

# 2014 Updated Recommendations for Preschool Vision Screening: Guidelines for Filipino Children Entering the Philippine Public School System

Leo D. P. Cubillan, MD, MPH, Alvina Pauline D. Santiago, MD,  
Toral D. Mehta, MS, MPH, and Jane Melissa L. Lim

Philippine Eye Research Institute (PERI)  
National Institutes of Health  
University of the Philippines Manila

Correspondence: Leo D. P. Cubillan, MD, MPH  
Philippine Eye Research Institute  
National Institutes of Health  
University of the Philippines Manila  
Email: ldpcubillan@post.upm.edu.ph

Disclosure: The PERI Vision Screening Kit is currently available only through PERI.

## ABSTRACT

**INTRODUCTION:** In 2004, the Philippine Guidelines on Periodic Health Examination (PHEX): Effective Screening for Diseases among Apparently Healthy Filipinos was published with recommendations for screening for vision impairment. Since that time, the Philippine education system has shifted to the K to 12 curriculum, and with full implementation of Republic Act 10157 (Kindergarten Education Act), Filipino children entered school earlier at age 5 years. This made the previous recommendations unenforceable in this new age group.

**NEW RECOMMENDATIONS:** The 2014 revised recommendations were: (1) Vision screening for amblyopia and strabismus is recommended for all children at least once using an age-appropriate chart (Level 2); and (2) Screening infants at 6 months of age for ocular problems, and at age 2 to 3 years, at 5 years, and every 1 to 2 years thereafter for visual acuity and ocular alignment may be done (Level 4).

**COMMENT:** The Philippine Eye Research Institute (PERI) incorporated the LEA Symbols in its vision screening kit, as the LEA Symbols was not only an age-appropriate chart but also had the added features of equal blurring of the optotypes precluding guesswork, and fulfilled the criteria set by international bodies. Included in this kit was a LEA symbol and number chart, right occluder glasses, left occluder glasses, and a 10-foot string to measure distance consistently. The vision screening kit has been pilot tested in several public schools and have gained the reputation for ease of use, reliability, and reproducibility.

**CONCLUSION:** The younger age of Filipino children at school entry, pegged at 5 years of age or more, meant that the initial recommendations for students age 7 years were no longer enforceable. The LEA symbols chart, now endorsed internationally as an effective preschool vision test, offered the advantages of being validated and having undergone repeated calibration; lacking in cultural bias as symbols were easy to recognize across cultures; and having the actual screening process akin to a “play” situation. Currently, the LEA symbols chart form part of the PERI Vision Screening kit and is available locally through the PERI.

**Key Words:** Preschool vision screening, Vision screening kit, LEA Symbols, LEA Numbers, Vision screening recommendations

In 2004, the University of the Philippines Manila published the Philippine Guidelines on Periodic Health Examination (PHEX): Effective Screening for Diseases among Apparently Healthy Filipinos.<sup>1</sup> The document was envisioned to “contribute... to the quality and efficiency of health care and health maintenance for all Filipinos... It was an appeal for rational medical decision-making, and an important step toward “equitable distribution of health and health resources.” The guidelines were prepared by designated task forces, with vision disorders, specifically vision impairment, and glaucoma identified as areas of interest.

PHEX recommendations were drafted using standardized principles and a common protocol, with each statement undergoing four phases of development: (1) preparation of the evidence-based draft; (2) *en banc* meeting that gave panelists a chance to assess and revise the draft, where issues of feasibility, resource limitations, value judgment, and experts’ opinions were taken into account. A consensus was declared when at least 75% agreed on a recommendation; (3) for unresolved issues, modified Delphi technique was employed by correspondence until a consensus was reached or a maximum of three circulations were accomplished. If still unresolved, the issue was labeled as such and included in the final draft; (4) lastly, a public forum was conducted before the final draft was written. In this manner, the recommendations for Screening for Visual Impairment were written by the Task Force for Vision Disorders.

The original recommendations for screening for visual impairment in children as published in the 2004 PHEX read as follows:

1. Vision screening for amblyopia and strabismus is recommended for all children at least once using a Snellen Chart and/or a stereoacuity test (Level 2).
2. Screening infants at 6 months of age for

ocular problems, and at age 2 to 3 years, at 5 years, and every 1 to 2 years thereafter for visual acuity and ocular alignment may or may not be done (Level 4).

The task force applied the criteria consistent with the United States and Canada recommendations.<sup>2,3</sup> These criteria were reproduced verbatim for better understanding of this set of recommendations.

1. “Treatment for the asymptomatic condition must have been evaluated using well-designed randomized-controlled trials that observed effects on clinical outcomes.”
2. “The burden of illness from the asymptomatic condition must have been measured accurately in locally conducted community-based studies.”
3. “Accuracy of the screening test for the asymptomatic condition must have been evaluated in validation studies done in the community.”
4. “Cost-effectiveness of the screening test, as well as treatment for the disease, should have been evaluated locally in properly conducted economic analysis.”

A Level 1 recommendation meant that all criteria above were met; Level 2 recommendation satisfied #1, but not all of #2, #3, and #4; Level 3 recommendation satisfied #2, #3, and #4, but not #1; and Level 4 recommendation satisfied none of the above criteria.<sup>1-3</sup>

At the time of publication in 2004, Filipino children entered the Philippine Basic Education System at age 7 years at the level of Grade 1. Following the shift to a K to 12 curriculum 2012<sup>4</sup>, and the nationwide implementation of Republic Act 10157 or the Kindergarten Education Act<sup>5</sup>, where one year of preschool education for children aged 5 years and above was provided, preschool entry for our public school system now commenced at an earlier

age. Neither screening tool, the Snellen Acuity or the Stereoacuity, was efficient in obtaining a 5-year-old child's visual acuity on school entry.

## RECOMMENDATIONS

Based on a consensus of local pediatric ophthalmology experts and recommendations published in the literature since 2004, the new recommended vision screening tool for Filipino children at school entry (many of whom will be at least age 5 years only) has been changed.

### 2014 UPDATED RECOMMENDATIONS

The new recommendations were revised, as follows:

1. Vision screening for amblyopia and strabismus is recommended for all children at least once using an age-appropriate chart (Level 2).
2. Screening infants at 6 months of age for ocular problems, and at age 2-3 years, at 5 years, and every 1 to 2 years thereafter for visual acuity and ocular alignment may be done (Level 4).

## DISCUSSION

*The Appropriate Chart for Children.* Support for the LEA Symbols as an age-appropriate chart for children unfamiliar with letters abound in the literature.<sup>6-12</sup> When children enter the Filipino school system, they will only be aged 5 years; the LEA Symbols exceeds all other preschool screening charts with regard to level of acceptance and clinical utility.

*The LEA Symbols.* The LEA symbols were designed by Lea Hyvarinen in 1976, and initially calibrated against the Snellen optotype, and later with the Landolt C when it became the reference optotype (1988), with size 1.0 symbol at 6.84 minutes of arc.<sup>12,13</sup> When the printing technique using computers was used in 1993, LEA symbols were recalibrated, with the apple being 1.31 times larger than the Landolt C, the house 1.35 times larger, the square 1.20 times larger, and the ball 1.42 times larger. The average of the symbols of 1.32 was used as the space between the symbols in printing the charts. When Landolt C was 5 minutes of visual angle and the size 1.0, the

average LEA symbol was 6.6 minutes of arc.

The preference for the LEA Symbols was based on an excellent design that took into account equal blurring capabilities of the different symbols. This means that children who do not see well will find it hard to guess the correct figures as the images will look similar (Figure 1). The LEA Symbols were also more culturally neutral, and could be recognized across different cultures, or socioeconomic status.



**Figure 1.** Equal blurring of LEA symbols & numbers.

Moreover, the LEA Symbols follow the eye chart standardization and recommendations from international bodies, such as the International Council of Ophthalmology and the World Health Organization; namely:<sup>15,16</sup>

1. Equal legibility of the different optotypes.
2. Equal number of optotypes per line.
3. Horizontal spacing between the optotypes and the width of the optotypes on a line are equal.
4. Vertical spacing between each row is equal to the height of the optotypes in the smaller row.
5. Geometric progression of optotype sizes occur in uniform 0.1 logMAR units between rows.
6. Black optotypes are on a white background [and seen well] under good lighting conditions.

*The Philippine Eye Research Institute (PERI) Vision Screening Kit.* Armed with these facts, the PERI embarked on pilot-testing the LEA Symbols chart in several sites and found additional cultural advantages. As Filipino preschool children were typically shy and may not speak during screening, the LEA Symbols can be administered as a matching game, with the students needing only to point to the similar target in the response card. This works well even for the nonverbal, preliterate, and even the illiterate child, permitting vision screening even in the most difficult of situations.

Armed with the success and lessons learned from pilot testing the LEA chart, PERI adapted the LEA Symbols in its Vision Screening Kit

(Figure 2). The PERI kit includes the LEA Symbols (Figure 3A) on one face of the chart and the LEA Numbers (Figure 3B) on the back face of the chart; a transparent response card to improve a child's response rate due to shyness, illiteracy, or lack of verbal skills; a right-sided eyeglass occluder; a left-sided eyeglass occluder; a 10-foot string for measuring testing distance; a vision screening manual; and a laminated instruction card on how to use the LEA Symbols and LEA Numbers charts. On recommendations from PERI staff, the Department of Education, and the Department of Health, PERI included the LEA numbers that were printed with the same specifications as the LEA symbols with regard to equal blur and calibration to permit the same kit to be used for screening a child who is able to read numbers at the time of evaluation.

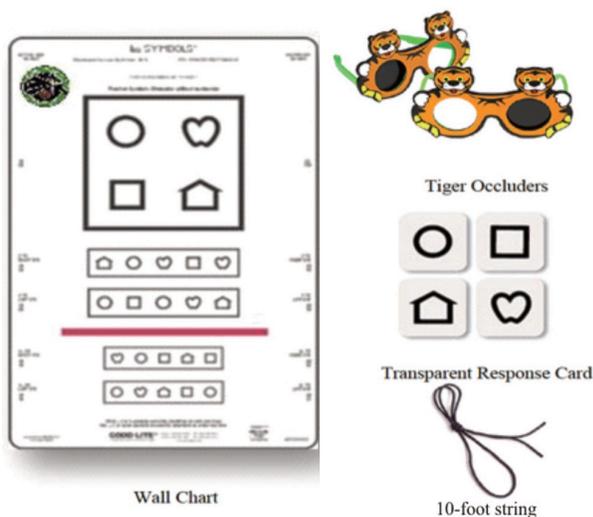


Figure 2. Contents of the PERI Vision Screening Kit.

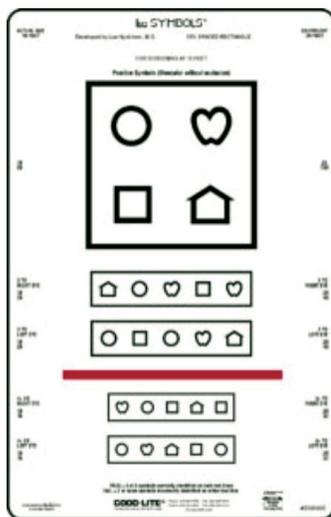


Figure 3A. Front of PERI vision screening chart with LEA symbols.

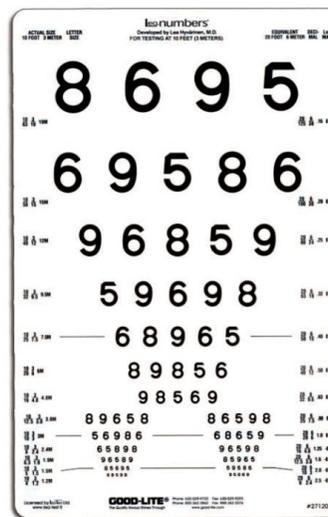


Figure 3B. Back of PERI vision screening chart with LEA numbers.

## CONCLUSION

The younger age of Filipino children at school entry, pegged at 5 years of age or more, meant that the initial recommendations for students age 7 years were no longer enforceable, as the Snellen acuity and the Titmus Fly stereoacuity tests were too difficult for this age group. The LEA Symbols, now endorsed internationally as an effective preschool vision test, offered the advantages of being validated and having undergone repeated calibration; lacking in cultural bias as symbols were easy to recognize across cultures; and having the actual screening process akin to a “play” situation. Currently, the LEA symbols chart form part of the PERI Vision Screening Kit and is available locally through PERI.

## REFERENCES

1. Task Force on Philippine Guidelines on Periodic Health Examination, Philippine Guidelines on Periodic Health Examination (PHEX): Effective Screening for Diseases among Apparently Healthy Filipinos. Manila: University of the Philippines Manila; 2004.
2. Lee PR. US Department of Health and Human Services, Press Conference Report of the US Preventive Services Task Force. Washington, DC: US Department of Health and Human Services; 1996.
3. Canadian Task Force on Preventive Health Care. The Canadian Guide to Clinical Preventive Health Care. ON, Canada: Minister of Public Works and Government Services; 1997.
4. The K to 12 Program of the Philippine Basic Education

- System. Available at: [www.gov.ph/k-12/](http://www.gov.ph/k-12/). Accessed November 3, 2014.
5. Republic Act 10157. An Act Institutionalizing the Kindergarten Education. Into the Basic Education System and Appropriating Funds Therefor. Available at: [www.gov.ph/2012/01/20/republic-act-no-10157/](http://www.gov.ph/2012/01/20/republic-act-no-10157/). Accessed November 3, 2014.
  6. Sanker N, Dhirani S, Bhakat P. Comparison of visual acuity results in preschool children with LEA symbols and Bailey-Lovie E Chart. *Middle East Afr J Ophthalmol* 2013;20:345-348.
  7. Omar R, Hussin DA, Knight VF. Comparison of LEA Symbols chart and the Sheridan Gardiner chart in assessing vision screening among preschool children: a Malaysia Perspective. *J Med Assoc Thai* 2012;95:412-417.
  8. Bertuzzi F, Orsoni JG, Porta MR, et al. Sensitivity and specificity of a visual acuity screening protocol performs with LEA Symbols 15-line folding distance chart in preschool children. *Acta Ophthalmol Scand* 2006;84:807-811.
  9. Cyer L, Schmidt P, Maguire M, et al. Threshold visual acuity testing of preschool children using the crowded HOTV and LEA Symbols acuity tests. *J AAPOS* 2003;7:396-399.
  10. Hered RW, Murphy S, Clancy M. Comparison of HOTV and LEA Symbols charts for preschool vision screening. *J Pediatr Ophthalmol Strabismus* 1997;34:24-28.
  11. Dobson V, Clifford-Donaldson CE, Miller JM, et al. A comparison of LEA symbol vs ETDRS (Early Treatment Diabetic Retinopathy Study) letter distance visual acuity in a population of young children with a high prevalence of astigmatism. *J AAPOS* 2009;13:253-257.
  12. Becker R, Hübsch S, Gräf MH, Kaufmann H. Examination of young children with LEA symbols. *Br J Ophthalmol* 2002;86:513-516.
  13. Hyvarinen L, Nasanen R, Laurinen P. New visual acuity test for preschool children. *Acta Ophthalmol* 1980;58:507-511.
  14. Hyvarinen L. Calibration of LEA Symbols 1993. Available at [www.lea-test.fi/en/vistests/pediatric/history/calibration.html](http://www.lea-test.fi/en/vistests/pediatric/history/calibration.html). Accessed December 10, 2014.
  15. Visual Functions Committee, International Council of Ophthalmology. May 25, 1984. Available at: [www.icoph.org/dynamic/attachments/resources/icovisualacuity1984.pdf](http://www.icoph.org/dynamic/attachments/resources/icovisualacuity1984.pdf). Accessed December 10, 2014.
  16. World Health Organization. Consultation on development of standards for characterization of vision loss and visual functioning, 2003. Available at: [http://whqlibdoc.who.int/hq/2003/WHO\\_PBL-03.91.pdf](http://whqlibdoc.who.int/hq/2003/WHO_PBL-03.91.pdf). Accessed December 10, 2014.