

# Renal outcomes

## VERSION HISTORY

V1	19/04/23	Template by VW
V2	Aug 2023	SW, VW, EE
V3	Feb 2023	EE
V4	April 2025	EE

## MAIN PROTOCOL

This document contains the outcome specific elements necessary to implement the protocol post\_covid\_events\_ehrql, found in this folder.

## STUDY POPULATION

All individuals must satisfy the following criteria:

- Alive at index
- Aged between 18 and 110 years inclusive at index
- Registered with a TPP GP practice for the six months prior to index
- Known sex at index
- Known deprivation at index
- Known region at index
- No evidence of end stage renal disease at index, defined as:
  - No history of kidney transplant
  - No history of dialysis
  - No history of coded end stage renal disease
  - No eGFR measurements less than 15

The study population will then be split into two cohorts according to the following specific criteria:

Cohort	Cohort specific criteria
No history of chronic kidney disease	No history of chronic kidney disease
History of chronic kidney disease	Diagnosed with chronic kidney disease (CKD) prior to index, defined as a code indicating CKD (any stage) or eGFR<60.

## OUTCOMES

Outcomes will be defined as the first event post-exposure recorded in primary care, secondary care or death registry data. We will use the following codelists for each outcome:

	Population(s)	Outcome	Primary Care (SNOMED CT)	Secondary Care and Deaths (ICD10)
1	No history of CKD	Chronic kidney disease (CKD) stages 3-5	CKD 3-4 – <a href="#">SNOMED</a> CKD 5/ESRD - <a href="#">SNOMED</a> Dialysis – <a href="#">SNOMED</a> Transplant - <a href="#">SNOMED</a>	CKD 3-4 - <a href="#">ICD-10</a> CKD 5/ESRD - <a href="#">ICD-10</a> Dialysis – <a href="#">ICD-10</a> , <a href="#">OPCS-4</a> Transplant – <a href="#">ICD-10</a> , <a href="#">OPCS-4</a>
2	a) No history of CKD b) History of CKD	Acute kidney injury (AKI)	AKI - <a href="#">SNOMED</a>	AKI: <a href="#">ICD-10</a>

3	History of CKD	End stage renal disease (CKD stage 5)	Dialysis – <a href="#">SNOMED</a> Transplant - <a href="#">SNOMED</a> CKD 5/ESRD - <a href="#">SNOMED</a>	CKD 5/ESRD - <a href="#">ICD-10</a> Dialysis – <a href="#">ICD-10</a> Transplant – ICD-10
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## POTENTIAL CONFOUNDERS

The following general covariates will be included in all analyses:

Covariate	Type	Definition	Data sources	Include for outcomes
Age	Continuous	Modelled as age in years using a restricted cubic spline with 3 knots at the 10th, 50th and 90th percentiles	Primary care	All
Sex	Categorical	Male, Female	Primary care	All
Ethnicity	Categorical	1: White 2: Mixed 3: South Asian 4: Black 5: Other	Primary care	All
Deprivation	Categorical	10 categories from Index of Multiple Deprivation 2019	Index of Multiple Deprivation	All
Region	Categorical	East of England London Midlands North East and Yorkshire North West South East South West Scotland Wales	Primary care	All
Smoking status	Categorical	E: Ever smoker M: Missing N: Never smoker S: Current smoker	Primary care	All
Care home status	Binary	1 if care home resident; 0 otherwise	<a href="#">Address matching CQC database</a>	All
Consultation rate	Continuous	Number of GP consultations 12 months prior to the start of the study	Primary care	All
Health care worker	Binary	1 if healthcare worker; 0 otherwise	<a href="#">NHS England COVID-19 data store</a>	All
Dementia	Binary	1 if diagnosis present; 0 otherwise.	Combine: <a href="#">Dementia SNOMED</a> <a href="#">Dementia ICD10</a> <a href="#">Dementia Vascular SNOMED</a> <a href="#">Dementia Vascular ICD10</a>	All
Liver disease	Binary	1 if diagnosis present; 0 otherwise.	Combine: <a href="#">Liver Disease ICD10</a>	All

			<a href="#">Liver Disease SNOMED</a>	
Cancer	Categorical	1 if diagnosis present; 0 otherwise.	Combine: <a href="#">Cancer SNOMED</a> <a href="#">Cancer ICD10</a>	All
Hypertension	Binary	1 if diagnosis present; 0 otherwise.	Combine: <a href="#">Hypertension ICD10</a> <a href="#">Hypertension SNOMED</a>	All
Diabetes	Binary	1 if diagnosis present; 0 otherwise.	Combine: <a href="#">Diabetes T1 SNOMED</a> <a href="#">Opensafely: Diabetes T1 ICD10</a> <a href="#">Diabetes T2 SNOMED</a> <a href="#">Diabetes T2 ICD10</a> <a href="#">Non-diagnostic diabetes SNOMED</a> <a href="#">Other-Nonspecific diabetes SNOMED</a> <a href="#">Gestational Diabetes SNOMED</a> <a href="#">Opensafely: Insulin SNOMED</a> <a href="#">Opensafely: Antidiabetic drugs SNOMED</a> <a href="#">Opensafely: Non-metformin-antidiabetic drugs SNOMED</a>	All
Obesity	Binary	1 if BMI $\geq$ 30 or coded diagnosis for obesity; 0 otherwise.	Combine: <a href="#">Obesity SNOMED</a> <a href="#">Obesity ICD10</a>	All
Chronic obstructive pulmonary disease (COPD)	Binary	1 if diagnosis present; 0 otherwise.	Combine: <a href="#">COPD SNOMED</a> <a href="#">COPD ICD10</a>	All
Acute myocardial infarction	Binary	1 if diagnosis present; 0 otherwise.	Combine: <a href="#">AMI SNOMED</a> <a href="#">AMI ICD10</a> <a href="#">AMI Prior ICD10</a>	All
Ischaemic stroke	Binary	1 if diagnosis present; 0 otherwise.	Combine: <a href="#">Ischaemic Stroke SNOMED</a> <a href="#">Ischaemic Stroke ICD10</a>	All

The following renal related covariates will be included for particular renal outcomes:

Covariate	Type	Definition	Data sources	Include for outcomes
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History of AKI	Binary	1 if diagnosis present; 0 otherwise.		1. CKD in whole population 2. AKI in whole population 3. AKI in CKD sub-population
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