# The UK Cochlear Implant Referral Criteria Audit (CIRCA): Socioeconomic and ethnic disparities associated with access to cochlear implantation for severe—to—profound hearing loss: a multicentre study of 6,236 UK adults





# INTRODUCTION

- Approximately 1.2 million people in the UK suffer from severe or profound hearing loss (1). One option for management of this degree of hearing loss is a cochlear implant (CI).
- Following the change in UK National Institute for Health and Care Excellence (NICE) guidance in 2019, many more adults are now potentially within audiometric criteria(2).

## PRIMARY OUTCOME MEASURE

To identify potential predictors of *referral* for assessment of cochlear implantation

### **SECONDARY OUTCOME MEASURE**

To identify potential predictors of *discussion of the option of* referral for assessment of cochlear implantation

### **FUNDING**

BSO grant. Funders had no role in the design, data collection, analysis or writing of this study.

# National retrospective audit

- INTEGRATE-delivered and supported by British Society of Otology (BSO) and British Cochlear Implant Group (BCIG).
- Inclusion criteria: adults (18 years and older) who had audiometric testing (pure-tone audiometry, auditory brainstem response or comparable) between 1st July and 31st December 2021 that confirmed their eligibility for CI referral as per NICE criteria (2).

**METHODS** 

- Only centres with Auditbase software (the most common Audiology software in the UK) were eligible to submit data. Duplicated patients were excluded.
- All UK general ENT, Audiology and Audiovestibular departments were invited to participate via social media and mailouts from supporting organisations.
- Eligible cases were identified retrospectively using an open-source electronic search tool (the BCIG CI Referral crystal report) in Auditbase, as designed by the BCIG.
- Site teams retrospectively analysed clinical notes, letters, audiology notes:
  - Were patients referred for a CI assessment?
  - Were patients informed that they were eligible for a CI assessment?
  - Patient and hospital factors

### **DATA ANALYSIS**

Baseline characteristics – means or proportions (chi-squared test or ANOVA). Backward stepwise logistic regression model to explore predictors for both primary & secondary outcomes: Odds ratios + 95% confidence intervals.

### Patient predictors of interest

Age, gender, comorbidities, degree of hearing loss, socioeconomic and ethnicity measures. Socioeconomic measures were assessed according to the patient's home postcode, which provided information regarding the Indices of Multiple Deprivation (IMD) decile and geographic region that patients lived. Ethnicity is categorised as per the 2021 UK census (white, Asian, Black, Mixed, and Other which are further subcategorised into 19 subgroups).

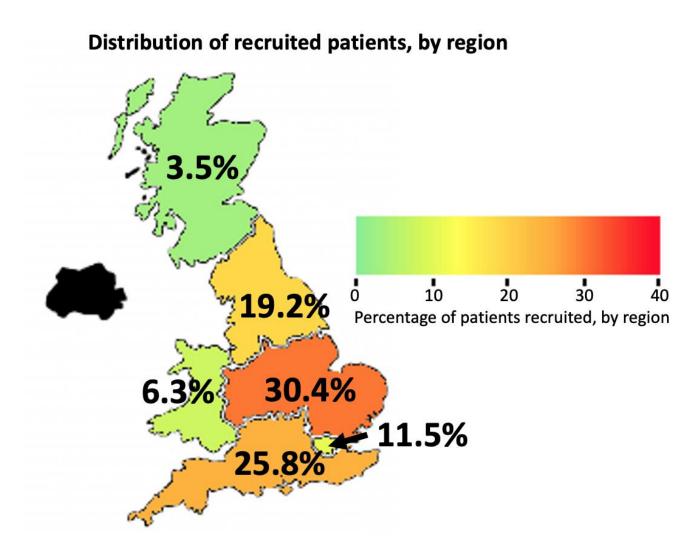
Hospital predictors of interest

Presence of CI champion and co-location of the hospital with an implant centre.

# Only **9**% of eligible patients were **referred** for assessment

 Only 36% of eligible patients had a documented discussion about their eligibility of being considered for CI assessment.

# **RESULTS**



Impact of Socioeconomic Status and Geography

OR 2.12 (1.28-3.5), ref: most deprived location)

7 domains of deprivation

MORE likely to be referred (P<0.001)(Least deprived region

MORE likely to have a discussion (P<0.001) (Least deprived

region OR 1.45 (1.09-1.92), ref: most deprived location)

Patients from LEAST deprived locations (IMD)

 36 hospitals across England, Wales and Scotland contributed data

### 6760 patients

- 6587 after duplicate patients excluded
- 6276 after patients already implanted excluded
- 9 (25%) sites were co-located with CI centres
- 27 (74%) had CI Champions on site
  - 11 sites (41%) 0 hours dedicated non-clinical time per month for the role
  - 5 sites (19%) 0-2 hours
  - 7 sites (26%) 2+ hours

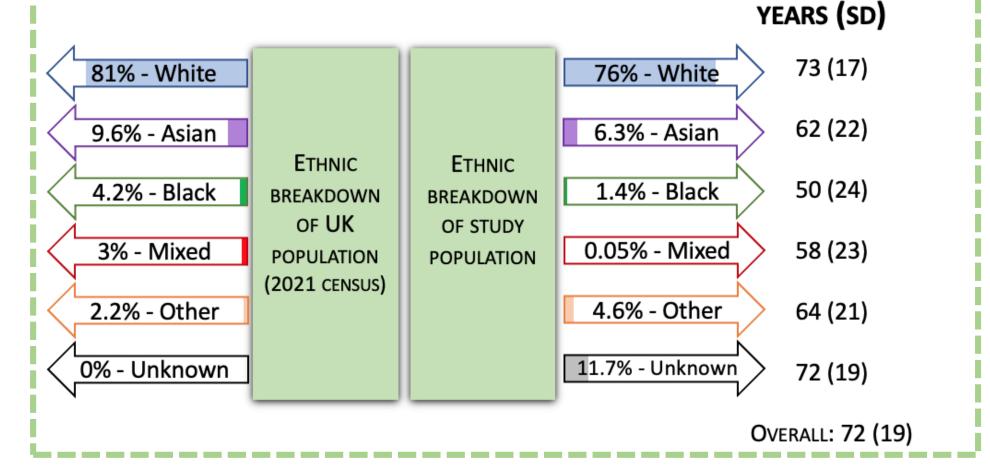
# Impact of Ethnicity

 Ethnicity and English language did not confer a significant association with likelihood for referral.

Ethnicity conferred a significant association with likelihood for **discussion** of a CI (p<0.001), whereby Asian patients (OR 0.57, 95% CI 0.42-0.76) and Black patients (OR 0.55, 95% CI 0.33-0.89) were less likely to have a discussion compared to white patients.

ETHNICITY

AGE BY ETHNICITY



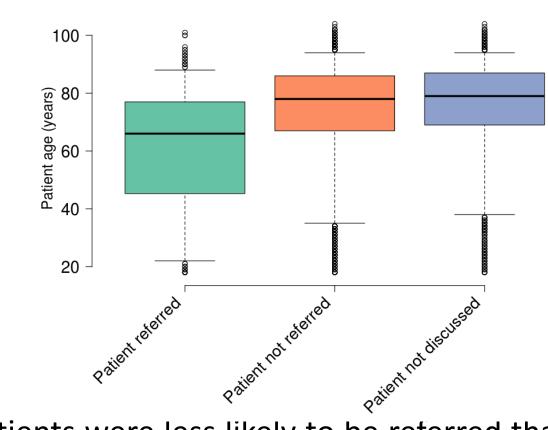
# Geography

- From London LEAST likely to be referred
- (OR 0.41 (0.29-0.59), ref: Midlands)
- From the North & London LEAST likely to be discussion
- (OR 0.73 (0.61-0.87) & OR 0.43 (0.34-0.54), ref:
   Midlands)

# Impact of Age & Gender

Older patients were less likely to be referred (OR 0.97, 95% CI 0.97-0.98).

Older patients were less likely to be informed of their eligibility (OR 0.98, 95% CI 0.98-0.98).



Sex: Male patients were less likely to be referred than female (OR 0.64, 95% 0.52-0.78) and less likely to have a discussion of their eligibility compared to female (OR 0.71, 95% 0.63-0.80).

# Impact of Past Medical History

- Patients with multimorbidity were less likely to be referred than those without (OR 0.72, 95% CI 0.57-0.91).
- Patients with cognitive impairment (p<0.001) and physical disabilities (p<0.001) were more likely to have a discussion about their eligibility than those without (cognitive: OR 1.41, 95% CI 1.11-1.80; physical: OR 1.35, 95% CI 1.01-1.82).

# Impact of Hospital Factors

- Patients seen at a centre specialising in CI, were more likely to be referred (OR 5.96, 95% CI 4.72-7.53).
- Patients at centres specialising in CI, were more likely to have a discussion about referral (OR 3.01, 95% CI 2.58-3.50).
- Discussion about referral was more likely if there was a CI champion at that hospital (OR 3.86, 95% CI 3.16-4.71).

# Impact of Severity of Hearing loss

• The degree of hearing loss was significantly associated with likelihood for referral (p<0.001), whereby patients with more severe hearing loss were more likely to be referred than those with less severe hearing loss, despite these patients still being eligible for referral (OR 3.11, 95% CI 1.61-6.03).

# **DISCUSSION**

# WHAT NEXT?

- Ensure all sites have a CI champion (25% did not) (3)
- Longer termEncourage
- Encourage regular re-audit using Auditbase BCIG CI referral crystal report
- Automatic alerts on Auditbase
- Increase capability and capacity in departments

# STUDY LIMITATIONS

- Retrospective note analysis over 6 months
- Lower representation from Scotland & Wales; no NI sites
- Were patients representative of UK population?

# No decision about me without me.

# CONCLUSION

- Eligible patients inadequately referred and discussed for cochlear implant assessments
- Disparities in care across the UK
- Further research required:
  - To understand disparities
    - Increase equitable access to treatment and assessment across the UK
  - Focus on education of secondary healthcare providers
  - Identify how best to facilitate discussions about referral for CI assessment for eligible patients

# REFERENCES

- 1. RNID facts and figures. <a href="https://rnid.org.uk/about-us/research-and-policy/facts-and-figures/">https://rnid.org.uk/about-us/research-and-policy/facts-and-figures/</a>
- 2. NICE guidance TA566. <a href="https://www.nice.org.uk/guidance/ta5663">https://www.nice.org.uk/guidance/ta5663</a>.
- 3. CI champion scheme: <a href="https://www.baaudiology.org/professional-information/cochlear-implant-champions/">https://www.baaudiology.org/professional-information/cochlear-implant-champions/</a>

Expert Advisory Group (alphabetical): James Arwyn-Jones, Hannah Blanchford, Reshma Ghedia, John Hardman, Eliot Heward, Kris Milinis, Alistair Mitchell-Innes, Jameel Muzaffar, Delphine Nkuliza, Chloe Swords

Expert Advisory Group (alphabetical): Manohar Bance, Rhian Bardsley, Sam Cho, Helen Cullington, Ann-Marie Dickinson, Susan Eitutis, Charlie Huins, Colin Leonard, Rishi Mandavia, Nishchay Mehta, Peter Monksfield, Irumee Pai, Matthew Smith, Emma Stapleton, Carl Verschuur, Deborah Vicke Katherine Wilson

Regional Leads (alphabetical): Javier Ash, Hannah Blanchford, Quentin Bonduelle, Richard Brown, Han Cao, Matthew Farr, Cillian Forde, Charn Gill, Elliot Heward, Peter Kullar, Colin Leonard, Kris Milinis, Faith Protts, Asil Tahir, Charlotte Thomas

Site Leads (alphabetical) Askash Amlani, As

Muhammed Talha Suleman, Muhammed Talha Suleman, Muhammed Talha Suleman, Sadie Khwaja, Rumannah Chothia, Harry Powell, Shiraz Jamshaid, Konstantinos Paraschou, Rhian Bardsley, Arunachalam Iyer, Mehaab Jaffer, Irene Benaran, Joanne Lydon, Christy Davidson, Ciaran Walsh, Clair Saxby, Claire Lingard, David Selwyn, Debbie Corbett, Derrick Siau, Dipan Mistry, Dominic Ip, Dora Amos, Ellie Morriss, Eniola Salau, Eyal Schechter, Farhana Begum, Gareth Smith, Graham Vosper, Hannah Blanchford, Helen Beer, Holly Whittaker, Judith Osuji, Jack Sandeman, James Bartram, James Tuck, Janneil Mitchell, Javier Ash, Jayesh Doshi, Jennifer Fahy, John Murphy, Jonathan Butler, Jonathan Clarke, Jonathan Lee, Joseph Blackaby, Karlien Van Staden, Kevin Kulendra, Kim Hui Lim, Kityee Chan, Kostas Tsioulos, Laura Burton, Linnea Cheung, Lisa Hunter, Lisa Kennedy, Lorraine Lewis, Louis Riley, Misha Verkerk, Mariam Moghal, Mark Chung, Matthew Smith, Matthew Trotter, Megan Allman, Michel Abou-Abdallah, Mohamed shaker, Nicaida Huggins, Owen Judd, Perindi Patel, Philip Gomersall, Peter Valentine, Rebecca Carpenter, Rebecca Christmas, Rhys Palfrey, Rupan Banga, Salim Suleman, Sara O'Neill, Sarah Creeke, Shalini Menon, Soo Oh, Sreedharan Nair Vijayanand, Suzanne Jervis, Terry Cuff, Usama Kamel, Usha Chittathur, William Tsang, Yohanna Takwoingi, Mama Ntiriwa Sekyi-Djan, Mohammed Yousif, Mohit Achanta, Muhammad Riaz Khokhar, Mustafa Thamer, Olivia Wharf, Razan Basonbul, Richard Brown, Ryan Perkins, SS Sara Badrol, Shilpa Divakaran, Swagatam Banerjee, Yousef Ibrahim, Sajida Julfa, Annette Hill, Andrew Rutter, Wacas Ghafoor, Charndeep Gill, Islam Soltan, Jenny Boswell, Amina Bibi, Alice Roberts, Chritine du Plessis, Michael Elliott, Quentin Bonduelle