

Mental health

VERSION HISTORY

V1	21/02/22	Developed by RD
V1	22/02/22	KT adding info for additional potential confounders.
V1	02/03/22	KT adding new secondary care code lists.
V2	10/05/22	VW updated outcomes table following feedback from Mental Health team.
V2	11/05/22	JC updated covariates following feedback from Mental Health team.
V3	18/07/22	Further outcome refinement following meeting with Mental Health team.

MAIN PROTOCOL

This document contains the outcome specific elements necessary to implement this protocol: [post-covid-events.docx](#)

OUTCOMES

Incident mental health episodes, defined by primary care records, will be ascertained anytime following exposure. A composite diagnosis variable will be derived for each outcome using data from primary care, secondary care, and the death registry. Secondary outcomes will include either a diagnosis of mental illness, or a prescription for a listed medication. Where multiple prescription codelists are listed, for example for antidepressants, a composite variable will also be created.

Outcome	Primary Care (SNOMED CT)	Secondary Care and Deaths (ICD10)	Prescriptions (BNF / DMD)
Depression	OpenCodelists: Depression (symptoms and diagnoses)	Depression ICD-10	Not applicable for main analysis
Anxiety – general	OpenCodelists: Anxiety (symptoms and diagnoses)	Anxiety ICD-10	Not applicable for main analysis
Anxiety – obsessive compulsive disorder	OpenCodelists: Obsessive Compulsive Disorder (OCD)	OCD ICD-10	Not applicable for main analysis

Anxiety – post traumatic stress disorder	OpenCodelists: Post traumatic stress disorder	PTSD ICD-10	Not applicable for main analysis
Eating disorders	OpenCodelists: Diagnoses eating disorder	Eating Disorder- ICD-10	Not applicable for main analysis
Serious mental illness	OpenCodelists: Severe Mental Illness	Combine: Bipolar and other mood related disorders ICD-10 Other psychotic disorders ICD-10 Schizophrenia ICD-10	Not applicable for main analysis
Self harm	Combine: OpenCodelists: Intentional self-harm (aged>=10 years) OpenCodelists: Intentional self-harm (aged>=15 years)	Combine: Self-harm (Intentional 10+ years) ICD-10 Self-harm (Undetermined Intent 15+ years) ICD-10	Not applicable for main analysis
Suicide	Not applicable	OpenCodelists: Suicide ICD-10	Not applicable for main analysis
Opioid addiction	OpenCodelists: Opioid dependency clinical diagnosis	OpioidMisuseICD10	Not applicable for main analysis
Depression [prescription outcome]	OpenCodelists: Depression (symptoms and diagnoses)	Depression ICD-10	bristol/antidepressant-drugs/1d04ddc8/
Anxiety – general [prescription outcome]	OpenCodelists: Anxiety (symptoms and diagnoses)	Anxiety ICD-10	bristol/anxiolytics_040102/38c710f3/

Serious mental illness [prescription outcome]	OpenCodelists: Severe Mental Illness	Combine: Bipolar and other mood related disorders ICD-10 Other psychotic disorders ICD-10 Schizophrenia ICD-10	bristol/antipsychotic-drugs/51d68428/
Opioid addiction [prescription outcome]	OpenCodelists: Opioid dependency clinical diagnosis	OpioidMisuseICD10	bristol/opioid-dependence/6ae5f75d/
Depression [primary care outcome]	OpenCodelists: Depression (symptoms and diagnoses)	Not applicable for primary care analysis	Not applicable for primary care analysis
Anxiety – general [primary care outcome]	OpenCodelists: Anxiety (symptoms and diagnoses)	Not applicable for primary care analysis	Not applicable for primary care analysis
Serious mental illness [primary care outcome]	OpenCodelists: Severe Mental Illness	Not applicable for primary care analysis	Not applicable for primary care analysis
Self harm [primary care outcome]	Combine: OpenCodelists: Intentional self-harm (aged>=10 years) OpenCodelists: Intentional self-harm (aged>=15 years)	Not applicable for primary care analysis	Not applicable for primary care analysis
Depression [secondary care outcome]	Not applicable for secondary care analysis	Depression ICD-10	Not applicable for main analysis
Anxiety – general [secondary care outcome]	Not applicable for secondary care analysis	Anxiety ICD-10	Not applicable for main analysis
Serious mental illness [secondary care outcome]	Not applicable for secondary care analysis	Combine: Bipolar and other mood related disorders ICD-10 Other psychotic disorders ICD-10 Schizophrenia ICD-10	Not applicable for main analysis
Self harm [secondary care outcome]	Not applicable for secondary care analysis	Combine: Self-harm (Intentional 10+ years) ICD-10 Self-harm (Undetermined Intent 15+ years) ICD-10	Not applicable for main analysis

POTENTIAL CONFOUNDERS

Covariate	Type	Definition	Data sources
Age	Continuous	Modelled as age in years using a restricted cubic spline with 3 knots at the 10th, 50th and 90th percentiles	Primary care
Sex	Categorical	Male, Female	Primary care
Ethnicity	Categorical	1: White 2: Mixed 3: South Asian 4: Black 5: Other	Primary care
Deprivation	Categorical	10 categories from Index of Multiple Deprivation 2019	Index of Multiple Deprivation
Region	Categorical	East of England London Midlands North East and Yorkshire North West South East South West Scotland Wales	Primary care

Smoking status	Categorical	E: Ever smoker M: Missing N: Never smoker S: Current smoker	Primary care
Care home status	Binary	1 if care home resident; 0 otherwise	Address matching CQC database
Consultation rate	Continuous	Number of GP consultations 12 months prior to the start of the study	Primary care
Health care worker	Binary	1 if healthcare worker; 0 otherwise	NHS England COVID-19 data store
Dementia	Binary	1 if diagnosis present; 0 otherwise.	Combine: Dementia SNOMED Dementia ICD10 Dementia Vascular SNOMED Dementia Vascular ICD10
Liver disease	Binary	1 if diagnosis present; 0 otherwise.	Combine: Liver Disease ICD10 Liver Disease SNOMED
Chronic kidney disease	Binary	1 if diagnosis present; 0 otherwise.	Combine: CKD SNOMED CKD ICD10

Cancer	Categorical	1 if diagnosis present; 0 otherwise.	Combine: Cancer SNOMED Cancer ICD10
Hypertension	Binary	1 if diagnosis present; 0 otherwise.	Combine: Hypertension Drugs DMD Hypertension ICD10 Hypertension SNOMED
Diabetes	Binary	1 if diagnosis present; 0 otherwise.	Combine: Diabetes T1 SNOMED Opensafely: Diabetes T1 ICD10 Diabetes T2 SNOMED Diabetes T2 ICD10 Non-diagnostic diabetes SNOMED Other-Nonspecific diabetes SNOMED Gestational Diabetes SNOMED Opensafely: Insulin SNOMED Opensafely: Antidiabetic drugs SNOMED Opensafely: Non-metformin-antidiabetic drugs SNOMED
Obesity	Binary	1 if BMI \geq 30 or coded diagnosis for obesity; 0 otherwise.	Combine:

			Obesity SNOMED Obesity ICD10
Chronic obstructive pulmonary disease (COPD)	Binary	1 if diagnosis present; 0 otherwise.	Combine: COPD SNOMED COPD ICD10
Acute myocardial infarction	Binary	1 if diagnosis present; 0 otherwise.	Combine: AMI SNOMED AMI ICD10 AMI Prior ICD10
Ischaemic stroke	Binary	1 if diagnosis present; 0 otherwise.	Combine: Ischeamic Stroke SNOMED Ischeamic Stroke ICD10
Recent episode of depression	Binary	A diagnosis of, or symptoms of depression in primary or secondary care. 1 if present ≤6 months prior to index date; 0 otherwise	Combine: OpenCodelists: Depression (symptoms and diagnoses) Depression ICD10
History of depression	Binary	A diagnosis of, or symptoms of depression in primary or secondary care. 1 if present >6 months prior to index data; 0 otherwise	

Recent episode of anxiety	Binary	<p>Diagnosis of anxiety in primary (PC) or secondary care (SC) – combining 6 code lists:</p> <p>anxiety general (PC), anxiety (SC), anxiety – OCD (PC), OCD (SC), anxiety – PTSD (PC), PTSD (SC).</p> <p>1 if present ≤6 months prior to index date; 0 otherwise</p>	<p>Combine:</p> <p>OpenCodelists: Anxiety (symptoms and diagnoses)</p> <p>Anxiety ICD10</p> <p>Obsessive Compulsive Disorder (OCD)</p> <p>OCD ICD-10</p> <p>OpenCodelists: Post traumatic stress disorder</p> <p>PTSD ICD-10</p>
History of anxiety	Binary	<p>Any history of anxiety in primary (PC) or secondary care (SC) – combining 6 code lists:</p> <p>anxiety general (PC), anxiety (SC), anxiety – OCD (PC), OCD (SC), anxiety – PTSD (PC), PTSD (SC).</p> <p>1 if present >6 months prior to index date; 0 otherwise</p>	
Recent diagnosis of an eating disorder	Binary	<p>To include Anorexia nervosa, bulimia nervosa, and other specified feeding and eating disorders</p> <p>As above for eating disorders but occurring on or before index date.</p> <p>1 if present ≤6 months prior to index date; 0 otherwise</p>	<p>Combine:</p> <p>OpenCodelists: Diagnoses eating disorder</p> <p>Eating Disorder- ICD-10</p>
History of eating disorders	Binary	<p>To include Anorexia nervosa, bulimia nervosa, and other specified feeding and eating disorders</p> <p>As above for eating disorders but occurring on or before index date.</p> <p>1 if present >6 months prior to index date; 0 otherwise</p>	

Recent report of a serious mental illness	Binary	<p>Diagnoses of schizophrenia and other psychotic disorders, and bipolar disorders. (Sensitivity includes prescription of an antipsychotic or mood stabiliser).</p> <p>As above for SMI but occurring on or before index date</p> <p>1 if present ≤ 6 months prior to index date; 0 otherwise</p>	<p>Combine:</p> <p>OpenCodelists: Severe Mental Illness</p>
History of serious mental illness	Binary	<p>Diagnoses of schizophrenia and other psychotic disorders, and bipolar disorders. (Sensitivity includes prescription of an antipsychotic or mood stabiliser).</p> <p>As above for SMI but occurring on or before index date.</p> <p>1 if present > 6 months prior to index date; 0 otherwise</p>	<p>Bipolar and other mood related disorders ICD-10</p> <p>Other psychotic disorders ICD-10</p> <p>Schizophrenia ICD-10</p>
Recent report of self harm	Binary	<p>1 if present ≤ 6 months prior to index date; 0 otherwise</p>	<p>Combine:</p> <p>OpenCodelists: Intentional self-harm (aged ≥ 10 years)</p> <p>OpenCodelists: Probable self-harm - Events of undetermined intent (aged ≥ 15 years)</p>
History of self-harm	Binary	<p>1 if present > 6 months prior to index date; 0 otherwise</p>	<p>Self harm 10 years ICD10</p> <p>Self harm 15 years ICD 10</p>

SUBGROUP ANALYSES

Subgroups according to prior history of outcome subcategory:

- (recent history (≤ 6 months prior to index date) of outcome subcategory / no recent history (≤ 6 months prior to index date) of outcome subcategory)
- (history (> 6 months prior to index date) of outcome subcategory / no history (> 6 months prior to index date) of outcome subcategory [excluding those with a recent history (≤ 6 months prior to index date) of outcome subcategory])