COVID-19 Sparks Community Action

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Scientists at Work
Transcript

[NARRATOR:] In March 2020, a new disease swept the world, causing hospitals to become overwhelmed and many people to die. This disease, COVID-19, is caused by a virus named SARS-CoV-2, which is a type of virus called a coronavirus.

[ABRAR ABIDI:] Once I realized that coronavirus had entered the US in a very serious way, it was a very scary thing. Our lives as researchers quickly stopped.

[YVONNE HAO:] I met Abrar in the Tjian-Darzacq Lab. I was a research assistant there. I first heard about COVID-19 in December of 2019. I think me, as well as a lot of other people, we just didn't know what the future would be like. How would my life change?

[NARRATOR:] Abrar and Yvonne were both working in a research lab with Robert Tjian. Their lab, like many others, shut down to control the spread of the virus.

[ROBERT TJIAN:] The university just shut down. Completely. Including all the research labs. All of the scientific community really had to think about what they were going to do. A lot of labs across the country, just flipping a switch, putting all their efforts to working on many, many different aspects of the SARS-CoV-2 virus.

[YVONNE:] We held our last in-person lab meeting, and we were discussing what would happen to our research.

[TJIAN:] I said, if you want to come in, you have to work on COVID, but which aspect of SARS-CoV-2 you want to work on is entirely up to you.

[NARRATOR:] Abrar and Yvonne thought about ways to reduce the spread of SARS-CoV-2. One way is to destroy the virus by washing your hands with soap and water. If water is not available, you can use hand sanitizer.

How does handwashing and hand sanitizer destroy viruses like SARS-CoV-2? SARS-CoV-2 is surrounded by a membrane made of lipids and proteins, called an envelope. Both soap and hand sanitizers have molecules that disrupt the envelope. In hand sanitizers, this molecule is usually ethanol. Ethanol interacts with the lipids and proteins in the envelope. These interactions disrupt the envelope's structure and make it fall apart. The virus becomes inactive.

[YVONNE:] I went to four different drugstores to try to look for hand sanitizer. The shelves were just empty. Even online, the prices were hiked up to hundreds of dollars for just a small jug. So we knew that we had to make some hand sanitizer and distribute it. And that was a way that we could both keep ourselves safe, as well as our community.

[ABRAR:] We found that the World Health Organization had come up with a really simple protocol for mixing together sanitizer. We begin by filling up this big vessel with water and hydrogen peroxide and glycerol, in these very specific quantities. Ethanol is a very flammable substance, so we have to mix it together with other reagents under a fume hood. And just stir those things up really well.

Professor Tjian quickly threw all of his support behind us and got us approval we needed in the department.

[TJIAN:] Pretty soon, it was clear that the scale that they needed to go up to, several hundred gallons a week, wasn't going to happen in our laboratory. So, the university gave us permission to use the undergraduate research laboratories.

[ABRAR:] This began as a pretty small effort that we sent out to some different shelters and homeless relief organizations. But after a few weeks, when word really spread, our phone numbers have been passed all around the area.

[YVONNE:] Often, we would leave lab around 2:00 AM, and then we would go home and continue writing emails until 4:00 AM. And then we'd wake up and just repeat.

When people learned about our project in different labs, they reached out to us asking if they could help. Soon enough, we were donating to large city organizations like fire departments and hospitals.

[WOMAN:] Thank you all. I appreciate you.

[YVONNE:] And we were making 400 gallons of hand sanitizer per week.

[NARRATOR:] Like Yvonne and Abrar, other students were also finding ways to help their community.

[CHRISTOPHER GEE:] So when the pandemic hit, I was trying to wrap up the last two experiments to complete my PhD work. So, with the lab shut down, I started focusing on making masks.

[NARRATOR:] Like hand sanitizer, wearing masks is an important way to reduce the spread of the SARS-CoV-2 virus.

When a person breathes or talks, they release a fine spray of liquid particles of various sizes. The smaller particles, called aerosols, can float in the air for hours. The SARS-CoV-2 virus replicates in the nose, throat, and lungs and can be carried out of the body in aerosols and other liquid particles. Masks come in many materials, but they generally reduce the virus's spread by trapping these particles in fibers. The tighter the weave, the more particles they trap.

Even if some particles get through, there will be fewer particles compared to wearing no mask at all. The most effective face coverings can trap over 95% of particles but are expensive to produce.

[CHRISTOPHER:] After researching a lot of different designs and materials, I read about Filti. Filti is a nanofiber filtration media that is able to filter out these small aerosol particles.

So the latest version of our mask incorporates Filti for the filtration layer, stapled together. Most volunteers can make this in about four to five minutes, and it costs about 75 cents in materials.

[NARRATOR:] Tests showed that Chris's masks trapped 85% of particles on average — a very effective rate, especially for masks that were so inexpensive and easy to make.

[CHRISTOPHER:] I heard about Yvonne and Abrar from the Berkeleyside article. And so I emailed them.

[ABRAR:] And we quickly saw how brilliant he was and how we needed to integrate his skills in these masks into our effort.

[CHRISTOPHER:] In order to scale up, we devised a system where we'd have a team coordinator, who would prep the raw materials for a small team of assembly volunteers, who would actually make the masks from these prepared kits.

[ABRAR:] Then the drivers would collect them and deliver these masks, along with the sanitizer, to whoever needed them.

[ELAINE QIAN:] My own role includes a lot of coordinating with volunteers. We have over 200 volunteers right now. Many of the volunteers in our project have full-time jobs. And there's a lot of high school volunteers that are also helping out and making these masks.

I think the core of our project is having ordinary people come together to help ordinary people.

[VOLUNTEER:] More bags!

[YVONNE:] Grassroots efforts are more impactful than I ever thought that they could be. And I never imagined that it would reach the scale that it did today.

[TJIAN:] I certainly think that science is here to serve the community, not just scientists. And I think these students understood that at a very visceral level, and they acted on it.

[CHRISTOPHER:] And it doesn't have to be someone else's responsibility. It can be our responsibility. I think that's what motivates our volunteers, and that's what really drives this project forward.

[ABRAR:] We never thought that there was anything that we could do in the face of a global, perhaps once in a century, pandemic. But we all discovered otherwise when we tried. You can be resourceful. You can find alternative ways of taking care of each other's basic needs.