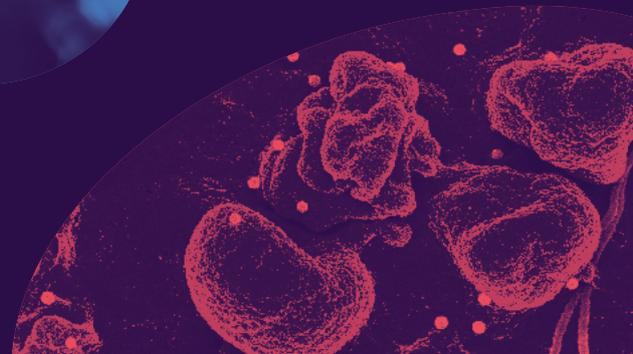




TACKLING EMERGING INFECTIONS AND FUTURE PANDEMIC THREATS



Established in 2021 to accelerate the response to emerging infections and future pandemic threats, The Pandemic Institute is a unique collaboration of academic, health and civic partners in Liverpool with extensive national and international collaborations.

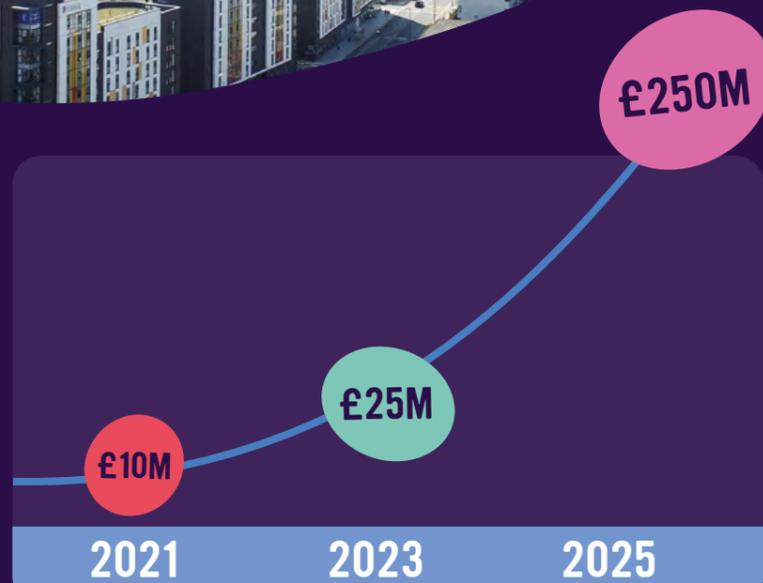
The Pandemic Institute builds on Liverpool's work leading the National Institute for Health and Care Research (NIHR) Health Protection Research Unit in Emerging and Zoonotic Infections (since 2014) which was at the forefront of the UK research response to Ebola, Zika and Covid-19. The unit was supported by £10M from NIHR and has leveraged more than £160M in further funding.

Based in the award-winning Spine building, The Pandemic Institute has seven founding partners:



Income

Launched with an initial donation of £10M in 2021, within 18 months The Pandemic Institute raised £25M in philanthropic, commercial and UK government support, with a target of £250M by 2026. The Pandemic Institute investigators have research income from UK Research and Innovation (UKRI), the NIHR, Wellcome, Gates Foundation, and other funders. This brochure describes recent work funded by these organisations as well as The Pandemic Institute.



What we do

The Pandemic Institute provides an end-to-end approach to emerging infection threats, working across five research themes:



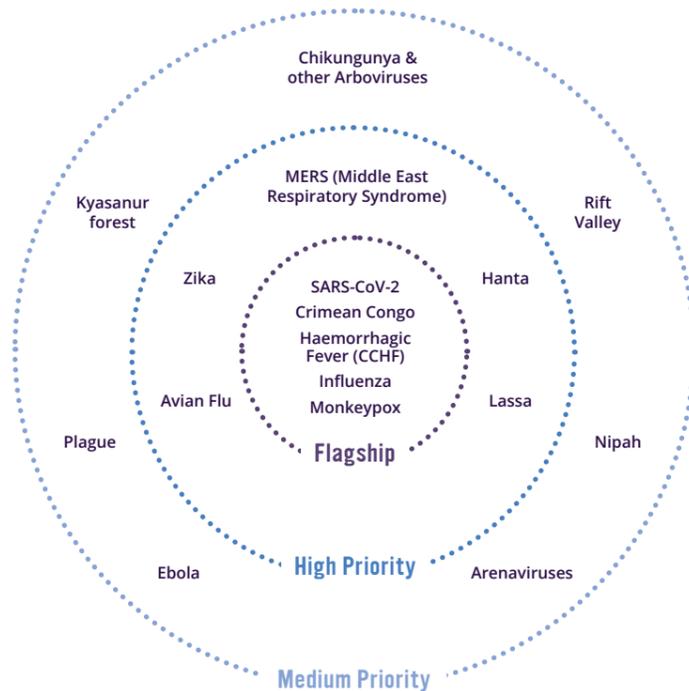
“ The Pandemic Institute brings together biomedical and health researchers, data scientists and modellers, plus behavioural and communication experts to tackle emerging infections and future pandemic threats, thus improving health and welfare, bringing economic benefits and delivering policy impacts.”

Professor Tom Solomon CBE FRCP FMedSci
Director of The Pandemic Institute



PREVENT

To prevent emerging infections spreading globally we need diagnostic tests, drug therapies and vaccines to be ready within 100 days of a new disease emergence. This 100 days mission is backed by the G7 Governments.



Priority Programmes

The World Health Organisation and other agencies have identified Priority Pathogens. Our research is organised into Flagship, High and Medium Priority Programmes to tackle these pathogens.

Diagnostics

Investigators at The Pandemic Institute have developed rapid diagnostic tests for many emerging pathogens, including dengue, Japanese encephalitis, Covid-19 and others. We are adopting a range of approaches including PCR, lateral flow, and microarray to look at host response.

Therapeutics

Our Investigators have an outstanding track record of drug discovery, development and delivery. During the Covid-19 pandemic we led the national AGILE clinical trial platform to test new drugs, including molnupiravir, which is now used routinely.

Khoo SH, et al. Lancet Infect Dis. 2022; 23: 183–95

Crimean–Congo Haemorrhagic Fever (CCHF)

CCHF is a tick-borne viral disease across Africa, Asia, the Middle East and the Balkans, which is spreading. It can cause uncontrollable bleeding, with up to 40% mortality.

Case Study: Diagnostics of CCHF

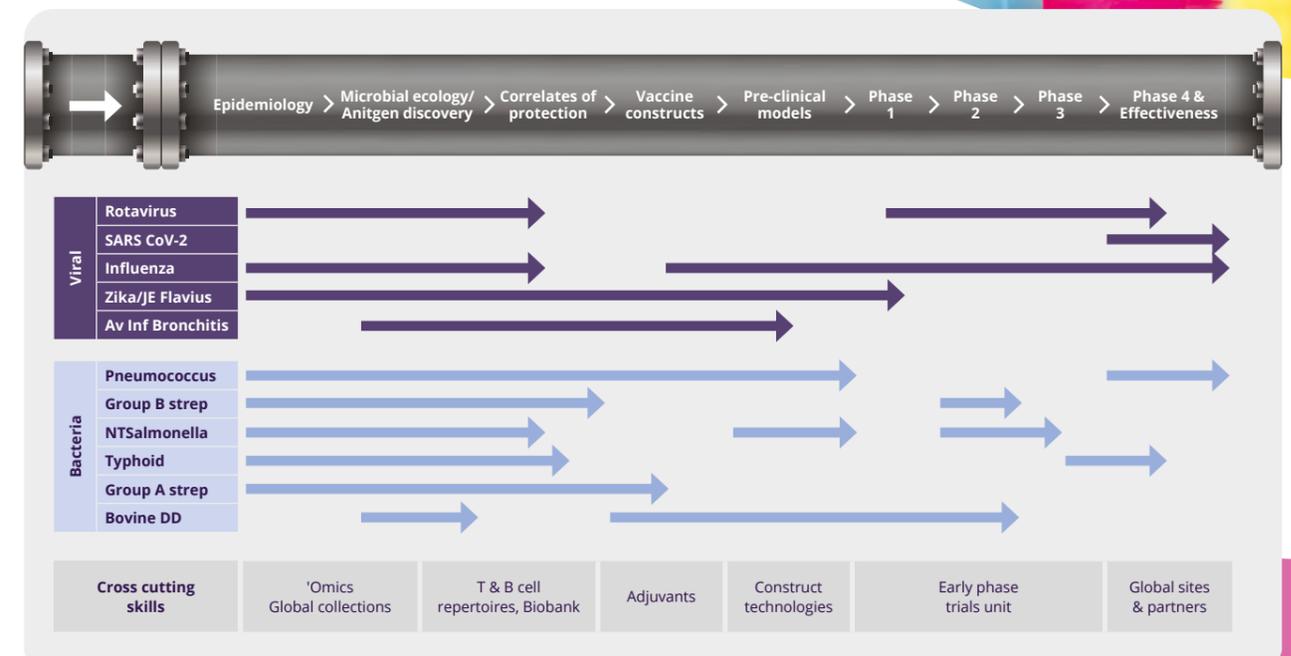
In partnership with GADx (Global Access Diagnostics), Dr Emily Adams (Liverpool School of Tropical Medicine, LSTM) and colleagues are developing a lateral flow test to diagnose CCHF.

Case Study: Treatment of CCHF

Dr Tom Fletcher (LSTM) and colleagues in Turkey are running the first ever randomised treatment trial for CCHF.

Vaccines

The Pandemic Institute collaborates closely with the Liverpool Centre for Global Vaccine Research, focusing especially on vaccines against emerging viruses.



Case Study: Zika Vaccine

There is no vaccine against Zika virus, which in 2016 emerged to cause severe brain damage in Brazil newborns, and continues to plague tropical countries. Dr Lance Turtle (UoL), Professor Neil French (UoL), Dr Tom Blanchard (Liverpool University Hospitals NHS Foundation Trust, LUHFT) and Dr Krishanthi Subramaniam (UoL) plus colleagues, have developed from scratch a novel viral-vectored vaccine, and in 2023 began Phase I, first in human studies, to test its safety and efficacy.

Partnership with CSL Seqirus on Influenza

Through a £5M partnership, The Pandemic Institute is working with Seqirus on a five year influenza research programme, looking at seasonal influenza, understanding the use of vaccines in deprived communities, and examining the genetic changes that might allow avian (bird) flu to become a major human disease.



RESPOND

As lead organization for the national ISARIC study, we have the team in place across the UK, to lead the early clinical research response to emerging infections.

Early in January 2020, Professor Callum Semple (UoL) with colleagues from Edinburgh and Imperial College London, established the ISARIC-4C study of patients hospitalised with Covid-19. The study reported weekly into the UK Government's Scientific Advisory Group for Emergencies (SAGE), and was a vital national asset, for example describing the first reports of hospital transmission and complications of severe disease to guide national policy. With more than 300,000 patients the study also made critical contributions to a range of national laboratory studies including investigations of genetic susceptibility, identifying potential future treatment targets, and understanding Covid-19 brain disease.

Drake TM, et al. Lancet. 2021; 398: 223-237
 Pairo-Castineira E, et al. Nature. 2023: 617; 764-768



↓ 20% INFECTIONS

Early in the pandemic Liverpool scientists and Liverpool City Council public health authorities (supported by the army) showed that with mass testing, Covid-19 cases could be brought down by 20%, rapidly changing national and international policy.

#DataSavesLives

By combining health, medical, social and administrative information into a civic data cooperative, we are creating a blueprint for prevention and control of infectious disease outbreaks in the future. This will provide real-time information to guide social interventions, such as distancing, masks and closures, reducing the delay between obtaining data and acting upon it.



RECOVER

The First Dance

With better understanding of the societal impacts of infectious diseases and pandemics we can build the resilience to help us recover more quickly.

As part of the Events Research Programme in 2021, we showed how by linking ticketing, Covid-19 testing and tracking data, mass public events could be safely re-started. The story of Liverpool's "First Dance" weekend, led by Professor Iain Buchan (UOL), Professor Matt Ashton (Liverpool City Council, LCC), Dr Emer Coffey (LCC) and colleagues rapidly became international news.

Building on this work in the pandemic, we are now using a "smart city" approach through a civic data and AI cooperative, sharing data across the NHS, UK Health Security Agency, local authorities and other sectors, to strengthen preparedness and resilience to emerging infection threats. This will allow us to make better use of non-pharmaceutical interventions, and avoid the need for drastic social interventions such as lock downs.

Case Study: Health Inequalities

In partnership with Aviva Insurance, we are looking at some of the longer-term implications of the pandemic and its impacts on health service and societal recovery. These include projects on hospital bed occupancy, access to health and social care, and supply chain management.

Professor Marie Claire Van Hout (Liverpool John Moores University, LJMU), Dr Cathy Montgomery (LJMU) and Professor Miriam Taegtmeier (LSTM) and colleagues are studying health inequalities and resilience in hard to reach communities, including among migrant, refugee and asylum seekers.

Professor Vivian Hope (LJMU) is working collaboratively with community organisations, trying to understand why Covid-19 disproportionately affected LGBTQ+ communities, and how future responses could be tailored and improved.



THE PANDEMIC INSTITUTE – OPEN FOR BUSINESS

At The Pandemic Institute we have all the infrastructure, expertise, techniques and solutions to address the needs of commercial and academic partners wishing to rapidly test and license diagnostics, therapeutics and vaccines against infectious diseases.

Contact our business development team to discuss your needs.

Biosafety Level 3 Facilities

With several Biosafety Level 3 Laboratories spread across our partner sites, for *in vitro* and *in vivo* (including mosquito) work, we have the largest footprint of academic BSL laboratories in the UK.



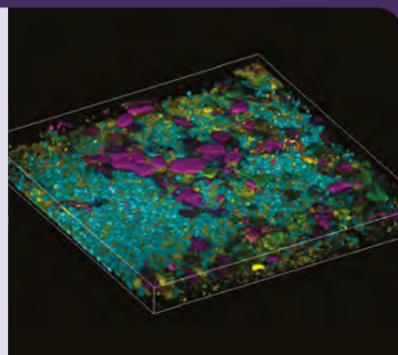
Pre-Clinical Studies Unit

Led by Professor Aras Kadioglu (UoL), we have rodent models for a range of viral and bacterial pathogens including sepsis, respiratory and brain infections, plus capabilities to develop new bespoke models as needed.



Human Organoid “Body on a Chip” Technologies

These “mini human organs” grown *in vitro* allow us to study the body’s responses to infection and determine which potential drug treatments and vaccines should be fast-tracked to clinical trials. We have organoids for lungs and blood vessels and are developing models for the gut and brain.



Human Challenge Facility

Controlled Human Challenge Models offer a rapid and cost-effective way of initial assessment of potential new treatments and vaccines. With £4.7m from the Research England Development Fund and £2M from The Pandemic Institute we have increased our facility at LSTM, led by Dr Andrea Collins (LSTM), to an 18-bed outpatient research clinic including a state-of-the-art 12-bed overnight human challenge facility, with ability to study higher risk and high consequence pathogens.

NIHR Clinical Research Facility

Established in 2009, our 24-bed facility (one of only two MHRA Phase I Accredited units in the NHS) has been relocated to the new Liverpool University Hospitals NHS Foundation Trust. Led by Professor Richard FitzGerald (UoL) and Dr Lauren Walker (UoL), it offers a state-of-the-art, purpose-built unit to design & conduct early phase studies, and is the home of the national AGILE Phase I/IIa Clinical Trial Platform.



Accelerator Research Clinic

Established in 2017, with funding from Unilever, and subsequent support from UKRI and NIHR, the Accelerator Research Clinic at LSTM has 18 beds for phase 2 outpatient and day-case studies. Its capacity to respond quickly, and at scale, demonstrated by the fact that it was the largest UK recruiter to the Oxford Astra Zeneca Covid-19 Vaccine Trial.

Vaccine Access and Inequalities

We ensure our clinical trials have a good mixture of people from all backgrounds, and teams led by Professor Miriam Taegtmeier (LSTM) and Dr Cathy Montgomery (LJMU) are working with our community-based champions to tackle broader issues of vaccine access in deprived and diverse communities. Professor Kay O’Halloran (UoL) and colleagues are looking at the importance of communication in vaccine hesitancy and the pandemic response.



PANDEMIC PREPAREDNESS AND RESPONSE FACILITY

To strengthen the UK's research, innovation and development capacities around infectious disease, The Pandemic Institute is building state-of-the-art research laboratories in Liverpool.

These new laboratories will accelerate the development of diagnostics, therapeutics and vaccines, and will be a national facility used by scientists from across the country who are members of the UK Pandemic Sciences Network.

With funding secured as part of the UK Government's £80-million Liverpool City Region Life Sciences Investment Zone, construction could start as soon as 2024, with the facility up-and-running by 2029.



“ Few places can claim to have made a bigger impact on global health than the Liverpool City Region – and it is a legacy that we are proud to be continuing today.

Together, with neighbouring Cheshire and Warrington, the Liverpool City Region delivers £2 billion of infectious disease research and development a year – and I want to harness our strengths – and potential – and turn them into profitable businesses, creating better, greener jobs and bringing greater prosperity to local people. To make that happen, our aim is for Research and Development investment to equal 5% of our GVA by 2030 – nearly double the government's national targets.

The Pandemic Institute will have a massive role to play in helping to drive us towards these goals.”

Steve Rotheram
Mayor of the Liverpool City Region



The UK Government's Department for Science Innovation and International Trade has identified the Liverpool City Region as a High Potential Opportunity for vaccine and therapeutics discovery, development and manufacturing.

Connected regionally, nationally and globally

ACADEMIC, COMMERCIAL AND INNOVATION INFECTION ASSETS IN THE LIVERPOOL CITY REGION

WIRRAL
LIVERPOOL
ST HELENS
HALTON



Liverpool is managing the UK Pandemic Sciences Network and hosted the 2023 annual meeting, with keynote speaker Dame Jenny Harries, director of the UK Health Security Agency.

UK PANDEMIC SCIENCES NETWORK

GLASGOW
University of Glasgow

EDINBURGH
University of Edinburgh

LIVERPOOL – THE PANDEMIC INSTITUTE
Liverpool John Moores University
Liverpool School of Tropical Medicine
University of Liverpool

WARWICK
University of Warwick

CAMBRIDGE
University of Cambridge

LONDON
Imperial College London
London School of Hygiene and Tropical Medicine
The Francis Crick Institute

OXFORD
University of Oxford

GLOBAL PANDEMIC SCIENCES COLLABORATORS

MCMASTER UNIVERSITY, ONTARIO

THE PANDEMIC INSTITUTE, LIVERPOOL

WHO HUB FOR PANDEMIC AND EPIDEMIOLOGICAL INTELLIGENCE, BERLIN

GLOBAL OUTBREAK ALERT AND RESPONSE NETWORK, GENEVA

PREVENTING ZOOONOTIC DISEASE EMERGENCE (PREZODE), PARIS

CHINESE CENTER FOR DISEASE CONTROL AND PREVENTION, BEIJING

A*STAR, SINGAPORE

OSWALDO CRUZ FOUNDATION (FIOCRUZ), RIO DE JANEIRO

THE PANDEMIC INSTITUTE: RESPONDING RAPIDLY TO NEW THREATS

When Mpox (formerly called monkeypox) spread globally beyond West Africa in 2022, The Pandemic Institute was able to allocate £0.5M in funding to rapidly support new work across all five domains of our research programme, leveraging further support from UK Government funding agencies. The rapidly spreading virus was soon brought under control, thanks to the work of UK and international researchers and public health authorities.

PREDICT

PREPARE

PREVENT

RESPOND

RECOVER

Reservoirs: Studying Cane Rats (*Thonomys swinderiasnus*) in Africa

Transmission: Contribution of Air, Surface and Direct Contact

Diagnostics: Developing Lateral Flow Testing

Therapy: Developing Safe Assays for Antiviral Drugs

Vaccinology: Understanding T Cell Responses

Logistics: Safe Sample Inactivation, Specimen Storage and Transport

Social Science: Behaviour and Stigma

Understanding the spread of Mpox

Work from The Pandemic Institute investigators has shown that prolonged shedding of Mpox virus from the upper respiratory tract, may be contributing to its spread.

Adler et al, Lancet Infect Dis 2022; 22:1153-62



“The Pandemic Institute's response to Mpox shows the true value of having flexible funding, and an agile organisation ready to rapidly address emerging infection challenges.”

Professor Louise Kenny CBE
Executive Pro-Vice-Chancellor,
Faculty of Health and Life
Sciences, UoL

TEACHING, TRAINING CAPACITY BUILDING

The Pandemic Institute and its partner organisations support teaching, training and capacity building for early, mid and established career researchers in the UK and internationally.



Winners of our annual postgraduate prize are now already making their way as early career researchers – Rachel Byrne (2nd from right) who a Student Excellence Award in 2022 went on to successfully gain funding for Mpox research, whilst Caitlin Thompson (below) who received her Award in 2023 has progressed to a research post supported by The Pandemic Institute.

Influencing regional, national and international policy

Our investigators at The Pandemic Institute work closely with Government Advisory Bodies to ensure research findings translate through to impact on policies. Our members have sat on the UK Government's Covid-19 SAGE, Advisory Committee on Dangerous Pathogens, Medicines and Healthcare products Regulatory Agency, New and Emerging Respiratory Virus Threats Advisory Group, plus a range of World Health Organisation Advisory Groups and Steering Committees. We also have policy experts on our Internal Scientific Advisory Panel, including Sue Jarvis (UoL) co-director of the Heseltine Institute for Public Policy, Practice and Place.



The Pandemic Institute collaborates and engages with the following organisations:



GET IN TOUCH

To find out more, or become a member:

Email: contact@thepandemicinstitute.org

X (Twitter): @ThePandemicInst

www.thepandemicinstitute.org



SCAN TO
JOIN OUR
MAILING LIST

Photography credits: Liverpool University Hospitals NHS Foundation Trust (*Front Cover*, masked nurses), NIAID (*Front Cover*, CCHF virus) Tom Solomon (*Page 5*, ward round), Jennifer Bruce/Liverpool City Council (*Page 8*, Covid-19 testing), Shaun Pennington & Aitor Casas Sanchez (*Page 10*, organoid), Amina Ismail (*Page 11*, access).

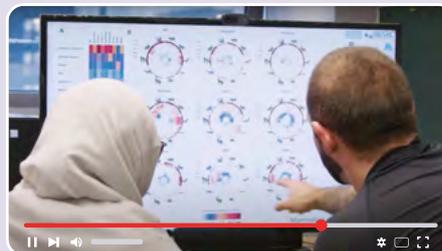
The Pandemic Institute partners:



ONLINE VIDEOS

THE PANDEMIC INSTITUTE

Protecting the world from emerging infections and future pandemic threats



SCAN TO WATCH

INSIDE THE PANDEMIC INSTITUTE'S LABORATORIES

A video made by The Times



SCAN TO WATCH