Long-term follow up of adults hospitalised with COVID-19

Submission date	Recruitment status	
16/07/2020	No longer recruiting	
Registration date 22/07/2020	Overall study status Ongoing	
Last Edited	Condition category	
27/01/2025	Infections and Infestations	

[X] Prospectively registered

[] Protocol

[] Statistical analysis plan

[X] Results

[] Individual participant data

Plain English summary of protocol

Background and study aims

COVID-19 is a condition caused by the coronavirus (called SARS-CoV-2) that was first identified in late 2019. This virus can infect the respiratory (breathing) system. Some people do not have symptoms but can carry the virus and pass it on to others. People who have developed the condition may develop a fever and/or a continuous cough among other symptoms. This can develop into pneumonia. Pneumonia is a chest infection where the small air pockets of the lungs, called alveoli, fill with liquid and make it more difficult to breathe.

In 2020, the virus has spread to many countries around the world and neither a vaccine against the virus or specific treatment for COVID-19 has yet been developed. As of April 2020, it is advised that people minimize travel and social contact, and regularly wash their hands to reduce the spread of the virus.

Groups who are at a higher risk from infection with the virus, and therefore of developing COVID-19, include people aged over 70 years, people who have long-term health conditions (such as asthma or diabetes), people who have a weakened immune system and people who are pregnant. People in these groups, and people who might come into contact with them, can reduce this risk by following the up-to-date advice to reduce the spread of the virus. The COVID-19 pandemic has tragically led to severe acute illness, hospitalisation and death. Beyond the health of those affected, it has had widespread economic, psychological and societal effects. The clinical spectrum is broad, ranging from those with no or minimal symptoms to severe pneumonia in 15-20% with evidence of widespread disease beyond the lung. As we emerge from the first wave of the pandemic we have new insights into the acute phase of this disease but very little information concerning the long-term effects of COVID-19 and the ongoing medical, psychological and rehabilitation needs of these patients. This will be a national UK research study, embedded within clinical care, that aims to understand and improve longterm outcomes for survivors following hospitalisation with COVID-19. This study includes expert groups across the UK and will use standardised assessments of patients, including advanced imaging, recording of information and collection of samples. This study will provide researchers with a comprehensive understanding of the impact on the health of those that have been hospitalised with COVID-19. This will enable trials of new strategies of clinical care including personalised treatments to improve the long-term outcome of current and future COVID-19 survivors.

Who can participate?

Patients aged over 18 who were admitted to a UK hospital and discharged following suspected COVID-19

What does the study involve?

The researchers will collect data from any clinic visits and from routine health records of all participants. This will include signs and symptoms, medication, physical test results, questionnaire answers, laboratory test results and imaging. In a subset of participants, the researchers will undertake additional research tests and obtain samples (for example, blood) for research experiments. Some participants may be asked to take part in additional studies.

What are the possible benefits and risks of participating?

There is no direct benefit to participants as this study will not directly change the clinical care that they receive. The information that is collected may help clinicians to better care for other patients in the future. If there are any test results that require follow-up, the participants' doctor will be informed. The researchers will not share the results from unvalidated research tests using the samples (for example, genetic data). Some participants may be asked to provide additional samples in addition to those needed for their clinical care. Whenever possible these samples will be taken at the same time as regular samples to reduce the extra procedures and participants will be advised on the maximum amount of sample that we will take when they agree to take part (and they will be free to decline any extra tests or samples). There is a risk of pain or discomfort when samples are taken, and these are detailed in the participant information sheet.

Where is the study run from?

The study is led by the University of Leicester and participants will be recruited at multiple hospital sites from across the UK (including Scotland, Wales and Northern Ireland)

When is the study starting and how long is it expected to run for? April 2020 to December 2046

Who is funding the study?

This study is supported by a grant to the University of Leicester from the MRC-UK Research and Innovation, and National Institute for Health Research (NIHR) rapid response panel to tackle COVID-19 and by core funding provided byNIHR Leicester Biomedical Research Centre - a partnership between the University of Leicester and University Hospitals of Leicester NHS Trust.

Who is the main contact? Prof. Chris Brightling phosp@leicester.ac.uk

Study website https://www.phosp.org/

Contact information

Type(s) Scientific

Contact name Prof Christopher Brightling

ORCID ID

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Contact details

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Type(s)

Scientific

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Contact details

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Scientific

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Type(s)

Public

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Additional identifiers

EudraCT/CTIS number

IRAS number 285439

ClinicalTrials.gov number

Secondary identifying numbers CPMS 46443, IRAS 285439

Study information

Scientific Title

Post-hospitalisation COVID-19 study: a national consortium to understand and improve long-term health outcomes (PHOSP-COVID)

Acronym

PHOSP-COVID

Study objectives

The aims of this study are to:

1. Determine the short to long-term chronic health (and health economic) sequelae of COVID-19 infection in post-hospitalisation survivors; to define demographic, clinical and molecular biomarkers of the susceptibility, development, progression and resolution of these health

sequelae

2. Understand the impact of interventions during the acute illness on these long-term sequelae 3. Build the foundation for multiple in-depth studies e.g. lung fibrosis, pulmonary and systemic vasculature, cardiometabolic, renal, sarcopenia, rehabilitation, mental health and neurological disease.

The findings will inform precision medicine in at-risk groups by directing new clinical trials and care for current and future post-COVID-19 patients.

Ethics approval required

Old ethics approval format

Ethics approval(s)

Approved 14/07/2020, Yorkshire & The Humber -Leeds West Research Ethics Committee (NHSBT Newcastle Blood Donor Centre, Holland Drive, Newcastle upon Tyne, NE2 4NQ, UK; +44 (0)207 972 2504, +44 (0)207 104 8088, +44 (0)207 104 8018; leedswest.rec@hra.nhs.uk), REC ref: 20/YH /0225

Study design

Prospective observational longitudinal study

Primary study design Observational

Secondary study design Longitudinal study

Study setting(s) Hospital

Study type(s) Other

Participant information sheet

Not available in web format, please use the contact details to request a participant information sheet

Health condition(s) or problem(s) studied

Adult survivors of a hospital admission with COVID-19 (SARS-CoV-2 infection)

Interventions

PHOSP-COVID is an observational longitudinal follow-up study of adults post-hospitalisation with COVID-19. The researchers propose to analyse routine clinical data with linkage to retrospective and prospective health and social care records (Tier 1), enhanced clinical data and research-specific biosampling (Tier 2) and re-call of participants by genotype and phenotype for more detailed studies (Tier 3).

All participants will be followed up for at least 12 months after discharge from hospital. The researchers will ask participants for their agreement to continue to extract data from their electronic records, and to be contacted about future research, for at least 25 years after recruitment to the study.

Intervention Type

Other

Primary outcome measure

Current primary outcome measure as of 18/11/2021:

1. Incidence of long-term sequelae of COVID-19 measured using multiple methods including: 1.1. Symptoms and quality of life measured using one or more of the following questionnaires: EQ-5D, Dyspnoea-12, Fatigue (FACIT), Brief Pain Inventory (BPI), MRC dyspnoea score, Montreal Cognitive Assessment (MoCA), Clinical Frailty Scale

1.2. Mental health: symptoms of anxiety assessed using Generalised Anxiety Disorder Assessment (GAD-7), depression assessed using Patient Health Questionnaire (PHQ-9), posttraumatic stress disorder (PTSD) checklist (PCL-5)

1.3. Physical function measured using one or more the following tests: Short Physical Performance Battery (SPPB), Incremental Shuttle Walk Test (ISWT), muscle strength tests (handgrip strength), physical activity monitoring

1.4. Biological samples taken e.g blood, urine, sputum, saliva, breath

1.5. Any imaging as part of clinical care

Measured at 6 weeks - 7.5 months and 12 months post-hospital discharge (and at regular timepoints thereafter for up to 25 years)

Please note that not all participants will be asked to complete or perform all of the above questionnaires and tests. Data from routine clinical investigations and tests will be recorded. 2. Healthcare utilisation measured using questionnaires and linkage to health and social care records at 6 weeks, 3 months, 6 months and 12 months post-hospital discharge (and at regular timepoints thereafter for up to 25 years)

3. Mortality measured using ONS data at 6 weeks, 3 months, 6 months and 12 months posthospital discharge (and at regular timepoints thereafter for up to 25 years)

Previous primary outcome measure:

1. Incidence of long-term sequelae of COVID-19 measured using multiple methods including: 1.1. Symptoms and quality of life measured using one or more of the following questionnaires: EQ-5D, Sarcopenia screen (SARC-F), General Practice Physical Activity Questionnaire (GPPAQ), Dyspnoea-12, Fatigue (FACIT), Brief Pain Inventory (BPI), Nottingham extended activity of daily living (NEADL), MRC dyspnoea score, Montreal Cognitive Assessment (MoCA), Clinical Frailty Scale, Fried Frailty assessment

1.2. Mental health: symptoms of anxiety assessed using Generalised Anxiety Disorder Assessment (GAD-7), depression assessed using Patient Health Questionnaire (PHQ-9), posttraumatic stress disorder (PTSD) checklist (PCL-5)

1.3. Physical function measured using one or more the following tests: Short Physical Performance Battery (SPPB), Incremental Shuttle Walk Test (ISWT), muscle strength tests (handgrip and quadriceps strength), physical activity monitoring, cardiometabolic risk assessment and body composition measurements

1.4. Biological samples taken e.g blood, urine, sputum, saliva, breath

1.5. Any imaging as part of clinical care

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3. Mortality measured using ONS data at 6 weeks, 3 months, 6 months and 12 months posthospital discharge (and at regular timepoints thereafter for up to 25 years)

Secondary outcome measures

Current secondary outcome measures as of 18/11/2021:

Characterisation of specific long-term morbidities and impacts of COVID-19 hospitalisation measured using multiple methods including:

1. Symptoms and quality of life measured using one or more of the following questionnaires: EQ-5D, Sarcopenia screen (SARC-F), General Practice Physical Activity Questionnaire (GPPAQ), Dyspnoea-12, Fatigue (FACIT), Brief Pain Inventory (BPI), Nottingham extended activity of daily living (NEADL), MRC dyspnoea score, Montreal Cognitive Assessment (MoCA), Clinical Frailty Scale, Fried Frailty assessment

2. Mental health: symptoms of anxiety assessed using Generalised Anxiety Disorder Assessment (GAD-7), depression assessed using Patient Health Questionnaire (PHQ-9), post-traumatic stress disorder (PTSD) checklist (PCL-5)

3. Physical function measured using one or more the following tests: Short Physical Performance Battery (SPPB), Incremental Shuttle Walk Test (ISWT), muscle strength tests (handgrip and quadriceps strength), physical activity monitoring, cardiometabolic risk assessment and body composition measurements

4. Biological samples taken e.g blood, urine, sputum, saliva, breath

5. Any imaging as part of clinical care

6. Healthcare utilisation assessed from linkage to health and social care records Measured at 6 weeks - 7.5 months and 12 months post-hospital discharge (and at regular timepoints thereafter for up to 25 years)

Please note that not all participants will be asked to complete or perform all of the above questionnaires and tests. Data from routine clinical investigations and tests will be recorded.

Previous secondary outcome measures:

Characterisation of specific long-term morbidities and impacts of COVID-19 hospitalisation measured using multiple methods including:

^{1.} Symptoms and quality of life measured using one or more of the following questionnaires: EQ-5D, Sarcopenia screen (SARC-F), General Practice Physical Activity Questionnaire (GPPAQ), Dyspnoea-12, Fatigue (FACIT), Brief Pain Inventory (BPI), Nottingham extended activity of daily living (NEADL), MRC dyspnoea score, Montreal Cognitive Assessment (MoCA), Clinical Frailty Scale, Fried Frailty assessment

^{2.} Mental health: symptoms of anxiety assessed using Generalised Anxiety Disorder Assessment (GAD-7), depression assessed using Patient Health Questionnaire (PHQ-9), post-traumatic stress disorder (PTSD) checklist (PCL-5)

^{3.} Physical function measured using one or more the following tests: Short Physical Performance Battery (SPPB), Incremental Shuttle Walk Test (ISWT), muscle strength tests (handgrip and quadriceps strength), physical activity monitoring, cardiometabolic risk assessment and body composition measurements

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^{5.} Any imaging as part of clinical care

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Please note that not all participants will be asked to complete or perform all of the above questionnaires and tests. Data from routine clinical investigations and tests will be recorded.

Overall study start date

15/04/2020

Completion date

31/12/2046

Eligibility

Key inclusion criteria

1. Participant admitted to an acute admissions unit or ward at a UK hospital and discharged with suspected COVID-19

2. Age 18 years and over

3. Participant is willing and able to give informed consent for participation in the study

4. Aged 18 years or above

Participant type(s)

Patient

Age group Adult

Lower age limit 18 Years

Sex Both

Target number of participants 10000

Key exclusion criteria

1. Confirmed diagnosis of a pathogen unrelated to the objectives of this study and no indication or likelihood of co-infection with a relevant pathogen

2. Attendance at an A&E or emergency department only

3. Refusal by participant, parent or appropriate representative

4. Other life-limiting illness with life expectancy <6 months such as disseminated malignancy

Date of first enrolment

25/07/2020

Date of final enrolment

01/03/2022

Locations

Countries of recruitment England

Northern Ireland

Scotland

United Kingdom

Wales

Study participating centre Queen Elizabeth Hospital

Heritage Building University Hospitals of Birmingham NHS Trust Mindelsohn Way Edgbaston Birmingham United Kingdom B15 2TH

Study participating centre

Hull Royal Infirmary

Hull University Teaching Hospitals NHS Trust Anlaby Rd Hull United Kingdom HU3 2JZ

Study participating centre

Bradford Royal Infirmary

Bradford Teaching Hospitals NHS Foundation Trust Duckworth Ln Bradford United Kingdom BD9 6RJ

Study participating centre Southmead Hospital North Bristol NHS Trust Southmead Rd

Bristol United Kingdom BS10 5NB

Study participating centre

Fulbourn Hospital Cambridgeshire and Peterborough NHS Foundation Trust Elizabeth House Cambridge United Kingdom CB21 5EF

Study participating centre Royal Papworth Hospital

Royal Papworth Hospital NHS Foundation Trust Papworth Rd Trumpington Cambridge United Kingdom CB2 0AY

Study participating centre Leeds General Infirmary

The Leeds Teaching Hospitals NHS Trust Great George St Leeds United Kingdom LS1 3EX

Study participating centre Glenfield Hospital

University Hospitals of Leicester NHS Trust Groby Road Leicester United Kingdom LE3 9QP

Study participating centre Royal Liverpool Hospital Liverpool University Hospitals NHS Foundation Trust Prescot St

Liverpool United Kingdom L7 8XP

Study participating centre

St Mary's Hospital Imperial College Healthcare NHS Trust The Bays South Wharf Road London United Kingdom W2 1NY

Study participating centre Chelsea & Westminster Hospital Chelsea & Westminster Hospital NHS Trust 369 Fulham Rd Chelsea London United Kingdom SW10 9NH

Study participating centre

Northwick Park Hospital

London North West University Healthcare NHS Trust Central Middlesex Ealing Hospital London United Kingdom HA1 3UJ

Study participating centre

Mount Vernon Hospital The Hillingdon Hospitals NHS Foundation Trust Rickmansworth Road Northwood London United Kingdom HA6 2RN

Study participating centre

Royal Brompton & Harefield Trust

Royal Brompton Hospital 1 Manresa Rd Chelsea London United Kingdom SW3 6LR

Study participating centre

St Thomas' Hospital Guy's and St Thomas' NHS Foundation Trust Westminster Bridge Rd London United Kingdom SE1 7EH

Study participating centre

King's College Hospital

King's College Hospital NHS Foundation Trust Denmark Hill Brixton London United Kingdom SE5 9RS

Study participating centre

The Royal Hospital Barts Health NHS Trust Whitechapel Rd London United Kingdom E1 1BB

Study participating centre

University College London Hospital

University College London Hospitals NHS Foundation Trust 235 Euston Road Bloomsbury London United Kingdom NW1 2BU

Study participating centre

The Whittington Hospital

Whittington Health NHS Trust Magdala Ave London United Kingdom N19 5NF

Study participating centre Royal Free Hospital

Royal Free London NHS Foundation Trust 17 Lyndhurst Gardens Hampstead London United Kingdom NW3 5NU

Study participating centre

North Middlesex University Hospital North Middlesex University Hospital NHS Trust Sterling Way London United Kingdom N18 1QX

Study participating centre

St George's Hospital St George's University Hospitals NHS Foundation Trust Blackshaw Road Tooting London United Kingdom SW17 0QT

Study participating centre

Manchester Royal Infirmary Manchester University NHS Foundation Trust Cobbett House Oxford Road Manchester United Kingdom M13 9WL

Study participating centre Salford Royal Hospital

Salford Royal NHS Foundation Trust Stott Ln Salford United Kingdom M6 8HD

Study participating centre

Freeman Hospital Newcastle Upon Tyne Hospitals NHS Foundation Trust Freeman Road High Heaton Newcastle-upon-Tyne United Kingdom NE7 7DN

Study participating centre

Belfast City Hospital Belfast Health and Social Care Trust A Floor Lisburn Road Belfast United Kingdom BT9 7AB

Study participating centre

Nottingham City Hospital Nottingham University Hospitals NHS Trust Hucknall Road Nottingham United Kingdom NG5 1PB

Study participating centre

John Radcliffe Hospital Oxford University Hospitals NHS Foundation Trust Headley Way Headington Oxford United Kingdom OX3 9DU

Study participating centre NHS Grampian Summerfield House 2 Eday Road Aberdeen United Kingdom AB15 6RE

Study participating centre NHS Dumfries and Galloway 21-22 High St Moffat United Kingdom DG10 9HL

Study participating centre NHS Tayside 230 Clepington Rd Dundee United Kingdom DD2 1GZ

Study participating centre NHS Fife Hayfield House Hayfield Rd Kirkcaldy United Kingdom KY2 5AH

Study participating centre NHS Forth Valley Stirling Rd Larbert United Kingdom FK5 4WR Study participating centre NHS Highland Inverness Retail and Business Park John Dewar Building Highlander Way Inverness United Kingdom IV2 7GE

Study participating centre NHS Greater Glasgow and Clyde 1055 Great Western Road Glasgow United Kingdom G12 0XH

Study participating centre NHS Lothian Search Results Morningside Pl Edinburgh United Kingdom EH10 5HF

Study participating centre Royal Hallamshire Hospital Sheffield Teaching Hospitals NHS Foundation Trust Glossop Rd Broomhall Sheffield United Kingdom S10 2JF

Study participating centre Southampton General Hospital, University Hospital Southampton NHS Foundation Trust Tremona Rd Southampton United Kingdom SO16 6YD

Study participating centre Hywel Dda University Health Board Ystwyth Building St Davids Park Jobswell Road Carmarthen United Kingdom SA31 3BB

Study participating centre Swansea Bay University Health Board 1 Talbot Gateway Baglan Energy Park Baglan Port Talbot United Kingdom SA12 7BR

Study participating centre Cardiff & Vale University Health Board Heath Park Cardiff United Kingdom CF14 4XW

Study participating centre Aneurin Bevan University Health Board Ringland Circle Newport United Kingdom NP19 9PS

Study participating centre

Betsi Cadwaladr University Health Board Glan Clwyd Hospital Sarn Ln Bodelwyddan Rhyl United Kingdom LL18 5UJ **Study participating centre Lanarkshire Primary Care NHS Trust** East Kilbride Glasgow United Kingdom G75 8NH

Sponsor information

Organisation University of Leicester

Sponsor details University Road Leicester England United Kingdom LE1 7RH +44 (0)116 252 2522 rgosponsor@leicester.ac.uk

Sponsor type University/education

Website https://le.ac.uk/about

ROR https://ror.org/04h699437

Funder(s)

Funder type Government

Funder Name UK Research and Innovation

Alternative Name(s) UKRI

Funding Body Type Government organisation

Funding Body Subtype

National government

Location United Kingdom

Funder Name Medical Research Council

Alternative Name(s) Medical Research Council (United Kingdom), UK Medical Research Council, MRC

Funding Body Type Government organisation

Funding Body Subtype National government

Location United Kingdom

Funder Name National Institute for Health Research

Alternative Name(s)

National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

Funding Body Type Government organisation

Funding Body Subtype National government

Location United Kingdom

Funder Name University of Leicester

Alternative Name(s) UoL

Funding Body Type

Private sector organisation

Funding Body Subtype

Universities (academic only)

Location United Kingdom

Funder Name University Hospitals of Leicester NHS Trust

Alternative Name(s)

Funding Body Type Private sector organisation

Funding Body Subtype Other non-profit organizations

Location United Kingdom

Results and Publications

Publication and dissemination plan

Results of the study will be made available in a timely fashion and published in a high-impact peer-reviewed journal.

Intention to publish date

31/01/2022

Individual participant data (IPD) sharing plan

Participant-level data will be made available for bona fide researchers via application. Researchers interested in accessing the data should contact phosp@leicester.ac.uk or visit http://www.phosp.org for more details of the process and an application form. Access to data and materials and the study are reviewed and approved by an independent data and materials access committee. Participants have provided appropriate consent to share their anonymised (pseudonymised) data. All access to data will be subject to agreement to appropriate terms and conditions.

IPD sharing plan summary

Available on request

Study outputs

Output Details type

Date Date Peer Patientcreated added reviewed? facing?

<u>Interim</u> results article	Two doses of SARS-CoV-2 vaccination induce robust immune responses to emerging SARS-CoV-2 variants of concern	17/08 /2021	19/08 /2021 Yes	No
<u>Results</u> article		07/10 /2021	11/10 /2021 Yes	No
<u>Interim</u> <u>results</u> <u>article</u>	Symptom Persistence Despite Improvement in Cardiopulmonary Health - Insights from longitudinal CMR, CPET and lung function testing post- COVID-19	20/10 /2021	26/10 /2021 Yes	No
<u>Preprint</u> <u>results</u>	preprint of clinical characteristics with inflammation profiling of Long- COVID and association with one-year recovery following hospitalisation in the UK	15/12 /2021	16/12 /2021 No	No
<u>Results</u> article	clinical characteristics with inflammation profiling of Long-COVID and association with one-year recovery following hospitalisation in the UK	22/04 /2022	27/04 /2022 Yes	No
<u>Results</u> article	prevalence of physical frailty, including risk factors, up to 1 year after hospitalisation for COVID-19 in the UK	11/03 /2023	21/03 /2023 Yes	No
<u>HRA</u> <u>research</u> summary			26/07 /2023 No	No
<u>Results</u> article	Association of blood biomarkers with cognitive deficits	31/08 /2023	28/09 /2023 Yes	No
<u>Results</u> article	Long COVID and cardiovascular disease	27/05 /2024	28/05 /2024 Yes	No
<u>Results</u> article	Long term health outcomes in people with diabetes	, 27/12 /2024	, 27/01 /2025 Yes	No