



## Spectacle prescribing in childhood: a survey of hospital optometrists

Jane Farbrother

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**Title: Spectacle prescribing in childhood: a survey of hospital optometrists.**

Authors: Jane E. Farbrother, Ph.D.

Affiliations: Optometry Department, Oxford Eye Hospital, Oxford, U.K.

Corresponding author:

Dr Jane Farbrother  
Optometry Department  
Oxford Eye Hospital  
West Wing, John Radcliffe Hospital  
Headley Way  
Oxford, OX3 9DU

Tel: 01865 234994

Fax: 01865 234007

Email: [janefarbrother@btinternet.com](mailto:janefarbrother@btinternet.com)

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## **Spectacle prescribing in childhood: a survey of hospital optometrists**

### Background/Aims:

To determine the spectacle prescribing practices of hospital optometrists for infants and young children

### Methods:

A two part survey relating to the prescribing of spectacles for non-strabismic children aged 1 to 5 years was distributed to all delegates at the 2006 Annual Hospital Optometrists Conference.

### Results:

A total of 93 of the 149 optometrists returned the survey. The threshold level at which 50% of the respondents would consider prescribing spectacles in non-strabismic children at ages 1, 3 and 5 years were for hyperopia 4.50DS, 3.00DS and 2.50DS, for myopia – 3.00DS, – 1.50DS and –1.00DS, for anisohyperopia 2.00DS, 1.00DS and 1.00DS and for non-oblique astigmatism 2.50DC, 1.50DC and 1.00DC. For hyperopic children in the 3-4 year age group at least two thirds of those recommending spectacles would give a partial correction, with an average reduction of 1.69DS from the cycloplegic refraction.

### Conclusions:

Delegates of the Hospital Optometrists Annual Conference recommend spectacles to correct lower levels, on average, of myopia and hyperopia in young children than members of the American Association of Pediatric Ophthalmology and Strabismus or those suggested in the American Academy of Ophthalmology Preferred Practice Patterns guidelines. However there is broad agreement for the management of astigmatism and anisometropia and the prescription of partial corrections in hyperopic children in the absence of strabismus.

## Spectacle prescribing in childhood: a survey of hospital optometrists

### Introduction

It is well established that uncorrected refractive error in childhood can be associated with the development of amblyopia and strabismus<sup>1-4</sup>. However, clinical and scientific opinion varies as to the level which places a child at significant risk. Normative data for refractive error in infancy and early childhood<sup>5-7</sup> are widely available from a number of well designed studies and reviews and provide an indication of the extreme values which can be considered clinically significant. However, the increasing kurtosis of the refractive error distribution during early childhood creates difficulty with interpretation of population means and standard deviations. The situation is further complicated by the possibility that intervention can interfere with normal emmetropisation in young children<sup>8,9</sup>. Most often, the appropriateness of spectacle correction is determined by the needs of the individual patient and influenced by the experience of the practitioner.

Prescribing recommendations that are currently available are based on clinical consensus either among a relatively small panel of ophthalmologists<sup>10</sup>, or on surveys of opinion of paediatric ophthalmologists in the USA<sup>11,12</sup>. Whilst these guidelines are a useful benchmark, it has been shown that prescribing practices can differ between ophthalmologists and optometrists. In a survey of the two professions Lyons *et al*<sup>13</sup> found that ophthalmologists required a higher level of hyperopia before considering spectacles in children under 4 years of age, which would seem to be borne out when the prescribing strategies described in optometric text books<sup>14,15</sup> are compared to those available from ophthalmology sources. Guidelines produced by professional bodies in the U.K. are scarce and incomplete<sup>16,17</sup>. In light of this, the present study aims to establish a clinical consensus for U.K. optometrists as a useful adjunctive guide to clinical decision making.

### Methods

Infants and young children are referred to the Hospital Eye Service from a variety of sources, including health visitors, GPs, vision screening services and community optometrists. Consequently hospital optometrists are usually experienced in the examination of young children considered to be at risk of strabismus or amblyopia.

There are approximately 450 optometrists working in hospital clinics in the UK. A questionnaire was issued to 149 optometrists at the 2006 Annual Hospital Optometrists Conference. Respondents returned their completed questionnaires to the conference reception over the period of the two day conference. The questionnaire was divided into two sections, with the first asking the respondent to write a dioptic value to indicate the minimum level of hyperopia, myopia, anisometropia in a hyperope (anisohyperopia) and non-oblique astigmatism at which they would 'consider prescribing spectacles in a non-strabismic child' of ages 1, 3 and 5 years. The second section detailed five case records, which included information on the child's age, family history, distance and near vision, distance (DCT) and near cover test (NCT), stereopsis and cycloplegic refraction (Cyclo Ref). The retinoscopy result stated was corrected for working distance. Respondents indicated whether spectacles

would be prescribed, whether this would be a full or partial correction, advised for full or part time wear and completed a suggested spectacle prescription as appropriate.

## Results

Ninety three optometrists responded (62%), many of these (32%) had been practising for over 20 years, with only a few (2%) having practised for less than 5 years. Likewise, a large proportion (32%) performed refractions on more than 15 children each week, and only a minority (5%) did not routinely see children as part of their current practice.

The mean and range of values denoting the minimum level of ametropia at which spectacle correction would first be considered are shown in Table 1, together with the level at which 50% of respondents would consider prescribing spectacles. Not all respondents answered every question, as is indicated in the 'number of respondents' column in the Table. The reason for the omissions is unknown, it is possible that the respondents considered that they would not prescribe at any level of ametropia in these cases or may have resulted from simple oversight. Hence no correction was made for the missing data. In Figure 1, these data are represented as the cumulative frequency of optometrists who would consider prescribing at a given dioptric value, in each refractive category, for a 3 year old child. These are compared to guidelines published by professional bodies and comparative survey data.

	Age (years)	50% <sup>λ</sup> (Dioptres)	Mean (Dioptres)	Max (Dioptres)	Min (Dioptres)	Number of respondents
Hyperopia	1	4.50	5.02	15.00	2.00	90
	3	3.00	3.40	6.00	1.00	91
	5	2.50	2.54	5.00	1.00	91
Myopia	1	-3.00	-3.47	-10.00	-0.50	88
	3	-1.50	-1.87	-10.00	-0.25	92
	5	-1.00	-0.98	-3.00	-0.25	92
Anisohyperopia	1	2.00	2.08	8.00	0.25	90
	3	1.00	1.38	3.00	0.25	91
	5	1.00	1.10	3.00	0.25	90
Astigmatism	1	2.50	2.63	8.00	1.00	90
	3	1.50	1.60	4.00	0.25	92
	5	1.00	1.13	2.50	0.25	90

*Table 1. The dioptric values are shown at which practitioners would consider prescribing spectacles in a non-strabismic child of a given age.*

*λ The 50% column indicates the level at which 50% of the respondents would consider prescribing a spectacle correction.*

Four of the five case records detailed hyperopic children, between 3 and 4 years of age. The responses for these case records were in broad agreement with the responses in Table 1. For example for the following case:

<i>Age</i>	<i>3 yrs, 6 months</i>
<i>History</i>	<i>Father convergent strabismus</i>
<i>Vision</i>	<i>R 6/6 L 6/6 (Sheridan Gardiner singles)</i>
	<i>Near vision not recorded</i>
<i>DCT</i>	<i>Orthophoric</i>
<i>NCT</i>	<i>Small exophoria</i>
<i>Stereopsis 55" (Frisby)</i>	
<i>Cyclo Ref</i>	<i>R+3.50/-0.50x180 L+3.50/-0.50x180</i>

No spectacles were recommended by 70% (65) of respondents, a reduced correction for full time wear by 16% (15), a reduced prescription for part time wear by 6.5% (6), full correction for full time wear by 5.5% (5) and a full correction for part time wear by 2% (2). It should be noted that the hyperopia in this case falls at the mean level at which practitioners responded that they would consider prescribing spectacles (Table 1), suggesting that other factors are influential in the decision of the majority not to prescribe in this case. An average reduction of 1.22DS compared to the full cycloplegic refraction was recommended by the practitioners suggesting a partial correction.

Two of the other three hyperopic cases aged 3 – 4 years were anisometropic. The first had +3.25DS of hyperopia in the least hyperopic eye and 1.00DS of anisometropia, with one line of amblyopia on the Crowded Kay Picture test. Spectacles were recommended by 96% (89) of respondents, of whom 64% (57) would prescribe a partial correction. The average reduction for the sphere (range) was 1.21DS (0.50 to 3.25DS). The second case had +4.00DS in the least hyperopic eye, anisometropia of 2.00DS and one line of amblyopia on the Crowded Kay Picture Test. Of the 95% (88) of optometrists who suggested spectacles 84% (74) would reduce the correction by an average (range) of 1.93DS (0.50 to 4.00DS).

The remaining hyperopic case had hyperopia of +10.25DS with bilateral reduced vision, here 100% (93) of practitioners suggested spectacle correction, of whom 61% (57) recommended reducing the prescription by an average (range) of 2.05DS (0.50 to 4.00DS).

Overall, the average reduction recommended by those suggesting a partial correction of the spherical component of the ametropia was 1.69DS across all the hyperopic cases.

The prescribing strategy for myopia and astigmatism in the following case also broadly reflected the response in Section 1 of the questionnaire (Table 1).

<i>Age</i>	<i>1 yrs, 10 months</i>
<i>History</i>	<i>Half sibling strabismus and spectacles, maternal grandfather 'strong' spectacles.</i>
<i>Vision</i>	<i>R 6/9.5 L 6/9.5 (Cardiff Cards)</i>
<i>DCT</i>	<i>Small exophoria, breaking down to slight alternating divergent strabismus</i>
<i>NCT</i>	<i>Small exophoria</i>
<i>Stereopsis 300" (Frisby)</i>	
<i>Cyclo Ref</i>	<i>R -1.00/-2.00x180 L -1.00/-2.00x180</i>

No spectacles were prescribed by 22% (20) of practitioners, 17% (16) prescribed a reduced correction for full time wear, 2% (2) a reduced prescription for part time wear, 54% (50) a full correction for full time wear, and 5% (5) a full correction for part time wear. For those prescribing a partial correction, the average reduction was 0.75DS on the sphere and 0.35DC on the cylinder. Hence, the majority of practitioners elected to prescribe spectacles, with most (55) suggesting a full correction and 12% (9) of prescribers choosing to fully correct the cylinder and partially correct the sphere.

### Discussion

The results of the present study suggest that in many situations hospital optometrists are more likely to prescribe than their ophthalmologist colleagues (Figure 1)<sup>10, 11</sup>. The level at which 50% of the optometrists in the population surveyed would consider prescribing spectacles adhere more closely to those outlined in optometric text books.<sup>14,15</sup> Responses for threshold levels of hyperopia at which spectacles would be considered in the current survey (Table 1) are lower than published guidelines derived from ophthalmology sources across all ages. However, they are in close agreement with brief optometric guidelines in a recent DOCET publication<sup>17</sup>.

Responses are similarly slightly less conservative than the AAPOS recommendations, and AAO and RCO guidelines for myopia (Figure 1), whereas the practises for anisometropia and astigmatism appear to be in broad agreement.

In common with previous surveys, there is considerable variability in the level at which individual practitioners indicate that they would consider prescribing spectacles for young children<sup>11-13,18</sup>. These data represent the opinion of the optometrists and need not necessarily agree with their actual prescribing behaviour. However, a benefit of the recommendations described here is the comparison with decision making responses for case histories in which additional information was presented. Although the cases did not represent the whole spectrum of prescribing for which practitioners were asked to give recommendations, the results reassuringly reflected a similar prescribing behaviour to the responses given in the first section of the survey. There were slight deviations, the prescribing behaviour was more conservative in cases of good visual acuity and binocular vision responses, whereas the opposite was true in anisometric cases with any evidence of amblyopia as would be expected. In clinical

practice decisions can also be influenced by the repeatability of test results on subsequent visits, a situation which is not easily modelled in a survey format.

It should be noted that these data reflect the opinion of hospital optometrists and may not mirror the decisions of their colleagues in community practice. The wide variation in prescribing practice demonstrated in Figure 1 would indicate that opinion is very likely to differ within and between ophthalmic professions.

In addition, data are provided on the average reduction in the prescription suggested by the practitioners prescribing partial spectacle corrections. This practice is common among our respondents, with around two thirds or more of the practitioners who did recommend spectacles suggesting that they would prescribe a partial correction. A greater percentage of practitioners recommended a reduced spectacle correction in the case with the highest hyperopia, but, it can be seen that the reduction was fairly constant across the hyperopic cases, which suggests that it is more greatly influenced by the normative range of refractive error for the child's age, rather than bearing a strong relationship to the overall level of hyperopia or the uncorrected vision. Overall, this practice is in agreement with the AAO guidelines which suggest a reduction of up to +2.00DS in hyperopes with no manifest strabismus and is supported by empirical data on the impact of partial spectacle correction on normal emmetropisation<sup>19</sup>. However, the practice of prescribing full hyperopic correction in children with esotropia remains widely advocated<sup>20</sup>.

These data provide a useful indicator of the general consensus amongst hospital optometrists for spectacle prescribing in young children.

Figure 1. Cumulative frequencies of optometrists considering prescribing spectacles in a 3 year old child for a given level of ametropia: Comparison to published guidelines.

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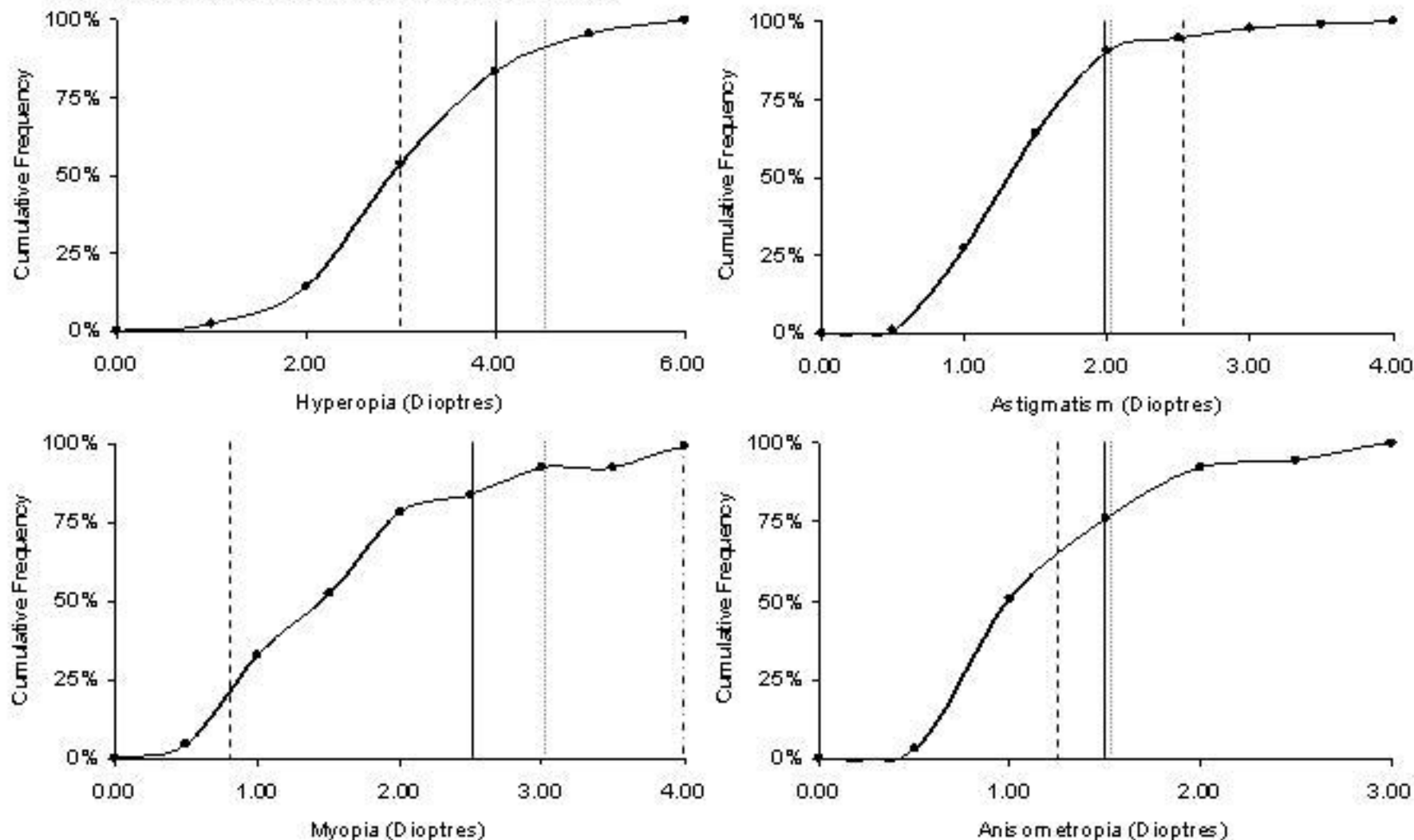
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Figure 1. Cumulative frequencies of optometrists considering prescribing spectacles in a 3 year old child for a given level of ametropia: Comparison to published guidelines



- AAPOS 1998 age 2 – 4 years
- ..... AAO 2002 age 2 – 3 years
- DOCET 2006 age over 2 years
- ..... RCO 2000 age 2 – 3 years