



VENTILATOR PRIORITIZATION GUIDELINES: COVID-19 PANDEMIC RESPONSE

Michigan.gov/Coronavirus

Introduction

Michigan hospitals and regional healthcare coalitions (HCC) have developed plans for use of ventilators during routine, contingency, and crisis standards of care. The current COVID-19 pandemic is of such magnitude within the state and the nation, that several regions of the state have moved beyond contingency plans and standards into crisis level standards of care for allocation of scarce resources. The COVID-19 pandemic has required unprecedented numbers of patients to be intubated, causing the need for ventilators to exceed available resources at the local, regional and state level. The U.S. Department of Health and Human Services (U.S. DHHS) notes, "The provision of medical care under catastrophic disaster conditions requires...recognition that the delivery of healthcare services will likely change due to the potential scarcity of required resources." This document describes guidelines for a reasonable approach to doing the greatest good for the greatest number of people in this unique and challenging environment.

Assessment of Current Capacity and Capabilities

All MI hospitals, Long Term Care (LTC) facilities, Emergency Medical Services (EMS) life support agencies (LSAs), and HCCs have access to EMResource, a web-based resource management system, and are required to populate the database in this system on a daily basis in order to provide situational awareness of bed availability by type, personal protective equipment (PPE), ventilators and extracorporeal membrane oxygenation (ECMO) resources. The information contained in the EMResource dashboards for all response entities is utilized to inform decision-making for supply chain management, including resource requests, resource sharing, and patient placement and management.

Regions of the State particularly in southeast Michigan, are collaborating with local, regional, State and federal agencies to stand up Alternate Care Sites. The Alternate Care Sites will also be required to enter data into EMResource to inform decision making around allocation of resources.

Utilization of EMResource dashboards, epidemiological modeling, and surveillance systems has demonstrated that the areas of the State demonstrating the highest need for ventilators is in the most populated areas of southeast Michigan where approximately one third of Michigan's residents live. There are other areas of the State that are experiencing accelerated rates of patients diagnosed with COVID-19 that may be requiring additional ventilators soon. Additionally, any hospital is at risk for a cluster outbreak (e.g., many residents from a nursing home or other congregate site becoming critically ill at once).

Measures required for ventilator need modeling projections include:

1. total ventilators that can be used for COVID-19 patients
2. total ventilators available for COVID-19 patients
3. total ventilators in use.

Modeling projections are developed through the State Emergency Operations Center with guidance from Michigan Department of Health and Human Services. This information is critical to include on requests for Federal resources.

Strategies to Optimize Provision of Mechanical Ventilation Local/Facility Level

When hospital facilities identify the trigger that routine ventilator use is nearing facility capacity moving from conventional and contingency care, the following strategies should be used to optimize the use of current cache including:

- Use alternate mechanisms to provide respiratory support in lieu of mechanical ventilation if patients will tolerate to include high flow nasal oxygen to treat hypoxia and respiratory insufficiency.
- Manual bag-valve ventilation done by ancillary providers may be considered as another bridging option to mechanical ventilation until a ventilator is available.
- Seek to purchase/rent additional ventilators from usual or new vendors through hospital purchasing.
- Cancellation of elective surgical procedures to free up airway management equipment that may be used in non-emergent situations.
- Personnel, supplies, and ventilators from outpatient surgery centers not being used for COVID-19 patients have been moved back to hospital departments on campus. Many Operating Room ventilators are not able to be used as Intensive Care Unit ventilators due to complexity and need for constant personnel support.
- Hospitals are utilizing ventilators in areas outside of traditional intensive care settings, thus expanding capacity for ventilator use. These are often general medical surge or pre and post op areas not currently in use, preferably with bedside monitoring including pulse-oximetry.
- Hospital systems that have facilities in areas that may be less impacted have shifted some ventilators to system hospitals in high impact areas.
- Continuous Positive Airway Pressure (CPAP), auto-CPAP and bilevel positive airway pressure (BiPAP), can be used to support patients with respiratory insufficiency due to COVID-19. BiPAP can be used for ventilation in some patients. Exhalation should be channeled through a filter to prevent aerosolization and in a negative pressure isolation room.

- Use of ventilators identified for home use may be used in medical facilities dependent on the features of the ventilator with proper monitoring.
- Provide just in time training to staff required to work with various types of ventilators that may not normally be used in the hospital setting (e.g., EMS personnel).

Movement from contingency to crisis levels of care:

- Utilize the *Michigan Department of Health and Human Services COVID-19 Practice Management Guide* distributed by the Michigan Health Alert on April 1, 2020 and posted to the www.Michigan.gov/coronavirus website.
- The VORTRAN GO2VENT® device is a backup oxygen powered, disposable ventilator for the management of situations such as mass casualties, natural disasters, disease outbreaks, and major power outages whether in or out of the hospital. It is a short-term option for bridging to an Intensive Care Unit (ICU) ventilator. Several of the Regional Healthcare Coalitions have these resources available. Region 2 South has pre-deployed these to hospitals within their region. Just in time training will be needed to utilize this resource.
- The American Society of Anesthesiologists does not recommend repurposing anesthesia machines for use in ICUs. “However, if the pandemic overcomes the capacity of the hospital ICUs to provide ventilators, unused operating room anesthesia machines can be repurposed for use in the ICUs.” Ventilation machines with the capability of controlled and assisted ventilation may be used outside traditional use. There is specific guidance from the American Society of Anesthesiologists (ASA) and the Food and Drug Administration (FDA) FDA: Ventilator Supply Mitigation Strategies on converting anesthesia machines for use with COVID-19 patients in respiratory failure.
- Consistent with contingency and crisis standards of care, hospitals are convening their ethics committees and carefully weighing the factors to make allocation decisions on use of these scarce resources A Model Hospital Policy for Allocating Scarce Critical Care Resources, has been made available to hospitals by the Department of Critical Care Medicine at the University of Pittsburgh to download and adapt for their individual facility needs.
- Previous crisis standards of care have included the potential to use one ventilator to ventilate two to four patients. However, this practice has recently been strongly opposed by the Society for Critical Care Medicine and five other national critical care related organizations in a joint consensus statement published on March 26, 2020.⁴

Regional Level

- HCCs have ordered the return of quality ICU transport ventilators (e.g., LTV-1200) purchased through the MDHHS Healthcare Preparedness Program to be reallocated to hospitals or staged within the Healthcare Coalition for use to support surge. Some of those ventilators were being stored in a state of readiness and/or are currently in use at Life Support Agencies within each HCC regions.
- During this response, the ICU transport ventilators are being used for prolonged use rather than short transports.

State Level

- MDHHS purchased and cached 25 ICU transport ventilators maintained in a state of readiness to respond to a request for ventilators to support response. These were verified as operationally ready at the onset of COVID-19 response by a contractual company and deployed to SE Michigan. They are currently in use at hospitals.
- The State Emergency Operations Center purchased additional ventilators to meet anticipated needs. These have been received, processed and deployed to support response. Efforts will continue to identify, purchase and deploy ventilators to support modeling projections and incident response.
- MDHHS continues to complete justification for additional ventilators to federal resources, such as the Strategic National Stockpile. All resource requests are based on modeling projections and incident response, evaluated prior to deployment.
- The State has implemented a resource hospital strategy that utilizes EMResource and a central Interhospital Transportation Unit dispatch center to facilitate matching hospitals that may need to transfer patients to a hospital that has the required resources, this includes ventilated patients that may or may not have COVID-19. This effort is focused on balancing available resources and optimizing patient care.
- The Governor issued an Executive Order to allow hospitals to utilize paramedics in a respiratory therapy role for ventilator monitoring.
- MDHHS is utilizing the MI Volunteer Registry to request assistance of nurses, physicians, respiratory therapists and other medical professionals to mitigate staffing shortages that can impact the ability to care for ventilated patients.
- Essential to the safe and effective use of mechanical ventilation is the use of a variety of medications needed to place patients on ventilators and to maintain them on the ventilator.
- Medications to provide sedation, pain relief, and neuromuscular relaxation are critical to successful mechanical ventilation. The state has mobilized in-state caches of selected medications (e.g., MEDDRUN), negotiated direct purchasing between prioritized hospitals in severely impacted areas and pharmaceutical suppliers and manufactures, and is directly procuring these medications and redistributing to hospitals in critically in need. A quantity of these medications is currently in the procurement process through the SEOC for immediate redistribution to hospitals that may experience future critical shortages.

- While patients requiring mechanical ventilation are initially placed in critical care units, the pandemic has necessitated hospitals to establish surge critical care units in other clinical locations within hospitals. Numerous models suggest the potential for more patients requiring mechanical ventilation than can be handled by hospital critical care and surge critical care units. This could necessitate placing patients requiring ventilators in alternate care sites (Tier-4 ACS) where critical care type monitoring is not available. For such a contingency MDHHS is identifying a source for procurement of portable cardiac monitors capable of providing basic critical care monitoring, including pulse oximetry, EKG, and other vital information if needed.

Federal Level

- Based on identification of the degree of need, the U.S. DHHS has provided the requested additional ventilators through the Strategic National Stockpile as well as FEMA.

References

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²Koonin, L.M., Pillai, S., Kahn, E.B., Moulia, D., Patel, A. (2020). Strategies to inform allocations of stockpiled ventilators to healthcare facilities during a pandemic. *Health Security*, Vol. 18, No.

³Minnesota Department of Health. (2019). Patient care strategies for scarce resource situations. <https://www.health.state.mn.us/communities/ep/surge/crisis/standards.pdf>

⁴Society of Critical Care Medicine. (2020, March 26). SCCM: Consensus Statement on Multiple Patients Per Ventilator. Retrieved from <https://www.sccm.org/Disaster/Joint-Statement-on-Multiple-Patients-Per-Ventilator>.

Other Information

American Society of Anesthesiologists. (2020). APSF/ASA guidance on purposing anesthesia machines as ICU ventilators. <https://www.asahq.org/in-the-spotlight/coronavirus-covid-19-information/purposing-anesthesia-machines-for-ventilators>

Food and Drug Administration. (2020). Ventilator supply mitigation strategies: Letter to health care providers. <https://www.fda.gov/medical-devices/letters-health-care-providers/ventilator-supply-mitigationstrategies-letter-health-care-providers>