Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Rapid tests for quantification of infectiousness are urgently required in patients with COVID-19

Muge Cevik and colleagues[1] report that for SARS-CoV-2, no study was able to culture live virus from any respiratory samples taken after day 8 or beyond day 9 of symptoms, despite persistently high viral RNA loads.[1] This is a striking finding because, unlike SARS-CoV and MERS-CoV, for which symptom severity correlates to infectiousness, most patients with COVID-19 continue to have worsening symptoms beyond day 9, but might become progressively less infectious.[2,3]

We would like to make two comments about this study.[1] First, none of the 11 studies that attempted to isolate live SARS-CoV-2 in this data synthesis included patients who were severely immunosuppressed. There is emerging evidence showing long-term SARS-CoV-2 culture positivity in this specific cohort (up to 119 days after symptom onset; table), with emergence of mutations that are identical to those found in the South African B.1.351, Brazilian P.1, and Kent B.1.1.7 variants.[4-8] Increased vigilance is needed to protect immunosuppressed individuals, as well as their close contacts, from being infected.

Second, the authors mention in their discussion that repeat RNA PCR testing in clinical practice might not be indicated to classify patients as no longer infectious. We strongly agree with this statement. Current National Institute for Health and Care Excellence guidance suggests that patients with COVID-19 awaiting an urgent operation can have the procedure postponed if they have a recent positive PCR test.[9] Some countries also require passengers from the UK to have a negative PCR test before flying.[10] We would recommend modifying such criteria to state that patients who have recovered from COVID-19 can have an operation or fly 10 days after their first positive swab, or 10 days after clear symptom onset, with exceptions for those who had severe symptoms or are heavily immunosuppressed. This guidance will require further updating as the evidence evolves, as has been done with the recent removal of repeat testing for hospitalised patients with COVID-19 before discharge to long-term care facilities in December, 2020.[11,12]

Future studies should focus on simpler and faster methods of quantifying the infectiousness of an individual with COVID-19 beyond viral cultures, which are labour intensive and require laboratory facilities with high biosafety levels (ie, category 3 or biosafety level 3 facilities), and for which a cytopathic effect can take 3–6 days to be observed. Cycle threshold values that indirectly provide a quantitative PCR value are not interchangeable between assays, and can be affected by the gene target or targets being assayed, the nucleic acid extraction system, and the PCR amplification biochemistry. One possible strategy could be to sample virus from exhaled breath rather than the nasopharyngeal tract using specialised matrices embedded within facemasks.[13] The rapid identification of infectious individuals in the community, as well as in hospitals, will be crucial for effective contact tracing of future respiratory virus outbreaks with pandemic potential.

	Type of immunosuppression	Duration of positive quantitative RT-PCR or NAAT, days	Duration of positive culture, days
Avanzato et al (2020)[4]	One patient with chronic lymphocytic leukaemia and acquired hypogammaglobulinaemia	105	70
Decker et al (2020)[5]	One patient who had a heart transplant, and was receiving cyclosporine A, mycophenolate mofetil, and prednisolone	35	21
Aydillo et al (2020)[6]	18 recipients of haematopoietic stem-cell transplants or chimeric antigen receptor T-cell therapy, and two patients with lymphoma	78* (IQR 24–64)	8, 17, 25, 26, and 61†
Baang et al (2020)[7]	One patient with mantle cell lymphoma who was receiving CD20 bispecific antibody with cyclophosphamide, doxorubicin, and prednisolone	156	119

Data show the number of days after COVID-19 symptom onset that patients were positive for SARS-CoV-2. NAAT=nucleic acid amplification test. *Maximum reported duration. †Values are from five individual patients.

Table: **Examples of emerging primary reports about long-term SARS-CoV-2 positivity in immunosuppressed individuals**

Published Online
May 12, 2021
https://doi.org/10.1016/S2666-5247(21)00089-6

DP is supported by a National Institute for Health Research (NIHR) Academic Clinical Fellowship. SS is supported by an NIHR Clinical Lectureship in Cardiology. CMWs supported by an NIHR Clinical Lectureship in Infectious Diseases and Microbiology. JWT has given talks on general aspects of COVID-19 (including transmission) at meetings sponsored by Thea Pharmaceuticals, Thornton & Ross, and Landsec, and received grants from Sanofi Pasteur outside the submitted work commented on here. MRB received funding from the UK National Core Study (PROTECT; transmission and the environment). MP is a member of the Health Data Research UK COVID-19 Taskforce, and is supported by a NIHR Development and Skills Enhancement Award, a grant from UK Research and Innovation, Medical Research Council, and NIHR (MR/V027549/1), and the NIHR Leicester Biomedical Research Centre.

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