Using Health Informatics to Improve Neurological Care

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Background

The Problem:

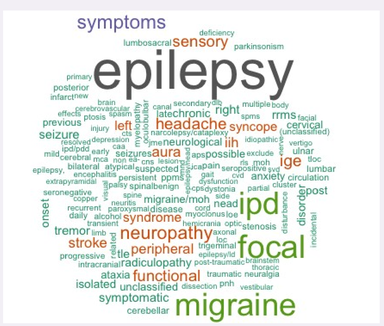
Outpatient neurological services are under a large amount of pressure, with too few consultants for the number of referrals, which has led to long waiting times for appointments. Attention was brought to the state of neurological services in 2011 by a National Audit Office (NAO) report entitled 'Services for people with neurological conditions' (National Audit Office, 2011). This report sought to outline the issues with neurological services and propose ways of solving those issues The issues they highlighted included delays in diagnoses and the role of the GP in referring the patient to the correct consultant; geographical inequalities in access to consultant neurological care; and the lack of good quality data on neurological conditions.

The Research Question(s):

- To examine the characteristics of those referred to neurology services and explore patterns in referral and working diagnosis.
- To explore geographical variations in referral and diagnosis.
- To analyse and understand the patterns of service utilisation in order to inform service design.
- To develop methods of visualising and analysing patient pathways.

The Data:

- Longitudinal patient data from a clinician maintained dataset of around 5000 patient appointments with neurology services. Data includes working diagnosis, age, whether the patient attended, whether the appointment was a new attendee or a follow up, and whether the patient was discharged or referred onwards.
- Business Intelligence data including GP Practice and CCG, LSOA, date and source of referral.
- Open source data aggregated at the population level, for example from the census.



Current Work

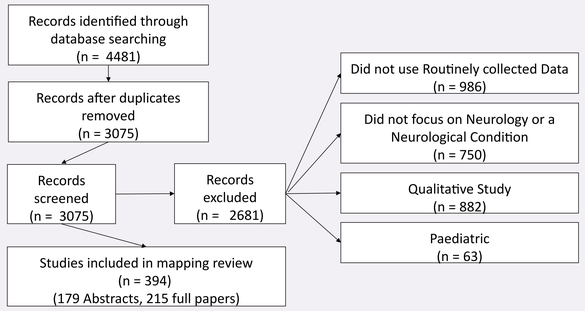
A Systematic Mapping Review of the Literature

What is a Systematic Mapping Review?

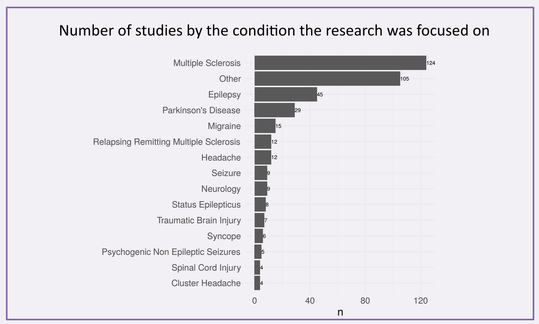
Mapping reviews aim to categorise and 'map out' existing literature on a topic. A primary goal of this type of review is to identify gaps in the current literature (Booth, Sutton, & Papaioannou, 2016). It can be used to give a broad view of the existing literature on a topic, and allows patterns in previous research to be discovered and gaps to be identified. Mapping reviews are suited to answering questions with a large scope which are not limited to single interventions or outcomes.

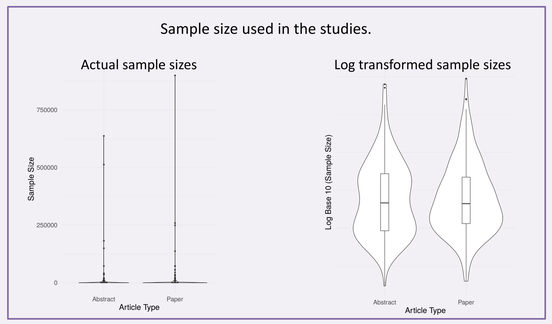
Review Questions:

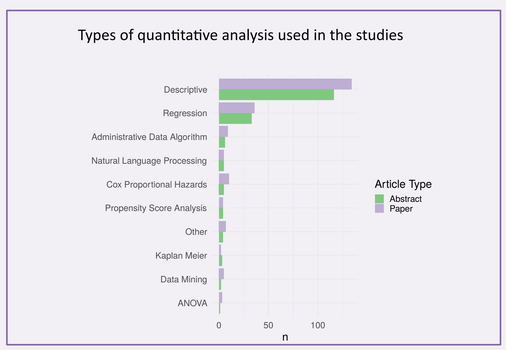
- How has routinely collected patient data been used in neurology research?
- Where are the gaps in current research into improving neurological services?
- What methodologies have other researchers used to explore routinely collected data in neurology?

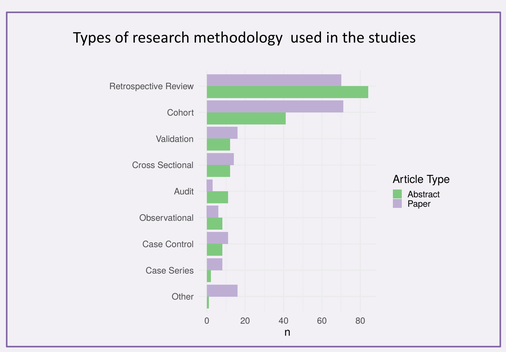


Initial Results









What's Next?

1. Examining Clinician recorded free text diagnoses

The Problem:

Diagnoses are often recorded using coding systems which allows for their use in analysis, costing and budget forecasting. Two such systems of clinical coding are the 10th iteration of the WHO International Classification for Disease (ICD-10) and SNOMED-CT. However, when clinicians are offered a free text field in which to enter a diagnosis they often don't align with the diagnosis definitions used by the coding systems. This makes it more difficult to use free text diagnoses in analysis.

The Solution:

Use Fuzzy Text Matching to analyse how closely clinician recorded diagnoses match with the ICD-10 and SNOMED-CT definitions.

2. Geographical analysis of diagnoses

The Problem:

There is very little research into and understanding of the reasons for geographical differences in Neurological diagnoses. These differences may stem from underlying factors such as socioeconomic status, or there may be a separate process driving them.

The Solution:

Use geostatistical modelling to identify underlying variation due to geographical location after accounting for other factors.

References

National Audit Office. (2011). *Services for people with neurological conditions*.

Booth, A., Sutton, A., & Papaioannou, D. (2016). *Systematic Approaches to a Successful Literature Review* (2nd ed.). London: Sage.