COVID-19 Hospitalisations in England Surveillance System (CHESS)

2020-11 CPRD CHESS Documentation

Version 1.0

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Documentation Control Sheet

Over time, it may be necessary to issue amendments or clarifications to parts of this document. This form must be updated whenever changes are made.

Version	Affected Areas Summary of Change	Prepared By	Reviewed By
1.0	Initial	Rebecca Ghosh	Daniel Dedman

Summary of Changes

COVID-19 Hospitalisations in England Surveillance System linked to CPRD primary care data

This document provides an overview of the COVID-19 Hospitalisations in England Surveillance System (CHESS) data, and the available subset that is linked to CPRD GOLD and CPRD Aurum.

What is the COVID-19 Hospitalisations in England Surveillance System (CHESS)?

CHESS is a secondary care surveillance system for hospitalised patients with laboratory confirmed SARS-CoV-2 coronavirus infection in England. It was established on the 15 March 2020 by Public Health England (PHE)[1]. The system has been adapted from the previously established UK Severe Influenza Surveillance System (USISS).

The aim of CHESS is to collect epidemiological data on COVID-19 cases requiring hospitalisation and admission to intensive care or high dependency units (ICU / HDU), to monitor the impact of severe SARS-CoV-2 coronavirus infection on the population, inform understanding of natural history of the disease and clinical severity of cases, and provide data to inform models of transmission dynamics to forecast and estimate disease burden and health services utilisation[2].

NHS Digital required a one-time historic feed for all daily CHESS collections dating from 1 January 2020 and CHESS now monitors hospital admissions to ICU and HDU as a result of COVID-19 only. The linked CPRD CHESS data set is composed of:
• Hospital and laboratory details
• Anti-viral treatment details
• Patient outcome details.

What data has CHESS data been linked to?

Currently the CHESS data has been linked to the CPRD GOLD and CPRD Aurum primary care databases. Linkage is available for patients at English practices who have consented to participate in the linkage scheme. Patients who have registered an individual opt-out will not be included in the linked data. Access to linked CPRD CHESS data is dependent on approval of a study protocol by the Independent Scientific Advisory Committee (ISAC), and all required linked data sources must be requested on the application form. These linked data are only provided by CPRD when part of a data extract is linked to CPRD primary care data.

Linkage method

Linkage was based on an exact match on NHS Number only. This linkage method is different from the 8-step linkage algorithm used for other CPRD linkages. The linkage was carried out by NHS Digital using July 2020 EMIS and Vision identifiers, which is also the basis for the set 20 source file. The set 20 source file is the most appropriate to use for understanding the subset of the population potentially eligible for linkage. No personal identifiers are held by CPRD, and none are included in the linked CHESS data.

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[1] https://www.gov.uk/government/publications/national-covid-19-surveillance-reports/sources-of-covid-19-systems

[2] Data Provision Notice. SGSS and CHESS. Copyright © 2020 Health and Social Care Information Centre (20 Oct 2020) https://digital.nhs.uk/binaries/content/assets/website-assets/corporate-information/directions-and-data-provision-notices/data-provision-notices/sgss-chess-dpn-v1.1.pdf

Linkage eligibility

There is no specific flag indicating eligibility for CHESS linkage, but we recommend using the HES eligibility flag (i.e. [hes_e] = 1) as a proxy since this indicates that the patient has a valid NHS Number. We are aware that not all NHS Acute Trusts were reporting to CHESS during the initial phases (see below, and Appendix 1). This means some patients may not appear in CHESS even if they were admitted with COVID-19 and were eligible for HES linkage.

Linkage coverage period

The collection of CHESS data commenced on or around the 6th April 2020, but Trust were requested to report retrospective data from 01 Jan 2020 onwards. Collection will continue until the expiry of the COVID-19 Direction, or earlier if NHS Digital issues a notice to cease the collection. The latest release of CHESS data linked to CPRD primary care data (set 20) contains data reported up to 30 July 2020 inclusive.

Data structure and formatting

CHESS data is supplied "as is", with minimal modification or cleaning during processing by CPRD. Where CPRD has modified the data, this is detailed below.

Data Quality – known issues

These data are being made available for research purposes on accelerated timelines. Minimal changes have been made to the raw data and there is likely to be some requirement for data cleaning. We therefore encourage our user community to share with us any issues or insights gained from using these data, which can be disseminated to other users via the documentation supporting the next update. See below some known potential concerns:

- **Trends**: Because CHESS data is reported for laboratory confirmed cases only, trends in hospital and critical care admission rates need to be interpreted in the context of testing recommendations, which have changed over time. For example:

  o Since 2 March 2020, all patients in ICU/HDU with influenza like illness (ILI) and/or lower respiratory tract infections (LRTI) and/or pneumonia have been tested for SARS-CoV-2
  o Since 15 March 2020, SARS-CoV-2 testing was extended to all patients hospitalised with ILI, LRTI or pneumonia
  o Since 27 April 2020, trusts were advised to test all non-elective admissions, including asymptomatic patients for SARS-CoV-2.

- **Data coverage:** incomplete coverage is an important limitation of the linked CHESS data. The current linked CPRD CHESS dataset contains data from 102 of 152 NHS Acute Trusts in England[3]. A list of NHS Trusts which reported at least 1 case is included in Appendix 1. Note the NHS Trust information has been pseudomymised in the linked CPRD CHESS dataset.

  The CHESS system comprises of three data collection/reporting components:

  o Aggregate reporting/collection of all COVID-19 related hospital and ICU/HDU admissions was a requirement for all NHS Trusts in England. However it has been estimated by NHS Digital that the volumes reported in the CHESS aggregate data represent between 70% and 75% of known cases, and it is known that many London NHS trusts did not report at all, at least

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[3] https://www.nhsconfed.org/resources/key-statistics-on-the-nhs

during the early phases of the pandemic. Aggregate reporting is not part of the CPRD linked CHESS data.

- o Individual reporting/collection of COVID-19 related ICU/HDU admissions was a requirement for all NHS Trusts in England. However reporting has been inconsistent, and it is estimated that the reported cases represent between 20% and 30% of eligible ICU admissions. Many London NHS trusts did not report at all, at least during the early phases of the pandemic. See appendix 1 for a list of the 102 NHS Trusts which reported at least one case. This data collection is included in the linked CPRD CHESS data.

- o Individual reporting/collection of all COVID-19 related hospital admissions by a subset of 24 Sentinel NHS Trusts. Sentinel Trusts were selected based on reporting performance in the period prior to the pandemic. Not all 24 sentinel Trusts report complete data, and it is estimated that the volume of reporting represents significantly less than 20% of all COVID admissions in England. The sentinel data collection is included in the linked CPRD CHESS data.

- **Data completeness:** Some data fields are poorly populated, and there has been a focus on improving the quality of key fields such as dates, outcomes, risk factors and level of severity. Changes in the completeness of some fields is therefore to be expected over time and between releases.

- **Duplicates:** Around 95% of all caseid–pairs have 2 or more records (mean 6, range 1-57). This is because Trusts were encouraged to update records as new information became available. Each update is incorporated as a new record, and is not reconciled with the original records.

CHESS: Data dictionary

1. FILE NAMES:
   CPRD_GOLD_CHESS_November_2020.txt; CPRD_Aurum_CHESS_November_2020.txt

Column name	Description	Type	Format
patid	Encrypted unique key given to a patient in CPRD GOLD or CPRD Aurum [primary key]	TEXT	6-19 numeric characters
pracid	Encrypted unique key given to a practice in CPRD GOLD or CPRD Aurum	INTEGER	5
caseid	Encrypted unique key given to a patient in the CHESS dataset	INTEGER	6
n_patid_chess	Generated by CPRD. Indicates the number of distinct patid associated with this caseid	INTEGER	3
trustid	CPRD generated psuedonym of NHS Trust Code	INTEGER	3
dateupdated	When was record updated	DATE	dd/mm/yyyy
weekno	Week of (first) report	INTEGER	2
weekofadmission	Week of admission	INTEGER	4
yearofadmission	Year of admission	INTEGER	4
ageyear	Age in years at admission date (calculated from date of birth on CHESS record [not included])	INTEGER	4
estimateddateonset	Estimated date of onset of symptoms, can be the admission date.	DATE	dd/mm/yyyy
notknownonset	Date of onset not known		
infectionswabdate	Swab/specimen date	DATE	dd/mm/yyyy
labtestdate	Laboratory test date, this is a required field	DATE	dd/mm/yyyy
typeofspecimen	Type of specimen. Required Field. Examples include: Nasal/throat swab, nasopharyngeal/nasal aspirate, sputum, tracheal aspirate, broncho-alveolar lavage, Other, Unknown	CATEGORICAL	char29
otherspecimentype	Details of other type of specimen	TEXT	char32
covid19	Positive test for SARS-CoV-2: "Yes" if true	CATEGORICAL	char3
influenzaah1n1pdm2009	Positive test for influenza virus subtype H1N1pdm2009 (2009 pandemic strain): "Yes" if true	CATEGORICAL	char3
influenzaah3n2	Positive test for influenza virus subtype AH3N2: "Yes" if true	CATEGORICAL	char3
influenzab	Positive test for influenza virus type B: "Yes" if true	CATEGORICAL	char3
influenzaanonsubtyped	Positive test for influenza virus type A/non-subtyped: "Yes" if true	CATEGORICAL	char3
influenzaaunsubtypable	Positive test for influenza virus type A/unsubtypable: "Yes" if true	CATEGORICAL	char3
rsv	Positive test for respiratory syncytial virus (RSV): "Yes" if true	CATEGORICAL	char3
otherresult	Positive test for other respiratory infection (specify): "Yes" if true	CATEGORICAL	char3

admittedfrom	Where was patient admitted from: examples include: Home, Nursing Home, Residential Home, Temp Accommodation, Acute Trust Hospital, Private Hospital, Other UK Hospital, Non-UK Hospital, Penal Establishment, Unknown, Other (specify)	TEXT	char20
dateadmittedicu	Date of admission to HDU/ICU	DATE	dd/mm/yyyy
dateleavingicu	Date left HDU/ICU	DATE	dd/mm/yyyy
sbother	Details of Other organism associated with secondary bacterial pneumonia. This field is completed if the [organismname] = "Other organism".	TEXT	char50
sbdate	Date of secondary bacterial pneumonia (if present)	DATE	dd/mm/yyyy
ventilatedwhilstadmitted	Was patient ventilated during the admission: "Yes" if true	CATEGORICAL	char3
admissionflu	Was admission flu related: Yes / No / Unknown	CATEGORICAL	char7
admissioncovid19	Was admission COVID-19 related: Yes / No / Unknown	CATEGORICAL	char7
isviralpneumoniacomplication	Complications: viral pneumonia: "Yes" if true	CATEGORICAL	char7
isardscomplication	Complications: acute respiratory distress syndrome (ARDS) : "Yes" if true	CATEGORICAL	char3
isunknowncomplication	Complications: unknown: "Yes" if true	CATEGORICAL	char3
isothercoinfectionscomplication	Complications: other co-infection: "Yes" if true	CATEGORICAL	char3
isothercomplication	Complications: other (specify) : "Yes" if true	CATEGORICAL	char3
issecondarybacterialpneumoniacom	Complications: secondary bacterial pneumonia: "Yes" if true	CATEGORICAL	char3
ventilatedwhilstadmitteddays	If patient was admitted, for how many days?	INTEGER	3
patientecmo	Did patient receive extra-corporeal membrane oxygenation (ECMO)?: "Yes" if true	CATEGORICAL	char3
wasthepatientadmittedtoicu	Was patient admitted to ICU?: Yes / No / Unknown	CATEGORICAL	char9
organismname	Anonymised text on organism associated with secondary bacterial pneumonia, if present. See also [sbother].	TEXT	char44
daysecmo	If patient received ECMO, how many days was this for?	INTEGER	4
hospitaladmissiondate	Date of admission to hospital	DATE	dd/mm/yyyy
admissionrsv	Was admission RSV related?: Yes / No / Unknown	CATEGORICAL	char7
respiratorysupportnone	Respiratory support required: none: "Yes" if true	CATEGORICAL	char3
oxygenviacannulaeormask	Respiratory support required: oxygen via cannulae or mask: none: "Yes" if true	CATEGORICAL	char3
highflownasaloxygen	Respiratory support required: high flow nasal oxygen: none: "Yes" if true	CATEGORICAL	char3
noninvasivemechanicalventilation	Respiratory support required: non-invasive mechanical ventilation: none: "Yes" if true	CATEGORICAL	char3

invasivemechanicalventilation	Respiratory support required: invasive mechanical ventilation: none: "Yes" if true	CATEGORICAL	char3
respiratorysupportecmo	Respiratory support required: extra-coorporeal membrane oxygenation (ECMO) : none: "Yes" if true	CATEGORICAL	char3
anticovid19treatment	Did patient receive specific anti-COVID-19 treatment		
chronicrespiratory	Risk factor – chronic respiratory disease?: Yes / No / Unknown	CATEGORICAL	char7
asthmarequiring	Risk factor – asthma requiring medication?: Yes / No / Unknown	CATEGORICAL	char7
chronicheart	Risk factor – chronic or congenital heart disease?: Yes / No / Unknown	CATEGORICAL	char7
chronicrenal	Risk factor – chronic renal disease?: Yes / No / Unknown	CATEGORICAL	char7
chronicliver	Risk factor – chronic liver disease?: Yes / No / Unknown	CATEGORICAL	char7
chronicneurological	Risk factor – chronic neurological disorder?: Yes / No / Unknown	CATEGORICAL	char7
isdiabetes	Risk factor – diabetes?: Yes / No / Unknown	CATEGORICAL	char7
diabetestype	Diabetes type, if present? e.g Type I / Type II [/Other]	CATEGORICAL	char8
immunosuppressiontreatment	Risk factor - immunosuppression due to treatment?: Yes / No / Unknown	CATEGORICAL	char7
immunosuppressiondisease	Risk factor - immunosuppression due to disease?: Yes / No / Unknown	CATEGORICAL	char7
other	Risk factor – other?: Yes / No / Unknown	CATEGORICAL	char7
obesityclinical	Risk factor – clinically obese?: Yes / No / Unknown / Borderline	CATEGORICAL	char10
obesitybmi	Body Mass Index (BMI) category: <18.5; 18.5 – 24.9; 25 – 29.9; 30 – 39.9; >39.9	CATEGORICAL	char9
pregnancy	Risk factor – pregnancy?: Yes / No / Unknown	CATEGORICAL	char7
gestationweek	Gestation at admission (if pregnant)	INTEGER	4
prematurity	Risk factor – premature birth (<37 weeks gestation)		
hypertension	Risk factor – hypertension?: Yes / No / Unknown	CATEGORICAL	char7
travelin14days	Risk factor - travel in 14 days before onset of COVID-19?: Yes / No / Unknown	CATEGORICAL	char7
worksashealthcareworker	Risk factor - works as a healthcare worker?: Yes / No / Unknown	CATEGORICAL	char7
contactwithconfirmedcovid19case	Risk factor - contact with a confirmed COVID-19 case in the 14 days before onset?: Yes / No / Unknown	CATEGORICAL	char7
finaloutcome	Final outcome: e.g. Discharged, transferred, died, still on ward	CATEGORICAL	char15
finaloutcomedate	Date of the final outcome	DATE	dd/mm/yyyy
transferdestination	If transferred, destination: e.g. Acute Trust Hospital; Care home; Death; Different ICU/HDU; General ward; Nursing home; Other; Other NHS hospital; Private hospital	CATEGORICAL	char20

causeofdeath	If died, cause of death: e.g. COVID-19 main cause; COVID-19 underlying cause; Not COVID-19 related	CATEGORICAL	char25
hospitaladmissionadmittedfrom	Admitted to hospital from: e.g. Home, Nursing Home, Residential Home, Temp Accommodation, Acute Trust Hospital, Private Hospital, Other UK Hospital, Non-UK Hospital, Penal Establishment, Unknown, Other (specify)	CATEGORICAL	char20
mechanicalinvasiveventilationdur	Anonymised text on duration of mechanical ventilation, duration (if applicable).	TEXT	char50
asymptomatictesting			
patientstillonicu	Is patient still on ICU?: Yes / No / Unknown	CATEGORICAL	char7
respiratorysupportunknown	Details of respiratory support not known: "Yes" if true	CATEGORICAL	char3
seriousmentalillness	Comorbidities – serious mental illness?: Yes / No / Unknown	CATEGORICAL	char7
priorhospitalattendance	Was patient in hospital prior to current admission?: Yes / No / Unknown	CATEGORICAL	char7
dateofpriorattendance	Date of prior admission if known	DATE	dd/mm/yyyy
admissionnotrelatedtorespiratory	Was admission not related to respiratory infection?: Yes / No / Unknown	CATEGORICAL	char7
typeorplaceofwork	Type or place of work, if known: e.g. Associate health professional; Care home worker; Catering; Construction/road maintenance; Doctor; Driving people; Education; Factory/warehouse; Goods delivery; Not working; Nurse/paramedic; Office; Retail; Security; Other	CATEGORICAL	char29
treatmenttocilizumab	Treatment with tocilizumab? : Yes / No / Unknown	CATEGORICAL	char7
treatmentremdesivir	Treatment with remdesivir?: Yes / No / Unknown	CATEGORICAL	char7
treatmentother	Treatment with other anti-COVID-19 treatment?: Yes / No / Unknown	CATEGORICAL	char7
treatmentconvalescentplasma	Treatment with convalescent plasma?: Yes / No / Unknown	CATEGORICAL	char7

Appendix1: List of 102 NHS Trusts contributing at least 1 record to CPRD linked CHESS set 20 dataset

This list is provided for information only. Trust codes have been pseudonymised in the CPRD linked CHESS data.

Trust code	Trust Name
R0A	Manchester University NHS Foundation Trust
R0B	South Tyneside And Sunderland NHS Foundation Trust
R1F	Isle Of Wight NHS Trust
R1H	Barts Health NHS Trust
RA2	Royal Surrey County Hospital NHS Foundation Trust
RA4	Yeovil District Hospital NHS Foundation Trust
RA7	University Hospitals Bristol And Weston NHS Foundation Trust
RA9	Torbay And South Devon NHS Foundation Trust
RAE	Bradford Teaching Hospitals NHS Foundation Trust
RAN	Royal National Orthopaedic Hospital NHS Trust
RAP	North Middlesex University Hospital NHS Trust
RAS	The Hillingdon Hospitals NHS Foundation Trust
RAX	Kingston Hospital NHS Foundation Trust
RBA	Taunton And Somerset NHS Foundation Trust
RBD	Dorset County Hospital NHS Foundation Trust
RBK	Walsall Healthcare NHS Trust
RBL	Wirral University Teaching Hospital NHS Foundation Trust
RBN	St Helens And Knowsley Teaching Hospitals NHS Trust
RBQ	Liverpool Heart And Chest Hospital NHS Foundation Trust
RBS	Alder Hey Children's NHS Foundation Trust
RBV	The Christie NHS Foundation Trust
RBZ	Northern Devon Healthcare NHS Trust
RC1	Bedford Hospital NHS Trust
RC9	Bedfordshire Hospitals NHS Foundation Trust
RCB	York Teaching Hospital NHS Foundation Trust
RCD	Harrogate And District NHS Foundation Trust
RCF	Airedale NHS Foundation Trust
RCX	The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust
RD1	Royal United Hospitals Bath NHS Foundation Trust
RD3	Poole Hospital NHS Foundation Trust

RDD	Basildon And Thurrock University Hospitals NHS Foundation Trust
RDE	East Suffolk And North Essex NHS Foundation Trust
RDU	Frimley Health NHS Foundation Trust
RDZ	The Royal Bournemouth And Christchurch Hospitals NHS Foundation Trust
REF	Royal Cornwall Hospitals NHS Trust
REM	Liverpool University Hospitals NHS Foundation Trust
RF4	Barking, Havering And Redbridge University Hospitals NHS Trust
RFF	Barnsley Hospital NHS Foundation Trust
RFR	The Rotherham NHS Foundation Trust
RFS	Chesterfield Royal Hospital NHS Foundation Trust
RGM	Royal Papworth Hospital NHS Foundation Trust
RGN	North West Anglia NHS Foundation Trust
RGP	James Paget University Hospitals NHS Foundation Trust
RGR	West Suffolk NHS Foundation Trust
RGT	Cambridge University Hospitals NHS Foundation Trust
RH5	Somerset NHS Foundation Trust
RH8	Royal Devon And Exeter NHS Foundation Trust
RHM	University Hospital Southampton NHS Foundation Trust
RHQ	Sheffield Teaching Hospitals NHS Foundation Trust
RHW	Royal Berkshire NHS Foundation Trust
RJ1	Guy's And St Thomas' NHS Foundation Trust
RJ2	Lewisham And Greenwich NHS Trust
RJ7	St George's University Hospitals NHS Foundation Trust
RJC	South Warwickshire NHS Foundation Trust
RK5	Sherwood Forest Hospitals NHS Foundation Trust
RKE	Whittington Health NHS Trust
RL4	The Royal Wolverhampton NHS Trust
RLQ	Wye Valley NHS Trust
RMC	Bolton NHS Foundation Trust
RMP	Tameside And Glossop Integrated Care NHS Foundation Trust
RN3	Great Western Hospitals NHS Foundation Trust
RN5	Hampshire Hospitals NHS Foundation Trust
RN7	Dartford And Gravesham NHS Trust
RNN	North Cumbria Integrated Care NHS Foundation Trust
RNS	Northampton General Hospital NHS Trust

RPA	Medway NHS Foundation Trust
RPY	The Royal Marsden NHS Foundation Trust
RQM	Chelsea And Westminster Hospital NHS Foundation Trust
RQX	Homerton University Hospital NHS Foundation Trust
RR8	Leeds Teaching Hospitals NHS Trust
RRF	Wrightington, Wigan And Leigh NHS Foundation Trust
RRJ	The Royal Orthopaedic Hospital NHS Foundation Trust
RRK	University Hospitals Birmingham NHS Foundation Trust
RRV	University College London Hospitals NHS Foundation Trust
RT3	Royal Brompton & Harefield NHS Foundation Trust
RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust
RTE	Gloucestershire Hospitals NHS Foundation Trust
RTG	University Hospitals Of Derby And Burton NHS Foundation Trust
RTK	Ashford And St Peter's Hospitals NHS Foundation Trust
RTP	Surrey And Sussex Healthcare NHS Trust
RTR	South Tees Hospitals NHS Foundation Trust
RVJ	North Bristol NHS Trust
RVR	Epsom And St Helier University Hospitals NHS Trust
RVV	East Kent Hospitals University NHS Foundation Trust
RVW	North Tees And Hartlepool NHS Foundation Trust
RVY	Southport And Ormskirk Hospital NHS Trust
RWA	Hull University Teaching Hospitals NHS Trust
RWE	University Hospitals Of Leicester NHS Trust
RWG	West Hertfordshire Hospitals NHS Trust
RWH	East And North Hertfordshire NHS Trust
RWJ	Stockport NHS Foundation Trust
RWP	Worcestershire Acute Hospitals NHS Trust
RWY	Calderdale And Huddersfield NHS Foundation Trust
RX1	Nottingham University Hospitals NHS Trust
RXC	East Sussex Healthcare NHS Trust
RXF	Mid Yorkshire Hospitals NHS Trust
RXH	Brighton And Sussex University Hospitals NHS Trust
RXK	Sandwell And West Birmingham Hospitals NHS Trust
RXL	Blackpool Teaching Hospitals NHS Foundation Trust
RXW	The Shrewsbury And Telford Hospital NHS Trust

RYJ	Imperial College Healthcare NHS Trust
RYR	Western Sussex Hospitals NHS Foundation Trust