

Please provide the following information:

1. A brief overview of your qualifications, career history, professional expertise and major publications.

Professional qualifications:

- **Certificate of Completion of Training (CCT) in Infectious Diseases & General (Internal) Medicine** – Joint Royal Colleges of Physicians Training Board (2018)
- **Doctor of Philosophy** – University of Oxford (2017)
- **Specialty Certificate in Infectious Diseases** – Royal College of Physicians, London (2017)
- **Diploma in Tropical Medicine & Hygiene** – Royal College of Physicians, London (2018)
- **Bachelor of Medicine & Bachelor of Surgery** – University of Newcastle upon Tyne (2004)
- **Bachelor of Medical Science with 2(i) honours** – University of Newcastle upon Tyne (2002)

Career history (current appointments):

- **Clinical Research Specialty Lead for Infection & Immunology** – National Institute of Health Research, West Midlands Clinical Research Network (2020 to present)
- **Associate Clinical Professor in Infectious Diseases** – Institute of Microbiology & Infection, University of Birmingham, Edgbaston, Birmingham B15 2TT (2019 to present)
- **Consultant Physician in Infectious Diseases & General (Internal) Medicine** – Department of Infectious Diseases & Tropical Medicine, University Hospitals Birmingham NHS Foundation Trust, Birmingham Heartlands Hospital, Birmingham B9 5SS (2019 to present)
- **Academic Visitor** – Oxford Vaccine Group, Department of Paediatrics, University of Oxford, c/o Centre for Clinical Vaccinology & Tropical Medicine (CCVTM), Churchill Hospital, Old Road, Headington, Oxford OX3 7LE (2017 to present)

Professional expertise:

- Clinical infectious diseases
- Translational research
- Clinical trials of investigative medicinal products (CTIMPs)

Major publications:

- Please see <https://scholar.google.com/citations?user=XclmICkAAAAJ&hl=en> h-index 42 (i10-index 64) with 20'992 citations (needs updating with more papers to add)
- Top 10 publications by journal impact factor:
 1. Horby PW, Mafham M, Peto L, Campbell M, Pessoa-Amorim G, Spata E, Staplin N, Emberson JR, Prudon B, Hine P, Brown T, **Green CA**, Sarkar R, Desai P, Yates B, Faust SN, Jaki T, Jeffery K, Juszczak E, Lim WS, Montgomery A, Mumford A, Rowan K, Thwaites G, Weinreich DM, Haynes R, Landray MJ. **Casirivimab and imdevimab in patients admitted to hospital with COVID-19 (RECOVERY): a randomised, controlled, open-label, platform trial.** *Lancet.* 2022 Feb 12;399(10325):665-676. doi: 10.1016/S0140-6736(22)00163-5. PMID: 35151397.
 2. Munro APS, Janani L, Cornelius V, Aley PK, Babbage G, Baxter D, Bula M, Cathie K, Chatterjee K, Dodd K, Enever Y, Gokani K, Goodman AL, **Green CA**, Harndahl L, Haughney J, Hicks A, van der Klaauw AA, Kwok J, Lambe T, Libri V, Llewelyn MJ, McGregor AC, Minassian AM, Moore P, Mughal M, Mujadidi YF, Murira J, Osanlou O, Osanlou R, Owens DR, Pacurar M, Palfreeman A, Pan D, Rampling T, Regan K, Saich S, Salkeld J, Saralaya D, Sharma S, Sheridan R, Sturdy A, Thomson EC, Todd S, Twelves C, Read RC, Charlton S, Hallis B, Ramsay M, Andrews N, Nguyen-Van-Tam JS, Snape MD, Liu X, Faust SN; COV-BOOST study group. **Safety and immunogenicity of seven COVID-19 vaccines as a third dose (booster) following two doses of ChAdOx1 nCov-19 or BNT162b2 in the UK (COV-BOOST): a blinded, multicentre, randomised, controlled, phase 2 trial.** *Lancet.* 2021 Dec 18;398(10318):2258-2276. doi: 10.1016/S0140-6736(21)02717-3. Epub 2021 Dec 2. Erratum in: *Lancet.* 2021 Dec 18;398(10318):2246. PMID: 34863358; PMCID: PMC8639161.
 3. Stuart ASV, Shaw RH, Liu X, Greenland M, Aley PK, Andrews NJ, Cameron JC, Charlton S, Clutterbuck EA, Collins AM, Darton T, Dinesh T, Duncan CJA, England A, Faust SN, Ferreira DM, Finn A, Goodman AL, **Green CA**, Hallis B, Heath PT, Hill H, Horsington BM, Lambe T, Lazarus R, Libri V, Lillie PJ, Mujadidi YF, Payne R, Plested EL, Provstgaard-Morys S, Ramasamy MN, Ramsay M, Read RC, Robinson H, Screaton GR, Singh N, Turner DPJ, Turner PJ, Vichos I, White R, Nguyen-Van-Tam JS, Snape MD; Com-COV2 Study Group. **Immunogenicity, safety, and reactogenicity of heterologous COVID-19 primary vaccination incorporating mRNA, viral-vector, and protein-adjuvant vaccines in the UK (Com-COV2): a single-blind, randomised, phase 2, non-inferiority trial.** *Lancet.* 2022 Jan 1;399(10319):36-49. doi: 10.1016/S0140-6736(21)02718-5. Epub 2021 Dec 6. PMID: 34883053; PMCID: PMC8648333.
 4. Read JM, **Green CA**, Harrison EM, Doherty AB, Funk S, Halpin S, Harrison J, Girvan M, Hardwick HE, Turtle LCW, Dunning J, Nguyen-Van-Tam JS, Openshaw PJM, Baillie JK, Semple MG, and ISARIC4C investigators.

- Hospital-acquired SARS-CoV-2 infection in UK hospitals.** *Lancet.* 2021 Aug 12;S0140-6736(21)01786-4. doi: 10.1016/S0140-6736(21)01786-4. Epub ahead of print. PMID: 34391505; PMCID: PMC8360701.
5. Liu X, Shaw RH, Stuart ASV, Greenland M, Dinesh T, Provstgaard-Morys S, Ramasamy MN, Aley PK, Mujadidi YF, Long F, Plested EL, Robinson H, Singh N, Walker LL, White R, Andrews NJ, Cameron CJ, Collins AM, Ferreira D, Hill H, **Green CA**, Hallis B, Heath PT, Faust SN, Finn A, Lambe T, Lazarus R, Libri V, Ramsay M, Read R, Turner DPJ, Turner PJ, Nguyen-Van-Tam JS, Snape MD and the Com-COV Study Group. **Safety and immunogenicity report from the Com-COV study – A single-blind randomised non-inferiority trial comparing heterologous and homologous prime-boost schedules with an adenoviral vectored and mRNA COVID-19 vaccine.** *Lancet.* 2021 Aug 6;398(10303):856–69. doi: 10.1016/S0140-6736(21)01694-9
 6. Emary KRW, Golubchik T, Aley PK, Angus B, Bibi S, Bonsall D, Cicconi P, Charlton S, Clutterbuck EA, Collins AM, Cox T, Darton TC, Dold C, Douglas AD, Duncan CJA, Ewer KJ, Flaxman A, Faust SN, Ferreira DM, Feng S, Finn A, Folegatti PM, Fuskova M, Galiza E, Goodman AL, Green CM, **Green CA**, Greenland M, Hallis B, Heath PT, Hay J, Hill HC, Jenkin D, Kerridge S, Lazarus R, Libri V, Lillie PJ, Marchevsky NG, Minassian AM, McGregor AC, Mujadidi YF, Phillips DJ, Plested E, Pollock KM, Smith A, Song R, Snape MD, Sutherland RK, Thomson EC, Toshner M, Turner DPJ, Vekemans J, Villafana TL, Williams CJ, Hill AVS, Lambe T, Gilbert SC, Voysey M, Ramasamy MN, Pollard AJ, COG-UK CONSORTIUM Study Group and the Oxford COVID Vaccine Trial Group. **Efficacy of ChAdOx1 nCoV-19 (AZD1222) vaccine against SARS-CoV-2 VOC 202012/01 (B.1.1.7), an exploratory analysis of a randomised controlled trial.** *Lancet.* 2021 Apr 10;397(10282):1351-1362. doi: 10.1016/S0140-6736(21)00628-0.
 7. Voysey M, Clemens SAC, Madhi SA, Weckx LY, Folegatti PM, Aley PK, Angus B, Baillie VL, Barnabas SB, Bhorat QE, Bibi S, Briner C, Cicconi P, Clutterbuck EA, Collins AM, Cutland CL, Darton TC, Dheda K, Douglas AD, Duncan CJA, Emary KRW, Ewer KJ, Flaxman A, Fairlie L, Faust SN, Feng S, Ferreira DM, Finn A, Galiza E, Goodman AL, Green CM, **Green CA**, Greenland M, Hill C, Hill HC, Hirsch I, Izu A, Jenkin D, Kerridge S, Koen A, Kwatra G, Lazarus R, Libri V, Lillie PJ, Marchevsky NG, Mendes AVA, Milan EP, Minassian AM, McGregor A, Mujadidi YF, Nana A, Padayachee SD, Phillips DJ, Pittella A, Plested E, Pollock KM, Ramasamy MN, Robinson H, Schwarzbald AV, Smith A, Song R, Snape MD, Sprinz E, Sutherland RK, Thomson EC, Estée Török M, Toshner M, Turner DPJ, Vekemans J, Villafana TL, White T, Williams CJ, Hill AVS, Lambe T, Gilbert SC, Pollard AJ and the Oxford COVID Vaccine Trial Group. **Single dose administration, and the influence of the timing of the booster dose on immunogenicity and efficacy of ChAdOx1 nCoV-19 (AZD1222) vaccine: a pooled analysis of four randomised trials.** *Lancet.* 2021 Mar 6;397(10277):881-891. doi: 10.1016/S0140-6736(21)00432-3.
 8. Voysey M, Clemens SA, Madhi SA, Weckx LY, Folegatti PM, Aley PK, Angus B, Baillie VL, Barnabas SL, Bhorat QE, Bibi S, Cicconi P, Collins AM, Colin-Jones R, Cutland CL, Darton TC, Dheda K, Duncan CJA, Emary KRW, Ewer KJ, Fairlie L, Faust SN, Feng S, Ferreira DM, Finn A, Goodman AL, Green CM, **Green CA**, Heath PT, Hill C, Hill H, Hirsch I, Hodgson SCH, Izu A, Jackson S, Jenkin D, Joe CCD, Kerridge S, Koen A, Kwatra G, Lazarus EM, Lazarus R, Lawrie AM, Lelliott A, Libri V, Lillie PJ, Mallory R, Mendes AVA, Milan EP, Minassian AM, McGregor A, Morrison H, Mujadidi YF, Nana A, O'Reilly PJ, Padayachee SD, Pittella A, Plested E, Pollock KM, Ramasamy MN, Rhead S, Schwarzbald AV, Singh N, Smith A, Song R, Snape MD, Sprinz E, Sutherland RK, Tarrant R, Thomson EC, Török ME, Toshner M, Turner DPJ, Vekemans J, Villafana TL, Watson MEE, Williams CJ, Douglas AD, Hill AVS, Lambe T, Gilbert SC, Pollard AJ and the Oxford COVID Vaccine Trial Group. **Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: An interim analysis of randomised controlled trials in Brazil, South Africa and the UK.** *Lancet.* 2021 Jan 9;397(10269):99-111. doi: 10.1016/S0140-6736(20)32661-1. Epub 2020 Dec 8.
 9. Horby PW, Mafham M, Bell JL, Linsell L, Staplin N, Emberson JR, Palfreeman A, Raw J, Elmahi E, Prudon B, **Green CA**, Carley S, Chadwick D, Davies M, Wise MP, Baillie JK, Chappell LC, Faust SN, Jaki T, Jeffrey K, Lim WS, Montgomery A, Rowan K, Juszczak E, Haynes R, Landray MJ. **Lopinavir-ritonavir in patients admitted to hospital with COVID-19 (RECOVERY): a randomised, controlled, open-label, platform trial.** *Lancet.* 2020 Oct 5;S0140-6736(20)32013-4. doi: 10.1016/S0140-6736(20)32013-4.
 10. Horby PW, Wei Shen L, Emberson J, Mafham M, Bell J, Linsell L, Staplin N, Brightling C, Ustianowski A, Elmahi W, Prudon B, **Green CA**, Felton T, Chadwick D, Rege K, Fegan C, Chappell L, Faust SN, Jaki T, Jeffrey K, Montgomery A, Rowan K, Juszczak E, Baillie JK, Haynes R, Landray MJ. **Effect of dexamethasone in hospitalised patients with Covid19 – preliminary report.** *New England Journal of Medicine.* July 17, 2020. doi: 10.1056/NEJMoa2021436.

2. **A list of the groups (i.e. SAGE and/or any of its sub-groups) in which you have been a participant, and the relevant time periods.**

Clinical Characterisation of Covid-19 admitted to hospitals in the UK committee (CO-CIN) member – subgroup of the Scientific Advisory Group of Emergencies (SAGE) from 2020-2022.

3. **An overview of your involvement with those groups between January 2020 and February 2022, including:**

I was involved at the inception of CO-CIN from 17Feb2020 to when CO-CIN was terminated in 2022. As the local Principal Investigator for ISARIC located at the UK's largest single NHS Trust (University Hospitals Birmingham NHS Foundation

Trust, or UHB) the Chief Investigator (Prof Calum Semple) and I were in regular contact on how we could best support the translational research needed in response to the pandemic. After further conversation and review, I was invited onto the CO-CIN membership and together we developed and refined the Case Report Form (CRF, or data capture questionnaire for emergency hospital admissions) that fed data into the analysis pipeline to generate on-demand and near real-time reports for members of SAGE and government. My other contribution was with writing and medical scrutiny of peer-reviewed publications that used these data.

Because of my clinical commitments to NHS patients and leading drug and vaccine trials across the urgent-public health research (UPHR) portfolio I was not able to make many meetings. I do not keep records of what meetings I attended and which I could not, due to the intensity of the work at the time. I attended several meetings online with other members of CO-CIN but not many outsiders of this sub-committee, with the exception of SPI-M colleagues.

4. A summary of any documents to which you contributed for the purpose of advising SAGE and/or its related subgroups on the Covid-19 pandemic. Please include links to those documents where possible.

Please see the dynamic CO-CIN reports.

5. A summary of any articles you have written, interviews and/or evidence you have given regarding the work of the above-mentioned groups and/or the UK's response to the Covid-19 pandemic. Please include links to those documents where possible.

Main author publications from ISARIC and CO-CIN;

1. Knight S, Gupta R, Pius R, Carson G, Drake T, Dunning J, Gamble C, **Green CA**, Halpin S, Hardwick H, Holden K, Horby P, Jackson C, Merson L, Nguyen-Van-Tam J, Norman L, Olliaro P, Pritchard M, Russell C, Shaw C, Sheikh A, Solomon T, Sudlow C, Swann O, Turtle L, Openshaw PJM, Docherty AB, Semple MG, Noursadeghi M, Harrison E. **Prospective validation of the 4C prognostic models for adults hospitalised with Covid-19 using the ISARIC WHO Clinical Characterisation Protocol.** *Thorax*. 2021 Nov 22;thoraxjnl-2021-217629. doi: 10.1136/thoraxjnl-2021-217629. Epub ahead of print. PMID: 34810237; PMCID: PMC8610617.
2. Read JM, **Green CA**, Harrison EM, Doherty AB, Funk S, Halpin S, Harrison J, Girvan M, Hardwick HE, Turtle LCW, Dunning J, Nguyen-Van-Tam JS, Openshaw PJM, Baillie JK, Semple MG, and ISARIC4C investigators. **Hospital-acquired SARS-CoV-2 infection in UK hospitals.** *Lancet*. 2021 Aug 12;S0140-6736(21)01786-4. doi: 10.1016/S0140-6736(21)01786-4. Epub ahead of print. PMID: 34391505; PMCID: PMC8360701.
3. Knight SR, Ho A, Pius R, Buchan I, Carson G, Drake TM, Dunning J, Fairfield CJ, Gamble C, **Green CA**, Gupta RK, Halpin S, Hardwick H, Holden K, Horby PW, Jackson C, McLean KA, Merson L, Nguyen-Van-Tam JS, Norman L, Noursadeghi M, Olliaro PL, Pritchard MG, Russell CD, Shaw CA, Sheikh A, Solomon T, Sudlow C, Swann OV, Turtle L, Openshaw PJM, Baillie KJ, Semple MG, Docherty AB, Harrison EM. **Risk stratification of patients admitted to hospital with Covid19 using the ISARIC WHO Clinical Characterisation Protocol: development and validation of the 4C Mortality Score.** *British Medical Journal*. 2020 Sept 09. 2020;370:m3339. doi:10.1136/bmj.m3339.
4. Docherty AB, Harrison EM, **Green CA**, Hardwick H, Pius R, Norman L, Holden KA, Read JM, Dondelinger F, Carson G, Merson L, Lee J, Plotkin D, Sigfrid L, Halpin S, Jackson C, Gamble C, Horby PW, Nguyen-Van-Tam JS, Ho A, Russel CD, Dunning J, Openshaw PJM, Baillie JK, Semple MG. **Features of 20 133 UK patients in hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: prospective observational cohort study.** *British Medical Journal*. 2020;369:m1985. 2020 May 22. doi:10.1136/bmj.m1985.

Contributing author publications from ISARIC and CO-CIN;

5. N rhi F, Moonesinghe SR, Shenkin SD, Drake TM, Mulholland RH, Donegan C, Dunning J, Fairfield CJ, Girvan M, Hardwick HE, Ho A, Leeming G, Nguyen-Van-Tam JS, Pius R, Russell CD, Shaw CA, Spencer RG, Turtle L, Openshaw PJM, Baillie JK, Harrison EM, Semple MG, Docherty AB; **ISARIC4C investigators. Implementation of corticosteroids in treatment of COVID-19 in the ISARIC WHO Clinical Characterisation Protocol UK: prospective, cohort study.** *Lancet Digit Health*. 2022 Apr;4(4):e220-e234. doi: 10.1016/S2589-7500(22)00018-8. PMID: 35337642; PMCID: PMC8940185.
6. Bouziotis J, Arvanitakis M, Preiser JC and the **ISARIC Clinical Characterisation Group. Association of body mass index with COVID-19 related in-hospital death.** *Clin Nutr*. 2022 Jan 29;S0261-5614(22)00026-7. doi: 10.1016/j.clnu.2022.01.017. Epub ahead of print. PMID: 35123821; PMCID: PMC8800162.
7. Rosadas C, Khan M, Parker E, Marchesin F, Katsanovskaja K, Sureda-Vives M, Fernandez N, Randell P, Harvey R, Lilley A, Harris BHL, Zuhair M, Fertleman M, Ijaz S, Dicks S, Short CE, Quinlan R, Taylor GP, Hu K, McKay P, Rosa A, Roustani C, Zuckerman M, El Bouzidi K, Cooke G, Flower B, Moshe M, Elliott P, Spencer AJ, Lambe T, Gilbert SC, Kingston H, Baillie JK, Openshaw PJM, Semple MG, Cherepanov P, McClure MO, Tedder RS; **ISARIC4C Investigators. Detection and quantification of antibody to SARS CoV 2 receptor binding domain**

- provides enhanced sensitivity, specificity and utility. *J Virol Methods*. 2022 Jan 22;302:114475. doi: 10.1016/j.jviromet.2022.114475. Epub ahead of print. PMID: 35077719; PMCID: PMC8782753.
8. Reyes LF, Murthy S, Garcia-Gallo E, Irvine M, Merson L, Martin-Loeches I, Rello J, Taccone FS, Fowler RA, Docherty AM, Kartsonaki C, Aragao I, Barrett PW, Beane A, Burrell A, Cheng MP, Christian MD, Cidade JP, Citarella BW, Donnelly CA, Fernandes SM, French C, Haniffa R, Harrison EM, Ho AWY, Joseph M, Khan I, Kho ME, Kildal AB, Kutsogiannis D, Lamontagne F, Lee TC, Bassi GL, Revilla JWR, Marquis C, Millar J, Neto R, Nichol A, Parke R, Pereira R, Poli S, Pova P, Ramanathan K, Rewa O, Riera J, Shrapnel S, Silva MJ, Udy A, Uyeki T, Webb SA, Wils EJ, Rojek A, Oliaro PL on behalf of the **ISARIC Clinical Characterisation Group**. **Clinical characteristics, risk factors and outcomes in patients with severe COVID-19 registered in the International Severe Acute Respiratory and Emerging Infection Consortium WHO clinical characterisation protocol: a prospective, multinational, multicentre, observational study.** *ERJ Open Research* 2022 8: 00552-2021; doi: 10.1183/23120541.00552-2021.
 1. **ISARIC Clinical Characterisation Group. The value of open-source clinical science in pandemic response: lessons from ISARIC.** *Lancet Infect Dis*. 2021 Dec;21(12):1623-1624. doi: 10.1016/S1473-3099(21)00565-X. Epub 2021 Oct 4. Erratum in: *Lancet Infect Dis*. 2021 Dec;21(12):e363. PMID: 34619109; PMCID: PMC8489876.
 2. **ISARIC Clinical Characterisation Group, Hall MD, Baruch J, Carson G, Citarella BW, Dagens A, Dankwa EA, Donnelly CA, Dunning J, Escher M, Kartsonaki C, Merson L, Pritchard M, Wei J, Horby PW, Rojek A, Oliaro PL. Ten months of temporal variation in the clinical journey of hospitalised patients with COVID-19: An observational cohort.** *Elife*. 2021 Nov 23;10:e70970. doi: 10.7554/eLife.70970. PMID: 34812731; PMCID: PMC8791638.
 3. de Silva TI, Liu G, Lindsey BB, Dong D, Moore SC, Hsu NS, Shah D, Wellington D, Mentzer AJ, Angyal A, Brown R, Parker MD, Ying Z, Yao X, Turtle L, Dunachie S; COVID-19 Genomics UK (COG-UK) Consortium, Maini MK, Ogg G, Knight JC; **ISARIC4C Investigators**, Peng Y, Rowland-Jones SL, Dong T. **The impact of viral mutations on recognition by SARS-CoV-2 specific T cells.** *iScience*. 2021 Nov 19;24(11):103353. doi: 10.1016/j.isci.2021.103353. Epub 2021 Oct 28. PMID: 34729465; PMCID: PMC8552693.
 4. Wickenhagen A, Sugrue E, Lytras S, Kuchi S, Norenberg M, Turnbull ML, Loney C, Herder V, Allan J, Jarmsom I, Cameron-Ruiz N, Varjak M, Pinto RM, Lee JY, Iselin, Palmalux N, Stewart DG, Swingler S, Greenwood EJD, Crozier TWM, Gu Q, Davies EL, Clohisey S, Wang B, Costa F, Santana MF, de Lima Ferreira LC, Murphy L, Fawkes A, Meynert A, Grimes G, **ISARIC 4C Investigators**, da Silva Filho JL, Marti M, Hughes J, Stanton RJ, Wang EY, Ho A, Davis I, Jarrett RF, Castello A, Robertson DL, Semple MG, Openshaw PJM, Palmirini M, Lehner PJ, Baillie JK, Rihn SJ, Wilson SJ. **A prenylated dsRNA sensor protects against severe COVID-19.** *Science*. 2021 Sep 28:eabj3624. doi: 10.1126/science.abj3624. Epub ahead of print. PMID: 34581622.
 5. Yates T, Zaccardi F, Islam N, Razieh C, Gillies CL, Lawson CA, Chudasama Y, Rowlands A, Davies MJ, Docherty AB, Openshaw PJM, Baillie JK, Semple MG; **ISARIC4C investigators**, Khunti K. **Obesity, Ethnicity, and Risk of Critical Care, Mechanical Ventilation, and Mortality in Patients Admitted to Hospital with COVID-19: Analysis of the ISARIC CCP-UK Cohort.** *Obesity (Silver Spring)*. 2021 Jul;29(7):1223-1230. doi: 10.1002/oby.23178. Epub 2021 May 14. PMID: 33755331; PMCID: PMC8251439.
 6. Russell CD, Fairfield CJ, Drake TM, Turtle L, Seaton RA, Wootton DG, Sigfrid L, Harrison EM, Docherty AB, de Silva TI, Egan C, Pius R, Hardwick HE, Merson L, Girvan M, Dunning J, Nguyen-Van-Tam JS, Openshaw PJM, Baillie JK, Semple MG, Ho A; **ISARIC4C investigators**. **Co-infections, secondary infections, and antimicrobial use in patients hospitalised with COVID-19 during the first pandemic wave from the ISARIC WHO CCP-UK study: a multicentre, prospective cohort study.** *Lancet Microbe*. 2021 Jun 2. doi: 10.1016/S2666-5247(21)00090-2. Epub ahead of print. PMID: 34100002; PMCID: PMC8172149.
 7. **ISARIC Clinical Characterisation Group. COVID-19 symptoms at hospital admission vary with age and sex: results from the ISARIC prospective multinational observational study.** *Infection*. 2021 Jun 25:1-17. doi: 10.1007/s15010-021-01599-5. Epub ahead of print. PMID: 34170486; PMCID: PMC8231091.
 8. Docherty AB, Mulholland RH, Lone NI, Cheyne CP, De Angelis D, Diaz-Ordaz K, Donegan C, Drake TM, Dunning J, Funk S, García-Fiñana M, Girvan M, Hardwick HE, Harrison J, Ho A, Hughes DM, Keogh RH, Kirwan PD, Leeming G, Nguyen Van-Tam JS, Pius R, Russell CD, Spencer RG, Tom BD, Turtle L, Openshaw PJ, Baillie JK, Harrison EM, Semple MG; **ISARIC4C Investigators**. **Changes in in-hospital mortality in the first wave of COVID-19: a multicentre prospective observational cohort study using the WHO Clinical Characterisation Protocol UK.** *Lancet Respir Med*. 2021 May 14:S2213-2600(21)00175-2. doi: 10.1016/S2213-2600(21)00175-2. Epub ahead of print. PMID: 34000238; PMCID: PMC8121531.
 9. Davies NG, Barnard RC, Jarvis CI, Russell TW, Semple MG, Jit M, Edmunds WJ; Centre for Mathematical Modelling of Infectious Diseases COVID-19 Working Group; **ISARIC4C investigators**. **Association of tiered restrictions and a second lockdown with COVID-19 deaths and hospital admissions in England: a modelling study.** *Lancet Infect Dis*. 2021 Apr;21(4):482-492. doi: 10.1016/S1473-3099(20)30984-1. Epub 2020 Dec 24. PMID: 33357518; PMCID: PMC7758181.
 10. Bloom CI, Drake TM, Docherty AB, Lipworth BJ, Johnston SL, Nguyen-Van-Tam JS, Carson G, Dunning J, Harrison EM, Baillie JK, Semple MG, Cullinan P, Openshaw PJM; **ISARIC investigators**. **Risk of adverse outcomes in patients with underlying respiratory conditions admitted to hospital with COVID-19: a national, multicentre prospective cohort study using the ISARIC WHO Clinical Characterisation Protocol UK.** *Lancet Respir Med*. 2021 Mar 4:S2213-2600(21)00013-8. doi: 10.1016/S2213-2600(21)00013-8. Epub ahead of print. PMID: 33676593.

11. Sigfrid L, Drake TM, Pauley E, Jesudason EC, Oliaro P, Lim WS, Gillesen A, Berry C, Lowe DJ, McPeake J, Lone N, Munblit D, Cevik M, Casey A, Bannister P, Russell CD, Goodwin L, Ho A, Turtle L, O'Hara ME, Hastie C, Donohue C, Spencer RG, Donegan C, Gummery A, Harrison J, Hardwick HE, Hastie CE, Carson G, Merson L, Baillie JK, Openshaw P, Harrison EM, Docherty AB, Semple MG, Scott JT; **ISARIC4C investigators. Long Covid in adults discharged from UK hospitals after Covid-19: A prospective, multicentre cohort study using the ISARIC WHO Clinical Characterisation Protocol.** *Lancet Reg Health Eur.* 2021 Sep;8:100186. doi: 10.1016/j.lanepe.2021.100186. Epub 2021 Aug 6. PMID: 34386785; PMCID: PMC8343377.
12. Leclerc QJ, Fuller NM, Keogh RH, Diaz-Ordaz K, Sekula R, Semple MG; ISARIC4C Investigators; CMMID COVID-19 Working Group, Atkins KE, Procter SR, Knight GM, **ISARIC 4C Investigators. Importance of patient bed pathways and length of stay differences in predicting COVID-19 hospital bed occupancy in England.** *BMC Health Serv Res.* 2021 Jun 9;21(1):566. doi: 10.1186/s12913-021-06509-x. PMID: 34107928; PMCID: PMC8188158.
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22. [plus others currently in preparation or submission]

6. Your views as to whether the work of the above-mentioned groups in responding to the Covid-19 pandemic (or the UK's response more generally) succeeded in its aims.

It is my view that the rapid analysis and publication of observational hospital epidemiology data was invaluable in helping clinicians, public health bodies, members of the public and others in understanding the dynamic nature and scale of the pandemic in the UK.

7. Your views as to any lessons that can be learned from the UK's response to the Covid-19 pandemic, in particular relating to the work of the above-mentioned groups. Please describe any changes that have already been made, and set out any recommendations for further changes that you think the Inquiry should consider making.

Modern healthcare collects a wealth of electronic health records (EHRs) but the NHS digital infrastructure does not support the exploitation of this great resource. The impact of CO-CIN was immensely successful but needed manual entry of data from NHS EHRs onto the CO-CIN CRFs using a small army of volunteers (in Birmingham alone we needed over 80 medical student volunteers). For future disease outbreaks, we should aim to have connected data and immediate ability to undertake hospital disease epidemiology surveillance.

Outside of my contribution to CO-CIN I also worked as the local UHB Principal Investigator for RECOVERY, RECOVERY-Respiratory Support and 7 separate COVID-19 vaccine trials co-ordinated by the NIHR vaccine taskforce. A common reflection from the success in these translational research programmes was the unified and highly effective working between NIHR and the NHS. For example, the platform design of the RECOVERY trial allowed a very rapid assessment of potential drug therapies and whether there were clinical benefits from them, even if we did not take biological samples to look at how they succeeded or failed. For the recruitment to COVID-19 vaccine trials, the creation of the NIHR Vaccine Register was highly effective in supporting the pace needed for this area of translational research. Thought is needed on how we sustain the lessons learned, fund the research that the NHS and global health community need, and continue to show the good value for money this cost represents.

8. A brief description of documentation relating to these matters that you hold (including soft copy material held electronically). Please retain all such material. I am not asking for you to provide us with this material at this stage, but I may request that you do so in due course.

All materials are available online.