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## **Vision:**

**Academic Challenges, Classroom Behaviors, &  
Evidence-Based Vision Screening Approaches**

Dr. P. Kay Nottingham Chaplin, EdD

## **Introduction and Disclaimer**



- 18 years in vision screening field
- *Former Director/Lead Trainer – Vision Initiative for Children – West Virginia University Eye Institute – focus on Head Start, school nurses, pediatric primary care practices*
- Member –Advisory Committee to the National Center for Children's Vision and Eye Health at Prevent Blindness
- *Consultant – Vision Screening Committee, American Association for Pediatric Ophthalmology and Strabismus*
- Current Director – Vision and Eye Health Initiatives at Good-Lite and School Health Corporation
- *Current Education and Outreach Coordinator for the National Center for Children's Vision and Eye Health at Prevent Blindness*
- My focus is to encourage age-appropriate and evidence-based vision screening – based on national guidelines and best practices – as part of a 12-component Strong Vision Health System of Care.

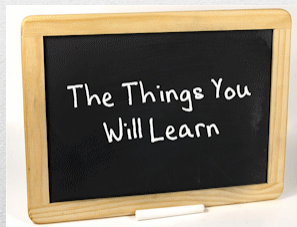
Dr. Nottingham Chaplin has:

- ✓ Provided 178 vision screening training workshops; and
- ✓ Lectured, trained, and consulted at more than 200 international, national, state, district, and local venues, including national webinar panels, and annual conferences, for example, the:
  - National Association of School Nurses
  - National Head Start Association
  - School-Based Health Alliance
  - National Center on Early Childhood Health and Wellness

## Info You Will Take Home ... 4 Learning Objectives

Describe 2 solutions to vision-related academic challenges.

List 1 website for finding resources to support your vision and eye health program.



List 2 classroom behaviors that may be related to vision.

List 2 evidence-based approaches to vision screening and describe what each measures.

## Current State of Children's Vision in the U.S.

Up to 1 in 17 preschool-aged children and up to 1 in 4 school-aged children in the United States has a vision problem that requires treatment.<sup>1,2</sup>

- Children's vision problems may lead to **permanent** vision loss if not treated and
- Cause problems socially, academically, and developmentally.
- Almost all (94%) of these vision problems can be found early.
- In order to find these vision problems, children who do not pass vision screening must:<sup>3</sup>
  - See an eye doctor;
  - Receive treatment, if necessary; and
  - Follow the eye doctor's suggestions to improve vision.



- Only 41% of children ages 5 years and younger are screened for vision problems.<sup>4</sup>

<sup>1</sup>U.S. Preventive Services Task Force. (2017). *Vision screening in children ages 6 months to 5 years* (Evidence Synthesis No. 153). Rockville, MD: Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0098873/>

<sup>2</sup>Kemper, A. R., Bruckman, D., & Freed, G. L. (2004). Prevalence and distribution of corrective lenses among school-aged children. *Optometry and Vision Science*, 81(1), 7-10.

<sup>3</sup>Varma, R., Tarczy-Hornoch, K., & Jiang, X. (2017). Visual impairment in preschool children in the United States: Demographic and geographic variations from 2015 to 2060. *JAMA Ophthalmology*, 135(6), 610-616.

<sup>4</sup>Block, S., & Baldonado, K. (2018). Staying Focused on Children's Vision: Leveraging Results from the 2016-2017 National Survey of Children's Health. Association of Maternal and Child Health Programs. Arlington, VA.

## National Organizations Endorsing Vision Screening and Follow-Up Eye Examinations

Developing Consensus for Children's Vision and Eye Health Programs

February 2019

### Developing a Consensus on a Systems-Based Approach to Children's Vision and Eye Health

*Endorsed by the National Center for Children's Vision and Eye Health at Prevent Blindness, the American Association of Pediatric Ophthalmology and Strabismus, the American Academy of Optometry, the American Association of Certified Orthoptists, the American Academy of Pediatrics and the National Optometric Association.*

**Purpose of this Consensus Statement:** Early detection and treatment of a vision disorder is critical to the long-term vision health of the child, and vision screenings serve a useful role in identifying children in need of further evaluation by an eye care professional. As part of a comprehensive public health approach to eye health, the National Academies of Sciences, Engineering and Medicine (NASEM) recommends the development of a "single set of evidence-based clinical . . . and practice guidelines and measures that can be used by eye care professionals, other care providers, and public health professionals to prevent, screen for, detect, monitor, diagnose and treat visual impairments."

While efforts to develop a single set of inter-organizational guidelines have begun, national, state and local organizations devoted to early childhood vision care have- up to this point- published their own screening and referral guidelines, which often vary in the recommendations provided. These differences can make it unclear to screening providers which guidelines to follow for their work with specific groups of children. This consensus statement

ALL AGREE THAT EARLY DETECTION AND TREATMENT OF A VISION DISORDER IS CRITICAL TO THE LONG-TERM VISION HEALTH OF THE CHILD, AND VISION SCREENINGS SERVE A USEFUL ROLE IN IDENTIFYING CHILDREN IN NEED OF EYE CARE AND PROMOTING FURTHER EVALUATION BY AN EYE CARE PROFESSIONAL.

## 7 Classroom Behaviors that May be Related to Vision Disorders

1. Talking in class
2. Notably quiet in class
3. "Spacy" children in their own world
4. Difficulty sitting still
5. Frustrated with academic work
6. Squinting during class activities
7. Clumsiness

Behaviors are not always related to vision.

A vision disorder is something to consider when the behaviors occur.

Conduct vision screening to rule out vision as a casual factor.



**Talking in class** – Child said he talked because he was asking other students to help him read material on board.

**Notably quiet in class** – Child said she stopped looking at board . . . She couldn't see material on board.

**"Spacy" and in own world** – Interrupt story time to come forward to see book pictures. "I can see that now!"

**Difficulty sitting still** – Up and moving in circle time or watching TV with brother. Loner and bored. Now sits and participates in group activities.

Gallin, P. F. (2015, May 15). Kids who can't see can't learn. The New York Times. Retrieved from [http://www.nytimes.com/2015/05/15/opinion/kids-who-cant-see-cant-learn.html?\\_r=0](http://www.nytimes.com/2015/05/15/opinion/kids-who-cant-see-cant-learn.html?_r=0) Screener and parent stories.

**Frustrated with "academic work"** – Before glasses, "things looked dusty". Different child, happier, less frustrated.

**Squinting during class activities** – "Mommy! There are numbers on that circle on the wall!"

**Clumsiness until receiving glasses** – "I have realized through these screenings that vision can affect a child's behavior, balance, and academic performance."

Gallin, P. F. (2015, May 15). Kids who can't see can't learn. The New York Times. Retrieved from [http://www.nytimes.com/2015/05/15/opinion/kids-who-cant-see-cant-learn.html?\\_r=0](http://www.nytimes.com/2015/05/15/opinion/kids-who-cant-see-cant-learn.html?_r=0) Screener and parent stories.

## Student with Frequent Headaches?



MinnPost photo by Erin Hinrichs  
Kim Meier, a nurse at Kennedy Elementary School in the Hastings Public Schools district, tending to a student.

Screen vision to  
rule out vision  
disorder as  
causal factor.

## Multistate Level

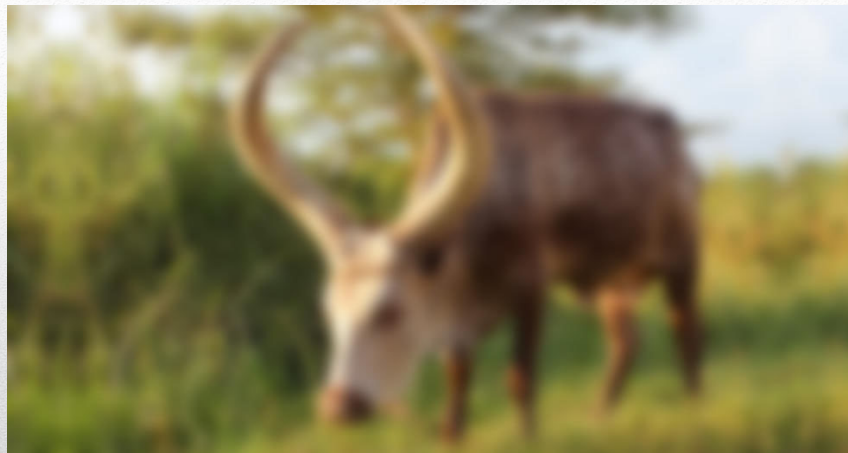


- 2015 Vision in Preschoolers – Hyperopia in Preschoolers Study (VIP-HIP) found:
  - Children ages 4 and 5 years with uncorrected hyperopia (farsightedness  $\geq 4.0$  D) scored *significantly* worse on a test of early literacy than children with normal vision.
  - $\leq 4.0$  D also had lower scores, but difference not statistically significant
- Test = TOPEL (Test of Preschool Early Literacy)
- Performance most affected:
  - Print knowledge subtest, which assesses the ability to identify letters and written words

VIP-HIP Study Group, Kulp, M. T., Ciner, E., Maguire, M., Moore, B., Pentimonti, J., Pistilli, M., Cyert, L., Candy, R., Quinn, G., & Ying, G. (2016). Uncorrected hyperopia and preschool early literacy: Results of the Vision In Preschoolers – Hyperopia In Preschoolers (VIP-HIP) Study. *Ophthalmology*, 123(4), 681-689.



Full vision - <http://www.onedollarglasses.org/eye-test/full-vision.html>

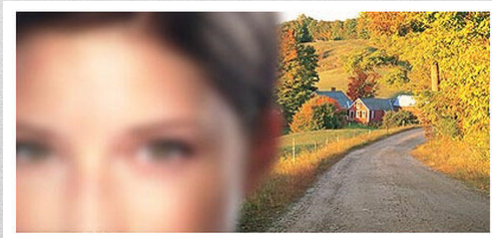


Vision defect of 4.0 D - <http://www.onedollarglasses.org/eye-test/4-diopters.html>



## Diopter defined

- “Diopter” refers to the strength of a prescription lens required to give a child the clearest vision possible. The higher the number, the stronger the prescription lens.
- A child requiring 4 diopters of correction in prescription glasses, or contact lenses, would likely struggle with blurred vision, crossed eyes, or both, and would see much better with prescription glasses.



## Multiple Inner City Schools Level

- 317 2<sup>nd</sup> and 3<sup>rd</sup> grade students in 12 high-poverty schools in Baltimore City School District in phase 1
- Poor baseline visual acuity and hyperopia associated with reduced reading achievement and worse baseline reading scores



Collins, M. E., Mudie, L., Slavin, R. E., Corcoran, R. P., Owoeye, J., Chang, D., Friedman, D. S., & Repka, M. X. (2016). Prevalence of eye disease and reading difficulty in an inner city elementary school population—preliminary results of the Baltimore Reading and Eye Disease Study (BREDS) [Abstract]. Journal of AAPOS, 20(4), e29-e30. Retrieved from [http://www.jaapos.org/article/S1091-8531\(16\)30239-7/abstract](http://www.jaapos.org/article/S1091-8531(16)30239-7/abstract)



## Single School District Level

2015 study of low-income children ages 3 through 5 years screened in South Carolina's Charleston County School District – *after diagnosis and treatment with prescription glasses* – found:

- Improvement in academic progress.
- Increase in focus during lessons.
- Increase in participation and classroom interaction.
- Improvement in confidence and behavior.



Peterseim, M. M., Papa, C. E., Parades, C., Davidson, J., Sturges, A., Oslin, C., Merritt, I., & Morrison, M. (2015). Combining automated vision screening with on-site examinations in 23 schools: ReFocus on Children Program 2012 to 2013. *Journal of Pediatric Ophthalmology & Strabismus*, 52(1), 20-24.

## Early Identification & Treatment Make a Difference

- First grade reading ability found to be predictive of 11<sup>th</sup> grade reading outcomes, including:

- Reading comprehension,
- Vocabulary, and
- General knowledge.

Children who lag in 1<sup>st</sup> grade but catch up by 3<sup>rd</sup> or 5<sup>th</sup> grade have good prognosis for future reading level.



Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology*, 33(6), 934-945.

## Academic Considerations for Vision

- Improved GPA (reading and math) - more likely for hyperopes than myopes
- Increased satisfaction with school
- Reduced stress
- Improved cognition, attention span, and focus
- Improved test scores
- Less task avoidance and need for discipline
- Less labeling- ADD or ADHD
- Earlier identification leads to improved outcomes

Academic Performance of Oylar School Students after Receiving Spectacle Correction. Thesis by Kimberly L. Renner; Graduate Program in Vision Science; The Ohio State University, 2017

Healthier Students Are Better Learners: A Missing Link in School Reforms to Close the Achievement Gap. Basch, CE. EQUITY MATTERS: Research Review No. 6 Columbia University; March 2010.

<https://sparkpe.org/wp-content/uploads/BaschReport.pdf>



## Cast of Characters for National Guidelines

### **NCCVEH** (ages 3, 4, and 5 years):

- National Center for Children's Vision and Eye Health at Prevent Blindness
  - Optometry
  - Ophthalmology
  - Family Advocates
  - Nurses
  - Public Health Professionals
  - Educators

### **AAP** (all ages):

- American Academy of Pediatrics
- American Association for Pediatric Ophthalmology and Strabismus
- American Academy of Ophthalmology
- American Association of Certified Orthoptists

## 2 Approaches to Vision Screening

### 1. Optotype-based screening

- Tests of visual acuity using optotypes to measure visual acuity as interpreted by the brain
  - *Quantifiable measurement of the sharpness or clearness of vision when identifying specific optotype sizes at a standardized distance*

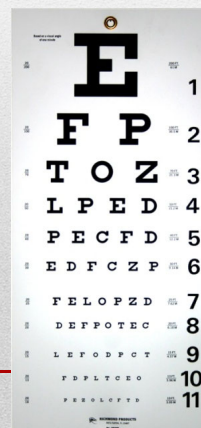
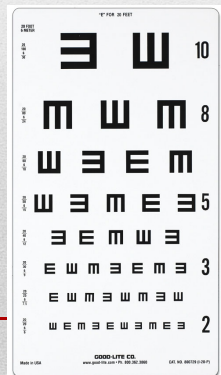
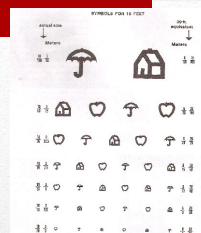
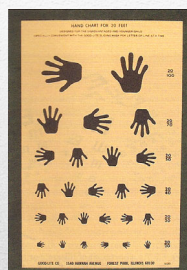
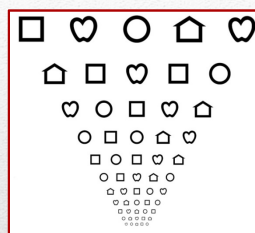
### 2. Instrument-based screening

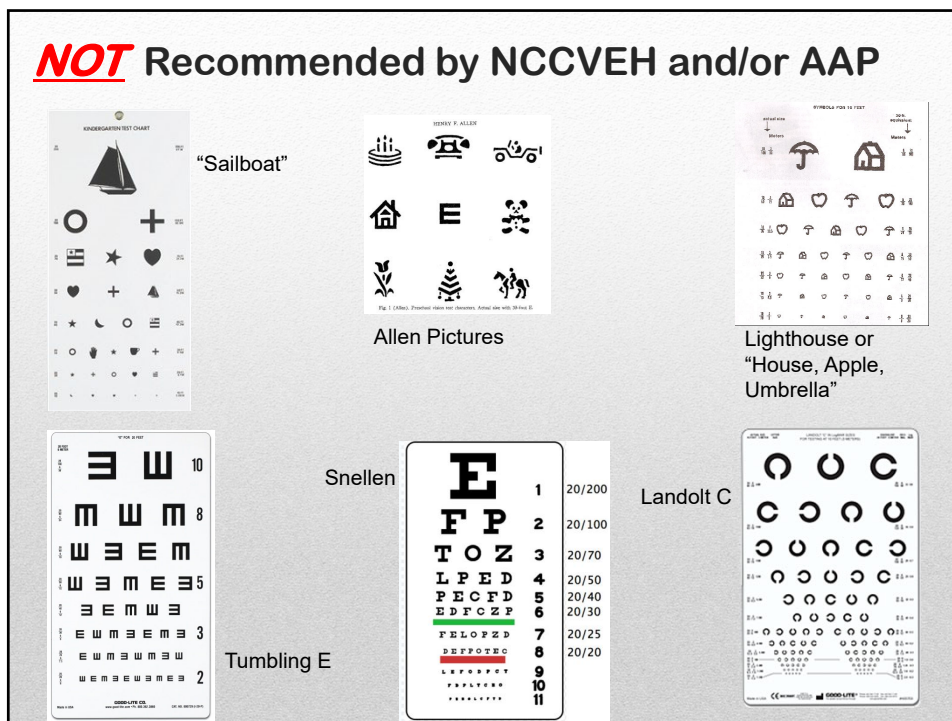
- Instruments do not measure visual acuity
- *Instruments use an automated image acquisition and analysis system of the eyes to provide information about amblyopia risk factors:*
  - Estimates of significant refractive error (hyperopia, myopia, astigmatism)
  - Estimates of anisometropia
  - Estimates of eye misalignment (some, not all)





- Threshold screening
  - *Move down chart until child cannot correctly identify majority of optotypes*
- Critical line screening
  - *Use only line child needs to pass according to child's age*





## Why **NOT** Recommended?

- The use of validated and standardized optotypes and acuity charts is important for an accurate assessment of vision.
- Charts not standardized.
- Children may not know their letters.
- Requires discrimination of direction, which is not sufficiently developed in preschool-aged children.
- Not well validated in screening environment.

Cotter, S. A., Cyert, L. A., Miller, J. M., & Quinn, G. E. for the National Expert Panel to the National Center for Children's Vision and Eye Health. (2015). Vision screening for children 36 to <72 months: Recommended practices. *Optometry and Vision Science*, 92(1), 6-16. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274336/pdf/oxp-92-06.pdf>

Donahue, S. P., Baker, C. N., & AAP Committee on Practice and Ambulatory Medicine, AAP Section on Ophthalmology, American Association of Certified Orthoptists, American Association for Pediatric Ophthalmology and Strabismus, American Academy of Ophthalmology (2016). Procedures for the evaluation of the visual system by pediatricians. *Pediatrics*, 137(1), e20153597. Retrieved from <http://pediatrics.aappublications.org/content/pediatrics/early/2015/12/07/peds.2015-3597.full.pdf>

## Importance of Appropriate Tools

- “Visual acuity scores can be significantly affected by the chart design.” (p. 1248)
  - Bailey, I.L. (2012). Perspective: Visual acuity – Keeping it clear. *Optometry and Vision Science*, 89(9), 1247-1248.
- Excluding optotype size, “each visual acuity level on a test chart should present an essentially equivalent task”. (p. 740)
  - Bailey, I. L., & Lovie, J. E. (1976). New design principles for visual acuity letter charts. *American Journal of Optometry & Physiological Optics*, 53(11), 740-745.

### National and international distance visual acuity eye chart design recommendations

- **1980 - National Academy of Sciences-National Research Council (NAS-NRC)**
  - Committee on Vision. (1980). Recommended standard procedures for the clinical measurement and specification of visual acuity. Report of working group 39. Assembly of Behavioral and Social Sciences, National Research Council, National Academy of Sciences, Washington, DC. *Advances in Ophthalmology*, 41:103–148.
- **1984 - International Council of Ophthalmology (ICO)**
  - [www.icoph.org/dynamic/attachments/resources/icovisualacuity1984.pdf](http://www.icoph.org/dynamic/attachments/resources/icovisualacuity1984.pdf)
- **2003 - World Health Organization Prevention of Blindness & Deafness (WHO)**
  - Prevention of blindness and deafness. Consultation on development of standards for characterization of vision loss and visual functioning. Geneva: WHO;2003 (WHO/PBL/03.91).
- **2010 – American National Standards Institute, Inc.**
  - ANSI Z80.21-1992 (R2004) Approved May 27, 2010



**Optotypes approximately equal in legibility**

**Horizontal between-optotype spacing = 1 optotype width**

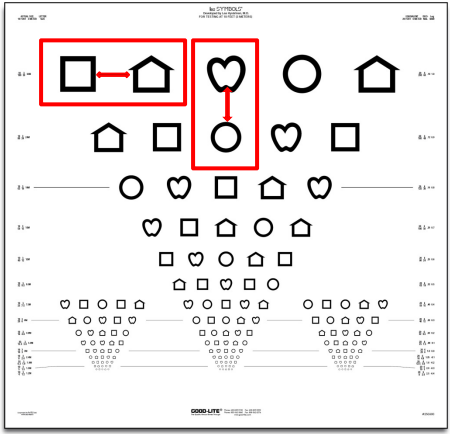
**Vertical between-line spacing = height of next line down**

**Geometric progression of optotype sizes of 0.1 log units (logMAR, ETDRS)**

**5 optotypes per line**

**Optotypes black on white background with luminance between 80 cd/m<sup>2</sup> and 160 cd/m<sup>2</sup>**

Similar recommendations across guidelines

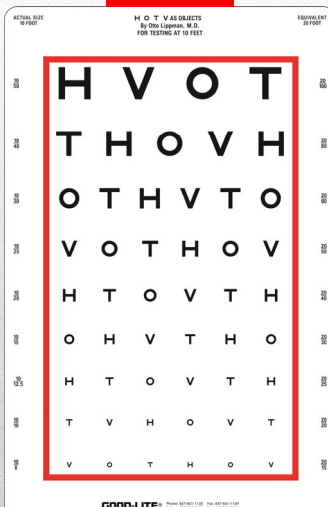


Design guidelines = "ETDRS" or "logMAR" chart

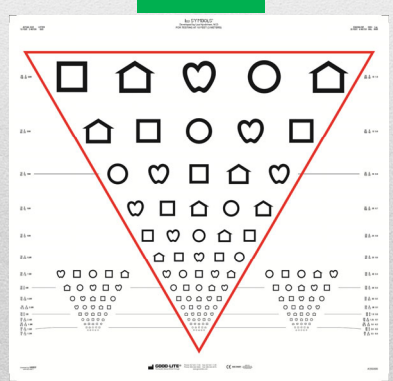
**Tips:**

- Line outside optotypes
- 20/32 vs. 20/30
- 10 feet vs. 20 feet

**NO**



**YES**



Do the following eye charts fit national/international eye chart design guidelines?

**Yes or No?**  
**✓NO**

## Preferred Optotypes for Ages 3 to 6 Years

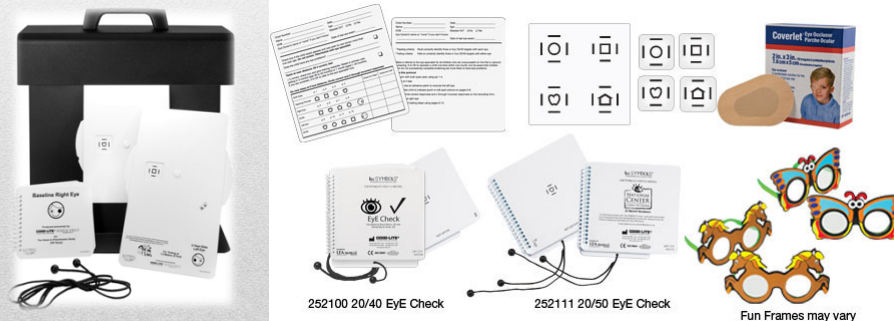
- NCCVEH
- AAP
- Recommend LEA SYMBOLS® and HOTV letters as optotypes

Cotter, S. A., Cyert, L. A., Miller, J. M., & Quinn, G. E. for the National Expert Panel to the National Center for Children's Vision and Eye Health. (2015). Vision screening for children 36 to <72 months: Recommended practices. *Optometry and Vision Science*, 92(1), 6-16. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274336/pdf/oxp-92-06.pdf>

Donahue, S. P., Baker, C. N., & AAP Committee on Practice and Ambulatory Medicine, AAP Section on Ophthalmology, American Association of Certified Orthoptists, American Association for Pediatric Ophthalmology and Strabismus, American Academy of Ophthalmology (2016). Procedures for the evaluation of the visual system by pediatricians. *Pediatrics*, 137(1), e20153597. Retrieved from <http://pediatrics.aappublications.org/content/pediatrics/early/2015/12/07/peds.2015-3597.full.pdf>

## Preferred Optotype Format

NCCVEH national guidelines call for using single, LEA SYMBOLS® or HOTV letter optotypes surrounded with crowding bars for children ages 3, 4, and 5 years at 5 feet



Cotter, S. A., Cyert, L. A., Miller, J. M., & Quinn, G. E. for the National Expert Panel to the National Center for Children's Vision and Eye Health. (2015). Vision screening for children 36 to <72 months: Recommended practices. *Optometry and Vision Science*, 92(1), 6-16. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274336/pdf/opx-92-06.pdf>



- Card with 4 optotypes – use as matching game
- Individual cards may be placed on floor in front of child – ask child to step on card matching optotype to identify



## Options: Critical Line Screening at 10 feet

Sight Line Kit



Cotter, S. A., Cyert, L. A., Miller, J. M., & Quinn, G. E. for the National Expert Panel to the National Center for Children's Vision and Eye Health. (2015). Vision screening for children 36 to <72 months: Recommended practices. *Optometry and Vision Science*, 92(1), 6-16. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274336/pdf/oxp-92-06.pdf>

Donahue, S. P., Baker, C. N., & AAP Committee on Practice and Ambulatory Medicine, AAP Section on Ophthalmology, American Association of Certified Orthoptists, American Association for Pediatric Ophthalmology and Strabismus, American Academy of Ophthalmology (2016). Procedures for the evaluation of the visual system by pediatricians. *Pediatrics*, 137(1), e20153597. Retrieved from <http://pediatrics.aappublications.org/content/pediatrics/early/2015/12/07/peds.2015-3597.full.pdf>

## Also acceptable . . .

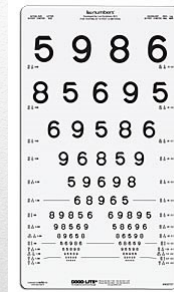


## Preferred Optotypes for Ages 7 Years & Older

- AAP
  - *Recommends Sloan Letters*

American Academy of  
Ophthalmology

- *Recommends Sloan Letters  
and numbers*



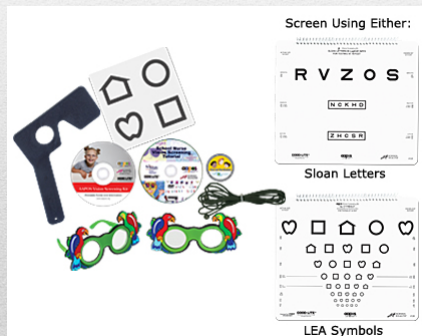
Donahue, S. P., Baker, C. N., & AAP Committee on Practice and Ambulatory Medicine, AAP Section on Ophthalmology, American Association of Certified Orthoptists, American Association for Pediatric Ophthalmology and Strabismus, American Academy of Ophthalmology (2016). Procedures for the evaluation of the visual system by pediatricians. *Pediatrics*, 137(1), e20153597. Retrieved from <http://pediatrics.aappublications.org/content/pediatrics/early/2015/12/07/peds.2015-3597.full.pdf>

American Academy of Ophthalmology. (2018). *Pediatric eye evaluations Preferred practice pattern I Vision screening in the primary care and community setting II. Comprehensive ophthalmic examination*. Retrieved from [http://www.aaojournal.org/article/S0161-6420\(17\)32958-5/pdf](http://www.aaojournal.org/article/S0161-6420(17)32958-5/pdf)

## Options - Kits From AAPOS

(American Association for Pediatric Ophthalmology and Strabismus)

- AAPOS Vision Screening Kit
- AAPOS Vision Screening Kit: Supplemental Screening Package



## Screening Distance

- 10 feet from chart to child's eyes
- *New, standardized distance charts will be at 10 feet for children and adults*
- 10/xx on left side of chart with 20/xx on right side – report 20/xx



## Occluders –3 Years to <10 Years





## **Unacceptable** Occluders Ages 3, 4, and 5 years

- Hand



- Tissue



- Paper or plastic cup



- Cover paddle



- Why unacceptable?

- Children can easily peek



Cotter, S. A., Cyert, L. A., Miller, J. M., & Quinn, G. E. for the National Expert Panel to the National Center for Children's Vision and Eye Health. (2015). Vision screening for children 36 to <72 months: Recommended practices. *Optometry and Vision Science*, 92(1), 6-16. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274336/pdf/opx-92-06.pdf>

## Occluders – Aged 10 Years and Older



Prevent Blindness. (2015). *Prevent Blindness position statement on school-aged vision screening and eye health programs*. Retrieved from <https://www.preventblindness.org/sites/default/files/national/positions/Prevent%20Blindness%20Statements%20on%20School-aged%20Vision%20Screening%20%20Approved%208-2015.pdf>

## To Point or Not to Point . . . ?

- Pointing to each optotype to help children know where they are on the chart is permissible.

☐ True or False?

✓ False

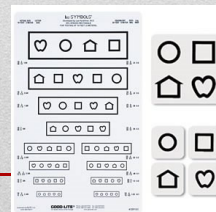
- 1.8 “Line-by-line isolation or pointing may be used, **but not letter by letter**

World Health Organization (2003). *Consultation on development of standards for characterization of vision loss and visual functioning*. Geneva: Switzerland. Retrieved from [http://apps.who.int/iris/bitstream/10665/68601/1/WHO\\_PBL\\_03.91.pdf](http://apps.who.int/iris/bitstream/10665/68601/1/WHO_PBL_03.91.pdf)



## No Pointing at Optotypes

- Holding pointer at optotype makes optotype easier to identify.
- *Instead . . . briefly point under or over top of optotype and quickly remove pointer.*
- If line has a box around optotypes, stay outside the box with pointer.



## No Need to Read Each Optotype on Every Line

World Health Organization (2003) says:

- *May be less tedious for children to read 1<sup>st</sup> optotype on left-side of chart until missing one and then moving up a line and reading entire line*

- Camparini et al. found: ETDRS-Fast (reading 1 letter per row until a mistake is made) yields accurate results compared with standard method of reading each optotype on every line.
  - *Also – significantly reduced test time*

Camparini, M., Cassinari, P., Ferrigno, L., & Macaluso, C. (2001). ETDRS-Fast: Implementing psychophysical adaptive methods to standardized visual acuity measurement with ETDRS charts. *Investigative Ophthalmology & Visual Science*, 42(6), 1226-1231.

## 2 Approaches to Vision Screening

### 1. Optotype-based screening

- Tests of visual acuity using optotypes to measure visual acuity as interpreted by the brain
  - *Quantifiable measurement of the sharpness or clearness of vision when identifying specific optotype sizes at a standardized distance*

### 2. Instrument-based screening

- Instruments do not measure visual acuity
- *Instruments use an automated image acquisition and analysis system of the eyes to provide information about amblyopia risk factors:*
  - Estimates of significant refractive error (hyperopia, myopia, astigmatism)
  - *Estimates of anisometropia*
  - Estimates of eye misalignment





## **National Guidelines** for Instrument-Based Screening

- Use beginning at age 12 months (AAP)
- Use for ages 1 and 2 years (AAP)
- Use instruments OR tests of visual acuity for children ages 3, 4, and 5 years (NCCVEH and AAP)
- Use instruments at any age for 6 years and older if child or young adult cannot do test of visual acuity (AAP)



Donahue, S. P., Baker, C. N., & AAP Committee on Practice and Ambulatory Medicine, AAP Section on Ophthalmology, American Association of Certified Orthoptists, American Association for Pediatric Ophthalmology and Strabismus, American Academy of Ophthalmology (2016). Procedures for the evaluation of the visual system by pediatricians. *Pediatrics*, 137(1), e20153597. Retrieved from <http://pediatrics.aappublications.org/content/pediatrics/early/2015/12/07/peds.2015-3597.full.pdf>

Cotter, S. A., Cyert, L. A., Miller, J. M., & Quinn, G. E. for the National Expert Panel to the National Center for Children's Vision and Eye Health. (2015). Vision screening for children 36 to <72 months: Recommended practices. *Optometry and Vision Science*, 92(1), 6-16. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274336/pdf/oxp-92-06.pdf>

## **Instrument-Based Screening**

- If use instruments, no need to also do visual acuity screening unless you want to check both VA and refractive error.
- If cannot “capture” a pass or refer result... refer child for comprehensive eye exam.



- Do not attempt to convert estimated refractive error to visual acuity value.
- Child could fail vision screening with instrument, but pass with conversion and miss opportunity for eye exam.

**Conversion Chart: Refractive State to “estimated” Visual Acuity<sup>[1][2]</sup>**

Myopia		Hyperopia			
Nearsighted		Farsighted			
Minus (-) Sphere		Plus (+) Sphere	Plus (+) Sphere	Plus (+) Sphere	
Ages: All	Estimated Visual Acuity	Ages: 5y to 15y	Ages: 25y to 35y	Ages: 45y to 55y	Estimated Visual Acuity
-0.5	20/30-40	+2.00	+1.25	+1.00	20/20
-0.75	20/50	+3.00	+1.75	+1.25	20/25
-1	20/60	+3.25	+2.50	+1.50	20/30
-1.25	20/70	+3.75	+3.00	+1.75	20/40
-1.5	20/100	+4.25	+3.50	+2.00	20/50
-2.5	20/200	+4.75	+4.00	+2.50	20/70

[1] Spherical results are based upon minus (-) cylinder convention.

Donahue, S. P., Cotter, S. A., & Moore, B. (in press). Position statement on the relationship between visual acuity and refractive error in the context of preschool vision screening using instrument-based technology.

*Not Recommended for conversion of screening results for children screened for amblyopic risk factors*

## Instruments Vetted by NCCVEH



Welch Allyn®  
Spot™ Vision Screener



Welch Allyn®  
SureSight™  
Vision Screener



Retinomax  
(Right Mfg. Co Ltd.-  
Tokyo, Japan)



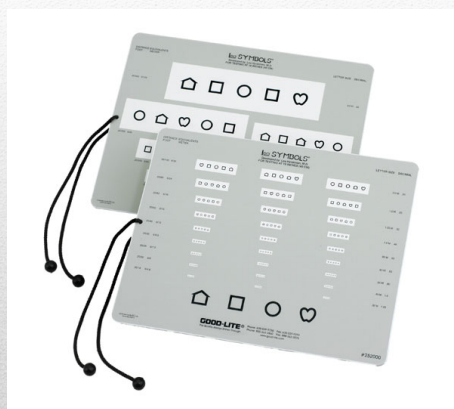
Plusoptix  
S12C Vision Screener

- Instruments typically will not capture readings on 100% of children (e.g., 97%).
- If doing instrument-based screening, still want optotype-based screening tool . . . just in case for other 3%.
- Example . . .



Visual Acuity  
Chart  
or  
Computerized  
Software

## Choices for Near Vision Screening



Can do critical line only with both eyes open.



## Stereoacuity Screening if NOT using Spot



PASS 2 Smile Test

## Choices for Color Vision Deficiency Screening



Good-Lite ColorCheck  
Complete Vision  
Screener



Waggoner Color Vision  
Testing Made Easy

## Vision Screening is . . .

- Part of a process...not a single event.
- 1 of 12 components of a strong vision health system of care.



## Evaluating Your Vision Health Program

### Annual Vision Health Program Evaluation Checklist

Evaluation Date: \_\_\_\_\_ Completed By: \_\_\_\_\_

Instructions: Review each component described below. Select the "Yes", "No", or other response that best describes your vision health program as it currently operates. Please note comments in the area indicated. Once you have responded to the questions in each of the components proceed to the "Vision Health System Action Plan" located on page 7 to identify areas for attention or improvement in your program.

1. Our program ensures 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.

Check Yes or No	Point of evaluation
<input type="checkbox"/> Yes <input type="checkbox"/> No	We have vision health information in all native languages of the families that we serve.
<input type="checkbox"/> Yes <input type="checkbox"/> No	We discuss the importance of healthy vision as a part of proper child development in the general health information provided by our program.
<input type="checkbox"/> Yes <input type="checkbox"/> No	We provide parents with easy-to-understand* information on the visual milestones for children at all stages of life. <small>*Information is written at an appropriate reading level, provides graphics as well as descriptions, and has been tested for ease of understanding.</small>
<input type="checkbox"/> Yes <input type="checkbox"/> No	Our parent/and or health advisory committee(s) have reviewed our vision health information for, content, clarity of instruction, cultural literacy, and reading level (4 <sup>th</sup> to 6 <sup>th</sup> grade level.)
<input type="checkbox"/> Yes <input type="checkbox"/> No	We provide health information to parents of children with special healthcare needs that describe their increased risk for vision problems.
<input type="checkbox"/> Yes <input type="checkbox"/> No	We have active Parent and Health Advisory Committees

### 12-Components of a Strong Vision Health System of Care



#### Our Children's Vision Health System Action Plan

Directions: Review your responses from the program evaluation form and the notes written for each item. In all areas where "no" was the response selected, or your notes indicate a need for improvement, establish the next steps your program will take to improve efforts in that area. Once all responses have been accounted for, establish your top three priorities out of your needed actions, a date to review progress, and a completion date.

Needed actions:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

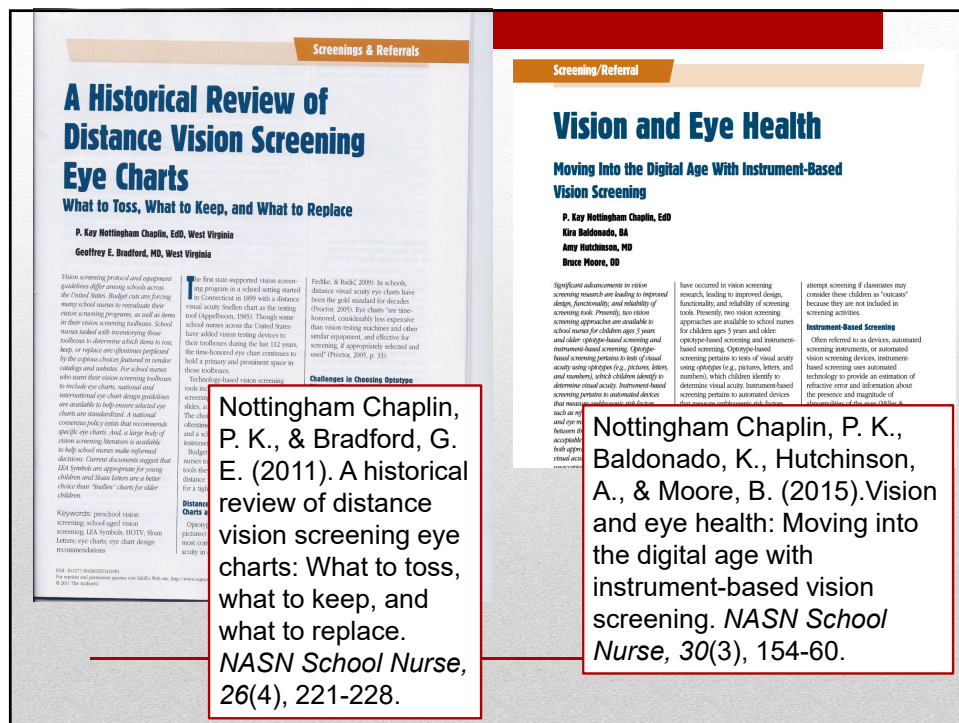
Priority #1:

Priority #2:

Priority #3:

Visit <http://nationalcenter.preventblindness.org/year-childrens-vision> for information and resources that will help you improve your vision health program.

<https://www.nasn.org/nasn-resources/practice-topics/vision-health>





Check for updates

Screening/Referral

## An Eye on Vision

### 20 Questions About Vision Screening and Eye Health

P. Kay Nottingham Chaplin, EdD  
Kira Baldonado, BA  
Geoffrey E. Bradford, MS, MD  
Susan Cotter, OD, MS, FAOD  
Bruce Moore, OD

*Current evidence-based and best practice vision screening and eye health approaches, tools, and procedures are the result of revised national guidelines in the past 3 years and advances in research during the last 15 years. To help the busy school nurse with little time to keep up with changes in children's vision practices and a growing body of literature, the National Center for Children's Vision and Eye Health used published, peer-reviewed research, vision screening and eye health national guidelines, and consensus-based best practices from eye care professionals and public health experts. The answers may differ from your state or district vision screening recommendations and mandates.*

**Nottingham Chaplin, P. K., Baldonado, K., Bradford, G. E., Cotter, S., & Moore, B. (2018). An eye on vision: 20 questions about vision screening and eye health. NASN School Nurse, 33(2), 87-92.**

Screening/Referral

## An Eye on Vision

### Five Questions About Vision Screening and Eye Health

P. Kay Nottingham Chaplin, EdD  
Kira Baldonado, BA  
Geoffrey E. Bradford, MS, MD  
Susan Cotter, OD, MS, FAOD  
Bruce Moore, OD

*Current evidence-based and best practice vision screening and eye health approaches, tools, and procedures are the result of revised national guidelines in the past 3 years and advances in research during the last 15 years. To help the busy school nurse with little time to keep up with changes in children's vision practices and a growing body of literature, the National Center for Children's Vision and Eye Health used published, peer-reviewed research, vision screening and eye health national guidelines, and consensus-based best practices from eye care professionals and public health experts. The answers may differ from your state or district vision screening recommendations and mandates.*

**Nottingham Chaplin, P. K., Baldonado, K., Bradford, G. E., Cotter, S., & Moore, B. (2018). An eye on vision: Five questions about vision screening and eye health. NASN School Nurse, 33(3), 146-149.**

Screening/Referral

## An Eye on Vision

### Five Questions About Vision Screening and Eye Health—Part 2

P. Kay Nottingham Chaplin, EdD  
Kira Baldonado, BA  
Susan Cotter, OD, MS, FAOD  
Bruce Moore, OD  
Geoffrey E. Bradford, MS, MD

*Current evidence-based and best practice vision screening and eye health approaches, tools, and procedures are the result of revised national guidelines in the last 3 years and advances in research during the last 18 years. To help the busy school nurse with little time to keep up with changes in children's vision practices and a growing body of literature, the National Center for Children's Vision and Eye Health used published, peer-reviewed research, vision screening and eye health national guidelines, and consensus-based best practices from eye care professionals and public health experts. The answers may differ from your state or district vision screening recommendations and mandates.*

**Nottingham Chaplin, P. K., Baldonado, K., Cotter, S., Moore, B., & Bradford, G. E. (2018). An eye on vision: Five questions about vision screening and eye health-Part 2. NASN School Nurse, 33(4), 210-213.**

Screening/Referral

## An Eye on Vision

### Five Questions About Vision Screening and Eye Health—Part 3

P. Kay Nottingham Chaplin, EdD  
Kira Baldonado, BA  
Susan Cotter, OD, MS, FAOD  
Bruce Moore, OD  
Geoffrey E. Bradford, MS, MD

*Current evidence-based and best practice vision screening and eye health approaches, tools, and procedures are the result of revised national guidelines in the last 3 years and advances in research during the last 18 years. To help the busy school nurse with little time to keep up with changes in children's vision practices and a growing body of literature, the National Center for Children's Vision and Eye Health used published, peer-reviewed research, vision screening and eye health national guidelines, and consensus-based best practices from eye care professionals and public health experts. The answers may differ from your state or district vision screening recommendations and mandates.*

**Nottingham Chaplin, P. K., Baldonado, K., Cotter, S., Moore, B., & Bradford, G. E. (2018). An eye on vision: Five questions about vision screening and eye health-Part 3. NASN School Nurse, 33(5), 279-283.**

Screening/Referral

## An Eye on Vision

### Seven Questions About Vision Screening and Eye Health—Part 4

**P. Kay Nottingham Chaplin, EdD**  
**Kira Baldonado, BA**  
**Susan Cotter, OD, MS, FAAO**  
**Bruce Moore, OD**  
**Geoffrey E. Bradford, MS, MD**

*Current evidence-based and best-practice vision screening and eye health approaches, tools, and procedures are the result of revised national guidelines in the past 3 years and advances in research during the past 18 years. To*

*Current evidence-based and best-practice vision screening and eye health approaches, tools, and procedures are the result of revised national guidelines in the past 3 years and advances in research during the past*

**Nottingham Chaplin, P. K., Baldonado, K., Cotter, S., Moore, B., & Bradford, G. E. (2018).** An eye on vision: Seven questions about vision screening and eye health-Part 4. *NASN School Nurse*, 33(6), 351-354.

Screening/Referral

## 12 Components of a Strong Vision Health System of Care

### Components 1 and 2—Family Education and Comprehensive Communication/Approval Process

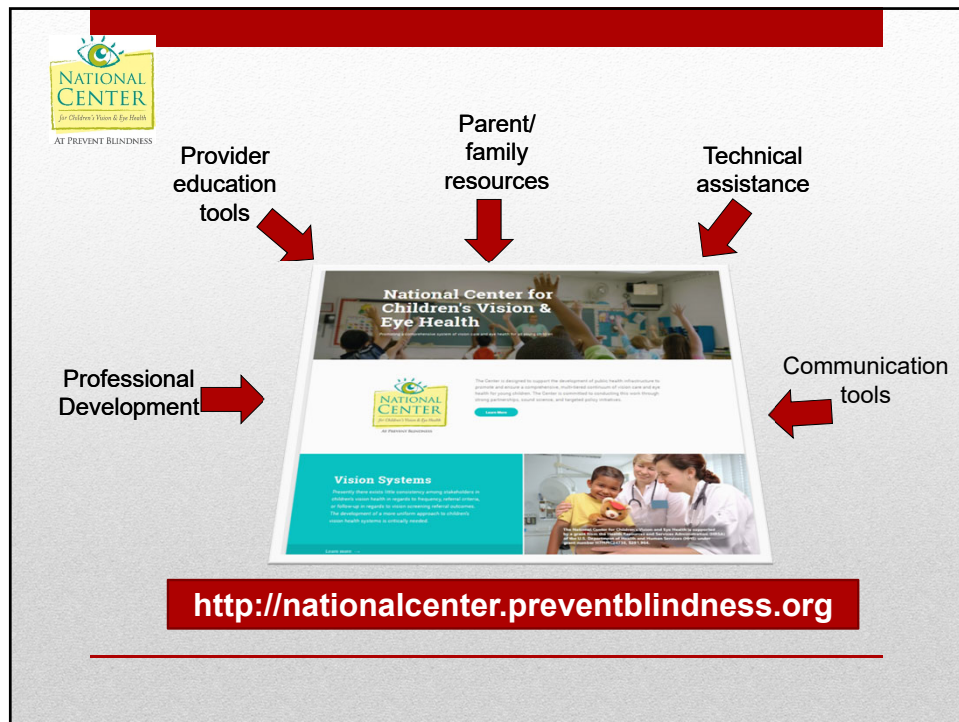
**P. Kay Nottingham Chaplin, EdD**  
**Kira Baldonado, BA**  
**Martha Dewey Bergren, DNS, RN, NCSN, PHNA-BC, FNASN, FASHA, FAAN**  
**Stacy Ayn Lyons, OD, FAAO**  
**M. Kathleen Murphy, DNP, RN, NEA-BC, FAAN**  
**Geoffrey E. Bradford, MS, MD**

*The National Center for Children's Vision and Eye Health (NCCVEH) at Prevent Blindness partnered with the National Association of School Nurses*

*from a systems perspective. This systems perspective addresses key activities along the entire spectrum of care that supports a child's vision health—beginning*

*Components of a System of Care. To provide guidance accountable for s*

Nottingham Chaplin, P. K., Baldonado, K., Dewey Bergren, M., Lyons, S. S., Murphy, M. K., & Bradford, G. E. (2019). 12 components of a strong vision health system of care: Components 1 and 2 – Family education and comprehensive communication/approval process. Published ahead of print. *NASN School Nurse*.



## Resources to Support Families . . .

**Financial Assistance Information**

**Association of Schools and Colleges of Optometry**  
1110 Executive Boulevard, Suite 100  
Rockville, Maryland 20852  
Phone: (301) 221-5444  
Fax: (301) 775-1629  
www.asco-opt.org

Many optometry schools offer financial aid to students willing to be treated by underserved students. They also provide their care to people who lack research studies.

**Chronic Disease Fund**  
600 N. Duane Parkway, Suite 200  
Pawnee, TX 78024  
Tel: (979) 688-7141  
Fax: (979) 688-7141  
www.cdfund.org

Chronic Disease Fund® is an independent 501(c)(3) non-profit charitable organization helping patients with chronic diseases care or the ability to obtain the appropriate medical care they need.

**Prevent Blindness®**  
Our Vision & Your®

211 West Wacker Drive  
Suite 1700  
Chicago, Illinois 60606  
800.331.2000  
PreventBlindness.org

**Financial Assistance Programs**

**Eye Glasses**

**Care**

**Tips**

**Tips for Wearing Eye Glasses**  
<https://www.preventblindness.org/your-childs-glasses>

**Parent Education**

**你知道嗎？**  
兒童視力檢查非常重要。如果視力檢查不及時，可能會導致失明。如果視力檢查不及時，可能會導致失明。如果視力檢查不及時，可能會導致失明。

**眼科疾病的症狀**  
許多兒童的眼部疾病可能不會被發現。如果沒有被發現，可能會導致失明。如果視力檢查不及時，可能會導致失明。如果視力檢查不及時，可能會導致失明。

<http://nationalcenter.preventblindness.org/resources-2>



## Year of Children's Vision

- <http://nationalcenter.preventblindness.org/year-childrens-vision>
- *Archived vision screening webinars in Resources*



### THINK OF VISION Guide for Preschool Teachers

A young child does not know how they should see and cannot tell us about their vision. One or two children in every preschool classroom will have a vision disorder that, left unidentified and untreated, could interfere with their development and acquisition of early literacy skills. As a preschool teacher, you can support the vision of the children you teach.

If you repeatedly observe a preschooler exhibiting one or several of these signs, **THINK OF VISION**. Ask the parent, school nurse, or health manager for the child to receive a vision screening or comprehensive eye exam from an eye doctor:

#### APPEARANCE:

- » Eyes are crusty, red, watery, inflamed or don't line up
- » Eye turn, wandering eye, droopy eyelid

#### BEHAVIORS:

- » Squints, frowns, rubs eyes or blinks frequently
- » Body rigid, or thrusts head forward or backward when looking at distant objects
- » Avoidance of eye contact
- » Extreme shyness, poor social interaction
- » Easily distracted/unable to focus or maintain attention
- » Avoids playing outside or joining in games
- » Difficulty coordinating hand/eye movements (e.g., picking up objects)
- » Clumsy, bumps into things

#### WHEN READING, WRITING OR DOING

##### CLOSE-UP WORK:

- » Poor letter or word recognition
- » Difficulty completing a letter or symbol
- » Rereads, skips lines, or loses place often
- » Closes one eye when doing near work
- » Tilts or turns head, or lays head on desk
- » Falls asleep while reading
- » Loses interest quickly
- » Seems cranky when doing near tasks
- » Holds books or objects close to face

#### ENROLLMENT IN PROGRAMS:

A comprehensive eye exam from an eye doctor should be part of the evaluation process if a child:

- » Is enrolled in Early Intervention
- » Is enrolled in a Special Education program
- » Will receive an I.E.P. in school
- » Has developmental delays

Most childhood vision disorders are treated by wearing prescription eyeglasses. To allow a preschooler the opportunity to enjoy play and learning, gain skills, and reach their fullest potential, the child needs to follow the eye doctor's treatment plan.

Teachers can help by understanding how the child's prescribed treatment should be applied in the classroom, and reinforcing and encouraging children and parents with adherence.



Visit [childrensvisionmassachusetts.org](http://childrensvisionmassachusetts.org) for more information.

<https://childrensvision.preventblindness.org/sites/default/files/THINK%20OF%20VISION%2011-8-18.pdf>

## Prevent Blindness Position Statement on School-Aged Vision Screening and Eye Health Programs



### PREVENT BLINDNESS POSITION STATEMENT ON SCHOOL-AGED VISION SCREENING AND EYE HEALTH PROGRAMS

REVIEWED AND APPROVED AUGUST 5, 2015

Prevent Blindness recommends a continuum of eye care for children to include both vision screening and comprehensive eye examinations. All children, even those with no signs of trouble, should have their eyes checked at regular intervals. Any child who experiences vision problems or shows symptoms of eye trouble should receive a comprehensive eye examination by an optometrist or an ophthalmologist.

Prevent Blindness, other organizations, and school health personnel often perform vision screenings for children at schools and other settings. While vision screenings and eye examinations are complementary approaches to assessing the eye problems of a child, a screening is used to identify a child at risk for vision problems and does not replace a comprehensive examination performed by an eye doctor. Additionally, vision screenings provide a critical bridge from detection to eye care for families that may not regularly access health or eye care services, may need financial assistance to afford care, or those that may not fully understand the impact an undiagnosed and untreated vision problem might have on the rest of their child's life. Prevent Blindness advocates for good vision for all throughout the life spectrum, and that all children are visually ready as they begin school and beyond.

This document is a position statement, not formal recommendations or protocols, and is meant to guide those charged with developing, implementing and evaluating vision screening programs for school-aged students. The guidance provided in this

Prevent Blindness Position Statement on School-Aged Vision Screening and Eye Health Programs – Reviewed and Approved August 5, 2015. Retrieved from <http://www.preventblindness.org/sites/default/files/national/positions/Prevent%20Blindness%20Statements%20on%20School-aged%20Vision%20Screening%20%20Approved%208-2015.pdf>

### CHILDREN'S VISION AND EYE HEALTH: A Snapshot of Current National Issues



February 2015 – Funder Statement: This project is/was supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant number H71MM24738 – Vision Screening for Young Children Grant (total award amount \$300,000; percentage financed with nongovernmental sources: 5%). This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.



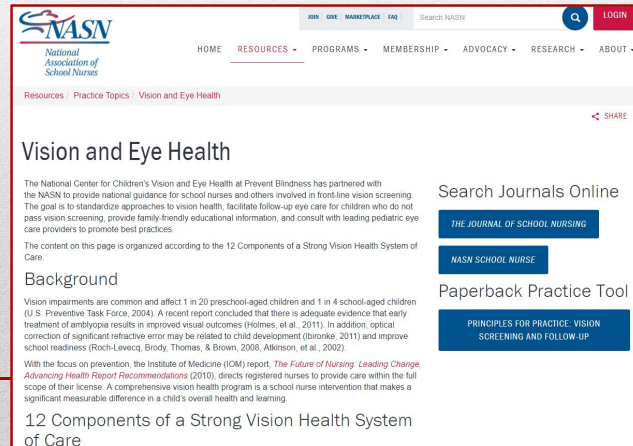
Helpful info and statistics for grant proposal writing . . .

[http://www.preventblindness.org/sites/default/files/national/documents/Children's\\_Vision\\_Chartbook.pdf](http://www.preventblindness.org/sites/default/files/national/documents/Children's_Vision_Chartbook.pdf)

## NASN Vision and Eye Health Resource

(National Center for Children's Vision and Eye Health and NASN partnership)

<https://www.nasn.org/nasn-resources/practice-topics/vision-health>

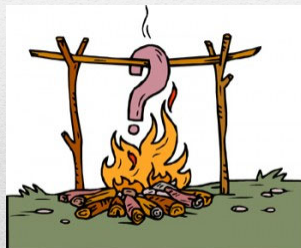
A banner for the "Prevent Blindness Children's Vision Screening Certification Course". The banner features a photograph of a young girl wearing green safety glasses. To the right of the photo, the text reads "Prevent Blindness Children's Vision Screening Certification Course" in large, bold letters. Below this, it says "Prevent Blindness has the only national certification program for children's vision screening." At the bottom of the banner, there is a line of text: "The Prevent Blindness Children's Vision Screening Certification course provides participants with a certification in the most current evidence-based vision screening and eye health best practices for school-aged and preschool-aged children." Below the banner, there is a section titled "Info for Prevent Blindness nationally recognized vision screening certification you can do online at your own pace" followed by the URL <http://nationalcenter.preventblindness.org/prevent-blindness-childrens-vision-screening-certification-course>. At the bottom of the page, there are two contact options: "800-331-2020" and "Nottingham@preventblindness.org".



## Call to Action

- ✓ Conduct evidence-based screening.
- ✓ Evaluate your vision and eye health program annually.
- ✓ Help ensure follow-up to eye care when children do not pass vision screening.
- ✓ Help ensure children follow their treatment plans at school.

## ***Burning*** Questions?



Thank you for your TIME and ATTENTION. . .

P. Kay Nottingham Chaplin, Ed.D.

kay@good-lite.com Nottingham@preventblindness.org

304-906-2204