

# Technical appendix

## Methodology

## Data sources and linkage

Our analysis uses data provided by patients and collected by the NHS as part of their care and support. The data were accessed via Clinical Practice Research Datalink (CPRD), which is a pseudonymised database of patient records from a network of GP practices across the UK.

Under ISAC protocol number 19\_178, we extracted data for a sample of all patients older than 18 years who had:

- A record of anxiety and/or depression in their health record between 1 November 2015 and 31 October 2016 (the look-back period), determined using either records of diagnosis, symptoms or prescriptions within each patient's data. The criteria for this was based on work from [Cassell et al 2018](#) and [Kendrick et al 2015](#) – the full list of codes is available on [GitHub](#).
- Data from an up-to-standard practice covering the study period from 1 November 2016 to 31 October 2018 (or an ONS recorded date of death during this period).

We excluded patients with schizophrenia or bipolar disorder as the care needs of people with severe mental illness and additional conditions have been described elsewhere. By relying on primary care records to identify patients with common mental disorders, our data will be biased by any variation in [treatment seeking behaviours](#) or recording of symptoms/diagnoses between different groups. Our approach also does not capture the severity of illness, but only whether it is present or absent.

Through these primary care records we obtained data on 407,990 patients from across the UK. It was possible to link records for 103,991 of these people to English data from the ONS (capturing both deaths and patient postcode Index of Multiple Deprivation) and Hospital Episode Statistics (capturing secondary care use across the 2-year study period of 1 November 2016 to 31 October 2018) for this analysis. While CPRD primary care records come from across the UK, linked data are only available for patients in England. It was not possible to obtain linked information for all health care use; for example, we do not have data from community mental health services, IAPT and privately provided mental health care.

Where comparisons are made to the general population, we used CPRD data covering the same period to extract a randomly-selected sample of 230,177 patients older than 18 years and with linked deprivation level data available (ISAC protocol amendment number 17\_150RMn2).

## Measuring additional long-term conditions

Building on [previous work](#), the presence of 35 other long-term conditions were determined using the primary care data. These conditions have been considered as they are associated with significant need for treatment, poorer quality of life, poorer functioning or greater risk of premature death.

### List of all additional long-term conditions

1. Alcohol problems
2. Anorexia or bulimia
3. Asthma (currently treated)
4. Atrial fibrillation
5. Blindness and low vision
6. Bronchiectasis
7. Cancer – diagnosis in last 5 years
8. Chronic kidney disease
9. Chronic liver disease and viral hepatitis
10. Chronic sinusitis
11. Constipation (treated)
12. COPD
13. Coronary heart disease
14. Dementia
15. Diabetes
16. Diverticular disease of intestine
17. Epilepsy (currently treated)
18. Hearing loss
19. Heart failure
20. Hypertension
21. Inflammatory bowel disease
22. Irritable bowel syndrome
23. Learning disability
24. Migraine
25. Multiple sclerosis
26. Painful condition
27. Parkinson's disease
28. Peptic ulcer disease
29. Peripheral vascular disease
30. Prostate disorders
31. Psoriasis or eczema
32. Psychoactive substance misuse (other than alcohol)
33. Rheumatoid arthritis, other inflammatory polyarthropathies and systematic connective tissue disorders
34. Stroke and transient ischaemic attack
35. Thyroid disorders.

## Measuring deprivation level

Deprivation information is gathered from linked ONS data on the 2015 Index of Multiple Deprivation, based on patient postcode information. We were provided with deprivation quintiles. For ease of data visualisation in plots, we show the most deprived 20% of areas as areas of high deprivation, while areas of low deprivation refer to the least deprived 20% of areas.

## Measuring health care use

Health care use was captured over a 2-year study period from 1 November 2016 to 31 October 2018. Length of time in study was calculated using date of death if this was within the study period. All values on health care use are presented as use per year, adjusted for length of time in study. Very high values for patients who were in the study for less than 2 years were windsorised at 200.

### Primary care measures

Primary care prescribing patterns were captured using the number of unique prescribed products in primary care, based on the drug substance information in the product.txt lookup file provided by CPRD. Primary care mental health-related prescribing was assessed by identifying the number of psychiatric products prescribed, as defined by [previously developed](#) product code lists for antidepressants, anxiolytics or antipsychotics.

### Secondary care measures

Mental health-related outpatient appointments were those where the treatment speciality field 'TRETSPPEF' was recorded as between 700 and 730.

Mental health-related inpatient spells were defined using the ICD chapter code, using the primary diagnosis was from ICD chapter 'F' or any diagnosis ICD chapter X 60-84 or ICD chapter Y 10-34 (excluding Y33.9). Elective inpatient spells were defined as those where the admission method field 'ADMIMETH' = 11, 12 or 13 and the patient classification field 'CLASSPAT' = 1 or 4, while emergency inpatient spells were those where 'ADMIMETH' = 21, 22, 23, 24, 25, 2A or 2D.

Mental health-related attendances in A&E were those where the recorded A&E diagnosis was a psychiatric diagnosis, using the A&E diagnosis scheme ('DIAGSCHEME' = 1 and 'DIAG2' = 35), or where the A&E patient group was identified as self-harm ('AEPATGROUP' = 30).

### Code availability

All analysis code used to produce the analysis presented can be found on [GitHub](#).