

Briefing Paper 2 HDR UK Multimorbidity Implementation Project

Introduction

The occurrence of two or more long-term diseases, such as heart diseases, diabetes, chronic infections, etc., in one patient is known as multimorbidity. We believe that in many countries the number of people with multimorbidity is growing as more people are living longer. There is lots of research on multimorbidity, and different research groups often measure multimorbidity differently, so as a result, reviewing research becomes more difficult.

Key Challenges

Each time a person interacts with the health services and is diagnosed with a specific condition or given a prescription, an electronic health record (EHR) is created for them. These EHRs are designed for clinical purposes and differ across health services. Under the appropriate governance, EHRs can be extracted to create different databases and made available for a number of research purposes. Research groups have access to different databases and the source of their data will determine how they measure multimorbidity. For example, Public Health Scotland provides access to hospital records and prescribing data, however, they do not have access to data from general practices. While in Wales, SAIL provides access to hospital records and data from general practices which contains prescribing records.

Multimorbidity research lacks consistency in how it is measured and reported in different studies. In general, research groups select a way to measure multimorbidity that best suits the data they have available. Moreover, different studies will look at different underlying conditions and might count them in different ways. Even if studies look at the same conditions, they will often use different methods to identify the patients with these conditions, therefore two studies will produce different results. In our study, we will define a framework for measuring multimorbidity across different sites in the UK.

Method

This study is part of a national programme where datasets from six different geographical populations (each relating to linked EHRs) will be extracted under existing governance guidance with the following objectives:

1. To study the best way to define multimorbidity across different research sites (6 sites across the UK).
2. To transform data into a standard structure and develop a common data model for analysis.
3. To examine how common multimorbidity is across the UK population and how it varies based on different factors like age, sex or level of deprivation.
4. To analyse what different conditions are most likely to be present in patients at the same time and how they occur (or change) with time.

Sample dataset description from one site (Scotland)

Within Scotland, we will extract data from outpatient appointments, hospital admissions, information on the use of prescribed drugs, accident & emergency visits and different disease registers. Patient characteristics including age, sex, level of social deprivation, ethnicity and where people live, will also be used. The data extracted for the Scottish population from the Tayside and Fife region will be held within the National Safe Haven and access will be monitored security arrangements followed.

How we measure multimorbidity

To measure multimorbidity, we need to undertake a number of different steps, which are as follows:

1. We need to agree on which conditions or diseases we are interested in. For example, in our sample analysis we used 31 different conditions which include hypertension, diabetes, etc. amongst other possible conditions.
2. We then decide on how we identify each condition within health records. This is normally done by using a set of agreed codes which we can compare against the data we have available. For example, we are able to use a set of codes and produce the level of multimorbidity in Tayside and Fife from

those who satisfy the inclusion criterion. For this analysis we only look at codes for diseases from hospital admissions and use the data analysis framework shown in Figure 1.

- The last step is to agree what we mean by multimorbidity. For example, in figure 2, we have shown the percentage of people and the number of conditions, so as we have defined multimorbidity as two or more conditions, we can easily see the populations we are interested in.

Figure 2 shows the level of multimorbidity in different age groups in Tayside and Fife. 307,876 individuals from Tayside and Fife satisfied our inclusion criteria and multimorbidity is present in 21.4% of this group. The likelihood of multimorbidity increased with deprivation from 18% for most affluent to 27% for most deprived population. Age was also a key factor for multimorbidity, as it is more common in the younger deprived population (14%), than in the most affluent group of the same age (6%).

What we will do next

Multimorbidity can be measured in many ways, the best way to measure it, can often only be determined by the purpose of the measurement and what research might be useful. Therefore, we will define a set of rules for including certain conditions, for example someone with asthma might only be included in our data if the condition has been active in the last 5 years, e.g., the patient has received repeated prescriptions or had hospital admission, etc. Different analytical methods will be tested on datasets and once an agreed method has been decided, we will start looking at variations across the country. We will then look at the characteristics of people who share the same set of diseases and look at which diseases are likely to be found together and lastly we will analyse how diseases develop over time.

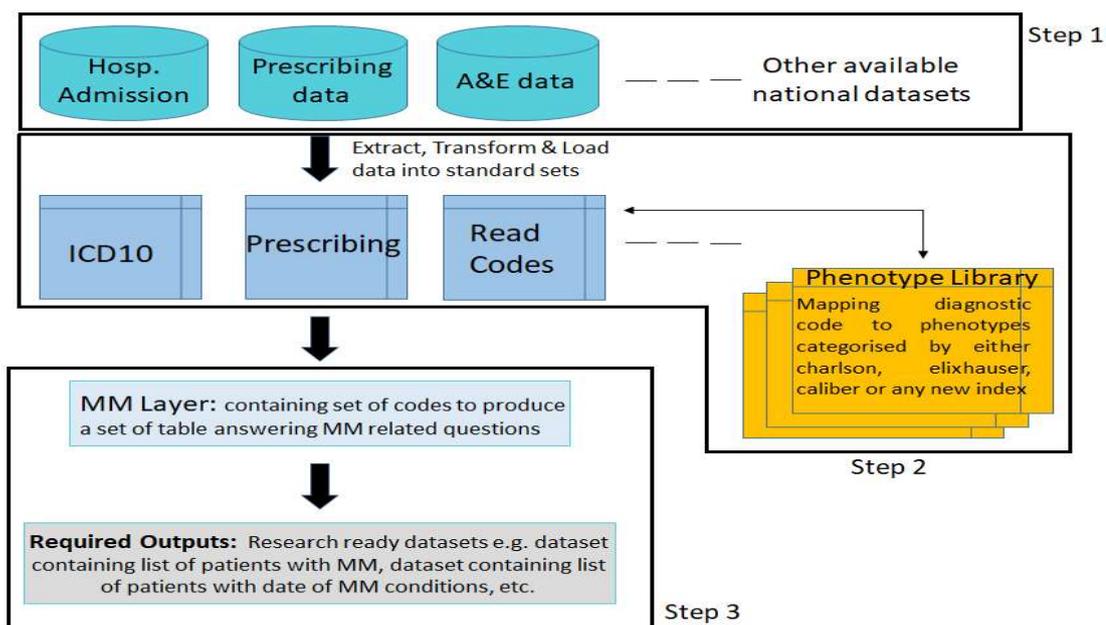


Figure 1: Data Analysis Framework

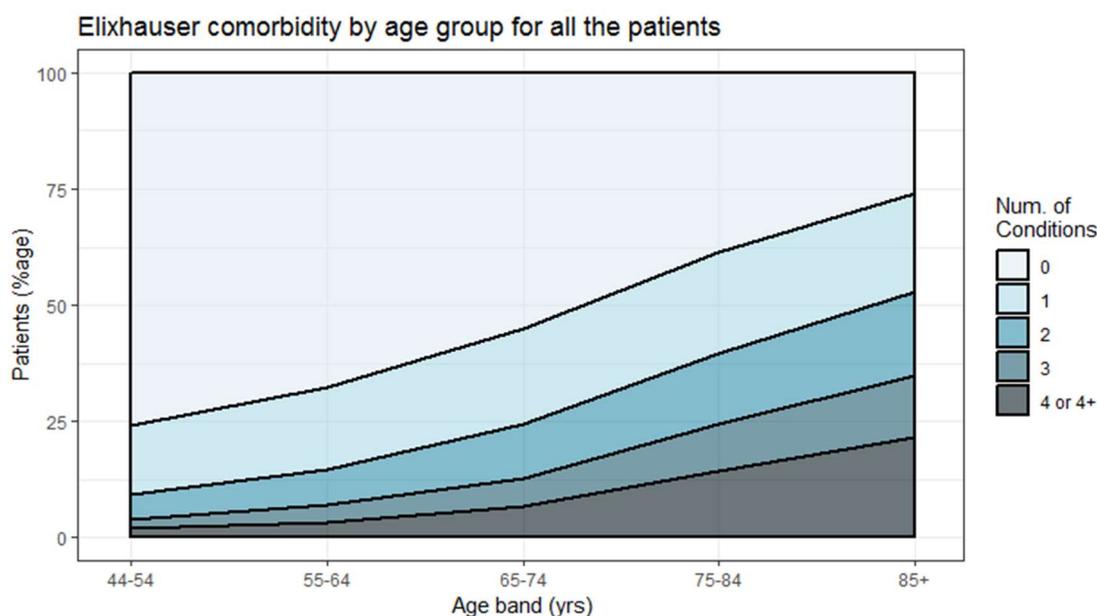


Figure 2: Multimorbidity across Tayside and Fife population