



# TACKLING EMERGING INFECTIONS AND PANDEMIC THREATS



The Pandemic Institute (TPI) was founded in 2021 with a clear purpose: to tackle emerging infections and ensure that the world will never again be as unprepared for a pandemic as it was in December 2019. Based in Liverpool, we are a unique collaboration of academic, civic and healthcare organisations, with strong industrial partnerships. We were founded with an initial philanthropic donation of £10M awarded to the region thanks to the life-saving research and innovation that occurred here during the COVID-19 pandemic.

The Pandemic Institute builds on Liverpool's work since 2014 leading the UK's National Institute for Health and Care Research (NIHR) Health Protection Research Unit in Emerging and Zoonotic Infections, which was at the forefront of the UK research response to Ebola, Zika and Covid-19.

## Our achievements to date

**£2m** Invested in critical infrastructure

**7** Strategic research posts fully funded by The Pandemic Institute

**£3.6m** Awarded by us to investigators for vital research

**76** Research projects funded

**£5m** In industry partnerships

**140** Investigators across the partnership

**£62m** Research portfolio of The Pandemic Institute's investigators across our founding partners



## What we do

The Pandemic Institute provides an end-to-end approach to emerging infection threats, working with multiple partners across three main research pillars:

### Predict

pathogen emergence and, through surveillance, prevent spread

### Prepare

for likely threats through the 100 Days Mission

### Respond

and recover through clinical & social interventions



**Professor Tom Solomon**  
CBE FRCP FMedSci  
Director of The Pandemic Institute

"At The Pandemic Institute, we bring together Liverpool's world-class expertise in infectious diseases to form a single, co-ordinated hub for pandemic preparedness and response, showcasing the strengths of our academic, clinical, civic, and industry partners. In the following pages you will see the great progress we are making towards our vision of a world protected from the devastating effects of emerging infections and pandemic threats."



**Steve Rotheram**  
Mayor of Liverpool City Region

"Few places can claim to have made a bigger impact on global health than the Liverpool City Region – and The Pandemic Institute is helping to carry that proud legacy forward."

By forging partnerships with global organisations like CSL Seqirus and AstraZeneca, and attracting significant research funding, The Pandemic Institute is not only putting us at the forefront of international health security, but also backing our ambition to become a science and innovation superpower."

## The Pandemic Institute's seven founding partners:





# THE PANDEMIC INSTITUTE OPEN FOR BUSINESS

Across its partner organisations, The Pandemic Institute has access to the infrastructure, expertise, techniques and solutions to address the needs of commercial and academic collaborators wishing to rapidly test and license diagnostics, therapeutics and vaccines against infectious diseases.

Contact The Pandemic Institute to be put in touch with the relevant business development team.

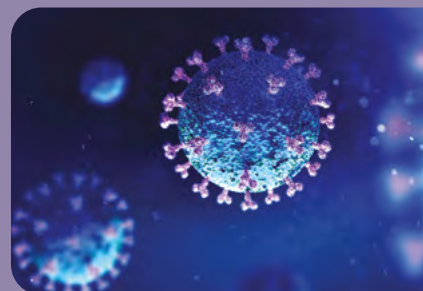
## Biosafety Level 3 Facilities

With several Biosafety Level 3 Laboratories (BSL3) located across our partner sites, for in vitro and in vivo (including mosquito) work, we have access to the largest footprint of academic BSL3 laboratories in the UK.



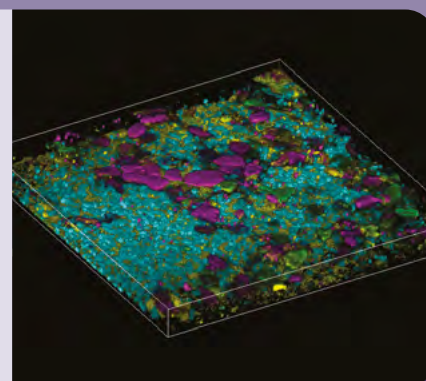
## Pre-Clinical Studies Unit

Led by **Professor Aras Kadioglu (University of Liverpool, 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 the study of the body’s responses to infection and determine which potential drug treatments and vaccines should be fast-tracked to clinical trials. Between **LSTM** and **UoL**, we have organoids for lungs, blood vessels and brains and are developing models for the gut.



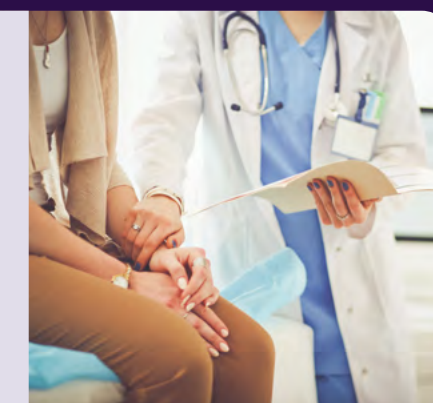
## Human Challenge Facility

Controlled human challenge models offer a rapid and cost-effective way to conduct initial assessments of potential new treatments and vaccines. Supported by £4.7M awarded by the **Research England Development Fund** and £2M funding from The Pandemic Institute, **Liverpool School of Tropical Medicine (LSTM)** has developed a 12 bedded inpatient unit to enable human challenge studies with higher risk pathogens.



## NIHR Clinical Research Facility

Established in 2009, the 24-bed facility, one of only two Phase I Accredited units in the NHS (accredited by the Medicines and Healthcare products Regulatory Agency), has been relocated to the new Royal Liverpool University Hospital, part of the **University Hospitals of Liverpool Group**. Led by **Professor Richard FitzGerald (UoL)** & **Professor 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 **LSTM Accelerator Research Clinic** has 18 beds for phase 2 outpatient and day-case studies. Its capacity to respond quickly, and at scale, is demonstrated by the fact that it was the largest UK recruiter to the **Oxford Astra Zeneca COVID-19 Vaccine Trial**.



## Access and Inequalities Unit

To ensure the medical countermeasures developed are used right across our communities, teams led by **Professor Miriam Taegtmeier (LSTM)** and **Dr Cathy Montgomery (Liverpool John Moore's University, LJMU)** are working with **Dr Emer Coffey** and colleagues at **Liverpool City Council** and community-based champions to tackle broader issues of vaccine access in underserved and diverse communities. **Professor Kay O'Halloran (UoL)** and colleagues are looking at the significance of communication in vaccine hesitancy and the pandemic response.



# PARTNERSHIP

As an outward-facing organisation, partnership is at the heart of what we do. We are strengthening links formed during the COVID-19 pandemic while expanding partnerships with industry and government to prepare for future threats.

## £5M influenza collaboration with CSL Seqirus

The Pandemic Institute is halfway through an ambitious five year £5M research partnership with CSL Seqirus to tackle **seasonal and pandemic flu**. The partnership is exploring vaccine use in deprived communities, tracking **avian flu** risks, and driving innovation in flu prevention and pandemic preparedness through data-driven research.

CSL Seqirus

**NIHR** Health Protection Research Unit in Emerging and Zoonotic Infections at University of Liverpool

## Working closely with the NIHR Health Protection Research Unit in Emerging and Zoonotic Infections

Since 2014, Liverpool has hosted the National Institute for Health and Care Research (NIHR) Health Protection Research Unit in Emerging and Zoonotic Infections, which was supported with £10M of government funding and has generated more than £160M in additional research income. Uniting experts from the academia and the UK Health Security Agency (UKHSA), the unit collaborates closely with The Pandemic Institute.

## FCDO-funded consortium to reduce the impacts of health emergencies in Southeast Asia

The Pandemic Institute is the UK academic and technical lead in the **Association of Southeast Asian Nations (ASEAN)** UK Health Security Partnership, a five-year Foreign, Commonwealth & Development Office (FCDO) funded initiative to tackle health emergencies in Southeast Asia. The programme is led by FHI 360 with The Pandemic Institute coordinating UK expertise, supporting the Peer Exchange Platform, and helping deliver grants to strengthen regional health systems.



fhi360

UK PANDEMIC SCIENCES NETWORK

## UK Pandemic Sciences Network

From 2023-2024 we developed the UK Pandemic Sciences Network from a new organisation into a thriving community, bringing together the UK's leading universities and pandemic science research teams to support the delivery of the 100 Days Mission and improve pandemic preparedness both in the UK and globally.

## Partnering with UKHSA to combat Avian Influenza

In partnership with UKHSA, the NIHR Health Protection Research Unit in Emerging and Zoonotic Infections and the **Pandemic Sciences Institute in Oxford**, we have awarded nearly £500,000 for **avian influenza** research. Eight projects led by our founding institutions are exploring diagnostics, vaccines, antivirals, and modelling, addressing key knowledge gaps and strengthening the UK's readiness for future avian flu outbreaks.

UK Health Security Agency

## Revolutionising intradermal injection technology with Pharma Latch

We are exploring innovative, needle-free vaccine delivery using microneedle technology, with Irish company Pharma Latch. Formalised during a visit to Dublin, the collaboration aims to boost vaccine effectiveness, reduce doses, and overcome needle phobia to improve public uptake. The partnership will focus on clinical trials, immune response studies, and patient acceptability.



PHARMA LATCH™



## Joining forces with a global leader in chemical and biological measurement

We partner with the UK's National Measurement Laboratory (NML) at LGC to advance pandemic preparedness and drive innovation. A global leader in measurement science, NML plays a vital role in standardising medical data worldwide. The joint research programme includes a PhD project on drug and vaccine delivery, and is supporting global standards for faster, more effective responses to future disease outbreaks.

## Collaborating with Dstl to tackle emerging health threats

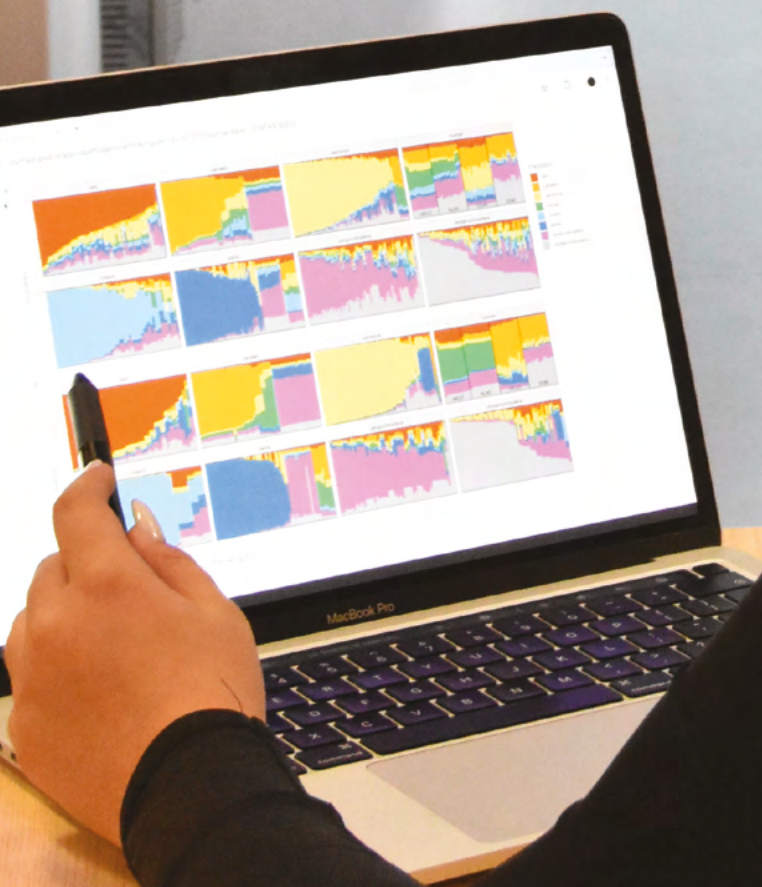
This collaboration unites scientific experts from The Pandemic Institute and Dstl (the Defence Science and Technology Laboratory) to improve the UK's ability to detect and respond to future health threats. The partnership combines defence and academic strengths to drive innovation in diagnostics, therapeutics, and pandemic preparedness across the UK.

**[dstl]**  
Delivering Mission Success



# PREDICT

We are using AI to **PREDICT** which pathogens might emerge, thus reducing the risk of future pandemics. Through enhanced surveillance, we are helping **PREVENT** the spread of recently emerged pathogens, supported by effective use of vaccines where they exist.



## Modelling future disease threats

Using machine learning, research by **Dr Liam Brierley (UoL)** and colleagues has been mapping the global spread of **avian influenza** and identifying strains that could jump to humans. We are also assessing the risk posed to the UK by **Oropouche virus**, a growing threat in Latin America. Closer to home, **Dr Christopher Overton (UoL)** and **Dr Emily Nixon (UoL)** are developing models to predict NHS winter pressures from **respiratory viruses**, giving healthcare planners the tools to prepare, respond early, and protect patients.

## Strengthening diagnosis of emerging brain infections

Many emerging diseases present in lower income settings starting with brain infections, but these can be some of the most challenging conditions to spot. To strengthen surveillance and diagnosis **Dr Bhagteshwar Singh (UoL)** and colleagues worked with clinicians, microbiologists, policymakers and other stakeholders in **Brazil, India and Malawi**, identified where the difficulties in diagnosis lay, and introduced simple, sustainable interventions, such as packs for performing spinal taps, to improve the diagnostic rate. This work, published in **The Lancet**, is being rolled out globally through **WHO initiatives on encephalitis and meningitis**.

Singh B, et al. Lancet. 2025 Mar 22;405(10483):991-1003

### SCAN TO WATCH

The **Brain Infections Global** video



## Training in outbreak detection in Malawi

The **Public Health Institute of Malawi (PHIM)** plays a key role in responding to disease outbreaks but lacks training capacity and lab resources. To strengthen PHIM's ability to detect and manage emerging infections, funding from The Pandemic Institute has supported the **Malawi Liverpool Wellcome Research Programme** to launch an internship scheme to train staff in essential lab skills. Interns will return to PHIM with knowledge and tools to improve outbreak response.

## Tackling vaccine hesitancy in diverse communities

In Liverpool, **Influenza** vaccine uptake is lower in ethnically diverse and marginalised groups, due to a mix of mistrust, misinformation, and cultural concerns. **Professor Cathy Montgomery (LJMU)** and **Professor Miriam Taegtmeier (LSTM)** are working with **Dr Emer Coffey** and colleagues at **Liverpool City Council** and local communities in Liverpool to understand these barriers and co-design public health messaging that speaks to their experiences. This work is creating tailored, culturally sensitive campaigns to boost vaccine confidence, reduce health inequalities, and protect vulnerable populations across the UK during future winter surges.

Powell A, et al. Vaccine. 2025 Mar 19;50:126837

## Preventing Lassa Fever

**Dr Emily Nixon (UoL)** and colleagues have for the first time been able to estimate the current burden of **Lassa fever**, project the impacts of vaccination programmes and demonstrate how these may help avoid the next pandemic. The study, published in **Nature Medicine** and funded by the **Coalition for Epidemic Preparedness Innovations (CEPI)**, demonstrated that in every scenario, particularly in areas where the disease is endemic, preventative vaccination campaigns are more effective in reducing health and economic burdens of the disease, and are more cost-effective in response to local outbreaks when compared with reactive vaccination.

Smith DRM, et al. Nat Med. 2024 Dec;30(12):3568-3577



# PREPARE

Our **PREPARE** pillar focuses on the 100 Days Mission, working to ensure that medical countermeasures, including diagnostics, treatments and vaccines, can be ready within 100 days of a new threat emerging.

## Almost £10M awarded to LSTM's Centre for Drugs and Diagnostics

Liverpool School of Tropical Medicine's Centre for Drugs and Diagnostics has received £9.8M over the next five years from **Research England** to expand its infectious disease research. The funding is supporting workforce development, especially **Early Career Researchers**, and investment in cutting-edge technologies. Recognised as a global leader in translational research, the Centre is using this support to advance diagnostics and treatments for vulnerable populations, reinforcing its regional and international impact.

## Diagnostics

We are supporting the development of faster, simpler diagnostic tests for emerging diseases. In partnership with researchers in **Brazil**, **Dr Ana Isabel Cubas-Atienzar (LSTM)** is creating a quick and easy test for **Oropouche virus**, to help health workers quickly diagnose cases in outbreak settings. We have also supported **LSTM researchers**, including **Dr Caitlin Thompson**, to develop the world's first rapid test for **Crimean-Congo Haemorrhagic Fever**, a tick-borne viral disease with up to 40% mortality. **LSTM researchers** have secured a further £1.3M from the **Medical Research Council** to progress the prototype rapid test into a final device, with the aim of commercialisation at the end of the project. **Dr Thomas Edwards (LSTM)** and colleagues are developing a fast, low-cost graphene-based biosensor that uses monoclonal antibodies to detect viruses, including **dengue** and **Mpox**, from clinical samples.

Thompson C, et al. EBioMedicine. 2024 Dec;110:105460

## Therapeutics

We're working to make sure effective treatments are ready for future outbreaks. For **Mpox**, **Professor Saye Khoo (UoL)** and colleagues are developing better ways to measure how antiviral drugs work in different patients, helping doctors use the right dose for each patient. For **avian influenza**, the team are also building libraries of drug knowledge to speed up decisions on which treatments to use in an outbreak. Work led by **Dr Shaun Pennington (LSTM)** is developing a rapid testing pipeline for new antivirals against **avian influenza**, screening drug candidates using organoid-based infection models and predictive modelling. This work helps ensure faster access to life-saving treatments when they are most needed. **Professor Tom Fletcher (LSTM)** and colleagues in Turkey have carried out the world's first randomised study of two drugs (favipiravir and ribavirin) as a treatment for **Crimean-Congo Haemorrhagic Fever**.

## Vaccines

We are advancing vaccine development for emerging viral threats. There is no vaccine to protect against the mosquito-borne **Zika virus**, which causes neurological disease in adults and birth defects in babies. **Professor Lance Turtle (UoL)** and colleagues including **Dr Krishanthi Subramaniam (UoL)**, **Dr Tom Blanchard (UoL)** and **Professor Neil French (UoL)**, have developed a novel vaccine, shown it is protective in disease models, and completed first-in-human studies at the **NIHR Clinical Research Facility** in Liverpool. Using a similar approach, investigators at The Pandemic Institute are developing a "Pan-Flavivirus" vaccine to target **Zika** and related viruses **dengue**, and **Japanese encephalitis**. We are also using a range of platforms to develop vaccines against **Oropouche**.

## Priority Pathogens

The **UK Health Security Agency** has released a list of 16 pathogen families that may pose significant public health risks, aiming to steer research and development efforts. The Pandemic Institute investigators are already conducting research on 9 of these, including high-risk viruses like **Middle Eastern Respiratory Syndrome**, **non-seasonal influenza**, and **Nipah**. Additionally, our work spans 7 of 11 high risk viral pathogen families identified by the World Health Organization (WHO), supporting global efforts to prepare for future pandemics.

The Pandemic Institute is researching:

# 9 of 16

UKHSA high-risk pathogen families,

# 7 of 11

WHO high-risk viral families.



# RESPOND

We **RESPOND** to emerging infections, bringing them under control with clinical and behavioural interventions and helping society **RECOVER** after outbreak events.

In Liverpool, we played a key role in the Events Research Programme, helping society recover and reopen after the pandemic.

## ISARIC

We provide underpinning support in the UK for ISARIC (**I**nternational **S**evere **A**cute **R**espiratory **I**nfection **C**onsortium), an open collaboration of clinicians and scientists addressing urgent infectious disease threats. The **ISARIC-Coronavirus Clinical Characterisation Consortium** (ISARIC-4C) established by **Professor Calum Semple (UoL)**, along with colleagues from Edinburgh and Imperial College London, was central to the UK's **COVID-19** response, rapidly identifying risk factors and informing national health policy. Funded by **UKRI** and **NIHR**, ISARIC-4C created a powerful open-access analysis platform linking NHS clinical data. It continues recruiting for emerging infections, publishing papers recently in the **Lancet** on **Mpox** and in **Nature** on **adeno-associated virus 2 (AAV2)**, which causes a severe liver disease in children. The ISARIC-4C initiative enables fast, collaborative research and underpins clinical trials and public health strategies by sharing data and biological samples with the global research community.

Ho A, et al. Nature. 2023 May;617(7961):555-563

## Studying long-term clinical outcomes

In a landmark national study of patients hospitalised with **COVID-19**, **Professor Benedict Michael (UoL)** and colleagues found that many still had thinking and memory problems a year later, key features of **Long COVID**. These deficits were linked to blood biomarkers of inflammation and brain injury on scans, especially in those with severe illness or psychiatric symptoms. Follow-up showed signs of gradual recovery. The findings suggest the brain effects may be immune-related and highlight the need for targeted treatments.

Michael B, et al. Nat Commun. 2023 Dec 22;14(1):8487

## Improving Crisis Communication

Our researchers are working to refine public health messaging by understanding how communities receive and respond to information. Projects in Liverpool have explored stigma around **Mpox** (led by **James Woolgar, Liverpool City Council**) and used digital mapping to track how **COVID-19** messages spread (led by **Professor Kay O'Halloran, UoL**). Insights from this work are shaping clearer, more inclusive communication for future outbreaks.

## Planning for future community testing

Large-scale testing, first piloted in Liverpool during **COVID-19**, helped reduce hospital admissions by 25% and supported a safer return to daily life, protecting vulnerable people and allowing more targeted use of isolation. But to make community testing work in future pandemics, we need better data, real-time insights, and clearer plans for when to start, and stop, testing. A recent review led by **Professor Iain Buchan (UoL, below)**, and funded by **UKHSA**, aims to build a smarter, more effective framework for future testing strategies.



**SCAN TO WATCH**  
the **Community Testing Review** video





# ENGAGEMENT

## Engaging with the public

The Pandemic Institute is committed to connecting with communities through a range of public engagement initiatives. Our new **Public Steering Group**, run with **The Thinker Hub Community Interest Company**, ensures local voices help shape pandemic research and planning. We also participate in the annual global **Pint of Science** festival, this year exploring Liverpool's legacy in infectious disease research and showcasing our funded work such as **Dr Caitlin Thompson's (LSTM)** work on developing diagnostics for some of the world's deadliest viruses. To inspire future scientists we work with local children, for example creating a hands-on introduction to infectious diseases and university life with the neighbouring **Kensington Fields Community Association**.



## BREAKING NEWS

### The Pandemic Institute Liverpool-Hong Kong Partnership

As we go to press (October 2025), we are launching an exciting new initiative that brings together The Pandemic Institute investigators with those from **The University of Hong Kong**, **The Chinese University of Hong Kong** and **The Hong Kong Polytechnic University**. The programme, supported by a generous philanthropic donation from **The Shaw Foundation**, focuses on emerging infectious threats in the region, where overcrowding is a major issue.



## Connecting with UK policymakers

In our recent role as secretariat to the **UK Pandemic Sciences Network**, we have helped forge strong links between senior government bodies and top UK pandemic science researchers to improve future preparedness. The Pandemic Institute was chosen for a visit by the former **Chancellor of the Duchy of Lancaster**, The Rt Honourable Pat McFadden MP, as a backdrop for the Government's announcement to carry out the largest ever national pandemic response exercise, which he is discussing here with **Dr Krishanthi Subramaniam (UoL)**.

**The Rt Honourable Pat McFadden MP**  
*Announcing the Government response to Module 1 of the COVID-19 public Inquiry.*

"Let me echo the praise of... the work that The Pandemic Institute are doing, they are absolutely right to underline the value of research, and we've said all the way through this statement the next crisis we face may be very different from the last."

We also took part in **The House of Commons' Science, Innovation and Technology Select Committee's (DSIT)** visit to Liverpool.

**Dr Allison Gardner**  
*Member of the Science, Innovation and Technology Committee speaking in a House of Commons debate said:*  
"It is vitally important we provide the time and funds to researchers such as Professor Solomon to help build our national resilience to future pandemics."





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](mailto:contact@thepandemicinstitute.org)

X (Twitter): @ThePandemicInst

Bluesky: @thepandemicinst.bsky.social

[www.thepandemicinstitute.org](http://www.thepandemicinstitute.org)



SCAN TO  
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### The Pandemic Institute Steering Group:

**Professor David Sweeney CBE,**  
External Chair of Steering Group

**Professor Matt Ashton,**  
Director of Public Health,  
Liverpool City Council

**Professor Mark Bellis,** Interim  
Pro Vice-Chancellor Faculty of  
Health, Innovation, Technology and  
Science, Liverpool John  
Moore's University

**Dr Jim Gardner,** Chief Medical  
Officer, University Hospitals of  
Liverpool Group

**Professor Louise Kenny CBE,**  
Pro Vice-Chancellor of the Faculty  
of Health and Life Sciences,  
University of Liverpool

**Professor David Laloo CMG,**  
Vice-Chancellor, Liverpool School  
of Tropical Medicine

**Adrian Nolan,** Senior  
Investment Manager, Liverpool  
City Region Combined Authority

**Colin Sinclair,** Chief Executive  
Officer, Knowledge Quarter

## ONLINE VIDEOS

### THE PANDEMIC INSTITUTE

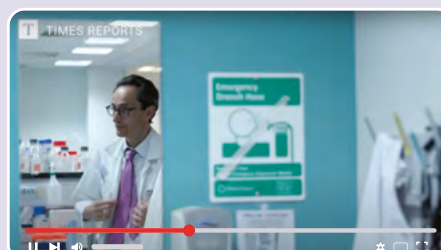
Protecting the world from emerging infections  
and future pandemic threats



SCAN TO WATCH

### INSIDE THE PANDEMIC INSTITUTE'S LABORATORIES

A video made by The Times



SCAN TO WATCH