Machine Learning vs Healthcare Professionals: Performance Assessment of an AI-Powered Ophthalmic Triage System

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Introduction

•Eye-related emergencies are common and require rapid, accurate triage to prevent vision loss and optimize patient outcomes [1,2]

•Telephone triage is crucial for identifying urgent and emergent ocular conditions, but diagnostic accuracy can vary between providers and impact patient safety. [1,3]

•Teleophthalmology and new triage systems, including AI-based platforms, are being developed to improve the efficiency and reliability of emergency eye care. [4,]

•Nurses and general practitioners often rely on subjective judgment for triage, leading to variability in assessments and highlighting the need for standardised tools [5,6]

•This retrospective study compares the accuracy and efficiency of triage decisions made by ophthalmologists, specialist nurses, and staff nurses, while also evaluating the potential of an artificial intelligence triage system to enhance care delivery.

Methods

The study analysed 3542 triage sheets from 2022 to 2024, encompassing a total of 929 triage sheets for the ophthalmologist, 900 for specialist nurses, and 500 for staff nurses. Additionally, the AI triage system processed 252 triage sheets in May 2024. The following key metrics were evaluated triage outcomes including:

· Accuracy according to the 'Traffic-light' Triage Guide which marked red, amber and green as urgent, semi-urgent and non-urgent respectively.

· Triage outcome including prescribing

· Provisional verses actual diagnosis

Statistical analyses, included chi-square tests and logistic regression, to assess the significance of associations and predictors of correct triage decisions.

Results

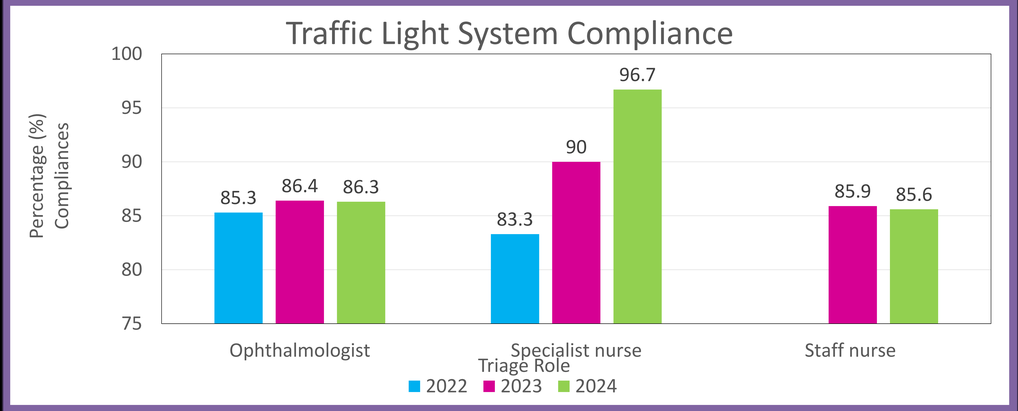


Figure 1- Highlights the compliance of Healthcare professionals using the triage system

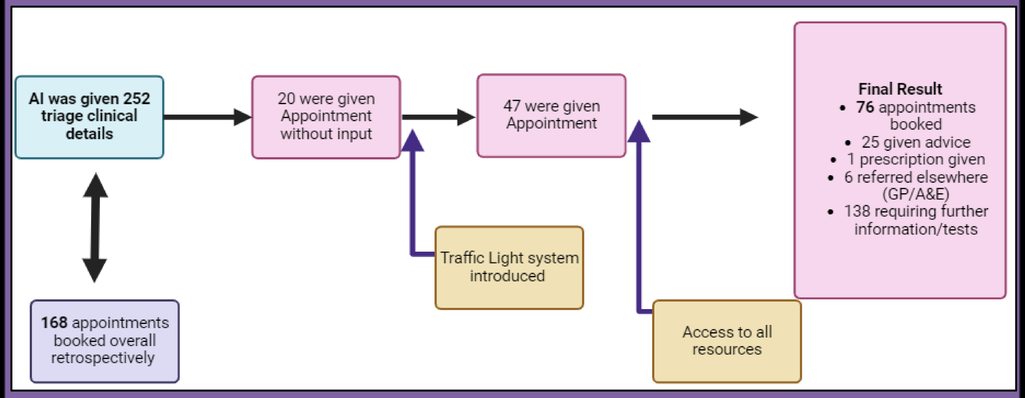


Figure 2- Displays the compliance of AI using the triage system

Key Findings

- Similar percentage of compliance with Traffic Light triage guidelines across all groups ($p>0.05$)
- Senior nurses showed increased compliance from 2022–25 ($p<0.05$)
- Escalation- Specialist nurses had the highest escalation rates ($p<0.05$)
- De-escalation- Similar rates in all groups
- Appointment bookings- Similar levels in all groups ($p>0.05$)
- Ophthalmologists provided slightly more advice and Staff nurses issued the most prescriptions ($p<0.001$).

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