

Efficacy and outcomes of a summer-based pediatric vision screening program

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Poor visual acuity in school-aged children results most commonly from refractive error and requires prompt and effective treatment to avoid long-term effects. We partnered with three summer programs to conduct vision screenings for underserved Philadelphia children. The aims of this study were to estimate the prevalence of decreased visual acuity and uncorrected refractive error in children attending these summer programs and to evaluate the association of demographic factors with ocular diagnoses. A total 1,627 children (mean age, 8.6 years) were screened, of whom 360 (22.1%) did not pass vision screening. Of the screening failures, 64/360 (17.8%) were referred to pediatric ophthalmology for subnormal best corrected vision or other concerns, and 301 (83.6%) received eyeglasses. Of all children screened, 34% exhibited decreased distance visual acuity ($\geq 20/30$), and 76 (4.7%) had visual acuity of less than 20/80. Younger children were more likely to have worse vision.

Of the 360 who did not pass the vision screening, 303 (84.2%) presented with correctable refractive errors, most commonly, myopia (73.0%), astigmatism (56.8%), and hyperopia (15.5%). Further, 12.5% of children presented with spherical anisometropia and 11.9% with cylindrical anisometropia. Mild myopia (64.0%; SE, 0.50-2.99), low astigmatism (49.5%; DC 1.00-2.75), and mild hyperopia (14.2%; SE 0.50-1.99) were the most common severity categorizations. The highest rate of astigmatism was seen in 5-year-olds, and rates of astigmatism decreased in older children.

Few studies report on the severity of refractive error and decreased visual acuity in elementary school children 5-13 years of age. Our reported prevalence of untreated decreased visual acuity (34.1%) suggests a greater need for vision screening than previously reported. Our program's coupling with summer programs allowed us to expand eye care access to pediatric populations in Philadelphia.

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PURPOSE	To investigate the prevalence of decreased visual acuity and uncorrected refractive error in school-aged children participating in summer programs.
METHODS	During the summers of 2014-2016, Wills Eye Hospital collaborated with summer programs in Philadelphia to provide vision screenings for underserved children. Parental consent was obtained prior to vision screening. Fail criteria included children in grades K-1 (ages 5-6) with visual acuity worse than 20/40 in either eye, children in grades 2-6 (ages 7-13) with visual acuity worse than 20/30 in either eye, or children with ≥ 2 lines of interocular difference. If decreased visual acuity was correctable to $\geq 20/30$ by the onsite optometrist, two pairs of free eyeglasses were provided. Children with other ocular abnormalities were referred to pediatric ophthalmology.
RESULTS	Of 1,627 children screened, 360 children (22.1%) did not pass vision screening, and 64 (3.9%) were referred. The prevalence of decreased distance visual was 34.1%. Younger children were more likely to have worse visual acuity than older children (OR = 0.943; $P = 0.023$; 95% CI, 0.896-0.992). Myopia (73%), astigmatism (56.8%), hyperopia (15.5%), spherical anisometropia (12.5%), and cylindrical anisometropia (11.9%) presented in the 303 children who underwent a manifest refraction. Myopia increased with age (OR = 0.818; $P = 0.001$; 95% CI, 0.724-0.922), whereas astigmatism decreased (OR = 0.817; $P < 0.001$; 95% CI, 0.728-0.913) with age. Two pairs of glasses were provided to 301 children.
CONCLUSIONS	Partnership with summer programs and other community initiatives to provide vision screenings facilitates access to eye care ultimately aimed at improving social functioning and academic performance. (J AAPOS 2018; ■:e1-e7)

Decreased visual acuity in children requires prompt and effective treatment to mitigate adverse long-term effects on a child and their

family. This is particularly important for school-aged children, who rely on vision skills for learning and academic achievement. Poor visual acuity in school-aged children results most commonly from refractive error. Other common ocular conditions that can benefit from early diagnosis and intervention include strabismus and amblyopia.¹⁻⁴ The Centers for Disease Control and Prevention's *Healthy People 2020* objectives include "increasing the proportion of children screened for vision" in order to reduce childhood vision impairment.⁵ However, increases in US pediatric vision screening rates have not produced a decline in vision impairment in the children.^{5,6} Burdened by funding constraints, low-income urban school districts often lack effective and systematic vision screening programs.⁷ In addition, children who face barriers to care have low eye care follow-up adherence rates even when screening does occur.^{8,9} These findings suggest the need for vision screening models that complement mandated school-based approaches in order to reduce pediatric vision impairment in underserved children nationwide. Limited research has evaluated vision screening programs in low-income, urban, school-aged populations, although

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