*Collaborating for a Quality Life-Span Through Vision*

Melvin D. Shipp, O.D., MPH, DrPH
President American Public Health Association
Dean - Ohio State University College of Optometry
Program Panel

* Dr. Marian C. Levy
* Dr. Marianne Hillemeier
* Dr. Glen T. Steele
* Dr. Kathleen Murphy
* Dr. Tom Sullivan
Nutrition: A Critical Influence on Child Development

Marian Levy, DrPH, RD
University of Memphis
School of Public Health
Marian Levy, DrPH, RD

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

* No relationships to disclose

* Presenter Disclosure
* Overview

Nutrition in infant development
Cognitive development
Deficiencies
Excesses
Hope for the future
Rapid Growth and Development

4 months: birthweight doubles
1st birthday
Birthweight triples
10-11 inches longer
brain, heart and kidneys double in size
18 months of age, most brain cells formed
Caloric need ~ adult 7,000 kcal
Cognitive Development

- Brain triples in size
- Iron transport $O^2$ to brain (concentration)
- Protein (alertness, motivation)
- B-vitamins (memory)
- Zinc (growth)
- DHA (Omega-3 f.a.)
  - needed for visual acuity
  - retina rich in DHA
Component of synapse production
Enhances learning, development
Nutrient Shortages and Cognition

Early - reduce cell production
Later - reduce cell size, complexity
Less efficient communication between brain cells
General Malnutrition

- Delayed growth, motor development
- Decreased attention, deficient learning
- Learning disabilities
- Lower IQ
- Compromised immunity
*Iron Deficiency*

Decreased attention, deficient learning
Growth retardation
Developmental delay
Compromised immunity
Fatigue
Delayed motor development
Lack of interest in social environment
Irritability
*Vitamin A Deficiency*

- Night blindness
- Loss of taste
- Poor wound healing
- Dry eye
- **Bitot spots**
- Softening of the cornea and other cornea related problems
- Blindness
- Death
Vitamin D Deficiency

**Figure 11.10** Vitamin D-Deficiency Symptoms—Bowed Legs and Beaded Ribs of Rickets

**Bowed legs.** In rickets, the poorly formed long bones of the legs bend outward as weight-bearing activities such as walking begin.

**Beaded ribs.** In rickets, a series of "beads" develop where the cartilages and bones attach.
Protein Deficiency
This child was frequently put to bed sucking on a bottle filled with apple juice, so the teeth were bathed in carbohydrate for long periods of time—a perfect medium for bacterial growth. The upper teeth show signs of decay.
* Most common type of accidental poisoning in children < 6 yrs
* Liver damage
* Particularly tempting because it appears similar to candy.
* Excess Vitamin A

* Birth defects if taken during pregnancy
* Eye malformation
* Intracranial hypertension
Breastfeeding

• All major health organizations recommend exclusive breastfeeding for 6 months, continuing through at least one year (AAP, ACOG, AAFP)
• No longer a lifestyle choice, a public health issue. (AAP)

Breastfeeding - what's not to like?

* Proper nutrients
* Proper balance
* Bacterially safe
* Immunity
* Convenient
* Economical
* Sustainable
* Bonding
**Health Benefits for Infants**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalization for LRI</td>
<td>72%</td>
</tr>
<tr>
<td>Otitis media</td>
<td>50%</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>64%</td>
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<tr>
<td>Necrotizing enterocolitis</td>
<td>77%</td>
</tr>
<tr>
<td>SIDS</td>
<td>36%</td>
</tr>
<tr>
<td>Obesity</td>
<td>31%</td>
</tr>
<tr>
<td>Diabetes Type I</td>
<td>30%</td>
</tr>
<tr>
<td>Diabetes Type II</td>
<td>40%</td>
</tr>
</tbody>
</table>

Public Health Implications

Public Health begins with Breastfeeding

Massachusetts Breastfeeding Coalition | www.massbfc.org

Obesity Prevention
Begins With Breastfeeding

For more information on breastfeeding for health care professionals or for families, visit the Web site for the American Academy of Pediatrics Breastfeeding Initiative at www.aap.org/breastfeeding.
“Breastfeeding is the most precious gift a mother can give her infant. When there is illness or malnutrition, it may be a lifesaving gift; when there is poverty, it may be the only gift.”

-- R.A. Lawrence, 2007
Thank you!
Infant Development in the First Year of Life

Marianne M. Hillemeier, PhD, MPH
Pennsylvania State University
Marianne M. Hillemeier, PhD, MPH

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

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Key Aspects of Infant Development

- Physical
  - Weight, length, and head circumference
  - Movement and coordination

- Social/Emotional
  - Interaction with caregivers

- Language
  - Receptive comprehension, verbal expression

- Cognitive
  - Learning, thinking, problem-solving

*CDC Act Early Program: http://www.cdc.gov/actearly*
Growth Charts: Length-For-Age and Weight-For-Age

Birth to 36 months: Boys
Length-for-age and Weight-for-age percentiles

Birth to 36 months: Girls
Length-for-age and Weight-for-age percentiles
Physical development

- Loses weight after birth; regained in 10-12 days
- Gains 4-8 ounces a week and grows 1-1.5 inches in first month

Social/Emotional

- Cries when uncomfortable
- Soon baby’s eyes track caregiver’s movements
- Facial expression brightens when cuddled and talked soothingly to
Language

- Baby listens and absorbs the basic and distinct sounds of language when spoken to.

Cognitive

- Brain growth is extremely rapid.
- Positive interactions with caregivers promote healthy brain growth.
**Two Months of Age**

*Physical development*
- Can hold head up
- Begins to push up when lying on tummy

*Social/Emotional*
- Begins to smile at people
- Can briefly calm him/herself (may bring hands to mouth and suck on hand)
- Tries to look at parent
Two Months of Age

* Language
  * Coos, makes gurgling sounds
  * Turns head toward sounds

* Cognitive
  * Pays attention to faces
  * Begins to follow things with eyes and recognize people at a distance
  * Begins to act bored (cries, fussy) if activity doesn’t change
Physical development

* Holds head steady, unsupported
* Pushes down on legs when feet are on hard surface
* May be able to roll from tummy to back
* Can hold a toy and shake it and swing at dangling toys
*Social/Emotional*

* Smiles spontaneously, especially at people
* Likes to play with people and might cry when playing stops
* Copies some movements and facial expressions, like smiling or frowning
**Four Months of Age**

**Language**
- Babbles with expression and copies sounds
- Cries in different ways for hunger, pain, being tired

**Cognitive**
- Responds to affection
- Reaches for toy with one hand
- Uses hands and eyes together, such as seeing and reaching for a toy
- Watches faces closely
Six Months of Age

*Social/Emotional

* Begins to know if someone is a stranger
* Responds to other people’s emotions and often seems happy
* Likes to look at self in a mirror
Six Months of Age

Physical development

* Rolls over front to back and back to front
* Begins to sit without support
* When standing, supports weight on legs
* Rocks back and forth, sometimes crawling backward before moving forward
Six Months of Age

*Language*

* Responds to sounds by making sounds
* Strings vowels together (“ah,” “eh,” “oh”)
* Responds to own name
* Begins to say consonant sounds (“m,” “b”)

*Cognitive*

* Brings things to mouth
* Shows curiosity about things and tries to get things out of reach
* Begins to pass things from one hand to the other
Nine Months of Age

*Physical development
  * Stands, holding on
  * Can get into sitting position
  * Pulls to stand
  * Crawls

*Social/Emotional
  * May be afraid of strangers
  * May be clingy with familiar adults
  * Has favorite toys
*Language

* Understands “no”
* Makes a lot of different sounds like “mamamama”
* Copies sounds and gestures of others
* Uses fingers to point at things
Cognitive

- Watches path of something as it falls
- Looks for things he/she sees you hide
- Plays peek-a-boo
- Picks up things like cereal o’s between thumb and index finger
Twelve Months of Age

* Physical development
  * Walks holding on to furniture (cruises)
  * May take a few steps without holding on
  * May stand alone

* Social/Emotional
  * Is shy or nervous with strangers
  * Cries when mom or dad leaves
  * Hands you a book when he/she wants to hear a story
  * Repeats sounds or actions to get attention
  * Puts out arm or leg to help with dressing
Twelve Months of Age

Language

* Responds to simple spoken requests
* Uses simple gestures like shaking head “no”
* Makes sounds with changes in tone
* Tries to say words you say
Twelve Months of Age

Cognitive

* Explores things in different ways, like shaking, banging, throwing
* Looks at the right picture or thing when it is named
* Bangs two things together
* Puts things into a container, takes things out
* Follows simple directions like “pick up the toy”
The American Academy of Pediatrics recommends that in addition to performing a physical exam, health care providers should educate parents about infant development during well-baby visits. This is just one of a long list of topics to be discussed, however...
American Academy of Pediatrics: Recommended Discussion Topics At Well-Child Visits

<table>
<thead>
<tr>
<th>AGES</th>
<th>2-4 DAYS</th>
<th>1 MONTH</th>
<th>2 MONTHS</th>
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<tbody>
<tr>
<td><strong>NUTRITION and EXERCISE</strong></td>
<td>Breast or formula Feeding frequency - amount</td>
<td>Breastfeeding/Formula exclusive</td>
<td>Breastfeeding/Formula exclusive</td>
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<tr>
<td><strong>DENTAL HEALTH</strong></td>
<td>Early dental decay</td>
<td>Early dental decay</td>
<td>Early dental decay</td>
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<tr>
<td><strong>HEALTH AWARENESS/SAFETY HABITS</strong></td>
<td>Signs of Illness Temperature taking, when to contact doctor, Emergency/911 Passive smoke Parenting practices &quot;Safe at home&quot; Potential for abuse</td>
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<td>Signs of illness Emergency/911 Passive smoke Parenting practices &quot;Safe at home&quot; Potential for abuse Child care safety Limit TV/Video exposure</td>
</tr>
<tr>
<td><strong>PSYCHOSOCIAL ISSUES</strong></td>
<td>Postpartum adjustment Family involvement Parent/Infant attachment</td>
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<td><strong>FOR ADDITIONAL INFORMATION</strong></td>
<td>Literature on Child Development Next Appointment</td>
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# American Academy of Pediatrics: Recommended Discussion Topics At Well-Child Visits

<table>
<thead>
<tr>
<th>AGES</th>
<th>FOUR MONTHS</th>
<th>SIX MONTHS</th>
<th>NINE MONTHS</th>
<th>TWELVE MONTHS</th>
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<td><strong>NUTRITION and EXERCISE</strong></td>
<td>May introduce baby food slowly</td>
<td>Finger foods/Introduce cup use</td>
<td>Finger Foods/Self-feeding Transition to cup</td>
<td>Nutrition/Self-feeding Transition to cup</td>
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<tr>
<td><strong>DENTAL HEALTH</strong></td>
<td>Early dental decay</td>
<td>Teething/Early dental decay</td>
<td>Early dental decay</td>
<td>Dental caries prevention</td>
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<tr>
<td><strong>ACCIDENT/INJURY PREVENTION</strong></td>
<td>Supine sleeping position</td>
<td>Supine sleeping position</td>
<td>Sleep practices</td>
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<td></td>
<td>Safety with siblings and pets</td>
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<td>Drowning prevention/Sun safety</td>
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<td>Car seat/Auto safety “Shaken baby syndrome”</td>
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<td></td>
<td>Emergency/911</td>
<td>Passive smoke</td>
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<td>Passive smoke</td>
<td>Parenting advice</td>
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<td></td>
<td>Potential for abuse</td>
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<td></td>
<td>Child care safety</td>
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<td>Postpartum adjustment</td>
<td>Family involvement/Interactions with parents</td>
<td>Family involvement/Interactions with parents</td>
<td>Stranger Awareness/Expectations</td>
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<td>Social Interactions/Expectations</td>
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<td>Parental/Sibling adjustment</td>
<td>Fears and phobias</td>
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<td>Sibling interactions/Expectations</td>
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<td></td>
<td>Family functioning</td>
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Discussion of infant development is likely to be brief. A 2011 study by Halfon and colleagues published in *Pediatrics* found:

- One-third of parents reported spending no more than 10 minutes with the clinician at their last well-child visit
- Nearly half spent 11 to 20 minutes
* InfantSEE® - a Program of Early Identification

Glen T. Steele, O.D.  FCOVD
Chair, InfantSEE® - A Public Health Program of Optometry Cares™ - the AOA Foundation
The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

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* Presenter Disclosure
*What is InfantSEE®
*Volunteer optometrists examine babies without charge to parent or third party
*An ongoing project - year round
*Specific emphasis times to educate parents and caregivers about the need for early identification and intervention
*Most importantly -

*It’s About Changing Lives
President and Mrs. Rosalyn Carter
Honorary National Spokespersons
Children’s Care Historically

• Through EPSDT, most babies receive eye screening as a basic part of each well-baby health exam - visual acuity does not begin until age 3.
• Bright Futures - done through Risk Assessment - a short questionnaire regarding the parent’s view of the child’s vision – no required screening until age 3.
• Prior to InfantSEE® it was assumed that about one in 30 babies may have a risk factor.
55

The InfantSEE® Launch – TODAY Show June 8, 2005

2006 – The Call that changed everything

Her new glasses
At seven months, Alaina was already on a Developmental Delay track. Marked Hyperopia – farsightedness (+12.00).
* Dislocated lenses discovered during the InfantSEE® examination
* Parent told by consulting doctor that “InfantSEE was worthless”
* Parent created a blog from Maya’s perspective entitled: How Being Told, “InfantSEE is worthless,” Changed My Life
InfantSEE®-What We Found (CDC)

* 1051 total: 536 (F) 515 (M)
* 145 Premature Babies (13.8 %)
* 280 non-Caucasian background (26%)
* 180 showed Risk Factors (17%) or One in SIX at Risk
* Lower socio-economic areas (25%) One in FOUR at Risk
*Income: $41,648 Average Reported Income
  * 1 of 8 Exams above Avg. Income had Risk Factors
  * 1 of 4 Exams below Avg. Income had Risk Factors

*Areas most frequently noted were:
  * Ocular motility
  * Visual acuity
  * Binocular function
* Results suggest that visual impairment in infancy is more significant than originally reported
* Children from families with lower income show a significantly higher incidence of visual risk factors
* 315 of 1051 Exams have Public Insurance or NO Insurance (33%)
When diagnosis and intervention takes place earlier in a baby’s life, the chance of later success increases dramatically.

Now how do we help?

InfantSEE is one specific way.

How do we do it?

How do we change lives?
* Children With Autism Show Slower Pupil Responses
  * Journal of Autism and Developmental Disorders
* Infant's Gaze May Be an Early, but Subtle, Marker for Autism Risk
  * Journal of Child Psychology and Psychiatry
* Visual Pattern Preference May Be Indicator of Autism in Toddlers
  * Archives of General Psychiatry - September 6 issue
Active gaze following by 12 months
* 335 words – known by 18 months
Babies without Active gaze following or other patterns
* 195 words known by 18 months

Meltzoff, A, The development of gaze following and its relation to language
Developmental Science 8:6 (2005), pp 535-543
Babies are surviving today that did not survive in the past. After managing to survive, now the baby meets life head-on.

Beyond retinopathy of prematurity, babies are not able to move and often look in order for “normal development” to take place.
Babies are born with visual hunger - 
Judgment of wakefulness is determined by how they are looking
  * Looking – awake
  * Stops looking – goes to sleep
Think of visual development in the broader sense of the development of looking

* Gesell and Amatruda – Developmental Diagnosis - 1947
* Challenge to Doctors

* Remember these ten very important words “I Will Walk With You Every Step of the Way.”
* By doing so, babies will get an earlier start toward success and the parents will have someone to help them better understand the diagnosis, it’s implications and possibilities of treatment.
InfantSEE® - What Can You Do?

* InfantSEE® is about caring for the eyes and vision care needs for people beginning at birth and continuing throughout their lifetime – It’s about changing lives

* Become an Ambassador for InfantSEE® – promote the program in your city, your state, and especially with the parents of the babies with whom you have contact
When you have a baby who is not at the expected levels – think of vision as one of the contributing factors

Don’t assume that vision has already been checked – make an appointment

Ensure that every baby has an early eye and vision assessment

Link with an InfantSEE® provider in your area – www.infantsee.org or 1-888-396-EYES (3937)
Life Consequences Without Early Intervention

M. Kathleen Murphy, DNP, RN, FNP-BC
University of Texas Medical Branch, School of Nursing
Chair, Advisory Committee of the
National Center for Children’s Vision and Eye Health
M. Kathleen Murphy, DNP, RN, FNP-BC

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*Presenter Disclosure
“I got glasses in second grade and I remember being astonished that stars really do twinkle…”
Vision and School
Unmet Vision Care Needs

Did Not Need Vision Care

Did Not Need Vision Care

Got All Needed Vision Care

Got All Needed Vision Care

2009-10 National Survey of Children with Special Health Care Needs
www.childhealthdata.org/home
Rates of Visual Impairment for Persons Age 12 and Above by Race/Ethnicity and Income

![Graph showing rates of visual impairment for persons age 12 and above by race/ethnicity and income.](image)

- **Race/Ethnicity**: White, Black, Hispanic, Low Income, Others
- **Income**: Categories not specified

*Issues Associated with Uncorrected Vision Problems*

- Demoralization
- Fatigue
- Impaired Literacy
- School Avoidance
- Juvenile Delinquency
  - Study: 98% of juvenile offenders had a vision problem
  - Study: 84% of children in foster care had a vision problem
Impact of uncorrected vision problems on quality of life.

- School success predicated on literacy and reading
- Educational achievement as a predictor of health status
- Health disparities
- Burden of vision loss for individuals, families, and communities
Practical Matters

Importance of improved communication between providers.

* Eye Care Professionals
* Healthcare Home
* Parents/Guardians/Families
* Educators
* School Nurses and School Based Health Centers

National Center for Children’s Vision and Eye Health

http://nationalcenter.preventblindness.org
The Take Home Message