Implementing an Instrument-Based Vision Screening Program? What You Need to Know

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Introduction and Disclaimer

- 16 years in vision screening field

- Former Director/Lead Trainer – Vision Initiative for Children – West Virginia University Eye Institute

- Member –Advisory Committee to the National Center for Children's Vision and Eye Health at Prevent Blindness

- Current Education and Outreach Coordinator for the National Center for Children's Vision and Eye Health at Prevent Blindness

- Current Director – Vision and Eye Health Initiatives at Good-Lite and School Health Corporation

- Not in sales . . . The opinions expressed in this presentation are solely those of the presenter based on research and professional experience.

Introduction and Disclaimer

- 40+ years as a pediatric optometrist, Marcus Professor of Pediatric Studies at the New England College of Optometry

- Devoted to studying visual problems and treatment options for young children

- Published more than 200 papers, posters, chapters, and 2 textbooks related to pediatric optometry

- Member of National Expert Panel to the National Center for Children's Vision and Eye Health at Prevent Blindness

- A principal investigator in a National Eye Institute-funded multicenter study – the Vision in Preschoolers (VIP) Study

Introduction and Disclaimer

- Professor, Illinois College of Optometry where she has been an active clinician, lecturer, and researcher for 35 years.

- International lecturer advocating for access to eye care for children and individuals with intellectual and developmental disabilities.

- Global Clinical Advisor, Special Olympics Lions Clubs International Opening Eyes Vision Program.

- Past co-chair, National Center for Children's Vision and Eye Health at Prevent Blindness, current member.

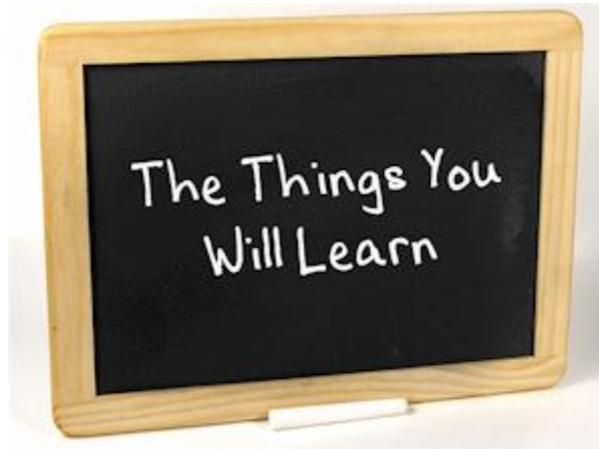- Board member, Prevent Blindness and the Illinois College of Optometry.

Info You Will Take Home ...
4 Learning Objectives

Describe what instruments measure when screening vision.

Describe why refractive error measurements should not be converted to visual acuity numbers.

The Things You Will Learn

Describe 2 evidence-based instruments.

Describe the age at which instrument-based vision screening can begin.

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6 Topics

1. How instrument-based screening differs from optotype-based screening (i.e., eye charts)

2. Ages when instruments can be used for vision screening

3. Answers to commonly asked questions from the field (i.e., for preschoolers, should I do both instruments and eye charts?)

4. Children who should bypass vision screening and receive referral from medical home for eye exam

5. Resources

6. Answers to your **BURNING** questions

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Glossary

- Instrument-based screening – using automated devices or instruments to screen vision

- Optotype-based screening – using eye charts or software to screen vision and report pass/fail or 20/XX number for each eye

- Tests of Visual Acuity – another name for eye charts or software that require pass/fail or 20/XX number for each eye

- NCCVEH – National Center for Children's Vision and Eye Health at Prevent Blindness

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

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Instruments "Approved" by NCCVEH

Welch Allyn® Spot™ Vision Screener

plusoptiX Portable S12C Vision Screener

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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 black optotypes on a white background using specific optotype sizes at a prescribed and standardized distance*

2. Instrument-based screening

- Instruments do not measure visual acuity
- *Instruments analyze images of the eyes to provide information about amblyopia and reduced vision risk factors:*
  - Estimates of significant refractive error (hyperopia, myopia, astigmatism)
  - *Estimates of anisometropia*
  - Estimates of eye misalignment (some, not all)

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Ages for Instrument-Based Screening

- Use beginning at 12 months; better success at 18 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., Committee on Practice and Ambulatory Medicine, 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/opx-92-06.pdf

Common Questions From the Field

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Do I need to do both optotype- and instrument-based screening when I screen vision?

ﬆ What does an optotype tell me?

- o Visual acuity measured with optotypes are the means that has been classically considered in telling how well a person can see at a fixed distance.

- o 20/20 – what we all expect everyone to see!
- o 20/25-20/40 still acceptable for children
- o Poorer than 20/40 – referral

- o It translates to how well one can see while viewing a distance target.

‍ Optotypes come in many forms
  o Some Good:
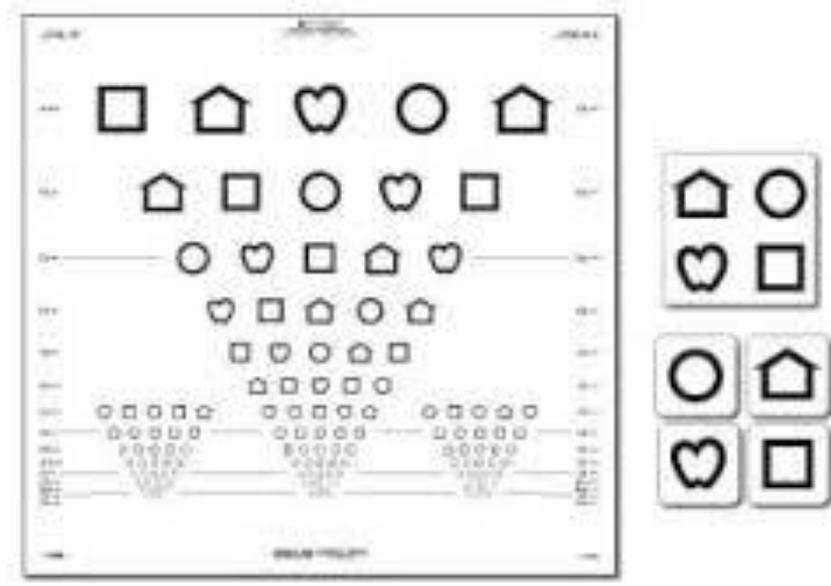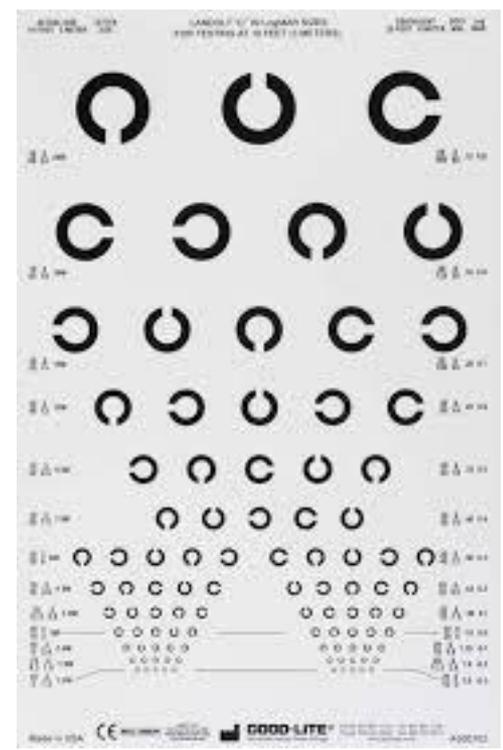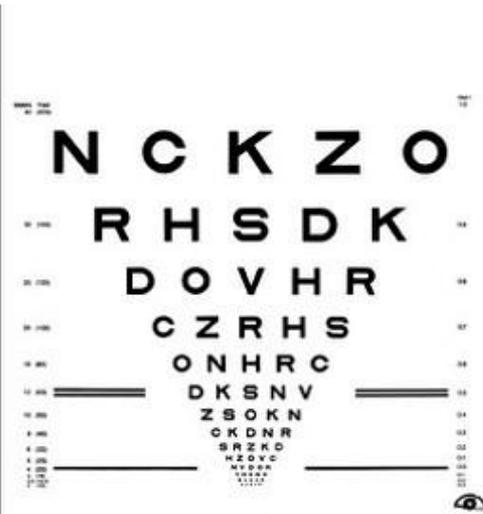
Do I need to do both optotype- and instrument-based screening when I screen vision?

- What is used with children before the know their alphabet?

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Optotypes come in many forms

- Some not so good:

Do I need to do both optotype- and instrument-based screening when I screen vision?

ജ What are some of the reasons to use instrument based screening?

- o Speed and efficiency
- o Accuracy – with untrained screeners, optotype may not be accurate
- o Auxiliary screeners – Lions Clubs
- o Younger children or children with special needs

Do I need to do both optotype- and instrument-based screening when I screen vision?

☙ Are the instruments testing for optotypes?

☙ What is measured with instrument-based screening?

- Refractive Error
  - Nearsightedness
  - Farsightedness
  - Astigmatism

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If the instrument recommends an eye exam, do I rescreen with a test of visual acuity before referring?

- Each instrument for vision screenings is set to discriminate acceptable and unacceptable readings.

- If the reading for the child is higher than the threshold set, that suggests that the child likely has more refractive error than is considered at a pass rate.

- The outcome of that screening is refer!

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Screening Complete
[All Measurements in Range]

From School Health document -
https://www.schoolhealth.com/media/pdf/Spot_Sample_Results.pdf

Hyperopia
[Far-sightedness]

From School Health document -
https://www.schoolhealth.com/media/pdf/Spot_Sample_Results.pdf

What Is "Capture Rate"?

- Some instrument websites provide info about a "capture rate" of 97%.

- Varies based on several factors including:
  - Environment critical
  - Child's behavior & attention
  - Child's visual status

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If I cannot get a reading because the pupils are too small, what do I do?

  There are two primary reasons for "small pupil"

1. Room illumination too high

2. Child's visual status, especially hyperopia

If I cannot get a reading because the wheel continues to spin and the device times out, what do I do?

- Environmental issues

- Child's visual status

- Child's behavior

TIPS for Instrument-Based Screening

꧰ Sunglasses

꧰ Hands shading eyes

꧰ Lower room lights

꧰ Check for glare from window

꧰ Wearing prescription glasses? Slightly lower head

꧰ "Wiggle your toes"

HAPPY WIGGLE YOUR TOES DAY!

www.swampysflori...

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What do I do when my paperwork wants a 20/XX number for each eye?

- You cannot convert estimated refractive error to visual acuity value.

- Why not? You are measuring two different aspects of vision.

- Child could fail vision screening with instrument, but pass with conversion and miss opportunity for eye exam.

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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.

[2] Source: "Composite Chart of Refractive State to V.A." Derived from Peter's multiple tables. *Peters, H.B. (1961): The Relationship between Refractive Error and Visual Acuity at Three Age Levels. A.A.A.O., 38:4.*

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

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

Readably observable ocular abnormalities	Neuro-developmental disorders, such as:	Systemic conditions with ocular abnormalities, such as:	Parents or siblings with history of:	History of prematurity	Parents who believe their child has vision problem
Strabismus	Hearing impairment	Diabetes	Strabismus	< 32 completed weeks	Message to primary care providers:
Ptosis	Motor, such as CP				Don't wait and see
	Down Syndrome				
	Cognitive impairment	Juvenile Arthritis	Amblyopia		
	Autism Spectrum Disorder				
	Speech / Language Delay				

References for previous slide:

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

Marsh-Tootle, W. L., Russ, S. A., & Repka, M. X., for the National Expert Panel to the National Center for Children's Vision and Eye Health. (2015). Vision and eye health in children 36 to <72 months: Proposed data definitions. *Optometry and Vision Science, 92*(1), 17-23. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274339/pdf/opx-92-17.pdf

If <u>Required</u> to Screen <u>All</u> Children . . .

❑ Use same vision screening tools you use with all children.

❑ If children are untestable, refer to child's medical provider.

❑ If children pass, explain to parents that the screening result does not check for everything:

    ❑ Because these children are at a higher risk of having an eye disorder.

❑ A comprehensive eye exam remains recommended for these children.

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❑ Link to Referral Letter via NCCVCH (bottom of page): http://nationalcenter.preventblindness.org/resources-2

Vision Screening Tools

Annual Vision Health Program Evaluation Checklist

Prevent Blindness America/School Health online store for vision screening equipment
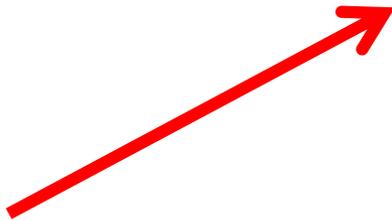
Pediatric Vision Screening Referral Form REVISED

AAPOS Vision Screening Kit and Supporting Resources

School Health Vision Screening Tools

Good-Lite Vision Screening Tools and Resources

Find PBA in Your State

Suggested Text for Your Family Information and Referral Letters

❑ Text to add to your existing referral letters:

❑ We refer children for an eye exam when they do not pass vision screening. We also refer children who may pass a vision screening if they are at a higher risk of having a vision disorder because of a medical or developmental reason.

❑ Include on your referral document:

❑ Reason for referral: Increased risk for vision disorder because of developmental or medical reason (describe):

_____

Resources . . .

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. 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 that measure amblyogenic risk factors, such as refractive error, media opacities, and eye misalignment. Differences between the two approaches; best and acceptable practice recommendations for

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 instrument-based 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 that measure amblyogenic risk factors, such as refractive error, media opacities, and eye misalignment.

This article describes tools and techniques for school nurses to screen

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, instrument-based screening uses automated technology to provide an estimation of refractive error and information about the presence and magnitude of abnormalities of the eyes (Miller & Lessin, 2012). Most instruments can be placed in two categories: photorefraction/photoscreening devices and handheld, portable autorefractors.

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.

Year of Children's Vision

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

- *Archived vision screening webinars in Resources*

National Center for Children's Vision & Eye Health

- http://nationalcenter.preventblindness.org/

Donate to Prevent Blindness

Children's Vision Screening Training and Certification

Prevent Blindness has the only national program for training and certifying vision screeners.

Our children's vision screening training and certification program ensures consistent, highly effective screening services. Prevent Blindness' professional advisors recommend screening tests designed to accurately detect children's vision problems. The training and certification program prepares screeners to do the best possible job.

Join Prevent Blindness and its 35,000 volunteers, Become a vision screener!

contact us about vision screening training and certification, or call 1-800-331-2020.

http://nationalcenter.preventblindness.org/childrens-vision-screening-training-and-certification

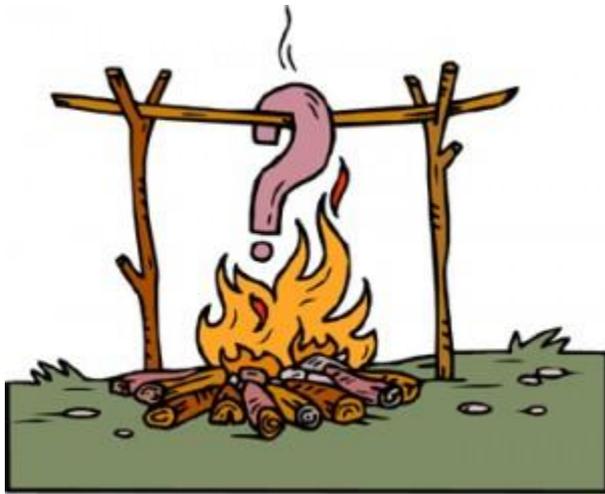800-331-2020   Nottingham@preventblindness.org

Raise your hand if:

- You learned something new today.

- You found this presentation helpful.

Questions for the Presenters?

Burning Questions?

Conclusion of Today's Presentation

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