

Evidence Submission

UK science, research and technology capability and influence in global disease outbreaks.

July 2020

Summary of recommendations

Recommendation 1 - There must be lessons learned from the early response to the Covid-19 pandemic, leading to a framework for how government can better implement a coherent national and local diagnostic testing strategy, as part of any future response to a pandemic of this kind.

Recommendation 2 - Part of the lessons learned should include evaluation of civil service capacity to undertake this level of national and local coordinated response, drawing together UK scientific capacity at such speed. This includes assessing scientific advice mechanisms and/or scientific skills needed at official level to undertake rapid coordination (see recommendation 4 below).

Recommendation 3 - The government must explain how scientific advice informed relevant operational considerations during the pandemic, including procurement practices.

Recommendation 4 - The government should provide regular progress updates on the recommendations in 'Raising our ambition on science' by the Government Office for Science. Particular attention should be paid to progress made against the recommendation '*to ensure that the civil service as a whole has the scientific skills it needs and the mechanisms to deploy them effectively through the wider civil service functional agenda*'. The government response to the pandemic has shown a renewed urgent need to prioritise ways to ensure that the civil service has the scientific skills that it needs.

Recommendation 5 - UKRI should outline what criteria they used to identify 'urgent' or 'highly urgent' proposals, including how this was informed by discussions with government relating to the ongoing management of the Covid-19 pandemic.

Recommendation 6 - UKRI should publish data on the time taken for the assessment of proposals (from application submission to panel decision) submitted to its open call on Covid-19. This, alongside other evidence, should be used to evaluate the scheme. Whilst there is much to be commended in UKRI's rapid response to the research challenges that Covid-19 presents, there will be lessons that can be learned on how to design and manage such schemes effectively in a time of huge live challenge.

Recommendation 7 - The government should continue to monitor the evolving situation and needs of SMEs as the pandemic progresses and work with the community to develop any further policy initiatives that may be needed. The government must remember that a long-term scientific solution to the Covid-19 pandemic, and future pandemics more widely, will need a range of actors working together, including SMEs who are particularly vulnerable.

Introduction

Since the start of the Covid-19 pandemic, scientists across the world, including those in our community have been reorienting efforts in many different ways to combat the pandemic. Members of our community have been coming forward to share their experiences of trying to contribute to national efforts in the UK and what they see as learnings from this experience. We draw upon these in our evidence and recommendations.

Our response to this inquiry focusses on the following points in the inquiry's terms of reference:

- *The capacity and capability of the UK research base in providing a response to the outbreak, in terms of the development of:*
 - *testing, diagnostic methods and technologies*
- *The flexibility and agility of institutions, Government departments and public bodies, and processes to respond appropriately during the crisis including*
 - *the availability and responsiveness of funding;*
 - *the optimal functioning of regulatory and ethical processes;*
 - *the availability and influence of scientific advice in all Government departments and public bodies—including by departmental Chief Scientific Advisers; and*
 - *the extent to which decisions taken drew on that advice;*
- *The capacity to manufacture and distribute testing, diagnostics, therapeutics and vaccines:*
 - *both standing capacity and capacity able to be mobilised*

Covid-19 testing capacity in the UK in March and April 2020

The chemical sciences, working in partnership with other disciplines, are a central part of both diagnostic and serological testing responses to manage the Covid-19 pandemic. Many of our members worked to volunteer equipment, reagents, skilled personnel and laboratory space in the early stages of the pandemic. We share some of their experiences of this below.

One researcher we spoke to told us that they first established contact with their local NHS trust in mid-March (before the government call for people to work from home where possible on 16th March). They proffered facilities that were suitable for testing (e.g. category 3 facilities for handling the Covid-19 virus), as well as a curated list of available personnel within their organisation and what these people were able to do in terms of testing. This academic then underwent a process of correspondence with different points of contact in this NHS trust. Throughout this short initial period, the researcher felt that there were some rapid changes of direction in terms of whether or not the trust wanted to use the facilities and personnel on offer, suggesting that the trust itself was unsure of the approach that they should be pursuing to support testing capacity in their hospitals.

At one point in March, the academic was told that the testing capacity they were offering was not needed by the trust, despite the focus at this point shifting towards concentrating testing in hospitals, instead of community testing. However, they were contacted at a similar time by a different contact in the same trust asking about the availability of personnel to support testing - 'even students'. In the end, one post-doctoral researcher from this organisation managed through their own personal contacts to support testing efforts at a hospital. However, the academic reflected that the lack of clarity on a testing approach prior to, and in the early stages of lockdown meant that a huge opportunity was lost in connecting

massive resource in terms of equipment, laboratory space and skilled personnel to support diagnostic testing efforts within hospitals in this trust. Moreover, this person emphasised that the entire senior leadership team of the appropriate part of their organisation had worked to quickly to agree and offer the organisation's available resource and were left dismayed at the lack of willingness on the part of the trusts to accept considerable relevant facilities, help and expertise. What was not clear was whether this trust's lack of engagement with the resource offered was driven by capacity issues in terms of being able to accept and integrate offers of help, or by a strategic decision to not expand diagnostic testing in this way, at the start of lockdown.

Similarly, another researcher contacted us to share their experience of offering equipment and trained staff to support testing efforts. This academic attempted to contact Public Health England (on 17th March) to offer labs and personnel. This was not taken up. At the same time, this researcher was developing a wider research consortium that, in part, would be able to analyse patient samples from those infected to support better understanding of the disease progression and severity. PHE suggested that the researcher contact the Cabinet Office directly with this. The researcher did this. They did not receive a reply and instead worked upon the consortium's proposal in order to make a submission to the UKRI open call for ideas that address COVID-19. This experience is discussed further below.

Detailed guidance on the criteria that organisations had to meet to support diagnostic testing efforts for Covid-19 was published by the Department of Health and Social Care on 9 April.ⁱ This guidance came a few weeks into the lockdown and a number of people that we spoke with in our community had worked to offer their capacity before this point in time. Many researchers were contacting multiple agencies, NHS trusts and government departments in parallel to offer support with no clear sense as to whether a national or local coordination effort was in place. Whilst the national-level guidance from DHSC is welcome, there was a sense amongst researchers that changes in direction on government testing strategy during March may have resulted in national structures and guidance arriving too late. Researchers within our community had tried and failed to link up the available capacity that they had immediately before and during the early stages of lockdown in mid-March and ahead of the point in time that the Prime Minister declared the UK as 'past the peak of this disease' at the end of April.

A cross-cutting issue that seemed to have arisen in the early stages that we heard from many in our community was confusion over localised and centralised responses and which route they should connect with, and when. This affected not just diagnostic testing, but the response more generally. Once centralised calls to action were in place, many in our community signed up to volunteer equipment, reagents, lab space, personnel and PPE, understanding that they should wait to be contacted. Some did not hear back for a long time. Others were contacted by government departments seeking specific types of equipment or reagents. When they could not provide these, but could provide alternatives, these were not considered or taken up in many cases.

At the same time, some were being contacted directly by local NHS trusts and hospitals asking for specific capabilities, suggesting that the centralised system was not delivering quickly enough. For example, we are aware of one university chemistry department that was approached for help by a local hospital. As a result, they are now synthesising and supplying mask testing solutions that are needed for respirators.ⁱⁱ

As an organisation, we also worked with our community to try to connect them as effectively as possible with mechanisms that fed into the pandemic efforts. Like many other organisations, we stand ready to contribute in the future, should the need arise.

Recommendation 1 - There must be lessons learned from the early response to the Covid-19 pandemic, leading to a framework for how government can better implement a coherent national and local diagnostic testing strategy, as part of any future response to a pandemic of this kind.

A common thread that we heard across our community was the challenge of government resource and capacity to coordinate a response. As described above, people became quickly aware of the government efforts to source input and capability from the UK science community and there was a strong desire to help. However, once they began to engage with the structures in place many sensed an absence of appropriately resourced government capability to respond to and coordinate the offers that were coming in, resulting in a lack of effective response to scientists who may have been able to support the overall pandemic response.

Recommendation 2 - Part of the lessons learned should include evaluation of civil service capacity to undertake this level of national and local coordinated response, drawing together UK scientific capacity at such speed. This includes assessing scientific advice mechanisms and/or scientific skills needed at official level to undertake rapid coordination (see recommendation 4 below).

Scientific Advice to support the Covid-19 response

Scientific expertise and advice during the pandemic must be considered in relation to all elements of the government response. Much of the wider discussion on scientific expertise and advice during the pandemic has focussed on the Scientific Advisory Group for Emergencies (SAGE) providing advice to government and how its configuration and sub-groups have operated.

However, scientific advice has a necessary role in operational aspects of the Covid-19 response, including the practicalities of delivering diagnostic testing, not just the development of the strategy behind it. During the pandemic response, the government approach to increasing diagnostic testing capacity has included the necessary urgent procurement of goods and services. It is a situation that has sometimes required the use of parts of the Public Contract Regulations 2015 that enable e.g. direct award due to extreme urgency.ⁱⁱⁱ However, what is less clear is whether and how scientific advice informed decisions relating to the implementation of the wider testing strategy, including procurement.

For example, on procurement in relation to testing, a range of different organisations have won contracts to manage diagnostic testing centres and analysis. Some in our community have observed that it is not clear under which criteria providers were selected and how scientific advice is used in relation to the procurement process, including how it is weighted alongside other factors to make a decision. Whilst any decision in terms of government response must include balancing the urgency of need, scientific advice to support effective operational implementation of testing is as vital as scientific advice supporting the strategy towards overall management of the pandemic response. There is a connection here to the scientific advice garnered through SAGE and its sub-committees. There needs to be an evaluation as to whether the composition of SAGE and its sub-committees sufficiently reflected a broad enough spectrum of entities, so as to include appropriate advice on issues such as procurement, management and logistics of testing.

Recommendation 3 – The government must explain how scientific advice informed relevant operational considerations during the pandemic, including procurement practices.

Some in our community have also raised questions regarding scientific expertise at official level and how this may or may not affect the government response in areas such as procurement. One person reflected that during their experience as a member of a government committee providing advice on infectious diseases several years ago, they felt that there was a greater prevalence of officials with scientific training. This led this person to observe that officials with scientific expertise or training were well placed to understand offers of support from the scientific community or approaches to tackling policy problems using science.

As the Government Office for Science report, ‘Raising our ambition on science’ observes ‘*Internal government science capability remains important in many areas*’.^{iv} The report goes on to recommend that ‘*The Government Science and Engineering (GSE) Profession Board should work with the Analysis Function Board to ensure that the civil service as a whole has the scientific skills it needs and the mechanisms to deploy them effectively through the wider civil service functional agenda being led by the Cabinet Office. Plans should be developed to remedy any shortages (working with UKRI and the Department for Education where appropriate), reporting early in 2020*’.^v

Recommendation 4 – The government should provide regular progress updates on the recommendations in ‘Raising our ambition on science’ by the Government Office for Science. Particular attention should be paid to progress made against the recommendation ‘to ensure that the civil service as a whole has the scientific skills it needs and the mechanisms to deploy them effectively through the wider civil service functional agenda’. The government response to the pandemic has shown a renewed urgent need to prioritise ways to ensure that the civil service has the scientific skills that it needs.

Availability and responsiveness of research funding

As part of the response to Covid-19, urgent funding streams have been made available to expedite rapid research relating to the disease. Whilst the development of rapid response streams of funding is positive, some of the experiences of our community suggest that there are learnings regarding the set-up of these schemes. We have heard about delays to assessing proposals that are time sensitive and a feeling that there is a lack of transparency over the criteria against which proposals are being assessed.

In particular, the UKRI open call for ideas that address COVID-19 has attracted huge amounts of attention across the scientific community.^{vi} Launched at the end of March, this rolling call invites proposals for short-term projects addressing and mitigating the health, social, economic, cultural and environmental impacts of the COVID-19 outbreak. UKRI reflected recently that as the call had been set up it was ‘*significantly streamlined to allow UKRI to quickly identify projects needing urgent funding. Peer reviewers and panel members stepped up to ensure rapid turnaround of reviews often within days rather than months...*’^{vii}

One researcher in our community that submitted a proposal to this call shared their experience to date with us. Their proposal brought together a consortium of UK researchers that would be able to analyse

samples from Covid-19 patients to better understand the progression of the disease and levels of severity.

The researcher that we spoke with submitted their proposal at the start of May. As part of the work of this consortium, they had rapidly managed to gather hundreds of patient samples that could be readily used in the analysis they proposed, providing that they received the outcome of their application (and that it was positive) quickly. They received reviewers' comments in early June that they addressed within 4 days (2 working days). By the first week in July, the researcher had still not received an outcome on the proposal. After chasing further, the researcher was approached by research council staff to discuss their application. The discussion focused on links with research programmes that had been funded to date already. Despite the fact that the original application covered some of these connections, the researcher worked to pull together further information to answer these further points within 48 hours. One of the things that they reflected on was their sense that there were further criteria for proposals being submitted to this scheme that were being assessed later in the process – i.e. a sense that there was a higher bar being set for those who had taken time to build proposals and ensure that they could work quickly if awarded funding, compared to those who had submitted more speculative bids earlier on the process.

Research Professional News reported that by 10 June UKRI '*had received a total of 1,410 proposals, 100 of which were out of scope; 503 have so far been rejected and 720 are currently in review*'.^{viii} At that point, 87 bids had been funded. On 13 July (after the discussion with the aforementioned researcher), UKRI confirmed publicly that its approach to this call was changing and that they would be '*moving to a new way of managing proposals to its Covid-19 open call*' and that rapid review would only be used for '*highly urgent*' proposals, with the aim that assessment '*from application submission to panel decision will be around six weeks*'.^{ix} At the time of speaking to the researcher above (mid-July), they still had not received an outcome on their application, 10 weeks after submission, despite holding patient samples across the country that are ready for urgent analysis.

Recommendation 5 – UKRI should outline what criteria they used to identify 'urgent' or 'highly urgent' proposals, including how this was informed by discussions with government relating to the ongoing management of the Covid-19 pandemic.

Recommendation 6 – UKRI should publish data on the time taken for the assessment of proposals (from application submission to panel decision) submitted to its open call on Covid-19. This, alongside other evidence, should be used to evaluate the scheme. Whilst there is much to be commended in UKRI's rapid response to the research challenges that Covid-19 presents, there will be lessons that can be learned on how to design and manage such schemes effectively in a time of huge live challenge.

The role of different sectors in a long-term scientific response

In the chemical sciences space, small and medium enterprises (SMEs) comprise a significant portion of the private sector. In terms of capacity to be mobilised as part of the efforts against the pandemic, the experiences of some of the SMEs in our community point to, in some cases, a unique ability to be able to respond quickly due to their nature and size. Early on in the pandemic, many micro or pre-profit companies faced stark challenges in terms of survival. However, we also knew of many SMEs in our community that were able to contribute to the Covid-19 response very quickly. Many of these companies started life as university spin-outs and feature a strong R&D component as part of their business,

alongside staff with specialist scientific knowledge and skills. They are established companies (i.e. in operation for > 5 years). As such, they may have a proven technology or stable R&D capacity (infrastructure and workforce) that can contribute to the pandemic efforts. Moreover, their size means that they are agile enough for decisions to be made rapidly on reorienting the business' efforts. Some reoriented to produce PPE; others were working in the areas of diagnostics and therapeutics.

A point to consider here in the context of a the long-term response to the Covid-19 pandemic is that the way that drug and vaccine discovery is carried out, part of the wider pharmaceutical sector, has changed significantly in the last 20 years. Whilst there are still a number of large multinational companies working in this space, overall the sector has seen greater fragmentation and increased prominence of SMEs, including those that undertake contract research.

In modern drug discovery, it is now highly common for large multinationals to work with or procure services of SMEs for specific purposes throughout the discovery, development and testing process for new therapeutics. For example, we know of SMEs that are working on enabling technologies that are critical to drug or vaccine delivery. Equally, other SMEs are working on technologies that can help in managing the ongoing Covid-19 response. For example, those working on improved point-of-care testing technologies (which could prove vital in a second wave) or anti-viral coatings that can be used towards controlling the transmission of the virus in high-risk settings.

As the Covid-19 pandemic continues, it is vital to understand that the twin goals of effective pandemic management and developing a vaccine will need those in SMEs, working alongside those in academia and large pharmaceutical businesses. This links to the wider issue of economic impacts during the coming months and year. Whilst the government has instituted schemes to support SMEs during the initial phases of the pandemic, continual monitoring of SMEs to understand their evolving situation needs to be part of the longer-term strategy of building a scientific community in the UK that has the capacity and resilience to respond to pandemics.

Recommendation 7 – The government should continue to monitor the evolving situation and needs of SMEs as the pandemic progresses and work with the community to develop any further policy initiatives that may be needed. The government must remember that a long-term scientific solution to the Covid-19 pandemic, and future pandemics more widely, will need a range of actors working together, including SMEs who are particularly vulnerable.

About us

With about 50,000 members in over 100 countries and a knowledge business that spans the globe, the Royal Society of Chemistry is the UK's professional body for chemical scientists, supporting and representing our members and bringing together chemical scientists from all over the world.

The Royal Society of Chemistry would be happy to discuss any of the issues raised in our statement in more detail. Any questions should be directed to policy@rsc.org.

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- ⁱ [Guidance for organisations seeking to support the COVID 19 Testing Programme](#), Department of Health and Social Care, April 2020
- ⁱⁱ [ChemVsCOVID: Mask testing spray shortage prompts call for assistance](#), Royal Society of Chemistry, May 2020
- ⁱⁱⁱ [Procurement Policy Note - Responding to COVID-19](#), Cabinet Office, March 2020
- ^{iv} [Realising our ambition through science, a review of Government Science Capability](#), Government Office for Science, November 2019
- ^v *ibid*
- ^{vi} <https://www.ukri.org/funding/funding-opportunities/ukri-open-call-for-research-and-innovation-ideas-to-address-covid-19/> - last accessed on 28 July 2020
- ^{vii} <https://www.ukri.org/news/ukri-to-switch-over-its-covid-19-open-call-to-jes-and-ifs/> - last accessed on 28 July
- ^{viii} [UKRI Covid rolling call funds 87 out of 1,410 applications so far](#), Research Professional News, June 2020 (paywalled access)
- ^{ix} <https://www.ukri.org/news/ukri-to-switch-over-its-covid-19-open-call-to-jes-and-ifs/> - last accessed on 28 July