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To: Primary Care Providers, School Nurses, School Physicians, and Other Interested Parties

From: Massachusetts Department of Public Health

SUBJ: Pre-School Age Vision Screening Protocols

DATE: February 28, 2005

MEMORANDUM

The Massachusetts Department of Public Health is pleased to provide the following protocol to conduct vision screening on pre-school age children in the Commonwealth. The protocol is intended to facilitate the identification of children with common vision problems at an early age when treatment is most effective.

The Massachusetts Legislature enacted Chapter 181 of the Acts of 2004 "*An Act Relative To Eye Examinations For Children*" which amended Massachusetts General Law, Chapter 71, Section 57. An important requirement of the amendment is that "...*Upon entering kindergarten or within 30 days of the start of the school year, the parent or guardian of each child shall present to school health personnel certification that the child within the previous 12 months has passed a vision screening*".

The Massachusetts Department of Public Health, working in partnership with expert representatives of the ophthalmology and optometry professions, established a standardized pre-school age vision screening protocol. The protocol described below represents an evidence based methodology and current best practice in the field of pre-school vision screening. The Massachusetts Department of Public Health will, on the recommendation of the ophthalmology and optometry professions, update the protocol as new research becomes available.

We would like to thank the Massachusetts Legislature, the Massachusetts Medical Society, American Academy of Pediatrics, Massachusetts Chapter of the American Academy of Pediatrics, Massachusetts Chapter of Prevent Blindness, Massachusetts Society of Eye Physicians and Surgeons, the Massachusetts School Nurse Organization, New England College of Optometry, Boston University and the many other organizations and individuals, too numerous to mention, for their support of pre-school vision screening in the Commonwealth.

Massachusetts Preschool Vision Screening Protocol

| Function to be Evaluated | Type of Test | Specific Test | Recommended Testing Procedure | Passing Criterion |
|---------------------------------|-----------------------|--|---|---|
| Distance Visual Acuity | Linear acuity | MassVAT (Massachusetts Visual Acuity Test) flip cards with HOTV letters or Lea symbols HOTV or Lea symbols wall chart | Test distance = 10 feet <p style="text-align: center;">Pretest: (performed binocularly) Test child's ability to perform the test by having child identify or match all 4 letters or symbols when presented up close.</p> <p style="text-align: center;">Test procedure: (performed monocularly) Test child's ability to identify or match optotypes on the critical line.</p> <p style="text-align: center;">Critical line: 20/40 at 36 to 47 months 20/30 at 48 months and older</p> | Child must identify or match 4 out of 5 letters or symbols on the critical line with each eye tested monocularly, being careful to watch for peeking. |
| Ocular Alignment/ Stereopsis | Random dot stereogram | Random Dot E | Test distance = 4 feet All testing, including pretesting, should be done binocularly with the polarized glasses on. <p style="text-align: center;">Pretest: Test child's ability to perform the test by having the child identify the location of the 3-dimensional E correctly on 4 out of 5 presentations.</p> <p style="text-align: center;">Test procedure: Test child's ability to identify the location of the stereo E. 5 presentations should be used, varying the location in a random manner.</p> | Child must locate stereo E on 4 out of 5 presentations |

Massachusetts Preschool Vision Screening Protocol

Chapter 181 of the Acts of 2004 amended Chapter 71, Section 57 to require a preschool vision screening. Please refer to the Commonwealth of Massachusetts General Laws (<http://www.mass.gov/legis/laws/mgl/71-57.htm>) for specific language.

The protocol is composed of two parts:

- (1) Distance visual acuity test**
- (2) Stereo vision test**

(1) DISTANCE VISUAL ACUITY TEST

What Are You Testing?

Visual acuity testing tests how well the child sees small objects far away. For this test, the distance between the child and the object is 10 feet (3 meters).

What You Need to Do the Test:

1. *Mass VAT (Massachusetts Visual Acuity Test) flip cards with HOTV Letters or Lea Symbols* is recommended. A *ten foot wall chart with HOTV letters or Lea symbols* is also acceptable. There are a total of 4 testing cards in a set of Mass VAT flip cards. Each card contains a line of 5 letters (combinations of H, O, T, and V) or 5 Lea symbols surrounded by a black crowding border (a line that forms a rectangle around the 5 letters). There are two cards for each acuity level, one card to test the right eye and one card to test the left eye, to prevent memorization. The cards which correspond to an acuity of 10/20 (equivalent to 20/40) are used for testing children less than 4 years of age

and the cards which correspond to an acuity of 10/16 (equivalent to 20/32) are used for testing children 4 years of age and older. If using the wall chart, the appropriate line for screening must be clearly identified: 10/20 (20/40) for testing children less than 4 years of age, and 10/15 (20/30) for testing children 4 years of age and older.



2. One *large, square lap card* that has each of the four letters or Lea symbols on it
3. *Flash cards* for pre-testing with single, large letters (one each of the H, O, T, and V) or Lea symbols
4. Chair for the child and screener

Getting Ready:

1. Be sure that the child's chair is 10 feet (3 meters) from the wall chart or the location at which the

MassVAT flip cards will be presented.

2. Select the set of cards or the line on the wall chart that is appropriate for the age of the child to be tested.
3. Ensure that there is good room illumination so that the letters or symbols are well lit when held in the proper testing position.
4. If the child is wearing distance glasses, or is supposed to wear glasses for distance, leave them on during testing.

Pretest:

1. Position the child in the chair 10 feet from the wall chart or 10 feet from the place where the flip cards will be presented. The letters or symbols must be presented at the same height as the child. It is important for the child to be able to look straight ahead and not be looking off to the side or lower than the letters or symbols.
2. Give the child the lap card, to hold on his/her lap. A helper may sit or stand next to the child and hold the lap card. This is especially useful with younger children and those with special needs. If you do not have a helper, have the child hold the lap card flat, with the letters right side up as the child is looking down at them.
3. Pre-test the child binocularly, i.e. with both eyes open. The purpose of pre-training is to practice identification of the letters/symbols and to find out whether the child is able to perform the test. Using the training flash cards, hold a single letter or Lea symbol close to the child (about 3 feet from the child). Point to a flash card and ask the child to name the letter/symbol or point to the matching letter/symbol on his or her lap card. Continue this procedure until all four letters or symbols have been correctly named or matched. If the child cannot do the task by matching or naming, you may have the child observe the testing of another child before attempting the pre-testing of this child one more time. If the child is then still unable to successfully accomplish the pretest, the child should be referred for a comprehensive eye examination by an ophthalmologist or optometrist.

Test Procedure:

1. Point to the child's left eye and tell the child to close that eye. Place a patch or other cover over the child's left eye. Alternatively, the child or an assistant may use the palm of his/her hand to completely cover the eye. It is very important to observe the child carefully to ensure that he/she does not peek around the hand. Covering the eye with fingers is not allowed because peeking is too easy with only fingers in front of the eye. Children with poor vision in one eye are the ones most likely to peek! If the child persists in peeking, the child should be referred for a comprehensive eye exam by an ophthalmologist or optometrist.
2. Move to the wall chart or the location (10 feet from the child) where the MassVAT flip cards will be presented.
3. If using the MassVAT flip cards, go to the two cards which correspond to the child's age. Point to the first letter/symbol on the R card (for the right eye). Be very careful to point just below the rectangular box around the letters/symbols. The pointer (finger or pencil) must not cover the letter/symbol or extend over the line of the rectangular box, i.e. don't "break the box". Masking, i.e. presenting one letter/symbol at a time, can overestimate the visual acuity in children with poor vision. Ask the child to name the letter/symbol or point to the matching letter/symbol on the lap card. If the child is correct, point to the second letter/symbol and have the child name or match it. Continue pointing to the letters/symbols, one at a time, until the child correctly names at least 4 of the 5 letters/symbols on the line. If the child misses 2 letters/symbols, stop there, record the results on the data sheet, and proceed to testing of the left eye. The child must correctly name or match 4

of the 5 letters/symbols on the line to pass the test for that eye. If the child is unable to correctly name or match at least 4 letters/symbols on a line for each eye, the child needs to be referred for a comprehensive eye examination by an ophthalmologist or optometrist. If using a wall chart, point to one letter/symbol at a time on the line appropriate for the child's age. As noted above, be careful not to cover the surrounding letters or symbols with your finger or pencil when pointing.

4. After testing of the right eye has been completed, cover the right eye, and proceed with testing of the left eye. Repeat the testing procedure by starting with the L card (for the left eye) if using the MassVAT flip cards. If using the wall chart, point to the letters or symbols on the appropriate line in a different order from that used when the right eye was tested, in order to help prevent memorization.
5. The acuity level required for a child under 4 years of age to pass is 10/20 (equivalent to 20/40). The acuity level required for children 4 years of age and older to pass is 10/16 (equivalent to 20/32, with MassVAT) or 10/15 (equivalent to 20/30, with the wall chart)

What You Tell the Child:

1. Keep encouraging the child to respond to your questions. Urge the child to keep naming or matching the letters/symbols even if the child must guess.
2. Provide positive comments about the child's performance, regardless of whether the child identifies the letter/symbol correctly or incorrectly.
3. Remind the child to stay seated and look straight ahead at the flip cards or the wall chart.
4. Repeat the instruction to keep the eye covered.

What You Write Down:

1. Circle "Pass" or "Refer".

Remember:

1. Maintain the distance during the test. Do not allow the child to move up closer to the letters/symbols.
2. Be very diligent to ensure that the eye is effectively and completely covered throughout the vision screening. A child who peeks is likely a child not seeing well.
3. Be very careful not to cover any of the surrounding letters/symbols when pointing. Such masking may cause the visual acuity to be overestimated, and a child with poor vision may not be recognized.
4. If using Lea symbols, other names for the symbols are acceptable as long as the child uses them consistently.
5. If a child gives a response while not paying attention to the task, that response should be ignored.
6. Clean the lap card with an antibacterial wipe as needed.

(2) STEREOVISION TEST

What Are You Testing?

Stereo testing checks how well a child's two eyes work together.

What You Need to Do the Test:

1. The *Random Dot E (RDE) Stereotest* (contains 3 cards): *Demonstration plate* with a large, raised, embossed letter E, to be used for training purposes only, *Stereo E test plate* with an array of dots that appear randomly oriented, but when viewed through the stereo glasses a large letter "E" will appear if the child has normal binocular vision, and *Blank test plate* with an array of dots that appear randomly oriented, even when viewed through the stereo glasses, i.e. no "E" appears even with the stereo glasses in place.
2. One pair of *stereo sunglasses*
3. A marked off 4 foot distance from the child's chair to the point at which the cards will be held
4. Antibacterial wipes



Getting Ready:

1. Make sure that the test distance between the chair and the cards is carefully measured at 4 feet.
2. Make sure that there is bright room lighting.
3. Confirm the 4 foot distance between the child and the test plates and carefully maintain it during testing.

Pretest:

1. Have the child put on a pair of stereo sunglasses. Children wearing glasses should wear their eyeglasses during testing with the stereo sunglasses worn over their own glasses.
2. Hold the model E *demonstration plate* at a distance of a foot and a half in front of the child. Point to the "E" and say to the child, "See the E." Then pick up the *blank test plate* with your other hand and shuffle the cards behind your back.
3. Be careful to hold the plates at an angle that is vertical or tilted back slightly to eliminate surface reflections. Be sure that there is no extraneous glare on the plates.
4. Hold the two cards side-by-side or above and below each other. Ask the child to point to the plate with the "E" on it.
5. Repeat this procedure 4 more times. Vary the position of the "E" (left, right, up, down), being careful not to present the plates in a pattern.

6. If the child gives incorrect responses on two of the five presentations, stop the test, and refer the child for a comprehensive eye exam by an ophthalmologist or optometrist. The child is unable to perform this test.

Test Procedure:

1. Move to the 4 foot test distance from the child. The testing procedure will proceed in the same manner as the training. Replace the model E *demonstration plate* with the *stereo E test plate*. Shuffle the *stereo E test plate* and the *blank test plate* behind your back. Hold the two cards side by side or above and below each other and ask the child to point to the card with the “E” on it.
2. If the child has trouble seeing the stereo “E”, move closer and show the child the *stereo E test plate* and the *blank test plate* again. If the child is still unable to determine the location of the card with the stereo “E”, stop the test, and refer the child for a comprehensive eye examination by an ophthalmologist or optometrist.
3. If the child is able to locate the stereo “E”, repeat the test again with the *blank test plate* and the *stereo E test plate* at a distance of 4 feet. If the child correctly locates the “E”, present the *blank test plate* and the *stereo test plate* 4 more times, randomizing the position of the plates on each trial so that the stereo test plate could be either to the right, left, up or down.
4. The child must correctly locate the letter “E” on at least 4 of the maximum of 5 presentations to pass.

What You Tell the Child:

1. Provide instruction and encouragement to the child, as needed. Because it takes a few seconds to see the stereo “E”, you need to encourage the child to keep looking at the plates. You can tell the child that the “E” is hiding and that they need to look hard to find it.

What You Write Down:

1. If the child refuses to wear the stereo sunglasses, allow the child to watch testing of another child. If the child is then still unwilling to wear the stereo sunglasses, the child is referred for a comprehensive eye exam.
2. If the child is unable to locate the model E on the demonstration plate 4 times, allow the child to watch testing of another child. If the child is then still unable to locate the “E”, the child is referred for a comprehensive eye exam.
3. If the child is able to locate the *stereo E test plate* at least 4 of 5 times, the child is a pass.
4. If the child fails to locate the *stereo E test plate* 2 times, the child is referred for a comprehensive eye exam.

Remember!

1. Do not let the child see the plates without wearing the stereo sunglasses.
2. The child is a “refer” if he/she refuses to wear the stereo sunglasses, even after watching another child being tested.
3. The child is a “refer” if he/she cannot locate the “E” in the *demonstration plate* 4 of 5 times at a distance of 1.5 feet, even after watching another child being tested.

4. The plate with the raised “E” (the *demonstration plate*) is for training purposes. It is easy for the child to see. The *demonstration model E* and the *blank test plates* are used to determine if the child understands the test.
5. Clean the ear pieces and nose area of the glasses with an antibacterial wipe after each use.