



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.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

the disappearance of infectious virus.²⁻⁷ With measles virus, viral RNA can still be detected 6–8 weeks after the clearance of infectious virus.⁸ The immune system can neutralise viruses by lysing their envelope or aggregating virus particles; these processes prevent subsequent infection but do not eliminate nucleic acid, which degrades slowly over time.

We were surprised to note the absence of viral load data in this study.¹ Although the use of sensitive PCR methods offers value from a diagnostic viewpoint, caution is required when applying such data to assess the duration of viral shedding and infection potential because PCR does not distinguish between infectious virus and non-infectious nucleic acid.

The timely publication of insightful data is paramount in responding to outbreaks of novel pathogens. However, the findings in this study should not be used to conclude prolonged viral shedding or provide rationale to amend isolation policies, as concluded by the authors; infectivity data are required to demonstrate these specific aspects.

We declare no competing interests.

Crown Copyright © 2020 Published by Elsevier Ltd. All rights reserved.

Barry Atkinson, *Eskild Petersen
eskild.petersen@gmail.com

National Collection of Pathogenic Viruses, Public Health England, Salisbury, UK (BA); Directorate General for Disease Surveillance and Control, Ministry of Health, Muscat, Oman (EP); European Society for Clinical Microbiology and Infectious Diseases Task Force for Emerging Infections, Basel, Switzerland (EP); and Institute for Clinical Medicine, Faculty of Health Sciences, University of Aarhus, 8200 Aarhus, Denmark (EP)

- Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020; **395**: 1054–62.
- Peiris JS, Chu CM, Cheng VC, et al. Clinical progression and viral load in a community outbreak of coronavirus-associated SARS pneumonia: a prospective study. *Lancet* 2003; **361**: 1767–72.
- Chan KH, Poon LL, Cheng VC, et al. Detection of SARS coronavirus in patients with suspected SARS. *Emerg Infect Dis* 2004; **10**: 294–99.
- Oh MD, Park WB, Choe PG, et al. Viral load kinetics of MERS coronavirus infection. *N Engl J Med* 2016; **375**: 1303–05.
- Wang Y, Guo Q, Yan Z, et al. Factors associated with prolonged viral shedding in patients with avian influenza A(H7N9) virus infection. *J Infect Dis* 2018; **217**: 1708–17.

- Sissoko D, Duraffour S, Kerber R, et al. Persistence and clearance of Ebola virus RNA from seminal fluid of Ebola virus disease survivors: a longitudinal analysis and modelling study. *Lancet Glob Health* 2017; **5**: e80–88.
- Paz-Bailey G, Rosenberg ES, Doyle K, et al. Persistence of Zika virus in body fluids—final report. *N Engl J Med* 2017; **379**: 1234–43.
- Lin W-HW, Kouyos RD, Adams RJ, Grenfell BT, Griffin DE. Prolonged persistence of measles virus RNA is characteristic of primary infection dynamics. *Proc Natl Acad Sci USA* 2012; **109**: 14989–94.

Authors' reply

We thank Barry Atkinson and Eskild Petersen for their comments on our Article describing the clinical course and risk factors for mortality of adult inpatients with coronavirus disease 2019 (COVID-19) in Wuhan, China.¹ We agree that the presence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) viral RNA in a respiratory specimen cannot be directly interpreted as a potential for disease transmission and infection.

Although viral culture is an important method to evaluate viral infectivity and activity, it is unavailable in clinical practice because of its low sensitivity and long turn-around time for virus detection.² Two negative SARS-CoV-2 RNA PCR tests, at least 24 h apart, was recommended by WHO³ as one of several criteria for discharge. Prolonged periods of detectable SARS-CoV-2 RNA suggest a sustained viral replication in some kinds of host cells in patients with COVID-19. A comparison has previously been made between viral shedding, as quantified by real time PCR (RT-PCR), and median tissue culture infectious dose (TCID₅₀) in patients with influenza.⁴ The temporal changes in viral load by RT-PCR were similar to that of TCID₅₀.⁴ For COVID-19, the association between viral load in respiratory tract specimens, quantified by RT-PCR, and viral culture needs evaluation.

Viral activity is only one of various factors that might influence disease transmission. Epidemiology is the gold standard to measure transmission potential of patients who recover from COVID-19 yet are

still positive for SARS-CoV-2 RNA. Further effort is urgently needed to evaluate the basic reproductive number in these patients.

We declare no competing interests.

Fei Zhou, Guohui Fan, Zhibo Liu, *Bin Cao

caobin_ben@163.com

Department of Pulmonary and Critical Care Medicine, Center of Respiratory Medicine, National Clinical Research Center for Respiratory Diseases, Institute of Respiratory Medicine, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing 100029, China (FZ, GF, ZL, BC); Institute of Clinical Medical Sciences, China-Japan Friendship Hospital, Beijing, China (GF); Department of Respiratory Medicine, Capital Medical University, Beijing, China (BC); and Tsinghua University School of Medicine, Beijing, China (BC)

- Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020; **395**: 1054–62.
- Charlton CL, Babady E, Ginocchio CC, et al. Practical guidance for clinical microbiology laboratories: viruses causing acute respiratory tract infections. *Clin Microbiol Rev* 2019; **32**: e00042–18.
- WHO. Clinical management of severe acute respiratory infection when COVID-19 is suspected. March 13, 2020. [https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected) (accessed April 4, 2020).
- Ip DKM, Lau LLH, Chan KH, et al. The dynamic relationship between clinical symptomatology and viral shedding in naturally acquired seasonal and pandemic influenza virus infections. *Clin Infect Dis* 2016; **62**: 431–37.

The political nature of medicine

“What should we expect of scientists in society?” This is the question we read in Richard Horton’s Comment,¹ which is quite important since the answer will be the same as for other similar questions: what should we expect of people having professions in different fields, such as engineers, musicians, economists, or soldiers in society? We agree that to achieve great science, there needs to be excellence in the field. We need to be able to provide the best diagnosis, best design, best music, best management of resources, and so on. However, to do great science or medicine, we also need to engage with



Published Online
April 15, 2020
[https://doi.org/10.1016/S0140-6736\(20\)30869-2](https://doi.org/10.1016/S0140-6736(20)30869-2)