VISION SCREENING: CRITICAL VISION DEVELOPMENT MILESTONES TO MONITOR IN YEAR 1 AND BEYOND

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Disclosure Statement

The presenters have nothing to disclose or conflicts of interest to declare.

Information You Will Take Home ...
4 Learning Objectives

- Describe the impact of uncorrected vision problems on development, behavior, and learning readiness.
- List eight critical vision development milestones that occur in the first year of life.
- Describe actions that should be taken when vision development milestones are not met.
- List 1 evidence-based approach to vision screening for children ages 1 and 2 years.
Vision – A Top Health Issue for Children

- Of 1M Children enrolled in HS/EHS Programs…
  - 30,000+ children with a diagnosed vision problem (3% of all children in HS/EHS programs)
  - 2nd MOST COMMON CHRONIC HEALTH ISSUE FOR HEAD START/EARLY HEAD START (after asthma)

1302.42 Child health status and care.

- (a) Source of health care. (1) A program, within 30 calendar days after the child first attends the program or, for the home-based program option, receives a home visit, must consult with parents to determine whether each child has ongoing sources of continuous, accessible health care – provided by a health care professional that maintains the child’s ongoing health record and is not primarily a source of emergency or urgent care – and health insurance coverage.
1302.42 Child health status and care

• (2) If the child does not have such a source of ongoing care and health insurance coverage or access to care through the Indian Health Service, the program must assist families in accessing a source of care and health insurance that will meet these criteria, as quickly as possible.

• (ii) Assist parents with making arrangements to bring the child up-to-date as quickly as possible; and, if necessary, directly facilitate provision of health services to bring the child up-to-date with parent consent as described in §1302.41(b)(1).

1302.42 Child health status and care

• (2) Within 45 calendar days after the child first attends the program or, for the home-based program option, receives a home visit, a program must either obtain or perform evidence-based vision and hearing screenings.

• (3) If a program operates for 90 days or less, it has 30 days from the date the child first attends the program to satisfy paragraphs (b)(1) and (2) of this section.
“Evidence-Based” Definition from the National Center for Children’s Vision and Eye Health (NCCVEH)

- Definition of “evidence-based” from the NCCVEH - Vision screening tools should be evidence-based, meaning . . .

- Information about the study and effectiveness of the tools were peer-reviewed and published in a scientific journal.

- The screening tools are able to identify targeted vision problems based on data from large-scale screenings performed by comparable screening personnel in typical screening settings, in which all children who pass and fail the screenings also received comprehensive eye examinations conducted by eye care professionals (ophthalmologists, optometrists, pediatric ophthalmologists, or pediatric optometrists).

- Outcomes from the eye examinations were used to validate the performance of the screening tools.

- Simply stating a tool was used to screen 10,000 children does not make the tool evidence-based.

- Stating the tool was used to screen 10,000 children, screening results were compared with eye examination results, and the tool found 90% of children with vision disorders is an example of an evidence-based tool.

Impact of Vision Health on Development, Behavior, and Learning Readiness

- Research shows a link between health and a child’s ability to perform optimally in school.

- “Health Barriers to Learning” include vision deficits.

- Left undetected and untreated, “Health Barriers to Learning” can affect a child’s ability to:
  - Pay attention in class
  - Be motivated to learn
  - Maintain consistent attendance
  - Perform well academically
  - Graduate high school

5th grade – Cs & Ds. Consistently unruly in class. After VS & glasses, behaviors calmed almost immediately. 3 mo later – Bs & working on As. “You saved my nephew.”

2015 study – low-income, ages 3 through 5 yrs – found: Improvement in academic progress, confidence & behavior - increase in focus during lessons & classroom participation & interaction

317 2nd & 3rd graders – 12 high-poverty schools – Baltimore City – Children with uncorrected hyperopia did not perform as well on reading assessments compared with children without hyperopia

2015 study – ages 4 and 5 yrs with hyperopia (farsightedness ≥4.0 D) scored significantly worse on early literacy test than children with normal vision

References for Previous Slide


True story from Charles Short – Indiana Lions District 25C – West Lafayette, IN
Vision defect of 4.0 D - http://www.onedollar glasses.org/eye-test/4-diopters.html

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

**Diopter defined as . . .**

- “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.
• First grade reading ability found to be predictive of 11th grade reading outcomes, including:
  • Reading comprehension,
  • Vocabulary, and
  • General knowledge.


Comment to “Vision problems can harm kids’ development grades”

“I always thought I was just sitting too far from the blackboard to read the words and numbers the teachers were writing. It wasn’t until my 8th grade year (having repeated 6th grade) that I was vision tested. Geez, what a difference when I went back to school as a freshman in high school. I could read everything, and my learning was so much easier.”

Key Year 1 Vision Development Milestones
Check-off year 1 vision screening tool available at:
http://nationalcenter.preventblindness.org/publications-and-presentations

Reports and Information from Prevent Blindness

- A complete list of public health reports available from Prevent Blindness
- Children's Vision and Eye Health: A Snapshot of Current National Issues
- Eye Health and Safety Information
- One Vision for Children's Vision, A National Call to Action for the Advancement of Children's Vision and Eye Health
- Prevent Blindness Statement on School-Aged Vision Screening and Eye Health Progress
- Eight Key Vision Development Milestones to Monitor from Birth to First Birthday
- Vision Preservation and the National Prevention Strategy: A call to Action
- Vision screenings and eye exams: complimentary public health approaches for vision
• Time for reaching milestones can vary up to 6 weeks . . . except milestone related to straight eyes.

• Slides show when baby should reach milestones.

• Process:
  • Milestone and age when milestone should occur
  • Why milestone is important
  • What to do if milestone not met . . . or next steps

• Many vision milestones are related to overall developmental milestones . . . want you to think about those milestones from a perspective of vision . . . or how baby’s vision could impact milestone.
What to Do?

Next Steps
Talk close to baby’s face while helping baby to feel parent’s or caregiver’s face.

Questions to Ask or Behavior to Monitor
Does baby maintain stable eye contact when awake and alert and initiated by parent or caregiver?

Why important?
Lack of stable eye contact can interfere with early emotional and general development.

Milestone: Maintains stable eye contact when awake and alert and initiated by parent or caregiver.

1st vision milestone - ages 6 weeks to no later than 8 weeks

Example of Baby Not Maintaining Stable Eye Contact

Videos from Lea Hyvärinen, MD, PhD
2nd vision milestone – during 3rd and 4th months

Milestone:
Lively communication with social smile.

Why important?
Brain is maturing, baby can vary accommodation, baby sees clearly at several distances.

Questions to Ask or Behavior to Monitor
When parent/caregiver approaches baby, does baby respond with a smile?

What to Do? Next Steps
Refer to pediatric primary health care provider to coordinate an eye examination.

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3rd vision milestone – during 3rd or 4th months

Milestone:
Awareness of hands and exploration of hands with mouth.

Why important?
Leads to exploring hands with mouth, which leads to exploring baby's world.

Questions to Ask or Behavior to Monitor
Does baby bring hands to midline and to mouth?

What to Do? Next Steps
Gently use baby's elbows to bring hands to midline. Make it a game.
**What to Do?**

**Next Steps**
Refer to pediatric primary health care provider to coordinate an eye examination AND refer to Birth to 3 Early Intervention to help baby observe and begin to copy hand movements of other children and adults.

**Questions to Ask or Behavior to Monitor**
Is baby keenly watching hands movements of others? Is baby beginning to copy hand movements of others?

**Why important?**
Leads to goal-directed reaching and grasping. Begins process of learning from imitation and understanding actions and goals of others.

**Milestone:**
Keenly watching hands movements of others; beginning to copy hand movements.

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**What to Do?**

**Next Steps**
Immediately refer for eye exam to help determine cause of eye misalignment.

**Questions to Ask or Behavior to Monitor**
Do baby's eyes ever appear to cross or drift?

**Why important?**
Eyes must be straight for good binocular vision to develop.

**Milestone:**
Eyes are straight and do not appear to cross or drift.

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**4th vision milestone – by 5th month**

**Milestone:**
Keenly watching hands movements of others; beginning to copy hand movements.

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**5th vision milestone – by age 5 months (no variance on this one)**

**Milestone:**
Eyes are straight and do not appear to cross or drift.
6th vision milestone – during ages 6 or 7 months

Milestone:
Goal-directed hand-arm movements.

Why important?
If baby is not reaching for objects, maybe baby cannot see the objects.

Questions to Ask or Behavior to Monitor
Does baby reach for, grasp object, and look at object when reaching?

What to Do? Next Steps
Refer to pediatric primary health care provider to coordinate eye examination AND Birth to 3 Early Intervention for assistance in helping baby develop goal-directed hand-arm movements.

7th vision milestone – during ages 7, 8, or 9 months

Milestone:
Recognition of family and/or caregiver faces.

Why important?
Baby could be incorrectly diagnosed as being on autism spectrum.

Questions to Ask or Behavior to Monitor
Does baby recognize family members outside the home among groups of people?

What to Do? Next Steps
Encourage family members/caregivers to wear same colorful blouse/shirt or headband when greeting baby each morning.
What to Do? Next Steps

If baby does not respond to the book, try a different book. Perhaps baby is not interested in the first book.

Questions to Ask or Behavior to Monitor
When given a book with pictures, does baby point to individual pictures and vocalize?

Why important?
If baby shows no interest in books or does not point to pictures, perhaps baby cannot see the pictures.

Milestone:
Points to individual pictures in a book and vocalizes while pointing.

B8th vision milestone – during ages 9 to 12 months

IF baby has been exposed to books

8th vision milestone – during ages 9 to 12 months

IF baby has NOT been exposed to books

Milestone:
Uses thumb and first finger to pick up objects, such as crumbs on floor.

Why important?
Helps baby to better explore baby's world in more detail and to improve fine motor skills of hands.

Questions to Ask or Behavior to Monitor
Does baby use thumb and first finger to pick up objects?

What to Do? Next Steps
Parents and caregivers can encourage baby to eat food with fingers.
Let’s Try Using the Vision Development Milestones Tool

Children's age: 5 months
Developmental skills exhibited:
- Maintaining stable eye contact initiated by an adult
- Social smile
- Exploring hands and putting them in their mouth
- Watching hand movements of others
- Eyes drift and cross when tired

Pass or Refer?
- Refer
### Using the Milestones Tool – Case Profile #2

**Child’s age:** 9 months  
- Developmental skills exhibited:  
  - Maintains stable eye contact initiated by an adult  
  - Social smile  
  - Exploring hands and putting them in their mouth  
  - Watching hand movements of others  
  - One eye turns in  
  - Goal-directed arm movements  
  - Recognizes parents, caregivers, and Grandpa

- **Pass or Refer?**  
  - Refer

### Using the Milestones Tool – Case Profile #3

**Child’s age:** 9 months  
- Developmental skills exhibited:  
  - Maintains stable eye contact initiated by an adult  
  - Social smile  
  - Exploring hands and putting them in their mouth  
  - Watching hand movements of others  
  - Eyes are straight  
  - Goal-directed arm movements  
  - Recognizes parents, caregivers, and Grandpa

- **Pass or Refer?**  
  - Pass
Vision Screening Years 1 and 2

Instrument-based screening

- Instruments do not measure visual acuity

- Instruments analyze digital images 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; better success at 18 months (AAP)


Instruments “Approved” by NCCVEH

- Welch Allyn® Spot™ Vision Screener
- Plusoptix S12C Vision Screener
- Welch Allyn® SureSight™ Vision Screener

Disclaimer: These tools are examples of vision screening instruments for this age group. These are not shown for the purpose of sales or promotion.

*The SureSight Vision Screener is no longer being produced.
Resources...

Check-off year 1 vision screening tool available at:
http://nationalcenter.preventblindness.org/publications-and-presentations

Reports and Information from Prevent Blindness

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Vision and Eye Health

Moving into the Digital Age With Instrument-Based Vision Screening

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Significant advancements in vision screening technology are leading to improved design, functionality, and reliability of screening tools. Presently, two main screening approaches are available to school nurses for children aged 3-years and older: optotype-based screening and instrument-based screening. Optotype-based screening involves identification of visual acuity using optotypes (i.e., pictures, letters, and numbers), while instrument-based screening involves use of automated devices that measure visual acuity, refraction, visual field, and eye alignment. Differences in the design and functionality of available vision screening tools and instruments for school nurses to screen have occurred in recent screening protocols, leading to improved design, functionality, and reliability of screening tools. Presently, two main screening approaches are available to school nurses for children aged 3-years and older: optotype-based screening and instrument-based screening. Optotype-based screening typically relies on visual acuity testing using optotypes (i.e., pictures, letters, and numbers), while instrument-based screening involves use of automated devices that measure visual acuity, refraction, visual field, and eye alignment. Differences in the design and functionality of available vision screening tools and instruments for school nurses to screen have occurred in recent screening protocols, leading to improved design, functionality, and reliability of screening tools. Presently, two main screening approaches are available to school nurses for children aged 3-years and older: optotype-based screening and instrument-based screening. Optotype-based screening typically relies on visual acuity testing using optotypes (i.e., pictures, letters, and numbers), while instrument-based screening involves use of automated devices that measure visual acuity, refraction, visual field, and eye alignment.


Year of Children’s Vision

- [http://nationalcenter.preventblindness.org/year-childrens-vision](http://nationalcenter.preventblindness.org/year-childrens-vision)
- Archived vision screening webinars in Resources
Resources to Support Families . . .

- Financial Assistance Programs
- VS Referral Documents
- Parent Education
- http://nationalcenter.preventblindness.org/resources-2

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

Book

Eyes That Thrive: http://www.preventblindness.org/eyes-thrive

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Conclusion of Today’s Presentation . . .

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