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Summary

- The Academy has been impressed with the rapid response to the COVID-19 pandemic by the UK research community.
- The UK life sciences sector is at the forefront of research and innovation and represents a huge strength of our nation towards driving medical research advancements.
- As recognised in the R&D roadmap, the UK's life sciences sector has an important role in supporting economic growth and the employment of a highly skilled workforce that promote the translation of health and wealth benefits.
- The UK's Medical Research eco-system has been heavily impacted as a result of the COVID-19 pandemic and it is crucial that the life sciences sector is maintained in order to uphold economic benefit.
- Tailored support across the life sciences sector is required to enable the UK research base to continue to deliver economic and societal benefit and contribute towards the economic recovery from COVID-19.

Introduction

1. The Academy of Medical Sciences is the independent body in the UK representing the diversity of medical science. Our mission is to promote medical science and its translation into benefits for society. The Academy's elected Fellows are the UK's leading medical scientists from hospitals, academia, industry and the public service. We work with them to promote excellence, influence policy to improve health and wealth, nurture the next generation of medical researchers, link academia, industry and the NHS, seize international opportunities and encourage dialogue about the medical sciences.
2. As the UK continues to respond and adapt to the evolving coronavirus pandemic, we continue to support the UK's life sciences community. The Academy strongly supports the Science and Technology Committee's aim to identify the provisions that are required by the life sciences sector and how technology, research and innovation can support an economic recovery from COVID-19. The following response draws on the expertise of the Academy's Fellowship as well as drawing upon key findings from previous Academy publications and other reports.

The role of technology, research and innovation in the response to, and recovery from, COVID-19*UK response to the COVID-19 pandemic*

3. The Academy has been impressed with the rapid response to the COVID-19 pandemic by the UK life sciences sector. The scientific community has made important contributions within research and development, including understanding the biology of SARS-CoV-2 and the implementation of modelling strategies.¹ Advancements in vaccine development through a coordinated and collaborative approach have seen the swift progression through

¹ UKRI (2020). *UKRI Coronavirus Hub*. <https://www.ukri.org/research/coronavirus/>

to the clinical evaluation of potential vaccine candidates.² The rapid redirection of resources towards COVID-19 research and prioritisation within our healthcare system has been possible due to our long-term investment in the life sciences sector.³

COVID-19 research and input towards an economic recovery

4. The continuation of the UK's research efforts towards vaccine development and drug discovery are vital for supporting an economic recovery. These scientific contributions are critical for getting the economy moving again and support for research and innovation is essential to this. The UK has seen considerable progress in vaccine development and the identification of existing drugs that demonstrate patient benefit, such as dexamethasone from the Recovery trial.^{4,5} In the absence of a vaccine, the continued spread/resurgence of SARS-CoV-2 infection provides a barrier to an economic recovery. Such circumstances emphasise the important role of UK research and innovation in the mitigation of risk of COVID-19 whilst we live alongside the virus.

The role of technology, research and innovation in supporting economic growth

5. The UK is at the forefront of research and innovation in the life sciences sector and continues to drive medical research advancements. As a global leader, the UK was named as the most productive science base amongst the G7, demonstrating the significant contributions the UK has made.³ In 2019, the UK was ranked 5th in the Global Innovation Index as well as within the top ten economies for Innovation Input and Output sub-indexes.⁶
6. Such contributions towards research and innovation are key for promoting economic development. A 2018 report commissioned by the Academy of Medical Sciences, Arthritis Research UK, the National Institute for Health Research, the Medical Research Council and Wellcome demonstrated that every £1.00 invested in medical research delivers a return of 25p every year in perpetuity.⁷ In 2019, the UK Life Sciences industry employed over 256,000 people across 6,300 businesses with an annual turnover of £80.7 billion.⁸ These strengths demonstrate the important role of medical research in creating jobs and economic returns to the UK economy and can drive an economic recovery. However, the sector will require support in order to be able to deliver these benefits.

Health and wealth of the UK

7. Life sciences research and its applications present a strong platform that can be translated into health and wealth benefits in the UK. The continued investment in UK research and development can contribute towards generating substantial economic return as well as improving public health and preventing disease. Current and future public health challenges within the UK can be addressed by life science research to help combat the

² World Health Organisation (2020). *Draft landscape of COVID-19 candidate vaccines*.

<https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines>

³ Department for International Trade (2020). *Healthcare and life sciences*.

<https://www.great.gov.uk/international/content/about-uk/industries/health-and-life-sciences/>

⁴ Nuffield Department of Population Health (2020). *RECOVERY trial*. <https://www.recoverytrial.net/>

⁵ University of Oxford (2020) *Dexamethasone reduces death in hospitalised patients with severe respiratory complications of COVID-19*. <https://www.ox.ac.uk/news/2020-06-16-dexamethasone-reduces-death-hospitalised-patients-severe-respiratory-complications>

⁶ Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO) (2020) *The Global Innovation Index 2019: Creating Healthy Lives—The Future of Medical Innovation*.

https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2019.pdf

⁷ Academy of Medical Sciences (2020) *Medical Research: What's it worth?* <https://acmedsci.ac.uk/file-download/54792223>

⁸ Office for Life Science (2019) *Bioscience and Health technology Sector Statistics 2019*.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/910439/Bioscience_and_Health_Technology_Statistics_2019_Infographic_-_Life_Sciences.pdf

economic and health burdens associated with ill-health. The importance of maintaining a strong and sustainable research landscape to promote health and wealth in the UK has been addressed in the 'Improving the health of the public by 2040' report by the Academy.⁹

R&D Roadmap

8. The UK R&D sector has a vital role in our national response to the pandemic as well as for our economic and societal recovery. As part of the UK R&D Roadmap, a commitment to increase UK investment in R&D to 2.4% of GDP by 2027 has been pledged.¹⁰ This commitment is critical to the UK's economic and social recovery whilst also helping to maintain its status as a global leader for the life sciences. The Academy welcomes the ambitious long-term objectives set out in the UK R&D Roadmap which will help to support the science and research that will drive economic growth and benefits to society.¹¹
9. A national effort towards the rapid response to the COVID-19 pandemic has been essential and the continued support to drive economic growth across the UK is vital. The UKRI Strength in Places Fund and proposed R&D Place-based strategy demonstrate the need to provide specific support research and innovation in specific areas.

Health of the system

10. The medical research eco-system in the UK spans academia, industry, the NHS and medical research charities. Maintaining the health and balance of this eco-system is vital to uphold economic benefit of R&D. However, many parts of the sector have been heavily impacted by the COVID-19 pandemic and will require tailored support to recover and play their full role in an economic recovery as covered in more detail below.

Medical research charity sector

11. Medical research charities play a critical role in the UK's research sector. The Association of Medical Research Charities (AMRC) is a national membership organisation comprised of the leading UK based medical and health research charities. AMRC charities invested £1.9 billion towards UK medical research during 2019, totalling more than £14 billion investment since 2008. On a national level, investment from AMRC charities accounted for half of public funding in medical research in 2019.¹²
12. UK universities are the principal site for the majority of research funded by these charities, with 87% of funding by AMRC members allocated to UK universities. This equates to an investment of nearly £12 billion in UK universities from medical research charities since 2008.¹³ It is important to recognise the additional contributions from medical research charities towards funding outside of UK universities such as for non-commercial research in

⁹ Academy of Medical Sciences (2016). *Improving the health of the public by 2040*. <https://acmedsci.ac.uk/file-download/41399-5807581429f81.pdf>

¹⁰HM Government (2020). *UK Research and Development Roadmap*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/896799/UK_Research_and_Development_Roadmap.pdf

¹¹ Academy of Medical Sciences (2020). *UK Government's R&D Roadmap: President's response*. <https://acmedsci.ac.uk/more/news/uk-governments-rd-roadmap-presidents-response>

¹² Association of Medical Research Charities (2020). *Government must act now to save charity research*. <https://www.amrc.org.uk/Handlers/Download.ashx?IDMF=c8e1f0b1-8dce-421d-9717-2c5237f34188>

¹³ Association of Medical Research Charities (2020). *Position statement on supporting research in universities*. <https://www.amrc.org.uk/position-statement-on-supporting-research-in-universities>

the NHS, capital projects, activities including education, welfare, support and care as well as overseas research.^{14,15}

13. Aside from financial resources, the medical research charities provide a unique and valuable role to focus specific research efforts on unmet needs including rare conditions and patient priorities. Medical research charities also offer essential contributions towards driving innovative collaborations with key partners, de-risk complex research fields to support additional funding and facilitate outputs, offer an important interface between medical research and the general public, and training for the next generation of medical researchers.
14. The COVID-19 pandemic has caused a significant financial impact on the UK medical research charity sector where substantial reductions in research funding have been predicted.¹⁶ With a collapse in the income from charity fundraising and the subsequent cost of delayed research activity, the pandemic has caused a considerable financial deficit. AMRC has reported that their members have seen a 38% loss in fundraising revenue. As a result, AMRC members expect that their research charity investment in medical research and development will fall by £310 million in FY20/21.¹⁷
15. To enable medical research charities to continue to provide their vital role both towards the UK's research sector and through patient support services, they must have the resources necessary to account for this. Such solutions must be tailored to support the medical research charity sector for both the immediate and long-term future. The contribution of the medical research charities is essential to achieving the ambitious objectives set out in the UK's R&D Roadmap.
16. The announcement for a £750 million fund towards frontline charities is a valuable contribution towards supporting the continuation of vital service provisions in this sector. However, medical research charities are not eligible for support from this package and so it is vital that they receive tailored support to continue their role to support the UK life sciences.

UK universities

17. UK universities are a hub for academic excellence and high-quality research outputs. The financial shortfall in medical research charity funding as well as the continued delays in ongoing research projects have caused significant impacts to the academic landscape. The potential loss of income through cross-subsidies and international tuition fees may further contribute to this.
18. Academic institutions provide a reputable and productive platform for conducting high-quality research that contributes towards the UK's reputation as a life sciences leader. Research progress has been severely impacted as a result of the pandemic. The availability of the University Research Support Package announced in June 2020 has gone some way to mitigating the immediate impacts, by providing up to £280 million to enable universities

¹⁴ Association of Medical Research Charities (2018). *AMRC's proposals for research and innovation in the NHS to inform NHS England's Long-Term Plan*. <https://www.amrc.org.uk/news/amrcs-proposals-for-research-and-innovation-in-the-nhs-to-inform-nhs-englands-long-term-plan>

¹⁵ Association of Medical Research Charities (2020). *UK medical research charity sector data*. <https://www.amrc.org.uk/pages/category/summary>

¹⁶ Association of Medical Research Charities (2020). *COVID-19: The risk to medical research charities*. <https://www.amrc.org.uk/Handlers/Download.ashx?IDMF=359e3762-05ee-46fa-90ed-c7169a925a33>

¹⁷ Association of Medical Research Charities (2020). *COVID-19: The risk to AMRC charities*. <https://www.amrc.org.uk/Handlers/Download.ashx?IDMF=3916cef3-3f16-437e-9cb7-7dbcbd5c0c33>

to continue their research activities and to protect the jobs of the talented researchers they employ.¹⁸

19. However, sustaining and supporting HEIs to act as partners in the long-term ambitions displayed by this Government will be critical to maximising the impact of public investment. Ongoing availability of Quality-related research (QR) funding, which empowers Universities to make strategic decisions about investing in talent and infrastructure will be an important part of this sustainability, particularly given this source of funding has seen a real terms decline in recent years.¹⁹

The future of medical research and sustainability of workforce

20. On 15 July 2020, the Academy hosted a virtual meeting for the biomedical research sector to discuss the mid- to longterm impact of COVID-19 on medical research careers and a full report will be published shortly.²⁰ During this workshop, concerns were raised over the impact of delays to research and the consequences this may have on the future careers of researchers. Attendees reported a significant impact to early career researchers (ECRs) and those at transition stages in their careers. The preservation of our highly skilled workforce is critical to meet the ambitions laid out in the R&D roadmap and support a strong future for medical research in the UK.

Clinical research activity

21. The UK's strength in clinical research has contributed significantly towards vaccine development and drug discovery approaches in response to the COVID-19 pandemic. Despite such outstanding advances, clinical research activity for non-COVID-19 related studies have been delayed. An overwhelming 70% of clinical trials funded by medical research charities have been paused or prematurely ended, with around 126,000 patients unable to start or continue their research trial. Without additional support, these charity-funded trials face the risk of being unable to restart.²¹ As included in the NIHR Restart Framework, it is crucial that the support for a research-active NHS continues in order to support the delivery of high-impact and important clinical research.²²

Support for clinical research infrastructure

22. The NHS has made valuable research contributions towards the UK's response to the pandemic, highlighted through the Recovery trial. To sustain the UK's position at the forefront of life sciences, recognition of the value of clinical research and subsequent investment is essential. The high demands of the COVID-19 pandemic on the NHS have required the support of clinical researchers to prioritise time in the clinic. To continue to drive the benefits from clinical research, it is important that clinical staff have allocated time that can be protected and dedicated towards focusing on their research. The importance of a strong NHS-academia interface, included the importance of protected time for research, has recently been explored in the Academy report 'Transforming health

¹⁸ Department for Business, Energy & Industrial Strategy (2020) *Government to protect UK research jobs with major support package*. <https://www.gov.uk/government/news/government-to-protect-uk-research-jobs-with-major-support-package>

¹⁹ Campaign for Science and Engineering (2018). *Written evidence submitted by the Campaign for Science and Engineering*. <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/balance-and-effectiveness-of-research-and-innovation-spending/written/90739.pdf>

²⁰ Academy of Medical Sciences (2020). *COVID and careers: what does the future hold?* <https://acmedsci.ac.uk/more/news/covid-and-careers-what-does-the-future-hold>

²¹ Association of Medical Research Charities (2020). *Submission to Select Committee on Culture, Media and Sport inquiry on the impact of COVID-19 on the charity sector, 15 April*. <https://committees.parliament.uk/writtenevidence/1719/pdf/>

²² National Institute for Health Research (2020). *A framework for restarting NIHR research activities which have been paused due to COVID-19*. <https://www.nihr.ac.uk/documents/restart-framework/24886>

through innovation: Integrating the NHS and academia'.²³

Measures adopted by Government to support research and innovation

23. As previously outlined, to support an economic recovery, it is important that the UK life sciences sector is supported to deliver the economic benefits associated with investing in the research base.

Headwinds for the medical research sector

Brexit

24. The ability of UK R&D to contribute to economic recovery will also depend on the overall health of the system, which will in turn be impacted by other factors, including the terms of the UK's departure from the EU and association to Horizon Europe. The Academy strongly supports the UK's ambition of working towards a full association to Horizon Europe. We welcome the position taken in the R&D Roadmap, that states if the UK does not associate with Horizon Europe, funds for UK partners to participate in European schemes will be available.¹⁰ In addition, the announcement of the UK Shared Prosperity Fund is due to replace that of the previous structural funding provided by the EU.²⁴ Such schemes would offer support to the life sciences sector in the UK to be in a position to continue to drive economic and social benefit.

Attracting investment and workforce to the UK life sciences research base

25. To support an economic recovery from COVID-19 and retain its status as a global leader of life sciences, it is essential that the UK research sector continues to attract national and international investment. Contributions from direct foreign investment and hosting commercial clinical research within the UK will help to support research and development. As evidenced by the global response to the global pandemic, there is huge value in maintaining international collaborations to facilitate access to existing platforms and continue to drive these partnerships.
26. The highly skilled workforce of the UK is a critical component for the success driven within the life sciences sector and it is important that we retain our current workforce and also continue to attract new talent from within the UK and beyond. The Office for Talent and Global Talent Visa reform will help maintain the status of the UK as an attractive destination for life sciences research and innovation.

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²³ Academy of Medical Sciences (2020). *Transforming health through innovation: Integrating the NHS and academia*. <https://acmedsci.ac.uk/file-download/23932583>

²⁴ House of Commons Library (2020). *The UK Shared Prosperity Fund*. <https://commonslibrary.parliament.uk/research-briefings/cbp-8527/>

