



# Children's Vision Health

## How to Create a Strong Vision Health System of Care

by P. Kay Nottingham Chaplin, Jean E. Ramsey, and Kira Baldonado

*The authors thank the members of the Advisory Committee for the National Center for Children's Vision and Eye Health at Prevent Blindness for their support in the development of this article.*

Madison, a child enrolled in Head Start, did not pass a vision screening and received glasses after a follow-up eye exam. When she returned to her classroom with her new glasses, Madison walked into the room and looked around. A picture of a giraffe on the wall caught her attention. She walked to the picture, looked at the giraffe, turned to her teacher, and said, "I didn't know giraffes had eyes!"

This story reinforces our knowledge that children with vision disorders rarely know that the way they see their world differs from the way children with good vision experience it. Consequently, they miss out on learning opportunities all around them because of poor sight.



P. Kay Nottingham Chaplin, EdD, is Director of Vision & Eye Health Initiatives at Good-Lite, vision screening consultant for School Health Corporation, and a member of the Advisory Committee to the National Center for Children's Vision & Eye Health at Prevent Blindness.



Jean E. Ramsey, MD, MPH, is with the Boston University School of Medicine and the American Association for Pediatric Strabismus and Ophthalmology, and is co-chair of the Advisory Committee to the National Center for

Children's Vision & Eye Health at Prevent Blindness.

Kira Baldonado, BA, is Director of the National Center for Children's Vision & Eye Health at Prevent Blindness.



Research suggests that up to 1 in 20 preschool-aged children may have a vision problem that can lead to permanent vision loss if not detected and treated early — preferably before age 5 years (Calonge, 2004). Head Start, Early Head Start, and early childhood program vision screeners are in a perfect position to help find these children, who can then be referred to an eye care provider for diagnosis and treatment.

To assist front-line screeners, the National Head Start Association is collaborating with leading national vision and eye health organizations in an initiative called the Year of Children's Vision (YOCV). The goal of YOCV is to provide national guidance to staff of Head Start programs and other early childhood educators to standardize approaches to vision screening, improve follow-up for eye care for children who do not pass vision screening, provide family-friendly educational information, and consult with some of the nation's leading pediatric eye care providers to ensure best practices.

### What Vision Disorders Do Young Children Have?

The development of good vision requires that the eyes are straight and

the brain receives clear, focused images from each eye. Any conditions that interfere with this development can cause vision loss known as amblyopia or "lazy eye." Four common conditions that can lead to amblyopia include:

1. *Misaligned eyes* (i.e., strabismus): Eyes crossing consistently after age 4 to 6 months (American Academy of Ophthalmology, 2012).
2. *Blurred images* (i.e., 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 nearsighted and the other farsighted.
4. *Abnormalities of eye structures causing visual deprivation*: Examples include congenital cataract and ptosis (droopy eyelid).

Unless a child's eye is crossed, you will rarely know that a child is having difficulty with vision. You can help find children with vision problems by implementing a strong vision health system of care as a part of your early education program.

## What is Included in a Strong Vision Health System of Care?

A strong vision health system of care at your early childhood program should follow, at a minimum, the following 12 components:

1. Ensure that all parents/caregivers receive educational material, which respects cultural and literacy needs, about the importance of:
  - a. good vision for their child now and in the future.
  - b. scheduling and attending an eye exam when their child does not pass vision screening.
  - c. increased risk for vision problems in defined high-risk populations.
2. Ensure that parent/caregiver's written approval for vision screening includes permission to:
  - a. share screening results with the child's eye doctor and primary care provider.
  - b. receive eye exam results for your file.
  - c. talk with the child's eye doctor for clarification of eye exam results and prescribed treatments.
  - d. share eye exam results with the child's primary care provider.
3. Screen vision with age-appropriate and evidence-based tools and procedures, including optotypes (pictures) and/or instruments (refer to sidebars for more information).
  - a. Follow national referral and rescreening guidelines.
  - b. Include vision screening training for your staff that leads to certification in evidence-based vision screening procedures.
4. Establish and follow policies for screening and referral of children with special needs (refer to sidebar for assistance on which children should bypass screening and go directly to eye exam).

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5. Rescreen or refer difficult-to-screen (untestable) children.
  - a. Research suggests that untestable children were twice as likely to have a vision problem than those children

who passed a vision screening (The Vision in Preschoolers Study Group, 2007).

- b. If you have reason to believe that the child may perform better on another day, consider rescreening the child

## 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.

Lea Hyvärinen, MD, PhD, FAAP, is Professor H.C., Rehabilitation Sciences, Technical University of Dortmund, Germany.

within 6 months (American Academy of Ophthalmology, 2012). Otherwise, refer untestable children for an eye exam.

6. Provide parents/caregivers with vision screening results in easy-to-understand language (both written and verbal), 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.
7. Create and implement a system for following-up with parents/caregivers to help ensure that the eye exam occurs.
  - a. Identify and remove barriers to follow-up to eye care, such as transportation or a lack of knowledge of what will occur during the eye exam.
  - b. Consider ways to engage parents in peer-to-peer conversations to encourage follow-up to eye care and adherence to prescribed treatments.
8. Link parents/caregivers with an eye doctor who specializes in the care and treatment of young children, when an eye exam is needed.
9. Obtain eye exam results for your files.
10. Send a copy of eye exam results to the child's primary care provider.
11. Ensure that the eye doctor's treatment plan is followed.
  - a. Develop a plan to assist with eye patching and/or glasses, as recommended by the eye care provider.

## Children Who Should Bypass Vision Screening and Go Directly to Eye Exam

by P. Kay Nottingham Chaplin, Jean E. Ramsey, and Kira Baldonado

Children with certain developmental delays or risk factors have a greater possibility of vision problems and should be directly referred to an eye care provider who specializes in caring for young children for a comprehensive eye examination. It is essential that parents of these children receive educational materials so that they can understand the increased risk of vision problems their child faces.

Children who should bypass vision screening and go directly to eye exam include those:

- with Down Syndrome, prematurity, juvenile idiopathic arthritis, and neurofibromatosis.<sup>1</sup>
- with a family history of amblyopia, strabismus, retinoblastoma, congenital cataracts, or congenital glaucoma.<sup>1</sup>
- with developmental delays, intellectual disabilities, neuropsychological conditions, or behavioral issues that render them untestable.<sup>1</sup>
- who experienced low birth weight, prolonged supplemental oxygen, or grades III or IV intraventricular hemorrhage.<sup>2,3</sup>
- with retinopathy of prematurity.<sup>2,3</sup>
- whose mothers smoked or used drugs or alcohol during pregnancy.<sup>2,3</sup>
- whose mothers had rubella, toxoplasmosis, venereal disease, herpes, cytomegalovirus, or human immunodeficiency virus during pregnancy.<sup>2,3</sup>
- whose mothers experienced difficult or assisted labor, which may be associated with fetal distress or low Apgar scores.<sup>2,3</sup>
- with known or suspected central nervous system dysfunction evidenced by developmental delay, cerebral palsy, dysmorphic features, seizures, or hydrocephalus.<sup>2,3</sup>
- on the autism spectrum.<sup>4</sup>

Your program should not conduct a family history because concerns may exist around privacy of health information; however, if parents freely provide information about any of the above conditions, refer those children for an eye exam.

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- <sup>2</sup>American Optometric Association. (1994; Revised 1998; Reviewed 2004). *Optometric clinical practice guideline: Care of the patient with amblyopia*. St. Louis, MO: American Optometric Association. Retrieved from [www.aoa.org/documents/CPG-4.pdf](http://www.aoa.org/documents/CPG-4.pdf)
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## The Role of Families in a Vision Health System of Care

by Catherine Johnson and Stacy Ayn Lyons

It is important for parents and caregivers to pay attention to signs of vision problems, including squinting, crossed eyes, tilting the head, excessive tearing or itchy eyes, as well as difficulty learning, or delays in reaching milestones like making eye contact, talking, and walking.

Families play the most important role in ensuring that children see an eye doctor and follow through with the recommended treatment. Vision screenings use a few simple tests to identify children who may be at risk of vision problems. Vision screenings are not intended to replace a comprehensive eye exam.

Head Start and early childhood program staff can support families by providing them with information to help them understand the importance of children's vision issues. Staff can also assist by providing a list of pediatric eye doctors, and a list of low- or no-cost examination and eyeglass programs. Children's vision health is supported by a network of advocates such as the Head Start staff, health managers, pediatricians, pediatric eye doctors, and families. Communication among these providers is crucial to ensuring that the recommended treatment is carried out.

Catherine Johnson, OD, FFAO, Associate Professor, and Stacy Ayn Lyons, OD, FFAO, Professor and Chair, Dept. of Specialty and Advanced Care are from the New England College of Optometry in Boston, Massachusetts.

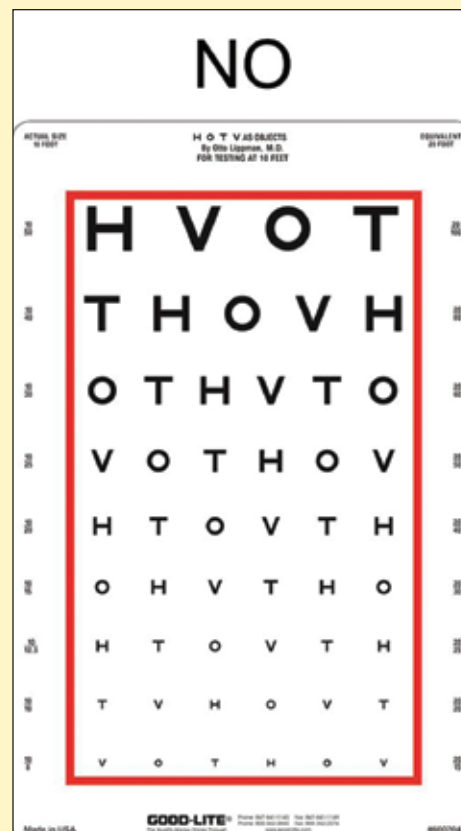
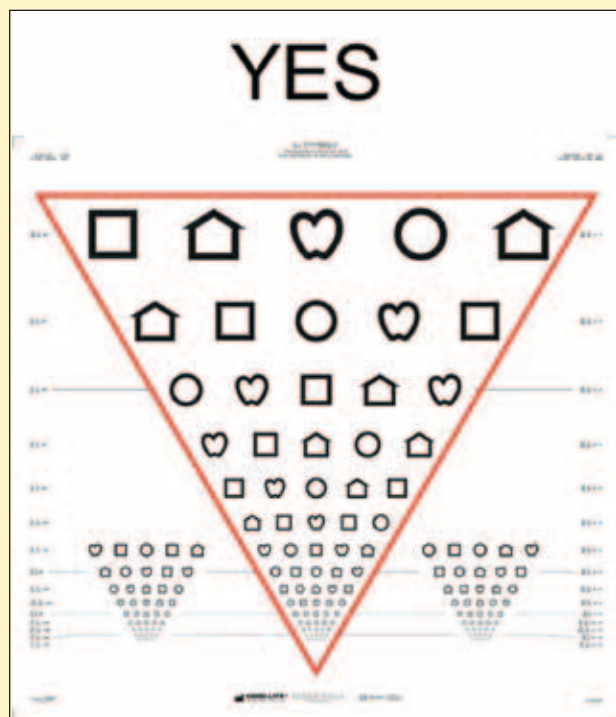
## National and International Guidelines for Standardized Eye Chart Design

by P. Kay Nottingham Chaplin

Chart design can significantly affect visual acuity scores.<sup>1</sup> Research supports using single, LEA Symbols optotypes surrounded with bars for preschool-aged children.<sup>2</sup> If you are required to use standard eye charts as your test of visual acuity for optotype-based screening, national and international guidelines exist regarding how charts should be designed.<sup>3,6</sup> The six guidelines are:

1. **Optotypes should be of approximate equal legibility.** "Optotype" is the name for the picture, symbol, letter, or number the child is to identify.
2. **Each line on an eye chart should have the same number of optotypes.** Some charts may have fewer than 5 optotypes on the top two lines to fit a light box. This is acceptable; you are concerned with lines 20/50 and below.
3. **Horizontal spacing between optotypes should be equal to the width of the optotypes on a line.**
4. **Vertical spacing between lines should be the height of the optotypes in the next line down.**
5. **The size of optotypes should progress down the chart by 0.1 log units between rows** (see Figures 1 and 2). You will see measurements of 20/32 instead of 20/30. Typically these charts are referred to as "proportionally spaced" in a catalog description.
6. **Optotypes should be black on a white background under good lighting conditions.**

The testing distance between the child's eyes and a standardized eye chart will be 10 feet.



Figures 1 and 2: If you drew a line around the outside of the optotypes on an appropriate design, the shape would resemble an inverted pyramid instead of a rectangle.

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- <sup>2</sup>Vision in Preschoolers (VIP) Study Group. (2009). Findings from the Vision in Preschoolers (VIP) Study. *Optometry and Vision Science*, 86(6), 619-623.
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- <sup>6</sup>World Health Organization. (2003). Consultation on development of standards for characterization of vision loss and visual functioning. Retrieved from [http://whqlibdoc.who.int/hq/2003/WHO\\_PBL\\_03.91.pdf](http://whqlibdoc.who.int/hq/2003/WHO_PBL_03.91.pdf)



## Evidence-Based Options for Optotype-Based Screening

by Wendy Marsh-Tootle

If your 3- and 4-year-old children do not cooperate well for optotype-based screening (typically visual acuity screening with an eye chart), you may be tempted to use cards showing only one picture (optotype). Do not use single optotypes without surround bars because children can more easily identify the single optotypes and you could miss vision disorders.

A simplified screening format, which has been validated by a large study<sup>1,2</sup> funded by the National Institutes of Health's Eye Institute, is an evidence-based option for optotype-based screening. Using the simplified screening format designed for the study — a single LEA Symbols optotype with crowding bars calibrated for screening at 5 feet (see Figure 1) — lay screeners found 79% of children with strabismus (turned eyes) and 87% of children with amblyopia ("lazy eye" or reduced vision in one or both eyes). The study also found that when showing one line of pictures surrounded by a rectangular box at a 10-foot screening distance, lay screeners detected only 39% of preschool children with strabismus and 56% of children with amblyopia. Another option is the Eye Check Screener with LEA Symbols (see Figure 2), which uses the essential elements of the VIP test, including the surround bars around the picture and a 5-foot screening distance.

If charts or lines of optotypes are difficult for your 3- and 4-year-old children, tests of visual acuity using single, surrounded LEA Symbols optotypes are options that worked better in the hands of lay screeners.<sup>1,2</sup>



Figure 1 — Vision in Preschoolers screening tool designed for VIP Study.



Figure 2 — Eye Check simplified screening test based on VIP screening tool.

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- <sup>1</sup>The Vision in Preschoolers Study Group. (2005). Preschool vision screening tests administered by nurse screeners compared with lay screeners in the Vision in Preschoolers Study. *Investigative Ophthalmology & Visual Science*, 46(8), 2639-2648.
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Wendy Marsh-Tootle, OD, MS, is a Professor at the University of Alabama at Birmingham School of Optometry.

- b. If insurance coverage provides two sets of glasses, consider requesting the parent/caregiver leave one set in the classroom.
12. Evaluate the effectiveness of your vision health program annually.
  - a. Compare screening results to eye exam outcomes.
  - b. Identify variations in referral rates among your screeners.
  - c. Monitor screening procedures to ensure they follow current recommendations.
  - d. Monitor follow-up to eye care for

- children who do not pass vision screening or who were untestable.
- e. Look for common barriers in follow-up to eye care and discuss solutions with your Health Services Advisory Committee.
- f. Report end-of-year data to health, education, and community stakeholders.

With a strong vision health system of care in place, you are better equipped to find children, like Madison, whose vision is too blurry to differentiate a giraffe's eyes from the pattern of its

coat. With early identification, diagnosis, and treatment, nearly all children can obtain their maximum visual potential. The steps you take now will lead to better lifelong vision health and learning readiness for the children you serve.

### Resources

**National Center for Children's Vision and Eye Health**

<http://nationalcenter.preventblindness.org/>

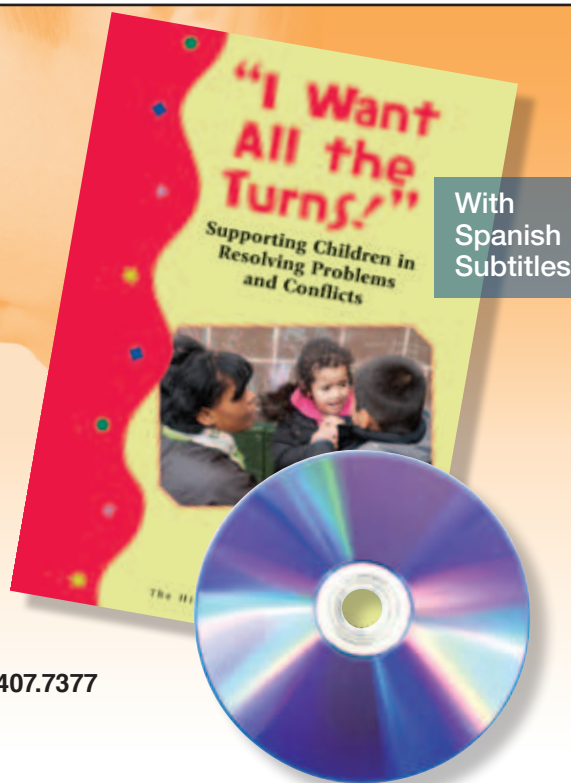
**Year of Children's Vision**

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accuracy. *Investigative Ophthalmology & Visual Science*, 48(1), 83-87.

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## Instrument-Based Screening Policy Statement

by Noelle S. Matta and David I. Silbert

The American Academy of Pediatrics recently released its new instrument-based pediatric vision screening policy statement. This document supports the use of photoscreeners and portable autorefractors — devices that can quickly and reliably detect vision problems in children, such as farsightedness, nearsightedness, misaligned eyes, and anisometropia. The use of instruments is suggested for children between the ages of 6 months and 3 years, or older children who were unable to be tested by a validated and age-appropriate eye chart.

Vision screening should be performed yearly. If a child is referred for not passing a vision screen, they should be seen by an eye care provider who specializes in the care and treatment of children's vision problems for a comprehensive eye exam.

Key considerations for instrument-based vision screening include the validation of the device for the age group being screened, referral criteria settings, and method of data capture compatibility with existing data systems.

For more information about vision problems in children and vision screening systems, please visit the Year of Children's Vision website at:

<http://nationalcenter.preventblindness.org/year-childrens-vision>

Noelle S. Matta CO, CRC, COT, and David I. Silbert MD, FAAP, are members of the Family Eye Group in Lancaster, Pennsylvania, and represent the Vision Screening Committee of the American Association for Pediatric Ophthalmology and Strabismus.