

Researchers develop new computer-based vision screening test for young children

28 April 2015

Many eye disorders in young children are asymptomatic and may remain undetected without testing. Since effective treatments are available for many of those conditions, early identification and intervention are critical to prevent potentially permanent vision problems. A new report published in the *Journal of the American Association for Pediatric Ophthalmology and Strabismus* (AAPOS) describes the effectiveness of a new computer-based vision-screening test, the Jaeb Visual Acuity Screener (JVAS), which is suitable for use in schools and pediatrician's offices.

"Broad adoption of this tool would result in a more standardized approach to pediatric vision [screening](#) in diverse medical and community office settings," commented lead investigator Tomohiko Yamada, OD, of the Department of Ophthalmology, Mayo Clinic, Rochester, Minnesota. "In comparison to traditional vision testing methodologies, this software-based tool provides the advantage of running on any windows-based PC in a pediatrician's examination room—avoiding testing in distracting office hallways."

JVAS is a computerized screening program developed by the Jaeb Center for Health Research that is designed to identify children with subnormal visual acuity in a rapid and reproducible manner. It uses a set testing algorithm to minimize subjective tester bias. It also uses age-specific visual acuity standards to provide a simple pass/fail result for four age groups (3, 4, 5 or 6, and 7 and over).

Investigators used the JVAS program to screen the vision of 175 children, ages 3 to 7, who then received a complete [eye examination](#) by an optometrist, which served as the study gold standard. The examining optometrist was kept unaware of the initial JVAS vision screening results. No children who already wore glasses, had been treated for amblyopia, or had undergone

ocular surgery were included in the screening. The average screening time was 84 seconds, with a range of 23 to 357 seconds across all age groups. There were three different failure criteria evaluated: (1) failure to identify at least three of any four normal threshold letters in either eye; (2) failure to identify at least three of any five normal threshold letters in either eye; (3) failure to identify at least four of any five normal threshold letters in either eye.

Of the 65 children failing the gold standard examination, 86% failed for reduced visual acuity (56), 35% for hyperopia (23), 23 % for astigmatism (15), 11% for anisometropia (7), 9% for myopia (6), and 5% for strabismus (3), with some patients failing the gold standard for more than one reason. For the 56 children with reduced visual acuity, the primary cause assigned hierarchically was uncorrected refractive error in 31 of 56 (55%), unilateral amblyopia in 7 (13%), bilateral amblyopia in 8 (14%), and for 10 (18%) the cause of reduced [visual acuity](#) was felt to be attention-maturation without specific reason.

For any screening test, high sensitivity and specificity are desirable. High sensitivity is the ability to correctly identify those children with the target condition(s). High specificity is the ability to correctly identify those who do not have the target condition(s). The investigators found a sensitivity of 88% to 91% and a specificity of 73% to 86%. The proportion of false positives (screening test failed but gold standard examination passed) was low for the JVAS, ranging from 9% to 17%, depending on which failure criterion was used. The criterion of "failure to identify at least three of any five normal threshold letters in either eye" gave the best balance of sensitivity and specificity.

The testing program is offered free of charge and the investigators encourage elementary school nurses, pediatricians, and other professionals who work with [children](#) ages 3-7 years to download and

use the JVAS for their vision screening needs. The program can be downloaded at <http://www.pedig.net/JVAS.aspx>.

Provided by Elsevier

APA citation: Researchers develop new computer-based vision screening test for young children (2015, April 28) retrieved 5 December 2021 from <https://medicalxpress.com/news/2015-04-computer-based-vision-screening-young-children.html>

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