

Strategies to Expand Ventilator Supply



Use existing alternatives to traditional ventilators

Helmet ventilation

- Company: [Sea-Long Medical Systems](#)
- Details: FDA-approved device, hooks up to the hospital's regular oxygen supply, costs \$162

Air-oxygen blender

- Company: [Bio-Med Devices](#)
- Details: Delivers air and oxygen that can be used in conjunction with a ventilator or on its own with a nasal cannula and humidifier; especially useful for patients who do not require full intubation

Ventilator "light" option

- Company: [Phillips](#)
- Details: Respironics E30 ventilator is a smaller ventilator alternative that clinicians can use when they have limited access to fully-featured ventilators; can be used invasively or non-invasively and a wide range of clinicians can easily set up and use the device; has FDA EUA¹

Non-invasive, portable ventilators

- Company: [Hillrom](#)
- Details: Can be used across settings and free up invasive ventilators for highest-need patients; *quintupling* production

Single-use, disposable ventilators

- Creator: [Xerox](#), [Vortran Medical](#)
- Details: Battery-operated, backup ventilator designed for patients in early stages of respiratory diseases; could support Covid-19 patients for up to 30 days; FDA-approved and costs roughly \$120

Ventilator "light" option

- Companies: [Boston Scientific](#), [Medtronic](#), [UnitedHealth Group](#)², [University of Minnesota](#)
- Details: Collaborating to deploy 3,000 emergency ventilator "light" alternatives; ready to deliver 500 the week of April 27th; will target deliveries to high-need areas and donate remaining devices to the U.S. Strategic National Stockpile



Convert other equipment to function as a ventilator

BiPAP³ machines

- Health system: [Northwell Health](#)
- Details: Converted BiPAPs to invasive ventilators using 3D printed T-piece adaptors and added two high-efficiency particulate air (HEPA) filters at both ends of the oxygen hose

Anesthesia machines

- Health system: [Northwell Health](#)
- Details: Converting 300 of their anesthesia machines (previously used to sedate patients during surgery) into ventilators



Monitor ongoing solutions and federal regulatory guidance

Reverse-engineered breast pumps

- Creator: [Engineers in Southern Maryland](#)
- Details: Reversed the suction of breast pumps to turn them into intermittent positive pressure ventilation devices; added safety valves and backflow filters
 - Seeking FDA approval; likely cost just over \$500

Homemade ventilators

- Creator: [UMMC](#)⁴ physician
- Details: Created a homemade ventilator with a garden hose, a lamp timer, and an electronic valve; costs less than \$100 and can be assembled in about 20 to 30 minutes

1. Emergency Use Authorization.

2. Advisory Board is a subsidiary of Optum, which is a subsidiary of UnitedHealth Group. All Advisory Board research, expert perspectives, and recommendations remain independent.

3. Bi-level positive airway pressure.

4. University of Mississippi Medical Center.

Source: Cavazuti L, et al., "Texas 'mom and pop' business flooded with orders for helmet-style ventilation device," NBC News; "Watch CNBC's full interview with Bio-Med Devices CEO Dean Bennett III," CNBC; "Hillrom More Than Doubles Production Of Critical Care Products, Including Ventilators, Hospital Beds And Vitals Monitoring Devices To Support COVID-19 Response," Hillrom; "Xerox and Vortran Medical Partnering to Mass Produce Disposable Ventilators," Xerox; "UnitedHealth Group, Boston Scientific, Medtronic and the University of Minnesota Work to Deploy 3,000 Emergency Ventilator Alternative Devices," UnitedHealth Group; "The Philips Respironics E30 ventilator is authorized for use to treat patients with respiratory insufficiency," Phillips; Libassi M, "Northwell converts BiPAP machines into ventilators for hospitalized COVID-19 patients, uses 3D printed adaptor," Feinstein Institutes for Medical Research Northwell Health; Campanile C, "Fearing shortage, hospitals convert other machines into ventilators," New York Post; Hill Z, "Southern Maryland Engineers Hope to Solve Ventilator Shortage With Breast Pumps," The Bay Net; Fowler S, "It's not fancy, but it works": Mississippi doctor uses garden hose, lamp timer and electronic valve to create makeshift ventilators," USA Today.