

Background and Overview

Introduction

Healthy Vision 2010, as part of the *Healthy People 2010* objectives, promotes the following objectives related to children and vision screening: Increase the proportion of preschool children aged 5 and under who receive vision screening (Objective 28-2) and Reduce uncorrected visual impairment due to refractive errors (Objective 28-3).

According to the United States Center for Statistics, only 14% of children below the age of 6 have received a comprehensive eye exam. Although laws and guidelines exist in most states for vision screening of preschool children, only 21% of preschool children are actually screened for vision problems and it is estimated that nearly 25% of school-age children have vision problems.

It has been estimated that as much as 80% of what a person learns during the first 12 years of life is the product of the sense of vision. The importance of vision in a child's education should be a concern, as vision disorders are the 4th most common disability in the United States and the most prevalent handicapping condition in childhood. Vision disorders include amblyopia, strabismus, significant refractive error, ocular disease, and color deficits. Early discovery and treatment of vision disorders in infants and young children can improve the prognosis for normal eye development, prevent further vision loss and may decrease the impact of learning problems, poor school performance, developmental delays and behavior concerns.

Vision screenings can identify children who have potential eye problems and need comprehensive eye exams. Routine screenings ensure that more children have their vision evaluated over the period in which their vision develops. Many school systems have regular vision screening programs that are carried out by volunteer professionals, school nurses, and/or properly trained laypersons. These guidelines are to help in the endeavor to screen children for vision problems by having uniform techniques to screen each age group.

Purpose

The purpose of the *University of Iowa Department of Ophthalmology Vision Screening Guidelines* is to promote healthy vision in infants, children, and youth by identifying possible vision abnormalities that require a referral to an eye specialist (optometrist or ophthalmologist).

Goals

The goals of the *University of Iowa Department of Ophthalmology Vision Screening Guidelines* are to:

- Promote consistent vision screening procedures in all settings.
- Provide guidelines for the education of vision screeners.
- Provide a resource for information and equipment.

Rationale for a Vision Screening Program

The detection of vision abnormalities in young children is important because a child's ability to visually recognize and discriminate are the foundations of most preschool and school programs. While statistics vary by source, Table 1 is one estimate of the prevalence of vision abnormalities found in children in age groups from birth through age 18. The most significant visual abnormalities develop before or around the time children begin school. These problems include strabismus (muscle imbalance), hyperopia (farsightedness), and amblyopia (lazy eye). Infantile esotropia (inward turning eye) and exotropia (outward turning eye) are the most common forms of strabismus and should be detected and treated well before school begins. Accommodative esotropia is the result of over convergence in excessively farsighted (hyperopic) children. Accommodative esotropia occurs most commonly in toddlers but may be seen as late as age seven. Mild hyperopia is normal in children up to age seven and should not be confused with more severe hyperopia of +2.50 diopters or more, which may lead to accommodative esotropia and amblyopia. Amblyopia is loss of vision in one or both eyes, which is most often the result of strabismus or an asymmetric refractive error. If left untreated, the vision loss may be permanent.

Table 1

Common Vision Problems in Children by Age Group

Vision Problem	Age Groups	
	Ages 6 months to 5 years 11 months	Ages 6 years to 18 years
Hyperopia	33%	23%
Astigmatism	22.5%	22.5%
Myopia	9.4%	20.2%
Nonstrabismic binocular disorders	5.0%	16.3%
Strabismus	21.1%	10.0%
Amblyopia	7.9%	7.8%
Accommodative Disorders	1.0%	6.0%
Peripheral retinal abnormalities requiring referral or follow-up care	0.5%	2%

The use of effective vision screening procedures to detect possible vision abnormalities in children is a critical element in the health and education of Iowa's children.

Vision Screening Guidelines

Laws Affecting School Vision Screening Programs

General vision screening of children and youth is not mandated in Iowa. Best practice does, however, dictate periodic vision screening of children before and after school entry. Throughout Iowa, there are many examples of well-developed and successful vision screening programs.

While there are no legislative or regulatory requirements in Iowa mandating vision screening of children, the Iowa Legislature supports vision screening and support for vision screening can be found in both federal and state special education laws.

Federal Law, 20 U.S.C.1412 (5)(c) the Code of Federal Regulations 34 §300.532(f) states: “The child or youth who is suspected to be in need of special education is assessed in all areas related to the suspected disability, including, where appropriate, health, vision, hearing, social and emotional status, general intelligence, academic performance, communicative status, and motor abilities.”

The Iowa Administrative Code states:

281—41.48(3) *Full and individual evaluation*. A full and individual evaluation of the individual’s educational needs shall be completed before any action is taken with respect to the initial provision of special education and related services. Written parental consent as required in these rules shall be obtained prior to conducting a full and individual evaluation. The purpose of the full and individual evaluation is to determine the educational interventions that are required to resolve the presenting problem, behaviors of concern, or suspected disability, including whether the educational interventions are special education.

- a. A full and individual evaluation shall include:
 1. An objective definition of the presenting problem, behaviors of concern, or suspected disability.
 2. Analysis of existing information about the individual, including the results of general education interventions.
 3. Identification of the individual's strengths or areas of competence relevant to the presenting problem, behaviors of concern or suspected disability.
 4. Collection of additional information needed to design interventions intended to resolve the presenting problem, behaviors of concern, or suspected disability, including, if appropriate, assessment or evaluation of health, vision, hearing, social and emotional status, general intelligence, academic performance, communicative status, adaptive behavior and motor abilities.
- b. A multidisciplinary team makes the evaluation.

Iowa Administrative Code, 280.7A Student Eye Care

1. A parent or guardian who registers a child for kindergarten or a preschool program shall be given a student vision card provided by the Iowa Optometric Association and as approved by the Department of Education with a goal of every child receiving an eye examination by age seven, as needed.
2. School districts may encourage a student to receive an eye examination by a licensed ophthalmologist or optometrist prior to the student receiving special education services pursuant to chapter 256B. The eye examination is not a requirement for a student to receive special education services. A parent or guardian shall be responsible for ensuring that a student receives an eye examination pursuant to this section.
3. Area Education Agencies, pursuant to section 273.3, shall make every effort to provide, in collaboration with local community organizations, vision screening services to children ages two through four.

This Act applies to school years beginning on or after July 1, 2009.

State of Iowa Eye Care Provider Guidelines

The Iowa Optometric Association and the Iowa Academy of Ophthalmology stress the importance of good vision and healthy eyes. Recognizing the importance of vision in learning, both organizations recommend that children between the ages of 6 months and 4 years, who do not show signs of visual defects, receive a scientifically validated vision screening to rule out undetected vision problems. If a parent suspects a vision problem, for their child of any age, both organizations recommend the child receive a comprehensive eye examination from an ophthalmologist or optometrist.

Other Guidelines

The U.S. Preventative Services Task Force, the American Association for Pediatric Ophthalmology and Strabismus, the American Academy of Ophthalmology, the American Academy of Pediatrics, the American Academy of Family Physicians, Prevent Blindness American, and the American Association of Certified Orthoptists recommend early vision screening. The recommendations of these organizations are used as resources throughout this manual. Furthermore, the American Academy of Ophthalmology and the American Association for Pediatric Ophthalmology and Strabismus recommend an ophthalmological examination be performed whenever questions arise about the health of the visual system of a child of any age. Currently, the American Optometric Association supports vision-screening efforts, but recommends a complete eye examination in infants, pre-school and school age children.

Vision Screening Program Details

The vision screening program needs to be described to all teachers and students before the screening begins to prepare them for the vision screening and secure cooperation. The overall goal is to incorporate eye health and safety for children beginning at birth.

Personnel

The screening team varies according to need. The individuals who will be conducting the screening program should be knowledgeable about visual abnormalities and familiar with the instruments and procedures to be used. Screeners often include school nurses, teachers, vision screening technicians, or lay volunteers. No one should attempt to conduct vision-screening procedures until they have demonstrated adequate understanding and skill in test administration and interpretation and recording of results.

A qualified vision screener is a person who (1) has successfully completed an approved vision screening education program by demonstrating the required skills to perform all recommended vision screening components and (2) passed a written examination with 85% accuracy (Appendix E).

Vision screening programs by an ophthalmologist or optometrist are generally not carried out in public health or school settings to ensure that the screening is not misinterpreted as a complete eye examination.

No vision screening procedures, regardless of how complex or extensive, can substitute for a complete, professional eye examination.

Choice of Testing Methodology

While the ideal vision screening program has yet to be developed, several approaches to effective vision screening are available. The vision screening methods described in this manual were carefully selected after a thorough review of the vision screening literature. Among the reasons for excluding a particular test were difficulties with the administration, scoring, or interpretation of the results, a poor correlation with significant visual difficulties, or a low reliability, validity, sensitivity or specificity. In addition to these factors, the recommended screening methods were based on the relative low cost of equipment and administration, the experience of other vision screeners and screening programs, and the personal experience of the manual's authors.

Photoscreening

The authors of this manual recognize the value of photoscreening for use with younger children (6 months to 4 years of age). For this reason, we support the use of photoscreening, when available, as an adjunct to the vision screening methods recommended in these guidelines.

Administration of a Vision Screening Program

To promote the continuity of vision care and to prevent the further development of undetected vision abnormalities, most experts recommend all children have their vision screened regularly. However, the frequency and timing of the screening has not been standardized.

There are a number of organizations that have made recommendations concerning vision screening (Appendix E). In general, these organizations support the vision screening of infants, especially those who are at risk for visual abnormalities, universally support the vision screening of preschoolers for the detection of any condition that may lead to amblyopia and a screening of first graders. An additional two vision screenings of children while in elementary school is generally supported; however, the grades in which to screen appear arbitrary.

School registration materials may include a notification to parents/guardians of vision screening and a statement that if the parent(s) do not want the student to be screened, they should notify the school. A sample notification of vision screening letter can be found in Appendix B.

Rescreening

Children who do not pass a part of the initial screening should receive a rescreening on another day before a referral is made for a professional eye examination. Also to be rescreened are those children who the screener was not able to test due to a child's inability or unwillingness to respond to the initial screening. The rescreening should be within two weeks following the initial screening. Children that can not be successfully screened on their second attempt should be referred.

Referral to an Eye Specialist

The vision screening program is the first step in identifying children and youth that need a comprehensive eye examination. The child or youth who fails the screening and rescreening program and those from whom the vision screener was unable to obtain results must be referred to a eye specialist for a complete eye examination. Sample letters that may be used for the referral process can be found in Appendix B.

Notification to parents that their child has not passed a vision screening and the need for the child to be examined by an eye specialist is the responsibility of the screening agency. Referral procedures are provided in the introduction of each age-related section of this manual.

Screening personnel should not represent the vision screening as an eye examination nor should personnel other than an optometrist or ophthalmologist make tentative diagnostic statements or suggestions that any child needs glasses or specific treatment. The agency should not make any statements or present any implications that restrict the child's or parent's freedom of choice regarding place of treatment or selection of practitioner.

All concerned with vision screening must be well informed as to the limitations of the vision-screening program being used. A child's successful vision screening does not guarantee that a vision defect or condition serious enough to require further evaluation and treatment does not exist. Any communication to children or parents regarding the result of the screening should clearly indicate that it does not replace the need for routine professional care.

Follow-up to the Eye Specialist Referral

Knowing the outcome of the referral for a professional eye examination is critical to the success of a vision screening program. The screener needs first to know if the referred child's caregiver followed through on the referral. Further encouragement may need to be provided in some cases. It is also important to record the results of the examination as part of a child's health file. The eye examination report in Appendix B may be used as a permanent record. A vision screening and follow-up form is provided at the end of each age-related category of this manual to record overall vision screening program results.

Dissemination of Information

Appropriate persons in the school need to be notified in cases where the outcome of the eye specialist examination has implications for a child's educational functioning. For example, if a child has newly prescribed eyeglasses, teachers should be informed if the glasses are for constant wear, only near tasks or only distant tasks. Any prescribed regime such as patching needs to be shared with educational staff. Examination results should also accompany any referral to special education for a child with a possible visual impairment.

Record Keeping

The Society to Prevent Blindness (1984) states that record keeping and reporting of results are essential parts of any vision-screening project. The data in the summary reports are useful for evaluating the project and for reporting results to school officials and parents.

Accurate records of the children screened and referred, and follow-up activity on referrals is necessary. With the exception of infants and toddlers (birth through 2), each section of procedures in this manual provides a Vision Screening Roster & Follow-up form that can be used to record individual vision screening results and summary information. In addition, the vision screening results should be recorded on the individual student health record.

Based on the literature and their own experience, the developers of this manual recommend that an effective vision screening program should screen, at minimum, during infancy, once during the preschool years, once in kindergarten or first grade, and again in third and fifth grades.

Special Issues in Vision Screening

Children Who Wear Glasses

Children who wear glasses or contact lenses should be screened while wearing their glasses or contact lenses and should be referred for professional eye care if (1) the child's health record indicates that the child has not been seen by an eye specialist for two years, or (2) the child's glasses are scratched, ill fitting or broken. Results of the screening need to be individually considered and if necessary, discussed with the parent(s) to determine the appropriate action.

Children Who Are Difficult to Test

There are many children who, for a variety of reasons, may not respond or be able to respond to the vision screener's efforts. Some children may be unwilling to cooperate on the testing day. Other children, especially those in preschool through kindergarten, may not have attained a level of knowledge great enough to respond to standardized tests (e.g. not knowing how to match). Still other children have physical, mental, or language disabilities that prevent their vision from being appropriately tested using standardized means.

Uncooperative children need to be encouraged by teachers and parents to attend to the test so that they may be more cooperative when rescreened. The screener may also wish to ask the uncooperative child's teachers for rewards that could be provided to the child for cooperative behavior. Children who lack understanding may be able to gain the necessary skills to respond favorably to the vision rescreening by receiving training in the tasks needed for screening.

It is important for those involved in the vision screening to remember that the purpose of their activities is prevention of eye disease and an assurance that children are seeing as well as they can for educational purposes. It is therefore considered best practice to refer children with unsuccessful vision screening results to an eye specialist for an eye examination.

Developing and maintaining a resource listing of local eye specialists willing and able to take the extra time necessary for successfully examining difficult-to-test children is recommended. Care should be taken not to recommend a specific eye specialist to parents, however.

Many children and youth with disabilities are more difficult to test than other children. However vision screening, referral and follow-up are no less important for these children. Therefore, every effort should be made to adequately screen *all* children and youth.

Children with Visual Impairment

Children who have been previously identified as having a visual impairment should **not be screened**. Children who have known vision loss will always fail a vision screening and for this reason, need not be screened. Information about their visual functioning should be available through the appropriate Area Education Agency Special Education division and should also be part of the child's health record at the school.

Referral to Special Education

Children who have been referred to an eye specialist where it was found that the child's vision cannot be corrected to 20/20 may be eligible for services as a child with a visual impairment. Generally, referrals for special education determination are made when a child's best-corrected vision is 20/70 or less in their better eye, or the child is experiencing a loss of visual field, or the child has been diagnosed with an eye condition indicative of a progressive loss of vision. Actual eligibility for special education as a child with a visual impairment is based on the child's visual functioning in educational and other settings in conjunction with a clinical evaluation. This determination is the responsibility of a multidisciplinary team that includes a teacher of students with visual impairment. Providers of the vision screening program and the Area Education Agency Special Education division should jointly determine the criteria and protocol for referring children for special education assessment based on vision loss.

Test Procedures and Sample Forms

The recommended screening procedures that follow are divided into three age-specific categories (Table 2). These age categories were selected on the basis of the need to screen for specific age-related vision problems. From birth through age two, vision difficulties resulting from congenital anomalies are screened. The focus of vision screening for preschool and kindergarten children is the identification of amblyopia or strabismus. The focus of vision screening during elementary school years is on the identification of hyperopia, myopia and color vision deficiencies.

Each age category contains a description of the type of instruments, recommended procedures for its administration and criteria for pass or don't pass. As some procedures are used in more than one age category, the reader will find some tests repeated. Sources for purchasing the recommended vision screening instruments can be found in Appendix C. If a program wishes to purchase equipment, the purchaser may want to comparison shop as the price of some instruments can vary greatly between sources.

Additionally, several pages at the end of each category contain forms that can be printed, photocopied and used for recording a child’s test results. Instructions for completing the forms are also provided.

Finally, each category suggests a referral procedure that may be adopted or adapted to the needs of a local screening program.

Table 2

UI Vision Screening Guideline Recommendations: Age and Grade, Function and Instruments

Age & Grade	History	Appearance, Behavior & Complaint	Fixation & Following	Distance Acuity	Stereopsis	Near Acuity	Color Vision
Infant (Birth-2 years)	Yes	AB Checklist	Observe				
Preschool & Kindergarten (3-5 years)	Yes	ABC Checklist		Lea Symbols	Random Dot E		
Elementary Grades 1*, 3, 5 (6-11 years)	New students only	ABC Checklist		ETDRS Chart		Plus Lens (1 & 3 only)	Ishihara in 3 rd grade

* If screened in Kindergarten, no screening necessary in first grade.

TEST PROCEDURES AND SAMPLE FORMS FOR VISION SCREENING OF INFANTS & TODDLERS

Birth through 2 years

General Considerations

Most vision screening of infants and toddlers is dependent on history, appearance of the eyes and the child's behavior. History is especially critical for the identification of children with a high risk for vision anomalies, necessitating a referral to an eye specialist.

The vision screening of infant or toddler can be a challenge and requires flexibility on the part of the screener. Timing is also a critical factor in screening the vision of very young children. Whenever possible, schedule the screening to occur at a time of day when the infant or toddler is typically awake and alert. Ask the parent or caregiver to bring a favorite toy, teething ring, pacifier, or other items that seem to quiet the child. During the screening the child should be kept as comfortable as possible.

Some children are quite visually attentive while drinking from a bottle or eating a cracker. Infants who lack head and neck control should be positioned so that their head and body are stabilized, either held by a parent or caregiver, or lying in an infant carrier or on a flat surface. Most infants and toddlers are more visually attentive when positioned at least partially upright. Older infants and toddlers can be seated on the lap of a parent or caregiver. The child must feel secure in order to attend to the screening procedures.

The screener may find it helpful to use auditory cues (speech, noisemaking toys, etc.) to attract the child's attention to the vision task. However, the sound cues must be eliminated during the actual testing to be certain that the child is using vision, rather than auditory input, to respond during the test.

Referral Procedures

The testing situation for children in this age category will likely differ greatly from mass screenings commonly used in the preschool and school-age years. The following referral procedures may be used in a vision-screening program for infants and toddlers if face-to-face or other more personal interactions, between the screener and the parent or caregiver are not available. A copy of each of the letters and forms referred to will be found in Appendix B.

- Notify parents/guardian of the need for a professional eye examination by mailing a completed referral letter.
- Enclose with the parent notification copies of the Eye Examination Report and the Vision Referral Follow-up form.
- Parents/guardian should mark and complete the Vision Referral form and return it to the vision screener. The screener acts on parent/guardian's response as appropriate.
- The eye specialist will complete the Eye Examination Report and return it to the vision screener.
- The vision screener records the results of the eye examination and notifies others as appropriate.

HISTORY, APPEARANCE (A) AND BEHAVIOR (B)

A form and instructions for recording results will be found following the Infant & Toddler section of this manual.

Purpose

To determine if the child has a greater than normal risk for vision abnormalities.

Vision problems detected

There are specific conditions that are associated with a higher probability of the child having a visual impairment. The presence of any of these conditions can be noted when the child's health history is initially obtained or when the child's health history is updated. The presence of any one of these conditions, that have not been evaluated in the past or that has worsened since the child's last evaluation by an eye specialist, should alert the screener to an increased probability of vision problems.

Age range

Birth through 2 years

Equipment

History, Appearance, Behavior Checklist can be printed, photocopied and used as a guide.

Procedure

Health history can be obtained by reviewing the child's health records, by having the child's caregiver complete the health history form, or interviewing the child's parent or caregiver for any of the factors listed under Risk Factors.

1. Review accompanying form, "History AB" (Appearance, Behavior). If appropriate, review the completed History form.
2. Thoroughly visually inspect the child's eyes to see if any of the "Appearances" conditions are present.
3. Caregiver's, teacher's, and other service provider's observations should be enlisted to determine if any of the Appearances or behaviors are present.
4. It is important to request information on age appropriate behaviors only.

Referral Criteria

The child should be referred when any of the following risk factors, appearance of the eyes, or behaviors are present.

FIXATION AND TRACKING

A form and instructions for recording results will be found following the Infant and Toddler section of this manual.

Purpose

- To determine the child's ability to visually fixate on a small object
- To determine the child's ability to move eyes in a normal fashion

Vision problems detected

- Impaired visual acuity
- Ocular motility disorders

Age range

- Birth through 2 years
- Can be used at any age, but other tests are generally used for older children

Equipment

Any small detailed objects (approximately 2") that can encourage and hold the interest of a young child (e.g. finger puppet on a pen light)

Procedure

1. Hold the object (fixation target) approximately 12-16" from the eyes.
2. Use of noise initially to get attention is acceptable. DO NOT provide continuous sound stimulation during the test.
3. If the child does not fixate (look directly at) the target, bring it closer or move the target around until fixation is obtained, then return the target to the original position.
4. Observe if the child's eyes are aligned with the target. Observe both eyes for their relative alignment with each other and whether they are both fixating on the target.
5. Move the target horizontally to the right 6-8" (move the target moderately slow, taking 2-3 seconds to cover the distance). Return the target to the central position, then move it to the left 6-8". In children less than four months of age, the target should be moved even slower. Do not allow the child's head to turn instead of turning their eyes. The child's head may need to be stabilized.
6. Move the target vertically from the central position to a point even with the top of the child's head (move the target moderately slow, taking 2-3 seconds to cover the distance). Return the target to the central position, then move it downward until even with the child's chin. The child's head may need to be stabilized.
7. The child should smoothly follow the target for several seconds, with at least 30 degrees of movement in all directions away from the straight-ahead position. Both eyes should move symmetrically in all directions of gaze.

Referral Criteria

Refer when child is unsuccessful in demonstrating step 7 of the procedures.

FORMS

The forms following this page are to be used when screening vision of
Infants and Toddlers.

HISTORY, APPEARANCE (A), BEHAVIOR (B) CHECKLIST
Infants and Toddlers
Birth through 2 years of age

Name of Child _____ Birth Date _____

Person Reporting _____

Relationship to Child _____ Today's Date _____

History

Has an ophthalmologist or optometrist evaluated this child previously? Yes No

If yes, by whom? _____ Date _____

What was the diagnosis/treatment/prognosis? _____

Risk Factors

Indicate if any of the conditions that follow have never been evaluated by an eye specialist or have developed or worsened since your child's last evaluation with an eye specialist. Mark in the boxes below, yes (the condition does apply) or no (the condition does not apply).

Y N

- Parent/caregiver has concerns regarding this child's vision
- Family history of vision loss, (such as retinitis pigmentosa, peripheral field loss, retinoblastoma (tumor of the eye), albinism (lack of pigment))
- Child had birth weight of less than 3 pounds
- Child had supplemental oxygen in the hospital during the newborn period
- Child was exposed to substances/chemicals during pregnancy
- Child may have been exposed to infection (toxoplasmosis, rubella, cytomegalovirus, syphilis, herpes) prior to birth
- Child had meningitis or encephalitis
- Child had head injury
- Child has neurological disorders such as seizures
- Child has other medical concerns (hearing loss, hydrocephalus, or excessive fever for prolonged period)
- Child has syndrome (Down, Marfan, Usher, etc.) Please list _____

Fixation and Tracking (Circle)

Fixation		Track Vertical		Track Horizontal	
Y	N	Y	N	Y	N

Appearance of the Eyes that may Indicate a Vision Problem:

When considering the following appearances or behaviors, only check those items that consistently occur and have not been previously evaluated by an eye specialist, or have developed or gotten worse since the child's last eye evaluation.

Check all that apply:

- Reddened eyes
- Watery eyes
- Encrusted eyelids
- Droopy eyelids
- Eyes in constant motion
- Eyes appear swollen
- Eyes with different pupil sizes
- White pupil
- Cloudy or enlarged cornea
- Eyes appear to cross or turn outward, upward, or downward (> 6 months of age)

Behaviors that may Indicate a Vision Problem:

Check all that apply:

- Abnormal sensitivity to light
- Tilts or turns head to one side when looking at objects (> 6 months of age)
- Cannot find a dropped toy
- Eye poking, rocking or staring at bright lights frequently
- Stares at own hand or an object and/or moves hand or object in front of eyes frequently (> 12 months of age)
- Places an object within a few inches of the eyes to look (> 18 months)
- Trips on curbs and steps (> 18 months of age)
- Does not appear interested in looking at toys or faces (> 3 months of age)
- Does not respond to visual toys but is responsive to toys with sound (6-12 months of age)

Additional information:

Test Procedures and Sample Forms for Vision Screening of Preschool and Kindergarten Children 3 through 5 years of age

General Considerations

Screening all three- to five-year-old children for vision problems is recommended by every source. Chiefly, this screening focuses on the detection of amblyopia (lazy eye) or conditions that may lead to amblyopia (strabismus or asymmetric refractive errors). The chances of curing this condition are reduced after the age of eight years.

Collecting history information can be a significant contributor to identifying vision problems in children. Children who have yet to be screened for risk factors that may result in a visual problem should be screened at this time. Any child who has a risk factor in his or her background should be referred to an eye specialist if that risk factor has not been previously evaluated. The better time for obtaining this information is during the mass child health screenings held for three-year-olds, where the information may be obtained from the parent or caregiver that accompanies the child.

The visual acuity of children who have reached the developmental age normally associated with attending preschool or kindergarten can be tested using standardized instruments. The LEA Single Symbol Book, which does not require the child to have knowledge of the alphabet, is recommended for acuity testing for this group. Either identification or matching can be used with either test, depending on the ability of the child being screened.

A test unique to this age group is the Random Dot E Test. This test is designed to detect problems with both eyes working together (stereopsis). It compliments the visual acuity test to detect the presence of potential or actual amblyopia

Appearances and/or behaviors that may indicate a vision problem is an important part of screening. At this age, possible complaints by the child are added to appearance and behavior as an indicator of potential difficulties. Since these children will be spending increasing amounts of time in the classroom, there is a need for classroom teachers to be aware of the ABCs of vision problems so that they may know when to refer a child to the appropriate school staff member. A suggested activity is to inservice teaching staff at the beginning of the school year in how to use the Teacher Observation form found at the end of this section of the manual. Teachers are asked to be alert for any of the conditions listed, among his or her students, and to notify the appropriate person if any of the conditions are noted in a student.

Referral Procedures

Failure of a child to meet criteria at rescreening on the Random Dot E or acuity measurements should result in a notice to parents or other caregivers that the child should be referred for a professional eye examination. A sample Referral Letter, Vision Referral Follow-up form, and Eye examination form can be found in Appendix B. Similarly, any problem found regarding eye health history, appearance, behavior, or complaints should result in a referral to an eye specialist. In these cases, however, judgment should be made as to whether the symptoms constitute a more immediate response than using the mail.

- Notify parents/guardian of the need for a professional eye examination by mailing a completed referral letter.
- Enclose with the parent notification, copies of the Eye Examination Report and the Vision Referral Follow-up form.
- Parents/guardian should mark and complete the Vision Referral form and return it to the vision screener. The screener acts on parent/guardian's response as appropriate.
- The eye specialist will complete the Eye Examination Report and return it to the vision screener.
- The vision screener records the results of the eye examination and notifies others as appropriate.

HISTORY, APPEARANCE (A), BEHAVIOR (B), AND COMPLAINTS (C)

A form and instructions for recording results can be found following this category of the manual.

Purpose

- To detect any history of obvious ocular pathology or abnormality
- To ensure that the eyes are in good health by observing the appearance of the eyes
- To elicit information regarding behaviors and/or complaints that may indicate the presence of vision problems

Vision Problems Detected

Various symptoms as noted by a child's complaints or direct observation that may indicate a vision problem that requires further evaluation by an eye specialist

Age Range

- 3 through 5 years of age

Equipment

- The History, Appearance, Behavior and Complaints form for Preschool and Kindergarten Children
- ABC Teacher Observation Form
- Vision Screening Roster and Follow-Up Form

Procedure

1. Review accompanying form, "History ABCs " (Appearance, Behavior, Complaints). If appropriate, review the completed History form.
2. Thoroughly visually inspect the child's eyes to see if any of the "Appearances" conditions are present.
3. Caregiver's, teacher's, and other service provider's observations should be enlisted to determine if any of the Appearances, Behaviors or Complaints are present.
4. It is important to request information on age appropriate behaviors only.

Referral Criteria

- Screening failure occurs if, based on age appropriate behaviors, any of the conditions noted on the History or ABC Checklist are present.
- Referral should be made to an eye specialist experienced in pediatric vision care

DISTANCE VISUAL ACUITY

A form and instructions for recording results can be found following this category of the manual.

Purpose

1. Screening for distance visual acuity is the most important single test of visual ability. This test will identify more children who require eye care than any other single test.
2. Screening for distance visual acuity has been proven reliable in detecting such vision problems as amblyopia, myopia, hyperopia, astigmatism and other conditions, such as cataracts, which can decrease visual acuity.
3. Poor vision can also affect learning ability and the entire educational process.

Vision Problems Detected

Impaired visual acuity (monocular)

Age Range

3 through 5 years of age

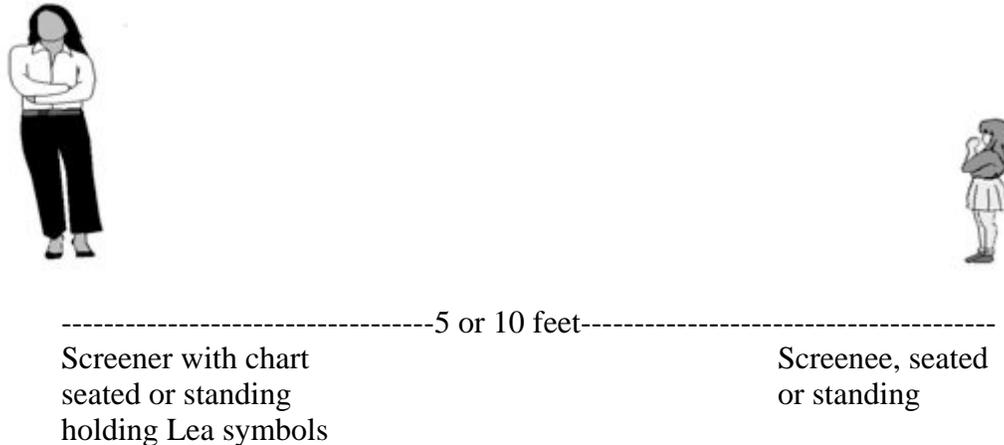
Equipment

- Lea Single Symbol Book (Figure 2)
- Occluder, or the student can use the heel of their hand
- Vision Screening Roster and Follow-Up Form

Setup (See Figure 2)

1. Choose an area that provides as a background a light-colored, uncluttered wall. Avoid a wall that is close to windows where glare may be a problem. Also avoid overly bright lights or shadows between the child and the acuity chart. Light on the acuity chart should read between 10 and 30 foot-candles as measured with light meter. If there is insufficient light, position gooseneck lamps on the floor in such a manner that the acuity chart is properly illuminated.
2. Place a line of tape along the two front legs of the screener's chair. Measure exactly 5 and 10 feet perpendicular to the tape line and place a tapeline at both positions.
3. The child will place their heels on the strip of tape during distance acuity testing if standing during testing. If the student is to be seated during testing, the front legs of the chair should be placed on the tapeline.

Figure 1
Setting Up the Screening Area for Distance Visual Acuity Testing of Children Ages 3 through 5 Years



Procedure

1. A short orientation is advisable to acquaint children with the test materials and to teach them the method of responding. This can be done in small groups of 4 or 5 children by the screener or a teacher.
2. Have the child sit or stand at the mark facing the test attendant.
3. Closely inspect the child's eyes for any of the appearance items on the ABC checklist.
4. The child who wears glasses or contact lenses that are prescribed for constant use should be screened only with glasses or contact lenses on. If a child has glasses and is not wearing them, screening should be rescheduled for another day with glasses.
5. Begin with both eyes open, looking at the larger targets so that the child becomes familiar with the pictures/symbols that they will be looking at. Children who are not able to identify the symbols may be successful by matching them using the Lea chart response key.
6. Once familiar, test each eye separately, right eye first then left using an occluder.
7. Squinting should not be allowed.
8. To pass a line, the child must be able to read (correctly identify or match) one more than half (3) of the symbols on the card at any acuity level.
9. When at least 3 of the symbols on a card have been correctly identified, proceed to the next smaller symbols and continue to present each card of symbols through the 10 foot card (when testing at 10 feet or the 5 foot card when testing at 5 feet), as long as the child can identify more than half the symbols on each card.

10. If the child can identify the 10 foot symbols correctly at a 10 foot testing distance, record the visual acuity obtained as $10/10 = 20/20$. If the child can identify the 8 foot symbols correctly at a 5 foot testing distance, record the visual acuity obtained as $5/8 = 20/32$.
11. If the child fails to read a card, repeat this card in reverse order.
12. After the card is failed twice, record the visual acuity as the next higher card, assuming that more than half the symbols on that card had been read correctly.

Rescreening Criteria

Rescreening a child is based on the following distance acuity test results:

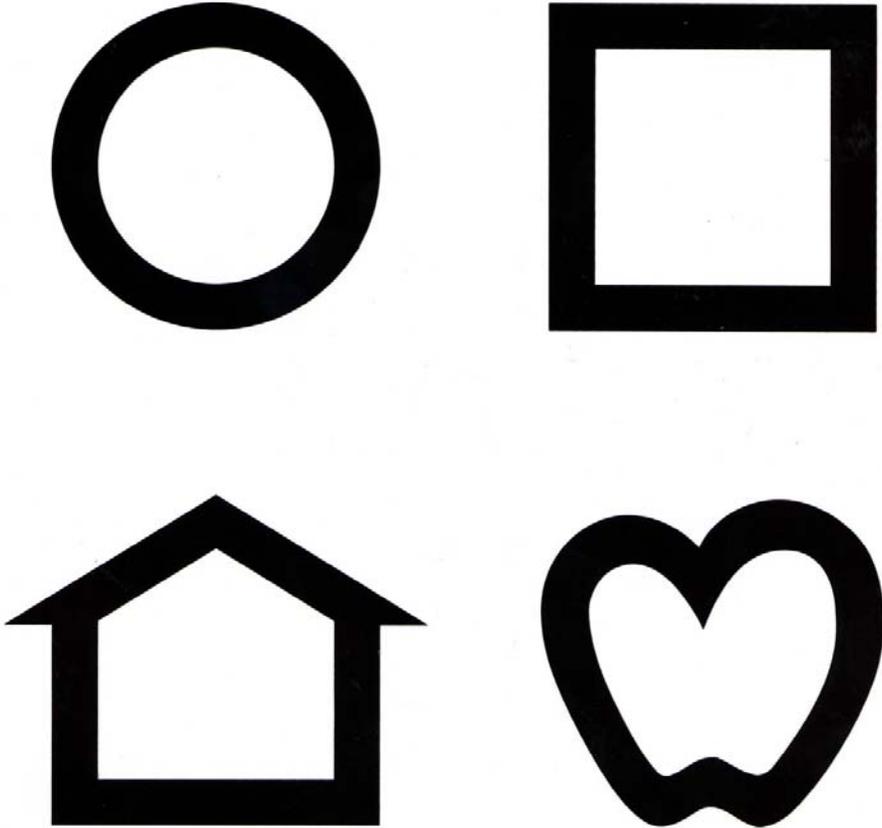
- Vision in either eye of 20/50 or poorer. This means the inability to identify correctly one more than half the symbols on the 20/40 card
- A greater than two line difference between the two eyes regardless of how good the acuity is in the better eye
- The screener was unable to obtain test results
- Rescreen children who fail the initial screening and those for whom results could not be obtained
- Rescreen within two weeks following the initial screening
- Rescreening can be particularly important for young children to be sure that their failure and/or difficulties were not due to temporary factors unrelated to vision

Referral Criteria

Referral to an eye specialist is based on the following distance acuity test results:

- Vision in either eye of 20/50 or poorer. This means the inability to identify correctly one more than half the symbols on the 20/40 card
- A greater than two line difference between the two eyes regardless of how good the acuity is in the better eye
- The screener was unable to obtain test results

Figure 2
Lea Single Symbols



STEREOPSIS

A form and instructions for recording results can be found following this category of the manual.

Purpose To determine the presence or absence of stereo acuity (as an indicator of the presence or absence of strabismus and/or amblyopia)

Vision Problems Detected

- Strabismus
- Amblyopia
- Impaired stereo acuity
-

Age Range 3 through 5 years

Equipment

- Random Dot E Stereogram Set that includes two random dot stereogram (one with an "E" and another one blank), one demonstration "E" plate and of compatible polarized glasses
- Vision Screening Roster and Follow-Up Form

Procedure

1. Show the demonstration plate to the child without using the polarized glasses and say; "this is an E".
2. Hold the demonstration plate in one hand and the blank stereogram plate in the other and ask the child to point to the "E".
3. Have the child put on the polarized glasses.
4. Hold the two random dot stereograms (one in each hand) at a distance of 40-cm (16 inches) from the child's eyes and ask the child to point to the "E."
5. "Shuffle" the random dot stereogram plates and repeat step 3.
6. Repeat step 3 until the child has achieved four successive correct responses or had a total of six attempts.
7. If the child initially gives an incorrect response, repeat steps 1-4.

Rescreening

Criteria Rescreen a child if the child shows an understanding of the test with the "demonstration E" but is unable to give four successive correct responses in six attempts.

Referral Criteria If the child shows an understanding of the test with the "demonstration E" but is unable to give four successive correct responses in six attempts.

Special Notes Failure to perform step 2 of the procedure is noted as an inability to complete the test, but does not constitute a failure.

**DIRECTIONS FOR COMPLETING
VISION SCREENING AND FOLLOW-UP ROSTER
(3 THROUGH 5 YEARS OF AGE)**

A form and instructions for recording results can be found following this category of the manual.

It is important that information gathered through vision screenings be systematically recorded so that it is not misplaced. The recorded information will be needed to determine which students are in need of rescreening, referral for professional eye examinations, and follow-up to the referral.

The accompanying Vision Screening and Follow-up Roster may be used to record each child's vision screening results in a mass screening situation. Following the screening, the recorded information can be examined to identify those who should be rescreened and referred to an eye specialist. One of the most important components of vision screening is follow-up.

Instructions for completing the Vision Screening & Follow-up Roster Form

<u>Column</u>	<u>Directions</u>
Name	Enter the child's name.
Age or Grade	Enter the child's age or grade.
History/ABC	Check the box if any appearance, behaviors or complaints are present or have been reported.
Acuity	Check the box if visual acuity criteria is 20/50 or less or if there is a greater than two line difference between the eyes.
W/Glasses	Check the box if the child was tested wearing glasses or contact lenses.
Stereopsis	Check the box if the child was unable to correctly identify the E 4 out of 6 times
Rescreen	Check the box if the child needs to be rescreened.
Referral	Check the box if the child is referred for a professional eye examination.

FORMS

The forms following this page are to be used when screening vision of
Preschool and Kindergarten Children.

HISTORY
Preschool through Kindergarten
3 through 5 years of age

Name of Child _____ Birth Date _____

Person Reporting _____

Relationship to Child _____ Today's Date _____

History

Has an ophthalmologist or optometrist evaluated this child previously? Yes No

If yes, by whom? _____ Date _____

What was the diagnosis/treatment/prognosis? _____

Risk Factors

Indicate if any of the conditions that follow have never been evaluated by an eye specialist or have developed or worsened since your child's last evaluation with an eye specialist. Mark in the boxes below, yes (the condition does apply) or no (the condition does not apply).

Y N

- Parent/caregiver has concerns regarding child's vision
- Family history of vision loss, such as retinitis pigmentosa, peripheral field loss, retinoblastoma (tumor of the eye), albinism (lack of pigment)
- Child had birth weight of less than 3 pounds
- Child had supplemental oxygen in the hospital during the newborn period
- Child was exposed to substances/chemicals during pregnancy
- Child may have been exposed to infection (toxoplasmosis, rubella, cytomegalovirus, syphilis, herpes) pre birth
- Child had meningitis or encephalitis
- Child had head injury
- Child has neurological disorders such as seizures
- Child has other medical concerns (hearing loss, hydrocephalus, or excessive fever for prolonged period)
- Child has syndrome (Down, Marfan, Usher, etc.) Please list _____

APPEARANCE (A), BEHAVIOR (B) & COMPLAINTS (C) CHECKLIST
Preschool through Kindergarten
3 through 5 years of age

Student's Name _____ **Classroom** _____

When considering the following appearances, behaviors or complaints, only check those items that consistently occur and have not been previously evaluated by an eye specialist, or have developed or gotten worse since the child's last eye evaluation.

Appearance of the Eyes that may indicate a Vision Problem:

- _____ Reddened eyes
- _____ Watery eyes
- _____ Encrusted eyelids
- _____ Droopy eyelids
- _____ Eyes in constant motion
- _____ Eyes appear swollen
- _____ Eyes with different pupil sizes
- _____ White pupil
- _____ Cloudy or enlarged cornea
- _____ Eyes appear to cross or turn outward, upward, or downward (> 6 months of age)

Behaviors that may indicate a Vision Problem:

- _____ Abnormal sensitivity to light
- _____ Tilts or turns head to one side when looking at objects (> 6 months of age)
- _____ Cannot find a dropped toy
- _____ Eye poking, rocking or staring at bright lights frequently
- _____ Stares at own hand or an object and/or moves hand or object in front of eyes frequently (> 12 months of age)
- _____ Places an object within a few inches of the eyes to look (> 18 months)
- _____ Trips on curbs and steps (> 18 months of age)
- _____ Does not appear interested in looking at toys or faces (> 3 months of age)
- _____ Does not respond to visual toys but is responsive to toys with sound (6-12 months of age)

Complaints Associated with Using the Eyes:

- _____ Eyes hurt
- _____ Headaches
- _____ Double vision
- _____ Cannot see distant objects
- _____ Burning, itching or tearing of the eyes

Additional information:

TEACHER OBSERVATION
Preschool through Kindergarten
3 through 5 years of age

As a teacher you have the greatest access to observing the appearance of your students' eyes, any difficulties that a student may have when using his or her eyes, and any complaints a student may express about his or her eyes or ability to see. Your observations are an important part of our school's vision screening program. Please notify the school nurse or other appropriate staff member IMMEDIATELY if any of your students consistently exhibit any of the following conditions.

Teacher's Name _____ **Classroom** _____

Appearance of the Eyes:

1. Eyes that turn in or out
2. Crusty or red eye lids
3. Different sized pupils or eyes
4. Swollen lids
5. Watery eyes
6. Drooping lid(s)
7. Haziness or clouding of the cornea
8. Eyes in constant motion, eye jerk on fixation

Behavioral Indications of Possible Vision Difficulty:

1. Squinting, frowning or scowling when looking at objects
2. Holding printed material in an unusual position
3. Rubbing eyes
4. Abnormal sensitivity to light

Complaints Associated with Using the Eyes:

1. Eyes hurt
2. Headaches
3. Double vision
4. Cannot see distant objects
5. Burning, itching or tearing of the eyes

Test Procedures and Sample Forms for Vision Screening of Elementary Children Grades 1 through 5 (6 through 11 years of age)

General Considerations

The screening of children ages 6 through 11 years focuses primarily on the detection of myopia (nearsightedness) and hyperopia (farsightedness) which commonly manifest themselves during these years. Additionally, screening for color vision deficiencies will also occur in this age group. Instruments to screening for these conditions include the ETDRS (Lighthouse) Distance Acuity Chart and the plus lens test in combination with the ETDRS (Lighthouse) chart. The Ishihara color test will be used to screen for color vision deficiencies.

A health history for the presence or absence of at-risk factors that could indicate a possible vision problem should be taken for those children not having such information in their health file. Additionally, the appearance of child's eyes, any behaviors that the child may exhibit that would indicate a possible vision problem, and any complaints made by the child regarding vision problems are important factors of which a screener must be cognizant. Instructions for recording health history and appearance, behavior, and complaints are contained in the following section.

Eye health care should not be ignored during the time between formal vision screenings. Rather a system is needed for addressing, on an ongoing basis, symptoms of eye problems that a child may exhibit. A Teacher Observation form is included in this section as one means for making classroom teachers aware of observable conditions that may indicate a vision problem. Teachers are asked to refer any student consistently exhibiting any symptom IMMEDIATELY to an appropriate staff member such as school nurse. The school nurse will then contact the student's parents to make them aware that a professional eye examination is needed.

Referral Procedures

Failure of a child to meet criteria at rescreening on the plus lens or acuity measurements should result in a notice to parents or other caregivers that the child should be referred for a professional eye examination. A sample Referral Letter, Vision Referral Follow-up form, and Eye examination form are available in Appendix B. Similarly; any problem found regarding eye health history, appearance, behavior, or complaints should result in a referral to an eye specialist. In these cases, however, judgment should be made as to whether the symptoms constitute a more immediate response than using the mail.

The following steps are recommended when a child is referred for professional eye care as a result of not passing a vision screening.

- Notify parents/guardian of the need for a professional eye examination by mailing a completed referral letter.
- Enclose with the parent notification, copies of the Eye Examination Report and the vision Referral Follow-up form.

- Parents/guardian should mark and complete the Vision Referral form and return it to the vision screener. The screener acts on parent/guardian's response as appropriate.
- The eye specialist will complete the Eye Examination Report and return it to the vision screener.
- The vision screener records the results of the eye examination and notifies others as appropriate.

Color vision testing is the exception to the above procedures. A child's failure to pass a color vision rescreening is not a cause for referral because a color deficiency is usually non-progressive, cannot be corrected, and usually does not effect visual acuity or visual function. If there are other vision problems suspected, or parents wish the opinion of an eye specialist, the parents should be encouraged to arrange for a professional eye examination. A sample letter to inform parent or caregivers of a color deficiency in their child can be found in Appendix B.

It is important to inform parents, teachers, and counselors of the student's color vision deficiency, which may cause the child difficulty in situations and/or vocations requiring accurate color discrimination. These persons may adjust educational materials for situations where color discrimination is a progress criteria. Additionally, the child should be made aware of his or her color vision deficiency and the potential impact on daily living and career planning.

APPEARANCE (A), BEHAVIOR (B), AND COMPLAINTS (C)

A form and instructions for recording results can be found following this section of this manual and may be printed and photocopied as needed.

Purpose

- To detect any history of obvious ocular pathology or abnormality
- To ensure that the eyes are in good health by observing the appearance of the eyes
- To elicit information regarding appearance, behaviors and/or complaints that may indicate the presence of vision problems

Vision Problems Detected

Various symptoms, as noted by student complaints or direct observation by the screener or the child's teacher, that may indicate a vision problem requiring further evaluation by an eye specialist.

Age Range 6 through 11 years

Equipment

- ABC Checklist of Vision Difficulties
- Vision Screening Roster and Follow-Up Form

Procedure

1. Review accompanying form, "ABCs of Vision Difficulties"
2. Thoroughly visually inspect the child's eyes to see if any of the "Appearances" conditions are present.
3. Caregiver's, teacher's, and other service provider's observations should be enlisted to determine if any of the Appearances, Behaviors or Complaints are present.
4. It is important to request information on age appropriate behaviors only.

Referral Criteria

- Failure occurs if, based on age-appropriate behaviors, any of the conditions noted are present. Children who fail should be referred to an eye specialist.
- Referral should be made to an eye specialist experienced in pediatric vision care.

DISTANCE VISUAL ACUITY

A form and instructions for recording results can be found following this section of the manual and may be printed photocopied as needed.

Purpose

- Screening for distance visual acuity is the most important single test of visual ability. This test will identify more children who require eye care than any other single test.
- Screening for distance visual acuity has been proven reliable in detecting such vision problems as amblyopia, myopia, hyperopia, astigmatism and other conditions such as cataracts that can decrease visual acuity. Early detection and treatment is vital in children with such eye problems.
- Poor vision can also affect learning ability and the entire adjustment to school.

Vision Problems Detected

Impaired visual acuity (monocular)

Age Range 6 through 11 years

Equipment

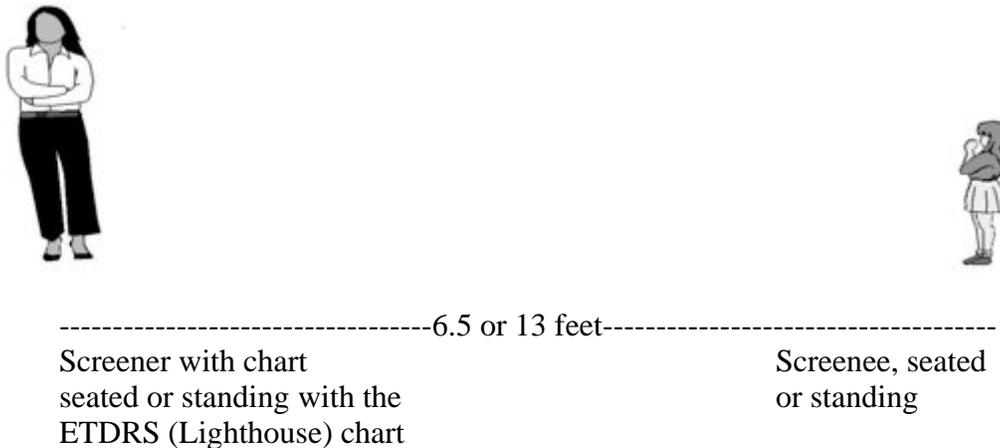
- ETDRS (Lighthouse) distance acuity chart (Figure 5)
- Occluder, or the student can use the heel of their hand
- Vision Screening Roster and Follow-Up Form

Setup

1. Choose an area that provides as a background a light-colored, uncluttered wall. Avoid a wall that is close to windows where glare may be a problem. Also avoid overly bright lights or shadows between the child and the acuity chart. Light on the acuity chart should read between 10 and 30 foot-candles as measured with light meter. If there is insufficient light, position gooseneck lamps on the floor in such a manner that the acuity chart is properly illuminated.
2. When using the ETDRS (Lighthouse) chart, the test should be done at four meters (13 ft). See Figure 5.
3. If space limitations occur, the ETDRS (Lighthouse) test can be done at two meters (6 1/2 feet) with doubling of the denominator to obtain a 20-foot equivalent.
4. Tape the ETDRS (Lighthouse) chart to the wall at about eye level for a 6-10 year old.
5. Using a tape measure, place a line of tape 6.5 and 13 feet from the wall with the ETDRS (Lighthouse) Chart on it.

6. Mark another tapeline 3 feet away from the chart. This is in case you need to use the Lea symbol book with a child who is not comfortable being tested with letters.
7. The child will place their heels on the strip of tape during distance acuity testing if standing during testing. If the student is to be seated during testing, the front legs of the chair should be placed on the tapeline.

Figure 3
Setting up the Screening Area for Distance Visual Acuity Testing of Children 6 through 11 years of age



Procedure

1. Students who wear glasses or contact lenses that are prescribed for constant distance use should be screened with their corrective lenses on.
2. Begin with the larger targets so that the child becomes familiar with the ETDRS (Lighthouse) chart.
3. Once familiar, test each eye separately, right eye first, then left.
4. Squinting should not be allowed.
5. To pass a line, the child must be able to read (correctly identify) one more than half (3) of the letters on the line.
6. When a line is correctly identified, proceed to the next smaller letters and continue to present each smaller line of letters through the 20-foot line, as long as the individual can identify more than half the letters on each line.
7. If the child can identify the 20-foot letters correctly, record the visual acuity obtained as 20/20.
8. If the child fails to read a line, repeat this line in reverse order.
9. If the line is failed twice, record the visual acuity as the next higher line, assuming that more than half the letters on that line had been read correctly

Rescreening Criteria

Rescreening a child is based on the following distance acuity test results:

- Vision in either eye of 20/40 or poorer. This means the inability to identify correctly one more than half the symbols on the 20/32 line on the chart
- A greater than two line difference between the two eyes regardless of how good the acuity is in the better eye
- The screener was unable to obtain test results
- Rescreen children who fail the initial screening and those who are untestable.
- Rescreen within two weeks following the initial screening
- Rescreening can be particularly important for young children to be sure that their failure and/or difficulties were not due to temporary factors unrelated to vision.

Referral Criteria

Referral for professional eye care is based on the following distance acuity test results:

- Vision in either eye of 20/40 or poorer. This means the inability to identify correctly one more than half the symbols on the 20/32 line on the chart
- A greater than two line difference between the two eyes regardless of how good the acuity is in the better eye
- The screener was unable to obtain test results

Figure 4
ETDRS (Lighthouse) Distance Visual Acuity Chart



PLUS LENS TEST FOR HYPEROPIA

A form and instructions for recording results can be found following this section of the manual and may be printed and photocopied as needed.

Purpose

To identify children with higher amounts of hyperopia who have passed the distance acuity test. It is expected that students with normal vision will have significantly worse distance vision when wearing the +2.50D spectacles.

Vision Problems Detected

Higher amounts of latent hyperopia may create binocular vision problems and adversely effect near point visual abilities

Age range

6 through 11 years

Equipment

- ETDRS (Lighthouse) Distance Acuity Chart
- +2.50 Diopter spectacles
- Vision Screening Roster & Follow-Up Form

Setup

Use the same test distance as was used for acuity testing (Figure 4)

Procedure

1. After the child has been screened for distant visual acuity, the plus lens procedure is done at the same distance.
2. Place the plus lenses on the child and again check their distance acuity with both eyes together.
3. The child should attempt to read with the glasses for at least 15 seconds, but not more than one minute.

Rescreening Criteria

- Rescreen if there is not a greater than a two line decrease from testing without the plus lens.

Referral Criteria

- If there is less than a two-line decrease in monocular visual acuity, when compared to their visual acuity measurement without the plus lens, the child should be referred for further evaluation.
- A child passes if their visual acuity is greater than two lines worse than what their distance acuity was without the plus lenses.

Special Comment

- The screener should emphasize to the child that it is “normal” when they cannot see clearly through the lenses. That statement should be made following the use of this test.

Example

A student’s distance acuity measures 20/20 in each eye. With the plus lenses, the student’s visual acuity measures 20/30, a two-line decrease in acuity. This means that this student failed the plus lens test, because their visual acuity is not more than two lines worse, when viewing through the plus lens.

COLOR VISION TESTING

A form and instructions for recording results can be found following this section of the manual and may be printed and photocopied as needed.

Purpose

To identify any discrepancy in the ability to recognize color

Vision Problems Detected

Color perception deficits

Age Range

6 through 11 years. Third grade is preferred

Equipment

- Ishihara color test plates, concise edition, 14 plates
- Vision Screening Roster and Follow-Up Form

Procedure

1. Hold the plates 75-cm (30”) from the child.
2. Have the child read the numbers on plates 1 through 8, 10, 12 and 13.

Referral Criteria

- The child does not pass if unable to read 8 of the 11 plates.
- Test failure is not a cause for referral because a color deficiency is usually non-progressive, cannot be corrected, and usually does not effect visual acuity or visual function.
- If there are other vision problems suspected, or parents wish the opinion of an eye specialist, a referral could be made.

Special Considerations

- The Ishihara plates are designed for use in a room that is lit by indirect daylight.

- The introduction of direct sunlight or the use of electric light may produce some discrepancy in the results because of an alteration in the appearance in the shades of color.
- When it is convenient only to use the electric light, it should be adjusted as far as possible to resemble the affects of natural daylight.
- Inform parents, teachers, and counselors of the student's color vision deficiency, which may cause him or her difficulty in situations and/or vocations requiring accurate color perception. These persons may adjust educational materials for situations where color discrimination is a progress criterion.
- The student should be aware of his or her color vision deficiency and the impact on daily living and career planning.
- Color vision screening may be done at a younger age if potential problems are noted. Unfortunately, some younger children may fail this test because of difficulty seeing figures against background, unrelated to color deficiencies. Reevaluate in 6 to 12 months when unsure of the accuracy of the test.

**DIRECTIONS FOR COMPLETING
VISION SCREENING AND FOLLOW-UP ROSTER
(6 THROUGH 11 YEARS OF AGE)**

A form and instructions for recording results can be found following this section of the manual and may be printed and photocopied as needed.

The accompanying Vision Screening and Follow-up Roster may be used to record each child's vision screening results in a mass screening situation. Following the screening, the recorded information can be examined to identify those who should be rescreened and referred to an eye specialist. One of the most important components of vision screening is follow-up.

<u>Column</u>	<u>Directions</u>
Name	Enter the child's name.
Age or Grade	Enter either the child's age or the child's grade.
ABC	Check the box if any appearance, behaviors or complaints are present or have been reported.
Acuity	Check the box if visual acuity in either eye is 20/40 or less or there is a greater than two line difference between the two eyes.
W/Glasses	Check the box if the child was tested wearing glasses or contact lenses.
+ Lens test	Check the box if there was a 2 line or less difference in acuity between testing without and with the plus lens.
Color Vision	Check the box if the child was unable to correctly identify 8 of the 11 plates.
Rescreen	Check the box if the child needs to be rescreened.
Referral	Check the box if the child is referred for a professional eye examination.

FORMS

The forms following this page are to be used when screening vision of
Elementary School children.

HISTORY
Grades 1 through 5 (6 through 11 years of age)

Name of Child _____ Birth Date _____

Person Reporting _____

Relationship to Child _____ Today's Date _____

History

Has an ophthalmologist or optometrist examined this child previously? Yes No

If yes, by whom? _____ Date _____

What was the diagnosis/treatment/prognosis? _____

Risk Factors (Use only if this information is not part of a child's health history.)

Indicate if any of the conditions that follow have never been evaluated by an eye specialist or have developed or worsened since your child's last evaluation with an eye specialist. Mark in the boxes below, yes (the condition does apply) or no (the condition does not apply).

Y N

- Parent/caregiver has concerns regarding individual's vision
- Family history of vision loss, such as retinitis pigmentosa, peripheral field loss, retinoblastoma (tumor of the eye), albinism (lack of pigment)
- Child had birth weight of less than 3 pounds
- Child had supplemental oxygen in the hospital during the newborn period
- Child was exposed to substances/chemicals during pregnancy
- Child may have been exposed to infection (toxoplasmosis, rubella, cytomegalovirus, syphilis, herpes) pre birth
- Child had meningitis or encephalitis
- Child had head injury
- Child has neurological disorders such as seizures
- Child has other medical concerns (hearing loss, hydrocephalus, or excessive fever for prolonged period)
- Child has syndrome (Down, Marfan, Usher, etc.) Please list _____

APPEARANCE (A), BEHAVIOR (B), & COMPLAINT (C) CHECKLIST
Grades 1 through 5
6 through 11 years of age

Student's Name _____ Classroom _____

When considering the following appearances, behaviors or complaints, only check those items that consistently occur and have not been previously evaluated by an eye specialist, or have developed or gotten worse since the child's last eye evaluation.

Appearance of the Eyes that may indicate a Vision Problem:

- Reddened eyes
- Watery eyes
- Encrusted eyelids
- Droopy eyelids
- Eyes in constant motion
- Eyes appear swollen
- Eyes with different pupil sizes
- White pupil
- Cloudy or enlarged cornea
- Eyes appear to cross or turn outward, upward, or downward

Behavioral Indications of Possible Vision Difficulty:

- Squinting, frowning or scowling when looking at objects, reading or writing
- Holding printed material in an unusual position
- Rubbing eyes
- Abnormal sensitivity to light

Complaints Associated with Using the Eyes:

- Eyes hurt or vision blurs while reading or at any other time
- Headaches when reading or at other times
- Words move or jump when reading
- Double vision
- Cannot see distance objects
- Burning, itching or tearing of the eyes
- Words or lines run together

Additional information:

TEACHER OBSERVATION
Grades 1 through 5 (6 through 11 years of age)

As a teacher you have the greatest access to observing the appearance of your students' eyes, any difficulties that a student may have when using his or her eyes, and any complaints a student may express about his or her eyes or ability to see. Your observations are an important part of our school's vision screening program. Please notify the school nurse or other appropriate staff member IMMEDIATELY if any of your students consistently exhibit any of the following conditions.

Teacher's Name _____

Classroom _____

Appearance of the Eyes that may indicate a Vision Problem:

- Reddened eyes
- Watery eyes
- Encrusted eyelids
- Droopy eyelids
- Eyes in constant motion
- Eyes appear swollen
- Eyes with different pupil sizes
- White pupil
- Cloudy or enlarged cornea
- Eyes appear to cross or turn outward, upward, or downward

Behavioral Indications of Possible Vision Difficulty:

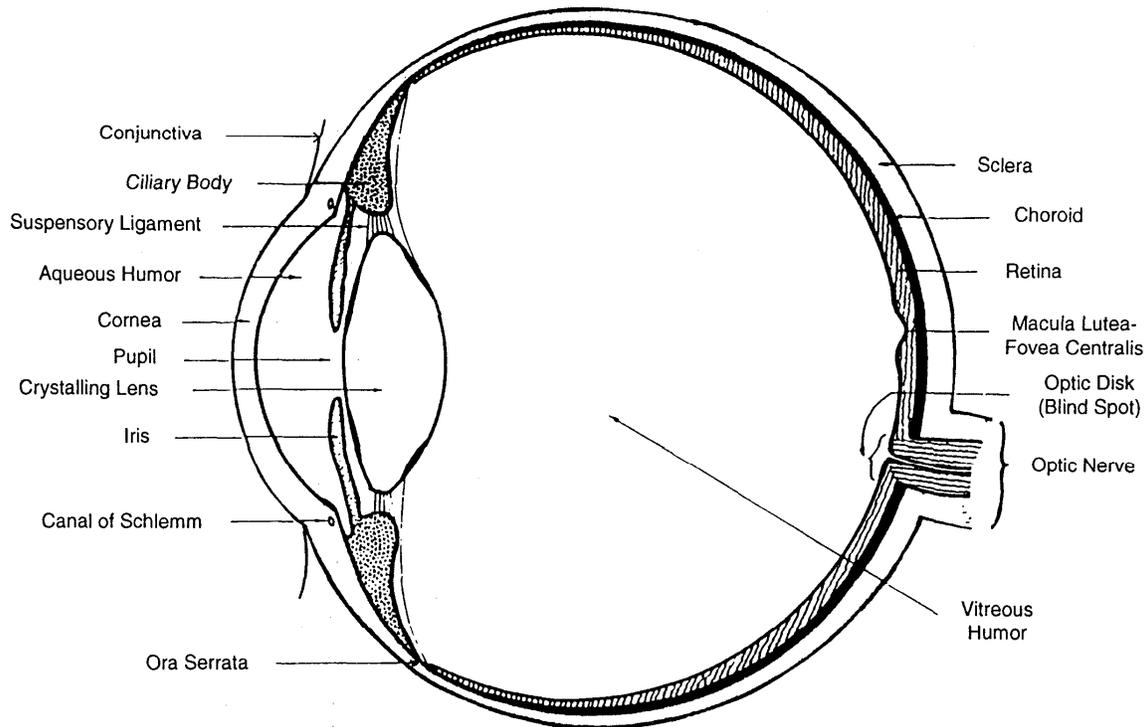
- Squinting, frowning or scowling when looking at objects, reading or writing
- Holding printed material in an unusual position
- Rubbing eyes
- Abnormal sensitivity to light

Complaints Associated with Using the Eyes:

- Eyes hurt or vision blurs while reading or at any other time
- Headaches when reading or at other times
- Words move or jump when reading
- Double vision
- Cannot see distance objects
- Burning, itching or tearing of the eyes
- Words or lines run together

Appendix A

The Eye and How it Works



Introduction

- I. 80% of learning, ages birth -12 years is the product of the sense of vision
 - a. Vision abnormalities are one of the most common childhood health problems
 - b. Early discovery and treatment improves the prognosis for normal eye development and visual function

- II. The Eye
 - a. Spherical in shape
 - b. Neurological extension of the brain

- III. Outer Part of the Eye
 - a. Eyelids - covering of skin and muscle tissue over the eyeballs that serves to protect, lubricates, and cleanse the eye.

- b. Conjunctiva - mucous membrane that continuously lines the inner portion of the eyelids and the sclera
- c. Lacrimal System
 - i. Lacrimal glands (where the watery portion of the tears is produced)
 - ii. Puncta (drains tears into the nose)
 - iii. Canaliculi (tear ducts that the puncta drain into)
 - iv. Lacrimal sac (where the tears from the canaliculi drain into)
 - v. Meibomian glands (secrete an oily substance that prevents tears from evaporating too quickly from the surface of the eye)
- d. Extraocular muscles - attached to outside of the eyeball, control eye movement, six per eye

IV. Structure of the Eyeball

- a. Sclera – firm, white portion of the eye
- b. Cornea - transparent, blood-free tissue covering central part of the eye that admits light to the retina
- c. Choroid - composed of many blood vessels, supplies the retina with blood
- d. Iris - colored part of the eye, regulates amount of light entering the eye to the retina
- e. Pupil - round opening in the center of iris
- f. Ciliary Body
 - i. Ciliary muscle - changes the shape of the lens to allow for the changes in the focusing power of the lens needed to see clearly during near vision tasks
 - ii. Ciliary processes - secrete aqueous humor which is a clear watery fluid that carries nutrients to the cornea and lens
- g. Anterior Chamber - space between cornea and lens filled with aqueous humor
- h. Lens - transparent structure lying behind the iris, enclosed in elastic capsule. The lens can change shape to allow the eye to focus for near vision
- i. Vitreous Humor - transparent, jelly like substance filling posterior portion of the eye between lens and retina
- j. Retina - light-sensitive tissue lining the back of the eye, receives visual stimuli, contains light receptor cells called rods and cones
- k. Macula - spot about size of pinhead on the retina. This area provides detail and color vision
- l. Fovea - tiny depression in center of macula, region of most distinct vision

V. Refraction

- a. Bending of light rays
- b. Must take place for light reflected from an object to come into focus on the retina
- c. Refracting media of the eye are the cornea and lens

VI. Refractive Errors

- a. Blurring of vision caused by the eye's inability to refract light in such a way that it focuses clearly on the retina
- b. Common Refractive Errors
 - i. Myopia
 - 1. "nearsightedness"
 - 2. Usually the eye is longer than normal
 - 3. Light rays focus at a point in the vitreous humor before reaching the retina
 - 4. Concave lenses are used to diverge light rays back to the retina
 - ii. Hyperopia
 - 1. "farsightedness"
 - 2. Usually the eye is shorter than normal
 - 3. Light rays focus at a point behind retina
 - 4. Convex lenses are used to converge light rays back on the retina.
 - iii. Astigmatism
 - 1. distorted vision
 - 2. Usually caused by a football shaped cornea
 - 3. Can be caused by the lens of the eye also being football shaped
 - 4. Regular astigmatism can be corrected with lenses that have two different powers ground into them

VII. Accommodation

- a. The process by which objects closer than infinity are focused on the retina
- b. the lens of the eye adjusts, by getting thicker, to allow for greater accommodation/focusing power
- c. Ciliary muscles contract and relax to change the shape of the lens of the eye, thereby increasing or decreasing accommodation

VIII. Amblyopia – general term meaning decreased vision for no apparent reason

IX. Strabismus – misalignment of the eye

X. Cataract – clouding of the crystalline lens

XI. Receptor Organs on the Retina

- a. Cones
 - i. Light receptors that provide detail and color vision
 - ii. Most numerous in the fovea - a tiny depression in macula region of the retina that is used for seeing detail and color
- b. Rods

- i. Light receptors that provide vision under conditions of low illumination
 - ii. Allows for night and peripheral motion vision
 - iii. Located in the mid peripheral and peripheral retina
 - c. Nerve impulses are sent to the brain via the visual pathways consisting of
 - i. photoreceptors
 - 1. rods
 - 2. cones
 - d. Optic nerve
 - i. Bundle of nerve fibers that connect the retina of each eye to the brain
 - ii. There is a blind spot in the visual field that corresponds to where the optic nerve fibers form the optic nerve. There are no rods and cones present in this area
- XII. Color deficiency - inability to discriminate differences in color
 - a. There are varying degrees of color vision loss from minor to complete

Glossary of Eye Terminology

Accommodation: The adjustment of the lens of the eye for seeing at different distances, which is achieved through changing the shape of the lens.

Acuity: Measurement of the sharpness of vision as it relates to the ability to discriminate detail.

Amblyopia: A condition in which the best corrected vision in one or both eyes is significantly decreased with no apparent disease of the eyes (often referred to as a lazy eye).

Anterior Chamber: Space in the front portion of eye between the cornea and iris and filled with aqueous humour.

Aphakia: The absence of the lens of the eye, which results from surgery or is a congenital condition.

Aqueous Humour: A clear, watery fluid that fills the anterior and posterior chambers in the front of the eye, the area between the cornea and the lens. The iris separates the chambers.

Astigmatism: Refractive error that prevents the light rays from coming to a single focus on the retina. This occurs because different amounts of refraction occur in the different meridians of the eye.

Binocular Stereopic Vision: The ability to use the two eyes simultaneously to focus on the same object and to fuse the two images into a single image that gives a correct interpretation of its solidity and its position in space.

Blindness: No perception of light.

Central Vision: Detail and color vision that comes from the macula.

Choroid: The middle covering of the eyeball containing veins and arteries which furnish nourishment to the other parts of the eyes, especially the outer portions of the retina.

Ciliary Body: A ring of tissue, between the iris and the choroid, consisting of

muscles and blood vessels, that changes the shape of the lens and manufactures aqueous humour.

Congenital: Present at birth.

Conjunctiva: Mucous membrane that lines the eyelids and covers the front part of the eyeball.

Contact Lenses: Lenses made to fit directly on the cornea.

Convergence: Deviation of the eyes inward.

Cornea: Clear transparent curved portion of the outer coat of the front of the eyeball.

Depth Perception: The perception of three-dimensionality and relative distance of objects from the viewer.

Diopter: Unit of measurement of strength or refractive power of lenses.

Diplopia: The seeing of one object as two.

Distance Vision: The ability to see objects from far away.

Divergence: Deviation of the eyes outward.

Esophoria: A tendency of the eye to turn inward when covered.

Esotropia: Constant or intermittent turning inward of one or both eyes (convergent strabismus or crossed eye).

Exophoria: A tendency of the eye to turn outward when covered.

Exotropia: Constant or intermittent turning outward of one or both eyes (divergent strabismus).

Extra-ocular: Outside of the eye.

Farsighted: See hyperopia.

Fovea (centralis): Small depression in the central retina (macula). Contains only cones and is the most light-sensitive part of the eye. Responsible for central vision (visual acuity) and color vision.

Functional Vision Assessment: A determination of how an individual uses

vision in daily activities and/or under specific conditions.

Fusion: The act of coordinating the images received by the two eyes into a single mental image (integration).

Hemianopsia: Half of the visual field is missing (e.g., right half, left half, upper half or lower half).

Hyperopia, Hypermetropia: A refractive error in which, because the eyeball is short or the refractive power of the eye is less than normal, the point of focus for rays of light from distant objects (parallel light rays) is behind the retina. Accommodation to increase the refractive power of the lens is necessary for distant, as well as, near vision.

Hyperphoria: A tendency of one eye to deviate upward.

Hypertropia: Constant or intermittent turning upward of one or both eyes.

IEP: Individualized Education Plan, a written plan of instruction for a student who receives special education services; must include present levels of the student's educational performance, annual goals, short-term objectives, and specific services that the student will need.

Intra-ocular: Inside the eye.

Iris: Colored, circular part of the eye that is positioned in front of lens and controls the size of the pupil, the opening at its center.

Legal Blindness: In the United States, the legal definition of blindness is: central vision acuity of less than 20/100 in the better eye after correction; or visual acuity of 20/100 or better with a visual field that subtends no greater than 20 degrees in its widest area.

Lens (crystalline): Transparent colorless disk, suspended in the middle of the eye behind the iris, which under normal conditions brings rays of light to focus on the retina during near point activities.

Light Perception: The ability to distinguish light from dark.

Light Projection: The ability to determine where light is coming from.

Low Vision Clinic: A clinic in which vision is assessed, vision-enhancing devices are prescribed, and instructions are given on how to use the devices.

Myopia: Nearsightedness. A refractive error in which, because the eyeball is too long in relation to its focusing power or the refracting power of the eye is too great, the point of focus for rays of light from distant objects (parallel light rays) is in front of the retina. Thus, to obtain distinct vision, the object must be brought nearer to take advantage of divergent light rays (those from objects less than twenty feet away).

Nearsighted: See myopia.

Near Vision: The ability to see objects at near.

Nystagmus: An involuntary movement of the eyeball; it may be lateral, vertical, rotary, or mixed.

Oculus Dexter (O.D.): Right eye.

Oculus Sinister (O.S.): Left eye.

Oculus Uterque or Oculi Uniter (O.U.): Both eyes.

Ophthalmologist: (MD or DO) are primary, secondary and tertiary health care practitioners who specialize in the medical care and surgical treatment of the human eye and visual system. Ophthalmologists prescribe glasses and contact lenses and may provide low vision rehabilitation and/or orthoptic training

Optic Disk: Head of optic nerve; formed by the meeting of all retinal nerve fibers at the retina.

Optician: Person who grinds, fits, adjusts, and dispenses corrective lenses according to a prescription from an ophthalmologist or optometrist.

Optic Nerve: Special nerve that carries messages from the rods and cones of the

retina to the brain, beginning in the retina as the optic disk.

Optometrist: Doctors of optometry (OD) are primary health care practitioners who examine, diagnose, treat and manage diseases and disorders of the visual system, the eye and associated structures as well as diagnose related systemic conditions. Optometrist prescribe eyeglasses and contact lenses and may prescribe low vision devices and/or vision therapy. Optometrist also prescribe medicines to treat eye diseases.

Orbit: Bony structure surrounding and protecting the eye.

Orientation & Mobility: A field of instruction that teaches systematic techniques of travel and orientation to people who are blind or visually impaired.

Peripheral Vision: The perception of objects or motion from the parts of the retina that are beyond the macula.

Phoria: A root word denoting a latent deviation in which the eyes have a tendency to turn from the normal position for binocular vision; used with a prefix to indicate the direction of such deviation (hyperphoria, esophoria, exophoria).

Photophobia: Extreme sensitivity to light or discomfort from light.

Ptoxis: A drooping of the upper eyelid.

Pupil: Opening in the iris which controls the amount of light that reaches the back of the eye by enlarging to take in more light or getting smaller to take in less light.

Refraction: 1) Deviation in the course of rays of light in passing through a lens or from one transparent medium into another of different density. 2) Determination of refractive errors of the eye and correction by glasses.

Refractive Error: A defect in the eye that prevents light rays from being brought to a single focus exactly on the retina.

Retina: Innermost coat of the eye containing light sensitive nerves cells and fibers; connecting with the brain through the optic nerve.

Rods and Cones: Light-sensitive visual cells distributed throughout the retina. Cones, which are more concentrated in the macula and paramacular area, work best in daylight allowing one to perceive details, shapes and color. Rods, more numerous in the midperiphery and periphery of the retina, work best in lower light conditions and provides for perception of motion.

Sclera: The white part of the eye - a tough covering which, with the cornea forms the external, protective coat of the eye.

Scotoma: A blind or partially blind area in the visual field.

Strabismus: Failure of the two eyes to simultaneously direct their gaze at the same object because of muscle imbalance.

Stereopsis: The perception of objects in space and their relative position to one another.

Syndrome: A group of symptoms that occur together and may affect the whole body or any of its parts.

Tropia: A root word denoting an obvious deviation from normal of the axis of the eyes (strabismus) used with a prefix to denote the type of strabismus, such as heterotropia, esotropia, exotropia.

Tunnel Vision: A condition in which the visual field is contracted to such an extent that only a small area of central vision is left, giving the affected individual the impression of looking through a tunnel.

Vitreous Body: Transparent, colorless mass of soft, gelatinous material filling the eyeball behind the lens.

Appendix B

Sample Letters

SAMPLE NOTIFICATION OF VISION SCREENING LETTER

LETTERHEAD

DATE

Dear Parent(s):

This school year _____ children at _____ school will be
(Grade or grades)

screened for vision problems. Commonly used tests will allow us to identify children who may have visual acuity and eye muscle imbalance. You will be notified if your child does not pass a particular test. You will not be notified if your child passes all the tests.

Please notify me immediately if you do not want your child to be included in the vision screening.

This screening is not meant to substitute for professional eye care.

Sincerely,

Vision Screener

Date

SAMPLE REFERRAL LETTER

School letterhead

Date

Dear _____:
Parent or Guardian

_____ recently participated in the vision screening and rescreening program provided by a qualified vision screener. The results of the screening indicate that it would be advisable for your child to have a complete eye examination by an eye specialist (ophthalmologist or optometrist).

The following checklist is to help you in your planning:

- [] Make an appointment for an examination with an ophthalmologist or optometrist
- [] Sign the enclosed Release of Information section of the "Vision Examination Report"
- [] Take the signed "Vision Examination Report" and this letter to the examination
- [] Ask the eye specialist to complete the report

Thank you for your cooperation. Please call me if you have any questions.

You may use the enclosed vision referral follow-up form to let me know when your child will be seen for an eye examination or concerns you may have about the examination.

Sincerely,

Signature
Telephone Number

Enclosure: Eye Examination Report
Vision Referral Follow-Up

SAMPLE VISION REFERRAL FOLLOW-UP

Dear Vision Screener:

In response to the vision screening referral to us on _____, my/our
Date

decision on behalf of _____ is the following (please check):
Name of Child

___ I/We disagree with the need.

___ Our child has been seen by an eye specialist within the last 6 months.

___ An appointment with the eye specialist is scheduled on _____.
Date

___ Financial assistance will be necessary for my child to see an eye specialist.

___ Other (please state in space below)

Sincerely,

Signature of Parent/Guardian

Address

City State Zip

Phone

Please note: Return this letter to the referring vision screener within one month of the date of the vision referral. (Include return address from referring agency.)

Return to: _____

Address: _____

City State Zip

EYE EXAMINATION REPORT

Patient's Name _____ DOB _____
 Address _____ City _____ State _____ Zip _____

Attention Eye Specialist

The above mentioned child participated in a vision screening assessment. He/she is being referred to you for the following reason(s):

- | | |
|---|---|
| <input type="checkbox"/> Past Medical History | <input type="checkbox"/> Fixation & Tracking |
| <input type="checkbox"/> Appearance(s) of visual difficulties | <input type="checkbox"/> Distance Visual Acuity |
| <input type="checkbox"/> Behavior(s) of visual difficulties | <input type="checkbox"/> Plus Lens Test for hyperopia |
| <input type="checkbox"/> Complaint(s) of visual difficulties | <input type="checkbox"/> Stereopsis Test |

Thank you in advance for completing this report and returning it to the school.

Visual Acuity

If the acuity **can** be measured, complete this box using Snellen acuity or Snellen equivalents or NLP, LP, LPP*.

Without Correction		With Best Correction	
Near	Distance	Near	Distance
R	R	R	R
L	L	L	L

If the acuity **cannot** be measured, check the most appropriate estimation:

- Legally Blind (less than 20/100 in better eye)
 Not Legally Blind
 Near Normal Mild to Moderate Vision Loss Severe Vision Loss

Muscle Function

Normal Abnormal Describe _____

Visual Field Test

- There is no apparent visual field restriction.
 There is a field restriction. Describe _____
 Yes No The visual field is restricted to 20 degrees or less.

Diagnosis (Primary cause of visual loss)

*No light perception (NLP), Light perception (LP), Light perception with projection (LPP)

Prognosis of visual condition (if appropriate)

- Permanent Recurrent Improving
 Progressive Communicable Can Be Improved

Treatment Recommended

- No visual abnormality noted
 Glasses
 Constant wear
 Near vision only
 Far vision only
 May be removed for PE
 Contact Lenses
 Medication _____
 Refer for other medical treatment/exam _____
 Referral for low vision rehabilitation evaluation
 Other _____

Precautions or Suggestions (e.g., lighting conditions, activities to be avoided, etc.)

Re-examination Recommended

- 6 mos. 12 mos. Other _____

Print or Type Name of Examining Eye Specialist

Signature of examining Eye Specialist

Address

Date of Examination

City State Zip

(_____)_____
Telephone Number

RELEASE OF INFORMATION

I (We) hereby authorize the release of the results and recommendations from this examination to:

Agency

Address

Parent Signature

City State Zip

Date

Return Completed Form to:

Name

Address

Agency

City State Zip

SAMPLE COLOR DEFICIENCY NOTIFICATION LETTER

Agency

To the parents of _____
Date of Birth _____
Screening Center _____
Date _____

Results of your child's recent vision screening indicate a difficulty with color vision. A color vision problem usually cannot be corrected. It does not mean that your child is not seeing well.

The main reason for color vision testing is to alert you, your child, and your child's teachers of a color vision problem. The problem may make tasks that use color more difficult. There may also be implications for planning a future career for your child.

If you would like more information about color vision, contact the school or public health nurse, family doctor or eye specialist.

Additional Remarks:

Vision Screener _____
Agency _____

Appendix C

Screening Equipment Resources

Screening Equipment Resources

Screening Equipment

ETDRS (Lighthouse) Distance Acuity Chart
Lea Single Symbol Book (includes keys and cards)
Disposable penlights (pkg. of 6)
Pen pal or equivalent fixation toy
Ishihara Color Test (14 plate adult)
Occluder, black, paddle type, alternately, can just have the student being tested use the heel of their hand as an occluder
+2.50 Full Frame Lenses
Random Dot E Test
Standard 3-D viewer (extra glasses 6/pkg.)

Equipment Vendors

Lombart Instruments
5358 Robin Hood
Norfolk, VA 32513
Telephone: 800-566-2278

Precision Vision
944 First Street
La Salle, IL 61301
Telephone: 800-772-9211

School Health Corporation
865 Muirfield Drive
Hanover Park, IL 60133
Telephone: 866-323-5465

Stereo Optical Company, Inc.
8623 W. Bryn Mawr Ave., Suite 502 □
Chicago, IL 60631
Telephone: 800-344-9500

Walman Optical Company
835 Highway 169 North
Plymouth, MN 55441
Telephone: 800-222-8095

Wilson Ophthalmic Corporation
PO Box 496
Mustang, OK 73064
Telephone: 800-222-2020
Fax: 800-329-9133

Local purchase:

Penlights. Recommended: those that do not emit a sound when turned on and off.

Fixators: Transparent or semitransparent soft plastic figures such as finger puppets that can be fitted over the lighted end of a penlight making it more attractive to some children.

+2.50 OU full frame lenses. Can often be found in drug and similar stores. Frame size must be suitable for elementary-aged children.

Appendix D

Vision Related Agencies & Organizations

VISION RELATED AGENCIES

IOWA

Iowa Academy of Ophthalmology

Administrative Office
Metro Square One – Suite 120
10 West Phillip Road
Vernon Hills, IL 60061-1730
(847) 680-1666
(888) 842-3937

Iowa Braille School

1002 G Avenue
Vinton, IA 52349
(319) 472-5221

Iowa Dept. for the Blind

524 4th Street
Des Moines, IA 50309
(515) 281-1333
(800) 362-2587

Iowa KidSight

2346 Mormon Trek Blvd., Ste. 2700
Iowa City, IA 52246
(319) 353-7616

Iowa Optometric Association

1454 30th St #204
West Des Moines, IA 50266-1312
(515) 222-5679

Lions Clubs of Iowa

State Office
2300 South Duff
Ames, IA 50010
(515) 232-2215

Prevent Blindness Iowa

1111 Ninth Street, Suite 250
Des Moines, IA 50314
(515) 244-4341

NATIONAL

American Academy of Ophthalmology

655 Beach Street
PO Box 7424
San Francisco, CA 94120-7424
(415) 561-8500

American Academy of Optometry

6110 Executive Boulevard, Suite 506
Rockville, MD 20852
(301) 984-1441

American Foundation for the Blind

15 W 16th St
New York, NY 10010
800-232-5463
(212) 620-2147

American Optometric Association

243 N Lindbergh Blvd
St. Louis, MO 63141
(314) 991-4100

Better Vision Institute

1800 N Kent St
Suite 904
Rosslyn, VA 22209
(703) 243-1528

National Association for Parents of the Visually Impaired

PO Box 317
Watertown, MA 02272
800-562-6265

Prevent Blindness America

500 East Remington Road
Schaumburg, IL 60173

Appendix E

Vision Screener Examination

References and Bibliography

Vision Screener Examination

Name

Date

Circle the correct answer

1. Detection of vision abnormalities is important because
 - A. 25% of what a person learns ages 0-12 is a product of the sense of vision
 - B. Early discovery and treatment can improve the prognosis for normal eye development
 - C. Vision abnormalities are uncommon in childhood
 - D. Vision and education are not related

2. The purpose of vision screening is to separate individuals who
 - A. Do not have vision problems from those who are suspect for vision problems
 - B. Have vision problems to make classroom accommodations
 - C. Provide professional vision examinations
 - D. Supply information and equipment

3. A comprehensive vision-screening program includes:
 - A. Identification
 - B. Referral
 - C. Follow-up
 - D. All of these

4. The **best** vision-screening environment is
 - A. In a dark room.
 - B. On a medium colored background.
 - C. Light between 10 and 30 foot-candles measured with a light meter.
 - D. Close to windows.

5. Appropriate techniques to use when testing a shy or frightened child include:
 - A. Let the child observe several children being tested
 - B. Provide lots of positive reinforcement
 - C. If child is unable to cooperate excuse the child and try again within two weeks
 - D. All of the above

6. Students with consistent Appearance, Behaviors or Complaints that might indicate a vision problem should
 - A. Be screened at the next scheduled vision screening
 - B. Be immediately screened by the school nurse
 - C. Be referred for a comprehensive eye examination
 - D. None of the above

Matching (Fill in letter of matching description)

- | | |
|-------------------------|---|
| 7. _____ Eyelid | A. Mucous membrane lining eyelid and front of the eyeball |
| 8. _____ Conjunctiva | B. White portion of eye |
| 9. _____ Lacrimal gland | C. Reduced vision for no apparent cause |
| 10. _____ Sclera | D. Nearsightedness |
| 11. _____ Pupil | E. Round opening in center of iris |
| 12. _____ Amblyopia | F. Protective skin tissue covering eye |
| 13. _____ Myopia | G. Behind outer upper eyelid, supplies tears |
| 14. _____ Hyperopia | H. Farsightedness |

True or False (Circle the correct answer)

15. T F Children wearing glasses are not included in the screening program.
16. T F Screening is not a diagnostic procedure but determines the need for glasses.
17. T F ABC refers to appearance, behavior, and complaints.
18. T F Glare from windows and overhead lights will not affect test results.
19. T F Color screening is a binocular test (both eyes are tested at the same time).
20. T F Failing the hyperopia screening means the individual does not have at least a two-line reduction in vision when wearing the screening lenses.
21. T F The preschool and kindergarten student is rescreened if 20/50 or poorer vision in either eye.
22. T F To pass a line during a visual acuity screening, a preschooler must correctly identify one more than half the symbols on that line.
23. T F The individual passes the stereopsis, random Dot E stereo screening by two successive correct responses out of a total of six attempts.
24. T F Fixation and tracking is carried out with a large object 3 feet from the eyes.
25. T F Using the ABC checklist for a kindergarten student, the screener visually inspects the eyes to see if any of the listed appearances are present.
26. T F Elementary students are screened for visual acuity using the LEA symbols.
27. T F Since it is important to know how each eye is seeing independently, visual acuity is tested monocularly (one eye at a time).

Vision Screener Examination Key

1. B	6. C	11. E	16. F	21. T	26. F	31. F	36. E
2. A	7. F	12. C	17. T	22. T	27. T	32. F	37. F
3. D	8. A	13. D	18. F	23. F	28. T	33. C	38. A
4. C	9. G	14. H	19. T	24. F	29. F	34. D	39. C
5. D	10. B	15. F	20. T	25. T	30. T	35. B	40. C

References & Bibliography

General Considerations

American Academy of Family Physicians. (1991). *Age charts for periodic health examination*. Kansas City, MO: Author.

American Academy of Ophthalmology. (1980). *A position statement for the select panel on child health: Infant and children's eye care*. Washington, DC, Author.

American Academy of Pediatric Ophthalmology and Strabismus. (1990). *Policy statement: Frequency of ocular examination*. San Francisco, CA: Author.

American Academy of Pediatrics. (1995). Eye examination and vision screening in infants, children and young adults. *Pediatrics*. 98, 153-157.

American Foundation for Vision Awareness. (Undated). *A nurse's guide to children's vision and learning*. St. Louis, MO: Author.

American Optometric Association. (1994). *Guidelines for school vision screening programs*. St. Louis, MO: Author.

Ciner, EB, Schmidt, PT, Orel-Bixler, D, Dobson, V, Maguire, M, Cyert, L, Moore, B, Schultz, J. (1998) Vision Screening of Preschool Children: Evaluating the Past, Looking Toward the Future, *Optometry and Vision Science*, Vol. 75, No. 8, August, 571-584

Ciner, EB, Schmidt, PT, Orel-Bixler, D, Dobson, V, Maguire, M, Cyert, L, Moore, B, Schultz, J. (1999) The Survey of Vision Screening Policies of Preschool Children in the United States, *Survey of Ophthalmology*, Vol. 43, No. 5, March/April, pp. 455-457

Crouch, E. R., & Crouch, E. R. (1991, September). Pediatric vision screening: Why? When? What? How? *Contemporary Pediatrics*, pp. 9-30.

Cummings, GE (1996) Vision Screening in Junior Schools, *Public Health*, 110:369-372.

Diholakia, S. (1987). The application of a comprehensive visual screening program to children aged 3-5 years: Can a modified procedure be devised for visual screening by ancillary staff? *Ophthalmic and Physiological Optics*, 4, 469-476

Essman, SW, Essman, TF (1992) Screening for Pediatric Eye Disease, *American Family Physician*, Vol. 46, No. 4, pp. 1243-1252

Fisher, M. (Ed.). (1989). Screening for diminished visual acuity. *Guide to clinical preventive services: An assessment of the effectiveness of 169 interventions*. In U.S. Preventative services task force, (pp. 181-185). Baltimore, Maryland: Wilham & Wilkins.

Guide to Clinical Preventive Services, 2nd Edition, Department of Health and Human Services, Office of Public Health and Science, Office of Disease Prevention and Health Promotion. Part E: Vision and Hearing Disorders.

Illinois Division of Health Promotion and Screening. (1993). *Vision screening manual*. Springfield, IL: Author.

Keeney, A. H. (1966). Development of vision. In F. Falkner, F. (Ed.): *Human development*. Philadelphia, PA: W. B. Saunders Co.

Liebman, S. D., & Gellis, S. S. (1966). *The pediatrician's ophthalmology*. St. Louis, MO: C. V. Mosby.

Maguire MG. Children unable to perform screening tests in vision in preschoolers study: proportion with ocular conditions and impact on measures of test accuracy. *Invest Ophthalmol Vis Sci* 2007; 48:83-7.

Marsh-Tootle, WL, Corliss, DA, Alvarez SL, Clore, KA, Daum, KM, Gordon, A, Huston, G, Perry, FF, Swanson, MW (1994). A Statistical Analysis of Modified Clinical Technique Vision Screening of Preschoolers by Optometry Students, *Optometry and Vision Science*, Vol. 71, No. 10, pp. 593-603.

Nader, P. R. (Ed.). (1993). School health services: Vision. In *School health: Policy and practice, 5th ed.* (pp. 88-90). Elk Grove Village, IL: American Academy of Pediatrics.

National Association of School Nurses. (1993). *Vision screening guidelines for school nurses*. Scarborough, ME: Author.

National Society to Prevent Blindness. (1984). *Children's eye health guide: Vision screening, eye health and safety for preschoolers and school age children*. Schaumburg, IL: Author.

Scheiman M, Gallaywa M, Couter R, et al. Prevalence of vision and ocular disease conditions in a clinical pediatric population. *J Am Optom Assoc* 1996; 67:192-202.

Schmidt, P. P. (1991). Effectiveness of vision-screening in pre-school populations with preferential-looking cards used for assessment of visual acuity. *Optometry and Vision Science*, 68, 210-219

Snowdod, S, Stewart-Brown, S (1998) The Value of Preschool Vision Screening, *Nursing Times*, January 28, Vol. 94, No. 4, pp. 53-55.

US Public Health Service (1994) Vision Screening in Children, *American Family Physician*, Vol. 50, No. 3, pp. 587-690.

Wasserman, R. C., Croft, C. A., & Brotherton, S. E. (1992). Preschool vision screening in pediatric practice: A study from the Pediatric Research in Office Settings (PROS) Network. American Academy of Pediatrics [published erratum appears in Pediatrics]. *Pediatrics*, 89, 834-838.

Whipple, D. V. (1966). *Dynamics of development*. New York: McGraw-Hill.

Pre-Screening Information

Cross, A. W. (1985). Medical Progress: Health Screening in Schools Part I. *The Journal of Pediatrics*, 107, 487-490.

Crouch, E. R., & Goodrich, K. A. (1988). Practical aspects of pediatric vision screening. *American Orthoptic Journal*, 38, 62-72.

Crouch, E. R., & Crouch, E. R. (1991, September). Pediatric vision screening: Why? When? What? How? *Contemporary Pediatrics*, 9-30.

Fathy, V. C., & Elton, P. J. (1993). Orthoptic screening for 3 and 4 year olds. *Public Health*, 107, 19-23.

Iowa Department of Public Health. (1992). *Iowa recommendations for child health services*. Des Moines, IA: Author.

Visual Acuity Testing

Fulton, A. (1992). Screening preschool children to detect visual and ocular disorders. *Archives of Ophthalmology*, 110, 1553-1554.

Diholakia, S. (1987). The application of a comprehensive visual screening program to children aged 3-5 years: Can a modified procedure be devised for visual screening by ancillary staff? *Ophthalmic and Physiological Optics*, 4, 469-476.

Hered, RW, Murphy, S, Clancy, M (1997) Comparison of the HOTV and LEA Symbol Charts for Preschool Vision Screening. *Journal of Pediatric Ophthalmology and Strabismus*, 34:24 - 28, January/February, No. 1.

Ruttum, M. S., & Nelson, D. B. (1991). Stereopsis testing to reduce over referral in preschool vision screening. *Journal of Pediatric Ophthalmology and Strabismus*, 28, 131-133.

Schmidt, P. P. (1991). Effectiveness of vision-screening in pre-school populations with preferential-looking cards used for assessment of visual acuity. *Optometry and Vision Science*, 68, 210-219.

Sprague, J. D., Stock, L. A., Connette, J. E., & Bormberg, J. (1988). Study of chart designs and optotypes for preschool vision screening. *American Orthoptic Journal*, 38, 18-23.

Sprague, J. B., Stock, L. A., Connett, J., & Bromberg, J. (1989). Study of chart designs and optotypes for preschool vision screening I: Comparability of chart designs. *Journal of Pediatric Ophthalmology and Strabismus*, 26, 189-197.

Wasserman, R. C., Croft, C. A., & Brotherton, S. E. (1992). Preschool vision screening in pediatric practice: A study from the Pediatric Research in Office Settings (PROS) Network. American Academy of Pediatrics [published erratum appears in Pediatrics]. *Pediatrics*, 89, 834-838.

Retesting

Oberbeck, T. G. (1988). Vision screening of preschool and school aged children. *Journal of Ophthalmic Nursing and Technology*, 7, 96-99.

Romano, PE (1990) Vision/Eye Screening: Test Twice and Refer Once, *Pediatrics Annals*, 19:6, June, 359-367.

Stereopsis Testing

Broadbent, H., & Westall, C. (1990). An evaluation of techniques for measuring stereopsis in infants and young children. *Ophthalmology and Physiological Optometry*, 10, 3-7.

Diholakia, S. (1987). The application of a comprehensive visual screening program to children aged 3-5 years: Can a modified procedure be devised for visual screening by ancillary staff? *Ophthalmic and Physiological Optics*, 4, 469-476.

Hope, C., & Maslin, K. (1990). Random dot stereogram E in vision screening of children. *Australian and New Zealand Journal of Ophthalmology*, 18, 319-324

Ruttum, M. S., & Nelson, D. B. (1991). Stereopsis testing to reduce over referral in preschool vision screening. *Journal of Pediatric Ophthalmology and Strabismus*, 28, 131-133.

Williams, S., Simpson, A., & Silva, P. A. (1988). Stereo acuity levels and vision problems in children from 7-11 years. *Ophthalmology and Physiological Optometry*, 8, 386-389.

Color Vision Testing

Diholakia, S. (1987). The application of a comprehensive visual screening program to children aged 3-5 years: Can a modified procedure be devised for visual screening by ancillary staff? *Ophthalmic and Physiological Optics*, 4, 469-476.

Littlewood, R., & Hyde, F. (1993). Screening for congenital colour vision defects, Comparison between the OHKUMA and Ishihara plates. *Australian and New Zealand Journal of Ophthalmology*, 21, 31-35.

Swanson, W. H., & Everett, M. (1992). Color vision screening of young children. *Journal of Pediatric Ophthalmology and Strabismus*, 29, 49-54.

Hyperopia Referrals

Diholakia, S. (1987). The application of a comprehensive visual screening program to children aged 3-5 years: Can a modified procedure be devised for visual screening by ancillary staff? *Ophthalmic and Physiological Optics*, 4, 469-476.

Lieberman, S., & Cohn, A. H., Stolzberg, M., & Ritty, J. M. (1985). Validation study of the New York State Optometric Association (NYSOA) Vision Screening Battery. *American Journal of Optometry and Physiological Optics*, 62, 165-168.

Peters, H. B. (1984). The Orinda Study. *American Journal of Optometry and Physiological Optics*, 61, 361-363.