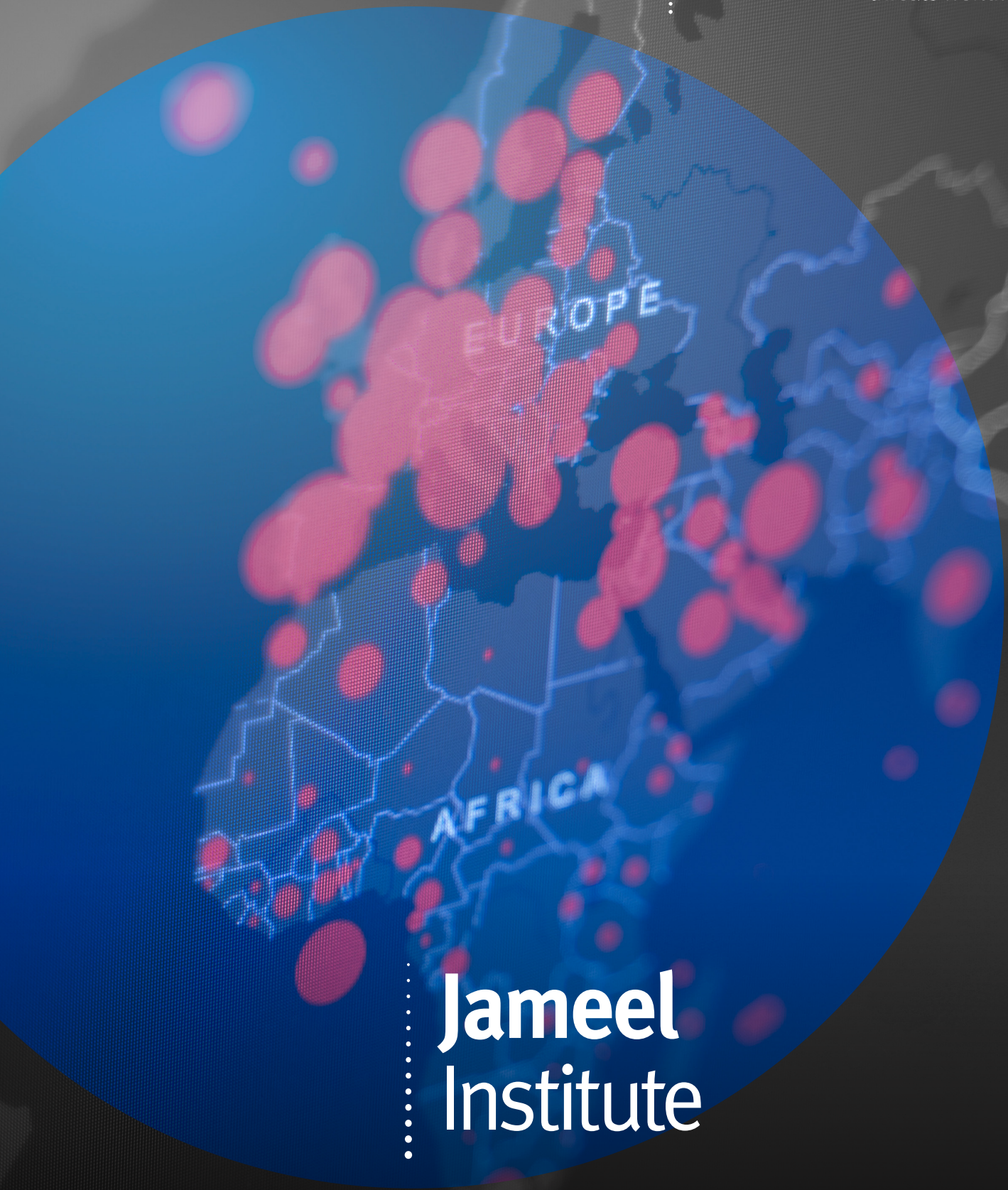
Imperial College London

Jameel Institute

Combating disease threats worldwide



Jameel Institute

Annual report

https://www.imperial.ac.uk/jameel-institute/

2021

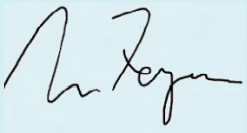
Foreword

2021 has proved to be another challenging year for the Jameel Institute and its partners in countries around the world, but one filled with hope with the arrival of the vaccines. As the measurable positive impacts of the COVID-19 vaccines in many countries emerge, we are beginning to see some form of normality being brought to the Institute. While working on real-time modelling to support policymakers and governments worldwide, we have continued to adapt and develop our multidisciplinary team to further strengthen our response to the ultimate health emergency of the century. Alongside this, work has also been ongoing to evolve our research agenda focused on making countries and the most vulnerable populations more resilient to future emergencies, via strengthening health systems, and enabling capacity building.

Building on its global impact during the pandemic, the Institute has attracted key decision-makers, and internationally renowned academics as collaborators from countries around the world, including Asia, Africa, South America, and the Middle East. These partnerships have allowed us to strengthen the evidence base in how data is used to inform health policy and create positive change for the most affected populations. These collaborations have also enabled us to support local teams in adapting our models for their context to better plan and prepare their health systems.

I am incredibly proud of how the team has shown resilience during these uncertain times. They have been adaptable, flexible, and pragmatic this year and I look forward to seeing how our newest researchers contribute to the Institute's strategic vision.

Lastly, our sincere thanks to Community Jameel for championing the Institute and showcasing our work to partners and potential collaborators. Your flexibility has not only enabled us to support multiple stakeholders in tackling the COVID-19 pandemic, but has also helped us further examine pandemic preparedness, zoonotic disease outbreaks and health economics. We look forward to 2022.



Professor Neil Ferguson
Director of the Jameel Institute

Executive summary

The Jameel Institute has continued to support the COVID-19 response worldwide. The Imperial College COVID-19 Response Team has provided advisory support to national agencies and bodies in many countries hardest hit by the pandemic, including Brazil, France, Italy, India, Indonesia, Malawi, Mozambique, Philippines, South Africa, Sri Lanka, USA and Zimbabwe. Our reports on Brazil and Syria have been peer-reviewed and published in the journals, *Science*, and *Nature*, respectively. Some of our outbreak modelling tools have also been further developed to project the impact of vaccine programmes, and to apply them to more countries. The inclusion of vaccine programmes in our projections will enable healthcare services and policymakers around the world to plan their vaccine rollout under different scenarios. Several members of the team also provided advisory support to international bodies including WHO (via the WHO Strategic Advisory Group of Experts on Immunization – WHO SAGE), the IMF and the Global Fund.

The Imperial College COVID-19 Response Team has played an instrumental advisory role to the UK government on England's 'roadmap' out of lockdown. 26 reports have been sent to the Scientific Pandemic Influenza Group on Modelling (SPI-M) since January 2021, of which eight have been released publicly as Scientific Advisory Group for Emergencies (SAGE) reports. We have also provided epidemiological analyses of the transmissibility of new variants (Alpha and Delta) to the NERVTAG Committee and the Cabinet Office, and provided modelling of social distancing measures and vaccine rollout. These informed both the decision to impose the January lockdown in England and then the staged roadmap out of lockdown that followed from March. It provided important early evidence to many other countries on the impact of variants and vaccines.

Following the development of DAEDALUS, which assesses the economic and epidemiological impact of mitigation policies, the team is working with funding from WHO to adapt the model for specific countries, and provide direct support to decision makers on navigating the agonising trade-off between health and economic outcomes in pandemic mitigation. DAEDALUS has also been used to calculate the return on investment of pandemic preparedness, for the G20 Higher Level Independent Panel on Pandemic Preparedness report. Please see our COVID-19 section below for further information and recent publications for examples of continued capacity-building activities.

Professor Katharina Hauck, co-creator of the integrated economic-epidemiology model DAEDALUS

Professor Helen Ward and the team have been working on the Real-Time Assessment of Community Transmission (REACT) studies, funded by the Department of Health and Social Care in England. Over two million people aged five years and above have been tested during 15 rounds of data collection.

The team have published 11 pre-prints and five peer reviewed articles on findings from the population testing for SARS-CoV-2. Each month over 100,000 randomly selected people from all

315 local authorities across England are tested for the virus by PCR, and every two months a similar sample are tested for antibodies. The findings estimate the current infection rate across the whole population and the prevalence of antibodies from natural infection or vaccination, both of which have informed national policy decisions (see the publications sections at the end of the report for all pre-prints and articles). Funding has been extended to cover ongoing data collection until April 2022.

Whilst COVID-19 has remained a priority for the Institute, other areas of research have continued. Professor Majid Ezzati has led on measuring poverty, overcrowding and environmental conditions in urban settings using satellite imagery to improve population health, and Professor Timothy Hallett has led on reviewing the impact of vaccinations in low-to-middle income countries (LMICs). This study estimates that vaccination of ten selected pathogens will have averted 69 million (95% credible interval 52–88) deaths between 2000 and 2030. Moreover, as the modelling secretariat for the investment case of the 7th replenishment of the Global Fund, we are overseeing the coordination and modelling that projects the impact of investment into HIV, tuberculosis, and Malaria.

Professor Majid Ezzati is leading work that is measuring poverty, overcrowding and environmental conditions in urban settings

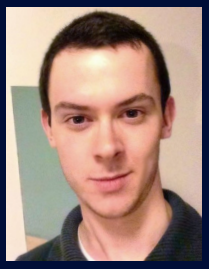
Finally, we were delighted to welcome new staff to the Institute. Dr Patrick Doohan, Research Associate, started in January 2021. Since joining, he has been working on the DAEDALUS model with Professor Katharina Hauck and on global COVID-19 vaccine modelling with Professor Azra Ghani. Dr Bin Zhou, a Research Fellow, joined us in March 2021. He is working closely with Professor Majid Ezzati on non-communicable diseases and their health systems responses, including working on worldwide trends in blood pressure and diabetes, their determinants and treatment coverage. Lastly, Dr Thomas Rawson joined us in May 2021. He is working closely with Professor Neil Ferguson, and his focus is the development and application of novel mathematical modelling approaches to investigate transmission dynamics of infectious diseases. We have also appointed two PhD students, Amen Patrick Nwosu and Tristan Naidoo, who will be working with Professors Timothy Hallett and Neil Ferguson.

New team member profiles

Dr Bin Zhou
Research Fellow at the Jameel Institute

Dr Zhou is a Research Fellow in Health Analytics and Machine Learning in the Global Environmental Health Research Group and the Jameel Institute. He obtained his PhD in Epidemiology and Biostatistics from Imperial College London, and also gained a BEng, BEcon and MEng in Civil Engineering from Tsinghua University. His research is primarily focused on the intersection between health and environment. He is currently working on the worldwide trends in blood pressure and diabetes, their determinants and treatment coverage, under the NCD Risk Factor Collaboration (NCD-RisC).

Dr Patrick Doohan
Research Associate at the Jameel Institute



Dr Doohan is a mathematical modeller at the Jameel Institute, based in the Department of Infectious Disease Epidemiology. His background is in applied and computational mathematics, having obtained an MSc and PhD from Imperial College London and HDip and BA degrees from University College Dublin. His research is at the intersection of infectious disease epidemiology and health economics, specifically the development and application of integrated epidemiological-economic models, which allow for the analysis of both health and economic costs of disease outbreaks. Current topics of focus include vaccine modelling, the impact of the COVID-19 pandemic on lower- and middle-income countries, epidemic mitigation strategies and pandemic preparedness.

Dr Thomas Rawson
Research Associate at the Jameel Institute

Dr Rawson is a mathematical modeller working within the Jameel Institute applying mathematical and statistical techniques to best utilise epidemiological data. His research to-date has focussed on a variety of disease categories. His DPhil research considered mathematical modelling approaches to studying and understanding the spread of food poisoning in chicken flocks. Other projects include considering the optimal combination of drug and intervention strategies on dengue transmission networks, quantitative microbial risk assessments of Salmonella, and more recently, the impact of the lockdowns on the spread of COVID-19.

COVID-19 – where are we now and what have we achieved

At the start of the year, COVID-19 cases surged in the UK and in other countries due to the spread of the Alpha variant. The Imperial College COVID-19 Response Team continued its policy of sharing research findings immediately on the developing pandemic. This immediate release has enabled policymakers to react quickly to introduce pandemic control interventions.

Professor Neil Ferguson has continued to lead Imperial College's COVID-19 Response Team. His work includes reviewing the genomics of the P1 lineage in Manus, Brazil, assessing the transmissibility of the Alpha variant and modelling recent trends of variants of concern. Specifically, in the UK, he has modelled the impact of the tier system on the transmission between the first and second national lockdowns. He has worked on leveraging community mortality indicators to infer COVID-19 mortality in Damascus, Syria. The team have continued to model ICU capacity under different epidemiological scenarios of the COVID-19 pandemic in three Western European countries. As mentioned in the 2020 annual report, they have also worked on state-level tracking in the US to inform the Biden transition team.

Under Professor Ferguson's leadership, the team has also developed global minimum estimates for COVID-19 associated orphanhood and death among caregivers. Mortality and fertility data were used to model minimum estimates and rates of COVID-19 associated with orphanhood. These estimates were then used to model global extrapolations for the number of children experiencing COVID-19 associated deaths of parents and grandparents. The paper concluded that orphanhood and caregiver deaths are a hidden pandemic resulting from COVID-19-associated deaths. Accelerating equitable vaccine delivery is key to prevention. Psychosocial and economic support can help families nurture children bereft of caregivers and help ensure institutionalisation is avoided. This data demonstrates the need for an additional pillar of our response: prevent, detect, respond, and care for children.

Barely one month following the first reported SARS-CoV-2 cluster, diabetes was already identified as an associated factor and key predictor of poor outcomes. Professor Edward Gregg and the team have been looking at the relationship between diabetes to COVID-19 related morbidity and mortality, the predictors of severe adverse outcomes, and implications of the overall pandemic, through a literature review which has since been published. Among hospitalised cases with diabetes and COVID-19, about 21-43% have required intensive care and COVID-19 case fatality has been higher at roughly 25%. The risk of severe morbidity and mortality is 50-150% higher among people with diabetes than those without. The impact for the general population with diabetes is similarly alarming, as overall mortality rates were 50% higher than historical trends, a net increase of more than twice that of the general population. About 75-80% of the excess deaths are not officially attributed to COVID-19, raising unanswered questions about missed attribution or collateral impact. Furthermore, the indirect impact of the pandemic's effect on health services, health behaviours, disease management, care, control, and complications, has not been quantified well and will also be essential to lessen future impacts of the pandemic. The analysis also commented on the need to expand epidemiologic studies on the relationship between diabetes and COVID-19 beyond a few high-income countries. This will be essential to limit the burden in LMICs where 80% of diabetes cases reside.

As mentioned above, since April 2020, Professor Helen Ward has been the lead investigator on the REACT (Real-Time Assessment of Community Transmission) study. There are two strands to this study:

1. **REACT-1** involved cross-sectional surveys using viral detection tests in repeated 120,000 to 180,000 randomly selected individual samples. From May 2020 to November 2021, over two million people aged five years and above were tested during 15 rounds of data collection. The study identified the onset of the second wave in October 2020, the unexpected growth in the South-East due to the Alpha variant in late 2020, symptoms predicting community infection, the rapid growth of the Delta variant by July 2021, and identification of predictive symptoms for infection.

2. **REACT-2** measured the prevalence of antibodies to SARS-CoV-2 as an indicator of past infection. Lateral-flow immunoassay tests were validated using samples collected at Imperial College Healthcare NHS Trust, and usability evaluated in 14,000 randomly selected adults. REACT-2 provided a snapshot of the extent of the first wave, estimating that 3.4 million adults had detectable antibodies by mid-July 2020, with higher prevalence in people of Black or Asian than white ethnicity, while revealing that infection fatality ratios were similar across ethnicities when adjusting for age. Subsequent rounds showed a 27% decline in the prevalence of antibodies before the second wave and variation in antibody positivity following vaccination. Using more than 600,000 digital images of self-tests from participants, we have developed an artificial intelligence-based system to validate self-read results.

In addition to providing timely data for policymakers in government, the REACT study has also led to further research studies and collaborations. We have raised over £7 million in related grants from UK Research and Innovation (UKRI), Medical Research Council (MRC), National Institute for Health Research (NIHR), Health Data Research UK (HDRUK), and the Department of Biotechnology India. We will apply methods from the REACT-2 study to evaluate self-testing for antibodies in immunosuppressed people to identify who may benefit from additional protection (through vaccination or anti-viral prophylaxis) – the MELODY study.

Collaborations have been established across the UK, including on longitudinal studies of COVID-19 outcomes through HDRUK, genomic markers of severity and long COVID with GENOMICS England, a National Long COVID Research Collaboration, the Centre for the Mathematical Modelling of Infectious Diseases (CMMID) COVID-19 working group, and the Vaccines Science Coordination Group. Internationally we are part of the Long COVID US-UK Research Collaboration (NIH/UKRI/ UK Science and Innovation Network), and we have shared REACT methods and findings with international audiences, for example through presentations at WHO and European Centre for Disease Prevention and Control (ECDC) meetings on surveillance. Professor Ward has also expanded pre-existing research to look at the impact of COVID-19 on wider health and wellbeing for people with HIV, and older adults in London.

"We really need surveillance of long COVID. Up to now the burden of SARS-CoV-2 has mainly been measured by the numbers of cases diagnosed and mortality from COVID-19, with an implicit assumption that you either die or get better. We also need to measure long-term health impacts. We are starting to see that there is a substantial burden of disability and prolonged symptoms. It's not something that we have got a global handle on so far, but in many studies it's between 10 and 30 per cent of people who have these persistent and late symptoms, some of which are really debilitating."

Professor Helen Ward
Lead investigator of REACT study

In February 2021, exit plans modelled by the team were submitted to UK SAGE to inform the UK government's roadmap out of the lockdown. Collaborating with the University of Warwick, the report provided critical evidence on England's roadmap and modelled multiple scenarios for lifting the non-pharmaceutical interventions (NPIs) under different vaccine rollout speeds.

Following reports of vaccine hesitancy, Report 43 was published in March 2021 and focused on quantifying the impact of vaccine hesitancy. This report has since been peer-reviewed and will

be published in *Nature Medicine* shortly. The report evaluated the potential impact of vaccine hesitancy on controlling the pandemic and the relaxation of NPIs. The findings suggest that the mortality over a 2-year period could be up to eight times higher in countries with high vaccine hesitancy compared to an ideal vaccination uptake and NPIs.

In May 2021, Report 44 was released which focused on variants of concern (VOC), including the B.1.1.7, which rapidly became the dominant lineage across much of Europe. The report covered some of the other VOCs which possess mutations thought to confer partial immune escape. The report suggested shifts in the composition of SARS-CoV-2 lineages driving transmissions in England between March and April 2021.

Separately, in March of this year, the Imperial College COVID-19 Response Team Report 2020-2021 was published. The report documents the chronology of events and activities the team undertook following reports of a 'novel coronavirus' being detected in Thailand in early January with reports of a positive case. These early reports were the first sign of how transmissible the virus was outside of Wuhan. On 17 January 2020, the team published its first report estimating the potential total number of novel coronavirus cases in Wuhan City. Since then, as mentioned above, the team, which grew to 80 academics and researchers, has published 47 reports, created 13 planning tools, including the J-IDEA Hospital Planner and has had over 150+ peer-reviewed publications. The report covers the models developed by the team, with supervision from Professor Neil Ferguson. It also outlines the role the team played in informing the national and global response to the virus, including quantifying the impacts of NPIs and on transmission levels in the UK through the REACT 1 and 2 studies, led by Professor Helen Ward. Professor Katharina Hauck, in collaboration with the Imperial College Business School and other partners, developed DAEDALUS, an integrated economic-epidemiology model that projects smart economic closure strategies' projecting both health and economic impacts. Please see below for further information about the model and how it has since been adapted.

The newer members of the Institute have been supporting our COVID-19 response. Dr Bin Zhou has contributed to two analyses on COVID-related excess mortality since the beginning of the pandemic in a number of countries in Europe, North America, Asia and Australasia. Dr Thomas Rawson has supported Imperial's real-time modelling group in outputting weekly SPI-M commissions to help the UK government with meaningful projections of the future disease trajectory. By performing analyses of ongoing population vaccine effectiveness data, he has provided up-to-date estimates of rates of vaccination effectiveness waning and dose-specific disease severity protection. Dr Patrick Doohan has primarily worked with the health economics group to develop and apply the integrated epidemiological-economic model DAEDALUS. The model estimates the health and economic costs of various pandemic mitigation strategies, in terms of hospitalisations, deaths and GDP loss, in order to consider the balance between lives and livelihoods. In addition to model development, Dr Doohan has worked on applying the model to various country settings. The DAEDALUS model has been employed for the UK to quantify the trade-offs between hospitalisations (and deaths), GDP loss, and school closures during the COVID-19 pandemic. In collaboration with WHO, the model has also been applied to several lower-middle-income countries to estimate the epidemiological outcomes of alternative scenarios on mitigation via closures of the economy, against the backdrop of vaccine rollout.

More recently, Dr Doohan has begun to work in Professor Azra Ghani's team to apply an immunological model to vaccine effectiveness data to estimate the waning of protection against COVID-19 infection and severe disease over time for various vaccines and age groups. These vaccine protection profiles feed into an individual-based model of COVID-19 transmission, which can also be applied to various country settings, to project the epidemiological outcomes of various vaccination strategies. This work seeks to answer pressing questions concerning the optimal timing of booster doses. When vaccine supply is limited, a key question analysed is whether older age groups should be boosted before younger age groups are vaccinated.

Dr Thomas Rawson is working alongside Professor Ferguson to develop a series of spatial models of COVID-19 transmission that unpick and identify the impact of location-specific case rate autocorrelation and covariate influence. Currently focussed on UK data, the completed models will be easily scalable to a global level where sufficiently detailed epidemiological data is available.

Furthermore, some reports have been peer reviewed and featured in leading scientific journals, including *Nature*, *PNAS*, and *The Lancet*. See the publication section later in this report for a complete list of all peer-reviewed publications.

The Science Matters: Let's Talk about COVID-19 Course has continued to attract learners globally, and over 144,285 have signed up to-date. In collaboration with the MRC Centre for Global Infectious Disease Analysis, we began the 'Science in Context' series to answer current COVID-19 questions in the media that week. Please see our Twitter page for further information.

Queens Anniversary Prize award

Imperial was recently awarded the Queen's Anniversary Prize for its response to the COVID-19 pandemic, and the team's world-class expertise in data modelling and real-time analysis was singled out as a key factor in the College receiving this honour. Professor Ferguson said of this award: "It is a real honour for the members of the Imperial COVID-19 Response Team and all other staff involved in COVID research at the College to receive this award."

Imperial COVID-19 Response Team

The groups who have made up Imperial's COVID-19 Response Team are:

- Jameel Institute
- MRC Centre for Global Infectious Disease Analysis
- Imperial College Business School
- Department of Mathematics

COVID-19 – impact in numbers

The Imperial College COVID-19 Response Team's work has been diverse and far reaching. The following numbers illustrate just some of the ways in which our activity, in collaboration with other Imperial research groups, has made a profound impact on the international response to the pandemic.

47 COVID-19 reports

Produced and published in 7 languages

144,285 people

Internationally have downloaded the *Let's Talk about COVID-19 Course*

150+ peer reviewed papers

Published on our COVID-19 related work

13 planning tools

Developed to assist governments and healthcare providers globally

193 countries

Have been directly impacted by our work

1,000+ people globally

Have attended our online events

Research overview – core themes

Below is a summary of activities under our core research themes of strengthening health systems and building partnerships and capacity. Our research theme of responding to health emergencies has been captured in the COVID-19 section above.

Strengthening health systems

As mentioned earlier in this report, in collaboration with the Imperial College Business School, the team developed the integrated epidemiological-economic model DAEDALUS. We have been working with the Centre for Global Development (CGD) to project the return on investments into pandemic preparedness for the G20 High Level Independent Panel (HLIP) on financing the global commons for pandemic preparedness and response. In scenario analyses, the team assessed the returns for four countries, assuming respiratory pathogens similar to historically observed ones would strike again over the next 10 years. The expected net health benefits of pandemic preparedness expressed as a % of annual GDP varies across countries between 14% and 18% for a SARS-CoV-2 like pathogen, 8% and 22% for a SARS-like, and 2% and 8% for a Spanish Flu-like pathogen. The study has informed a report that was submitted to the G20 delegates in October. This is being led by Professor Katharina Hauck and supported by Dr Patrick Doohan.

Professor Timothy Hallett's group has continued to examine the impact of potential public health interventions on a range of pressing endemic and epidemic diseases. The team reviewed the global epidemiology of hepatitis B (HBV) and making the case of the impact of increasing the availability of birth dose of HBV worldwide and for scaling-up treatment in China, investigating strategies for screening for hepatitis C (HCV) among key populations in Yunan province (China). This review also examined the role of novel tuberculosis (TB) diagnostics in sub-Saharan Africa, evaluating the potential of new methods of HIV prevention (long-acting Cabotegravir-based pre-exposure prophylaxis) and contributing to the global strategic plan for HIV. The group also built upon its collaboration with both the Malawian College of Medicine and Ministry of Health, to jointly develop an evaluation of alternative strategies for mitigating the impact of the COVID-19 pandemic in that country.

"I am really interested in the use of unconventional, novel data sources. During the COVID-19 pandemic, we have come to rely on data from mobile phone apps to understand contact patterns. That is just one example of how different data sources can meaningfully support public health planning."

Professor Timothy Hallett
Global Health

A major theme of work has also been to consider the importance of strengthening healthcare systems for delivering services. With the Imperial College COVID-19 Response Team, the group has reviewed therapeutics available for COVID-19, showing how these are critically dependent on available healthcare resources and identifying the properties that will be most valuable for therapeutics in low-income countries. Work is now underway to evaluate the impact of investments made-to-date in therapeutics, diagnostics and personal protective equipment, building on earlier work with the World Bank. To continue this theme of work, Professor Hallett has recently been awarded a Wellcome Trust Collaborative Award in Science that will bring together the team with colleagues in the Eastern, Central and Southern Health Community, University of Malawi, York and UCL, over the next four years.

Furthermore, Professors Hallett and Ferguson published a paper in *The Lancet* on the health impact of vaccination against ten pathogens in 98 LMICs from 2000 to 2030. The paper found that increases in vaccine coverage and the introduction of new vaccines into LMICs have significantly reduced mortality. These public health gains are predicted to increase if progress in increasing coverage is sustained in the coming decades.

Since joining the Institute, Dr Zhou's work has focused on understanding the global trends and variations in hypertension treatment. He led a consortium (NCD Risk Factor Collaboration) to collate the largest global database on hypertension and its treatment and produced comparable estimates for 200 countries in the world from 1990 to 2019. The team found treatment and control of hypertension remains low in most parts of the world, especially in low- and middle-income countries. The results were published in *The Lancet* in August 2021 and became the official statistics of the World Health Organization.

Dr Zhou also led a review article on the global epidemiology of blood pressure and hypertension and its management, published in *Nature Reviews Cardiology* in May 2021. One of the key points from the paper was that by scaling up treatment coverage and improving its effectiveness, the health burden of hypertension can be substantially reduced. This research also highlighted that hypertension is more prevalent in LMICs compared to high-income countries.

In a separate collaboration with the Chinese Center for Disease Control and Prevention, and Oxford University, he co-led an analysis of the latest Chinese national surveys on body-mass index and prevalence of obesity and reported a notable emergence of rural disadvantage in the country. The results were published in *The Lancet* in July 2021. Finally, Dr Zhou co-led works at the NCD Risk Factor Collaboration to understand global variation in childhood growth trajectory in body-mass index, height, global trends and variation in blood cholesterol.

Outside of the COVID-19 response work, Professor Helen Ward has continued to lead on patient and public involvement at Imperial for the NIHR Biomedical Research Centre (BRC), and the NIHR Applied Research Collaborative. In both, the priority has been to increase diversity and inclusion in research, and to shift to remote methods for involvement and engagement. She has developed a new research theme for the BRC reapplication on Social, Genetic and Environmental Determinants of Health which was submitted in October 2021. If successful, this new theme will provide infrastructure to study the interaction between different health determinants (including biobanking and trusted research environments) and provide research facilities for experimental interventions. By involving the diverse local population in such research, they hope to provide widely generalisable findings, with an initial focus on precision genomic medicine, adolescent and child health, and COVID-19 recovery.

Work on the Wellcome Trust Collaborative Award, 'People Like You: contemporary figures of personalisation' has been disrupted by COVID-19, but progress has been made in their understanding of the ways in which data science techniques lead to different ways of categorising people for personalised address or intervention. Stefanie Posavec conducted an arts residency with the People Like You project in 2020-21, and has produced 'Data Murmurations: points in flight', an artwork visualising data and samples in biobanks, which will be used for public engagement with research processes.

Beyond COVID-19, Professor Edward Gregg and teams have reviewed the trends in predominant causes of deaths in individuals with and without diabetes in England (over 2001-2018). The study, published in *The Lancet Diabetes and Endocrinology*, analysed primary care records and estimated how all caused mortality and cause-specific mortality in people with diabetes have changed over time, and how the composition of morality burden has changed. A follow up on hospitalisation was just published in *The Lancet Diabetes and Endocrinology*, with hospitalisation outcomes including infections.

In addition, Professor Edward Gregg contributed to the Lancet Commission regarding diabetes (released late last year), which embodied four years of extensive work on data curation, synthesis, and modelling to urge policymakers, payers, and planners to collectively change the ecosystem, build capacity and improve the clinical practice environment. The key recommendations outlined in the paper include:

- Ensuring access to insulin, patient education and tools for monitoring blood glucose concentration can prevent premature deaths and emergencies in young patients with type 1 diabetes, especially in disadvantaged communities;
- Personalised care for patients with early on-set diabetes for reducing premature development of NCDs;
- Multitiered societal and population-based prevention strategies are required for managing type 2 diabetes;
- Marked differences in LMICs in diagnosis, treatment and outcomes are likely to be due to the difference in investment, capacity, health-care systems and care organisation.

"One of the most ominous findings has been that the overall mortality rate among people with diabetes is 50% higher than in previous years. That's in comparison with the general population, where we see that the COVID-19 pandemic has been really damaging as well; it's had a 20% increase. This essentially amounts to two and a half times the impact for the population with diabetes compared with the general population, and this is a reflection of the impact that COVID-19 can have not only on the risk for hospitalization but also the risk for further morbidity and mortality."

Professor Edward Gregg
Interview with Medscape (July 2021)

Building capacity and partnerships

Our tools and resources have continued to support the local and national response to COVID-19 and other health emergencies and have helped to strengthen health systems. Earlier this year, The J-IDEA Hospital Planner was published in the *Medical Care Journal*, describing the tool and using the methodology to effectively support national health systems.

Following advisory support throughout the pandemic, we have substantially strengthened our collaboration with the Indian Council for Medical Research (ICMR) and look forward to collaborating with them on building in-country capacity moving forward.

Institute wide activities

As a Centre of Excellence at Imperial College London, the Jameel Institute has continued to develop relationships with a range of departments and faculties across the College. We have collaborated with Imperial Maths on our COVID-19 work, through the Imperial College COVID-19 Response Team. In addition, the team have continued to build links with Imperial Business School to help expand our health economic focus and capabilities.

To follow is an update on activity that has been undertaken across the Institute to strengthen and expand our research collaborations and share our work with a global audience of scientists, policymakers, healthcare leaders and members of the public.

Events

Jameel Institute symposium: Data analytics in a pandemic: policy, politics and partnerships

Following the success of our first anniversary symposium where we invited a range of external speakers to explore 'Shaping the post COVID-19 world', we held our second anniversary symposium on 2 November entitled: 'Data analytics in a pandemic: policy, politics and partnerships.' The symposium examined how data has been communicated and how it has been politicised. We analysed the difficult and often fraught partnership between politicians, who answer to an electorate, and scientists, who uphold principles of good scientific conduct including objectivity and transparency. We also looked at how the media and others have communicated data over the last 18 months and the importance placed on data. Lastly, we examined the successes and challenges of building effective partnerships between nations to ensure the mitigation strategies are equitable.

Speakers at the event included:

- **Anjana Ahuja** – Science Commentator, Financial Times
- **Fiona Fox** – Chief Executive, Science Media Centre
- **Professor Christian Drosten** – Head of Administrative Office for Global Health and Director, Institute of Virology
- **Nick Robinson** – British broadcaster, BBC Radio 4
- **Professor Dame Angela McLean** – Chief Scientific Advisor, Ministry of Defence
- **Dr Anders Tegnell** – State Epidemiologist of Sweden
- **Amanda Glassman** – Executive Vice President, CEO of CGD Europe, and Senior Fellow, Center for Global Development
- **Dr Richard Hatchett** – CEO of Coalition for Epidemic Preparedness Innovations
- **Dr Matshidiso Moeti** – WHO Regional Director of Africa
- **Sir Andrew Pollard** – Professor of Paediatric Infection and Immunity, University of Oxford
- **Professor Glenda Gray** – President and CEO of SAMRC
- **Nyka Alexander** – Health Emergency Communications, WHO

Just under 350 people joined the symposium from 23 countries.

Where are we now? The COVID-19 global vaccination programme

Earlier this year, the Institute co-hosted an event with the MRC Centre for Global Infectious Disease Analysis, exploring where the world is now with the global COVID-19 vaccination rollout. Professor Azra Ghani (Chair in Infectious Disease Epidemiology) moderated the event and she was joined by Professor Anthony Harnden (Deputy Chair of the Joint Committee of Vaccination and Immunisation, UK), Professor Heidi Larson (Founder of the Vaccine Confidence Project), and Professor Julio Croda (Former Chief, Department of Communicable Diseases at the Secretary of Health Surveillance, Brazil 2019-2020).

The panel explored key questions such as: how do we guarantee world-wide vaccine supply, what challenges do constrained health systems face with vaccine distribution, how are concerns over vaccine safety impacting uptake and what role has communication played in the vaccine rollout? You can watch the full event back here.

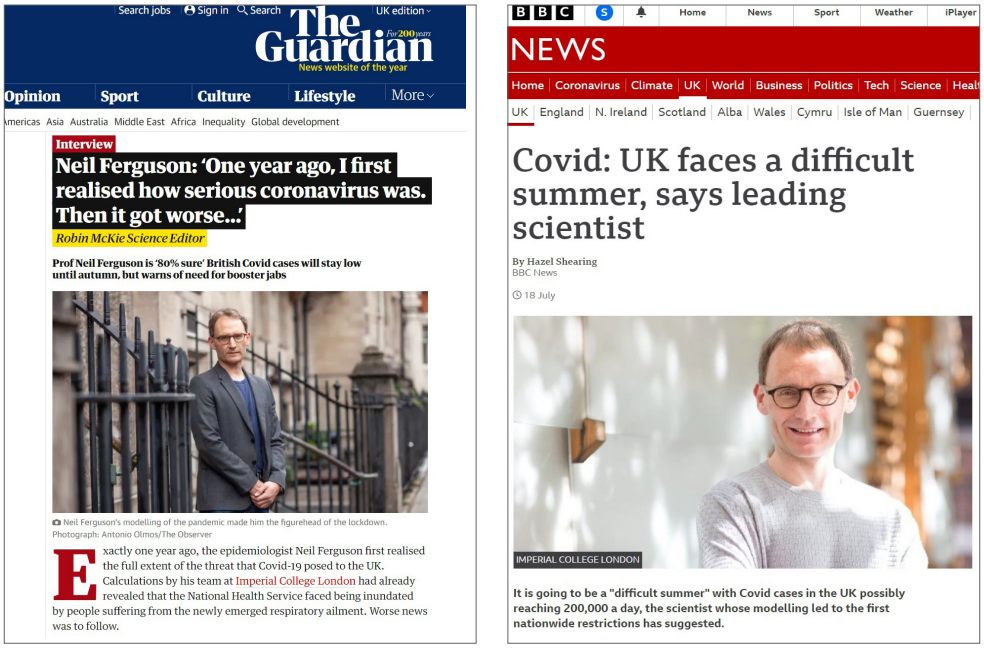
The event was mentioned in an online article in *The Telegraph* and Professor Azra Ghani gave an interview on vaccine equity on Radio 4's The World This Weekend.

Further information about all our events, including links to the recordings, can be found at the following link: https://www.imperial.ac.uk/jameel-institute/events/

News coverage

The Jameel Institute has continued to be an important voice in the public media nationally and internationally. Professor Neil Ferguson has been interviewed by a range of media outlets, including the BBC and ITV and has written pieces for the Financial Times, StatNews and other leading UK media outlets, on the impact of new variants of concern (including the Alpha and Delta variants), the UK roadmap out of lockdown and the impact of vaccines. Professor Katharina Hauck has also written a commentary piece for the Financial Times on UK hospital capacity and has been interviewed about the economic impacts of the coronavirus by several UK and international media outlets. She has spoken at a virtual UK Embassy event in Saudi Arabia about the role of the Jameel Institute during COVID-19 to help promote and foster relationships within the region.

Earlier this year, Professor Helen Ward was interviewed by Times Radio about BAME communities in England being more likely to face a higher risk of contracting COVID-19 due to jobs and family structures. Professor Majid Ezzati was quoted in international media outlets following the publication in *The Lancet* of the largest study to date on global hypertension trends in August and September. In August, Professor Edward Gregg was quoted in an article in Reuters on lowering the age for diabetes screening in the US.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The Guardian
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Opinion Sport Culture Lifestyle More
Interview
Neil Ferguson: 'One year ago, I first realised how serious coronavirus was. Then it got worse...'
Robin McKie Science Editor
Prof Neil Ferguson is '80% sure' British Covid cases will stay low until autumn, but warns of need for booster jabs
Neil Ferguson's modelling of the pandemic made him the figurehead of the lockdown. Photograph: Antonio Olmos/The Observer
Exactly one year ago, the epidemiologist Neil Ferguson first realised the full extent of the threat that Covid-19 posed to the UK. Calculations by his team at Imperial College London had already revealed that the National Health Service faced being inundated by people suffering from the newly emerged respiratory ailment. Worse news was to follow.
BBC Home News Sport Weather iPlayer
NEWS
Home Coronavirus Climate UK World Business Politics Tech Science
UK England N. Ireland Scotland Alba Wales Cymru Isle of Man Guernsey
Covid: UK faces a difficult summer, says leading scientist
By Hazel Shearing
BBC News
18 July
IMPERIAL COLLEGE LONDON
It is going to be a "difficult summer" with Covid cases in the UK possibly reaching 200,000 a day, the scientist whose modelling led to the first nationwide restrictions has suggested.

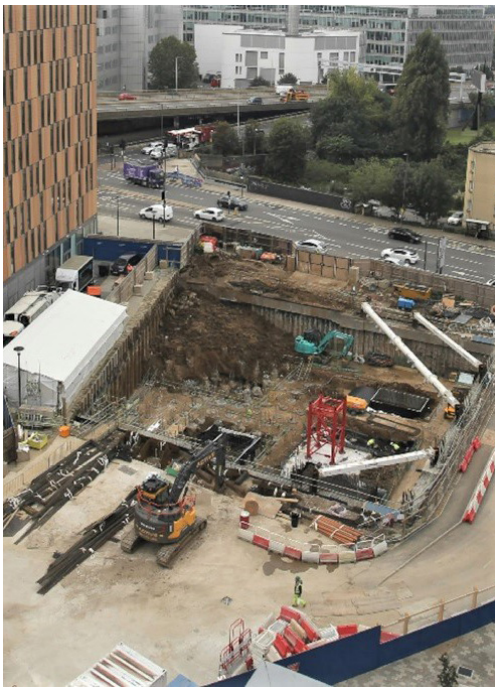
Mainstream press coverage featuring interviews with Professor Neil Ferguson

School of Public Health building

In April 2021, the School of Public Health at Imperial College London reached a key milestone as construction of the building began at White City. The site set-up was completed by the end of summer 2021. The basement level dig and ground works have been undertaken and a tower crane installed on-site. Work is progressing in line with plans for completion in the summer of 2023.

The new multidisciplinary building will provide collaborative, flexible, and interactive spaces for academics, researchers, students and the local community. Set in Imperial's thriving entrepreneurial ecosystem at White City, the new School of Public Health Building has been designed by Allies and Morrison, who also designed the neighbouring Sir Michael Uren Hub, which was completed in 2019. The eight-storey building will provide nearly 58,000 sq ft of space, fitted out by Graham Construction.

We plan to be a long-term partner in the community, bringing people together to find solutions to both local and global challenges. The College is building a campus that is inclusive and engaging through our programme of regular events, projects and pop-ups at neighbourhood festivals and fun days, that help to share the wonder of science and technology with the local community through creative, hands-on activities. We are enabling people in the community to develop their professional and leadership skills with programmes such as Agents for Change, a collaborative initiative aimed at boosting the confidence and ambition of women living locally and laying the foundations for a new women's leadership network.



Recent images of works being undertaken at the School of Public Health construction site

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Professor Neil Ferguson

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Professor Katharina Hauck

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