Supplemental materials for:

Carr MJ, Ashcroft D, Kontopantelis E, et al. Premature death among primary care patients with a history of self-harm. *Ann Fam Med*. 2017;15(3):246-254.

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Appendix 1: Explanation of the Read coding system and how diagnostic information is routinely recorded in the CPRD

The Read classification was devised in the 1980s by English general practitioner (GP) James Read as a thesaurus of medical terms according to the following principles: 1) Comprehensive; 2) Hierarchical; 3) Coded; 4) Computerized; 5) Cross-referenced; 6) Dynamic. It contains a vast array of codes for the following entities: disease diagnosis, management and monitoring; history, signs and symptoms; investigative, preventive, operative and therapeutic procedures; medication and appliances; and referrals to secondary care health services. By 1990 it was claimed to be "… the most comprehensive medical coding system in the world (p1092)."[18] Read codes that denote a self-harm episode or a co-morbid physical or mental health condition are routinely entered in a patient's electronic medical record by their GP or practice nurse in the course of a clinical consultation, or by a practice administrator who has gleaned the information from a secondary healthcare provider. Thus, in some instances the patient's GP or practice nurse will have made the diagnosis whilst in others it will have been made by a clinician who had previously seen the patient in a general hospital or a mental health unit. With self-harm episodes, some patients will have self-reported the behavior at consultation (e.g. "I intentionally cut my arm today") or it will be recorded on the basis that the patient had self-poisoned or self-injured to a degree that consequently required clinical observation or treatment.

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Appendix 2: Explanation of psychiatric and co-morbid physical illness diagnostic classifications

Our schizophrenia-spectrum definition included diagnoses of delusional disorders, brief psychotic disorders, schizophreniform disorders, schizoaffective disorders, and schizophrenia. The spectrum definition also included patients with psychotic symptoms that did not adequately fit the definition for any of the specified diagnostic subgroups. We identified patients with bipolar disorder via records that referred directly to bipolar or affective disorder and records describing recurrent mania, manic-depression, or depression with psychosis. We applied broad definitions for the two most common conditions: depression and anxiety. Our definition of depression included the full range of diagnoses from either single or recurrent episodes of mild to severe depression through to more persistent chronic conditions. Anxiety incorporated panic disorders, phobias, post-traumatic stress disorders, social anxiety disorders, and generalized anxiety disorder.

Defining personality disorders can be complex due to the substantial overlap with other diagnostic categories. This is particularly true when considering variants that include some form of paranoia or psychosis. For instance, some definitions place schizoid and schizotypal personality disorders in the schizophrenia spectrum whereas our definition included these conditions as personality disorders when references to delusions or hallucinations were not present in the patient's records. Our definition also incorporated erratic variants (including antisocial, borderline, histrionic, and narcissistic personality disorders) and anxiety or stress-related variants (including avoidant, dependent, and obsessive-compulsive personality disorders). The classification of eating disorders is also prone to subjectivity. Again, we applied a broad definition that covered the more common conditions (including anorexia nervosa, bulimia, and binge eating) but also included some rarer psychogenic variants.

Table 2 ('Clinical characteristics at index self-harm episode') of the manuscript presents the prevalence of physical illness conditions that are monitored in the Quality Outcomes Framework (QOF), which has been part of the General Medical Services contract for general practices in the UK National Health Service since April 1st 2004: http://www.nhsemployers.org/your-workforce/primary-care-contacts/general-medical-services/quality-and-outcomes-framework

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Appendix 3: ICD-10 codes and descriptions for classifying alcohol-related death and drug poisoning death

These two categories of cause-specific mortality are routinely reported by the Office for National Statistics (ONS), England and Wales: alcohol-related death;[30] drug poisoning death.[32] Box 1 presents the lists of codes used to classify these outcomes along with their respective descriptions.

Box 1: ICD-10 classification for alcohol-related death and drug poisoning death

ICD-10 code or range	Description
Alcohol-related death:	
F10	Mental and behavioral disorders due to use of alcohol
G31.2	Degeneration of the nervous system due to alcohol
G62.1	Alcoholic polyneuropathy
I42.6	Alcohol gastritis
K70	Alcoholic liver disease
K73	Chronic hepatitis, not elsewhere classified
K74	Fibrosis and cirrhosis of liver (*excluding K74.3-K74.5 - Biliary cirrhosis*)
K86.0	Alcohol-induced chronic pancreatitis
X45	Accidental poisoning by and exposure to alcohol
X65	Intentional self-poisoning by and exposure to alcohol
Y15	Poisoning by and exposure to alcohol - undetermined intent
Drug poisoning death:	
F11-F16, F18-F19	Mental and behavioral disorders due to drug use

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X40-X44	Accidental self-poisoning by drugs, medicaments and biological substances
X60-X64	Intentional self-poisoning by drugs, medicaments and biological substances
X85	Assault by drugs, medicaments and biological substances
Y10-Y14	Poisoning by drugs, medicaments and biological substances - undetermined intent

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Appendix 4: Generating time-dependent covariates for multivariable modelling

We fitted time-dependent covariates to account for potential confounders of the relationship between self-harm and premature mortality risk. With cohort entry as the origin for a given patient, we derived covariates at time points $t = t_1, t_2, t_3, \ldots$ where $t > 0$.

(a) *Calendar year*. To account for any trends in the relationship between self-harm and premature mortality, we adjusted for the calendar year at each time point *t*.

(b) *Frequency of contact with a GP in past 12 months*. We applied a previously developed a consultation categorization scheme to identify face-to-face patient contacts with clinical staff.[45] When a patient had more than one consulting record on the same day, we regarded it as a single consultation, or 'contact day'. At each time point *t* (for each patient), we identified all direct contacts in the interval [*t* –12 months, *t*).

(c) *Mental illness diagnoses*. We considered diagnoses of mental illness in the following six categories: the schizophrenia-spectrum, bipolar disorders, depression, anxiety disorders, personality disorders, and eating disorders. Appendix 2 contains detailed information on diagnostic category specifications; read code lists are available at: https://clinicalcodes.rss.mhs.man.ac.uk/. We constructed a binary time-dependent variable for a history of mental illness diagnoses on or prior to each time point *t*.

(d) *Referral to mental health services*. We identified relevant referrals to specialist mental health services using the family health services authority (FHSA) specialty which indicated the department to which the patient was referred; it is mandatory for GPs to enter this information upon referral. For our purposes, there was just one relevant specialty: psychiatry. Secondly, information on the National Health Service (NHS) specialty was also available. The information in this field was more granular, but completion by general practice staff is not compulsory when coding referrals. We combined the information from both fields to construct indicators for each patient's referral history.

(e) *Psychotropic medication prescribed in past 12 months*. The dataset also contained records of primary care prescribed medication for our study cohort. GPs selected and recorded prescription items using the Multilex product dictionary. Information on the Multilex coding system is available at: http://www.fdbhealth.co.uk/solutions/multilex/. Dictionary items include medicinal products, devices and appliances. We extracted all prescriptions for our cohort in the following classes of psychotropic medication: typical, atypical and depot antipsychotics; lithium and other mood stabilisers; selective

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serotonin reuptake inhibitor (SSRI), tricyclic and other antidepressants; benzodiazepines; opioid analgesics; other anxiolytics and hypnotics. Our categorized lists of Multilex codes for psychotropic medication are also available at www.clinicalcodes.org. We constructed a binary indicator variable for any psychotropic prescription in the interval [t –12 months, t).

(f) *Clinically significant alcohol misuse*. We constructed binary indicator variables representing any history of clinically significant alcohol misuse prior to time t. The read code list is provided at:

https://clinicalcodes.rss.mhs.man.ac.uk/

(g) *Current smoking status*. Defining this covariate at each time point required a complex algorithm to address coding inconsistencies over time. We created a categorical variable for never smoked, current smoker and ex-smoker. The list of read codes for current smoking status is available at: https://clinicalcodes.rss.mhs.man.ac.uk/ Feasible one-step changes in smoking status over time were specified using the state transition matrix that is outlined here:

		Status at time t_j:		
		Never	Current	Ex
Status at time t_{j-1}:	Never	1	1	1
	Current	0	1	1
	Ex	0	1	1

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