



## ORIGINAL ARTICLE

# Factors influencing accuracy of referral and the likelihood of false positive referral by optometrists in Bradford, United Kingdom



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### KEYWORDS

False positive;  
Referral;  
Experience;  
Gender;  
Accuracy

### Abstract

**Aims:** Levels of false positive referral to ophthalmology departments can be high. This study aimed to evaluate commonality between false positive referrals in order to find the factors which may influence referral accuracy.

**Methods:** In 2007/08, a sample of 431 new Ophthalmology referrals from the catchment area of Bradford Royal Infirmary were retrospectively analysed.

**Results:** The proportion of false positive referrals generated by optometrists decreases with experience at a rate of 6.2% per year since registration ( $p < 0.0001$ ). Community services which involved further investigation done by the optometrist before directly referring to the hospital were 2.7 times less likely to refer false positively than other referral formats ( $p = 0.007$ ). Male optometrists were about half as likely to generate a false positive referral than females (OR = 0.51,  $p = 0.008$ ) and as multiple/corporate practices in the Bradford area employ less experienced and more female staff, independent practices generate about half the number of false positive referrals (OR = 0.52,  $p = 0.005$ ).

**Conclusions:** Clinician experience has the greatest effect on referral accuracy although there is also a significant effect of gender with women tending to refer more false positives. This may be due to a different approach to patient care and possibly a greater sensitivity to litigation. The improved accuracy of community services (which often refer directly after further investigation) supports further growth of these schemes.

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**PALABRAS CLAVE**

Falso positivo;  
Derivación;  
Experiencia;  
Sexo;  
Precisión

## Factores que influyen en la precisión de las derivaciones y en la probabilidad de falsos positivos por parte de los optometristas en Bradford, Reino Unido

**Resumen**

**Objetivos:** Los niveles de falsos positivos en las derivaciones a los departamentos de oftalmología pueden ser elevados. Este estudio trató de evaluar los elementos comunes de las derivaciones falso positivas, para hallar los factores que pueden influir en la precisión de dichas derivaciones.

**Métodos:** En 2007/08, se analizó retrospectivamente una muestra de 431 nuevas derivaciones oftalmológicas procedentes de la zona de actuación de Bradford Royal Infirmary.

**Resultados:** La proporción de falsos positivos en las derivaciones generadas por los optometristas desciende con la experiencia a una tasa del 6,2% anual desde la fecha de registro ( $p < 0,0001$ ). Los servicios comunitarios que implicaron una investigación más amplia por parte del optometrista, antes de la derivación directa al hospital, reflejaron un índice 2,7 veces menor de probabilidades de derivación de falsos positivos que otras formas de derivación ( $p = 0,007$ ). Los optometristas varones reflejaron la mitad de probabilidad de generar un falso positivo que las mujeres (OR = 0,51,  $p = 0,008$ ), y dado que las consultas de optometría corporativas en la zona de Bradford emplean a personal menos experimentado y femenino, las consultas de optometría independientes generan alrededor de la mitad de derivaciones falso positivas (OR = 0,52,  $p = 0,005$ ).

**Conclusiones:** La experiencia clínica tiene un mayor efecto sobre la precisión de las derivaciones, aunque el sexo tiene también un efecto significativo, ya que las mujeres tienden a derivar más falsos positivos. Esto puede deberse a un diferente enfoque sobre los cuidados al paciente, y posiblemente a una mayor sensibilidad hacia los litigios. La mejora de la precisión en los servicios comunitarios (que realizan a menudo una derivación directa, tras una investigación más amplia) respalda el crecimiento adicional de estos programas.

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**Introduction**

Optometrists in the United Kingdom work in both Primary Care (High Street optical practice) and in Secondary Care. There is a large diversity of roles in Secondary Care, which mainly exist in National Health Service (NHS) hospitals, but also increasingly in private provider clinics. Only two studies have reported what proportion of referrals from optometrists in Primary Care for all pathologies were correct, and what proportion were false positive.<sup>1,2</sup> There is, however, a large body of research covering false positive referrals for glaucoma patients, which has a low incidence and thus relatively high false positive referral rates,<sup>3</sup> with levels ranging from 29 to 68%.<sup>4-15</sup> The literature is in agreement that a significant number of false positive referrals are being generated by optometrists, and some authors have developed strategies to improve referral accuracy for possible glaucoma.<sup>16-19</sup> However, no study has so far investigated commonality between false positive referrals.

The aims of this study were to determine:

- (i) The levels of false positive referrals by optometrists and general practitioners (GPs) to the Hospital Eye Service (HES).
- (ii) The factors that influence false positive referrals and the accuracy of referral. Factors considered for inclusion were patient age, gender and ethnicity, pathology referred for, referral format, final diagnosis, legibility, type of referring clinician, type of referring practice,

referrer gender and years the referrer has been registered.

Fear of litigation, and an increase in modern diagnostic equipment in practice<sup>20</sup> may increase the likelihood of Optometrists screening their patients for as many pathologies as possible whereas the decision to screen should take into account risk factors and the social cost.<sup>21,22</sup> Myint and colleagues found that lack of time to repeat measurements, or remuneration for doing such, as the most commonly reported barriers to effective glaucoma detection in the UK.<sup>23</sup> Fewer optometrists in Scotland reported this, which is coincident with a study by Ang and colleagues<sup>24</sup> investigating the effect on glaucoma referrals of the 2006 General Ophthalmic Services (GOS) contract in Scotland. The new contract replaced the refraction centred NHS sight test with a more comprehensive eye examination that does not necessarily include refraction and allowed funding for repeat appointments when necessary. The study found that after the introduction of the new contract there was a significant reduction in false positive referrals and a significant increase in true positive referrals.

**Methods**

The hospital records of a random sample of 431 (25% out of a total of approximately 1750) new referrals to Bradford Royal Infirmary (BRI) ophthalmology department, Bradford, England were retrospectively analysed. The referrals were

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