

# Vision Screening in the Pediatrician's Office\*

Natario L. Couser, Fatema Q. Esmail, Amy K. Hutchinson<sup>#</sup>

The Department of Ophthalmology, Emory University School of Medicine, Atlanta, USA.  
Email: <sup>#</sup>amy.hutchinson@emory.edu

Received January 13<sup>th</sup>, 2012; revised February 16<sup>th</sup>, 2012; accepted March 10<sup>th</sup>, 2012

## ABSTRACT

**Objective:** To assess current practices, attitudes, and perceived barriers toward pediatric vision screening. **Patients and Methods:** A link to a 9-question survey was electronically distributed to a national sample of 6000 pediatricians through Medical Marketing Services Inc. Data were collected using Survey Monkey. **Results:** Email open rate was 11%; 37% of those who opened the email responded (225 respondents). Over ninety percent of respondents perform some type of vision screening at least yearly, although age at which screening began varied, with two thirds of respondents instituting formal vision screening after three years. Fifty eight percent of respondents were either extremely unsatisfied, unsatisfied or only somewhat satisfied with their current screening method. Preferred methods of screening and confidence of pediatricians in their ability to detect pathology varied for children under versus over age three. The least frequently used methods for all age groups were autorefraction and photoscreening. The most commonly reported barriers to screening were inadequate training (48%), time required for exam (42%), and inadequate reimbursement (32%). **Conclusions:** Perceived barriers to vision screening in the pediatrician office have been previously identified, and photoscreening and autorefraction have been identified as a possible means to circumvent them. In spite of the addition of new procedural codes, pediatricians continue to report similar barriers to screening.

**Keywords:** Pediatric Vision Screening; Barriers; Reimbursement; Pediatricians; Photoscreening; Autorefraction; US Preventative Services Task Force; CPT 99174

## 1. Introduction

Early detection of ocular disorders can prevent lifelong visual impairment. The US Preventative Services Task Force (USPSTF) has concluded that vision screening for children ages 3 to 5 is beneficial, and recommends vision screening at least once between the ages of 3 and 5 years to detect the presence of amblyopia or its risk factors [1]. The USPSTF has also concluded that “the current evidence is insufficient to assess the balance of benefits and harms of vision screening for children <3 years of age”; [1] however, the evidence base for vision screening in children under 3 is limited by a paucity of studies evaluating the screening techniques that are feasible in this age group of children, such as red reflex testing, and objective vision screening such as photoscreening and autorefraction [2].

In 2006, Kemper and Clark surveyed a national sample of pediatricians to evaluate their preschool vision screening practices, and reported that common barriers to screening included perceptions that screening was con-

sidered too time consuming, children were uncooperative, and that reimbursement was not adequate [3]. The authors suggested that financial incentives and emerging screening technologies might be important to ensure the delivery of preschool vision screening. In January 2008 a current procedural terminology (CPT) code 99174 was established, and in November 2008 a relative value unit (RVU) of 0.69 was assigned for objective screening using a photoscreener. We designed our survey to revisit the practices and perceptions of vision screening among pediatricians, and to determine whether these practices and perceptions differed for patients below and above age 3.

## 2. Patients and Methods

This study was approved by the Institutional Review Board at Emory University. We designed a 9-question survey with an additional section for general comments to assess pediatricians' current practices, attitudes, and perceived barriers toward pediatric vision screening. A link to the survey was electronically distributed to a national sample of 6000 pediatricians through Medical Marketing Services Inc. (MMS) with a broadcast subject line reading: “Help Us Improve Pediatric Vision Screen-

\*Conflict of interest and disclosure statement: None of the authors have a conflict of interest or a financial interest in any of the methods or products described in this manuscript.

<sup>#</sup>Corresponding author.

ing Methods.” Detailed practice characteristics of the pediatricians receiving the email were not known; however MMS collects demographic information about their participating physicians, and we designated surveys be sent only to office based physicians whose primary specialty was pediatrics. Data were collected using Survey Monkey (www.surveymonkey.com). Descriptive statistics were used to summarize the data.

### 3. Results

Delivery information provided by the marketing service confirmed that 98% of the emails were received. There was an 11% open rate, and of the recipients who opened the email, 37% responded to the survey, for a total of 225 respondents. Not all respondents answered every question.

Although 15% of respondents indicated that they began vision screening at birth by testing the red reflex in infancy, the majority of respondents (67%) indicated that they did not begin formal visual acuity testing until age 3 or over (Question 1, **Table 1**). Most respondents indicated that they screened their patients at every well child visit, but 9% of respondents reported that they screened their patients less than once a year, and 1% reported that they did not screen vision at all (Question 2, **Table 2**).

**Table 1. At what age do you begin screening your pediatric patients' vision?**

Answer Options	Response Percent	Response Count
Birth	15%	32
2 weeks	1%	2
1 month	0%	1
2 months	1%	3
6 months	3%	7
9 months	1%	2
1 year	1%	2
2 years	2%	4
3 years	34%	71
4 years	26%	54
5 years	7%	15
Misc*	8%	17
<b>Answered question</b>	<b>210</b>	
<b>Skipped question</b>	<b>15</b>	

\*misc responses included “infant”, respondent giving a range of answers, “at first visit”, “birth, but formally at age...”.

of respondents were either extremely unsatisfied, unsatisfied or only somewhat satisfied with their current screening method (Question 3, **Table 3**), and although a majority of respondents felt at least somewhat adequately trained to perform vision screening, only one third felt well trained (Question 4, **Table 4**). Fifty six percent of respondents felt confident or extremely confident in their ability to detect a vision problem in children over age 3 compared to only 19% feeling an equal level of confidence in detecting vision problems in children under age 3 (Questions 5 and 6, **Figure 1**). A variety of testing methods were employed in children in both age groups (Questions 7 and 8, **Table 5**), with photoscreening and autorefractometry being the least frequently employed methods in both age groups. Finally, the most frequently reported barriers to performing vision screening were Inadequate training (48%), inadequate reimbursement (32%) and time constraints (42%) (Question 9, **Table 6**). Although a majority of respondents felt at least somewhat satisfied with their current screening methods, 58%

**Table 2. How frequently do you perform some type of vision screening on your pediatric patients? (Please choose one answer that best describes your practice).**

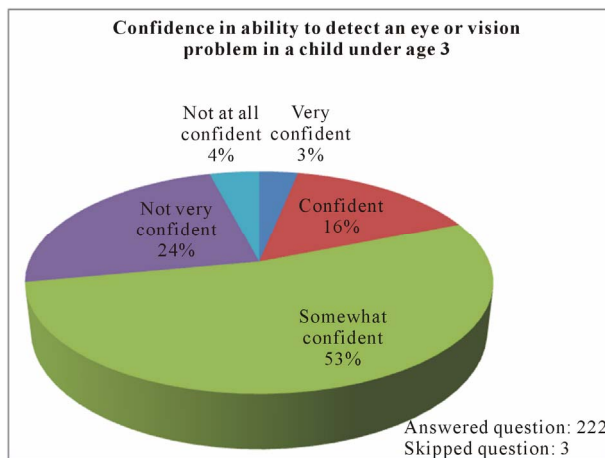
Answer Options	Response Percent	Response Count
At every visit	6.7%	15
At every scheduled well child check	68.2%	152
At least yearly	15.7%	35
Less than once a year	8.5%	19
Never	0.9%	2
Don't know	0.0%	0
<b>Answered question</b>	<b>223</b>	
<b>Skipped question</b>	<b>2</b>	

**Table 3. How satisfied are you with your current method of screening vision in children?**

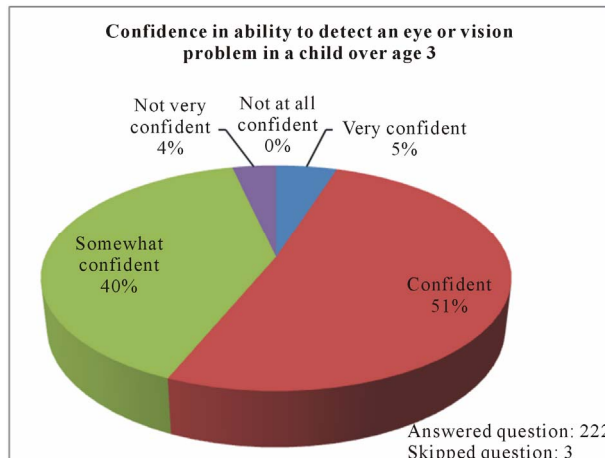
Answer options	Response percent	Response count
Extremely satisfied	3.6%	8
Satisfied	38.5%	85
Somewhat satisfied	44.8%	99
Unsatisfied	10.9%	24
Extremely unsatisfied	2.3%	5
<b>Answered question</b>	<b>221</b>	
<b>Skipped question</b>	<b>4</b>	

**Table 4. How adequately do you feel you are trained to perform vision screening on your pediatric patients?**

Answer options	Response percent	Response count
Extremely well trained	3.6%	8
Well trained	29.1%	65
Somewhat trained	52.5%	117
Poorly trained	13.0%	29
Very poorly trained	1.8%	4
<i>Answered question</i>	<b>223</b>	
<i>Skipped question</i>	<b>2</b>	



(a)



(b)

**Figure 1. How confident are you in your ability to detect an eye or vision problem in a child?**

**4. Discussion**

Our survey suggests that pediatricians are still facing substantial barriers to vision screening including poor reimbursement for vision screening, lack of available

methods to allow individuals with limited training to perform vision screening efficiently, and discomfort with screening young children under age 3 in part due to limited access to automated devices available for screening of very young children due to poor reimbursement for these methods.

Vision screening is a cost effective way to detect amblyopia and amblyopia risk factors, has been endorsed by the USPSTF in children age 3 to 5, and has been recommended for children of all ages by the American Academy of Pediatrics (AAP), the American Academy of Ophthalmology (AAO), the American Association of Pediatric Ophthalmology and Strabismus (AAPOS), and the American Association of Certified Orthoptists (AAO) [4]. Amblyopia affects 2% - 4% of the population, and treatment has been shown to be highly successful and cost effective [5,6]. In addition, studies have suggested that anisometropic amblyopia often begins before age 3 and that children who have their amblyogenic refractive errors corrected earlier have a higher likelihood of achieving 20/20 visual acuity and a lower rate of developing amblyopia or strabismus than children who are treated later [7-9]. Hence the recent finding by the USPSTF of “insufficient evidence” to recommend vision screening for children under age 3 is of concern, and is an indication of the need for better utilization of photorefraction and autorefractometry, which are becoming preferred methods for screening young children, so that data can be collected to provide a sufficient evidence base to determine conclusively whether vision screening should be recommended by the USPSTF in these young children [2,10-15].

Our study has significant limitations, most notably that our low response rate could bias our results such that only the only pediatricians who responded to our survey were those who are dissatisfied with vision screening and were moved by our broadcast subject line reading: “Help Us Improve Pediatric Vision Screening Methods,” potentially overemphasizing the concerns of pediatrician regarding the cost and feasibility of vision screening in children. However, we think such a scenario is unlikely, given the percentage of respondents who indicated that they were satisfied with their current methods.

**5. Conclusion**

Our survey suggests that perceived barriers to pediatric vision screening have not changed substantially since 2006, in spite of the fact that in January 2008 a current procedural terminology (CPT) code 99174 was established, and in November 2008 a relative value unit (RVU) of 0.69 was assigned for objective screening using a photo technique. Efforts should be devoted to improving efficiency and reimbursement for vision screening.

**Table 5. What method(s) do you currently employ to screen vision in your patients (check all that apply).**

Answer options	Under age 3		Over age 3	
	Response percent	Response count	Response percent	Response count
Visual inspection of the external eye	97.7%	217	96.0%	214
Red reflex testing	96.8%	215	73.1%	163
Observe child’s ability to fix and follow a target	91.4%	203	85.2%	190
Cover/uncover testing	71.2%	158	70.9%	158
Ophthalmoscopy	45.9%	102	57.8%	129
Visual acuity testing with pictures or symbols	23.0%	51	87.0%	194
Visual acuity testing with letters	10.4%	23	79.4%	177
Autorefracton	3.2%	7	5.4%	12
Photoscreening	4.5%	10	4.5%	10
<i>Answered question</i>	<b>222</b>			
<i>Skipped question</i>	<b>3</b>			

**Table 6. What are the obstacles you face in performing vision screening in children? (check all that apply).**

Answer options	Response percent	Response count
Not adequately trained	53.7%	109
Not adequately reimbursed	34.5%	70
Too time consuming	46.8%	95
Too difficult	23.6%	48
I don’t face any obstacles	18.2%	37
Other (please specify)		46
<i>Answered question</i>	<b>203</b>	
<i>Skipped question</i>	<b>22</b>	

**6. Acknowledgements**

Supported in part by an unrestricted grant to the Emory Eye Center from Research to Prevent Blindness, Inc., New York.

**REFERENCES**

[1] Us Preventive Services Task Force, “Vision Screening for Children 1 to 5 Years of Age: Us Preventive Services Task Force Recommendation Statement,” *Pediatrics*, Vol. 127, No. 2, 2011, pp. 340-346. [doi:10.1542/peds.2010-3177](https://doi.org/10.1542/peds.2010-3177)

[2] S. P. Donahue and J. B. Ruben, “US Preventive Services Task Force Vision Screening Recommendations,” *Pediatrics*, Vol. 127, No. 3, 2011, pp. 569-570. [doi:10.1542/peds.2011-0020](https://doi.org/10.1542/peds.2011-0020)

[3] A. R. Kemper and S. J. Clark, “Preschool Vision Screening in Pediatric Practices,” *Clinical Pediatrics*, Vol. 45, No. 3, 2006, pp. 263-266. [doi:10.1177/000992280604500309](https://doi.org/10.1177/000992280604500309)

[4] American Academy of Pediatrics, “Eye Examination in Infants, Children, and Young Adults by Pediatricians,” *Pediatrics*, Vol. 111, No. 4, 2003, pp. 902-907.

[5] J. M. Holmes, *et al.*, “The Treatment of Amblyopia,” *Strabismus*, Vol. 14, No. 1, 2006, pp. 37-42. [doi:10.1080/09273970500536227](https://doi.org/10.1080/09273970500536227)

[6] J. H. Membreno, *et al.*, “A Cost-Utility Analysis of Therapy for Amblyopia,” *Ophthalmology*, Vol. 109, No. 12, 2002, pp. 2265-2271. [doi:10.1016/S0161-6420.02\)01286-1](https://doi.org/10.1016/S0161-6420.02)01286-1)

[7] A. Leon, *et al.*, “The Age-Dependent Effect of Anisometropia Magnitude on Anisometropic Amblyopia Severity,” *Journal of AAPOS: The Official Publication of the American Association for Pediatric Ophthalmology and Strabismus/American Association for Pediatric Ophthalmology and Strabismus*, Vol. 12, No. 2, 2008, pp. 150-156.

[8] D. Friedburg and K. P. Kloppel, “Early Correction of Hyperopia and Astigmatism in Children Leads to Better Development of Visual Acuity,” *Klinische Monatsblatter fur Augenheilkunde*, Vol. 209, No. 1, 1996, pp. 21-24. [doi:10.1055/s-2008-1035271](https://doi.org/10.1055/s-2008-1035271)

[9] J. D. Colburn, *et al.*, “Longitudinal Follow-Up of Hypermetropic Children Identified during Preschool Vision Screening,” *Journal of Aapos : The Official Publication of the American Association for Pediatric Ophthalmology and Strabismus/American Association for Pediatric Ophthalmology and Strabismus*, Vol. 14, No. 3, 2010, pp. 211-215.

[10] B. W. Arthur, *et al.*, “Field Testing of the Plusoptix S04 Photoscreener,” *Journal of Aapos: The Official Publication of the American Association for Pediatric Ophthalmology and Strabismus/American Association for Pediatric*

- ric Ophthalmology and Strabismus*, Vol. 13, No. 1, 2009, pp. 51-57.
- [11] N. S. Matta, *et al.*, "Comparison between the PlusoptiX and MTI Photoscreeners," *Archives of Ophthalmology*, Vol. 127, No. 12, 2009, pp. 1591-1595.  
[doi:10.1001/archophthalmol.2009.294](https://doi.org/10.1001/archophthalmol.2009.294)
- [12] N. S. Matta, E. L. Singman and D. I. Silbert, "Performance of The Plusoptix S04 Photoscreener for the Detection of Amblyopia Risk Factors in Children Aged 3 to 5," *Journal of Aapos: The Official Publication of the American Association for Pediatric Ophthalmology and Strabismus/American Association for Pediatric Ophthalmology and Strabismus*, Vol. 14, No. 2, 2010, pp. 147-149.
- [13] S. P. Donahue, *et al.*, "Lions Clubs International Foundation Core Four Photoscreening: Results from 17 Programs and 400,000 Preschool Children," *Journal of Aapos: The Official Publication of the American Association for Pediatric Ophthalmology and Strabismus/American Association for Pediatric Ophthalmology and Strabismus*, Vol. 10, No. 1, 2006, pp. 44-48.
- [14] A. J. Rowatt, *et al.*, "Field Evaluation of the Welch Allyn Suresight Vision Screener: Incorporating the Vision in Preschoolers Study Recommendations," *Journal of Aapos: The Official Publication of the American Association for Pediatric Ophthalmology and Strabismus/American Association for Pediatric Ophthalmology and Strabismus*, Vol. 11, No. 3, 2007, pp. 243-248.
- [15] S. Q. Longmuir, *et al.*, "Nine-Year Results of a Volunteer Lay Network Photoscreening Program of 147 809 Children Using a Photoscreener in Iowa," *Ophthalmology*, Vol. 117, No. 10, 2010, pp. 1869-1875.  
[doi:10.1016/j.ophtha.2010.03.036](https://doi.org/10.1016/j.ophtha.2010.03.036)