Modelling of hypothetical SARS-CoV-2 point-of-care tests on admission to hospital from A&E: rapid cost-effectiveness analysis

Matt Stevenson,[1*] Andrew Metry[1] and Michael Messenger[2,3]

[1]School of Health and Related Research (ScHARR), University of Sheffield, Sheffield, UK
[2]Leeds Institute of Health Sciences, University of Leeds, Leeds, UK
[3]NIHR Leeds Medtech and In Vitro Diagnostics Co-operative, Leeds, UK

*Corresponding author m.d.stevenson@sheffield.ac.uk

Declared competing interests of authors: Matt Stevenson reports that he is part of a team that has received funding from Roche Diagnostics (Basel, Switzerland) in the area of biomarkers following head trauma. Michael Messenger reports that he has been a paid expert advisor to Cepheid, Inc. (Sunnyvale, CA, USA) on the development of their cancer test portfolio; he is a partner of Roche Diagnostics, with current collaborations in the field of early cancer detection and diagnosis; he is a partner of SomaLogic, Inc. (Boulder, CO, USA), with current collaborations in the field of personalised health management of pre-diabetes; that he has received in-kind co-funding from Abbott Laboratories (Chicago, IL, USA) on a kidney research project; that Siemens Healthineers (Erlangen, Germany) holds the pathology contract for Leeds Teaching Hospitals NHS Trust where he holds an honorary contract of employment; and that Avacta Life Sciences Limited (Wetherby, UK) is a spin-out company of the University of Leeds. All of these companies listed are working in the field of COVID-19 diagnostics. Furthermore, Michael Messenger is, or has been, a paid expert advisor to the European Union, including for COVID-19 therapeutics and diagnostics, a seconded scientific advisor to the UK Department of Health and Social Care to support the COVID-19 testing programme and a member of the UK Government Scientific Advisory Group for Testing.

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Plain English summary

SARS-CoV-2 POCTs on admission to A&E

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Plain English summary

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the virus that causes coronavirus disease 2019 (COVID-19). SARS-CoV-2 is highly infectious, and this can cause problems in hospitals, where the virus can spread quickly. Laboratory-based tests can determine whether or not a patient has SARS-CoV-2, but these tests are not perfect and can require a considerable time to provide a result. Point-of-care tests to detect SARS-CoV-2 are being developed that may have much shorter times to a test result, although these are likely to be less accurate than laboratory-based tests. The benefit of quicker tests is that a decision to put a patient in a SARS-CoV-2-infected bay or in a non-SARS-CoV-2-infected bay can be made sooner, limiting contact between patients with SARS-CoV-2 and patients without SARS-CoV-2 and reducing the risk of infection transmission. The disadvantage of reduced accuracy is that some patients may be allocated to the wrong bay, increasing the risk of SARS-CoV-2 infection.

A computer model was built to explore the impact of using SARS-CoV-2 point-of-care tests for people admitted to hospital. This model estimated the number of infections and deaths due to COVID-19, the costs of testing, and the number of people waiting to be put in an appropriate bay. Strategies were run using different values, including the time to get a test result, the accuracy of tests and whether or not staff who do not have symptoms should be tested. The results of the model indicated that point-of-care tests could be good if there was a large reduction in the time to get a test result and if accuracy was high. However, it is not certain whether or not such tests will become available. When newer SARS-CoV-2 tests are available, the model will allow an estimate of the clinical effectiveness and cost-effectiveness of the test to be made.

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This report

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