

REVERA PANDEMIC REPORT: A PERFECT STORM
CHAPTER FIVE

Building Resistance



This report is dedicated to Revera's employees, residents, their families, and all those on the front lines of the senior living sector who are working through the worst pandemic in living history.



With more than 35,000 people waiting for a place in long term care [in Ontario] and few other options to house them, the government has continued to renew nursing home licenses for buildings that fail to meet current Ministry design standards

CHAPTER FIVE:

Building Resistance

Of all the factors that contributed to the COVID-19 tragedy in the long term care sector, none were more predictable than the insidious effects of the old, outdated buildings that house many of the country's vulnerable seniors. Built decades ago, when multi-bed rooms and communal bathrooms were customary, these long term care homes proved to be a bricks-and-mortar obstacle to containing the novel coronavirus in the spring of 2020 – and the numbers bear it out.

Nearly 60 per cent of resident deaths in long term care homes during the pandemic's first wave occurred in these so-called "C" buildings, which either meet or fall below 1972 design standards. While the age of a building had no bearing on whether COVID-19 broke out in a home, research indicates that it had a major impact on the scope, severity and duration of an outbreak. A study published in the Canadian Medical Association Journal in August 2020, for example, found that Ontario homes with outdated design standards had longer outbreaks, more cases of infection and a higher number of resident deaths.

At Revera, the study jibes with the conclusions of the Revera Expert Advisory Panel, which found that the age of a home was a powerful predictor of whether it would suffer the worst outcomes. Most of the company's 74 long term care homes and 96 retirement residences were unaffected by COVID-19, and the vast majority of the 87 outbreaks it did have during the first wave involved only a single case. But the virus took a toll at nine of the company's long term care homes and six of its

retirement residences, accounting for nearly all 1,486 cases among Revera staff and residents in the first wave, including the deaths of 286 seniors. Of the nine long term care homes most severely impacted, seven were C buildings that conformed to 48-year-old standards.

Outdated buildings where COVID-19 caused the greatest damage, the analysis showed, had been vulnerable to higher rates of seasonal flu outbreaks and other contagions in the past. Indeed, improving infection control was among the reasons that Revera was in the process of seeking government approval to redevelop 30 of its 33 C building sites when the pandemic hit.

For more than two decades, the Ontario government, home operators and seniors' advocates have all recognized the pressing need to upgrade old nursing homes. Yet an ongoing stalemate has paralyzed the approval process for redevelopment. The result has been 22 years of inertia. To date, roughly a third of Ontario's 79,000 long term care beds are still housed in buildings that fail to meet modern design standards. But the pandemic may finally change that. The number of COVID-19 deaths among Canadian seniors in long term care has drawn national and international attention to the old-homes issue, and underscored the need to take immediate action.

As part of Revera's Expert Advisory Panel review, a team of healthcare design experts has identified stopgap measures to improve infection control at the company's older sites in the short term, making better use of existing spaces and devising ways to separate residents and staff as needed. The suggestions may not only reduce infection risks at Revera's C buildings but could also serve as a guide for the many outdated homes that continue to operate during the pandemic. The team has also produced longer-term recommendations for new building designs with the goal of creating safer, healthier environments for the future and the elderly residents who may one day call them home.

A DEVELOPING HISTORY

The notion of dedicated care homes for the elderly grew out of the Industrial Revolution in the late 19th century. As people scattered for jobs in the cities, fewer family members were available to look after aging loved ones. In turn, the 20th century brought the rise of the institution: large, often government-backed facilities that housed various populations – adults with disabilities or mental illness, children with developmental challenges and, also, the aged.

Right through to the 1970s, the design sensibility of “old age” homes reflected an institutional style. Four-bed ward-style rooms, shared toilets, large dining halls and small common areas were standard in the building code of 1972. At the time,

however, the life expectancy of Canadians was just shy of 73 and residents tended to be younger and healthier, with lower rates of dementia and better mobility. As a result, nursing home bedrooms, corridors and communal bathrooms were not necessarily built to accommodate roaming and wandering, wheelchairs or walkers.



But the next two decades heralded a profoundly different approach to housing society's vulnerable seniors. With the 1980s came a growing body of evidence that architectural design has a significant impact on health. In senior living settings, it led to a new focus on preventing falls and controlling infections, and a burgeoning awareness that the layout of physical spaces can have a psychological impact. The era of the institution was over. Families wanted long term care for their aging loved ones in congregate residences that felt more like homes, with private bedrooms, private washrooms and bright, spacious lounge areas.

In response, in 1998, the Ontario government introduced its first Design Manual for seniors' homes, which fundamentally changed earlier standards with the stated intention to create less institutional long term care homes that provide a higher quality of life for the people who live there. It mandated, among other things, an end to four-bed, ward-style rooms and specified that nursing home bedrooms should accommodate no more than two residents.

With demand for seniors' homes growing, the manual – which has been updated several times since – was part of a new capital program in 1998 to build approximately 20,000 new long term care beds in Ontario. It allowed existing homes to continue to operate by the older design standard, with the expectation that they would all eventually be upgraded. A dozen years later, however, very few had been redeveloped.

Despite this, in 2010, the Ontario government granted these homes new 15-year licences to operate, again with the understanding that C buildings would be brought

up to code within that time frame. Yet when the pandemic hit in 2020, nearly 30,000 beds in Ontario remained in substandard homes.

With the 1980s came a growing body of evidence that architectural design has a significant impact on health.

In Ontario, since introducing new design standards in 1998, the province has struggled to establish a workable approval process and funding model for redevelopment. But with more than 35,000 people waiting for a place in long term care and few other options to house them, the govern-

ment has continued to renew nursing home licenses for buildings that fail to meet current Ministry design standards, because the health system cannot go without the beds they provide. Meanwhile, home operators who have been advocating for redevelopment are forced to continue to operate aging homes.

THE HIGH RISKS OF HIGH DENSITY

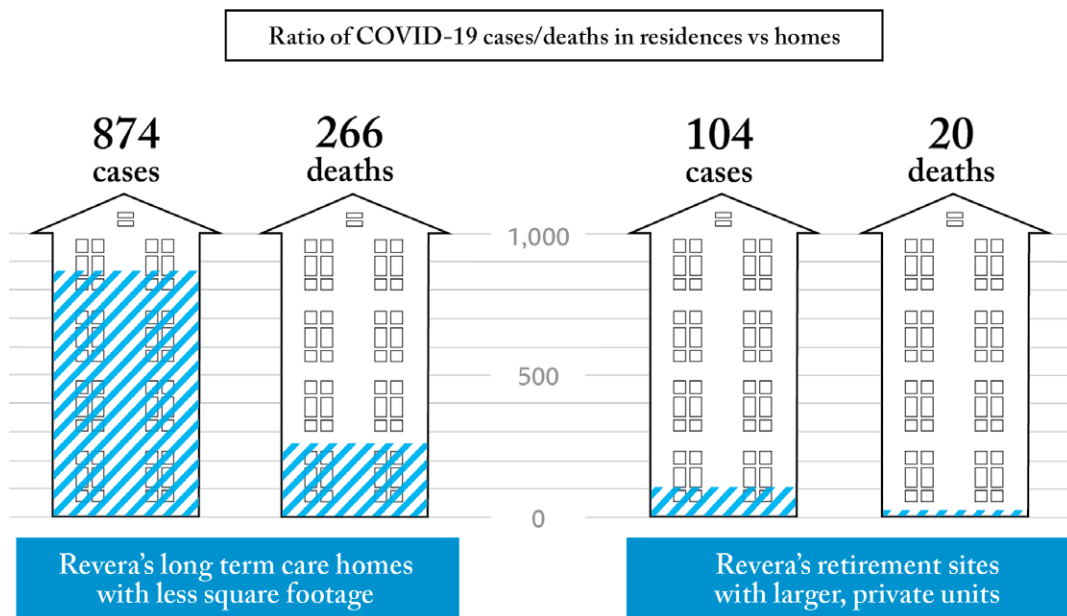
To identify the various infection control challenges in long term care homes, and potential measures to overcome them, the external review design team focused on four of Revera's C buildings plus the proposed layouts of two new long term care homes that the company plans to build. Their review also took into close account the unique threat that COVID-19 poses in congregate settings.

A highly contagious virus that may contaminate objects and surfaces for several hours or more, and has the unusual ability to be transmitted by carriers who are asymptomatic, requires infection control measures that demand space for people to socially distance, quarantine or isolate, and for cohorts to be created to keep the sick apart from the healthy. All of this must be taken into consideration in a building's layout and design. Prior to the 2015 update to Ontario's design standard, for example, the rooms in a long term care home were typically organized in a single wing, making it difficult to create cohorts of residents when an outbreak occurs. Newer homes are organized into smaller units.

With the COVID-specific factors in mind, the team assessed the six Revera sites for the environmental issues that can make a long term care home vulnerable to the spread of infection: the number and density of residents, the number of staff and visitors who access a single building, the movement of staff between multi-resident rooms, and the traffic levels in and around communal areas (such as dining rooms, activity areas or living spaces).

The health benefits of residents having more living space is evidenced by the fact that Revera's retirement residences fared much better against COVID-19 than the company's long term care homes. At Revera's 96 retirement sites – where residents tend to be more able-bodied and independent, and have larger, private units – there were 104 cases among seniors, 20 of whom died. In its 74 long term care homes – where there is less square footage per resident, and more care is required to meet the complex medical needs of the frail elderly – there were 874 cases and 266 deaths.

The ward-style rooms of the outdated sites can be hot spots of contagion not only as a result of four people sharing a confined space for extended periods, but also because it can quadruple the number of other people – staff members, healthcare workers, family and friends – coming into the space and the pathogens they may bring with them. As well, sharing a washroom means more opportunities to spread viruses between residents in the same room. An Ontario study led by Sinai Health System geriatrician and National Institute on Ageing Associate Fellow Nathan Stall, for example, concluded that converting all four-bed rooms to two-bed rooms would have averted 19 per cent of COVID-19 infections and deaths in Ontario long term care homes.



Eliminating the use of ward-style rooms and reducing their maximum occupancy from four residents to two are among the many changes that provincial governments have mandated in the wake of the pandemic's first wave.

THE GREAT DESIGN GAP

Examining the building layout information for the six Revera sites under review, the design team found stark differences between the proposed new builds, which would meet current standards, and the existing sites, which (as expected) do not meet several of the current fundamental requirements.

Of prime interest in the layouts were resident home areas, or RHAs, where seniors spend most of their time and receive care, including their rooms. The team looked at the spatial characteristics of these RHAs in terms of occupant density: that is, the available square footage per resident; shared spaces with often-touched surfaces where transmission risk could be heightened; and “pinch point” areas, such as narrow corridors, where close contact may be unavoidable.

The comparison showed that there were almost double the number of residents in the RHAs of the four existing sites as there would be in these areas of the two proposed new builds – 60 seniors in C homes, versus 32 in the planned facilities. As well, the review found that less than 15 per cent of beds in the old sites were private bedrooms, whereas more than half (60 per cent) of the accommodation in the new builds would be single rooms. Four-bed wards accounted for roughly half of the total beds in the C sites, a range of between 46 to 53 per cent. In the new builds, as the standards dictate, there are none. Other findings include:

- Existing homes have a bedroom area that is 32 per cent smaller per resident than allotted for residents in the new builds.
- There are 50 per cent fewer washrooms per resident in existing sites than in the proposed new buildings. Washroom-to-resident ratio is 36 per cent lower compared to proposed future sites.
- Increasing the availability of washrooms and sinks can help with infection control.
- The social areas (such as lounges and activity rooms) in existing homes are roughly half the size of these spaces in the proposed new builds.
- Dining room areas in existing sites have anywhere from a quarter to a third of the required space in RHAs (often, dining facilities in existing sites are centralized at grade).
- Proposed new builds include corridors that widen in areas, whereas existing homes are generally without this feature. Widening these areas allows for the possibility of treating them as transitional spaces that can serve as viewing, observing and socializing spaces if common areas are restricted during an outbreak.

- Proposed new builds present fewer pinch points in their planned layouts when compared to existing facilities.
- Consolidated staff space, which is present in all sites, with lockers often below grade, pose challenges to subdividing staff in cases of outbreak. For both existing sites and proposed buildings, storage, supplies and staff care stations were generally consolidated – hampering the ability to decentralize staff teams when outbreaks occur, and to maintain “clean / dirty” flow patterns for things such as laundry, both of which can impact infection control measures.

Recommendations

Modifying older buildings can pose unique challenges, given the obvious limitations of updating existing and occupied structures. Any change must be carefully considered in the context of how it may affect the residents who live there, as well as its regulatory implications. The feasibility of implementing structural or design changes also depends highly on the individual characteristics of each building. Not all changes can be made to every home, and careful individual site assessments are necessary to determine which changes will be possible and beneficial.

With these issues in mind, the following are potential upgrades to existing sites:

A. Priority Recommendations for Implementation in the Short Term

1 Reduce resident density.

A reduction in four-bed wards to semi-private rooms remains the most effective solution to mitigate future outbreak severity and duration, based on the data presented to date and reinforced by external experts. This relatively simple act can reduce the risk of disease spread in the most vulnerable outdated sites. At the four Revera “C” properties reviewed, reducing four-bed room accommodations to a maximum of two beds increases the square-foot-per-resident ratio by 24 per cent at these long term care homes. This allows for better physical distancing and the creation of smaller cohorts, and, ultimately, it can limit the magnitude of an outbreak if one occurs.

Revera Response: Implementation of recommendation is in progress.

This recommendation applies to old C-class long term care properties only, as we do not have ward-style suites in retirement residences. In long term care homes, we are reducing four-bed wards to semi-privates (two beds) through 2021 via attrition. We are also installing Plexiglas separators to provide additional resident protection and safety.

2 Create space to cohort residents.

Many older homes have a central area between two wings. This centralized building footprint provides an opportunity to create two distinct groupings of bedrooms, which could help to separate residents as needed during an outbreak.

Revera Response: Recommendation already implemented.

We have been cohorting residents and staff at our sites since the onset of the pandemic. This is achieved through collaboration between clinical, operations and building management groups and approaches are based on building design/layout.

3 Construct makeshift positive-pressure vestibules.

The bedroom grouping separation could be enhanced by setting up temporary positive-presurized vestibules, similar to those used when renovation work is underway in occupied healthcare facilities.

Revera Response: Recommendation to be considered as part of a future strategy.

Upon consulting with our external consultant, it was confirmed that this recommendation would create safety/fire code concerns and, due to building code requirements, a more permanent solution should be considered as part of a future strategy.

4 Reduce the resident population to increase the availability of social space.

Restricting access to common areas or shared living areas can be isolating for residents; a balance must be struck between social engagement, communal activities and infection control. One bedroom per grouping in existing sites could be converted to a lounge or similar social or activity space, to ensure that residents in separate cohorts have a place to meet during an outbreak. This would reduce the risks of residents congregating in one central space where infection could spread between residents of different cohorts. Designating a communal area for each cohort zone would not only give residents the opportunity for social interaction, but also help to maintain their mobility.

Revera Response: Implementation of recommendation is in progress.

We have reduced the population of our homes through reduction of four-bed ward rooms, allowing for more physical space per resident and better distancing protocol. As well, we have reduced congregation of different cohorts in central areas, to minimize infection spread between cohorts. We will consider more repurposing of space as part of our future strategy to allow for further reductions in cohort sizes.

5 Increase area available for dining and reconfigure critical congregate spaces.

One of the most significant deficits found in the existing buildings reviewed is the small amount of floor area available for dining. If meal service is not delivered at bedside, it is crucial to find ways to expand available meal service areas. If meals are still delivered in the dining room, consider scheduling more than one seating per meal to reduce density among residents. Remove all loose seating furniture (sofas) and tables from sitting and lounge areas

to increase room seating capacity during an outbreak and minimize the number of elements to disinfect; provide seating for loose chairs and wheelchairs only.

Where possible, decentralized dining is recommended. Where dining spaces are located only on the ground floor, designated elevators can transport residents.

Revera Response: Recommendation already implemented.

We have moved to multiple seatings to ensure that cohorts are scheduled in congregate areas at different times if it is not possible to cohort to entirely separate areas.

6 Use screens and temporary partitions to manage communal spaces.

To help maintain social distancing, provide portable Plexiglas screens that are easy to clean and sanitize. Provide temporary drywall partitions that can help to keep two different resident cohorts separate. These temporary dividers could be used in common areas serving more than one cohort grouping, and moved as needed to avoid potential cross-contamination.

Revera Response: Recommendation already implemented.

In our ward-style and semi-private rooms, where safe distancing is difficult, we have invested in special fabricated acrylic screens to allow for better separation of residents in their rooms. These special Plexiglas screens are mobile and can be utilized to separate other areas safely where distancing may not be effective. Where applicable, screening has been used in congregate areas as well.

7 Dedicate a separate elevator for staff and visitors.

To reduce the risk of infecting residents, it is advised, where possible, to dedicate an elevator for only staff and visitors to use, given that these are small, largely unventilated areas of high-touch surfaces.

Revera Response: Implementation of recommendation is not feasible for the foreseeable future.

We are limiting the number of people in the elevators to allow for safe distancing, but have not dedicated elevators to just staff and visitors as this would be impractical for residents who would experience long waits, and in long term care homes, most residents have to be accompanied by a staff member.

8 Reconfigure resident circulation spaces.

Ensure there is safe walking space for dedicated cohorts, particularly for residents with a cognitive impairment who may roam or “walk with purpose.” In addition to the resident room and communal spaces, integrate “intermediate spaces,” such as porches and alcoves,

providing strategically placed seating to allow viewing of the streetscape. This latter recommendation would support the activities of viewing, watching and observing, all of which are recognized as critical components of life in a long term care home.

Revera Response: Recommendation already implemented.

In long term care, each resident home area includes alcoves to serve as a destination at the end of corridors, which may be fitted with life stations. Resident amenity areas are in close vicinity to active areas, such as the nursing station and dining room.

9 Create spaces for family/caregiver access and visits.

To reduce infection risk during the first wave of COVID-19, homes were mandated to follow strict no-visitor policies. But the experience revealed that the resulting unhealthy epidemic of loneliness, anxiety, depression and grief cannot be sustained or allowed to persist throughout future waves of the pandemic. Various design solutions could allow visits to continue, such as:

- a. Designate space at grade near the entry for monitored visits.
- b. Construct temporary visitation modular pods that can be connected to existing entries, to allow for resident and caregiver interaction through panels that can provide visual and, potentially, acoustic connectivity.
- c. If no safe space for visits is available in existing buildings, consider providing power to a location close to the main building entrance, or other door accessible to the resident's path of travel, where a portable and accessible pod can be brought in to allow for a safe visiting protocol. The pod should be well ventilated, provided with a barrier-free entrance, and allow for safe distancing. Ideally, the mechanical systems incorporated within the pod would allow for separate ventilation streams for the resident and visitor within the pod. A strict cleaning protocol between visits would have to be defined and implemented.

Revera Response: Recommendation to be considered as part of a future strategy.

Our approach to date has been to repurpose spaces that are not being used for their intended purposes (e.g., chapels) for visits during an outbreak. In addition, where possible, we have converted interior spaces to safe visiting areas.

10 Delineate staff workflows and work areas.

While there has been a focus on dedicated staff entrances in the context of this current pandemic, staff must also be provided with adequate changing and hygiene facilities, with

the flexibility to segregate these areas further as needed should there be staff teams dedicated to different cohorts of residents. There must be a designated space to accommodate staff testing that can be converted for other uses. In addition to a central command centre, which may be needed to oversee the home's operations, it is highly recommended that homes include a respite area for staff members, with access to natural light and (possibly) nature, given the mental health toll of working in the context of COVID-19.

Revera Response: Recommendation already implemented.

Staff have been dedicated to cohorts, and their interaction in areas of congregation and respite is limited as much as possible (given limitations to the physical plant).

RECOMMENDATIONS FOR THE LONG TERM

Existing older long term care homes will continue to struggle against design challenges that can contribute to the scope, severity and duration of outbreaks, especially given the highly contagious and stealthy nature of the virus behind COVID-19. The physical limitations of these old buildings, constructed to meet standards of a bygone era, can significantly limit effective mitigation efforts in the near term. The best hope of doing so depends on the government, which would need to allow operators to take steps to reduce the number of residents and resident density in the existing spaces in order to bring these ratios closer to the standards of the current recommended guidelines.

The designs proposed for the two new Revera buildings assessed in the external review have already addressed many of the environmental factors that can contribute to the magnitude of any outbreak. This includes the elimination of ward-style rooms, reducing the number of all shared rooms, increasing the size of common areas, enhancing access to outdoor areas, creating residential areas of smaller cohorts, and fewer shared spaces generally. The review process has also added features to plans for the new facilities designed to benefit the mental health of both residents and staff in the event of an outbreak.

Looking ahead, the design team also pointed to the need to apply what has been learned from the pandemic's first wave in terms of selecting sites for future builds. Choosing sites with closer proximity to nearby hospitals, for example, has taken on new importance. As Revera homes pursue closer relationships with hospitals, potentially working toward establishing an "on-campus presence," this could go a significant distance to fostering stronger links between long term care residences and the wider healthcare system.

Our Expert Advisory Panel

Special thanks to our expert advisory panel for their hard work and insights. Members of the panel contributed their advice and recommendations on a voluntary basis.

Dr. Bob Bell, Chair, Former Ontario Deputy Minister of Health and former President and CEO of University Health Network. Dr. Bell agreed to participate in and chair this advisory committee. Revera agreed that Dr. Bell will have final editorial approval of the committee's report.

Dr. Diana Anderson, Healthcare architect and board-certified internist, DoChitect

Bob Bass, Bass Associates Professional Corporation

Dr. Vivek Goel, Vice President, Research and Innovation at the University of Toronto; Founding President and CEO, Public Health Ontario

Santiago Kunzle, Director and Principal, Montgomery Sisam Architects Inc.

Dr. Mark Loeb, Professor, Departments of Pathology and Molecular Medicine and Health Research Methods, Evidence, and Impact, McMaster University

Dr. Allison McGeer, Professor, Departments of Laboratory Medicine and Pathobiology and Public Health Sciences, University of Toronto

Michael Nicin, Executive Director, National Institute on Ageing, Ryerson University

Dr. Krystyna Ostrowska, Medical Microbiologist/Infectious Disease Specialist, Trillium Health Partners and LifeLabs, and Lecturer, University of Toronto

Dr. Samir Sinha, Director of Geriatrics, Sinai Health System and the University Health Network; Director of Health Policy Research, National Institute on Ageing, Ryerson University

