

## CVD-COVID-UK/COVID-IMPACT Research Outputs

The papers and preprints listed below have been produced on behalf of the [CVD-COVID-UK/COVID-IMPACT Consortium](#), supported by the [BHF Data Science Centre](#).

In line with the consortium's principles - based on a collaborative, transparent and inclusive ethos - all related analysis plans, protocols, code, phenotype code lists and reports are made publicly available via the centre's [collection on the HDR UK Gateway](#), repositories in the centre's [GitHub organisation](#) and through open-access publications (via the links below).

### Published papers/reports and preprints

#### April 2025

**Title:** Replicating a COVID-19 study in a national England database to assess the generalisability of research with regional electronic health record data. *BMJ Open*  
**Project:** CCU040\_03: Replicating a regional COVID-19 study in the national UK COVID-IMPACT database  
**DOI:** <https://doi.org/10.1136/bmjopen-2024-093080>  
**GitHub:** [https://github.com/BHFDSC/CCU040\\_01](https://github.com/BHFDSC/CCU040_01)

**Title:** Incidence and prevalence of asthma, chronic obstructive pulmonary disease and interstitial lung disease between 2004 and 2023: harmonised analyses of longitudinal cohorts across England, Wales, South-East Scotland and Northern Ireland. *Thorax*  
**Project:** CCU052\_01: How does the incidence and prevalence of asthma, ILD, and COPD change from 2019 to the end of 2022?  
**DOI:** <https://doi.org/10.1136/thorax-2024-222699>  
**GitHub:** [https://github.com/BHFDSC/CCU052\\_01](https://github.com/BHFDSC/CCU052_01)

**Title:** Burden of cardiovascular diseases from 2020 to 2024: a national cohort in NHS England. *Preprints with The Lancet*  
**Project:** CCU072\_01: Influence of COVID-19 on British burden of cardiovascular disease  
**DOI:** <https://dx.doi.org/10.2139/ssrn.5203816>  
**GitHub:** [https://github.com/BHFDSC/CCU072\\_01](https://github.com/BHFDSC/CCU072_01)

#### March 2025

**Title:** Impact of COVID-19 pandemic on rates of congenital heart disease procedures among children: prospective cohort analyses of 26 270 procedures in 17 860 children using CVD-COVID-UK consortium record linkage data. *Open Heart*  
**Project:** CCU007\_01: What are the differences in types of congenital heart disease (CHD) procedures in children during periods of lockdown and relaxation of lockdown, compared to before the COVID-19 pandemic?  
**DOI:** <https://doi.org/10.1136/openhrt-2024-003054>  
**GitHub:** [https://github.com/BHFDSC/CCU007\\_01](https://github.com/BHFDSC/CCU007_01)

## February 2025

**Title:** **Peripandemic outcomes of infants treated for sentinel congenital heart diseases in England and Wales.** *Open Heart*

**Project:** CCU007\_03: What are the effects of delays to surgery for CHDs on child's health and wellbeing over the one to two years following the start of the pandemic?

**DOI:** <https://doi.org/10.1136/openhrt-2024-002964>

**GitHub:** [https://github.com/BHFDSC/CCU007\\_03](https://github.com/BHFDSC/CCU007_03)

**Title:** **Hospital readmission after heart valve surgery in the United Kingdom.** *JTCVS Open*

**Project:** CCU007\_11: Trend, early and midterm clinical outcomes of cardiac surgical interventions during covid era

**DOI:** <https://doi.org/10.1016/j.xjon.2025.02.001>

**GitHub:** [https://github.com/BHFDSC/CCU007\\_11](https://github.com/BHFDSC/CCU007_11)

## January 2025

**Title:** **Prevalence and demographics of 331 rare diseases and associated COVID-19-related mortality among 58 million individuals: a nationwide retrospective observational study.** *The Lancet Digital Health*

**Project:** CCU019\_01: Identification and personalised risk prediction for severe COVID-19 in patients with rare disorders impacting cardiovascular health

**DOI:** [https://doi.org/10.1016/S2589-7500\(24\)00253-X](https://doi.org/10.1016/S2589-7500(24)00253-X)

**GitHub:** [https://github.com/BHFDSC/CCU019\\_01](https://github.com/BHFDSC/CCU019_01)

## December 2024

**Title:** **Use of sodium valproate and other antiseizure drug treatments in England and Wales: quantitative analysis of nationwide linked electronic health records.** *BMJ Medicine*

**Project:** CCU014\_03: The impact of the COVID-19 pandemic on use of sodium valproate and implementation of recommendations of the Cumberlege report

**DOI:** <https://doi.org/10.1136/bmjmed-2023-000760>

**GitHub:** [https://github.com/BHFDSC/CCU014\\_03](https://github.com/BHFDSC/CCU014_03)

## November 2024

**Title:** **Healthcare utilisation of 282,080 individuals with long COVID over two years: a multiple matched control, longitudinal cohort analysis.** *Journal of the Royal Society of Medicine*

**Project:** CCU049\_01: Healthcare utilisation in individuals with Long Covid

**DOI:** <https://doi.org/10.1177/01410768241288345>

**GitHub:** [https://github.com/BHFDSC/CCU049\\_01](https://github.com/BHFDSC/CCU049_01)

## November 2024

**Title:** **Surgical and transcatheter aortic valve interventions for aortic stenosis in England: sociodemographic variations in treatment trends and outcome over 20 years.** *Heart*

**Project:** CCU056\_01: Socio-demographic make-up of patients undergoing surgical and transcatheter aortic valve intervention in England and the impact of COVID on this

**DOI:** <https://doi.org/10.1136/heartjnl-2024-324918>

**GitHub:** [https://github.com/BHFDSC/CCU056\\_01](https://github.com/BHFDSC/CCU056_01)

**Title:** **Routine measurement of cardiometabolic disease risk factors in primary care in England before, during, and after the COVID-19 pandemic: A population-based cohort study.** *PLOS Medicine*

**Project:** CCU008\_01: The impact of the COVID-19 pandemic on the measurement of routine cardiometabolic disease risk factors in primary care

**DOI:** <https://doi.org/10.1371/journal.pmed.1004485>

**GitHub:** [https://github.com/BHFDSC/CCU008\\_01](https://github.com/BHFDSC/CCU008_01)

**Title:** **Risks of major arterial and venous thrombotic diseases after hospitalisation for influenza, pneumonia, and COVID-19: A population-wide cohort in 2.6 million people in Wales.** *Thrombosis Research*

**Project:** CCU002\_04: Comparing the long-term risk of stroke/MI in patients after coronavirus infection with other respiratory infections

**DOI:** <https://doi.org/10.1016/j.thromres.2024.109213>

**GitHub:** [https://github.com/BHFDSC/CCU002\\_04](https://github.com/BHFDSC/CCU002_04)

**Title:** **Combinations of multiple long term conditions and risk of hospital admission or death during winter 2021-22 in England: population based cohort study.** *BMJ Medicine*

**Project:** CCU059\_01: Combinations of multimorbidity and risk of hospitalisation or death in England during the winter season: a population-based study of 48 million people

**DOI:** <https://doi.org/10.1136/bmjmed-2024-001016>

**GitHub:** [https://github.com/BHFDSC/CCU059\\_01](https://github.com/BHFDSC/CCU059_01)

## October 2024

**Title:** **Contemporary epidemiology of hospitalised heart failure with reduced versus preserved ejection fraction in England: a retrospective, cohort study of whole-population electronic health records.** *The Lancet Public Health*

**Project:** CCU045\_02: Contemporary trends and impact of multiple long-term conditions in patients with heart failure with reduced and preserved ejection fraction following the onset of the COVID-19 pandemic

**DOI:** [https://doi.org/10.1016/S2468-2667\(24\)00215-9](https://doi.org/10.1016/S2468-2667(24)00215-9)

**GitHub:** [https://github.com/BHFDSC/CCU045\\_02](https://github.com/BHFDSC/CCU045_02)

## October 2024

**Title:** Association between ethnicity and emergency department visits in the last three months of life in England: a retrospective population-based study using electronic health records. *BMJ Public Health*

**Project:** CCU024\_02: Intersectional inequality in emergency department (ED) visits, in-hours and out-of-hours, in the last 3 months of life for people who died in England in 2020

**DOI:** <https://doi.org/10.1136/bmjph-2024-001121>

**GitHub:** [https://github.com/BHFDSC/CCU024\\_02](https://github.com/BHFDSC/CCU024_02)

**Title:** Trends in pediatric hospital admissions caused or contributed by SARS-CoV-2 infection in England. *The Journal of Pediatrics*

**Project:** CCU029\_02: How do the characteristics of first ascertained SARS-CoV-2 related hospital admissions and the children admitted vary over time related to the pandemic waves of SARS-CoV-2?

**DOI:** <https://doi.org/10.1016/j.jpeds.2024.114370>

**GitHub:** [https://github.com/BHFDSC/CCU029\\_02](https://github.com/BHFDSC/CCU029_02)

**Title:** The impact of COVID-19 vaccination on patients with congenital heart disease in England: a case-control study. *Heart*

**Project:** CCU068\_01: The impact of vaccination on the excess clinical risks of COVID-19 in patients with congenital heart disease

**DOI:** <https://doi.org/10.1136/heartjnl-2024-324470>

**GitHub:** [https://github.com/BHFDSC/CCU068\\_01](https://github.com/BHFDSC/CCU068_01)

**Title:** The impact of the COVID-19 pandemic on cardiovascular risk factors and events in England: a population-based cohort study. *Preprints with The Lancet*

**Project:** CCU003\_05:

- 1) To describe the trends in incident diagnoses of hypertension and atrial fibrillation between November 2019 and March 2022 among the adult population of England, overall and in subgroups of interest
- 2) To estimate the incidence rates of acute myocardial infarction and acute stroke between November 2019 and March 2022 among the adult population of England, overall and in subgroups of interest

**DOI:** <https://dx.doi.org/10.2139/ssrn.4972808>

**GitHub:** [https://github.com/BHFDSC/CCU003\\_05](https://github.com/BHFDSC/CCU003_05)

## August 2024

**Title:** COVID-19 diagnosis, vaccination during pregnancy, and adverse pregnancy outcomes of 865,654 women in England and Wales: a population-based cohort study. *The Lancet Regional Health - Europe*

**Project:** CCU018\_01: Estimating the short- and longer-term risk of cardiovascular disease and intermediate traits in women infected with COVID during pregnancy

**DOI:** <https://doi.org/10.1016/j.lanepe.2024.101037>

**GitHub:** [https://github.com/BHFDSC/CCU018\\_01](https://github.com/BHFDSC/CCU018_01)

## August 2024

**Title:** COVID-19 vaccination and birth outcomes of 186,990 women vaccinated before pregnancy: an England-wide cohort study. *The Lancet Regional Health - Europe*

**Project:** CCU036\_01: Starting a course of COVID-19 vaccination before pregnancy and future pregnancy outcomes

**DOI:** <https://doi.org/10.1016/j.lanepe.2024.101025>

**GitHub:** [https://github.com/BHFDSC/CCU036\\_01](https://github.com/BHFDSC/CCU036_01)

**Title:** The challenges of replication: a worked example of methods reproducibility using electronic health record data. *medRxiv*

**Project:** CCU040\_02: The challenges of replication: a worked example of methods reproducibility using routinely collected healthcare data

**DOI:** <https://doi.org/10.1101/2024.08.06.24311535>

**GitHub:** [https://github.com/BHFDSC/CCU040\\_01](https://github.com/BHFDSC/CCU040_01)

## July 2024

**Title:** Cohort study of cardiovascular safety of different COVID-19 vaccination doses among 46 million adults in England. *Nature Communications*

**Project:** CCU002\_06: First, second and booster dose COVID-19 vaccination and the risks of arterial and venous vascular events

**DOI:** <https://doi.org/10.1038/s41467-024-49634-x>

**GitHub:** [https://github.com/BHFDSC/CCU002\\_06](https://github.com/BHFDSC/CCU002_06)

## June 2024

**Title:** Vaccinations, cardiovascular drugs, hospitalisation and mortality in COVID-19 and Long COVID. *International Journal of Infectious Diseases*

**Project:** CCU060\_01: Improving characterisation, prediction and intervention for COVID- and influenza-related morbidity and mortality

**DOI:** <https://doi.org/10.1016/j.ijid.2024.107155>

**GitHub:** [https://github.com/BHFDSC/CCU060\\_01](https://github.com/BHFDSC/CCU060_01)

**Title:** Risk of cardiovascular events following COVID-19 in people with and without pre-existing chronic respiratory disease. *International Journal of Epidemiology*

**Project:** CCU035\_01: SARS-CoV-2 infection and risk of major vascular events in people with chronic respiratory diseases

**DOI:** <https://doi.org/10.1093/ije/dyae068>

**GitHub:** [https://github.com/BHFDSC/CCU035\\_01](https://github.com/BHFDSC/CCU035_01)

## June 2024

<b>Title:</b>	<b>A nationwide, population-based study on specialized care for acute heart failure throughout the COVID-19 pandemic.</b> <i>European Journal of Heart Failure</i>
<b>Project:</b>	CCU045_01: The impact of COVID-19 on heart failure epidemiology, quality of care and outcomes across primary and secondary care
<b>DOI:</b>	<a href="https://doi.org/10.1002/ejhf.3306">https://doi.org/10.1002/ejhf.3306</a>
<b>GitHub:</b>	<a href="https://github.com/BHFDSC/CCU045_01">https://github.com/BHFDSC/CCU045_01</a>

## February 2024

<b>Title:</b>	<b>Ethnicity data resource in population-wide health records: completeness, coverage and granularity of diversity.</b> <i>Scientific Data</i>
<b>Project:</b>	CCU037_01: Implementing a novel approach to improve correctness, completeness, and granularity of ethnicity information using routinely collected data
<b>DOI:</b>	<a href="https://doi.org/10.1038/s41597-024-02958-1">https://doi.org/10.1038/s41597-024-02958-1</a>
<b>GitHub:</b>	<a href="https://github.com/BHFDSC/CCU037_01">https://github.com/BHFDSC/CCU037_01</a>

## January 2024

<b>Title:</b>	<b>Undervaccination and severe COVID-19 outcomes: meta-analysis of national cohort studies in England, Northern Ireland, Scotland, and Wales.</b> <i>The Lancet</i>
<b>Project:</b>	CCU051_01: Unvaccination and under-vaccination against SARS-CoV-2 in England
<b>DOI:</b>	<a href="https://doi.org/10.1016/S0140-6736(23)02467-4">https://doi.org/10.1016/S0140-6736(23)02467-4</a>
<b>GitHub:</b>	<a href="https://github.com/BHFDSC/CCU051_01">https://github.com/BHFDSC/CCU051_01</a>

## October 2023

<b>Title:</b>	<b>Understanding covid-19 outcomes among people with intellectual disabilities in England.</b> <i>BMC Public Health</i>
<b>Project:</b>	CCU030_01: Understanding covid-19 outcomes among people with intellectual disabilities in England
<b>DOI:</b>	<a href="https://doi.org/10.1186/s12889-023-16993-x">https://doi.org/10.1186/s12889-023-16993-x</a>
<b>GitHub:</b>	<a href="https://github.com/BHFDSC/CCU030_01">https://github.com/BHFDSC/CCU030_01</a>

## August 2023

<b>Title:</b>	<b>Sars-Cov-2 infection in people with Type 1 diabetes and hospital admission: an analysis of risk factors for England.</b> <i>Diabetes Therapy</i>
<b>Project:</b>	CCU040_01: Investigating why some people with diabetes have a greater risk of becoming seriously unwell or dying with COVID-19
<b>DOI:</b>	<a href="https://doi.org/10.1007/s13300-023-01456-8">https://doi.org/10.1007/s13300-023-01456-8</a>
<b>GitHub:</b>	<a href="https://github.com/BHFDSC/CCU040_01">https://github.com/BHFDSC/CCU040_01</a>

## August 2023

**Title:** Antipsychotic drug prescribing and mortality in people with dementia before and during the COVID-19 pandemic: a retrospective cohort study in Wales. *The Lancet Healthy Longevity*

**Project:** CCU016\_01: Cardiovascular and cerebrovascular diseases related to antipsychotic prescribing in patients with dementia during the COVID-19 pandemic

**DOI:** [https://doi.org/10.1016/S2666-7568\(23\)00105-8](https://doi.org/10.1016/S2666-7568(23)00105-8)

**GitHub:** [https://github.com/BHFDSC/CCU016\\_01](https://github.com/BHFDSC/CCU016_01)

## July 2023

**Title:** Hospital admissions linked to SARS-CoV-2 infection in children and adolescents: cohort study of 3.2 million first ascertained infections in England. *BMJ*

**Project:** CCU029\_01: Hospital admissions linked to SARS-CoV-2 infection in children and adolescents: cohort study of 3.2 million first ascertained infections in England

**DOI:** <https://doi.org/10.1136/bmj-2022-073639>

**GitHub:** [https://github.com/BHFDSC/CCU029\\_01](https://github.com/BHFDSC/CCU029_01)

## January 2023

**Title:** The impact of the COVID-19 pandemic on cardiovascular disease prevention and management. *Nature Medicine*

**Project:** CCU014\_01: Assessing cardiovascular disease impact through medicines

**DOI:** <https://doi.org/10.1038/s41591-022-02158-7>

**GitHub:** [https://github.com/BHFDSC/CCU014\\_01](https://github.com/BHFDSC/CCU014_01)

**Title:** Harmonising electronic health records for reproducible research: challenges, solutions and recommendations from a UK-wide COVID-19 research collaboration. *BMC Medical Informatics and Decision Making*

**Project:** CCU005\_03: Harmonising electronic health records for reproducible research: challenges, solutions and recommendations from a UK-wide COVID-19 research collaboration

**DOI:** <https://doi.org/10.1186/s12911-022-02093-0>

**GitHub:** [https://github.com/BHFDSC/CCU005\\_03](https://github.com/BHFDSC/CCU005_03)

## November 2022

**Title:** Better End of Life 2022. Mind the gaps: understanding and improving out-of-hours care for people with advanced illness and their informal carers. Research report. *Marie Curie*

**Project:** CCU024\_01: Mind the gaps: understanding and improving out-of-hours care for people with advanced illness and their informal carers.

**URL:** <https://www.mariecurie.org.uk/globalassets/media/documents/policy/beol-reports-2022/better-end-of-life-report-2022.pdf>

**GitHub:** [https://github.com/BHFDSC/CCU024\\_01](https://github.com/BHFDSC/CCU024_01)



## November 2022

**Title:** **Effects of the COVID-19 pandemic on secondary care for cardiovascular disease in the UK: an electronic health record analysis across three countries.** *European Heart Journal - Quality of Care and Clinical Outcomes*

**Project:** CCU003\_04: Quantifying the impact of the COVID-19 pandemic on the provision of cardiovascular disease-related hospital healthcare in the UK

**DOI:** <https://doi.org/10.1093/ehjgcco/qcac077>

**GitHub:** [https://github.com/BHFDSC/CCU003\\_04](https://github.com/BHFDSC/CCU003_04)

**Title:** **Using national electronic health records for pandemic preparedness: validation of a parsimonious model for predicting excess deaths among those with COVID-19 – a data-driven retrospective cohort study.** *Journal of the Royal Society of Medicine*

**Project:** CCU003\_03: Using national electronic health records for pandemic preparedness: validation of a parsimonious model for predicting excess deaths among those with COVID-19.

**DOI:** <https://doi.org/10.1177/01410768221131897>

**GitHub:** [https://github.com/BHFDSC/CCU003\\_03](https://github.com/BHFDSC/CCU003_03)

## September 2022

**Title:** **Association of COVID-19 with major arterial and venous thrombotic diseases: a population-wide cohort study of 48 million adults in England and Wales.** *Circulation*

**Project:** CCU002\_01: SARS-CoV-2 infection and risk of venous thromboembolism and arterial thrombotic events

**DOI:** <https://doi.org/10.1161/CIRCULATIONAHA.122.060785>

**GitHub:** [https://github.com/BHFDSC/CCU002\\_01](https://github.com/BHFDSC/CCU002_01)

## June 2022

**Title:** **A retrospective cohort study measured predicting and validating the impact of the COVID-19 pandemic in individuals with chronic kidney disease.** *Kidney International*

**Project:** CCU003\_01: Predicting and validating risk of pre-pandemic and excess mortality during the COVID-19 pandemic in individuals with chronic kidney disease

**DOI:** <https://doi.org/10.1016/j.kint.2022.05.015>

**GitHub:** [https://github.com/BHFDSC/CCU003\\_01](https://github.com/BHFDSC/CCU003_01)

**Title:** **COVID-19 trajectories among 57 million adults in England: a cohort study using electronic health records.** *The Lancet Digital Health*

**Project:** CCU013\_01: Characterising COVID-19 related events in a nationwide electronic health record cohort of 57 million people in England

**DOI:** [https://doi.org/10.1016/S2589-7500\(22\)00091-7](https://doi.org/10.1016/S2589-7500(22)00091-7)

**GitHub:** [https://github.com/BHFDSC/CCU013\\_01\\_ENG-COVID-19\\_event\\_phenotyping](https://github.com/BHFDSC/CCU013_01_ENG-COVID-19_event_phenotyping)



## March 2022

**Title:** Evaluation of antithrombotic use and COVID-19 outcomes in a nationwide atrial fibrillation cohort. *Heart*

**Project:** CCU020: Evaluation of antithrombotic use and COVID-19 outcomes

**DOI:** <http://dx.doi.org/10.1136/heartjnl-2021-320325>

**GitHub:** <https://github.com/BHFDSC/CCU020>

**Title:** Risk of myocarditis and pericarditis following BNT162b2 and ChAdOx1 COVID-19 vaccinations. *medRxiv*

**Project:** CCU002\_03: COVID-19 vaccination and disease and the risks of myocarditis and pericarditis

**DOI:** <https://doi.org/10.1101/2022.03.06.21267462>

**GitHub:** [https://github.com/BHFDSC/CCU002\\_03](https://github.com/BHFDSC/CCU002_03)

## February 2022

**Title:** Association of COVID-19 vaccines ChAdOx1 and BNT162b2 with major venous, arterial, or thrombocytopenic events: A population-based cohort study of 46 million adults in England. *PLOS Medicine*

**Project:** CCU002\_02: COVID-19 vaccination and disease and the risks of major venous and arterial vascular events

**DOI:** <https://doi.org/10.1371/journal.pmed.1003926>

**GitHub:** [https://github.com/BHFDSC/CCU002\\_02](https://github.com/BHFDSC/CCU002_02)

## December 2021

**Title:** A nationwide deep learning pipeline to predict stroke and COVID-19 death in atrial fibrillation. *medRxiv*

**Project:** CCU004\_02: Prediction of stroke and COVID-19 death using deep learning and sequential medical histories in a nationwide atrial fibrillation cohort

**DOI:** <https://doi.org/10.1101/2021.12.20.21268113>

**GitHub:** [https://github.com/BHFDSC/CCU004\\_02](https://github.com/BHFDSC/CCU004_02)

## April 2021

**Title:** Linked electronic health records for research on a nationwide cohort of more than 54 million people in England: data resource. *BMJ*

**Project:** CCU005: Data management and analysis methods

**DOI:** <https://doi.org/10.1136/bmj.n826>

**GitHub:** <https://github.com/BHFDSC/Linked-EHR-England-2021>