



GEOSPATIAL ANALYSIS OF NON-ATTENDANCE IN VIRTUAL EYE CLINICS ACROSS GLOUCESTERSHIRE

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INTRODUCTION

Non-attendance reduces the efficiency of Virtual clinics

Virtual eye clinics (VEC) support high-volume ophthalmic pathways including medical retina, glaucoma, diabetic retinopathy, hydroxychloroquine monitoring, naevus surveillance, and rapid-access imaging. Although they improve efficiency and reduce hospital footfall^{1,2}, non-attendance (DNA) limits service capacity and contributes to delays in detecting sight-threatening disease.

OBJECTIVE

Is clinic attendance a marker of socioeconomic status?

This study evaluated the relationship between socioeconomic deprivation and engagement with virtual imaging pathways using geospatial methods.

METHODOLOGY

- 1 A retrospective review of an electronic patient record (TrakCare, InterSystems Corporation, UK) included 14,410 patients scheduled for virtual ophthalmic imaging between January 2022 and September 2025.
- 2 Patient postcodes were geocoded to electoral wards and ward-level DNA rates were calculated. Socioeconomic deprivation was measured using the Index of Multiple Deprivation³ (IMD).
- 3 Choropleth maps were used to visualise geospatial variation, and scatter analysis was performed to quantify the relationship between IMD and DNA.
- 4 Spearman’s correlation coefficient was calculated to assess the strength and statistical significance of this association.
- 5 Excel and Power BI were used for statistical analysis and mapping. All data were fully anonymised. No Artificial Intelligence was used in the process.

CHOROPLETH MAPPING

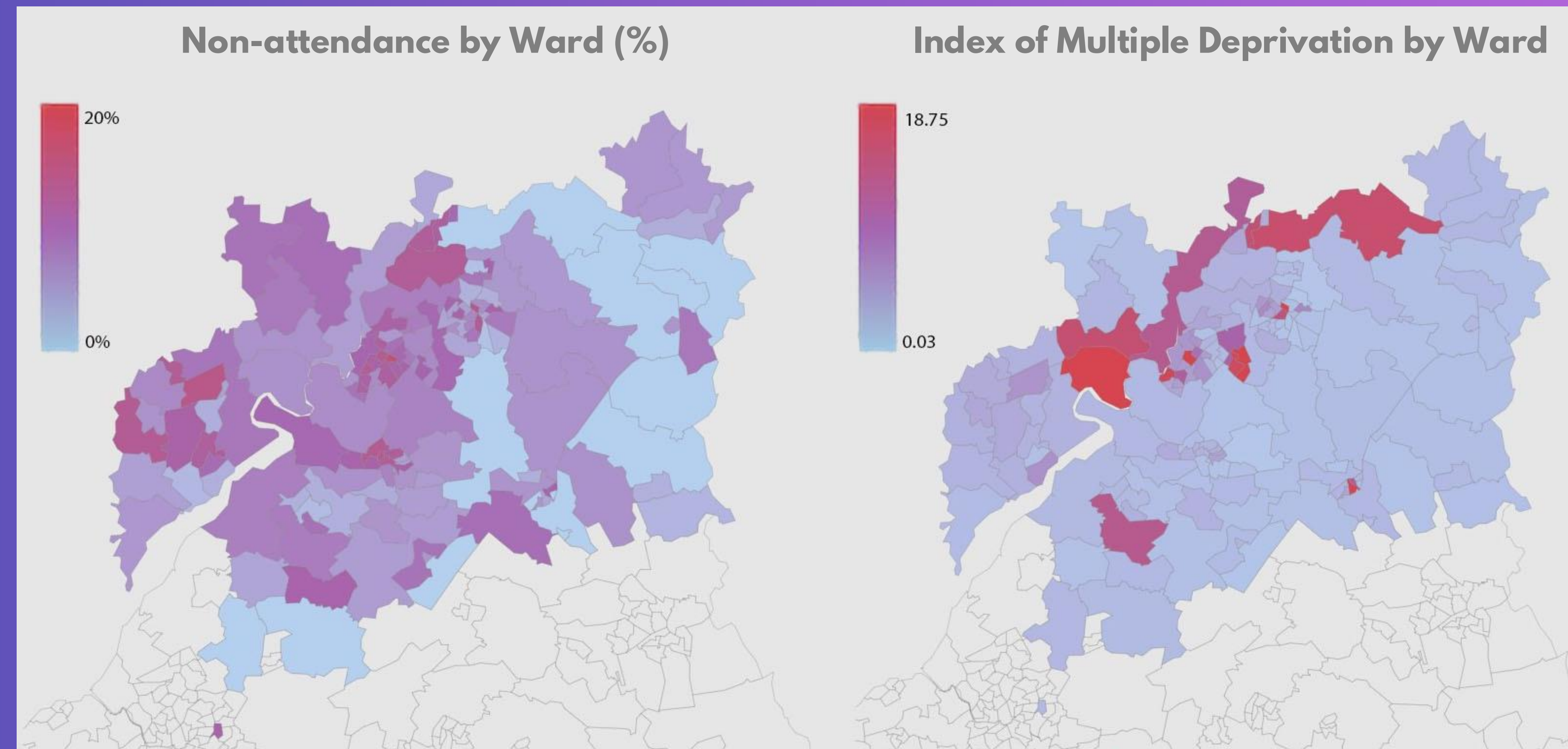


Figure 1. The left-hand map shows percentage non-attendance to virtual eye clinics in each ward of Gloucestershire. The right-hand map shows the index of Multiple Deprivation in each ward of Gloucestershire.
Figure 2. The relationship between virtual clinic non-attendance and Index of Multiple Deprivation (IMD) is shown for each Ward in Gloucestershire.



RESULTS

Virtual eye clinic non-attendance in 2022-25 cost the NHS £161,392

Gloucestershire had an overall non-attendance rate of 7%, higher than the UK outpatient average of 6%⁴. Missed appointments are estimated to cost the NHS approximately £160 per patient⁵ hence over the three-year period £161,392 has been lost to non-attendance.

Socioeconomic deprivation varies across Gloucestershire

Geospatial mapping demonstrated clear clustering of higher non-attendance rates within wards with elevated deprivation scores. Among the most deprived areas, Gloucester showed a DNA rate of 7.65% with an IMD score of 1.18, and the Forest of Dean recorded a DNA rate of 5.70% with an IMD score of 0.80. Tewkesbury also demonstrated elevated deprivation, with a DNA rate of 5.41% and an IMD score of 1.44. These figures are all more than double the DNA rate observed in the least deprived area, the Cotswolds, which had a DNA rate of 2.65% and an IMD score of 0.35.

Non-attendance is a marker of increased socioeconomic deprivation

Scatter analysis revealed a strong positive correlation between IMD and DNA rate ($p = 9.5 \times 10^{-9}$). The socioeconomic gradient remained consistent across clinic types. Further investigation is required to better understand the barriers to access which underpin this correlation. Increased provision of community-based imaging hubs in higher deprivation wards may improve attendance rates.

CONCLUSION

Non-attendance in virtual ophthalmology clinics is associated with increased socioeconomic deprivation in Gloucestershire

References

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- 3.“English indices of deprivation 2019”. Ministry of Housing, Communities & Local Government. Gov.uk. 2019.

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