Vision and eye screening implementation handbook

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Introduction

At the Seventy-third World Health Assembly in November 2020, WHO Member States adopted resolution WHA73.4, "Integrated people-centred eye care, including preventable vision impairment and blindness".[i] In recognition of the growing need for eye care services worldwide, the resolution requested WHO to "develop guidance on evidence-based and cost–effective eye care interventions and approaches to facilitate the integration of eye care into universal health coverage". To this end, WHO, through consultation with international experts, developed the *Package of eye care interventions (PECI) (1)* that was launched in May 2022. The PECI provides a set of recommended, evidence-based eye care interventions, presented across the continuum of care, and the material resources required for implementation. This includes an overview of recommended screening strategies at critical stages throughout the life course.

Building on the recommendations made in the PECI, this *Vision and eye screening implementation handbook* (hereinafter referred to as the "VESIH" or the "handbook") is a useful tool to plan and implement an evidence-based vision and eye screening programme at the national or subnational levels. The target users include coordinators or focal points within the ministries of health, public health planners and managers, and nongovernmental organizations providing eye care. The VESIH will provide practical information for facilitating screening and early intervention for eye disease and vision loss for the neonatal period, pre-school children, school children, and older adults. It provides global minimum recommendations for vision and eye screening at the community and primary levels of care.

Vision and eye screening is recommended to promote case-finding at the community and primary levels of care. Screening is designed to identify a wide range of eye conditions that can significantly impact vision. Early detection through screening allows for timely intervention, ensuring appropriate treatment and management to prevent vision loss or further complications.

For the screening to be truly effective, it is crucial to establish functional referral pathways that connect individuals with comprehensive eye care services at the primary-plus,[ii] secondary, and tertiary levels of care. These pathways ensure that individuals who need to be referred for further investigation following the screening, can seamlessly access the necessary follow-up care, interventions, and treatments provided by eye care personnel at different levels of care.

The *Vision and eye screening implementation handbook* can complement and be used alongside other screening tools, including those to detect Vitamin A deficiency, trachoma and diabetes. These specific tools have been designed to tackle the unique challenges posed by each condition, while the VESIH focuses on vision and eye screening, offering a broader perspective to eye health.

To further support country approaches in strengthening vision and eye screening at the community and primary care levels, the VESIH incorporates a section on the advantages and disadvantages of diverse vision and eye screening approaches (section 5). Additionally, various pathways for refraction and

i See: https://apps.who.int/gb/ebwha/pdf_files/WHA73/A73_R4-en.pdf.

ii "Primary plus" interventions enhance the eye care services provided at the primary level of care and are recommended under "assessment", "treatment" and "rehabilitation".

spectacles service delivery are outlined, along with actionable recommendations aimed at enhancing refractive error services, promoting equity, and ensuring inclusivity for all. By emphasizing these principles, the VESIH aims to facilitate sustainable improvements in vision and eye screening, fostering equal access and better eye care outcomes.

Purpose of the handbook

The *Vision and eye screening implementation handbook* provides guidance on the vision and eye screening requirements for high-risk populations at the community and primary care levels. The recommendations are evidence-based and developed with a focus on delivering screenings easily, safely, and effectively in low- and low–intermediate-resource settings.

Development of the handbook

The handbook has been developed through a consultative and evidence-based approach and is built on the work of the PECI. In total, 114 public health, academic and clinical professionals from 45 countries contributed to the development of the PECI. The PECI separated the population for screening into high-risk populations including the neonatal period, children and adolescents, and older adults. This handbook has taken these populations and further developed them by:

1. performing a thorough analysis of evidence compiled in the PECI for each defined age group; and
2. expanding on the recommendations made in the PECI to develop the handbook, which was validated through review from selected PECI technical working group members and other key experts. The declaration of interests of 10 selected PECI technical working group members that represented the 6 global regions was assessed, and no conflicts of interest were identified.

Minimum recommendations for vision and eye screening

The minimum recommendations to perform vision and eye screening in the identified high-risk populations are described in Table 1. These guidelines serve as a foundation, ensuring that essential aspects of screening are covered, based on the feasibility of implementation in low- and low–intermediate-resource settings. If additional resources are available, screening providers can include further tests or assessments to enhance the screening process. The minimum visual acuity threshold will also depend on the regulations and capacity of the setting; for example some countries may use the 6/9 line as the distance threshold.

Table 1. Minimum recommendations for screening at community and primary levels in low- and low–intermediate-resource settings

Age group	**Neonatal period (birth–4 weeks)**	**Pre-school children (aged 3–5 years)**	**School children (aged 5–18 years)**	**Older adults (aged ≥50 years)**
Tests performed	– External eye screening – Red reflex test	– Distance visual acuity – External eye screening	– Distance visual acuity – External eye screening	– Distance visual acuity – Near visual acuity – External eye screening – Screening for reading spectacles, if the minimum near visual acuity threshold is not met and minimum distance visual acuity threshold is met
Frequency	Once – preferably within 72 hours of birth	Once – typically before starting school	Every 1–2 years	Every 1–2 years
Minimum distance visual acuity threshold	–	Better than or equal to 6/12 in each eye		
Minimum near visual acuity threshold	–			Better than or equal to N6 in both eyes

1

Eye screening in the neonatal period

This section provides guidance on the eye screening requirements for the neonatal period at the community and primary levels of care. The recommendations are evidence-based and developed with a focus on delivering screenings easily, safely, and effectively in low- and low–intermediate-resource settings.

Links to resources:

- WHO recommendations on maternal and newborn care for a positive postnatal experience
- The basics of eye health screening of a newborn

1.1 Needs and rationale

Screening during the neonatal period (0–4 weeks) is warranted to identify and treat sight-threatening conditions such as congenital cataract, glaucoma, retinoblastoma and retinopathy of prematurity. This proactive approach mitigates the potential for associated adverse impacts of delayed visual development or premature death. To be effective, the screening should detect congenital and paediatric eye conditions, which must be followed by a prompt referral and an appropriate intervention *(1)*.

WHO recommends universal newborn eye screening (UNES) for all settings. However, where resources are limited, screening is often not included in newborn and child health policies or practiced routinely for all full-term healthy newborns. Screening for eye abnormalities in newborns should be conducted before discharge following a health-facility birth, or at the first postnatal care contact in an outpatient setting after a home birth *(2)*.

There is substantial need for high-quality neonatal care, particularly in low- and low–intermediate-resource settings, including systematic screening among preterm infants and/or newborns of low birth weight, together with timely referral for treatment interventions where indicated, with long-term follow-up.

1.2 Age and time frame for screening

The eye screening of newborns should be conducted at the following ages and time frames:

- neonatal (less than 4 weeks from birth, preferably within 72 hours of birth) or at first encounter with a well-baby clinic (or equivalent); and
- at a postnatal visit, for example at the routine 6-week postnatal check.

Universal newborn eye screening is essential for all newborns, regardless of their place of delivery. Specific arrangements may be required to cater to the needs of births at home.

1.3 Summary of resource requirements for eye screening in the neonatal period

The screening requirements for the detection of eye abnormalities and sight-threatening conditions in newborns, and for subsequent referral for further examination, are described in Table 2 below.

Table 2. Summary of resource requirements for neonatal eye screening

Resource	Description
Staff/personnel	– Health worker/birth attendant midwife/general physician/paediatrician/eye care personnel including allied ophthalmic personnel/optometrists/ophthalmologists
Training	– Theory and practice-based training in external eye screening and in assessing the red reflex during the neonatal period at the community and primary levels of care
Supplies	– Record forms; Referral forms; Referral list – Health promotion information for parent/carer – Batteries (replaceable or rechargeable)/electrical charging facilities
Equipment	– Light source for external eye screening e.g. medical torch/flashlight/pen torch/ ophthalmoscope/phone torch
Infrastructure	– Room that can be darkened for the red reflex test and well-lit for the external eye screening – Chairs for screener and for parent/carer (who will hold the newborn while being screened)
Time	– Screening can be performed as part of a maternal health check/ postnatal visit (including vaccination visit) – Time taken to perform: 5–10 minutes
Referral	– Referral to eye care personnel including ophthalmic nurse/optometrist/ ophthalmologist, is required if the newborn does not pass the screening, or is considered untestable.

1.4 Screening protocol

The protocol for neonatal eye screening and referral involves a process of steps as outlined in Figure 1 below. The time taken to perform the eye screening is approximately 5–10 minutes. Ensure your hands are thoroughly clean before screening each newborn, and avoid touching the newborn's eyes

Figure 1. Eye screening protocol for the neonatal period

1. Gather history

Equipment/supplies: Record form – Annex 3

Ask parent/carer about newborn's birth term and weight; pregnancy history; any birth defects; any concerns they may have about the infant's health and eyes; and family history of eye conditions.

>>REFER: If the infant is premature; has a low birth weight; is unwell; or has a birth defect.

2. Conduct external eye screening

Equipment/supplies: medical torch/flashlight/pen torch

Examine the appearance of the infant's external eye, eyelids and eyelashes: look for any crust or pus on the eyelid margin; excessive watering of the eyes; red on the white part of the eye; abnormal shape and/or haziness of the coloured part of the eye; alignment of the eyes; movement of the eyes; size of each eye.

>>PASS: Eyelids and eyelashes appear clean and free from crusts or pus; white part of the eye appears white; coloured part of the eye is clear (i.e. no haziness); eyes are equal in shape; eyes are aligned with normal/symmetrical movement; eyes are equal in size.

>>REFER: Significant crust or pus on eyelids; swelling of eyelids; absent or abnormal appearance of eyelashes/ eyelids; excessive watery or sticky discharge from the eyes; abnormal red on the white part of the eye; abnormal shape or haziness of the coloured part of the eye; eyes are not aligned; abnormal/ asymmetrical eye movements; one eye is of a different size to other eye.

3. Conduct red reflex test

Equipment/supplies: ophthalmoscope, darkened room

The ophthalmoscope is positioned in front of the screener's eye, at an approximate distance of 50 cm from the infant's open eye.

Make sure the testing room is dark. Shine the light on each eye, and look for a normal red reflex in the central part of the eye (pupil). If the reflex is poor, move the light from side to side.

>>PASS: Red reflexes are normal – i.e. symmetrically red or red/orange and equivalent in colour, intensity (brightness), size and shape when comparing the two eyes.

>>REFER: Eyes are abnormal in shape or colour; the red reflex is absent.

4. Record results as Pass or Refer

Equipment/supplies: Record form – Annex 3, Referral form – Annex 4

Communicate to the parent/carer the result of the screening and of the next steps to take.

>>PASS result: A date for a follow-up assessment should be arranged; the parent/carer should be given information as to how to care for the infant's eyes (eyelid hygiene), and to be aware of signs of vision impairment.

>>REFER result: If any results are abnormal, or if the infant is considered unable to be tested, refer for a full eye examination to eye care personnel, such as an ophthalmologist.

1.5 Screening test

Red reflex test

The red reflex test is particularly useful in detecting abnormalities in the eye such as retinoblastoma, significant refractive errors, retinal detachment, and the presence of media opacities, for example cataracts.

The images shown below in Figures 2a–2b, and Figures 3a–3h provide examples, respectively, of results of a red reflex test and abnormal eye conditions that require referral to trained eye care personnel for further examination.

The colour and brightness of the red reflex should be identical in both eyes (Figure 2a). Any difference when comparing the eyes, an absence of the red reflex, or an abnormal colour (Figure 2b) may indicate abnormality in the eye. Abnormal findings in the red reflex test include differences between the two eyes, black areas or shadows, black flecks, any absence of uniform red appearance, or presence of white reflex. In infants with pigmented skin, the reflex appears less red, and more yellow–orange.

Tips for conducting the red reflex test:

- Perform the test in a room with low light to ensure that the pupil is fully dilated for the examination. If a room cannot be made sufficiently dark, drops to dilate the pupil (e.g. Tropicamide 0.5% or 1% solution) may be needed. Eye care personnel should oversee the administration of such drops.
- Conduct the test when the infant is calm and content.
- Adjust the ophthalmoscope's power to zero or to an appropriate level, accommodating for any uncorrected refractive error of the person conducting the screening.
- Position the infant at about 50 centimetres from the screener, aligning the screener's eyes with the infant's eyes.
- Enlist the assistance of the parent/carer to hold the infant during the screening.
- If there is any uncertainty as to whether or not the red reflex is normal, refer the infant for a comprehensive eye examination.

Figure 2. Examples of results from a red reflex test

Figure 2a. Normal red reflex

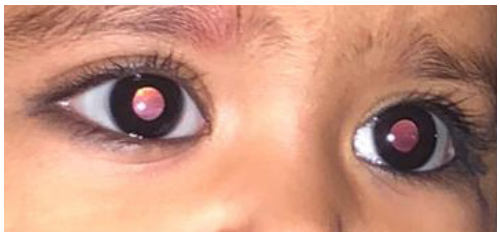
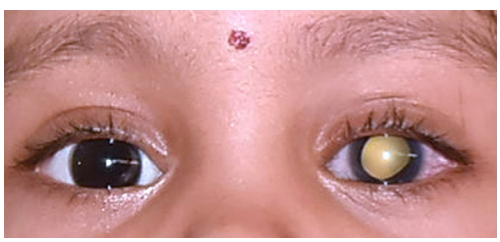


Figure 2b. Abnormal red reflex



1.6 Red flags for referral

A red flag for referral of a newborn for further examination is required if any of the eye abnormalities illustrated in Figures 3a–3h are observed:

- Significant crust or pus on the eyelid margin (Figure 3a).
- Swollen eyelids (which may also obstruct full examination of the eye) (Figure 3b);
- Eyelashes and/or eyelids are absent or appear abnormal (Figure 3c).
- Excessive watering of the eyes (Figure 3d).
- Abnormal red on the white part (conjunctiva) of the eye (Figure 3e);
- Abnormal haziness on the coloured part (iris, pupil, cornea) of the eye (i.e. a white/grey/hazy/cloudy appearance) (Figure 3f);
- Abnormal shape of the coloured part (iris, pupil) of the eye (i.e. is not round, not centred, or is unequal in both eyes) (Figure 3g);
- Eyes are not aligned (i.e. one eye is turned and looks in a different direction to the other eye) (Figure 3h);
- Eyes move abnormally or asymmetrically, including tremor of the eyeballs;
- One eye is of a different size to the other eye;
- Abnormal red reflex – i.e. any difference in red reflex when comparing the two eyes (Figures 2b), an absence of the red reflex or an abnormal colour, may signify congenital cataract or retinoblastoma (Figure 2c);
- The infant is considered unable to be tested or has limited cooperation (untestable).

Annex 2 provides a diagram showing simple parts of the external eye.

All high-risk newborns should be referred to an ophthalmologist for a comprehensive eye examination due to the increased risk of developing eye conditions. High-risk cases include:

- all premature newborns, i.e. less than 28 weeks' gestation, regardless of weight;
- all newborns weighing less than 1250 grams, regardless of gestational age; and
- all newborns or infants who have systemic infection, have experienced trauma, or have observed or suspected birth defects.

Figure 3. Abnormal eye conditions in newborns that require referral

Figure 3a

Figure 3b

Figure 3c

Figure 3d

Figure 3e

Figure 3f

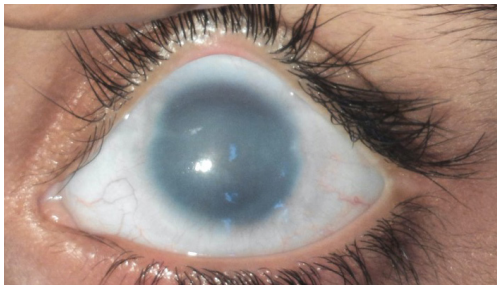
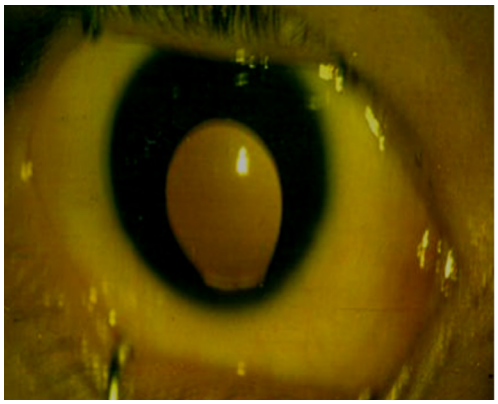


Figure 3g



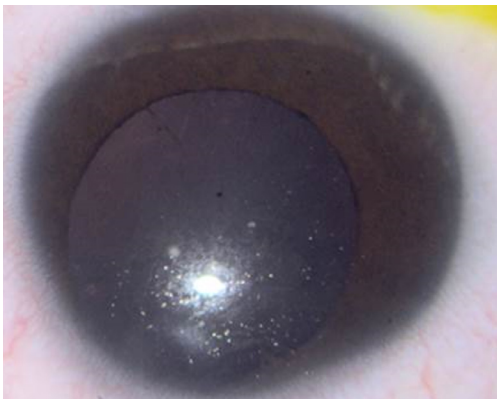
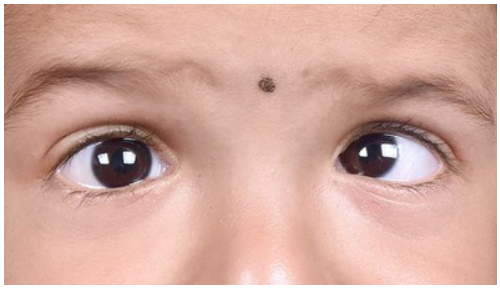
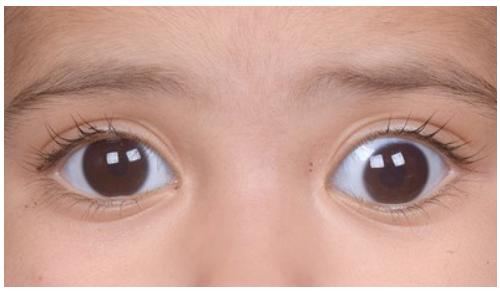


Figure 3h





1.7 Results and follow-up

Pass result

A Pass result is given when the eyelids and eyelashes appear clean and free from crusts or pus; the white part of the eye appears white; the coloured part of the eye is clear (i.e. no haziness) and of equal shape in both eyes; the eyes are aligned, have normal/symmetrical movement and are equal in size; the red reflex in the eyes is normal (i.e. red or red/orange and equal in terms of colour, intensity, size and shape).

A date for a routine follow-up assessment should be arranged. The parent/carer should be given information as to how to care for the child's eyes (see Box 1. Eyelid hygiene), and to be aware of signs of vision impairment. Information that can be shared with the parent/carer is provided in 1.11 "Health promotion and prevention".

Box 1. Eyelid hygiene – guidance for parents/carers

Newborns begin to produce tears at around 3 weeks of age. Some newborns have blocked tear ducts, which can cause excessive tearing and potentially result in an eye infection. Fortunately, most cases of blocked tear ducts resolve on their own within the first year of life. In such cases, screeners should educate parents/carers about straightforward steps they can take to maintain good hygiene in their infant's eyes.

Keep the eye clean

Excessive pooling of tears in the eye can potentially lead to infections, giving rise to a discharge that may appear yellow/green, accompanied by occasional redness and itching. To prevent this, advise parents/carers to use a soft washcloth or a cotton ball dampened with lukewarm boiled water. Instruct them to gently cleanse the infant's closed eyes, starting from the inner corner and moving outward. Emphasize the importance of using a fresh section of the cloth or a new cotton ball for each eye. Reinforce the need for thorough hand-washing before and after attending to the infant's eyes and when touching the infant's surroundings to prevent any potential contamination.

Tear duct massage

This technique can be effective in alleviating obstructions in the tear ducts. Guide parent/carers to apply moderate to firm pressure on the infant's eyelids using the tip of their forefinger, gently sliding downward for a short distance (approximately 1–2 cms) where the upper and lower eyelids meet. For optimal results, recommend repeating this process five times, twice a day. Remind parents/carers to ensure their hands are clean and their fingernails are trimmed before attempting the massage.

If a parent/carer suspects any degree of vision impairment at any point, regardless of the infant's age or the outcome of previous screenings, it is crucial that they bring the infant for a further eye screening. This is essential because vision impairment can arise at any time post-birth; or can manifest progressively as the child grows, potentially with no immediate obvious signs. An infant can behave normally, even with vision loss in one eye, and have no means of complaining, nor of the loss being detected. Parents/carers should be instructed to pay attention to any change of head posture in their infant or if there is a strong preference for looking with one eye only.

Refer result

A Refer result is given when there is an abnormal red reflex; significant crust or pus on the eyelids; swelling of the eyelids; absent or abnormal appearance of the eyelashes or eyelids; excessive watery or sticky discharge from the eyes; abnormal red on the white part of the eye; abnormal shape or haziness on the coloured part of the eye; the eyes are not aligned; abnormal or asymmetrical eye movements; or one eye being a different size to other eye.

The newborn should also be referred if the parent/carer reports any of the following during the case history: premature birth; low birth weight; the infant being generally unwell; trauma; an observed or suspected birth defect; or if the infant is considered untestable during the screening.

All newborns who are given a "Refer" result after an eye screening should be referred to eye care personnel, such as an ophthalmologist for a full eye examination (see Annex 4 for a Referral form template). All referrals need to be tracked and followed up.

1.8 Referral process management

The steps of the referral process should be mapped out and align with those of the existing national referral system; they should facilitate parent/carer attendance at follow-up to ensure maximum compliance prior to screening taking place. An established follow-up system should include a mechanism to ensure that any infant referred receives the appropriate care. Options to ensure compliance with referral include automated reminders on patient management software; or more manual approaches.

Tips to prevent referral losses and ensure that the newborn accesses referral services include:

- giving a clear explanation to the parent/carer, in the appropriate language, as to why the newborn is being referred; explain what the impact could be if the infant does not receive the correct treatment;
- providing clear details of the name and location of the facility where the newborn is being referred;
- developing a relationship with the eye care provider to whom the newborn is being referred, so that the list of names of all newborns referred can be shared. Maintaining regular communication with the eye care provider enables the referrer to stay updated on the availability of eye care services and their capacity;
- keeping a separate list of the newborns referred; this is essential, particularly in the absence of an automated referral tracking system. It helps to keep track of the referrals and enables easier follow-up with the parent/carer if they have not followed through with the referral (a template for a Follow-up referral list can be found in Annex 10);
- managing the referral process; this should be carried out systematically by a designated person and included as part of their roles and responsibilities;
- monitoring referral losses to identify newborns who have not followed through with their referrals. This is crucial; if referral losses are observed, further investigation can then be conducted to understand the reasons behind non-compliance and address these appropriately. Potential reasons may include limited access to transportation; distance to the referral facility; misunderstandings regarding instructions; financial barriers; or other barriers.

1.9 Equipment and infrastructure

As with screening for all age groups, the equipment and infrastructure required for eye screening for the neonatal period is basic and accessible. Items include, but are not limited to, those shown in Annex 11.

Screening environment

The screening area should have adequate lighting that can be adjusted and darkened to conduct the red reflex test.

For reasons of child protection, no newborn should be left alone in the room with the screener with the door closed. The door should be kept open and/or a parent/carer should be present in the screening room with the newborn and screener.

1.10 Human resources

Personnel

The personnel involved in conducting eye screening for the neonatal period will depend on the availability of resources. Typically, in a health centre or hospital setting, eye screening for the neonatal period can be conducted by ophthalmologists, neonatologists, paediatricians, midwives, nurses (including ophthalmic nurses), primary care physicians, optometrists, and orthoptists.

In areas where eye screening is performed outside the hospital setting, health workers and other occupational groups that provide childcare services and eye care services at primary health-care level can be engaged.

Competencies

The minimum competencies and activities required by the screener align with those described in the *WHO Eye care competency framework (3) (available on the WHO website:* https://www.who.int/health-topics/blindness-and-vision-loss), and are included in Annex 13.

Minimum training requirements
Personnel conducting eye screening for the neonatal period should receive competency-based training, with a particular focus on the competencies and activities outlined in Annex 13. Training should encompass practice in torch-lit examination, specifically tailored for neonatal health personnel. Emphasis should also be placed on identifying red flags for referral, familiarizing personnel with the screening equipment to be used and the standard operating procedures of the programme, including full documentation of results, data collection, and referral management.

1.11 Health promotion and prevention

The aim of health promotion, education, and counselling is to improve people's capacity to take greater control over their eye health and the factors that support it. An essential component of empowering individuals and their families, specifically underserved populations, is to help them increase their understanding and subsequent adoption of healthy behaviours, as well as to promote optimal self-care and the uptake of services.

Any health promotion and prevention initiative should be complementary to existing clinical interventions and policies, including those at the individual level (for example, conducted by health personnel during routine clinical practice) and/or the population group level (for example, public health campaigns).

The *Package of eye care interventions (1)* outlines key evidence-based areas for health promotion and prevention in the field of eye care for newborns. Short health promotion messages that can be used by the screener, either during or after the screening to promote healthy eye care habits, are provided in Annex 14. The messages are also available as posters and tiles on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss.

1.12 Monitoring and evaluation

Monitoring and evaluation play a vital role in ensuring the effectiveness and impact of vision and eye screening programmes. The processes of systematic data collection, analysis, and assessment, provide valuable insights into the programme's performance, and help to identify strengths, weaknesses, and areas for improvement.

Every setting that implements eye screening during the neonatal period should establish a comprehensive monitoring framework. This framework must incorporate indicators from all the domains of the result chain, which can be assessed through Health Information Systems (HIS) encompassing input, output, and outcome indicators. It is vital to ensure full integration of this framework within the wider health monitoring and evaluation framework and data collection process.

An indicator collected during the neonatal period and relevant to eye screening, is "Core indicator 11: Newborn screening coverage for congenital and neonatal eye conditions" (introduced in the WHO *Eye care indicator menu (ECIM) (4)*). This indicator allows for measuring the extent of coverage of newborn screening for the detection of congenital and neonatal eye conditions. As the preferred data source for this indicator is routine data from health facilities, data can also be collected and analysed using the District Health Information Software 2 (DHIS2) platform, or any other health facility information system *(5)*. The information provided by this indicator may be used to detect for service planning, with the aim of improving coverage. The additional dimension provided by the disaggregation according to the result of the screening, as "Passed" (i.e. no eye condition detected or suspected) or "Failed" (i.e. eye condition detected or suspected), also provides important information for the planning of services and for detecting epidemiological trends.

Further information can be found in the *WHO Eye care indicator menu (ECIM),* and the *Guidance on the analysis and use of routine health information systems: eye and ear care module*, available on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss.

2

Vision and eye screening in pre-school-aged children

This section provides guidance on the vision and eye screening requirements for pre-school-aged children at the community and primary levels of care. The recommendations are evidence-based and developed with a focus on delivering screenings easily, safely, and effectively in low- and low–intermediate resource settings.

Links to resources:

- TAP Vision assistive products – Training in Assistive Products

2.1 Needs and rationale

Vision and eye screening in pre-school aged children (aged 3–5 years) is critical as vision plays an important role in early childhood development. Children in this age group are at a higher risk of developing amblyopia from various causes including uncorrected refractive error and strabismus *(6)*. Uncorrected refractive error, particularly myopia, is the leading cause for vision impairment in pre-school-aged children, and prevalence is projected to significantly increase in the future *(7)*. Additionally, early-onset myopia poses a higher risk of rapid progression in the severity of refractive error, which also increases the risk of myopia-related complications such as retinal detachment in young children as they grow.

It is therefore imperative to identify children who are at a high risk of myopia during the pre-school years for early prevention, identification and control of myopia progression *(8)*. Moreover, detection of strabismus, amblyopia and refractive errors, including myopia, hyperopia and astigmatism, is critical in this age group *(9)*. Providing timely treatment for uncorrected refractive errors and/or strabismus in pre-school-aged children is crucial to prevent future development of amblyopia. Children with disrupted early visual development are less likely to benefit from schooling, potentially leading to reduced productivity and employment options in adulthood *(10)*. Thus, vision and eye screening at the pre-school age is warranted to detect eye conditions and vision impairment *(11)*.

Vision screening before entering school remains a common practice in high-resource settings. However in low- and low-intermediate-resource settings, the provision of vision screening is frequently sporadic, with efforts typically supported by nongovernmental initiatives and programmes. WHO currently recommends pre-school-aged children to have vision screening at least once before entering school for the detection of reduced visual acuity, infection or inflammation, amblyopia, and strabismus, with timely referral where indicated *(1)*.

2.2 Age and time frame for screening

Vision and eye screening for pre-school-aged children should be conducted for children aged 3–5 years; this corresponds to the early childhood group or those who are about to enter kindergarten or primary school.

Vision and eye screening can be conducted once during the pre-school period for each child in this age group.

2.3 Summary of resource requirements for vision and eye screening in preschool children

The screening requirements for the detection of eye and sight-threatening conditions in pre-school-aged children, and for subsequent referral for further examination, are described in Table 3 below.

Table 3. Resource requirements for vision and eye screening in pre-school children

Resource	Description
Staff/personnel	– Pre-school teacher/health worker/outreach worker/refractionist/ vision technician/ allied ophthalmic personnel/optometrist
Training	– Theory and practice-based training for community and primary levels of care in vision screening and external eye screening in children; basic information on chronic eye diseases and their treatment; and awareness of systemic diseases that increases risk for eye disease
Supplies	– Consent forms; Record forms; Notification forms; Referral list – Health promotion information for parent/carer – Batteries (replaceable or rechargeable)/electrical charging facilities
Equipment	– Distance visual acuity charts e.g. printed version of charts included in handbook, or existing HOTV or LEA Symbols chart – Tape measure/3-metre string – Tape to mark the measured distance – Occluder – Light source for external eye screening e.g. medical torch/flashlight/pen torch/ ophthalmoscope/phone torch
Infrastructure	– A testing space that allows a testing distance of at least 3 metres – A well-lit room – Chairs for screener and child being screened
Time	– Screening can be performed as part of pre-school health programmes – Time to perform: 5–10 minutes
Referral	– Referral to eye care personnel, including ophthalmic nurse/ optometrist/ ophthalmologist, is required when the child does not pass the screening, or is considered untestable.

2.4 Screening protocol

The vision and eye screening protocol for pre-school-aged children is shown in Figure 4 below. The time taken to perform the vision screening is approximately 5–10 minutes. Ensure your hands are thoroughly clean before screening each child, and avoid touching the child's eyes.

Figure 4. Vision and eye screening protocol for pre-school-aged children

1. Send Consent form to parent/carer prior to screening

Equipment/supplies: Consent form – Annex 5

Prior to conducting vision and eye screening at a facility such as a pre-school or child-care centre, or any other service, it is essential to obtain consent from the appropriate authority (parent/carer/head of school) for the child's participation. A flyer of the programme and information letters may be attached to the Consent form given to the parent/carer/head of school. (See Annex 5 for a Consent form template.) Once consent is received, the child can participate in the vision and eye screening. If the child is absent on the day of the screening, and consent has been given, a screening should be rearranged and conducted on another day. It is important that all documentation is recorded.

2. Gather history from pre-school Consent form

Equipment/supplies: Consent form – Annex 5; Record form – Annex 6

Use the information provided by the parent/carer on the Consent form to gather the history and document it on the Record form.

>>REFER: if the child has diabetes, or complains of pain/discomfort/severe itchiness of the eye.

Record results on the Record form.

3. Test visual acuity (VA)

Equipment/supplies: Distance VA chart e.g. HOTV chart – Annex 12, tape measure/3m† string, tape, occluder, well-lit room allowing for testing distance of 3m†

Distance VA: test each eye separately (monocularly), starting first with the right eye, then the left eye. Verify that the child looks at the chart straight, without turning or twisting the head/face. Use an occluder to cover the eye that is not being tested. Ensure the chart is 3m† from the child's eyes.

>>PASS: Distance vision is 6/12 or better in each eye.

>>REFER: Distance vision is worse than 6/12 in either eye.

Record results on the Record form.

4. Conduct external eye screening

Equipment/supplies: Light source e.g. medical torch

Examine the appearance of the external eye, eyelids and eyelashes: look for any crust or pus on eyelid margin, excessive watering of the eyes, red on white part of the eye, abnormal haziness of the coloured part of the eye, alignment of the eyes.

>>PASS result: Eyelids and eyelashes appear clean, free from crusts or pus; the white part of the eye appears white; the coloured part of the eye is clear (no haziness); and both eyes are aligned.

>>REFER result: Significant crust or pus on eyelid margin; excessive watery or sticky discharge from the eye; abnormal red or lesion on the white part of the eye; abnormal haziness on the coloured part of the eye; eyes are not aligned.

Record results on the Record form.

5. Record results as Pass or Refer	**Equipment/supplies:** Record form – Annex 6; Parent/carer Notification form – Annex 7
	Communicate the results in a letter sent to the parent/carer.
	>>PASS result: A date for a routine follow-up assessment should be given, the parent/carer should be given information about how to care for the child's eyes, and to be aware of signs of vision impairment.
	>>REFER result: For any abnormal results or if the child is considered unable to be tested, refer to eye care personnel for a full eye examination.
	Record results on the Record form and complete the parent/carer Notification form.
	If the child is being referred, complete the Follow-up referral list (Annex 10).

† *WHO recommends a 3-metre distance for testing distance vision using the visual acuity chart provided in this handbook (Annex 12), or other standardized distance vision charts available. However the testing distance should always be checked in relation to the chart being used and adjusted accordingly.*

2.5 Screening test

Visual acuity test

A visual acuity test measures the ability of a person to clearly identify or distinguish an object or letter at a given distance. The test is reasonably straightforward and easy to conduct. Although the test can identify central visual status, it is not useful to detect any peripheral visual defects.

Charts

Different charts are available to measure distance visual acuity. For pre-school-aged children, this is usually an HOTV chart or an LEA Symbols chart. A Tumbling E chart, LogMAR (EDTRS) chart or a Snellen letter chart consisting of the Latin alphabet, or numbers, is not suitable for this age group. If an existing chart is not available, Annex 12 of this handbook provides a printable visual acuity chart suitable for conducting vision screenings in various settings. The chart can be used for pre-school-aged children and accommodates for different language groups.

Tips for visual acuity test

- If the child already wears spectacles, test the visual acuity with the child wearing the spectacles; make sure that the lenses are clean.
- Ensure that the correct testing distance is being used for the chart selected (usually 3 metres). Once the correct distance has been measured, mark it with a strip of tape on the floor.
- Ensure that the testing space has good lighting.
- Give clear instructions to the child, in the child's language, as to what is required of them. To make the child more comfortable during the screening, it is helpful for teachers or parents to explain the process beforehand.

- Ensure that the child does not lean forward, turn their head to the left or right, or move closer to the chart during the test. If the child is using their hand as the occluder, ensure that the hand which covers the untested eye is not pushing against the eyeball and that there is no gap through which the child can see.
- To pass the distance vision test, the child must be able to identify more than half the letters/symbols (i.e. 3 out of 4, or 3 out of 5 letters/symbols) on the 6/12 line.
- Record the result immediately on the Record form, to avoid missing any documentation of the results.

Note: Conducting vision and eye screening on children aged 3–4 years can be challenging, and it is often easier to involve the parent or carer to assist during the screening process. Their cooperation and support can greatly enhance the accuracy and effectiveness of the screening, ensuring a smoother experience for the child.

2.6 Red flags for referral

Referral of a child for further examination is required if any of the red flags illustrated in Figures 5a–5f are observed:

- The child has diabetes, or complains of pain/discomfort/severe itchiness of the eye.
- Distance visual acuity is worse than 6/12 in either eye.
- Significant crust or pus on the eyelid margin (Figure 5a).
- Excessively watery or sticky discharge from the eyes (Figure 5b).
- Abnormal red (Figure 5c) or lesion (Figure 5d) on the white part (conjunctiva) of the eye.
- Abnormal haziness on the coloured part (iris/pupil/cornea) of the eye (Figure 5e).
- Eyes are not aligned – i.e. one eye is turned and looks in a different direction to the other eye (Figure 5f).
- The child is considered unable to be tested or has limited cooperation (untestable).

Annex 2 provides a diagram showing simple parts of the external eye.

Figure 5. Abnormal eye conditions in pre-school-aged children that require referral

Figure 5a

Figure 5b

Figure 5c

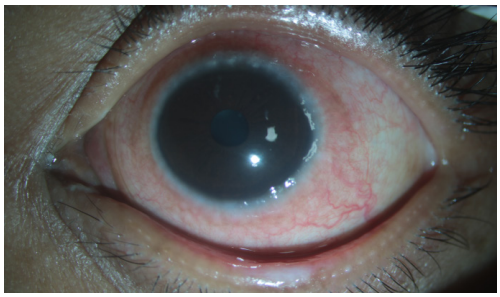


Figure 5d

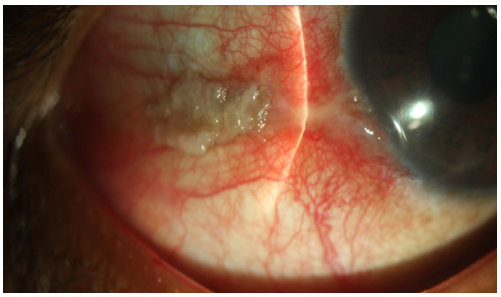


Figure 5e

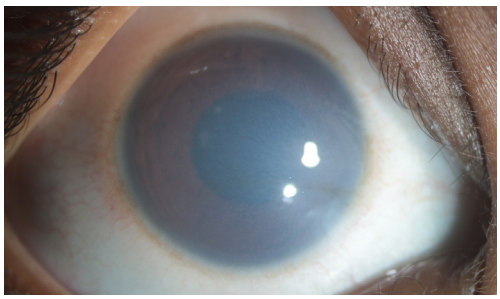
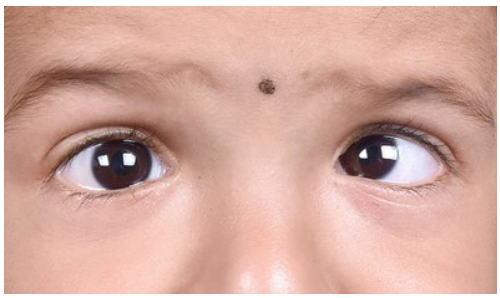
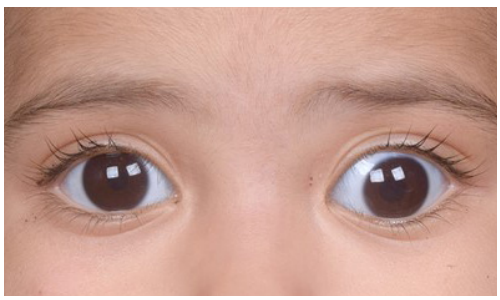


Figure 5f





2.7 Results and follow-up

Pass result

A Pass result is given when distance visual acuity is 6/12 or better in each eye; the eyelids and eyelashes appear clean and free from crusts or pus; the white part of the eye appears white; the coloured part has no haziness; and both eyes are aligned and look in the same direction.

A date for a routine follow-up assessment should be arranged. The parent/carer should be given information about how to care for the child's eyes (see Box 2. Eye hygiene), and to be aware of signs of vision impairment. Information that can be shared with a parent/carer is provided in 2.11 "Health promotion and prevention".

Note: The minimum visual acuity threshold for a child to be given a Pass is recommended at 6/12. However, this may vary depending on the country's regulations; for example, some countries may use the 6/9 line as a minimum visual acuity threshold.

Box 2. Eye hygiene

Teaching children about eye hygiene is essential for maintaining healthy vision and preventing eye-related issues. Parents/carers should be also taught to reinforce practices for good eye hygiene by encouraging children to:

- wash their hands thoroughly before touching their eyes to reduce the risk of infections;
- avoid rubbing their eyes vigorously, as this can irritate the sensitive tissues and potentially lead to eye problems;
- use their own towels to prevent the spread of germs; and
- take breaks from prolonged use of digital devices and near-work activities. Follow the "20-20-20" rule, which suggests taking a 20-second break to look at something 20 feet (6 metres) away every 20 minutes. This simple practice helps reduce eye strain and fatigue.

If a parent or caregiver suspects any degree of vision impairment at any point, regardless of the child's age or the outcome of previous screenings, it is crucial that they bring the child back for a further vision and eye screening. This is essential because vision impairment can arise at any time, or manifest progressively as the child grows, potentially with no immediate obvious signs. A child can behave normally when there is vision loss in only one eye, relying on the better eye to see. They may be unaware or unable to perceive the loss, and consequently not complain about seeing poorly out of one eye. Parents/carers should be instructed to pay attention to any change in the child's head posture; to notice if there is a strong preference for the child to look with one eye only; or if the child bumps into objects on one side; moves closer in order to see objects; has frequent headaches at the end of the day; or displays an unusual avoidance of near-activity tasks.

Note: Vision and eye screening provides a broad assessment and may not detect minor refractive errors or subtle eye conditions. Therefore, it is crucial to advise the parent/carer of the importance of ongoing eye checks as their child continues to develop and grow.

Refer result

A Refer result is given if the child has diabetes; complains of pain/discomfort/severe itchiness of the eye; if distance vision is worse than 6/12 in either eye; if there is significant crust or pus on the eyelid margin; excessive watery or sticky discharge from the eyes; abnormal red or lesion on the white part of the eye; abnormal haziness on the coloured part of the eye; or if the eyes are not aligned. A child should also be referred if they are considered untestable during the screening.

All pre-school-aged children who have a "Refer" result after a vision screening should be referred to an optometrist, ophthalmic nurse, ophthalmologist, or appropriate eye care personnel for a full eye examination (Annex 7 provides a Notification form template). All referrals should be tracked and followed up.

Note: If a child is unable to see the 6/60 line with either eye, this is considered as an urgent referral and the child should have a full eye examination within 30 days by qualified eye care personnel, such as an optometrist or ophthalmologist.

2.8 Referral process management

The steps for the referral process should be mapped out and align with those of the existing national referral system; they should facilitate parent/carer attendance at follow-up to ensure maximum compliance prior to the screening taking place. An established follow-up system should include a mechanism to ensure that children who are referred receive the appropriate care. Options to ensure compliance with referrals include automated reminders on patient management software, or other more manual approaches.

Tips to prevent referral losses and ensure that the child accesses referral services include:

- completing the Notification form (see Annex 7) for the parent/carer;
- providing clear details of the name and location of the facility where the child is being referred;
- developing a relationship with the eye care provider to whom the child is being referred, so that the list of names of children referred can be shared. Maintaining regular communication with the eye care provider enables the referrer to stay updated on the availability of eye care services and their capacity;
- keeping a separate list of the pre-school children referred; this is essential, particularly in the absence of an automated referral tracking system. It helps to keep a track of the referrals and enables easier follow-up with the parent/carer if they have not complied with the referral (a template for a Follow-up referral list is provided in Annex 10);
- depending on privacy policies, notifying the relevant personnel at the pre-school facility of children who are being referred for further investigation. This enables the pre-school facility to also follow up with parents/carers of the referred children. If the child is being screened outside the pre-school facility, the parent/carer must be notified directly;
- managing the referral process; this should be carried out systematically by a designated person and included as part of their roles and responsibilities;
- monitoring referral losses to identify children who do not follow through with their referrals. This is crucial; if referral losses are observed, further investigation can then be conducted to understand the reasons behind

non-compliance and address these appropriately. Potential reasons may include limited access to transportation; distance to the referral facility; misunderstandings regarding instructions; financial barriers; or other barriers.

2.9 Equipment and infrastructure

As with screening for all age groups, the equipment and infrastructure required for pre-school vision screening is basic and accessible; items include, but are not limited to, those shown in Annex 11.

Screening environment

The screening area should have adequate lighting, with no glare or reflections on the vision chart, and minimal distractions. Children who are waiting to be screened should not be able to see the chart.

For reasons of child protection, no child should be left alone in the room with the screener with the door closed. The door should be kept open and/or a school teacher/parent/carer should be present in the screening room with the child and screener.

2.10 Human resources

Personnel

A minimum of two personnel is required for the screening of pre-school-aged children: a screener to conduct the eye screening, and the school teacher/health worker/parent/carer supervising the child waiting to be screened. The screener can be a health worker, ophthalmic nurse, allied ophthalmic personnel, or general physician. If several children are attending the screening, additional personnel may be required to assist the screener with the screening and/or to supervise the children.

Competencies

The minimum competencies and activities required by the screener align to those described in the *WHO Eye care competency framework (3), available on the WHO website:* https://www.who.int/health-topics/blindness-and-vision-loss), and included in Annex 13.

Minimum training requirements

Personnel conducting vision and eye screening for pre-school-aged children should receive competency-based training, with a particular focus on the competencies and activities outlined in Annex 13. Training should encompass both theoretical knowledge and practical skills related to vision and eye screening at the community and primary levels of care. Emphasis should also be placed on identifying red flags for referral, familiarizing personnel with the screening equipment to be used and the standard operating procedures of the programme, including full documentation of results, data collection, and referral management.

2.11 Health promotion and prevention

The aim of health promotion, education, and counselling is to improve people's capacity to take greater control over their eye health and the factors that support it. An essential component of empowering individuals and their families, specifically underserved populations, is to help them to increase their understanding and subsequent adoption of healthy behaviours, as well as to promote optimal self-care and the uptake of services.

Any health promotion and prevention initiative should be complementary to existing clinical interventions and policies, including those at the individual level (for example, conducted by health personnel during routine clinical practice) and/or the population group level (for example, public health campaigns). The *Package of eye care interventions (1)* outlines key evidence-based areas for health promotion and prevention in the field of eye care for pre-school-aged children.

The presence of uncorrected refractive errors and vision impairment may be difficult to detect in children; however potential signs that parents/carers and/or pre-school teachers may notice include:

- the child having difficulty in seeing the classroom board at school;
- the child having learning difficulties at school, which may result in disruptive behaviour or issues with participating in school activities;
- the child complaining of sore eyes or headaches, or rubbing their eyes;
- the child isolating themselves from other children because they do not see sufficiently well to participate in activities; and/or
- the child not demonstrating good eye contact.

If any of these signs become evident through a health promotion initiative, the parents/carers and/or pre-school teachers should be informed.

If the child passes the vision screening test, health promotion information should be included with the "Pass" note for the parents/carers. Educating school teachers and students will help to remove any stigma that may be associated with a child wearing spectacles at school. The *Package of eye care interventions (1)* outlines key evidence-based areas for health promotion and prevention in the field of eye care for pre-school children. Annex 14 provides short health promotion messages that can be used by the screener to promote healthy eye care habits, either during or after the screening. The messages are available as posters and tiles on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss.

2.12 Monitoring and evaluation

Monitoring and evaluation play a vital role in ensuring the effectiveness and impact of vision and eye screening programmes. The processes of systematic data collection, analysis, and assessment provide valuable insights into the programme's performance, and help to identify strengths, weaknesses, and areas for improvement.

Every setting implementing a vision and eye screening programme for pre-school-aged children must establish a comprehensive monitoring framework. The framework should incorporate indicators from all the domains of the result chain that can be assessed through Health Information Systems (HIS), including input, output, and outcome indicators. To ensure its effectiveness, it is imperative to fully integrate this framework within the broader health monitoring and evaluation framework and data collection processes.

An expanded indicator collected for the pre-school-age population and relevant to vision and eye screening is "Expanded indicator 3: Pre-school (aged 3–5 years) eye care programme" (introduced in the WHO *Eye care indicator menu (ECIM) (4)).* This indicator allows for assessing the availability and implementation of pre-school eye care programmes and is usually collected from administrative sources, such as reports from the Ministry of Health or Education, or national eye care committee reports. The indicator is set for comprehensive eye examination;

however, since the method of measurement is based on multilevel categories, it can be adjusted to vision and eye screening. The information provided by this indicator may be used at higher levels (national or subnational), for planning, strategy development or policy-making.

Further information can be found in the *WHO Eye care indicator menu (ECIM),* available on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss.

3

Vision and eye screening in school-aged children

This section provides guidance on the vision and eye screening requirements for school-aged children at the community and primary levels of care. The recommendations are evidence-based and developed with a focus on delivering screenings easily, safely, and effectively in low- and low–intermediate-resource settings.

Links to resources:

- WHO guideline on school health services
- TAP Vision assistive products – Training in Assistive Products

3.1 Needs and rationale

Uncorrected refractive error, is the leading cause for vision impairment in school-aged children (5–18 years), and global prevalence is projected to increase significantly in the future *(7)*. Significant refractive errors, including myopia, hyperopia, and astigmatism, can adversely affect a child's learning and development. To confound this problem, the number of children and teenagers with myopia is expected to have risen by 200 million from 2000 to 2050 *(12)*.

Younger children and children with higher initial myopia are more prone to myopia progression. To help myopia prevention in its earliest phases, particularly during the early school years, it is essential to identify those who are at a high risk of developing the condition *(8)*.

Children with disrupted early visual development are less likely to benefit from schooling, potentially leading to reduced productivity and employment options in adulthood *(10)*. Vision screening in the school-age group is warranted to detect eye conditions and vision impairment and mitigate conditions such as amblyopia *(11),* thereby minimizing any potential detrimental impact on their education and well-being.

WHO currently recommends vision and eye screening for school-aged children, to detect, among other potential eye conditions, reduced visual acuity, infection or inflammation, amblyopia, and strabismus, and to provide timely referral where indicated *(1)*. Vision and eye screening, in the context of school health services, with the provision of spectacles or referral for care, often involves coordination with trained eye care personnel at other levels of care *(13)*, which requires cooperation between ministries of health and of education.

3.2 Age and time frame for screening

Vision and eye screening for school-aged children should be conducted for children aged 5–18 years; this corresponds to the later childhood to later adolescence group, or those who are in the primary to secondary schooling years.

Vision and eye screening can be conducted every 1–2 years for each child in this age group.

3.3 Summary of resource requirements for vision and eye screening in school children

The screening requirements for the detection of eye and sight-threatening conditions in school-aged children, and for subsequent referral for further examination, are described in Table 4 below.

Table 4. Resource requirements for vision and eye screening in school children

Resource	Description
Staff/personnel	– School teacher/health worker/outreach worker/refractionist/vision technician/allied ophthalmic personnel/optometrist
Training	– Theory and practice-based training for community level and primary levels of care in vision screening and external eye screening in children; basic information on chronic eye diseases and their treatment; and awareness of systemic diseases that increase risk for eye disease
Supplies	– Consent forms; Record forms; Notification forms; Referral lists – Health promotion information for parent/carer – Batteries (replaceable or rechargeable)/electrical charging facilities
Equipment	– Distance visual acuity charts e.g. printed version of charts included in handbook, or existing HOTV or LEA Symbols chart and Tumbling E chart – Tape measure/3-metre string – Tape to mark the measured distance – Occluder – Light source for external eye screening e.g. medical torch/flashlight/pen torch/ophthalmoscope/phone torch
Infrastructure	– A testing space that allows for a testing distance of at least 3 metres – A well-lit room – Chairs for screener and child being screened
Time	– Screening can be performed as part of a school health programme – Time to perform: 5–10 minutes
Referral	– Referral to eye care personnel, including ophthalmic nurse/optometrist/ophthalmologist, is required if the child does not pass the screening, or is considered untestable.

3.4 Screening protocol

The vision and eye screening protocol for school-aged children is shown in Figure 6 below. The time taken to perform the vision screening is approximately 5–10 minutes. Ensure your hands are thoroughly clean before screening each child, and avoid touching the child's eyes.

Figure 6. Vision and eye screening protocol for school-aged children

1. Send Consent form to parent/carer prior to screening

Equipment/supplies: Consent form – Annex 5

Prior to conducting vision and eye screening at a facility such as a school or other service, it is essential to obtain consent from the appropriate authority (parent/carer/head of school) for the child's participation. A flyer of the programme and information letter may be attached to the Consent form given to the parent/carer/head of school. (See Annex 5 for a Consent form template.) Once consent is received, the child can participate in the vision and eye screening. If the child is absent on the day of the screening, and consent has been given, a screening should be rearranged and conducted on another day. It is important to record all documentation.

2. Gather history from Consent form

Equipment/supplies: Consent form – Annex 5; Record form – Annex 6

Use the information provided by the parent/carer in the Consent form to gather history; document in the Record form.

>>REFER: if the child has diabetes, or complains of pain/discomfort/severe itchiness of the eye.

Record results on the Record form.

3. Test visual acuity (VA)

Equipment/supplies: Distance VA chart e.g. HOTV, Tumbling E chart – Annex 12, tape measure/3m† string, tape, occluder, well-lit room allowing for testing distance of 3m†

Distance VA: test each eye separately (monocularly), starting first with the right eye, then the left eye. Use an occluder to cover the eye not being tested. Verify that the child looks at the chart straight, without turning or twisting the head/face. Ensure that the chart is 3m† from the child's eyes.

>>PASS: Distance vision is 6/12 or better in each eye.

>>REFER: Distance vision is worse than 6/12 in either eye.

Record results on the Record form.

4. Conduct external eye screening

Equipment/supplies: Light source e.g. medical torch

Examine the appearance of the external eye, eyelids and eyelashes; look for any crust or pus on eyelid margin; excessive watering of the eyes; red on the white part of the eye; abnormal haziness of the coloured part of the eye; alignment of the eyes.

>>PASS result: Eyelids and eyelashes appear clean, free from crusts or pus; the white part of the eye appears white; the coloured part of the eye is clear (i.e. no haziness); and both eyes are aligned.

>>REFER result: Significant crust or pus on eyelid margin; excessive watery or sticky discharge from the eyes; abnormal red or lesion on the white part of the eye; abnormal haziness on the coloured part of the eye; eyes are not aligned.

Record results on Record form.

5. Record results as Pass or Refer	**Equipment/supplies:** Record form – Annex 8; Parent/carer Notification form – Annex 7
	Inform the parent/carer of the results by letter.
	»PASS result: A date for a routine follow up assessment should be given, the parent/carer should be given information about how to care for the child's eyes, and to be aware of signs of vision impairment.
	»REFER result: For any abnormal results, or if the child is considered unable to be tested, refer to eye care personnel for a full eye examination.
	Record results on the Record form. Complete parent/carer Notification form.

[†] *WHO recommends a 3-metre distance for testing distance vision using the visual acuity chart provided in this handbook (Annex 12), or other standardized distance vision charts available. However the testing distance should always be checked in relation to the chart being used, and adjusted accordingly.*

Note: The protocol outlined above is for vision and eye screenings conducted in an educational setting and/or outreach programme for children, with no parent/carer present. If a child visits a health facility or community screening initiative accompanied by a parent/carer, the protocol remains mostly the same. However, rather than obtaining consent through a form sent to the child's home, consent can be given directly by the parent/carer during the visit. The child's history can also be given by the parent/carer, and the screening results handed directly to them. The protocol must be adapted accordingly, based on the setting, to ensure proper consent, history collection, and result distribution.

3.5 Screening test

Visual acuity test

A visual acuity test measures the ability of a person to clearly identify or distinguish an object or letter at a given distance. The test is reasonably straightforward and easy to conduct. Although the test can identify central visual status, it is not useful for the detection of any peripheral visual defects.

Charts

Different charts are available to measure distance visual acuity. For younger school-aged children (5–8 years), the appropriate chart is usually an HOTV chart or LEA Symbols chart. For older school-aged children (over 8 years), a Tumbling E chart can be used in various settings to conduct vision screenings and accommodates for different language groups. Additionally, for the over-8 years' age group, a LogMAR (EDTRS) chart or Snellen chart consisting of letters of the Latin alphabet, numbers or symbols, can be used.

Annex 12 provides a printable chart that can be used for the 5–8 years' age group, and a printable Tumbling E chart for the over-8 years' age group.

Tips for visual acuity test

- If the child already wears spectacles, test visual acuity with the child wearing the spectacles; make sure that the lenses are clean.
- Ensure that the correct testing distance is being used for the chart selected (usually 3 metres). Once the correct distance has been measured, it can be marked using a strip of tape on the floor.
- Ensure that the testing space has good lighting.

- Give clear instructions to the child, in the child's language as to what will be required of them. To make the child more comfortable during the screening, it is helpful for teachers or parents to explain the process to the child beforehand.
- Ensure that the child does not lean forward, turn their head to the left or right, or move closer to the chart during the test. If the child is using their hand as the occluder, ensure that the hand which covers the untested eye is not pushing against the eyeball and that there is no gap through which the child may be able to see.
- To pass the distance vision test, the child must be able to identify more than half the letters/symbols (i.e. 3 out of 4; or 3 out of 5 letters/symbols on the 6/12 line.
- Record the result immediately on the Record form (see Annex 6) to avoid missing documentation of results.

3.6 Red flags for referral

Referral of a child for further examination is required if any of the red flags illustrated in Figures 7a–7e are observed:

- The child has diabetes, or complains of pain/discomfort/severe itchiness of the eye.
- Distance visual acuity is worse than 6/12 in either eye.
- Significant crust or pus on the eyelid margin (Figure 7a).
- Excessively watery or sticky discharge from the eyes (Figure 7b).
- Abnormal red on the white part (conjunctiva) of the eye (Figure 7c).
- Abnormal haziness on the coloured part (iris/pupil/cornea) of the eye (Figure 7d).
- Eyes are not aligned – i.e. one eye is turned and looks in a different direction to the other eye (Figure 7e).
- The child is unable to be tested or has limited cooperation (untestable).

Annex 2 provides a diagram showing simple parts of the external eye.

Figure 7. Abnormal eye conditions in school-aged children that require referral

Figure 7a

Figure 7b

Figure 7c

Figure 7d

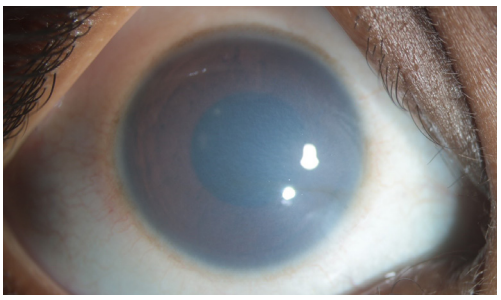
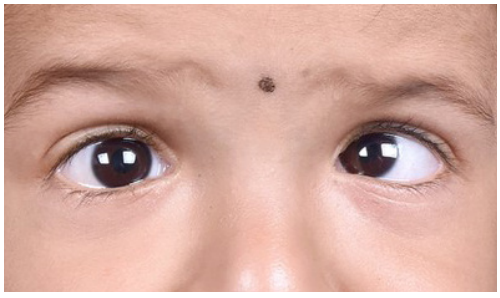
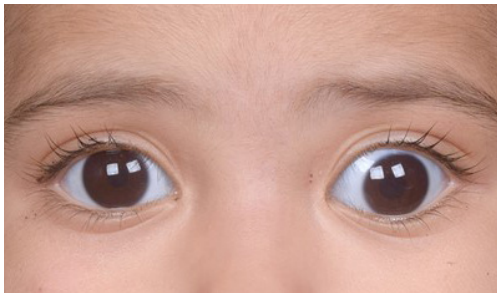


Figure 7e





3.7 Results and follow-up

Pass result

A Pass result is given when distance visual acuity is 6/12 or better in each eye; the eyelids and eyelashes appear clean and free from crusts or pus; the white part of the eye appears white; the coloured part has no haziness; and both eyes are aligned and look in the same direction.

A date for a routine follow-up assessment should be arranged. The parent/carer should be given information about how to care for the child's eyes (see Box 3. Eye hygiene), and to be aware of signs of vision impairment. Information that can be shared with the parent/carer is provided in 3.11 "Health promotion and prevention".

Note: The minimum visual acuity threshold for a child to be given a Pass is recommended at 6/12. However, this may vary depending on the country's regulations; for example some countries may use the 6/9 line as the minimum threshold.

Box 3. Eye hygiene

Teaching children about eye hygiene is essential for maintaining healthy vision and preventing eye-related issues. Children should be encouraged to:

- wash their hands thoroughly before touching their eyes to reduce the risk of infections;
- avoid rubbing their eyes vigorously, as this can irritate the sensitive tissues and potentially lead to eye problems;
- use their own towels to prevent the spread of germs; and
- take breaks from prolonged use of digital devices and near-work activities. Follow the "20-20-20" rule, which suggests taking a 20-second break to look at something 20 feet (6 metres) away, every 20 minutes. This simple practice helps reduce eye strain and fatigue.

If a parent or caregiver suspects any degree of vision impairment at any point, regardless of the child's age or the outcome of previous screenings, it is crucial that they bring the child back for a further vision and eye screening. This is essential because vision impairment can arise at any time, or manifest progressively as the child grows, potentially with no immediate obvious signs. A child can behave normally when there is vision loss in only one eye, relying on the better eye to see. They may be unaware or unable to perceive the loss, and consequently not complain about seeing poorly out of one eye. Parents/carers should be instructed to pay attention to any change in the child's head posture; to notice if there is a strong preference for the child to look with one eye only; if the child bumps into objects on one side; moves closer in order to see objects; has frequent headaches at the end of the day; displays an unusual avoidance of near-activity tasks; or has learning delays.

Note: Vision and eye screening provides a broad assessment and may not detect minor refractive errors or subtle eye conditions. Therefore, it is crucial to advise parents/carers of the importance of ongoing eye checks as their child continues to develop and grow.

Refer result

A Refer result is given if the child has diabetes; complains of pain/discomfort/ severe itchiness of the eye; if distance vision is worse than 6/12 in either eye; if there is significant crust or pus on the eyelid margin; excessive watery or sticky discharge from the eyes; abnormal red on the white part of the eye; abnormal haziness on the coloured part of the eye; or if the eyes are not aligned. A child should also be referred if they are considered untestable during the screening.

All school-aged children who have a Refer result after a vision screening should be referred to an optometrist, ophthalmic nurse, ophthalmologist, or appropriate eye care personnel for a full eye examination (Annex 7 provides a Notification form template). All referrals should be tracked and followed up.

Note: If a child is unable to see the 6/60 line with either eye, this is considered as an urgent referral. The child should have a full eye examination within 30 days with qualified eye care personnel, such as an optometrist or ophthalmologist.

3.8 Referral process management

The steps for the referral process should be mapped out and align with those of the existing national referral system; they should facilitate parent/carer attendance at follow-up to ensure maximum compliance prior to the screening taking place. An established follow-up system should include a mechanism to ensure that children who are referred receive the appropriate care. Options to ensure compliance with referrals include automated reminders on patient management software, or other more manual approaches.

Tips to prevent referral losses and ensure that the child accesses referral services include:

- completing the Notification form (see Annex 7) for the parent/carer;
- providing clear details of the name and location of the facility where the child is being referred;
- developing a relationship with the eye care provider to whom the child is being referred, so that the list of names of children referred can be shared. Maintaining regular communication with the eye care provider enables the referrer to stay updated on the availability of eye care services and their capacity;
- keeping a separate list of the children referred; this is essential, particularly in the absence of an automated referral tracking system. It helps to keep a track of the referrals and enables easier follow-up with the parent/carer if they have not complied with the referral (a template for a Follow-up referral list can be found in Annex 10);
- depending on privacy policies, notifying the relevant personnel at the school of the children being referred for further investigation. This enables the school to also follow up with parents/carers of the referred children. If the child is being screening outside the school setting, the parent/carer must be notified directly;
- managing the referral process; this should be carried out systematically by a designated person and included as part of their roles and responsibilities;
- monitoring referral losses to identify children who do not follow through with their referrals. This is crucial; if referral losses are observed, further investigation can then be conducted to understand the reasons behind

non-compliance and address these appropriately. Potential reasons may include limited access to transportation; distance to the referral facility; misunderstandings regarding instructions; financial barriers; or other barriers.

3.9 Equipment and infrastructure

As with all screening, the equipment and infrastructure required for a school vision screening is basic and accessible; items include, but are not limited to, those shown in Annex 11.

Screening environment

The screening area should have adequate lighting, no glare or reflections on the vision chart, and minimal distractions. Children who are waiting to be screened should not be able to see the chart.

For reasons of child protection, no child should be left alone in the room with the screener with the door closed. The door should be kept open and/or a school teacher/health worker/parent/carer should be present in the screening room with the child and screener.

3.10 Human resources

Personnel

A minimum of two personnel is required for the screening of school-aged children: a screener to conduct the eye screening, and a school teacher/health worker/parent/carer supervising the children waiting to be screened. The screener can be a school teacher trained in screening, health worker, ophthalmic nurse, allied ophthalmic personnel, or general physician. If a large number of children are attending the screening, additional personnel may be required to assist the screener and/or to supervise the children.

Competencies

The minimum competencies and activities required by the screener align with those described in the *WHO Eye care competency framework (3)* (available on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss), and included in Annex 13.

Minimum training requirements

Personnel conducting vision and eye screening for school children should receive competency-based training, with a particular focus on the competencies and activities outlined in Annex 13. Training should encompass both theoretical knowledge and practical skills related to vision and eye screening at the community and primary levels of care. Emphasis should also be placed on identifying red flags for referral, familiarizing personnel with the screening equipment to be used and the standard operating procedures of the programme, including full documentation of results, data collection, and referral management.

3.11 Health promotion and prevention

The aim of health promotion, education, and counselling is to improve people's capacity to take greater control over their eye health and the factors that support it. An essential component of empowering individuals and their families, specifically underserved populations, is to help them increase their understanding and subsequent adoption of healthy behaviours, as well as to promote optimal self-care and the uptake of services.

Any health promotion and prevention initiative should be complementary to existing clinical interventions and policies, including those at the individual level (e.g. by health personnel during routine clinical practice) and/or the population group level (e.g. public health campaigns).

The presence of uncorrected refractive errors and vision impairment may be difficult to detect in children; however potential signs that parents/carers and/or school teachers may notice include:

- the child having difficulty in seeing the classroom board at school;
- the child avoiding reading books;
- the child having learning difficulties at school, which may result in disruptive behaviour or issues with participating in school activities;
- the child complaining of sore eyes or headaches, or rubbing their eyes;
- the child isolating themselves from other children because they do not see sufficiently well to participate in activities; and/or
- the child not demonstrating good eye contact.

If any of these signs become evident through conducting a health promotion initiative, the parents/carers and/or school teachers should be informed.

If the child passes the vision screening test, health promotion information should be included with the "Pass" note for the parents/carers. Educating school teachers and students will help to remove any stigma that may be associated with a child wearing spectacles at school.

A school-based vision and eye screening programme provides an excellent opportunity for teachers to have their own eyes screened, typically before or after the children's screening.

The *Package of eye care interventions (1)* outlines key evidence-based areas for health promotion and prevention in the field of eye care for school children. Short health promotion messages that can be used by the screener, either during or after the screening to promote healthy eye care habits are provided in Annex 14. The messages are also available as posters and tiles on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss.

3.12 Monitoring and evaluation

Monitoring and evaluation play a vital role in ensuring the effectiveness and impact of vision and eye screening programmes. The processes of systematic data collection, analysis, and assessment, provide valuable insights into the programme's performance, and help to identify strengths, weaknesses, and areas for improvement. Every setting that implements a vision and eye screening programme for school-aged children must establish a comprehensive monitoring framework. This framework should encompass indicators from all domains of the result chain that can be assessed through Health Information Systems (HIS) covering input, output, and outcome indicators. It is crucial to fully integrate this framework within the wider health monitoring and evaluation framework and data collection processes. By doing so, the effectiveness and impact of the programme can be ensured, while facilitating data-driven decision-making for continuous improvement.

An expanded indicator collected for the school-aged population and relevant to vision and eye screening is "Expanded indicator 12: School eye care programmes coverage" (introduced in the WHO *Eye care indicator menu (ECIM) (4)*. This indicator allows for measuring the extent of coverage of national periodic screening of school-aged children for eye and vision conditions. The preferred data sources for this indicator are population-based surveys or administrative sources, such as reports from the Ministry of Health or Education or school health reports. The indicator provides important information for the planning of services and detecting epidemiological trends, and at higher levels (national or subnational) for planning, strategy development or policy-making.

Further information can be found in the *WHO Eye care indicator menu (ECIM),* available on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss.

4

Vision and eye screening in older adults

This section provides guidance on the vision and eye screening requirements for older adults at the community and primary levels of care. The recommendations are evidence-based and developed with a focus on delivering screening easily, safely, and effectively in low- and low–intermediate-resource settings.

This section is a contribution to WHO's work as part of the United Nations Decade of Healthy Ageing (2021–2030), a global 10-year collaboration that includes governments, civil society, international agencies, and professionals aligned to achieving the 2030 targets of the Sustainable Development Goals, specifically to improve the lives of older adults, their families, and the communities in which they live *(14)*.

Links to resources:

- Integrated care for older people (ICOPE): guidance for person-centred assessment and pathways in primary care
- TAP Vision assistive products – Training in Assistive Products
- TAP Reading glasses – Training in Assistive Products

4.1 Needs and rationale

Age is a significant risk factor for various eye disorders, often leading to distance and near vision impairment in individuals in the older age group (aged 50 years and older). Research estimates reveal that this older age group constitutes approximately 80% of individuals with bilateral distance vision impairment and blindness, as well as two thirds of those with bilateral near vision impairment *(15)*. This prevalence of reduced vision is only set to grow, particularly due to ageing populations globally *(16)*.

Vision and eye screening in older adults can be relatively simple, quick, and inexpensive. However, particularly in low-resource settings, individuals may not have access to eye care facilities and have never undergone vision and eye screenings. In some countries, these screenings may be conducted as part of a general health check or as a requirement for driving regulations.

Vision screening in this age group is warranted due to the significantly higher prevalence of vision impairment compared with younger adults. WHO guidelines for the integrated care of older persons (ICOPE) recommend that older adults should undergo systematic assessment of visual acuity (both distance and near) and assessment of presence of eye diseases in the primary care setting, followed by timely provision of comprehensive eye care *(17)*.

4.2 Age and time frame for screening

Vision and eye screening for older adults should be conducted in individuals aged 50 years and older.

In this age group, vision and eye screening can be conducted every 1–2 years.

4.3 Summary of resource requirements for vision and eye screening in older adults

The screening requirements for the detection of eye and sight-threatening conditions in older adults, and for subsequent referral for further examination, are described in Table 5 below.

Table 5. Resource requirements for vision and eye screening in older adults

Resource	Description
Staff/personnel	– Health worker/outreach worker/refractionist/vision technician/allied ophthalmic personnel/optometrist/general physician
Training	– Theory and practice-based training for the community and primary level of care in vision screening and external eye screening, basic information on chronic eye diseases and their treatment, and awareness of systemic diseases that increases risk for eye disease.
Supplies	– Record forms; Referral forms; Referral list – Health promotion information for person/carer – Batteries (replaceable or rechargeable)/electrical charging facilities – Readymade reading spectacles (+1.00DS to +3.00DS in 0.50DS steps)
Equipment	– Distance and near visual acuity charts e.g. printed version of charts included in handbook, or existing Tumbling E chart – Tape measure/3 or 6 metre string and 40 centimetre string – Tape to mark the measured distance – Occluder – Light source for external eye screening e.g. medical torch/flashlight/pen torch/ophthalmoscope/phone torch
Infrastructure	– A testing space that allows a testing distance of at least 3 metres – A well-lit room – Chairs for screener and person being screened
Time	– Screening can be performed as part of general health check/routine vision screening programme – Time taken to perform: 10–15 minutes
Referral	– Referral to eye care personnel including ophthalmic nurse/optometrist/ophthalmologist, is required where the person does not pass the screening, or is untestable.

4.4 Screening protocol

The vision and eye screening protocol for older adults is shown in Figure 8. The time taken to perform the vision screening is approximately 10–15 minutes. Ensure your hands are thoroughly clean before screening each person, and avoid touching the person's eyes.

Figure 8. Vision and eye screening protocol for older adults

1. Gather history

Equipment/supplies: Record form – Annex 8

See Annex 9 for Record form template.

Ask the person if they are experiencing blurred vision (with their current correction); if they wear spectacles; if they wear them for distance, or near, or both; if they are experiencing any eye pain or discomfort; if they have any previous eye history such as trauma or being diagnosed with an eye disease; if there is any family history of eye disease that they are aware of; if they have diabetes and/or hypertension; and if they take any medications, particularly for the eye.

>>REFER: if the person has diabetes, or hypertension, or is currently using eye medications, or complains of eye pain/discomfort or any other eye related symptom regardless of other vision screening results.

Record results on Record form.

2. Test visual acuity (VA)

Equipment/supplies: Distance VA chart e.g. Tumbling E chart – Annex 12; Near VA chart e.g. Tumbling E card; tape measure/3m string†, tape, occluder, well-lit room with testing distance of 3m†, Record form

Test distance and near vision with spectacles if normally worn. Make sure to ask if their spectacles are for distance or near vision (check that the person knows).

Distance VA: test each eye separately (monocularly), starting with the right eye first, then the left eye. Use an occluder to cover the eye not being tested. Verify that the person looks at the chart straight, without turning or twisting the head/face. Ensure the chart is 3m† from the person's eyes.

>>PASS: Distance vision is 6/12 or better in each eye.

>>REFER: Distance vision is worse than 6/12 in either eye.

Near VA: test both eyes together (binocularly). Hold the near chart at 40 cm from the person's eyes.

>>PASS: Near vision is N6 or better.

>>REFER: Near vision is worse than N6. Conduct Step 5 at the end of the screening. If there is no improvement with the trial readymade spectacles, the person will need to be referred.

Record results on the Record form.

3. Conduct external eye screening

Equipment/supplies: Light source e.g. medical torch

Examine the appearance of the external eye, eyelids and eyelashes; look for any crust or pus on eyelid margin; excessive watering of the eyes; red on the white part of the eye; abnormal haziness of the coloured part of the eye; alignment of the eyes.

>>PASS result: Eyelids and eyelashes appear clean, free from crusts or pus; the white part of the eye appears white; the coloured part of the eye is clear (i.e. no haziness); and both eyes are aligned.

>>REFER result: Significant crust or pus on eyelid margin; excessive watery or sticky discharge from the eyes; abnormal red or lesion on the white part of the eye; abnormal haziness on the coloured part of the eye; eyes are not aligned.

Record results on Record form.

4. Record results as Pass or Refer

Equipment/supplies: Record form – Annex 8; Parent/carer Notification form – Annex 7

Inform the parent/carer of the results by letter.

>>PASS result: A date for a routine follow up assessment should be given, the parent/carer should be given information about how to care for the child's eyes, and to be aware of signs of vision impairment.

>>REFER result: For any abnormal results, or if the child is considered unable to be tested, refer to eye care personnel for a full eye examination.

Record results on the Record form. Complete parent/carer Notification form.

5. Prescribe reading spectacles*

Equipment: Near-reading card e.g. Tumbling E card, well-lit room; Record form – Annex 8

Conducted if person has a PASS result for the distance VA test and external eye screening, but has a FAIL result for the near VA test.

Ask the person to hold the reading card at a distance of 40 cm, or at a comfortable reading distance, with both eyes open.

- Trial readymade reading spectacles on hand, using the person's age as a guidance.
- Dispense (or prescribe) the readymade reading spectacles so that the person is able to see N6 clearly on the reading card and the spectacles are comfortable for them to wear.

>>REFER: If the person is unable to see N6 at a distance of 40 cm with the trial readymade reading spectacles.

Record results on Record form.

**Additional tests have been added in the protocol as step 5. This step is optional and is dependent on the resources available, the training of the screeners, and the availability of eye care personnel to carry out the tests.*

†WHO recommends a distance of 3 metres for testing distance VA using the chart provided in this handbook (Annex 12), or other standardized distance VA charts available. However the testing distance should always be checked in relation to the chart being used, and adjusted accordingly.

4.5 Screening test

Visual acuity test

A visual acuity test measures the ability of a person to identify or distinguish an object or letter clearly at a given distance. The test is reasonably straightforward and easy to conduct. Although this test can identify central visual status, it is not useful for the detection of any peripheral visual defects.

Charts

There are different charts available to measure distance visual acuity and near visual acuity. A Tumbling E chart has wide application, while a LogMAR (EDTRS) chart consisting of the Latin alphabet or symbols may not be suitable for certain settings as it requires knowledge of the Latin alphabet. If an existing visual acuity chart is not available, Annex 12 of this handbook provides a printable Tumbling E chart suitable for conducting vision screenings in various settings. This chart can be used for older adults and accommodates for different language groups.

Tips for visual acuity test

- If the person already wears spectacles, test visual acuity with the person wearing the spectacles; make sure the lenses are clean.
- Ensure that the correct testing distance is being used for the chart selected (usually 3 metres or 6 metres). Once the correct distance has been measured, mark with a strip of tape on the floor.
- Ensure that there is good lighting in the testing space.
- Give clear instructions to the person being tested, in the person's language
- If the person is accompanied by a carer, it may be necessary to ask for her/his assistance.
- Ensure that the person does not lean forward, turn the head to the left or right, squint/strain their eyes, or move closer to the chart during the test. If the person does not wear spectacles, ensure the hand which covers the eye not being tested is not pushing against the eyeball or has a gap through which the person can see.
- The person must be able to identify more than half (i.e. 3 out of 4, or 3 out of 5) of the letters/symbols correctly on the 6/12 line to pass the distance visual acuity test; and identify more than half (i.e. 3 out of 4, or 3 out of 5) of the letters/symbols correctly on the N6 line to pass the near visual acuity test.
- Record the result immediately on the Record form, to avoid missing documentation of results.

Prescribing reading spectacles

Readymade reading spectacles, near spectacles or short-distance spectacles (commonly referred to as reading glasses) are an effective and quick solution to correct presbyopia in older adults; however these can only be dispensed in situations where:

- the person passes the case history questions; where they are not experiencing any eye pain; and they do not report having eye or systemic diseases (diabetes, hypertension or use systemic drugs). Reading spectacles may still be dispensed if the person reports having an eye or general disease, and have already been referred for comprehensive examination including retinal assessment;
- the person passes the distance visual acuity test and can see 6/12 or better in both eyes without spectacle correction; and

- the person passes the external eye screening.

There are several ways to prescribe reading spectacles. One commonly-used method is to combine a person's age with trial and error.

Age group	Power of reading spectacles
40–50 years	+1.00DS to +2.00DS
≥ 50 years	+2.00DS to +3.00DS

It is important to note that people with longer arms may prefer spectacles with lower powers while people with shorter arms, and who hold material closer, may prefer spectacles with higher powers.

Trial the readymade reading spectacles in a well-lit room, using the near visual acuity card. To ensure the spectacles are correct, the person should be able to see N6 or better comfortably, i.e. with little or no eye strain, with both eyes open, at 40 centimetres or at a reading distance that is comfortable for them (making sure that the material is not too close). The frame of the spectacles should also fit the person comfortably and correctly, i.e. not too small or too loose-fitting, and fit over the ears comfortably without pressing on the side of the head.

4.6 Red flags for referral

Referral of a person for further examination is required if any of the red flags illustrated in Figures 9a–9i are observed:

- The person has diabetes, hypertension, is currently using eye medications and/or complains of eye pain/discomfort or any other eye related symptom regardless of other vision screening results.
- Distance visual acuity is worse than 6/12 in one or both eyes.
- Near visual acuity is worse than N6 and does not improve with trial spectacles.
- Significant crust or pus on eyelid margin (Figure 9a).
- Excessively watery or sticky discharge from the eyes (Figure 9b).
- Eye lashes turn inwards; anomalies of eyelid margins, form, or shape; lack of complete closure of eyes (Figure 9c and 9d).
- Abnormal red on the white part (conjunctiva) part of the eye (Figure 9e).
- Abnormal haziness (Figure 9f–9h) or red on the coloured part (iris/pupil/cornea) of the eye.
- The person is unable to be tested or has limited cooperation (untestable).

Annex 2 provides a diagram showing simple parts of the external eye.

Figure 9. Abnormal eye conditions in older adults that require referral

Figure 9a

Figure 9b

Figure 9c

Figure 9d

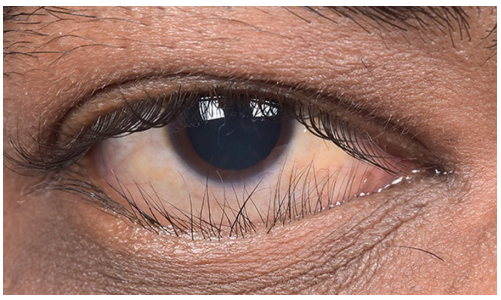


Figure 9e

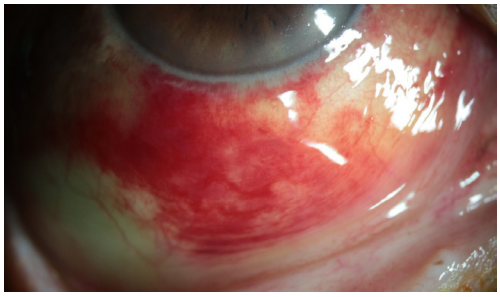


Figure 9f

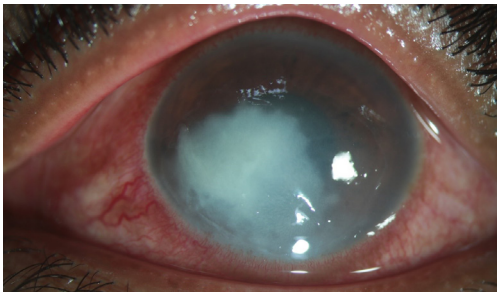


Figure 9g

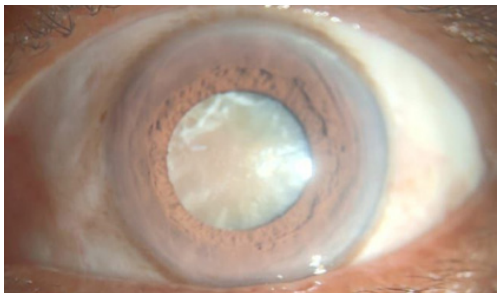
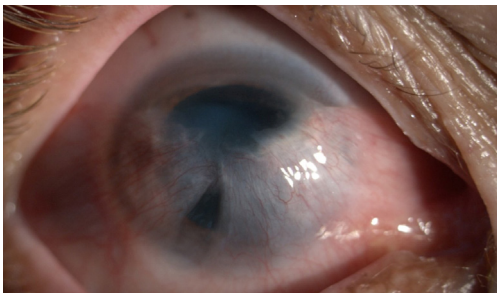


Figure 9h



4.7 Results and follow-up

Pass result

A Pass result is given when there is no history of previously diagnosed eye disease; no systemic disease such as diabetes or hypertension; no use of eye medication; no pain or discomfort in the eyes; distance visual acuity is 6/12 or better in both eyes (with spectacles if used); near visual acuity is N6; the eyelids and eyelashes appear clear and free from crusts or pus; the eyelids close completely; the white part of the eye appears white; and the coloured part of the eye appears clear (i.e. with no haziness or redness).

A date for a routine follow-up assessment should be arranged, and information given on how to care for the eyes and to be aware of signs of vision impairment. Information that can be shared with the person is provided in 4.11 "Health promotion and prevention".

If vision impairment is suspected by the person after the screening, they should return for a vision and eye screening, irrespective of previous test outcomes. This is important because vision impairment can develop at any time and be progressive in nature, which becomes apparent as people age.

Note: The minimum distance visual acuity threshold for a Pass for older adults is recommended at 6/12; near visual acuity is N6. However, this may vary depending on a country's regulations; for example some countries may use 6/9 and/or N8 respectively as minimum thresholds.

Refer result

A Refer result is given if the person has a case history of diabetes or hypertension; is currently using eye medications; complains of eye pain or discomfort or any other eye related symptom regardless of the other vision screening results; if distance visual acuity is worse than 6/12 in either eye; near visual acuity is worse than N6; if there is significant crust or pus on eyelid margin; excessively watery or sticky discharge from the eyes; the eye lashes turn inwards; there is abnormal closure of the eyelid; abnormal red on the white part of the eye; or abnormal haziness or red on the coloured part of the eye. An individual should also be referred if they are considered untestable during the screening.

All older persons who have a Refer result after a vision and eye screening should be referred for a full eye examination to appropriate eye care personnel (see Annex 9 for a Referral form template). All referrals need to be tracked and followed up.

Note: If a person is unable to see the 6/60 line, this requires an urgent referral and the person should have a full eye examination within 30 days.

4.8 Referral process management

The steps in the referral process should be mapped out in a system that aligns with the existing national referral system. An established follow-up system should include a mechanism to ensure that all individuals referred receive appropriate care. Options to ensure compliance with referrals include automated reminders on patient management software, or other more manual approaches.

Tips to prevent referral losses and ensure that the person accesses referral services include:

- providing clear details of the name and location of the facility where the person is being referred;

- developing a relationship with the eye care provider to whom the person is being referred, so that the list of names of people referred can be shared. Maintaining regular communication with the eye care provider enables the referrer to stay updated on the availability of eye care services and their capacity.
- keeping a separate list of the people referred; this is essential, particularly in the absence of an automated referral tracking system. It helps to keep track of referrals, and enables easier follow-up with the person if they have not complied with the referral (a template of a Follow-up referral list can be found in Annex 10).
- managing the referral process; this should be carried out systematically by a designated person and included as part of their roles and responsibilities.
- monitoring referral losses to identify individuals who do not follow through with their referrals. This is crucial; if referral losses are observed, further investigation can then be conducted to understand the reasons behind non-compliance and address these appropriately. Potential reasons may include limited access to transportation; distance to the referral facility; misunderstandings regarding instructions; financial barriers; or other barriers.

4.9 Equipment and infrastructure

As with the screening for all age groups, the equipment and infrastructure required for a vision and eye screening for older adults is basic and accessible; items include, but are not limited to, those shown in Annex 11.

Screening environment

The screening area should be adequately lit; have no glare or reflections on the visual acuity chart, and minimal distractions. People who are waiting to be screened should not be able to see the chart.

4.10 Human resources

Personnel

A minimum of one eye care personnel is required to conduct the eye screening. This can be a health worker, ophthalmic nurse, allied ophthalmic personnel, or general physician. If a large number of people are attending the screening, the assistance of an additional person may be considered to support the screener.

Competencies

The minimum competencies and activities required by the screener align with those described in the *WHO Eye care competency framework (3)* (available on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss), and are included in Annex 13.

Minimum training requirements

Personnel conducting vision and eye screening for older adults should receive competency-based training, with a particular focus on the competencies and activities outlined in Annex 13. Training should encompass both theoretical knowledge and practical skills related to vision and eye screening at the community and primary levels of care. Emphasis should also be placed on identifying red flags for referral, familiarizing personnel with the screening equipment to be used and the standard operating procedures of the programme, including full documentation of results, data collection, and referral management.

4.11 Health promotion and prevention

The aim of health promotion, education, and counselling is to improve people's capacity to take greater control over their eye health and the factors that support it. An essential component of empowering individuals and their families, specifically underserved populations, is to help them to increase their understanding, and subsequent adoption, of healthy behaviours, as well as to promote optimal self-care and the uptake of services.

Any health promotion and prevention initiative should be complementary to the existing clinical interventions and policies, including those at the individual level (e.g. conducted by health personnel during routine clinical practice) and/or at the population group level (e.g. public health campaigns).

The *Package of eye care interventions (1)* outlines key evidence-based areas for health promotion and prevention in the field of eye care for older adults. Short health promotion messages that can be used by the screener, either during or after the screening to promote healthy eye care habits are provided in Annex 14. The messages are also available as posters and tiles on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss.

4.12 Monitoring and evaluation

Monitoring and evaluation play a vital role in ensuring the effectiveness and impact of vision and eye screening programmes. The processes of systematic data collection, analysis, and assessment provide valuable insights into the programme's performance, and help to identify strengths, weaknesses, and areas for improvement. Every setting that implements a vision and eye screening programme for older adults should establish a comprehensive monitoring framework. This framework should encompass indicators from all domains of the result chain that can be assessed through Health Information Systems (HIS) covering input, output, and outcome indicators. It is crucial to fully integrate this framework into the wider health monitoring and evaluation framework and data collection processes. By doing so, the effectiveness and impact of the programme can be ensured, while facilitating data-driven decision-making for continuous improvement and quality assurance.

5

Approaches to vision and eye care service delivery

5.1 Refractive error service delivery

Vision and eye screening is critical for identifying individuals who have an eye condition that may require further care, including those with uncorrected refractive error. Integrated people-centred eye care is essential to ensure services are accessible to all. By integrating screening, refractive error, and optical services into health-care systems, the accessibility and sustainability of these vital services can be enhanced.

A scoping review of the literature on approaches to refractive error service delivery *(18)* revealed that outreach and school-based approaches were commonly employed in community and primary health-care settings, thereby strengthening referral pathways to secondary and tertiary levels of care. However, notable gaps remain in evaluating these approaches.

By taking into consideration factors such as available resources, infrastructure, and health-care settings, the diverse approaches to service delivery can be customized to suit specific contexts, ensuring that eye care reaches those who need it most.

5.2 Vision and eye screening service delivery

Table 6 below presents an overview of the different vision and eye screening approaches available at the community and primary levels of care as well as the associated advantages and disadvantages. The table provides a concise yet informative resource to understand the different screening methods and assists in selecting the most suitable approach based on specific requirements and constraints.

Table 6. Vision and eye screening approaches at the community and primary levels

COMMUNITY LEVEL

Outreach screening

Approach description	Advantages	Disadvantages
What does it involve? Vision and eye screening is conducted in communities or settings where access to regular services may be limited. It may take place in a designated community centre (e.g. satellite clinic), or "door-to-door" in individuals' homes or workplaces. Screening may be conducted as part of an integrated community health programme or through visiting eye care teams. **Who conducts it?** Vision and eye screening is conducted by trained personnel including community health workers, outreach workers, volunteers, and private/public eye care personnel.	– Increased accessibility for underserved populations or communities with limited access to eye care services. – Potential cost-savings for individuals who may otherwise have to travel long distances and incur higher expenses to access eye care services. – Serves as a valuable short-term intervention that promptly addresses the immediate service needs of the population. – Screenings conducted at workplaces provide improved accessibility for employees and are of particular benefit to those with presbyopia. – Fosters eye health awareness and opportunities for providing eye health education among people who would otherwise not seek eye care services.	– Potential for limited resources and inadequate follow-up care for identified vision problems, if not integrated into an existing programme or eye care system. – Challenges in finding and retaining qualified personnel for screening. – Can often be "ad hoc", with limited long-term sustainability due to dependence, usually, on external funding. – Can be uncoordinated, leading to duplication and inappropriate service delivery. – Potential for missed or inaccurate diagnoses due to limited equipment, diagnostic capabilities and application of systems and processes. – Disruption to, or suspension of, services at health centres due to limited availability of screening personnel and their absence during outreach visits.

School-based screening

Approach description	Advantages	Disadvantages
What does it involve? Vision and eye screening is conducted for school-aged children within an educational setting, either as part of a school health programme or through visiting eye care teams. **Who conducts it?** Vision and eye screening for children is conducted either by school teachers trained to screen and/or other trained personnel including community health workers, outreach workers, volunteers, and private/public eye care personnel.	– Convenient vision and eye screening for students and teachers with limited access to eye care services. – The swift screening of numbers of students may be cost–effective in identifying vision problems, and relieve the financial burden on families and health-care systems. – Engages parents/carers in the child's eye health, promoting awareness of regular eye care and facilitating necessary follow-up care.	– Potential for limited resources and inadequate follow-up care for identified vision problems, if not integrated into an existing programme or eye care system. – Challenges in finding and retaining qualified personnel for screening, particularly to manage young children, as well as the potential cost and burden of training teachers as alternative screeners. – Potential quality issues such as false positives or false negatives in screening results, due to inadequate training of personnel, or limited equipment and diagnostic capabilities. – Disruption to classroom activities.

	– Promotes the establishment of a comprehensive and effective school eye care policy or programme. – Encourages cross-sectoral collaboration between the Ministry of Health and of Education, potentially giving the programme a higher priority.	– Only targets children attending school, particularly on the day of the screening. – Requires cross-sectoral collaboration between the Ministry of Health and of Education for programme approvals.

Screening at pharmacies

Approach description	Advantages	Disadvantages
What does it involve? Vision and eye screening is conducted within a pharmacy. **Who conducts it?** Vision and eye screening is conducted either by trained pharmacists or trained pharmacy staff.	– Convenient in areas where pharmacies are easily accessible in many communities, often with extended opening hours, including evenings and weekends. – Reaches a broader population and potentially detects vision problems that may otherwise go unnoticed. – Attracts a diverse range of individuals, including those who may not regularly seek health-care services. – Has the capacity to provide a convenient and affordable solution for individuals with presbyopia, such as readymade reading spectacles. – Pharmacy staff can promote general health and provide health-related advice.	– Potential for limited resources and inadequate follow-up care for identified vision problems, if not integrated into an existing programme. – Ensuring consistent quality control and adherence to standardized screening protocols may be challenging across different pharmacy locations. – May present challenges in accessing trained personnel who can provide in-depth guidance, or address specific concerns related to eye health, when required. – Potential for missed or inaccurate diagnoses due to limited equipment and diagnostic capabilities. – Individuals accessing readymade reading spectacles at pharmacies may overlook the importance of having a comprehensive eye examination.

Screening at driver's licence registration centres

Approach description	Advantages	Disadvantages
What does it involve? Vision screening is conducted within a driver's licence registration centre. **Who conducts it?** Vision screening is conducted by trained staff working at the driver's licence registration centre.	– Ensures that drivers meet the minimum visual acuity requirements, promoting safer roads and reducing the risk of accidents caused by poor vision. – Provides an opportunity to educate individuals about the importance of vision health and raise awareness about potential vision problems.	– Limited scope as screening focuses on distance visual acuity only and does not include near visual acuity or external eye screening. – Staff members at registration centres do not have specialized training in vision screening and are not equipped to identify subtle visual impairments accurately. – If an individual fails the vision screening, there may be challenges in ensuring they seek appropriate follow-up care and obtain necessary corrective measures.

		– If an individual passes the vision screening, it may give them a false sense of security and overlook the importance of having an eye screening or a comprehensive eye examination.

Self-testing (smart phone applications, kiosks)

Approach description	Advantages	Disadvantages
What does it involve? Vision screening is accessible via a smartphone application or devices placed within the community at frequently-visited locations, including shopping centres and pharmacies. **Who conducts it?** Vision screening is performed by individuals on themselves using automated devices or tools. No trained personnel are involved.	– Allows individuals to assess their vision readily and at their own convenience, without the need for scheduling appointments or visiting health-care facilities. – Promotes greater awareness in an individual of their visual health, encouraging them to take ownership and proactive measures in seeking eye care services if any issues are identified. – Regular self-screening may help individuals identify potential vision problems early on, prompting them to seek early intervention.	– Limited scope as the screening typically does not include external eye screening. – May not be as accurate as assessments conducted by trained personnel. – Typically not suitable for pre-school-aged and younger school-aged children. – Without the involvement of trained personnel, individuals may struggle to interpret the screening results accurately, potentially leading to misunderstandings or incorrect self-diagnosis. – If an individual fails the vision screening, there may be challenges in ensuring they seek appropriate follow-up care and obtain necessary corrective measures. – If an individual passes the vision screening, it may give them a false sense of security and overlook the importance of having an eye screening or a comprehensive eye examination.

PRIMARY LEVEL

Primary health care (PHC) facility/health centre/integrated vision centre

Approach description	Advantages	Disadvantages
What does it involve? Vision and eye screening is provided at a permanent facility, along with other health services. Often offers outreach services to community or satellite clinics. **Who conducts it?** Vision and eye screening is conducted by qualified personnel, including nurses and health workers.	– Increased accessibility as PHC facilities are often more widely distributed, including in rural or underserved areas. – Vision and eye screening is integrated seamlessly into comprehensive PHC services when required, ensuring a holistic approach to individuals' overall health and well-being. – Often have strong referral pathways. – May be more cost–effective for individuals, as they can access screening services alongside other PHC needs in a single location.	– Refractive and optical services are not often included at PHC facilities. – Potential limitations in terms of equipment, staffing, and funding for vision screening programmes. – Staff often have competing priorities, demanding schedules and limited appointment time with patients. – Awareness and demand for vision and eye screening may be lower compared to specialized eye care centres.

Standalone vision centre/optometry practice/optical shop

Approach description	Advantages	Disadvantages
What does it involve? Vision and eye screening is provided at a permanent facility, often also providing refractive and optical services. This approach is usually suitable in high-density population areas. Often offers outreach services to community or satellite clinics. Standalone vision centres can be a combination of public/private/social enterprise models. **Who conducts it?** Vision and eye screening is conducted by qualified personnel, including vision technicians, refractionists, ophthalmic nurses, opticians or optometrists.	– Facilities staffed with trained eye care personnel who specialize in vision screening and eye health, ensuring accurate assessments and appropriate follow-up care. – Able to offer comprehensive eye examinations and treatment options including refractive and optical services; providing a "one-stop shop" for refractive services. – Able to incorporate the use of advanced technology which aids accuracy, including Telehealth.	– May not be easily accessible to all individuals, especially those in remote areas or areas with limited health-care facilities. – If conducted through the private system, may involve higher costs for screenings and refractive services, including spectacles, compared to other settings, potentially limiting access for individuals with financial constraints or inadequate insurance coverage. – May rely on the support of secondary/tertiary hospitals for infrastructure and human resources, which may pose challenges in low-density population areas or regions with limited access to primary level care. This typically occurs for standalone vision centres. – May not be integrated into the public health system, potentially impacting sustainability, accessibility and/or affordability.

5.3 Refraction and spectacles service delivery

The following approaches are described typically for vision and eye screening that is conducted either through outreach, school-based or primary health-care settings.

Delivery of refraction assessment, as part of a comprehensive eye examination

If an individual does not pass the vision and eye screening, a referral process is initiated to facilitate a comprehensive eye examination, which includes a refraction assessment. The referral process operates through three options, allowing for flexibility and adaptability to suit various health-care settings and resources (see Figure 10). For each option, qualified eye care personnel are responsible for conducting the comprehensive eye examination, which includes a refraction assessment. This can occur onsite at the screening location either immediately or with a delay, or at an off-site facility if necessary. If the referred individual requires spectacles, a prescription is generated, and the subsequent step in the process is the prompt initiation of the delivery of spectacles which can range from readymade to custom-made spectacles.

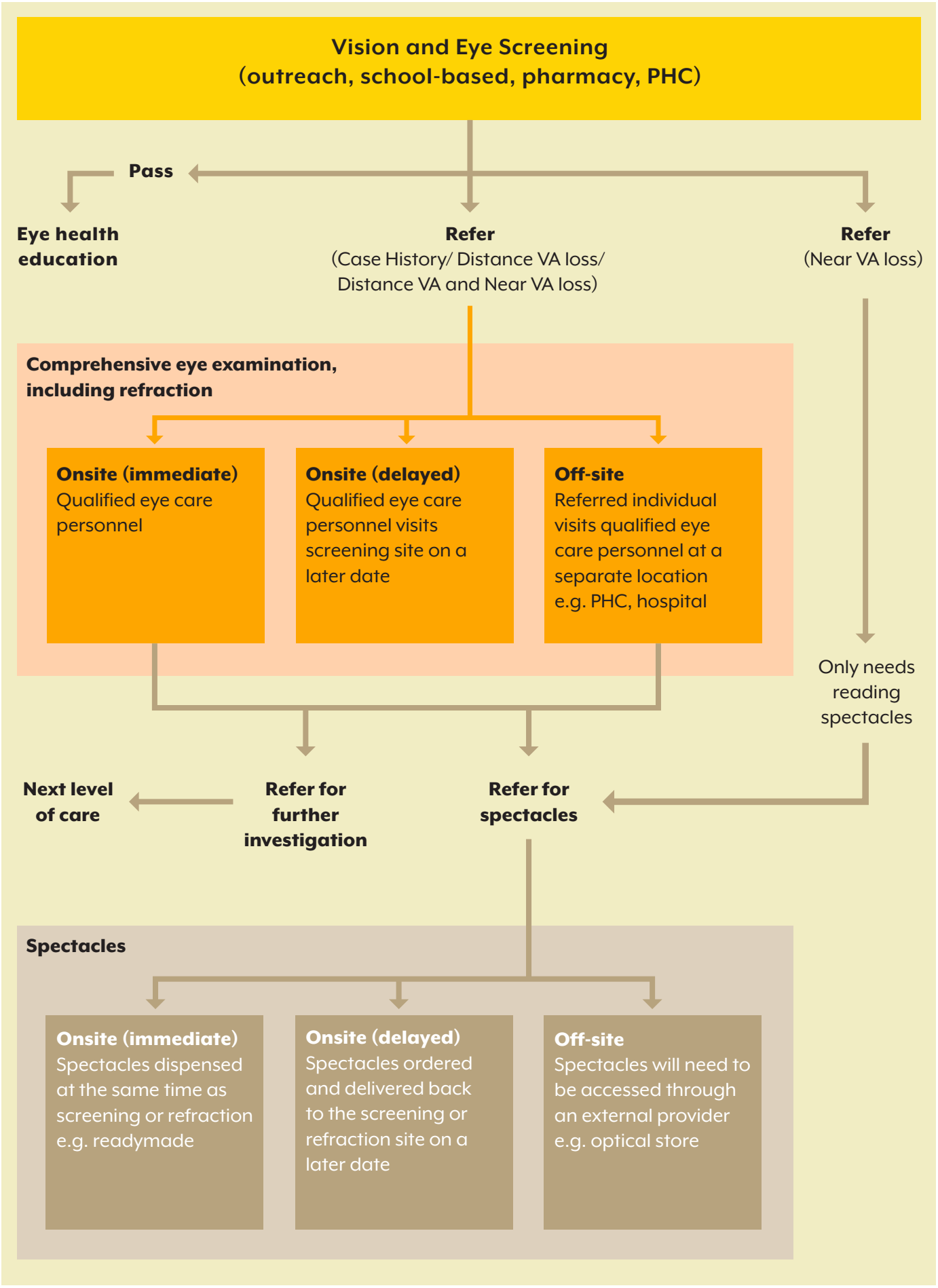
Note: In instances where an individual receives a comprehensive eye examination and requires further investigation, a referral is made to the appropriate (secondary or tertiary) level of care. The person may then need to be retested for spectacles once other investigations have been cleared or managed.

Delivery of spectacles

Once the refraction assessment is completed and, where necessary, a prescription for spectacles is generated, individuals have three options for accessing their spectacles. This further demonstrates the flexibility and adaptability of the process in relation to health-care settings and available resources. Spectacles can be dispensed immediately onsite, typically with readymade spectacles, or with a delay onsite, or alternatively, at an off-site facility (see Figure 10). An off-site facility may include a public or private optical outlet, or a centralized distribution centre where individuals can access their prescribed spectacles. Dispensing spectacles offsite typically entails a higher cost to the individual. The dispensing of previously worn (recycled) spectacles are not recommended.

Note: In cases where an individual passes the case history, distance visual acuity, and external eye screening, but does not pass the near visual acuity test (indicating a need for reading spectacles), a comprehensive eye examination may not be necessary. Instead, the individual may proceed directly to the spectacles process, as shown in Figure 10. This scenario typically occurs during screenings conducted for older individuals at outreach, pharmacy, and primary health care settings.

Figure 10. Refraction and spectacles service delivery



PHC: primary health care; VA: visual acuity.

5.4 Telehealth in eye care service delivery

Telehealth has emerged as an efficient approach to delivering eye care services, providing several advantages to both individuals and health-care providers. By incorporating Telehealth into eye care, access to specialized services can be extended to remote and underserved areas, overcoming geographical barriers and increasing health-care accessibility. This approach applies integrated people-centred eye care in terms of facilitating timely and convenient consultations, and enables individuals to seek expert advice without the need to travel. A summary of the advantages and disadvantages of Telehealth in refractive error service delivery is provided in Table 7 below.

Telehealth in eye care may have limitations, particularly concerning refractions that require in-person assessments. Nonetheless, Telehealth can prove highly effective in delivering services, including in preventing, diagnosing and treating simple eye conditions, such as red eye. Additionally, it can be used as a mentoring and supervisory tool to support eye care personnel in providing refractive error services. By leveraging Telehealth for these specific purposes, eye care services can still reach a wider audience and provide timely and accessible care to those in need.

Table 7. Advantages and disadvantages of Telehealth in eye care service delivery

Advantages	Disadvantages
– Eliminates distance as a barrier, ensuring that patients in rural or remote areas can access specialized eye care services. – Enables convenience in that individuals can access care from the comfort of their homes or local facility, reducing the need for travel and associated costs. – Allows for prompt consultations, enabling early detection and intervention for certain eye conditions. – Can lead to cost-savings for both individuals and eye care providers by reducing the need for physical infrastructure and travel expenses. – Potential reduction in greenhouse gas emissions, promoting environmental sustainability, due to reduced travel requirements. – Can be used as a training, mentoring and supervisory system for service eye care personnel, through opportunities for collaboration and seeking expert opinions remotely.	– Telehealth consultations may lack certain physical examination capabilities, such as examining for refraction. – To participate in Telehealth consultations, individuals and eye care providers must have access to reliable and secure technology, such as Internet connectivity and compatible devices. – Requires crucial and robust encryption and compliance with regulations to protect patient privacy and data security. – Potential hesitancy in some individuals to adopt Telehealth due to its unfamiliarity or for a preference for in-person interactions with eye care providers.

Telehealth case study

Preserving vision through Telehealth: a successful case of congenital glaucoma management

Demonstrating the effectiveness of Telehealth, an infant's vision was preserved through a series of interventions. A sudden change in the infant's eye colour prompted his parents to seek medical assistance. A general physician conducted an eye screening, noticed abnormal eye features, and made an immediate referral to the Nagarkurnool Vision Centre. Here, a Vision technician engaged in a comprehensive evaluation and Telehealth consultation. The presence of congenital glaucoma was confirmed and followed up by a timely "red referral" to the Thoodukurthy Secondary Centre. At the centre, ophthalmologists diagnosed megalocornea and congenital glaucoma, which resulted in a priority referral to the Kallam Anji Reddy Campus in Hyderabad. Surgery was performed promptly, and was followed by post-operative monitoring of the infant's progress.

This case study underscores how Telehealth plays a crucial role in identifying and managing complex eye conditions quickly. It highlights the importance of early screening and timely referrals in primary eye care. The use of Telehealth technologies speeds up diagnosis, promotes expert collaboration, and enables swift interventions. This coordinated approach is vital for protecting the vision of young individuals, emphasizing the broader impact of Telehealth on their overall well-being and future.

Case study supplied by Dr Rohit Khanna (LV Prasad Eye Institute, Hyderabad, India).

5.5 Strengthening refractive error service delivery

A summary of actionable changes that can be implemented to strengthen a chosen approach to refractive error service delivery is provided in Table 8 below. The listed points are applicable to almost all approaches, and offer valuable insights for enhancing their effectiveness and impact. By referring to this table, programme planners, eye care personnel and stakeholders can identify key areas for improvement and implement strategies to optimize the chosen approach, ensuring better outcomes for the target population.

Table 8. Actionable changes to strengthen approaches for refractive error service delivery

Strengthening the approach	Action
Promote integration of refractive error services	– Integrate refractive error services, with existing health programmes, schools, and community organizations such as child health programmes, primary care programmes, and school health programmes. Vision and eye screening should be part of programmes particularly those involving high-risk age groups. – Ensure personnel involved in refractive error services, including nurses and other health personnel at the community and primary levels, have adequate training in primary eye care, and are aware of the referral pathway.
Tailor the refractive error services to meet specific needs or requirements of the population	– Tailor refractive error services to the community by understanding the specific needs and cultural context and adapt outreach strategies accordingly. This may involve language-interpreting services, culturally-sensitive approaches, and community engagement initiatives.

Strengthening the approach	Action
Ensure inclusivity and equity	– Ensure that all individuals, regardless of their socioeconomic status, ethnicity, gender, cultural beliefs or other factors, have equal access to screening services, thus helping to reduce disparities. – Examples to ensure inclusivity include to design inclusive policies, establish accessible screening locations, develop culturally sensitive materials, and address barriers such as financial constraints or language barriers.
Foster collaboration with relevant stakeholders	– Central coordination is essential to avoid duplication of services and to streamline efforts. – Collaborate with various stakeholders, including community organizations, schools, clinics, and health-care providers, to optimize the use of the available resources and streamline eye health promotion messaging.
Establish strong referral pathways	– Establish a strong referral pathway through partnerships and collaborations with eye care personnel at all levels of care. A functional and accessible referral pathway should be a prerequisite for any vision and eye screening programme. – Ensure that referrals are followed up once an individual has been screened and referred. – Ensure mechanisms are in place for spectacles to be affordable and accessible, if the referral results in the individual requiring spectacles.
Utilize technology	– Utilize technology by exploring the use of telemedicine and digital screening tools. – Ensure personnel are adequately trained and systems and processes are updated for seamless integration of technology. – Prioritize data privacy and security measures to safeguard the personal and medical information of individuals accessing the service.
Prioritize raising public awareness	– Utilize a behaviour change approach to provide the public with information about the significance of eye health; early detection of eye conditions; the advantages of undergoing regular screenings; and addressing stigma and discrimination. – Actively engage the community and collaborate with community organizations, schools, health-care providers, and local influencers to amplify messages to reach a wider audience. – Utilize partnerships to organize events, disseminate information, and engage key stakeholders in promoting public awareness of vision and eye screening, thereby enhancing reach and acceptance.
Ensure all personnel involved in the refraction are competent	– Provide comprehensive and ongoing training to personnel involved in conducting the refractions. – Ensure quality assurance through regular monitoring, feedback, and evaluation to maintain personnel competency, adherence to protocols, and delivery of high-quality refraction services. – Refer to the *WHO Eye care competency framework (3)* to ensure personnel involved in the refraction have the necessary competencies, and that referral is made to competent personnel.

Strengthening the approach	Action
Ensure that the refractive error service is well-resourced	– Ensure that sufficient financial resources are allocated to support the refractive error service. This includes budgeting for necessary equipment, supplies (including spectacles), personnel, training programmes, and ongoing maintenance and upgrades. – Ensure that the refractive error service has appropriate infrastructure and facilities to conduct the screenings effectively. – Ensure that the refractive error service has an adequate number of trained personnel.
Conduct regular programme monitoring, evaluation and quality improvements	– Conduct continual programme evaluation and improvement to regularly assess the programme's impact and address any identified gaps or challenges. Adapting strategies accordingly will enable ongoing quality improvement and the effectiveness of the service.

5.6 Case studies

1) Outreach eye care services

Integration of vision and eye screening into health-care services for the Rohingya population and host community: a case study from Bangladesh

Cox's Bazar, Bangladesh, is home to over 3.2 million people, including 961 729 Rohingya refugees from Myanmar's Rakhine state. The district faces a significant eye health challenge, with 3.2% of all adults over 50 years of age being blind – the highest rate in Bangladesh. Refractive errors and untreated cataracts are the main causes of vision loss in both the host and Rohingya communities. With only two eye care facilities available, there is considerable unmet need for eye care services. To address this issue, Orbis International[1] launched several initiatives in 2018, culminating in the 2020 project, "Integration of Eye Care into Healthcare Services for the Rohingya People and Host Community in South-East Bangladesh". The primary goal of the project is to strengthen the health systems in Cox's Bazar by integrating eye care services with existing health-care services.

Expanding access and awareness

Partners worked closely with Cox's Bazar Baitush Sharaf Hospital (CBBSH) and local authorities, including UN organizations, to establish a comprehensive district eye care service delivery model. CBBSH organizes outreach camps, provides eye care and support for surgeries, and conducts awareness-raising activities in the host community and Rohingya camps. Alliance for Cooperation and Legal Aid Bangladesh (ACLAB),[2] an Orbis International project partner, conducts house-to-house screenings. A referral pathway from integrated vision centres and outreach camps to CBBSH ensures a continuum of care. Complex eye care cases, including cataract surgery, are referred to Chittagong Eye Infirmary and Training Complex, located approximately 150 km south-west of Cox's Bazar.

Achieving a positive impact

The project has made significant progress, reaching 208 673 people. From January 2021 to June 2023, 82 066 patient visits were recorded, with 3527 cataract surgeries performed, and 5786 spectacles provided. The success of the project led to collaboration with the Gonoshasthaya Kendro Foundation[3] to establish a primary care unit for the Rohingya community at the UNHCR-funded Ukhiya Specialized Hospital.

Learning and overcoming challenges
The project encountered various challenges, including the COVID-19 pandemic, internal conflicts within the Rohingya community, floods, and outbreaks of fires. However, through collaboration with stakeholders such as the Office of the Refugee Relief and Repatriation Commissioner (RRRC) and UN agencies, challenges have been overcome and much-needed eye care services have been provided to the Rohingya camp and host community in Cox's Bazar.

This case study shows that outreach vision and eye screening, and comprehensive eye care services can be successfully provided in humanitarian settings, addressing challenges of equity and access for forcibly displaced communities. Key to this success is close collaboration between the Government of Bangladesh and UN agencies, as well as partnerships with trusted local community organizations. The project's achievements serve as a testament to the potential impact of such integrated initiatives on eye health in vulnerable populations.

Case study supplied by Mirza Manbira Sultana, Iqbal Hossain and Dr Munir Ahmed from the Bangladesh team, Orbis International; Dr Doris Macharia from Orbis International; Shahid Uddin Mahmud from CBBHS/partner eye hospital; Mohammed Mizanur Rahman from RRRC; Additional Secretary, Minister for Ministry of Disaster Management and Relief, RRRC Office, Cox's Bazar.

[1] https://www.orbis.org/en; [2] https://www.aclabbd.org; [3] https://gonoshasthayakendra.com.

2) School-based eye care services

Integrating vision and eye screening into a school health programme: a case study from Liberia

In partnership with the Liberian Ministry of Health and Ministry of Education, Sightsavers[1] supports a sustainable national eye health programme in Liberia, enhancing access to eye care for communities in need. School health integrated programming (SHIP) is a vital part of this initiative, providing vision and eye screening, full eye examinations, spectacles, and referrals for school-aged children. SHIP aims to improve health outcomes for school-aged children, offering eye care services, refractive error correction, deworming interventions, and generating evidence for future planning and advocacy.

Engagement with existing plans and strategies
SHIP actively collaborates with education and health sector plans, ensuring its sustainability within national strategies. Schools, teachers, and eye care personnel coordinate to provide vision and eye screening and deworming services, with involvement from parents and community leaders.

Strengthening eye care systems and capacities
SHIP focuses on building the capacities of teachers and health personnel to implement integrated school health interventions effectively. The cascade training model for teachers on vision screening has proven successful, fostering a positive attitude toward vision screening and deworming at the community level.

Key lessons learned
- Sensitizing parents and community members with health promotion messages has been effective in ensuring active participation in deworming and vision screening campaigns, maximizing service coverage.
- Adopting a cascade training model for teachers engages education actors at national and community levels, showcasing potential scalability and long-term sustainability.

– Streamlining government-led procurement and supply-chain, expedites the distribution of spectacles and deworming drugs, reducing delays.

Promoting collaboration and impact
Through SHIP, teachers and health workers in Liberia collaborate to deliver health education, promote prevention, and create awareness about the significance of eye health and use of spectacles. The Eye Health Technical Working Group under the Ministry of Education exemplifies successful collaboration. In its second phase, SHIP will focus on scaling-up, streamlining supply chain mechanisms, and generating evidence on cost–effectiveness and quality of life impact.

This case study shows the integration of eye health into Liberia's School Health Programme, which presents a comprehensive and holistic approach to vision and eye screening. By engaging with existing plans, building capacities, and promoting collaboration, SHIP demonstrates how health and education systems can work together seamlessly to enhance the well-being of school-aged children. The success of this initiative opens doors for further expansion and improvement in the future.

Case study supplied by Hortance Manjo, Mulbah K Howard, Sumrana Yasmin from Sightsavers: Cameroon, Liberia, Pakistan.

[1] https://www.sightsavers.org.

3) Pharmacy eye care services

Enhancing access to vision care through pharmacy distribution

Vision impairment, particularly presbyopia, remains a significant global health concern. In response to this challenge, VisionSpring,[1] a social enterprise, has developed an innovative approach to improve access to near-vision spectacles. By leveraging a wholesale model, VisionSpring partnered with pharmacies in both urban and rural centres to distribute these essential eyewear solutions.

The wholesale pharmacy approach
VisionSpring's strategy involves collaborating with pharmacies to make near-vision spectacles readily available to individuals in various regions. This approach has been rigorously tested, notably with Apollo,[2] a major pharmacy chain in India, and has since expanded to 11 countries across Asia, Latin America, and Africa. This expansion has led to a substantial presence in India and other targeted regions.

Innovative initiatives
VisionSpring's commitment to addressing vision care gaps extends beyond distribution. In Ghana, the organization has introduced the "Reading Glasses in Pharmacies Project", supported by Latter-Day Saint Charities. This initiative empowers pharmacists to conduct vision screenings, provide reading spectacles, and facilitate referrals to nearby clinics for more comprehensive eye examinations if necessary. The goal is to establish partnerships with 200 pharmacies in Ghana's Ashanti region by the end of 2024.

Promise and challenges
The pharmacy-centred approach holds substantial promise for expanding access to presbyopic correction and enhancing vision care. By leveraging the existing infrastructure of pharmacies, VisionSpring has significantly reduced barriers to obtaining reading spectacles. This innovative approach has the potential to encourage more individuals to seek vision care services, thereby addressing an often-overlooked aspect of public health.

The need for comprehensive care

While the pharmacy distribution model demonstrates potential, it is crucial to emphasize the importance of comprehensive eye care. VisionSpring acknowledges that while reading spectacles play a critical role in presbyopic correction, a more integrated approach to quality eye care is essential. To ensure optimal outcomes, it is recommended that reading spectacles be dispensed only after a person passes a distance vision acuity test and external eye screening.

This case study showcases the use of pharmacies as distribution hubs for reading spectacles, highlighting a significant breakthrough in addressing presbyopia and vision impairment. By combining innovative distribution strategies with a commitment to comprehensive eye care, this approach sets a valuable precedent for enhancing vision health on a global scale. The success of this approach reinforces the potential of holistic and accessible solutions to improve the lives and vision of countless individuals around the world.

Case study sourced from Karnani AG, Garrette B, Kassalow JS, Lee M. Better vision for the Poor. Ross School of Business Paper; 2010; 1137 (http://dx.doi.org/10.2139/ssrn.1569479, accessed 4 September 2023) and VisionSpring launches reading glasses in pharmacies. Citi Newsroom; 2022 (https://citinewsroom.com/2022/01/visionspring-launches-reading-glasses-in-pharmacies-project/, accessed 4 September 2023)

[1] https://visionspring.org; [2] https://www.apollopharmacy.in/about-us.

4) Primary health care facility, health centre, and integrated vision centre eye care services

Integration of vision and eye screening into primary health care services: a case study from Indonesia

"Puskesmas" – shortened from Pusat Kesihatan Masyarakat (Community Health Centres) – serve as a backbone for health care services in Indonesia. The centres are integral to providing essential eye care to local communities, making them a critical entry point for various eye care interventions. The Indonesian Government launched an ambitious initiative, the Integrated People-Centred Eye Care (IPEC) strategy, aiming to reduce visual impairment prevalence by 25% by 2030. To achieve this, a comprehensive and inclusive approach was essential. Collaborating with the Nusa Tenggara Barat (NTB) Provincial Health Department and the Indonesian Ophthalmologists Association, the Fred Hollows Foundation[1] responded to the need for accessible eye care. Their joint efforts aim to establish vision centres that are integrated within existing Puskesmas facilities.

Expanding accessibility through integration and collaboration

Puskesmas vision centres address the urgent need for primary eye care across Indonesia. By embedding these centres within Puskesmas locations, they bring eye health services closer to communities, bridging geographical gaps.

Staffed by skilled health personnel, including doctors and nurses, Puskesmas vision centres are equipped to provide screening and primary eye care services. The also extend their reach through training programmes for teachers and health volunteers to conduct screenings and eye health education. Children with refractive errors are referred by teachers to the vision centres for further screening. Health volunteers provide community education, conduct initial vision and eye screenings and assist health workers with outreach activities and the mobilization of cataract patients.

Collaborating with local optical shops is pivotal to the success of these centres. These partnerships ensure that patients with refractive errors can access spectacles. Strong referral pathways have resulted from collaborations between hospitals and associations of ophthalmologists.

Empowering through education and advocacy
The NTB Provincial Health Office's initiative to develop an accredited eye health curriculum for health workers (including doctors and nurses) has significantly enhanced the competencies of personnel at Puskesmas vision centres. This standardized curriculum holds the potential to be adopted across provinces, contributing to consistency in quality.

The role of the vision centre is to provide not only eye health screening and services to patients, but also eye health counselling and education. During cataract campaigns, the centre will conduct outreach services, facilitating access to cataract surgery for patients, accompanying them during the surgery, and conducting post-surgery follow-ups.

The Bagu Vision Centre in Central Lombok stands as a model for good eye care services, fostering a community-wide understanding of eye health. The success of this centre has led to advocacy efforts, prompting local government support for expanding initiatives for vision centres, including advocating for the Lombok Tengah district government to support a new building for the centre.

Challenges and global potential
As most vision centres cannot generate income, they collaborate with local optical shops to provide spectacles for patients with refractive errors. Vision centres can also refer patients to a hospital where they may be able to claim spectacles through the National Health Insurance scheme.

Challenges include the limited government budget for procuring equipment and training health workers training. In addition, vision centres need to be established in many areas that are far from eye health facilities.

This case study demonstrates that integrating vision and eye screening into community health facilities can provide people-centred eye care to the community and can increase access to comprehensive eye care by bringing services to those who live in remote areas and far from hospitals. The success of this integrated initiative serves as a model to be adapted and expanded into other countries and contexts.

Case study supplied by Resti Dwi Hasriani, Ministry of Health, Indonesia; Burhanudin of the Nusa Tenggara Barat Provincial Health Office; and Anna Yulia, Alice Godycki and Dr S May Ho of The Fred Hollows Foundation.

[1] https://www.hollows.org/au/about-fred.

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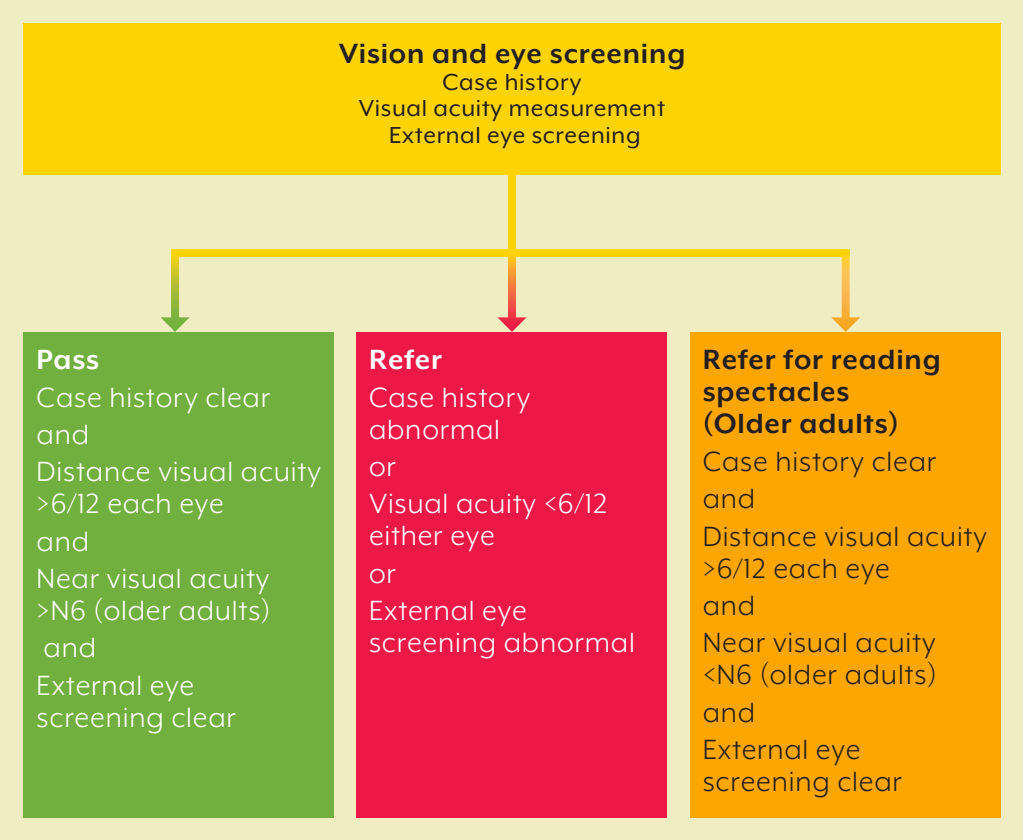
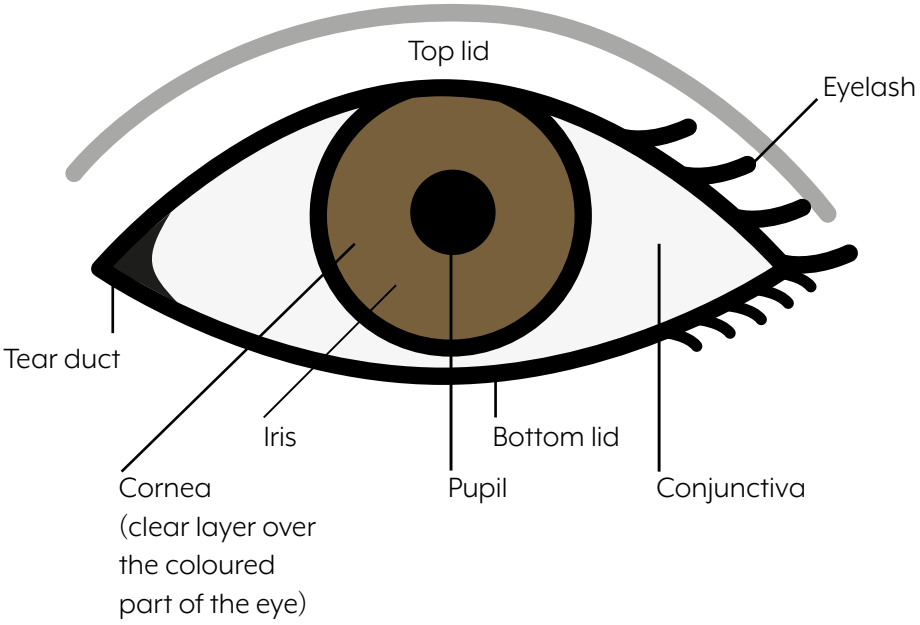
Annex 1.
Summary protocol for screening pre-school children, school children and older adults



Annex 2.
Simple parts of the external eye



Annex 3. Template for Record form for neonatal eye screening

World Health Organization

[Insert details of service provider e.g. Ministry of Health/Education]

Record form Date: _____

Parent/carer details	
Parent/carer family name:	Parent/carer given names:
Parent/carer date of birth:	Gender: ☐ Male ☐ Female ☐ Other
Parent/carer address:	Screening facility:

Child's details	
Child's family name:	Child's given names:
Child's date of birth:	Gender: ☐ Male ☐ Female ☐ Other

Case history		
Gestation at birth: ☐ Term ☐ Preterm	Weight at birth: ☐ Normal ☐ Low birth weight	Case history ☐ Pass ☐ Refer
Birth defects: ☐ No ☐ Yes	Child unwell: ☐ No ☐ Yes	
Family eye history: Pregnancy history:	Observations/concerns from parent/carer:	

Eye screening details

Basic external eye screening

Eyelids and eyelashes	☐ Clear ☐ Swollen	☐ Crust/pus ☐ Absent/abnormal	☐ Watery/sticky discharge	External eye examination ☐ Pass ☐ Refer
White part of the eye (conjunctiva)	☐ Clear (white)	☐ Red		
Coloured part of the eye (iris/pupil/cornea)	☐ Clear	☐ Abnormal (white/grey/hazy)		
Shape of coloured part of the eye	☐ Equal, round	☐ Abnormal		
Alignment of eyes	☐ Aligned	☐ Not aligned		
Movement of eyes	☐ Normal	☐ Abnormal		
Size of eyes	☐ Equal, round	☐ Abnormal		
Notes:				

Red reflex test

☐ Normal red reflex: symmetrical red/orange and equivalent in colour, intensity, size and shape when comparing the two eyes. ☐ Abnormal red reflex: non-symmetrical red/orange and not equivalent in colour, intensity, size and shape when comparing the two eyes. Notes:	Red reflex test ☐ Pass ☐ Refer

Results

Entered in referral list? ☐ Yes ☐ No ☐ N/A	☐ PASS ☐ REFER ☐ URGENT REFER Notes:
Referral follow-up (1 month) ☐ Yes ☐ No ☐ N/A Contact date:	
Referral follow-up (3 months) ☐ Yes ☐ No ☐ N/A Contact date:	Referral form completed and given to parent/carer? ☐ Yes ☐ No ☐ N/A

Name of screener:	Signature:	Date:

Annex 4. Template for Referral form for neonatal eye screening

World Health Organization

[Insert details of service provider e.g. Ministry of Health/Education]

Date: _____ Referral location: _____

Dear Eye care personnel,

Re:

Child's family name:	Child's given names:
Child's date of birth:	Gender: ☐ Male ☐ Female ☐ Other
Screening site:	Parent/carer present: ☐ Mother ☐ Father ☐ Other

This child attended a neonatal eye screening, as part of the *[insert programme name]* programme, by *[insert service provider name]* on *[insert date of screening]*. The result of the eye screening is below:

Eye screening details

Basic external eye examination

Eyelids and eyelashes	☐ Clear ☐ Swollen	☐ Crust/pus ☐ Absent/abnormal	☐ Watery/sticky discharge
White part of the eye (conjunctiva)	☐ Clear (white)	☐ Red	
Coloured part of the eye (iris/pupil/cornea)		☐ Clear	☐ Abnormal/white/grey/hazy
Shape of coloured part of the eye (iris/pupil)		☐ Equal, round	☐ Abnormal
Alignment of eyes	☐ Aligned	☐ Not aligned	
Movement of eyes	☐ Normal	☐ Abnormal	
Size of eyes	☐ Equal, round	☐ Abnormal	
Notes:			

Red reflex test

☐ Normal red reflex: symmetrical red/orange and equivalent in colour, intensity, size and shape when comparing the two eyes.

☐ Abnormal red reflex: non-symmetrical red/orange and not equivalent in colour, intensity, size and shape when comparing the two eyes.

Notes:

Given the results, we would like you to perform a further assessment on the child's eyes.
If you require more information, please contact *[insert contact details of programme coordinator screener]*.

Kind regards
[Insert signature]
[Insert name, title of screener and date]

Annex 5. Template for Consent form for pre-school/school children

World Health Organization

[Insert details of service provider e.g. Ministry of Health/Education]

Dear Parent/Carer/Head of School (appropriate authority),

Your child's vision is important for their development. The World Health Organization recommends that every child have their vision screened by qualified personnel.

Your child has been selected to be part of a vision and eye screening programme conducted by the *[insert service provider and sponsor] on [insert date].* During the screening, your child's vision will be tested, and an external eye screening will be conducted. No eye drops will be placed in your child's eyes.

You will be informed of the results after the screening.

Please complete the form below to assist with the vision and eye screening.

Child's details	
Child's family name:	Child's given names:
Child's date of birth:	Gender: ☐ Male ☐ Female ☐ Other
Child's address:	
Child's pre-school/care facility/school:	Child's class:

Parent/ Carer details	
Family name:	Given name:
Address:	Phone:
Languages spoken: ☐ English ☐ Other (specify):	

Consent for vision screening

☐ Yes, I consent to have my child's vision screened

☐ No, I decline to have my child's vision screened because (specify why) _____

If you have marked "Yes", please continue to complete the form below.

Pre-screening questions (to complete if you marked "Yes" to consent to screening above)			
Do you have concerns about your child's eyes?	☐ Yes	☐ No	
If "Yes", what are your concerns?:			
Does your child wear spectacles?	☐ Yes	☐ No	
If "Yes", are the spectacles for	☐ Distance	☐ Reading	☐ Both
Has your child had their eyes examined in the last 12 months?	☐ Yes	☐ No	
Does your child have any pain, discomfort or severe itchiness in the eye?		☐ Yes	☐ No
Does anyone in your family have eye problems?	☐ Yes	☐ No	
If "Yes", please give details:			
Does your child have diabetes?	☐ Yes	☐ No	
If "Yes", are they currently being managed by an eye specialist?	☐ Yes	☐ No	

Parent/carer name:	Relationship to child:
Parent/carer signature:	Date:

For more information on the vision screening programme, please contact *[insert contact details]*.

Please return this completed form to your *[insert vision screening coordinator/school/facility name]*.

Kind regards

[Insert name and title of programme coordinator]

Annex 6. Template for Record form for pre-school/school children vision and eye screening

World Health Organization

[Insert details of service provider e.g. Ministry of Health/Education]

Record form Date: _____

Child's details

Family name:	Given names:
Date of birth:	Gender: ☐ Male ☐ Female ☐ Other
Address:	Telephone:
Child's pre-school/care facility/school: Child's class:	Consent received: ☐ Yes ☐ No

Case history

Blurred vision (with correction if needed)?
☐ Yes ☐ No
Notes:

Wears spectacles?
☐ Yes ☐ Distance ☐ Near ☐ Both
☐ No

Family eye history:

Any pain/discomfort/severe itchiness in the eye?
☐ Yes ☐ No
Notes:

Diabetes? ☐ Yes ☐ No
Notes:

Case history
☐ Pass
☐ Refer

Vision screening details

Distance visual acuity test

Distance visual acuity chart:	☐ HOTV ☐ LogMAR	☐ LEA symbols ☐ Snellen	☐ Tumbling E	Distance vision test ☐ Pass ☐ Refer
Vision screening distance:	☐ 1.5 metres	☐ 3 metres	☐ 6 metres	
Vision tested:	☐ Without spectacles		☐ With spectacles	
Distance vision test results:	Right eye: ☐ 6/12 Left eye: ☐ 6/12	☐ Other _____ ☐ Other _____		
Notes:				

Basic external eye examination

Eyelids and eyelashes	☐ Clear	☐ Crusty/pus	☐ Watery/sticky discharge	External eye exam ☐ Pass ☐ Refer
White part of the eye (conjunctiva)		☐ Clear (white)	☐ Red ☐ Lesion	
Coloured part of the eye (iris/pupil/cornea)	☐ Clear	☐ Abnormal/white/grey/hazy		
Alignment of eyes	☐ Aligned	☐ Not aligned		
Notes:				

Results

Entered in referral list? ☐ Yes ☐ No ☐ N/A	☐ PASS ☐ REFER ☐ URGENT REFER Notes:	
Referral follow-up (1 month) ☐ Yes ☐ No ☐ N/A Contact date:		
Referral follow-up (3 months) ☐ Yes ☐ No ☐ N/A Contact date:	Notification form completed? ☐ Yes ☐ No ☐ N/A	
Name of screener:	Signature:	Date:

Annex 7. Template for Notification form for pre-school/school children

World Health Organization

[Insert details of service provider e.g. Ministry of Health/Education]

Date: _____

Dear Parent/Carer/Head of School (appropriate authority),

Re:

Child's family name:	Child's given names:
Child's date of birth:	Gender: ☐ Male ☐ Female ☐ Other
Child's pre-school/care facility/school:	Child's class:

Your child's school participated in a vision screening as part of the *[insert programme name]* programme, by *[insert service provider name]* on [insert date of screening]. The result of the vision screening is below:

☐ **Pass**

Your child's vision is within normal limits for their age. If you have any concerns about your child's eyes, please have their eyes examined by eye care personnel.

Please check your child's eyes again by *[insert follow-up date]*

Additional care information is attached ☐ Yes ☐ No

☐ **Refer**

Your child's vision requires further assessment. Please ensure that your child has a full eye examination with eye care personnel.

Reason for referral: _____

Referral location: _____

Your child should attend the referral location: ☐ Within 1 month ☐ Within 3 months

Please take this form with you to the referral location.

☐ **Other**

☐ Your child is under the care of eye care personnel, and we recommend that you continue with this care.

☐ Your child was absent on the day of the screening. Please contact the school for more information.

If you require more information, please contact *[insert contact details of programme coordinator]*.

Kind regards

[Insert signature]

[Insert name, title of screener and date]

Annex 8. Template for Record form for older adults vision and eye screening

World Health Organization

[Insert details of service provider e.g. Ministry of Health/Education]

Record form

Date: _____

Person's details

Family name:	Given names:
Date of birth:	Gender: ☐ Male ☐ Female ☐ Other
Address:	Telephone:
Case history:	

Blurred vision (with correction if needed)? ☐ Yes ☐ No Notes:	Any eye pain/discomfort? ☐ Yes ☐ No	Case history ☐ Pass ☐ Refer
Wears spectacles? ☐ Yes ☐ Distance ☐ Near ☐ Both ☐ No	Diabetes? ☐ Yes ☐ No Hypertension? ☐ Yes ☐ No	
Eye history: Family eye history:	Medications:	

Vision screening details

Distance visual acuity test

Distance visual acuity chart:	☐ Tumbling E	☐ LogMAR	☐ Snellen	Distance vision test ☐ Pass ☐ Refer
Vision screening distance:	☐ 3 metres	☐ 6 metres		
Vision tested:	☐ Without spectacles	☐ With spectacles		
Distance vision test results:	Right eye: ☐ 6/12	☐ Other _____		
	Left eye: ☐ 6/12	☐ Other _____		
Notes:				

Near visual acuity test

Distance visual acuity chart used:	☐ Tumbling E	☐ Reading card	☐ LogMAR	ear vision test ☐ Pass ☐ Refer
Vision screening distance:	☐ Normal reading distance	☐ Other: _____		
Vision tested:	☐ Without spectacles	☐ With spectacles		
Near vision test results:	Both eyes: ☐ N6	☐ Other _____		
Notes:				

Basic external eye examination

Eyelids and eyelashes	☐ Clear	☐ Crust/pus	☐ Watery/sticky discharge	External eye examination
	☐ Eye lashes turn inward		☐ Abnormal lid closure	☐ Pass
White part of the eye (conjunctiva)	☐ Clear (white)	☐ Red	☐ Lesion	☐ Refer
Coloured part of the eye (iris/pupil/cornea)	☐ Clear	☐ Abnormal (white/grey/hazy/red)		
Notes:				

Reading spectacles

Reading spectacles prescribed? ☐ Yes Power: _____ ☐ None prescribed

Results

Entered in referral list? ☐ Yes ☐ No ☐ N/A	☐ PASS ☐ REFER ☐ URGENT REFER Notes:	
Referral follow-up (1 month) ☐ Yes ☐ No ☐ N/A Contact date:		
Referral follow-up (3 months) ☐ Yes ☐ No ☐ N/A Contact date:	Referral form completed? ☐ Yes ☐ No ☐ N/A	
Screener's name:	Signature:	Date:

Annex 9. Template for Referral form for older adults

World Health Organization

[Insert details of service provider e.g. Ministry of Health/Education]

Date:_____ Referral location: _____

Dear Eye care specialist,

Re:

Family name:	Given names:
Date of birth:	Gender: ☐ Male ☐ Female ☐ Intersex
Screening site:	Family/Carer present: ☐ No ☐ Yes _____

This person attended a vision screening, as part of the *[insert programme name]* programme, by *[insert service provider name]* on *[insert date of screening]*. The result of the vision screening is below:

Eye screening details

Case History

☐ Diabetes ☐ Hypertension ☐ Eye with pain ☐ Wears spectacles
☐ Uses medications for the eye ☐ Other: _____

Case history
☐ Pass
☐ Refer

Distance visual acuity test

Vision tested: ☐ Without spectacles ☐ With spectacles

Distance vision test results: Right eye:_____ Left eye:_____

Distance vision test
☐ Pass
☐ Refer

Near visual acuity test

Vision tested: ☐ Without spectacles ☐ With spectacles

Near vision test results: Both eyes _____

Near vision test
☐ Pass
☐ Refer

Basic external eye examination

Eyelids and eyelashes	☐ Clear	☐ Crust/pus	☐ Watery/sticky discharge
	☐ Eye lashes turn inward		☐ Abnormal lid closure
White part of the eye (conjunctiva)	☐ Clear (white)		☐ Red
Coloured part of the eye (iris/pupil/cornea)	☐ Clear	☐ Abnormal/white/grey/hazy/red	

External eye examination
☐ Pass
☐ Refer

Given the results, we would like you to perform a further assessment on the patient's eyes.
If you require more information, please contact *[insert contact details of programme coordinator screener]*.
Kind regards

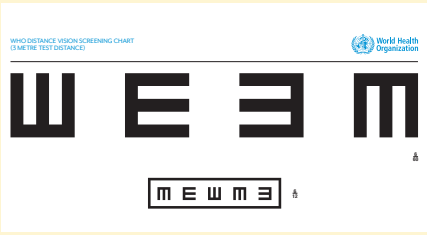
[Insert signature]
[Insert name, title of screener and date]

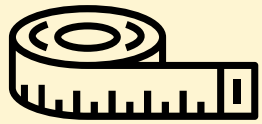
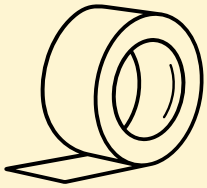
Annex 10. Template for Follow-up referral list

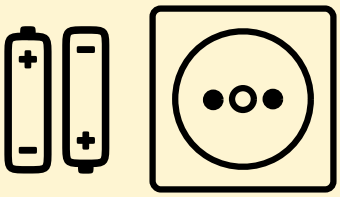
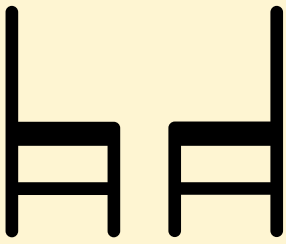
World Health Organization

Reason for referral: case history/ visual acuity/ eye examination?	Referral date	Referral location	Follow -up date	Patient ID/ Class	Patient name	Patient Date of birth	Female/ Male/ Other	Patient contact details	Notes

Annex 11. List of equipment for vision and eye screening

Equipment	Image	Neonatal screening	Pre-school screening	School screening	Screening for older adults
Distance visual acuity chart *Pre-school and younger school-aged children (3–8 years)* A printable HOTV distance screening chart is provided in this handbook. It there are existing charts, a HOTV chart or LEA Symbols chart at 3 metres is preferred. The charts should always be positioned at the manufacturer's advised test distance and should include, at a minimum, equivalent measurements for 6/12. The chosen chart should be appropriate for young children.	 Accompanying pointing card: 	–	X	X	–
Distance visual acuity chart *Older school-aged children (>8 years) and Older adults (≥50 years)* A printable Tumbling E distance screening chart is provided in this handbook. If there are existing charts, a Tumbling Es chart at 3 metres distance is preferred. The charts should always be positioned at the manufacturer's advised test distance and should include, at a minimum, equivalent measurements for 6/12. The chosen chart should be appropriate for the person's language.		–	–	X	X

Equipment	Image	Neonatal screening	Pre-school screening	School screening	Screening for older adults
Near visual acuity chart A printable near-screening chart of Tumbling Es is provided in this handbook. If there are existing charts, a Tumbling Es chart at 40 centimetres distance is preferred. The charts should always be positioned at 40 centimetres from the person's eyes and should include, at a minimum, equivalent measurements for N6. The chosen chart should be appropriate for the person's language.		-	-	-	X
Digital distance and near visual acuity charts There are several vision screening apps that can be downloaded and installed on a mobile device. The WHOeyes app is available from the app store cost-free and can be used for screening. The WHOeyes app is easily accessible, is cost-free to download, and can give an immediate result. However, it relies on a charged mobile device and is only suitable for individuals aged 8 years and above.		-	-	X	X
Tape measure or 3 meter string and 40 centimetre string	 	–	X	X	X
Tape to mark the measured distance		–	X	X	X

Equipment	Image	Neonatal screening	Pre-school screening	School screening	Screening for older adults
Occluder or a device which occludes one eye at a time (e.g. eye patch) to allow for each eye to be tested separately. If neither an occluder nor eye patch are available, the palm of a person's hand or piece of paper/cardboard can be used.		–	X	X	X
Light source for external eye screening e.g. medical torch/flashlight/ pen torch/ophthalmoscope/ phone torch		X	X	X	X
Batteries/electrical charging facilities for ophthalmoscope (depending on device)		X	X	X	X
A testing space that allows a testing distance of at least 3 metres. The space should allow for it to be both darkened and well-lit depending on the test being performed	N/A	X	X	X	x
Chairs For the person being examined and the screener Consider an additional chair for carer		X	X	X	X
Readymade reading spectacles A standard range of readymade reading spectacles should be kept in stock. Two different sizes in a unisex style is desirable. The power range recommended is +1.00DS; +1.50DS; +2.00DS; +2.50DS; +3.00DS. Cleaning cloths to accompany the spectacles are recommended.		-	-	-	X

Annex 12. WHO vision screening charts

World Health Organization

Chart for pre-school-aged children and younger school-aged children (3–8 years)

Printing instructions:

1. Print a full sized chart. Do not reduce the document size to fit the paper.
2. Print on white A4 card that is thick and strong.
3. Make sure the letters are printed in rich black.
4. If the printed image is unclear, or grey, do not use.
5. To ensure you have printed the chart the correct size, measure the 10cm ruler on the page to verify its accuracy.

Distance visual acuity measurement instructions

Preparation:

1. Ensure that the *WHO Distance vision pre-school screening chart* is mounted on a well-lit wall and at eye level for the child being screened; the child must be at 3 metres* distance from the chart (measure distance and mark with tape).
2. Ensure the child is wearing any existing spectacles they have for distance.
3. Explain the test to the child: use child-friendly language; explain the pointing card and that you will be showing them the HOTV letters and that they need to tell you what they see, by matching what they see on the chart with the pointing card.
4. Give the child the pointing card, which they can hold on their lap. If needed, a helper can assist by sitting or standing next to the child and holding the pointing card. This approach is particularly helpful for younger children or those with special needs. If a helper is not available, instruct the child to hold the pointing card flat with the letters right side up as they look down at them.

Begin the test:

1. Test each eye separately. First, cover the left eye with an occluder, leaving the right eye open to see. A helper can assist if necessary.
2. Point to the letter at the top of the chart (6/60 line) and ask the child to match the letter on the HOTV pointing card.
3. If the child identifies the 6/60 letters correctly, ask them to identify the next line down the chart (6/12 line) in the same way.
4. Record the results for the right eye.
5. Repeat steps 1 and 4, now with the left eye open, and the right eye covered.
6. Record the results for the left eye.

* For children around 3 years of age, testing their visual acuity at 1.5 metres may be more suitable. Thus, when using the chart at 1.5 meters, the visual acuity for the 6/60 line will become 6/120, and the visual acuity for the 6/12 line will become 6/24.

Print the following two pages

WHO DISTANCE VISION PRE-SCHOOL SCREENING CHART
(3 METRE TEST DISTANCE)

World Health Organization

V O H T

6/60

V H T V O

6/12

10CM

Print this page

World Health Organization

Pointing card

World Health Organization

Chart for school-aged children (over 8 years) and older adults (50 years and older)

Printing instructions

1. Print a full sized chart. Do not reduce the document size to fit the paper.
2. Print on white A4 card that is thick and strong.
3. Make sure the letters are printed in rich black.
4. If the printed image is unclear, or grey, do not use.
5. To ensure you have printed the chart the correct size, measure the 10cm ruler on the page to verify its accuracy.
6. After printing, carefully separate the *WHO Distance vision screening chart* from the WHO Near vision screening chart along the dotted line.

Distance visual acuity measurement instructions

Preparation:

1. Ensure that the *WHO Distance vision screening chart* is mounted on a well-lit wall and at eye level for the person being screened; the person must be at 3 metres distance from the chart (measure distance and mark with tape).
2. Ask the person to wear any existing spectacles they have for distance.
3. Explain the test to the person: use appropriate language; show the Tumbling E chart and explain that when being tested, they need to use their fingers to point in the same direction as they see the E is facing.

Begin the test:

1. Ask the person being screened to cover their left eye with an occluder, leaving the right eye open to see.
2. Point to the top of the chart (6/60 line) and ask the person to tell you which direction the letter E is facing (up, down, left, or right).
3. If the person identifies the 6/60 letter correctly, ask them to identify the next line of Es down the chart (6/12 line) in the same way.
4. Record the results for the right eye.
5. Repeat steps 1 to 3, now with the left eye open, and the right eye covered.
6. Record the results for the left eye.

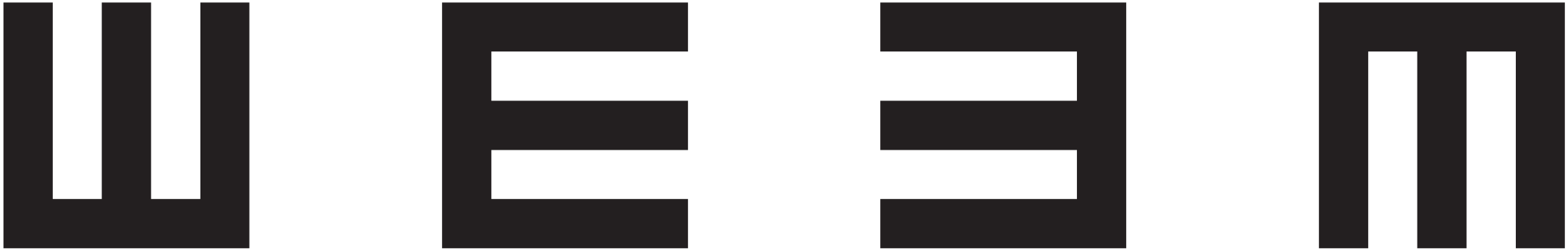
Near visual acuity measurement instructions

1. Begin by ensuring that the *WHO Near vision screening chart* is 40 centimetres away from the persons eyes, in a well-lit room.
2. Ask the person to wear any existing spectacles they have for reading.
3. Ask the person to use both eyes to tell you which direction the letter E is facing (up, down, left, or right) of the N6 line.
4. Record the results.

Print the following page

WHO DISTANCE VISION SCREENING CHART
(3 METRE TEST DISTANCE)

World Health Organization

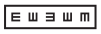


6/60

6/12

WHO NEAR VISION SCREENING CHART
(40 CENTIMETRE TEST DISTANCE)

World Health Organization



N6

10CM

Annex 13. Competencies and activities for vision and eye screeners

Table A13 below outlines the minimum competency requirements for screeners to conduct vision and eye screenings across different age groups: neonates, pre-school and school children, and older adults. These requirements have been aligned with those described in the WHO *Eye care competency framework*.

The competencies and activities from the "Introductory level of proficiency" are required for all age groups. However, exceptions are made in Practice Activity 1 ("Obtaining informed consent") and Management and Leadership Activity 1 ("Managing an eye care team"). For a comprehensive understanding of the competencies and activities, refer to the *WHO Eye care competency framework*, available on the WHO website: https://www.who.int/health-topics/blindness-and-vision-loss.

Table A13. Minimum competency requirements for vision and eye screeners

INTRODUCTORY LEVEL OF PROFIECIENCY	**Practice domain (P)**			
		Competency (C)		**Activity (A)**
	PC1	Maintains people-centred practice	*PA1*	Obtaining informed consent (except for 3.6; 3; 7; 3.8; and 8.2 for neonatal period and 3.8 for all other groups)
	PC2	Performs within scope of practice and abilities	*PA2*	Maintaining documentation
	PC3	Applies current evidence-based best practice appropriate to context	*PA3*	Conducting a vision assessment and eye examination
	PC4	Applies a rational approach to problem-solving and decision-making	*PA4*	Establishing a diagnosis
	PC5	Communicates effectively with a person, their family and carers	*PA5*	Providing information and advice to a person, their family and carers
			PA6	Managing referrals
			PA7	Establishing collaborative eye care management plans
			PA8	Conducting eye care interventions
			PA9	Ensuring continuity of care
	Professionalism domain (PM)			
		Competency (C)		**Activity (A)**
	PMC1	Practices professional and ethical conduct	*PMA1*	Managing risks
	PMC2	Practices within the legal and/or regulatory framework	*PMA2*	Improving quality
	PMC3	Manages professional responsibilities	*PMA3*	Implementing inclusive practice

INTRODUCTORY LEVEL OF PROFIECIENCY

PMC4	Demonstrates awareness and responsiveness to intersectionality, socioeconomic and environmental factors	–	–
PMC5	Appropriately represents the role of eye care workers	–	–

Learning and Development domain (LD)

	Competency (C)		**Activity (A)**
LDC1	Maintains learning and development	*LDA1*	Continuing education
LDC2	Supports others to learn and develop	–	–
LDC3	Strengthens educational training capacity in eye care	–	–

Management and Leadership domain (ML)

	Competency (C)		**Activity (A)**
MLC1	Enhances the eye care team	*MLA1*	Managing an eye care team (except for 1.2 for all groups)
MLC2	Enhances eye care service development	*MLA2*	Managing eye care service delivery
MLC3	Integrates eye care services as part of universal health coverage	–	–

Community and Advocacy domain (CA)

	Competency (C)		**Activity (A)**
CAC1	Supports integrated people-centred eye care (IPEC) in health systems	*CAA2*	Disseminating relevant health promotion messages
CAC2	Empowers the community	–	–
CAC3	Enhances community awareness and health promotion	–	–
CAC4	Acts as an advocate for eye care	–	–

Evidence domain (E)

	Competency (C)		**Activity (A)**
EC1	Integrates evidence-based practice	*EA3*	Monitoring and evaluation
EC2	Strengthens research capacity in eye care	–	–

Annex 14. Health promotion and prevention message library

The main evidence-based areas for health promotion and prevention in the field of eye care are described in Table A14 below. The table provides key promotional messages in the field of eye care which can be made available to promote good eye care and help prevent eye conditions and blindness. The messages can be downloaded in pdf or tile format from the WHO website and can be tailored to suit individual locations and environments.

Table A14. Health promotion and prevention message library

Target	Short health promotion message
Neonatal period	
Nutrition and immunization to prevent secondary eye conditions	"Breastfeeding is the best way to nourish your baby and protect them from infections that can harm their eyes. Exclusive breastfeeding for the first 6 months of life can lower your baby's risk of diarrhoea, measles, vitamin A deficiency and other causes of blindness. Breastfeed your baby as soon as possible after birth and continue until they are 2 years of age or beyond." "Immunization can save your baby's life and sight. Measles, rubella, tetanus and other diseases can cause serious eye problems or even blindness in babies. Make sure your baby receives all the recommended vaccines on time, starting from birth. Vaccines are safe effective and available at your nearest health facility." "Vitamin A is essential for your baby's eye health and development. Vitamin A deficiency can lead to night blindness, dry eyes, corneal ulcers and blindness. Give your baby 2 doses of vitamin A supplements at 6 months and 9 months of age, as advised by your health worker. Vitamin A supplements can also reduce the risk of measles complications and death."
Oxygen management to prevent retinopathy of prematurity	"Oxygen is important for your baby's life, but too much or too little can harm their eyes. Learn how to monitor and adjust your baby's oxygen levels with the help of your neonatal care team to prevent a serious eye condition that can lead to blindness." "The risk of blindness is higher in very premature babies and very low birth weight babies. These babies need the correct amount of oxygen to help them to breathe, and also to develop their retinas in a controlled environment."
Prophylactic management to prevent ophthalmia neonatorum	"Eye infections in your baby's eyes can cause blindness if not treated promptly. To prevent this risk, if your baby has an eye infection, make sure your baby receives eye drops or ointment soon after birth and follow your doctor's instructions for care." "Eye infections can harm your baby's vision. You can prevent this by getting screened and treated for any sexually transmitted infections (STIs) before or during pregnancy, and by having your baby receive eye drops or ointment at birth."

Target	Short health promotion message
Pre-school and school children	
Behavioural change to delay the onset and progression of myopia	"Take regular breaks during near-vision activities (e.g. when using digital devices or reading) to avoid eye strain and dry eyes." "Avoid eye strain and headaches. Follow the 20-20-20 rule. After 20 minutes spent using a screen, look at an object 20 feet (6 metres) away, for at least 20 seconds." "Risks for myopia: Having parents who have myopia can increase myopia risk; spending lots of time with near-vision activities, such as reading and using a smartphone, can increase myopia risk; children not spending enough time outdoors can increase myopia risk." "Good habits for managing myopia: Spend at least 90 minutes outdoors in daylight every day; take regular breaks during prolonged near-vision activities; have regular eye checks; Remember to wear your spectacles as they were prescribed by your eye care practitioner." "Encouraging healthy behaviours, such as spending time outdoors, can help delay the onset and progression of myopia in children." "By promoting healthy behaviours and reducing environmental risk factors, parents and carers can help protect the eye health of children and prevent myopia from worsening."
Spectacle compliance	"Wearing spectacles regularly helps protect the eyes and prevents future eye problems." "Only wear spectacles that have been prescribed for you. Do not share spectacles with your friends." "By promoting and monitoring spectacle compliance, parents, teachers, and health-care providers can help children with vision problems maximize their potential and achieve optimal eye health." "Ensuring spectacle compliance is essential for children with vision problems, as it can significantly improve their quality of life and academic performance."
Older adults	
Control of key risk factors for diabetic retinopathy	"Good diabetes management is essential to prevent vision loss from diabetic retinopathy." "Your general health should be regularly checked by your doctor. Good general health reduces your risk of vision loss." "If left untreated, systemic diseases (such as diabetes) can lead to vision loss or blindness." "All people with diabetes should have an annual eye check to detect any changes in their retina." "All people living with diabetes should have their eyes checked as soon as possible if their vision changes suddenly." "Good systemic disease management (e.g. for diabetes or hypertension) is essential to prevent vision loss from general diseases."

Target	Short health promotion message
Lifestyle or behavioural risk factors for eye conditions	"Stop smoking. Smoking increases the risk of eye diseases such as cataracts and macular degeneration." "Wear sunglasses and brimmed hats outdoors to reduce UV exposure that can damage your eyes."
All ages	
Importance of regular comprehensive eye examinations	"If you notice any sudden changes in your vision you should visit your local eye or health clinic immediately." "Know your family history. Family members usually know about their eye diseases. Report any family eye conditions when having your eyes checked." "Regular eye checks are important to detect and treat eye conditions early on, and to give you the best chance of having healthy eyes and good vision in the long-term."
Adherence to treatment regimen for chronic eye conditions	"Always take eye medication as prescribed for you." "Do not use eye medication that does not belong to you or was not prescribed for you."
Increasing demand for eye care interventions	"A child may not know that their vision is bad. Try asking if they can see the classroom board clearly. If they can't, then they need to have their eyes checked." "Sitting too close to the TV or holding a book/device/toy too close may be a sign that a child is developing myopia. Eye care personnel will be able to assess the situation properly. Go for an eye check as soon as possible." "Signs that you may need your eyes checked: eye rubbing, squinting, closing one eye to see, or having trouble seeing the board in class; sitting too close to the TV, experiencing headaches; squinting; holding a book too close to see it clearly; underperforming at school; not seeing clearly when using your current spectacles."
Ocular injury prevention	"Wear eye protection when using tools and chemicals, such as welding, flying metals or wood, that could damage your eyes." "Rinse your eyes when exposed to hazardous chemicals. Immediately rinse your eye with clean water for at least 15 minutes and get your eyes checked by eye care personnel as soon as possible."
Counselling on good eye health practices and prevention strategies for the spread of eye infections	"Wash your hands often with soap and water, and help young children to do the same." "Avoid touching or rubbing your eyes as this can worsen the infection or spread it to the other eye." "Avoid sharing personal items such as towels, beds, makeup and spectacles."

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https://www.who.int/health-topics/blindness-and-vision-loss

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