Written Evidence Submitted by Pandemic Sciences Institute, University of Oxford
(EMD0022)

Introduction

This evidence focuses on four aspects of the Inquiry's call for evidence:

- How the UK government is applying lessons from the COVID-19 pandemic
- The extent of UK preparedness for an emerging disease outbreak with pandemic potential, and how this could be enhanced
- The extent of co-ordination between government departments and other bodies such as the UK Health Security Agency
- Additional policy initiatives and solutions needed in the UK and internationally to reduce the risk of the future spread of emerging diseases with pandemic potential.

First we briefly outline our expertise and the value of UK science and technology for UK and global health security. We then provide evidence and recommendations for the UK government across three themes:

1. Developing a comprehensive, cross-sectoral research and development (R&D) strategy for pandemic preparedness
2. Providing resources to deliver a strategy for pandemic preparedness
3. Cultivating an enabling environment.

About us

The Pandemic Sciences Institute (PSI) at the University of Oxford is a multi-disciplinary centre of global research collaboration and excellence in pandemic sciences. Launched in 2022, our mission is to ensure that the world is better equipped to prepare for, identify and counter future pandemic threats. Our expertise includes infectious disease, vaccines, therapeutics, clinical trials, diagnostics, data analytics, epidemiology, ethics, social science and policy.

Our team played pivotal roles during the COVID-19 pandemic including leading the development of the Oxford/AstraZeneca vaccine, pioneering the world's largest COVID-19 drug trial RECOVERY, providing epidemiological, mathematical and ethical evidence for the NHS COVID-19 contact tracing app, building a serology platform, and developing the COVID-19 Government Response Tracker to track and compare policy responses and interventions around the world.

Our recommendations are based on our collective expertise over many decades of epidemic and pandemic preparedness and response, including the COVID-19 pandemic. The following researchers contributed to this evidence:

- Professor Sir Peter Horby (PSI Director)
- Professor Christl Donnelly
- Professor Christophe Fraser
- Professor Dame Sarah Gilbert
- Professor Thomas Hale

- Professor Sir Martin Landray
- Dr Alice Norton
- Professor Michael Parker
- Professor Sir Andrew Pollard

The value of UK science and technology for UK and global health security

COVID-19 challenged the world's understanding of pandemic preparedness. Despite apparently strong preparedness on paper, COVID-19 exposed weaknesses in the evidence base for interventions, our situational awareness, our national capabilities and our decision-making processes.

However, COVID-19 has also demonstrated that academic excellence – when partnered with strong public health, government and commercial capabilities – can deliver major benefits at astonishing speed. The last three years have shown that research, innovation, collaboration and agility can yield critical breakthroughs that save lives and livelihoods, from diagnostics, treatments and vaccines through to digital disease control tools.

There is an opportunity and an obligation to build on these successes to realise the potential for academia to contribute to global health security. To improve preparedness and ensure global health and economic stability for future generations, we need to apply the lessons of COVID-19 and build something better. We need to ensure that academic excellence is deepened, extended and applied to prevent – not just respond to – pandemics, and that the clear deficiencies in evidence, interventions and health equity are remedied.

1. **Developing a comprehensive, cross-sectoral research and development (R&D) strategy for pandemic preparedness**

   1.1. The UK government showed leadership during its G7 Presidency including at the 2021 G7 summit with launch of its 100 Days Mission report[1] to deliver safe, effective diagnostics, therapeutics and vaccines within the first 100 days of a pandemic and the associated Clinical Trials Charter.[2] This work led to the UK, along with Argentina, bringing the successful 75.8 Resolution on Strengthening Clinical Trial Capacity[3] to the World Health Assembly (WHA) in 2022, which member states are now mandated to act on. However, recent UK government science and technology publications do not describe or articulate a clear plan of action to deliver on these aspirations.[4] There is a risk of being overtaken by others internationally – for example, refer to The White House Office of Science and Technology Policy news and update (January 2023).[5]

   1.2. Whilst the UK Innovation Strategy[6] (July 2021) and the UK Science and Technology Framework[4] (March 2023) make a robust case for the value of UK science to the economy and describe high level strategic priorities, they do not put forward a plan to ensure that the UK science and technology ecosystem delivers the technologies and capabilities required to keep us safe.

   1.3. Recent events have demonstrated very clearly that the UK remains unprepared. The UK was not prepared for the Mpox (formerly known as monkeypox) outbreak and

remains unprepared for avian influenza A/H5N1, with a lack of diagnostic capabilities, treatments and vaccines for both.

1.4. Building on the innovations of the COVID-19 pandemic and delivering the aspirations of the 100 Days Mission requires a clear roadmap. Relying on broad thematic science strategies and piece-meal funding initiatives will not work – this 'business as usual' was the situation in early 2020 when we faced an existential health threat without adequate technologies and capabilities. It was 'business as usual' that left us unprepared. To ensure pandemic preparedness, the UK government needs to move to 'better business than before.'

1.5. Recommendations:

- The UK government should establish a formal mechanism to ensure cross-departmental coordination of strategic investment in core R&D and capabilities required for UK preparedness for major epidemics and pandemics.
- This mechanism should produce a pandemic preparedness R&D roadmap that describes the national capabilities, activities and outputs that are required to improve the ability of the UK to better detect, mitigate and respond effectively to future pandemic threats. The roadmap should also guide the allocation of resources over the next decade.
- The R&D roadmap needs to focus on delivering the 100 Days Mission. It must not be diluted or delayed. There should be oversight (including metrics) of actual delivery against the 100 Days Mission requirements with clear accountability across government.
- The roadmap should also consider wider R&D needs for pandemic preparedness, such as research on the optimal application of non-pharmaceutical interventions, the possibilities for containment of an incipient pandemic, and the potential impact (both positive and negative) of new technologies such as artificial intelligence.
- The roadmap should be cross-departmental and include private (commercial), academic (university) and non-profit (third sector) input. It should be holistic and in addition to conventional science and technology dimensions, should encompass R&D needs in the social and behavioural sciences and ethical and policy arenas. These areas are essential for ensuring interventions and policies are acceptable, moral, equitable and effective.

2. Providing resources to deliver a strategy for pandemic preparedness

2.1. There is a clear dissonance between the aspirations articulated in UK government publications and the reality of funding decisions currently being taken. It is our view that the UK government is not making the necessary strategic and long-term investment to significantly deliver on stated policy commitments around pandemic preparedness. We have observed disinvestment and dismantling of key UK capabilities created during the pandemic, many of which have been highlighted in UK government documents as exemplars of UK science innovation and impact. Examples include COG-UK (ending 31 March 2023), ISARIC 4C, the RECOVERY trial (not permitted to use remaining funds to pivot to other pandemic threats), the

COVID-19 infection study and the national serology platform (closed March 2023) and the Vaccine Manufacturing and Innovation Centre (VMIC), which was sold to Catalent (April 2022) and is apparently now mothballed. Diagnostic technologies and tools, as part of pandemic preparedness, also need greater investment.

2.2. In addition, UK high containment laboratory capacity (biosafety level 4 – BSL4) for studying human pathogens is very limited and much academic work on high threat pathogens has to be contracted off-shore to European or US facilities. This creates a risk for domestic R&D and therefore for UK preparedness and response capabilities. The UK, unlike some other countries, has no academic BSL4 laboratory capacity.

2.3. Commitments to sustain long-term research funding have been made by the UK in the 100 days mission[1] and WHA 75.8[3]. However, independent review has shown that present funding arrangements do not provide adequate support for 'end-to-end' research[7], and this is true particularly for pandemic preparedness R&D. The true cost of end-to-end research needs to be accounted for to ensure a sustainable R&D ecosystem in the UK.

2.4. The recent independent review of the UK research, development and innovation landscape highlights the value of core funding for sustainability, operations and agility in responding to emerging priorities, and recommends the UK government considers more stable and properly costed funding.[7] Because of the need to maintain infrastructure and expertise to rapidly respond to emerging health threats, stable core funding is particularly critical for pandemic preparedness R&D. The typical ‘boom and bust’ funding for pandemic threats is extremely unhelpful and wasteful. Core funding is required to enable strategically important capabilities and technologies to be developed, tested and maintained, to retain and attract talent, and to ensure an ‘always-on’ ability to rapidly pivot or surge to emerging threats.

2.5. Several groups set up during the pandemic facilitated valuable coordination across departments: an epidemics working group convened by UK Collaborative Development Research (UKCDR, a group of UK funders including Department of Health and Social Care (DHSC)) which focused on coordination of Official Development Assistance (ODA) research funding; and COVID-19 Research Coordination and Learning Initiative (COVID CIRCLE) which mapped funding activities and highlighted research needs linking to both UKCDR and Global Research Collaboration for Infectious Disease Preparedness (GloPID-R) funders groups. However, a more comprehensive formal mechanism for funding coordination for UK domestic research funding was lacking.

2.6. There is also a need for funds that can be released within a week and are sufficient to support substantive work, such as setting up and running clinical trials or manufacturing a vaccine for early clinical trials (£10–20 million). The awarding of these funds should have a strategic steer to minimise the fragmentation across the UK funding landscape seen during COVID-19 as shown in the Wellcome Living Mapping Review of COVID-19 funded research projects developed by GLOPID-R and others[8].

2.7. Recommendations:

- The UK government should provide stable, non-hypothecated core funding to develop and maintain critical infrastructure and capabilities for pandemic R&D.
- The UK government should also develop a formal mechanism for strategic cross-governmental coordination of funding for pandemic R&D and response.
- To supplement long-term strategic funding, the UK government should make provision for flexible, quick-release research funds when needed.
- As recommended by the Independent Review of the Research, Development and Innovation Organisational Landscape,[7] arrangements for the UK's association with the Horizon Europe research funding should be agreed as a matter of urgency. The UK is highly connected with Europe on an epidemiological, social and economic basis and UK researchers need the ability to work closely with EU colleagues.
- The UK government should review and address the lack of on-shore high containment laboratory space for UK scientists to conduct research and development on high-threat pathogens.

3. Cultivating an enabling environment

3.1. The UK Vaccine Taskforce (VTF), set up in May 2020 to lead efforts to find and manufacture a COVID-19 vaccine, was driven independently of government. The VTF worked well, facilitating partnerships and making decisions to invest and manufacture as part of a national programme. However, the VTF closed in October 2022. Similarly, the independent UK COVID-19 Therapeutics Advisory Panel (UK-CTAP) – which provided an extremely useful function, advising on what treatments should be proposed for testing through national platform clinical trials – is no longer available.

3.2. The UK government should put in a place a more coordinated, competent and timely approach to getting the approvals needed to set up multi-centre clinical studies. This includes Medicines and Healthcare products Regulatory Agency (MHRA) and ethics approval, as well as associated side contracts and, crucially, access to General Practitioner, hospital and laboratory data. In terms of pandemic preparedness, replacing this bureaucracy with a single efficient set of approvals is critical. This is a artificial problem which is fixable but only if there is the concerted will to do so.

3.3. COVID-19 demonstrated the importance of equipping relevant regulatory bodies globally – including the MHRA – with appropriate skills to ensure vaccines and therapeutics could be rigorously but swiftly assessed. By taking a more open approach to training MHRA staff, and bringing in expertise from academia and industry, staff would be equipped with better knowledge of clinical trials – and the application of good practice as well as good principles – as set out by the Good Clinical Trials Collaborative.[9] This would have a knock-on effect in benefitting UK life sciences and other areas of UK and global health. The recent outcome of the MHRA's consultation on proposals for legislative changes for clinical trials'[10] must now be translated into law (without dilution or introduction of additional complexity). But that will not be enough – the MHRA must work with the substantial expertise in clinical trial methodology and experience of clinical trial delivery in other

organisations (such as academia) to develop the skills of its own staff and remain up-to-date in a rapidly changing field.

3.4. The RECOVERY trial has been lauded as an exemplar for clinical trials worldwide. Most recently, the US Food and Drug Administration (FDA) recommended that the RECOVERY platform be adopted in the USA. The FDA stated that in the US, 'our knowledge of the risks and benefits of interventions could be greatly enhanced with focused, pragmatic point-of-care trial designs,' the approach to clinical research adopted by the RECOVERY trial[11]. The UK government should build on the lessons from the RECOVERY trial and embed simple clinical trials at scale within the NHS that have the ability to pivot quickly to emerging health threats.

3.5. Health data linkage was a unique benefit in the UK, allowing the UK to excel in clinical trials. However, sharing of data within and between other settings delayed researchers' understanding of how COVID-19 was spreading in the UK, particularly in the early stages of the pandemic. For example, it was challenging to gather data on numbers and causes of deaths in England where reporting of deaths can be slow, in contrast to Scotland where deaths must be registered within eight days. By improving the way data is stored, linked and accessed – ensuring consistency across all four UK nations – scientists and policymakers would have a clearer understanding of how a pandemic is developing.

3.6. The contracting and reporting for research funding is increasingly complex and burdensome, leading to delays in urgent responses and unnecessary reporting burdens on scientists.[6] Independent reviews have found that excessive bureaucracy and emphasis on audit-orientated reviewing wastes, both money and researchers' time in receiving grant funding.[7,12,13] Simplified research funding administration should be embedded as best practice to improve return on investment and to allow for rapid research response to emerging health threats.[14]

3.7. Recommendations:

- The pandemic threats R&D roadmap should consider the governance structures that would facilitate efficient and effective implementation. Examples of structures that proved very effective during COVID-19 in supporting the science and technology community are the UK-CTAP and VTF, both of which have been stood down.
- The UK Clinical Trials Legislation should be updated in close alignment with the results of the recent response to public consultation, and structures should be set up to upskill MHRA staff and provide them with advice and expertise from those in academia and industry who develop and deploy innovative approaches to clinical trials.
- The UK government should improve how data from different settings are linked. To expedite access to data in emergencies, criteria for access should be agreed in advance and researchers could pre-qualify for access within a safe research environment. Ethicists should help to guide these decisions.
- The UK government should build on lessons from UK successes in clinical trials for COVID-19 and deliver on commitments made in the 100 days mission[1] and WHA 75.8[3], by promoting the embedding of simple clinical trials at scale within the NHS that have the ability to pivot quickly to emerging health threats.

- UK government research funders should greatly simplify funding administration and reporting requirements.

References

1. Cabinet Office, 2021. 100 Days Mission to respond to future pandemic threats. Reducing the impact of future pandemics by making diagnostics, therapeutics and vaccines available within 100 days. A report to the G7 by the Pandemic Preparedness Partnership.
2. Department of Health and Social Care, 2021. G7 Therapeutics and Vaccines Clinical Trials Charter.
3. Department of Health and Social Care, 2022. New clinical trials deal struck to better protect world from future pandemics.
4. Department for Science, Innovation and Technology, 2023. The UK Science and Technology Framework.
5. Office of Science and Technology Policy, The White House, 2023. Preparing U.S Clinical Trials Infrastructure for Emergencies: A White House Virtual Roundtable Discussion.
6. Department for Science, Innovation and Technology and Department for Business, Energy and Industrial Strategy, 2021. UK Innovation Strategy: leading the future by creating it.
7. Nurse P., 2023. Independent Review of the UK's Research, Development and Innovation Organisational Landscape: Final Report and Recommendations. Department for Science, Innovation and Technology and Department for Business, Energy & Industrial Strategy.
8. Wellcome Open Access, 2022. UKCDR Living Mapping Review of COVID-19 funded research projects.
9. The Good Clinical Trials Collaborative.
10. Medicines and Healthcare products Regulatory Agency, 2023. Consultation outcome: Proposals for legislative changes for clinical trials.
11. Califf RM, Cavazzoni P, Woodcock J., 2022. Benefits of Streamlined Point-of-Care Trial Designs: Lessons Learned From the UK RECOVERY Study. JAMA Internal Medicine.
12. Tickell A., 2021. Independent Review of Research Bureaucracy Final Report London, UK, Department for Science, Innovation and Technology, UK Research and Innovation, and Department for Business, Energy & Industrial Strategy.
13. Grant D., 2021. Independent Review of UK Research and Innovation (UKRI): final report and recommendations. London, UK, Department for Science, Innovation and Technology and Department for Business Energy & Industrial Strategy.
14. COVID CIRCLE Initiative, 2023. Funding and undertaking research during the first two years of the COVID-19 pandemic: COVID CIRCLE updated report.

(March 2023)