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Preschool Vision Screening in Pediatric Practices

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Summary

A national sample of pediatricians was surveyed to evaluate preschool vision screening practices (response rate 55%, 377 of 690 eligible respondents). The rate of acuity screening for 3-year-old children was low (35%), but increased for 4- (73%) and 5-year-old children (66%). Few used photoscreening or autorefraction (8%). Common barriers were that screening is too time-consuming and children are uncooperative. Half reported that there should be separate reimbursement for vision screening. Financial incentives may be important for ensuring the delivery of preschool vision screening, as well as adoption of emerging screening technologies if such devices are shown to be effective.

Introduction

Vision screening for preschool-aged children (3–5 years) is recommended for the early detection of amblyopia or conditions that if left untreated could lead to the development of amblyopia.^{1,2} Current recommendations call for specific components of the physical examination (e.g., red reflex test, corneal reflex test, cover test) and the use of formal screening tests (e.g., HOTV test, random dot E stereo test) to evaluate ocular media clarity, stereopsis and ocular alignment, and distance visual acuity.¹

Two national studies have measured the rate of vision screening in pediatric practices. The first, from 1988, evaluated a large pediatric practice-based research network and found that the overall rate of visual acuity screening attempts ranged from 38% among 3-year-old children to 81% among 5-year-old children.³ A 1998 survey of American Academy of Pediatrics (AAP) members found remarkably similar rates of visual screening (34% among 3-year-old children to 91% among 5-year-old children).⁴ This survey also found that although most (95%) screen for red reflexes and many (64%) perform a cover test, few (32%) reported stereopsis testing.⁴

Two recent factors may have lead to changes in vision screening practices. First, the increasing availability of new screening technology (e.g., photoscreening, monocular autorefraction) may simplify the process of vision screening. Although these devices are not included in the screening recommendations,⁵ recent data suggest that automated vision screening may be an important strategy for the detection of visual impairment in preschool-aged children.⁶ In 1998, 2% of pediatricians reported using photoscreening; autorefraction was not available to primary care providers at that time.⁴

The second factor that may have increased vision screening rates is the introduction in 2000 of a current procedural terminology (CPT) code for vision screening (99173, “screening tests of visual acuity, quantitative, bilateral”),⁷ allowing primary care providers to bill insurance

carriers for providing this service; however, no work value units (RVUs) are associated with this code. No data are available on how often this code is used or the degree to which reimbursement is paid. Similarly, no data are available regarding how much primary care providers believe they should be paid, if anything, for providing vision screening during routine well-child examinations.

Our objective was to identify barriers to preschool vision screening and to assess the impact of the new screening technology and the new economic incentives on pediatricians' vision screening practices. We surveyed a national sample of pediatricians about their current vision screening practices, their perceived barriers to vision screening, and their attitudes toward and experience with billing and reimbursement for vision screening. These data are central to our overarching goal of developing effective interventions to ensure the timely detection of vision impairment in young children.

Methods

Instrument

We designed a survey instrument to assess pediatricians' practice and attitudes toward preschool vision screening, including perceived barriers. Questions were developed from the key themes found from 5 focus groups of primary care physicians held across Michigan during the summer, 2004. Barriers to vision screening fell into 3 broad categories: practice-related factors, test-related factors, and referral-related factors. The instrument was then pilot tested with a separate group of pediatricians to ensure readability and clarity. The final instrument consisted of a 4-page, 20-question survey on preschool vision screening and practice demographics and took fewer than 5 minutes to complete. Questions were primarily multiple-choice or Likert scales of agreement.

Sampling Frame

We queried the American Medical Association (AMA) Masterfile, which includes both members and nonmembers of the AMA and is the most complete national database of physicians available in the United States, to obtain a national random sample of 755 pediatricians. Our sample excluded physicians who were older than 70 years, federal and military employees, physicians with a non-generalist board or sub-board certification, and those with a major professional activity other than office-based direct patient care. The first survey mailing, accompanied by a cover letter, \$2 participant incentive, and business reply envelope, was sent during September 2004. Two subsequent mailings to non-responders were sent at 3-week intervals. Physicians who reported that they do not conduct well-child examinations for preschool-aged children were excluded from the analysis.

Data Analysis

Initially, general frequency responses to all survey items were determined. After this, Pearson chi-square tests of independence were used to test for association among the categorical variables. P values less than 0.05 were considered significant. All analyses were performed with Stata 8.2 software (College Station, Texas). The University of Michigan Medical School Institutional Review Board approved this project.

Results

Sample

Of the 755 pediatricians in the sample, 65 were ineligible (43 did not provide well-child care for preschool-aged children, 6 retired or died, and 16 moved and were not able to be contacted

for study participation). The response rate was 55% (377 of 690 eligible respondents).⁸ The practice characteristics of the respondents are listed in Table 1.

Eye Examination

Nearly all pediatricians (97%) reported including at least 1 component of the eye examination (red reflex test, corneal light reflex test, or cover test) as part of their preschool well-child care. These included the red reflex test (83%), cover test (75%), and corneal light reflex test (77%).

Formal Vision Screening

Most (90%) reported formal vision screening at least once as part of their preschool well-child care. Only 35% reported using a wall chart to test for visual acuity among 3-year-old children. However, approximately twice as many reported acuity testing among 4-year-old children (73%, $p < 0.001$) and 5-year-old children (66%, $p < 0.001$). Few reported using a test of stereoacuity (15%). A similar proportion reported using a vision testing devices, such as a Titmus vision screening machine (14%). Photoscreening or autorefractometry was reported by 8%.

Barriers to Vision Screening

Few pediatricians (3%) reported that screening is unnecessary because vision problems would be identified elsewhere (e.g., by the family). The barriers to vision screening are summarized in Table 2. The most common barriers were factors related to screening within the practice. Among these, the children's lack of cooperation with testing was the major barrier (49%). Test accuracy was not considered a barrier to vision screening. However, many (58%) pediatricians reported that they would only consider a vision screening test acceptable if the false positive rate was 10% or less. Most did not consider issues related to referral to eye care specialists to be a barrier to vision screening.

Reimbursement

Many (62%) believed that there should be separate reimbursement for vision screening. Among these, the median amount that respondents felt they should receive was \$20 (interquartile range: \$15–\$25). The belief of the need for reimbursement was greater among full-time than part time physicians (65% vs. 52%; $p = 0.03$) and among smaller practices than larger ones (1 provider: 89%, 2–5 providers: 62%, more than 5 providers: 55%; $p < 0.001$). Reimbursement was not associated with the annual number of well-child examinations ($p = 0.32$) or the proportion of Medicaid-enrollees in the practice ($p = 0.25$). The need for reimbursement was also not associated with the belief that screening is too time-consuming or that children are uncooperative with testing ($p = 0.84$).

Billing for Vision Screening

Among those pediatricians who routinely attempt formal preschool vision screening, half (51%) reported that they bill insurance separately for that activity. Of these, 3% ($n = 5$) reported never receiving reimbursement. Among those who have received reimbursement, 28% ($n = 45$) reported receiving less than \$10, 15% ($n = 24$) reported \$11–\$20, 4% ($n = 7$) reported greater than \$20, and 49% ($n = 79$) were unsure how much they receive.

Discussion

Most of the pediatricians in this study endorsed preschool vision screening as important. Although nearly all pediatricians used some component of the recommended physical examination for visual impairment, few pediatricians reported testing for stereopsis, and the rate of visual acuity screening was low among 3-year-old children but higher for 4- and 5-year-

old children. The rate of visual acuity screening was similar to that found in 1988 and 1998.^{3,4}

Nearly half reported that the lack of child cooperation is a barrier to preschool vision screening. Compared to traditional vision screening, photostereopsis and autorefractometry do not require much child cooperation. Although little is known about the accuracy of any vision screening test in the primary care practice setting,⁹ recent data suggest that autorefractometry may be a reasonable alternative to visual acuity and stereopsis testing.⁶ However, more than half also reported that they would only consider using a vision screening test that had a false positive rate of 10% or less, a level of accuracy likely not met by any current vision screening test.⁶ Adopting this new technology would also require a new capital investment by practices. We found, however, that 8% of pediatricians have invested in new technology for vision screening.

Our findings underscore the importance of financial issues for vision screening. We were surprised that half of the respondents reported that there should be separate reimbursement for vision screening. Providing reimbursement might increase the rate of screening, induce some physicians to begin screening earlier, and would provide an audit trail that could be used for tracking rates of screening. Reimbursement might also be necessary for practices to be able to afford new and emerging technology, such as autorefractometry, if evidence emerges that such devices are superior to traditional vision screening. However, unbundling vision screening services from the well-child examination might lead to an increased financial burden on families or lower quality of care for children who are uninsured or underinsured for preventive services.

As with any survey of practice behavior, self-reports can overestimate the actual rate at which services are provided. Furthermore, this survey cannot determine whether these tests are used appropriately.

New screening technology may overcome some of the barriers to testing; however, data regarding accuracy and cost-effectiveness are needed before pediatricians are encouraged to invest in new methods for screening. Financial incentives may be an important strategy for ensuring the delivery of preschool vision screening, but future research is required to understand the impact of unbundling components of the well-child examination for separate reimbursement.

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Table 1
CHARACTERISTICS OF THE PEDIATRICIANS (n = 377) IN THE STUDY

Characteristic	Percent [*]
Patient care	
Full-time	75
Part-time	24
Annual number of preschool-aged well-child visits	
<50	3
50–100	17
>100	79
Number of providers in practice	
1	12
2–5	42
>5	45
Proportion of patients ≤ 5 years enrolled in Medicaid	
<10%	43
10–50%	35
>50%	21

^{*} Categories may not add to 100% due to missing values.

Table 2**BARRIERS TO VISION SCREENING (n = 377)**

Practice-related factors	
Children are not cooperative with screening	49%
Screening is too time-consuming	23%
Lack of training	15%
Test-related factors	
Lack of specificity	13%
Lack of sensitivity	8%
Referral-related factors	
Lack of insurance for follow-up care	17%
Lack of eye care providers	15%
Concern about parent reaction to false-positive referral	3%