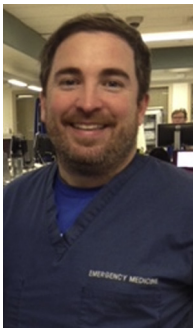
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Conclusions: LUS was more sensitive than CXR at identifying COVID-19 pneumonia. LUS using a portable, handheld ultrasound can be a valuable triage screening modality for patients with suspected COVID-19 pneumonia in diverse clinical settings.



22 Flow and Pressure Differential Results of a Novel Low-Cost Portable Negative Pressure Patient Enclosure For COVID-19

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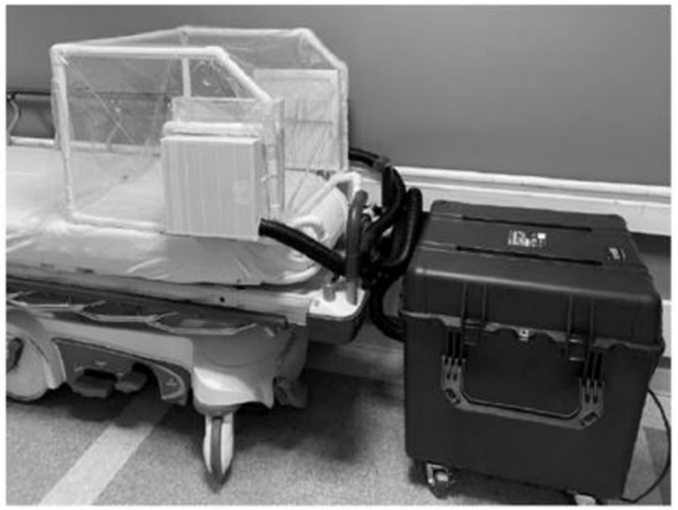
Study Objectives: To overcome the shortage of negative pressure isolation rooms during the 2019 novel coronavirus pandemic, the novel Covering for Operations during Viral Emergency Response (COVER) device was developed. The main goal of the device is to generate a portable negative pressure environment using non-medical supplies to improve patient and health care worker safety. Several variations of the device were created and tested for their ability to generate the -2.5 pascal (Pa) pressure recommended by the Centers for Disease Control [1].

Methods: Device Construction The device utilizes a rigid, polyvinyl chloride (PVC)-based frame covered in a transparent plastic sheet with a connected sound-isolated vacuum (Figure 1). Access to the patient can occur from either customizable user-made perforations along guidelines marked on the top and sides of the transparent sheet or from along the sheet's bottom edge. To generate airflow and create a negative pressure environment, the use of either two 10-inch portable fans or various vacuums (Dyson® 1.6 hp, Shop-Vac® 2.5 hp, and Shop-Vac® 3.5 hp) were tested. These airflow-generating fans or vacuums were attached to the device's two HEPA filter boxes either directly in the case of the fans or using standard 2.75-inch tubing. Airflow and Pressure Differential Testing To assess for device efficacy, we tested the airflow generated by the device using either the fans or the various vacuums. The airflow was tested using a TSI-ALNOR EBT-731 (TSI Incorporated, Shoreview, Minnesota) capture hood and reported in cubic feet per minute (cfm). A PPM3-S Abatement Portable Differential Pressure Monitor (Abatement Technologies, Fort Erie, Canada) was used to record pressure differentials in pascals in real time within the device using each of the vacuums. The device's pressure differential was measured with a simulated patient present and with and without the maximum 60 cm of functional access cuts made into the device.

Results: The airflow measurements are displayed in Table 1. The fans as part of the fully constructed device did not generate any measurable airflow and were dropped from subsequent testing. The highest measured airflow rates and pressure differentials were observed with the 3.5 hp vacuum. All the vacuums generated an observable negative pressure environment even with a simulated patient and 60 cm of access cuts made into the device as shown in Table 2.

Conclusion: The COVER device uses off-the-shelf, non-medical components to generate a negative pressure environment using a simulated patient and an aggregate of 60cm of patient care access cuts.



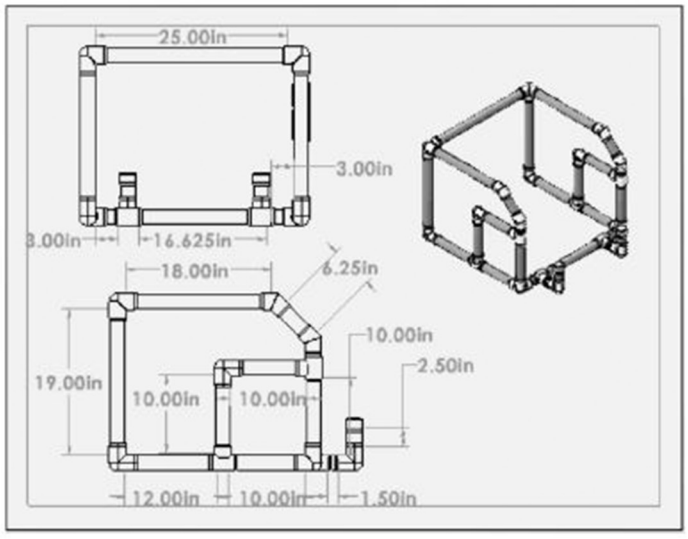


Figure 1. Picture of COVER Device on Hospital Stretcher with Vacuum Sound Isolation Box (a) and Construction Diagram (b).

Vacuum Model	Flow Rates (cfm)
3.5 hp Shop-Vac	40
2.5 hp Shop-Vac	22
1.6 hp Dyson	7
Kitchen Fans	Undetectable

Table 1. Measured airflow rates for the fans and various vacuums for the fully constructed COVER device.