# Agencies Turn to 3D Printing Amid Ventilator, PPE Shortages

The technology is one way to solve national shortages of medical supplies during the COVID-19 pandemic.

Melissa Harris

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With the numbers of COVID-19 cases rapidly growing across the U.S., medical facilities and providers are struggling to cope with a shortage of critical supplies, from personal protective equipment to ventilators. Now federal agencies are aiming to make use of 3D-printing technology to alleviate some of the shortages in supplies.

Among the many steps military actors are taking to help in the COVID-19 response, the U.S. Navy said that engineers and scientists at the Naval Surface Warfare Center Panama City Division, or PCD, have been developing “low-cost, easily assembled, non [Food and Drug Administration]-approved ventilators that can be rapidly prototyped and used in both hospital and field settings.”

The Defense Department held a "Hack-a-Vent Innovation Challenge" over a period of two weeks, during which they brought various medical innovators together to create inexpensive and easy-to-build ventilators using commercial-off-the-shelf materials or 3D-printed parts.

Participants in the challenge and defense health experts stressed that developing a ventilator prototype that can be brought to the market rapidly is critical to addressing the medical supply shortage brought by the pandemic.

“Aside from the tragic loss of life, the emotional toll this must take on our health care providers is almost unimaginable,” said Dr. Andrew Schicho, a mechanical engineer with the Panama City Division and one of the challenge team leaders. “Knowing that the United States does not have a ready supply of ventilators to support the estimated need, I decided right then that I wanted to help."

The division submitted upon the end of the challenge five different ventilator proposals — including one that had a working prototype that met the challenge’s requirements — for a review before a panel of experts. If approved, one or several of the prototypes can help supplement the low supply of ventilators required to treat many COVID-19 patients.

While military engineers are using 3D printing to build ventilators themselves, the FDA, National Institutes of Health and Department of Veterans Affairs are trying to disseminate 3D-printing data and technology to help “yield metrics training, protocols, and programs for medical products that are manufactured close to the patient or at the point of care,” according to an FDA Memorandum of Understanding .

Under the memo, the FDA, NIH and VA will share information and resources to facilitate the development of 3D-printed products and associated training.

To meet those two goals, all three agencies agreed to help connect health care facilities seeking 3D-printed supplies with manufacturers that can print 3D parts, as well as lessons learned from and consultations on models, testing and practices of relevant 3D printing.

The Veterans Health Administration has agreed to share its resources, instructions and information on 3D printing with NIH and FDA, and it will host an external-facing website for health care organizations and providers to support 3D-printed medical supplies or those with 3D-printing capabilities wishing to provide printing services. Further, VHA will offer engineering support in designing and evaluating print.

NIH will focus on collecting and sharing digital data in 3D printing. More specifically, it's creating a digital file collection on the NIH Print Exchange for the “fabrication of COVID response medical devices and products such as personal protective equipment (PPE)” through 3D printing. The agency will also provide 3D printing and infectious disease expertise in evaluating printable designs it receives.

FDA will act as the point of contact for addressing public questions about 3D-printable medical devices and PPE, and it will provide data and models for the three agencies to evaluate. FDA will, like the other agencies, do its own evaluations, development and testing of 3D-printing designs.

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