

United States Resource Availability for COVID-19

Version 3

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With the onset of COVID-19¹ and the strong possibility of large percentages of the U.S. population being admitted to the hospital and intensive care unit (ICU), the Society of Critical Care Medicine (SCCM) has updated its [statistics on critical care with this new document focusing resources](#) available for COVID-19 in the United States.² Our goal is to provide information regarding the resources needed and available to care for a potentially overwhelming number of critically ill patients, many of whom may require mechanical ventilation.¹ In this report, we address the most current data and estimates on the number of acute care, ICU, and step-down (eg, observation, progressive) beds; ICU occupancy rates; mechanical ventilators; and staffing. We also seek to provide context to the data.

Acute care hospitals; ICU, step-down, and burn beds: The American Hospital Association (AHA) maintains a proprietary dataset of most non-federal hospitals in the United States. Data is gathered by voluntary survey. In April 2019, a study published in *Critical Care Medicine* analyzed the 2015 AHA data.³ For this current report, we extended the analysis from that publication using the most currently available 2018 AHA data while noting minimal changes from 2015.⁴ The 2018 AHA data indicate that there are 5256 AHA-registered community hospitals in the United States. Of these, 2704 (51.4%) provide ICU services (**Figure 3**). These hospitals have 534,964 staffed (operational) acute care beds, including 96,596 ICU beds (**Table 1**), accounting for a median 16.7% of all hospital beds. The ICU beds are categorized as adult, pediatric, or neonatal. There are 68,558 adult beds (medical-surgical 46,795, cardiac 14,445, and other ICU 7318), 5137 pediatric ICU beds, and 22,901 neonatal ICU beds. Additionally, there are 25,157 step-down beds, and 1183 burn-care beds.

The proportion of ICU beds that are capable of negative-pressure isolation is not recorded in the AHA dataset; however, the hospitals studied reported a total of 42,562 airborne infection isolation rooms [AIIR] (formerly known as negative-pressure isolation rooms). The purpose of a negative-pressure room is to confine pathogens to a single closed environment with direct exhaust of air from the room thereby preventing the release of patient generated pathogens into adjacent spaces (i.e. corridor). Negative pressure is strongly recommended for patients with highly communicable droplets nuclei associated diseases such as COVID-19.⁵ Beyond designated AIIR rooms, hospitals may also be able to convert entire wards of patient rooms to negative pressure. When negative pressure rooms are not available, portable high-efficiency particulate air (HEPA) filters that remove airborne contaminants may be placed in the patient rooms to help protect staff both inside and outside the room. HEPA filters may also be included in a hospital's air handling system to ensure that air circulating to specific target areas, like operating rooms or bone marrow transplant room, is highly purified.

Acute care hospitals by core-based statistical area: Of the 2704 U.S. hospitals with ICU services, 74% (1996) are in metropolitan areas (> 50,000 population), 17% (464) are in micropolitan areas (10,000-49,999 population), and the remaining 9% (244) are in rural areas (< 10,000 population) (**Table 2**). Concomitantly, 91% (489,337) of acute care beds and 94% (90,561) of ICU beds are in metropolitan hospitals. Only 7% (36,453) of hospital beds and 5% (4715) of ICU beds are in micropolitan areas. Two percent of acute care hospital beds and 1% of ICU beds are located in rural areas.

ICU occupancy rates: We have focused on U.S. ICU, step-down, and burn care beds as documented by the AHA. ICU bed utilization and occupancy rates, however, are not tracked by the AHA. Instead such data can be calculated from the Healthcare Cost Report Information System, a Centers for Medicare and Medicaid Services dataset composed of the cost reports submitted by every Medicare-certified hospital.⁶ ICU occupancy rates in acute care hospitals in 2010 (the most recent data available) are 66.6% in adult units, 61.6% in pediatric units and 67.7% in neonatal units.⁷ ICU occupancy rates are known to be higher in larger hospitals than in smaller hospitals. For contextual purposes, the occupancy rates do not reflect temporal or seasonal variations but instead represent national aggregates.

Contingency and crisis beds for critically ill patients: The outbreak of COVID-19 has generated concern that critically ill patients may overwhelm existing ICU bed availability. When contingency plans are implemented and elective surgeries and procedures are rescheduled, ICU beds normally used to provide perioperative support would become available to provide COVID-19 care, as would operating rooms (with ventilators) and post-anesthesia care unit (PACU) beds.⁸ Additional monitored hospital beds such as step-down beds may also be drafted into ICU service. At crisis levels, even non-monitored hospital beds may be mobilized but a significant investment of ICU-level facility infrastructure (eg oxygen, gas, power, drainage), devices (eg, physiological monitors, mechanical ventilators, crash carts) and staff uptraining would be required. Making facility changes on this scale can take significant time and cause serious operational disruption at a time when those beds are most needed.

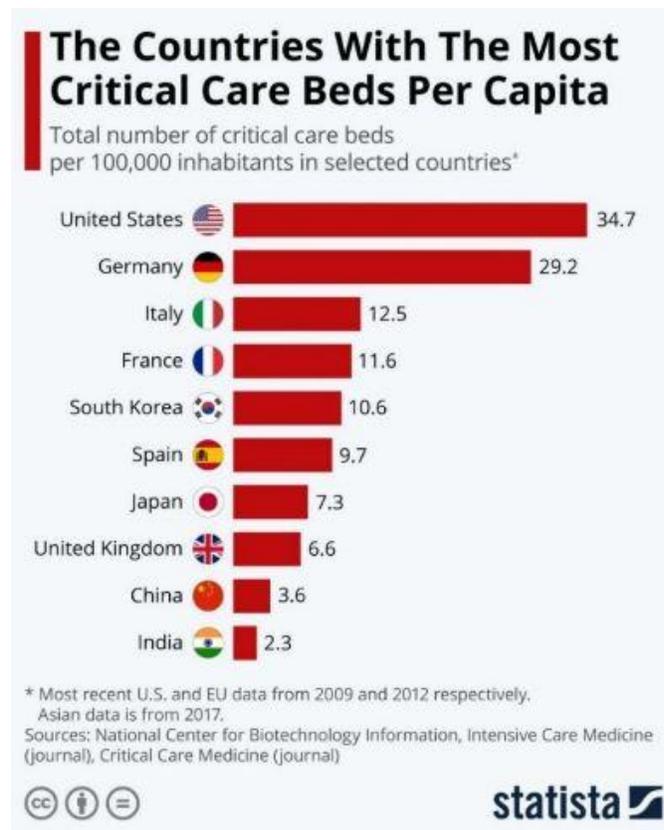
Beyond adjusting distribution and usage of existing hospital beds, there are a host of other options. In China, the government rapidly constructed hospitals solely for COVID-19 patients. This could be done in the United States. Local governments can also consider regionalizing or cohorting their critically ill COVID-19 patients in designated large and high-acuity medical centers. The benefit of this approach is that many of these medical centers already have great numbers of well-equipped ICU and step-down beds as well as trained staff, thereby allowing the remaining hospitals to principally care for non-COVID-19 critically ill patients. Additionally, opening previously shuttered hospital facilities or medical wards and updating their supportive utilities (eg, power, data, air, oxygen, and suction) should be considered. Retrofitting existing nonmedical buildings (eg, hotels, dormitories) into COVID-19 care facilities has also been suggested, although this would be labor-intensive and expensive. These choices may be affected by the availability of medical devices as well as administrative and clinical staff, let alone the array of support services that are essential for quality care.

The U.S. government has additional resources such as the USNS Mercy (T-AH-19) and USNS Comfort (T-AH-20), which can be deployed to assist in coastal areas. Each of these hospital ships contains 12 fully equipped operating rooms, a 1000-bed hospital facility (including 80 intensive care beds, 20 surgical recovery beds, and 280 intermediate-care [step-down] beds), digital radiologic services, medical laboratory, pharmacy, optometry laboratory, CT capability, and two oxygen-producing plants. Each ship is equipped with a helicopter deck capable of landing large military helicopters. The ships have side

ports to take on patients at sea. Their crew comprises 71 civilians and up to 1200 Navy medical and communications personnel when operating at full capacity.⁹

Comparison of U.S. critical care bed numbers with those of other countries. The United States has a significant number of critical care beds per capita compared with other countries (**Figure 1**).

Figure 1. Countries With the Most Critical Care Beds Per Capita



Mechanical ventilators: Reports from ICUs worldwide suggest that the most common reason for COVID-19 patient admission to the ICU is severe hypoxic respiratory failure. Many of these patients require mechanical ventilation.

Supply of mechanical ventilators in U.S. acute care hospitals: Based on a 2009 survey of 5752 AHA hospitals, with 4350 respondents (74.8%), Rubinson et al estimated that U.S. acute care hospitals own 62,188 full-featured mechanical ventilators (20.5/100,000 population).^{10, 11} Approximately half of these can be used to ventilate pediatric or neonatal patients. This national analysis also identified an additional 98,738 non full-featured ventilators for use as surge devices.¹⁰ These include 22,976 noninvasive ventilators, 9488 portable mechanical gas ventilators, 32,668 automatic resuscitators, 8567 continuous positive airway pressure (CPAP) units and other miscellaneous ventilators. This study did not query hospitals about their ownership of anesthesia machines. Nor did this study assess the number of anesthesia machines present in ambulatory surgery care centers.

An analysis of the 2018 AHA dataset described earlier⁴ reveals the presence of 33,588 operating rooms in the 2704 U.S. acute care hospitals. Of the total 4400 AHA hospital survey respondents, there were

35,897 operating rooms. If we assume that each operating room has an anesthesia machine, that adds another approximately 36,000 ventilators to the U.S. national ventilator inventory. This number may be significantly increased if anesthesia machines present in ambulatory surgery care centers are included.

Centers for Disease Control and Prevention (CDC) Strategic National Stockpile (SNS) and other ventilator sources: The SNS has an estimated 12,700 ventilators for emergency deployment, according to recent public announcements from National Institutes of Health officials.¹² These devices offer basic ventilatory modes. In simulation testing, they performed very well despite being in long-term storage.¹³ Obtaining SNS ventilators requires hospital administrators to formally request that their state health officials ask for this equipment. SNS delivery is dependent on a federal decision to deploy them; the delivery timeline may be variable. States may have their own ventilator stockpiles as well.¹⁴ Respiratory therapy departments also rent ventilators from local companies to meet either baseline and/or seasonal demand, further expanding the deployable supply. Additionally, many modern anesthesia machines are capable of being adapted for ICU use and can augment a hospital's surge capacity.

Adding together full-featured and basic hospital ventilators, SNS ventilators, and hospital-based anesthesia machines increases the estimated number of ventilators to over 200,000 devices nationally. It is not known if the non-full-featured and SNS ventilators are capable of adequately supporting patients with severe acute respiratory failure. Also, supplies for these ventilators may be unavailable due to interruptions in the international supply chain. Device maintenance, refurbishment, and repair capabilities are therefore at risk. To our knowledge, anesthesia machines have not in the past been used for short or long-term support of patients with respiratory failure and would initially require anesthesia staff to operate and maintain them, as opposed to typical ICU ventilators, which hospital-based respiratory therapists are trained to operate and maintain.

A detailed projection study of the capacity to rapidly incorporate ventilators into the existing fleet suggests that U.S. hospitals could effectively absorb between 26,000 to 56,000 additional ventilators at the contingency and crisis peaks of a national pandemic, respectively. While many parameters were analyzed in this projection analysis, the rate-limiting feature is the absence of the requisite number of respiratory therapists to manage the ventilators in concert with skilled intensivists.¹⁵

Historical perspectives of ventilatory stockpiling and current approaches to enhance the ventilator supply: Several analyses dating back over a decade have addressed the requisite preparations of the United States to deal with natural, man-made, and infection-related disasters. Many of these studies focused on surge capacity to provide mechanical ventilation for large numbers of patients acutely developing respiratory failure, whether due to mass casualty or influenza pandemic scenarios.¹⁶⁻¹⁸ These studies all acknowledged the need to address the types of ventilators to be stockpiled so that the curated devices were capable of providing care to patients with complex respiratory failure over a prolonged period of time.

In a U.S. survey, Wilkens et al in 2010 found that only 9 states confirmed the presence of a plan or committee designated for triage or management for mechanical ventilation in a pandemic influenza event.¹⁸ All states appeared to rely primarily on the CDC for influenza-based pandemic planning estimates and guidance. In response, Wilkens et al developed the AGILITIES (Age, Glasgow Score, Infusions, Lungs, Interventions, Tests, Informal/Incidental, Excessive Weight and Subtract) system for ventilator triage and allocation for both governments and hospitals. Moreover, the investigators found that only 23.5% of states' public health official survey respondents could accurately describe the key features of a ventilator. Even though the authors queried each state, the authors found that they could

not develop an estimate of the overall U.S. ventilator capacity. Based on these findings, the authors concluded that the US is “woefully unprepared for an event requiring large numbers of ventilators.”

In 2014, a surge capacity consensus statement suggested the development of regional counts of ventilators coupled with establishing goals for regional ventilator stockpiles.¹⁹ This included the recommendation that individual hospitals determine their own ventilatory capacities including traditional ventilators, anesthesia machines, noninvasive ventilators, and transport ventilators. Additionally, the consensus statement recommended that hospitals ascertain their abilities to provide ventilatory support focusing on their identification of hospital areas capable of supporting mechanical ventilators based on existing or readily establishable infrastructure.

Despite the multiple recommendations to enhance ventilator capacity,¹⁶⁻¹⁸ and a broad estimate of greater than 200,000 ventilators available nationwide, the New York and New Jersey epicenters of COVID-19 in March and early April 2020 found themselves with ventilator shortages.²⁰ The optimal enrichment of the U.S. ventilator supply would require ventilator manufacturers to rapidly produce modern full-featured ventilators. This approach would allow experienced clinicians to readily incorporate ventilators that are familiar to them into the care space. Moreover, such devices would also seamlessly integrate into the hospitals’ ventilator fleet and informatics systems. Older devices, such as those in the SNS, lag behind current technology and are unable to stream device data into the electronic health record or project alarms. Anesthesia ventilators may suffice for acute care; however, their long-term use has not been evaluated. Their long term viability may also be limited by the need to be reintegrate them into routine operating room use as normal operations resume. Bilevel positive airway pressure (BiPAP) devices used for noninvasive ventilation support may aerosolize viral particles and increase the risk of staff exposure. Nevertheless, in recognition of extreme conditions identified, the Food and Drug Administration (FDA) on March 24, 2020, granted an Emergency Use Authorization for modifications of a host of ventilator-type devices to be used during the COVID-19 pandemic.^{21,22} This authorization included repurposing BiPAP and CPAP devices to offset the work of breathing or using one ventilator to care for more than one patient when no other safe, clinically proven alternative exists. A major New York medical center recently described their transformation of operating rooms and PACUs into ICU rooms.²³

According to recent media reports, two major car manufacturers, Ford Motor Company and General Motors, as well as GE Health, have collaborated with several ventilator companies to begin mass production of simple, but modern, ventilators that had previously been FDA approved but, to date, have been produced only in small quantities.²⁴⁻²⁷ Local U.S. suppliers have been sought for other ventilator elements. Three-dimensional imaging is also being used to create internal ventilator components.

Recently a new public-private program known as the Dynamic Ventilator Reserve (DVR) has been created to facilitate redeployment of ventilators and ventilator supplies to areas of need.²⁸ The DVR will have a virtual ventilator inventory that will be jointly managed by the AHA and Federal Emergency Management Agency (FEMA) in conjunction with hospitals and healthcare systems. It is hoped that this new system will help address state and regional planning for ventilated patients as COVID-19 epicenters shift throughout the country and longer-term ventilator care becomes required for those with persistent respiratory failure or chronic critical illness.²⁹ A COVID-19 Capacity Predictor tableau dashboard has also been created to aid in allocating vital resources such as ventilators in near real-time.³⁰

Projections of hospitalized patients requiring critical care and mechanical ventilation: The U.S. Department of Health and Human Services estimated in 2005 that 865,000 U.S. residents would be

hospitalized during a moderate pandemic (as in the 1957 and 1968 influenza pandemics) and 9.9 million during a severe pandemic (as in the 1918 influenza pandemic).³¹ A recent AHA webinar on COVID-19, using estimates provided by James Lawler, MD, MPH, of the University of Nebraska Medical Center in Omaha, projected that 30% (96 million) of the U.S. population will test positive, with 5% (4.8 million) being hospitalized.³² Of the hospitalized patients, 40% (1.9 million) would be admitted to the ICU, and 50% of the ICU admissions (960,000) would require ventilatory support.

Since the beginning of the COVID-19 pandemic, projections by the Institute for Health Metrics and Evaluation (IHME), an independent global health research center at the University of Washington, and the MRC Centre for Global Infectious Disease Analysis (MRC GIDA) of the Imperial College London have continuously informed the public and the U.S. and United Kingdom governments.^{33,34} Their COVID-19 projections have addressed rates of infection, hospitalization, ICU admission, need for mechanical ventilators, and mortality. In both countries, their projections have helped form the basis for governmental decisions especially regarding the implementation of societal measures to mitigate the impact of COVID-19 and the requests for support (eg. Hospital and ICU beds and mechanical ventilators) from local to central governmental bodies.

The IHME and MRC GIDA projection data, as broadly presented in the media, convey a high degree of certainty, particularly regarding the peaks of illness and death. However, many statisticians, epidemiologists, and clinicians have questioned the value and certitude of the projections, especially when so many factors of COVID-19 and societies' reactions to both the illness and compliance with governmental recommendations were unknown.³⁵⁻⁴⁰ These commentaries cast doubt on the core premises of the projection models, the complicated methodologies used, the lack of transparency in the assumptions applied, the presence of unacknowledged biases, and the absence of emphasis of the inherent limitations of the models. Collectively the commentaries suggest that such models be used primarily for short- rather than long-term planning. Many discrepancies were noted between the projections and data-driven realities gleaned from contact with COVID-19. For example, in metropolitan New York, there were gross overestimations of the need for hospital and ICU beds and ventilators. These projections led to a large number of additional hospital beds being built and a big hospital ship being brought to New York City. Both of these high-cost and large-scale undertakings were underutilized. Moreover, the uncertainties of the usefulness of projections have been reinforced by the frequent projection revisions by the IHME and MRC GIDA.

Nevertheless, without projections, it is difficult for governments, supply chain managers, and healthcare networks to prepare resources for a range of pandemic-level eventualities.⁴¹ It is hoped that future modelers will benefit from current experiences and projections for the next pandemic. Additionally, local healthcare networks may find more utility in determining resource needs by using projection models at their local, rather than regional or national, levels.^{42,43}

Staffing to care for critically ill patients: As large numbers of critically ill patients are admitted to ICU, step-down, and other expansion beds, an entire critical care team must be allocated to care for them. Having an adequate supply of beds and equipment is not enough. Based on AHA 2015 data, 28,808 intensivists are privileged to deliver care in the ICUs of U.S. acute care hospitals.³ Intensivists are physicians with initial training in one of several parent specialties (eg, internal medicine, anesthesiology, emergency medicine, surgery, pediatrics) who have additional specialized training in critical care medicine. Intensivists work with a dedicated team of nurses, respiratory therapists, pharmacists, and often advanced practice providers (APPs) to render direct care. There are an estimated 34,000 critical

care APPs available to help care for critically ill patients.⁴⁴ The intensivist team is supported by a host of others including social workers, occupational and physical therapists, registered dietitians, pastoral care practitioners, and many others. These fully replete teams, however, are not found in all U.S. hospitals.

Approximately 48% of acute care hospitals have no intensivists on their staffs.³ Based on the needs of critically ill COVID-19 patients, the intensivist deficit may be especially evident during peak periods of patient volume. At forecasted crisis levels, we estimate that the projected shortages of intensivists, critical care APPs, critical care nurses, pharmacists, and respiratory therapists trained in mechanical ventilation would limit the care of critically ill ventilated patients.¹⁵ Therefore, our priority should focus not only on increasing the numbers of mechanical ventilators but on growing the number of trained professionals for both the near and long term who will be needed to care for the critically ill and injured with respiratory failure during crisis conditions.

Augmenting critical care staffing: SCCM encourages hospitals to adopt a tiered staffing strategy in pandemic situations such as COVID-19 (Figure 2).

Figure 2. Tiered Staffing Strategy for Pandemic

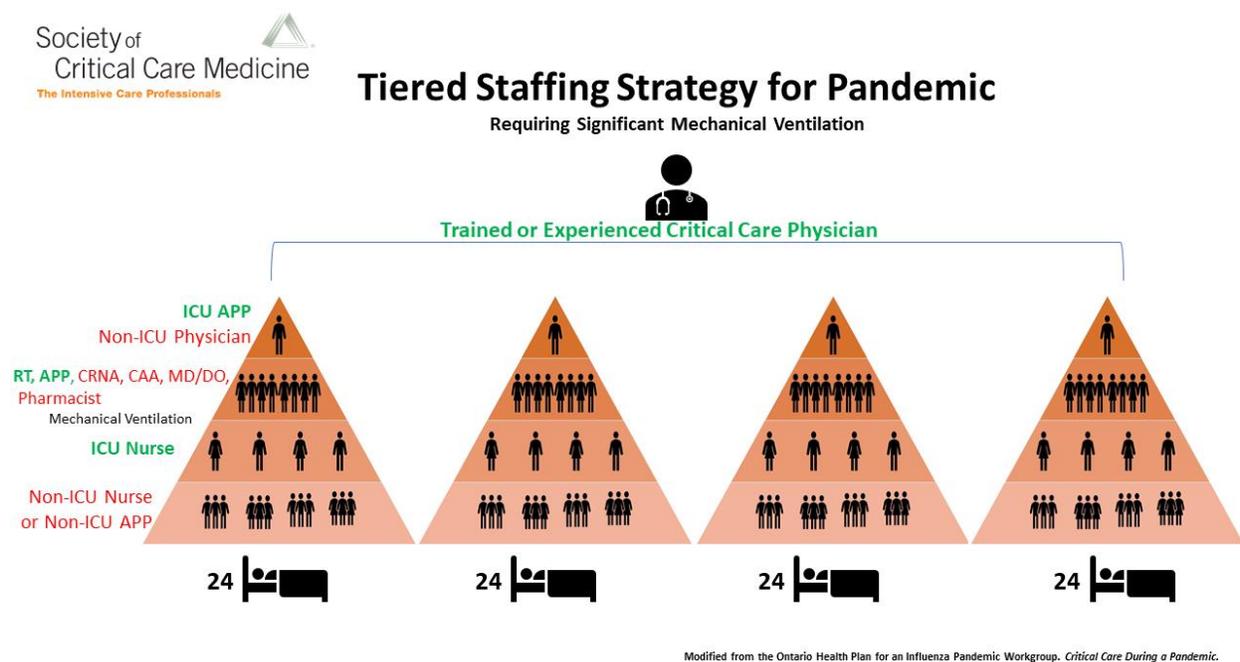


Figure 2 Note: In the crisis model presented here, a physician who is trained or experienced in critical care and who regularly manages ICU patients, oversees the care of four groups of 24 patients each. A non-ICU physician (eg, anesthesiologist, pulmonologist, surgeon, hospitalist), who ideally has some ICU training but who does not regularly perform ICU care, is inserted at the top of each triangle. This non-ICU physician extends the trained or experienced critical care physician’s knowledge, while working alongside APPs who regularly care for ICU patients. Similarly, to augment the ability to mechanically ventilate more patients, experienced ICU respiratory therapists and APPs are amplified by adding clinicians such as physicians (either MD or DO), nurse anesthetists, certified anesthesiologist assistants, and pharmacists who are experienced in managing patients’ ventilation needs.

The model above, originally developed by the Ontario Health Plan for an Influenza Pandemic, was adapted for SCCM's [Fundamental Disaster Management program](#) as an effective strategy to incorporate non-ICU-trained staff of all disciplines (physicians, nurses, APPs, and others [in red] to greatly augment the trained and experienced ICU staff [in green]). While pharmacists, registered dietitians, rehabilitation specialists, and other professionals are also key members of the ICU team, this model speaks to staff needed to address a pandemic requiring a dramatic increase in the need for mechanical ventilation. As elective procedures are curtailed, experienced perioperative clinical staff (eg, surgeons, anesthesiologists, certified registered nurse anesthetists [CRNA], certified anesthesiologist assistants [CAA], operating room and PACU nurses) may be available to support critical care services in hospitals with and without intensivists. The operating room and perioperative teams may be especially valuable if operating rooms or PACU beds are converted to ICU beds or operating room ventilators are moved to other venues to supplement the limited supply of mechanical ventilators.

While this model focuses specifically on hospitals with intensivists, 48% of U.S. hospitals have no intensivists.³ Moreover, even in the hospitals with intensivists, the intensivist team may be overstretched as new ICU sites are created or experienced ICU staff become ill. Thus, in either group of hospitals, critical care teams may be directed by anesthesiologists, pulmonologists, surgeons, hospitalists, or others with experience caring for critically ill patients. This model recommends adding staff dedicated to the management of multiple ventilators, while other staff (experienced and additive) support the patient overall. While the ratios shown in the figure depict generally accepted models of critical care staffing augmentation, each hospital will need to adjust to its own demands for critical care while most effectively using its available personnel. While the level of care may not be the same as in the typical ICU in non-crisis times, having care directed by trained and experienced intensivists or others with critical care clinical experience is a sound way to maximize care for large numbers of critically ill patients. This tiered model has recently been adopted by the University of Wisconsin and other U.S. institutions during the COVID-19 pandemic.⁴⁵ Various technologies, including local or remote-based telemedicine or virtual multi-patient surveillance systems, can also be inserted into the model to further assist caregivers. SCCM offers [free online training resources \(sccm.org/covid19\)](https://sccm.org/covid19) to help non-typical ICU staff prepare to care for critically ill patients during a pandemic or other crisis.

Recent strategies and web tools to meet surge capacity for staffing: Recently, novel approaches to expeditiously increase the clinical workforce have been adopted to augment the large number of clinicians who are required to provide care during the COVID-19 surge and to replace acutely ill healthcare workers.⁴⁶⁻⁴⁸ First, retirees of all medical professions have been invited to rejoin the workforce. Second, state-based licensing requirements have been relaxed to allow medical professionals to cross state lines. Third, hospitals have developed same-day credentialing and privileging to rapidly incorporate new workers into their facilities, including out-of-state volunteers. Fourth, several states have expanded the scope of practice to allow clinicians of various disciplines (eg, APPs, CRNAs, pharmacists) to work independently, without the usual supervision of higher-trained professionals. Fifth, trainees within specific non-critical care graduate medical education programs have been permitted to work within critical care. Lastly, medical schools have advanced graduation dates to help augment the immediately available physician workforce.

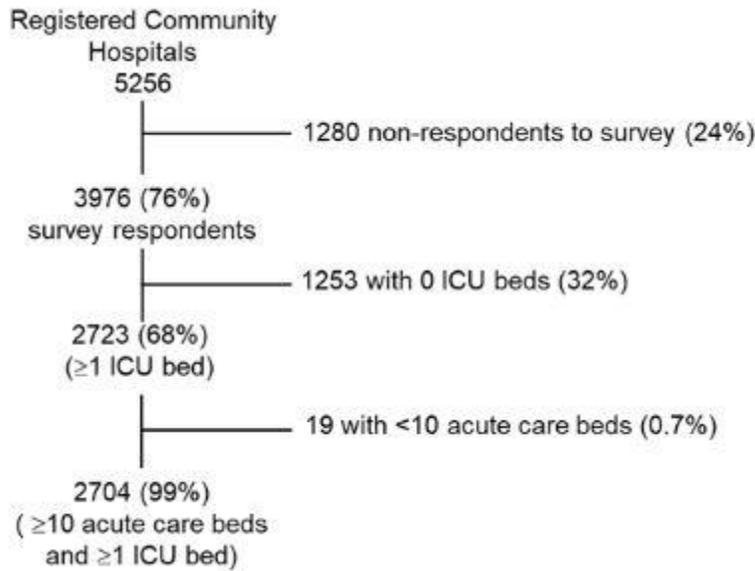
Web tools that actively analyze the COVID-19 hospital and ICU admission and workforce levels have been developed to enable a high-level view of local and state-based needs. The George Washington University's Fitzhugh Mullan Institute for Health Workforce Equity has developed the State Health Workforce Deficit Estimator.⁴⁹ This interactive program estimates the need by location for hospital-

based healthcare workers (eg, respiratory therapists and intensivists) using surge staffing ratios under different scenarios of COVID-19 patients demand and healthcare worker attrition. The COVID-19 Capacity Predictor mentioned earlier is another recently introduced web tool.³⁰ It is likely that administrators and department leaders will leverage data from more than one tool to craft projections that impact staffing.

Resources may be overwhelmed: Hospitals and their critical care organizations must include in their pandemic resource planning an ethical and legal approach to triage and resource allocation. These tactics would be activated only if the pandemic is perceived to be overwhelming the hospital's surge capacity strategies^{8,50-52} and triggering a crises with the departure from the usual standard of care. It is crucial that all staff have full access to the pandemic resource plan and know in advance who will help guide difficult decisions if the plan is activated. Topics that must be considered during crisis care include identifying triggers to activate crisis standards, establishing and activating a triage system, assessing resources, providing alternative care modalities (including palliative care), supporting families, and enacting healthcare worker support systems, in particular around moral distress and posttraumatic stress management. Other concerns include guidance around the use of experimental interventions and the conduct of medical research in the midst of a healthcare crisis. These considerations have been explored in a number of multiprofessional statements including those from the American College of Chest Physicians and SCCM.^{8,50-52} SCCM provides guidance that may be useful during crisis care in its [Ethics of Outbreaks Position Statement](#).⁵²

Interconnectedness: It should be apparent that all hospital and ICU resources discussed in this report are interconnected and cannot work independently.⁴⁸ Each of the three domains—ICU beds, support equipment (including ventilators), and the critical care team—are essential components of patient management resources during a pandemic or other crisis that stresses a healthcare site or system. Simply adding more of one resource element without considering the interconnectedness of the healthcare system's many assets is unwise and potentially unsafe in planning for or managing patients during a pandemic such as COVID-19.

Figure 3. AHA 2018 Data



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In 2018, there were 5256 AHA-registered community hospitals. Of these, 3976 (76%) responded to the AHA survey. Of these, 2704 met the criteria for acute care hospitals that provide critical care services. Only a minority of Department of Veterans Affairs and Department of Defense hospitals participate in the AHA survey; none were included in this report because they were not classified as community hospitals by the AHA.



Table 1. Acute Care Hospitals (2018 AHA Data)

	Hospitals Combined (n = 2704)
Aggregate across all hospitals, n (%)	
Number of acute care hospital beds ^a	534,964
Number of ICU beds	96,596
Number of ICU units ^b	5039
Number of ICU beds by unit type: ^a	
Medical-surgical	46,795
Cardiac	14,445
Other	7318
Pediatric	5137
Neonatal	22,901
Number of burn beds ^c	1183
Number of other special care (observation, step-down, or progressive) beds ^c	25,157

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a. Acute care hospital beds include general medical and surgical adult, pediatric, obstetric, neonatal intermediate, ICU, step-down, and burn beds. Rehabilitation, alcohol/drug abuse or dependency, psychiatric, skilled nursing facility, intermediate nursing, and other long-term beds are excluded.

b. Units refers to the number of hospitals reporting more than one bed per ICU type. Each hospital can have a maximum of five AHA-designated ICU types.

c. Burn and other special care beds (observation, step-down, progressive) are not commonly counted in the ICU bed totals.



Table 2. Acute Care Hospitals and Beds by Core-Based Statistical Area (AHA 2018 Data)

	Hospitals Combined (n = 2704)
Number of hospitals by location, n (%): ^a	
Metropolitan	1996 (74%)
Micropolitan	464 (17%)
Rural	244 (9%)
Aggregate across all hospitals, n (%)	
Number of hospital beds by location:	
Metropolitan	489,337 (91%)
Micropolitan	36,453 (7%)
Rural	9174 (2%)
Number of ICU beds by location:	
Metropolitan	90,561 (94%)
Micropolitan	4715 (5%)
Rural	1320 (1%)

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a. Metropolitan areas: > 50,000 population, micropolitan areas: 10,000-49,999 population, rural areas: < 10,000 population.

Additional Resources on Mechanical Ventilator Supply

- As the pandemic spreads, will there be enough ventilators? *Weekend Edition Saturday*. March 14, 2020. National Public Radio. Accessed May 6, 2020. <https://www.npr.org/sections/health-shots/2020/03/14/815675678/as-the-pandemic-spreads-will-there-be-enough-ventilators>
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