



Published in final edited form as:

J Pediatr Ophthalmol Strabismus. 2003 ; 40(5): 279–282.

Services Provided for Preschool-Aged Children With Suspected Amblyopia

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Abstract

Background—Little is known about the pattern and variation of care offered to preschool-aged children who have had an abnormal vision screening test.

Purpose—To evaluate the variations in pediatric eye care services and availability of optometrists and ophthalmologists for preschool-aged patients, referral patterns, and barriers to providing care as perceived by eye care specialists.

Methods—A survey was mailed to 542 ophthalmologists and a random sample of 501 optometrists actively practicing in Michigan.

Results—The response rate was 65% (optometrists, 75%; ophthalmologists, 57%). More optometrists than ophthalmologists evaluated preschool-aged children (97% vs 79%; $P < .001$). Of these, most managed amblyopia (80% vs 77%; $P = .372$) and strabismus (89% vs 80%; $P = .002$) themselves. Fewer optometrists than ophthalmologists dilated eyes routinely during the first evaluation of a preschool-aged child (39% vs 93%; $P < .001$). The leading barrier to care for preschool-aged children reported by both optometrists and ophthalmologists was difficulty of the examination (25% vs 23%; $P = .501$). Optometrists reported that most of their patients were referred from community-based screening programs or by parent self-referral. Ophthalmologists reported that most of their preschool-aged patients were referred from primary care providers.

Conclusions—There are different sources of referrals for optometrists and ophthalmologists. Although most eye care specialists treat amblyopia, the types of care offered by optometrists and ophthalmologists differ. Future studies should address the impact that these patterns have on outcomes and cost. The results of these studies should be shared with those responsible for screening.

Introduction

Approximately 5% to 10% of children in the United States have a visual impairment.¹ Because early intervention improves the long-term quality of life, routine screening beginning in infancy is recommended.² A key argument for vision screening for preschool-aged children is that amblyopia becomes more difficult to treat with increasing age.^{1,3}

Because of the complexity of visual impairment, it is not surprising that there are many treatment options. Interestingly, the type of treatment offered may vary according to the type of eye care specialist. Vision therapy, which consists of activities to improve visual skill, is endorsed for the treatment of amblyopia and strabismus by the American Academy of Optometry and the American Optometric Association,⁴ whereas the American Academy of

Ophthalmology does not consider it to be effective.⁵ Current screening guidelines do not specify whether particular specialists are preferred for specific conditions.²

Other important differences between optometrists and ophthalmologists affect access to care for children with visual impairment. There are more optometrists in practice than there are ophthalmologists. In general, optometrists tend to have longer office hours, are more available in nonurban settings, and charge less for diagnostic evaluation than do ophthalmologists.^{6–8}

The primary goal of this study was to describe the services provided by optometrists and ophthalmologists for preschool-aged children. Secondary goals were to describe the current referral patterns and perceived barriers to providing care for preschool-aged children.

Subjects and Methods

Study Population

The sample of ophthalmologists was randomly selected from the American Medical Association Masterfile, which includes both members and non-members. The sample consisted of actively practicing ophthalmologists in Michigan who had completed residency training and were younger than 65 years ($n = 542$).

A similar number ($n = 501$) of licensed optometrists was randomly selected from a list maintained by the Michigan Department of Consumer and Industry Services. This sample represented approximately one-third of all optometrists in Michigan.

Survey

The survey instrument consisted of a 1-page questionnaire. All of the questions were specifically focused on preschool-aged children. Items queried included practice characteristics, the management of amblyopia and strabismus, referral sources, and the barriers to providing care for children. This study was approved by the University of Michigan Institutional Review Board.

Data Analysis

Stata software (version 6.0; Stata Corp., College Station, TX) was used for statistical analysis. A practice was defined as urban if the zip code of the reported main practice location corresponded to a city with a population of at least 10,000, according to the 1990 U.S. census.

Results

Survey Response

We received completed and eligible surveys from 285 ophthalmologists and 352 optometrists. Among those surveyed, 40 of the ophthalmologists and 30 of the optometrists were ineligible because they did not provide direct clinical care, had retired, or had moved from the state of Michigan. Thus, the overall response rate was 65% (optometrists, 75%; ophthalmologists, 57%).

Practice Location and Training

Fewer optometrists than ophthalmologists reported practicing in an urban location (43% vs 58%, respectively; $P < .001$). Formal advanced training in pediatric eye care was reported by 11% of the optometrists, whereas 6% of the ophthalmologists reported fellowship training in pediatric ophthalmology ($P = .034$). Of those with advanced pediatric training, fewer optometrists than ophthalmologists reported practicing in an urban setting (25% vs 56%, respectively; $P = .029$).

Services Offered

Most of the respondents, but more optometrists than ophthalmologists, reported that they evaluate preschool-aged children (97% vs 79%, respectively; $P < .001$). Few optometrists and ophthalmologists who evaluate preschool-aged children reported having turned down a request to evaluate a preschool-aged child in their practice (5% and 4%, respectively; $P = .640$). The wait for an appointment for a new, preschool-aged patient was shorter than 1 month for 95% of the optometrists and 75% of the ophthalmologists ($P < .001$), and between 1 and 2 months for 3% of the optometrists and 22% of the ophthalmologists ($P < .001$).

Fewer optometrists than ophthalmologists dilated eyes routinely during the first evaluation of a preschool-aged child (39% vs 93%, respectively; $P < .001$). Compared with ophthalmologists, optometrists were more likely to dilate the eyes under special circumstances only, such as suspicion of amblyopia or strabismus (52% vs 6%, respectively; $P < .001$). Among optometrists and ophthalmologists, the use of a dilated eye examination did not vary by advanced pediatric training (optometrists, $P = .317$; ophthalmologists, $P = .562$).

Most optometrists and ophthalmologists who evaluate children managed amblyopia themselves instead of referring to another specialist (80% and 77%, respectively; $P = .372$). More ophthalmologists in nonurban practice settings managed amblyopia than did those in urban practice settings (90% vs 65%, respectively; $P < .001$). No such difference was found between nonurban and urban optometrists ($P = .289$).

More optometrists than ophthalmologists reported that they managed strabismus, including accommodative esotropia, nonaccommodative esotropia, and exotropia (89% vs 80%, respectively; $P = .002$). As with amblyopia, more ophthalmologists in nonurban practices than in urban practices managed strabismus (89% vs 66%, respectively; $P < .001$), but no difference was found between nonurban and urban optometrists ($P = .756$). Eye care specialists with advanced pediatric training were more likely than those without such training to have managed common pediatric eye disorders themselves instead of referring to another specialist (Table 1). All ophthalmologists with advanced pediatric training managed common pediatric eye disorders themselves. When a comparison was made across specialties, optometrists were less likely than ophthalmologists to treat nonaccommodative esotropia and exotropia ($P < .009$), regardless of advanced pediatric training.

Barriers to Providing Care

Fewer than half of the optometrists and ophthalmologists reported experiencing barriers to providing care for preschool-aged children in their practices (38% vs 43%, respectively; $P = .284$). For both, difficulty of examination is the leading barrier (optometrists, 25%; ophthalmologists, 23%; $P = .501$). More optometrists than ophthalmologists considered the lack of appropriate equipment to be a barrier (18% vs 7%, respectively; $P < .001$), whereas fewer optometrists than ophthalmologists considered busy clinic schedules to be a barrier (3% vs 21%, respectively; $P < .001$). Inadequate reimbursement was cited infrequently as a barrier for both optometrists and ophthalmologists (4% and 6%, respectively; $P = .488$).

Referral Patterns

Table 2 lists the sources that optometrists and ophthalmologists reported were responsible for referring preschool-aged children to be evaluated in their practices. Optometrists received a greater proportion of their referrals from community-based screening programs and parent self-referral than did ophthalmologists. In contrast, more ophthalmologists received most or some of their referrals from primary care physicians. Although these differences in referral patterns were significant ($P < .001$), there was important overlap: 32% of optometrists received most or some referrals from primary care physicians, 59% of ophthalmologists received most or

some referrals from community-based screening programs, and 65% of ophthalmologists received most or some referrals from parent self-referral.

Few optometrists, but more ophthalmologists, reported receiving a significant number of referrals from optometrists or ophthalmologists. This difference was more pronounced in urban areas. In urban practices, 29% of the ophthalmologists reported that more than half of their preschool-aged patients were referred from other eye specialists, compared with 7% of nonurban ophthalmologists ($P < .001$).

Discussion

The results of this study indicated that most of the optometrists and ophthalmologists provided care for preschool-aged children who may have visual impairment, instead of referring to another specialist. Our results validate the assumption that the type of eye care specialist who evaluates a child with a suspected visual impairment may make a difference in the care that is provided.^{4,5} Moreover, these findings indicate that there are different patterns of referral to eye care specialists, which directly affects the type of care that is provided.

There are three limitations of this study. First, the sample of optometrists and ophthalmologists was from a single state. Treatment and referral patterns may vary in other states. Second, actual practice may differ from what was reported on the survey. We did not ask detailed questions regarding treatment, which is based on precise clinical findings for an individual patient. Such an evaluation would be more appropriately done by chart audit. Finally, this study addressed the availability of and barriers to care from the perspective of eye care specialists. Important factors that may impede families from taking their children to see an eye care specialist would not be apparent in this study.

This study highlights some of the key differences in the services provided for preschool-aged children. To provide excellent eye care for all children, future studies should define the best practices by addressing the effectiveness and costs of commonly practiced diagnostic and treatment strategies. Some of this work is now under way. The Amblyopia Treatment Study, supported by the National Eye Institute, is a randomized trial comparing patching with atropine therapy.⁹ It is critical to ensuring proper care for children with visual impairment that such outcome data are shared with those who are responsible for screening, including pediatricians, family physicians, and supervisors of community screening programs, to allow for the development of effective referral guidelines.

References

1. U.S. Preventive Services Task Force. Guide to Clinical Preventive Services. 2. Alexandria, VA: International Medical Publishing; 1996.
2. Hartmann EE, Dobson V, Hainline L, et al. Preschool vision screening; summary of a task force report. *Pediatrics* 2000;106:1105–1116. [PubMed: 11061783]
3. Rurstein RP, Fuhr PS. Efficacy and stability of amblyopia therapy. *Optom Vis Sci* 1992;69:747–754. [PubMed: 1436994]
4. Anonymous. Vision therapy: information for health care and other allied professionals. *Optom Vis Sci* 1999;76:739–740. [PubMed: 10566857]
5. American Academy of Ophthalmology Preferred Practice Patterns Committee Pediatric Ophthalmology Panel. Amblyopia. San Francisco: American Academy of Ophthalmology; 1997.
6. Gauer BB, Erickson TS, Ulland RL, Bleything WB. Access, provision, and cost of routine eye care: a comparison of Oregon optometrists and ophthalmologists. *Journal of the American Optometric Association* 1994;65:240–247. [PubMed: 8014365]
7. Shipp MD. Health care changes from a public health perspective: implications for optometry–ophthalmology relations. *Optom Vis Sci* 1997;74:1019–1024. [PubMed: 9423993]

8. Soroka M. Comparison of examination fees and availability of routine vision care by optometrists and ophthalmologists. *Public Health Rep* 1991;106:455–459. [PubMed: 1908597]
9. Pediatric Eye Disease Investigator Group. A randomized trial of atropine vs. patching for treatment of moderate amblyopia in children. *Arch Ophthalmol* 2002;120:268–278. [PubMed: 11879129]

Management by Eye Care Specialists With and Without Advanced Pediatric Training and the Percentage Reporting That They Manage the Condition Themselves Instead of Referring to Another Specialist

TABLE 1

Condition	Optometrist		P	Ophthalmologist		P
	With	Without		With	Without	
Amblyopia	89%	75%	.049	100%	78%	.044
Accommodative esotropia	100%	86%	.014	100%	77%	.037
Nonaccommodative esotropia	49%	25%	.003	100%	54%	.001
Exotropia	66%	41%	.004	100%	55%	.001

TABLE 2

Referral Sources for Preschool-Aged Patients to Eye Care Specialists and the Percentage of Eye Care Specialists Reporting That Most, Some, Few, * or None of These Patients Are From the Listed Referral Source[†]

Source of Referral	Amount of Patients Referred From Source	% Reporting Referral From Source	
		Optometrists	Ophthalmologists
Primary care physician	Most	6	45
	Some	26	37
	Few	53	16
	None	15	3
Community-based screening program	Most	27	12
	Some	54	47
	Few	18	31
	None	1	10
Parent self-referral	Most	42	21
	Some	43	44
	Few	15	31
	None	1	4
Ophthalmologist	Most	2	12
	Some	1	5
	Few	18	27
	None	79	56
Optometrist	Most	1	3
	Some	3	12
	Few	20	59
	None	76	26

* Most = > 50% of the children; some = 25% to 50% of the children; and few = < 25% of the children.

[†] Differences between optometrists and ophthalmologists are significant ($P < .001$) for all referral sources.