



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.



## Letter to the Editor

## Faecal shedding of SARS-CoV-2: considerations for hospital settings



Sir,

The recent opinion article by McDermott and colleagues offers important considerations for potential faecal bio-aerosolization transmission in hospital settings [1]. Several recent findings have been referenced that have strengthened the plausibility of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) faecal shedding as a mode of transmission and well-considered research questions are raised on the matter of bio-aerosols. The authors may have overlooked some pressing priorities with potentially far-reaching consequences.

In hospital settings, extra care is warranted in the handling of faecal wastes, regardless of whether individuals are infected, recovering, or have recovered. A study by Wang *et al.* following the 2002–2003 SARS outbreak adopted biochemical analysis to ascertain the plausibility of sewage as a transmission route of the coronavirus implicated in the outbreak (SARS-CoV-1) [2,3]. An electropositive filter media particle was used to concentrate SARS-CoV-1 from the sewage of hospitals, with SARS-positive patients. Detection and identification using cell culture and reverse transcription–polymerase chain reaction followed. Sewage discharged by two hospitals was found positive for SARS-CoV-1. A recent study with similar methodological design identified positive samples of the novel coronavirus (SARS-CoV-2) in hospital inlets of the preprocessing disinfection sewage pool, although not in the final outlet [4]. However, this study had significant limitations and the time lag that faecal testing represents, in comparison to other forms of testing, should be recognized [5]. Careful management of sewage discharged from hospitals is a priority in the preventive approach to COVID-19 even if the evidence base is not yet developed.

Regarding aerosol transmission of SARS-CoV-2, toilet plumes are known to disperse microbes to the immediate environment and the extent of dispersion can be modelled using the inverse-square law. In hospital settings, heightened care for disinfection is necessary in toilet cubicles; unnecessary fomites with the potential to harbour faecal microbes in the surrounding environment should be removed. A common example

of an overlooked fomite around household toilets are toothbrushes, particularly when positioned in relatively close proximity to toilets [6]. The strengthening plausibility of faecal–oral transmission presents a challenge for this pathway. Hand dryers also present the risk of generating bio-aerosols, with some modern designs accommodating an upward air-stream of microbes more readily. This may pose an increased risk of pathogen inhalation or entry through the conjunctiva: a recently identified mode of entry [7].

In the preventive approach to this unqualified – albeit highly plausible – mode of transmission, it is necessary to reinforce existing advice for hand hygiene with emphasis on hand washing after using a toilet, and reminding users to close toilet lids when flushing. Effective sewage management is essential for public health reasons and environmental consideration.

**Conflict of interest statement**

None declared.

**Funding sources**

None.

**References**

- [1] McDermott CV, Alicic RZ, Harden N, Cox EJ, Scanlan JM. Put a lid on it: are faecal bio-aerosols a route of transmission for SARS-CoV-2? *J Hosp Infect* 2020. <https://doi.org/10.1016/j.jhin.2020.04.024> [Epub ahead of print].
- [2] Quilliam RS, Weidmann M, Moresco V, Purshouse H, O'Hara Z, Oliver DM. COVID-19: the environmental implications of shedding SARS-CoV-2 in human faeces. *Environ Int* 2020;140:105790.
- [3] Wang XW, Li J, Guo T, Zhen B, Kong Q, Yi B, et al. Concentration and detection of SARS coronavirus in sewage from Xiao Tang Shan Hospital and the 309th Hospital of the Chinese People's Liberation Army. *Water Sci Technol* 2005;52:213–21. <https://doi.org/10.2166/wst.2005.0266>.
- [4] Wang J, Feng H, Zhang S, Ni Z, Ni L, Chen Y, et al. SARS-CoV-2 RNA detection of hospital isolation wards hygiene monitoring during the Coronavirus Disease 2019 outbreak in a Chinese hospital. *Int J Infect Dis* 2020;94:103–6. <https://doi.org/10.1016/j.ijid.2020.04.024>.
- [5] Wu Y, Guo C, Tang L, Hong Z, Zhou J, Dong X, et al. Prolonged presence of SARS-CoV-2 viral RNA in faecal samples. *Lancet Gastroenterol Hepatol* 2020;5:434–5. [https://doi.org/10.1016/S2468-1253\(20\)30083-2](https://doi.org/10.1016/S2468-1253(20)30083-2).
- [6] Patel J. A plausible transmission mode. *Br Dent J* 2020;228:735.

- [7] Hui KPY, Cheung M-C, Perera RAPM, Ng K-C, Bui CHT, Ho JCW, et al. Tropism, replication competence, and innate immune responses of the coronavirus SARS-CoV-2 in human respiratory tract and conjunctiva: an analysis in ex-vivo and in-vitro cultures. *Lancet Resp Med* 2020 May 7 [Epub ahead of print]. [https://doi.org/10.1016/S2213-2600\(20\)30193-4](https://doi.org/10.1016/S2213-2600(20)30193-4).

\* Corresponding author. Address: School of Dentistry, University of Leeds, Worsley Building, Clarendon Way, Leeds, LS2 9LU, UK.  
E-mail address: [dn18jyp@leeds.ac.uk](mailto:dn18jyp@leeds.ac.uk)

Available online 20 May 2020

J. Patel\*

*School of Dentistry, University of Leeds, Leeds, UK*