Pediatric Vision Care
What you need to know from the AOA clinical practice guidelines

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Why pediatric care?

- Vision is the dominant sense by 6 months of age
- Visual system is most susceptible to conditions that cause blur or abnormal binocularity between birth and age 6 years
- One in five preschool age children have vision problems
- Children with disabilities have significantly more vision problems
- Early diagnosis and treatment are critical to prevent long term vision loss
- Vision disorders lead to problems in development, academic performance, social interactions and self-esteem
  - These will likely continue into adulthood

Objectives of AOA evidence-based pediatric guidelines

- To recommend an optimal timetable for comprehensive vision exams for infants and children (Birth to 18 yrs)
- To suggest appropriate procedures to effectively examine eye health, vision status, and ocular manifestations of systemic disease in infants and children
- To reduce risks and adverse effects of eye and vision problems in infants and children through prevention, education, early diagnosis, treatment, and management
- To inform and educate patients, parents/caregivers, and other health care providers about the importance of eye health, good vision, and the need for and frequency of pediatric eye and vision examinations.
Visual development

- Visual cortex is capable of 20/20 by 6 months (VEP)
- Stereopsis first appears at 3-4 months of age - fully developed by 2 years
- Accommodation fully developed at 5-24 months

Epidemiology of refractive error in children

- Most common cause of correctable reduced vision in children
  - Hyperopia
    - Under 5 years: over 20% of children have > 2.00D
    - Hyperopia (> 2.00D) is a significant risk factor for development of strabismus and amblyopia
    - 5-17 years: 12.8% are hyperopic
  - Myopia
    - Generally develops during early school years (age 7-16)
    - 19.3% of children age 5-17 are myopic (CLEERE study)
    - More than 75% of new cases between ages 9 and 13
    - Increased risk of lattice, retinal hole/tears, detachments, cataracts, glaucoma, and myopic macular degeneration
  - Astigmatism
    - Less than 12 months: 30-50% have astigmatism > 1.00D
    - Declines during emmetropization process
    - Stable by 2% to 3 years
    - Under 3 years: up to 2.00D common
    - Age 5-17 years: 28.4%
  - Anisometropia
    - 1.00D or more is clinically significant
    - Low prevalence (4%) before 6 years of age
    - Severe anisometropia (>3.00D) is likely to persist and lead to development of amblyopia during preschool years
Epidemiology of amblyopia in children

- Leading cause of monocular vision loss in children
- Prevalence in general population is 2-2.5%
- Attributed to
  - Strabismus
  - Anisometropia
  - Form deprivation
- Although amblyopia is a treatable condition in **BOTH CHILDREN AND ADULTS**, the end result is better when diagnosed and treated early.

Epidemiology of strabismus in children

- Prevalence in general population 2.5-4.6%
- Usually develops during childhood
  - Infantile esotropia onset prior to 6 months
  - Accommodative esotropia onset between 2-3 years
- Constant unilateral strabismus often leads to amblyopia and impaired stereopsis
- Early identification and treatment is key to prevent amblyopia and preserve stereopsis

Epidemiology of binocular vision and accommodative disorders in children

- Second most prevalent vision conditions in children (refractive error #1)
  - Convergence Insufficiency: 8.3% of school aged children
  - 13% of 5th and 6th graders considered clinically significant
  - Convergence Excess: 7.1% of school age children
  - Accommodative disorders: 5% of school aged children
Epidemiology of binocular vision and accommodative disorders in children

- Symptoms
  - Headaches
  - Eyestrain
  - Blurred vision
  - Diplopia
  - Difficulty concentrating
  - Sleepiness
  - Movement of print while reading
  - Inattention
  - Loss of place
  - Loss of comprehension after short periods of reading

Epidemiology of color vision deficiencies in children

- 8% of white males and 0.4% of white females
  - 2x increased prevalence in white non-Hispanic population compared to Hispanic, African American, and Asian
- Primarily red-green
- May have difficulty precisely matching colors or discriminating fine color differences

Epidemiology of ocular diseases in children

- Ocular inflammatory disease
  - i.e. conjunctivitis, keratitis, scleritis, uveitis
  - Most often benign and self-lmiting - can become chronic and sight-threatening
  - May have systemic cause: JRA, sarcoidosis, Behcet's disease, Sjogren's syndrome
Epidemiology of ocular diseases in children

- Ocular conditions of prematurity
  - Preterm infants = higher rates of amblyopia, strabismus, optic atrophy, and refractive errors
  - Retinopathy Of Prematurity (ROP)
    - 60% prevalence in infants born 28-31 weeks gestation
    - >80% prevalence in infants born before 28 weeks gestation
    - Common in infants with birth weight less than 1,251 grams (2.75 lbs)

- Retinoblastoma
  - 11% of cancers occurring in first year of life
  - 95% diagnosed before 5 years of age
  - Most common intraocular cancer of childhood
  - Affects 200 children in the US each year
  - Most common sign: leukocoria
  - Mutation in RB1 gene
  - Tumor can be unilateral or bilateral
  - Can be inherited
  - Early diagnosis is key
  - Prognosis is largely dependent on stage of disease at presentation

- Cataracts
  - Visually significant in 3-4 infants per 10,000 live births

- Glaucoma
  - Rare in children, most cases develop during first year of life
  - 2.29 per 100,000 in persons younger than 20 years of age

- Retinitis Pigmentosa
  - Most frequent cause of inherited visual impairment
  - Affects 1 in 3,000 to 1 in 4,000 people in the US
Epidemiology of ocular diseases in children

- Diabetic Retinopathy
  - Leading cause of disease related vision impairment in young adults
  - Type 1 historically most common
  - Type 2 now accounts for 45% of new cases
  - Among pediatric patients average duration of diabetes before retinopathy is 5.7-9.1 years
    - Development of retinopathy greater in patients that are diagnosed during or after puberty

- Optic nerve hypoplasia
  - Exact cause unknown
    - May be associated with prenatal exposure to alcohol, smoking, recreational drugs
    - 70% of cases have no known risk factors
    - Mother’s young age (<20 years), and being first child have increased prevalence
    - Evidence suggests infrequently occurs in isolation

- Cortical Visual Impairment (CVI)
  - Reduction or complete loss of visual acuity and optokinetic nystagmus
  - Due to injury to the visual cortex, with preservation of pupillary response, normal eye motility, and normal retina
  - In infants that experience hypoxia or ischemia, CVI is the most prevalent visual condition and often last to be diagnosed
  - Requires neuroimaging to evaluate the extent of injury to the brain
Access to care

- 20% of preschool age children have a vision problem
  - Less than 15% of preschoolers have received an examination by an eye care professional
- Factors limiting access to comprehensive care
  - False sense of security from vision screenings
  - Absence of signs, symptoms, or family history
  - Limited family income

Why vision screenings are not enough

- Snellen visual acuity used alone as screening tool
  - 100% specific for identifying reduced acuity
  - Misses 75.5% of children found to have binocular and oculomotor vision problems when given a compete visual examination
- Nearly two thirds of children who fail vision screening do not receive follow up care

Cost of eye and vision disorders in children

- $5.9 BILLION
  - Estimated known economic cost of eye and vision disorders among children
- Many indirect and non-medical costs
  - Learning related vision problems are significant contributors to reading difficulty and need for IEP/Special education services
- Future costs
  - Child not reaching full potential
  - Limited occupational choices with decreased earning potential

Educational services for children with undiagnosed and untreated vision conditions

Indirect and non-medical costs

Future costs

Limited occupational choices with decreased earning potential
General considerations

- Study divides exam procedures into three developmental age groups
  - Infant and toddlers (newborn through 2 years)
  - Best in morning or after nap time
  - Objective examination – work quickly
  - Preschool children (3 years through 5 years)
  - Can use more traditional vision tests
  - May need to modify – start with procedures that are less threatening to ease child in
  - School age children
  - May still need to modify testing
  - Remember to assess accommodation, oculomotor skills, and binocular function (NPC/cover testing)

Action statements

- Consensus-Based Action Statements:
  - Based on consensus by guideline development reading group
  - Without any quality of evidence or strength of clinical recommendation

- Evidence-Based Action Statements:
  - Each action statement is accompanied by the quality of evidence, level of confidence, and clinical recommendation grading
  - Grading scale A, B, C, D

What is a comprehensive pediatric visual exam?

- Collect comprehensive history
  - Including patient and family
- Visual Acuity
- Refractive status
- Binocular vision, Oculomotor, and Accommodative status
- Color vision (baseline)
- Ocular and systemic health
  - Pupillary assessment, anterior and posterior segment, peripheral retina, IOP, visual fields
Patient History

- Key component to exam
- Ongoing throughout evaluation
- Should include:
  - Presenting problem
  - Visual and ocular history
  - General health history
    - Include prenatal, perinatal, postnatal, as well as surgery, head and/or ocular trauma and/or treatment
  - Medications and allergies
  - Family ocular and medical history
  - Developmental history of child
  - School performance of school age children
  - Time spent outdoor, sports activities, near work and screen viewing
  - Contact information for other health providers

Testing

Birth to age 2

- Visual Acuity:
  - Preferential looking (Teller cards, Cardiff cards)
  - Fixation preference (Less reliable)
  - VEP

- Refraction:
  - Objective
  - Ret bar or loose lenses

- Cycloplegic Refraction:
  - Select appropriate agent (0.5% < 1yr vs. 1.0% >1 yr)
  - Tropicamide 1% also appropriate

Birth to age 2 (continued)

- Binocular Vision and Ocular Motility
  - Ocular alignment: Cover testing or Hirschberg
    - - Bruelker
      - Detection of strabismus, opacities, anisometropia [improved sensitivity at 4 meters]
  - Stereopsis
    - After 6 months of age
    - Preschool Assessment of Stereopsis with a Smile (PASS)
PASS Stereopsis Test

Testing

- Birth to age 2 (continued)
  - Near Point of Convergence
    - Use interesting targets
  - Ocular Motility
    - Use interesting targets

Testing

- 3 through 5 years of age
  - Visual Acuity
    - Accurate measurement allows for early detection of amblyopia and high refractive errors
    - Verbal or matching/forced choice depending on child’s ability
    - LEA symbols or HOTV
  - Refraction
    - Objective
      - Lens bars or loose lenses
      - Viewing video will help sustain attention at distance
  - Ocular Motility
  - Near Point of Convergence
    - Use interesting targets
### Testing

#### 3 through 5 years of age (continued)
- Cycloplegic retinoscopy
  - Cycloplegic retinoscopy is the preferred procedure for the first evaluation of preschoolers
- Autorefraction
  - Use cautiously
- Color Vision
  - Can be reliably evaluated after 60 months
    - Important to know if severe deficiency – may be misidentified as learning disabled
    - May also indicate ocular health problem

#### 6 through 18 years of age
- Visual Acuity
  - Monocularly, binocularly, distance and near
  - With and without most recent correction
  - Snellen or ETDRS
    - ETDRS especially useful in diagnosing and monitoring amblyopia
### Refraction
- Can be objective or subjective
  - Objective
    - Static retinoscopy (Bar/loose lenses or phoropter)
    - Cycloplegic retinoscopy
      - Consensus-Based Action Statement
        - Cycloplegic retinoscopy is the preferred procedure for the first evaluation of school-age children
      - Clinical note
        - Cycloplegic refraction results in more positive spherical power (Grade B)
        - Difference in spherical refractive errors pre vs. post cyclo is significant up to age 20 (Grade B)
  - Subjective
    - Autorefration
      - May be used as starting point, not as substitute or replacement of subjective refraction
    - Retinoscopy is more accurate than autorefration for starting point (Grade C)

### Binocular Vision, Ocular Motility, and Accommodation
- Ocular alignment:
  - Cover test, Hirschberg, Von Graefe phoria, or Maddox Rod
- Ocular Motility:
  - Saccades and pursuits
- NPC
- Stereopsis
  - Start global – if not present evaluate local, potential for flat fusion, and potential for simultaneous perception
- Positive and negative fusional vergence ranges
- Accommodative testing
  - May include amplitude, facility, NRA/PRA

### Color Vision
- Consensus-Based Action Statement:
  - Abnormal color vision can affect your daily performance and may interfere with occupational choices later in life
  - Test as early as possible to accurately convey that information
Ocular and systemic health

- Standard procedures can be used, but may need to modify for very young patients
- Pupil Responses
  - Visual Field Evaluation
    - Confrontation
- Anterior Segment and Adnexa
- Posterior Segment
  - Pharmacological dilation of pupil is generally required for thorough assessment (Grade B)
  - Examination under general anesthesia may be considered under rare circumstances

Ocular and systemic health

- IOP
  - Prevalence of glaucoma is low, however IOP measurement should be attempted. Testing under anesthesia may be indicated. Include method used and time of day (Grade C)
  - Goldmann is considered the reference of standard, but may not be practical in very young children. Non-contact can provide IOP measurements close to Goldmann (Grade A)
  - Rebound tonometry advantage over Goldmann because portable, easy to use and better tolerated (Grade B)

Ocular and systemic health

- Supplemental Testing
  - May be necessary to
    - Confirm or rule out differential diagnoses
    - Enable more in-depth assessment
  - Electrodiagnostic testing (ERG or VEP)
  - Imaging
    - Ultrasound, OCT, Scanning laser ophthalmoscopy, Fundus photography, Corneal topography, CT, MRI, Scheimpflug camera (Anterior sag)
Testing for learning-related vision problems

- Typically requires additional office visit
- Includes extensive testing of the following
  - Accommodation
  - Binocular Vision
  - Eye movements
  - Visual Information Processing
- May require referral to doctor of optometry with advanced training in this area

Children with special needs

- At-risk children
  - Children with obvious physical anomaly (e.g., strabismus, ptosis, nystagmus)
  - CNS dysfunction (e.g., cerebral palsy, Down syndrome, seizures, developmental delay)
  - Autism Spectrum Disorder
  - Children enrolled in Early Intervention Programs (e.g., IEP, enrolled in early head start)
  - Children with Family of amblyopia, strabismus, or other early eye disease
  - Children born from high-risk pregnancy (e.g., maternal drug use, infection during pregnancy, preterm delivery)

- Developmental Disabilities
  - Often have undetected and untreated visual problems (Higher rate)
  - Should have comprehensive visual evaluation (Consensus-Based Action Statement)
  - Although clinically more challenging, visual assessment is possible in the majority of these children (Grade B)
  - Early identification of visual deficits could lead to interventions to improve educational and occupational achievement and quality of life (Grade B)
Trauma and ocular manifestations of child abuse/neglect

- Ocular signs of abuse
  - General physical signs of abuse or neglect
  - Emotional and behavioral signs of abuse or neglect

- Cortical blindness
- Ruptured globe
- Retinal, preretinal, vitreous hemorrhages particularly if child is less than 2 years old
- Detached retina, retinal dialysis
- Chorioretinal atrophy
- Papilledema
- Optic atrophy
- Cataracts
- Dislocated, subluxated lens
- Glaucoma
- Shallow anterior angle
- Angle recession
- Iris tears, iris dialysis
- Pupillary anomalies
- Anisocoria
- Hyphema
- Hypopyon
- Corneal scars, edema, opacities
- Conjunctival, subconjunctival hemorrhages
- Orbital, periorbital edema
- Lid lacerations
- Ptosis
- Proptosis
- Esotropia
- Strabismus
- Nystagmus
- Disconjugate eye movements
- Eyelash infestation with Phthirus pubis (crab louse)

- Bruises around cheeks, jaw, eyes, ears, or mastoid area
- Soft tissue bruises on upper arms, thighs, buttocks or genitals
- Hair loss with/without subgaleal menatoma
- Torn frenum of upper lip
- Torn ear of mouth
- Burns on any posterior part of the body, particularly buttocks, perineum, hands, or feet
- Full thickness burns
- Multiple lesions or fractures in different stages of healing
- Poor hygiene
- Inferior general health
- Signs of malnutrition such as sunken cheeks and buttocks, distended abdomen
- Child not properly immunized
- Venereal disease in a preadolescent child
- Case history inconsistencies
- No history offered
- History vague or inconsistent with injuries
- History changes during course of examination
- History varies between two parents or between parents and child
- Multiple office visits for accidental injuries
- Increase in severity of injuries
- Delay in seeking medical attention

- Frozen watchfulness
- Fear of strangers
- Indiscriminate attachment to strangers
- Failure to thrive
- Growth failure
- Low intellectual performance
- Sad affect
- Low self-esteem
- Impaired ability to enjoy life
- Social withdrawal
- Learned helplessness
- Suicidal ideation or attempts
- Drug or alcohol abuse
- Misconduct in school
- Academic failure
- Low school attendance
- Aggressive behavior
- Sleeping problems
- Running away
- Low level of activity
- Weight fluctuation
- Fatigue
- Generalized anxiety
- Sexual acting out

- Trauma (Accidental)
  - Majority of concussions occur ages 5-17 years
    - Ages 11-17 most common
  - Children are most vulnerable to consequences of concussion
  - Prolonged recovery with poorer outcomes than adults
  - High prevalence of vision problems post concussion
    - CI is most common (49% in children)
    - Saccadic dysfunction and accommodative insufficiency

- Ocular Manifestations of Child Abuse and Neglect
  - External eye trauma
  - Retinal trauma
  - Most often between 2-18 months of age
  - Eyes can be a direct or indirect target of child abuse and may provide valuable diagnostic information when there are limited external signs of abuse. In children, the leading cause of retinal hemorrhages with retinal folds and macular retinoschisis, in the absence of skull fractures or automobile accident, is typically abusive head trauma. Retinal hemorrhages, poor visual response, and poor pupil response in an infant may indicate abusive head trauma or shaken baby syndrome. (Grade B)
### Management

- **Prescription for correction**
- **Additional Treatment Services**
  - Prism, Vision Therapy, Ocular pharmaceuticals
- **Counseling and Education**
  - Important for children and caregivers to understand the medical information and recommendations given to them
  - Eye models, diagrams, open-ended questions
  - Shared decision making
  - Including in treatment options will increase compliance
  - Be aware of language and cultural differences as well as "health literacy"
  - Use patient centered communication to reduce anxiety
  - ADA: Be aware of requirements

### Management

<table>
<thead>
<tr>
<th>Counseling and Education</th>
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<tbody>
<tr>
<td>Eye safety and protection</td>
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<tr>
<td>Eye injuries are the leading cause of monocular blindness</td>
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<tr>
<td>Eye injuries treated in ER among children &lt;18 years average over 70,000 annually in 1990-2009</td>
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<tr>
<td>Risk of injury is highest in 15-17 year olds</td>
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<tr>
<td>Most common: abrasions or foreign bodies</td>
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<tr>
<td>Majority of eye injuries occur at home</td>
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<td>Frequent causes: sports, chemicals, household products</td>
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<td>Most eye injuries are preventable with use of protective eye wear</td>
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<td>Only 14.5% reported to wear protective eyewear all or most of the time</td>
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### Management

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<tr>
<td>Important to discuss eye safety in school and sports activities [Grade B]</td>
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<tr>
<td>Prevention strategies should focus on protective eyewear, parental supervision, and education on risks of eye injury [Grade B]</td>
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Management

Counseling and Education

Ultraviolet Radiation and Blue Light Protection

- Eyes of infants and young children have higher level of UV and short wavelength transmittance than older children and adults
- Exposure to high level of short wavelength visible energy (blue light) has potential to cause photochemical retinal damage
- Increased evening use of laptops and other broad spectrum self illuminated devices rich in blue light has been suggested to interfere with good sleep hygiene, especially in adolescents

Consensus-Based Action Statement:
- All children and their parents/caregivers should be advised about the benefits of regular use of sunglasses and/or clear prescription glasses that effectively block at least 99% of UVA and UVB, use of hats and brims when outdoors.
### Management

#### Counseling and Education

- **Impact of near work and reduced time outdoors on vision**
  - Prevalence of myopia in children has increased significantly in past few decades.
  - Most children spend considerable time each day using computers, tablets, or smart phones at school and at home – results in less time outdoors.
  - More time spent outdoors and less time indoors during near work may slow axial elongation and prevent high myopia thereby reducing the risk of developing sight-threatening conditions such as retinal detachment and myopic retinopathy. (Grade A)
  - More time outside may decrease myopia progression. Less outdoor/sports activity before myopia onset may exert a stronger influence on the development of myopia than near work. (Grade B)
  - Outdoor time and near work do not have a major effect on myopia progression. (Grade D)
  - Higher levels of outdoor activity were associated with lower amounts of myopia in primary school students. (Grade D)

- **Myopia Control**
  - Early onset myopia is associated with higher progression rates and risk of continuing to high myopia
  - Progressives, prismatic bifocals, multiple and dual focus contact lenses, orthokeratology, and atropine have been studied to slow myopia progression
  - Most successful: low concentration of atropine eye drops and orthokeratology

#### Coordination and Frequency of Care

- Following examination, patient may need additional services
  - **Intra-professional**
    - Treatment of ocular disease, vision rehabilitation, vision therapy, and/or specialty contact lenses
  - **Inter-professional**
    - ONS for ophthalmic surgery or other secondary/tertiary eye care
    - Developmental considerations or systemic disease
    - Pediatrician, pediatric neurologist, school psychologist, Special Education
    - Ocular telehealth programs when necessary
**Management**

### Frequency of Care

#### Infants and Toddlers
- Infants should receive an in-person comprehensive eye and vision assessment between 6 and 12 months of age for the prevention and/or early diagnosis and treatment of sight-threatening eye conditions and to evaluate visual development (Grade B).
- Preterm infant with a history of retinopathy of prematurity should be closely monitored for development of high myopia, astigmatism, and anisometropia (Grade B).
- Early visual examination in infants for amblyopia and amblyopic risk factors can lower the prevalence and severity of amblyopia in children (Grade B).
- Assessment of infant refractive error can identify not only vision problems, but also potential developmental difficulties. Hyperopic infants may show deficits in many visuocognitive, spatial, visuomotor, and attention tests (Grade B).

#### Preschool and School age
- Preschool age children should receive an in-person comprehensive eye and vision examination at least once between the ages of 3 and 5 to prevent and/or diagnose and treat any eye or vision conditions that may affect visual development (Grade B).
- Amblyopia is a treatable condition in children and adolescents (Grade A); however, amblyopia is more responsive to treatment among children younger than 7 years of age (Don’t forget you can still treat later!)
- Uncorrected hyperopia in 4 and 5 year old children has been associated with delays in development of early literacy (Grade C).
- Early identification of amblyopia during the preschool years can result in significantly improved best-corrected visual acuity by kindergarten age (Grade C).
- US Preventive Services Task Force recommends that children that have their vision screened at least once between ages of 3 and 5 years of age (Grade B).
- Gaps exist in delivery of preschool vision screenings and rates of screening are low, particularly in 3 year old children (Grade C).

#### School-age
- School-age children should receive an in-person comprehensive eye and vision examination before beginning school to diagnose, treat, and manage any eye or vision conditions (Grade B).
- Children should receive an eye examination at the beginning of primary school to diagnose the onset of myopia (Grade B).
- Hyperopia can affect the development of literacy skills. Children with uncorrected hyperopia show reduced performance in the acquisition of emergent literacy skills (Grade C).
- Correction of hyperopia may, under specific conditions, lead to increased reading speed; therefore, eye examinations to diagnose uncorrected hyperopia are recommended (Grade B).
- Early diagnosis and treatment of an accommodative or vergence problem may reduce the negative impact on academic performance (Grade B).
- Children with ADHD or related learning problems may benefit from comprehensive vision evaluation to assess the presence of convergence insufficiency (Grade D).
Management

- Frequency of Care
  - Preschool and School age
    - Consensus-Based Action Statement:
      - School-age children should receive an in-person comprehensive eye and vision examination annually to diagnose, treat, and manage any eye or vision problems.

Management

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<th>Examination Interval</th>
<th>Asymptomatic/ Low Risk</th>
<th>At-risk</th>
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<tr>
<td>0-2 years</td>
<td>At least 6 months of age</td>
<td>At least 12 months of age or as recommended</td>
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<tr>
<td>3-5 years</td>
<td>At least once between 3 and 5 years of age</td>
<td>At least once between 3 and 5 years of age or as recommended</td>
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<tr>
<td>6-18 years</td>
<td>Before first grade and annually thereafter</td>
<td>Before first grade and annually or as recommended, thereafter</td>
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### Management

- **At-risk Children**
  - The extent to which a child is at risk determines the appropriate re-evaluation schedule
  - Factors placing a child at risk include:
    - Prematurity
    - Family history of ocular conditions
    - Maternal substance abuse during pregnancy
    - Infection of mother during pregnancy
    - Difficult labor (may cause fetal distress)
    - High or progressive refractive error
    - Cortical visual impairment
    - Neurodevelopmental disorders
    - Systemic health conditions with potential ocular manifestations
    - Wearing contact lenses
    - Eye injuries or previous surgery
    - Taking medications with potential ocular side effects

### Conclusion

- **Eye and vision disorders are substantial in children**
- Research shows that early detection and intervention are important because of the rapid development of the visual system in early childhood and its sensitivity to interference
- When visual disorders occur, long term consequences can lead to vision loss as well as decreased education, occupational opportunities and quality of life
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