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Pediatric Vision Screening Training

Acknowledgements

- These guidelines are based on recommendations from the American Academy of Pediatrics (AAP) and the National Expert Panel of the National Center for Children's Vision and Eye Health (NCCVEH) at Prevent Blindness

- These slides have been adapted from the American Association for Pediatric Ophthalmology and Strabismus (AAPOS) with their permission

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Learning Objectives

- Understand the importance of vision screening
- Understand the basic anatomy of the eye and the pathway of vision
- Recognize Common Vision disorders in Children
- Identify the steps of Vision Screening
- Describe and implement the EPSDT guidelines for referral and follow up
- Properly document screening results referrals and follow up

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Importance of Vision Screening

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Why Perform Vision Screening?

Early intervention is the key to successful treatment

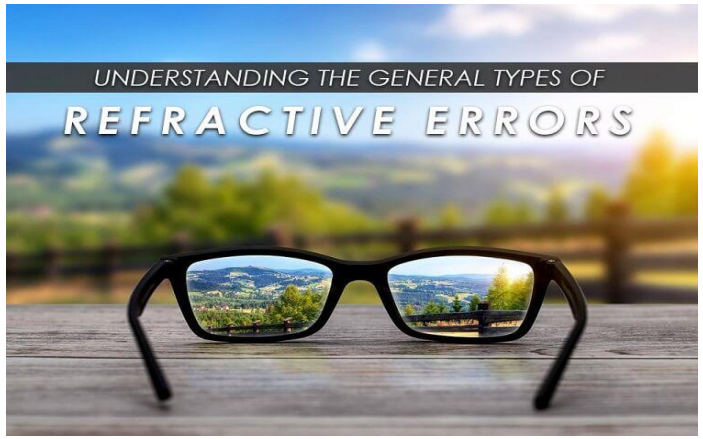

Fig. 1 Large-angle infantile-onset esotropia.

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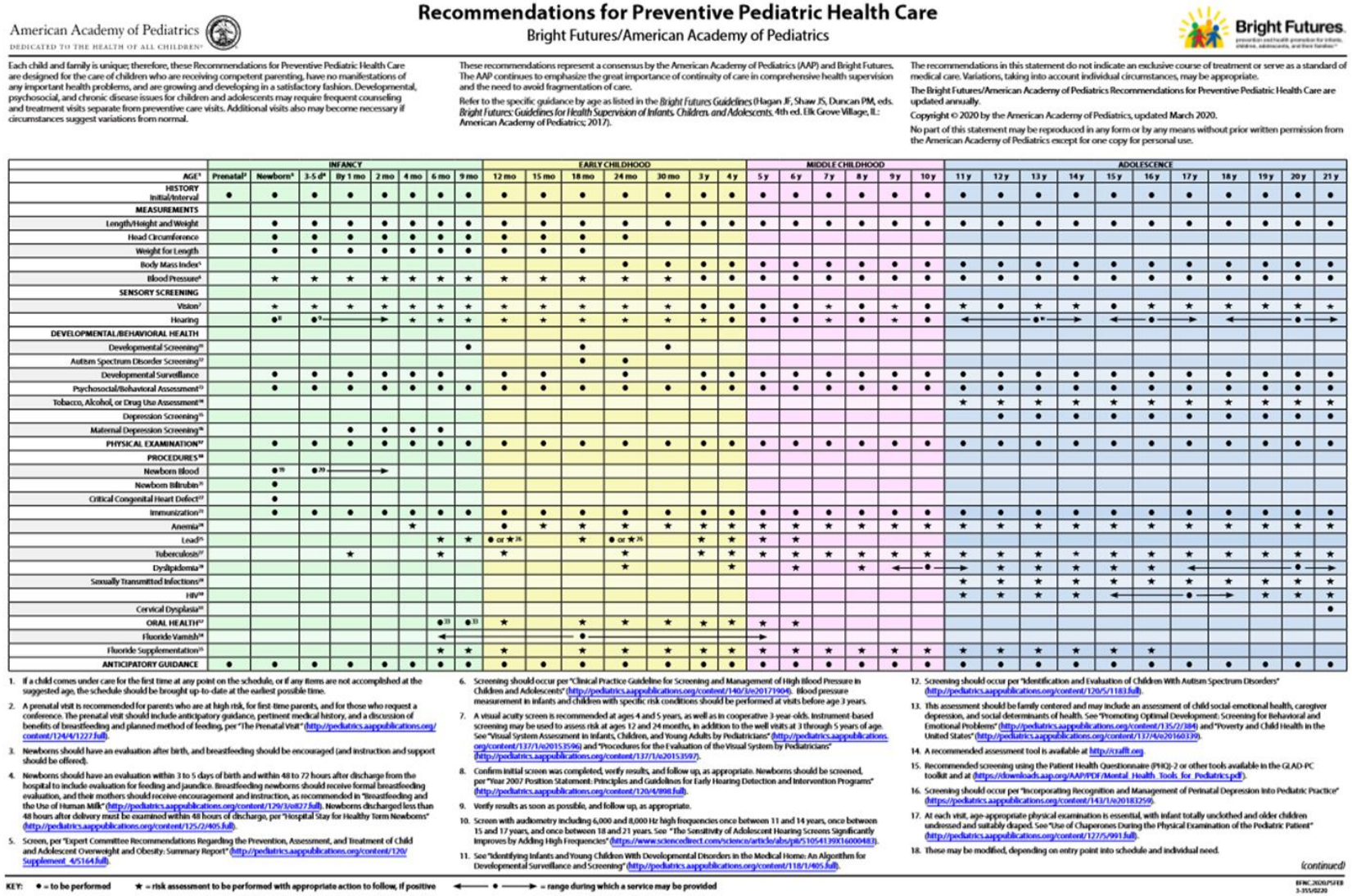
Why Perform Vision Screening?

It is required by the American Academy of Pediatrics [Bright Futures Periodicity Schedule]



American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN

Recommendations for Preventive Pediatric Health Care

Bright Futures/American Academy of Pediatrics

Bright Futures

Each child and family is unique; therefore, these Recommendations for Preventive Pediatric Health Care are designed for the care of children who are receiving competent parenting, have no manifestations of any important health problems, and are growing and developing in a satisfactory fashion. Developmental, psychosocial, and chronic disease issues for children and adolescents may require frequent counseling and treatment visits separate from preventive care visits. Additional visits also may become necessary if circumstances suggest variations from normal.

These recommendations represent a consensus by the American Academy of Pediatrics (AAP) and Bright Futures. The AAP continues to emphasize the great importance of continuity of care in comprehensive health supervision and the need to avoid fragmentation of care.

Refer to the specific guidance by age as listed in the *Bright Futures Guidelines* (Hagan JF, Shaw JS, Duncan PM, eds. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*. 4th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2017).

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

The Bright Futures/American Academy of Pediatrics Recommendations for Preventive Pediatric Health Care are updated annually.

	INFANCY								EARLY CHILDHOOD							MIDDLE CHILDHOOD						ADOLESCENCE										
AGE[1]	Prenatal[2]	Newborn[3]	3-5 d[4]	By 1 mo	2 mo	4 mo	6 mo	9 mo	12 mo	15 mo	18 mo	24 mo	30 mo	3 y	4 y	5 y	6 y	7 y	8 y	9 y	10 y	11 y	12 y	13 y	14 y	15 y	16 y	17 y	18 y	19 y	20 y	21 y
HISTORY Initial/Interval	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MEASUREMENTS																																
Length/Height and Weight		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Head Circumference		•	•	•	•	•	•	•	•	•	•	•																				
Weight for Length		•	•	•	•	•	•	•	•	•	•																					
Body Mass Index[5]												•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Blood Pressure[6]		★	★	★	★	★	★	★	★	★	★	★	★	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SENSORY SCREENING																																
Vision[7]		★	★	★	★	★	★	★	★	★	★	★	★	•	•	•	•	★	•	★	•	★	•	★	★	•	★	★	★	★	★	★
Hearing		•[8]	•[9]	→	★	★	★		★	★	★	★	★	★	•	•	•	★	•	★	•	←		•[9]	→	←	•	→	←		•	→
DEVELOPMENTAL/BEHAVIORAL HEALTH																																
Developmental Screening[10]								•			•		•																			
Autism Spectrum Disorder Screening[12]											•	•																				
Developmental Surveillance		•	•	•	•	•	•		•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Psychosocial/Behavioral Assessment[13]		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tobacco, Alcohol, or Drug Use Assessment[14]																						★	★	★	★	★	★	★	★	★	★	★
Depression Screening[15]																							•	•	•	•	•	•	•	•	•	•
Maternal Depression Screening[16]				•	•	•	•																									
PHYSICAL EXAMINATION[17]		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PROCEDURES[18]																																
Newborn Blood		•[19]	•[19]	→																												
Newborn Bilirubin[20]		•																														
Critical Congenital Heart Defect[22]		•																														
Immunization[23]		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Anemia[24]						★			•	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Lead[25]							★	★	• or ★[26]		★	• or ★[26]		★	★	★	★															
Tuberculosis[27]				★			★		★			★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Dyslipidemia[28]												★			★		★		★	←	•	→	★	★	★	★	★	←		•	→	
Sexually Transmitted Infections[29]																						★	★	★	★	★	★	★	★	★	★	★
HIV[30]																						★	★	★	★	←	•	→	★	★	★	
Cervical Dysplasia[31]																																•
ORAL HEALTH[32]							•[33]	•[33]	★		★	★	★	★	★	★	★															
Fluoride Varnish[34]							←				•				→																	
Fluoride Supplementation[35]							★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★			
ANTICIPATORY GUIDANCE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

1. If a child comes under care for the first time at any point on the schedule, or if any items are not accomplished at the suggested age, the schedule should be brought up-to-date at the earliest possible time.
2. A prenatal visit is recommended for parents who are at high risk, for first-time parents, and for those who request a conference. The prenatal visit should include anticipatory guidance, pertinent medical history, and a discussion of benefits of breastfeeding and planned method of feeding, per "The Prenatal Visit" (http://pediatrics.aappublications.org/content/124/4/1227.full).
3. Newborns should have an evaluation after birth, and breastfeeding should be encouraged (and instruction and support should be offered).
4. Newborns should have an evaluation within 3 to 5 days of birth and within 48 to 72 hours after discharge from the hospital to include evaluation for feeding and jaundice. Breastfeeding newborns should receive formal breastfeeding evaluation, and their mothers should receive encouragement and instruction, as recommended in "Breastfeeding and the Use of Human Milk" (http://pediatrics.aappublications.org/content/129/3/e827.full). Newborns discharged less than 48 hours after delivery must be examined within 48 hours of discharge, per "Hospital Stay for Healthy Term Newborns" (http://pediatrics.aappublications.org/content/125/2/405.full).
5. Screen, per "Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report" (http://pediatrics.aappublications.org/content/120/Supplement_4/S164.full).
6. Screening should occur per "Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents" (http://pediatrics.aappublications.org/content/140/3/e20171904). Blood pressure measurement in infants and children with specific risk conditions should be performed at visits before age 3 years.
7. A visual acuity screen is recommended at ages 4 and 5 years, as well as in cooperative 3-year-olds. Instrument-based screening may be used to assess risk at ages 12 and 24 months, in addition to the well visits at 3 through 5 years of age. See "Visual System Assessment in Infants, Children, and Young Adults by Pediatricians" (http://pediatrics.aappublications.org/content/137/1/e20153596) and "Procedures for the Evaluation of the Visual System by Pediatricians" (http://pediatrics.aappublications.org/content/137/1/e20153597).
8. Confirm initial screen was completed, verify results, and follow up, as appropriate. Newborns should be screened, per "Year 2007 Position Statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs" (http://pediatrics.aappublications.org/content/120/4/898.full).
9. Verify results as soon as possible, and follow up, as appropriate.
10. Screen with audiometry including 6,000 and 8,000 Hz high frequencies once between 11 and 14 years, once between 15 and 17 years, and once between 18 and 21 years. See "The Sensitivity of Adolescent Hearing Screens Significantly Improves by Adding High Frequencies" (https://www.sciencedirect.com/science/article/abs/pii/S1054139X16000483).
11. See "Identifying Infants and Young Children With Developmental Disorders in the Medical Home: An Algorithm for Developmental Surveillance and Screening" (http://pediatrics.aappublications.org/content/118/1/405.full).
12. Screening should occur per "Identification and Evaluation of Children With Autism Spectrum Disorders" (http://pediatrics.aappublications.org/content/120/5/1183.full).
13. This assessment should be family centered and may include an assessment of child social-emotional health, caregiver depression, and social determinants of health. See "Promoting Optimal Development: Screening for Behavioral and Emotional Problems" (http://pediatrics.aappublications.org/content/135/2/384) and "Poverty and Child Health in the United States" (http://pediatrics.aappublications.org/content/137/4/e20160339).
14. A recommended assessment tool is available at http://crafft.org.
15. Recommended screening using the Patient Health Questionnaire (PHQ)-2 or other tools available in the GLAD-PC toolkit and at (https://downloads.aap.org/AAP/PDF/Mental_Health_Tools_for_Pediatrics.pdf).
16. Screening should occur per "Incorporating Recognition and Management of Perinatal Depression Into Pediatric Practice" (https://pediatrics.aappublications.org/content/143/1/e20183259).
17. At each visit, age-appropriate physical examination is essential, with infant totally unclothed and older children undressed and suitably draped. See "Use of Chaperones During the Physical Examination of the Pediatric Patient" (http://pediatrics.aappublications.org/content/127/5/991.full).
18. These may be modified, depending on entry point into schedule and individual need.

(continued)

KEY: • = to be performed ★ = risk assessment to be performed with appropriate action to follow, if positive ← • → = range during which a service may be provided

BFRC 2020/PS/EB
3-355/0220

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Requirements for Visual Acuity Screening

- Must be performed at EVERY well-child exam using a standardized eye chart and other approved method starting at 3 years of age.
- Usually performed by EPSDT CHDP certified medical staff.
- Certification is required every 4 years

Bright Futures Previsit Questionnaire Sample

Questions About Your Child				
Have any of your child's relatives developed new medical problems since your last visit? If yes, please describe:		☐ Yes	☐ No	☐ Unsure
Vision	Do you have concerns about how your child sees?	☐ Yes	☐ No	☐ Unsure
	Has your child ever failed a school vision screening test?	☐ Yes	☐ No	☐ Unsure
	Does your child tend to squint?	☐ Yes	☐ No	☐ Unsure

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Screening Vs. Diagnosis

Screening Purpose

- Identify children at risk for certain eye conditions
- Detect signs of vision disorders in an early, treatable stage
- Identify need for referral to an eye specialist for further evaluation

Diagnosis Purpose

- Determine whether or not the child has an eye condition and which one (comprehensive eye exam)
- Allows the eye specialist to prescribe the appropriate treatment

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Elements of Vision

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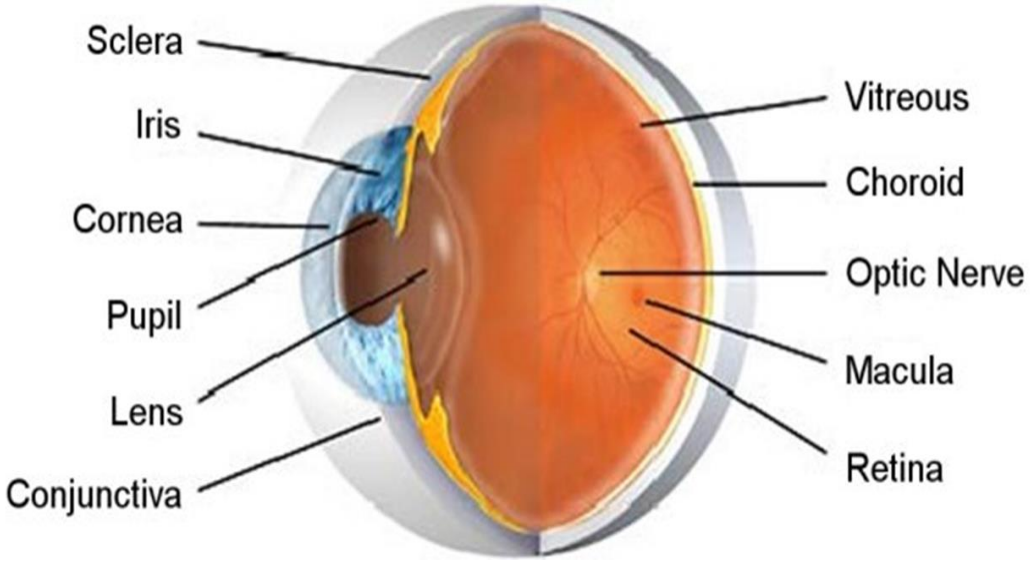
Eye Anatomy

When conducting an external inspection of the eye the clinician examine the:

Sclera: The tough and dense outer coating of the eyeball that forms the white of the eye.
The sclera should be white with no discoloration or growths

Iris: The color portion of the eye; it helps control the amount of light let into the eye.
The iris should be a complete circle and be the same color in both eyes.



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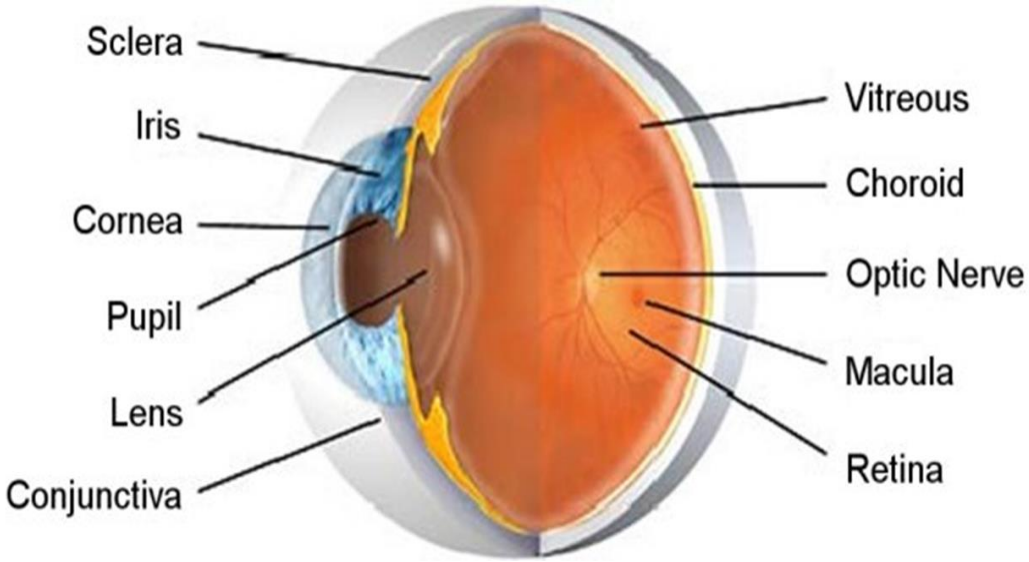
Eye Anatomy *(cont.)*

Cornea: The transparent anterior part of the external coat of the eye covering the iris and the pupil. Its clarity (translucence) permits light to pass into the eye, through the pupil and on to the retina at the back of the eye.) The cornea should be clear with no discoloration check for infection, trauma, inflammation, or dry eye.

Pupil: The opening in the center of the iris through which light enters the eye.
The pupils should be clear and dark. There should be no cloudiness or white discoloration. The pupils should be of equal size and circular shape. If they are white (leukocoria) then an immediate referral to an ophthalmologist is required.



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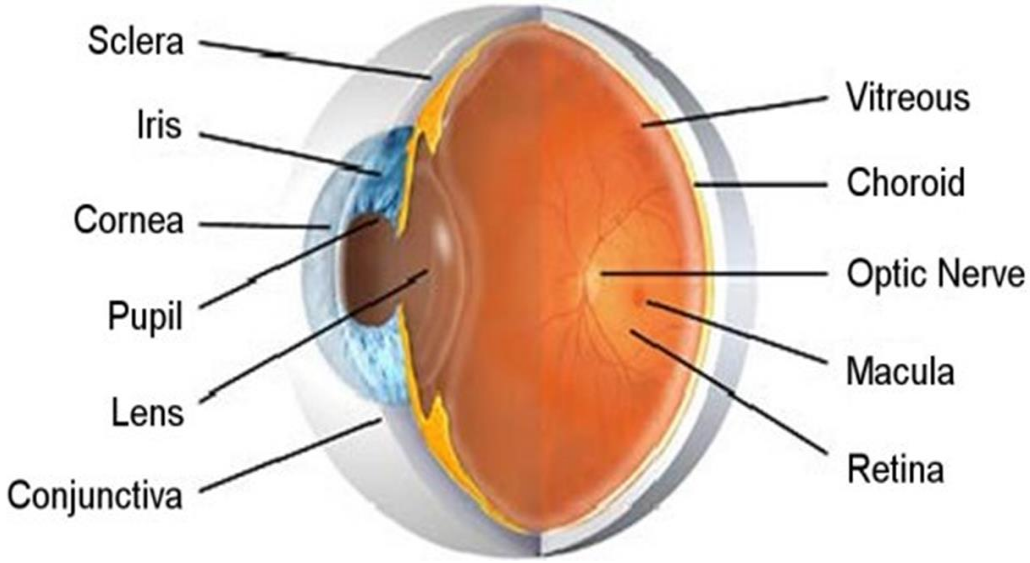
Eye Anatomy *(cont.)*

Lens: A biconvex transparent body situated behind the iris in the eye; its role (along with the cornea) is to focuses light on the retina.

Conjunctiva: The delicate membrane lining the eyelids and covering the eyeball.
The Conjunctiva should be clear and free of infection and/or discoloration. When the there is an infection present it is known as conjunctivitis or by its common name "Pink Eye", which is caused by bacterium or virus. The child should be referred if an infection is suspected.



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Eye Anatomy

Click on eye
to view video

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Pathway of Vision

Click on eye
to view video

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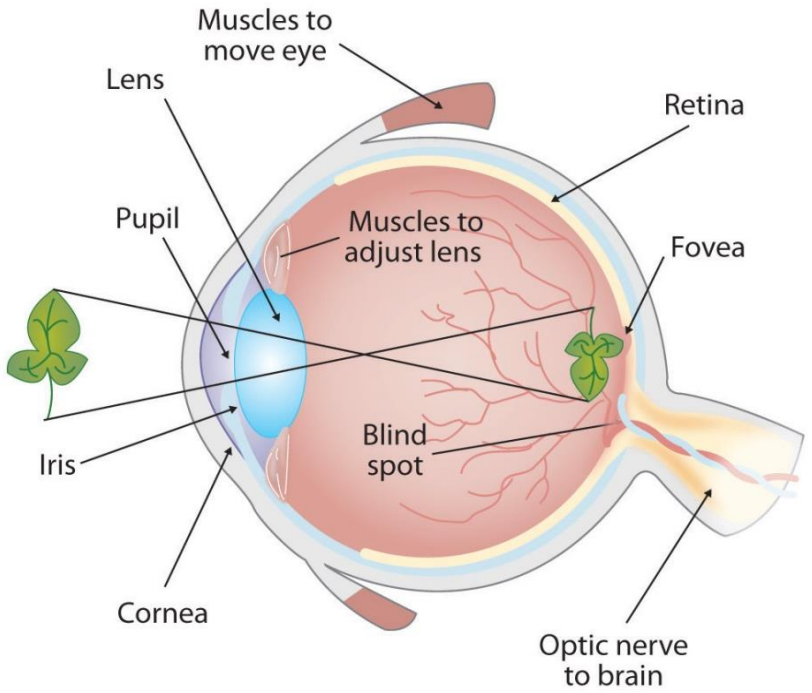
Pathway of Vision

Vision is the process by which images captured by the eye are interpreted by the brain, and the visible part of the eye is where the process of sight begins.

Behind the cornea is a watery fluid called the aqueous humor. The cornea and aqueous humor form an outer lens that refracts (bends) light on its way into the eye. This is where most of the eye's focusing work is done.

The iris controls the amount of light entering the eye through the pupil. Like a camera, which controls the amount of light coming in to prevent both overexposure and underexposure, the iris becomes wider and narrower, changing the size of the pupil to control the amount of light entering the eye. The pupil gets bigger when more light is needed to see better and smaller when there's plenty of light.



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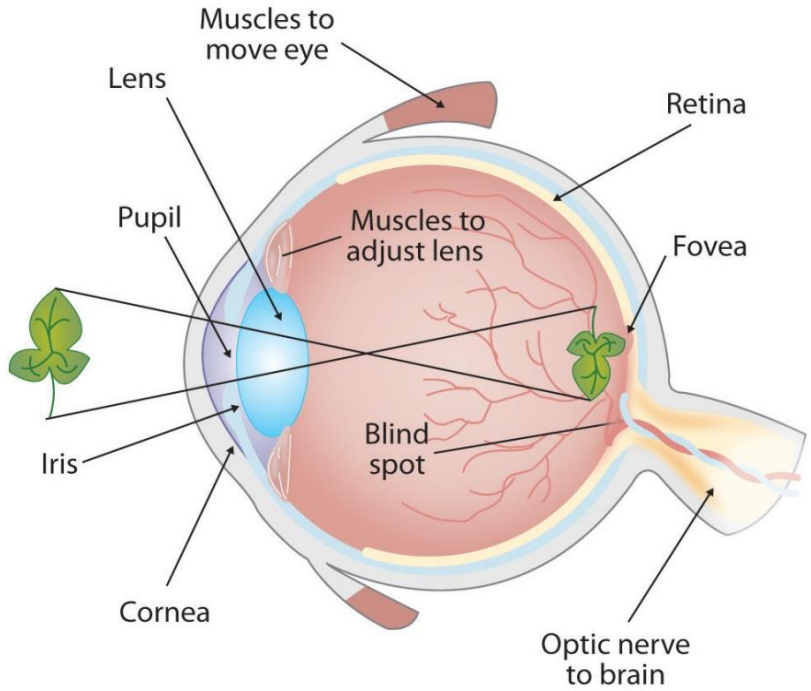
Pathway of Vision *(cont.)*

The retina is made up of millions of light receptors called rods and cones. Rods are much more sensitive to light than cones. Each eye has about 125 million rods that help us see in dim light and detect shades of gray, but they cannot distinguish colors.

When focused light is projected onto the retina, it stimulates the rods and cones. The retina then sends nerve signals. The signals are sent through the back of the eye to the optic nerve. The optic nerve carries these signals to the brain, which interprets them as visual images.



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Development of Vision

- The visual pathway from the eye to the brain is developing from birth to about 9 years of age
- A newborn sees at 20/400, which improves until 5 to 6 years old
- The brain needs input from the eye to develop normally during this period
- This is the critical time period to detect vision conditions

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What Does the Fraction 20/20 Mean?

- Top number (numerator): number of feet away from the chart person should be standing
- Bottom number (denominator): shows the size of the letter
- Remember to test at the appropriate distance.
  - For instance, if you have a 20-foot chart, you must have the child standing at the 20-foot mark. If you have a 10-foot chart, you must have the child stand at the 10-foot line and document the result 10/result, i.e. (10/10)

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Development of Vision

- Visual acuity of a newborn infant: approximately 20/400
- Ability to follow an object by three months of age (in most infants)
- Ability to distinguish colors by 5 months of age
- Between three and seven months of age:
  - Perception of depth (stereopsis)
  - Ability to maintain visual focus on an object with both eyes, creating a single visual image (binocular vision)

Visual acuity reaches the adult level of 20/20 by three to five years of age, though young children often will not perform formal visual acuity testing to this level

Amblyopia

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Amblyopia

Amblyopia affects 2-3% of children in the United States.

About 4.5 million children with preventable vision loss
(Ref National Eye Institute (NEI))

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Amblyopia

- This is what the zebra would look like through the eyes of a child with Amblyopia
- Over time the eye that "sees" the blurry image will be completely ignored by the brain

Blurred View

Normal View

Figure 1. Amblyopia occurs when one eye experiences a blurred view and the other is normal view, but brain only processes the normal view.

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Amblyopia Effects

Amblyopia can only develop during childhood

- If NOT treated in childhood
  - May result in **permanent vision loss**
  - Permanent vision loss **cannot be corrected** by contact lenses, glasses, or laser
  - Untreated Amblyopia is the **most common cause** of vision loss in adults 20-70 years of age

Blurred View

Normal View

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Common Causes of Amblyopia

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Common Causes of Amblyopia

- Untreated or unequal refractive errors:
  - Nearsighted (Myopia)
  - Farsighted (Hyperopia)
  - Astigmatism
- Strabismus or “crossed eyes”
- Obstruction:
  - Ptosis
  - Cataract

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Refractive Errors

Myopia

- A difficulty or inability to see distant objects.
- Nearsighted: close objects are seen clearly

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Refractive Errors *(cont.)*

Hyperopia

- A difficulty or inability to see close objects.
- Farsighted: distant objects are seen clearly

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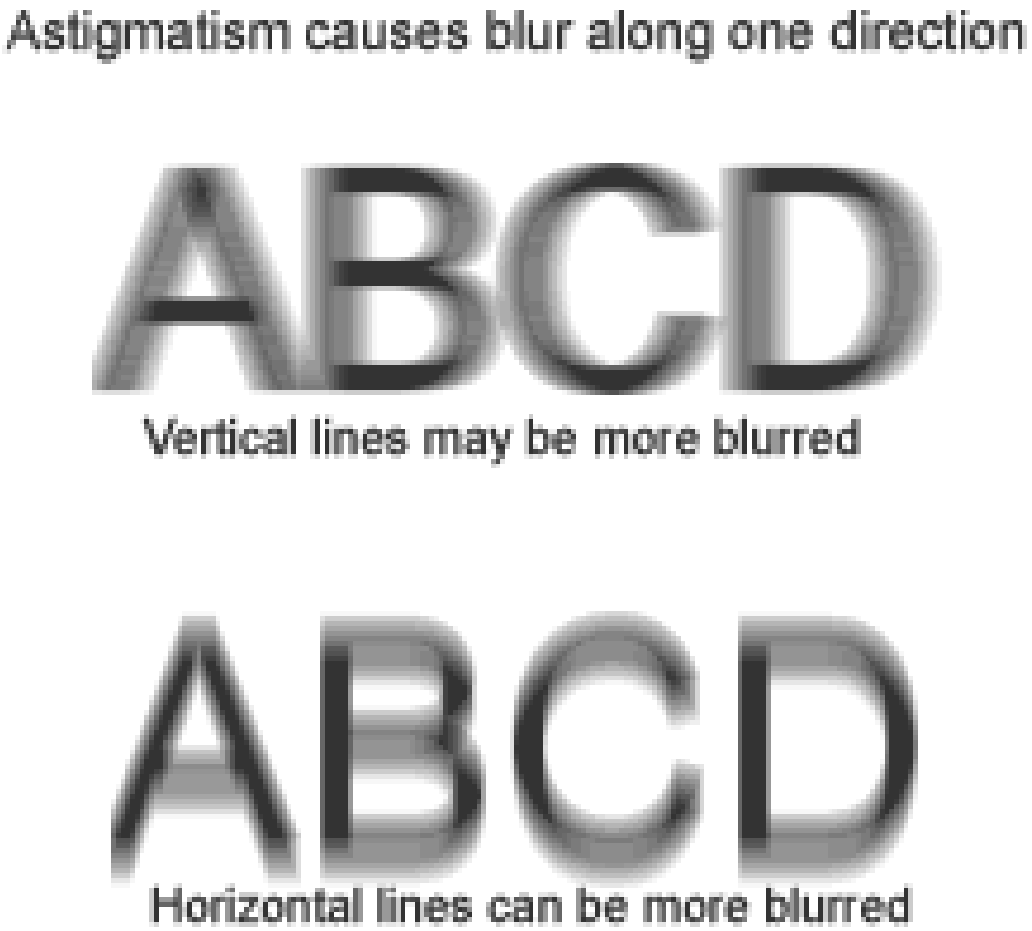
Refractive Errors *(cont.)*

Astigmatism

- An irregular curve in the eye causing blurry vision at all distances



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Strabismus

- A condition in which they eyes cannot align to look at the same place at the same time
- Crossed eyes, misalignment of the eyes

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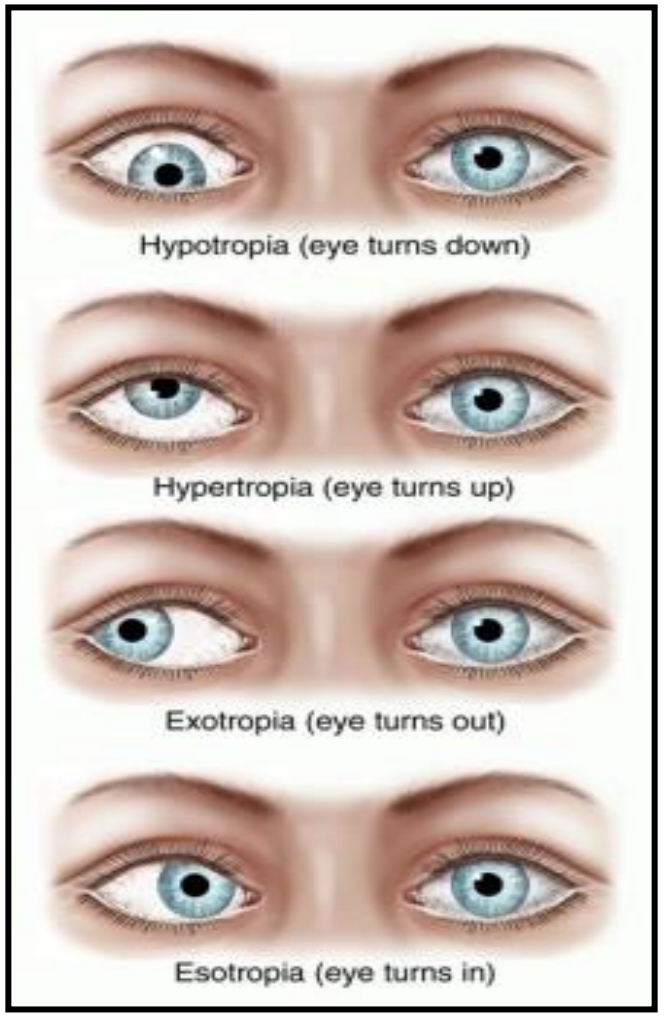
Types of Stabismus

- Hypotropia – eye turns down
- Hypertropia – eye turns up
- Exotropia – eye turns out
- Esotropia – eye turns in

*Up to 5% of children have some type of Strabismus



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Obstruction

Ptosis: drooping of an eyelid due to a weak lid muscle.

- May obstruct vision
- Look for chin elevation in these children.

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Obstruction *(cont.)*

Cataract: condition in which the lens of the eye becomes progressively cloudy, resulting in blurred vision.

Some Causes:

- Congenital
- Trauma
- Systemic diseases
- Tumors

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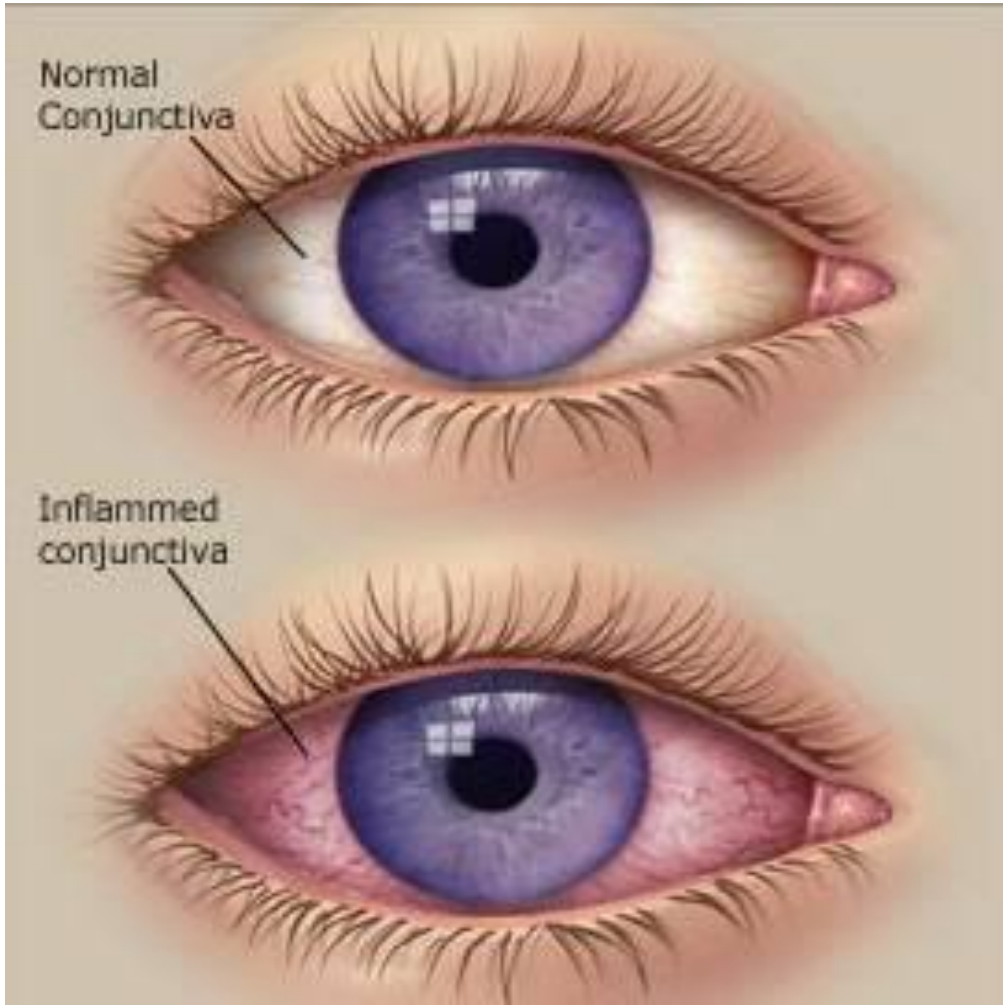
Other Vision Conditions

These other vision conditions are less common, but could cause problems with the eye that make vision screening difficult, so be on the lookout for any kind of visible irritation or abnormality of the eye or Conjunctivitis (pink eye).



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Screening Early is Best

- School-aged vision screening may be too late
- Amblyopia is harder to treat after 5 years of age
- By 7 years of age, some vision loss from amblyopia may become permanent

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Barriers to Screening

- Poor cooperation of young children
- Takes time to perform
- Staff not adequately trained
- Poor reimbursement for physicians

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References & Links

- Visual System Assessment in Infants, Children and Young Adults by Pediatricians
  - American Academy of Pediatrics Policy Statement
  - Pediatrics. January 2016. Volume 137. Issue 1
- Procedures for the Evaluation of the Visual System by Pediatricians
  - American Academy of Pediatrics Clinical Report
  - Pediatrics. January 2016. Volume 137. Issue 1

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References & Links

- Bright Future and Preventative Medicine Coding Fact Sheet
  - American Academy of Pediatrics
  - AAP.org → Professional Resources → Practice Transformation → Coding at the AAP
  - Updated January 2016
- Vision Screening for Children 36 to < 72 Months: Recommended Practices
  - National Expert Panel to the National Center for Children's Vision and Eye Health
  - Optometry and Vision Science. January 2015. Volume 92. No. 1
  - CHDP 2016 Vision Health Assessment Guidelines

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Important Next Steps:

cencalhealth.org/providers/care-guidelines/medi-cal-for-kids-teens-services/pediatric-oral-health/

1. Please take a moment to work with your Clinical Trainer and walk through a Vision Screening practice session.

2. Once complete, please submit the CenCal Health Training Acknowledgement Form to receive your Vision Screening Training Certificate of Completion for your records.

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