From Birth to the 1st Birthday:
7 Critical Vision Development Milestones to Monitor

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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
Describe next steps to take when vision development milestones are delayed.

Name the 7 key vision development milestones between birth and the 1st birthday.

Describe 3 reasons why we should care about the vision of children.

Describe 1 method to try if baby does not maintain eye contact with a parent or caregiver.

Describe next steps to take when vision development milestones are delayed.
4 Topics

1. 7 key vision developmental milestones in the first year of life

2. Impact of vision disorders on learning

3. Tools can use in Early Head Start

4. Wrap-up and your burning questions
Vision disorders are the 4th most common disability in the US.

Vision is the most prevalent handicapping condition in childhood.

There can be a critical adverse affect on learning.

Early detection and treatment improves outcomes.

Most vision problems in children are occult.
Epidemiology of Vision Problems in Children

- Amblyopia
- Strabismus
- Significant refractive error
- Eye Disease
Amblyopia

- Incidence
- What is it?
- What is its significance?

Classroom as it appears with bilateral amblyopia

Classroom as it should appear to child
Strabismus

- Incidence
- What is it?
- What is its significance?
Significant Refractive Error

- Incidence
- What is it?
- Astigmatism
- Anisometropia
- What is meant by significant?
Eye Disease

 Incidence
 What is it?
 What is it’s significance?
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

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
How Screen Vision in Early Head Start Children?

- Monitoring check-off document
- Instruments
Monitoring Check-Off Document for Year 1
7 Critical Vision Development Milestones to Monitor
• Time for reaching milestones can vary up to 6 weeks.

• Slides show when baby **should** reach milestones.

• Process:
  • Milestone and age when milestone should occur
  • Why milestone is important
  • Example of 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.
# Seven Key Vision Development Milestones to Monitor from Birth to First Birthday

Lea Hyvarinen, MD, PhD and P. Kay Nottingham Chaplin, EdD

http://nationalcenter.preventblindness.org/sites/default/files/national/documents/Key_vision_questions_to_ask_n_year_1_10.31.16.pdf

Check box if child meets milestone – Circle “no” if not meeting milestone and move to Next Steps

<table>
<thead>
<tr>
<th>AGE</th>
<th>MILESTONE</th>
<th>IMPORTANCE OF MILESTONE</th>
<th>QUESTIONS TO ASK OR BEHAVIORS TO MONITOR</th>
<th>NEXT STEPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 weeks to no later than 8 weeks</td>
<td>1st Milestone</td>
<td>Babies have innate attraction to faces, especially smiling faces. Creates pleasant feeling for baby and parent.</td>
<td>□ Does baby maintain <strong>stable</strong> eye contact when awake and alert and initiated by parent and/or caregiver? (If “no”, move to Next Steps.)</td>
<td>□ Refer for eye exam for an assessment to include refraction and accommodation, if possible, to determine if baby can see parent’s/caregiver’s face.</td>
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<tr>
<td></td>
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<td>Stable eye contact with parents or caregivers is essential to developing bonding and communication.</td>
<td>□ If vision is found to be normal, refer to primary care provider to further discuss concerns.</td>
<td>□ Refer to Birth to 3 Early Intervention program for supporting development of total communication through all senses, including hands and motor functions.</td>
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<td></td>
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<td>Lack of stable eye contact can interfere with early emotional and general development.</td>
<td>□ In interim, help parents/caregivers help baby to develop communication through all the senses.</td>
<td>□ Example: Talk close to baby’s face while helping baby to feel parent’s or caregiver’s face.</td>
</tr>
</tbody>
</table>

Check-off monitoring tool available at:

http://nationalcenter.preventblindness.org/publications-and-presentations

Direct link:
http://nationalcenter.preventblindness.org/sites/default/files/national/documents/Key_vision_questions_to_ask_n_year_1_10.3.1.16.pdf
What to Do? Next Steps
Talk close to baby’s face while helping baby to feel parent’s or caregiver’s face.

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

Questions to Ask or Behavior to Monitor
Does baby maintain 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

Milestone:
Maintains stable eye contact when awake and alert and initiated by parent or caregiver.
If BabyAvoids Parent/Caregiver...

Try using +4 lenses

Videos from Lea Hyvärinen, MD, PhD
What to Do? Next Steps
If Mother seems distressed, brainstorm on ways to support Mother (i.e., family member cares for baby while Mother sleeps).

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

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

Milestone:
Lively communication with social smile.

2nd vision milestone – during 3rd and 4th months
3rd vision milestone – **ages 3rd, 4th, or maybe 5th month**

*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*
Use small objects with variation in size, weight, texture to help baby use hands to explore.
4th vision milestone – **by age 5 months**

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

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

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

**What to Do? Next Steps**
Refer for eye exam to access visual system AND refer to Birth to 3 Early Intervention to help baby observe and begin to copy hand movements of other children and adults.
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.

5th vision milestone – by age 5 months (no variance on this one)
6th vision milestone – **during ages 5 or 6 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 for eye exam and to Birth to 3 Early Intervention for assistance in helping baby develop goal-directed hand-arm movements.
**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.

7th vision milestone – **during ages 7, 8, or 9 months**
How Screen Vision in Early Head Start Children?

- Monitoring check-off document
- Instruments
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
Instruments “Approved” by NCCVEH

Welch Allyn® Spot™ Vision Screener  
plusoptiX Portable S12C Vision Screener
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)


Resources . . .
Check-off monitoring tool available at:

http://nationalcenter.preventblindness.org/publications-and-presentations

Direct link:
http://nationalcenter.preventblindness.org/sites/default/files/national/documents/Key_vision_questions_to_ask_n_year_1_10.31.16.pdf
Vision and Eye Health

Moving Into the Digital Age With Instrument-Based Vision Screening

P. Kay Nottingham Chaplin, EdD
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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. Differences between the two approaches: best and acceptable practice recommendations for

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/photocorrection devices and handheld, portable autorefractors.

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

National Center for Children’s Vision & Eye Health

• [http://nationalcenter.preventblindness.org/](http://nationalcenter.preventblindness.org/)
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](http://nationalcenter.preventblindness.org/childrens-vision-screening-training-and-certification), or call 1-800-331-2020.

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?
Floating “Hot Dog” Trick
Conclusion of Today’s Presentation

YOU ROCK!

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