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When even two is a crowd: shared nursing home rooms and the risk of respiratory infection outbreaks



Before vaccines were available, COVID-19 outbreaks occurred frequently in nursing homes, often with devastating consequences.¹ The rapid transmission in facilities housing susceptible populations led to a disproportionate number of COVID-19-associated deaths among older adults residing in nursing homes. These outbreaks, which initially appeared to occur seemingly at random, have since been linked not only to high levels of community transmission but also to facility size, staffing shortages, and the degree of population density in nursing homes.^{2,3}

In this issue of *The Lancet Healthy Longevity*, Pamela Leece and colleagues build on previous work by assessing the associations between population density and frequency and severity of non-COVID-19 respiratory infection outbreaks in nursing homes in Ontario, Canada, over a 5-year period predating the COVID-19 pandemic.⁴ Leece and colleagues developed a crowding index that quantifies resident density on the basis of the mean number of residents per bedroom and bathroom across a nursing home, ranging from a score of 1 (ie, exclusively private, single-bed rooms with private bathrooms) to 4 (ie, four beds per room with shared bathrooms). Using data from the Ontario Ministry of Long-Term Care, the authors ascertained the frequency, extent, and associated mortality of outbreaks due to different respiratory pathogens and tested the association of these outcomes with crowding in nursing homes (ie, high vs low crowding index) using negative binomial models.

Leece and colleagues assessed 4921 outbreaks comprising 64 829 acute respiratory infections during the 5-year study period, and found that homes with a high crowding index had fewer beds and were more often for-profit than were homes with a low crowding index. Moreover, homes with a high crowding index had a higher incidence of outbreak-associated infections (26.4% vs 13.8%) and deaths (0.8% vs 0.4%) and a greater outbreak size (17.6% vs 9.8%) than did homes with a low crowding index. The authors also estimated the potential effects of setting a cap of two residents per room, which would have reduced total infections from 64 829 to 53 434 (–18%) and outbreak-associated deaths from 1969 to 1536 (–22%).

The strengths of Leece and colleagues' study include the large sample of nursing homes, the use of Canada's robust public health databases, a long study period, and the ability to draw consistent conclusions across different respiratory pathogens. However, the study design has some limitations. First, facility-level race and ethnicity data were not reported. Previous studies have identified a higher risk of COVID-19 infection, hospital admission, and attributable death in non-White nursing home residents than in White residents, and whether an association exists between specific racial groups and facilities with a high crowding index is unclear.^{5,6} Second, the study did not quantify health-care staff-to-patient ratios to assess the association between staffing shortages and the likelihood of respiratory infection outbreaks, which has been reported in previous studies⁷ and would not be solved by redesigning facilities to accommodate an increased number of private rooms. Third, no differentiation was made between rooms that were used for post-acute care and long-term care; these disparate populations might have different risks of crowding and respiratory infection transmission. Finally, the crowding index needs additional validation, ideally from a different geographical location.

What can be done about nursing home crowding? Studies that include whole-genome sequencing might help to disentangle the relative contributions of patient-to-patient transmission versus staff-to-patient transmission. Patient-oriented translational studies could establish the relative contributions of nursing home crowding versus staff-related risk factors (eg, labour shortages and presenteeism) to the likelihood and severity of respiratory infection outbreaks. Similar studies conducted across the health-care continuum could define the role of community transmission in nursing home outbreaks and related adverse consequences. To reduce crowding from a policy perspective, as Leece and colleagues suggest, government regulation is likely to be necessary to counteract the economic incentives to build high-density facilities with a large proportion of shared rooms. Increasing insurance reimbursement for care provided in private rooms could also promote a move away from shared rooms; however, this approach

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has the potential to increase health disparities for people who are uninsured or underinsured. Another possible strategy is the inclusion of a crowding metric in a pay-for-performance structure, such as the US Centers for Medicare and Medicaid Services five-star quality rating system.

Other creative options also exist to alleviate crowding in nursing homes and improve quality of life for older adults. The COVID-19 pandemic has spurred experimentation with alternative care delivery models, including hospital at home, and has enhanced formal home care and monitoring options so that older adults can age in place.⁸ Such models of care might be more appropriate than traditional nursing homes for many older adults and have the additional benefits of allowing older adults to stay in familiar surroundings and of avoiding the stigma associated with nursing homes while still addressing post-acute and long-term care needs.^{9,10} Further development and implementation of these unique models of care across various countries might produce culturally appropriate delivery of long-term care and also reduce the risk of respiratory and other infectious outbreaks.

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