

Science and Technology Committee: The Science of COVID-19

Submission by the Society for Applied Microbiology

Introduction

1. The Society for Applied Microbiology's response draws upon evidence from members from all fields of microbiology, to highlight areas that will enable better preparation for future epidemics.

Virology and Research Needs

2. Based on previous emerging infectious disease outbreaks (e.g. HIV, Ebola), it is highly likely that an animal will be the source of the next pandemic. To implement effective outbreak prevention measures, there needs to be more research on pathogen ecology. While much is known about pathogen: host interactions, more information is needed on the ecology of infectious diseases such as where pathogens are and how they are evolving.

Epidemiology, modelling and testing

3. Early and widespread testing is vital for developing safe responses because such testing determines the rate of transmission, the groups within the population who are responsible for transmission (whether symptomatic or asymptomatic) and identifies mortality trends. Test data provides the scientific evidence that validates the predictions of mathematical models and underpins policy decisions (e.g. who to immunise first to maximise the impact of vaccination).
4. It is also crucial that testing is not limited to viral RNA testing but also anti-viral antibodies. PCR tests identify if a person currently has the virus, ensuring isolation measures are effective. Antibody assays identify those persons who have been infected, which provides additional information on infection rates and epidemiology, and, more importantly, on probable population immunity that is needed to inform policy for easing lockdown measures. Confirming if someone has mounted a protective antibody response may also inform vaccine development and antibody therapy approaches.¹
5. During the current outbreak, due to limited supplies of swab testing, most swab tests have been directed to the NHS frontline as part of a centralised procurement of PPE. While this testing is essential for reducing the spread of infection via frontline carers, this has meant that most evidence gathering, particularly COVID-19 research, has been limited and delayed. Without diverse and adequate testing, it is difficult to develop vaccinations and therapies as well as assess asymptomatic carriers, and if the presence of antibodies indicates immunity and how long that immunity lasts.
6. As early testing is critical, it is imperative that strategies for future pandemics include a means to rapidly scale up testing. At the onset of the outbreak, many facilities (whose research programmes were suspended) could have contributed to testing but did not, due to unclear infrastructure and plans.

¹ Professor Kenneth Timmis, The COVID -19 pandemic: some lessons learned about crisis preparedness and management, and the need for international benchmarking to reduce deficits. *Environmental Microbiology*, 22: June 2020. <https://doi.org/10.1111/1462-2920.15029>.

Vaccines and treatments

7. The WHO has been warning for many years of the potential for a new pandemic, so-called Disease-X. However, only a few select philanthropic organisations, such as the Gates Foundation, currently fund the early search and development of vaccines because industrial organisations require profitable returns. To ensure adequate preparation of vaccination production for future outbreaks, the pharmaceutical industry will need to be incentivised to develop vaccines and antibiotics at an earlier stage of research.
8. Likewise, the UK has for many years relied on imported vaccines for its immunisation programme (apart from the vaccine Fluenz (AstraZeneca). This means that when a vaccination becomes available, the UK will not have the capacity to produce the large quantities of vaccines required and will rely on importing, which may be delayed and in shortage due to lockdowns in the global supply chain.

About the Society for Applied Microbiology

The Society for Applied Microbiology (SfAM) is the oldest microbiology society in the UK, representing a global scientific community that is passionate about the application of microbiology for the benefit of the public. Our members work to address issues spanning the environment, human and animal health, agriculture and industry. www.sfam.org.uk

June 2020