Johns Hopkins engineers develop 3D-printed ventilator splitters

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Their prototype, developed in response to the urgent need for more ventilators to treat patients with acute respiratory distress syndrome caused by COVID-19, aims to address safety concerns about cross-contamination and correctly managing air flow to patients

In response to a pressing need for more ventilators to treat critically ill COVID-19 patients, a team led by Johns Hopkins University engineers is developing and prototyping a 3D-printed splitter that will allow a single ventilator to treat multiple patients. Though medical professionals have expressed concerns about the safety and effectiveness of sharing ventilators, the team has designed this tool to address those concerns.

"There is an emphasis right now on using engineering to develop open-source solutions to many aspects of the COVID-19 crisis, but especially for ventilator design and production," said Sung Hoon Kang, an assistant professor of mechanical engineering at the Johns Hopkins Whiting School of Engineering who is leading a team that includes ICU intensivists and pulmonary specialists at the Johns Hopkins School of Medicine. "One approach is to use one ventilator to treat multiple patients. While this is feasible, it must be safe for all the patients. That means ensuring that each patient gets the care they need, without shortchanging anyone. This is what we set out to create."

A serious lung condition called acute respiratory distress syndrome, or ARDS, is the leading cause of death for COVID-19 patients. In individuals with ARDS, fluid builds up in the lungs, limiting the amount of oxygen in the bloodstream and depriving vital organs of the oxygen they need to function properly. The condition must be managed by a ventilator.

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