



COVID-19 alternative care sites: Addressing capacity, safety, & risk challenges for our nation's hospitals during a public health pandemic response

The briefing in summary

The current pandemic presents a “rising tide” condition of prolonged challenge compared to the “big bang” single incidents of natural disasters or man-made events.¹ In considering the World Health Organization’s pandemic risk management phases, we find ourselves ill-prepared in the midst of an “alert phase” of the pandemic. The projected lack of hospital bed space within the context of a public health crisis has been an alarming area of concern.²⁻⁴ The strategy being proposed on an ad-hoc basis in multiple states includes facility-based and community-based surge capacity.⁵ The need for alternative care sites (ACS) during disasters or pandemics has been documented, but details are often scarce (and obviously not specific to COVID-19).⁶⁻⁷ The American Institute of Architects established a task force to address the role of architects and the built environment in the current COVID-19 crisis. The task force is developing a set of findings to be used during this pandemic response as well as creating a database to house the collection of evolving examples of ACS development. Qualified health care architects and allied professionals are in a unique position to leverage problem-solving skills to optimize safety and mitigate risk when implementing ACS. Our goal is saving lives and reducing the transmission of SARS-CoV-2 (COVID-19).

3 key messages

A Health Impact Briefing Method. The public health pandemic will continue to evolve with rapidly developing information changing day-to-day and even hour-by-hour requiring a rapid response approach.

Alternative Care Sites (ACS). The use of ACS requires a critical distinction in how to safely and effectively provide healthcare operations within a non-healthcare setting or building.

Case Study Examples. A COVID-19 ArchMap allows anyone to access examples of built environment solutions being developed across the nation as well as global entries.

Background

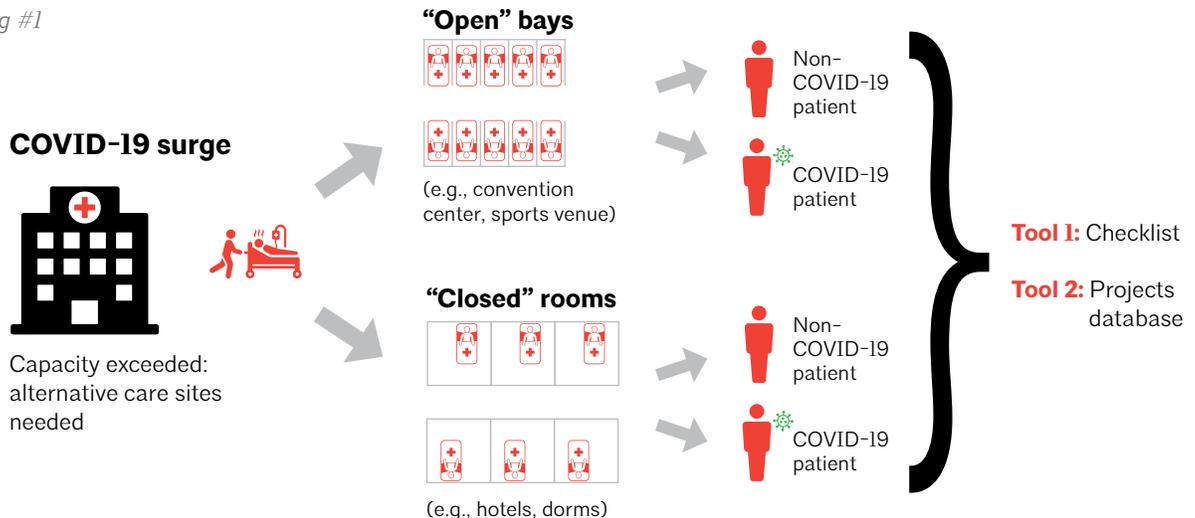
During the COVID-19 pandemic public health response, the projected lack of hospital bed space within a public health crisis has been an area of alarming concern.²⁻⁴ Qualified health care architects and allied professionals are in a unique position to leverage problem-solving skills to optimize safety and mitigate risk when evaluating and recommending physical facility changes at alternative care sites (ACS).

The need

There is an unprecedented need for the adaptive reuse of buildings to serve in a surge capacity for medical screening, triage, and patient care. Further, the need to protect health care workers and first responders in the line of duty is essential to continue to meet the demand. The strategy being proposed on an ad-hoc basis in multiple states includes facility-based and community-based surge capacity⁵ through the adaptive reuse of “open” structures, such as convention centers, as well as enclosed sports venues. “Room-based” structures, such as hotels and dormitories, are also a consideration, particularly newer facilities that have ventilation and bathroom facilities for distinct separation of patients. However, the adaptive reuse of buildings for health care in a pandemic scenario should consider both safety and functionality, not solely bed counts.

While the US Army Corps of Engineers has developed Performance Work Statements for Alternative Care Facilities, there is an urgent need for additional guidance to establish the safe and functional use of ACS being established. In an effort to support the COVID-19 response, The American Institute of Architects (AIA) launched a COVID-19 Task Force with multiple initiatives to help inform public officials, health care facility owners, and architects on adapting existing buildings for temporary health care operations. We recognize that in times of crisis, the established norms should not restrict innovation in handling the influx and treatment of patients or residents. Our task force has aligned temporary solutions advised by the minimum requirements contained in the FGI *Guidelines*, which are considered the minimums for establishing patient and staff safety during conventional periods of planning, design, and construction of health care facilities.

Figure 1: A visual abstract of health impact briefing #1



Problem statement

The need for ACS during disasters or pandemics has been documented, but details are often scarce (and obviously not specific to COVID-19).⁶⁻⁷ The task force has developed a set of preliminary findings to be used during the alert phase of the pandemic response (30–90-day window of time) to plan for the care of both COVID-19 and non-COVID-19 patients in both “open” and “closed” room-based settings.

The findings will also address issues of staff health and safety; telemedicine and teleconnect; and the challenge of marginalized populations, including the myriad of issues surrounding behavioral/mental health patients. The considerations are being developed by architects with a wide range of expertise, including in health care facility design, public health, and disaster assistance.

Preparedness

Prior pandemics (e.g., SARS-CoV-1, MERS) have offered lessons learned. Yet, from both a public health and health care perspective, we find ourselves ill-prepared for the current crisis,⁸ perhaps most notably as it concerns health care delivery settings. A pandemic response is not just about housing a displaced population, but also providing the World Health Organization’s (WHO’s) whole-of-society approach to readiness, response, and recovery, addressing the government, civil society, and businesses.

The WHO model of pandemic readiness is supported by nine essential services: food, water, health, defense, law and order, finance, transport, telecom, and energy.⁹ Yet “shelter,” a fundamental hierarchy of need,¹⁰ is missing. Perhaps the model assumes alternative shelter will be available.

Figure 2: Whole-of-society pandemic readiness (adapted from the WHO)⁹

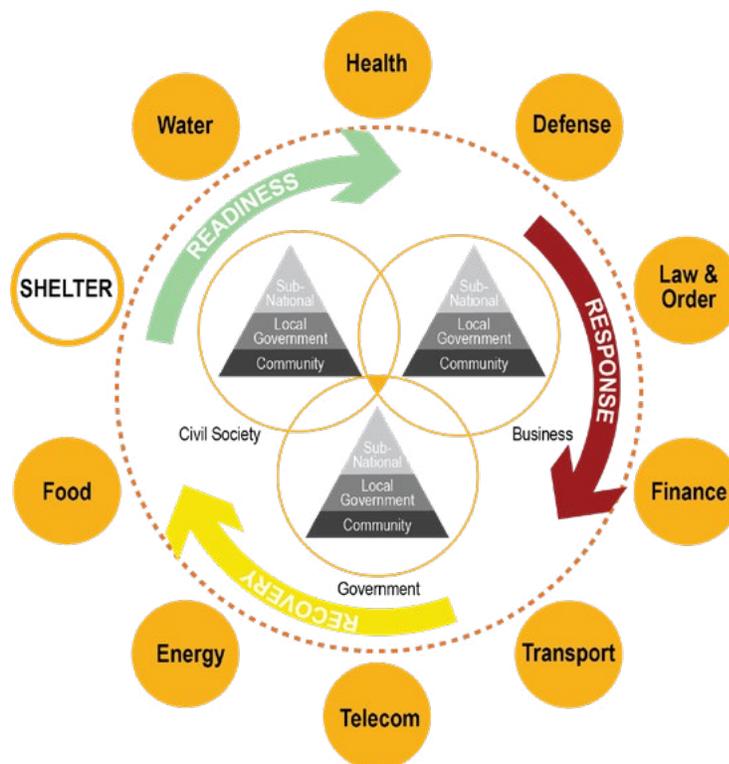
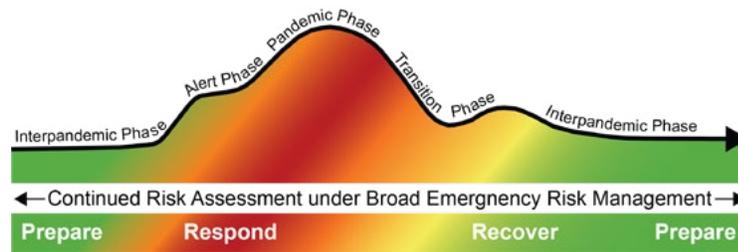


Figure 3: Pandemic phases continuum (adapted from the WHO)¹¹



However, during the COVID-19 US preparations, a lack of planning, design, and construction for ACS is evident. As a result, “shelter” has been incorporated into the WHO model (Figure 2).

According to the WHO’s Pandemic Influenza Risk Management Guidance continuum of pandemic phases (Figure 2),¹¹ we estimate we are nearing the end of the alert phase. This is not the opportune time to be planning, let alone constructing, surge capacity. While the imperative for continued risk assessment for our built environments has never been more clear, the need for rapid response assessment is also imperative to meet demand.

The intended audience

Our task force has taken the position that our guidance must clarify opportunities for a wide range of facility operations and conditions such as:

1. Local individual hospitals and health systems extending their crisis management domain to include COVID-19 critical patients;
2. Local hospital systems forming informal or formal operating agreements to jointly manage patients in geographically defined populations;
3. Federal, state, or local departments of health organizing health systems and public health officials to centralize operational control for geographically defined populations;
4. Department of Defense, Federal Emergency Management Agency, National Guard, and state militias organizing caregivers and others to centralize operational control; and
5. Facilities for marginalized populations or other populations left outside of the mainstream health care delivery model, as well as any combinations of 1-4 above.

Methods

Through a series of call-to-action networks (i.e., expressed need to act) the AIA’s professional service organization groups felt an urgency to step forward and assist during the COVID-19 USA public health response. Healthcare providers have been calling on architectural firms since January 2020 to provide design ideas or technical assistance with solutions to increase “surge capacity.” Surge capacity was to address additional bed capacity, safety, and risk challenges for COVID-19 patient care in our nation’s hospitals or alternative care sites.

A conference call organized by AIA brought together AIA leadership and members to discuss how to proceed. Three COVID-19 Task Forces were formed around Health, Implementation & Community Outreach, and Business Practice Resources.

Our task force was created from members of the AIA Academy of Architecture for Health (AAH), AIA Design & Health Leadership Group (DHLG), the American College of Healthcare Architects (ACHA), The Center for Health Design (CHD), the AIA Board, and the Facility Guideline Institute (FGI) Health Guidelines Revision Committee (HGRC).

Our team of approximately 12 members assembled and agreed to work for seven consecutive days using a charrette think tank format to develop tools helpful during a pandemic rapid response phase of work. Consensus was reached to develop guidance tools for ACS for:

- COVID-19 patients
- non-COVID-19 patient populations

and briefings on related challenges for:

- frontline health care workers;
- mental/behavioral health patients including marginalized populations; and
- telemedicine and teleconnection applications during a pandemic.

The highest priority was given to evaluating the US Army Corps of Engineers Implementation Support Materials (conceptual documents and performance specifications) available in the public domain.¹²

Guidance tools

Our task force determined that it would create two tools to guide stakeholders evaluating ACS environments for adaptive reuse over the next 30–90 days.

Tool I: COVID-19 Alternative Care Sites Preparedness Assessment Tool VI.O

The purpose of the **assessment tool** is to allow all states and US territories to prepare for the arrival of patients with COVID-19, which may require accommodation for surge capacity of COVID-19 or non-COVID-19 patients.

The Preparedness Assessment Tool does not describe mandatory requirements, but highlights important areas for evaluation by both health care organizations and public health agencies in selecting alternative care sites.

Using the format and method outlined in the CDC (Centers for Disease Control and Prevention) Comprehensive Hospital Preparedness Checklist for Coronavirus Disease 2019 (COVID-19), an ACS Preparedness Assessment Tool was adapted for the evaluation of sites and buildings.

All hospitals and public health agencies need to ensure that ACS, both on a health care campus and in community settings, are appropriate for managing patient care operations during a pandemic public health response in order to:

1. Mitigate the risk of spreading of pathogens, including SARS-CoV-2 within the facility;
2. Maximize preservation of life;
3. Promptly identify patients requiring screening, isolation, or transitioning to the correct facility based on health care organization or public health authority having jurisdiction (AHJ) during the pandemic;
4. Care for a larger number of patients with varying conditions in the context of a pandemic; and
5. Ensure monitoring and management to assure ongoing safety for 24/7 operations.

The assessment tool contains information synthesized from non-crisis situations (design principles, available supporting evidence, or translation of applicable standards) in combination with federal documents issued during the COVID-19 crisis. The content was prepared with joint professional input from trained and experienced health care architects, engineers, life-safety consultants, and hospital facility operations. The ACS Preparedness Assessment Tool does not describe mandatory requirements. It does highlight important areas for evaluation by both health care organizations and public health agencies in selecting an ACS for the safe and effective treatment of patients, as well as supportive environments for frontline staff. The goal is to identify appropriate adaptive reuse of existing built environments, such as convention centers, sports arenas, community centers, hotels, dormitories, or other space for occupancy during the pandemic.

Tool 2: COVID-19 ArchMap

Our task force also developed an online database of ACS case studies. [The COVID-19 ArchMap](#) can be searched by state, type of construction, location, and other characteristics. The intent of this initiative is to provide timely information regarding implemented (or planned) accommodations for surge capacity. The tool was beta-tested by AIA AAH members prior to its launch in early April to assure a base number of projects and data were populated into the landing page. A quality control process is being implemented through the University of Kansas' Institute for Health and Wellness Design to assure accurate reporting to the extent possible. The goal is to continue developing content by recruiting other firms and organizations to provide project details.

The short-term results of the COVID-19 ArchMap site are anticipated as the quick retrieval of possible solutions for individual institutions along with the monitoring of overall national activity.

The webpage is being developed using Microsoft Power BI, which allows flexible formats for displaying information. The raw input data is stored on a Google sheet maintained by AIA. The short-term results of the COVID-19 ArchMap site are anticipated as the quick retrieval of possible solutions for individual institutions along with the monitoring of overall national activity. Longer-term benefits of the database include the ability to analyze strategies to inform future responses and to identify case studies for further documentation.

Perspectives

In addition to considering care in non-health care settings, the task force identified the important role of technology to manage communications and care and the challenges posed by managing patients with comorbidities including mental and behavioral health conditions. Further, the task force identified the crucial need to address the care of the frontline workers who face risks of infection as well as mental anguish and physical exhaustion.

Technology and managing mandated isolation practices

Telemedicine has evolved over the past decade into a major component of medical care, including primary care screening, chronic care monitoring, remote medical support, and other applications. The special conditions created by COVID-19 (i.e., the surge of outpatient visits and the need for quarantining patients and staff) merit consideration for remote approaches to care.¹³⁻¹⁴ Technology and digital communication play a new role in delivering meaningful, safe, and dignified connections in a state of mandated COVID-19 isolation. Standard telemedicine offers some significant advantages:

- Reducing exposure to patients who may or may not be diagnosed with COVID-19¹⁴
- Mitigating risk of cross-contamination¹⁵
- Providing efficient care, reducing transportation time and delays in waiting for care¹⁵
- Allowing staff under protective quarantine to provide care¹⁴
- Reaching remote areas and care sites with limited clinical expertise¹⁶
- Providing mental health support to COVID-19 patients, staff, and others¹⁷

Patients are becoming more comfortable using technology for medical advice. A recent study of DTC (direct to consumer) telemedicine found that 85% rated their satisfaction with their physician with five out of five stars.¹⁸ One possible disadvantage of this approach is the limited use by older, high-risk populations. The DTC study found only 15% of the telemedicine users were age 50 or older.

Technology and digital communication play a new role in making connections in a state of mandated COVID-19 isolation.

However, this technology is not only for standard telemedicine applications. In the case of COVID-19 patients and those awaiting diagnosis, video communication may be the only visual connection to family. Additionally, scarce resources (e.g., ventilators and ICU beds) mean hospitals will have to triage cases¹⁹ and communicate with families and authorized proxies who are off-site because visitation is prohibited during the pandemic.²⁰ Common applications, such as FaceTime and Skype, are utilized on tablets, which are wiped clean after each use. In some cases, though, using such technology require staff assistance, which does not reduce the burden on frontline workers.¹⁹ While frontline workers are at risk for infection and mental and physical fatigue, another dire situation for the caregiver may be patients dying alone.²¹ Provisions for end-of-life care in isolation are essential.

Experience from clinicians at the front line

Health care workers at the front line of the COVID-19 pandemic can provide architects and designers with critical perspectives on how hospital design is currently working (and what is sorely lacking) in this crisis. Although all hospitals have disaster plans in place, the deployment of these plans within a rapid response pandemic has never been tested. The unprecedented scale and spread of COVID-19 has put the US health care system and its health care workers at tremendous risk. Thus, clinicians are essential partners for design teams seeking to circumvent the overwhelming burden of disease stressing the health system capacity and its workforce.²²

Although all hospitals have disaster plans in place, the unprecedented scale and spread of this disease puts our health care delivery system and our health care workers at great risk.

Yet, health care workers encounter many hazards as they provide care, including risk of infection, exposure to pathogens, long work hours, psychological distress, fatigue, occupational burnout, stigma, and physical and psychological violence.²³ Although these risks are an accepted part of their chosen profession, they are also concerned about family transmission. Health workers like any other worker have family members who are elderly, immunocompromised, or have chronic medical conditions.²²

The task force is gathering input from clinicians to understand how the built environment can better support the provision of care and support the care providers themselves.

Key topics to be investigated from the clinicians' perspectives include:

1. What immediate actions are necessary for provider safety?
2. How should COVID-19 and non-COVID-19 patients be assigned, distributed, and moved within health care settings?
3. What improvements can be made to the built environment to improve the ability to provide care?
4. Which technologies, innovations, or adaptations are needed to minimize risk and improve outcomes?

The initial interviews and preliminary analysis will reveal how protection of providers' health and well-being is related to a) environmental and built conditions; b) the provision of a safe setting in which to provide care; c) adequate personal protective equipment (PPE); and d) widespread testing to rapidly identify infected patients. A variety of strategies are being adopted, and emergent needs for improved design will be identified. Rapid innovation is essential to support health care providers so they can continue to provide care for others.

Mental and behavioral health patients and marginalized populations

Multiple marginalized populations are also adversely affected by the global pandemic. With the growing number of confirmed COVID-19 cases, individuals suffering from mental and behavioral health disorders are finding their treatments, medications, and support systems negatively impacted.²⁴ Providers and families alike are stretched to deal with the situation. Mental health care providers, spread thin even before COVID-19, are experiencing increased demand for services.²⁵

Individuals suffering with substance use disorders or addictive behaviors may find current events overwhelming, potentially causing them to relapse after a period of abstinence.²⁶ Distraught by the current uncertainty caused by loss of employment or fear of infection, individuals are at risk for suicide ideation,²⁷ and panic attacks may mimic heart attacks. Without intervention, the clinically depressed and anxious could present at hospitals, consuming valuable staff time and resources.

Many state hospitals housing persons with severe mental illness are not prepared to facilitate the care of highly infectious individuals. Acute care facilities facing surge conditions are not likely to manage an influx of mental health patients needing transport from a state hospital.

Individuals suffering with substance use disorders or addictive behaviors may find current events overwhelming, potentially causing them to relapse after a period of abstinence.

Just as in our acute care facilities today, patients with comorbidities that include mental and behavioral health conditions may end up in an ACS solely due to a primary diagnosis of COVID-19. Minimal space should be considered to accommodate a patient in distress who may need to be transferred to another location.

Next steps

As part of the release of Health Impact Briefing #1, our task force is advancing two tools to provide immediate rapid-response guidance to the industry:

1. Coronavirus Disease 2019 (COVID-19) Alternative Care Sites (ACS) Preparedness Assessment Tool V1.0: A set of temporary solutions as an integral part a pandemic response for realizing hospital operations in non-health care settings
2. The COVID-19 Arch Map: A database of ACS case study examples

Additionally, depending upon the pandemic response and its advancement across the nation, the task force may expand on:

- issues with telemedicine
- management of patients with mental and behavioral health conditions
- reflections from frontline workers

We anticipate offering updates for the tools and information related to alternatives care sites when necessary.

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Author contributions

Health Impact Briefing

The following represents the individual author's substantial contributions: conceptualization, MS; methodology, ET; formal analysis, MS and ET; review, and editing, ET and MS; project administration, MS, ET, and DP; perspective of frontline health workers, EE, DA, MW, KW, and JR; perspective of behavioral health and marginalized communities, YS, EP, RF, NH, HS, and FP; perspective of telemedicine, EP, FZ, and ET.

COVID-19 Alternative Care Sites Preparedness Assessment Tool V1.0

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COVID-19 Arch Map Tool

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Meetings

The task force conducted daily meetings from March 24 through April 2 for the preparation of the Health Impact Brief #1 and related work products for review, consensus, and approvals. Additional subgroup meetings for each work product were held over the same time period.

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Conflicts of Interest

MS, ET, KW, FZ, DA, and DP declare no conflict of interest. *Potential Conflict of Interest:* WH, JF, EE, MW, YS, and EP work in firms providing professional services related to health care architecture planning and design; however, the work presented for this effort does not require any proprietary product or service from their firms.

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Important reader note

Health Impact Briefing in the context of the AIA COVID-19 rapid response is a summary of the best available information on the date of release using evidence-based best practices or policy analysis (guidelines, standards, or code initiatives) for a public health pandemic response to challenges emerging from the perspective of the built environment for the health, safety, and welfare of the public and notably building occupants such as patients, frontline health care staff, caregivers, family, and support staff.

This Health Impact Briefing represents the work of the AIA COVID-19 Task Force to educate and inform architects, health care practitioners, public health professionals, and authorities having federal, state, and/or local jurisdiction within the pandemic response. This Health Impact Briefing in no manner represents or is intended to replace existing applicable laws, regulations, or standards.