



GUIDING PRACTICES FOR EARLY CHILDHOOD VISION SCREENING

“Demonstrating best practices in assessing young children in North Carolina”

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INTRODUCTION

Early identification and remediation of visual problems in infants, toddlers, and preschoolers can prevent later academic difficulties and improve outcomes for life. Data suggest, however, that we need to improve our early childhood vision screening system. Nationally, the Health Resources and Services Administration (mchb.hrsa.gov/) reports that more than 12.1 million school-age children have a vision problem of some kind. Yet only one in three children in America receives eye care services before the age of six. Research indicates that up to (Calonge, 2004) 1 in 20 preschool age children suffers from a vision problem that can lead to amblyopia, a condition causing lifelong vision damage unless detected and treated before the child's sixth birthday. This document provides guidance and resources to improve the practices of professionals who conduct early childhood vision screening in order to increase the likelihood that children will receive timely and critical eye care services.

In North Carolina the early childhood system (serving children from birth through five years of age) consists of a complex, interagency, mixed-delivery system. As a result, the people who actually conduct early childhood vision screening may have varying backgrounds and expertise as well as different purposes for screening. Early childhood vision screening is a requirement for entry into some early childhood programs. In other situations, it is a required step in the eligibility determination process for early intervention and preschool special education and related services.

When preschoolers are enrolled in NC Pre-K, Head Start, or Title I Preschool programs, vision screening results must be documented. These programs may accept vision screening results from physicians conducted at the health assessment prior to program entry or arrange vision screening through other means. Some of these preschool classes may be embedded in public schools and thereby have access to school nurses who are highly trained in vision screening (see Appendix A. School Nurse Vision Screening Procedures). Other classes may be in private child care facilities or centers that must provide this service in alternative ways.

When infants, toddlers, or preschoolers are suspected of having a disability, vision screening must be a part of the comprehensive evaluation process. While professionals who conduct early childhood vision screenings for this purpose may have great expertise in child development (e.g., audiologists, psychologists, occupational therapists, speech pathologists), their expertise and knowledge of vision screening and available follow-up resources may be limited.

When a child is first referred to early intervention or preschool exceptional children programs, the evaluation team must take the child's developmental history. As part of this process, teams should inquire about past vision screening or interventions, especially with:

- Medical conditions such as Down syndrome, premature birth (<32 completed weeks gestation), juvenile idiopathic arthritis, and neurofibromatosis, and
- Family history of *amblyopia*, *strabismus*, *retinoblastoma*, *congenital cataracts*, or *congenital glaucoma*

These conditions are heightened risk factors for potential developmental vision problems.

NOTE: The definitions of all italicized terms can be found in Appendix E. Glossary of Terms.

After failing his preschool vision screening, Nathan received a follow-up eye exam and was diagnosed with significant astigmatism and mild hyperopia (farsightedness). Glasses were prescribed, and his parents were pleased to see the positive changes soon after he began wearing them. Nathan's behavior at preschool improved and he reached his occupational therapy goals very quickly. His motor skills also improved, enabling him to toss and catch a ball. Nathan began to look at books independently because he could finally see them! What a difference good vision can make in the life of a young child!



DEVELOPMENTAL PROGRESSION OF VISION IN YOUNG CHILDREN

The integrity of a young child’s visual system can have a significant impact on his or her development. During the first year of life, children rely on their sense of sight to learn and communicate; sight remains important for skill development throughout childhood.

Changes that occur from birth to age 7 play a critical role in visual development (see Appendix B for information on the developmental progression of visual development). While vision develops most rapidly during the first year of life, fine adjustments continue to be made through 9 to 10 years of age. Most of the time, visual problems in early childhood are difficult for adults to detect because there are no obvious signs and young children usually do not verbally express their symptoms.

There are a number of methods used to screen the vision of infants, toddlers, and preschoolers. These methods differ significantly from screening procedures with older children and adults. The method chosen is largely dependent on the age and capability of the child being screened, as well as the experience of the examiner.

Vision screening with infants, toddlers, and preschoolers differs from screening with school-age children and adults. Vision screening with young children is meant to identify problems that could interfere with typical development and, if untreated, may become permanent. According to the Centers for Disease Control and Prevention, impaired vision affects a child’s cognitive, emotional, neurologic, and physical development by limiting the range of experiences and kinds of information to which the child is exposed.

To distinguish vision screening with infants, toddlers, and preschoolers from best practices for screening older children and adults, we will use the term “Developmental Vision Screening” to refer to practices for infants, toddlers, and preschoolers.

CONDITIONS IMPACTING VISION DEVELOPMENT

The development of good vision requires that the eyes are straight and that the brain receives clear, focused images from each eye. Any condition that interferes with this development can cause reduced vision known as amblyopia or “lazy eye” which can be permanent if left untreated at an early age.

Four common conditions that can lead to amblyopia include:

1. **Misaligned eyes** (e.g., strabismus): Eyes crossing or wandering consistently after age 4 to 6 months (American Academy of Ophthalmology, 2012).
2. Conditions resulting in **Blurred images** (e.g., uncorrected refractive errors): One or both eyes may have a high amount of farsightedness, nearsightedness, or astigmatism.
3. **Asymmetry in refractive error** (anisometropia): One eye could be more farsighted, nearsighted, or have more astigmatism than the other.
4. **Abnormalities of eye structures causing visual deprivation**: Examples include congenital cataract and ptosis (droopy eyelid).

Many children with developmental disabilities have vision problems, such as cortical visual impairments, based on brain conditions. Typical developmental vision screening may not identify such conditions.

You can help find children with vision problems by implementing a strong vision health system of care as a part of your early childhood program. With early detection, referral, and connections to affordable follow-up treatment, most vision problems can be easily corrected. Appropriate treatment not only improves children’s quality of life, it also helps them realize their full potential in their natural environment or educational setting.



CRITICAL SCREENING PROGRAM COMPONENTS

A screening program should include the following components:

1. Ensure that all parents/caregivers receive educational materials which respect their cultural and literacy needs. These materials should communicate the importance of:
 - a. Good vision for their child now and in the future.
 - b. Scheduling and attending an eye exam if their child does not pass vision screening.
 - c. Increased risk for vision problems in defined high-risk populations.
2. Ensure that parent permission is obtained to:
 - a. Share screening results with the child's eye doctor and primary care provider.
 - b. Receive eye exam results for the screening program file.
 - c. Talk with the child's eye doctor for clarification of eye exam results and prescribed treatments.
3. Screen vision with age-appropriate and evidence-based tools and procedures, including instruments.
 - a. Follow national referral and rescreening guidelines.
 - b. Provide vision screening training for your staff.
4. Re-screen or refer children who are difficult/cannot be screened.
 - a. Research suggests that children who are untestable are twice as likely to have a vision problem as those who pass a vision screening (The Vision in Preschoolers Study Group, 2007).
 - b. When young children are untestable (e.g., according to instruments and charts), strongly encourage parents to follow up with an eye doctor exam.
5. Provide parents/caregivers with vision screening results in easy-to-understand language (both written and oral) which respects their cultural and literacy needs and provides clearly defined and time-limited steps to take for prompt follow-up with an eye care provider.

6. Create and implement a system for following-up with parents/caregivers to help ensure that the eye exam occurs. Available resources for follow-up eye treatment should be shared with the family (nc.preventblindness.org).
7. When an eye exam is warranted, link parents/caregivers with an eye doctor who specializes in the care and treatment of young children.
8. Obtain eye exam results for screening program files.
9. Evaluate the effectiveness of your vision screening program annually.
 - a. Compare screening results to eye exam outcomes.
 - b. Identify variations in referral rates among screeners.
 - c. Monitor screening procedures to ensure that current recommendations are followed.
 - d. Monitor follow-up to eye care for children who do not pass vision screening or who were untestable.

When vision screening is conducted as part of determining eligibility for early intervention or special education and related services, children may have enough useful vision to participate in the comprehensive evaluation even though an eye exam is strongly encouraged. In these cases, early intervention and/or special education teams need to develop a process for tracking eye exam results and treatment plans. For the Early Intervention (Infant-Toddler Program), this recommendation is discussed with the family and noted in the Early Intervention program record. Assistance with making an appointment for follow up is also offered to the family. If the child ends up enrolling in the Early Intervention Program, the results of the follow up will be reviewed and considered as part of service coordination. For the school system, follow-up should be documented in the IEP records at the time of eligibility determination. If the vision evaluation is obtained after the IEP meeting and results show significant vision issues, the IEP Team must reconvene to review all data and determine the educational significance of the information.

ESTABLISHING A CONSISTENT PROCESS FOR EARLY CHILDHOOD VISION SCREENING

Developmental vision screening should be conducted with age-appropriate, evidence-based tools and procedures. There are two categories of acceptable vision screening tools:

- **Optotype or chart-based screening** measures visual acuity. Visual acuity is the clarity or sharpness of vision. “Optotype” is the name of the picture, symbol, or letter the child must identify.
- **Instrument-based screening** detects risk factors that could lead to amblyopia. These factors include significant refractive errors, unequal refractive error, misalignment of the eyes, and presence of a cataract. Instruments do not test visual acuity or function.

The decision to use an instrument or an eye chart depends on:

- What the screener prefers and is trained to use;
- The screening environment;
- What is to be measured;
- The population to be screened; and
- Available resources for instruments.

According to a 2012 *Instrument-Based Pediatric Vision Screening Policy Statement* from the American Academy of Pediatrics, the American Academy of Ophthalmology, the American Association for Pediatric Ophthalmology, the American Association for Pediatric Ophthalmology and Strabismus, and the American Association of Certified Orthoptists:

- Successful visual acuity testing using a vision chart is highly dependent on patient age and screener experience;
- In children younger than 3 years, few professionals can reliably determine acuity in each eye by using a vision chart;
- Instrument-based screening is quick, requires minimal cooperation of the child, and is especially useful in the preverbal, preliterate, or developmentally delayed child; and
- For 3 to 5 year-old children, the preferred methodology is instrument-based detection of risk factors for amblyopia.

The US Preventive Services Task Force concludes that the current evidence is insufficient to assess vision screening for children less than 3 years of age. National guidelines exist for children 3 to 5 years of age for screening vision and ocular health within the medical home. However, such guidelines are not currently available for early childhood programs. One of the best approaches that early childhood programs can employ is to maximize the parental relationship with the child’s medical home.

1. Testing for Acuity or Amblyogenic Risk Factors

Instrument Screening

- **Photoscreening** assesses both eyes simultaneously. It obtains an optical image of the eye, which is then interpreted by a trained operator or a computer to evaluate for any refractive error, media opacities (e.g., cataract), and misalignment.
- **Autorefraction** refers to an instrument used to evaluate the refractive error of each eye individually (with no eye drops). This technique cannot detect misalignment.

Recommendations

- **For children who are 6 months to 3 years of age:** Photoscreening and handheld autorefraction are elective if the screener is trained, has time, and the equipment is readily available.
- **For children who are 3 to 5 years of age:** Photoscreening and handheld autorefraction are preferred. Vision charts and standard physical examination techniques to assess amblyopia remain a viable practice.

If you choose to use an instrument, consider adding an age-appropriate, evidence-based, and scientifically validated eye chart as a back-up in case:

- You forget to charge the battery and an electrical outlet is inaccessible in your screening area;
- The device malfunctions; and/or
- You cannot achieve a reading.

Instruments measuring vision one eye at a time (e.g., Welch Allyn SureSight, Retinomax) cannot directly detect eye misalignment. Instruments such as the PlusOptix can detect eye misalignment (strabismus) because they capture both eyes simultaneously.

Some devices contain different internal referral criteria leading to differences in sensitivity (e.g., if a person has a disease, how often will the test be positive) and specificity (e.g., if a person does not have a disease, how often will the test be negative). To select the appropriate referral setting for the ages of children screened with your device, consult with pediatric eye care providers in your area or review guidelines from the American Association for Pediatric Ophthalmology and Strabismus Vision Screening Committee (www.aapos.org). Contact the manufacturer of your device or review the device user’s manual for instruction on changing referral criteria. If you review your vision screening data and suspect a large number of over-referrals, you may want to ensure that the machine is properly calibrated and/or revise your device’s referral criteria settings.

Acceptable Alternatives to Instrument Screening

If an instrument is not available, the screener gets unreliable results, or the child cannot tolerate the screening process, the use of one of the following alternative procedures is acceptable:

A. Charts for Screening Children 3-5 years of age

The use of vision charts and standard physical examination techniques to assess amblyopia in children 3 to 5 years of age remains a viable practice. Age-appropriate, evidence-based, and scientifically validated eye charts should be used. Visual acuity testing of both eyes should always be conducted monocularly (one eye at a time) because amblyopia present in one eye will be masked by the better-seeing eye if the child is tested binocularly. Pretesting ensures the child’s ability to perform the test by identifying or matching all four letters or symbols when presented up close. The tables below further outline best, acceptable, and unacceptable practices for testing distance visual acuity.

BEST PRACTICE	
Chart Optotype	Single Lea Symbols or HOTV letters surrounded by a bar on all 4 sides
Test Distance	5 feet
Pretest	Matching Lapcard; or different line for each eye
Passing Acuity	Monocularly, child must name or match 3 or 4 of 4 on: <ul style="list-style-type: none"> • 20/50 line for 3-year-olds • 20/40 line for 4- and 5-year-olds
Illumination	Lighted cabinet or computer screen with 80 cd/m2 minimum luminance, no competing glare
Aids for Testing	Lapcard with optotypes to play a matching game
Occlusion	Adhesive patch or opaque paper tape
Example	Vision in Preschoolers (VIP) Screener from Good-Lite

ACCEPTABLE PRACTICE	
Chart Optotype	Linear array of 4 or 5 Lea Symbols or HOTV letters surrounded by a crowding bar (rectangular box)
Test Distance	10 feet (3m)
Pretest	Matching Lapcard; or different line for each eye
Passing Acuity	Monocularly, child must name or match 3 out of 5 letters or symbols on: <ul style="list-style-type: none"> • 20/50 line for 3-year-olds • 20/40 line for 4- and 5-year-olds
Illumination	Properly illuminated (80 cd/m2 minimum) printed card; no glare
Aids for Testing	Lapcard with optotypes for matching; Cards for pretesting
Occlusion	Specialized occluder glasses with adult supervision
Example	Precision Vision MassVAT

UNACCEPTABLE PRACTICE	
Chart Optotype	Snellen, Allen figures, Tumbling E, Lighthouse, visual acuity machines (e.g., Titmus/Optec vision tester)
Test Distance	20 feet, near card, or visual acuity instrument
Passing Acuity	Binocular testing
Illumination	Printed card near glare source
Occlusion	Child’s or parent’s hand, tissue, paper cup, cover paddle

B. Behavioral Observations using “Fix and Follow Test” for children 0-3 years of age and children who are untestable

The Fix and Follow Test can be used to determine whether a child has basic functional vision if:

- an instrument is not available;
- the screener gets unreliable results;
- the child cannot tolerate the vision screening process; OR
- the child cannot be tested (or is not age eligible) using one of the recommended charts,

Always contact the physician for a comprehensive eye exam if a child cannot fix and follow a small toy. The Fix and Follow Test is a basic global screening method that checks the whole visual system. If the child fails this test, he or she does not have enough useful vision to reliably complete a developmental evaluation.

- **Purpose:** To check for basic functional vision by following a moving target with both eyes open.
- **Description:** As a target is moved in front of a child, an observer determines if the child can follow the object with both eyes open.
- **Equipment:** Small, quiet toy (not a noise maker)
- **Procedure:** Hold the target centered 14-16 inches in front of the child’s eyes and slowly move the target horizontally while simultaneously observing the child’s eyes to see whether the child is following the object (This should take 2-3 seconds.). Then slowly move the target up and down vertically to confirm. The child may move his/her head to follow the object. NOTE: If the child does not seem to notice the fixation toy but appears to have visual interest in other things in the room (faces etc) a different toy or object can be tried.

Results:

- **Pass:** The child followed the target easily and smoothly with at least one eye.
- **Fail:**
 - No visual fixation or following noted when the child had both eyes open during the re-screen.
 - Refer parent to Ophthalmologist/Optomtrist.
 - IEP/IFSP Team convenes to determine appropriate diagnostic measures for children with potential vision loss so as to complete the evaluation.

2. Observation for Alignment (Strabismus)

A second step in the screening process incorporates the intentional observation for strabismus that may not be detected through instrumental screens or behavioral screening using the Fix and Follow Test. Observation allows the screener to check for constant strabismus.

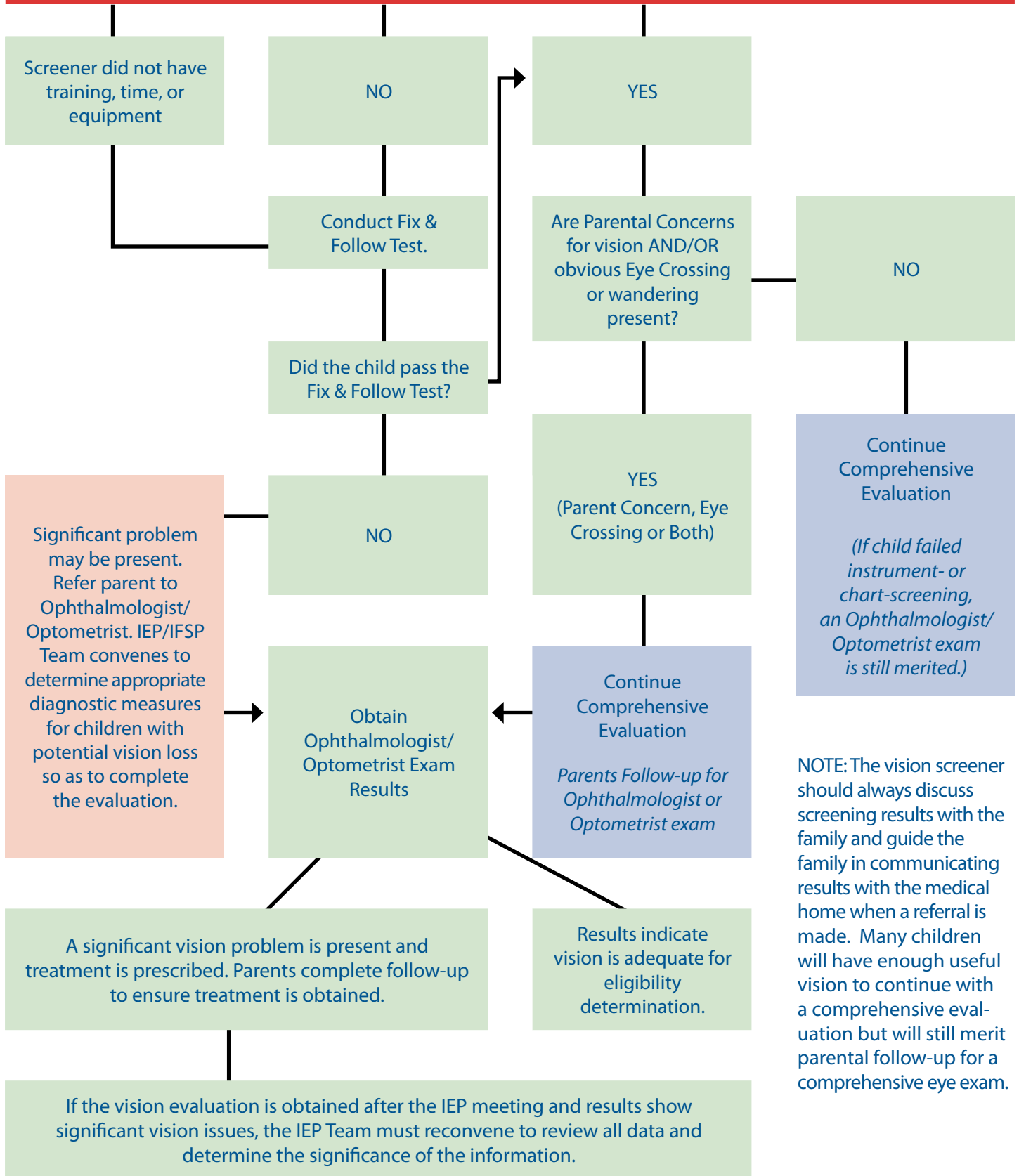
- **Ages:** 4 months to 6 years
- **Description:** Observing alignment
- **Equipment:** None
- **Facilities:** Well-lighted room
- **Procedure:** The screener observes the child’s eyes to see if one eye appears to turn in, out, up, or down in relation to the other. The position of the head for tilt (chin up or down) should also be noted. If the child has prescription glasses, it is imperative that he or she wears them. The prescription glasses may already be correcting a previously diagnosed crossed eye.
- **Results:**
 - **Pass:** The eyes are properly aligned and head position is normal.
 - **Re-screen/Refer:** One eye appears to turn in, out, up, or down in relation to the other.

Appendix C offers additional Signs of Possible Vision/Eye Problems in Young Children that include appearance, behavior and complaint (ABC) signs which may interfere with positive visual development. These signs are not specific to the vision screening process but important to look for throughout the developmental evaluation process as well as during the child’s every day activities.

ESTABLISHING CONSISTENT CRITERIA FOR FOLLOW-UP DECISIONS

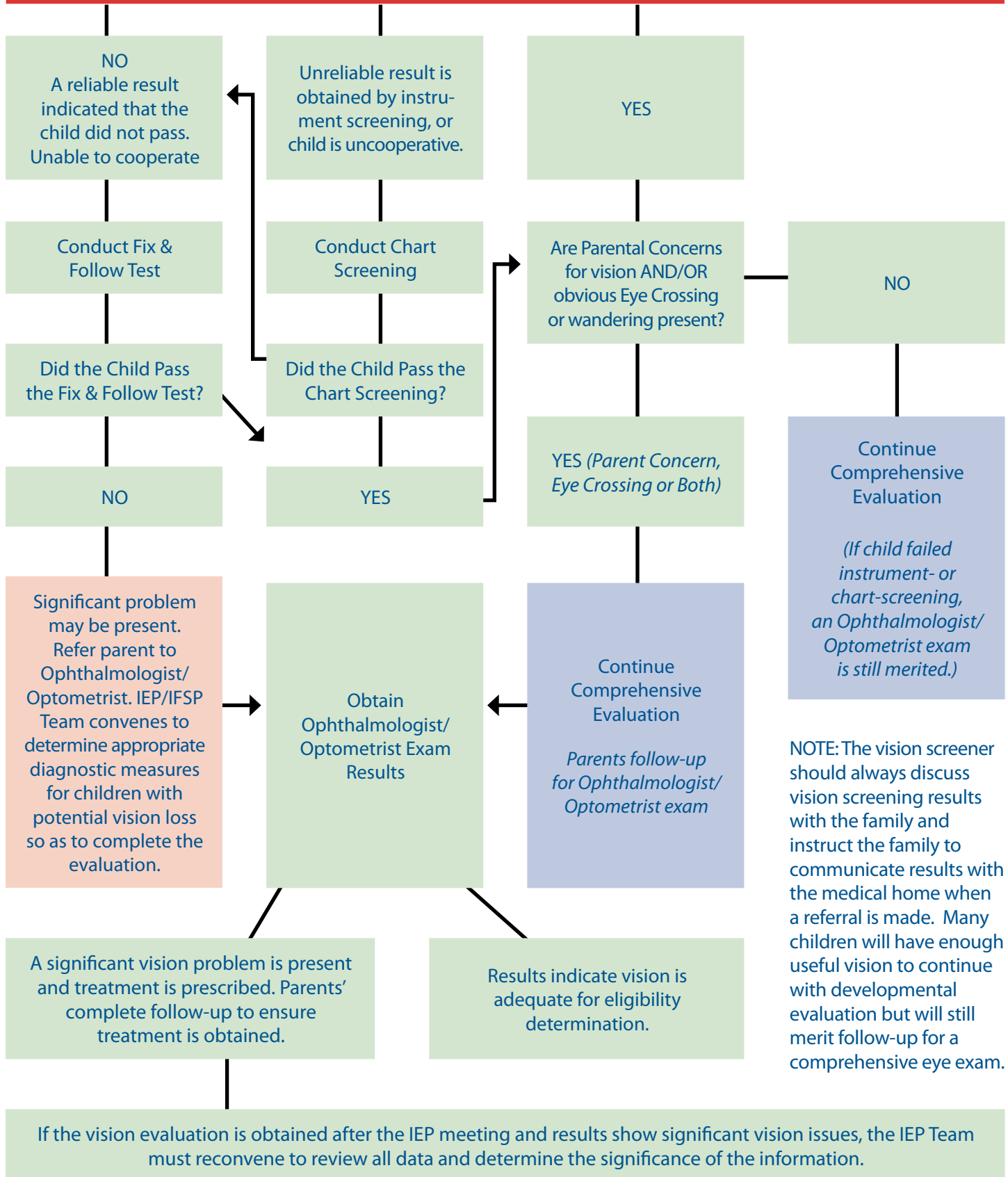
Given the recommended procedures noted in this guide, the following decision tree is offered to help determine when to continue a comprehensive evaluation and when to encourage parents to make an appointment for a comprehensive eye exam by an eye care professional, while also finding all available resources to support successful follow-up.

Children 3 Months up to 3 Years of Age: Did the Child Pass an Instrument-Based Screening?



NOTE: The vision screener should always discuss screening results with the family and guide the family in communicating results with the medical home when a referral is made. Many children will have enough useful vision to continue with a comprehensive evaluation but will still merit parental follow-up for a comprehensive eye exam.

Children 3 to 5 Years of Age: Did the Child Pass an Instrument-Based Screening?



NOTE: The vision screener should always discuss vision screening results with the family and instruct the family to communicate results with the medical home when a referral is made. Many children will have enough useful vision to continue with developmental evaluation but will still merit follow-up for a comprehensive eye exam.

APPENDIX A. SCHOOL NURSE VISION SCREENING PROCEDURES

MASS SCREENING	INDIVIDUAL SCREENING
Purpose: Early detection of a health problem that may impact the educational process.	<p>Purpose for students referred by teachers based on their observations: To determine if observations are related to a health problem that may impact the educational process.</p> <p>Purpose for students referred as part of an eligibility process: To verify that student educational issues are not related to an unidentified health problem.</p>
Set calendar dates	Completed year-round upon referral
Reserve appropriate space	Pre-standardized location, usually health room or nurse's office
Reserve/assure training of sufficient staff	Completed by single identified staff member (trained) who refers failures to school nurse, or by school nurse, depending on district
Assure sufficient equipment for event	Equipment that has been assigned to school or nurse is used
Notify parents as per district policy (Many districts just list in local handbook that mass screenings are done each year for...). Other districts insist on individual notification.	Individual screenings that are not part of a mass event require parental consent. May be part of a larger consent, such as for Exceptional Children eligibility evaluation.
Plan logistics and flow for dates	NA
Conduct screening event	Obtain student from class when referral is made
Plan make-up day for absent students	NA
Refer failures to school nurse for re-screen	Refer failures to school nurse for re-screen
Record results	Screener records results
School nurse makes referrals for re-screen failures	School nurse makes referrals for re-screen failure
School nurse follows up for secured care	School nurse follows up for secured care

APPENDIX B. MILESTONES OF VISION DEVELOPMENT

During Pregnancy

- Visual development begins as early as the fourth week of pregnancy. At that time, the developing eye is smaller than the head of a pin and hidden under a layer of skin.
- In the next few months, the eye's nerves and blood vessels start to grow, as do the lens and retina. At the end of the sixth month of pregnancy, the eye has completed much of its development.
- There is an increased risk of high refractive errors, amblyopia, and strabismus in preterm infants, low birth weight infants, and infants born with disabilities such as Cerebral Palsy and Down Syndrome.

Newborn to 3 Months

- Turns eyes and head to look at light sources.
- Stares at surroundings when awake.
- Blinks at camera flash.
- Moves eyes and head together.
- Eyes track vertically and horizontally.
- Momentarily holds gaze on bright light or objects.
- Eye contact begins at 6 to 8 weeks.

Three to 6 Months

- Reaches toward and later grasps hanging objects.
- Eyes follow moving people and objects across midline.
- Eyes begin to move more widely with less head movement.
- Eyes move actively, inspecting surroundings.
- Watches parent/caregiver's face when he/she is spoken to.
- Looks at his/her hands.
- While sitting, looks at his/her hands, food, and bottle.
- Looks for and watches more distant objects.
- Responds to mirror image.

Seven to 12 Months

- Visually oriented to objects in the home.
- Eyes may turn inward while inspecting toys or hands.
- Notices very small objects like bread crumbs.
- Develops interest in pictures.
- Recognizes partially hidden objects – enjoys “hide and seek.”
- Looks for toys that fall down.
- Visually inspects toys he/she can hold.
- Visually responds to smiles and voices of people.
- Sweeps eyes around room to see what is happening.

Vision During the Important First Year of Life

by Lea Hyvärinen

Vision, hearing, vocalization, and motor functions develop quickly during the first year of life. Four important vision development milestones to monitor are:

1. Maintaining eye contact by the age of 6 weeks; latest at 8 weeks. If eye contact has not developed, the baby and the parent(s) feel rejected, which disturbs bonding and interaction. This is a *Developmental Emergency situation* requiring *Early Intervention without delay*.
2. Developing a social smile by the age of 12 weeks.
3. Watching lip movements, goal-directed reaching, and copying of hand movements for exploration of objects by the age of 4 to 6 months. If these visual functions do not develop, *eyes and brain functions need to be thoroughly assessed*. Avoid passive entertainment (videos); it decreases interaction and disturbs the development of communication.
4. Recognizing familiar faces with a welcoming smile before the individual speaks to the infant by the age of 7 to 10 months. The loss or lack of this function, known as *face blindness*, could be inappropriately misinterpreted as an autistic behavior.

Follow the development of vision and, if concerned, request an assessment of vision and early intervention by the child's pediatric primary care provider and/or an eye care specialist who cares for young children.

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Twelve to 18 Months

- Uses both hands and visually steers hand activity.
- Visually interested in pictures.
- Holds objects very close to eyes to inspect.
- Points to objects or people using words “look” or “see.”
- Looks for and identifies pictures in books.

Eighteen to 24 Months

- Turns book right-side up.
- Names one picture.
- Matches objects to pictures.

Two to 3 Years

- Sometimes inspects objects visually without touching them.
- Smiles and face brightens when viewing favorite people and objects.
- Likes to watch movement of, for example, wheels or egg beater.
- Watches and imitates other children.
- Visually explores and steers while walking and climbing.
- Watches own hand while scribbling.
- Begins to control coloring while drawing on paper.
- “Reads” pictures in books.
- Finds details in familiar picture book.
- Matches pictures.

Three and a Half to 4 Years

- Brings head and eyes close to page of book while inspecting.
- Draws and names circles and crosses on paper.
- Can close eyes on request and may be able to wink one eye.

Four to 5 Years

- Uses eyes and hands together with increasing skill.
- Moves and rolls eyes expressively.
- Draws and names pictures.
- Colors within lines.
- Cuts and pastes simple projects quite well.
- Can place small objects in small openings
- Visually alert and observant of surroundings.
- Talks about places, objects, and people observed.
- Shows visual interest in new things.

SOURCES:

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APPENDIX C. SIGNS OF POSSIBLE VISION/EYE PROBLEMS IN YOUNG CHILDREN

Children between the ages of birth and five years acquire the vast majority of their information about the world via visual means. When those means are compromised in any way, the way in which a child learns is often significantly impacted and can affect everything from motor patterns to concept development. Because of this, it is critical that vision concerns be caught and addressed as early as possible.

In this section, you will find information on signs (physical and/or behavioral) that, when exhibited by a young child, may be indicative of a vision loss. This loss may range from minor (corrected with glasses) to serious (requiring support that may range from surgical to life-long educational interventions). Knowledge of these signs and symptoms will assist families and professionals in identifying a suspected vision loss and identifying appropriate resources to address it.

These are potential “red flags” for possible visual problems. If your child, or a child for whom you provide care, exhibits one or more of these signs of possible eye problems, he/she should be evaluated by an eye care professional.

Appearance

- Crossed eyes, “wall” eye or other misalignments of the eyes
- Ptosis – the sagging of the eyelid partially covering the pupil of the eye
- The presence of a white pupil, which may be observed when looking directly at the child’s eyes
- Possible eye injuries: watch for eyes that are reddened, bloodshot, blackened, bruised or swollen, or show evidence of lacerations or abrasions.
- Growth on the eyeball

Behavior (Note that this could also be a sudden change in behavior.)

- Body rigid when looking at distant objects
- Bumping into open doors or furniture while looking straight ahead
- Thrusting head forward or backward while looking at distant objects
- Tilting head to one side
- Rubbing eyes excessively
- Closing or covering one eye
- Holding objects close to eyes
- Having difficulty reading or with close work
- Blinking excessively
- Squinting or frowning when viewing distant objects such as a chalkboard
- Exaggerated responses – e.g. suddenly stopping when moving from a rug to the bare floor, being fearful when going down steps
- Overreaching or underreaching for toys or objects

Complaints (Be aware that young or non-verbal children will not be able to tell you about their discomfort.)

- Blurry vision, dizziness, or nausea after close work
- Blurred or double vision
- Eyes that itch, burn, or feel scratchy
- Unusual sensitivity to light



What Do I Do If I See Any of These Signs in a Child?

CHILD CARE PROVIDERS:

- Be sure to mention what you observed to the child's parents, and be ready to share the information in this document with them.
- Do not assume that someone else has already noticed this, no matter how obvious it may seem to you. You provide a unique insight as to how the child functions in your particular setting.
- A parent may have noticed something, but is waiting for a child "expert" to reinforce his/her observation.
- Be tactful, but assertive. For example, "I have noticed that one of _____'s eyes turns in at times, especially when he is tired. Have you noticed this? Let me share this list of possible vision/eye problems and resources with you. You may want to consult an eye care professional. Please let me know what she/he says." Then continue to follow up and provide support.

PARENTS:

- Discuss what you have noticed with your child's care providers and ask if they have seen the same sign(s) in their settings.
- Be sure to mention your concern to your child's doctor.
- Do not assume someone else (including the doctor) has noticed this sign, no matter how obvious it may seem to you. You see your child often and in a variety of settings. These signs can vary across places and times.
- You are an expert on your child. If you continue to have concerns after seeking answers, or if your child begins to exhibit new or additional signs, persist with your doctor, consult an eye care specialist, or ask for a second opinion.

Please refer to the following websites for further information regarding children's visual health and signs of possible problems:

- National Center for Children's Vision and Eye Health at Prevent Blindness: www.nationalcenter.preventblindness.org
- Prevent Blindness America: www.preventblindness.org
- Prevent Blindness North Carolina: nc.preventblindness.org
- American Association for Pediatric Ophthalmology and Strabismus: www.aapos.org
- American Optometric Association: www.aoa.org
- Year of Children's Vision: www.schoolhealth.com/media/pdf/YOCV_slides_022614.pdf and nationalcenter.preventblindness.org/year-children's-vision

APPENDIX E. GLOSSARY OF TERMS

Acuity – Clarity or sharpness of vision that is measured and recorded using an internationally recognized two figured indicator such as 20/20 (numerator = specific size of symbol used in acuity testing and denominator = distance in feet from child). (Colorado – www.cde.state.com)

Amblyopia – Loss of vision in one or both eyes caused by conditions that impair the normal visual input during the period of development of vision. Amblyopia may be caused by strabismus. (American Association for Pediatric Ophthalmology and Strabismus, AAPOS – www.aapos.org)

Astigmatism – A refractive error caused by an abnormality in the curvature of the cornea and/or the lens. (AAPOS)

Autorefractor – An instrument used to evaluate the refractive error of each eye individually (with no eye drops). This technique cannot detect misalignment.

Binocular vision – The ability to use both eyes at the same time to focus on an object and to combine the individual images in each eye into a single three dimensional image. (en.wikipedia.org)

Cataract – A condition in which the lens of the eye, which is normally clear, becomes cloudy or opaque. (American Foundation for the Blind, AFB – www.afb.org)

Cognition – The mental process of knowing, including aspects such as awareness, perception, reasoning, and judgment. (www.thefreedictionary.com)

Depth perception – Awareness of the relative spatial location of objects, some being closer to the observer than others. Dictionary of Eye Terminology, 4th Edition and Functional Vision: A Practitioners Guide to Evaluation and Intervention, Lueck, ED., AFB Press

Cortical visual impairment – Visual impairment caused by damage to those parts of the brain related to vision. Although the eye is normal, the brain cannot properly process the information it receives. (AFB)

Hyperopia – An abnormal condition of the eye in which vision is better for distant objects than for near objects. It results from the eyeball being too short from front to back, causing images to be focused behind the retina. Also called farsightedness. (www.thefreedictionary.com)

Legal blindness – A level of visual impairment that has been defined by law to determine eligibility for benefits. It refers to central visual acuity of 20/200 or less in the better eye with the best possible correction, or a visual field of 20 degrees or less. (AFB)

Low vision – Vision loss that may be severe enough to impede a person's ability to carry on everyday activities, but still allows some functionally useful sight. (AFB)

Monocular vision – Vision in which each eye is used separately. By using the eyes in this way, as opposed by binocular vision, the field of view is increased, while depth perception is limited. (en.wikipedia.org)

Myopia – Ability to see close-up objects clearly but distance vision is blurry. Light rays coming from a distant object are brought

into focus before reaching the retina Dictionary of Eye Terminology, 4th Edition

Nystagmus – Condition that involves involuntary, rapid, repetitive movements of one or both eyes from side to side, up and down, or in a circular motion. (AFB)

Occluder – A device used to cover one eye during vision screening (www.cde.state.com)

Ophthalmologist – An ophthalmologist – Eye M.D. – is a medical or osteopathic doctor who specializes in eye and vision care. Ophthalmologists differ from optometrists and opticians in their levels of training and in what they can diagnose and treat. As a medical doctor who has completed college and at least eight years of additional medical training, an ophthalmologist is licensed to practice medicine and surgery. An ophthalmologist diagnoses and treats all eye diseases, performs eye surgery, and prescribes and fits eyeglasses and contact lenses to correct vision problems. Many ophthalmologists are also involved in scientific research on the causes and cures for eye diseases and vision disorders.

Optometrist – Optometrists are healthcare professionals who provide primary vision care ranging from sight testing and correction to the diagnosis, treatment, and management of vision changes. An optometrist is not a medical doctor. An optometrist receives a doctor of optometry (OD) degree after completing four years of optometry school, preceded by three or more years of college. An optometrist is licensed to practice optometry, which primarily involves performing eye exams and vision tests, prescribing and dispensing corrective lenses, detecting certain eye abnormalities, and prescribing medications for certain eye diseases.

Optician – Opticians are technicians trained to design, verify, and fit eyeglass lenses and frames, contact lenses, and other devices to correct eyesight. They use prescriptions supplied by ophthalmologists, who are medical doctors and surgeons or optometrists, but do not test vision or write prescriptions for visual correction. Opticians are not permitted to diagnose or treat eye diseases.

Optotypes – Figures or letters of different sizes used in testing the acuity of vision. (www.merriam-webster.com)

Photostereotyping – Instrument that assesses both eyes simultaneously. It obtains an optical image of the eye, which is then interpreted by a trained operator or a computer to evaluate for any refractive error, media opacities (e.g., cataract), and misalignment.

Ptosis – A drooping of one or both eyelids. (AAPOS)

Retinoblastoma – Malignant tumor (cancer) of the retina, generally affecting children under the age of 6. Usually hereditary, retinoblastoma may affect one or both eyes. (AFB)

Strabismus – The misalignment of the eyes caused by muscle imbalance (AAPOS)

- Esotropia - A type of strabismus in which one or both eyes turn inward. It can be intermittent or constant.
- Exotropia - A type of strabismus in which one or both eyes turn outward. It can be intermittent or constant.



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