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Physician and first responder collaborations to ease personal protective equipment shortages



The global COVID-19 pandemic led to multiple shortages of medical equipment and supplies, especially personal protective equipment (PPE) [1,2]. This led to a well-documented scramble for PPE both visible and invisible across the United States and the world [3]. Some clinical sites adapted by reusing PPE, and in some instances, innovative, home grown solutions were used. Another avenue was to obtain PPE through outreach efforts to external partners, especially First Responder and Emergency Medical Services (EMS) contacts. EMS services regularly train and prepare for hazardous materials responses and employ techniques and equipment that can be extremely useful during situations such as COVID-19 and future pandemics. Moreover, they are well equipped with reusable PPE, such as Self-Contained Breathing Apparatus (SCBAs) and Air Purifying Respirators (APRs).

During the initial shortage of N95 respirators, Massachusetts General Hospital (MGH) collaborated with the Boston Fire Department (BFD) to train and pilot the use of APRs with front-line physicians for COVID-19 related clinical care. Based on anonymous surveys of our clinical staff, we found that the APRs were usable, easily cleaned and put back into service quickly. The benefits of these devices include: (1) ease of use; (2) easy to clean; and (3) reusable thus saving our limited supply of PPE. The challenges of using APRs were the following: (1) requires special fit testing utilizing external partners' special operations and hazardous materials (HAZMAT) teams to fit test our clinicians; (2) in-depth discussion with our infectious disease experts to ensure donning and doffing were safe, especially since previous studies show that donning and doffing are the highest risk procedures; (3) adapting larger than standard hospital PPE; (4) limits in APR usability for some hospital personnel; and (5) need to identify dedicated space for storage and decontaminate of the APRs [4].

We report this collaboration as a potential avenue for hospitals and health care systems to explore if the need arises in the face of future shortages of PPE. Collaborating with local first responders and EMS could yield novel solutions, especially in times of crisis.

Declaration of Competing Interest

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References

- [1] Ranney ML, Griffith V, Jha AK. Critical supply shortages - the need for ventilators and personal protective equipment during the Covid-19 pandemic. *N Engl J Med.* 2020; 382:e41.
- [2] He S, Lai D, Lee J. The medical right to repair: the right to save lives. *Lancet.* 2021;397: 1260-1.
- [3] Artenstein AW. In pursuit of PPE. *N Engl J Med.* 2020;382:e46.
- [4] Chughtai AA, Chen X, Macintyre CR. Risk of self-contamination during doffing of personal protective equipment. *Am J Infect Control.* 2018;46:1329-34.

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