What’s the Problem?

- Powered air-purifying respirators (PAPRs) are a type of Personal Protective Equipment (PPE) that serves an essential line of defense against the spread of COVID-19 and other airborne pathogens.¹
- Demand for PAPRs are at a premium during a time where supply chains have been disrupted.
- The hose component of the 3M™ Air-Mate™ PAPR has a fragile interface with the hood, leading to damage and rendering the PAPR unit unsafe for continued use.
- PAPR units are on backorder, as are their components.
- Given the acute need for functional PAPRs other approaches for repair were explored.

Our solution

- The hospital has a surplus of 3M™ Versaflo™ PAPR hose units, which has the same hose-battery/filtration interface.
- The damaged portion of the 3M™ Air-Mate™ PAPR hose was the hose itself, not its interfaces.
- In collaboration with local engineers, our team at the Health Design Lab 3D-modeled and 3D-printed (3DP) adaptors using fusion deposition modeling (FDM) printers to convert 3M™ Versaflo™ hoses to be 3M™ Air-Mate™ compatible at the hose-hood interface.

How Might We: Repair damaged PAPR hoses acutely with readily available materials?

Figure 1. The hose-hood interface of the 3M™ Air-Mate™ hose was combined with a 3DP adaptor and salvaged 3M™ Versaflo™ hose-hood interface to create a new hose for the 3M™ Versaflo™ PAPR system.

We published the STLs with fabrication instructions for use by others on our website: [https://sites.google.com/view/projectpapr/project-papr](https://sites.google.com/view/projectpapr/project-papr). Rigorous testing has not been conducted to determine non-inferiority and durability of these designs, and users should perform their own safety tests prior to use.

Special acknowledgement to John Spetrino, Franki Abraham, Dylan Kenna

Refs: