

IMPERIAL

Economics of Pandemic Preparedness: Trade-offs in peacetime and pandemics

Report

Prepared For:

Jameel Institute
Institute of Infection
Centre for Health Economics & Policy Innovation

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Key messages, challenges and proposed solutions presented in an interdisciplinary Imperial College workshop organized by Imperial College London's Jameel Institute, Institute of Infection and the Centre for Health Economics & Policy Innovation, on the 22 April 2024 at The Royal Society, London.





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Setting the scene



Pandemics and epidemics can lead to great loss of life - and they are costly to fight. Preventing and preparing for the next pandemic may be one of the best investments countries can make.

Expenditure on prevention and preparedness is measured in billions of dollars, the cost of a pandemic in the trillions (Adam Tooze: *Shutdown: How Covid Shook the World's Economy*. Allen Lane, 2021).

Covid-19 is estimated to have cost the world \$11 trillion – so far. The World Health Organization notes that it would take 500 years to spend as much on investing in preparedness, at the current rate, as the world lost due to Covid-19. And even if there is not a global pandemic raging, local epidemics are a constant challenge. In 2018, epidemics reportedly cost the world \$60 billion a year.

Why is pandemic prevention and preparedness so severely underfunded? And more importantly, what should be invested – and where – to improve preparedness?

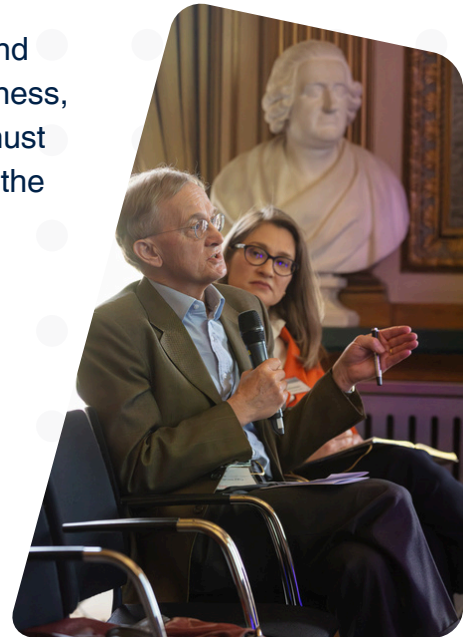
Pandemic preparedness competes with other urgent policy priorities. Severe pandemics are uncommon and unpredictable, but election cycles of policymakers are short. The full benefits of investment in pandemic prevention and preparedness may extend beyond election cycles, and even the lifetime of policymakers. The evidence is weak on which policy measures in pandemic preparedness and prevention generate the greatest returns, and appropriate measures are likely to vary between countries of different income levels.



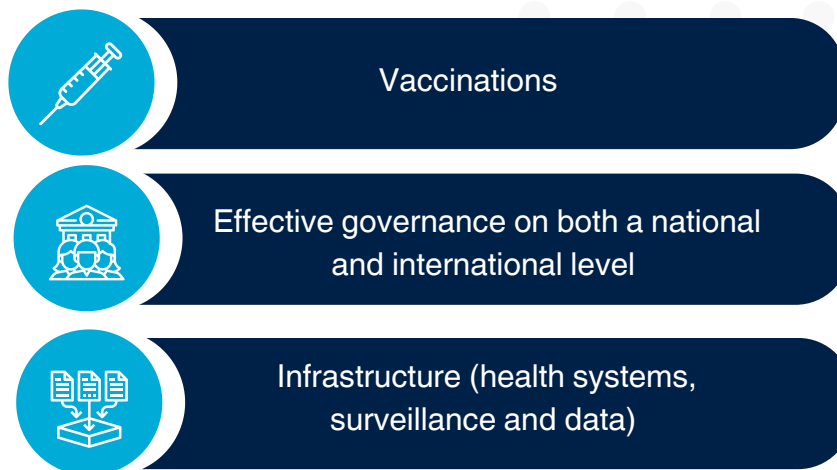


The objective of this workshop was to debate the policy and research priorities for pandemic prevention and preparedness, recognizing that budgets are limited, and tough choices must be made in the trade-offs between population health and the economy.

Bringing speakers together from finance and economics, public health, epidemiology and infectious diseases, we discussed the investments needed to equip countries to effectively prevent, prepare for, and respond to pandemics; the investments with the highest returns in terms of lives saved and economic and wider societal outcomes, in both the global north and the global south.



The discussion raised many fundamental questions. What are the outcomes we should aim for, and how should we measure them? How can we reconcile the cost to public health with the cost to the economy? And lastly, what action is needed now, to make the most impact next time round, in three key areas:



Looking forwards, the workshop outputs will be leveraged to further the programme of research under the Jameel Institute-Kenneth C. Griffin Initiative for the Economics of Pandemic Preparedness (EPPI). Established by the Jameel Institute in 2022, EPPI uses integrated economic-epidemiological modelling to provide critical data and analysis to inform public health decisions related to pandemic preparedness and disease outbreaks.

Click [here](#) to find out more about EPPI.



The Experts



The speakers, leaders and experts in their respective fields, set a thorough and comprehensive view of the challenges, strengths, weaknesses and opportunities that exist to prepare the world for the next pandemic. The workshop focused on the need to navigate the trade-offs in investment between pandemic preparedness and the surveillance, prevention and management of endemic infectious diseases, with talks from a range of organizational, multi-disciplinary and global perspectives:

Professor Jonathan Haskel | Imperial College Business School,
External Member of the Monetary Policy Committee, Bank of England

Speaking on the microeconomic and macroeconomic aspects of pandemic preparedness, Professor Jonathan Haskel emphasized the insurance role of preparedness, and set out the factors determining the amount of pandemic insurance to buy, and the importance of state involvement. Prof Haskel spoke to the special role of knowledge in an economy, laying out the process by which upstream production of new knowledge is used downstream in production. He disentangled the effects of the pandemic on real GDP, focusing on labour participation and productivity. He presented surprising statistics on the sustained reductions in participation rate in the UK since the COVID-19 pandemic as the key factor impacting UK real GDP.



Professor John Edmunds | Infectious Disease Modelling, London
School Hygiene and Tropical Medicine (LSHTM)

Professor John Edmunds explained that before COVID-19, macro-economic studies of pandemics were not integrated with epidemiological studies, summarizing contributions on H1N1, and the West African Ebola pandemic. Prof Edmunds then discussed the substantial recent scientific progress on integrated economic-epidemiological models, which finally allows us to bridge the gulf between economics and epidemiology. He highlighted the interlinked nature of public health and economic objectives, the damaging effects of an adversarial approach to policy, and the need for an ecosystem of tools capable of integrating epidemiological and economic analyses to improve epidemic planning and real-time decision making.

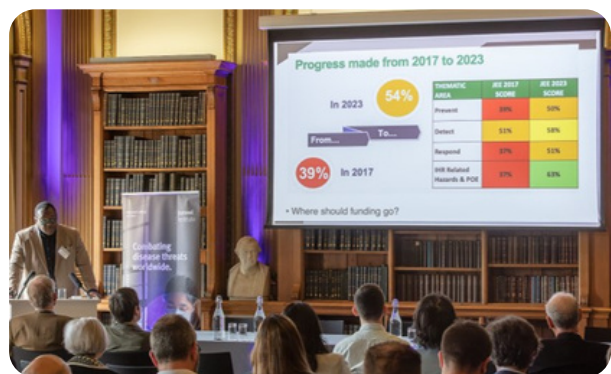




Professor Susan Michie | Health Psychology and Director, Centre for Behaviour Change, University College London (UCL)



Emphasizing the importance of applying behavioural science to managing COVID-19, Professor Susan Michie put forward the view that understanding and managing behaviour is key to pandemic management, because it enables people to adhere to advice and rules, and helps decision-makers to implement effective mitigation policies. She presented the COM-B model that understands behaviour as the interaction between capability, motivation and opportunity. Prof Michie reflected on the data required to effectively model behaviour. Prof Michie emphasized the urgent need for interdisciplinarity approaches and called on researchers to ‘cross lanes’ when needed, and venture beyond their disciplines.



Dr Ifedayo Adetifa | Clinical epidemiologist and former General Director, Nigeria CDC



Dr Idefayo Adetifa identified competing global health agendas: universal health coverage, health security, and health promotion. He called out major areas where global cooperation is falling short, with continuing inequities in healthcare access and provision, especially in countries with a smaller economy. At present the world lacks sufficient data to properly track investments in pandemic preparedness and pandemic response: this lack needs urgent redress. Further, most currently available funding is directed to curative healthcare services, rather than health promotion or preventive care. Following the theme of a multidisciplinary approach, Dr Adetifa insisted there must be synergy in both the planning and implementation of economic policy.



Professor Els Torreele | Policy Associate, Institute for Innovation and Public Purpose, UCL



Professor Els Torreele noted that the current ‘market’ for outbreak disease R&D and preparedness doesn’t work. Advocating the view that it is both a public and political responsibility to foster availability of healthcare as part of the right to health, Professor Torreele showed how the economic interest of pharmaceutical companies can conflict with equitable, timely and affordable access to healthcare and medicines. She called on us to shape the economy with public health as a key objective. This requires a redesign of healthcare economics as a whole-of-government, end-to-end value proposition in which health value is given priority over monetary value and social contract to achieve global public health goals.

Dr Edith Patouillard | Health Economist, WHO. Dept. of Health Financing and Economics



Focusing on an integrated, holistic approach to modelling and policymaking built on multidisciplinary, cross-sector and inter-agency collaboration, Dr Patouillard offered potential solutions and activities. First, to initiate and establish partnerships in interpandemic times; formalize mutual engagement between policymakers and modellers in specifically created government units; and maintain this cooperation at local, national and global levels. Second, to develop educational opportunities both by formal and on-the-job training in modelling for policymakers and by establishing modelling networks. Lastly, to review the structure of economic and policy models, identify the models appropriate for specific policy questions and instigate collaborative surveillance through data collection and sharing systems both across sectors, disciplines and regions. For detailed descriptions of potential solutions and activities from Dr Patouillard’s presentation, see [here](#).

The Challenge ↙

Delegates were split into three groups covering:



Vaccinations:
public good and
private incentives



Infrastructure for
surveillance, data
and health care



National & international
governance and policy

Each group was challenged to answer three key questions, using the information gathered in the presentations and panel session:

“If you had £5M, what would your research programme be?”

“If you had £5B, what would you invest in for pandemic prevention, preparedness or response?”

“Where should these funds come from?”

The breakout groups were chaired respectively by Professor Faith Osier, Co-Director of the Institute of Infection, Imperial College London; Professor Mark Jit, head of the Department of Infectious Disease Epidemiology & Dynamics and co-director for the Global Health Economics Centre at LSHTM and Professor Rifat Atun, Professor of Global Health Systems and Director of the Health Systems Innovation Lab, Harvard University.

Delegates were encouraged to take into consideration points such as routine detection and surveillance during peacetime, inequalities and inequity, stockpiling, manufacturing capacity, health services provisions, systems approach, non-pharmaceutical approaches, socio-economic impacts, communication and information and trust.



Vaccinations: public good and private incentives



£5M programme

Vaccination is a global public good, and designing strategies to foster investments into pandemic vaccines requires a deep understanding of the tension between private and public benefits.

Vaccination creates benefits both to individuals and to society. For the £5M research project, the group focused on issues of effective vaccination campaigns and vaccine hesitancy.

The group also put forward a £20M implementation proposal, in which technology transfers would be facilitated from high to upper middle and middle-income countries to ensure equitable access to vaccine R&D, manufacturing and distribution.



Mechanisms must be developed to weigh private benefits against public benefits, considering both direct and indirect benefits.



Economic arguments may not convince people to vaccinate, but may be sufficient to persuade policymakers and private initiatives to invest in vaccines.



Communication on the social and medical benefits of vaccinations have always proved tricky. The content and style of messaging are critical.







£5B programme

Using a 'bottom-up' approach, this would start with identifying populations' health needs and then tailoring specific strategies to address them. The next step would be to set a governance structure based on public leadership to make best use of existing strengths and capacity, especially in lower- and middle-income countries (LMICs). The goal would be to create a viable ecosystem and capacity-building.

Bottom-up solutions are key to success, in which regional and local needs are taken into account. There is an important distinction between the recipient and the co-creator of technologies. Issues from the African CDC were raised such as investment in basic infrastructure, that capacity needs to come first, and it can be difficult to drive effective collaboration in the face of strong nationalism. Basic infrastructure and capacity need to be built before technology transfer can be implemented.

Investment is also needed in further small projects such as small-scale manufacturing, and tech transfer from high-income to low-income countries. The plans must be tailored according to the capacity of each country.

Key points for consideration

-  • Grow from initial smaller-scale projects first, particularly in manufacturing.
-  • Establish a clear distinction in capacity between upper-middle and lower-middle income countries.
-  • Both regional and local solutions are needed, and a clear distinction between the recipient and the co-creators in vaccine manufacturing investment.
-  • Debate would be needed as to who makes the decisions on;
 - Ownership and benefits in vaccine manufacture
 - Leading the initiative.



Infrastructure for surveillance, data and health care ↙

Surveillance (routine and non-routine) key points for consideration

- Zoonotic surveillance needs to consider both ecological and mathematical approaches. Where should the surveillance be carried out?
- Wastewater and environmental surveillance, to detect asymptomatic transmission of pathogens.
- Routine surveillance in healthcare. For example, the detection of H5N1 in UK hospital could lead to awareness of a variant of interest at 1-2 weeks' extra notice.
- Economic surveillance. This may be conducted during outbreaks, rather than on a permanent basis.
- Event-based surveillance / indicator-based
- Genomic surveillance for early detection of potential pathogens.
- Public health laboratory networks including hospitals and public bodies such as UKHSA and CDC. These networks require major investment in human capital.

Data infrastructure key points for consideration

- Standardization of data and international cooperation are key
- Data policy and governance
- Feasibility of contact tracing
- Data linkages with hospital mortality data, regulation, case and metadata, feasibility of collection of case characteristic
- Case definition
- Data digitisation



Collaboration and exchange of information key points for consideration

- Early Warning System required by International Health Regulations
- Cross-border surveillance (e.g. EU/European Centre for Disease Prevention and Control, Niger/Nigeria)
- Agreements between countries (e.g., agreements between the Economic Community of West African States, also known as ECOWAS), which may not always be possible
- Incentives to encourage notification, to mitigate negative effects of border closures
- Implementation of the results of scientific research

Health systems and economies key points for consideration

- Health system strengthening for human capital; redeployment; 'one health' training of other professionals
- Model what intervention gives the most synergy. Pandemic HTA (Health Technology Assessment)
- Integrated modelling impacts/benefits of health system strengthening
- Data collection



National and international governance and policy

£5M programme

Research priorities were broadly set to identify suitable and effective means to communicate research through case studies and qualitative research:



- How to synthesise and integrate evidence



- How to present evidence to policymakers :
 - What is the route from scientific advisor to policy? e.g. in Germany, "SAGE" included politicians, whereas in the UK, low science literacy among MPs was an issue: They did not understand the steps between evidence and policy. Some sort of national agency could bridge that gap.
 - What factors influence decision making? What are their incentives?
 - What is effective / has worked in national and international contexts? This likely depends on the setting/context. We decided to focus on the UK.
 - How do we improve transmission of information / evidence?



- How policy is presented to the public



- How research and evidence are presented to the public



- How uncertainty is communicated to policy and public



- Engaging the public. What do they think? What are their priorities? How to battle misinformation.



£5B programme

This budget was split into four buckets, as follows:



£500M for international collaboration on surveillance and reporting

- What was the policy and what was its impact? For policies including health; non health; fiscal packages
- Funding to source, store and (safely) share new data
- Considerations included: language barriers; press reports; social media; policy comparisons; death reporting



£500M for stockpiling / insurance

- Innovative financing with co-investment from private sector.
- The "Lloyd's of P2": insurance and reinsurance.



£2B for mitigating socioeconomic impacts:

- Childcare needs and education
- Cash transfers
- Supporting health workers
- Requires monitoring and evaluation



£2B for expansion of general healthcare capacity

- Should follow the evidence on what are the worthwhile investments to make
- Should have a day-to-day benefit
- Also requires monitoring and evaluation.

Key points for consideration

- Methods to synthesize and present evidence to decision-makers
 - Who are the appropriate decision-makers?
 - The groups presenting evidence must remain in regular dialogue with policymakers, but must maintain their independence from the policy decisions
- Availability of academics and public health experts
- Politicians' understanding of the science
- Other influencing factors aside from evidence and how it is communicated, taking into consideration the likes of political economy
- Mechanism for incentivising 'wanting to do the right thing'
- How to align incentives to help politicians do what is right for the population?
 - Paying attention to politicians and citizens
 - Including mechanisms
 - Uncertainty



Report Summary

It is now widely recognized that there are substantial inequalities throughout the world in pandemic preparedness and response. There are workable solutions to transfer vaccine technology, manufacturing and distribution from the Global North to the Global South.

It is imperative that the different disciplines come together and collaborate in interdisciplinary projects to analyze and optimize the inescapable trade-offs between public health, and the economy, to inform future policy and mitigate poor outcomes both in public health and the economy.

Speakers collectively emphasized the need, and great lack, of transdisciplinary collaboration. Pandemic prevention and preparedness would be facilitated by metrics that convey the value of pandemic preparedness activities to economists and policymakers. The most effective way of preventing and preparing for future pandemics is to introduce measures to protect the population against the spread of infectious diseases, not only during a pandemic, but also in 'peacetime'.

The development of global networks, to enable the sharing of intelligence by means of data, policy, research dissemination, professional training and in doing so, building a multisectoral collaboration of experts will provide better resilience and preparedness in the face of emerging epidemic threats.



With thanks

Thank you on behalf of the **Jameel Institute**, **Institute of Infection** and the **Centre for Health Economics & Policy Innovation**. It is inspiring and promising to see such expertise and innovative thinking applied to the future of pandemic prevention and preparedness. Special thanks to:

The speakers and panellists:

Professor Jonathan Haskel | Economics, Imperial College London, External Member of the Monetary Policy Committee, Bank of England

Professor John Edmunds | Infectious Disease Modelling, London School Hygiene and Tropical Medicine (LSHTM)

Professor Susan Michie | Health Psychology and Director, Centre for Behaviour Change, University College London (UCL)

Dr Ifedayo Adetifa | Clinical epidemiologist and former General Director, Nigeria CDC

Professor Els Torreele | Policy Associate, Institute for Innovation and Public Purpose, UCL

Dr Edith Patouillard | Health Economist, WHO. Dept. of Health Financing and Economics

Mr George Richards | Director, Community Jameel (Panel Chair)

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To all **delegates** who attended and support this crucial work.