



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.

Low risk of SARS-CoV-2 transmission by fomites in real-life conditions

We read with interest the Comment by Emanuel Goldman¹ highlighting experiments done under controlled laboratory conditions that suggest persistence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) on inanimate surfaces for days, with potential implications for viral transmission.² Yet, at the same time, Goldman laments the absence of real-life studies investigating the infectious potential of SARS-CoV-2 on contaminated inanimate material and patient fomites, particularly in high-risk hospital wards. A study done in a hospital environment showed that most surfaces were contaminated, including air-conditioning vents, bed rails, bedside lockers, and rarely, toilets.³ Of note, environmental surface contamination declined after week 1 of illness, and intriguingly, no surface contamination was detected in intensive care unit (ICU) rooms. A limitation of the study by Chia and colleagues³ is that no attempt was made to culture SARS-CoV-2 from

the environmental swabs, which would have helped to understand the significance of SARS-CoV-2 RNA positive samples in terms of infectious potential.

We have done two sequential studies^{4,5} seeking to determine on one hand the extent, if any, of contamination of inanimate surfaces in a standard infectious disease ward of a major referral hospital in northern Italy, and on the other hand whether the risk of contamination was higher in emergency rooms and sub-intensive care wards than on ordinary wards. Cleaning procedures were standard. A number of objects and surfaces were swabbed. Remarkably, only the continuous positive airway pressure helmet of one patient was positive for SARS-CoV-2 RNA. More importantly, attempts to culture the positive swabs on Vero E6 cells were unsuccessful,⁵ suggesting that patient fomites and surfaces are not contaminated with viable virus. Our findings suggest that environmental contamination leading to SARS-CoV-2 transmission is unlikely to occur in real-life conditions, provided that standard cleaning procedures and precautions are enforced. These data would support

Goldman's point that the chance of transmission through inanimate surfaces is less frequent than hitherto recognised.

We declare no competing interests.

***Mario U Mondelli, Marta Colaneri, Elena M Seminari, Fausto Baldanti, Raffaele Bruno**

mario.mondelli@unipv.it

Divisions of Infectious Diseases II and Immunology (MUM), Infectious Diseases I (MC, EMS, RB), and Microbiology and Virology (FB), Fondazione IRCCS Policlinico San Matteo, Pavia, Italy; and Department of Internal Medicine and Therapeutics (MUM, MC) and Department of Clinical, Surgical, Diagnostic, and Paediatric Sciences (RF, FB), University of Pavia, Pavia, Italy

- 1 Goldman E. Exaggerated risk of transmission of COVID-19 by fomites. *Lancet Infect Dis* 2020; published online July 3. [https://doi.org/10.1016/S1473-3099\(20\)30561-2](https://doi.org/10.1016/S1473-3099(20)30561-2).
- 2 van Doremalen N, Bushmaker T, Morris DH, et al. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *N Engl J Med* 2020; **382**: 1564–67.
- 3 Chia PY, Coleman KK, Tan YK, et al. Detection of air and surface contamination by SARS-CoV-2 in hospital rooms of infected patients. *Nat Commun* 2020; **11**: 2800.
- 4 Colaneri M, Seminari E, Piralla A, et al. Lack of SARS-CoV-2 RNA environmental contamination in a tertiary referral hospital for infectious diseases in Northern Italy. *J Hosp Infect* 2020; **105**: 474–76.
- 5 Colaneri M, Seminari E, Novati S, et al. Severe acute respiratory syndrome coronavirus 2 RNA contamination of inanimate surfaces and virus viability in a health care emergency unit. *Clin Microbiol Infect* 2020; **26**: 1094.e1–e5.



Published Online
September 29, 2020
[https://doi.org/10.1016/S1473-3099\(20\)30678-2](https://doi.org/10.1016/S1473-3099(20)30678-2)