

GenOMICC Investigators

GenOMICC Consortium

GenOMICC Co-Investigator

J. Kenneth Baillie^{36,37}, Colin Begg³⁸, Sara Clohisey³⁶, Charles Hinds³⁹, Peter Horby⁴⁰, Julian Knight⁴¹, Lowell Ling⁴², David Maslove⁴³, Danny McAuley^{44,45}, Johnny Millar³⁶, Hugh Montgomery⁴⁶, Alistair Nichol⁴⁷, Peter J.M. Openshaw^{48,49}, Alexandre C Pereira⁵⁰, Chris P Ponting⁵¹, Kathy Rowan⁵², Malcolm G Semple^{53,54}, Manu Shankar-Hari⁵⁵, Charlotte Summers⁵⁶, Timothy Walsh³⁷.

Management, Laboratory and Data team

Latha Aravindan⁵⁷, Ruth Armstrong³⁶, J. Kenneth Baillie^{36,37}, Heather Biggs⁵⁸, Ceilia Boz³⁶, Adam Brown³⁶, Richard Clark⁵⁹, Sara Clohisey³⁶, Audrey Coutts⁵⁹, Judy Coyle³⁶, Louise Cullum³⁶, Sukamal Das⁵⁷, Nicky Day³⁶, Lorna Donnelly⁵⁹, Esther Duncan³⁶, Angie Fawkes⁵⁹, Paul Finernan³⁶, Max Head Fourman³⁶, Anita Furlong⁵⁸, James Furniss³⁶, Bernadette Gallagher³⁶, Tammy Gilchrist⁵⁹, Ailsa Golightly³⁶, Fiona Griffiths³⁶, Katarzyna Hafezi⁵⁹, Debbie Hamilton³⁶, Ross Hendry³⁶, Andy Law³⁶, Dawn Law³⁶, Rachel Law³⁶, Sarah Law³⁶, Rebecca Lidstone-Scott³⁶, Louise Macgillivray⁵⁹, Alan Maclean⁵⁹, Hanning Mal³⁶, Sarah McCafferty⁵⁹, Ellie McMaster³⁶, Jen Meikle³⁶, Shona C Moore⁵³, Kirstie Morrice⁵⁹, Lee Murphy⁵⁹, Sheena Murphy⁵⁷, Mybaya Hellen³⁶, Wilna Oosthuyzen³⁶, Chenqing Zheng⁶⁰, Jiantao Chen⁶⁰, Nick Parkinson³⁶, Trevor Paterson³⁶, Katherine Schon⁵⁸, Andrew Stenhouse³⁶, Mihaela Das⁵⁷, Maaïke Swets^{36,61}, Helen Zoor-McElhinney³⁶, Filip Taneski³⁶, Lance Turtle⁵³, Tony Wackett³⁶, Mairi Ward³⁶, Jane Weaver³⁶, Nicola Wrobel⁵⁹, Marie Zechner³⁶, Mybaya Hellen³⁶.

Guys and St Thomas' Hospital team

Gill Arbane⁶², Aneta Bociek⁶², Sara Campos⁶², Neus Grau⁶², Tim Owen Jones⁶², Rosario Lim⁶², Martina Marotti⁶², Marlies Ostermann⁶², Manu Shankar-Hari⁶², Christopher Whitton⁶².

Barts Health NHS Trust team

Zoe Alldis⁶³, Raine Astin-Chamberlain⁶³, Fatima Bibi⁶³, Jack Biddle⁶³, Sarah Blow⁶³, Matthew Bolton⁶³, Catherine Borra⁶³, Ruth Bowles⁶³, Maudrian Burton⁶³, Yasmin Choudhury⁶³, David Collier⁶³, Amber Cox⁶³, Amy Easthope⁶³, Patrizia Ebano⁶³, Stavros Fotiadis⁶³, Jana Gurasashvili⁶³, Rosslyn Halls⁶³, Pippa Hartridge⁶³, Delordson Kallon⁶³, Jamila Kassam⁶³, Ivone Lancoma-Malcolm⁶³, Maninderpal Matharu⁶³, Peter May⁶³, Oliver Mitchelmore⁶³, Tabitha Newman⁶³, Mital Patel⁶³, Jane Pheby⁶³, Irene Pinzuti⁶³, Zoe Prime⁶³, Oleksandra Prsyazhna⁶³, Julian Shiel⁶³, Melanie Taylor⁶³, Carey Tierney⁶³, Suzanne Wood⁶³, Anne Zak⁶³, Olivier Zongo⁶³.

James Cook University Hospital team

Stephen Bonner⁶⁴, Keith Hugill⁶⁴, Jessica Jones⁶⁴, Steven Liggett⁶⁴, Evie Headlam⁶⁴.

Royal Stoke University Hospital team

Nageswar Bandla⁶⁵, Minnie Gellamucho⁶⁵, Michelle Davies⁶⁵, Christopher Thompson⁶⁵.

North Middlesex University Hospital NHS trust team

Marwa Abdelrazik⁶⁶, Dhanalakshmi Bakthavatsalam⁶⁶, Munzir Elhassan⁶⁶, Arunkumar Ganesan⁶⁶, Anne Haldeos⁶⁶, Jeronimo Moreno-Cuesta⁶⁶, Dharam Purohit⁶⁶, Rachel Vincent⁶⁶, Kugan Xavier⁶⁶, kumar Rohit⁶⁷, Frater Alasdair⁶⁶, Malik Saleem⁶⁶, Carter David⁶⁶, Jenkins Samuel⁶⁶, Zoe Lamond⁶⁶, Wall Alanna⁶⁶.

The Royal Liverpool University Hospital team

Jaime Fernandez-Roman⁶⁸, David O. Hamilton⁶⁸, Emily Johnson⁶⁸, Brian Johnston⁶⁸, Maria Lopez Martinez⁶⁸, Suleman Mulla⁶⁸, David Shaw⁶⁸, Alicia A.C. Waite⁶⁸, Victoria Waugh⁶⁸, Ingeborg D. Welters⁶⁸, Karen Williams⁶⁸.

King's College Hospital team

Anna Cavazza⁶⁹, Maeve Cockrell⁶⁹, Eleanor Corcoran⁶⁹, Maria Depante⁶⁹, Clare Finney⁶⁹, Ellen Jerome⁶⁹, Mark McPhail⁶⁹, Monalisa Nayak⁶⁹, Harriet Noble⁶⁹, Kevin O'Reilly⁶⁹, Evita Pappa⁶⁹, Rohit Saha⁶⁹, Sian Saha⁶⁹, John Smith⁶⁹, Abigail Knighton⁶⁹.

Charing Cross Hospital team

David Antcliffe⁷⁰, Dorota Banach⁷⁰, Stephen Brett⁷⁰, Phoebe Coghlan⁷⁰, Ziortza Fernandez⁷⁰, Anthony Gordon⁷⁰, Roceld Rojo⁷⁰, Sonia Sousa Arias⁷⁰, Maie Templeton⁷⁰.

Nottingham University Hospital team

Megan Meredith⁷¹, Lucy Morris⁷¹, Lucy Ryan⁷¹, Amy Clark⁷¹, Julia Sampson⁷¹, Cecilia Peters⁷¹, Martin Dent⁷¹, Margaret Langley⁷¹, Saima Ashraf⁷¹, Shuying Wei⁷¹, Angela Andrew⁷¹.

John Radcliffe Hospital team

Archana Bashyal⁷², Neil Davidson⁷², Paula Hutton⁷², Stuart McKechnie⁷², Jean Wilson⁷².

Kingston Hospital team

David Baptista⁷³, Rebecca Crowe⁷³, Rita Fernandes⁷³, Rosaleen Herdman-Grant⁷³, Anna Joseph⁷³, Denise O'Connor⁷⁴, Meryem Allen⁷³, Adam Loveridge⁷³, India McKenley⁷³, Eriko Morino⁷³, Andres Naranjo⁷³, Richard Simms⁷³, Kathryn Sollesta⁷³, Andrew Swain⁷³, Harish Venkatesh⁷³, Jacyntha Khera⁷³, Jonathan Fox⁷³.

Royal Infirmary of Edinburgh team

Gillian Andrew⁷⁵, J. Kenneth Baillie⁷⁵, Lucy Barclay⁷⁵, Marie Callaghan⁷⁵, Rachael Campbell⁷⁵, Sarah Clark⁷⁵, Dave Hope⁷⁵, Lucy Marshall⁷⁵, Corrienne McCulloch⁷⁵, Kate Briton⁷⁵, Jo Singleton⁷⁵, Sophie Birch⁷⁵.

Queen Alexandra Hospital team

Lutece Brimfield⁷⁶, Zoe Daly⁷⁶, David Pogson⁷⁶, Steve Rose⁷⁶.

Morrison Hospital team

Ceri Battle⁷⁷, Elaine Brinkworth⁷⁷, Rachel Harford⁷⁷, Carl Murphy⁷⁷, Luke Newey⁷⁷, Tabitha Rees⁷⁷, Marie Williams⁷⁷, Sophie Arnold⁷⁷.

Addenbrooke's Hospital team

Petra Polgarova⁷⁸, Katerina Stroud⁷⁸, Charlotte Summers⁷⁸, Eoghan Meaney⁷⁸, Megan Jones⁷⁸, Anthony Ng⁷⁸, Shruti Agrawal⁷⁸, Nazima Pathan⁷⁸, Deborah White⁷⁸, Esther Daubney⁷⁸, Kay Elston⁷⁸.

BHRUT (Barking Havering) - Queens Hospital and King George Hospital team

Lina Grauslyte⁷⁹, Musarat Hussain⁷⁹, Mandeep Phull⁷⁹, Tatiana Pogreban⁷⁹, Lace Rosaroso⁷⁹, Erika Salciute⁷⁹, George Franke⁷⁹, Joanna Wong⁷⁹, Aparna George⁷⁹.

Royal Sussex County Hospital team

Laura Ortiz-Ruiz de Gordo⁸⁰, Emily Peasgood⁸⁰, Claire Phillips⁸⁰, Laura Ortiz-Ruiz de Gordo⁸⁰, Emily Peasgood⁸⁰, Claire Phillips⁸⁰.

Queen Elizabeth Hospital team

Michelle Bates⁸¹, Jo Dasgin⁸¹, Jaspret Gill⁸¹, Annette Nilsson⁸¹, James Scriven⁸¹, Amy Collins¹⁴³, Waqas Khaliq¹⁴³, Estefania Treus Gude¹⁴³.

St George's Hospital team

Carlos Castro Delgado⁸², Deborah Dawson⁸², Lijun Ding⁸², Georgia Durrant⁸², Obiageri Ezeobu⁸², Sarah Farnell-Ward⁸², Abiola Harrison⁸², Rebecca Kanu⁸², Susannah Leaver⁸², elena Maccacari⁸², Soumendu Manna⁸², Romina Pepermans Saluzzio⁸², Joana Queiroz⁸², Tinashe Samakomva⁸², Christine Sicut⁸², Joana Texeira⁸², Edna Fernandes Da Gloria⁸², Ana Lisboa⁸², John Rawlins⁸², Jisha Mathew⁸², Ashley Kinch⁸², William James Hurt⁸², Nirav Shah⁸², Victoria Clark⁸², Maria Thanasi⁸², Nikki Yun⁸², Kamal Patel⁸².

Stepping Hill Hospital team

Sara Bennett⁸³, Emma Goodwin⁸³, Matthew Jackson⁸³, Alissa Kent⁸³, Clare Tibke⁸³, Wiesia Woodyatt⁸³, Ahmed Zaki⁸³.

Countess of Chester Hospital team

Azmerelda Abraheem⁸⁴, Peter Bamford⁸⁴, Kathryn Cawley⁸⁴, Charlie Dunmore⁸⁴, Maria Faulkner⁸⁴, Rumanah Girach⁸⁴, Helen Jeffrey⁸⁴, Rhianna Jones⁸⁴, Emily London⁸⁴, Imrun Nagra⁸⁴, Farah Nasir⁸⁴, Hannah Sainsbury⁸⁴, Clare Smedley⁸⁴.

Royal Blackburn Teaching Hospital team

Tahera Patel⁸⁵, Matthew Smith⁸⁵, Srikanth Chukkambotla⁸⁵, Aayesha Kazi⁸⁵, Janice Hartley⁸⁵, Joseph Dykes⁸⁵, Muhammad Hijazi⁸⁵, Sarah Keith⁸⁵, Meherunnisa Khan⁸⁵, Janet Ryan-Smith⁸⁵, Philippa Springle⁸⁵, Jacqueline Thomas⁸⁵, Nick Truman⁸⁵, Samuel Saad⁸⁵, Dabheoc Coleman⁸⁵, Christopher Fine⁸⁵, Roseanna Matt⁸⁵, Bethan Gay⁸⁵, Jack Dalziel⁸⁵, Syamlan Ali⁸⁵, Drew Goodchild⁸⁵, Rhiannan Harling⁸⁵, Ravi Bhattejee⁸⁵, Wendy Goddard⁸⁵, Chloe Davison⁸⁵, Stephen Duberly⁸⁵, Jeanette Hargreaves⁸⁵, Rachel Bolton⁸⁵.

The Tunbridge Wells Hospital and Maidstone Hospital team

Miriam Davey⁸⁶, David Golden⁸⁶, Rebecca Seaman⁸⁶.

Royal Gwent Hospital team

Shiney Cherian⁸⁷, Sean Cutler⁸⁷, Anne Emma Heron⁸⁷, Anna Roynon-Reed⁸⁷, Tamas Szakmany⁸⁷, Gemma Williams⁸⁷, Owen Richards⁸⁷, Yusuf Cheema⁸⁷.

Pinderfields General Hospital team

Hollie Brooke⁸⁸, Sarah Buckley⁸⁸, Jose Cebrian Suarez⁸⁸, Ruth Charlesworth⁸⁸, Karen Hansson⁸⁸, John Norris⁸⁸, Alice Poole⁸⁸, Alastair Rose⁸⁸, Rajdeep Sandhu⁸⁸, Brendan Sloan⁸⁸, Elizabeth Smithson⁸⁸, Muthu Thirumaran⁸⁸, Veronica Wagstaff⁸⁸, Alexandra Metcalfe⁸⁸.

Royal Berkshire NHS Foundation Trust team

Mark Brunton⁸⁹, Jess Catterson⁸⁹, Holly Coles⁸⁹, Matthew Frise⁸⁹, Sabi Gurung Rai⁸⁹, Nicola Jacques⁸⁹, Liza Keating⁸⁹, Emma Tilney⁸⁹, Shauna Bartley⁸⁹, Parminder Bhuie⁸⁹.

Broomfield Hospital team

Sian Gibson⁹⁰, Amanda Lyle⁹⁰, Fiona McNeela⁹⁰, Jayachandran Radhakrishnan⁹⁰, Alistair Hughes⁹⁰.

Northumbria Healthcare NHS Foundation Trust team

Bryan Yates⁹¹, Jessica Reynolds⁹¹, Helen Campbell⁹¹, Maria Thompsom⁹¹, Steve Dodds⁹¹, Stacey Duffy⁹¹.

Whiston Hospital team

Sandra Greer⁹², Karen Shuker⁹², Ascanio Tridente⁹².

Croydon University Hospital team

Reena Khade⁹³, Ashok Sundar⁹³, George Tsinaslanidis⁹³.

York Hospital team

Isobel Birkinshaw⁹⁴, Joseph Carter⁹⁴, Kate Howard⁹⁴, Joanne Ingham⁹⁴, Rosie Joy⁹⁴, Harriet Pearson⁹⁴, Samantha Roche⁹⁴, Zoe Scott⁹⁴.

Heartlands Hospital team

Hollie Bancroft⁹⁵, Mary Bellamy⁹⁵, Margaret Carmody⁹⁵, Jacqueline DGLISH⁹⁵, Faye Moore⁹⁵, Joanne Rhodes⁹⁵, Mirriam Sangombe⁹⁵, Salma Kadiri⁹⁵, James Scriven⁹⁵.

Ashford and St Peter's Hospital team

Maria Croft⁹⁶, Ian White⁹⁶, Victoria Frost⁹⁶, Maia Aquino⁹⁶.

Barnet Hospital team

Rajeev Jha⁹⁷, Vinodh Krishnamurthy⁹⁷, Lai Lim⁹⁷, Rajeev Jha⁹⁷, Vinodh Krishnamurthy⁹⁷, Li Lim⁹⁷.

East Surrey Hospital team

Edward Combes⁹⁸, Teishel Joefield⁹⁸, Sonja Monnery⁹⁸, Valerie Beech⁹⁸, Sallyanne Trotman⁹⁸.

Ninewells Hospital team

Christine Almaden-Boyle⁹⁹, Pauline Austin⁹⁹, Louise Cabrelli⁹⁹, Stephen Cole⁹⁹, Matt Casey⁹⁹, Susan Chapman⁹⁹, Stephen Cole⁹⁹, Clare Whyte⁹⁹.

Worthing Hospital team

Yolanda Baird¹⁰⁰, Aaron Butler¹⁰⁰, Indra Chadbourn¹⁰⁰, Linda Folkes¹⁰⁰, Heather Fox¹⁰⁰, Amy Gardner¹⁰⁰, Raquel Gomez¹⁰⁰, Gillian Hobden¹⁰⁰, Luke Hodgson¹⁰⁰, Kirsten King¹⁰⁰, Michael Margaron¹⁰⁰, Tim Martindale¹⁰⁰, Emma Meadows¹⁰⁰, Dana Raynard¹⁰⁰, Yvette Thirlwall¹⁰⁰, David Helm¹⁰⁰, Jordi Margalef¹⁰⁰.

Southampton General Hospital team

Kristine Criste¹⁰¹, Rebecca Cusack¹⁰¹, Kim Golder¹⁰¹, Hannah Golding¹⁰¹, Oliver Jones¹⁰¹, Samantha Leggett¹⁰¹, Michelle Male¹⁰¹, Martyna Marani¹⁰¹, Kirsty Prager¹⁰¹, Toran Williams¹⁰¹, Belinda Roberts¹⁰¹, Karen Salmon¹⁰¹.

The Alexandra Hospital team

Peter Anderson¹⁰², Katie Archer¹⁰², Karen Austin¹⁰², caroline Davis¹⁰², Alison Durie¹⁰², Olivia Kelsall¹⁰², Jessica Thrush¹⁰², Charlie Vigurs¹⁰², Laura Wild¹⁰², Hannah-Louise Wood¹⁰², Helen Tranter¹⁰², Alison Harrison¹⁰², Nicholas Cowley¹⁰², Michael McAlindon¹⁰², Andrew Burtenshaw¹⁰², Stephen Digby¹⁰², Emma Low¹⁰², Aled Morgan¹⁰², Naiara Cother¹⁰², Tobias Rankin¹⁰², Sarah Clayton¹⁰², Alex McCurdy¹⁰².

Sandwell General Hospital and City Hospital team

Cecilia Ahmed¹⁰³, Balvinder Baines¹⁰³, Sarah Clamp¹⁰³, Julie Colley¹⁰³, Risna Haq¹⁰³, Anne Hayes¹⁰³, Jonathan Hulme¹⁰³, Samia Hussain¹⁰³, Sibet Joseph¹⁰³, Rita Kumar¹⁰³, Zahira Maqsood¹⁰³, Manjit Purewal¹⁰³.

Blackpool Victoria Hospital team

Leonie Benham¹⁰⁴, Zena Bradshaw¹⁰⁴, Joanna Brown¹⁰⁴, Melanie Caswell¹⁰⁴, Jason Cupitt¹⁰⁴, Sarah Melling¹⁰⁴, Stephen Preston¹⁰⁴, Nicola Slawson¹⁰⁴, Emma Stoddard¹⁰⁴, Scott Warden¹⁰⁴.

Royal Glamorgan Hospital team

Bethan Deacon¹⁰⁵, Ceri Lynch¹⁰⁵, Carla Potheary¹⁰⁵, Lisa Roche¹⁰⁵, Gwenllian Sera Howe¹⁰⁵, Jayaprakash Singh¹⁰⁵, Keri Turner¹⁰⁵, Hannah Ellis¹⁰⁵, Natalie Stroud¹⁰⁵.

The Royal Oldham Hospital team

Jodie Hunt¹⁰⁶, Joy Dearden¹⁰⁶, Emma Dobson¹⁰⁶, Andy Drummond¹⁰⁶, Michelle Mulcahy¹⁰⁶, Sheila Munt¹⁰⁶, Grainne O'Connor¹⁰⁶, Jennifer Philbin¹⁰⁶, Chloe Rishton¹⁰⁶, Redmond Tully¹⁰⁶, Sarah Winnard¹⁰⁶.

Glasgow Royal Infirmary team

Susanne Cathcart¹⁰⁷, Katharine Duffy¹⁰⁷, Alex Puxty¹⁰⁷, Kathryn Puxty¹⁰⁷, Lynne Turner¹⁰⁷, Jane Ireland¹⁰⁷, Gary Semple¹⁰⁷.

St James's University Hospital and Leeds General Infirmary team

Kate Long¹⁰⁸, Simon Whiteley¹⁰⁸, Elizabeth Wilby¹⁰⁸, Bethan Ogg¹⁰⁸.

University Hospital North Durham team

Amanda Cowton¹⁰⁹, Andrea Kay¹⁰⁹, Melanie Kent¹⁰⁹, Kathryn Potts¹⁰⁹, Ami Wilkinson¹⁰⁹, Suzanne Campbell¹⁰⁹, Ellen Brown¹⁰⁹.

Fairfield General Hospital team

Julie Melville¹¹⁰, Jay Naisbitt¹¹⁰, Rosane Joseph¹¹⁰, Maria Lazo¹¹⁰, Olivia Walton¹¹⁰, Alan Neal¹¹⁰.

Wythenshawe Hospital team

Peter Alexander¹¹¹, Schvearn Allen¹¹¹, Joanne Bradley-Potts¹¹¹, Craig Brantwood¹¹¹, Jasmine Egan¹¹¹, Timothy Felton¹¹¹, Grace Padden¹¹¹, Luke Ward¹¹¹, Stuart Moss¹¹¹, Susannah Glasgow¹¹¹.

Royal Alexandra Hospital team

Lynn Abel¹¹², Michael Brett¹¹², Brian Digby¹¹², Lisa Gemmell¹¹², James Hornsby¹¹², Patrick MacGoey¹¹², Pauline O'Neil¹¹², Richard Price¹¹², Natalie Rodden¹¹², Kevin Rooney¹¹², Radha Sundaram¹¹², Nicola Thomson¹¹².

Good Hope Hospital team

Bridget Hopkins¹¹³, James Scriven¹¹³, Laura Thrasyvoulou¹¹³, Heather Willis¹¹³.

Tameside General Hospital team

Martyn Clark¹¹⁴, Martina Coulding¹¹⁴, Edward Jude¹¹⁴, Jacqueline McCormick¹¹⁴, Oliver Mercer¹¹⁴, Darsh Potla¹¹⁴, Hafiz Rehman¹¹⁴, Heather Savill¹¹⁴, Victoria Turner¹¹⁴.

Royal Derby Hospital team

Charlotte Downes¹¹⁵, Kathleen Holding¹¹⁵, Katie Riches¹¹⁵, Mary Hilton¹¹⁵, Mel Hayman¹¹⁵, Deepak Subramanian¹¹⁵, Priya Daniel¹¹⁵.

Medway Maritime Hospital team

Oluronke Adanini¹¹⁶, Nikhil Bhatia¹¹⁶, Maines Msiska¹¹⁶, Rebecca Collins¹¹⁶.

Royal Victoria Infirmary team

Ian Clement¹¹⁷, Bijal Patel¹¹⁷, A Gulati¹¹⁷, Carole Hays¹¹⁷, K Webster¹¹⁷, Anne Hudson¹¹⁷, Andrea Webster¹¹⁷, Elaine Stephenson¹¹⁷, Louise McCormack¹¹⁷, Victoria Slater¹¹⁷, Rachel Nixon¹¹⁷, Helen Hanson¹¹⁷, Maggie fearby¹¹⁷, Sinead Kelly¹¹⁷, Victoria Bridgett¹¹⁷, Philip Robinson¹¹⁷.

Poole Hospital team

Julie Camsooksai¹¹⁸, Charlotte Humphrey¹¹⁸, Sarah Jenkins¹¹⁸, Henrik Reschreiter¹¹⁸, Beverley Wadams¹¹⁸, Yasmin Death¹¹⁸.

Bedford Hospital team

Victoria Bastion¹¹⁹, Daphene Clarke¹¹⁹, Beena David¹¹⁹, Harriet Kent¹¹⁹, Rachel Lorusso¹¹⁹, Gamu Lubimbi¹¹⁹, Sophie Murdoch¹¹⁹, Melchizedek Penacerrada¹¹⁹, Alastair Thomas¹¹⁹, Jennifer Valentine¹¹⁹, Ana Vochin¹¹⁹, Retno Wulandari¹¹⁹, Brice Djeugam¹¹⁹.

Queens Hospital Burton team

Gillian Bell¹²⁰, Katy English¹²⁰, Amro Katary¹²⁰, Louise Wilcox¹²⁰.

North Manchester General Hospital team

Michelle Bruce¹²¹, Karen Connolly¹²¹, Tracy Duncan¹²¹, Helen T-Michael¹²¹, Gabriella Lindergard¹²¹, Samuel Hey¹²¹, Claire Fox¹²¹, Jordan Alfonso¹²¹, Laura Jayne Durrans¹²¹, Jacinta Guerin¹²¹, Bethan Blackledge¹²¹, Jade Harris¹²¹, Martin Hruska¹²¹, Ayaa Eltayeb¹²¹, Thomas Lamb¹²¹, Tracey Hodgkiss¹²¹, Lisa Cooper¹²¹, Joanne Rothwell¹²¹.

Aberdeen Royal Infirmary team

Angela Allan¹²², Felicity Anderson¹²², Callum Kaye¹²², Jade Liew¹²², Jasmine Medhora¹²², Teresa Scott¹²², Erin Trumper¹²², Adriana Botello¹²².

Derriford Hospital team

Liana Lankester¹²³, Nikitas Nikitas¹²³, Colin Wells¹²³, Bethan Stowe¹²³, Kayleigh Spencer¹²³.

Manchester Royal Infirmary team

Craig Brandwood¹²⁴, Lara Smith¹²⁴, Richard Clark¹²⁴, Katie Birchall¹²⁴, Laurel Kolakaluri¹²⁴, Deborah Baines¹²⁴, Anila Sukumaran¹²⁴.

Salford Royal Hospital team

Elena Apetri¹²⁵, Cathrine Basikolo¹²⁵, Bethan Blackledge¹²⁵, Laura Catlow¹²⁵, Bethan Charles¹²⁵, Paul Dark¹²⁵, Reece Doonan¹²⁵, Jade Harris¹²⁵, Alice Harvey¹²⁵, Daniel Horner¹²⁵, Karen Knowles¹²⁵, Stephanie Lee¹²⁵, Diane Lomas¹²⁵, Chloe Lyons¹²⁵, Tracy Marsden¹²⁵, Danielle McLaughlan¹²⁵, Liam McMorro¹²⁵, Jessica Pendlebury¹²⁵, Jane Perez¹²⁵, Maria Poulaka¹²⁵, Nicola Proudfoot¹²⁵, Melanie Slaughter¹²⁵, Kathryn Slevin¹²⁵, Melanie Taylor¹²⁵, Vicky Thomas¹²⁵, Danielle Walker¹²⁵, Angiy Michael¹²⁵, Matthew Collis¹²⁵.

William Harvey Hospital team

Tracey Cosier¹²⁶, Gemma Millen¹²⁶, Neil Richardson¹²⁶, Natasha Schumacher¹²⁶, Heather Weston¹²⁶, James Rand¹²⁶.

Queen Elizabeth University Hospital team

Nicola Baxter¹²⁷, Steven Henderson¹²⁷, Sophie Kennedy-Hay¹²⁷, Christopher McParland¹²⁷, Laura Rooney¹²⁷, Malcolm Sim¹²⁷, Gordan McCreath¹²⁷.

Bradford Royal Infirmary team

Louise Akeroyd¹²⁸, Shereen Bano¹²⁸, Matt Bromley¹²⁸, Lucy Gurr¹²⁸, Tom Lawton¹²⁸, James Morgan¹²⁸, Kirsten Sellick¹²⁸, Deborah Warren¹²⁸, Brian Wilkinson¹²⁸, Janet McGowan¹²⁸, Camilla Ledgard¹²⁸, Amelia Stacey¹²⁸, Kate Pye¹²⁸, Ruth Bellwood¹²⁸, Michael Bentley¹²⁸.

Bristol Royal Infirmary team

Jeremy Bewley¹²⁹, Zoe Garland¹²⁹, Lisa Grimmer¹²⁹, Bethany Gumbrill¹²⁹, Rebekah Johnson¹²⁹, Katie Sweet¹²⁹, Denise Webster¹²⁹, Georgia Efford¹²⁹.

Norfolk and Norwich University hospital (NNUH) team

Karen Convery¹³⁰, Deirdre Fottrell-Gould¹³⁰, Lisa Hudig¹³⁰, Jocelyn Keshet-Price¹³⁰, Georgina Randell¹³⁰, Katie Stammers¹³⁰.

Queen Elizabeth Hospital Gateshead team

Maria Bokhari¹³¹, Vanessa Linnett¹³¹, Rachael Lucas¹³¹, Wendy McCormick¹³¹, Jenny Ritzema¹³¹, Amanda Sanderson¹³¹, Helen Wild¹³¹.

Sunderland Royal Hospital team

Anthony Rostron¹³², Alistair Roy¹³², Lindsey Woods¹³², Sarah Cornell¹³², Fiona Wakinshaw¹³², Kimberley Rogerson¹³², Jordan Jarmain¹³².

Aintree University Hospital team

Robert Parker¹³³, Amie Reddy¹³³, Ian Turner-Bone¹³³, Laura Wilding¹³³, Peter Harding¹³³.

Hull Royal Infirmary team

Caroline Abernathy¹³⁴, Louise Foster¹³⁴, Andrew Gratrix¹³⁴, Vicky Martinson¹³⁴, Priyai Parkinson¹³⁴, Elizabeth Stones¹³⁴, Lluicia Carbral-Ortega¹³⁵.

University College Hospital team

Georgia Bercades¹³⁶, David Brealey¹³⁶, Ingrid Hass¹³⁶, Niall MacCallum¹³⁶, Gladys Martir¹³⁶, Eamon Raith¹³⁶, Anna Reyes¹³⁶, Deborah Smyth¹³⁶.

Royal Devon and Exeter Hospital team

Letizia Zitter¹³⁷, Sarah Benyon¹³⁷, Suzie Marriott¹³⁷, Linda Park¹³⁷, Samantha Keenan¹³⁷, Elizabeth Gordon¹³⁷, Helen Quinn¹³⁷, Kizzy Baines¹³⁷.

The Royal Papworth Hospital team

Lenka Cagova¹³⁸, Adama Fofano¹³⁸, Lucie Garner¹³⁸, Helen Holcombe¹³⁸, Sue Mephram¹³⁸, Alice Michael Mitchell¹³⁸, Lucy Mwaura¹³⁸, Krithivasan Praman¹³⁸, Alain Vuylsteke¹³⁸, Julie Zamikula¹³⁸.

Ipswich Hospital team

Bally Purewal¹³⁹, Vanessa Rivers¹³⁹, Stephanie Bell¹³⁹.

Southmead Hospital team

Hayley Blakemore¹⁴⁰, Borislava Borislavova¹⁴⁰, Beverley Faulkner¹⁴⁰, Emma Gendall¹⁴⁰, Elizabeth Goff¹⁴⁰, Kati Hayes¹⁴⁰, Matt Thomas¹⁴⁰, Ruth Worner¹⁴⁰, Kerry Smith¹⁴⁰, Deanna Stephens¹⁴⁰.

Milton Keynes University Hospital team

Louise Mew¹⁴¹, Esther Mwaura¹⁴¹, Richard Stewart¹⁴¹, Felicity Williams¹⁴¹, Lynn Wren¹⁴¹, Sara-Beth Sutherland¹⁴¹.

Royal Hampshire County Hospital team

Emily Bevan¹⁴², Jane Martin¹⁴², Dawn Trodd¹⁴², Geoff Watson¹⁴², Caroline Wrey Brown¹⁴².

Great Ormond St Hospital and UCL Great Ormond St Institute of Child Health NIHR Biomedical Research Centre team

Olugbenga Akinkugbe¹⁴⁴, Alasdair Bamford¹⁴⁴, Emily Beech¹⁴⁴, Holly Belfield¹⁴⁴, Michael Bell¹⁴⁴, Charlene Davies¹⁴⁴, Gareth A. L. Jones¹⁴⁴, Tara McHugh¹⁴⁴, Hamza Meghari¹⁴⁴, Lauran O'Neill¹⁴⁴, Mark J. Peters¹⁴⁴, Samiran Ray¹⁴⁴, Ana Luisa Tomas¹⁴⁴.

Stoke Mandeville Hospital team

Iona Burn¹⁴⁵, Geraldine Hambrook¹⁴⁵, Katarina Manso¹⁴⁵, Ruth Penn¹⁴⁵, Pradeep Shanmugasundaram¹⁴⁵, Julie Tebbutt¹⁴⁵, Danielle Thornton¹⁴⁵.

University Hospital of Wales team

Jade Cole¹⁴⁶, Michelle Davies¹⁴⁶, Rhys Davies¹⁴⁶, Donna Duffin¹⁴⁶, Helen Hill¹⁴⁶, Ben Player¹⁴⁶, Emma Thomas¹⁴⁶, Angharad Williams¹⁴⁶.

Basingstoke and North Hampshire Hospital team

Denise Griffin¹⁴⁷, Nycola Muchenje¹⁴⁷, Mcdonald Mupudzi¹⁴⁷, Richard Partridge¹⁴⁷, Jo-Anna Conyngham¹⁴⁷, Rachel Thomas¹⁴⁷, Mary Wright¹⁴⁷, Maria Alvarez Corral¹⁴⁷.

Arrowe Park Hospital team

Reni Jacob¹⁴⁸, Cathy Jones¹⁴⁸, Craig Denmade¹⁴⁸.

Chesterfield Royal Hospital Foundation Trust team

Sarah Beavis¹⁴⁹, Katie Dale¹⁴⁹, Rachel Gascoyne¹⁴⁹, Joanne Hawes¹⁴⁹, Kelly Pritchard¹⁴⁹, Lesley Stevenson¹⁴⁹, Amanda Whileman¹⁴⁹.

Musgrove Park Hospital team

Patricia Doble¹⁵⁰, Joanne Hutter¹⁵⁰, corinne Pawley¹⁵⁰, Charmaine Shovelton¹⁵⁰, Marius Vaida¹⁵⁰.

Peterborough City Hospital team

Deborah Butcher¹⁵¹, Susie O'Sullivan¹⁵¹, Nicola Butterworth-Cowin¹⁵¹.

Royal Hallamshire Hospital and Northern General Hospital team

Norfaizan Ahmad¹⁵², Joann Barker¹⁵², Kris Bauchmuller¹⁵², Sarah Bird¹⁵², Kay Cawthron¹⁵², Kate Harrington¹⁵², Yvonne Jackson¹⁵², Faith Kibutu¹⁵², Becky Lenagh¹⁵², Shamiso Masuko¹⁵², Gary H Mills¹⁵², Ajay Raithatha¹⁵², Matthew Wiles¹⁵², Jayne Willson¹⁵², Helen Newell¹⁵², Alison Lye¹⁵², Lorenza Nwafor¹⁵², Claire Jarman¹⁵², Sarah Rowland-Jones¹⁵², David Foote¹⁵², Joby Cole¹⁵², Roger Thompson¹⁵², James Watson¹⁵², Lisa Hesseldon¹⁵², Irene Macharia¹⁵², Luke Chetam¹⁵², Jacqui Smith¹⁵², Amber Ford¹⁵², Samantha Anderson¹⁵², Kathryn Birchall¹⁵², Kay Housley¹⁵², Sara Walker¹⁵², Leanne Milner¹⁵², Helena Hanratty¹⁵², Helen Trower¹⁵², Patrick Phillips¹⁵², Simon Oxspring¹⁵², Ben Donne¹⁵².

Dumfries and Galloway Royal Infirmary team

Catherine Jardine¹⁵³, Dewi Williams¹⁵³, Alasdair Hay¹⁵³.

Royal Bolton Hospital team

Rebecca Flanagan¹⁵⁴, Gareth Hughes¹⁵⁴, scott Latham¹⁵⁴, Emma McKenna¹⁵⁴, Jennifer Anderson¹⁵⁴, Robert Hull¹⁵⁴, Kat Rhead¹⁵⁴.

Lister Hospital team

Carina Cruz¹⁵⁵, Natalie Pattison¹⁵⁵.

Craigavon Area Hospital team

Rob Charnock¹⁵⁶, Denise McFarland¹⁵⁶, Denise Cosgrove¹⁵⁶.

Southport and Formby District General Hospital team

Ashar Ahmed¹⁵⁷, Anna Morris¹⁵⁷, Srinivas Jakkula¹⁵⁷.

Calderdale Royal Hospital team

Asifa Ali¹⁵⁸, Megan Brady¹⁵⁸, Sam Dale¹⁵⁸, Annalisa Dance¹⁵⁸, Lisa Gledhill¹⁵⁸, Jill Greig¹⁵⁸, Kathryn Hanson¹⁵⁸, Kelly Holdroyd¹⁵⁸, Marie Home¹⁵⁸, Diane Kelly¹⁵⁸, Ross Kitson¹⁵⁸, Lear Matapure¹⁵⁸, Deborah Melia¹⁵⁸, Samantha Mellor¹⁵⁸, Tonicha Nortcliffe¹⁵⁸, Jez Pinnell¹⁵⁸, Matthew Robinson¹⁵⁸, Lisa Shaw¹⁵⁸, Ryan Shaw¹⁵⁸, Lesley Thomis¹⁵⁸, Alison Wilson¹⁵⁸, Tracy Wood¹⁵⁸, Lee-Ann Bayo¹⁵⁸, Ekta Merwaha¹⁵⁸, Tahira Ishaq¹⁵⁸, Sarah Hanley¹⁵⁸.

Prince Charles Hospital team

Bethan Deacon¹⁵⁹, Meg Hibbert¹⁵⁹, Carla Potheary¹⁵⁹, Dariusz Tetla¹⁵⁹, Chrstopher Woodford¹⁵⁹, Latha Durga¹⁵⁹, Gareth Kennard-Holden¹⁵⁹.

Royal Bournemouth Hospital team

Debbie Branney¹⁶⁰, Jordan Frankham¹⁶⁰, Sally Pitts¹⁶⁰, Nigel White¹⁶⁰.

Royal Preston Hospital team

Shondipon Laha¹⁶¹, Mark Verlander¹⁶¹, Alexandra Williams¹⁶¹.

Whittington Hospital team

Abdelhakim Altabaibeh¹⁶², Ana Alvaro¹⁶², Kayleigh Gilbert¹⁶², Louise Ma¹⁶², Loreta Mostoles¹⁶², Chetan Parmar¹⁶², Kathryn Simpson¹⁶², Champa Jetha¹⁶², Lauren Booker¹⁶², Anezka Pratley¹⁶².

Princess Royal Hospital team

Colene Adams¹⁶³, Anita Agasou¹⁶³, Tracie Arden¹⁶³, Amy Bowes¹⁶³, Pauline Boyle¹⁶³, Mandy Beekes¹⁶³, Heather Button¹⁶³, Nigel Capps¹⁶³, Mandy Carnahan¹⁶³, Anne Carter¹⁶³, Danielle Childs¹⁶³, Denise Donaldson¹⁶³, Kelly Hard¹⁶³, Fran Hurford¹⁶³, Yasmin Hussain¹⁶³, Ayesha Javaid¹⁶³, James Jones¹⁶³, Sanal Jose¹⁶³, Michael Leigh¹⁶³, Terry Martin¹⁶³, Helen Millward¹⁶³, Nichola Motherwell¹⁶³, Rachel Rikunen¹⁶³, Jo Stickley¹⁶³, Julie Summers¹⁶³, Louise Ting¹⁶³, Helen Tivenan¹⁶³, Louise Tonks¹⁶³, Rebecca Wilcox¹⁶³, Denise Skinner¹⁹², Jane Gaylard¹⁹², Dee Mullan¹⁹², Julie Newman¹⁹².

Macclesfield District General Hospital team

Maureen Holland¹⁶⁴, Natalie Keenan¹⁶⁴, Marc Lyons¹⁶⁴, Helen Wassall¹⁶⁴, Chris Marsh¹⁶⁴, Mervin Mahenthiran¹⁶⁴, Emma Carter¹⁶⁴, Thomas Kong¹⁶⁴.

Royal Surrey County Hospital team

Helen Blackman¹⁶⁵, Ben Creagh-Brown¹⁶⁵, Sinead Donlon¹⁶⁵, Natalia Michalak-Glinska¹⁶⁵, Sheila Mtuwa¹⁶⁵, Veronika Pristopan¹⁶⁵, Armored Salberg¹⁶⁵, Eleanor Smith¹⁶⁵, Sarah Stone¹⁶⁵, Charles Piercy¹⁶⁵, Jerik Verula¹⁶⁵, Dorota Burda¹⁶⁵, Rugia Montaser¹⁶⁵, Lesley Harden¹⁶⁵, Irving Mayangao¹⁶⁵, Cheryl Marriott¹⁶⁵, Paul Bradley¹⁶⁵, Celia Harris¹⁶⁵.

Hereford County Hospital team

Susan Anderson¹⁶⁶, Eleanor Andrews¹⁶⁶, Janine Birch¹⁶⁶, Emma Collins¹⁶⁶, Kate Hammerton¹⁶⁶, Ryan O'Leary¹⁶⁶.

University Hospital of North Tees team

Michele Clark¹⁶⁷, Sarah Purvis¹⁶⁷.

Lincoln County Hospital team

Russell Barber¹⁶⁸, Claire Hewitt¹⁶⁸, Annette Hilldrith¹⁶⁸, Karen Jackson-Lawrence¹⁶⁸, Sarah Shepardson¹⁶⁸, Maryanne Wills¹⁶⁸, Susan Butler¹⁶⁸, Silvia Tavares¹⁶⁸, Amy Cunningham¹⁶⁸, Julia Hindale¹⁶⁸, Sarwat Arif¹⁶⁸.

Royal Cornwall Hospital team

Sarah Bean¹⁶⁹, Karen Burt¹⁶⁹, Michael Spivey¹⁶⁹.

Royal United Hospital team

Carrie Demetriou¹⁷⁰, Charlotte Eckbad¹⁷⁰, Sarah Hierons¹⁷⁰, Lucy Howie¹⁷⁰, Sarah Mitchard¹⁷⁰, Lidia Ramos¹⁷⁰, Alfredo Serrano-Ruiz¹⁷⁰, Katie White¹⁷⁰, Fiona Kelly¹⁷⁰.

Royal Brompton Hospital team

Daniele Cristiano¹⁷¹, Natalie Dormand¹⁷¹, Zohreh Farzad¹⁷¹, Mahitha Gummadi¹⁷¹, Kamal Liyanage¹⁷¹, Brijesh Patel¹⁷¹, Sara Salmi¹⁷¹, Geraldine Sloane¹⁷¹, Vicky Thwaites¹⁷¹, Mathew Varghese¹⁷¹, Anelise C Zborowski¹⁷¹.

University Hospital Crosshouse team

John Allan¹⁷², Tim Geary¹⁷², Gordon Houston¹⁷², Alistair Meikle¹⁷², Peter O'Brien¹⁷².

Basildon Hospital team

Miranda Forsey¹⁷³, Agilan Kaliappan¹⁷³, Anne Nicholson¹⁷³, Joanne Riches¹⁷³, Mark Vertue¹⁷³, Miranda Forsey¹⁷³, Agilan Kaliappan¹⁷³, Anne Nicholson¹⁷³, Joanne Riches¹⁷³, Mark Vertue¹⁷³.

Glan Clwyd Hospital team

Elizabeth Allan¹⁷⁴, Kate Darlington¹⁷⁴, Ffyon Davies¹⁷⁴, Jack Easton¹⁷⁴, Sumit Kumar¹⁷⁴, Richard Lean¹⁷⁴, Daniel Menzies¹⁷⁴, Richard Pugh¹⁷⁴, Xinyi Qiu¹⁷⁴, Llinos Davies¹⁷⁴, Hannah Williams¹⁷⁴, Jeremy Scanlon¹⁷⁴, Gwyneth Davies¹⁷⁴, Callum Mackay¹⁷⁴, Joanne Lewis¹⁷⁴, Stephanie Rees¹⁷⁴.

West Middlesex Hospital team

Metod Oblak¹⁷⁵, Monica Popescu¹⁷⁵, Mini Thankachen¹⁷⁵.

Royal Lancaster Infirmary team

Andrew Higham¹⁷⁶, Kerry Simpson¹⁷⁶, Jayne Craig¹⁷⁶.

Western General Hospital team

Rosie Baruah¹⁷⁷, Sheila Morris¹⁷⁷, Susie Ferguson¹⁷⁷, Amy Shepherd¹⁷⁷.

Chelsea & Westminster NHS Foundation Trust team

Luke Stephen Prockter Moore¹⁷⁸, Marcela Paola Vizcaychipi¹⁷⁸, Laura Gomes de Almeida Martins¹⁷⁸, Jaime Carungcong¹⁷⁸.

The Queen Elizabeth Hospital team

Inthakab Ali Mohamed Ali¹⁷⁹, Karen Beaumont¹⁷⁹, Mark Blunt¹⁷⁹, Zoe Coton¹⁷⁹, Hollie Curgenven¹⁷⁹, Mohamed Elsaadany¹⁷⁹, Kay Fernandes¹⁷⁹, Sameena Mohamed Ally¹⁷⁹, Harini Rangarajan¹⁷⁹, Varun Sarathy¹⁷⁹, Sivarupan Selvanayagam¹⁷⁹, Dave Vedage¹⁷⁹, Matthew White¹⁷⁹.

King's Mill Hospital team

Mandy Gill¹⁸⁰, Paul Paul¹⁸⁰, Valli Ratnam¹⁸⁰, Sarah Shelton¹⁸⁰, Inez Wynter¹⁸⁰.

Watford General Hospital team

Siobhain Carmody¹⁸¹, Valerie Joan Page¹⁸¹.

University Hospital Wishaw team

Claire Marie Beith¹⁸², Karen Black¹⁸², Suzanne Clements¹⁸², Alan Morrison¹⁸², Dominic Strachan¹⁸², Margaret Taylor¹⁸², Michelle Clarkson¹⁸², Stuart D'Sylva¹⁸², Kathryn Norman¹⁸².

Forth Valley Royal Hospital team

Fiona Auld¹⁸³, Joanne Donnachie¹⁸³, Ian Edmond¹⁸³, Lynn Prentice¹⁸³, Nikole Runciman¹⁸³, Dario Salutous¹⁸³, Lesley Symon¹⁸³, Anne Todd¹⁸³, Patricia Turner¹⁸³, Abigail Short¹⁸³, Laura Sweeney¹⁸³, Euan Murdoch¹⁸³, Dhaneesha Senaratne¹⁸³.

George Eliot Hospital NHS Trust team

Michaela Hill¹⁸⁴, Thogulava Kannan¹⁸⁴, Wild Laura¹⁸⁴.

Barnsley Hospital team

Rikki Crawley¹⁸⁵, Abigail Crew¹⁸⁵, Mishell Cunningham¹⁸⁵, Allison Daniels¹⁸⁵, Laura Harrison¹⁸⁵, Susan Hope¹⁸⁵, Ken Inweregbu¹⁸⁵, Sian Jones¹⁸⁵, Nicola Lancaster¹⁸⁵, Jamie Matthews¹⁸⁵, Alice Nicholson¹⁸⁵, Gemma Wray¹⁸⁵.

The Great Western Hospital team

Helen Langton¹⁸⁶, Rachel Prout¹⁸⁶, Malcolm Watters¹⁸⁶, Catherine Novis¹⁸⁶.

Harefield Hospital team

Anthony Barron¹⁸⁷, Ciara Collins¹⁸⁷, Sundeep Kaul¹⁸⁷, Heather Passmore¹⁸⁷, Claire Prendergast¹⁸⁷, Anna Reed¹⁸⁷, Paula Rogers¹⁸⁷, Rajvinder Shokkar¹⁸⁷, Meriel Woodruff¹⁸⁷, Hayley Middleton¹⁸⁷, Oliver Polgar¹⁸⁷, Claire Nolan¹⁸⁷, Vicky Thwaites¹⁸⁷, Kanta Mahay¹⁸⁷.

Rotherham General Hospital team

Dawn Collier¹⁸⁸, Anil Hormis¹⁸⁸, Victoria Maynard¹⁸⁸, Cheryl Graham¹⁸⁸, Rachel Walker¹⁸⁸, Victoria Maynard¹⁸⁸.

Ysbyty Gwynedd team

Ellen Knights¹⁸⁹, Alicia Price¹⁸⁹, Alice Thomas¹⁸⁹, Chris Thorpe¹⁸⁹.

Diana Princess of Wales Hospital team

Teresa Behan¹⁹⁰, Caroline Burnett¹⁹⁰, Jonathan Hatton¹⁹⁰, Elaine Heeney¹⁹⁰, Atideb Mitra¹⁹⁰, Maria Newton¹⁹⁰, Rachel Pollard¹⁹⁰, Rachael Stead¹⁹⁰.

Russell's Hall Hospital team

Vishal Amin¹⁹¹, Elena Anastasescu¹⁹¹, Vikram Anumakonda¹⁹¹, Komala Karthik¹⁹¹, Rizwana Kausar¹⁹¹, Karen Reid¹⁹¹, Jacqueline Smith¹⁹¹, Janet Imeson-Wood¹⁹¹.

Denise Skinner¹⁹², Jane Gaylard¹⁹², Dee Mullan¹⁹², Julie Newman¹⁹².

St Mary's Hospital team

Alison Brown¹⁹³, Vikki Crickmore¹⁹³, Gabor Debreceni¹⁹³, Joy Wilkins¹⁹³, Liz Nicol¹⁹³.

University Hospital Lewisham team

Waqas Khaliq¹⁹⁴, Rosie Reece-Anthony¹⁹⁴, Mark Birt¹⁹⁴.

Colchester General Hospital team

Alison Ghosh¹⁹⁵, Emma Williams¹⁹⁵.

Queen Elizabeth the Queen Mother Hospital team

Louise Allen¹⁹⁶, Eva Beranova¹⁹⁶, Nikki Crisp¹⁹⁶, Joanne Deery¹⁹⁶, Tracy Hazelton¹⁹⁶, Alicia Knight¹⁹⁶, Carly Price¹⁹⁶, Sorrell Tilbey¹⁹⁶, Salah Turki¹⁹⁶, Sharon Turney¹⁹⁶.

Royal Albert Edward Infirmary team

Joshua Cooper¹⁹⁷, Cheryl Finch¹⁹⁷, Sarah Liderth¹⁹⁷, Alison Quinn¹⁹⁷, Natalia Waddington¹⁹⁷.

Victoria Hospital team

Tina Coventry¹⁹⁸, Susan Fowler¹⁹⁸, Michael MacMahon¹⁹⁸, Amanda McGregor¹⁹⁸.

Eastbourne District General Hospital team

Anne Cowley¹⁹⁹, Judith Highgate¹⁹⁹, Anne Cowley¹⁹⁹, Judith Highgate¹⁹⁹.

Cumberland Infirmary team

Alison Brown²⁰⁰, Jane Gregory²⁰⁰, Susan O'Connell²⁰⁰, Tim Smith²⁰⁰, Luigi Barberis²⁰⁰.

New Cross Hospital team

Shameer Gopal²⁰¹, Nichola Harris²⁰¹, Victoria Lake²⁰¹, Stella Metherell²⁰¹, Elizabeth Radford²⁰¹.

The Princess Alexandra Hospital team

Amelia Daniel²⁰², Joanne Finn²⁰², Rajnish Saha²⁰², Nikki White²⁰², Amy Easthope²⁰².

Salisbury District Hospital team

Phil Donnison²⁰³, Fiona Trim²⁰³, Beena Eapen²⁰³.

Dorset County Hospital team

Jenny Birch²⁰⁴, Laura Bough²⁰⁴, Josie Goodsell²⁰⁴, Rebecca Tutton²⁰⁴, Patricia Williams²⁰⁴, Sarah Williams²⁰⁴, Barbara Winter-Goodwin²⁰⁴.

University College Dublin team

Ailstair Nichol²⁰⁵, Kathy Brickell²⁰⁵, Michelle Smyth²⁰⁵, Lorna Murphy²⁰⁵.

Glangwili General Hospital team

Samantha Coetzee²⁰⁶, Alistair Gales²⁰⁶, Igor Otahal²⁰⁶, Meena Raj²⁰⁶, Craig Sell²⁰⁶.

Gloucestershire Royal Hospital team

Paula Hilltout²⁰⁷, Jayne Evitts²⁰⁷, Amanda Tyler²⁰⁷, Joanne Waldron²⁰⁷.

Yeovil Hospital team

Kate Beesley²⁰⁸, Sarah Board²⁰⁸, Agnieszka Kubisz-Pudelko²⁰⁸, Alison Lewis²⁰⁸, Jess Perry²⁰⁸, Lucy Pippard²⁰⁸, Di Wood²⁰⁸, Clare Buckley²⁰⁸.

Leicester Royal Infirmary team

Peter Barry²⁰⁹, Neil Flint²⁰⁹, Patel Rekha²⁰⁹, Dawn Hales²⁰⁹.

Royal Manchester Children's Hospital team

Lara Bunni²¹⁰, Claire Jennings²¹⁰, Monica Latif²¹⁰, Rebecca Marshall²¹⁰, Gayathri Subramanian²¹⁰.

Royal Victoria Hospital team

Peter J McGuigan²¹¹, Christopher Wasson²¹¹, Stephanie Finn²¹¹, Jackie Green²¹¹, Erin Collins²¹¹, Bernadette King²¹¹.

Wrexham Maelor Hospital team

Andy Campbell²¹², Sara Smuts²¹², Joseph Duffield²¹², Oliver Smith²¹², Lewis Mallon²¹², Watkins Claire²¹².

Walsall Manor Hospital team

Liam Botfield²¹³, Joanna Butler²¹³, Catherine Dexter²¹³, Jo Fletcher²¹³, Atul Garg²¹³, Aditya Kuravi²¹³, Poonam Ranga²¹³, Emma Virgilio²¹³.

Darent Valley Hospital team

Zakaula Belagodu²¹⁴, Bridget Fuller²¹⁴, Anca Gherman²¹⁴, Olumide Olufuwa²¹⁴, Remi Paramsothy²¹⁴, Carmel Stuart²¹⁴, Naomi Oakley²¹⁴, Charlotte Kamundi²¹⁴, David Tyl²¹⁴, Katy Collins²¹⁴, Pedro Silva²¹⁴, June Taylor²¹⁴, Laura King²¹⁴, Charlotte Coates²¹⁴, Maria Crowley²¹⁴, Phillipa Wakefield²¹⁴, Jane Beadle²¹⁴, Laura Johnson²¹⁴, Janet Sargeant²¹⁴, Madeleine Anderson²¹⁴.

Warrington General Hospital team

Ailbhe Brady²¹⁵, Rebekah Chan²¹⁵, Jeff Little²¹⁵, Shane McIvor²¹⁵, Helena Prady²¹⁵, Helen Whittle²¹⁵, Bijoy Mathew²¹⁵.

Warwick Hospital team

Ben Attwood²¹⁶, Penny Parsons²¹⁶.

University Hospitals Coventry & Warwickshire NHS Trust team

Geraldine Ward²¹⁷, Pamela Bremmer²¹⁷.

University Hospital Monklands team

West Joe²¹⁸, Baird Tracy²¹⁸, Ruddy Jim²¹⁸.

Princess of Wales Hospital team

Ellie Davies²¹⁹, Lisa Roche²¹⁹, Sonia Sathe²¹⁹.

Northwick Park Hospital team

Catherine Dennis²²⁰, Alastair McGregor²²⁰, Victoria Parris²²⁰, Sinduya Srikanan²²⁰, Anisha Sukha²²⁰.

Raigmore Hospital team

Rachael Campbell²²¹, Noreen Clarke²²¹, Jonathan Whiteside²²¹, Mairi Mascarenhas²²¹, Avril Donaldson²²¹, Joanna Matheson²²¹, Fiona Barrett²²¹, Marianne O'Hara²²¹, Laura Okeefe²²¹, Clare Bradley²²¹.

Royal Free Hospital team

Christine Eastgate-Jackson²²², Helder Filipe²²², Daniel Martin²²², Amitaa Maharajh²²², Sara Mingo Garcia²²², Glykeria Pakou²²², Mark De Neef²²².

Scunthorpe General Hospital team

Kathy Dent²²³, Elizabeth Horsley²²³, Muhmmad Nauman Akhtar²²³, Sandra Pearson²²³, Dorota Potoczna²²³, Sue Spencer²²³.

West Cumberland Hospital team

Melanie Clapham²²⁴, Rosemary Harper²²⁴, Una Poultney²²⁴, Polly Rice²²⁴, Tim Smith²²⁴, Rachel Mutch²²⁴, Luigi Barberis²²⁴.

Airedale General Hospital team

Lisa Armstrong²²⁵, Hayley Bates²²⁵, Emma Dooks²²⁵, Fiona Farquhar²²⁵, Brigid Hairsine²²⁵, Chantal McParland²²⁵, Sophie Packham²²⁵.

Birmingham Children's Hospital team

Rehana Bi²²⁶, Barney Scholefield²²⁶, Lydia Ashton²²⁶.

Liverpool Heart and Chest Hospital team

Linsha George²²⁷, Sophie Twiss²²⁷, David Wright²²⁷.

Pilgrim Hospital team

Manish Chablani²²⁸, Amy Kirkby²²⁸, Kimberley Netherton²²⁸.

Prince Philip Hospital team

Kim Davies²²⁹, Linda O'Brien²²⁹, Zohra Omar²²⁹, Igor Otahal²²⁹, Emma Perkins²²⁹, Tracy Lewis²²⁹, Isobel Sutherland²²⁹.

Furness General Hospital team

Karen Burns²³⁰, Andrew Higham²³⁰.

Scarborough General Hospital team

Dr Ben Chandler²³¹, Kerry Elliott²³¹, Janine Mallinson²³¹, Alison Turnbull²³¹.

Southend University Hospital team

Prisca Gondo²³², Bernard Hadebe²³², Abdul Kayani²³², Bridgett Masunda²³².

Alder Hey Children's Hospital team

Taya Anderson²³³, Dan Hawcutt²³³, Laura O'Malley²³³, Laura Rad²³³, Naomi Rogers²³³, Paula Saunderson²³³, Kathryn Sian Allison²³³, Deborah Afolabi²³³, Jennifer Whitbread²³³, Dawn Jones²³³, Rachael Dore²³³.

Torbay Hospital team

Matthew Halkes²³⁴, Pauline Mercer²³⁴, Lorraine Thornton²³⁴.

Borders General Hospital team

Joy Dawson²³⁵, Sweyn Garrioch²³⁵, Melanie Tolson²³⁵, Jonathan Aldridge²³⁵.

Kent & Canterbury Hospital team

Ritoo Kapoor²³⁶, David Loader²³⁶, Karen Castle²³⁶.

West Suffolk Hospital team

Sally Humphreys²³⁷, Ruth Tampsett²³⁷.

James Paget University Hospital NHS Trust team

Katherine Mackintosh²³⁸, Amanda Ayers²³⁸, Wendy Harrison²³⁸, Julie North²³⁸.

The Christie NHS Foundation Trust team

Suzanne Allibone²³⁹, Roman Genetu²³⁹, Vidya Kasipandian²³⁹, Amit Patel²³⁹, Ainhi Mac²³⁹, Anthony Murphy²³⁹, Parisa Mahjoob²³⁹, Roonak Nazari²³⁹, Lucy Worsley²³⁹, Andrew Fagan²³⁹.

The Royal Marsden Hospital team

Thomas Bemand²⁴⁰, Ethel Black²⁴⁰, Arnold Dela Rosa²⁴⁰, Ryan Howle²⁴⁰, Shaman Jhanji²⁴⁰, Ravishankar Rao Baikady²⁴⁰, Kate Colette Tatham²⁴⁰, Benjamin Thomas²⁴⁰.

University Hospital Hairmyres team

Dina Bell²⁴¹, Rosalind Boyle²⁴¹, Katie Douglas²⁴¹, Lynn Glass²⁴¹, Emma Lee²⁴¹, Liz Lennon²⁴¹, Austin Rattray²⁴¹.

Withybush General Hospital team

Abigail Taylor²⁴², Rachel Anne Hughes²⁴², Helen Thomas²⁴², Alun Rees²⁴², Michaela Duskova²⁴², Janet Phipps²⁴², Suzanne Brooks²⁴², Michelle Edwards²⁴².

Ealing Hospital team

Victoria Parris²⁴³, Sheena Quaid²⁴³, Ekaterina Watson²⁴³.

North Devon District Hospital team

Adam Brayne²⁴⁴, Emma Fisher²⁴⁴, Jane Hunt²⁴⁴, Peter Jackson²⁴⁴, Duncan Kaye²⁴⁴, Nicholas Love²⁴⁴, Juliet Parkin²⁴⁴, Victoria Tuckey²⁴⁴, Lynne Van Koutrik²⁴⁴, Sasha Carter²⁴⁴, Benedict Andrew²⁴⁴, Louise Findlay²⁴⁴, Katie Adams²⁴⁴.

St John's Hospital Livingston team

Jen Service²⁴⁵, Alison Williams²⁴⁵, Claire Cheyne²⁴⁵, Anne Saunderson²⁴⁵, Sam Moultrie²⁴⁵, Miranda Odam²⁴⁵.

Northampton General Hospital NHS Trust team

Kathryn Hall²⁴⁶, Isheunesu Mapfunde²⁴⁶, Charlotte Willis²⁴⁶, Alex Lyon²⁴⁶.

Harrogate and District NHS Foundation Trust team

Chunda Sri-Chandana²⁴⁷, Joslan Scherewode²⁴⁷, Lorraine Stephenson²⁴⁷, Sarah Marsh²⁴⁷.

National Hospital for Neurology and Neurosurgery team

David Brealey²⁴⁸, John Hardy²⁴⁸, Henry Houlden²⁴⁸, Eleanor Moncur²⁴⁸, Eamon Raith²⁴⁸, Ambreen Tariq²⁴⁸, Arianna Tucci²⁴⁸.

Bronglais General Hospital team

Maria Hobrok²⁴⁹, Ronda Loosley²⁴⁹, Heather McGuinness²⁴⁹, Helen Tench²⁴⁹, Rebecca Wolf-Roberts²⁴⁹.

Golden Jubilee National Hospital team

Val Irvine²⁵⁰, Benjamin Shelley²⁵⁰.

Homerton University Hospital Foundation NHS Trust team

Amy Easthope²⁵¹, Claire Gorman²⁵¹, Abhinav Gupta²⁵¹, Elizabeth Timlick²⁵¹, Rebecca Brady²⁵¹.

Royal Hospital for Children team

Colin Begg³⁸, Barry Milligan³⁸.

Sheffield Children's Hospital team

Arianna Bellini²⁵², Jade Bryant²⁵², Anton Mayer²⁵², Amy Pickard²⁵², Nicholas Roe²⁵², Jason Sowter²⁵², Alex Howlett²⁵².

The Royal Alexandra Children's Hospital team

Katy Fidler²⁵³, Emma Tagliavini²⁵³, Kevin Donnelly²⁵³.

³⁶Roslin Institute, University of Edinburgh, Easter Bush, Edinburgh, EH25 9RG, UK

³⁷Intensive Care Unit, Royal Infirmary of Edinburgh, 54 Little France Drive, Edinburgh, EH16 5SA, UK

³⁸Royal Hospital for Children, Glasgow, UK

³⁹William Harvey Research Institute, Barts and the London School of Medicine and Dentistry, Queen Mary University of London, London EC1M 6BQ, UK

⁴⁰Centre for Tropical Medicine and Global Health, Nuffield Department of Medicine, University of Oxford, Old Road Campus, Roosevelt Drive, Oxford, OX3 7FZ, UK

⁴¹Wellcome Centre for Human Genetics, University of Oxford, Oxford, UK

⁴², Prince of Wales Hospital, Hong Kong, China

⁴³Department of Critical Care Medicine, Queen's University and Kingston Health Sciences Centre, Kingston, ON, Canada

⁴⁴Wellcome-Wolfson Institute for Experimental Medicine, Queen's University Belfast, Belfast, Northern Ireland, UK

⁴⁵Department of Intensive Care Medicine, Royal Victoria Hospital, Belfast, Northern Ireland, UK

⁴⁶UCL Centre for Human Health and Performance, London, W1T 7HA, UK

⁴⁷Clinical Research Centre at St Vincent's University Hospital, University College Dublin, Dublin, Ireland

⁴⁸National Heart and Lung Institute, Imperial College London, London, UK

⁴⁹Imperial College Healthcare NHS Trust: London, London, UK

⁵⁰Heart Institute, University of Sao Paulo, Brazil

⁵¹MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine, University of Edinburgh, Western General Hospital, Crewe Road, Edinburgh, EH4 2XU, UK

⁵²Intensive Care National Audit & Research Centre, London, UK

⁵³NIHR Health Protection Research Unit for Emerging and Zoonotic Infections, Institute of Infection, Veterinary and Ecological Sciences University of Liverpool, Liverpool, L69 7BE, UK

⁵⁴Respiratory Medicine, Alder Hey Children's Hospital, Institute in The Park, University of Liverpool, Alder Hey Children's Hospital, Liverpool, UK

⁵⁵Department of Intensive Care Medicine, Guy's and St. Thomas NHS Foundation Trust, London, UK

⁵⁶Department of Medicine, University of Cambridge, Cambridge, UK

⁵⁷NIHR Clinical Research Network (CRN), North West London Core Team, 3rd Floor Administrative Block South, Clock Tower, Hammersmith Hospital, Du Cane Road, London W12 0HS

⁵⁸Cambridge University Hospitals NHS Foundation Trust, Hills Road, Cambridge, CB2 0QQ, UK

⁵⁹Edinburgh Clinical Research Facility, Western General Hospital, University of Edinburgh, EH4 2XU, UK

⁶⁰Biostatistics Group, State Key Laboratory of Biocontrol, School of Life Sciences, Sun Yat-sen University, Guangzhou, China

⁶¹Department of Infectious Diseases, Leiden University Medical Center, Leiden, The Netherlands

⁶²Guys and St Thomas' Hospital, London, UK

- 63Barts Health NHS Trust, London, UK
- 64James Cook University Hospital, Middlesbrough, UK
- 65Royal Stoke University Hospital, Staffordshire, UK
- 66North Middlesex University Hospital NHS trust, London, UK
- 67north Middlesex University Hospital NHS trust, London, UK
- 68The Royal Liverpool University Hospital, Liverpool, UK
- 69King's College Hospital, London, UK
- 70Charing Cross Hospital, St Mary's Hospital and Hammersmith Hospital, London, UK
- 71Nottingham University Hospital, Nottingham, UK
- 72John Radcliffe Hospital, Oxford, UK
- 73Kingston Hospital, Surrey, UK
- 74kingston Hospital, Surrey, UK
- 75Royal Infirmary of Edinburgh, Edinburgh, UK
- 76Queen Alexandra Hospital, Portsmouth, UK
- 77Morrison Hospital, Swansea, UK
- 78Addenbrooke's Hospital, Cambridge, UK
- 79BHRUT (Barking Havering) - Queens Hospital and King George Hospital, Essex, UK
- 80Royal Sussex County Hospital, Brighton, UK
- 81Queen Elizabeth Hospital, Birmingham, UK
- 82St George's Hospital, London, UK
- 83Stepping Hill Hospital, Stockport, UK
- 84Countess of Chester Hospital, Chester, UK
- 85Royal Blackburn Teaching Hospital, Blackburn, UK
- 86The Tunbridge Wells Hospital and Maidstone Hospital, Kent, UK
- 87Royal Gwent Hospital, Newport, UK
- 88Pinderfields General Hospital, Wakefield, UK
- 89Royal Berkshire NHS Foundation Trust, Berkshire, UK
- 90Broomfield Hospital, Chelmsford, UK
- 91Northumbria Healthcare NHS Foundation Trust, North Shields, UK
- 92Whiston Hospital, Prescot, UK
- 93Croydon University Hospital, Croydon, UK
- 94York Hospital, York, UK
- 95Heartlands Hospital, Birmingham, UK
- 96Ashford and St Peter's Hospital, Surrey, UK
- 97Barnet Hospital, London, UK
- 98East Surrey Hospital, Redhill, UK
- 99Ninewells Hospital, Dundee, UK
- 100Worthing Hospital, Worthing, UK and St Richard's Hospital, Chichester, UK
- 101Southampton General Hospital, Southampton, UK
- 102The Alexandra Hospital, Redditch and Worcester Royal Hospital, Worcester, UK
- 103Sandwell General Hospital and City Hospital, Birmingham, UK
- 104Blackpool Victoria Hospital, Blackpool, UK
- 105Royal Glamorgan Hospital, Pontyclun, UK
- 106The Royal Oldham Hospital, Manchester, UK
- 107Glasgow Royal Infirmary, Glasgow, UK
- 108St James's University Hospital and Leeds General Infirmary, Leeds, UK
- 109University Hospital North Durham, Darlington, UK and Darlington Memorial Hospital,

Darlington, UK
110Fairfield General Hospital, Bury, UK
111Wythenshawe Hospital, Manchester, UK
112Royal Alexandra Hospital, Paisley, UK
113Good Hope Hospital, Birmingham, UK
114Tameside General Hospital, Ashton Under Lyne, UK
115Royal Derby Hospital, Derby, UK
116Medway Maritime Hospital, Gillingham, UK
117Royal Victoria Infirmary, Newcastle Upon Tyne, UK
118Poole Hospital, Poole, UK
119Bedford Hospital, Bedford, UK
120Queens Hospital Burton, Burton-On-Trent, UK
121North Manchester General Hospital, Manchester, UK
122Aberdeen Royal Infirmary, Aberdeen, UK
123Derriford Hospital, Plymouth, UK
124Manchester Royal Infirmary, Manchester, UK
125Salford Royal Hospital, Manchester, UK
126William Harvey Hospital, Ashford, UK
127Queen Elizabeth University Hospital, Glasgow, UK
128Bradford Royal Infirmary, Bradford, UK
129Bristol Royal Infirmary, Bristol, UK
130Norfolk and Norwich University hospital (NNUH), Norwich, UK
131Queen Elizabeth Hospital Gateshead, Gateshead, UK
132Sunderland Royal Hospital, Sunderland, UK
133Aintree University Hospital, Liverpool, UK
134Hull Royal Infirmary, Hull, UK
135Hull Royal Infirmary, Hull, UK
136University College Hospital, London, UK
137Royal Devon and Exeter Hospital, Exeter, UK
138The Royal Papworth Hospital, Cambridge, UK
139Ipswich Hospital, Ipswich, UK
140Southmead Hospital, Bristol, UK
141Milton Keynes University Hospital, Milton Keynes, UK
142Royal Hampshire County Hospital, Hampshire, UK
143Queen Elizabeth Hospital, Woolwich, London, UK
144Great Ormond St Hospital and UCL Great Ormond St Institute of Child Health NIHR
Biomedical Research Centre, London, UK
145Stoke Mandeville Hospital, Buckinghamshire, UK
146University Hospital of Wales, Cardiff, UK
147Basingstoke and North Hampshire Hospital, Basingstoke, UK
148Arrowe Park Hospital, Wirral, UK
149Chesterfield Royal Hospital Foundation Trust, Chesterfield, UK
150Musgrove Park Hospital, Taunton, UK
151Peterborough City Hospital, Peterborough, UK and Hinchingsbrooke Hospital, Huntingdon,
UK
152Royal Hallamshire Hospital and Northern General Hospital, Sheffield, UK
153Dumfries and Galloway Royal Infirmary, Dumfries, UK

- 154 Royal Bolton Hospital, Bolton, UK
- 155 Lister Hospital, Stevenage, UK
- 156 Craigavon Area Hospital, County Armagh, NI
- 157 Southport and Formby District General Hospital, Ormskirk, UK
- 158 Calderdale Royal Hospital, Halifax, UK and Huddersfield Royal Infirmary, Huddersfield, UK
- 159 Prince Charles Hospital, Merthyr Tydfil, UK
- 160 Royal Bournemouth Hospital, Bournemouth, UK
- 161 Royal Preston Hospital, Preston, UK
- 162 Whittington Hospital, London, UK
- 163 Princess Royal Hospital, Telford and Royal Shrewsbury Hospital, Shrewsbury, UK
- 164 Macclesfield District General Hospital, Macclesfield, UK
- 165 Royal Surrey County Hospital, Guildford, UK
- 166 Hereford County Hospital, Hereford, UK
- 167 University Hospital of North Tees, Stockton on Tees, UK
- 168 Lincoln County Hospital, Lincoln, UK
- 169 Royal Cornwall Hospital, Truro, UK
- 170 Royal United Hospital, Bath, UK
- 171 Royal Brompton Hospital, London, UK
- 172 University Hospital Crosshouse, Kilmarnock, UK
- 173 Basildon Hospital, Basildon, UK
- 174 Glan Clwyd Hospital, Bodelwyddan, UK
- 175 West Middlesex Hospital, Isleworth, UK
- 176 Royal Lancaster Infirmary, Lancaster, UK
- 177 Western General Hospital, Edinburgh, UK
- 178 Chelsea & Westminster NHS Foundation Trust, London, UK
- 179 The Queen Elizabeth Hospital, King's Lynn, UK
- 180 King's Mill Hospital, Nottingham, UK
- 181 Watford General Hospital, Watford, UK
- 182 University Hospital Wishaw, Wishaw, UK
- 183 Forth Valley Royal Hospital, Falkirk, UK
- 184 George Eliot Hospital NHS Trust, Nuneaton, UK
- 185 Barnsley Hospital, Barnsley, UK
- 186 The Great Western Hospital, Swindon, UK
- 187 Harefield Hospital, London, UK
- 188 Rotherham General Hospital, Rotherham, UK
- 189 Ysbyty Gwynedd, Bangor, UK
- 190 Diana Princess of Wales Hospital, Grimsby, UK
- 191 Russell's Hall Hospital, Dudley, UK
- 192 Princess Royal Hospital, Haywards Heath, UK
- 193 St Mary's Hospital, Newport, UK
- 194 University Hospital Lewisham, London, UK
- 195 Colchester General Hospital, Colchester, UK
- 196 Queen Elizabeth the Queen Mother Hospital, Margate, UK
- 197 Royal Albert Edward Infirmary, Wigan, UK
- 198 Victoria Hospital, Kirkcaldy, UK
- 199 Eastbourne District General Hospital, East Sussex, UK and Conquest Hospital, East Sussex, UK

²⁰⁰Cumberland Infirmary, Carlisle, UK
²⁰¹New Cross Hospital, Wolverhampton, UK
²⁰²The Princess Alexandra Hospital, Harlow, UK
²⁰³Salisbury District Hospital, Salisbury, UK
²⁰⁴Dorset County Hospital, Dorchester, UK
²⁰⁵University College Dublin, St Vincent's University Hospital, Dublin, Ireland
²⁰⁶Glangwili General Hospital, Camarthen, UK
²⁰⁷Gloucestershire Royal Hospital, Gloucester, UK
²⁰⁸Yeovil Hospital, Yeovil, UK
²⁰⁹Leicester Royal Infirmary, Leicester, UK
²¹⁰Royal Manchester Children's Hospital, Manchester, UK
²¹¹Royal Victoria Hospital, Belfast, NI
²¹²Wrexham Maelor Hospital, Wrexham, Wales
²¹³Walsall Manor Hospital, Walsall, UK
²¹⁴Darent Valley Hospital, Dartford, UK
²¹⁵Warrington General Hospital, Warrington, UK
²¹⁶Warwick Hospital, Warwick, UK
²¹⁷University Hospitals Coventry & Warwickshire NHS Trust, Coventry, UK
²¹⁸University Hospital Monklands, Airdrie, UK
²¹⁹Princess of Wales Hospital, Llantrisant, UK
²²⁰Northwick Park Hospital, London, UK
²²¹Raigmore Hospital, Inverness, UK
²²²Royal Free Hospital, London, UK
²²³Scunthorpe General Hospital, Scunthorpe, UK
²²⁴West Cumberland Hospital, Whitehaven, UK
²²⁵Airedale General Hospital, Keighley, UK
²²⁶Birmingham Children's Hospital, Birmingham, UK
²²⁷Liverpool Heart and Chest Hospital, Liverpool, UK
²²⁸Pilgrim Hospital, Lincoln, UK
²²⁹Prince Philip Hospital, Lianelli, UK
²³⁰Furness General Hospital, Barrow-in-Furness, UK
²³¹Scarborough General Hospital, Scarborough, UK
²³²Southend University Hospital, Westcliff-on-Sea, UK
²³³Alder Hey Children's Hospital, Liverpool, UK
²³⁴Torbay Hospital, Torquay, UK
²³⁵Borders General Hospital, Melrose, UK
²³⁶Kent & Canterbury Hospital, Canterbury, UK
²³⁷West Suffolk Hospital, Bury St Edmunds, UK
²³⁸James Paget University Hospital NHS Trust, Great Yarmouth, UK
²³⁹The Christie NHS Foundation Trust, Manchester, UK
²⁴⁰The Royal Marsden Hospital, London, UK
²⁴¹University Hospital Hairmyres, East Kilbride, UK
²⁴²Withybush General Hospital, Pembrokeshire, Wales
²⁴³Ealing Hospital, Southall, UK
²⁴⁴North Devon District Hospital, Barnstaple, UK
²⁴⁵St John's Hospital Livingston, Livingston, UK
²⁴⁶Northampton General Hospital NHS Trust, Northampton, UK

²⁴⁷Harrogate and District NHS Foundation Trust, Harrogate, UK

²⁴⁸National Hospital for Neurology and Neurosurgery, London, UK

²⁴⁹Bronglais General Hospital, Aberystwyth, UK

²⁵⁰Golden Jubilee National Hospital, Clydebank, UK

²⁵¹Homerton University Hospital Foundation NHS Trust, London UK

²⁵²Sheffield Children's Hospital, Sheffield, UK

²⁵³The Royal Alexandra Children's Hospital, Brighton, UK

Covid-19 Human Genetics Initiative

Gita A. Pathak²⁵⁴, Juha Karjalainen²⁵⁵, Christine Stevens²⁵⁶, Shea J. Andrews²⁵⁷, Masahiro Kanai²⁵⁶, Mattia Cordioli²⁵⁵, Renato Polimanti²⁵⁴, Matti Pirinen²⁵⁵, Nadia Harerimana²⁵⁷, Kumar Veerapen²⁵⁶, Brooke Wolford²⁵⁸, Huy Nguyen²⁵⁶, Matthew Solomonson²⁵⁶, Rachel G. Liao²⁵⁶, Karolina Chwialkowska²⁵⁹, Amy Trankiem²⁵⁶, Mary K. Balaconis²⁵⁶, Caroline Hayward²⁶⁰, Anne Richmond²⁶⁰, Archie Campbell²⁶⁰, Marcela Morris²⁶¹, Chloe Fawns-Ritchie²⁶⁰, Joseph T Glessner^{262,263}, Douglas M Shaw²⁶⁴, Xiao Chang²⁶², Hannah Polikowski²⁶⁴, Petty E Lauren²⁶⁴, Hung-Hsin Chen²⁶⁴, Zhu Wanying²⁶⁴, Hakon Hakonarson^{262,263}, David J Porteous²⁶⁰, Jennifer Below²⁶⁴, Kari North²⁶⁵, Joseph B McCormick²⁶¹, Paul RHJ Timmers²⁶⁰, James F Wilson²⁶⁰, Albert Tenesa^{260,266}, Kenton D'Mellow²⁶⁶, Shona M Kerr²⁶⁰, Mari E.K. Niemi²⁵⁵, Lindokuhle Nkambul^{256,267}, Kathrin Aprile von Hohenstaufen²⁶⁸, Ali Sobh²⁶⁹, Madonna M. Eltoukhy²⁷⁰, Amr M. Yassen²⁷¹, Mohamed A.F. Hegazy²⁷², Kamal Okasha²⁷³, Mohammed A. Eid²⁷⁴, Hanteera S. Moahmed²⁷⁵, Doaa Shahin²⁷⁶, Yasser M. El-Sherbiny^{276,277}, Tamer A. Elhadidy²⁷⁸, Mohamed S. Abd Elghafar²⁷⁹, Jehan J. El-Jawhari^{276,277}, Attia A.S. Mohamed²⁷⁰, Marwa H. Elnagdy²⁸⁰, Amr Samir²⁷², Mahmoud Abdel-Aziz²⁸¹, Walid T. Khafaga²⁸², Walaa M. El-Lawaty²⁷⁵, Mohamed S. Torky²⁷⁵, Mohamed R. El-shanshory²⁸³, Chiara Batini²⁸⁴, Paul H Lee²⁸⁴, Nick Shrine²⁸⁴, Alexander T Williams²⁸⁴, Martin D Tobin^{284,285}, Anna L Guyatt²⁸⁴, Catherine John²⁸⁴, Richard J Packer²⁸⁴, Altaf Ali²⁸⁴, Robert C Free²⁸⁶, Xueyang Wang²⁸⁴, Louise V Wain²⁸⁴, Edward J Hollox²⁸⁷, Laura D Venn²⁸⁴, Catherine E Bee²⁸⁴, Emma L Adams²⁸⁴, Ahmadreza Niavarani²⁸⁸, Bahareh Sharififard²⁸⁸, Rasoul Aliannejad²⁸⁹, Ali Amirsavadkouhi²⁹⁰, Zeinab Naderpour²⁸⁹, Hengameh Ansari Tadi²⁹¹, Afshar Etemadi Aleagha²⁹², Saeideh Ahmadi²⁹³, Seyed Behrooz Mohseni Moghaddam²⁹⁴, Alireza Adamsara²⁹⁵, Morteza Saeedi²⁹⁶, Hamed Abdollahi²⁹⁷, Abdolmajid Hosseini²⁹⁸, Pajaree Chariyavilaskul^{299,300}, Monpat Chamnanphon^{299,301}, Thitima B. Suttichet²⁹⁹, Vorasuk Shotelersuk^{302,303}, Monnat Pongpanich^{304,305}, Chureerat Phokaew^{302,303,306}, Wanna Chetruengchai^{302,303}, Watsamon Jantarabenjakul^{307,308}, Opass Putchareon^{307,309}, Pattama Torvorapanit^{307,309}, Thanyawee Puthanakit^{308,310}, Pintip Suchartlikitwong^{310,311}, Nattiya Hirankarn^{312,313}, Voraphoj Nilaratanakul^{309,314}, Pimpayao Sodsai^{312,313}, Ben M Brumpton^{315,316,317}, Kristian Hveem^{315,316}, Cristen Willer^{258,318,319}, Wei Zhou^{267,320}, Tormod Rogne^{321,322,323}, Erik Solligard^{321,323}, Bjørn Olav Åsvold^{315,316,317}, Malak Abedalthagafi³²⁴, Manal Alaamery³²⁵, Saleh Alqahtani³²⁶, Dona Baraka³²⁷, Fawz Al Harthi³²⁴, Ebtehal Alsolm³²⁴, Leen Abu Safieh³²⁴, Albandary M Alowayn³²⁴, Fatimah Alqubaishi³²⁴, Amal Al Mutairi³²⁴, Serghei Mangul³²⁸, Abdulraheem Alshareef³²⁹, Mona Sawaji³³⁰, Mansour Almutairi³²⁵, Nora Aljawini³³¹, Nour Albasher³³¹, Yaseen M Arabi³³², Ebrahim S Mahmoud³³², Amin K Khattab³³³, Roaa T Halawani³³³, Ziab Z Alahmadey³³³, Jihad K Albakri³³³, Walaa A Felemban³³³, Bandar A Suliman³²⁹, Rana Hasanato³²⁷, Laila Al-Awdah³³⁴, Jihad Alghamdi³³⁵, Deema AlZahrani³³⁶, Sameera AlJohani³³⁷, Hani Al-Afghani³³⁸, May Alrashed³³⁹, Nouf AlDhawi³³⁶, Hadeel AlBardis³²⁴, SARAH ALKWAI³³¹, MONEERA ALSWAILM³³¹, FAISAL ALMALKI³³⁶, MAHA

ALBELADI³³⁶, IMAN ALMOHAMMED³³¹, EMAN BARHOUSH³⁴⁰, ANOUD ALBADER³³⁶, Salam Massadeh³²⁵, Abdulaziz AlMalik³⁴¹, Sara Alotaibi³²⁴, Bader Alghamdi³⁴², Junghyun Jung³⁴³, Mohammad S fawzy³²⁴, Yunsung Lee³⁴⁴, Per Magnus³⁴⁴, Lill-Iren S Trogstad³⁴⁵, Øyvind Helgeland³⁴⁶, Jennifer R Harris³⁴⁶, Massimo Mangino^{347,348}, Tim D Spector³⁴⁷, Duncan Emma³⁴⁷, Sandra P Smieszek³⁴⁹, Bartłomiej P Przychodzen³⁴⁹, Christos Polymeropoulos³⁴⁹, Vasilios Polymeropoulos³⁴⁹, Mihael H Polymeropoulos³⁴⁹, Israel Fernandez-Cadenas³⁵⁰, Jordi Perez-Tur^{351,352,353}, Laia Lluçà-Carol^{350,354}, Natalia Cullell^{350,355}, Elena Muiño³⁵⁰, Jara Cárcel-Márquez³⁵⁰, Marta L DeDiego³⁵⁶, Lara Lloret Iglesias³⁵⁷, Anna M Planas^{354,358}, Alex Soriano³⁵⁹, Veronica Rico³⁵⁹, Daiana Agüero³⁵⁹, Josep L Bedini³⁵⁹, Francisco Lozano³⁶⁰, Carlos Domingo³⁵⁹, Veronica Robles³⁵⁹, Francisca Ruiz-Jaén³⁶¹, Leonardo Márquez³⁶², Juan Gomez³⁶³, Eliecer Coto³⁶³, Guillermo M Albaiceta³⁶³, Marta García-Clemente³⁶³, David Dalmau³⁶⁴, Maria J Arranz³⁶⁴, Beatriz Dietl³⁶⁴, Alex Serra-Llovich³⁶⁴, Pere Soler³⁶⁵, Roger Colobrán³⁶⁵, Andrea Martín-Nalda³⁶⁵, Alba Parra Martínez³⁶⁵, David Bernardo³⁶⁶, Silvia Rojo³⁶⁷, Aida Fiz-López³⁶⁶, Elisa Arribas³⁶⁶, Paloma de la Cal-Sabater³⁶⁶, Tomás Segura³⁶⁸, Esther González-Villa³⁶⁸, Gemma Serrano-Heras³⁶⁸, Joan Martí-Fàbregas³⁶⁹, Elena Jiménez-Xarrié³⁶⁹, Alicia de Felipe Mimbrera³⁷⁰, Jaime Masjuan³⁷⁰, Sebastian García-Madrona³⁷⁰, Anna Domínguez-Mayoral³⁷¹, Joan Montaner Villalonga³⁷¹, Paloma Menéndez-Valladares³⁷¹, Daniel I. Chasman^{372,373}, Julie E. Buring^{372,373}, Paul M Ridker^{372,373}, Giulianini Franco³⁷², Howard D. Sesso^{372,373}, JoAnn E. Manson^{372,373}, Joseph R Glessner^{262,374}, Hakon Hakonarson^{262,374,375}, Carolina Medina-Gomez³⁷⁶, Andre G Uitterlinden³⁷⁶, M. Arfan Ikram³⁷⁶, Kati Kristiansson³⁷⁷, Sami Koskelainen³⁷⁷, Markus Perola^{377,378}, Kati Donner²⁵⁵, Katja Kivinen²⁵⁵, Aarno Palotie²⁵⁵, Samuli Ripatti^{255,256,379}, Sanni Ruotsalainen²⁵⁵, Mari Kaunisto²⁵⁵, Tomoko Nakanishi^{380,381,382,383}, Guillaume Butler-Laporte^{380,381}, Vincenzo Forgetta³⁸⁰, David R. Morrison³⁸⁰, Biswarup Ghosh³⁸⁰, Laetitia Laurent³⁸⁰, Alexandre Belisle³⁸⁰, Danielle Henry³⁸⁰, Tala Abdullah³⁸⁰, Olumide Adeleye³⁸⁰, Noor Mamlouk³⁸⁰, Nofar Kimchi³⁸⁰, Zaman Afrasiabi³⁸⁰, Nardin Rezk³⁸⁰, Branka Vulesevic³⁸⁰, Meriem Bouab³⁸⁰, Charlotte Guzman³⁸⁰, Louis Petitjean³⁸⁰, Chris Tselios³⁸⁰, Xiaoqing Xue³⁸⁰, Erwin Schurr³⁸⁰, Jonathan Afilalo³⁸⁰, Marc Afilalo³⁸⁰, Maureen Oliveira³⁸⁰, Bluma Brenner³⁸⁰, Pierre Lepage³⁸⁰, Jiannis Ragoussis³⁸⁰, Daniel Auld³⁸⁰, Nathalie Brassard³⁸⁰, Madeleine Durand³⁸⁰, Michaël Chassé³⁸⁰, Daniel E. Kaufmann³⁸⁰, G. Mark Lathrop³⁸⁰, Vincent Mooser³⁸⁰, J. Brent Richards³⁸⁰, Rui Li³⁸⁰, Darin Adra³⁸⁰, Souad Rahmouni³⁸⁴, Michel Georges³⁸⁴, Michel Moutschen³⁸⁵, Benoit Misset^{384,385}, Gilles Darcis^{384,385}, Julien Guiot^{384,385}, Julien Guntz³⁸⁵, Samira Azarzar^{384,385}, Stéphanie Gofflot³⁸⁶, Yves Beguin³⁸⁶, Sabine Claassen³⁸⁷, Olivier Malaise³⁸⁵, Pascale Huynen³⁸⁵, Christelle Meuris³⁸⁵, Marie Thys³⁸⁵, Jessica Jacques³⁸⁵, Philippe Léonard³⁸⁵, Frederic Fripiat³⁸⁵, Jean-Baptiste Giot³⁸⁵, Anne-Sophie Sauvage³⁸⁵, Christian Von Frenckell³⁸⁵, Yasmine Belhaj³⁸⁴, Bernard Lambermont³⁸⁵, Mari E.K. Niemi²⁵⁵, Sara Pigazzini²⁵⁵, Lindokuhle Nkambule^{256,256,267}, Michelle Daya³⁸⁸, Jonathan Shortt³⁸⁸, Nicholas Rafaels³⁸⁸, Stephen J Wicks³⁸⁸, Kristy Crooks³⁸⁸, Kathleen C Barnes³⁸⁸, Christopher R Gignoux³⁸⁸, Sameer Chavan³⁸⁸, Triin Laisk³⁸⁹, Kristi Läll³⁸⁹, Maarja Lepamets³⁸⁹, Reedik Mägi³⁸⁹, Tõnu Esko³⁸⁹, Ene Reimann³⁸⁹, Lili Milani³⁸⁹, Helene Alavere³⁸⁹, Kristjan Metsalu³⁸⁹, Mairo Puusepp³⁸⁹, Andres Metspalu³⁸⁹, Paul Naaber³⁹⁰, Edward Laane^{391,392}, Jaana Pesukova³⁹¹, Pärt Peterson³⁹³, Kai Kisand³⁹³, Jekaterina Tabri³⁹⁴, Raili Allos³⁹⁴, Kati Hensen³⁹⁴, Joel Starkopf³⁹², Inge Ringmets³⁹⁵, Anu Tamm³⁹², Anne Kallaste³⁹², Pierre-Yves Bochud³⁹⁶, Carlo Rivolta^{397,398}, Stéphanie Bibert³⁹⁶, Mathieu Quinodoz^{397,398}, Dhryata Kamdar^{397,398}, Noémie Boillat³⁹⁶, Semira Gonseth Nussle³⁹⁹, Werner Albrich⁴⁰⁰, Noémie Suh⁴⁰¹, Dionysios Neofytos⁴⁰², Véronique Erard⁴⁰³, Cathy Voide⁴⁰⁴, Rafael de Cid⁴⁰⁵, Iván Galván-Femenía⁴⁰⁵, Natalia Blay⁴⁰⁵, Anna Carreras⁴⁰⁵, Beatriz Cortés⁴⁰⁵, Xavier Farré⁴⁰⁵, Lauro Sumoy⁴⁰⁵, Victor Moreno⁴⁰⁶, Josep Maria

Mercader⁴⁰⁷, Marta Guindo-Martinez⁴⁰⁸, David Torrents⁴⁰⁸, Manolis Kogevinas^{409,410,411,412}, Judith Garcia-Aymerich^{409,411,412}, Gemma Castaño-Vinyals^{409,410,411,412}, Carlota Dobaño^{409,412}, Alessandra Renieri^{413,414,415}, Francesca Mari^{413,414,415}, Chiara Fallerini^{413,415}, Sergio Daga^{413,415}, Elisa Benetti⁴¹⁵, Margherita Baldassarri^{413,415}, Francesca Fava^{413,414,415}, Elisa Frullanti^{413,415}, Floriana Valentino^{413,415}, Gabriella Doddato^{413,415}, Annarita Giliberti^{413,415}, Rossella Tita⁴¹⁴, Sara Amitrano⁴¹⁴, Mirella Bruttini^{413,414,415}, Susanna Croci^{413,415}, Ilaria Meloni^{413,415}, Maria Antonietta Mencarelli⁴¹⁴, Caterina Lo Rizzo⁴¹⁴, Anna Maria Pinto⁴¹⁴, Giada Beligni^{413,415}, Andrea Tommasi⁴¹⁶, Laura Di Sarno^{413,415}, Maria Palmieri^{413,415}, Miriam Lucia Carriero^{413,415}, Diana Alaverdian^{413,415}, Stefano Busani⁴¹⁷, Raffaele Bruno^{418,419}, Marco Vecchia⁴¹⁸, Mary Ann Belli⁴²⁰, Nicola Picchiotti^{421,422}, Maurizio Sanarico⁴²³, Marco Gori⁴²², Simone Furini⁴¹⁵, Stefania Mantovani⁴¹⁸, Serena Ludovisi⁴²⁴, Mario Umberto Mondelli^{418,419}, Francesco Castelli⁴²⁵, Eugenia Quiros-Roldan⁴²⁵, Melania Degli Antoni⁴²⁵, Isabella Zanella^{426,427}, Massimo Vaghi⁴²⁸, Stefano Rusconi^{429,430}, Matteo Siano⁴³⁰, Francesca Montagnani^{415,431}, Arianna Emiliozzi⁴³², Massimiliano Fabbiani⁴³¹, Barbara Rossetti⁴³¹, Elena Bargagli⁴³³, Laura Bergantini⁴³³, Miriana D'Alessandro⁴³³, Paolo Cameli⁴³³, David Bennett⁴³³, Federico Anedda⁴³⁴, Simona Marcantonio⁴³⁴, Sabino Scolletta⁴³⁴, Federico Franchi⁴³⁴, Maria Antonietta Mazzei⁴³⁵, Susanna Guerrini⁴³⁵, Edoardo Conticini⁴³⁶, Luca Cantarini⁴³⁶, Bruno Frediani⁴³⁶, Danilo Tacconi⁴³⁷, Chiara Spertilli⁴³⁷, Marco Feri⁴³⁸, Alice Donati⁴³⁸, Raffaele Scala⁴³⁹, Luca Guidelli⁴³⁹, Genni Spargi⁴⁴⁰, Marta Corridi⁴⁴⁰, Cesira Nencioni⁴⁴¹, Leonardo Croci⁴⁴¹, Maria Bandini⁴⁴², Gian Piero Caldarelli⁴⁴³, Paolo Piacentini⁴⁴², Elena Desanctis⁴⁴², Silvia Cappelli⁴⁴², Anna Canaccini⁴⁴⁴, Agnese Verzuri⁴⁴⁴, Valentina Anemoli⁴⁴⁴, Agostino Ognibene⁴⁴⁵, Alessandro Pancrazi⁴⁴⁵, Maria Lorubbio⁴⁴⁵, Antonella D'Arminio Monforte⁴⁴⁶, Federica Gaia Miraglia⁴⁴⁶, Massimo Girardis⁴¹⁷, Sophie Venturelli⁴¹⁷, Andrea Cossarizza⁴⁴⁷, Andrea Antinori⁴³², Alessandra Vergori⁴³², Arianna Gabrieli⁴³⁰, Agostino Riva^{429,430}, Daniela Francisci^{416,448}, Elisabetta Schiaroli^{416,448}, Francesco Paciosi⁴⁴⁸, Pier Giorgio Scotton⁴⁴⁹, Francesca Andretta⁴⁴⁹, Sandro Panese⁴⁵⁰, Renzo Scaggiante⁴⁵¹, Francesca Gatti⁴⁵¹, Saverio Giuseppe Parisi⁴⁵², Stefano Baratti⁴⁵², Matteo Della Monica⁴⁵³, Carmelo Piscopo⁴⁵³, Mario Capasso^{454,455,456}, Roberta Russo^{454,455}, Immacolata Andolfo^{454,455}, Achille Iolascon^{454,455}, Giuseppe Fiorentino⁴⁵⁷, Massimo Carella⁴⁵⁸, Marco Castori⁴⁵⁸, Giuseppe Merla^{454,459}, Gabriella Maria Squeo⁴⁵⁹, Filippo Aucella⁴⁶⁰, Pamela Raggi⁴⁶¹, Carmen Marciano⁴⁶¹, Rita Perna⁴⁶¹, Matteo Bassetti^{462,463}, Antonio Di Biagio⁴⁶³, Maurizio Sanguinetti^{464,465}, Luca Masucci^{464,465}, Serafina Valente⁴⁶⁶, Marco Mandalà⁴⁶⁷, Alessia Giorli⁴⁶⁷, Lorenzo Salerni⁴⁶⁷, Patrizia Zucchi⁴⁶⁸, Pierpaolo Parravicini⁴⁶⁸, Elisabetta Menatti⁴⁶⁹, Tullio Trotta⁴⁷⁰, Ferdinando Giannattasio⁴⁷⁰, Gabriella Coiro⁴⁷⁰, Fabio Lena⁴⁷¹, Domenico A. Coviello⁴⁷², Cristina Mussini⁴⁷³, Enrico Martinelli⁴⁷⁴, Sandro Mancarella⁴²⁰, Luisa Tavecchia⁴²⁰, Lia Crotti^{475,476,477,477}, Chiara Gabbi⁴²³, Marco Rizzi⁴⁷⁸, Franco Maggiolo⁴⁷⁸, Diego Ripamonti⁴⁷⁸, Tiziana Bachetti⁴⁷⁹, Maria Teresa La Rovere⁴⁸⁰, Simona Sarzi-Braga⁴⁸¹, Maurizio Bussotti⁴⁸², Stefano Ceri⁴⁸³, Pietro Pinoli⁴⁸³, Francesco Raimondi⁴⁸⁴, Filippo Biscarini⁴⁸⁵, Alessandra Stella⁴⁸⁵, Kristina Zguro⁴¹⁵, Katia Capitani^{415,486}, Claudia Suardi⁴⁸⁷, Simona Dei⁴⁸⁸, Gianfranco Parati^{475,476}, Sabrina Ravaglia⁴⁸⁹, Rosangela Artuso⁴⁹⁰, Giordano Bottà⁴⁹¹, Paolo Di Domenico⁴⁹¹, Ilaria Rancan⁴³¹, Antonio Perrella⁴⁹², Francesco Bianchi^{415,492}, Davide Romani⁴⁴², Paola Bergomi⁴⁹³, Emanuele Catena⁴⁹³, Riccardo Colombo⁴⁹³, Marco Tanfoni⁴²², Antonella Vincenti⁴⁹⁴, Claudio Ferri⁴⁹⁵, Davide Grassi⁴⁹⁵, Gloria Pessina⁴⁹⁶, Mario Tumbarello^{415,497}, Massimo Di Pietro⁴⁹⁸, Ravaglia Sabrina⁴⁸⁹, Sauro Luchi⁴⁹⁹, Chiara Barbieri⁵⁰⁰, Donatella Acquilini⁵⁰¹, Elena Andreucci⁴⁹⁰, Francesco Vladimiro Segala⁵⁰², Giusy Tiseo⁵⁰⁰, Marco Falcone⁵⁰⁰, Mirjam Lista^{413,415}, Monica Poscente⁴⁹⁶, Oreste De Vivo⁴⁶⁶, Paola Petrocelli⁴⁹⁹, Alessandra Guarnaccia⁴⁶⁴, Silvia Baroni⁵⁰³, Albert V Smith²⁵⁸, Andrew P

Boughton²⁵⁸, Kevin W. Li²⁵⁸, Jonathon LeFaive²⁵⁸, Aubrey Annis²⁵⁸, Anne E Justice⁵⁰⁴, Tooraj Mirshahi⁵⁰⁵, Geetha Chittoor⁵⁰⁴, Navya Shilpa Josyula⁵⁰⁴, Jack A. Kosmicki⁵⁰⁶, Manuel A.R. Ferreira⁵⁰⁶, Joseph B. Leader⁵⁰⁷, Dave J. Carey⁵⁰⁵, Matthew C. Gass⁵⁰⁷, Julie E Horowitz⁵⁰⁶, Michael N. Cantor⁵⁰⁶, Ashish Yadav⁵⁰⁶, Aris Baras⁵⁰⁶, Goncalo R. Abecasis⁵⁰⁶, David A van Heel⁵⁰⁸, Karen A Hunt⁵⁰⁸, Dan Mason⁵⁰⁹, Qin Qin Huang⁵¹⁰, Sarah Finer⁵⁰⁸, Bhavi Trivedi⁵⁰⁸, Christopher J Griffiths⁵⁰⁸, Hilary C Martin⁵¹⁰, John Wright⁵⁰⁹, Richard C Trembath⁵¹¹, Nicole Soranzo^{512,513,514}, Jing Hua Zhao⁵¹⁵, Adam S. Butterworth^{513,515,516,517}, John Danesh^{512,513,515,516,517}, Emanuele Di Angelantonio^{513,515,516,517}, Lude Franke⁵¹⁸, Marike Boezen⁵¹⁸, Patrick Deelen⁵¹⁹, Anniqve Claringbould⁵¹⁸, Esteban Lopera⁵¹⁸, Robert Warmerdam⁵¹⁸, Judith. M. Vonk⁵²⁰, Irene van Blokland⁵¹⁸, Pauline Lanting⁵²¹, Anil P. S. Ori^{518,522}, Sebastian Zöllner²⁵⁸, Jiongming Wang²⁵⁸, Andrew Beck²⁵⁸, Gina Peloso^{523,524}, Yuk-Lam Ho⁵²⁵, Yan V Sun⁵²⁶, Jennifer E Huffman⁵²⁴, Christopher J O'Donnell⁵²⁴, Kelly Cho⁵²⁵, Phil Tsao⁵²⁷, J. Michael Gaziano⁵²⁵, Michel (M.G.) Nivard⁵²⁸, Eco (E.J.C.) de geus⁵²⁸, Meike Bartels⁵²⁸, Jouke Jan Hottenga⁵²⁸, Scott T Weiss³⁷², Elizabeth W. Karlson³⁷², Jordan W. Smoller⁴⁰⁷, Robert C. Green⁵²⁹, Yen-Chen Anne Feng⁴⁰⁷, Josep Mercader⁵²⁹, Shawn N Murphy⁴⁰⁷, James B. Meigs⁴⁰⁷, Ann E. Woolley³⁷², Emma F Perez⁴⁰⁷, Daniel Rader⁵³⁰, Anurag Verma⁵³⁰, Marylyn D. Ritchie⁵³⁰, Binglan Li⁵²⁷, Shefali S Verma⁵³⁰, Anastasia Lucas⁵³⁰, Yuki Bradford⁵³⁰, Hugo Zeberg^{531,532}, Robert Frithiof⁵³³, Michael Hultström^{533,534}, Miklos Lipcsey^{533,533}, Lindo Nkambul^{256,267,535}, Nicolas Tardif⁵³⁶, Olav Rooyackers⁵³⁶, Jonathan Grip⁵³⁶, Tomislav Maricic⁵³², Konrad J. Karczewski^{256,407}, Elizabeth G. Atkinson^{256,407}, Kristin Tsuo^{256,407}, Nikolas Baya^{256,407}, Patrick Turley^{256,407}, Rahul Gupta^{256,407}, Shawneequa Callier⁵³⁷, Raymond K. Walters^{256,407}, Duncan S. Palmer^{256,407}, Gopal Sarma^{256,407}, Nathan Cheng^{256,407}, Wenhan Lu^{256,407}, Sam Bryant^{256,407}, Claire Churchhouse^{256,407}, Caroline Cusick²⁵⁶, Jacqueline I. Goldstein^{256,407}, Daniel King^{256,407}, Cotton Seed^{256,407}, Hilary Finucane^{256,407}, Alicia R. Martin^{256,407}, F. Kyle Satterstrom^{256,407}, Daniel J Wilson⁵³⁸, Jacob Armstrong⁵³⁸, Justine K Rudkin⁵³⁸, Gavin Band⁵³⁹, Sarah G Earle⁵³⁸, Shang-Kuan Lin⁵³⁸, Nicolas Arning⁵³⁸, Derrick W Crook⁵⁴⁰, David H Wyllie⁵⁴¹, Anne Marie O'Connell⁵⁴², Chris C A Spencer⁵⁴³, Nils Koelling⁵⁴³, Mark J Caulfield⁵⁴⁴, Richard H Scott⁵⁴⁴, Tom Fowler⁵⁴⁴, Loukas Moutsianas⁵⁴⁴, Athanasios Kousathanas⁵⁴⁴, Dorota Pasko⁵⁴⁴, Susan Walker⁵⁴⁴, Augusto Rendon⁵⁴⁴, Alex Stuckey⁵⁴⁴, Christopher A Odhams⁵⁴⁴, Daniel Rhodes⁵⁴⁴, Georgia Chan⁵⁴⁴, Prabhu Arumugam⁵⁴⁴, Catherine A. Ball⁵⁴⁵, Eurie L. Hong⁵⁴⁵, Kristin Rand⁵⁴⁵, Ahna Girshick⁵⁴⁵, Harendra Guturu⁵⁴⁵, Asher Haug Baltzell⁵⁴⁵, Genevieve Roberts⁵⁴⁵, Danny Park⁵⁴⁵, Marie Coignet⁵⁴⁵, Shannon McCurdy⁵⁴⁵, Spencer Knight⁵⁴⁵, Raghavendran Partha⁵⁴⁵, Brooke Rhead⁵⁴⁵, Miao Zhang⁵⁴⁵, Nathan Berkowitz⁵⁴⁵, Michael Gaddis⁵⁴⁵, Keith Noto⁵⁴⁵, Luong Ruiz⁵⁴⁵, Milos Pavlovic⁵⁴⁵, Laura G. Sloofman²⁵⁷, Alexander W. Charney²⁵⁷, Noam D. Beckmann²⁵⁷, Eric E. Schadt²⁵⁷, Daniel M. Jordan²⁵⁷, Ryan C. Thompson²⁵⁷, Kyle Gettler²⁵⁷, Noura S. Abul-Husn²⁵⁷, Steven Ascolillo²⁵⁷, Joseph D. Buxbaum²⁵⁷, Kumardeep Chaudhary²⁵⁷, Judy H. Cho²⁵⁷, Yuval Itan²⁵⁷, Eimear E. Kenny²⁵⁷, Gillian M. Belbin²⁵⁷, Stuart C. Sealfon²⁵⁷, Robert P. Sebra²⁵⁷, Irene Salib²⁵⁷, Brett L. Collins²⁵⁷, Tess Levy²⁵⁷, Bari Britvan²⁵⁷, Katherine Keller²⁵⁷, Lara Tang²⁵⁷, Michael Peruggia²⁵⁷, Liam L. Hiester²⁵⁷, Kristi Niblo²⁵⁷, Alexandra Aksentijevich²⁵⁷, Alexander Labkowsky²⁵⁷, Avromie Karp²⁵⁷, Menachem Zlatopolsky²⁵⁷, Michael Preuss²⁵⁷, Ruth J.F. Loos²⁵⁷, Girish N. Nadkarni²⁵⁷, Ron Do²⁵⁷, Clive Hoggart²⁵⁷, Sam Choi²⁵⁷, Slayton J. Underwood²⁵⁷, Paul O'Reilly²⁵⁷, Laura M. Huckins²⁵⁷, Marissa Zyndorf²⁵⁷, Mark J. Daly^{255,256}, Benjamin M. Neale²⁵⁶, Andrea Ganna^{255,256}.

²⁵⁴Yale University, New Haven, CT, USA

²⁵⁵Institute for Molecular Medicine Finland (FIMM), University of Helsinki, Helsinki, Finland

²⁵⁶Broad Institute of MIT and Harvard, Cambridge, MA, USA

- ²⁵⁷Icahn School of Medicine at Mount Sinai, New York, NY, USA
- ²⁵⁸University of Michigan, Ann Arbor, MI, USA
- ²⁵⁹Centre for Bioinformatics and Data Analysis, Medical University of Bialystok, Bialystok, Poland
- ²⁶⁰Institute of Genetics and Cancer, University of Edinburgh, Western General Hospital, Edinburgh, UK
- ²⁶¹University of Texas Health, Texas, USA
- ²⁶²Center for Applied Genomics, Children's Hospital of Philadelphia, Philadelphia, PA, USA
- ²⁶³Department of Pediatrics, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA
- ²⁶⁴Vanderbilt University Medical Center, Tennessee, USA
- ²⁶⁵University of North Carolina at Chapel Hill, NC, USA
- ²⁶⁶The Roslin Institute, The Royal (Dick) School of Veterinary Studies, University of Edinburgh, Edinburgh, UK
- ²⁶⁷Analytic and Translational Genetics Unit, Massachusetts General Hospital, Boston, Massachusetts, USA
- ²⁶⁸Genolier Innovation Network and Hub, Swiss Medical Network, Genolier Healthcare Campus, Route du Muids 3, 1272 Genolier, Switzerland
- ²⁶⁹Department of Pediatrics, Faculty of Medicine, Mansoura University, Mansoura, Egypt
- ²⁷⁰Department of Clinical Pathology, Faculty of Medicine, Tanta University, Tanta, Egypt
- ²⁷¹Department of Anaesthesia and Critical Care, Faculty of Medicine, Mansoura University, Mansoura, Egypt
- ²⁷²Department of Surgery, Faculty of Medicine, Mansoura University, Mansoura, Egypt
- ²⁷³Department of Internal Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt
- ²⁷⁴Faculty of Science, Tanta University, Tanta, Egypt
- ²⁷⁵Chest Department, Faculty of Medicine, Tanta University, Tanta, Egypt
- ²⁷⁶Department of Clinical Pathology, Faculty of Medicine, Mansoura University, Mansoura, Egypt
- ²⁷⁷Department of Biosciences, School of Science and Technology, Nottingham Trent University, Nottingham, UK
- ²⁷⁸Chest Department, Faculty of Medicine, Mansoura University, Mansoura, Egypt
- ²⁷⁹Anesthesia, Surgical Intensive Care & Pain Management Department, Faculty of Medicine, Tanta University, Tanta, Egypt
- ²⁸⁰Department of Medical Biochemistry, Faculty of Medicine, Mansoura University, Mansoura, Egypt
- ²⁸¹Department of Tropical Medicine, Faculty of Medicine, Mansoura University, Mansoura, Egypt
- ²⁸²pediatric and neonatology, Kafr Elzayat General Hospital, Kafr El-Zayat, Egypt
- ²⁸³Pediatrics Department, Faculty of Medicine, Tanta University, Tanta, Egypt
- ²⁸⁴Department of Health Sciences, University of Leicester, Leicester, UK
- ²⁸⁵Leicester NIHR Biomedical Research Centre, Leicester, UK
- ²⁸⁶Department of Respiratory Sciences, University of Leicester, UK
- ²⁸⁷University of Leicester, Leicester, UK
- ²⁸⁸Digestive Oncology Research Center, Digestive Disease Research Institute, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran
- ²⁸⁹Department of Pulmonology, School of Medicine, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran

- ²⁹⁰Department of Critical Care Medicine, Noorafshar Hospital, Tehran, Iran
- ²⁹¹Department of Emergency Intensive Care Unit, School of Medicine, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran
- ²⁹²Department of Anesthesiology, School of Medicine, Amir Alam Hospital, Tehran University of Medical Sciences, Tehran, Iran
- ²⁹³Department of Pulmonology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
- ²⁹⁴Department of Pathology, Parseh Pathobiology and Genetics Laboratory, Tehran, Iran
- ²⁹⁵Department of Microbiology, Health and Family Research Center, NIOC Hospital, Tehran, Iran
- ²⁹⁶Department of Emergency Medicine, School of Medicine, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran
- ²⁹⁷Department of Anesthesiology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
- ²⁹⁸Department of Pathology, Faculty of Medicine, Tehran Azad University, Tehran, Iran
- ²⁹⁹Clinical Pharmacokinetics and Pharmacogenomics Research Unit, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand
- ³⁰⁰Department of Pharmacology, Faculty of Medicine, Chulalongkorn University, Bangkok Thailand
- ³⁰¹Department of Pathology, Faculty of Medicine, Nakornnayok, Srinakharinwirot University, Thailand
- ³⁰²Center of Excellence for Medical Genomics, Medical Genomics Cluster, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand
- ³⁰³Excellence Center for Genomics and Precision Medicine, King Chulalongkorn Memorial Hospital, The Thai Red Cross Society, Bangkok, Thailand
- ³⁰⁴Department of Mathematics and Computer Science, Faculty of Science, Chulalongkorn University, Bangkok, Thailand
- ³⁰⁵Omics Sciences and Bioinformatics Center, Faculty of Science, Chulalongkorn University, Bangkok, Thailand
- ³⁰⁶Research Affairs, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand
- ³⁰⁷Thai Red Cross Emerging Infectious Diseases Clinical Centre, King Chulalongkorn Memorial Hospital, Bangkok, Thailand
- ³⁰⁸Department of Pediatrics, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand
- ³⁰⁹Division of Infectious Diseases, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand
- ³¹⁰Center of Excellence in Pediatric Infectious Diseases and Vaccines, Chulalongkorn University, Bangkok, Thailand
- ³¹¹Department of Microbiology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand
- ³¹²Immunology Division, Department of Microbiology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand
- ³¹³Center of Excellence in Immunology and Immune-mediated Diseases, Department of Microbiology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand
- ³¹⁴Healthcare-associated Infection Research Group STAR (Special Task Force for Activating Research), Chulalongkorn University, Bangkok, Thailand
- ³¹⁵K.G. Jebsen Center for Genetic Epidemiology, Department of Public Health and Nursing,

NTNU, Norwegian University of Science and Technology, Trondheim, 7030, Norway

³¹⁶HUNT Research Center, Department of Public Health and Nursing, NTNU, Norwegian University of Science and Technology, Levanger, 7600, Norway

³¹⁷Clinic of Medicine, St. Olavs Hospital, Trondheim University Hospital, Trondheim, 7030, Norway

³¹⁸Division of Cardiovascular Medicine, Department of Internal Medicine, University of Michigan, Ann Arbor, MI, USA

³¹⁹Department of Computational Medicine and Bioinformatics, University of Michigan, Ann Arbor, MI, USA

³²⁰Program in Medical and Population Genetics, Broad Institute of Harvard and MIT, Cambridge, Massachusetts, USA

³²¹Gemini Center for Sepsis Research, Department of Circulation and Medical Imaging, NTNU, Norwegian University of Science and Technology, Trondheim, Norway

³²²Department of Chronic Disease Epidemiology and Center for Perinatal, Pediatric and Environmental Epidemiology, Yale School of Public Health, New Haven, CT, USA

³²³Clinic of Anaesthesia and Intensive Care, St. Olavs Hospital, Trondheim University Hospital, Trondheim, Norway

³²⁴Genomics Research Department, Saudi Human Genome Project, King Fahad Medical City and King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia

³²⁵Developmental Medicine Department, King Abdullah International Medical Research Center, King Saud Bin Abdulaziz University for Health Sciences, Ministry of National Guard-Health Affairs, Riyadh, Kingdom of Saudi Arabia and Saudi Human Genome Project (SHGP), King Abdulaziz City for Science and Technology (KACST), Satellite Lab at King Abdulaziz Medical City (KAMC), Ministry of National Guard Health Affairs (MNG-HA), Riyadh, Kingdom of Saudi Arabia

³²⁶The Liver Transplant Unit, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia. The Division of Gastroenterology and Hepatology, Johns Hopkins University

³²⁷Department of Pathology, College of Medicine, King Saud University, Riyadh, Saudi Arabia

³²⁸Titus Family Department of Clinical Pharmacy, USC School of Pharmacy, University of Southern California, USA

³²⁹College of Applied Medical Sciences, Taibah University, Madina, Saudi Arabia

³³⁰Developmental Medicine Department, King Abdullah International Medical Research Center, King Saud Bin Abdulaziz University for Health Sciences, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia

³³¹KACST-BWH Centre of Excellence for Biomedicine, Joint Centers of Excellence Program, King Abdulaziz City for Science and Technology (KACST), Riyadh, Kingdom of Saudi Arabia

³³²Ministry of the National Guard Health Affairs, King Abdullah International Medical Research Center and King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Kingdom of Saudi Arabia

³³³Ohud Hospital, Ministry of Health, Madinah, Saudi Arabia

³³⁴Pediatric Infectious Diseases, Children's Specialized Hospital, King Fahad Medical City, Riyadh, Saudi Arabia

³³⁵The Saudi Biobank, King Abdullah International Medical Research Center, King Saud bin Abdulaziz University for Health Sciences, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia

³³⁶Developmental Medicine Department, King Abdullah International Medical Research Center, King Saud Bin Abdulaziz University for Health Sciences, King AbdulAziz Medical City,

Ministry of National Guard Health Affairs, Riyadh, Kingdom of Saudi Arabia

³³⁷Department of Pathology and Laboratory Medicine, King Abdulaziz Medical City, Ministry of National Guard Health Affairs, King Saud Bin Abdulaziz University for Health Sciences and King Abdullah International Medical Research Center, Riyadh, Saudi Arabia

³³⁸Laboratory Department, Security Forces Hospital, General Directorate of Medical Services, Ministry of Interior, Riyadh, Saudi Arabia

³³⁹Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia

³⁴⁰King Abdulaziz City for Science and Technology (KACST), Riyadh, Kingdom of Saudi Arabia

³⁴¹Life Science and environmental institute, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia

³⁴²Department of Developmental Medicine, King Abdullah International Medical Research Center, King Saud Bin Abdulaziz University for Health Sciences, King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia

³⁴³Titus Family Department of Clinical Pharmacy, USC School of Pharmacy University of Southern California, CA, USA

³⁴⁴Centre for Fertility and Health, Norwegian Institute of Public Health, Oslo, Norway

³⁴⁵Department of Method Development and Analytics, Norwegian Institute of Public Health, Oslo, Norway

³⁴⁶Department of Genetics and Bioinformatics, Norwegian Institute of Public Health, Oslo, Norway

³⁴⁷King's College London, Department of Twin Research and Genetic Epidemiology, London, UK

³⁴⁸NIHR Biomedical Research Centre at Guy's and St Thomas' Foundation Trust, London, UK

³⁴⁹Vanda Pharmaceuticals Inc, London, UK

³⁵⁰Stroke Pharmacogenomics and Genetics, Biomedical Research Institute Sant Pau, Sant Pau Hospital, Barcelona, Spain

³⁵¹Institute of Biomedicine of Valencia (IBV), CSIC, València, Spain

³⁵²Network Center for Biomedical Research on Neurodegenerative Diseases (CIBERNED), València, Spain

³⁵³Neurology and Genetic Mixed Unit, La Fe Health Research Institute, València, Spain

³⁵⁴Institute for Biomedical Research of Barcelona (IIBB), National Spanish Research Council (CSIC), Barcelona, Spain

³⁵⁵Department of Neurology, Hospital Universitari MútuaTerrassa, Fundació Docència i Recerca MútuaTerrassa, Terrassa, Spain

³⁵⁶Department of Molecular and Cell Biology, Centro Nacional de Biotecnología (CNB-CSIC), Campus Universidad Autónoma de Madrid, 28049 Madrid, Spain

³⁵⁷Instituto de Física de Cantabria (IFCA-CSIC), Spain

³⁵⁸Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), Barcelona, Spain

³⁵⁹Hospital Clínic, Barcelona, Spain

³⁶⁰Hospital Clínic, IDIBAPS, School of Medicine, University of Barcelona, Spain

³⁶¹IDIBAPS, Barcelona, Spain

³⁶²IIBB-CSIC, Barcelona, Spain

³⁶³Servicio de Salud del Principado de Asturias, Oviedo, Spain

³⁶⁴Hospital Mutua de Terrassa, Terrassa, Spain

³⁶⁵Hospital Valle Hebrón, Barcelona, Spain

³⁶⁶Instituto de Biomedicina y Genética Molecular (IBGM), CSIC-Universidad de Valladolid,

Spain

- ³⁶⁷Hospital Clínico Universitario de Valladolid (SACYL), Spain
- ³⁶⁸University Hospital of Albacete, Albacete, Spain
- ³⁶⁹Department of Neurology, Biomedical Research Institute Sant Pau (IIB Sant Pau), Hospital de la Santa Creu i Sant Pau, Barcelona, Spain
- ³⁷⁰Hospital Universitario Ramon Y Cajal, IRYCIS, Madrid, Spain
- ³⁷¹Institute de Biomedicine of Seville, IBI/S/Hospital Universitario Virgen del Rocío/CSIC/University of Seville & Department of Neurology, Hospital Universitario Virgen Macarena, Seville, Spain
- ³⁷²Brigham and Women's Hospital, Boston, MA, USA
- ³⁷³Harvard Medical School, Boston, MA
- ³⁷⁴Division of Human Genetics, Department of Pediatrics, The Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA
- ³⁷⁵Faculty of Medicine, University of Iceland, Reykjavik, Iceland
- ³⁷⁶Erasmus MC, Rotterdam, Netherlands
- ³⁷⁷Finnish Institute for Health and Welfare (THL), Helsinki, Finland
- ³⁷⁸University of Helsinki, Faculty of Medicine, Clinical and Molecular Metabolism Research Program, Helsinki, Finland
- ³⁷⁹Public Health, Faculty of Medicine, University of Helsinki, Finland
- ³⁸⁰Department of Human Genetics, McGill University, Montréal, Québec, Canada
- ³⁸¹Lady Davis Institute, Jewish General Hospital, McGill University, Montréal, Québec, Canada
- ³⁸²Kyoto-McGill International Collaborative School in Genomic Medicine, Graduate School of Medicine, Kyoto University, Kyoto, Japan
- ³⁸³Research Fellow, Japan Society for the Promotion of Science
- ³⁸⁴University of Liege, Liege, Belgium
- ³⁸⁵CHU of Liege, Liege, Belgium
- ³⁸⁶5BHUL (Liege Biobank), CHU of Liege, Liege, Belgium
- ³⁸⁷CHC Mont-Legia, Liege, Belgium
- ³⁸⁸University of Colorado - Anschutz Medical Campus, Aurora, CO, USA
- ³⁸⁹Estonian Genome Centre, Institute of Genomics, University of Tartu, Tartu, Estonia
- ³⁹⁰University of Tartu, Tartu, Estonia
- ³⁹¹Kuressaare Hospital, Kuressaare, Estonia
- ³⁹²Tartu University Hospital, Tartu, Estonia
- ³⁹³Institute of Biomedicine and Translational Medicine, University of Tartu, Tartu, Estonia
- ³⁹⁴West Tallinn Central Hospital, Tallinn, Estonia
- ³⁹⁵Estonian Health Insurance Fund, Tallinn, Estonia
- ³⁹⁶Infectious Diseases Service, Department of Medicine, University Hospital and University of Lausanne, Lausanne, Switzerland
- ³⁹⁷Institute of Molecular and Clinical Ophthalmology Basel (IOB), Basel, Switzerland
- ³⁹⁸Department of Ophthalmology, University of Basel, Basel, Switzerland
- ³⁹⁹Centre for Primary Care and Public Health, University of Lausanne, Lausanne, Switzerland
- ⁴⁰⁰Division of Infectious Diseases and Hospital Epidemiology, Cantonal Hospital St Gallen, St Gallen, Switzerland
- ⁴⁰¹Division of Intensive Care, Geneva University Hospitals and the University of Geneva Faculty of Medicine, Geneva, Switzerland
- ⁴⁰²Infectious Disease Service, Department of Internal Medicine, Geneva University Hospital,

Geneva, Switzerland

⁴⁰³Clinique de Médecine et spécialités, Infectiologie, HFR-Fribourg, Fribourg, Switzerland

⁴⁰⁴Infectious Diseases Division, University Hospital Centre of the canton of Vaud, hospital of Valais, Sion, Switzerland

⁴⁰⁵GCAT-Genomes for Life, Germans Trias i Pujol Health Sciences Research Institute (IGTP), Crta. de Can Ruti, Cami de les Escoles s/n.08916 Badalona, Catalonia, Spain

⁴⁰⁶Catalan Institute of Oncology, Bellvitge Biomedical Research Institute, Consortium for Biomedical Research in Epidemiology and Public Health and University of Barcelona, Barcelona, Spain

⁴⁰⁷Massachusetts General Hospital, Boston, MA, USA

⁴⁰⁸Barcelona Supercomputing Center - Centro Nacional de Supercomputación (BSC-CNS).Life & Medical Sciences, Barcelona, Spain

⁴⁰⁹ISGlobal, Barcelona, Spain

⁴¹⁰IMIM (Hospital del Mar Medical Research Institute), Barcelona, Spain

⁴¹¹Universitat Pompeu Fabra (UPF), Barcelona, Spain

⁴¹²CIBER Epidemiología y Salud Pública (CIBERESP), Madrid, Spain

⁴¹³Medical Genetics, University of Siena, Siena, Italy

⁴¹⁴Genetica Medica, Azienda Ospedaliero-Universitaria Senese, Siena, Italy

⁴¹⁵Med Biotech Hub and Competence Center, Department of Medical Biotechnologies, University of Siena, Siena, Italy

⁴¹⁶Infectious Diseases Clinic, Department of Medicine 2, Azienda Ospedaliera di Perugia and University of Perugia, Santa Maria Hospital, Perugia, Italy

⁴¹⁷Department of Anesthesia and Intensive Care, University of Modena and Reggio Emilia, Modena, Italy

⁴¹⁸Division of Infectious Diseases and Immunology, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy

⁴¹⁹Department of Internal Medicine and Therapeutics, University of Pavia, Italy

⁴²⁰U.O.C. Medicina, ASST Nord Milano, Ospedale Bassini, Cinisello Balsamo (MI), Italy

⁴²¹Department of Mathematics, University of Pavia, Pavia, Italy

⁴²²University of Siena, DIISM-SAILAB, Siena, Italy

⁴²³Independent Researcher, Milan, Italy

⁴²⁴Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

⁴²⁵Department of Infectious and Tropical Diseases, University of Brescia and ASST Spedali Civili Hospital, Brescia, Italy

⁴²⁶Department of Molecular and Translational Medicine, University of Brescia, Italy

⁴²⁷Clinical Chemistry Laboratory, Cytogenetics and Molecular Genetics Section, Diagnostic Department, ASST Spedali Civili di Brescia, Brescia, Italy

⁴²⁸Chirurgia Vascolare, Ospedale Maggiore di Crema, Crema, Italy

⁴²⁹III Infectious Diseases Unit, ASST-FBF-Sacco, Milan, Italy

⁴³⁰Department of Biomedical and Clinical Sciences Luigi Sacco, University of Milan, Milan, Italy

⁴³¹Dept of Specialized and Internal Medicine, Tropical and Infectious Diseases Unit, Azienda Ospedaliera Universitaria Senese, Siena, Italy

⁴³²HIV/AIDS Department, National Institute for Infectious Diseases, IRCCS, Lazzaro Spallanzani, Rome, Italy

⁴³³Unit of Respiratory Diseases and Lung Transplantation, Department of Internal and Specialist Medicine, University of Siena, Siena, Italy

- ⁴³⁴Dept of Emergency and Urgency, Medicine, Surgery and Neurosciences, Unit of Intensive Care Medicine, Siena University Hospital, Siena, Italy
- ⁴³⁵Department of Medical, Surgical and Neuro Sciences and Radiological Sciences, Unit of Diagnostic Imaging, University of Siena, Siena, Italy
- ⁴³⁶Rheumatology Unit, Department of Medicine, Surgery and Neurosciences, University of Siena, Policlinico Le Scotte, Siena, Italy
- ⁴³⁷Department of Specialized and Internal Medicine, Infectious Diseases Unit, San Donato Hospital Arezzo, Arezzo, Italy
- ⁴³⁸Dept of Emergency, Anesthesia Unit, San Donato Hospital, Arezzo, Italy
- ⁴³⁹Department of Specialized and Internal Medicine, Pneumology Unit and UTIP, San Donato Hospital, Arezzo, Italy
- ⁴⁴⁰Department of Emergency, Anesthesia Unit, Misericordia Hospital, Grosseto, Italy
- ⁴⁴¹Department of Specialized and Internal Medicine, Infectious Diseases Unit, Misericordia Hospital, Grosseto, Italy
- ⁴⁴²Department of Preventive Medicine, Azienda USL Toscana Sud Est, Tuscany, Italy
- ⁴⁴³Clinical Chemical Analysis Laboratory, Misericordia Hospital, Grosseto, Italy
- ⁴⁴⁴Territorial Scientific Technician Department, Azienda USL Toscana Sud Est, Arezzo, Italy
- ⁴⁴⁵Clinical Chemical Analysis Laboratory, San Donato Hospital, Arezzo, Italy
- ⁴⁴⁶Department of Health Sciences, Clinic of Infectious Diseases, ASST Santi Paolo e Carlo, University of Milan, Milan, Italy
- ⁴⁴⁷Department of Medical and Surgical Sciences for Children and Adults, University of Modena and Reggio Emilia, Modena, Italy
- ⁴⁴⁸Infectious Diseases Clinic, Santa Maria Hospital, University of Perugia, Perugia, Italy
- ⁴⁴⁹Department of Infectious Diseases, Treviso Hospital, Treviso, Italy
- ⁴⁵⁰Clinical Infectious Diseases, Mestre Hospital, Venezia, Italy
- ⁴⁵¹Infectious Diseases Clinic, ULSS1, Belluno, Italy
- ⁴⁵²Department of Molecular Medicine, University of Padova, Padua, Italy
- ⁴⁵³Medical Genetics and Laboratory of Medical Genetics Unit, A.O.R.N. "Antonio Cardarelli," Naples, Italy
- ⁴⁵⁴Department of Molecular Medicine and Medical Biotechnology, University of Naples Federico II, Naples, Italy
- ⁴⁵⁵CEINGE Biotechnologie Avanzate, Naples, Italy
- ⁴⁵⁶IRCCS SDN, Naples, Italy
- ⁴⁵⁷Unit of Respiratory Physiopathology, AORN dei Colli, Monaldi Hospital, Naples, Italy
- ⁴⁵⁸Division of Medical Genetics, Fondazione IRCCS Casa Sollievo della Sofferenza Hospital, San Giovanni Rotondo, Italy
- ⁴⁵⁹Laboratory of Regulatory and Functional Genomics, Fondazione IRCCS Casa Sollievo della Sofferenza, San Giovanni Rotondo (Foggia), Italy
- ⁴⁶⁰Department of Medical Sciences, Fondazione IRCCS Casa Sollievo della Sofferenza Hospital, San Giovanni Rotondo, Italy
- ⁴⁶¹Clinical Trial Office, Fondazione IRCCS Casa Sollievo della Sofferenza Hospital, San Giovanni Rotondo, Italy
- ⁴⁶²Department of Health Sciences, University of Genova, Genova, Italy
- ⁴⁶³Infectious Diseases Clinic, Policlinico San Martino Hospital, IRCCS for Cancer Research, Genova, Italy
- ⁴⁶⁴Microbiology, Fondazione Policlinico Universitario Agostino Gemelli IRCCS, Catholic University of Medicine, Rome, Italy

- ⁴⁶⁵Department of Laboratory Sciences and Infectious Diseases, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy
- ⁴⁶⁶Department of Cardiovascular Diseases, University of Siena, Siena, Italy
- ⁴⁶⁷Otolaryngology Unit, University of Siena, Siena, Italy
- ⁴⁶⁸Department of Internal Medicine, ASST Valtellina e Alto Lario, Sondrio, Italy
- ⁴⁶⁹Oncologia Medica e Ufficio Flussi Sondrio, Sondrio, Italy
- ⁴⁷⁰First Aid Department, Luigi Curto Hospital, Polla, Salerno, Italy
- ⁴⁷¹Local Health Unit-Pharmaceutical Department of Grosseto, Toscana Sud Est Local Health Unit, Grosseto, Italy
- ⁴⁷²U.O.C. Laboratorio di Genetica Umana, IRCCS Istituto G. Gaslini, Genova, Italy
- ⁴⁷³Infectious Diseases Clinics, University of Modena and Reggio Emilia, Modena, Italy
- ⁴⁷⁴Department of Respiratory Diseases, Azienda Ospedaliera di Cremona, Cremona, Italy
- ⁴⁷⁵Department of Cardiovascular, Neural and Metabolic Sciences, Istituto Auxologico Italiano, IRCCS, San Luca Hospital, Milan, Italy
- ⁴⁷⁶Department of Medicine and Surgery, University of Milano-Bicocca, Milan, Italy
- ⁴⁷⁷Istituto Auxologico Italiano, IRCCS, Laboratory of Cardiovascular Genetics, Milan, Italy
- ⁴⁷⁸Unit of Infectious Diseases, ASST Papa Giovanni XXIII Hospital, Bergamo, Italy
- ⁴⁷⁹Direzione Scientifica, Istituti Clinici Scientifici Maugeri IRCCS, Pavia, Italy
- ⁴⁸⁰Department of Cardiology, Istituti Clinici Scientifici Maugeri IRCCS, Institute of Montescano, Pavia, Italy
- ⁴⁸¹Istituti Clinici Scientifici Maugeri, IRCCS, Department of Cardiac Rehabilitation, Institute of Tradate (VA), Pavia, Italy
- ⁴⁸²Cardiac Rehabilitation Unit, Fondazione Salvatore Maugeri, IRCCS, Scientific Institute of Milan, Milan, Italy
- ⁴⁸³Department of Electronics, Information and Bioengineering (DEIB), Politecnico di Milano, Milano, Italy
- ⁴⁸⁴Scuola Normale Superiore, Pisa, Italy
- ⁴⁸⁵CNR-Consiglio Nazionale delle Ricerche, Istituto di Biologia e Biotecnologia Agraria (IBBA), Milano, Italy
- ⁴⁸⁶Core Research Laboratory, ISPRO, Florence, Italy
- ⁴⁸⁷Fondazione per la ricerca Ospedale di Bergamo, Bergamo, Italy
- ⁴⁸⁸Health Management, Azienda USL Toscana Sudest, Tuscany, Italy
- ⁴⁸⁹IRCCS Mondino Foundation, Pavia, Italy
- ⁴⁹⁰Medical Genetics Unit, Meyer Children's University Hospital, Florence, Italy
- ⁴⁹¹Allelica Inc, New York, NY, USA
- ⁴⁹²Department of Medicine, Pneumology Unit, Misericordia Hospital, Grosseto, Italy
- ⁴⁹³Department of Anesthesia and Intensive Care Unit, ASST Fatebenefratelli Sacco, Luigi Sacco Hospital, Polo Universitario, University of Milan, Milan, Italy
- ⁴⁹⁴Infectious Disease Unit, Hospital of Massa, Massa, Italy
- ⁴⁹⁵Department of Clinical Medicine, Public Health, Life and Environment Sciences, University of L'Aquila, L'Aquila, Italy
- ⁴⁹⁶UOSD Laboratorio di Genetica Medica - ASL Viterbo, San Lorenzo, Italy
- ⁴⁹⁷Department of Medical Sciences, Infectious and Tropical Diseases Unit, Azienda Ospedaliera Universitaria Senese, Siena, Italy
- ⁴⁹⁸Unit of Infectious Diseases, S.M. Annunziata Hospital, Florence, Italy
- ⁴⁹⁹Infectious Disease Unit, Hospital of Lucca, Lucca, Italy
- ⁵⁰⁰Department of Clinical and Experimental Medicine, Infectious Diseases Unit, University of

Pisa, Pisa, Italy

⁵⁰¹Infectious Disease Unit, Santo Stefano Hospital, AUSL Toscana Centro, Prato, Italy

⁵⁰²Clinic of Infectious Diseases, Catholic University of the Sacred Heart, Rome, Italy

⁵⁰³Department of Diagnostic and Laboratory Medicine, Institute of Biochemistry and Clinical Biochemistry, Fondazione Policlinico Universitario A. Gemelli IRCCS, Catholic University of the Sacred Heart, Rome, Italy

⁵⁰⁴Department of Population Health Sciences, Geisinger Health System, Danville, PA, USA

⁵⁰⁵Department of Molecular and Functional Genomics, Geisinger Health System, Danville, PA, USA

⁵⁰⁶Regeneron Genetics Center, Tarrytown, NY, USA

⁵⁰⁷Phenomic Analytics & Clinical Data Core, Geisinger Health System, Danville, PA, USA

⁵⁰⁸Queen Mary University of London, London, United Kingdom

⁵⁰⁹Bradford Institute for Health Research, Bradford Teaching Hospitals National Health Service (NHS) Foundation Trust, Bradford, UK

⁵¹⁰Medical and Population Genomics, Wellcome Sanger Institute, Hinxton, UK

⁵¹¹School of Basic and Medical Biosciences, Faculty of Life Sciences and Medicine, King's College London, London, United Kingdom

⁵¹²Department of Human Genetics, Wellcome Sanger Institute, Hinxton, UK

⁵¹³National Institute for Health Research Blood and Transplant Research Unit in Donor Health and Genomics, University of Cambridge, Cambridge, UK

⁵¹⁴Department of Haematology, University of Cambridge, Cambridge Biomedical Campus, Long Road, Cambridge, CB2 0PT, UK

⁵¹⁵British Heart Foundation Cardiovascular Epidemiology Unit, Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK

⁵¹⁶British Heart Foundation Centre of Research Excellence, University of Cambridge, Cambridge, UK

⁵¹⁷Health Data Research UK Cambridge, Wellcome Genome Campus and University of Cambridge, Cambridge, UK

⁵¹⁸Department of Genetics, University Medical Centre Groningen, University of Groningen, Groningen, Netherlands

⁵¹⁹Department of Genetics, University Medical Centre Groningen, University of Groningen / Department of Genetics, University Medical Centre Utrecht, P.O. Box 85500, 3508 GA, Utrecht, The Netherlands

⁵²⁰Department of Epidemiology, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands

⁵²¹University of Groningen, University Medical Center Groningen, Department of Genetics, Groningen, The Netherlands

⁵²²Department of Psychiatry, University Medical Center Groningen, Groningen, The Netherlands

⁵²³Department of Biostatistics, Boston University School of Public Health

⁵²⁴Center for Population Genomics, MAVERIC, VA Boston Healthcare System, Boston, MA, USA

⁵²⁵MAVERIC, VA Boston Healthcare System, Boston, MA, USA

⁵²⁶Department of Epidemiology, Emory University Rollins School of Public Health, GA, USA

⁵²⁷Stanford University, CA, USA

⁵²⁸Vrije Universiteit Amsterdam, Amsterdam, UK

⁵²⁹Broad Institute of MIT and Harvard, Boston, MA, USA

⁵³⁰Department of Genetics, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA, USA

⁵³¹Department of Neuroscience, Karolinska Institutet, Stockholm, Sweden

⁵³²Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

⁵³³Anaesthesiology and Intensive Care Medicine, Department of Surgical Sciences, Uppsala University, Uppsala, Sweden

⁵³⁴Integrative Physiology, Department of Medical Cell Biology, Uppsala University, Uppsala, Sweden

⁵³⁵Stanley Center for Psychiatric Research & Program in Medical and Population Genetics

⁵³⁶Division Anaesthesiology and Intensive Care, CLINTEC, Karolinska Institutet, Stockholm, Sweden

⁵³⁷Department of Clinical Research and Leadership, George Washington University, Washington, DC, USA

⁵³⁸Big Data Institute, Nuffield Department of Population Health, University of Oxford, Oxford, United Kingdom

⁵³⁹Wellcome Centre for Human Genetics, University of Oxford, Roosevelt Drive, Oxford, OX3 7BN, United Kingdom

⁵⁴⁰Nuffield Department of Medicine, Experimental Medicine Division, University of Oxford, John Radcliffe Hospital, Oxford, United Kingdom

⁵⁴¹Public Health England, Field Service, Addenbrooke's Hospital, Cambridge, CB2 0QQ, United Kingdom

⁵⁴²Public Health England, Data and Analytical Services, National Infection Service, London, NW9 5EQ, United Kingdom

⁵⁴³Genomics PLC, King Charles House, Park End Street, Oxford, OX1 1JD, United Kingdom

⁵⁴⁴Genomics England, London, United Kingdom

⁵⁴⁵Ancestry, Lehi, UT, USA

23andMe Investigators

Janie F. Shelton⁵⁴⁶, Anjali J. Shastri⁵⁴⁶, Chelsea Ye⁵⁴⁶, Catherine H. Weldon⁵⁴⁶, Teresa Filshtein-Sonmez⁵⁴⁶, Daniella Coker⁵⁴⁶, Antony Symons⁵⁴⁶, Jorge Esparza-Gordillo⁵⁴⁷, Stella Aslibekyan⁵⁴⁶, Adam Auton⁵⁴⁶.

⁵⁴⁶ 23andMe Inc., 223 N Mathilda Ave, Sunnyvale, CA 94086

⁵⁴⁷ Human genetics - R&D, GSK Medicines Research Centre, Target Sciences-R&D, Stevenage, UK