Hearing health geography in England

Hearing Health Geography in England: Findings from the English Longitudinal Study of Ageing (ELSA) and Evidence of a North-South Divide

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Aim

To explore the regional patterns and trends of hearing loss (HL) in a representative longitudinal prospective cohort study of the English population aged 50 years old and above.

Methods

Time-series analyses in the full dataset (8 Waves) of the English Longitudinal Study of Ageing (ELSA) [1]. The primary outcome measure was self-reported HL [2].

Local spatial analysis statistical tools used for analysing spatial distributions, patterns, processes and relationships of the geographical data.

The Spatial Join tool used to aggregate the number of cases of self-reported HL to total responses of hearing acuity in each polygon (GOR) to visualise the prevalence rates of HL per GOR.

We computed Adjusted Predictions at the Means (APMs) and the Marginal Effects at the Means (MEMs) [3] of the HL prevalence in each ELSA Wave, with age, gender, education, occupation, income, wealth, IMD and alcohol consumption as the factor variables.

Results

Between 2002-2017 there was an estimated increase of **10.2%** in the total HL prevalence in the English older population. The mean HL prevalence increased from 38.50 (95%CI 37.37-39.14) in Wave 1 to 48.66 (95%CI 47.11-49.54) in Wave 8. (**Figure 1**)

A wide variation in HL prevalence was revealed in representative samples from different regions in England that had significantly equal age, and the increase rate of HL ranged in the 15-year period from 3.2% to 45%. (**Figure 2**)

The highest HL prevalence was observed in GORs with the highest prevalence of participants in the categories of a) most deprived (IMD) quintile, b) those in routine or manual occupations, and c) those with the highest prevalence of alcohol misuse (>14 units/week).

The Hot Spot and Cold Spot analyses showed marked regional variability and evidence of a North-South divide. (**Figure 3**)

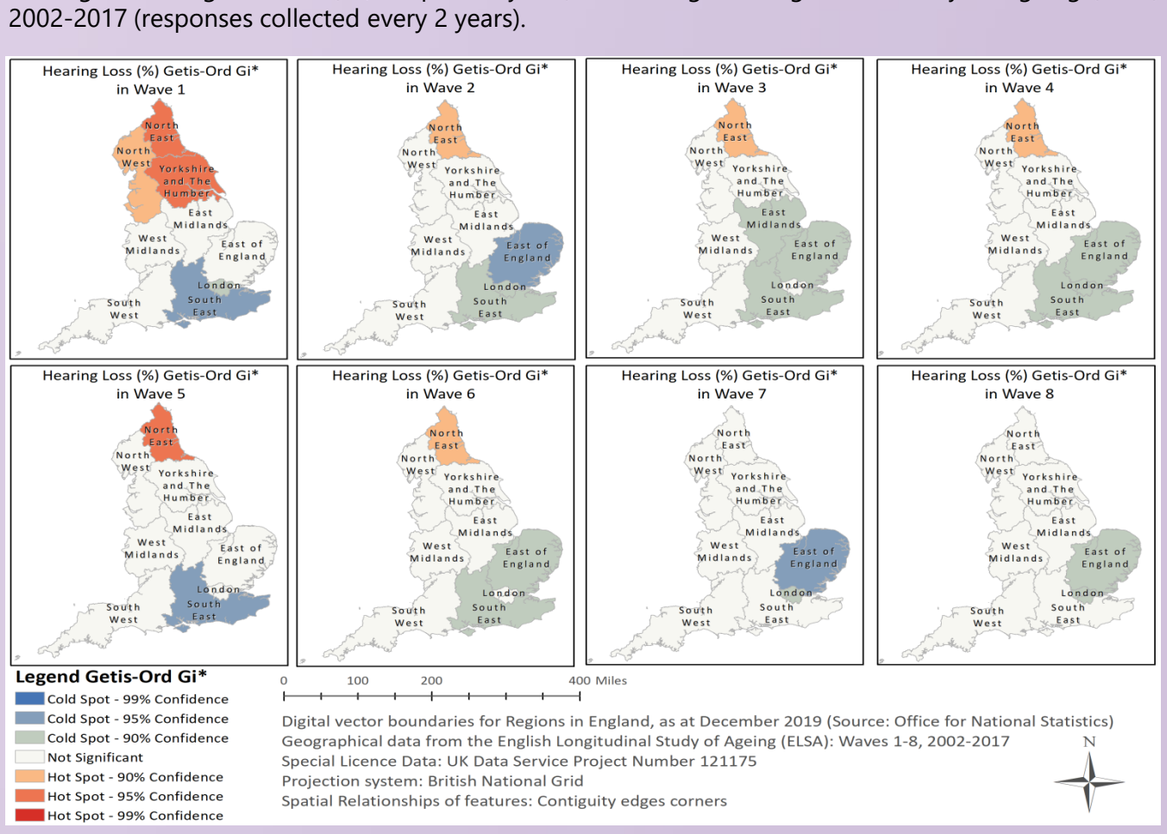

Figure 1. Map of England by Government Office Regions, showing prevalence rates of self-reported hearing loss in eight Waves (74,699 person-years) of the English Longitudinal Study of Ageing (ELSA) 2002-2017 (responses collected every 2 years).

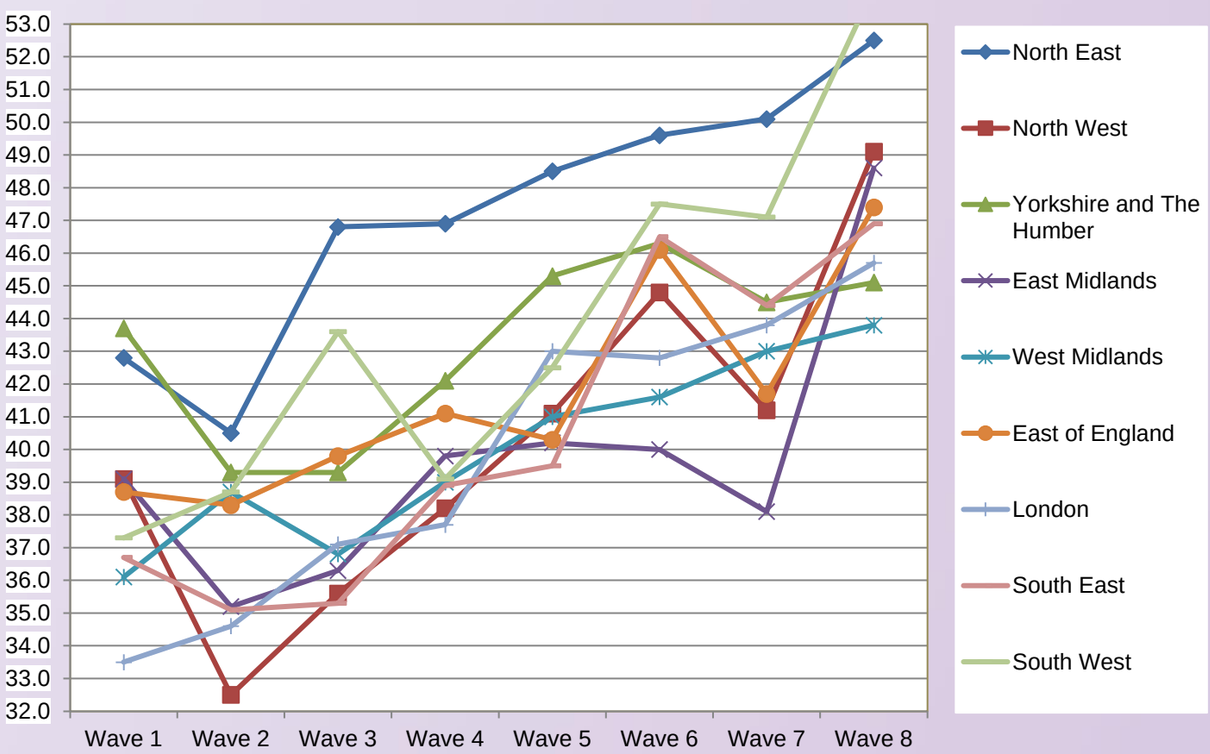

Figure 2. Predicted probabilities (%) of hearing loss prevalence at Regions of England in eight Waves (74,699 person-years) of the English Longitudinal Study of Ageing (ELSA)*

*Holding factor variables (age, gender, education, occupation, income, wealth, IMD and alcohol consumption) at their means, for each ELSA Wave.

Figure 3. Map of England by Government Office Regions showing the spatial clusters of hearing loss prevalence according to Hot Spot and Cold Spot analyses using the Getis-Ord Gi* statistic in eight Waves (74,699 person-years) of the English Longitudinal Study of Ageing (ELSA), 2002-2017.

Summary

- This study is the first that investigated geographical patterns and trends of HL based on a representative cohort of older adults and not through population projections.
- Our study showed that the increase in HL prevalence is not related to the ageing of the population, as widely believed, but potentially due to social and lifestyle changes.
- A socio-spatial approach is crucial for planning sustainable models of hearing care based on the actual needs, and for reducing hearing health inequalities.

Conclusions

- ❖ HL is highlighted as an increasingly important public health issue in England and globally. A spatial dimension is now being added which shows that the increasing trend in HL prevalence is not age-related, as widely believed [4, 5].
- ❖ The Clinical Commissioning Groups (CCGs) who are currently responsible for the NHS audiology services in England should take into consideration socioeconomic factors and modifiable lifestyle behaviours for HL, along with their spatial patterning in England.

References

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Acknowledgments

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