made spectacles; To refer XX children to hospital for treatment (examples from CEHJ)

Assessing the gaps between the current situation and the 'ideal' situation can help formulate the objectives.

Potential barriers to the programme should also be considered and assessed when planning the programme.

Qualitative research such as focus groups or key informant interviews can be useful to identify local barriers if a lack of information or local contextual understanding exists.
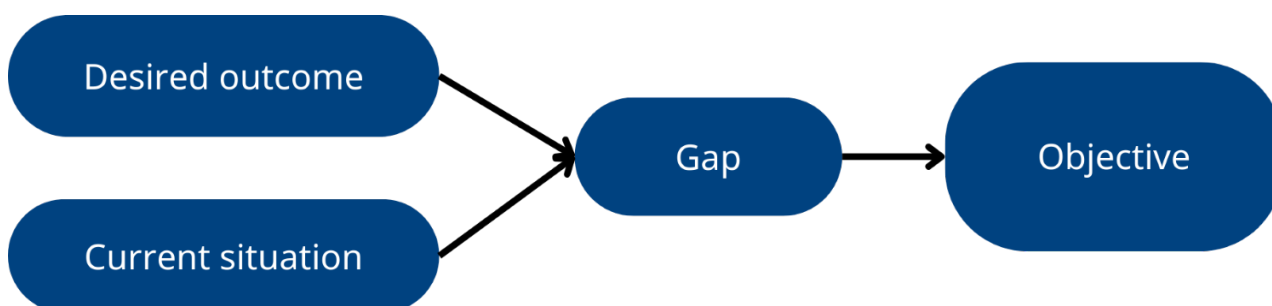
Example: Girls do not like wearing glasses. School nurses are overloaded.

Desired outcome	Current situation	Objective	Potential barrier	Possible solutions
All children wear their spectacles	Only 30% of children wear their spectacles	Obtain 70% spectacle wear rate at 6-months follow-up	Girls don't wear their spectacles because they are teased	Let the young girls choose their frames with a friend Targeted education campaign in schools

2.3. Operational planning

Once the goals and objectives of the programme have been clearly stated, it is time to reflect on the activities and operational procedures of the programme. Evidence-based protocols should be chosen based on available personnel (e.g. WHO screening implementation guidelines, REACH, WCO Paediatric resource).
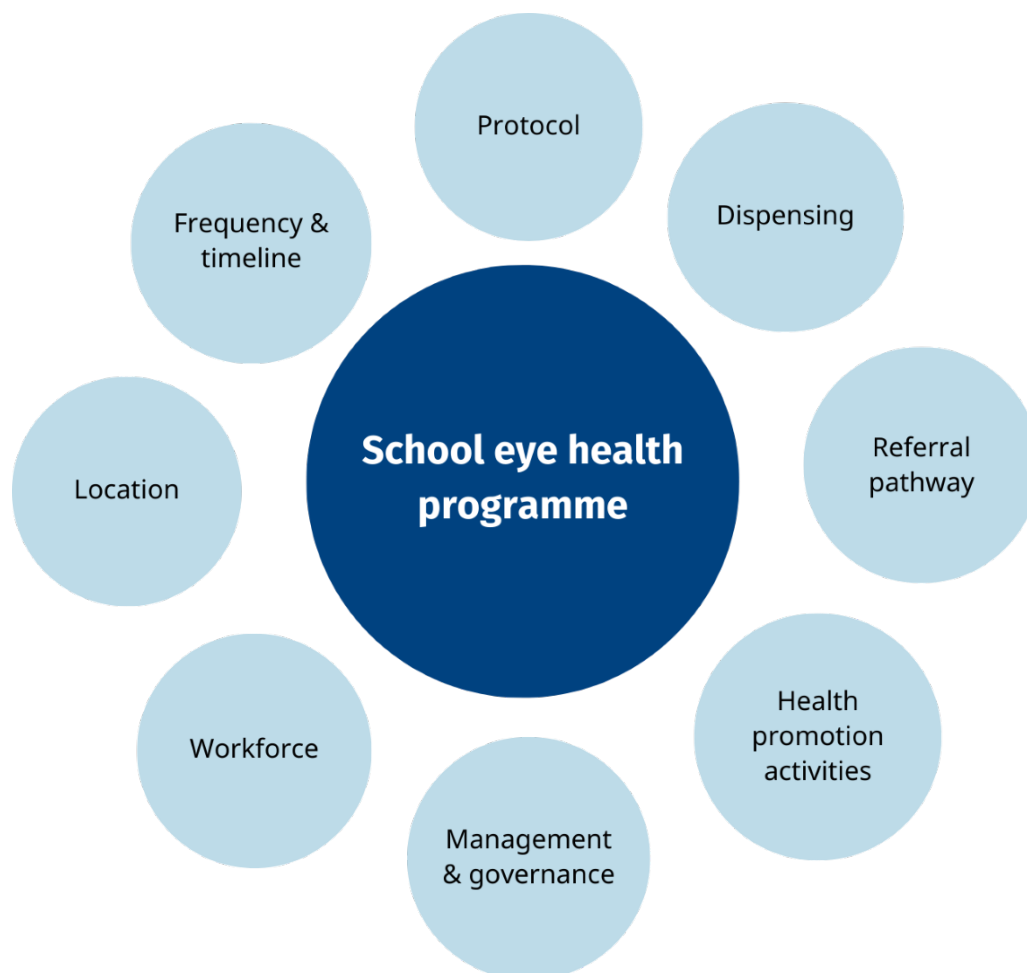
Key elements to consider in planning:

Provision of spectacles: An efficient mechanism must be in place to procure affordable high quality spectacle frames and lenses. 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.

Treatment of non-visual impairing conditions (NVIC): Basic medication should be made available during screenings to avoid unnecessary referral to eye hospitals. Delivery of these medications should be done by a competent health professional in accordance with the country's legislation, and based on the child's symptoms and examination. School or ophthalmic nurses can be useful resources to provide counselling and treatments at the school site (e.g. for allergies and minor ailments).

Referral mechanisms and tracking update of referral: Children whose vision do not improve with refraction should be referred to specific eye hospitals or 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 using referral slips and a register at the hospital, or electronic systems could be used. Ideally, collaboration between the hospitals and the schools should develop into a permanent partnership that could ensure a continuous pathway of care for children who would need it.

See Appendix 2

2.3.1. Resources needed

Based on the previous steps, resources should be estimated for each component of the programme.

Human resources	Financial resources	Material resources
Screeners	Budget for pilot, implementation, scaling, and monitoring & evaluation	Equipment
Managing team		Health promotion material

2.3.1.1.   Human resources:

Screeners: teachers are sometimes a cost-effective workforce, but they need constant training and motivation, which can be one of the most expensive components in screening programmes. Community-level workers such as allied health workers or school nurses show better outcomes for screening. Consideration for integrated screeners who can screen other health areas like hearing and oral health.

Eye care providers: When available, eye care professionals are a great addition to the screening teams. Ophthalmologists, optometrists or optometry students can provide detailed examinations on site based on their competencies and national legislation (retinoscopy, refraction, cycloplegia, binocular vision). Delivery of eye care in school minimises drop out in attendance of referrals but comes with a cost. If such professionals are not available for school screenings, trained health professionals such as vision technicians, refractionists, allied ophthalmic personnel or ophthalmic nurses can do a triage following initial screening and refer as appropriate.

Managing team: all programmes 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 stakeholders. They are also usually responsible for initiating midterm reviews and end of programme evaluations. The overall processes and procedures of the programme will have to be governed in a manner that ensures the provision of quality eye health services to children in a way which promotes equity.

2.3.1.2.   Financial resources:

The different components of the plan should be costed, and funding sought from the government, non-governmental organizations, community based and service organisations and commercial enterprises willing to support the programme.

2.3.1.3.   Material resources

Child-specific material, with locally affordable instruments, technologies, topical medications and spectacles based on the selected protocol

Health promotion material: locally relevant material should be developed. Community, parents, teachers and children should be involved in health promotion activities to ensure compliance after screenings.

The design of your school health intervention will impact the materials and resources required, the training needs and human resources and the extent of service provision being offered during different phases of the program. For example, an integrated screening day may include screening and some basic provision of services such as glasses as well as referral but a school eye health program may only include the delivery of eye health awareness by teachers and basic screening, with children referred to trained services if needed.

2.4.   Implementing
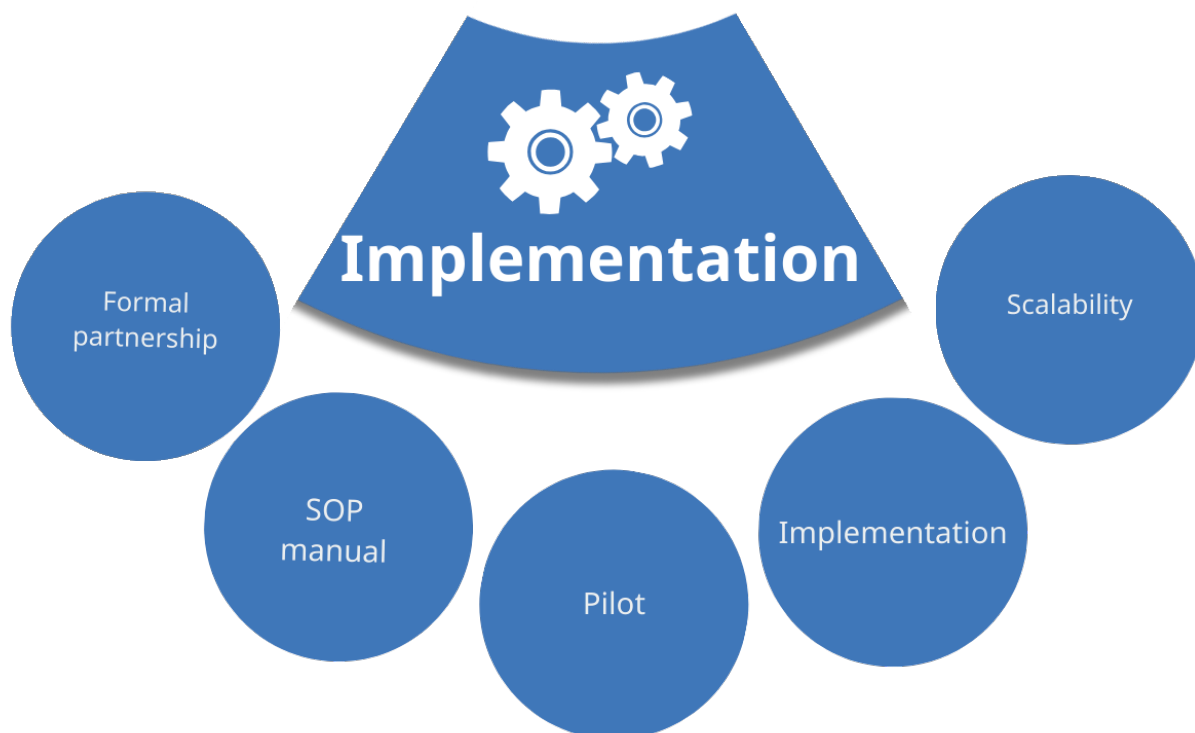
2.4.1. Formal partnerships

Once the programme is planned, it is time to present and validate the feasibility of the programme to the key stakeholders, namely the ministries, the local eye care professionals, the spectacles providers, etc. Communication must be adapted to each partner, keeping their own interest in mind.

Relationships with financial partners should also be confirmed. Once the main partners are on board, the managing and staff teams can be hired and trained accordingly.

Link: messaging tool

2.4.2. Standard Operating Procedures manual

Standard Operating Procedures (SOPs) are highly desirable to ensure that activities are implemented in an evidence-based, uniform, consistent, high-quality manner. Standard Operating Procedures provide a step-by-step guide on who should do what and how.

2.4.3. Pilot

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

The SOP may need to be modified after the pilot. Pilots can include surveys on children's preferences for spectacles to validate frame options.

2.4.4. Programme implementation

Once the programme is ready to be implemented at a larger scale, collaboration between the team and the school must be coordinated. The Ministry of Education can help identify school head teachers willing to participate in the programme. The head teachers are a vital link to any school related interventions and they must be brought on board at an early stage of the programme. For large programmes, it is advisable to have a District level liaison teacher who coordinates with the contact teachers (see HR section).

2.4.5. Scalability

Long-term, integrated, large-scale programmes are obviously the ultimate goal for most organizations and countries. However, dependency on NGO's financing and lack of government's engagement may limit national deployment. Recent publications have described successful implementation of national school eye health plans, namely in Zambia[29] , Malawi [30] and India[31]. Key factors for successful integration include[5]:

- Adequate resource allocation (human resources and funding) from government and long-term, bilateral funding from international stakeholders
- Advocacy for integration of eye care in national health plans
- Community partnerships with government during implementation
- Teachers' and students' engagement
- Monitoring data collected and analysed (including costing data)
- Centralised data systems
- Clear clinical and operational guidelines
- Appropriate referral pathways in the health system

2.5.   Monitoring & Evaluation
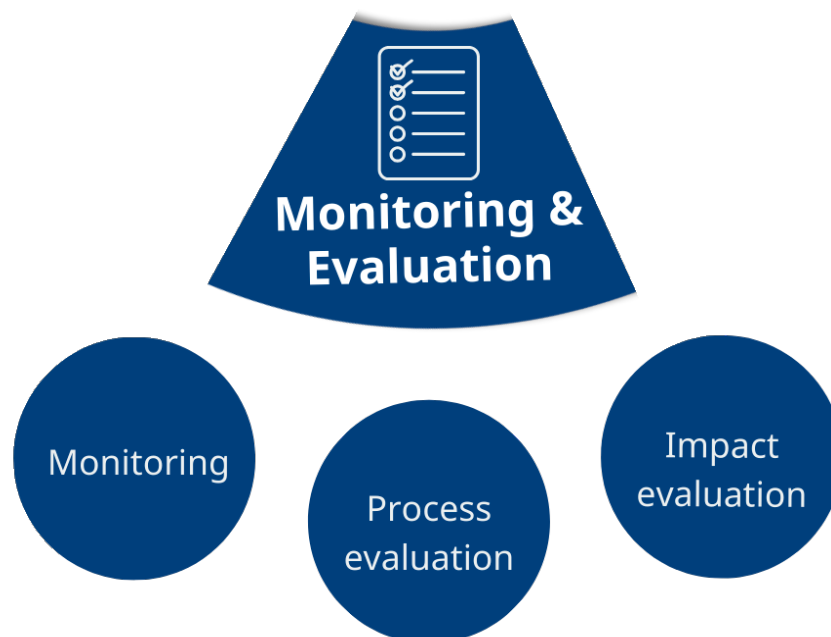
Outcomes are very relevant to stakeholders in order to continue, improve or stop programmes. Quality data must be gathered during all stages of implementation, so a clear monitoring framework and evaluation plan with specific indicators should be established during planning. Time and personnel resources should be planned accordingly to ensure continuous monitoring throughout the whole duration of the programme.

Monitoring: Monitoring aims to track performance of a programme over time with indicators that are collected on a regular basis. An initial evaluation of spectacle wear, wearing behaviour, adaptation problems etc. should ideally be carried out after just a few weeks. Periodic monitoring and auditing the referrals by screening personnel and compliance with spectacle wear after 6 months are also important.

Evaluation: Evaluation on the other hand, provides feedback on how the programme was implemented (process evaluation) or its impact (impact evaluation). It can be conducted at mid-course or at the end of the programme, and should be undertaken by external individuals who have relevant expertise.

	Monitoring (and auditing)	Process evaluation	Impact evaluation
Objectives	track performance of the programme over time	assess if the programme was implemented as planned and if not, why not	assess the extent to which the goals and objectives have been met, and if not, why not
Examples of indicators	number of children/teachers screened, screening accuracy, referrals, spectacle wear, attendance rates	satisfaction of the children, teachers, parents and other stakeholders with the processes;	impact of spectacles on quality of life and visual functioning of children and teachers impact on school attendance or academic performance compliance on spectacle wear and follow-ups, and reasons for noncompliance.

Initial screening Visual Acuity

Number enrolled in school (relevant age)

Number not available for testing

Number and % of children available for testing

Number of children not screened

Number and % of children screened

Number that could not be screened

Number and % that failed screening

Number and % that passed screening

take 10% for re-test (false negatives)

Coverage

Why didn't we reach all children? How can we reach them?

All data should be disaggregated by age & gender

Refraction

Number and % with good VA on retesting (false positives)

Number and % with poor VA on retesting

Number of children not refracted

Number and % of children refracted

Number and % referred to eye clinic

Number and % for whom spectacles were prescribed

Quality of screening

Suffisant training? Motivated screeners?

Need & uptake for refraction

Outtcomes & impact

Number examined in eye clinic

Number who did not get spectacles

Number and % who received spectacles

Number and % being treated as recommended

Number who do not wear their spectacles at school/home

Number who wear their spectacles at school/home

Compliance

Why the children don't want to wear their spectacles?

Benefit realised

Children have better functional vision

Benefit realised

**adapted from Gilbert 2017

Monitoring will allow the programme makers to identify if parts of the programme aren't reaching the objectives and take corrective actions to adjust. Main indicators should provide information on coverage, reach, outcomes, compliance, cost-effectiveness and quality of the programme:

Number of children screened: provides information on the reach and coverage of the programme. If the number is low, we need to find out how to reach more children in the school or the community

Number referred / number prescribed glasses: provides information on the outcomes of the programmes; helps planning in a cost-effective manner

Number attending referrals / number of spectacles dispensed: provides information on the impact of the programme; if low compliance, it is necessary to investigate to identify the main causes of non-compliance in the region

Number correctly referred (true positives): indicates the effectiveness of the screening

Number of children missed (false negatives): can be calculated by rechecking a sample, 10%, of the children who passed the screening; indicates the quality of screening

For more information & examples: Gilbert 2017

Given that young girls with refractive disorders carry a higher burden than boys[32], all data should be collected and analysed by sex and disability. This methodology will help compare results between both sex and prevent gender inequalities and promote inclusiveness in the programme.

		Disability (Y/N)	Male	Female	Total
Output indicators (number)					
Training	Screeners trained				
	Eye care professionals (or allied health workers) orientated for detailed examination in schools where applicable				
Screening of teachers	Teachers screened				
	Teachers dispensed spectacles (near and/or distance)				
	Teachers referred				
	Children exposed to health education				

		Disability (Y/N)	Male	Female	Total
Health promotion	Parents (and/or other community members) exposed to health education				
	Parents of children dispensed spectacles exposed to health education				
	Parents of children referred exposed to health education				
Outcome indicators (%)					
Spectacle provision & referrals for teachers	Proportion of teachers requiring spectacles who receive them				
	Proportion of teachers referred who access eye care services				
Impact indicators					
	Number of children undergoing surgery (sight restoring or strabismus)				
	Change in quality of life / visual functioning in children wearing spectacles				
	Improvement in school performance				
Programme indicators					
	Number of spectacles dispensed				

		Disability (Y/N)	Male	Female	Total
Spectacle dispensing	Number and % of children eligible to ready-made / ready-to-clip				
Costing	Cost per child screened				
	Cost per child needing spectacles				
	Cost per child receiving medication				

Links to cost-analysis studies:

- Saravanan (2023) Cost Analysis of a comprehensive School eye screening model from India *https://pubmed.ncbi.nlm.nih.gov/36447358/*
- Minakaran (2020) Cost-minimisation Analysis from a Non-inferiority Trial of Ready-Made versus Custom-Made Spectacles for School Children in India https://pubmed.ncbi.nlm.nih.gov/33256485/
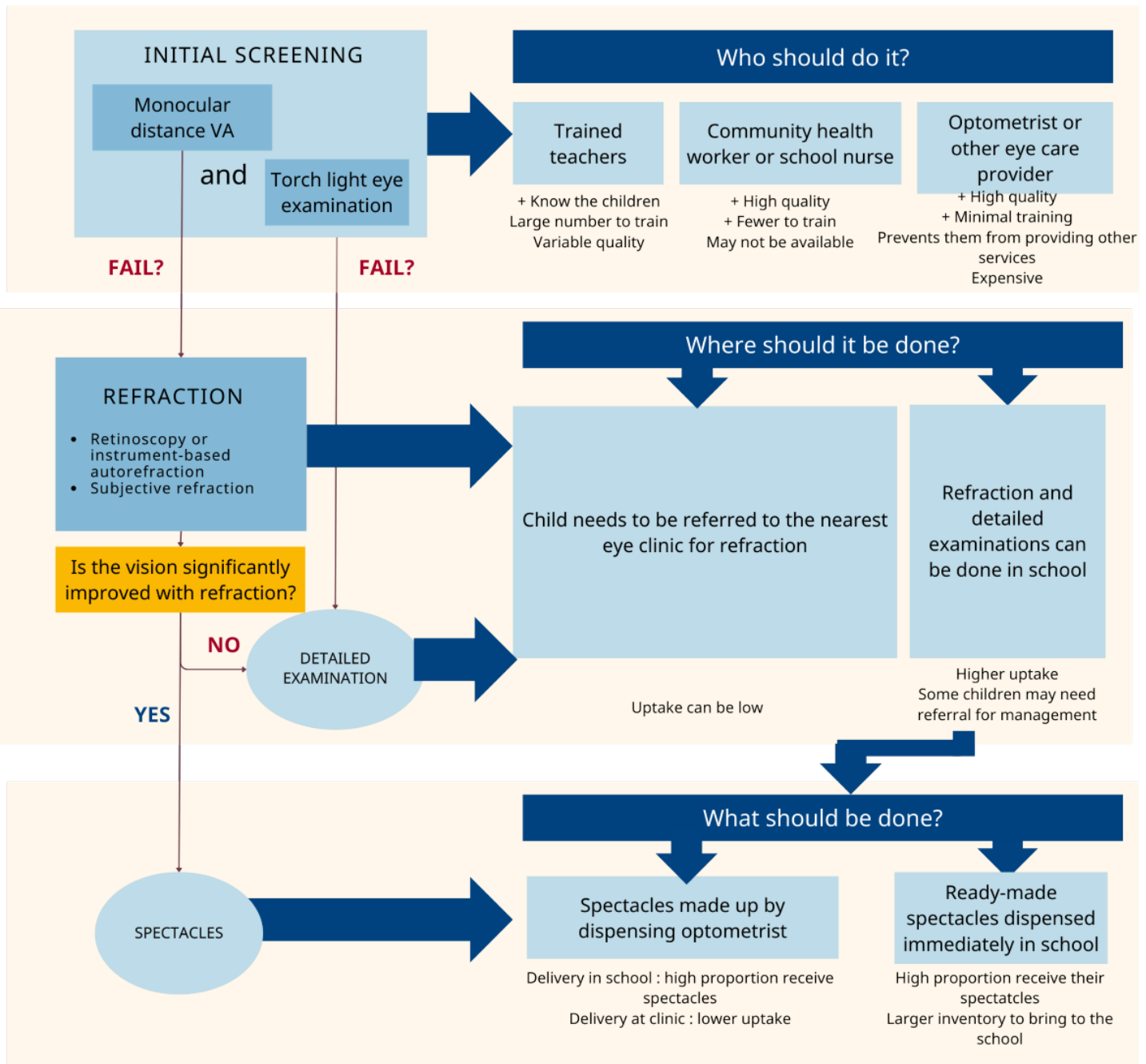
3. Screening guidelines

Standardised protocols with uniform components is essential to monitor and compare outcomes of different programmes. However, it is important to consider available resources when designing a protocol. While comprehensive screenings are recommended, complex tests may be a limiting factor in some contexts[5]. Each approach has its pros and cons (see figure below) so a thorough situation analysis can help decide which model is feasible in each context. The following section presents a multi-stage protocol based on screeners and eye care professionals for detailed examination, but different protocols can be found in the literature, such as [WHO Vision and Screening Implementation](#) Handbook, the REACH programme[33] or [WCO pediatric resource](#).

As mentioned previously, these guidelines represent minimum clinical guidelines for school eye health, with a focus on low- and middle-income countries. Where they exist, in-country formal and legal guidelines or protocols for school health or eye health should be considered and integrated.

Initial steps

1) Meet with school directors, teachers and parents associations (if existing) for early sensitization
2) Ensure child protection practices are in place and consent has been given for the screening to take place
3) Find a quiet, private room with normal lighting; A waiting area should also be designated and supervised by a coordinator to prevent disorganization and distraction of children tested inside.
4) Set-up material: Measure distance VA chart at testing distance (3 to 6 meters), prepare record charts
5) Introduce the screening team and explain the testing procedures to all children (per class) to take away initial fears
6) Screen one child at the time, the others waiting outside

INITIAL SCREENING

Monocular distance VA

and

Torch light eye examination

FAIL?   **FAIL?**

Who should do it?

Trained teachers
+ Know the children
Large number to train
Variable quality

Community health worker or school nurse
+ High quality
+ Fewer to train
May not be available

Optometrist or other eye care provider
+ High quality
+ Minimal training
Prevents them from providing other services
Expensive

REFRACTION
- Retinoscopy or instrument-based autorefraction
- Subjective refraction

Is the vision significantly improved with refraction?

NO   **YES**

DETAILED EXAMINATION

Where should it be done?

Child needs to be referred to the nearest eye clinic for refraction

Uptake can be low

Refraction and detailed examinations can be done in school

Higher uptake
Some children may need referral for management

SPECTACLES

What should be done?

Spectacles made up by dispensing optometrist

Delivery in school : high proportion receive spectacles
Delivery at clinic : lower uptake

Ready-made spectacles dispensed immediately in school

High proportion receive their spectatcles
Larger inventory to bring to the school

3.1. School-based screenings

3.1.1. Initial screening

School-based screenings aim primarily at detecting significant refractive errors in children and dispense glasses to those who need them. Clear criteria should be established for testing and prescription of glasses to optimise compliance and cost-efficiency of the programme. Even if WHO's recommended distance vision indicator (eREC) is 6/12, school-based screenings should aim for a VA cut-off of 6/9 considering the excellent visual potential of children. However, a lower cut-off may lead to a higher false positive rate and therefore increase costs of the programme [5].

While myopia and astigmatism will affect distance VA, hyperopia is much more difficult to detect in a school-setting. In fact, there is no consensus yet on whether to screen children for hyperopia, but testing visual acuity with a +2.00 lens is recommended in these guidelines.

Screenings should also include identification of common eye conditions of childhood such as eye infections (conjunctivitis), lid infections (styes) and allergies (allergic conjunctivitis; vernal catarrh). Even if these conditions may not affect the visual acuity, they may keep children away from school or interfere with learning. Other more serious eye conditions which need to be detected and referred to an eye care provider for management include strabismus (in-turning or out-turning eyes), cataracts and amblyopia.

3.1.1.1.   Distance visual acuity:

- Should be done with usual correction
- Monocular (right then left eye)

Cut-off:

- 6/9 is recommended but may lead to more false positive
- 6/12 can be acceptable if resources are limited

Chart

- One isolated row of five age-appropriate optotypes of 6/9 (approximately 0.2 logMAR) with crowding bars (AAO screening guidelines)
- Appropriate test distance (minimum of 3 meters)
- High contrast black on white should be used, with crowding bars
- Mobile phone technologies can be used if validated in children

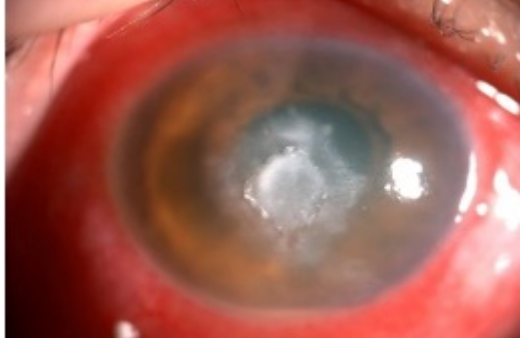Failure of screening is defined as a child sees 3 or less of the 5 letters.

3.1.1.2.   Visual acuity with +2.00 lens (hyperopia screening)

- Distance visual acuity is measured with child wearing a pair of +2.00 D glasses for at least 1 minute to release the accommodation
- A child fails if they are able to pass the 6/9 screening chart with the +2.00 D glasses on or if there is no decline of VA with their existing correction

3.1.1.3.   External eye examination

Use of torch light for examination of external structures. Any child presenting an ocular health problem in one or both eyes should be seen for detailed examination:

- Cornea not transparent
- Pupil not round and black
- Eyes are red with discharge
- White patch on the conjunctiva (Bitot's spot)

Signs of healthy eyes	Signs of unhealthy eyes
The white of the eye should be white in colour Photo courtesy of Brien Holden Vision Institute	A red eye with profuse discharge Photo courtesy of International Centre for Eye Health
The eyes should be straight Photo courtesy of Brien Holden Vision Institute	Outward turn of the left eye Photo courtesy of LV Prasad Eye Institute
The corneal must be transparent and shiny Photo courtesy of Brien Holden Vision Institute	Diseased cornea that is not transparent Photo courtesy of LV Prasad Eye Institute

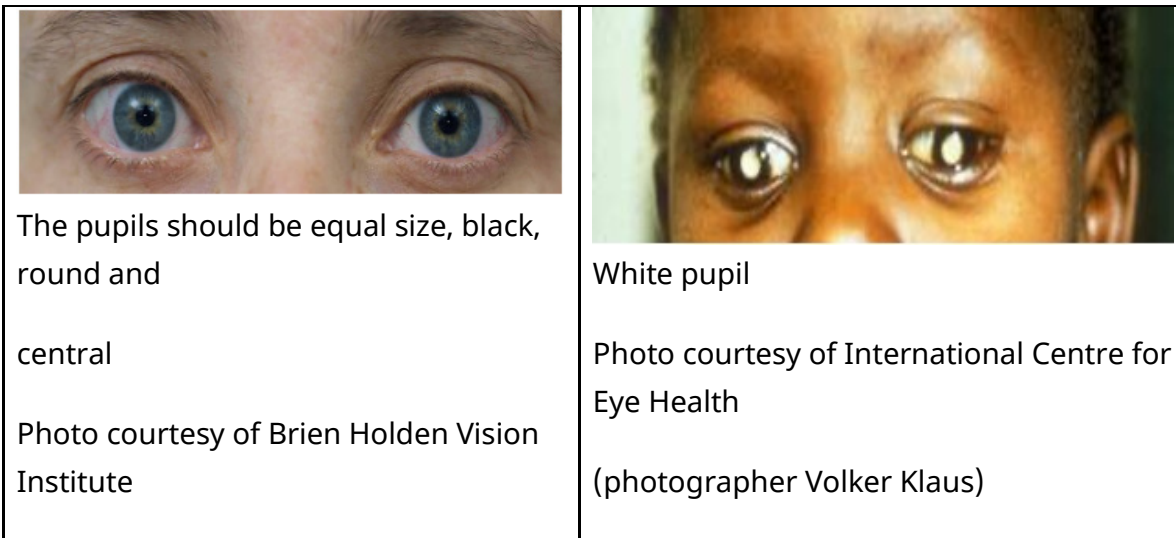|	
The pupils should be equal size, black, round and central Photo courtesy of Brien Holden Vision Institute	White pupil Photo courtesy of International Centre for Eye Health (photographer Volker Klaus)

Figure: Comparison of health and unhealthy looking eyes

3.1.2. Who should do the screenings?

Screening can be undertaken by health care professionals or non-health care personnel who have been trained and who have demonstrated high levels of competency in all the steps involved (i.e., gives adequate explanation; asks the child if they already wear spectacles; ensures adequate lighting and test distance; tests each eye separately; correctly records the findings as pass or fail for each eye), and interprets the findings correctly and identifies children who require refraction.

Trained teachers are typically recommended as screeners, given their direct time in the class room and familiarity with the children, and builds ownership. There is significant evidence that shows that teachers are able to accurately measure and correctly identify children with vision impairment [34-36].

However, recent studies have shown that work overload, insufficient training and lack of time can compromise the efficacy and increase the cost of screenings by teachers [34-36]. Community-level health workers such as school nurses, allied health trainees or vision technicians showed better overall outcomes and should be considered as primary screeners [37-40].

Link: Example clinical vision screening protocol

3.2.   Refractive error management

Detailed examination should be done by a recognised cadre within the health system, with the necessary competencies in refracting children and examination of other non-refractive conditions (for example, optometrists, optometry students, ophthalmologists).

3.2.1. Refraction

Retinoscopy only or instrument-based autorefraction is not sufficient to prescribe glasses for school-aged children. Subjective refraction must follow objective refraction. There are two alternatives for providing subjective refraction:

3.2.1.1.   Directly in schools (vertical approach)

Ensures that a high proportion of children who fail screening are refracted; false negative monitoring can also be conducted by visiting eye health team

Disadvantages:

- requires qualified personnel and equipment = additional costs to the programme
- lack of ownership of eye problems by the community
- may limit cycloplegic retinoscopy as parental consent is required and must be obtained prior to the team visit
- does not build referral pathways to eye care services at the community level

3.2.1.2.   At a local eye care facility that is engaged in the programme* (integrated approach):

Reduces costs to programmes and encourages community ownership, hence greater sustainability

Disadvantages:

- high rates of non-attendance
- additional costs of travel for parents (may result in inequity)
- potential overburdening of local eye care providers

**Referral to optical centres which are not actively involved in the program is not recommended as the quality of the refraction and the spectacles dispensed cannot be monitored.

Referral to the local eye care provider should be made for:

- Any child presenting visual acuity is less than 6/60 in either eye, even if due to a correctable RE;
- Any child presenting a strabismus
- All children whose visual acuity does not improve to normal (6/9) in both eyes with refraction
- Any child requiring cycloplegic refraction (if not done on site)

- Any child presenting an ocular health problem in one or both eyes:
- Cornea is not transparent
- Pupil is not round and black
- Eyes are red with discharge (conjunctivitis or allergy)
- White patch on the conjunctiva (Bitot's spot)
- Conjunctival growths

No child with severe vision impairment (VA <6/60; 1.0) or who is blind (VA <3/60; 1.3) should be referred directly to low vision services, special education or rehabilitation without first being assessed by an primary or secondary eye care professional.

3.2.2. Cycloplegia

if done on site, cycloplegia should be done by a trained eye care professional.

Indications:

- Children uncooperative or difficult to refract
- VA that doesn't improve at refraction
- Media opacities or irregular corneas,
- Presence of strabismus or suspected amblyopia
- Significant progression in myopia or suspected latent hyperopia (fails +2.00 test)

In children over the age of 5 years, 2 drops of cyclopentolate 1% should be administered per eye with 5 minutes separation between instillations. Parental consent is mandatory. Children, parents and teachers should be aware of side effects (blurriness, dilated pupils, sensitivity to light, dizziness etc.)

3.2.3. Binocular vision

To be included in protocol if personnel is qualified

- Cover test both at near and far
- Ocular motility assessment
- Stereopsis
- Accommodation
- Fusion

For more information on these tests: AAO Paediatric eye evaluations PPP 2022

Link: Recommended guidelines for comprehensive eye examinations of children referred to eye care providers for school age children

3.2.4. Prescription guidelines

Provision of quality spectacles can improve a child's vision, reduce discomfort, and even lead to better educational outcomes. 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. Some studies showed that spectacle wear is associated with poorer uncorrected VA and higher levels of refractive error, so prescription of spectacles should be made only when there is a significant improvement in VA [11,41].

Myopia	Hyperopia	Astigmatism	Anisometropia
improvement of VA by 2 or more logMAR/Snellen lines	improvement of VA by 2 or more logMAR/Snellen lines	improvement of VA by 2 or more logMAR/Snellen lines	significant anisometropia i.e. ≥ 2D AND one or more of the following: correctly balanced lenses improve vision of the most affected eye by 2 or more logMAR/Snellen VA lines, and/or noticeably improve eye comfort
	presence of amblyopia and the child's age suggests the amblyopia is potentially treatable	presence of amblyopia and the child's age suggests the amblyopia is potentially treatable	presence of amblyopia and the child's age suggests the amblyopia is potentially treatable
	esotropia or large esophoria	noticeably improved eye comfort	

3.2.5. Compliance: how to get children to wear their glasses?

Spectacle wear rates can be very low after school screenings. The main reasons cited for non-compliance are:

Main reasons for non-compliance	Possible solutions to improve compliance
Broken/lost frames	Dispensing quality frames suitable for children Ongoing partnerships with local eye care providers for repair/replacement of spectacles
Discomfort when wearing spectacles	Provision of quality frames adapted to children Thorough adjustment when delivering the spectacles Regular screenings to prevent children growing out of their frames
Social stigma (teasing, family disapproval, negative perceptions) & misconceptions towards spectacle wear	In-class health promotion activities Integration of eye health in the school curriculum 'Vision champions' in schools Community-based eye health education Parents' involvement in screenings
No perceived benefits	Prescription of spectacles only to those with significant VA improvement

Gathering context-specific data on reasons for non-compliance can be very useful in developing locally-relevant material [11].

Spectacle dispensing: Each child requiring correction should get a suitable, comfortable and adapted pair of spectacles. While best practice is to provide a custom-made pair with exact prescription and PD, it can get very expensive for programmes. Approximately 85% of children who need correction

should be eligible for ready-made or ready-to-clip glasses. These are acceptable and cost-effective solutions for providing quality eyewear to children when custom-made spectacles are not available or affordable[42,43]. They are available in powers from −6.00 D to +6.00 D and can be dispensed on site. However, powers above 3.50 D are not recommended as there could be induced prism if there is a mismatch in pupillary distance. Frames should be selected based on the children's preference. Ready-made spectacles should be supplied under the guidance of a qualified practitioner and should be adjusted to suit the wearer by a trained person. Children who are not eligible should have their spectacles made at a local eye centre[44].

	Ready-made spectacles	Custom-made
Improvement in vision with spherical equivalent lenses	Same or only one line less than full correction	VA with full correction is two lines or more than spherical equivalent
Difference in the spherical equivalent in RE/LE	< 1.00D (<2.00D for ready-to-clip)	>1.00D
Astigmatism	max. of 0.75 cylinder in both eyes	>0.75D cylinder in at least one eye
Maximum spherical equivalent*	+/- 3.50D	No limit
Inter-pupillary distance between the eyes and the frames available	Not more than +/- 2mm	Can be adapted to any PD
Comfort of spectacles frames	As comfortable as custom spectacles	

adapted from [44]

* 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 programmes. Full quality assurance checks should be carried out where possible.

IAPB does not recommend other types of spectacles such as recycled or self-adjustable spectacles for SEHPs.
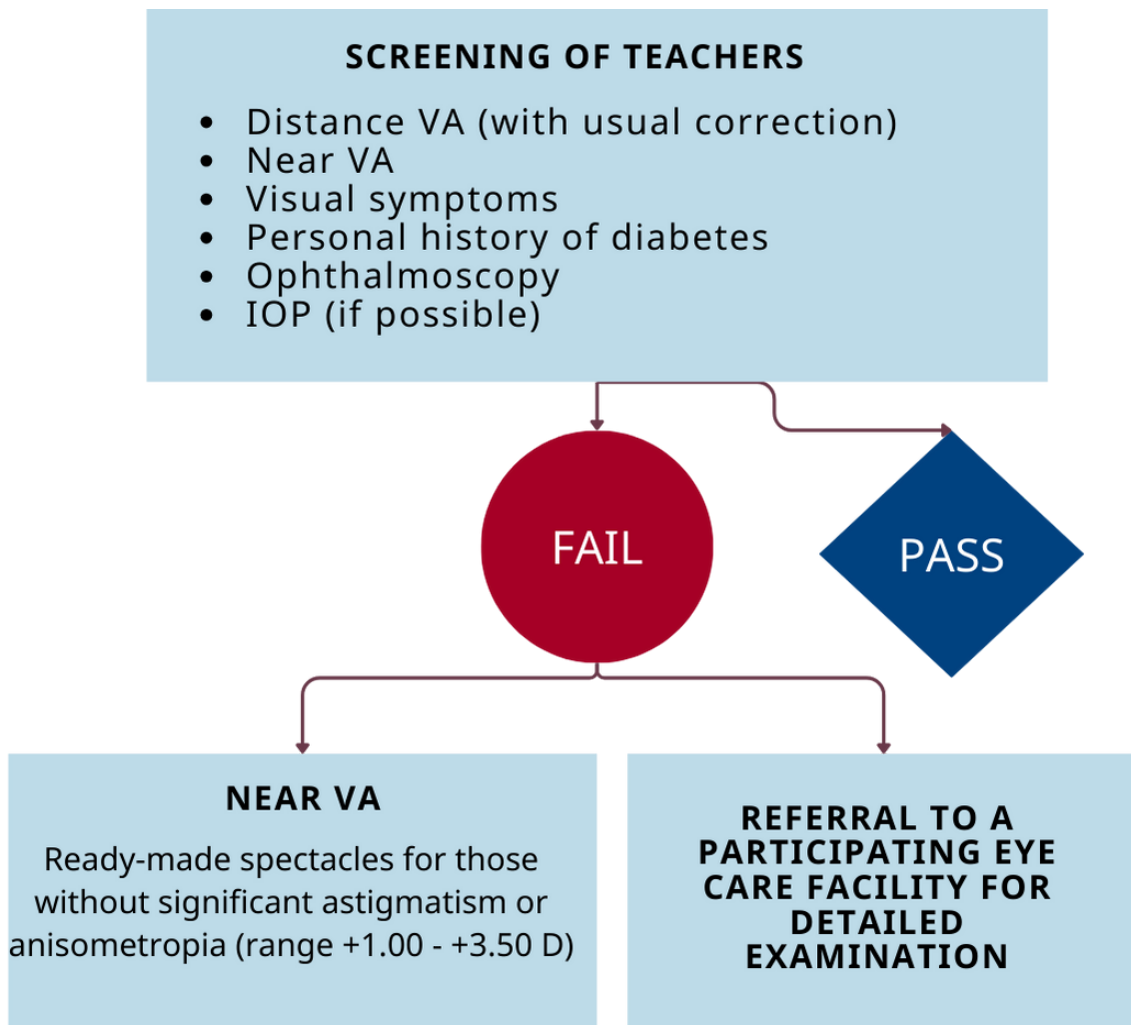
Used spectacles donated by members of the public and are not an acceptable solution for children. The International Agency for the Prevention of Blindness (IABP) recommends that groups involved in eye care should not accept donations of recycled spectacles nor use them in their programmes as <u>"no amount of efficiency and effectiveness in the delivery chain can justify the output and outcome of this recycling scheme."</u>

Self-adjustable spectacles should not be used in school eye health programmes unless they are used under the supervision of suitably trained eye care personnel to prevent over- or under-correction of refractive error. The <u>IAPB position paper</u> states that while these types of spectacles may be a solution to correction of refractive error, they should meet optical standards and be supplied only in conjunction with an eye examination by trained eye care personnel.

3.3.   Teachers

As the eye health of teachers is important for quality education, teachers should be included in school initiatives. Involvement of teachers increases motivation for health promotion activities and reminders on spectacle wear[6]. 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.

SCREENING OF TEACHERS

- Distance VA (with usual correction)
- Near VA
- Visual symptoms
- Personal history of diabetes
- Ophthalmoscopy
- IOP (if possible)

FAIL

PASS

NEAR VA

Ready-made spectacles for those without significant astigmatism or anisometropia (range +1.00 - +3.50 D)

REFERRAL TO A PARTICIPATING EYE CARE FACILITY FOR DETAILED EXAMINATION

3.3.1. Prescription guidelines:

Significant refractive error AND complaints of difficulty with distance or near vision OR VA improved by 2 lines or more with correction

Presbyopia: if plus lenses of 1.00D or more improve near visual acuity, or ease symptoms during near tasks

3.3.2. Conditions to look for in teachers:

Presbyopia: The ability of the eye to focus on near objects declines with age, a condition known as presbyopia. In presbyopia reading and other near tasks become increasingly difficult, particularly under conditions of poor lighting. It affects most adults over 40 years old.

Glaucoma: Glaucoma is a chronic eye condition which affects 3-5% of adults aged 40 years and above in which the optic nerves are progressively damaged. While glaucoma causes no symptoms in the early stages, it can lead to total, irreversible visual loss. Early detection and treatment to lower the pressure inside the eye can prevent blindness. During screening, any teacher with a family history of glaucoma should be referred for a detailed examination.

Diabetic retinopathy: Diabetes is a condition of faulty metabolism of glucose. Its prevalence is increasing in most populations as a result of socio-economic development and changing lifestyles. Complications of diabetes can lead to blindness from diabetic retinopathy. Up to 10% of people with diabetes develop "sight threatening diabetic retinopathy" (ST-DR). Early detection and treatment of ST-DR can be highly effective at preserving sight. During screening, any teacher with diabetes should be referred for a detailed examination.

Cataracts: A cataract is the cloudiness in the lens of the eye that leads to a blurred vision. Other symptoms include faded colours, halos, sensitivity to lights, difficulty with night vision, and change in refractive error. In most cases, it is related to aging of the eye and can be treated by surgery.

3.4. Referral pathways

3.4.1. Referrals to ophthalmologists:

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. Teachers can contribute to ensure follow ups and educate the parents on the importance of uptake on treatment.

Follow-ups on referrals should be covered in the M&E plan of the programme. It is a great opportunity for members of the team to gather information on the uptake on the child's treatment and reasons why it has not been followed if it is the case (e.g. cost, lack of time, misbeliefs etc.).

3.4.2. Referrals to low vision clinics:

After a clinical diagnosis has been made and treatment given, children with severe vision impairment (VA <6/60; 1.0) or blindness (VA <3/60; 1.3) ([WHO classification)](#) should be assessed in a low vision clinic or rehabilitation services and special education.

3.5. Frequency of screenings

School-based screenings should include children starting at the age of 5 or 6 years old. As myopia usually starts during school age, and in some children, progresses over time, schools should be visited every 1-2 years. The frequency of visits may need to be adjusted for the local context, for example in contexts with high annual incidence of RE amongst older children.

Year 1 of implementation	Screen all children as recommended in SOP
Year 2 of implementation	Screen new intake AND re-examination all children given spectacles the previous year
Year 3 of implementation	As for year 2

3.5.1. Basic equipment list for screening and detailed examination

Equipment list should obviously be based on the selected protocol. This example list indicates what is usually required for multi-stage screenings as described earlier.

Initial screening	Detailed examination	Dispensing
Vision screener for three meters (6/9 optotype); appropriate for children ex E, Lea, Snellen) Three-metre rope Near VA chart (& +2.00 if used) Record forms Torch	Visual acuity charts: Distance Near Lea Occluder Auto-refractor (if locally affordable)* Retinoscopes, trial frames for adults and children and trial lenses Cross cylinders and flipper lenses Short-acting topical cycloplegic agents such as cyclopentolate hydrochloride - 1.0% if done on site ** Ophthalmoscope Fixation target (Portable tonometer)	Custom-made spectacles and conventional or clip in and out ready-made spectacles *** Low vision devices

*Auto-refractors and photoscreening can be used as guidance for subjective refraction but not as a replacement of retinoscopy and are not essential for screenings in limited resource settings (Harvey, others). IAPB's technology guide can help evaluate available tools.

**Cycloplegia: use of drops requires pre-approval from head teachers and parents

***Recycled or self-adjustable spectacles should not be used as mentioned previously

3.5.2. New technologies

In the past few years, many technologies were developed in order to increase efficiency and efficacy of SEHPs. While data shows that most of recent innovations cannot replace traditional tests such as retinoscopy, cycloplegia or subjective refraction, these tools can certainly be helpful as screening devices to complement programmes when cost and infrastructures allow it [5,45,46].

However, the software and hardware needs to be monitored and the device calibrated periodically. Here is a non-exhaustive list of recent tools used in screening settings, which is likely going to evolve with emerging technologies. Devices that have been compared to comprehensive eye exams are preferred over those without valid studies supporting the outcomes. IAPB's Eye health Technology Guide can help programme-makers decide on which technology to invest on based on evidence and availability.

	Technology	Utility	Advantages	Limits
Programme management software	Peek Vision	Software to implement, optimise and evaluate eye health services in schools: app-based charts for screenings, SMS referral reminders, Monitoring	Better attendance at hospital follow-ups [47]	No significant improvement in spectacle wear with the health education intervention due to poor fidelity [48]
		Rapid assessment of local needs [49]	Effective planning Data collection	
Refraction*	EyeNetra	Smart-phone powered autorefraction Handheld phoropter	Scientific publications: https://eyenetra.com/science.html	Overcorrection of myopia [50]

	Technology	Utility	Advantages	Limits
		Digital Lensometer		
	Spot Vision Screener	Handheld, binocular photoscreeners for detection of amblyopic risk factors: Designed for younger children; can screen for refraction and other binocular vision abnormalities (strabismus)	Acceptable screening tool to guide subjective correction but not a replacement for retinoscopy [51]	moderate-to-poor low sensitivity for hyperopia, anisometropia and astigmatism [52,53]
	Plusoptix Vision Screener (based on transillumination test)		Minimal time for screening a child and cost-effective compared to Mohindra retinoscopy[54] Most useful device for estimating refractive error in young children with low to moderate levels of hyperopia [46]	Variable validity [54]
	Adaptica 2Win/ 2WinS		Valid at detecting amblyopia risk factors, refractive error and strabismus higher than 10PD [55,56] Cost-effective compared to Mohindra retinoscopy [54]	Poor validity for vertical deviations [57]
	Plenoptika QuickSee/	Handheld monocular autorefractor	High level of agreement with subjective refraction [58-60] Most accurate and patient-prefered	

	Technology	Utility	Advantages	Limits
	[Aurolab e-see wavefront autorefractor](#)		compared to other portable autorefractors according to a systematic review [61]	
	Retinomax K+		Industry standard Child mode: good cooperation with children over 5yo [45]	
Fundus examination	ArcLight	Multi-purpose diagnostic tool for direct ophthalmoscopy and anterior segment loupe	low cost solar powered easier to use than standard direct ophtalmoscope [62,63] can be effectively used to perform the Bruckner reflex test and identify eye disease and common amblyogenic risk factors with higher sensitivity than torchlight [64,65]	
	[D-Eye](#)	Smartphone ophthalmoscopes	uses the camera and the light source from the Smartphone, illuminating the interior of the eye for examination fast, easy to use for non-ophtalmologists[66-68]	variability in quality of images[69] limited options compared to direct ophthalmoscopy (no filters, no fixation target) [70]

*adapted from [71]

4. HR & training tools

4.1. Project management team

Role	Attributes	Responsibilities
Project manager (PM)	Medical or public health background programme management experience Preferably ophthalmologist or optometrist with management skills	Overall management of the programme ·Planning all aspects of implementation ·Managing finances and other programme staff ·Coordination and collaboration with partners, sensitization of other stakeholders; coordination with other school health programmes for possible integration ·Seeking permissions ·Trouble-shooting ·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 stakeholders
Technical programme manager	Skills in planning and management; communication and organization	·Communication: liaison with teachers, obtains consent from 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 ·Organize the venue for screening: a large enough, well lit, clean room ·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 ·Answer technical questions from Contact Teachers i.e. face to face, by SMS or phone calls

Coordinator/ district level teacher	·Knowledge (authority/ relationship) of all schools and teachers in the county ·Good relationship with senior education authorities	·Works with programme manager to seek permission and planning ·Coordinates training of screeners ·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

4.2. School team

Role	Attributes	Responsibilities
Head teacher		·Identifies and supervises contact teacher ·Date for assembly sensitization ·Fix a date for screening - motivates teachers to participate - select two contact teachers, in each participating school, who will be trained to assist and coordinate screening.
Contact person for the school (one for each school; can be a teacher, school nurse, member of administration etc)	· Interested and motivated by eye health related activities ·Knows if there are any other children have eye problems or that are not attending screening	·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 ·Sends list of children referred to the referral centre ·Contact referral centre to identify children who have not attended ·Follow up those who have/have not gone for treatment

Role	Attributes	Responsibilities
Class teacher	·Knows and understand the family situation of the children (i.e. financial, other issues)	·Prepare list of children who require screening with names & phone numbers ·Assists while screening ·Crowd control on the screening day · Prepares and organizes eye health education activities · Monitors who wears/does not wear spectacles after screening
Screener	Background in community-level health (health workers, school nurses)	·Liaise with contact teacher ·Check screening venue and measure and mark the screening distance ·Screen all listed 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
Refractionist, vision technician, allied ophthalmic assistant	Mid-level ophthalmic personnel trained for refraction in children	·Refract children according to SOP ·Record prescription and relevant data ·Ask child to select preferred frames ·If vision does not improve with refraction, 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

Role	Attributes	Responsibilities
Optometrist		Same role than refractionist but also provides detailed examination, with ocular health and binocular vision assessments ·If vision does not improve with refraction record a preliminary diagnosis and refer according to SOP

4.3.   Community members

Role	Responsibilities
Dispensing optician (or partner local eye care provider)	·Makes up spectacles correctly, using the correct frame ·Marks each pair of spectacles with the child's name, class and school ·Provides reparation or replacement services when spectacles are broken or lost
Parents	·Take child to eye care provider, if referred ·Pay for treatment (mechanism required to support the child with financial barriers) ·Encourages spectacle wear at home when required
Community leaders	·Encourage children to be screened and to wear their spectacles ·Encourage parents to take child for treatment e.g. not spectacles · Sensitize other members of the community on importance of eye health
Child welfare officer	·Work with community leaders to encourage parents and children to comply with recommendations, if required.

4.4.   Training guides

Periodic refresher training is vital to the long-term success of the school eye health initiative. It should be anticipated and planned for in each of the training programmes as appropriate.

Cadre	Training
Screeners (Health workers, teachers and nurses)	• Eye and vision screening for school aged children (5-18 years) • 5 hours • Incorporate a periodic refresher training program as well
Eye care personnel - Refraction (optometrists, ophthalmologists, ophthalmic clinical officers (OCO), ophthalmic nurses (ON) and other cadres qualified to provide refraction services for children)	• Refraction and prescribing for children • 35 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

Resources for training can be found at: Brien Holden Foundation and Cybersight.

5. References

For full references, see the IAPB School Eye Health Guidelines webpage.

6. Appendix 1 - Situation analysis

Situation analysis should include:

- Assess the local needs in the programme area
- Assess whether there are policies for school health or eye health in the government health and education systems;
- Identify activities / programmes for health or eye health in school children which are already being provided and who is managing them;
- Identify the eye care delivery services for children
- Potential barriers

6.1.   Need assessment in the programme 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 ……………………………

District(s) ……………………………

Total population in geographical area ……………………………

Estimate of children aged 5-10 years ……………………………

Estimate of children aged 11-18 years ……………………………

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

Estimated prevalence of uncorrected RE	%
Estimated prevalence with other eye conditions (trachoma, Vitamin A deficiency, etc)	
Estimated prevalence with eye conditions in teachers (diabetes, glaucoma, etc)	

6.2.   Government policies in planned program area

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?

Education policies for eye health	Yes	No	Comments
Eyes and vision included in school curriculum			
Health care provided in schools by nurse/trained teacher			
Eye Health policies			
Current legislation for eyecare			
Who are the main eye care providers in the country?			
What are the referral pathways?			
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			

6.3.   School health policies

- 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 organisations already active in school eye health in the planned area?
- Are there other school health initiatives that eye health could be integrated into? e.g. deworming programmes, dental programmes, nutrition programmes
- Does school health education include eye health?

6.4.   Provision of eye care services for children

List the eye care providers who are responsible for providing services for children in the country and identify in which facility they practice. What are the current referral pathway between these different actors in SEH?

Services for children	Service provider(s)	Facilities	Financing (private, public, insurance plans?)
Primary eye care			
Health promotion Screening	Nurses? Community health workers? Teachers?	Community health care facilities? Schools?	
Secondary eye care			
Refraction	Ophthalmic technicians? Optometrists? Refractionists?	Eye care centres?	
Dispensing	Opticians?	Optical centres? Vision centres attached to hospitals?	
Tertiary eye care			
Low vision care	Optometrists?	Hospital?	
Surgery and medical treatment	Ophthalmologists?	Private eye care centres?	

6.5. Potential barriers

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

- Cultural considerations:
    - Cultural beliefs and practices about eye health and spectacle wear
- Misconceptions:
    - Fears about wearing spectacles
    - Low literacy levels of parents
- Cost of programme
    - Lack of investment from the government
    - Cost of spectacles & treatments too expensive for parents
- Lack of human resources
    - Insufficient training of screeners
    - Lack of eye care professionals for follow-ups & referrals
- Lack of access
    - to affordable and acceptable spectacles for children
    - to eye care centres

How might these be addressed?

7. Appendix 2 - Example of operational planning tools

Operational planning for school eye health requires several stages which are summarized below:

1. Determine coverage of planned program area
2. Estimate the number of children to be screened and the number needing spectacles, referral and other interventions
   a. Estimate the number of teachers to be screened and who require eye care services
3. Assess the human resources and services available for eye care in children;
4. Estimate the workload for screening, refraction and dispensing
5. Develop protocol for screening, refraction, dispensing and health promotion activities
6. Identify the supply chain for providing spectacles and determine clear referral pathways
7. Determine location, frequency & timeline of the programme
8. Hire management team

7.1. Coverage of planned programme

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				
	Aged 11-18 years				

Assess unmet need for school eye health – refractive errors

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

ᵃUse 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

Reflect on potential inequalities: How might out-of-school be reached? Are there any gender inequalities that should be addressed?

7.2. Assess the resources and services available for eye care in children

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 in main referral centre

	Total
Number of ophthalmologists	
Number of optometrists	
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 asses children	
Number of dispensing opticians will adequate competencies to asses children	

Human resources available

In other eye centres

Eye care provider_____	Total
Number of ophthalmologists	
Number of optometrists	
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 will adequate competencies to assess children	

Human resources – total available to be included in the program

Ophthalmologists ....

Optometrists ....

Mid-level ophthalmic personnel ....

Refractionists ....

Dispensing opticians ....

Low vision workers ....

Other, specify ....

Estimating the workload for screening, refraction and dispensing

In year 1 it is recommended that all children aged 5-18 years are screened.

	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 at 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