

The Experience of COVID-19 in Singapore

<https://doi.org/10.26419/int.00054.014>

By Emi Kiyota and David Michael Allen

An unprecedented global response to the rapid spread of SARS-CoV-2 has been crucial to reducing COVID-19 associated mortality as well as to limiting the burden on health care systems. Singapore's contribution to the international effort has included sharing our experiences in the medical management of COVID-19, public health communication, tracking SARS-CoV-2 variants, and other observations with the global community while simultaneously learning and adapting best practices based on other countries' experiences.

Singapore showed exceptional leadership in COVID-19 containment, as demonstrated by our low rate of new infections in the initial months of the pandemic. This was achieved by gaining the population's trust and cooperation, implementing evidence-based mitigation measures and frequent public updates from scientists, clinicians, policy makers and political office holders. Despite Singapore's quick whole-of-government response to COVID-19, infections subsequently spiked and the country's health care assets were tested.

As in much of the world, Singapore observed that older persons and other residents of congregate housing were the groups most affected by the pandemic. Elder care settings were especially vulnerable because high levels of frailty make elderly residents more susceptible to severe COVID-19 infection. Also, crowded shared living areas made it challenging for facility operators to effectively prevent the virus from spreading. A surge in cases among foreign workers living in high population densities in April-May 2020, further demonstrated the built environment's large role in SARS-CoV-2's transmission.

Prior experiences with public health emergencies informed Singapore's response. Following the 2003 outbreak of Severe Acute Respiratory Syndrome (aka SARS-CoV-1), Singapore established a pandemic taskforce and invested heavily to enhance existing infrastructure for infectious disease prevention and preparation. These measures were refined when Singapore experienced H1N1 influenza and Zika virus outbreaks in 2009 and 2016, respectively.

WHO declared the novel coronavirus outbreak a public health emergency of international concern (PHEIC) on 30 January 2020. Ten days prior (20 January 2020) Singapore implemented border screening and isolation of patients with pneumonia. Singapore's first confirmed case was on 24 January 2020 by which time a multi-ministry task force had already convened, quarantine of travelers from China was in place, as was enhanced border screening, isolation for those infected, and active contact tracing. The rapid deployment of these measures in the early months of the pandemic prevented the health care system from being overwhelmed. As a consequence, lives were saved.

In March 2020 local transmission increased, presumably the result of asymptomatic travelers importing SARS-CoV-2, leading to a change in the screening of travelers. The situation further evolved in April 2020 when infection rates increased in both long-term care facilities (LCTFs) and in foreign worker dormitories, which raised concerns regarding the capacity of existing measures to prevent spread in congregate settings.

The rapid deployment of these measures in the early months of the pandemic prevented the health care system from being overwhelmed. As a consequence, lives were saved.

What Happened to Older Persons?

Despite LTCFs' strict visitor restrictions in early March 2020, COVID-19 cases spread among six dispersed LTCFs; 14% of the country's total number of deaths from the virus were cases linked to LTCFs in April 2020 (Tan LF, 2021). To ensure the safety of the older population, the Ministry of Health reinforced a set of robust actions to halt virus transmission: proper hand hygiene, environmental disinfection, routine swab testing of residents and health care workers, social distancing, quarantine of contacts, coordination with acute hospitals, and admission policies. Visitation restrictions including stopping LTCF visits for three months were implemented to enforce social distancing and limit new introductions of SARS-CoV-2 into the facilities (Calcaterra et al 2022).

The Built Environment

Through an empirical study (Von Seidlein and et al, 2021), we also learned that living conditions among migrant workers residing in crowded dormitories exacerbated the widespread transmission of the virus. Their infection rate in April 2020 was three hundred times greater than that of the local residents. Their sanitation facilities and kitchen spaces were shared, and some users practiced poor hygiene. This type of built environment presented critical challenges to standard prevention strategies and control measures. These events have emphasized the government's role in active reforms of building codes and health care systems to create more inclusive and healthy cities for all of society.

Experts on designing health care and housing for older persons have developed several design guidelines for acute, long-term care, and senior housing during COVID-19. Recommendations include better air flow, effective ventilation strategies, provision of improved spatial plans that allow people's safe movement and flow, controlling high traffic places, easy outdoor access, creation of smaller clusters/community within a large congregate housing, cleaning protocols for high-touch surfaces, and embedding technologies (MASS design, 2021). Touchless touch points or reducing the use of high-touch areas such as elevators is also recommended, for example through improving existing stairs to encourage the use of other means of egress or inserting common spaces on each floor to allow people to gather without frequently traveling to other floors. Built environments should be co-developed with facility operators seeking input from Infection Prevention and Control Specialists integrating their insights to design and operate outbreak-safer facilities. To prepare the health care environment for future pandemics, the environment should be versatile to meet a variety of needs and designed for flexibility (Arup and HKS, 2021, and CPG, 2022).

Social Isolation

Although strict social restriction measures have limited the pandemic's spread, these measures caused unintended consequences. Older persons especially have suffered from a lack of physical activities, limited access to services, social isolation, and disruption in the continuity of their care. Social restrictions contributed

The Experience of COVID-19 in Singapore

to a decline in physical, mental, and cognitive health (Sepulveda, W, 2022, and Menze, 2022). While Singapore managed the morbidity and mortality of COVID-19 better than most countries, the measures utilized led to people facing social isolation, and disruptions in access to nutritious food, medical care, and supportive services (Yu, J., Mahendran, R, 2021). It also shed light on inequities that older people face when they do not have an adequate living environment after hospital discharge, which is especially crucial for those without family support. Even before the pandemic, many older persons struggled with lack of social and financial resources to afford their everyday life expenses, health care, and other necessities. These challenges were not created by SARS-CoV-2, but the pandemic exacerbated these pre-existing conditions. As a result, inequalities experienced by older persons in Singapore deepened.

Recommendations

Drawing from public information available as well as informed knowledge by both medical and design communities, this section provides a set of observations and recommendations for the future.

- Whole-of-government approach is critical. It enables swift and effective strategies to control infections at a country level. In this way, government can more efficiently coordinate inter-governmental networks and collaborate with local organizations that have direct contact with and the trust of older adults.
- Expand capacity during peacetime to prepare for future pandemics. Examples are securing space and refining programs for quarantine and isolation, and developing more robust and agile public health structures.

- Develop model scenarios and undertake drills to test pandemic preparedness, including implementing regular “war games” exercises.
- Ensure an effective supply management system is in place for future pandemics with well-considered contingency plans. Stockpile necessary equipment and supplies in a strategic manner.
- Conduct peace time pandemic preparedness education and drills for citizens to optimize the general public’s understanding of their role when an emergency occurs.
- Develop robust epidemiology and basic science systems to ensure that applied solutions are evidence-based.
- Coordinate the efforts of architects, developers, planners and other built environment and health care professionals.
- Design safe and accessible housing and neighborhoods that promote health and well-being via access to fresh air, healthy foods, health care, etc.
- Be intentional about designing to meet the space’s unique purpose, ventilation capacities, and types of users, since infection prevention and control measures are specific to each built environment.
- Prepare for future pandemics by planning for accessibility and safety of the home environment and the infrastructure of neighborhoods during a lockdown.

Singapore's narrative provides an opportunity to better prepare for future pandemics.

Conclusion

Singapore's narrative provides an opportunity to better prepare for future pandemics. This article shared Singapore's recent experience from both an infection control and a built environment lens. While many countries implemented similar measures to address COVID-19, Singapore's immediate and strict application of these efforts limited the virus's spread compared to other countries. The investment in future pandemic planning following SARS in 2003 allowed for the prompt implementation of measures and ensured their success by facilitating citizen adherence to those measures. Sociocultural values which place an emphasis on protecting older persons informed the prompt response to secure the safety of LTCFs. And lessons were derived around the increased vulnerability of residents and staff in congregate settings and design strategies that facilitate resilience. ●

References

- CPG (2022). Designing for pandemic resilient health care facilities. <https://www.cpgcorp.com.sg/news-insights/designing-for-pandemic-resilient-health-care-facilities> (accessed on December 12, 2022)
- Dickens BL, Koo JR, Lim JT, et al. (2021) Modelling Lockdown and Exit Strategies for COVID-19 in Singapore. *Lancet Reg Health-West Pac*. doi: 10.1016/j.lanwpc.2020.100004
- Tan LF, Seetharaman SK. COVID-19 outbreak in nursing homes in Singapore. *J Microbiol Immunol Infect*. 2021 Feb;54(1):123-124. doi: 10.1016/j.jmii.2020.04.018. Epub 2020 May 13. PMID: 32405290; PMID: PMC7219412.
- HKS and Arup (2022). The Pandemic-Resilient Hospital: How Design Can Help Facilities Stay Operational and Safe" by HKS, Arup and the American Society for Health Care Engineering.(<https://www.hfmmagazine.com/articles/4330-key-design-strategies-for-pandemic-resilience>)
- Von Seidlein L, Alabaster G, Deen J, Knudsen J (2021) Crowding has consequences: Prevention and management of COVID-19 in informal urban settlements, *Building and Environment*, Volume 188, MASS design (2021) Designing Senior Housing for Safe

Interaction: The Role of Architecture in Fighting COVID-19. <https://massdesigngroup.org/sites/default/files/multiple-file/2020-07/Designing%20Senior%20Housing%20for%20Safe%20Interaction.pdf>

Menze, I, Mueller, P, Mueller, N.G. et al. (2021) Age-related cognitive effects of the COVID-19 pandemic restrictions and associated mental health changes in Germans. *Sci Rep* 12, 8172 (2022). <https://doi.org/10.1038/s41598-022-11283-9>

Ministry of Health, Singapore (2020). Confirmed imported case of novel coronavirus infection in Singapore; multi-ministry taskforce ramps up precautionary measures. 23 January 2020. Available at: <https://www.moh.gov.sg/news-highlights/details/confirmed-imported-case-of-novel-coronavirus-infection-in-singapore-multi-ministry-taskforce-ramps-up-precautionary-measures>. Accessed on 29 March 2020.

Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, Ganz F, Torralba R, Oliveira DV, Rodríguez-Mañas L. (2020). Impact of Social Isolation Due to COVID-19 on Health in Older People: Mental and Physical Effects and Recommendations. *J Nutr Health Aging*. 2020 Sep 25:1–10. doi: 10.1007/s12603-020-1469-2. Epub ahead of print. PMID: PMC7514226.

Yu, J, Mahendran, R. (2021). COVID-19 lockdown has altered the dynamics between affective symptoms and social isolation among older adults: results from a longitudinal network analysis. *Sci Rep* 11, 14739 (2021).

World Health Organization.(2021). Coronavirus Disease 2019 (COVID-19): Situation Report. *Weekly Epidemiological Update on COVID-19* — 28 September 2021. Available online: <https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19> — 28-september-2021 (accessed on 15 October 2021).



Emi Kiyota
Associate Professor,
Yong Loo Lin School of
Medicine and College of
Design and Engineering
National University
of Singapore



David Michael Allen
Associate Professor,
Yong Loo Lin School
of Medicine
National University
of Singapore