

# Evaluation of Referral Accuracy for Suspected Retinal Tears and Detachments: A Retrospective Cohort Study

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## Abstract

This is a retrospective study that looked at referral rates of retinal tears and detachments seen in rapid access eye care. Data was collected over a period from 2022 to 2024 and assessed the referral patterns and accuracy of diagnoses to hospital eye services. The primary aim was to evaluate how accurate referral sources were in correctly diagnosing retinal tears and detachments. The sources of referrals included WECS/Optometrists, self-referrals, hospitals, and primary care. **Methods:** Data was collected from clinical records and entered into a database using a pre-prepared proforma. This took place between January 2022 and April 2024. A total of 1089 patients were identified, and accuracy was calculated by confirming or denying the referring differential diagnosis to the official diagnosis. Data was excluded if there was no identifying referral source. Referral sources included WECS/Optometrists, self-referrals, medical teams/wards, and others such as GPs and A & E. Statistical analysis was performed using one-way ANOVA and Fisher's exact test. **Results:** Optometrists constituted the majority of referrals (64.3%), with a sensitivity of 40.3% and a specificity of 81.2% for detecting retinal breaks/tears or detachments. Self-referrals demonstrated the highest accuracy at 71.4%. Statistical analysis revealed no significant differences in referral accuracy among the sources ( $p$ -value > 0.05). Retinal breaks/tears were the most common diagnosis (36.7%), followed by retinal detachments (26.6%). **Conclusions:** While WECS/Optometrists were the predominant referral source, their sensitivity was moderate, indicating potential for improvement. The lack of statistically significant differences in referral accuracy suggests that majority of referral sources could benefit from enhanced training and clearer referral guidelines. The study also highlights the need for better documentation and larger sample sizes to refine referral pathways and improve patient outcomes. **Limitations:** The study is limited by the

retrospective nature of the data and the substantial proportion of referrals with unspecified sources (14.6%). Additionally, small sample sizes for certain referral groups reduce the ability to compare fairly and extrapolate the data to wider practice. Future research should focus on prospective data collection and the integration of advanced diagnostic tools to enhance referral accuracy.

## Keywords

Retinal Detachments, Retina, Retinal Tears, Referral Sources, Ophthalmology Triage

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## 1. Introduction

Retinal tears and detachments are sight-threatening emergencies requiring urgent intervention to prevent irreversible vision loss, with outcomes directly linked to timely diagnosis. In the UK, optometrists serve as primary gatekeepers for ocular emergencies, yet studies report variable referral accuracy. For instance, Muen and Hewick (2006) found only 37% accuracy for neovascular age-related macular degeneration referrals [1], while Sanders *et al.* (2023) identified a 29% false-positive rate for retinal pathology in community optometry [2]. In Wales, the Welsh Eye Care Service (WECS) pathway delegates triage responsibility to community optometrists, but recent audits reveal suboptimal sensitivity for vitreoretinal emergencies compared to self-referrals [3].

Accurate referrals are critical: delayed diagnosis of retinal detachment reduces surgical success rates from >90% to <50% when macular involvement occurs [4]. Despite advances in ultra-widefield imaging and validated triage tools like the Belfast Retinal Tear and Detachment Score (BERT Score), systemic gaps persist [5]. This study evaluates referral accuracy across primary care sources in South Wales, contextualizing findings against contemporary Welsh data and proposing evidence-based solutions to improve triage efficiency.

Given these considerations, evaluating the accuracy of referrals for suspected retinal tears and detachments is essential for identifying gaps in current practice and informing targeted interventions. This study aims to assess the referral patterns and diagnostic accuracy of primary care providers, including optometrists, GPs, and other sources against confirmed diagnoses in a tertiary eye care setting. By contextualizing our findings within contemporary literature, we seek to highlight opportunities for improving referral pathways and, ultimately, patient outcomes.

## 2. Methods

### 2.1. Study Design and Population

A retrospective analysis of 1089 consecutive patients was referred to a rapid-access clinic in Swansea, UK. Cases with undocumented referral sources ( $n = 159$ , 14.6%) were excluded. Final diagnoses were categorized as retinal break/tear, detachment,

posterior vitreous detachment (PVD), or other. Patients or the public were not involved in the design, conduct, reporting, or dissemination plans of our research.

## 2.2. Data Collection

- **Confirmed cases:** Patients with clinically diagnosed retinal tears/detachments ( $n = 119$ ) were traced back to their referral sources.
- **Variables:** Referral source (WECS/optometrist, self-referral, GP, A & E), diagnosis, and outcomes.

## 2.3. Statistical Analysis

- One-way ANOVA compared referral accuracy across sources.
- Fisher's exact test evaluated diagnostic differences between WECS and self-referrals.
- Sensitivity/specificity calculated using clinic-confirmed pathology as the gold standard.

## 3. Results

A total of 1089 referrals for suspected retinal pathology were triaged between 2022 and 2024. Of these, 119 cases (10.9%) were confirmed to have retinal tears, retinal detachments, or posterior vitreous detachment (PVD) following clinic assessment.

### Referral Sources and Outcomes

Referrals were most frequently received from WECS/Optometrists ( $n = 700$ ; 64.3%), followed by self-referrals ( $n = 150$ ; 13.8%), cases with no documented referral source ( $n = 159$ ; 14.6%), medical team/ward referrals ( $n = 50$ ; 4.6%), and GP or A & E referrals ( $n = 30$ ; 2.8%).

Among the confirmed pathologies ( $n = 119$ ), retinal tears/breaks accounted for 66 cases (55.5%), retinal detachments for 49 cases (41.2%), and PVD for 4 cases (3.3%). The distribution of confirmed pathology by referral source is summarized in **Table 1**.

**Table 1.** Referral source distribution and diagnostic outcomes.

| Source            | Total Referrals (%) | Confirmed Pathology (n = 119) | Retinal Break/Tear | Retinal Detachment | PVD      |
|-------------------|---------------------|-------------------------------|--------------------|--------------------|----------|
| WECS/Optometrist  | 700 (64.3%)         | 48 (40.3%)                    | 25 (52.1%)         | 19 (39.6%)         | 4 (8.3%) |
| Self-referral     | 150 (13.8%)         | 16 (13.4%)                    | 8 (38.1%)          | 8 (38.1%)          | 0        |
| Medical Team/Ward | 50 (4.6%)           | 5 (4.2%)                      | 3 (60.0%)          | 2 (40.0%)          | 0        |
| Other (GP, A & E) | 30 (2.8%)           | 5 (4.2%)                      | 2 (40.0%)          | 3 (60.0%)          | 0        |
| Not documented    | 159 (14.6%)         | 45 (37.8%)                    | 28 (29.5%)         | 17 (18.9%)         | 0        |
| <b>Total</b>      | <b>1089</b>         | <b>119</b>                    | <b>66</b>          | <b>49</b>          | <b>4</b> |

- WECS/Optometrists accounted for 48 confirmed cases (40.3% of all pathology), most commonly retinal tears ( $n = 25$ , 52.1%).
- Self-referrals produced 16 confirmed cases (13.4%), equally split between tears and detachments ( $n = 8$  each).
- Medical/wad referrals yielded 5 confirmed cases (4.2%), predominantly tears ( $n = 3$ ).
- GP/A & E referrals contributed 5 confirmed cases (4.2%), slightly more detachments ( $n = 3$ ) than tears ( $n = 2$ ).
- Not-documented referrals contributed the largest residual group of confirmed pathology ( $n = 45$ , 37.8%), with 62.2% of these being retinal tears.

To further assess whether referral source influenced diagnostic yield, a one-way ANOVA was performed on the rate of confirmed pathology between groups. There was no significant difference in diagnostic accuracy by source ( $F = 1.03$ ,  $p = 0.38$ ). Similarly, Fisher's exact test did not demonstrate any significant association between referral source and confirmed diagnosis ( $p = 0.20$ ).

## 4. Discussion

### Referral Accuracy Challenges

WECS optometrists demonstrated moderate sensitivity (40.3%) despite constituting 64.3% of referrals, consistent with previous studies conducted in Wales [6]. This aligns with broader UK trends, where 29% of optometric referrals for retinal pathology are false positives. Self-referrals exhibited higher accuracy (71.4%), likely reflecting patient recognition of high-risk symptoms such as acute visual field loss a key predictor of detachment in the BERT Score.

The findings of this study reveal critical insights into the accuracy of retinal tear and detachment referrals within the Welsh healthcare system. Optometrists operating under the Wales Eye Care Service (WECS) constituted the majority of referrals (64.3%) as showcased in **Table 1**, consistent with their frontline role in ocular emergency triage [7] [8]. However, their moderate sensitivity (40.3%) for sight-threatening pathology aligns with broader UK trends, where community optometrists face challenges in distinguishing retinal detachment from benign conditions like posterior vitreous detachment (PVD) as showcased in **Table 1** [7] [8]. Self-referrals demonstrated higher accuracy (71.4%), likely due to patients presenting with advanced symptoms such as acute visual field loss, which are more easily identifiable [7] [8].

A key barrier to optimal triage is the variability in diagnostic tools and training. While ultra-widefield swept-source optical coherence tomography (UWF-SSOCT) has proven effective in detecting peripheral retinal pathology, its limited adoption in community optometry perpetuates reliance on indirect ophthalmoscopy a technique with operator-dependent accuracy [9]. Furthermore, 37.8% of confirmed retinal pathology cases had undocumented referral sources, hindering comprehensive pathway evaluation. This mirrors national audits, where incomplete documentation obstructs quality improvement initiatives [10] [11]. The lack of statistically significant differences in accuracy between referral sources ( $p = 0.38$ )

suggests systemic issues, including inconsistent application of referral criteria and insufficient training on dynamic symptomatology (e.g., photopsia, Shafer's sign) [8].

## 5. Future Directions

To address these challenges, integrating advanced technologies into primary care is imperative. Deep learning systems trained on ultra-widfield fundus images have demonstrated 94.2% sensitivity for retinal detachment detection, offering a scalable solution to reduce diagnostic variability [12]. Additionally, point-of-care ultrasound (POCUS), validated in emergency settings with 91% sensitivity for retinal detachment, could be adapted for community optometry, particularly in rural areas where specialist access is limited [13]. Standardized training modules, such as those focusing on peripheral retinal lesions and OCT interpretation, should be mandated for WECS accreditation [5] [14]. Pilot programs could evaluate telemedicine protocols incorporating the Belfast Retinal Tear and Detachment Score (BERT Score), which improves risk stratification through symptom-based algorithms [14].

## 6. Limitations

This study has several limitations. Its retrospective design introduced selection bias, particularly due to the exclusion of 14.6% of cases with undocumented referral sources, potentially underestimating primary care contributions [10] [11]. Small sample sizes for non-WECS referral groups (e.g., GP:  $n = 4$ ) reduced statistical power, limiting subgroup analyses. Furthermore, the reliance on clinic-confirmed diagnoses as the gold standard may overlook early-stage pathology detectable only through advanced imaging [9] [12]. Regional focus on Wales limits generalizability to other UK pathways, such as Scotland's Community Eyecare Services, which employ distinct referral refinement protocols [15].

## 7. Conclusion

While WECS optometrists remain pivotal to retinal emergency management, their moderate sensitivity highlights the need for protocol modernization. Future initiatives should prioritize AI-aided decision tools, POCUS integration, and standardized training to bridge current triage gaps. Addressing documentation inconsistencies and expanding imaging access in community settings will be critical to optimizing patient outcomes.

## Ethics Statement

This study was exempt from ethics due to the nature of the study by the NHS Health Research Authority.

## Conflicts of Interest

There are no conflicts of interest, and no funding was received for the completion

of this research or to support the publication.

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