



Council
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Design
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COVID-19 and the Built Environment

**Trends Impacting the
Interior Design Industry**

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October 01, 2020

Introduction

On New Year's Eve 2019, the World Health Organization (WHO) picked up a media statement by the Wuhan Municipal Health Commission from their website on cases of "viral pneumonia" in Wuhan, People's Republic of China.¹ It was the first indication of the existence of a heretofore unknown form of novel coronavirus, later dubbed COVID-19. By the third week of January, the United States and France reported their first confirmed cases of the new virus, and Canada said it had identified several suspected cases. Within days, many other countries in Asia and Europe also reported confirmed cases. On January 30, WHO declared what had been an isolated epidemic in China to have risen to the level of a worldwide emergency health crisis.

Aside from being an unknown and deadly entity, what made COVID-19 so problematic for health officials was that it could be transmitted from human-to-human rapidly via the respiratory system, it could take weeks in some instances for those infected to notice symptoms, and some infected individuals were found to be asymptomatic, meaning they carried the virus and could infect others but showed no signs of illness themselves. This made it all the more difficult to identify and track carriers, leading to widespread undetected spreading of the virus. By the time an outbreak was identified, hundreds, even thousands, of people had been unknowingly infected.

By early March, the number of reported cases around the world was approaching 100,000, and more than 3,000 people were known to have died from the virus. In an effort to try to contain the spread of the virus, countries began restricting or closing their borders and advising or requiring citizens to stay in their homes. Whole industries ground to a halt, economies faltered, and governments were forced to pour billions and trillions of dollars into healthcare and fiscal aid spending to prop up businesses and supplement lost income.

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Now, more than six months into the height of the pandemic, by official counts more than 35 million people worldwide have fallen ill from the virus, and the number of deaths has exceeded 1 million.² WHO predicts that number could go as high as 2 million deaths if more is not done to limit social interaction. Outbreaks are reoccurring in countries that had appeared to have gotten the virus under control, and in some the number of cases has risen more rapidly and resulted in a higher number of deaths. At present, the United States has the highest number of reported cases, nearly 7.5 million, and the highest number of deaths, at more than 200,000. Canada has fared much better. Canadian health officials have recorded fewer than 176,000 cases since March and fewer than 10,000 deaths, with the majority of cases and deaths being reported by Ontario and Quebec. Currently, however, there are fewer than 19,000 active cases in the country, and the recovery rate for all cases is around 85 percent.³

A number of countries and companies are working on developing a vaccine and more effective treatments against the virus, but it could be well into next year before those are widely available.⁴ Some experts believe it could take several years before the virus is brought sufficiently under control worldwide, and the economic repercussions could be felt for a decade or more.

With that background as context, this report looks at how the built environment industry in the United States and Canada, and in particular the interior design sector, has been impacted by the pandemic, the ways in which the risk of contagion from the virus has affected the use of interior spaces, and how interior designers have responded to make those spaces safer and better able to function given current needs and restrictions.

Impact of COVID-19 on the Built Environment

As of the last week of March, the United States officially became the country hardest hit by the pandemic and has remained so. In mid-March, California was the first state to issue a stay-at-home directive, and by the end of March some 23 states and the District of Columbia had issued directives. Where governors chose not to issue a statewide directive, some mayors chose to issue local ones. Workplaces and schools were shut, as were non-essential retail and food services businesses. Occupancy at hotels and other lodging and resort properties dropped precipitously. Between March 16 and March 22, a state of emergency was declared in each of Canada's provinces; however, restrictions were limited mostly to size of gatherings and, in some provinces, the closing of day care centers and sit-down restaurants and bars.⁵ It was anybody's guess how long the situation might last.

The effect on the built environment industry was immediate and widespread. Most active projects came to a halt - in some cases postponed or delayed, in some cases canceled - and those in the planning or proposal stage suffered a similar fate. Supply chains were disrupted as factories, distribution centers, and showrooms were forced to close.

According to Dodge Data & Analytics, new construction starts, by dollar amount, declined by 25 percent in April.⁶ The U.S. Census Bureau reported new home starts fell by 22.3 percent in March and by another 30.2 percent in April.⁷ Home sales also contracted sharply, with sales of new homes dropping 15.4 percent in March and sales of existing homes sliding nearly 18 percent in April.⁸ Likewise, in Canada home sales plummeted across the board, down 14.3 percent from February, in which both sales and home prices had surged, and then nearly hit bottom, plunging another 57 percent in April.⁹ Nationwide, construction spending hit a historic low in April, with both the residential and non-residential sectors experiencing record-breaking declines.¹⁰

Construction industry employment figures experienced their first drop in over a year in March, a decline of 29,000, and then plunged by 975,000 jobs on net in April, a record loss according to the Associated Builders and Contractors (ABC).¹¹

In Canada, construction employment from March to April fell by 314,000 jobs.¹² A survey conducted by the American Institute of Architects (AIA) in late March found two-thirds of architecture firms reported slowing or stoppage of projects.¹³ In the first of a series of COVID-19 Pulse Surveys, from March 31-April 1, conducted by the American Society of Interior Designers (ASID), 48 percent of respondents said the virus has made a significant impact on their business, and 41 percent expressed a high level of concern for how the virus would impact their professional life.¹⁴ On a scale from 1 to 10, with 10 being a significant impact, members of the National Kitchen and Bath Association (NKBA) in April rated the virus' impact on their business as an 8.¹⁵

Early on, the situation was not as severe in Canada. Most firms quickly switched to remote working. There was some concern that projects could be delayed or canceled as more businesses and government offices shut down, and firms were keeping an eye on how that might affect their cash flow.¹⁶ Conditions soon deteriorated, however. Results of a second COVID-19 Pulse Survey conducted by the Royal Architectural Institute of Canada from April 30 to May 8 showed nearly half of member firms had laid off at least some staff, and another quarter said they likely would lay off some staff. Eight in 10 firms reported some level of project cancellation, and four in 10 reported some level of project postponement. Around six in 10 were experiencing reduced revenues, and the same proportion of individuals had their incomes reduced.¹⁷

All the major industry indexes of business conditions tumbled. The National Association of Home Builders (NAHB) Home Market Index (HMI) fell from 72.0 in March to a record low of 30 in April, and its Remodeling Market Index (RMI) plunged from 58 in the fourth quarter of 2019 to 24 in the first quarter of 2020. The AIA Architectural Billings Index (ABI) went from 53.4 in February to 33.3 in March and 29.5 in April. Similarly, ASID's Interior Design Billings Index (IDBI) cratered from 49.5 in February to 28.4 in March to 19.7 in April, its lowest level ever. The NKBA's Kitchen and Bath Market Index (KBMI) slid from 69.8 in the fourth quarter of 2019 to 41.0 in the first quarter of 2020, with most of the drop coming in the latter part of March.

Despite the calamitous impact the stay-at-home directives had on the built environment industry initially, activity in many sectors rebounded quickly once some states began opening up again toward the middle of May. Residential activity has had the strongest comeback, with home construction, home sales, home remodeling and, to a lesser extent, interior design experiencing renewed demand as people confined to their residences eagerly sought updates and improvements, such as home offices and learning centers, and those living in urban areas shifted to the suburbs and resort areas seeking communities with less density and more spacious properties. Sales of both new and existing homes soared in June and July, buoyed by low interest rates. The NAHB's HMI hit a record high of 83 for September.¹⁸ An analysis of user data conducted by Houzz found a 58 percent increase in demand for home professionals in the month of June compared to the year before.¹⁹

Canada has experienced a similarly robust resurgence in the housing market. Sales soared to a record high in July, up 26 percent from June and 30.5 percent year-over-year, with buyers far exceeding sellers. Activity has remained strong, with another record-setting month in August, and early results for September showing a jump of 25 percent from the previous month, for a year-over-year increase of 61 percent. Demand is highest for single-family homes.²⁰ Housing starts in the third quarter were up 22.2 percent from the second quarter, but slowed in August and September, particularly in the multifamily sector, and are expected to trend lower by the end of 2021.²¹

Commercial activity, on the other hand, has recommenced more slowly but is improving. Dodge Data & Analytics found total construction starts were up 19 percent in August, with nonresidential building posting a 16 percent gain, primarily in the office and manufacturing sectors.²² However, the AIA and the ABI reading for August remained stuck at around 40 for the third month in a row, with many members saying fewer proposals are converting to active projects, although the score for new design contracts increased by about five points.²³ Demand has been slowest in firms specializing in commercial/industrial projects. Based on the most current data available on architectural services employment, from July, noted the AIA, in total, the industry has lost 16,900 jobs since the beginning of the pandemic. The trend is similar in Canada, with office, retail, and hospitality construction all facing reduced activity.²⁴

Design Industry's Response to the COVID-19 Health Threat

While millions of Americans confined themselves mostly to home, others whose jobs or services were considered essential had to report to work, increasing their risk of becoming infected with the virus. Special care had to be taken to protect healthcare workers and caregivers who were caring for infected patients, particularly in nursing homes, which experienced high rates of infection and mortality. As weeks of confinement turned into months, dragging down the economy and endangering personal financial security, pressure grew for more employees to return to work, children to go back to school, and more businesses to reopen.

As the professionals most experienced in creating interior spaces to ensure health, safety, and wellness of occupants, architects and designers took up the challenge of producing solutions to respond to the health crisis. In late March, the AIA announced that it was establishing a task force to support the COVID-19 response. Starting in April, the organization began issuing a series of strategies, tools, and checklists for safely re-opening buildings in various sectors, including alternative care facilities, schools, senior living communities, healthcare facilities, retail stores, offices, and multifamily housing. Office furnishings manufacturers Herman Miller and Steelcase and A&D giant Perkins Eastman released research-based publications on adapting office spaces to protect employees. The major trade media created information to provide readers with advice and recommendations on how to implement design solutions and specify products and materials to ensure existing spaces were safe and contagion-resistant.

Many employees were not prepared to work from home full-time. The residential design media spoke with designers and related to readers how they could create more productive, comfortable, and ergonomically correct work areas at home, along with tips on how to keep the home well-lit and germ-free.

Steelcase conducted a survey to find out how people were actually working in their homes and provided tips on choosing a proper space, selecting furniture, and making everything ergonomically supportive.

The media also ran stories on how designers were adapting their practices to ensure clients and their staff could work safely on projects in home. Like others confined to home or isolated in their offices, designers who had not used them before quickly adopted videoconferencing and cloud-based document-sharing technologies to maintain communication with clients, manage staff and suppliers, and keep projects moving forward as best as possible.²⁵ Many added design-online services as well, from consultations to full-service design, purchasing and project management to attract new clients. Those who were allowed to proceed with on-site work and deliveries established strict health and safety protocols, such as requiring the use of masks, gloves, hand sanitizers, disinfectants, and protective coverings, and thoroughly cleaning all surfaces interacted with prior to vacating the premises.

Because much of the work did not require face-to-face interaction with clients, suppliers, or other members of the team, firms that had active projects did not feel the impact of the health restrictions as did firms whose projects were postponed or canceled. In fact, some firms found themselves in high demand from clients who were eager to make change in the home to make it more suitable to longer periods of confinement, remote working, and distance learning.

It's important to bear in mind that project delays and cancellations also affect manufacturers, vendors, reps, and many other businesses that supply and support interior designers. Speaking with Canadian real estate website Point2, interior designer Kellie Sirna, principal and co-founder of Studio 11 Design, observed, "It's crucial to support local antique shops and small businesses. Anyone can do this by sourcing from their websites or even calling to ask them to send photos of what you are looking for. Protecting the small businesses, artisans, and antique shops is a monumental step towards mitigating the effects of the outbreak on our industry. Taking these measures will help ensure they are still there when the crisis is over."²⁶

Design of Interior Environments in the Era of COVID and Beyond

Even after a vaccine becomes widely available, concern about possible contagion and the safety of indoor environments will linger. Nonetheless, we are essentially social beings and need to be able to gather and interact in order to conduct commerce, maintain our livelihood, sustain our relationships, provide care and support, and carry on with our cultural and spiritual activities. Designers, architects, builders, and others have already begun to think about the ways spaces in the future will need to be designed to strike a balance between supporting occupants and protecting them.

Design of Commercial Spaces

Offices. For the past several decades, the trend in office design has been to create more open, engaging spaces in order to promote interactivity, socializing, and knowledge-sharing as a way to create corporate culture and drive creativity, innovation, and productivity. Which makes them something of a hazard in a pandemic. At present, most non-essential employees are working remotely, but that is not a viable solution in the long term for many businesses and can be stressful for employees as well. A more satisfactory solution is needed.

In the short-term, one immediate solution, according to Janet Pogue-McLaurin, Gensler global workplace practice areas leader, is to "dedensify" the workplace: Workstations will be spaced further apart, conference rooms depopulated, space-dividing partitions erected, and staff issued rotating schedules.²⁷ Similarly, Elizabeth Van Goeler, principal and interior designer at A/E/D firm Sasaki, believes the "resimercial" trend in office design will be replaced with a new, more corporate approach, featuring "neighborhoods" or "pods" of small groups of employees and team workrooms with partially-assigned seats.²⁸ Another approach, offered by Darryl Henderson, lead of the interior design practice at Hanbury, is to update the old cubicle model with spacious and space-art work areas, adding low glass partitions to minimize contact transmission.²⁹

More use of non-touch technology, antimicrobial surfaces, screening stations in lobby or reception areas, more outdoor work options, and higher-quality HVAC and air filtration systems are other oft-cited strategies to reduce risk of infection. Janine Grossman, principal of corporate interiors at Perkins and Will's Toronto and Ottawa studios, cautions, however, of the need to "encourage our clients to resist taking a knee-jerk approach, for instance, in asking us to specify antimicrobial products and other materials that are potentially toxic to human health...Ultimately, as workplace designers, we will need to test and pilot re-integration as we go. We will need to measure our successes constantly, look for feedback from employees on a consistent basis, and tweak as we go."³⁰

In an article posted to the website of the Association of Registered Interior Designers of Ontario (ARIDO), Alexandra DiCenzo, an associate with the law firm WeirFoulds LLP, contends,

"In the long-term, we will see more science based driven decisions with respect to the design of office spaces. There will be new materials and hands-free technology with respect to work surfaces and equipment such as light switches or computer monitors. Companies will have to think ahead and no longer buy equipment which can be used for singular purpose, such as large boardroom tables, but instead they will buy surfaces that can split up and be repurposed and reimagined so they can re-organize their workplace flexibility when needed. Post vaccine, experts predict people will not be coming to an office to do heads down work, and instead, organizations will want employees to come back to physical workplaces to collaborate, spark ideas, and be connected. Auxiliary spaces will take on new importance, because that is where people co-create. Design will be more thoughtful and will not just be about how quickly we can move through a space and manage density, but how do we move someone through an environment so they can be inspired and get a task done. So there is a prediction of a more holistic space in the future."³¹

Hospitality. Along with the travel industry, hospitality was one of the sectors most heavily impacted by the pandemic. Safety concerns, restricted travel, and stay-at-home initiatives led to

widespread reservation cancellations. Some hotels attempted to pivot and lure locals with discounted rates and getaway packages, but with little success. Within weeks, hotel occupancy in the United States declined by nearly 80 percent, according to hospitality analytics company STR.³² The Canadian Tourism Commission estimated that overnight arrivals had declined by 99 percent by May 31, and hotel occupancy at present is still at only 38 percent.³³

Similar to the trend in office design, for the past decade or more hotels have redesigned their lobbies to make them gathering places for socializing and remote working, flanking them with bars and restaurants that face out onto the street to attract locals as well as guests. As one *Washington Post* reporter phrased it, the pandemic "took a buzz saw" to all that.³⁴ Designers were quickly called in to reconfigure public areas to make them more appropriate for social distancing and easy cleaning. Furniture was weeded out and rearranged. Signs and wayfinding indicators were added to aid one-way navigation and remind guests to keep a safe distance apart. Plastic shields were installed at reception and concierge desks, along with hand sanitizers stations.

A more recent development has been the conversion of public spaces, conference rooms, and guest suites to co-working spaces, as properties look for ways to generate revenues from local businesses.³⁵ This has involved removing beds and other guest furnishings and replacing them with desks, office chairs, work lamps, and conveniences like in-room snacks and catered meals. Hotel chains that have invested in these co-working areas believe they will become an integral part of their offerings even after business and recreational travel have resumed.

At the same time, hotels are already planning and implementing changes for the future. Those that have not already are switching to remote check-in via app and/or self check-in at a kiosk in the lobby, keyless entry using a smart phone, and the use of antimicrobial materials and surfaces to limit the risk of contagion.³⁶ More space will be allocated to health and wellness areas and services. UV lighting will be adopted to ensure linens, towels, and uniforms are properly disinfected. Hotels will increase their sustainability measures as a sign of their health-consciousness as well as a way to address guests' concerns about the property's impact on the environment.

Among all the sectors of hospitality design, restaurants have been most affected. Many were forced to close for weeks and then to restrict occupancy to minimal levels when they could reopen. To comply with social distancing measures, owners rearranged tables and employed alternate seating arrangements. Where possible, restaurants added outdoor dining options to expand their seating and entice back diners who were uneasy about sitting in an indoor environment with others. Since it is uncertain how long restrictions will remain in place or be reimposed should there be flare ups of the virus, flexibility will be key for designing restaurants in the near term.

In a discussion with Adrian Thompson, associate editor at *Interiors + Sources* magazine, Michael Lawless and Keiko Matsumoto of Wilson Associates suggested that at-table sanitization devices, booths with elevated partitions, and open-layout kitchens separated from diners by glass may be features of tomorrow's restaurants.³⁷ *Building Design + Construction* magazine reported, "MASS Design Group, an architecture and design collective that has worked with Partners in Health to create safe, sanitary spaces during infectious disease outbreaks around the world, released *Spatial Strategies for Restaurants in Response to COVID-19*. This white paper advises several measures such as establishing a clearly defined exchange zone for transition of food, supplies, and people to and from the front of the eatery to the back where the kitchen is located." The firm also advised adding outdoor dining spaces to expand capacity, using signs to direct traffic flow and remind patrons of health safety protocols, and integrating graphic elements to facilitate wayfinding and social distancing.³⁸

Healthcare. U.S. and Canadian healthcare facilities were not prepared for the challenges presented by the novel coronavirus. They rapidly had to cordon off areas and dedicate separate wings, intake entrances, and storage and disposal areas to prevent the spread of infection to patients and staff other than those treating or being treated for the virus. Elective surgeries and other treatments were postponed or canceled to create additional ward space for COVID patients and avoid possible contamination to non-COVID patients.³⁹ Emergency makeshift treatment centers were set up in tents, conference centers, sports arenas, and other unoccupied spaces.

Designers were called in to help address issues related to the interior environment. In a survey of 100 certified healthcare designers conducted by

the American College of Healthcare Architects (ACHA) in April, nearly two-thirds said they had responded to client requests to evaluate alternative care sites and to help increase healthcare system capacity.⁴⁰

The same ACHA survey asked designers to identify upcoming challenges for healthcare facilities. They mentioned the need to prevent cross-contamination so that normal operations and regular treatments could continue, restricting patient and visitor flow, separate entrances and intake areas for regular and COVID patients, and making spaces more flexible and adaptable. In an article for *Healthcare Design* magazine, architect James Albert, principal at Hord Coplan Macht, identified a number of other changes that will be needed, including modifying shared staff and public spaces, planning for inpatient surge capacity, and isolating operating rooms and labs.⁴¹ (At the time of writing, *Healthcare Design* was conducting its own survey of healthcare designers, asking them to share insight on how they've responded to the crisis through design solutions as well as how they anticipate business/projects faring in a post-pandemic world.)

For the past couple of decades, hospitals and other facilities have adopted elements of hospitality, retail and residential design in an attempt to make patient and visitor experience feel less institutional. Now, as in hospitality, many of those spaces will need to be rethought and redesigned. Like hotels, more will be transitioning to self check-in and self-rooming procedures using smart device technologies and kiosks.⁴² To be able to react more quickly to a future health crisis, spaces will need to be adaptable, flexible, and suitable for multiple purposes.

Changes to furnishings, surfaces, and finishes will be required to fulfill the need for more adaptable spaces as well as to minimize infection transmission and facilities cleaning and disinfecting regimens. Interviewed for an article for *Health Facilities Management* magazine, Pam Krill, product manager at Steelcase, said "We expect to see even more focus on the use of durable, cleanable material and designing furniture with features such as open bases, minimal seams, and functional crumb sweeps."⁴³ Herman Miller now offers a MicrobeCare antimicrobial coating on some of its furnishings that actively kills microbes and is safer than using chemical solutions to disinfect surfaces.

The elderly, those age 70 and older, have experienced the highest levels of hospitalization and deaths during the pandemic. Early on, rates of infection and mortalities were exceptionally high in long-term care facilities. Worldwide, as of July more than 40 percent of COVID-19 related deaths had been linked to long-term care facilities, with figures being as high as 80 percent in some high-income countries, related to the World Health Organization.⁴⁴ Of the United States, *The New York Times* in September reported, "While 7 percent of the country's cases have occurred in long-term care facilities, deaths related to COVID-19 in these facilities account for about 40 percent of the country's pandemic fatalities," a total of some 77,000 resident and staff deaths.⁴⁵ During the spring, 81 percent of deaths from the coronavirus in Canada occurred in long-term care facilities.⁴⁶

The Center for Disease Control has produced guidelines for improving health and safety measures in long-term care facilities, but changes are also needed to the physical environment. In article for *Building Design + Construction*, Bradford Perkins, founder and chairman of Perkins Eastman Architects, and Martin Siefering, the firm's co-national practice leader for senior living, presented a 13-point plan to reduce coronavirus deaths in nursing homes that includes the selection of interior finishes and furniture that can withstand frequent and harsher cleaning regimens, implementation of "WELL Design" principles, more options for private rooms or apartments, and flexible spaces that can be easily converted to sleeping rooms for staff if needed.⁴⁷ For the longer term, changes such as replacing multi-resident facilities with separated individual units or walled-off "neighborhoods" of individual units, separating staff areas from resident areas, employing more monitoring technology including possibly robots and selecting furniture that can be easily moved if a resident needs to be placed in quarantine are among those designers have proposed.⁴⁸

Education. Perhaps no sector of the built environment has invoked so much controversy as education. At the onset of the pandemic, in the United States most schools and institutions of higher learning closed almost immediately and in Canada shortly thereafter, reverting to distance learning as families complied with stay-at-home directives. Understandably, parents, teachers, and students are leery of bringing students back to campus before a proven vaccine is widely available.

Attempts to do so in August and September met with mixed results, with some campuses having to re-close or isolate groups of students exposed to the virus. Yet, concerns about students falling behind in their studies and parents having to take time away from work to assist with schooling their children at home, as well as potentially substantial financial losses, have put pressure on administrators to recommence onsite classes.

To maintain adequate social distancing, the capacity of classrooms need to be greatly reduced, notes Peter Bachmann, principal and market sector leader for JCJ Architecture in an interview with *Interiors + Sources* magazine.⁴⁹ Thus, other facilities will need to be repurposed to increase the number of classroom spaces, and spaces will need to be more flexible and adaptable to suit multiple purposes. Using touchless technology in entry ways, bathrooms, and classrooms; improving traffic flow and widening entries; and modifying air, water, and lighting systems are other, readily implementable design solutions to help prevent transmission.

For college and university campuses, a major area of concern is student residence halls, where students eat, sleep, and have their greatest amount of interaction together. Converting double-occupancy to single-occupancy rooms, employing dividers and hospital curtains to separate living and sleeping areas or using suite-like floor plans with some shared and some private spaces, creating smaller islands of seating in common areas, integrating touchless technologies, and transforming public bathrooms into multiple individual private bathrooms are some of the design changes that have been implemented or explored.⁵⁰

Retail. Most retail stores were deemed non-essential in stay-at-home directives and were forced to close for an extended period. When they were allowed to reopen, strict social distancing and health safety protocols were mandatory. Meanwhile, out of necessity greater numbers of customers turned to online shopping for convenience and safety, and experts believe that will have a lasting effect on how people shop in the future, even after COVID-19 is no longer a threat.⁵¹ Stores have implemented design changes such as placing signs and graphics throughout the store to facilitate wayfinding and control customer flow, adding touchless shopping counters and/or contact-less payment technologies, and installing

plexiglass shields between customers and staff and/or customers and product.

In an interview with *Interior + Sources* chief content director Robert Niemenen, Kathy Crat-Reich and Robyn Novak with NELSON Worldwide discussed how retail spaces are likely to change as a result.⁵² Two major developments they foresee are retail outlets expanding their back-of-house operations to accommodate more pre-order pick-ups and deliveries while shrinking the front-of-house and carrying less on-shelf merchandise, directing consumers to their online inventory listings instead; and, having different store models in different locations, one of which may be the pick-up-and-go outlet and another a smaller space that is more focused on providing an engaging consumer experience, with a third being a hybrid of the two. Such a change would have considerable implications for the demand for retail design services versus merchandising display services in the future.

Design of Residential Spaces

Single-family homes. Stay-at-home directives and the need to limit contact with others transformed homes into COVID bunkers from which all daily life activities took place - working, schooling, shopping, exercising, dining, socializing (via technology), and playing/relaxing. After weeks of such confinement, residents were eager to make changes to their homes in order to better accommodate these activities and adjust to a lifestyle that kept them primarily indoors. Demand for home offices, learning centers, and outdoor play and living areas boomed once restrictions began to be lifted.⁵³

Longer term, designers and builders foresee more demand for adaptable and multipurpose spaces, with guest rooms doubling as home offices and entertainment spaces as learning centers. Health, wellness, and prevention against the spread of disease will be of primary importance, resulting in the use of entrance halls and mudrooms as transition areas with hand-washing and sanitizing stations, dedicated fitness areas, use of touchless fixtures, higher quality air and water filtration systems, antimicrobial surfaces and materials, and increased natural lighting and ventilation.⁵⁴

The open plan trend will reverse itself. With people doing more cooking at home, the kitchen will be closed off from the dining area to prevent the spread of smells and smoke. Likewise, open great room designs will give way to more separated spaces, either temporary or permanent, to provide more privacy for occupants. Spa bathrooms may be replaced with separate his and hers bathrooms.

More attention will be given to sustainability and design for aging. In a blog for the Toronto real estate and urban living website *Urbaneer*, contributor Steven Fudge notes that he has seen an increase in multiple generations residing under the same roof and foresees more homes adding an accessibility suite to accommodate younger and older family members and to facilitate caregiving.⁵⁵

Less commuting means households will need fewer cars. Garages will be reconfigured to provide more storage space as well as parking. Outdoor spaces will be used for distanced socializing, physical activities, and abundant gardens in place of long stretches of lawn to enhance the feeling of connection to nature and to substitute for public parks.⁵⁶

Smart, voice-activated and wireless technology will be implemented throughout the home to support work, school and entertainment activities, monitor home systems and security, and facilitate home deliveries, as well as reduce the need to touch appliances, door handles, light switches, fixtures, and curtains and blinds. This will require dedicated areas with backup systems and power sources to serve as tech hubs, plus additional outlets and charging stations in convenient locations throughout the home.

Multi-family. Rental housing is home to more than a third of U.S. households, according to the Harvard Joint Center for Housing Studies, and the proportion is about the same in Canada.⁵⁷ In addition, many more own and reside in condominiums and co-ops. Yet, how the pandemic has affected multi-family housing residents has received very little attention from trade media and the mainstream press. In an article for *Building Design + Construction*, Charlotte Blue an interior designer with LS3P Foresight, states "Multifamily developments pose unique challenges and opportunities. Designers must consider how people use private residential spaces as well as

public shared spaces. In both settings, design and operational strategies can support healthier, more comfortable lifestyles as needs evolve."⁵⁸

Among the possible design solutions that can be implemented to make units more functional and livable for those living in smaller spaces, Blue suggests adding a mudroom to serve as a decontamination zone, providing a nook or fold-down work station that can be used for office or learning center during the day, using multi-purpose furniture such as a console/desk with a video screen for work and entertainment viewing, separating work and live spaces on different floors, and including in-unit fitness areas or equipment.

Along the same lines, in an article for *Canadian Architect*, design staff at A&D firm Kasian add, noting the need for adaptable, multipurpose spaces, "Dividers can change the shape and character of spaces with sliding doors, barn doors or ceiling-hung curtains, transforming meeting space during the day into a dining area in the evening." They also are seeing an increased demand for more flexible homes to accommodate new uses and multi-generational families due to a growing need for childcare, elder care, and aging in place.⁵⁹

Public or communal spaces also will need to be re-designed. In an interview with *Canadian Apartment*, Jonathan King, principal at the architectural firm BNKC, states, "Technology will play an even greater role in helping us manage these spaces. For instance, allowing residents to enter their building and call an elevator from their mobile device without touching a surface as they pass up to their suite, or booking a conference room for a work-from-home meeting." Furthermore, he adds, "We are looking at how to re-program both our indoor and outdoor amenity spaces. We are looking to create more flexibility to allow for continuous use by individuals or smaller groups. Bookable spaces where students can study...conference rooms to support working from home...outdoor dining areas and unique play spaces - these features are going to become even more important in the future."⁶⁰

Senior living. One of the biggest impacts on senior living as a result of coronavirus may be a decline in occupancy. Because of the headline-grabbing high mortality rates early on in senior

care facilities, older persons and their adult children may be hesitant to move from a private residence to a communal setting, such as senior living complex. Be that as it may, builders, operators, and designers are thinking about the changes that will need to be made to make senior living facilities safer. In the past decade or more, senior living has been heavily influenced by trends in hospitality and residential design, and the solutions being explored are very similar to those being employed in those sectors. Many of them were already under consideration prior to the onset of the pandemic, such as incorporating more smart and wellness technology (such as health monitoring devices and touchless and voice-activated controls), expanding outdoor areas for dining and fitness, and adding balconies, porches, or patios to increase time spent outdoors and allow for distanced social interaction.⁶¹

Going forward, separated auxiliary spaces for visitors and outpatient medical care will be needed in order to safeguard against exposure from external contagion. Air filtration and ventilation systems will need to be upgraded, along with surfaces and materials that can be easily cleaned and deter the spread of infection. Among other recommendations, the AIA's white paper *Strategies for Safer Senior Living Communities* includes ideas and a diagram for redesigning dining areas to encourage social distancing and reduce the risk of cross-contamination.⁶²

Sharing his advice for other designers to support the health of senior living communities while maintaining their aesthetics, healthcare interior designer Keith Stanton, director of design development at Thoma-Holec Design, said it is important to be mindful of the needs of staff as well: "Staff members' health and psychological well-being is critical and can be supported by making space available for them to have a private moment, catch their breath, or call family members to ensure them that they are OK. They should be able to shower, wash their hands frequently, and have access to healthy food and beverages."⁶³

Conclusion

With the recent resurgence of outbreaks in Europe, Asia, and the United States, hopes for a quick resolution to the pandemic have given way to a more stoic acceptance that conditions may well remain as they are for a large part of 2021 and perhaps beyond.⁶⁴ Most government projections foresee the delivery of a proven, safe vaccine in some countries in the spring of 2021, although some scientists believe it will not be generally available until the fall, with less-developed countries lagging behind due to logistical and other problems.⁶⁵ That means designers will be put in the position of having to come up with solutions that meet the current need to address the health crisis while anticipating a return to more normal use of spaces once it is on the wane.

With the passing of time, we are learning more and more about the virus and how it is spread. That should help designers figure out the most effective ways to improve the safety of interior spaces. As the overview above reveals, design interventions proposed to date have been fairly uniform across all industry sectors, based on general design principles. Over time, as designers gain more experience and gather more post-occupancy data on how successful these interventions may be, they will be able to fine tune their approaches to particular types of spaces.

In addition, designers may need to re-think their approach to design, suggests Carolyn BaRoss, firm-wide health interiors director at Perkins and Will: "Designers need to reevaluate offices and all our environments through the lens of public health...Just as other types of crisis have driven operational, architectural change, this one will force us all to evaluate everything we do, how we design and build, and reimagine these places for solutions that restore our health and sense of safety and actual safety. They are complex problems, and I can see the design teams of the future including scientists, infection control experts, and much more integration with engineers to inform spatial configuration and how engineering systems integrate with our projects to ensure occupant safety."⁶⁶

Wellness was already at the front and center of design before the start of the health emergency. The pandemic has raised the bar on health and wellness, requiring designers to acquire new knowledge and try new approaches. Designers in other specialty areas are likely to borrow practices from healthcare design, just as healthcare designers in recent years have looked to hospitality, residential, and retail design to create less institutional healthcare facilities. Materials and surfaces formerly specified almost exclusively for healthcare and senior care environments will be incorporated into commercial environments to withstand more rigorous cleaning regiments and prevent the spread of infection. Technology of various sorts will be employed to minimize contact and monitor the health status of occupants.

The use of spaces also will change, in some cases reversing decades of design trends. Office spaces likely will get smaller and be designed primarily to accommodate gatherings of small groups, with more employees performing their own work remotely. Retail spaces will focus on processing and delivering orders or on quickly facilitating on-site sales, rather than on attracting consumers and enticing them to linger. Hotels, resorts, clubs, and conference centers will need to make their efforts to ensure the safety and health of guests conspicuous and credible. Large gathering spaces, public restrooms and showers, and dining areas will need to be reconfigured for smaller groups and safe personal hygiene. Classroom size will be smaller, access to labs and communal spaces will be limited, and large lecture halls will have to be repurposed as presentations are delivered via online learning platforms.

These and other changes will require designers to rethink their approaches to these environments, which should prove both challenging and inspiring. Moreover, clients and occupants will have a greater appreciation for the importance of good design in protecting their health and safety.

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