

Written evidence submitted by the Optimising Coronavirus Testing Systems (OCTS) project (EMD0054)

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The OCTS project was undertaken by a multi-disciplinary group of researchers, including clinicians, natural scientists and social scientists, to provide a detailed comparison of the testing systems of eight countries during the acute phase of the Covid-19 pandemic.

Summary

- Our research evaluated the impact of Test, Trace and Isolate (TTI) systems of eight countries on excess mortality in order to determine the utility of largescale TTI systems in combating a severe pandemic.
- We found that TTI systems worked to reduce excess deaths.
- TTI systems remain one of the key capabilities to mitigate the effects of future pandemics and their improvement is of paramount importance.

Scope of evidence provided

1. We report new findings from a quantitative analysis of Test, Trace, and Isolate (TTI) systems in eight study countries, comprising the four devolved nations of the UK as well as Australia, Canada, Germany, Ireland, Spain, South Africa, and South Korea.
2. The focus of our research addresses two areas from the call for evidence:
 - How the government is applying lessons from the Covid-19 pandemic in the area of testing capacity and approach
 - The extent of UK preparedness for an emerging disease outbreak with pandemic potential, and how this could be enhanced.

How the Government is applying lessons from the Covid-19 pandemic in the area of testing capacity and approach

3. PCR-based TTI systems were widely adopted internationally as a way to mitigate the spread of infection, illness and deaths from Covid-19. The World Health Organization encouraged countries to “Test. Test. Test” (WHO 16/3/2020) and investments were made in TTI systems to conduct community testing on an unprecedented scale and at great expense.
4. The impact of these systems has been contentious, in particular because of the high costs of testing (e.g. as suggested by [the Public Accounts Committee](#)). In order to establish the performance of TTI systems, the OCTS project team undertook a longitudinal statistical analysis

of key measures to determine their influence on excess deaths - a measure that relates strongly to Covid-19 mortality and also reflects the impacts of pandemic stress in other areas (such as hampering the day-to-day running of health services). The study compared the testing rate and other TTI measures implemented in eight countries between March 2020 and May 2022.

5. The findings are based on quantitative analysis of data gathered from public databases including Our World In Data and the World Mortality Dataset. We report an average impact over the study period, although the actual impact of testing is likely to have varied over time and across countries.
6. We observed that **an increase of 1% in tests undertaken per 100 people per week was associated with a decline of 2.19 excess deaths per million people three weeks later**. The decline in deaths is likely to have been mediated by official contact tracing and isolation efforts, as well as changes in behaviour and informal communication efforts by positive cases and their networks after receiving test results.
7. A related finding was the positive relationship between excess mortality and test positivity rate. **A 1% increase in the weekly SARS-COV-2 test positivity rate was associated with one additional excess death per million per week**. The positivity rate is composed of two metrics – (a) the number of positive tests and (b) the number of tests performed. An increase in positivity rate provides some indication of the capacity of the TTI system relative to the scale of local infections. It demonstrates either a high burden of Covid-19 or limited testing capacity. As government policies can control only the rate of testing and not the number of positive tests, providing a high capacity for testing and efficient test delivery is critical to ensuring reductions in the positivity rate, which is correlated with levels of excess mortality.

Recommendations on testing capacity and approach

8. *High testing capacity should be maintained, ready to be scaled-up quickly and bring the test positivity rate down as fast as possible in order for TTI systems to work efficiently.*
9. *Similarly, governments should be able to scale down the systems in a timely manner in order to preserve resources and human capital.*

The extent of UK preparedness for an emerging disease outbreak with pandemic potential, and how this could be enhanced

10. Our research observes that delivering high rates of testing has a measurable impact on reducing excess deaths, even in the context of a widely disseminated virus. These effects may be further enhanced by the specific design of TTI systems. However insufficiently granular data was available in this study to demonstrate the impacts of different system designs.
11. The UK's future pandemic preparedness frameworks should recognise the importance of maintaining high PCR testing capacity, which our findings show can reduce excess mortality as well as Covid-19 mortality.
12. Prior statistical models used to evaluate the UK's NHS Test and Trace system included [the Rùm model](#), which focused on the influence of adherence to guidance on the self-isolation. The updated [Canna model](#) provided a high-level model of the whole testing system, with positive PCR cases as one aspect. The [DHSC's independent report](#) chapter on testing recognises the difficulties in assessing the impact of testing specifically, although noting that it is vital for surveillance and prompting isolation.

13. Our analysis complements these evaluations by measuring the impact of testing, and a wider range of measures, such as vaccination, on excess deaths.

Recommendations on enhancing UK preparedness

14. *Pandemic preparedness plans should prioritise high-capacity testing systems and consider the lagged impact on excess deaths as a complementary model to those used by DHSC or UKHSA previously.*
15. *Explicit plans for utilising testing capacity should be prepared.*
16. *Further research on improving the quality and efficiency of TTI systems should be used to advise on the design of these systems.*

Further information

17. OCTS was funded by the Economic and Social Research Council, through UKRI's Covid-19 programme (Website: www.octs.info; Grant reference: ES/W00156X/1), and led by Professor Michael Hopkins (University of Sussex Business School).

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