



Online First

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# Anesthesia Residents' 'Crazy Idea' Helps Ship PPE Masks

While juggling hospital rounds and COVID-19 quarantines, anesthesia residents Jacqueline Boehme and Alexander Stone launched MasksOn.org, which adapts snorkeling gear into emergency masks for medical providers.

In four weeks, the residents at Brigham and Women's Hospital, in Boston, transformed the project from an idea into actual shipments of 10,000 masks to over 1000 institutions battling the coronavirus.

The inspiration came when Dr. Boehme's mother bought an N95 mask for personal use but it didn't fit. Boehme wondered whether a full-face snorkeling mask, with its tight seal, could be adapted. In mid-March, as the coronavirus became more prevalent in the United States and supplies of personal protective equipment (PPE) dwindled, Dr. Boehme emailed Brigham's anesthesia department, asking for feedback on her "crazy idea." Dr. Stone replied that he, too, had been tinkering with a snorkeling mask as emergency PPE.

"We were just completely on the same wavelength, and so we decided to join forces," said Dr. Boehme, a CA-3.

The addition of two Google product managers, Eugene Mann and Sanjay Vakil, was critical to jumpstarting and scaling up the project. The duo leveraged their networks to produce a prototype in one day. Mann led efforts to raise more than \$1 million. Vakil found snorkeling masks to adapt, buying 9,000 from Head—about 75% of the company's U.S. supply—and 11,000 from Ocean Reef. Another 5,000 masks have been sent from Wildhorn. All three companies sold the gear at cost, Vakil said.

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## The Idea Takes Off

Drs. Boehme and Stone are the only anesthesiologists intimately involved with MasksOn.org

, which has more than 100 active volunteers.

“We’ve been integral to designing it, testing it, thinking about possible failures and how to account for those, and thinking about CO<sub>2</sub> [carbon dioxide] retention. We attached ourselves to anesthesia machines at work, and actually measured our CO<sub>2</sub> levels with different types of activities,” Dr. Boehme said.

The residents leveraged their knowledge of heat and moisture exchange filters and high efficiency particulate air (HEPA), continuous positive airway pressure and bilevel positive airway pressure filters. “All of these just happen to share the same universal adaptor, so we said if we can create something that attaches to that, the possibilities are endless,” Dr. Boehme explained.

That “something” is an injection-molded adaptor between the mask and the filter. MasksOn.org does not provide a filter with the mask to avoid competing with hospitals for filters. MasksOn.org recommends using a standard viral/bacterial HEPA filter, and instructs recipients to test the masks before using them clinically.

Because these masks are not approved by the FDA, they are intended for emergency use only. “It’s to be used at locations that have completely run out,” Dr. Boehme noted. “We are trying to protect clinicians who have nothing.”

Recipients span 45 states and include hospitals, doctor groups and hospices. One hospital not on that list is Brigham and Women’s. “We’re very lucky that our hospital has kind of moved mountains to be able to make sure we have enough FDA-approved PPE,” said Dr. Stone, who is a CA-2.

Feedback on the masks has been positive, according to Drs. Boehme and Stone. Users praise the tight fit, saying they feel very protected. The masks’ downsides are an inability to wear glasses and muffled communications, and MasksOn.org is working on solutions for both issues.

Each mask costs \$50 to adapt, according to Vakil, and MasksOn.org is committed to providing the masks for free to medical providers.

“The fundraising is key to allow us to continue our mission to bridge this emergency PPE gap for front-line providers,” Dr. Stone said.

MasksOn.org has been a welcome distraction for the residents. “It helps get your mind off a lot of the COVID-19 stuff,” Dr. Stone added.

Dr. Boehme agreed. “This has been something very hopeful in these dark times.”

—*Sharon Waters*

*To donate, visit [MasksOn.org](https://MasksOn.org).*