INTRODUCTION

Despite general agreement from health care professionals that it is important to screen preschool children for the risk factors of amblyopia and referral-warden ocular diseases, only 40.4% of pre-kindergarten children in the United States are screened.1 With the support of the Casey Eye Institute, a partnership was created with the Oregon State Elks Association. The Elks Children’s Eye Care of OHSU, and the Oregon State Head Start Association to provide free vision screenings. There is an extensive follow-up component to this program to ensure that the children who are referred receive the care they need from their local eye doctor. Chart notes from eye exams are analyzed to determine accuracy of the screenings.

The main goal of this study is to determine the accuracy of our vision screening referrals using the plusoptiX S12 Vision Screener (Plusoptix GmbH, Nuernberg, Germany) during August – December, 2013.

METHODS

Approval was obtained from the Institutional Review Board (IRB) at Oregon Health & Sciences University to collect and review data on 4,077 vision screenings completed throughout the state of Oregon by Head Start teachers and Elks Preschool Vision Screening staff. The plusoptiX S12 was selected as the standard screening tool. Screenings were performed using the plusoptiX S12 with Option 5 referral criteria for the 36 – 72 month old Head Start children.

Option 5 referral criteria

Amblyopia ≤ -1.50 D

Hyperopia and Anisometropia ≤ 1.00 D

Myopia ≤ -3.00 D

Other Ocular

1.00

0.50

Spherical Equivalent ≤ -1.50 D

57.1, 79.1

95%CI

Myopia

missing eye exam refraction data.

They went to an eye doctor. Three children were removed from the astigmatism analysis due to measurement data was not saved. However, eye exam data is available for these children if recorded on the consent forms. Plusoptix measurement reports were distributed to parents, and follow up was performed on all referrals and chart notes were reviewed for those referred to an eye doctor. For those children referred for possible astigmatism, Receiver Operating Curve (ROC) exam data was referred by the screening. A chart note review of 618 exams indicates that there are two potential cutoff points for astigmatism: 2.00D and 2.20D. The referral criterion of 2.00D produces a greater area under the curve (AUC), or the optimal balance between sensitivity and specificity. However, a cutoff of 2.00D produces a slightly better positive predictive value. The cutoff point of 2.20D produces a positive predictive value of 68.1% (95% CI: 56.9, 81.3). The referral criteria of 2.20D produces a slightly better positive predictive value. The cutoff point of 2.20D produces a positive predictive value of 69.1% (95% CI: 56.9, 81.3). The referral criteria of 2.20D produces a slightly better positive predictive value. The cutoff point of 2.20D produces a positive predictive value of 69.1% (95% CI: 56.9, 81.3).

CONCLUSION

Oregon recently passed legislation (HB 3000) that mandates all children show proof of a vision screening (or eye exam) before entering public school. This law will certainly increase the pool of children who have the need for eye care, but do not have the means to cover treatment. Each year, the Oregon Elks donate a growing sum of dollars to assist children who are not otherwise able to obtain treatment. In order to administer the Elks’ donation prudently, it is important for our program to maintain a reasonable level of confidence that our screening referrals are accurate. Based on this research, a decision was made to change the referral criterion settings from Option 5 to plusoptix Option 4 settings. The Option 4 referral criterion for astigmatism (2.20D) will reduce the number of false positive referrals for astigmatism.

RESULTS

Dilated eye exams were recommended for 1067 (26%) children who were referred by the screening. A chart note review of 618 exams indicate that 54% of those referred received treatment, usually glasses. 407 (88%) referrals received the benefit of a dilated eye exam. The primary treatment was glasses for 337 (83%) of children who received dilated eye exam and 72 received glasses without the benefit of dilution. Amblyopia was diagnosed by eye exam in 42 dilated cases. The most common diagnosis was refractive error.

ROC ANALYSIS OF OPTIMAL REFERRAL CRITERION FOR ASTIGMATISM

In this group of 407 full exams, 78% had significant refractive error. 10% had Amblyopia, 3% had ataxia and 4% had no significant diagnosis. Other significant cause conditions were found in 5%, including craniofacial anomaly, Phoe, Duane Syndrome, and glaucoma suspect.

DIAGNOSIS BASED ON DILATED EYE EXAMS OF REFRACTIVE ERROR

POTENTIAL ASTIGMATISM CUTOFF POINTS

FINANCIAL DISCLOSURE

AUTHOR AFFILIATIONS: ELKS CHILDREN’S EYE CLINIC, CASEY EYE INSTITUTE, OREGON HEALTH & SCIENCE UNIVERSITY

REFERENCES

1. Donahue SP, Arthur B, Neely NE, Arnold RW, Silbert D, Ruben JB; POS Vision Screening Program’s goal is to achieve high quality vision screening referrals. Astigmatism was the most common reason for plusoptix false positive referrals using the Option 5 settings. Of those referred for astigmatism, 48.7% of the referrals did not require treatment. In order to improve the quality of the referrals, the plusoptix settings for astigmatism could be changed to improve the accuracy of the referrals.

REASON FOR REFERRAL BY PLUSOPTIX S12.

Treatment based on dilated eye exams.

Note: Lighter areas indicate cases where no treatment was needed.