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Not to be used as a stand-alone training or certification tool.

Relationship Between Classroom Challenges and Vision Disorders

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.

Info You Will Take Home ... 4 Learning Objectives

Describe 1 academic challenge of undetected and untreated vision disorders in the classroom.

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



List 2 classroom behaviors that may be related to vision.

Describe the difference between optotype- and instrument-based screening.

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

Vision disorders requiring treatment impact 1% to 6% of preschool-aged children and about 20% of school-aged children in the United States.^a

- Eye and vision disorders in children are a time-sensitive concern.
- If left undiagnosed and untreated, eye diseases and vision disorders in children can lead to permanent and irreversible vision loss and/or cause problems socially, academically, and developmentally.
- Nearly 94% of the vision problems leading to the impairment in preschool-aged children can be identified early during a vision screening resulting in earlier access to an eye care provider and improvement in vision.^b
- Only 41% of children ages 5 years and younger are screened for vision problems.^c

a. 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/

b. 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.

c. 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.

7 Classroom Behaviors that May be Related to Vision Disorders

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.

- 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

<u>Talking in class</u> – 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.

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!"

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

Student with Frequent Headaches?



MinnPost photo by Erin Hinrichs

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 ≥4.0 D) scored significantly worse on a test of early literacy than children with normal vision.
 - ≤ 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, **9**, 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.

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 2nd and 3rd 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

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 11th grade reading outcomes, including:
 - Reading comprehension,
 - Vocabulary, and
 - General knowledge.

Children who lag in 1st grade but catch up by 3rd or 5th 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 Oyler 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



Four Steps to Simple Solution









Cast of Characters

NCCVEH:

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

AAP:

- 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

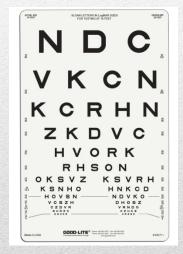
1. Optotype-based screening

- 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

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)







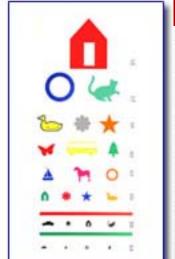
"Not so great" charts . . .

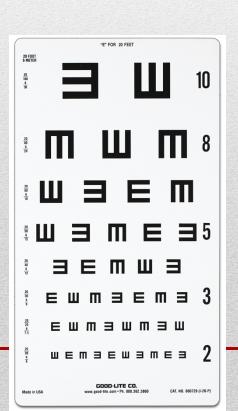


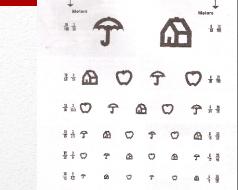












SYMBOLS FOR 10 FEET



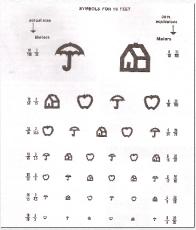
NOT Recommended by NCCVEH and/or AAP



"Sailboat"



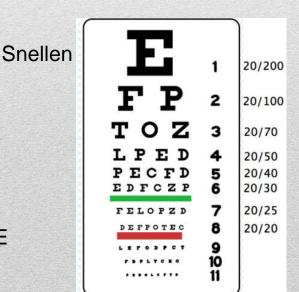
Allen Pictures



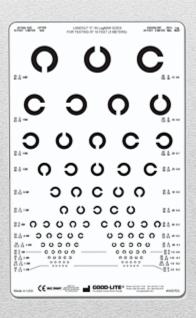
Lighthouse or "House, Apple, Umbrella"



Tumbling E



Landolt C



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/opx-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
- 2003 World Health Organization Prevention of Blindness & Deafness (wно)
 - 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

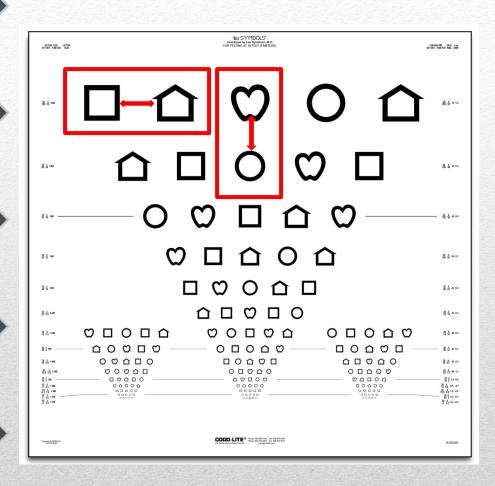
Vertical between-line spacing = height of next line down

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/m² and 160 cd/m²

Similar recommendations across guidelines

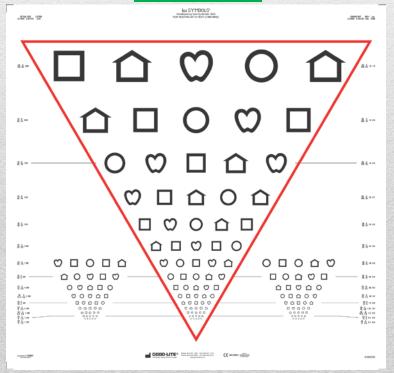


Design guidelines = "ETDRS" or "logMAR" chart

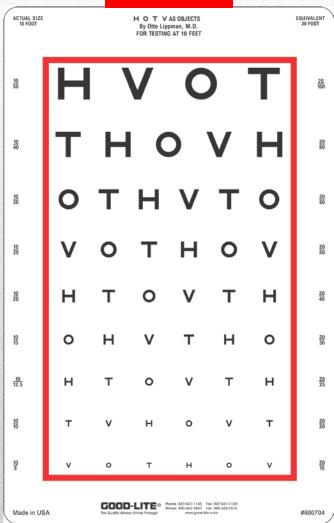
Tips:

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



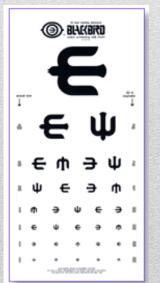


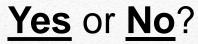




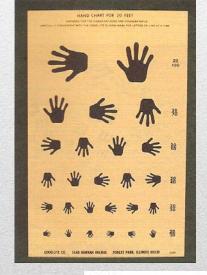
Do the following eye charts fit national/international eye chart design guidelines?



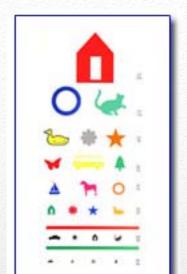




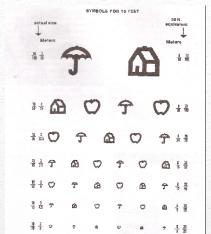


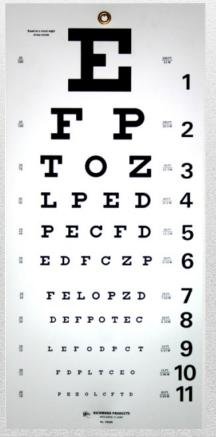








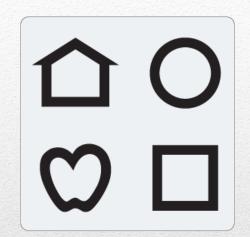




Preferred Optotypes for Ages 3 to 6 Years

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/opx-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

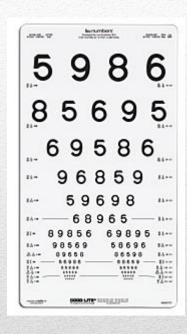
Preferred Optotypes for Ages 7 Years & Older

- 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

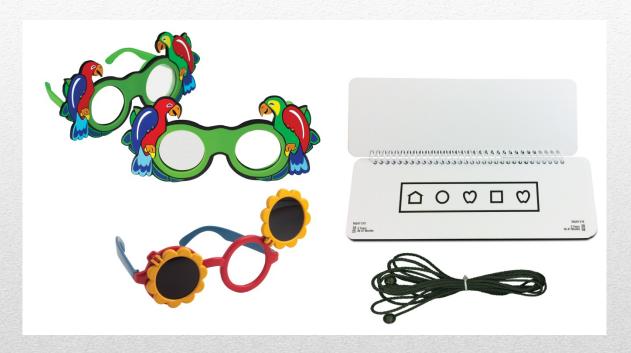
http://pediatrics.aappublications.org/content/pediatrics/early/2015/12/07/peds.2015-3597.full.pdf

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

Examples of Distance Visual Acuity Tools for Optotype-Based Screening in CA

Examples of evidence-based, developmentally appropriate optotypes						
Preschool	TK/K/Grade 1		Grades 2 - 12			
EyE Check Screener	LEA SYMBOLS®	HOTV	LEA	Sloan		
with LEA SYMBOLS®			NUMBERS®	Letters		
Eye Check Brown day Company Company		VOH THOV HOVTH OTOHV TVTHO	8 6 9 5 8 6 11-1 6 8 9 6 5 11-1 6 8 9 6 11-1 6 8 9 6 11-1 6 8 9 6 11-1 6 8 9 6 11-1 6 8 9 6 11-1 6 9 6 1	NDC VKCN KCRHN ZKDVC HVORK RHSON OKSVZ KSVRH		
Matching cards can be used as needed						

Would also suggest until children can identify letters out of sequence . . .





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





Unacceptable

Occluders Ages 3, 4, and 5 years



- Tissue
- Paper or plastic cup

Cover paddle



- Why unacceptable?
- Children can easily peek

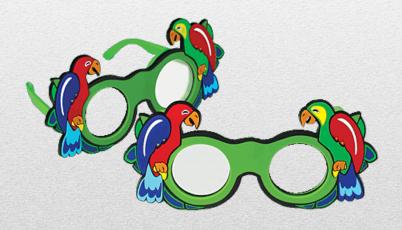


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Examples of Occluders Recommended for CA

Examples of acceptable occluder options						
Preschool - Grade 1			Grades 2-12			
Adhesive Eye Patch	2-in Hypoallergenic	Occluder	Paddle	Mask		
	Surgical Tape	Glasses	Occluder	Occluder		
Coverlet \$m October 2 in 13 in menomenance 3 in menomenance 4 in menomenance 5 in menomenance 6 i						

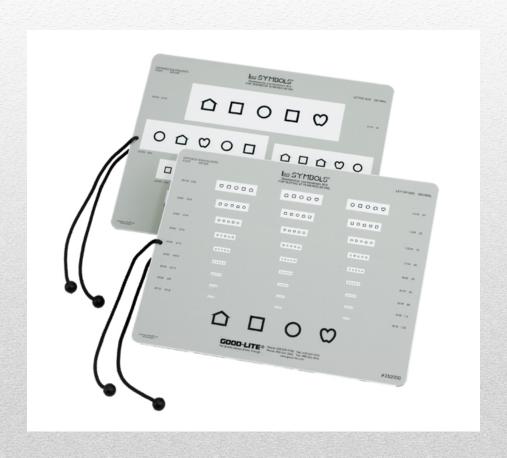
Would also suggest . . .



Examples of Near Visual Acuity Tools for Optotype-Based Screening in CA

Examples of grade level appropriate charts						
TK/K - 0	Grades 2 - 12					
LEA SYMBOLS®	HOTV	Sloan Letters				
LEA NUMBERS®						
5 9 8 9 6 8 5 6 8 9 6 9 5 6 8	OVHOT THVTO VONTAN HT VONTAN HT HOTV	ZRKDC DNCHV COHZV SZNDC VKORNN XXORNN				

Would also suggest . . .



Stereoacuity Screening if NOT using Spot



PASS 2 Smile Test

Examples of Tools for Color Vision Deficiency Screening in CA

Examples of color vision deficiency screening books					
Color Check	Ishihara Color		HRR		
Complete Vision	Deficiency	Color Dx Pediatric	Pseudoisochromatic		
Screener	Plates		Plates		
COLORA/ TENSA TENS	marked with marked and and and and and and and and and an	ColorDx ColorD			

Different Waggoner test available . . .





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

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





Instrument-Based Screening

- Use beginning at 12 months (AAP)
- Use instruments OR tests of visual acuity for children ages 3, 4, and 5 years (NCCVEH and AAP)
- 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

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Instrument-Based Screening

Best practices for instrument-based screening should be evidence-based, also referred to as scientifically validated, and will evolve as technology changes. Screening devices require instrument- and age-specific pass/fail refractive error criteria. For a listing of recommended instrument-based screening protocols by the National Center for Children's Vision and Eye Health, visit the California School Nurses Organization Website www.csno.org. In addition, up-to-date scientific evidence on instrument-based screening may also be found at www.csno.org.

Instruments Vetted by NCCVEH



Welch Allyn[®] Spot[™] Vision Screener



Welch Allyn[®]
SureSight[™]
Vision Screener



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



- 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[1][2]

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.

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

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

- 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.

Evaluation Date: _____ Completed By: ____

program.

- 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
Yes No	We have vision health information in <u>all</u> native languages of the families that we serve.
Yes No	We discuss the importance of healthy vision as a part of proper child development in the general health information provided by our program.
Yes No	We provide parents with easy-to-understand* information on the visual milestones for children at all stages of life. *Information is written at an appropriate reading level, provides graphics as well as descriptions, and has been tested for ease of understanding.
Yes 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 th to 6 th grade level.)
Yes No	We provide health information to parents of children with special healthcare needs that describe their increased risk for vision problems.
Yes 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:			
111011ty #21			
D: :: #0			
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.



Resources . . .

Fedtke, & Radić, 2009). In schools.

distance visual acuity eye charts have

been the gold standard for decades

(Proctor, 2005). Eye charts "are time-

honored, considerably less expensive

than vision testing machines and other

screening, if appropriately selected and

similar equipment, and effective for

Challenges in Choosing Optotype

used" (Proctor, 2005, p. 33).

Nottingham Chaplin,

P. K., & Bradford, G.

E. (2011). A historical

A Historical Review of Distance Vision Screening Eye Charts

What to Toss. What to Keep, and What to Replace

P. Kay Nottingham Chaplin, EdD, West Virginia

Geoffrey E. Bradford, MD. West Virginia

Vision screening protocol and equipment guidelines differ among schools across the United States. Budget cuts are forcing many school nurses to reevaluate their vision screening programs, as well as items in their vision screening toolboxes. School nurses tasked with inventorying those toolboxes to determine which items to toss, keep, or replace are oftentimes perplexed by the copious choices featured in vendor catalogs and websites. For school nurses who want their vision screening toolboxes to include eye charts, national and international eye chart design guidelines are available to belp ensure selected eve charts are standardized. A national consensus policy exists that recommends specific eye charts. And, a large body of vision screening literature is available to belp school nurses make informed decisions. Current documents suggest that LEA Symbols are appropriate for young children and Sloan Letters are a better choice than "Snellen" charts for older children.

Keywords: preschool vision screening; school-aged vision screening; LEA Symbols; HOTV; Sloan Letters; eve charts; eve chart design recommendations

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he first state-supported vision screening program in a school setting started in Connecticut in 1899 with a distance visual acuity Snellen chart as the testing tool (Appelboom, 1985). Though some school nurses across the United States have added vision testing devices to their toolboxes during the last 112 years, the time-honored eye chart continues to hold a primary and prominent space in those toolboxes.

Technology-based vision screening

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pictures acuity in

review of distance Distance Charts a Optoty vision screening eye charts: What to toss, what to keep, and

26(4), 221-228.

what to replace. NASN School Nurse, Screening/Referral

Vision and Eye Health

Moving Into the Digital Age With Instrument-Based Vision Screening

P. Kay Nottingham Chaplin, EdD Kira Baldonado. BA Amy Hutchinson, MD Bruce Moore, OD

Significant advancements in vision screening research are leading to improved design, functionality, and reliability of screening tools. Presently, two vision screening approaches are available to school nurses for children ages 3 years and older: optotype-based screening and instrument-based screening. Optotypebased screening pertains to tests of visual acuity using optotypes (e.g., pictures, letters, and numbers), which children identify to determine visual acuity. Instrument-based screening pertains to automated devices

have occurred in vision screening research, leading to improved design, functionality, and reliability of screening tools. Presently, two vision screening approaches are available to school nurses for children ages 3 years and older: optotype-based screening and instrumentbased screening. Optotype-based screening pertains to tests of visual acuity using optotypes (e.g., pictures, letters, and numbers), which children identify to determine visual acuity. Instrument-based screening pertains to automated devices

attempt screening if classmates may consider these children as "outcasts" because they are not included in screening activities.

Instrument-Based Screening

Often referred to as devices, automated screening instruments, or automated vision screening devices, instrumentbased screening uses automated technology to provide an estimation of refractive error and information about the presence and magnitude of

such as ref and eye n between to acceptable visual acus

Nottingham Chaplin, P. K., Baldonado, K., Hutchinson, A., & Moore, B. (2015). Vision and eye health: Moving into the digital age with instrument-based vision screening. NASN School Nurse, 30(3), 154-60.



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, FAAO Bruce Moore, OD

Current evidence-based and best practice vision screening and eye bealth approaches, tools, and procedures are the result of revised national guidelines in the past 3 years and advances in research during the last 16 years. To belp the busy school nurse with little time to keep up with changes in children's vision practices and a growing body filterance has been been seen as well as filterance with the processing to be filterance to the seen as a second process filterance with the second process filterance with the second process filterance who we will be for the second process filterance who we will be for the second process filterance who we will be for the second process filterance who we will be for the second process filterance filterance for the second process filterance filterance filterance for the second filterance for the second filterance answers to 20 questions, 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. indicating where the student should stand, the student stands with the arches of each foot on the line so that the end of the screening distance from the chart is in alignment with the student's eyes.

Occluders

3. How should each eye be occluded

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, FAAO Bruce Moore, OD

Current evidence-based and best-practice vision screening and eye bealth 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. In providing answers to the five questions in this article, the National Center for Children's Vision and Eye Health

screenings at different ages in different states. What are the recommended ages for schoolbased vision screening?

ANSWER: While vision screening guidelines exist for many (but not all) states, they can vary widely.

critical for identifying vision disorders where treatment windows are short (e.g., amblyopia), as well as identifying vision disorders that may emerge in late childhood and adolescence (e.g., myopia). Early and ongoing vision screening can also help to detect untreated vision

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, FAAO Bruce Moore, OD Geoffrey E. Bradford, MS, MD

Current evidence-based and best practice vision screening and eye bealth approaches, tools, and procedures are the result of revised national guidelines in the last 3 years and advances in research during the past 18 years. To belp the busy school nurse, with little time to keep up with changes in children's vision practices and a growing body of literature, the

advances in research during the last 18 years. In providing answers to the five questions in this article, the National Center for Children's Vision and Eye Health at Prevent Blindness used published peer-reviewed research, vision screening and eye health national guidelines, and consensus-based best practices from eye care professionals and

ANSWER: We use the term "Snellen fraction" in our answer to represent Herman Snellen's creation of the fraction of 20/XX in 1862 (Ewing, 1920). Snellen fraction is the 20/XX visual acuity measurement used on eye charts. The use of "Snellen" in Snellen fraction should not be confused with Snellen charts. The preferred optotype-

screening

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.

An Eye on Vision

Five Questions About Vision Screening and Eye Health—Part 3

P. Kay Nottingham Chapilin, 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 bealth approaches, tools, and procedures are the result of revised national guidelines in the past 3 years and advances in research during the bast 18 years. To helb 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 at Prevent Blindness is providing answers to five questions that are often received from the field. Topical areas are: (1) instrument-based screening for children ages 6 years and older, (2) stereoacuity screening and Random Dot E. (3) binocular distance visual acuity screening

the result of revised national guidelines in the past 3 years and advances in research during the past 18 years. In providing answers to the five questions in this article. the National Center for Children's Vision and Eve Health at Prevent Blindness 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 guidelines and mandates. This is the fourth installment of the "An Eye on Vision Frequently Asked Questions" section. To review earlier installments, see the March, May, and

(Nottingham Chaplin, Baldonado, Bradford, Cotter, & Moore, 2018) that instrument-based vision screening should not be used with children older than age 6 vears unless those children could not participate in optotype-based screening. We have community volunteers who conduct our vision screening and want to use instrument-based screening with students of all ages. I appreciate the assistance from community volunteers, but what do I say to these volunteers when they want to use an instrument with children ages 6 years and older?

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 bestpractice 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 urrent evidence-based and bestpractice 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.

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 distractible/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 for more information.

To share with your preschool teachers:

https://childrensvision .preventblindness.org /sites/default/files/THI NK%20OF%20VISIO N%2011-8-18.pdf

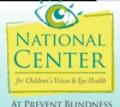




CHILDREN'S VISION AND EYE HEALTH: A Snapshot of Current National Issues



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Prevent Blindness°

Our Vision Is Vision®

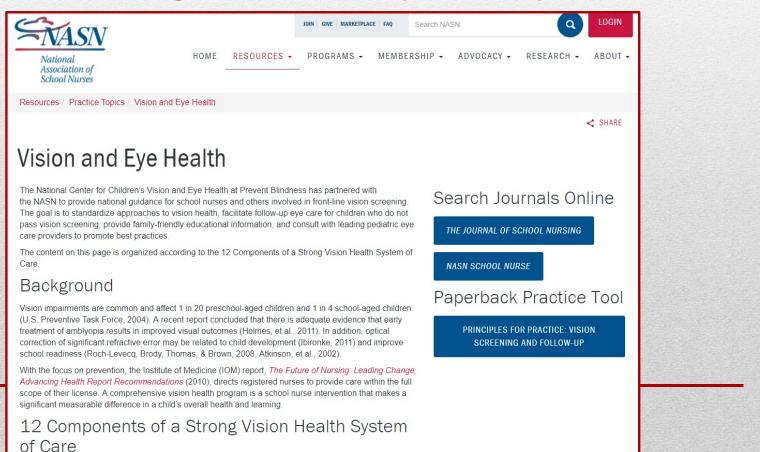
Helpful info and statistics for grant proposal writing . . .

http://www.preventb lindness.org/sites/d efault/files/national/ documents/Childre n%27s_Vision_Cha rtbook.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



Call to Action

- ☐ Share information about academic challenges and classroom behaviors with teachers.
- □ Evaluate your vision and eye health program.
- □ Help ensure follow-up to eye care when children do not pass vision screening.



Thank you for your TIME and ATTENTION. . .

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