

Resilience, and the Built Environment

HMC Architects



Many individuals deserve special mention for their contributions to this important study. We would like to express our sincere gratitude to all the research participants—internally and externally—for sharing their insight and generating new knowledge. Without their participation, this study would not have been possible. Special thanks to HMC Architects' leadership Brian Staton, Kirk Rose, and Lance Hosey, as well as all the practice leaders, for valuing and supporting research initiatives and for their guidance and contribution throughout this process. We would also like to extend our gratitude to the very creative individuals from our graphics and communications teams for their amazing work in presenting and distributing this important effort.

 OVID-19 has changed lives around the world, from the way people work, learn/teach, and deliver/ receive healthcare. At HMC, we value research and we invest in it. Through the lens of research, we decided to explore the impacts of COVID-19 on our core practices of civic, education, and healthcare. The purpose of our research is to help our clients amid this human health and financial crisis. We are looking to identify new business partners and define transformational initiatives that will steer us to a meaningful future path. We are eager to learn how to promptly adapt to industry changes, lead with innovation, and shift our mindset to find new ways of serving our clients and communities.

#### PURPOSE OF THE STUDY

America's public infrastructure has been designed to respond to emergency and mass-casualty incidences such as terrorist attacks, chemical/biological events, or natural disasters such as earthquakes, hurricanes. and fires. However, it wasn't prepared for an infectious disease outbreak like COVID-19. This is not the first and won't be the last viral pandemic we'll experience. They may even become more frequent. This is the result of choices we make and how we, as human beings, interact with our planet. Climate change is making the earth more hospitable to bacteria and viruses. We are also pushing boundaries by invading natural spaces and coming into contact with wildlife and new kinds of diseases for which we're not prepared. As designers, it's our responsibility to anticipate these negative effects on our ecosystem and learn how to design pandemic-ready facilities. We started this research effort by posing a few exploratory auestions:

- 2. What happened during the pandemic, what was affected first, and what were the changes put in place?

6. How can we define pandemic-ready facilities?

Using snowball sampling, we invited our clients, end users (medical team members, students, teachers, representatives from public agencies), architects, general contractors, engineering firms, and technology companies to participate in our study, using a combination of phone interviews, virtual focus groups, and online surveys.

**Civic:** A group of representatives from different public agencies, including fire, police, sheriff, city or county administration as well as consultants from public safety and engineering companies were invited to attend a virtual focus group to discuss and share insights. Prior to the focus group session, a brief online survey was sent to the group for their review and evaluation of the short-and long-term impacts of COVID-19 on their current and future facility operations and desian.

PreK-12: The study began with a comprehensive literature review on building design and infectious disease transmission/ prevention as well as guidelines from industry groups (AIA, ASHRAE, and others) and governmental agencies (CDC, LADPH, and others). A group of PreK-12 client 1. What was the past state before COVID-19? representatives from various school districts participated in individual phone interviews to share their insight and understanding of short-and long-term impacts of COVID-19 on their schools' design and operation. An

3. What is the likely future state tied to behaviors, perceptions, and the changed business model that occurred?

4. What will be adopted and lasting?

5. What will this mean for our core practices of civic, education, and healthcare?

### METHODOLOGY

online survey asked parents with children living at home to share their insights across various dimensions of technology, operations, health and safety, and procedures for reopening schools in the fall of 2020. We distributed the survey to HMC colleagues and posted it on social media platforms to engage participants outside the firm.

**Higher Education:** We invited a group of higher education clients, students, contractors, and consultants to participate in individual phone interviews to share their insight and understanding of short-and longterm impacts of COVID-19 on facility design and operations for college campuses and universities.

**Healthcare:** We invited a group of healthcare clients and end users (physicians and nurses), design experts, engineering firms, and technology companies to participate in individual phone interviews to share their insights and understanding of short- and long-term strategies for healthcare facility design and operations in response to COVID-19 and future pandemics.

#### **RESULTS/DISCUSSION**

As the COVID-19 pandemic continues to disrupt nearly all aspects of life, from the way we work and learn remotely to delivering and receiving healthcare virtually, we are looking at this disruption as an opportunity to reinvent our practice. By discovering and generating new knowledge and insight, we are determined to help our clients by exploring their current pain points, streamlining their processes, and identifying solutions to improve their organizational outcomes. As part of this ongoing research effort, we are committed to sharing our findings with the industry in two main sections of common strategies and practice-specific strategies, in five main areas of 1. Technology, 2. Adaptability and Flexibility, 3. Regulatory, Budgetary, and Institutional Impacts, 4. Space Needs, Reduction, and Restructuring, and 5. Impacts to Wellness and Mental Health.

Public health crises may become more frequent, and the choices we make now will determine how prepared we are in the future.

INTRODUCTION

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hile the unique needs of specific communities, clients, and building types also can require unique strategies, many strategies apply to virtually all building types.

#### Flexibility and Adaptability

Now more than ever, we need to design with flexibility and adaptability in mind. Our design solutions must be nimble enough to pivot around the required condition. Modular construction, "kits of parts" furniture systems, and switchable mechanical, electrical, and plumbing (MEP) systems are just a few strategies to implement in future planning and design. For example, as a result of work-from-home initiatives, office spaces could become less dense, less hierarchical, and potentially more collaborative. Furniture

manufacturers are marketing a variety of clear dividers with different heights that could be added or taken down depending on the pandemic "threat level." In many places,



outdoor areas can be reimagined to serve the traditional functions of indoor spaces. In fact, many activities normally performed indoors may have to be relocated outside to accommodate for physical distancing and the shortage of interior space as occupation densities lower.

#### Technology

Technology will be a key driver of how we encounter future pandemics. Our challenges today can serve as a test for many technical advancements to show their capabilities in creating safe and healthy environments for their occupants. Examples include:

• Heat sensing infrared cameras that can be installed outside of buildings to allow building operations staff to identify individuals with high body temperatures. An automated door opener can be programmed to open when the temperature check has been completed and the data is within range.<sup>1</sup>



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pandemic showed us a huge gap in society in terms of equitable access to technology.



- Pattern recognition software can be utilized within video recording software to confirm that a person is wearing a mask and spaced an appropriate distance from others.<sup>1</sup>
- Robots can roam buildings and public spaces and inform people if they are not meeting physical distancing rules.<sup>1</sup>
- Real time locating systems (RTLS), mobile apps, and wearable sensors can identify equipment to be sanitized and notify any person that comes in contact with an infected person without added privacy concerns.
- Spaces could be sanitized while occupied using an ionized hydrogen peroxide (IHP) system added to a standard heating, ventilation, and air conditioning (HVAC) system. This technology creates a cloud of hydrogen peroxide which is 80 to 90 percent effective in killing microorganisms.<sup>2</sup>
- Using ultraviolet germicidal irradiation (UGVI) light is another strategy for reducing the viability of infectious agents by deactivating the virus.<sup>3</sup>
- Air curtains (with suction duct on the floor) could be installed in between spaces to allow air isolation between two sensitive spaces.<sup>4</sup>
- Smart toilets can require a lid to be closed prior to flushing and surfaces within the toilet sanitized for the next use.<sup>5</sup>
- There are technologies that provide antimicrobial finish coatings on high-use objects like door handles and furniture in public spaces. While a promising concept, the execution of these products needs to be further researched to meet wide industry acceptance.

When we talk about technology, the COVID-19 pandemic showed us a huge gap in society in terms of equitable access to technology.

- As employees working from home, students taking online courses, and patients receiving healthcare via telehealth, we all need equitable access to:
- o A reliable and high-speed internet connection
- o Affordable computers or tablets
- o Sufficient training for a smooth transition to a new normal when we may have to work from home, learn remotely, and visit our doctors virtually for a longer period of time.
- Kiosks or tele-cubbies can be used to provide an in-person experience for people in communities with limited access to technology.
- Network security will become a necessity to ensure privacy and to avoid service disruptions.

### **Carbon Reduction**

The pandemic has isolated millions indoors, where the concentration of pollutants can be two-to-five times higher than outdoors.<sup>6</sup> Dwelling in environments with poor indoor air quality (IAQ) can have long-term negative impacts on productivity, physical health, and cognitive abilities.<sup>7, 8</sup> Frequently diluting indoor air with fresh air from the outdoors is vital, but this often requires relatively large amounts of energy, resulting in carbon emissions that contribute to climate change. which in fact contributes to COVID-19.

Climate change is dramatically undermining biodiversity through deforestation, altered habitats, and diminished resources, giving rise to novel viruses such as COVID-19 and creating conditions that allow diseases to spread more readily. Additionally, people are more susceptible to contracting COVID-19 if they live in places with poor air quality, which is exacerbated by the greenhouse gas emissions that cause climate change.<sup>9</sup>

Using more energy to combat COVID-19 creates a vicious cycle. To avoid this, it is imperative to develop low-energy strategies to improve indoor air quality while reducing energy consumption:

**Conduct an air quality test.** Once you identify problems, improving IAQ and energy could be as simple as replacing filters or fine-tuning the HVAC systems, or replacing certain materials, finishes, and furnishings.

Conduct an energy audit. Careful review of a building's energy use can reveal whether it is performing efficiently. An audit can also identify ways to lower energy use by 10 to 40 percent.<sup>10</sup>

**Replace older systems.** The average commercial building in the U.S. is about 50-years-old, and many are much older.<sup>11</sup> Current systems use 30 to 50 percent less energy to produce the same amount of cooling as air conditioners made in the mid-1970s.<sup>12</sup>

**Open spaces.** The U.S. Environmental Protection Agency (USEPA) recognizes open work plans as a standard strategy for saving energy. Studies show that open workspaces can be more than twice as efficient with energy than closed offices<sup>15</sup>

Use on-site renewable energy sources. Many states, including California, are setting ambitious targets for energy efficiency. The California Energy Efficiency Strategic Plan



Natural ventilation strategies include operable awning windows and trickle vents for nighttime flushing. Oxnard Union High School District's Rancho Campana High School (designed by HMC Architects)

**Convert systems.** Some HVAC systems are more efficient than others. For example, switching from a constant volume (CV) to variable air volume (VAV) can reduce annual energy use by 10 to 21 percent.<sup>13</sup>

**Passive ventilation.** A study of office buildings in China found that passive ventilation can cut cooling energy by as much as 78 percent.<sup>14</sup> Natural airflows are unpredictable, so often this strategy is coupled with fan assist or other mechanical devices.



The impacts of the COVID-19 pandemic will be felt for many years to come. which will undoubtedly lead to significant regulatory changes in the industry.



calls for all commercial buildings to be net-zero energy by 2030.16

### Regulations

The impacts of the COVID-19 pandemic will be felt for many years to come, which will undoubtedly lead to significant regulatory changes in the industry. Code cycle changes and licensing requirements can generally take a long time to be adopted, but since we have learned that pandemics can happen more frequently and COVID-19 won't be the last, regulatory agencies will evaluate and adopt short-term waivers and long-term guidelines to protect human health and wellbeing now and in the future. Below are a few examples of these regulatory changes:

- The Centers for Medicare & Medicaid Services (CMS) approved 80 additional services to be furnished via telehealth and paying providers at the same rate as in-person visits.<sup>17</sup>
- California's Office of Statewide Health Planning and Development (OSHPD) allowed hospitals to reconfigure spaces as needed to accommodate patient surge and non-hospital buildings to be used for patient care and auarantine on a short-term basis.<sup>18</sup>
- The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) issued a statement indicating that "transmission of SARS-CoV-2 through the air is sufficiently likely and that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures." For more details, please review one of HMC Architects' white papers published on this topic, with a list of ASHRAE recommendations to improve IAQ, including: <sup>19, 20</sup>
- o Increasing ventilation rate
- o Increasing outside air (OA) rates through mechanical ventilation
- o Building flushing

- o Reducing pathogen transport via filtration
- o Mitigating virus survival by controlling humidity (40 and 60 percent)
- o Controlling transport via pressurization and airflow patterns

#### References

- 1. Morrissey, J. (2020). *Fighting the* Coronavirus with Innovative Tech. The New York Times. <u>https://www.nytimes.</u> com/2020/06/16/business/fighting-covid-<u>19-innovative-tech.html</u>
- 2. Parker, C. (2020). 4 Technologies for improving building sanitization in a post *pandemic society.* Building Design & Construction. https://www.bdcnetwork.com/ blog/4-technologies-improving-buildingsanitization-post-pandemic-society
- 3. Setty, R., Hammelman, K., & Metzger, C. (2020). Re-opening our schools: Activities and Recommendations [Webinar]. The American Society of Heating, Refrigerating, and Air- Conditioning Engineers (ASHRAE). https://www.ashrae.org/file%20library/ professional%20development/learning%20 portal/instructor-led%20training/online%20 instructor-led/final re-opening-ourschools -activities-and-recommendations june-2020.pdf
- 4. Advanced Industries Practice. (2020). Can HVAC systems help prevent transmission of COVID-19. McKinsey & Company. https:// www.mckinseu.com/industries/advancedelectronics/our-insights/can-hvac-systemshelp-prevent-transmission-of-covid-19
- 5. Brulliard, K., & Wan, K. B. (2020). Put a lid on it, folks: Flushing may release coronavirus*containing 'toilet plumes'*. The Washington Post. <u>https://www.washingtonpost.com/</u> health/2020/06/16/coronavirus-toilet-<u>flushing/</u>

- 6. USEPA. (n.d.). What are the trends in indoor air quality and their effects on human health? https://www.epa.gov/reportenvironment/indoor-air-quality#
- 7. USEPA. (n.d.). Introduction to Indoor Air Quality. https://www.epa.gov/indoor-airaualitu-iaa/introduction-indoor-air-aualitu
- 8. TH Chan School of Public Health, Harvard University. (n.d.). *Poor indoor air quality* may dull cognitive abilities. <u>https://www.</u> hsph.harvard.edu/news/hsph-in-the-news/ indoor-air-quality-cognitive-abilities/
- 9. C-CHANGE (Center for Climate, Health, and the Global Environment). (n.d.). *Coronavirus* and Climate Change. Harvard T.H. Chan School of Public Health. <u>https://www.</u> hsph.harvard.edu/c-change/subtopics/ coronavirus-and-climate-change/
- 10. Abraxas Energy. (n.d.). *Commercial Energy* Audits. https://www.abraxasenergy.com/ fm-services/sustainability-csr/commercialenergy-audits/
- 11. Feldstein, S. (n.d.). *Research Commentary*. Enhanced Commercial Property Database. http://www.commbuildings.com/ ResearchComm.html
- 12. US DOE. (n.d.). Central Air Conditioning, Chapter 5: Increasing Efficiency of Building Systems and Technologies. https://www. energy.gov/energysaver/central-air-<u>conditioning</u>
- 13. USEPA. (n.d.). Indoor Air Quality and Energy Efficiency. https://www.epa.gov/indoor-airguality-iag/indoor-air-guality-and-energyefficiency

### COMMON STRATEGIES 12

14. Tong, Z., Chen, Y., Malkawi, A., Liu, Z., & Freeman, R. B. (2016). Energy saving potential of natural ventilation in China: The impact of ambient air pollution. Applied energy, 179, 660-668. 15. Holmin, J., Levison, E., & Oehme, S. (2015) The utilization of office spaces and its impact on energy use. (Dissertation). http://uu.diva-portal.org/smash/get/ diva2:817033/FULLTEXT01.pdf 16. California Public Utilities Commission. (2017) Zero Net Energy. https://www.cpuc.ca.gov/ 17. Centers for Medicare & Medicaid Services (CMS), (2020), Coronavirus Update; CMS Releases Waivers for COVID-19. American Hospital Association. <u>https://www.aha.org/</u> advisory/2020-03-31-coronavirus-updatecms-releases-waivers-covid-19 18. California Hospital Building Safetu Board. (2020). Administrative Processes, Code Changes, & Standard Details *Committee*. Office of Statewide Health Planning and Development (OSHPD). https://oshpd.ca.gov/ml/v1/resources/ document?rs:path=/Public-Meetings/ Documents/HBSB/2020/COMBINED-APCCSD-6-22-20..pdf 19. ASHRAE (2020). ASHRAE Position Document on Infectious Aerosols, Atlanta. Georgia. https://www.ashrae.org/file%20 library/about/position%20documents/ pd infectiousaerosols 2020.pdf 20. ASHRAE (2020). ASHRAE Epidemic Taskforce Schools & Universities. https://www.ashrae.org/file%20library/ technical%20resources/covid-19/ashraereopening-schools-and-universities-c19-<u>quidance.pdf</u>



## **TECHNOLOGY**

s the COVID-19 pandemic continues to disrupt nearly all aspects of life, there are real risks that technology can help reduce—and in a sense come to our rescue. Whether it's in the hope for the fast development of a vaccine or the myriad of ways that it can help make us feel safer during the pandemic, there is a general concept that technology will lead the way. There are many innovative new or repurposed technologies that do offer hope. Others need to be tested before they are implemented, relied upon, and fail. In either case, technology will play a very important role in how life returns to normal and how civic facilities and services will be transformed to support the communities they serve.

- With current technology, public agencies already have online systems in place to:
- o accept payments for taxes and services
- o resolve court cases
- o renew driver's licenses
- o apply for business licenses and permits
- o visit loved ones who are in jails and prisons
- One important part of this ongoing change is to have strategies to encourage those who would typically forgo online for an in-person visit:
- o Safe, searchable, and discoverable online services that take advantage of universal design principles may encourage this atypical usage.
- o The availability of community Wi-Fi, local mobile apps, kiosks, or decentralized internet cafes could also increase the percentage of citizens using these online services.

## CIVIC 14

• The move to online public services has allowed much public agency staff to take advantage of work from home during the pandemic crisis:

o A survey of American companies found that 74 percent were planning to move at least 5 percent of their staff to remote working and around 25 percent were planning to take 20 percent of their staff remote.<sup>1</sup> o Videoconferencing, email, and text messaging have allowed staff to stay connected while continuing to complete their work.

o The security of public, sensitive information being shared across networks is critical if work from home is going to be deemed a success

• Within public agencies responsible for reviewing and inspecting construction sites, there is an effort to find new ways to address the public need while also keeping staff and construction sites safe:

o Permit applications and documentation are transitioning quickly to online platforms. o Permit officials are now allowing 360-degree photography and video to replace in-person inspections.<sup>1</sup>

o This will allow construction schedules to stay on track during a disruption.

## ADAPTABILITY AND FLEXIBILITY

• ivic spaces need to be designed with **Public Spaces** flexibility and adaptability in mind. How an agency operates during and after a pandemic event will differ greatly. Some changes will become the standard as people go back to working together. Public safety agencies may rethink how limited funding resources are spent. Working from home and relying on technology may allow agencies to continue to do more with less, while also addressing future pandemic risks. Many operational items will change to be adaptable and flexible to address viral pandemics; however, we are focused on how the physical environment in the following categories can support the civic mission to serve the public:

### Workspace

- Working from home initiatives from all types of employers, including civic agencies, will allow some level of work from home to continue after the current crisis subsides. This will create new demand for flexible work environments since staff will require a space to work in the office as well as have their own home office.
- Staff may not be assigned to a specific desk location, but rather allowed to pick a location available each day.
- Enclosed office spaces may become less used as they do not provide the flexibility that an adaptable work-from-home staff will require.
- Office layouts of public agencies could become less dense, less hierarchical. and potentially more collaborative. Collaboration spaces will be necessary but may become more flexible in design.

- In the short-term, limiting the number of people in a space or providing on-time appointments is possible. Long-term, these changes could affect the level of service that an agency can provide.
- While online services will assist in keeping the need for in-person services lower,<sup>2</sup> there will always be services that demand in-person meetings. Many of these types of services are for the most at-risk among us.
- Based on the CDC guidelines, they recommend closing common areas (break rooms, lobbies, and other community areas) during a pandemic event.<sup>3</sup>

### Living Quarters - Jails and Prisons

- Cells may be designed for multiple people but occupied by one person during a pandemic event.
- Common spaces such as dayrooms and classrooms may have reduced occupancies. Rooms that are designed for these common uses may become triage centers or guarantine rooms in the face of a serious outbreak.
- Technology may allow inmates to have online visitation which would otherwise be unavailable during a pandemic event.

## **REGULATORY, BUDGETARY,** AND INSTITUTIONAL IMPACTS

ivic agencies represent many of the frontline workers that respond in times of crisis. Their ability to maintain their staff's safety allows a coordinated response that saves lives. Architects have always been responsible for the health and safety of building occupants. This new challenge is one more item that architects will have to consider as they design spaces for civic clients. Building codes will need to change to provide better protection during pandemic events. Worker safety rules will need to be clarified to define

while at work. Privacy rules about health information may need to have a place carved out for pandemic infections. And all of this takes place in an environment where civic agencies have the countering effects of lower income from sales taxes and higher demand for services. The world is changing in response to this pandemic. It can be a blip or an impetus for greater change and an

ways in which we can protect ourselves

improved society on the other side.

### **Occupational Safety and Health** Administration (OSHA)

- OSHA has confirmed that they are including COVID-19 in 'reportable illnesses' for workplace safety.<sup>4</sup> Worker's compensation insurance claims could be filed for treatment costs.<sup>5</sup>
- Many civic agencies also provide health insurance to their staff through a selffunded mechanism. The cost to treat a small percentage of their staff could bankrupt the fund.
- OSHA encourages employers to create an Infectious Disease Preparedness and Response Plan as part of their required overall Emergency Action Plan.

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## **Cares Act II - Federal Stimulus Funding**

### Health Insurance Portability and Accountability Act Of 1996 (HIPAA)

 HIPAA covers many elements of healthcare treatment, but one of the biggest changes was in the area of privacy.

• Under some circumstances such as a pandemic, "an authorization is not required to use or disclose protected health information for certain essential government functions. Such functions include protecting the health and safety of inmates or employees in a correctional institution."6

• This caveat may need to be expanded or further allowed in declared pandemic emergencies to protect the health of civic employees.

• Most civic agencies are experiencing loss of revenue: while this reduction in revenue has occurred, costs have increased for public agency services. Cleaning and sanitizing have added costs. Staff efficiency has been reduced in many areas to lower pandemic risks.

Cities and states have requested federal assistance to address this emergency. There are small funds included to reimburse local agencies, pay for housing, transportation, testing, and law enforcement, etc. Without direct funding, civic services and employees could become added victims of the pandemic.

## SPACE NEEDS, REDUCTION, AND RESTRUCTURING

any public agencies were already evaluating their programmatic space needs to provide increased efficiencies, enhanced inter-agency collaboration, reduce redundancy, and save critical public funding. Additionally, public entities and departments had begun to move many of their services online, which allowed them to reduce or eliminate physical high touch areas like public counters. Much like the private sector, public agencies were looking to consolidate buildings and spaces creating "open-office" plans with smaller collaborative workspaces and low partitions. While the goals for increased efficiency, collaboration, and cost-savings remain, public agencies must rethink how to achieve these goals while implementing infectious control measures and remote work schedules to provide necessary and critical public services.

#### **Reduced Space Utilization**

- Work-from-home or alternate work schedules have created underutilized office space. While some agencies or departments may be able to reduce space, others may need more space to maintain physical distancing or to disperse public services.
- Many civic services and spaces are currently closed, limited, or underutilized for the foreseeable future.<sup>8</sup> Even in essential workplaces such as police and fire departments, safety protocols have resulted in empty or underutilized buildings and spaces.
- While it may be possible to utilize or repurpose space for essential functions, it is unlikely that civic agencies will be able to maintain empty buildings with decreasing budgets.

#### **Revaluating and Restructuring Civic Spaces**

 Functions or critical services that cannot be performed from a remote workplace will have to be done in an environment

large enough to accommodate physical distancina.

- For some essential services, more space is needed to allow for physical distancing at building entries, waiting for areas, security checkpoints, and elevator queuing.
- As space requirements are evaluated, consolidated, and expanded to other facilities, it will be important to provide flexible and adaptable work environments to ensure the safety of agency workers and their constituents.

#### **Outdoor Public Space**

- Public entities are looking into repurposing parks and squares for small outdoor meeting spaces, cafes, lunchrooms, and other interior gathering spaces that allow building occupants to maintain a safe distance.<sup>8</sup>
- Outdoor civic spaces are an extension of public life and can be utilized for activities and functions that are normally performed indoors.9

#### **Civic Partnerships**

- Increased civic and private partnerships will be critical to enduring the instability and uncertainty of a post-pandemic economy.
- Cities have had to work with retailers, restaurants, and other vendors to both support and return to an open economu.<sup>10</sup>
- Civic agencies, healthcare, and educational institutions, and the private sector must work together to support their missions, provide essential services and reinvigorate their local economies.<sup>11</sup>

## **IMPACTS TO WELLNESS** AND MENTAL HEALTH

ivic agencies represent many of the frontline workers that respond in times of crisis. Their ability to maintain their staff wellness and mental health allows a coordinated response that saves lives. There is a paradox of increased demand on public services while also trying to limit interaction with a public that may be infected with a communicable disease. These factors create unending stress that can reduce the ability to respond. Many civic agencies have been forced to do things differently. As these agencies have been tested, they have shown great resiliency and agility. When the crisis recedes, there will be a decision point for these agencies to continue to do things the way they always have, or in a new "crisis tested" way.

#### **Social Interactions**

- Social interactions are reduced and lessen the preventative effect on peoples' well-being. While telehealth and Zoom chats can provide some level of human interaction and healthcare, it has been shown not to provide the same level of care as in-person interactions.<sup>12</sup>
- Stress and depression within a pandemic can cause domestic violence and child abuse to increase. Unfortunately, in a pandemic with families staying at home, these incidents can be hidden from view.
- Stress reduction apps, in-home fitness, and other ways to relieve stress have become important ways to deal with strong emotional conditions.

#### New Way of Doing Things

- During the pandemic, orthodoxies have been guestioned and overturned as agencies needed to do business in different ways to respond appropriately.<sup>13</sup>
- In addition to COVID-19, public safety agencies have had to deal with social

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unrest. These protests have forced many agencies to re-think how they accomplish their mission and even to re-think what the mission is.

• The City of San Diego responded to the continuing social and public safety crisis by creating a Homeless Outreach Team (HOT) whose mission is to engage with the homeless population and educate them about available options.<sup>14</sup> Shelley Zimmerman, retired Chief of Police at San Diego Police Department stated "Their goal is to bring the people off the streets, but even de-escalating a situation and talking to the person about what they need is seen as a success."

### Hiring, Retention, Staff Amenities, and Stress

• One of the long-term (post-pandemic) problems facing agencies and companies is how to attract and retain the best staff.

• The health and safety of staff will be critical as employees decide where to work. A survey of American workers by the Society for Human Resource Management (SHRM) found that 40 percent of workers with a wellness program work harder and miss fewer days.<sup>15</sup>

• One of the outcomes of the pandemic has been increased stress and even post-traumatic stress disorder (PTSD) in frontline health and public safety workers who have faced unrelenting stresses while dealing with this crisis. Some described dealing with COVID-19 as "drinking from a poisonous fire hydrant."16



Frontline health and public safety workers may experience increased stress and even PTSD due to unrelenting mental pressure while dealing with this crisis.



## SUMMARY OF A PANDEMIC-READY FACILITY

andemics are becoming more frequent in the twenty-first century. During the 20th century, there were three influenza pandemics with tens of thousands of victims (1918, 1957, 1968).<sup>3</sup> In the last 20 years, four similar viral pandemics have occurred (SARS- 2003, Swine Flu- 2009, MERS- 2012, COVID- 2019).<sup>3</sup> Preparation for the current and the next pandemics are no longer a question of "if," but "when." Civic agencies represent many of the frontline workers that respond in times of crisis. Their ability to maintain their staff's safety allows a coordinated response that saves lives. There is a paradox of maintaining or even increasing public services while also trying to limit interaction with a public that may be infected with a communicable disease. Another difficulty that these agencies face is the variety of physical space that they are responsible for: police, sheriff and fire stations, detention facilities, morgues and labs, city and county administrations, and community centers and libraries. Each has its challenges and strategies for maintaining a safe environment. For instance, state and

federal prisons have reported 121,217 cases among inmates and 26,495 staff infections as of September 11, 2020.<sup>17</sup> Architects have always been responsible for the health and welfare inside buildings. This new challenge is one more item that architects will have to consider as they design spaces for civic clients. Changes that have been in process before the pandemic are beginning to accelerate as this moment is an opportunity to re-make society in its new image.

#### References

- Goodman, J. (2020). The new normal: 8 ways the coronavirus crisis is changing construction. Construction Dive. <u>https://</u> www.constructiondive.com/news/the-newnormal-8-ways-the-coronavirus-crisis-ischanging-construction/576681/
- 2. Ailand, T. (2020). Preparing workplaces to minimize the risk of covid-19 spread: Custom partition structures. ProExhibits. https://www.proexhibits.com/blog/partitionstructures-in-the-office/



Los Angeles County Liberty Community Plaza (designed by HMC Architects)

3.	CDC. (2020). Centers for Disease Control.	-11.	
	www.cuc.gov		F
4.	Jillings L. A. (2020). <i>Revised Enforcement</i> Guidance for Recording Cases of		<u>o</u> re
	Coronavirus Disease 2019 (COVID-19).		
	https://www.osha.gov/memos/2020-05-19/	12.	F
	revised-enforcement-guidance-recording-		te
	<u>cases-coronavirus-disease-2019-covid-19</u>		h
5	Eair Health Inc. (2020) The Projected		<u>a</u>
J.	Fall Health Inc., (2020). The Projected Economic Impact of the $COVID$ 19		
	Pandemic on the LIS Healthcare Sustem	13	F
	https://s3.amazonaws.com/media?	15.	F
	fairhealth.org/brief/asset/COVID-19%20		C
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	Pandemic%20on%20the%20US%20		g
	Healthcare%20System.pdf		
		14.	С
6.	Office for Civil Rights (OCR). (2020).		V
	Summary of the HIPAA Privacy Rule.		S
	U.S. Department of Health & Human		(
	Services. <u>nilps://www.nns.gov/nipad/tor-</u>		<u>n</u>
	index html		₽ tr
7.	County of Los Angeles. (2020). COVID-19:	15.	Ν
	County Closures, Cancellations, and Service		e
	Modifications. <u>https://covid19.lacounty.gov/</u>		F
	covid19-2-2/closures/		0
			р
8.	Long, M. (2020). <i>Designing confidence</i>		
	in public spaces: How cities will change	16.	V
	post-lockdown. Design Week. <u>https://www.</u>		15
	<u>designweek.co.uk/issues/29-june-5-july/</u>		C
	public-space-redesign-post-lockdown/		n
9	Counterpart International (2020)		<u> </u>
<i>.</i>	Preserving civic space to create a better	17.	Т
	world. https://www.counterpart.org/stories/		k
	preserving-civic-space-create-better-world/		<u>h</u>
			0
10.	Frere, E. (2020). Long Beach moves forward		<u>C</u>
	with a plan to use streets for outdoor		
	<i>dining</i> . <u>https://abc7.com/long-beach-</u>		
	<u>coronavirus-los-angeles-whats-open-in-</u>		

covid-19/6198031/

National League of Cities. (2020). *How COVID-19 Will Reshape Public-Private Partnerships*. <u>https://citiesspeak.</u> org/2020/04/29/how-covid-19-willreshape-public-private-partnerships/

Fetters, A. (2020). *We need to stop trying to replicate the life we had.* The Atlantic. https://www.theatlantic.com/family/ archive/2020/04/why-your-zoom-happyhour-unsatisfying/609823/

Eggers, W., Flynn, M., O'Leary, J., & Chew, B. (2020). *Governments' response to COVID-19: from pandemic crisis to a better future*. Deloitte. <u>https://www2.deloitte.</u> <u>com/us/en/insights/economy/covid-19/</u> governments-respond-to-covid-19.html

County of San Diego Mental Health Services (2020). *Police Department, City of San Diego, Homeless Outreach Team* (HOT). <u>https://sandiego.networkofcare.org/</u> mh/services/agency.aspx?pid=PoliceDepartmentCityofSanDiegoHomelessOucreachTeamHOT\_61\_2\_0

Miller, S. (2020). *Wellness programs as an employee retention tool.* Society for Human Resource Management. <u>https://www.shrm.</u> brg/resourcesandtools/hr-topics/benefits/ bages/wellness\_employeeretention.aspx

Wan, W. (2020). *The coronavirus pandemic is pushing America into a mental health crisis*. Washington Post. <u>https://www.</u> washingtonpost.com/health/2020/05/04/ mental-health-coronavirus/

The Marshall Project. (2020). A Stateby-State Look at Coronavirus in Prisons. https://www.themarshallproject. org/2020/05/01/a-state-by-state-look-atcoronavirus-in-prisons



## **TECHNOLOGY**

n California, the COVID-19 pandemic is causing public health officials and district superintendents to rethink school reopening procedures. With high local case loads, sanitation stations, temperature checks, masks, and physical distancing may not be sufficient to allow schools to re-open. Distance learning has inevitably caused a surge in tech wizardry, apps, video conferencing, bandwidth boosts, and possibly worldwide cloud-based education platforms. Broadcast education could become reality knowing that this pandemic wasn't the first and won't be the last. COVID-19 has shattered economies, broadened societal inequities, and will continue to disrupt every aspect of our daily life until a vaccine becomes available for everyone. One thing is apparent; education technology (edtech) entrepreneurism will change the framework of education as we

# Based on our surveys we ranked the top three needs and priorities for virtual learning and reopening priorities.

**Edtech Needs** 

Top 3

#### Top 3 Tech Needs

- Access to reliable bandwidth
- Teacher training • Access to affordable
- computers or tablets
- projects and Greater opportunity for collaboration

Innovative online

### Top 3 Reopening Priorities

- Reconfigure classrooms to accommodate physical distancing rules
- Smaller class sizes
- Facilitating outdoor learning should also be higher on everyone's list

## PK12 22

know it. In 2019, investors poured \$1.6 billion into edtech, a five-year high and 16 percent increase from previous years reported by EdSurge. While edtech will set new investment records in 2020, it's unclear whether they're able to bring the human quality of teaching to the virtual world.

To answer some of the questions, we established a research initiative focused on how to improve primary and secondary edtech delivery methods and offer educators options that focus on today, and how school architects can support meaningful exploration of the future of education in America. Our research methods combined cloud surveying, peer review research, and one-on-one interviews with school administrators, teachers, facility directors, and mental health counselors throughout California, Oregon, and Washington.



### Top 3 Virtual School Resource Needs

- Art programs
- Sports and athletics
- Library services

### Top 3 Reopening Daily Needs

- Routine school disinfection of touched surfaces
- Daily temperature
- Physical distancing

## **ADAPTABILITY** AND FLEXIBILITY

n this time of uncertainty, as schools and school districts proceed with mapping out plans for reopening, we face a key moment for our schools: Can we use the momentum gathered to respond to this pandemic to enhance learning, wellness, and community? Or, will we return to even more restrictive versions of the traditional classroom?

Based on an in-depth investigation of the evolving research, HMC proposes that we can respond with safer, more welcoming, and more nurturing school environments. We can achieve this with a focus on adaptable. flexible solutions that allow schools and districts to pivot as needed to accommodate changing and unpredictable conditions.

Schools occupy a special place in our society, providing not only essential services for the education of our children, but also for their social and emotional development, for food security, and for the care of children during the weekday allowing parents to work. As a result, schools face intense pressure to re-open prior to the wide-spread availability of a vaccine.



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Added to this is the urgency of ensuring equity for all students across school districts: ensuring equal access to the technology and resources that facilitate remote learning and, more broadly, providing an education that narrows, rather than widens the persistent gap between students from different segments of our community. The aim is not just for our schools to survive, but to capitalize on this disruption with a vision for long-term enhancements to our learning communities. So, what might this vision look like?

We have identified and developed several design solutions that expand on this vision:

- A school design of flexible connected spaces that allow classrooms to expand and contract, with transparency between spaces, to facilitate blended in-person and online learning (synchronous and asynchronous), collaborative and independent learning, and indoor/ outdoor continuity.
- Enhanced outdoor learning environments across the campus to increase opportunities for safe in-person learning
- Modular components for architecture, building systems, and furniture to allow districts to pivot quickly as local conditions change.
- Flexible furniture to facilitate multiple learning styles.
- Student-centered classrooms: A common component of student-centered schools is the 360-degree classroom. With studentled instruction on all four perimeter walls, the teacher acts as a collaborator moving throughout the space to support the students.
- Envisioning spaces as multi-functional: The school environment is particularly complex and multi-functional. encompassing a variety of activities from learning to preparing and eating food, sports and performance, counseling and after-school care.
- Various options for technology can facilitate flexible learning environments even when physical flexibility is limited. These include technology for distance learning, to offer blended learning options combining in-person and virtual learning.

## **REGULATORY, BUDGETARY,** AND INSTITUTIONAL IMPACTS

 cientists, researchers, and design professionals agree — buildings can be designed to reduce transmission of disease but also to bring back normalcy to everyday life. We reviewed the latest healthy school building research that places an unprecedented urgency on PreK-12 school planning and regulations during and beyond the COVID-19 pandemic. We assembled perspectives for overcoming the challenges associated with pandemics, building health and performance, and more importantly, to reduce the common pathogens from spreading and reduce chronic absenteeism, which affects as many as 6.5 million students nationwide.

- Increasing ventilation rates, dilution: According to the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), sufficient ventilation is a key "infectious disease control strategy" as it can dilute the indoor air close to the source and eliminate infectious particles.<sup>1</sup>
- Increasing outside air (OA) rates through mechanical ventilation: Increasing outside air may result in increased energy consumption. Schools may consider using a dedicated outdoor air system to facilitate flexibility and respond to pandemic conditions, while maintaining energy efficiency goals.<sup>2</sup>
- Building flushing: ASHRAE recommends extending ventilation time prior to reopening, and before and after school.<sup>2</sup>
- Avoiding indoor air recirculation: Recirculating indoor air is an energy reduction strategy. However, during the pandemic, indoor air recirculation should be avoided or minimized as much as possible.<sup>3</sup>
- Natural ventilation: Natural ventilation is an energy-efficient technique for bringing outside air indoors, a means to control infection in school facilities.<sup>4</sup>

## PK12 24

• Reducing pathogen transport, filtration: In aeneral, all commercial buildinas, includina schools, are required to use filters with a minimum efficiency rating value (MERV) of 6 or higher per California Title 24. For a safer reopening during the pandemic, ASHRAE recommends improving HVAC filtration in schools to MERV 13 or higher or using high efficiency particulate air (HEPA) filters to reduce the transfer of the infectious particles.<sup>2</sup>

• Mitigating virus survival, humidification: Dry air is linked to higher rates of infectious diseases in buildings. ASHRAE recommends a relative humidity (RH) in the classroom between 40 and 50 percent at 72 degrees in the winter and 50 to 60 percent at 75 degrees in the summer to reduce virus transmission.<sup>2</sup>

Deactivating the virus, disinfection: Another strategy for reducing the viability of infectious agents is using ultraviolet germicidal irradiation light (UGVI) and air ionization systems. ASHRAE recommends the use of UV-C in ductwork and in upperair units at schools.

 Controlling transport pressurization: Managing airflow between zones through pressure differentials is a common practice in healthcare settings. During the pandemic, ASHRAE recommends using pressurization as one of the reopening strategies in particular zones of schools that are in isolation mode.<sup>2</sup>

• Airflow patterns: ASHRAE recommends to "ensure airflow patterns in classrooms are adjusted to minimize occupant exposure to particles."2

• Monitoring indoor air quality: Constant monitoring of the indoor air quality can help schools identify areas of deficiency and take relevant measures accordingly.<sup>6</sup>

## SPACE NEEDS, REDUCTION, AND RESTRUCTURING

he current pandemic will undoubtedly stretch all of us in the upcomina months. We do see a silver lining to this current crisis. We see districts improving their online curriculum, and developing new successful strategies involving smaller groups of direct and indirect instruction. This new blended model may be here to stay and require less built space on some campuses, so facility funding can be better used to make dynamic and flexible student-centered learning studios. When safe, students and families seeking the full educational, social, and emotional experience will return to our neighborhood schools, and perhaps some will continue with the blended model, especially if they are thriving. School districts have an opportunity to migrate from the industrial model of teacher-centered instruction with rows of desks in classrooms and more widely adopt student-centered instruction utilizing more spaces within the school, both indoor and outdoor.

- The learning environment needs to be able to adapt; flex outside, into an adjacent space, a learning hallway, or over the internet to anywhere in the world. Flexible learning studios remove barriers to learning, leading to dynamic learning environments without boundaries.
- In the short term, we see an incredible opportunity to repurpose large spaces like libraries, multi-purpose rooms, and gyms (if conditioned) into studentcentered future focused learning spaces. Think of these spaces as being transformed into "study halls of the future" where synchronous and asynchronous learning can take place in a safe school setting. This would allow students who may not have an ideal distance learning setup at home to have a safe and collaborative space to learn and get help from school resources.

- Dedicated science labs and lecture spaces will give way to collaborative indoor/outdoor learning labs that double as online learning teaching/ demonstration studios. On-site science labs will offer spaces to conduct real world experimentation and engage the outdoors for biology and other natural science lessons.
- There will be a new focus on health screenings, campus security, spaces to separate unhealthy students prior to getting picked up, and caring for the health of students and staff.
- Visitors will be limited, and lobby waiting areas will become health screening stations.
- We also see school districts taking cues and moving to a "wait outside/in your car" model where text messages would notify people when to enter, preventing long lines.
- Supervised isolation rooms with negative pressure HVAC systems should also be created, where students who are sick can wait to be picked up.
- We see a new focus on campus hygiene, and an establishment of cleaning protocols and schedules that will help prevent the spread of all illnesses.
- There will also be a newfound awareness and sense of importance around personal hygiene, and its impact on health and wellness.
- We will see health offices reimagined into wellness centers that care for student and staff's physical and mental health, with a focus on overall wellness.

## **IMPACTS TO WELLNESS** AND MENTAL HEALTH

hile most parents are concerned about their children falling behind in their education, the larger more lasting impact of COVID-19 may be on the mental health of children as they are secluded from their peers, seeing their parents struggle with unemployment and financial instability, and potentially experiencing death and loss due to the pandemic. Students are facing ever-growing levels of depression and anxiety as the crisis continues to turn normalcy on its head. Mental health experts across the country agree that the pandemic, social isolation, and uncertainty are adverse childhood experiences (ACEs) on their own and that these conditions may exacerbate existing mental health issues in our community. It is becoming more and more apparent that school districts need to expand their mental health services.

- Making wellness a priority: Wellness centers should be celebrated and accessible. Pushing these spaces out toward the students, away from the administration buildings is one strategy to making them more accessible. The investment in making these spaces welcoming, comfortable, bright, and accessible speaks to the investment in the services that they offer.
- Telehealth in school: Post-pandemic, we believe there is an opportunity in the school setting to create small private telehealth stations where students can link up with counseling professionals to receive the support they need.
- Take learning outdoors: Expanding the physical space used for education beyond its brick-and-mortar facilities may not only help schools meet physical distancing requirements aimed to protect students' physical health, but also promote better mental health.<sup>7</sup>

When considering mental health in our PreK-12 schools we must not only consider students, but we must also consider the educators and leaders who are guiding and delivering the educational programs. Many teachers are part of an aging demographic, so we can expect some of our educators will not return because they have been directly impacted by COVID-19. A greater number will be impacted by the loss of a loved one, by the emotional hardships of social confinement, the stress of refining and adapting their skill to a virtual environment, and by the increased anxiety caused by economic uncertainty for their families. We cannot expect educators to return to us without mental and emotional needs resulting from their grief, economic anxiety, and personal loss. Great schools begin with great leaders. The mental health, positive outlook, and self-confidence of these school leaders are equally critical, and they will also need care and support. We are facing a long-haul mental health triage to support our teachers and staff so that they, in turn, can support our students and deliver equitable, accessible education.9

• Design for elevated mood: The power of natural dauliaht and color on the human psyche should be emphasized in PreK-12 facilities. Not only does daylight help students learn and retain information but it is also a natural mood elevator. Updating or implementing a new color palette for specific rooms on campus is a low cost/high impact solution.<sup>8</sup>



Improving mental health in schools is imperative for students as well as educators and administrators.



## SUMMARY OF A PANDEMIC-READY FACILITY

ur vision for school environments has evolved in the last decade to places that nurture mental and emotional wellness, community, and belonging rather than impose restrictions to movement, social connection, and collaboration. Such a vision is still within reach if we keep our eye on the long-term goals while responding to the immediate and urgent needs presented by COVID-19.

The implementation of flexible and adaptable learning environments will facilitate quick pivoting to respond to changing short-term needs, while at the same time providing more options to accommodate the long-term vision for student-centered learning. We can and must take advantage of this momentum to move toward measurable improvements in creating high performing learning environments that are safe, healthy, equitable, effective, and resilient. As Lindsay Currier, facility administrator with the Riverside County Office of Education noted, "We can find bright sides to this experience." Staff and students have had to become more comfortable with trying new technological platforms, adding the flexibility to provide other types of studentcentered and collaborative instruction, and leading to innovative and creative schoolwork.

Now more than ever, indoor air quality measures, such as increasing outdoor ventilation rates, filtration, disinfection, and humidification, along with testing and commissioning ventilation systems are being evaluated and implemented for a safe reopening. Last but not the least, our children are experiencing many changes and just as post-pandemic life will include taking the temperature of students as they enter the campus, access to learning must begin with immediate and continuous vigilance of student mental health for readiness to learn.



Oxnard Union High School District's Rancho Campana High School (designed by HMC Architects)

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june-2020.pdf

 Chan, R., & Pistochini, T. (2020). The Pathway to COVID-19 Recovery, how to improve indoor air quality when reopening K-12 schools [Webinar]. UC Davis Western Cooling Efficiency Center and Johnson Controls. https://energy.ucdavis.edu/outreach/ calendar/?trumbaEmbed=view%3 Devent%26eventid%3D144918816

 Koch, S. (2020). Outdoor classrooms could improve student mental health. Multi Briefs. <u>http://exclusive.multibriefs.com/content/</u> <u>outdoor-classrooms-could-improve-student-</u> <u>mental-health/education</u>

 How Color Affects Mood and Mental Health (2020). Art Therapy. Retrieved August 25, 2020, from <u>https://deserthopetreatment.</u> <u>com/addiction-treatment/psychology/colortheory/</u>

 Baird K. E. (2020). After COVID-19, Equity & Access Will Start with Prioritizing the Mental Health of Students & Teachers. The American Consortium for Equity in Education. <u>https://ace-ed.org/prioritizing-mental-health/</u>



## **TECHNOLOGY**

ere colleges and universities ready for an exclusively remote learning model? The overall takeaway is that nobody was ready to move to 100 percent distance learning when the stay-at-home orders were issued in March of 2020. While every institution has utilized technology to continue operating during this pandemic, it is clear that significant progress needs to happen to make distance learning equally effective as the traditional methods.

Upgrading technology infrastructure and providing equitable access to technology for students are the main hurdles that need to be overcome for distance learning to be effective on a larger scale. On the bright side, the flexibility in schedules and less commute time were appealing to students. Administrators are also finding that additional online courses are a way to generate additional revenue for their institutions.<sup>1</sup>

Even if everything returns to pre-COVID normal, all signs point to the possibility of future pandemics creating the same disruptions to our education system. Now is the time for institutions to start planning. HMC suggests making the following changes to better prepare the higher education delivery model for what lies ahead:

• Robust IT infrastructure to advance remote learnina.

• Equitable access to technology (internet, computers, etc.) for students and faculty.

• Strong content management portal for ease of use by students and faculty.

• Ensure cyber security for online learning platforms.

• A virtual tech helpline for students and faculty navigating the online platforms.

• Train faculty for a smooth transition to a 100 percent online or a hybrid teaching model.

• Repurpose underutilized spaces on campus by creating dedicated, socially distanced space for students to access internet and computers for online classes.

• Create recording studios or classrooms to provide faculty the resources they need to create engaging, collaborative online classes.

• Find effective ways for students to socialize and interact since this is difficult to foster in a virtual environment.



## ADAPTABILITY AND FLEXIBILITY

 OVID-19 is accelerating transformation of higher education and is forcing our society to rethink its educational models, their value, and delivery. Universities and colleges are re-assessing their curriculums and exploring an increased need for online classes. For better or worse, online instruction is here to stay, and the main driver to an online environment is flexibility. When, how, and where the instruction is delivered is completely independent of the physical space and classroom scheduling. There are two ways that online instruction is currently being delivered:<sup>2</sup>

- 1. Asynchronous Learning occurs through online channels without realtime interaction. It is also called location independent learning because the student can stream and engage educational content anytime and anywhere.
- 2. Synchronous Learning distance education that happens in real-time where teachers and students are interacting at the same time using online tools and platforms.



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One of the main benefits of the online environment is greater class capacity. Online classes allow institutions to accommodate an increase in student enrollment without investing in new buildings and instructional spaces.<sup>1</sup> Higher education institutional facilities are continuing to evolve to meet current and future needs of educational models. We expect the following trends with the continued growth of online instruction:

- There will be a reduced need for faculty offices and traditional classroom spaces. particularly 100-plus seat tiered lecture halls.
- There will be a need for flexible and adaptable spaces that accommodate a variety of uses.
- Campuses will continue to invest in flexible learning environments, expand ergonomic solutions for short- and longterm use, and grow social and student owned spaces that support different modalities of learning and teaching.
- Higher education institutions will be forced to re-think class sizes and the availability of courses.
- Hybrid instruction models will be developed where online instruction is supplemented with traditional on-campus instruction.
- Vocational and technical training as well as laboratory instruction will continue to evolve using digital tools but will remain tied to the physical environment due to the tactile and kinesthetic needs of their programs.
- Underutilized spaces on campus will be repurposed to create dedicated, socially distanced space for courses requiring hands-on training or operation of specific technical and laboratory equipment that is difficult to replicate through online instruction.
- Campuses will be masterplanned to further reduce the impact of vehicles on the campus core (decreasing central parking and roads leading to them), with the goal of giving that valuable land back to the students.

## **REGULATORY, BUDGETARY,** AND INSTITUTIONAL IMPACTS

pikes and dips in college enrollment tend to inversely follow the economy, particularly at the community college and graduate levels. The shutdown due to the pandemic adds a large wrinkle to that adage and has created new dynamics for each tier. While most students decided to persevere through the ad hoc online model to complete the spring 2020 term, their expectations for the seamless delivery and collegiate experience are higher going forward. The California State University system—23 campuses strong—may experience a 20 to 40 percent drop in enrollment in the fall of 2020 and potentially beyond, depending on how quickly vaccines will roll out.<sup>3</sup> The rise in student unemployment, a misalignment of the collegiate experience and online learning, and a drastically reduced student housing capacity is only exasperated by California's high cost of living. The uncertainty for international graduate students and their housing situation will further erode an institution's balance sheet since these students typically pay full tuition and fees.<sup>4</sup> The good news is that opportunity exists for nearly all institutions and programs to increase enrollment,<sup>1</sup> and matriculate students guicker, using the distance learning capacity in concert with on-campus seats.

• In terms of policy and operational impacts, more administrative flexibility will be needed to respond effectively, including updated human resources policies, labor agreements, and extended class scheduling.

• Where students will be returning to campus even at reduced capacity, advanced cleaning protocols throughout campus will be an added burden to budgets, as will smaller class sizes, providing more comprehensive healthcare services, and even changes to food service methods.

• In terms of budgetary and financial impacts, institutions will be negatively impacted by state funding decreases, dramatically less housing revenue, reduced income from various student fees, parking fees, food service programs, and even branded clothing, as well as dormant athletic programs with financial commitments to scholarship studentathletes on scholarships. Institutions may face pressure to reduce tuition for online learning.

In response to future pandemics, there will be a faster pace of adaptation due to improved technology services and infrastructure, making the campus facilities ready to maintain distancing, transforming underutilized space into more study space, better access to technology for disadvantaged students, more distance education, and improved distance learning platforms.

• Where campuses are closed, there may be some savings in maintenance, and institutions can take advantage of vacant campuses by accelerating scheduled improvements and deferred maintenance projects.

In terms of institutional impacts, campuses will be quieter until a vaccine is in place, with no athletic events, recreation programs, single occupancy resident accommodations, smaller class sizes, and dispersed study areas.

## SPACE NEEDS, REDUCTION, AND RESTRUCTURING

earning from the COVID-19 pandemic, institutions are now developing more proactive strategies and tools to beyond the temporary adaptations to existing buildings, designing with flexibility in mind will be critical to respond to evolving needs. While we cannot anticipate program and design changes with any certainty in the long term due to the prospect of a vaccine, colleges are interested in being better prepared for the future. Our study yielded the following suggestions:

- Reevaluate space needs. Certain types of classes may remain online permanently with 60 percent of the student body continuing to take online classes in the future, potentially reducing the need for facility expansion in the future.
- Plan large open flexible spaces with room for students to work individually on laptops.
- Prioritize small, flexible rooms rather than large lecture halls with fixed seats.
- Avoid fixed desk computer labs and room configurations that are difficult to adapt.
- In mild climates such as Southern California, hold classes outdoors where feasible
- Configure circulation to accommodate one-way traffic as needed.
- Widen hallways to allow for more separation with "sticky" spaces for students to sit outside of the circulation path.
- Allow for more frequent and deeper sanitizing of shared spaces. These often-unseen support functions will need bolstering as many colleges lack resources and staff to achieve.

- Focus on durable, cleanable materials and fabrics for soft seating. While durability has always been important, it has taken on renewed significance.
- Provide fewer faculty offices since staff are working from home and holding virtual office hours
- Many campuses are also investigating adding "content creation centers" for simple video recording and editing, subdivided from an existing classroom or included in the planning of new facilities. These spaces will centralize the equipment and services a faculty member needs (cameras and microphones, simple editing equipment, and software, etc.) to create content for distance learning.
- Technology also offers software tools for managing space usage on campus. Effective programs for room scheduling and real-time room use tracking can help institutions make sure to maximize use of their facilities.
- Institutions are not redesigning student housing, rather simply scaling usage to reduce the occupancy as many students will continue to distance learn in the short-term.
- Dining areas for the time being will limit self-service, focus on grab-and-go, and limit seating capacity for indoor dining areas.
- Restroom facilities in the near term will close stalls to limit occupants, and switch to hands-free appliances wherever possible. Protocols for more frequent cleaning and disinfecting can achieve safety goals.

## **IMPACTS TO WELLNESS** AND MENTAL HEALTH

tudents are struggling to balance home, work, friends, family, and school. This is a new paradigm that is stressing young and not-so-young alike. Understanding the underlying cause of anxiety and stress in college students will allow us to better understand how we might support them.

- According to the Healthy Minds Network survey, 66 percent of students report the pandemic has caused them more financial stress—a known predictor of student mental health.<sup>5</sup>
- According to Thomas Insel, former director of the National Institute of Mental Health, "because 75 percent of adults with a mental illness first began experiencing it before age 25, mental problems are the chronic disorders of the student-aged population."6
- According to a University of South Florida (USF) study on COVID-19's impact on mental health, "In a survey of 2,000 participants conducted by nonprofit organization Active Minds, 80 percent of college students said that COVID-19 has had a negative effect on their mental health and 20 percent said their mental health has 'significantly worsened.' Of those who responded to Active Minds' survey, 80 percent said they experienced loneliness or isolation."7

COVID-19 impacts to students are real and profound. The campus environment is a place where students can access varied resources, feel safe, socially engage, and learn from each other. The long-term impact of a dissocialized student is less known but must be met with socially responsible options that focus on altruistic benefits. We, as a society, need to take proactive steps to better understand and help with aspects of students' lives that promote wellness which benefit them now, and when we return to the new version of normal. Now, for the bright side, where do we go from here?

• Financial stress leads to mental health decline. Food and housing security are connected to this. Extending or enhancing aid and providing access to food and shelter will alleviate other pressures on the student.

• It's the perfect time to help. Three out of four people who have mental health issues later in life will start to experience this in their college years. Proactivity now will forever improve each person's life and serve the greater good. Think of it as contributing to your 401k beginning in your twenties instead of your fifties.

• Teaching students to develop strategies to find balance in all aspects of their life will help each individual aspect of their life. Consider yoga, religion, communing with nature, talking with a friend, etc. A summarized Deion Sanders quote might help to convey the need for balance: "Look good, feel good, play good.". Each are connected and influence the other.



Understandina the underlying cause of anxiety and stress in college students will allow us to better understand how we might support them.

## SUMMARY OF A PANDEMIC-READY FACILITY

The COVID-19 pandemic has become a major disruption to colleges and universities across the world and may lead to some long-standing changes in higher education. As a result, institutions are now developing more proactive strategies moving forward. Online instruction is here to stay, and the main driver is flexibility and a new way to generate additional revenue for institutions. A hybrid instruction model will be developed where online instruction needs to be supplemented with traditional on-campus learning for courses requiring hands-on training or operation of specific technical and laboratory equipment. Institutions need to invest in a robust IT infrastructure, equitable access to technology (internet, computers, etc.) for students and faculty, a strong content management portal, and a training system for a smooth transition to a fully online or a hybrid teaching model. At the same time, colleges and universities will rethink the need for faculty offices and traditional classroom spaces and will continue to invest in flexible learning environments, create more student-friendly open space, expand ergonomic solutions for short- and long-term use, and grow social and student-owned spaces that support different modalities of learning and teaching. A mental health crisis with anxiety and depression is on the rise as the pandemic is putting significant stress on college students. Increased awareness and de-stigmatization of mental health, use of telehealth and therapist-led social media support groups, and a refocus on holistic care are a few strategies to promote healthy minds on college campuses.

#### References

1. Taparia, H. (2020). The Future of College Is Online, and Its Cheaper. https://www. nutimes.com/2020/05/25/opinion/ online-college-coronavirus.html

- 2. Mahoney, J., & Hall, C. A. (2020). Exploring Online Learning Through Sunchronous and Asynchronous Instructional Methods. In~Exploring Online Learning Through Synchronous and Asynchronous Instructional Methods~(pp. 52-76). IGI Global.
- 3. Gordon, L. (2020). California colleges, fearing enrollment loss this fall, are trying hard to bond with students this~summer. https://edsource.org/2020/californiacolleges-fearing-enrollment-loss-this-fallare-trying-hard-to-bond-with-studentsthis-summer/636349
- 4. Durrani, A (2020). How U.S. Coronavirus Measures Affect International Students. https://www.usnews.com/education/bestcolleges/articles/how-us-coronavirusmeasures-affect-international-students
- 5. Redden, E. (2020). *Pandemic Hurts* Student Mental Health. https://www. insidehighered.com/news/2020/07/13/ survey-finds-higher-prevalencedepression-among-students-anddifficulties-accessing
- 6. Kerr, E. (2020). *How College Students* Manage Coronavirus Stress. https://www. usnews.com/education/best-colleges/ articles/how-college-students-aremanaging-coronavirus-stress
- 7. Manna-Rea, J. (2020). USF study investigates COVID-19 effects on mental health. http://www.usforacle. com/2020/05/28/usf-study-investigatescovid-19-effects-on-mental-health/

Online instruction is here to stay, and the main driver is flexibility and a new way to generate additional revenue for institutions.



California State Polytechnic University, Pomona Student Housing (designed by HMC Architects)

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## **TECHNOLOGY**

echnology solutions will "overlay" all future operations and planning solutions –particularly for hospital safety. The identification and tracking • Evaluate the impact of work from home of infectious patients are key to protect others in healthcare facilities. Providers will use existing and new technologies to identify

patients who show symptoms, triage them before entering facilities, and track "at-risk" population groups to pre-emptively limit infection pools and future contagions.

Safe Entries. The identification and segregation of infectious patients from the general patient population is the first step to ensure a safe environment. Hospital systems have had to limit access to their facilities to evaluate patients before entering. New technologies such as infrared cameras and handheld devices to detect elevated temperatures allow providers to electronically measure temperature as a first indicator of infections.

Office and Exam Spaces. The pandemic has created the need to evaluate the future demand for offices and exam rooms in the context of telehealth. Ninety-one percent of providers are expected to offer telemedicine in 2020.<sup>1</sup> Providers need to evaluate the drop-in demand and re-program office and exam spaces for new construction.

- Create smaller telehealth "cubbies" that are acoustically separated for virtual visits.
- Develop plans that predict a drop-in demand for spaces at a ratio of 25 and 50 percent less volume over the next three years.

Telehealth. Telehealth visits have increased during the pandemic out of necessity to see a physician. The Center for Medicaid and Medicare (CMS) has relaxed payment rules allowing full payment for remote visits. The early reports are that as many as half

- virtuallu.<sup>2</sup>

  - visits.

Waiting Spaces. Providers have recently looked for strategies to minimize or even eliminate waiting by the use of technologies that call patients for appointments.

Wearable Technologies. Home healthcare is a natural extension of the migration of outpatient care and home health digital aids have become the tools of greater responsibility for one's health and to share data with providers. Wearable health devices and their abilities to connect with hospitalbased records will have an increasingly dramatic and important role to further connect patients with providers and keep them safe.

of physician visits can and will be done

on the overall need for campus-based workspaces.

• Provide a telehealth playbook for patients to maximize their virtual experience.

• Evaluate planning solutions that reduce the number of exam spaces corresponding to increased telehealth

• Integrate "geo-fencing" technologies in coordination with hospital-based computer systems that allow patients to "opt-in" allowing the ability to connect with information and to "locate" patients on campus.

• Develop strategies for "self-rooming" and "app guided directions" so patients in clinics can arrive "just in time."

• Create spaces on campus for patients to wait outside the facility with amenities.

## ADAPTABILITY AND FLEXIBILITY

roviding the flexibility of design within healthcare spaces is a key goal for planners and operators who need to respond to evolving practices, medical equipment changes, and now the existential crises of COVID-19. Hospital campus designs have traditionally been built around a central core of buildings developed over decades making it difficult to adapt to modern care and infrastructure needs due to low floor-tofloor heights, tight column grids, and older MEP/IT systems that cannot be modified easily or economically. Continuous operations of core functions within older parts of a health facility present challenges to modify departments and rooms.

Nursing units and patient rooms have traditionally been designed for a specific programmatic need or acuity level. For example, a medical-surgical patient room serves a specific segment of patients without the ability to convert to a higher use such as ICU care. Further, they have been constrained by both the minimum room size, clearances, gas services, and air change needs. The compartmentalization of units that limit size by function is a significant factor that limits future adaptability. Emergency departments are similarly constrained given their 24/7 full-time use and challenging to remodel. The recent impact of surging COVID-19 patients and their screening has required this department to rethink strategies for triaging patients outside the facility and separating infectious patients from non-infectious patients and families in the department and waiting rooms. While medical office buildings are not as constrained by hospital regulations, stricter MEP requirements, and hours of use, they too are challenging to adapt given hard wall construction and integration of services within the walls.

What has been revealed so far from the pandemic is that air quality and negative pressure capable MEP systems are key to managing airborne diseases and must be evaluated for their ability to switch on and off based on specific health requirements. So, how do these spaces, departments, and their related services accommodate a change to be flexible and adaptable going forward? Here are several strategies to consider:

- "Modular planning" of rooms that utilize standard dimensions and allow conversion to a different room type.
- The development of optimal column grids that can accommodate multiple different programmatic room types.
- Larger infrastructure pathways for future technologies that are not currently required.
- Movable demountable partitions that can be reorganized into different spaces.
- Providing "soft" spaces such as administrative offices and conference rooms adjacent to hardened diagnostic rooms to accommodate growth.
- Build-in surge capacity within the Emergency Department to convert conference and office space to accommodate patients.
- Convertible MEP systems that can flex between positive and negative air pressurization
- Acuity adaptable spaces that can accommodate different levels of care.
- Flexible circulation that can allow for separating infectious areas from noninfectious ones.

## **REGULATORY, BUDGETARY,** AND INSTITUTIONAL IMPACTS

ignificant changes are underway in two broad categories: regulatory requirements from the Centers for Medicare and Medicaid Services (CMS) and requirements from state or local agencies such as OSHPD in California, that enforce code requirements and provide guidance on proposed changes. CMS plays an outsized role. In coordination with state licensing agencies, they have provided temporary regulatory waivers and new rules effective during the COVID-19 crisis.<sup>3</sup> One of the main categories for these waivers is the flexibility of buildings to adapt to new uses:

- Surgery centers can contract with local healthcare systems to provide hospital services.
- Non-hospital buildings and spaces can be used for patient care and guarantine.
- Hospital emergency departments can test and screen patients for COVID-19 at a drivethrough and off-campus test site.
- Hospitals can bill for telehealth
- Emergency departments can use telehealth to triage patients remotely.
- Most patient care visits can be reimbursed at full CMS rates for services.
- Medicare approved eighty additional services to be furnished via telehealth. Providers can bill for telehealth visits at the same rate as in-person visits.
- California's Office of Statewide Health Planning and Development (OSHPD) provides waivers for space use. These waivers are in effect from April 2020 thru April 2021.4
- o Hospitals may reconfigure space as needed to accommodate patient surae but must restore to their original condition. • Increased locations of low return exhaust They can increase hospital beds for

#### Planning and Design

The flexibility

adaptability

spaces, now more than

ever, needs

beginning.

to be planned from the

of healthcare

and

patients over the amount allowed by five percent.

- o The ability to implement policies and procedures to accommodate multiple respiratory patients.
- o Authorize surge tents for use as waiting rooms, to conduct triage and medical screening exams, and provide basic first aid and outpatient treatment.

The Hospital Building Safety Board (HBSB) has provided recommendations to OSHPD for potential code changes, in planning and design as well as MEP systems.<sup>4</sup>

• More airborne isolation rooms and some patient rooms should be adjustable to accommodate negative pressure

• Some ORs to be provided with negative pressure anterooms

• Permanent changes to convert rooms to negative pressure airflow

• Evaluation of circulation paths in triage spaces and units

• Touchless operational components

#### MEP systems

• UV-C treatment at coils and filters

• Change relative humidity levels from 40 to 60 percent in some areas

• In-room HEPA filtration and filtration with MERV 13 or 14 as a starting point for design

• Evaluation of a minimum of 6 air changes per hour in a hospital

• Adjustment of some negative pressure rooms to add HEPA / exhaust ICU space

grills

## SPACE NEEDS, REDUCTION, AND RESTRUCTURING

any of today's hospital campuses have been decades in the making. Single-building facilities that were established to serve a communitu's healthcare needs have expanded to include multiple, interconnected buildings. Growing populations, changing regulations, and emerging technologies have led each campus with its existing buildings to take on a different character. Not every space in our healthcare facilities will need to be redesigned and rebuilt in the wake of the pandemic. However, adjustments to our physical environment should be expected due to changes in social norms, facility operations, and infection prevention.

Entry Points. The identification and segregation of infectious patients from the general population has been the first step to ensure a safe environment. Hospital systems have had to limit access to their facilities to evaluate patients before entering. This has included reducing the number of entry points, providing screening and electronic temperature checks, and providing greeters to monitor the number of people entering and exiting.

Nursing Units. California's Office of Statewide Health Planning and Development (OSHPD) provided waivers for space use in hospitals, in effect from April 2020 thru April 2021.<sup>4</sup> These waivers allow hospitals to increase hospital beds over the allowed amount by five percent.

**Emergency Departments.** Emergency departments can be challenging to affect wholesale change and remodeling given their 24/7 full-time use. Changes in the ED will be likely be focused on more robust operational changes. Most EDs have been designed to accommodate a modest number of infectious patients, but not a significant surge. An increased quantity of airborne isolation rooms can be expected in the future to segregate a portion of the ED

as an "isolation wing." There is still much to learn about the long-term impacts on social norms and healthcare best-practices. But one thing is certain, as healthcare operations and care protocols change, so too will the buildings that house those activities.

#### Future expected changes:

- Patient and visitor temperature and symptom screening upon arrival
- Changes in requirements for high-risk areas such as waiting and dining spaces
- Greater focus and implementation of touchless technologies, especially in the intake process, such as real-time location systems (RTLS) and "self-rooming" technologies
- UV lighting for infection control and robotic material management will be incorporated into facility design.
- Demountable or permanent tent structures to triage patients outside
- Additional airborne isolation rooms
- Air change requirements: humidity levels, air changes/hour, exhaust requirements
- Ambulatory care centers will be designed with the anticipation that inpatient use may be required in the future.
- Redesign typical exam rooms to flex between exam/treatment and telehealth
- A higher degree of acuity-flexibility is planned for key rooms. For example, medical-surgical rooms designed to be ICU-capable or post-anesthesia care unit (PACU) rooms designed to be medicalsurgical capable.

## **IMPACTS TO WELLNESS** AND MENTAL HEALTH

he COVID-19 pandemic has pushed us into a mental crisis with anxietu and depression on the rise. Social distancing, isolation, and an economic upheaval not seen since the Great Depression has resulted in another surge of people seeking mental health help. The US seems ill-prepared to meet the new and hidden consequences of the virus and an increase in mental health issues. Depression and anxiety have crept into our psychological system as well. "Our Mental health system was vastly underfunded, fragmented, and difficult to access before the pandemic, and is even less prepared to handle this coming surge", said Susan Borja, who leads the traumatic stress research program at the National Institute of Mental Health. The data is heart pounding as "46% of Americans report the coronavirus crisis has been harmful to their mental health," according to a Kaiser Family Foundation poll.<sup>5</sup>

The economic effects of the pandemic have mental health experts alarmed. A study of the great recession established significant links between economic disruption, suicide, and substance abuse. Studies that began in 2007 found that every percentage point increase in the unemployment rate equated to a 1.6 percent increase in suicide.<sup>6</sup> This rising wave of mental injuries will be met in the coming months by a severely broken system. As many mental health and drug addiction centers are community-based, the pandemic has many on the ropes and at the edge of financial collapse with more than half saying that they will have to shut their doors in less than three months.

There are potential bright spots for mental health post-pandemic. Increased use of telemedicine could make services more accessible – especially for those that have access. The pandemic has highlighted the connections between mental health, drug and alcohol addiction, homelessness, and access to care; reforms may trigger

follows:

## Patients and families

- abuse

# Providers

• The de-stigmatization of "mental health" and a refocus on wholistic care

additional focus and better treatment options. Mental health issues often laa between physical health concerns and the invisible nature of the virus, and the confusion it has caused requires coolheaded and coordinated messaging from government officials to undo underlying anxieties. As the pandemic has revealed, there are linkages between mental health, economic security, and social strata. We believe the coronavirus impact will be as

 Increased symptoms of mental health disorders – anxiety, depression, obsessive-compulsive

• Feeling of losing livelihood and not being able to work

• Increased rate of alcoholism and drug addiction

Increased rate of suicides and domestic

• Inability to focus and impaired concentration skills for children

• Deterioration of social networks due to isolation

 Increased awareness and funding for mental health services

• Increased research about chronic stress and effects on overall health

 Increased access to mental health providers by telehealth

• Data-driven research identifying mental health impacts by demographic



Increased use of telemedicine could make mental health services more accessible



## SUMMARY OF A PANDEMIC-READY FACILITY

ealthcare institutions have been faced with an incredible burden due to the COVID-19 pandemic. Beginning in March 2020, health systems – almost without exception - have experienced an unpreceded impact on their top-line operating revenue and have adapted quickly to new ways to provide care to their patients and keep them safe. The impacts were so significant that the American Health Association (AHA) reported that hospital systems through March, April, and May have collectively lost over \$200 billion thru this period and are estimated to lose up to \$350 billion through the end of 2020.7 Without a doubt these are unprecedented times for healthcare providers. Based on our extensive investigation, we understand technology will be critical to all future operations and planning solutions—particularly for hospital safety. The flexibility and adaptability of healthcare spaces, now more than ever, needs to be planned from the beginning. Significant changes to regulations and guidelines for healthcare facilities are underway as the pandemic has exposed the vulnerabilities of healthcare buildings due to the impact of infectious diseases and required emergency response measures. There has been a dramatic shift in how people view access to healthcare and this new perspective will result in scenarios in which healthcare organizations find themselves with assets that will need to be repurposed to respond to the changing landscape. Data shows social isolation. unemployment, and forced guarantines are having a significant effect on people's mental health. It is time to rethink the American mental healthcare system by de-stigmatizing mental health, increasing awareness, and expanding mental health services.

#### REFERENCES

1. Guttman, D., (n.d.). 25 Statistics you need to know about Healthcare and Telemedicine, First Stop Health, https:// www.fshealth.com/blog/29-statisticsabout-telemedicine-healthcare

- 2. Zimiles, A., (2020). Four new statistics prove that telemedicine isn't just a pandemic. Medical Economics. <u>https://</u> www.medicaleconomics.com/view/ four-new-statistics-that-prove-thattelemedicine-isn-t-just-a-pandemic-fad
- 3. Centers for Medicare & Medicaid Services (CMS), (2020), Coronavirus Update: CMS Releases Waivers for COVID-19. American Hospital Association. <u>https://www.aha.</u> org/advisory/2020-03-31-coronavirusupdate-cms-releases-waivers-covid-19
- 4. California Hospital Building Safety Board. (2020). Administrative Processes, Code Changes, & Standard Details *Committee*. Office of Statewide Health Planning and Development (OSHPD). https://oshpd.ca.gov/ml/v1/resources/ document?rs:path=/Public-Meetings/ Documents/HBSB/2020/COMBINED-APCCSD-6-22-20..pdf
- 5. Panchal, N., Kamal, R., Orgera, K., Cox, C., Garfield, R., Hamel, L., & Chidambaram, P. (2020). The implications of COVID-19 for mental health and substance use. Kaiser Family Foundation. Retrieved May 5, 2020 https://abtcounseling.com/wp-content/ uploads/2020/09/The-Implicationsof-COVID-19-for-Mental-Health-and-Substance-Use- -KFF.pdf
- 6. William, W., (2020). The coronavirus pandemic is pushing America into a mental health crisis. The Washington Post. <u>https://www.washingtonpost.com/</u> health/2020/05/04/mental-health-<u>coronavirus/</u>
- 7. Haefner, M., (2020). COVID-19 to cost hospitals \$323 billion, American Hospital Association says. Becker's Hospital CFO Report. https://www. beckershospitalreview.com/finance/ covid-19-to-cost-hospitals-323-billionamerican-hospital-association-saus.html

This is not the first and won't be the last viral pandemic we'll experience. As designers, it's our responsibility to anticipate these negative effects on our ecosystem and learn how to design pandemic-ready facilities.



Shunde Hospital of Southern Medical University (designed by HMC Architects)



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