COVID-19 transmission in geriatric acute care shows need for enhanced infection control and prevention measures

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Researchers in Switzerland and the UK have found that in COVID-19 isolation wards less transmission of the virus occurred between patients

and healthcare workers than expected, according to a study published today in *eLife*.

However, the team found that the highest source of new hospital-acquired infections tended to be transmitted by healthcare professionals working on other wards when an outbreak occurred. The findings highlight gaps in infection control practices between different acute care wards.

Hospital-acquired cases of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in geriatric institutions and long-term care facilities (LTCF) are thought to account for large proportions of declared COVID-19 deaths worldwide. However, there is ongoing uncertainty about transmission chains in these environments and the respective roles of healthcare professionals and patients in spreading the virus.

"Because the reservoir of SARS-CoV-2 in healthcare environments may contribute to amplifying the pandemic, we need to better understand transmission dynamics in these settings," says lead author Mohamed Abbas, Senior Research Associate at the Infection Control Programme, Geneva University Hospitals, Switzerland, and Honorary Clinical Research Fellow at the MRC Centre for Global Infectious Disease Analysis, Imperial College London, UK. "Detecting and defining cases is crucial in settings with a high patient turnover, or where patients are admitted from the community and both COVID-19 and non-COVID-19 cases are cared for in the same institution. If we can determine the sources of infection and transmission pathways, we can improve infection prevention and control strategies."

The team set out to reconstruct the transmission dynamics in several hospital-based outbreaks of COVID-19 that involved patients and healthcare workers in the Swiss university-affiliated Hospital of

Geriatrics, which has 196 acute-care and 100 rehabilitation beds. During the first wave of the pandemic in 2020, 176 acute care beds were dedicated to patients with COVID-19 who did not require intensive care. At the same time, other patients were admitted for non-COVID-19 indications and shared access to rehabilitation beds with patients convalescing from COVID-19.

To look at the transmission between patients and healthcare workers on these wards, the team used a mathematical model incorporating information on contact networks between patients and healthcare professionals. They considered the time between infections (in an infector/infectee pair) and a model of genetic sequence evolution, which shows whether one infection has arisen from another. They then compared this with the transmission dynamics they expected to see at random from healthcare workers and patients on the COVID-19 ward.

Of the SARS-CoV-2 positive cases, 127 cases were in healthcare workers operating in dedicated COVID-19 wards, 36 cases were healthcare workers in non-COVID-19 wards where outbreaks occurred, and 48 patients contracted the virus while in a ward where an outbreak occurred.

Most patient-to-patient transmission involved patients having shared a ward, rather than sharing a room. Patients in a ward where there had been an outbreak were twice as likely than expected to be infected by other patients with hospital-acquired COVID-19. Similarly, healthcare workers were more than twice as likely to be infected by another healthcare professional working on a ward that had an outbreak, than from one of the COVID-19 wards. The data also suggest that healthcare workers on a ward with an outbreak went on to cause more secondary cases of COVID-19 than patients with hospital-acquired COVID-19 did.

"Our study shows transmission dynamics among healthcare workers

differ according to whether they worked in COVID-19 wards or wards where outbreaks occurred. This could suggest that those working on COVID-19 wards were concerned about becoming infected and applied infection control measures rigorously, whereas those working on non-COVID wards may have underestimated the risk of transmission," concludes senior author Stephan Harbarth, Professor of Infectious Diseases at the Infection Control Programme, Geneva University Hospitals. "Strategies to prevent SARS-CoV-2 transmission in geriatric settings should take into account the potential for patient-to-patient transmission and the transmission dynamics between healthcare workers in non-COVID-19 wards, which may differ considerably from those in dedicated COVID-19 wards."

More information: Mohamed Abbas et al, Reconstruction of transmission chains of SARS-CoV-2 amidst multiple outbreaks in a geriatric acute-care hospital: a combined retrospective epidemiological and genomic study, *eLife* (2022). DOI: 10.7554/eLife.76854

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