

Hospital Operations Toolkit for COVID-19

Capacity: Space

November 30, 2020

Updated September 3, 2021

Identifying ways to generate additional space is a key component of hospital planning efforts to prepare for a surge of patients. While some geographic locations cared for overwhelming numbers of COVID-19 patients early in the pandemic requiring the activation of alternate care sites (ACS) in their communities, other areas with limited COVID-19 transmission had excess beds as elective surgeries and other procedures were delayed and patients avoided seeking emergency care. As the pandemic continues, additional geographic areas have experienced large surges of COVID-19 patients. Some hospitals have also seen increases in non-COVID-19 patients whose conditions worsened as they delayed care. The decision to expand hospital space must occur in conjunction with considerations on how to expand staffing and supplies to support its use.

The space considerations included in this section assume the facility has converted rooms to semi-private as possible and is maximizing available inpatient space, including potentially converting observation, rehabilitation, and other units to inpatient care. It also assumes that load-balancing strategies with other hospitals in the region or healthcare coalition (HCC) are preventing a single hospital or few hospitals from bearing a disproportionate burden of the overall community's patients.

Additional information on load-balancing is found in the [Response Coordination](#) section.

Safely modifying facility space for patient care is addressed in the [Engineering Controls](#) section.

Intensive Care Unit (ICU)

When converting space to critical care, hospitals should account for:

- Appearance of each bed in the electronic health record (EHR). Ensure they are categorized as inpatient beds and that inpatient charting is available to the providers.
- Appropriate beds/carts for ongoing care rather than procedural care.
- Notifications to pharmacy, nutrition, laboratory, and consults.

Two key strategies for generating additional critical care space are:

1. Using post-anesthesia care unit (PACU) and other procedural areas as critical care units.

- Strategies to preserve adequate resources for emergency procedures and partitioning of COVID-19 care from surgical/procedural patients are important concerns.
2. Repurposing intermediate/monitored care units to ICU.
 - Provide an appropriate supply of oxygen. Pipes to non-ICU units may not accommodate necessary flow rates or the numbers of patients.
 - Expand negative pressure capacity through temporary or permanent conversion to isolation rooms.
 - Consider placement of high efficiency particulate air filters and UV lights to decrease potential transmission.
 - Ensure patients can be adequately monitored and cared for in the rooms by using alarm systems, securing visual contact through glass, making adequate room for equipment, communication, and video devices, and other means.
 - Consider the need for in-room specialty procedures, such as renal replacement therapy (RRT).

Hospital-Based Alternate Care Sites

Multiple non-patient care areas may be suitable for care of lower acuity COVID positive or non-COVID patients when inpatient space is saturated. This is usually preferable to opening a community-based ACS since the patient can easily be moved to a higher level of care and rapid response teams from the facility are available to assess and treat patients who may deteriorate. (Note that information on establishing a community-based [ACS](#) is outside the scope of this toolkit.) Conference centers, classrooms, gymnasiums/rehabilitation spaces, and other flat space areas as well as some outpatient clinic, specialty services (e.g., sleep center) spaces, or tents and trailers may be appropriate for alternate care locations. Issues to consider when establishing these hospital-based ACS include:

- Approximate capacity for expansion.
- Consideration to layout such as triage, clean supply area, medication/preparation area, dirty utility, area for donning and doffing PPE, and other areas to support patient care and staff needs.
- Approximate beds for care and prioritized/cascading activation of these areas by suitability.
- Need for safety systems (e.g., call lights, supervision) and recognition of potential safety concerns of the area, including fall risk, ambient noise, lighting, patient wandering, access to bathrooms and handwashing, and disease transmission risks.
- Oxygen supply or oxygen options. Determine, for example, if the existing electrical system can support concentrators, the potential for multi-place systems running off high-pressure connections (including adequacy of piping to support), or liquid/large cylinder-based systems.
- Ventilation, including temperature, humidity, air exchanges, supply/return, and where the air goes within the heating, ventilation, and air-conditioning (HVAC) system.
- Availability of water for renal replacement therapy.
- Consider food services, sanitation, laundry, pharmacy, and environmental services

- Licensing and waiver issues, both at the state level and through the Centers for Medicare & Medicaid Services.

Non-Traditional Facility Use

One strategy to generate surge space in a tertiary center is to partner with smaller community hospitals to determine the level of care they are comfortable providing and transfer patients in agreed upon categories. This may include:

- Transferring patients with non-COVID-19 diagnoses that the community hospital is comfortable managing (e.g., diabetic ketoacidosis, congestive heart failure exacerbation, chronic obstructive pulmonary disease/asthma flare).
- Transferring convalescent COVID-19 patients who are stable enough for movement to a lower level of care, potentially including ongoing ventilator weaning.
- Transitioning patients from inpatient to “swing” beds for long-term care while staying in the same facility and bed. Swing beds can be particularly useful for prolonged weaning off a ventilator.
- Adjusting rehabilitation beds to acute care beds if patient census allows.
- Dedicating a long-term acute care facility for COVID-19 patients or dedicating units within a hospital system (usually at lower volume centers) for prolonged ventilator weaning or respiratory care needs.
- Transitioning patients from inpatient hospital beds to a community-based ACS as the need for critical/acute care decreases.
- Discharging patients to isolation or respite and recovery sites established by the community.
- Transitioning to home health care or virtual medical care.

The [Case Management](#) section includes details on supporting discharged patients.

The [Telehealth/Virtual Medicine](#) section includes information on the expansion of remote patient care.

The [Fatality Management](#) section includes additional information on mortuary space requirements.

Adjusting Services

Hospitals may consider adjusting offered services – including elective procedures – to accommodate surge.

- The expansion of telehealth services may reduce some patient space needs.
- Ideally, a consistent approach to titrating elective procedures:
 - Is accepted by all facilities in the HCC/region.
 - Considers the potential post-operative needs of the patient and holds procedures that would require an inpatient stay when such capacity is limited.
 - Balances the need for procedural space and staff to provide surge critical care versus the type of procedure and available resources to determine whether to proceed with the intervention.

- Balances the risk to the patient of a delay in the procedure versus space needs and competing needs of other procedures.
- Uses a tiered approach that involves a third-party (i.e., not the providing surgeon) determination of time sensitivity (e.g., may risk be deferred). This may include a panel of surgeons and non-surgeon physicians at the facility who review all requested non-emergent procedures prior to scheduling.
- Stopping all “elective” procedures is seldom required and can place some patients at risk. It also has serious financial consequences for many hospitals.

Resources Related to Space Capacity

- American College of Emergency Physicians: [ACEP COVID-19 Field Guide](#)
- American College of Surgeons, American Society of Anesthesiologists, Association of periOperative Registered Nurses, and American Hospital Association: [Joint Statement: Roadmap for Maintaining Essential Surgery during COVID-19 Pandemic](#)
- American Society for Health Care Engineering:
 - [COVID-19 Recovery](#)
 - [Pressurization](#)
- American Society of Health-System Pharmacists: [Patient Surge Management During a Pandemic: Toolkit for Hospital and Health System Pharmacy](#)
- American Society of Nephrology: [Coronavirus Disease 2019](#)
- ASHRAE:
 - [Buildings](#)
 - [Healthcare](#)
- ASPR TRACIE:
 - [COVID-19 and Tribal Hospitals: Tuba City Regional Health Care Corporation](#)
 - [COVID-19: Healthcare System Operations Strategies and Experiences](#)
 - [COVID-19 Patient Surge and Scarce Resource Allocation Resource Page](#)
 - [Creating a COVID-19 Specialty Hospital](#)
 - [Designated COVID-19 Hospitals: Case Studies and Lessons Learned](#)
 - [Maintaining Healthcare Safety During the COVID-19 Pandemic Speaker Series](#)
 - [Patient Surge Management Strategies and Crisis Standards of Care during COVID-19](#)
 - [Reconfiguring Spaces: How NorthShore University HealthSystem Met the COVID-19 Challenge](#)
- Einav, S., Hick, J., Hanfling, D., et al: [Surge Capacity Logistics: Care of the Critically Ill and Injured During Pandemics and Disasters: CHEST Consensus Statement](#)
- Healthcare Systems Engineering Institute: [Surge Capacity Bed Management Tools](#)
- Hick, J.: [Critical Care Planning – COVID-19 Quick Notes](#)
- Institute for Healthcare Improvement: [Hospital Preparedness for a COVID-19 Surge: Assessment Tool](#)
- Kaiser Permanente: [Medical Air and Oxygen Capacity](#)

- Kaiser Permanente Northern California: [COVID-19 Hospital Surge Playbook](#)
- Minnesota Department of Health: [Engineering Services](#)
- Prachand, V., Millner, R., Angelos, P., et al: [Medically Necessary, Time-Sensitive Procedures: Scoring System to Ethically and Efficiently Manage Resource Scarcity and Provider Risk During the COVID-19 Pandemic](#)
- Society of Critical Care Medicine: [Configuring ICUs in the COVID-19 Era](#)

[Return to Toolkit Landing Page](#)