The American Institute of Architects

Coronavirus Disease 2019 (COVID-19) Alternative Care Sites (ACS)

Preparedness Assessment Tool V2.0

This preparedness 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, designers, engineers, scientists, life-safety consultants, healthcare professionals, and hospital facility operations.

All US states and territories should be prepared for the arrival of patients with COVID-19. All hospitals and public health agencies need to ensure that ACS, both on a health care campus and in community settings, are capable of handling patient care during a pandemic public health response to:

- Maximize preservation of life;

- Mitigate the risk of spreading of pathogens, including SARS-CoV-2 within the facility;

- Promptly identify patients requiring investigation and isolation and transition patient(s) to the correct facility based on health care organization or public health authority having jurisdiction (AHJ) determinations;

- Care for a larger number of patients with varying conditions in the context of an escalating outbreak/epidemic/pandemic; and

- Ensure monitoring and management of ongoing safety for 24/7 operations.

- Address ethnic diversity and cultural competency , as well as marginalized, rural, homeless, and mental/behavioral health populations

The checklist does not describe mandatory requirements; it does highlight important areas for evaluation by hospital and public health agencies in selecting ACS for the care and treatment of COVID-19 or surge-capacity patients. The goal is to identify appropriate rapid-adaptive reuse of existing built environments such as convention centers, sports arenas, community centers, hotels, dormitories, or other space for occupancy during the pandemic.

	Yes	No

Go/no go building selection

If the building lacks any of these basic building components, then the current facility is unlikely to be appropriate for patient care operations during a pandemic since it cannot be rapidly altered.

Prior to finalizing site selection(s), all considerations should be reviewed for suitability to support care for the intended patient population.

Age: The proposed site is a newer building, built (or renovated) under contemporary codes (less than 20 years old). ☐ ☐

Life-Safety: Confirm building meets minimum construction type and egress requirements as allowed by the Authority Having Jurisdiction (AHJ). ☐ ☐

Adequate Floor Area: There is enough space to accommodate all required patient care functions. (Evaluate using the considerations below.) ☐ ☐

Municipal Water Supply: Water quality and pressure will support safe clinical operations. (Evaluate using the considerations below.) ☐ ☐

Power Outlets: There are a sufficient number of grounded outlets for the safety of patients and staff. (Evaluate using the considerations below.) ☐ ☐

1.0 General conditions of tool use

1.1 Baseline parameters

Completed/Agreed

1.1.1 Operating authority

• Confirm which authorities have jurisdiction (e.g., local hospitals/ health systems; hospital systems with inter-operating agreements; federal, state, or local departments of health/public health; US DOD, FEMA, National Guard, and state militias; or other combinations) ☐

• Confirm whether authority may change over the course of the temporary occupation ☐

1.1.2 Key health administrative roles

• Establish an on-site health care operations leadership structure to govern and coordinate medical affairs and patient care operations, and properly support those operations ☐

• Identify and confirm remote support required ☐

1.1.3 Facility-specific administration

• Establish the facility-based administrative structure to monitor, maintain, or manage:

  – IT and communications ☐

  – supply chain ☐

  – fire-hazard potential ☐

  – operations of permanent and portable HVAC equipment ☐

  – medical gas (surgical air and oxygen) supplies ☐

  – infection prevention protocols ☐

- bio-hazardous waste ☐

• Develop procedures and manage evacuation/movement of patients and staff in emergency conditions ☐

• Create emergency egress maps and train occupants in facility-specific life-safety procedures ☐

1.1.4 Risk management

• Establish authority of the local operator to act in the best interest of patients under its care, assess patient risk, prioritize treatments, allocate/assign all local assets, and adjust course as needed ☐

• Conduct and keep up-to-date a facility-based Safety Risk Assessment (SRA) (inclusive of infection control, security, medication safety, infection prevention, patient handling, and the possibility of injury associated with behavioral/mental health) ☐

• Comply with federal, state, and local laws (e.g., Americans with Disabilities Act [ADA], Health Insurance Portability and Accountability Act [HIPAA], Occupational Safety and Health Administration [OSHA]) while ensuring patient life-safety. (Conditions may differ from strategies employed in non-pandemic care) ☐

• Confirm with AHJ and local fire department if a 24/7 fire watch is required and available due to existing building life safety/fire alarm deficiencies ☐

1.1.5 Professional support for ACS selection & development

• Engage licensed, trained, and experienced health care architects and engineers as well as those design professionals familiar with the alternative care building type under consideration ☐

1.2 Temporary assets

• Confirm whether the operator may also be required to provide temporary medical staff, an electrical generator, additional HVAC equipment, modular gas generation, toilet and shower facilities, staff housing, food, and supplies ☐

1.3 Evolving recommendations

• These recommendations support a rapid-response facility solution, evolving as conditions and precedents warrant ☐

2.0 Functional requirements

2.1 Concept for operations   **Yes/Agreed**

• Patient level of care is identified as:

- ambulatory (capable of self-preservation) ☐

- acute (incapable of self-preservation) ☐

- critical (e.g., requiring life support/mechanical ventilation) ☐

• Patient diagnosis for treatment has been identified for:

- COVID-19 positive (COVID) ☐

- COVID-19 negative (non-COVID) ☐

- Transitional cases (e.g., Asymptomatic, Persons under Investigation (PUI), post-discharge) ☐

• Develop a plan for where both diagnosis and treatment will occur ☐

• Develop a plan for providing care for unanticipated mental and behavioral patients (e.g., observation, safe design areas, transfers) ☐

2.2 On-site patient care

2.2.1 Site selection/location (see also 2.2.6, 2.3.1)

• Site is in close proximity to first responders ☐

• Site is convenient to a hospital ☐

• Confirm parking for staff, ambulances, delivery, and waste removal ☐

2.2.2 Isolate COVID-19 operations

• COVID-related operations can be separated from other activities in the facility ☐

• Establish one-way flow of patient, staff, and materials from clean to contaminated ☐

• Isolate staff support spaces from patient care spaces ☐

• Establish plan for transitioning patient care type during operation of ACS ☐

2.2.3 Patient spaces are sized to accommodate:

• A projected number of _____ occupants, with:

- direct or remote patient monitoring ☐

- patient privacy ☐

- daylight allowed in patient space (windows in patient rooms preferred) ☐

- patient toileting and bathing ☐

- handwashing sink for staff ☐

- space/connections for ventilators, IV poles, monitors, biohazard disposal, etc. ☐

- Space for storage cart and disposal bin (recycling) of immediately available PPE ☐

- Space for donning and doffing of staff PPE-related attire at patient care areas with room for buddy system to supervise (or via camera observations) ☐

- Secure area for patient belongings ☐

2.2.4 Nurse/clinician team station spaces need to accommodate:

- A physician and nursing documentation area ☐

- An area for nurse/clinical team communication ☐

- A cardiopulmonary resuscitation cart ☐

- Handwashing sink for staff ☐

- A POCT (point of care testing) alcove in care areas (e.g., glucometer machines, i-STAT, arterial blood gases) ☐

- Nurse call annunciator ☐

- Surveillance monitors ☐

2.2.5 Nursing support needs to include:

- Provide a medication prep room (secured) or a self-contained dispensing unit with adequate lighting ☐

- Nourishment area(s) with sink, prep counter, refrigerator, ice machine, and handwash station ☐

- Clean supply room(s) ☐

- Soiled materials holding room with a flushable sink and cleanable work counter ☐

- Clean linen storage room ☐

- Equipment and supply storage room ☐

- Environmental services room ☐

- Secured storage for staff items ☐

- Staff toilet and shower ☐

- Area for facility-wide/unit PPE storage (secured as needed) ☐

- Ventilator decontamination and repair ☐

- Break room or respite area with access to daylight (where possible) ☐

- On-call sleeping rooms ☐

2.2.6 Intake & discharge

- Establish space needed for security protocols ☐

- Provide a covered ambulance drop-off ☐

- Accommodation for patient transfer related to disease case or death ☐

2.2.7 Intake & discharge if used for walk-ins

- Separate walk-in/drive-through patient registration ☐

- Enclosed, covered, and/or drive-through triage area (e.g., for swabbing, and evaluation) ☐

- Separate patient exit, remote from the patient entry ☐

2.2.8 End of life

- Accommodate virtual family access (adequate Wi-Fi) ☐

- Provide area for end-of-life visitation (based on allowed policies and protocols) ☐

- Provide exterior window if available (if conscious) ☐

2.3 General support

2.3.1 On-site support needs to include:

- Site security ☐

- Separate designated staff entry and exit consistent with SRA ☐

- Receiving and logistics ☐

- Satellite pharmacy and related security ☐

- A STAT-lab (See also POC in 2.2.5 Nursing Support) ☐

- Morgue (mobile, if necessary) ☐

- Normal and biohazard waste management ☐

- Decontamination and clean workroom for ventilators ☐

- Food delivery and staging ☐

2.3.2 Off-site support

- If not provided onsite, confirm inter-organizational operating agreements for:

  - sterile processing ☐

  - linen processing ☐

  - general equipment and supply storage and logistics, general lab ☐

  - general pharmacy ☐

  - lab ☐

  - food service ☐

2.3.3 Administration ☐

- Areas to support site leadership

2.3.4 Caregiver support area for rest, self-isolation/ quarantine conditions ☐

- Confirm location(s) for on-site temporary housing (medical, nursing, and support staff)

☐

- Investigate ability to contract with local hotels or others providing sleeping quarters in close proximity

3.0 Facility modifications required under design/build

3.1 Architectural

3.1.1 Construction type

- Avoid combustible construction ☐

- Preferred: NFPA 101, Life Safety Code Type II or greater level of fire and life-safety occupant protection ☐

3.1.2 Passive life-safety

- Confirm if stairs allow for evacuation of patients on a med-sled, if patients are incapable of self-preservation ☐

- Confirm egress paths for appropriate fire and smoke enclosure rating ☐

- Review fire and smoke compartmentation based on patient density (especially if no or limited smoke dampers exist) ☐

- Confirm general storage rooms >100 SF and oxygen storage rooms are fire-rated, including positive latching ☐

- Confirm at least one horizontal exit ☐

- Provide at least two means of egress per floor where patients are located ☐

- Adequate exit signs and egress lighting ☐

3.1.3 Defend in place

- Where patients are incapable of self-preservation, evaluate life-safety plans to defend in place or develop an active operationally-based life safety plan ☐

3.1.4 Building geometry

- Confirm layout (walls, doors, corridors, etc.) for the ability of staff to easily move patient stretchers and medical equipment ☐

- Confirm visibility for staff to maintain sightlines in patient care areas to actively monitor patients as well as mitigate risk of behavioral incidents (e.g., elopement, aggression—in the event of behavioral/mental health comorbidity) ☐

3.1.5 Building components

- Provide patient entries/doors that:

  - Include vision panels for out-of-room observation ☐

  - Contain aerosolized spores ☐

  - Allow clearances for equipment and stretcher ingress and egress ☐

- Provide scrubbable and easily cleaned finishes in patient areas (evaluate removal of existing finishes such wall coverings, window treatments, and carpet) ☐

- Provide hard-surface, slip-resistant flooring ☐

3.1.6 Equipment & furnishings

- Use patient beds and chairs that can withstand disinfection ☐

- Evaluate space for necessary furniture and medical equipment ☐

- Remove equipment or furniture not directly supporting patient care ☐

3.1.7 Conveyance

- Elevators should allow staff to move a patient on a stretcher or, if ambulatory, in a wheelchair ☐

- Consider segregating staff and patient flow in elevators ☐

3.2 Structural

- Confirm the existing structural system can support the revised structural (live) load for increased occupants, medical equipment, and any additional rooftop equipment ☐

3.3 Mechanical

3.3.1 Isolation & negative pressure

- If clinically required, make provisions to maintain a negative pressure room, zone, or floor ☐

- If possible and clinically required, use/create airborne infection isolation rooms (AIIR) ☐

- Where possible, locate exhaust near the patient's head ☐

- Ensure adjacent spaces are protected from cross-contamination ☐

3.3.2 Air-changes & filtration

- Where possible, the preference is 10 air-changes per hour (ACH), plus 2 ACH of outside air ☐

- Where possible, the preference is MERV 7 filters at patient areas and MERV 14 final filters ☐

3.3.3 Testing & balancing

- Perform post-construction/renovation testing and balancing of the HVAC system ☐

3.3.4 Potential existing system limitations

- Consider through-wall units and bathroom exhaust for existing exhaust capacity, filtration, and air change rates. (These may be affected by ductwork sizing) ☐

- Consider packaged rooftop units with electric heating to provide additional ventilation ☐

- Consider upgrading building exhaust systems (e.g., higher-volume fans) to maintain negative pressure ☐

- Evaluate humidity controls to provide optimal humidity levels for effective patient care and treatment ☐

- Consider HEPA-filtered recirculation units in patient rooms ☐

3.3.5 Smoke control

- Confirm smoke-control system capabilities. If not possible, the patient population may be limited ☐

3.4 Electrical

3.4.1 Power

- Provide power circuits based on equipment demands at all patient and staff locations ☐

- Confirm locations of floor boxes for general power distribution ☐

3.4.2 Branch power availability

- Confirm branch circuits are available to support patient care operations ☐

3.4.3 Emergency power

- Based on the needs of the patients (i.e., ambulatory or critical care), provide uninterrupted critical and life-safety power circuits to support patient care areas for at least 24 hours for essential services, including:

  - life-sustaining medical equipment and drug storage equipment/refrigerators ☐

- outlets to support medical equipment at patient care stations and headwalls ☐

- nurse call system ☐

- IT (patient-related, medical team communication, and infrastructure) ☐

- egress lighting ☐

- fire alarm system, elevators, IT infrastructure, etc. ☐

- elevators ☐

- automatic transfer switch ☐

3.4.4 Lighting

- Provide lighting (sealed fixtures) and portable exam lights to support the clinical operation ☐

- Verify emergency egress lighting ☐

3.5 Plumbing/medical gas

3.5.1 Medical gas

- Provide accommodations for oxygen, medical air, and vacuum to support intubation and ventilator operations s to accommodate high/full demand ☐

- Confirm availability of space for temporary modular oxygen tank generators, when needed ☐

- Confirm availability of an appropriately fire-rated storage container or room for bottled oxygen ☐

- Confirm availability of storage for empty oxygen tanks ☐

3.5.2 Water

- Provide potable water to support the clinical operation. (This may include disinfection of the water main and the water distribution system and analytical testing of the building to confirm the water system is safe for patient care operations) ☐

- If required, plan for processing water for decontamination or on-site sterilization. ☐

- Plan for ongoing management of the water system to include flushing, temperature monitoring, and residual disinfectant levels. ☐

3.6 Fire protection/life safety

- Confirm fire/life safety conditions and expectations with local AHJ(s) ☐

- Confirm presence of fire alarm system and functionality to support the patient care setting. If no fire alarm system, reevaluate appropriateness of building for pandemic response, or install a fire alarm system ☐

- Preference: Full automatic fire-suppression system ☐

- Confirm adequate supply and spacing of fire extinguishers ☐

3.7 Communication

3.7.1 Information technology

- Confirm or install a secure information technology infrastructure appropriate to support patient care, including HIPAA compliance ☐

3.7.2 EMS communications

- Confirm or install an EMS communication system appropriate to support patient care, including HIPAA compliant security ☐

3.7.3 Nurse call/communication

- Confirm or install a secure nurse call system appropriate to support patient care or similar method of communication from patient to nurse. ☐

- Establish method for clinician communication (e.g., mobile, wireless) ☐

3.7.4 Fire alarm

- Confirm or install a fire alarm system connected to local emergency responders ☐

- Verify availability of fire alarm pull stations ☐

3.7.5 Security surveillance

- Evaluate security needs and provide security surveillance system as appropriate (cameras, monitors, motion detectors, door and window alarms etc.) ☐

- Consider wireless systems where necessary ☐

4.0 Additional considerations

4.1 Ethnically diverse or marginalized populations

- Review any space needs to address cultural competency ☐

- Consider accommodations for community-specific spiritual and cultural practices ☐

- Consider accessibility of ACS and transportation options and within or adjacent to public housing communities ☐

- Provide dedicated spaces for social worker(s) and language translation services ☐

4.2 Rural populations

- Consider accessibility of and navigation to ACS, evaluating associated drive times and distances ☐

- Consider the need for helicopter transport ☐

- Consider housing and lodging for healthcare staff and patient families ☐

- Evaluate needs for ambulance services to transport higher acuity patients ☐

- Verify systems for communication (mobile phone, boosters for improved wireless) ☐

- Verify critical infrastructure needs (sewer, septic, potable water, electricity) are adequate for anticipated demand ☐

4.3 Homeless and unsheltered populations

- Provide bathroom and shower areas, located within close proximity to entry ☐

- Designated storage for life belongings, bicycles etc. ☐

4.4 Mental and behavioral health (MBH) patients

- Consistent with section 1.1.4, perform a Safety Risk Assessment of all locations accessible to potential MBH patients to eliminate opportunities for self-harm and harm against others ☐

- If MBH patients are identified, provide space for continuous 1:1 observation until transfer or discharge ☐

- Consider safe rooms, if appropriate to operational plan identified ☐

Additional guidance

For additional reference materials, refer to
https://bit.ly/C19HealthcareArch

Task force & author contributions

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COVID-19 Alternative Care Sites Preparedness Assessment Tool

The following represents the individual author's substantial contributions: conceptualization, MS; formal codes and standards analysis, JF, WH, KW, and ET; project administration, ET, MS, and DP.

Meetings

The task force conducted daily meetings from March 24–April 2 2020 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. Updates were prepared through April 22, 2020 for a revised version release

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